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Routing Study

MidAtlantic Resiliency Link Project



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SIGNATURE PAGE

Routing Study

MidAtlantic Resiliency Link Project

0718854

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
BioNet	Biodiversity Conservation Network
CDP	census designated place
COMAR	Code of Maryland Regulations
Dominion Energy	Virginia Electric and Power Company d/b/a Dominion Energy Virginia
ERM	Environmental Resources Management, Inc.
FirstEnergy	FirstEnergy Corp.
FMA	Fisheries Management Area
GIS	Geographic Information System
NHL	National Historic Landmark
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
INA	Irreplaceable Natural Area
kV	kilovolt
Md. Code Ann.	Annotated Code of Maryland
MARL Project	MidAtlantic Resiliency Link Project
MBTA	Migratory Bird Treaty Act
MP	milepost
NEET MA	NextEra Energy Transmission MidAtlantic, Inc.
NEET VA	NextEra Energy Transmission Virginia, Inc.
PA Code	Pennsylvania Code
PJM	PJM Interconnection LLC
Pub. Util.	Public Utilities
ROW	right-of-way
SGL	State Game Land
USACE	U.S. Army Corps of Engineers
Va. Code	Virginia Code
W. VA. Code R.	West Virginia Code of Regulations
WMA	Wildlife Management Area
WVDNR	West Virginia Division of Natural Resources

1. INTRODUCTION

This report summarizes the findings of a routing study (Routing Study) conducted by Environmental Resources Management, Inc. (ERM) on behalf of NextEra Energy Transmission MidAtlantic, Inc. (NEET MA) and NextEra Energy Transmission Virginia, Inc. (NEET VA). The Routing Study evaluated the natural environment, built environment, cultural resources, social resources, and engineering constructability for the MidAtlantic Resiliency Link Project (MARL Project) for NEET MA's and NEET VA's proposed new 107.5-mile, 500 kilovolt (kV) transmission line that will traverse portions of Pennsylvania, West Virginia, Maryland, and Virginia, as well as the new 500/138 kV Woodside Substation to be located in Frederick County, Virginia.[1]

The purpose of the Routing Study was to identify a preferred end-to-end route (Proposed Route) across all four states that meets the following criteria:

1. Reasonably minimizes potential impacts on the natural and built environment (including both the transmission line as well as the access roads and temporary workspaces to facilitate construction).
2. Maximizes placement of proposed infrastructure adjacent to existing linear infrastructure and routing opportunities, where available.
3. Minimizes special design requirements that could result in increased costs (e.g., engineering factors or special structure designs), and can be constructed and operated in a safe, timely, and reliable manner.

1.1 OVERVIEW

PJM Interconnection LLC (PJM) has directed NEET MA and NEET VA to develop, construct, own, operate, and maintain the MARL Project to resolve significant and widespread reliability criteria violations on the Bulk Electric System that serves the PJM Region,[2] due to load growth and anticipated resource retirements in the PJM Region. To meet this purpose and need, the MARL Project will have the following facilities:

- A new single-circuit 500 kV transmission line on lattice structures from the FirstEnergy Corp. (FirstEnergy)-owned 502 Junction Substation to the existing FirstEnergy-owned Black Oak 500/138 kV Substation to an interconnection with new 500 kV transmission lines to be constructed by FirstEnergy and Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion Energy).[3]

[1] NEET MA is responsible for constructing the portions of the MARL Project in Pennsylvania, West Virginia, and Maryland. NEET VA is responsible for constructing the portions of the MARL Project in Virginia, as well as a new 500/138 kV Woodside Substation in Frederick County, Virginia. The permitting of the substation is subject to the siting authority of Frederick County, and information in this Routing Study related to the Woodside Substation is provided for overall context of the full MARL Project.
[2] The PJM Region includes all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia.
[3] The MARL Project does not include the FirstEnergy and Dominion Energy portions of the PJM-approved West Cluster solutions.

- A new Woodside 500/138 kV substation in Frederick County, Virginia, which will connect to existing Dominion Energy and FirstEnergy infrastructure.[4]

NEET MA's and NEET VA's facilities are collectively referred to as "the MARL Project." Figure 1.1-1 below depicts the MARL Project Study Area.

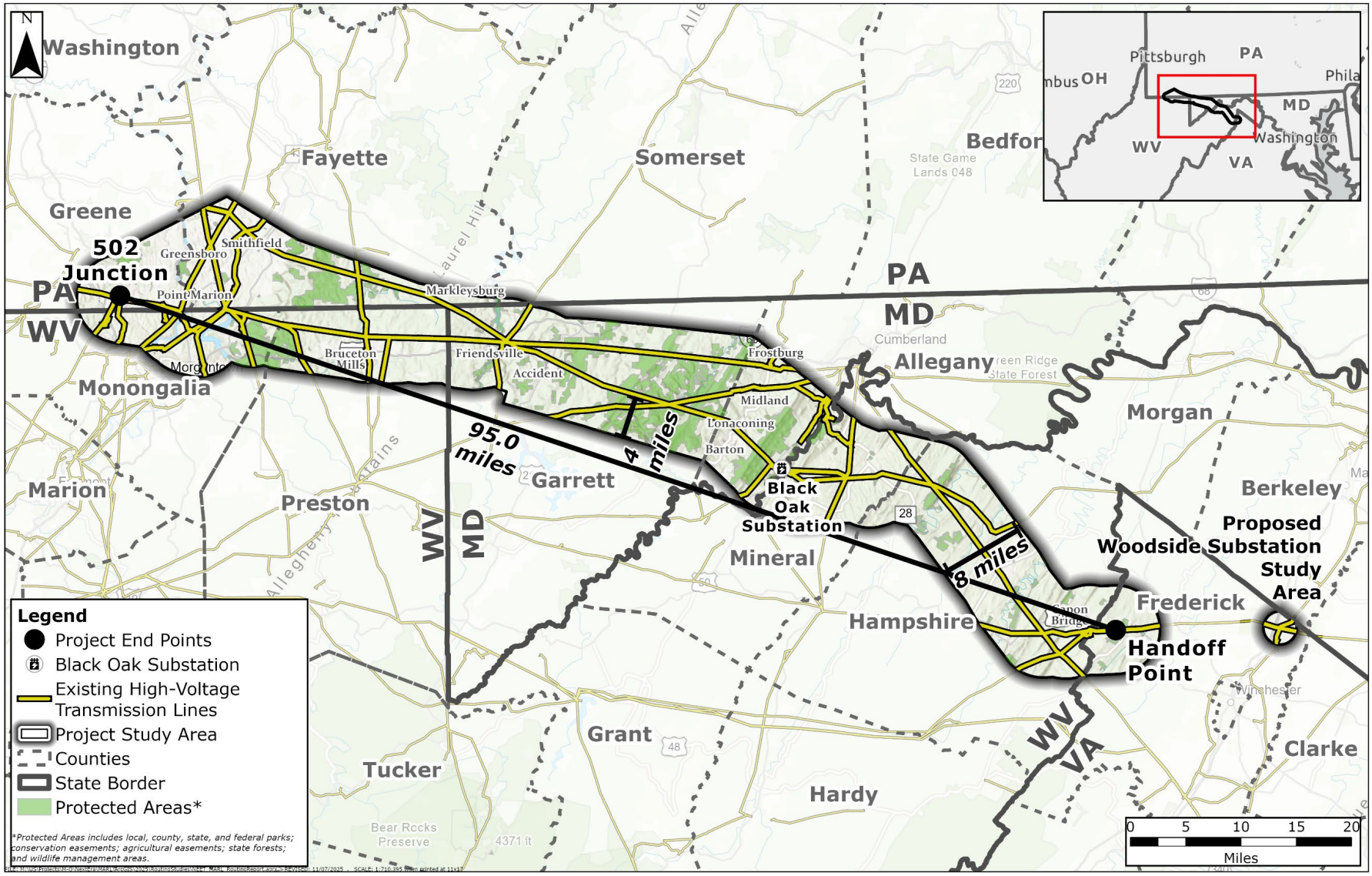
All mileposts (MPs) and distances associated with the MARL Project facilities listed above are rounded to the nearest 0.1 mile, and all land areas are rounded to the nearest 0.1 acre (unless otherwise specified). All references to MPs, distances, and acreages in this document are assumed to be approximate (e.g., a reference to "MP 1.2" or "124.3 acres" means "approximately at MP 1.2" or "approximately 124.3 acres," respectively).

Following PJM's direction to NEET MA and NEET VA to construct the MARL Project, NEET MA and NEET VA assembled a team of experienced internal subject-matter experts that have extensive experience in transmission development, including from its development, Transmission Planning, Engineering and Construction, Environmental Services, Land, Regulatory, Legal, Operations and Maintenance, and Tribal Relations groups, among other teams, and retained ERM as its expert outside routing and siting consultant (hereafter referred to as the "Routing Team") to develop and ultimately select the Proposed Route for the MARL Project. ERM was retained to perform the detailed routing and siting analysis (Routing Study) and prepare associated testimony for the respective state siting applications[5] for approval of the MARL Project as well as the environmental studies and permitting. NEET MA and NEET VA also retained ERM to lead the environmental scope of work associated with the transmission line routing analysis supporting the state siting applications and eventual federal, state, and local environmental permitting for the MARL Project. The ERM team is comprised of environmental scientists, planners, cultural resources specialists, and engineers. ERM was responsible for routing, permitting, and development of the Environmental Review Documents (Appendices A, B, C, and D) as well as supporting agency consultation.

[4] Specifically, the Woodside Substation will connect to Dominion Energy's existing 500 kV Bismark-Doubs transmission line, FirstEnergy's existing Stonewall 138 kV Substation via the Hampshire to Stonewall 138 kV line, and to FirstEnergy's upgraded Gore-Stonewall-Doubs 500 kV transmission line.

[5] NEET MA and NEET VA will be filing four state siting applications with the respective state public utility commissions. NEET MA is filing a Certificate of Public Convenience and Necessity application with the following state utility commissions: Maryland Public Service Commission and Public Service Commission of West Virginia. NEET MA is also filing a Certificate of Public Convenience and a Siting application with the Pennsylvania Public Utilities Commission. NEET VA is filing a Certificate of Public Convenience and Necessity application with the Virginia State Corporation Commission.

FIGURE 1.1-1 MARL PROJECT OVERVIEW AND STUDY AREA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

In developing route alternatives for the MARL Project, the Routing Team considered the following:

- Facilities needed to construct and operate the MARL Project;
- Width of new right-of-way (ROW) that would be required;
- Amount of existing and proposed development in the area;
- Potential for impacts on the natural environment, built environment, cultural resources, and social resources;
- Engineering constructability; and
- MARL Project cost.

As discussed in Section 4, ERM identified six feasible Alternative Routes for the MARL Project.

1.2 PROJECT BACKGROUND

The MARL Project was approved by the PJM Board of Managers in December 2023 as part of PJM's annual Regional Transmission Expansion Plan process for 2022 and its resulting competitive solicitation process, which identified projects to address severe reliability issues in the region. As explained further in the respective state commission applications and supporting evidence, the MARL Project is needed to prevent extensive, severe, and widespread thermal overloads and potential voltage collapses, which could compromise the overall system reliability in the PJM Region and lead to widespread and extreme conditions, including system collapse and blackouts that could affect residents and businesses. These reliability needs are driven by exponential load growth in the region, the cumulative impact of generation changes including the deactivation and retirement of 11 gigawatts of generation resources, and changes in PJM's reliability criteria. Refer to the respective state commission applications and supporting testimony for a more detailed description of the MARL Project's background and need.

1.3 SCOPE OF REPORT

This Routing Study presents the steps and findings of how end-to-end route alternatives for the MARL Project were conceived across four states: Pennsylvania, West Virginia, Maryland, and Virginia. An overview map of the MARL Project Study Area is shown on Figure 1.1-1.

The following sections present ERM's overall approach to developing route alternatives that have an endpoint in Pennsylvania and another endpoint in Virginia. In developing the end-to-end route alternatives, ERM considered state-specific requirements and data, while also recognizing that the state-specific environmental data are different in each of the four states. Accordingly, ERM has developed state-specific Environmental Review Documents (Appendices A, B, C, and D) to present the different information that each state authority expects to see.

NEET MA and NEET VA requested ERM's services to define a study area for routing the MARL Project, collect information on routing constraints and opportunities within the study area, identify and compare route alternatives, select a Proposed Route, and document the routing efforts in this report. Mapbooks associated with the Routing Study are included in Appendix E, Mapbooks for Routing Study. More specifically, ERM's scope of work consisted of the following:

- Defining and describing the MARL Project Study Area;

- Gathering and assessing information about routing constraints and opportunities;
- Identifying and mapping routing constraints and opportunities within the MARL Project Study Area;
- Participating in public outreach efforts (e.g., public open houses and agency meetings) to gather input from stakeholders, agency staff, and the public;
- Identifying buildable route alternatives that meet the siting criteria of the four states;
- Comparing Alternative Routes based on an analysis of natural environment, built environment, cultural, and social impacts; and engineering constructability; and
- Recommending the Proposed Route and Alternative Routes to carry forward.

1.4 PROJECT DESCRIPTION

Table 1.4-1 shows the length, footprint acreage, number of structures, and structure characteristics for the six feasible Alternative Routes retained for evaluation analysis for the MARL Project. Refer to the respective state siting applications and supporting testimony for detailed discussions as they relate to engineering specifications for the MARL Project.

1.4.1 ROW WIDTHS AND STRUCTURE TYPES

The MARL Project will be constructed in a new ROW Corridor measuring, on average, 200 feet wide. The MARL Project will require a wider ROW Corridor in some areas where additional aerial easement rights are necessary to comply with electrical standards and requirements[6] (Figure 1.4-1). The full area of required MARL Project-specific ROW Corridor at any given point along the route is hereafter referred to as the "ROW Corridor." The number of aerial easement blowout areas for each Alternative Route are shown in Table 1.4-1, and the ROW Corridor for these areas ranges from 202 feet to 426 feet, averaging 289 feet wide (Figure 1.4-1).

[6] The aerial easement blowout area is a designated section within the ROW Corridor that requires additional transmission line easement area to accommodate engineering considerations (e.g., increased span lengths), which can result in greater line sway. These areas are necessary due to constraints, such as uneven terrain, steep slopes, or natural obstructions that make the standard ROW Corridor width impractical or unsafe.

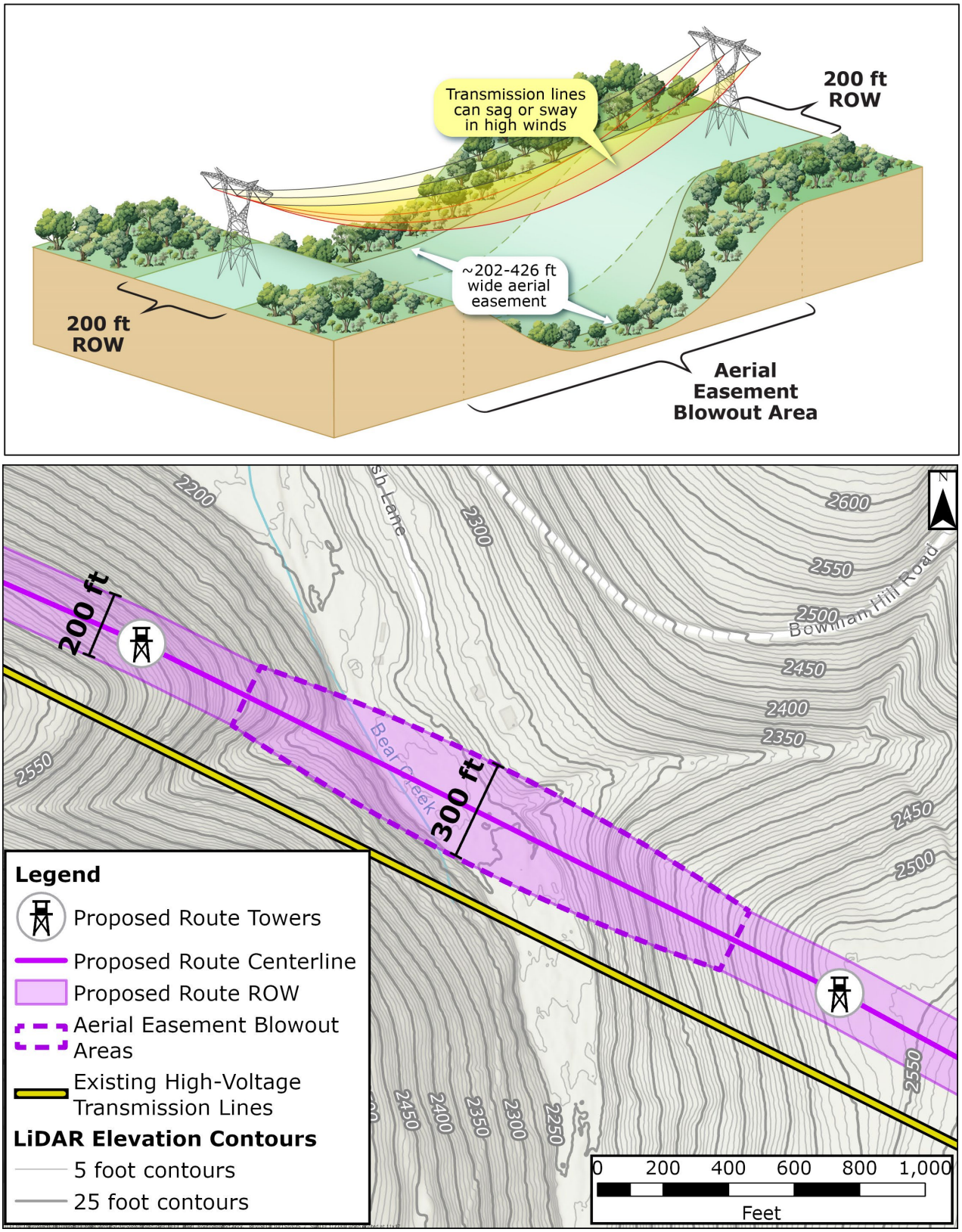
TABLE 1.4-1 PROJECT FEATURES FOR THE FINAL END-TO-END ALTERNATIVE ROUTES

Feature	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Centerline Length (miles)	107.5	107.3	113.6	115.2	106.3	119.1
Siting Corridor (acres)	6,208.6	6,197.5	6,598.5	6,798.1	6,180.6	7,112.0
ROW Corridor (acres)	2,669.0	2,671.4	2,835.5	2,839.0	2,651.5	2,964.3
Aerial Easement Blowout Area [a] (count)	24	31	28	24	28	32
Paralleling Existing Transmission Line ROW (miles)	56.4	59.7	64.5	43.1	50.8	43.2
Paralleling Existing Transmission Line ROW (percentage)	52.5%	55.6%	56.8%	37.4%	47.8%	36.3%
Structures (count)	452	452	478	492	446	519
Minimum Structure Height (feet)	85	85	85	85	85	85
Maximum Structure Height (feet)	190	190	190	190	190	190
Average Structure Height (feet)	145	145	145	145	145	140
Average Span Length (feet)	1,258	1,256	1,240	1,224	1,259	1,213
Maximum Span Length (feet)	2,927	2,927	2,955	2,739	2,927	2,955
Spans Greater than 1,600 feet (count)	33	42	31	34	39	38
Estimated Costs	$1,167,236,674	$1,175,521,094	$1,204,723,343	$1,241,099,297	$1,159,876,697	$1,256,130,573

ROW = right-of-way

[a] The aerial easement blowout area is a designated section within the ROW Corridor that requires additional transmission line easement area to accommodate engineering considerations (e.g., increased span lengths), which can result in greater line sway. These areas are necessary due to constraints, such as uneven terrain, steep slopes, or natural obstructions that make the standard ROW Corridor width impractical or unsafe.

FIGURE 1.4-1 GRAPHICAL DEPICTION OF ADDITIONAL AERIAL EASEMENT BLOWOUT AREAS



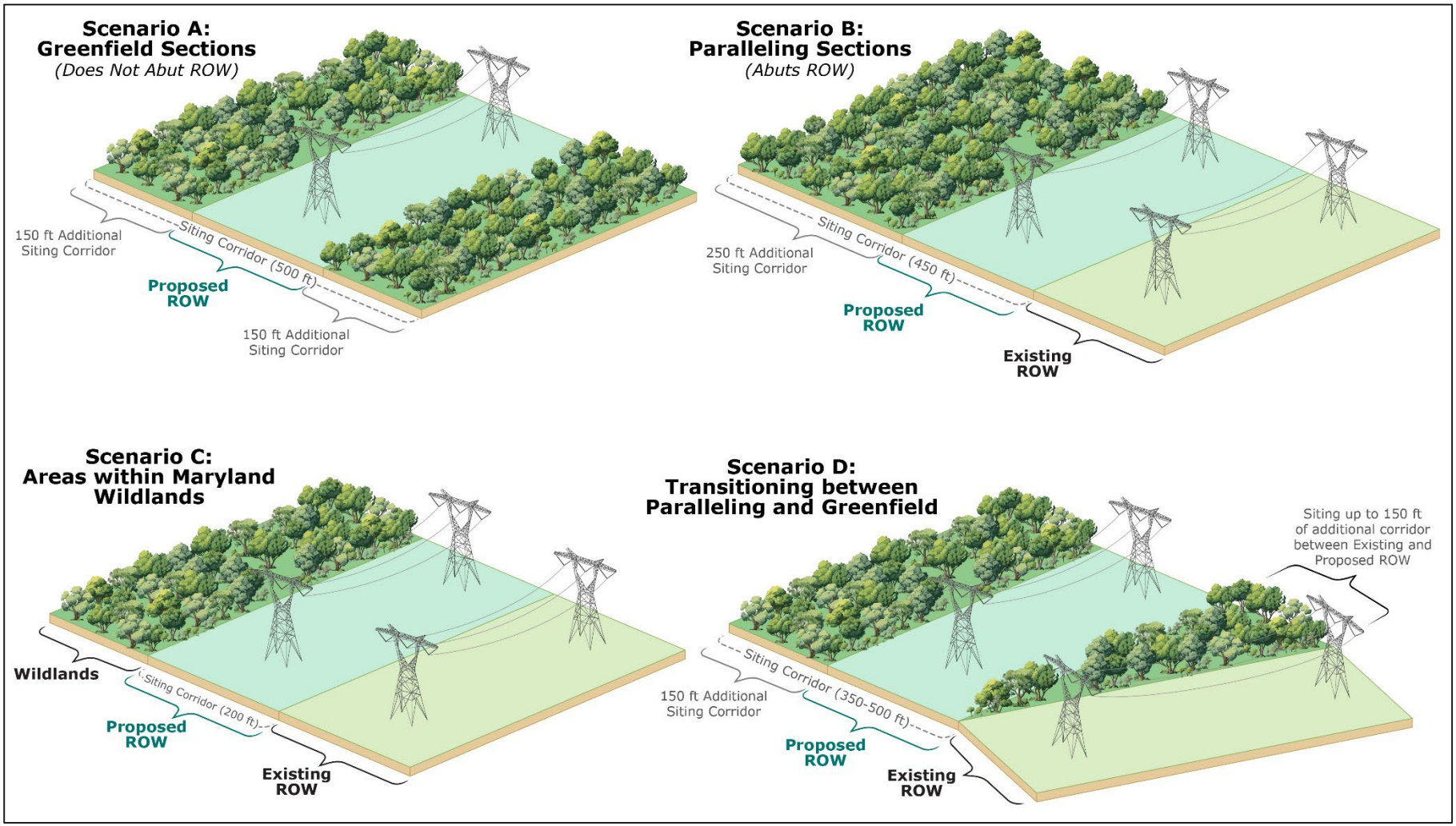
ft = feet; ROW = right-of-way

The MARL Project developed a predefined, Project-specific Siting Corridor, hereafter referred to as the "Siting Corridor," in which existing conditions were assessed to allow for reasonable flexibility to adjust the centerline on either side of the Alternative Routes, if necessary. The Siting Corridor was designed to abut and not overlap the ROW of any existing transmission lines when paralleling. The Siting Corridor width will range from 200 to 500 feet; however, in those areas that require aerial easement blowout, the maximum width for the Siting Corridor will be 715 feet. The Siting Corridor is inclusive of the MARL Project's ROW Corridor. The width of the Siting Corridor varies based on the MARL Project's ROW Corridor width and proximity to existing transmission lines. To account for the varying conditions along the ROW Corridor, such as paralleling existing transmission lines, greenfield sections, and legal requirements in the Maryland Wildlands, the Routing Team developed four scenarios that are shown on Figure 1.4-2 and described below:

A. **Scenario A:** For greenfield sections of the MARL Project that do not abut an existing transmission line corridor, the Siting Corridor is a 150-foot buffer on either side of the ROW Corridor. This typically results in a **500-foot-wide Siting Corridor** except in areas where additional aerial easement blowout rights are necessary.
B. **Scenario B:** For paralleling sections of the MARL Project that abut an existing transmission line corridor, the Siting Corridor is a 250-foot buffer of the ROW Corridor only on the opposite side of the existing transmission line corridor. This typically results in a **450-foot-wide Siting Corridor** except in areas where additional aerial easement blowout rights are necessary.
C. **Scenario C:** For areas of the MARL Project inside the Maryland Wildlands, the Siting Corridor does not extend beyond the ROW Corridor, and is therefore only a **200-foot-wide Siting Corridor.**
D. **Scenario D:** For areas where the MARL Project transitions from paralleling to greenfield sections, the Siting Corridor is a 150-foot buffer of the ROW Corridor on the opposite side of the existing transmission line corridor, and will also be a 150-foot buffer of the ROW Corridor on the side near the existing ROW that does not encroach on the existing transmission line corridor.

For the MARL Project, *paralleling* is defined as siting the proposed transmission line so the MARL Project ROW Corridor abuts the existing transmission line corridor. *Greenfield* is defined as a section of the MARL Project ROW Corridor for any portion of the route that does not abut an existing transmission line corridor.

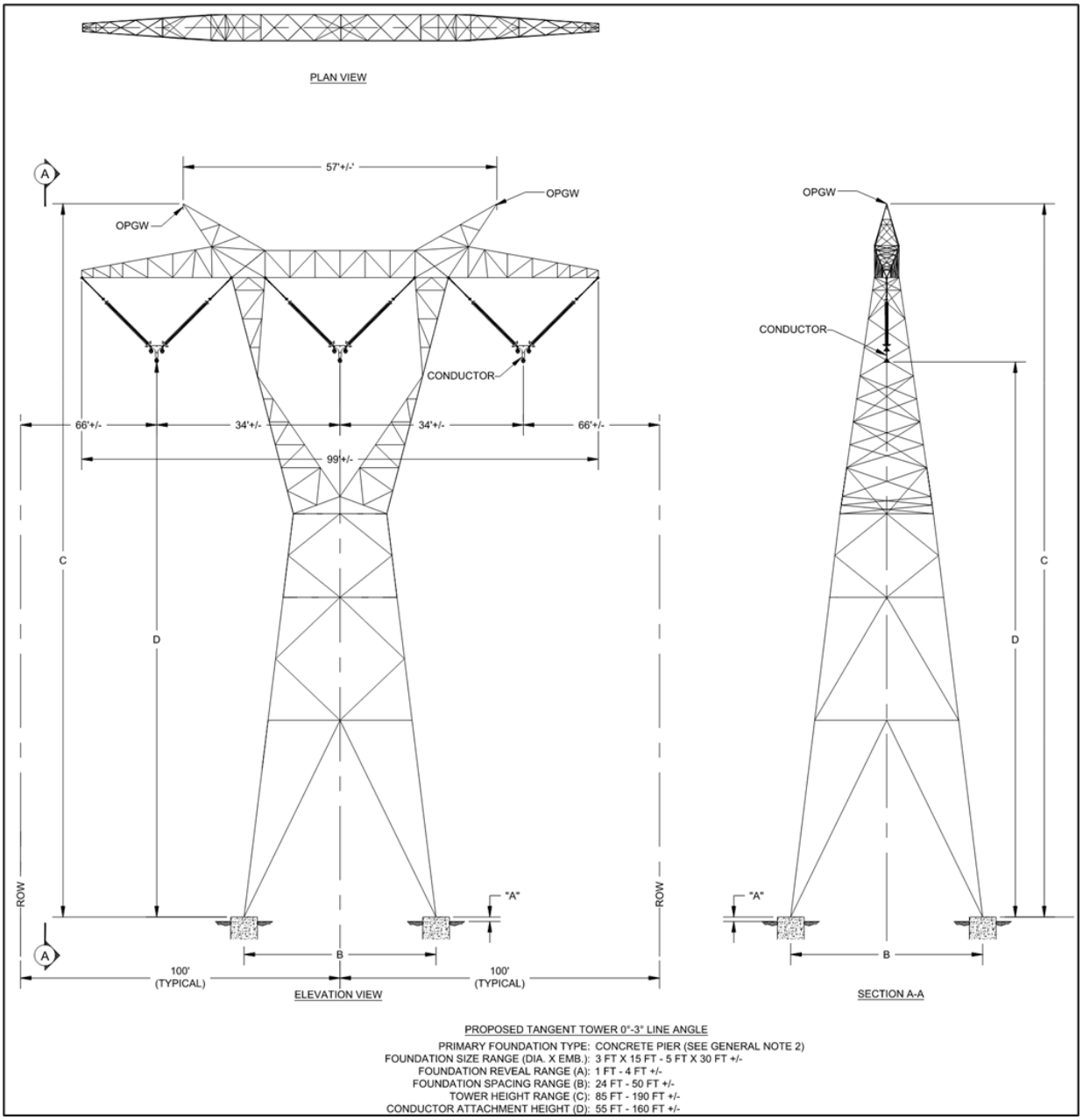
FIGURE 1.4-2 SITING CORRIDOR SCHEMATIC



ft = feet; ROW = right-of-way

NEET MA and NEET VA plan to use primarily lattice steel structures for the MARL Project. The proposed structures for the MARL Project will have four legs and be comprised of steel. Structure heights of all the Alternative Routes range from 85 to 190 feet, with an average structure height dependent on selected route and preliminary conceptual design, excluding foundation reveal. Final structure heights are subject to change based on final engineering. The average distance between towers (span) will be 1,258 feet for the MARL Project, with the span between transmission structures depending on the type of structure used, as well as topography, ground elevation, and nearby constraints. A typical lattice structure is shown on Figure 1.4-3.

FIGURE 1.4-3 TYPICAL LATTICE TRANSMISSION LINE STRUCTURE



FT = feet; OPGW = Optical Ground Wire; ROW = right-of-way

1.4.2 CONSTRUCTION, OPERATION, AND MAINTENANCE PROCESS

Construction of new overhead transmission lines will involve some or all of the steps listed below:

- Detailed survey of the route alignment;
- ROW acquisition and clearing;
- Construction of access roads and work pads, where necessary;
- Installation of tower foundations;
- Assembly and erection of new structures;
- Stringing and tensioning of conductors; and
- Final cleanup and land restoration.

More detailed discussion of the construction, operation, and maintenance process will be provided by the MARL Project's engineering expert (please see Testimony of Philip Givens). Required materials for the MARL Project's 500 kV structures will be delivered to each structure location within the ROW Corridor. Detailed foundation type and design will be determined based on the final engineering design, geophysical surveys, and geotechnical investigations prior to construction. Typical installation will be drilled piers with reinforced concrete; however, micropiles may be used in certain circumstances. Other foundation types will be considered on an as-needed basis. Structures will be erected with a crane or flown in via helicopter and anchored to the foundation during final assembly. In upland areas, the minimal amount of soils from each structure foundation construction will be used onsite to regrade the final ROW back to preconstruction conditions, to the maximum extent practicable. In wetland areas, excess soil will be removed from the excavation and hauled to an upland site within the ROW Corridor to be respread and stabilized. Typical construction equipment may include feller-bunchers, chippers, excavators or drilling equipment, earth moving equipment (e.g., bulldozer), cranes, wire stringing pullers and tensioners, skidsteers, backhoes, and trucks. To comply with state stormwater requirements, NEET MA and NEET VA will obtain coverage under the appropriate state stormwater permit for construction activities prior to any ground disturbance. A MARL Project-specific Erosion and Sediment Control Plan and Stormwater Pollution Prevention Plan will be developed in coordination with state and local agencies to meet applicable requirements, using best management practices.

Once the MARL Project is in-service, maintenance of the ROW Corridor under the transmission lines will be essential for the reliable operation of the lines as well as for public safety. Operation and maintenance of the MARL Project will include periodic inspections of the line and ROW Corridor and periodic vegetation management. Periodic inspections will occur through both aerial and ground patrols. Please refer to Appendix F for NEET MA's and NEET VA's Vegetation Management Plan.

2. METHODOLOGY

The process of routing a new electric transmission line begins with the definition of a study area encompassing and surrounding the beginning and endpoints for the new line. This is followed by evaluating routing opportunities and constraints within the study area, such as paralleling opportunities (e.g., roads or existing utility lines), land uses, planned developments, and environmental, visual, recreational, and cultural features. The study area is adjusted as needed based on constraints and opportunities. Feasible route alternatives, which avoid constraints and use opportunities to the extent practicable, are developed. Communication with stakeholders and analysis of impacts result in adjustments to routes throughout the process.

The fundamental objectives of the routing process are the same regardless of project or location: maximize paralleling opportunities with compatible linear features or land uses; avoid, and where avoidance cannot be achieved, minimize impacts, and then mitigate impacts where appropriate to the natural environment, built environment, cultural resources and social resources; incorporate engineering constructability to minimize to the extent practicable special engineering design requirements; and provide feasible, efficient, and equitable route alternatives that meet the purpose and need of a project.

2.1 GOAL OF THE ROUTING STUDY

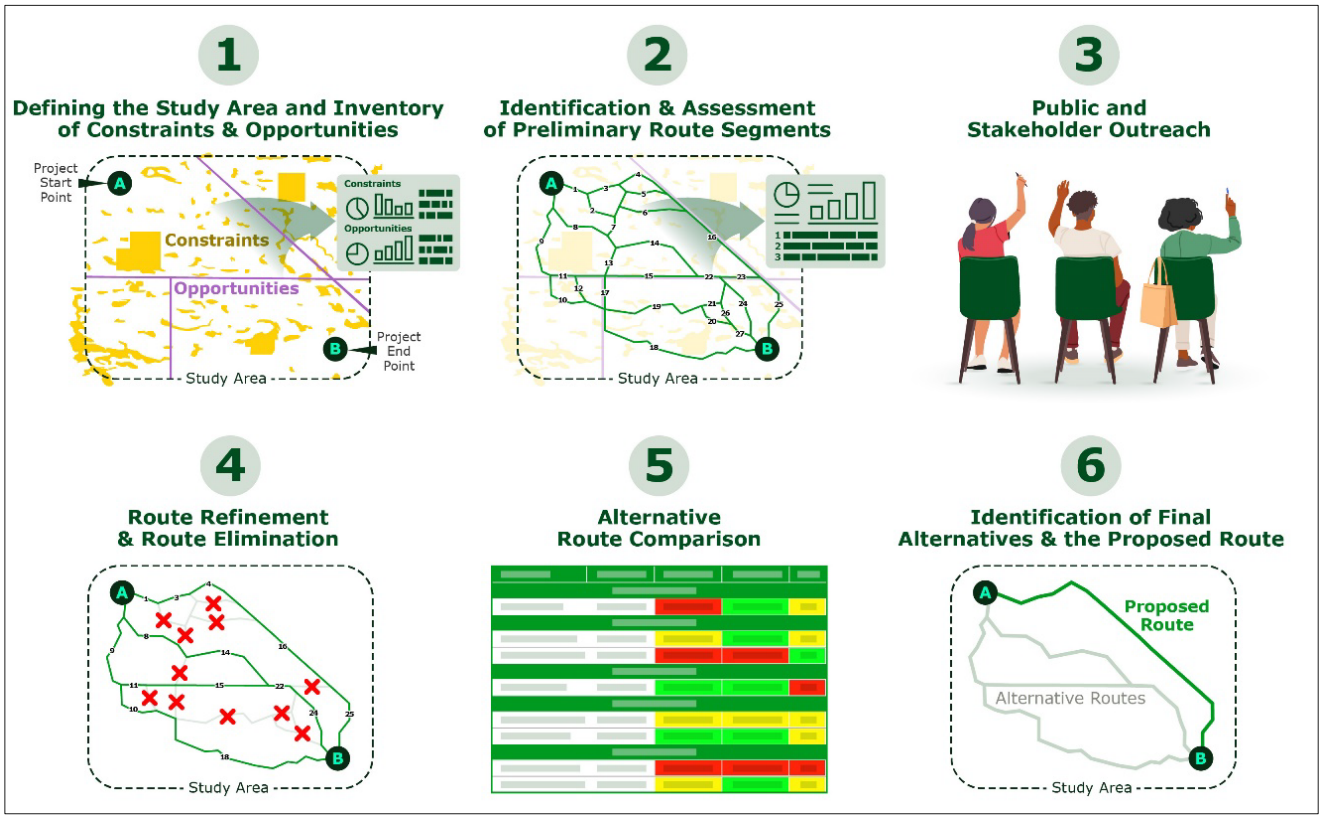
The goal of the routing process was to identify Alternative Routes that meet the technical and economic needs of the MARL Project while avoiding potential constraints (e.g., sensitive environmental resources, residential dwellings) and taking advantage of opportunity areas (e.g., existing linear infrastructure) to the greatest extent possible. Furthermore, the goal was to identify and evaluate opportunities and environmental constraints in the MARL Project Study Area to 1) facilitate the development of feasible Alternative Routes; 2) evaluate potential impacts associated with the Alternative Routes; and 3) ultimately, identify a Proposed Route that meets the MARL Project need that is constructable. The Proposed Route is the superior route that best 1) reasonably minimizes adverse impacts on area land uses and the natural environment and built environment; 2) minimizes special engineering design requirements that could result in increased costs; and 3) can be constructed and operated in a safe, timely, and reliable manner.

The Routing Study involved five main steps that included:

1. Definition of the MARL Project Study Area;
2. Identification of constraints and opportunities;
3. Identification and assessment of preliminary routes;
4. Execution of field reconnaissance and stakeholder engagement including open houses; and
5. Implementation of quantitative and qualitative analysis to identify feasible route alternatives, including the Proposed Route.

Furthermore, route viability was assessed through permitting risk, constructability, ROW acquisition, and cost after the least impactful alternatives were identified. As outlined below, the routing process establishes how the Routing Team identifies routes, screens route alternatives, and selects a Proposed Route (Figure 2.1-1).

FIGURE 2.1-1 TYPICAL ROUTING PROCESS

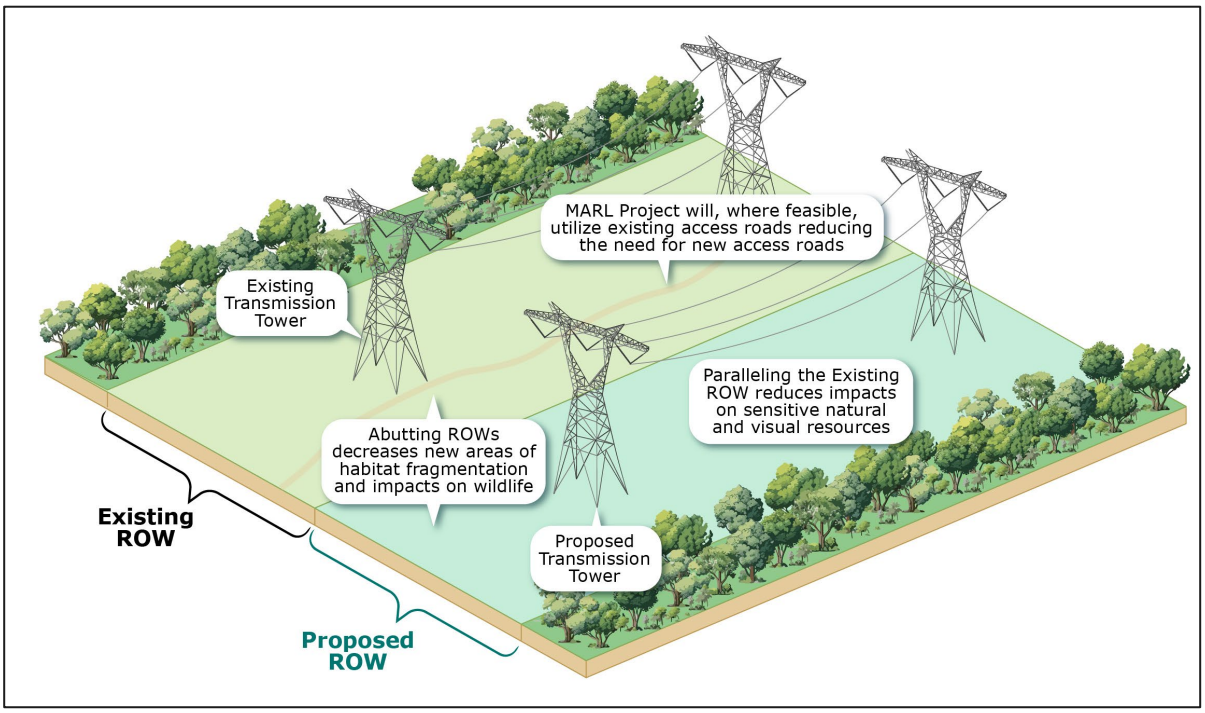


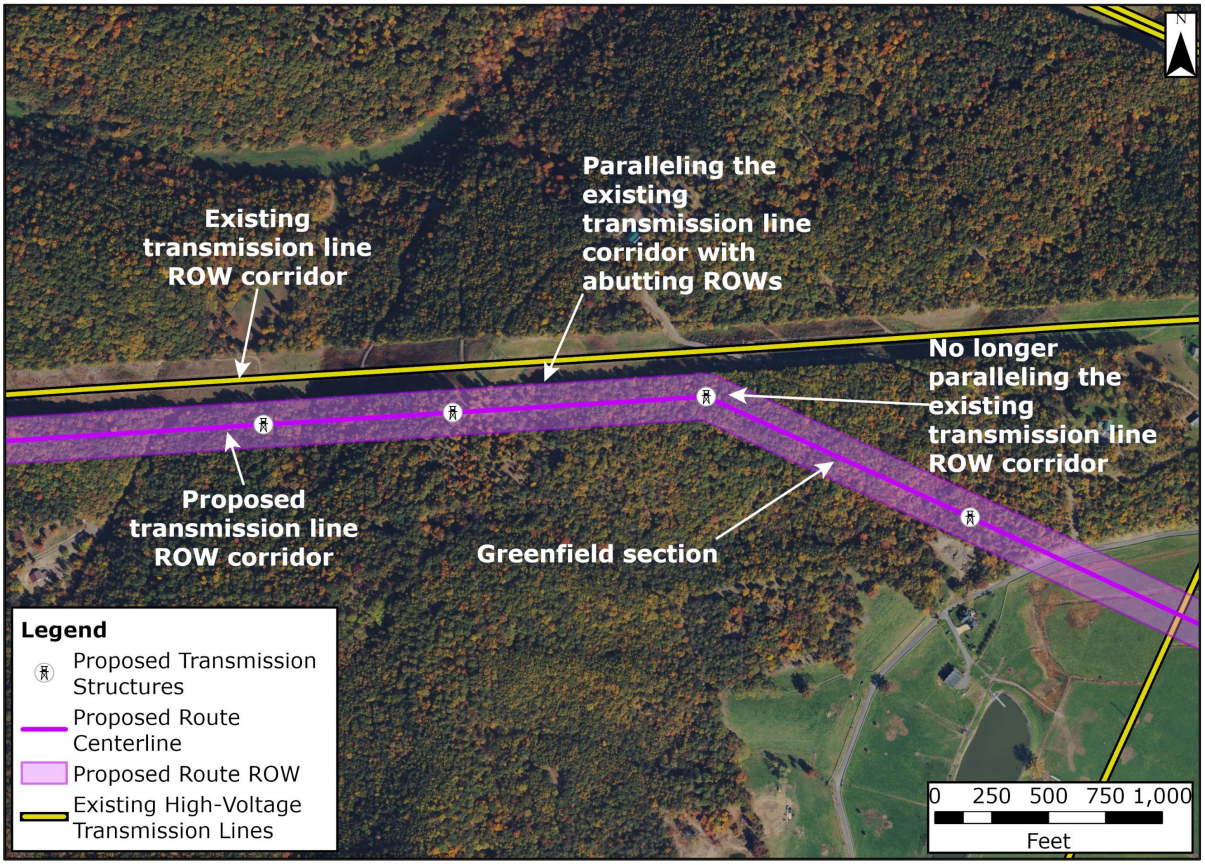
Both desktop and field reviews were performed by the Routing Team to identify key opportunities and constraints and to gain a comprehensive understanding of the landscape. The primary objective of the Routing Study was to identify at least three feasible transmission line route options for evaluation that minimized impacts on communities and the environment.

As part of the above, the Routing Team aimed to parallel existing transmission lines to the extent practicable to minimize visual, environmental, and access effects. Figure 2.1-2 provides an illustration of MARL Project paralleling. Benefits to paralleling existing transmission lines include:

- Limiting impacts on the local community;
- Providing easier construction access;
- Reducing the need for new access roads;
- Reducing impacts on sensitive natural and visual resources; and
- Decreasing new areas of habitat fragmentation and impacts on wildlife.

FIGURE 2.1-2 ILLUSTRATION OF MARL PROJECT PARALLELING





MARL Project = MidAtlantic Resiliency Link Project; ROW = right-of-way

2.2 DEFINING THE MARL PROJECT STUDY AREA

The first step in the routing process involved defining a geographic study area in alignment with PJM's identified electric reliability requirements, which included two fixed endpoints. The MARL Project Study Area was delineated to encompass the western terminus at the 502 Junction Substation in Greene County, Pennsylvania, and the eastern terminus at the PJM-designated handoff point in Frederick County, Virginia. In addition to these endpoints, the Study Area included a sufficiently broad area designed to capture geographically diverse opportunities for paralleling existing linear infrastructure—such as transmission lines, pipelines, and transportation corridors—thereby supporting the identification and evaluation of a reasonable range of routing alternatives. Additionally, and to the extent practicable, the limits of the Study Area were defined by reference to easily distinguished landmarks, such as roads or other features. This approach helped the Routing Team to clearly communicate the Study Area boundaries to stakeholders, including potentially affected landowners, county officials, and permitting agency staff. Section 3.1 describes the characteristics of the Study Area in detail.

2.3 INVENTORY OF CONSTRAINTS AND OPPORTUNITIES

The second step in the routing process involved identifying and mapping constraints that consisted of natural environment, built environment, cultural resources, and social resources; engineering considerations; and existing opportunities within the MARL Project Study Area. A geospatial database development played a critical role in the routing and siting of the MARL Project by integrating spatial data with analytical tools to support informed decision-making. This process involved collecting, organizing, and managing a wide range of geospatial data layers such as topography, slope, land use, environmental constraints, infrastructure, and socioeconomic factors. Using Geographic Information Systems (GIS), the Routing Team analyzed these datasets to identify optimal paths that minimize environmental impact, confirm constructability, and avoid populated or sensitive areas. Based on extensive data collection, this step resulted in an inventory of routing constraints and opportunities in the MARL Project Study Area, including, but not limited to:

- Existing electric transmission and other utility ROWs;
- Federal, state, county, and private road ROWs;
- Residences and residential areas and structures identified through high-resolution aerial imagery and LiDAR acquisition flown for and collected by NEET MA and NEET VA for MARL Project-specific data[7];
- Parcels;
- Planned developments;
- Public lands;
- Protected lands (e.g., federal, state, and local lands, parks, trails);

[7] NEET MA and NEET VA contracted SAM to capture high-resolution aerial imagery and LiDAR data for the MARL Project Study Area. Data acquisition was conducted during leaf-off conditions between December 2023 and February 2024, providing 3-inch-resolution imagery and LiDAR data used as part of the routing and siting process.

- Conservation easements (e.g., National Conservation Easement Database, state-specific databases);
- Parks and trails;
- Wetlands and waterbodies as well as floodplains;
- Forested land;
- Hospitals, schools, cemeteries, and convalescent centers;
- Natural heritage resources (e.g., conservation sites and habitat for rare, threatened, and endangered species);
- Visually sensitive resources—locations where views are protected by regulation or where higher quality views are an expected condition, regardless of regulatory status; and
- Archaeological and historic sites and other nationally or locally significant cultural resources.

2.4 IDENTIFICATION AND ASSESSMENT OF PRELIMINARY DRAFT ROUTES

The third step in the routing process was identifying broad conceptual route corridors—swaths of the MARL Project Study Area feasible for routing new transmission infrastructure—and excluding areas where transmission line routing would be impracticable due to land use or other constraints.

Following the route development criteria and guidelines listed in Section 2.7, ERM developed a network of preliminary route segments using GIS software and the constraint and opportunity database. To the extent practicable, preliminary route segments were identified that avoid natural environment and built environment constraints, cultural and social resources, as well as factor in engineering constructability, and parallel routing opportunities. Throughout this step, the Routing Team continued to collect and assess data on constraints obtained through desktop sources, field reconnaissance, and stakeholder/public engagement activities. The Routing Team used this information to validate and develop a better understanding of resources that could be affected and then identified routes to avoid or reduce potential impacts where feasible.

After the preliminary route segments were identified, the Routing Team assessed the viability of preliminary draft route options by evaluating environmental impacts, compatibility with existing and future land uses, permitting risk, community input, ability to acquire new ROW, constructability, and cost. Section 4 describes the route alternatives developed for the MARL Project as well as routes considered but dismissed from the MARL Project.

2.5 FIELD RECONNAISSANCE AND STAKEHOLDER ENGAGEMENT

The fourth step of the routing process consisted of conducting field reconnaissance and stakeholder/public engagement activities. These included establishing a MARL Project website, hosting open houses, distributing targeted mailings, and holding both virtual and in-person meetings. Section 4.3 discusses the specific platforms and surveys used to collect stakeholder and public feedback, and how that feedback was incorporated into the route selection process. These efforts were undertaken to gather local knowledge, identify sensitive resources, and inform routing and route selection. Collecting public feedback enabled the Routing Team to refine the preliminary draft route options identified during the third step, supporting further analysis and ultimately the selection of the Proposed Route. Section 3.3 describes the public engagement

activities conducted for the MARL Project and explains how feedback gathered through this process was incorporated into the development of Alternative Routes.

2.6 ROUTE ALTERNATIVE ANALYSIS AND ROUTE RECOMMENDATION

The fifth step of the routing process used data collected during field reconnaissance and stakeholder outreach activities to refine the preliminary draft route options, develop end-to-end route alternatives, and conduct both quantitative and qualitative analyses of those alternatives. In evaluating the final route alternatives, the Routing Team considered multiple factors, including public input received during engagement activities, constructability, feasibility, environmental and land use constraints, and compliance with applicable state siting requirements. Based on this comprehensive analysis, the team identified a set of Alternative Routes and ultimately selected a Proposed Route by comparing the relative advantages and disadvantages of each route. Routes determined to be too impactful, infeasible, or impracticable were not carried forward for further consideration as a potential Alternative Route.

2.7 ROUTE DEVELOPMENT CRITERIA AND GUIDELINES

The following criteria, guidelines, and considerations were developed by the Routing Team based on best practices and extensive experience in transmission line routing and siting projects. While there are no published studies or formal industry standards, the criteria reflect methodologies that have been applied to other greenfield projects and, in some cases, accepted by state commissions. These were considered and applied to the MARL Project, incorporating natural environment and built environment resources as well as land and engineering considerations provided by NEET MA and NEET VA that include, but are not limited to, the following:

- Maximize the separation distance from or minimize impacts on residential dwellings.
- Maximize the separation distance from or minimize impacts on commercial buildings.
- Maximize the separation distance from or minimize impacts on schools, churches, cemeteries, and other socially sensitive facilities.
- Minimize the removal of existing barns, garages, and other nonresidential structures.
- Minimize, to the extent possible, placement of structures within the middle of active agricultural and residential areas.
- Minimize impacts on agricultural use, including the operation of irrigation infrastructure, where possible.
- Maximize placement of the route to be immediately adjacent to existing transmission lines.
- Reduce circuitous routes and special design requirements, where possible.
- Minimize the number of affected parcels and/or landowners and follow parcel boundaries, to the extent possible, to prevent bifurcation of parcels, which could contribute to increased easement acquisition costs or creation of unbuildable lots.
- Minimize the crossing of large lakes, major rivers, and large wetland complexes.
- Minimize impacts on designated critical habitat, protected species, and other identified sensitive natural resources.

- Minimize new habitat fragmentation and impacts on designated areas of biodiversity concern.
- Minimize conflict with designated public resource lands such as local parks and other recreation lands, nature preserves, or other conservation areas.
- Minimize visibility from populated areas, scenic roadways, and designated scenic resources.
- Minimize interference with economic activities, including agricultural practices.
- Consider the proximity of floodplain boundaries, meandering rivers, creeks, and ravines due to banks subject to soil erosion and flooding, which can compromise the integrity of the design, and reduce the number crossings of meandering rivers, creeks, and/or ravines.
- Span over rivers, streams, and other water features to limit impacting the ordinary high-water mark and downstream hydrology.
- Place towers on high ground to minimize structure heights and avoid low areas (e.g., valleys, ravines) that extend tower heights and might result in more tree clearing, stream temperature changes, and construction access concerns.
- Consider accessibility of tower placement and line constructability (e.g., drainage ditches or dikes, use of existing roads or trails) to reduce construction access concerns.
- Consider the tower and line placement to minimize and/or avoid free-standing water areas to reduce costly foundations and constructability concerns.
- Consider the tower placement away from the brink of steep slopes to accommodate tower footprint and safe construction practices.
- Consider the space around towers for temporary construction activities.
- Consider the tower placement to provide for efficient span lengths of towers.
- Consider and avoid steep terrain with side slopes of 15 percent grade or more, if possible.
- Reduce and/or avoid clipping the corners of private properties, where possible.
- Minimize the number of existing high-voltage transmission line crossings.

Segments and route alternatives were quantitatively and qualitatively evaluated using the set of criteria developed by the Routing Team (Table 2.7-1) to align with MARL Project routing guidelines, minimize or avoid environmental and social constraints, and identify opportunities to parallel existing linear infrastructure, particularly existing transmission lines. Appendix G, Data Sources, provides a list of sources used for the Routing Study.

Route alternatives were developed through a comparative evaluation process that considered:

- Existing opportunities for paralleling;
- The presence and extent of constraints along potential routes; and
- When route alternatives were otherwise comparable in terms of constructability, length, and other technical factors, the Routing Team considered the types of constraints present along each route and their relative significance.

As part of the MARL Project, the Routing Team adhered to three principles when developing route alternatives:

- Parallel existing transmission lines where feasible.
- Avoid residential dwellings within the ROW Corridor where feasible.
- Minimize crossing conservation easements.

To support a comprehensive and balanced evaluation of routing alternatives for the MARL Project, the Routing Team applied both quantitative and qualitative assessments across a range of criteria, including natural environment, built environment, cultural resources, social resources, and engineering factors.

Although a wide array of criteria was considered in the evaluation of potential transmission line routes (as summarized in Table 2.7-1), the Routing Team elected not to assign explicit numerical weights or scores to individual routing criteria. Instead, the Routing Team opted for a hybrid quantitative-qualitative approach on route selection based on a comprehensive and balanced assessment rather than rigid numerical weighting. This approach was adopted for the following reasons:

- The relative importance of evaluation criteria (e.g., proximity to residential dwellings, presence of wetlands, constructability constraints) can vary significantly depending on geographic context. A rigid weighting system may overemphasize a single factor that is less relevant in one area but highly relevant in another. By avoiding fixed weights, the evaluation remains adaptable to site-specific conditions and local sensitive receptors.
- Flexible consideration of multiple criteria allows the routing process to be more responsive to stakeholder input, including feedback from landowners, communities, and regulatory agencies.
- This approach helps prevent unintentional bias or over-prioritization of one impact type over another. Numerical weighted scoring systems can create a false impression of mathematical precision and obscure how qualitative considerations influence route selection. A quantitative-qualitative hybrid approach promotes clearer communication with stakeholders and regulatory agencies, showing that decisions were based on a transparent understanding of constraints and opportunities rather than numeric weighting.

This methodology reflects best practices in infrastructure planning and supports that the selected route minimizes adverse impacts while meeting technical and regulatory requirements and addressing stakeholder preferences.

TABLE 2.7-1 QUANTITATIVE CONSTRAINTS AND OPPORTUNITIES EVALUATION CRITERIA

Constraints and Opportunities Evaluation Criteria	Measure
Route Length and Construction Footprint	
Centerline Length	Miles
ROW Corridor	Acres
Land Use and Social Resources	
Paralleling Existing Infrastructure [a]	
Paralleling Existing Transmission Lines	Miles; Percentage
Greenfield section (within 500 feet of Existing Transmission Lines)	Miles; Percentage
Greenfield section (within 500–1,000 feet of Existing Transmission Lines)	Miles; Percentage
Greenfield section (>1,000 feet of Existing Transmission Lines)	Miles; Percentage
Total Greenfield	Miles; Percentage
Paralleling railroad ROW	Miles; Percentage
Paralleling natural gas pipelines ROW	Miles; Percentage
Paralleling Highways	Miles; Percentage
Community and Recreational Resources [b, c, d, e, f, g, h, i]	
Parcels/ unique landowners	Count
Residential dwellings within ROW Corridor/ 250 feet / 500 feet of centerline	Count
Residential outbuildings within ROW Corridor / 250 feet / 500 feet of centerline	Count
Non-residential buildings within ROW Corridor / 250 feet / 500 feet of centerline	Count
Places of worship within 500 feet of the centerline	Count
Childcare Facilities within 500 feet of the centerline	Count
Public / private schools within 500 feet of centerline	Count
Trails crossings—Potomac Heritage National Scenic Trail and Hiking Trails	Count
State Scenic Byways	Count
Protected Lands [j, k, l, m, n, o, p]	
State Forest	Count; Miles; Acres
State Park	Count; Miles; Acres
Fisheries / Wildlife Management Area	Count; Miles; Acres
Pennsylvania State Wilderness Area	Count; Miles; Acres
Pennsylvania State Game Lands	Count; Miles; Acres
Maryland Wildlands	Count; Miles; Acres
Conservation Easements	Count; Miles; Acres
USACE Recreation Areas	Count; Miles; Acres
Total Protected Lands	Count; Miles; Acres
Cultural Resources [q, r, s, t]	
Cemeteries within ROW Corridor; 500 feet of centerline	Count
Archaeological Resources within ROW Corridor	Count
Architecture Resources—NRHP eligible, NRHP listed or NHL listed within ROW Corridor; 0.5-mile buffer from centerline	Count
Historic Districts Crossed	Count
Battlefields	Count; Acres

Constraints and Opportunities Evaluation Criteria	Measure
MD—Heritage Areas	Count; Acres
Agricultural Land [u]	
Not Prime Farmland Class	Acres
State Importance Farmland Class	Acres
Local Importance Farmland Class	Acres
Prime Farmland Class	Acres
Land Cover [v]	
Barren Land (Rock/Sand/Clay)	Acres
Cultivated Crops	Acres
Deciduous Forest	Acres
Developed, High Intensity	Acres
Developed, Low Intensity	Acres
Developed, Medium Intensity	Acres
Developed, Open Space	Acres
Emergent Herbaceous Wetlands	Acres
Evergreen Forest	Acres
Grassland/Herbaceous	Acres
Mixed Forest	Acres
Open Water	Acres
Pasture/Hay	Acres
Shrub/Scrub	Acres
Woody Wetlands	Acres
Forest Lands Total (Deciduous Forest, Evergreen Forest, and Mixed Forest)	Acres
Agricultural Lands Total (Pasture/Hay and Cultivated Crops)	Acres
Developed Lands Total (High, Low, Medium, Open Space)	Acres
Natural Environment	
Water Resources [w, x, y, z, aa, bb, cc, dd]	
NHD Stream/River Perennial [c]	Count; Feet
NHD Stream/River—Intermittent [c]	Count; Feet
NHD Waterbody	Count, Acres
Section 10 Navigable Waters	Count
Trout Streams and Coldwater Fisheries (all states)	Count; Feet
PA Trout Streams	Count; Feet
WV Trout Streams	Count; Feet
VA Trout Streams	Count; Feet
PA—Designated Use Streams (CWF, EV, HQ, TSF)	Count; Feet
MD—Designated Use Streams (Use III and III-P: Nontidal Cold Water and Public Water Supply)	Count; Feet
MD—Designated Use Streams (Use IV and IV-P: Recreational Trout Waters and Public Water Supply)	Count; Feet
VA—Threatened & Endangered Species Waters	Count; Feet
WV—Mussel Streams	Count; Feet

Constraints and Opportunities Evaluation Criteria	Measure
MD—Designated Use Streams (Use I and I-P Water Contact Recreation, Protection of Aquatic Live, and Public Water Supply)	Count; Feet
Modeled Wetlands [jj]	Acres
NWI—All Types	Acres
NWI—Freshwater Emergent	Acres
NWI—Freshwater Shrub Scrub	Acres
NWI—Freshwater Pond	Acres
NWI—Lake	Acres
NWI—Riverine	Acres
WV—DEP Wetlands	Acres
MD—DNR Wetlands of Special Concern	Acres
MD—DNR Wetlands	Acres
FEMA Flood Zone A/AE/AO—Areas with a 1% annual chance of flooding (100-year flood area)	Acres; Structure Count
FEMA Flood Zone X—Areas with 0.2% annual chance of flooding (500-year flood area)	Acres; Structure Count
FEMA Flood Zones Combined	Acres
Conservation and Habitat [y, i, ee, ff, gg, hh]	
USFWS Critical Habitat Final	Acres
USFWS Critical Habitat Proposed	Acres
State-listed Species Occurrence (from state NHI Element Occurrence Data)	Acres
Potentially Suitable State-listed Species, MBTA, and Foraging Bat Habitat	Acres
Potentially Suitable Monarch Butterfly	Acres
Bat Known Occupied Summer Habitat (all states)	Acres
Bat Hibernacula (all states)	Acres
Potentially Suitable Bat Roosting Habitat	Acres
MD—Irreplaceable Natural Areas	Count
MD—Irreplaceable Natural Areas	Acres
MD—Forest Interior Dwelling Species Confirmed	Acres
MD—Forest Interior Dwelling Species Probable	Acres
MD—Natural Heritage Areas	Acres
MD—Forests of Recognized Importance	Count
MD—Forests of Recognized Importance	Acres
MD—Federal or State-Listed Species	Acres
MD—Species of Concern	Acres
MD—BioNet Tier 1 (critically significant)	Acres
MD—BioNet Tier 2 (Extremely Significant)	Acres
MD—BioNet Tier 3 (Highly Significant)	Acres
MD—BioNet Tier 4 (Moderately Significant)	Acres
MD—BioNet Tier 5 (Significant)	Acres
PA—Natural Heritage Areas	Acres
VA—Ecological Core C1 (Outstanding)	Acres
VA—Ecological Core C2 (Very High)	Acres
VA—Ecological Core C3 (High)	Acres

Constraints and Opportunities Evaluation Criteria	Measure
VA—Ecological Core C4 (Moderate)	Acres
VA—Ecological Core C5 (General)	Acres
Engineering and Infrastructure Considerations [a, ee]	
Existing Transmission Line Crossings	
Electric Transmission Line Unknown kV Crossing	Count
Electric Transmission Line 69 kV Crossing	Count
Electric Transmission Line 115 kV Crossing	Count
Electric Transmission Line 132 kV Crossing	Count
Electric Transmission Line 138 kV Crossing	Count
Electric Transmission Line 500 kV Crossing	Count
Structures and Design	
Number of Structures	Count
Structures with Turn Angles 0-20 degrees	Count
Structures with Turn Angles 20-30 degrees	Count
Structures with Turn Angles greater than 30 degrees	Count
Span Length Greater than 1,600 feet	Count
Topography	
Very steep slope (31–90 degrees)	Miles
Steep slope (21–30 degrees)	Miles
Moderate slope (16–20 degrees)	Miles
Strongly sloping (6–15 degrees)	Miles
Flat to gentle slope (0–5 degrees)	Miles
Infrastructure Crossings	
Primary Road Crossing	Count
Secondary Road Crossing	Count
Tertiary Road Crossing	Count
Railroad Crossing	Count
Oil and Gas Wells: within the proposed ROW; 500 feet of centerline	Count
Natural Gas Pipeline Crossing (transmission / distribution / gathering)	Count
Wind turbines (within 500 feet and 0.5 mile of the centerline)	Count
Public Airports within 20,000 feet of the centerline	Count
Geologic Karst features within the ROW Corridor	Miles; Acres

Sources: [a] Rextag Infrastructure Data, [b] ReportAll [c] HIFLD, [d] MDOT, [e] WVDOT, [f] MDiMap, [g] WVGISTC, [h] PASDA, [i] ERM, [j] PAD-US, [k] NCED, [l] MDNR, [m] MDiMAP, [n] PASDA, [o] WVDEP, [p] VADCR, [q] PASHPO, [r] WVSHPO, [s] MHT, [t] VADHR, [u] USA SSURGO, [v] USGS NLCD 2024, [W] USGS NHD, [x] FEMA's National Flood Hazard Layer (NFHL), [y] USFWS, [z] MDE, [aa] PFBC, [bb] PADEP, [cc] WVDNR, [dd] VADWR, [ee] USGS, [ff] VADWR, [gg] PNHP, [hh] PADCNR, [jj] Appendix H, Wetland Identification Model Report

BioNet = Biodiversity Conservation Network; CWF = Coldwater Fishes; DEP = Department of Environmental Protection; DNR = Department of Natural Resources; EV = Exceptional Value; FEMA = Federal Emergency Management Agency; HQ = High Quality; kV = kilovolt; MBTA = Migratory Bird Treaty Act; MD = Maryland; NHD = National Hydrography Dataset; NHI = Natural Heritage Inventory; NHL = National Historic Landmark; NLCD = National Land Cover Database; NRHP = National Register of Historic Places; NWI = National Wetlands Inventory; PA = Pennsylvania; ROW = right-of-way; SSURGO = Soil Survey Geographic Database; TSF = Trout Stocking; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service; VA = Virginia; WV = West Virginia; WMA = Wildlife Management Area

3. MARL PROJECT STUDY AREA

3.1 MARL PROJECT STUDY AREA DESCRIPTION

The Routing Team developed a study area broad enough to incorporate a diversity of routing options with a focus on using existing high-voltage transmission lines between the MARL Project's endpoints and other existing linear infrastructure. The MARL Project Study Area encompasses 1,053 square miles, is 95 miles west to east (straight-line distance) (Figure 1.1-1), and varies from 8 to 16 miles wide across the following states and counties:

- Pennsylvania: Greene and Fayette Counties;
- West Virginia: Monongalia, Preston, Mineral, and Hampshire Counties;
- Maryland: Garrett and Allegany Counties; and
- Virginia: Frederick County.

As depicted on Figure 1.1-1 and in Appendix E-1, Major Constraints and Opportunities, the Study Area generally follows existing transmission lines between the two Project endpoints and is bound by the following features:

- Morgantown in Monongalia County, West Virginia, to the southwest.
- Masontown and Fairchance in Greene County, Pennsylvania, to the northwest.
- Approximate 4-mile buffer of the 502 Junction Substation to the west near Interstate 79 in Greene County, Pennsylvania.
- Cumberland and Frostburg, Maryland to the north.
- Approximate 4-mile buffer of the existing high-voltage transmission lines to the south, including:
    - Potomac Edison's[8] 138 kV transmission line traveling west to east in Monongalia and Preston Counties, West Virginia, and Garret County, Maryland (referred to as Hazelton to Lake Lynn 138 kV, Jennings to Hazelton 138 kV, and Frostburg to Jennings 138 kV).
- Potomac Edison's 500 kV transmission line (referred to as Hatfield's Ferry Power Station to Black Oak 500 kV) traveling southeast from Fayette County, Pennsylvania to Black Oak Substation in Mineral County, West Virginia.
    - Potomac Edison's 138 kV transmission line (referred to as Hampshire to Ridgeley 138 kV) traveling southeast in Hampshire County, West Virginia.
    - Potomac Edison's 138 kV transmission line (referred to as Hampshire to Stonewall 138 kV) traveling west to east in Hampshire County, West Virginia, and Frederick County, Virginia.
- Approximate 4-mile buffer of the MARL Project endpoint to the east near US-522 (North Frederick Pike) in Frederick County, Virginia (referred to as the handoff point).

The Study Area encompasses 34 census designated places (CDP), including, but not limited to:

- Cheat Lake CDP, West Virginia
- Jennings CDP, Maryland

[8] Potomac Edison is a subsidiary electric company owned by FirstEnergy.

- Detmold CDP, Maryland
- Danville CDP, Maryland
- Rawlings CDP, Maryland
- Fort Ashby CDP, West Virginia
- Springfield CDP, West Virginia
- Gore CDP, Virginia

The Study Area also encompasses 19 incorporated places shown on Appendix E-1 including, but not limited to:

- Smithfield, Pennsylvania
- Fairchance, Pennsylvania
- Point Marion, West Virginia
- Morgantown, West Virginia
- Brandonville and Bruceton Mills, West Virginia
- Friendsville, Maryland
- Accident, Maryland
- Lanaconing Town, Maryland
- Capon Bridge, West Virginia

The Study Area traverses a diverse Appalachian landscape, characterized by rolling to rugged terrain within the Allegheny Mountains and Ridge-and-Valley physiographic provinces. The land cover is predominantly forested, interspersed with agricultural fields, rural residences, and small towns, reflecting a mix of low-density rural and exurban land uses. Morgantown, home to West Virginia University, marks the western end with a more urbanized core, while Gore, a small unincorporated community in Frederick County, Virginia, anchors the east with a more sparsely developed setting. The existing high-voltage transmission lines in the Study Area traverse rugged terrain in Maryland and West Virginia such as Savage River State Forest and Dan's Mountain in Maryland and Knobly Mountain, White Horse Mountain, and Dillons Mountain in West Virginia. The Study Area contains outdoor recreational activities including hiking, kayaking, and fishing highlighted in Section 3.2.

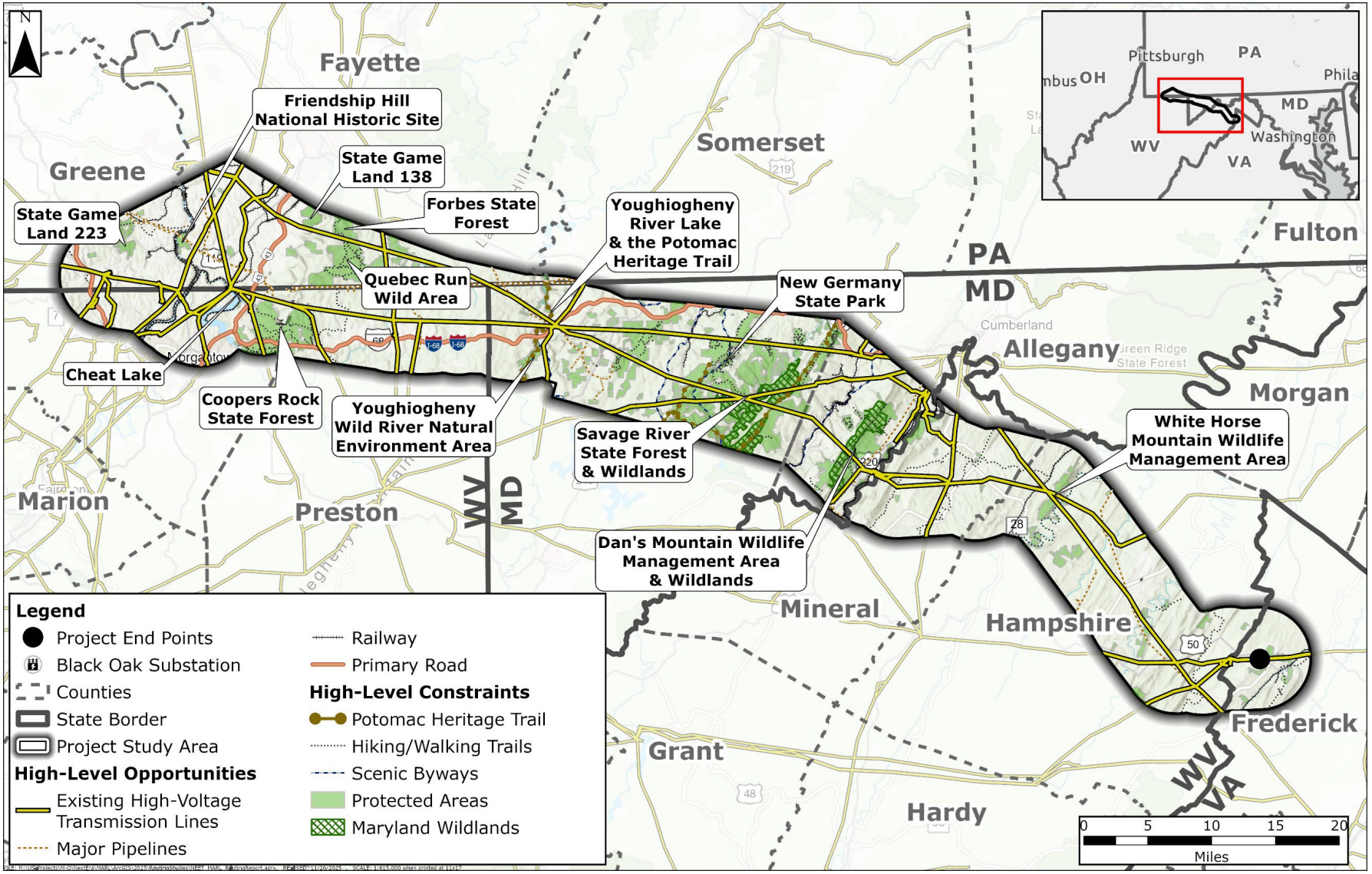
3.2 MAJOR ROUTING CONSTRAINTS AND OPPORTUNITIES IN THE MARL PROJECT STUDY AREA

This section summarizes the major constraints and opportunities in the MARL Project Study Area affecting transmission line routing. In accordance with the state siting requirements and/or guidelines,[9] ERM assessed constraints and opportunities for routing the MARL Project.

[9] 52 PA Code §57.75(e)(3); 52 PA Code §57.72(c)(7)-(13); 52 PA Code §69.3105; W. Va. Code R. §24-2-11a; W. Va. Code R. §150-3-9 (Electric Rule 9); COMAR §20.79.04.02–20.79.04.04; Md. Code Ann., Pub. Util., Section 7-207; and Guidelines for Transmission Line Applications Filed Under Title 56 of the Va. Code.

Routing opportunities within the Study Area included existing transmission lines, utility ROWs, and major roadways. Routing constraints included residential and non-residential buildings, existing and planned developments, public lands, and sensitive natural resources (e.g., streams, floodplains, wetlands). Often, features in the Study Area are both constraints and opportunities. For example, running parallel to existing transmission lines in a state forest could offer space for new ROWs, but it may not be compatible with the adjacent land uses (e.g., dwellings or businesses). ERM also identified routing constraints and opportunities through review of local land use plans and stakeholder engagement. Figure 3.2-1 depicts major routing constraints and opportunities in the Study Area and Appendix E-1 provides a detailed mapbook of these major routing constraints and opportunities within the Study Area. Appendix E-2, Terrain and Slope, provides a detailed mapbook of the slope and terrain that is throughout the Study Area.

FIGURE 3.2-1 MAJOR ROUTING CONSTRAINTS AND OPPORTUNITIES IN THE MARL PROJECT STUDY AREA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

- **Existing Transmission Lines:** The MARL Project Study Area has several high-voltage transmission lines that were used as routing opportunities, including but not limited to:
  - A 500 kV transmission line operated by Keystone Appalachian Transmission Company from Fort Martin Power Station in Monongalia County, West Virginia, traveling north through the western portion of the Study Area. Referred to as "Ronco to Fort Martin 500 kV" in Section 4.1.
  - A 500 kV transmission line operated by Monongahela Power Company[10] from Hatfield's Ferry Power Station, traveling southeast through the Study Area. Referred to as "Hatfield's Ferry Power Station to Black Oak 500 kV" in Section 4.1.
  - A 500 kV transmission line operated by Potomac Edison from Black Oak to Bedington, traveling east-southeast. Referred to as "Black Oak to Bedington 500 kV" in Section 4.1.
  - A 138 kV transmission line operated by Potomac Edison from Lake Lynn Power Station, traveling east to Cumberland, Maryland. Referred to as "Hazelton to Lake Lynn 138 kV," "Jennings to Hazelton 138 kV" and "Frostburg to Jennings 138 kV" in Section 4.1.
  - A 138 kV transmission line operated by Potomac Edison from Cumberland, Maryland, traveling southeast to Capon Bridge, West Virginia. Referred to as "Hampshire to Ridgeley 138 kV" in Section 4.1.
  - A 138 kV transmission line operated by Potomac Edison from Romney, West Virginia, traveling east to the MARL Project endpoint in Frederick County, Virginia. Referred to as "French Mill to Hampshire 138 kV" or "Hampshire to Stonewall 138 kV" in Section 4.1.
  - A 500 kV transmission line operated by Virginia Electric & Power Company from Mount Storm Substation in Grant County, West Virginia, traveling east to the MARL Project endpoint in Frederick County, Virginia, and continuing to Doubs Substation in Frederick County, Maryland. Referred to as "Mt Storm to Doubs 500 kV" in Section 4.1.
- **Existing Natural Gas Pipelines:** The MARL Project Study Area has several natural gas pipelines, including gathering, distribution, and transmission. Several transmission pipelines were selected for routing opportunities, including, but not limited to:
  - A transmission natural gas pipeline operated by Columbia Gas Transmission, LLC traveling east to west along the Pennsylvania and West Virginia border.
  - A transmission natural gas pipeline operated by Texas Eastern Transmission, LP traveling southeast in Garrett County, Maryland.
  - A transmission natural gas pipeline operated by Texas Eastern Transmission, LP traveling south in Hampshire County, West Virginia.
- **Railways:** The Study Area has four predominant railways; however, these lines generally run southwest/northeast and do not offer opportunities to connect the MARL Project's endpoints.
- **Primary Road Networks:** The MARL Project Study Area has several primary roads including, but not limited to:
  - **Interstate 68**: Travels east to west from Monongalia County, West Virginia, to Garrett County, Maryland. This highway corridor was ultimately not used as an opportunity for

[10] Monongahela Power is a subsidiary of FirstEnergy.

routing due to its scenic nature, particularly as a national scenic highway known as the National Freeway that traverses Garrett and Allegany Counties, Maryland, and offers dramatic views of forested ridges, valleys, and mountain towns. In Monongalia and Preston Counties, West Virginia, Interstate 68 also offers several scenic opportunities near Coopers Rock State Forest.

- **Interstate 79:** Travels north to southwest of the MARL Project endpoint in Greene County, Pennsylvania. This highway corridor was not used as a routing opportunity due to its direction and location.
- **State Highway 43:** Travels north to south from Fairchance, Pennsylvania, to Morgantown, West Virginia. This highway corridor was not used as a routing opportunity due to its direction and location.

- **Protected Areas:** There are 188 protected areas in the MARL Project Study Area, including 69 agricultural easements, 44 conservation easements, 4 historic or cultural easements, 33 local parks or recreation areas, 1 military base, 16 private conservation areas, 2 recreation management areas, 6 state conservation areas, 4 state parks, 6 state resource management areas, and 2 state wilderness areas. There are also eight different state wildland areas designated in Maryland within the Study Area. The major constraints for routing include the following protected resources:
  - **Coopers Rock State Forest:** Coopers Rock State Forest is a 12,747-acre state forest located in Morgantown, West Virginia, that is managed by the West Virginia Division of Forestry. The northern section of this forest is known as the West Virginia University Research Forest and is a working forest used primarily for education and academic research. There are currently two existing high-voltage transmission lines within the research forest in the north that are used as routing opportunities for this Routing Study.
  - **Friendship Hill National Historic Site:** Friendship Hill National Historic Site is in Point Marion, Pennsylvania, on 675 acres of land near the Monongahela River and is managed by the National Park Service. It commemorates the life and legacy of Albert Gallatin, best known for his 13-year tenure as Secretary of the Treasury under Presidents Thomas Jefferson and James Madison. During his time in office, Gallatin significantly reduced the national debt, played a key role in the acquisition of the Louisiana Territory, and helped fund the Lewis and Clark Expedition.
  - **State Game Land No. 138:** Pennsylvania State Game Land No. 138 (SGL 138) is managed by the Pennsylvania Game Commission to provide hunting and trapping opportunities through the management of wildlife habitat. There is currently an existing 500 kV high-voltage transmission line in the southern portion that is used as a routing opportunity for this Routing Study.
  - **Forbes State Forest:** Forbes State Forest is an approximately 60,000-acre forest reserve managed by the Pennsylvania Department of Conservation and Natural Resources Bureau of Forestry. The southern portion is in the Study Area and there is currently an existing 500 kV high-voltage transmission line running through the state forest that is used as a routing opportunity for this Routing Study.

- **Youghiogheny River Lake:** The Youghiogheny River Lake, located north of Friendsville, Maryland, is a flood control reservoir managed by the U.S. Army Corps of Engineers (USACE) that is a popular recreation destination. The Eastern Continental Divide Trail, which is a 150-mile network of hiking and paddling that is part of the Potomac National Scenic Trail, also follows the Youghiogheny River Lake. There are currently two existing high-voltage transmission lines that cross the Youghiogheny River Lake north of Friendsville that are used as routing opportunities for this Routing Study.
- **Youghiogheny Wild River Natural Environmental Area:** The Youghiogheny Wild River Natural Environmental Area, located south of Friendsville and Interstate 68, is managed by the Maryland Park Service. It was the first officially designated state Wild River in Maryland and is used heavily for whitewater rafting and other recreational activities. The Eastern Continental Divide Trail, a 150-mile network of hiking and paddling that is part of the Potomac National Scenic Trail, also follows the river.
- **Savage River State Forest:** Savage River State Forest, located in Garrett County, Maryland, spans approximately 55,000 acres. It is used for recreation opportunities such as hiking, snowmobiling, camping, and hunting. The forest also supports sustainable timber harvesting through a forest stewardship plan. Of the 55,000 acres, 11,000 acres are designated as Maryland State Wildlands. Savage River State Forest contains two sections of the Potomac Heritage National Scenic Trail, including Meadow Mountain and Big Savage Mountain Trail. There are currently several routing opportunities within the state forest, including an existing 500 kV high-voltage transmission line operated by Potomac Edison traveling southeast through the middle of the forest and its associated Wildlands; an existing 138 kV high-voltage transmission line traveling west to east through the northern portion of the forest operated by Potomac Edison; and an existing 138 kV high-voltage transmission line traveling northeast operated by Potomac Edison going through the associated Wildlands.
- **Dan’s Mountain Wildlife Management Area:** Dan’s Mountain Wildlife Management Area (WMA) contains approximately 9,500 acres in Allegany County, Maryland, and is managed by the Maryland Department of Natural Resources. Approximately 50 percent of the WMA is designated as Maryland State Wildlands. There is currently an existing 500 kV high-voltage transmission line bisecting the WMA and Wildlands that is used as a routing opportunity for the Routing Study.
- **Maryland State Wildlands System**: The Maryland Wildlands System is a network of state-designated protected areas managed by the Maryland Department of Natural Resources. There are eight state-designated Wildlands in the Study Area that are part of Savage River State Forest and Dan’s Mountain WMA including: Bear Pen, Big Savage, Big Savage Mountain, Dan’s Mountain, High Rock, Middle Fork, Savage Ravines, and South Savage. Bear Pen, Big Savage Mountain, Big Savage, Savage Ravines, and Dan’s Mountain currently have existing high-voltage transmission lines bisecting the protected areas that are used as routing opportunities for this Routing Study.

- **White Horse Mountain Wildlife Management Area**: The White Horse Mountain WMA is a 1,725-acre conservation and recreation area located in Hampshire County, West Virginia, and is managed by the West Virginia Division of Natural Resources (WVDNR). The Potomac Conservancy held a conservation easement on White Horse Mountain to protect it from development and transferred ownership to WVDNR to manage the land as a public recreation area and WMA. The area contains rugged ridgeline topography including Valley Mountain and River Mountain. The area currently contains two high-voltage transmission lines bisecting the WMA that travel southeast and are used as routing opportunities for this Routing Study.

- **Scenic Byways:** There are several state-designated scenic byways, in the MARL Project Study Area including Mountain Maryland Scenic Byways and The Historic National Road in Garrett and Allegany Counties and the Laurel Highlands Scenic Byway in Fayette County, Pennsylvania.
- **Recreation:** There are several recreational opportunities within the MARL Project Study Area including hiking, mountain biking, boating, kayaking, hunting, and fishing. The Study Area contains three sections of the Potomac Heritage National Scenic Trail. Cheat Lake and the Youghiogheny River Lake offer kayaking and boating recreational opportunities. Recreational areas in the Study Area include but are not limited to those areas identified under the protected areas noted above and the following:
  - **Walking, Hiking, Backpacking, and Biking Trails:** The Study Area contains 329 miles of multi-use trails located in Savage River State Forest, Coopers Rock State Forest, Quebec Run Wild Area, Forbes State Forest, Dan's Mountain WMA, Monongahela and Cheat River, and various private trails. These trails include two sections of the Potomac National Scenic Trail (Meadow Mountain and Big Savage Trail), the Margraff Trail System, Mount Aetna Trails, Bowman Hill North, New Germany State Park Trails, The Alleghany Trail (Section 1), to name a few.
  - **Boating, Kayaking, and Whitewater Rafting:** There are many water-based recreational activities in the various streams, rivers, and lakes in the Study Area including 11.2 miles of the Youghiogheny River Trail, which includes an area of whitewater rafting south of Friendsville, Maryland. The Study Area also has water trails on Patterson Creek, Cacapon River, Upper Monongahela River, and the South Branch and North Branch of the Potomac River.
  - **Fishing:** The Study Area contains many fishing opportunities across the 1,200+ miles of perennial streams, including 700+ miles of coldwater fisheries and trout streams. There are also 11+ miles of trout-stocked streams in Maryland, and 6 miles of trout-stocked streams in Pennsylvania.
  - **Camping:** There are various private and state-managed campgrounds in the Study Area including Coopers Rock State Forest, New Germany State Park, Hill Run Group Campsite in Dan's Mountain, and Big Run State Park Campground.
  - **Hunting:** There are various private and public hunting areas in the Study Area including Savage River State Forest, SGL 138, SGL 223, Dan's Mountain WMA, White Horse Mountain WMA, and Coopers Rock State Forest.

- **Cultural Resources:** There are many cultural resources in the MARL Project Study Area including resources listed in the National Register of Historic Places (NRHP), cemeteries, historic districts, and battlefields. Friendship Hill National Historic Site is also located in Fayette County, Pennsylvania, and includes the Gallatin house.
- **Sensitive Environmental Areas:** There are several sensitive environmental areas in the MARL Project Study Area including, but not limited to:
  - **Trout Streams:** West Virginia has many designated trout streams in Monongalia, Preston, and Hampshire Counties. Fayette County, Pennsylvania, contains many coldwater fisheries, Exceptional Value and High Quality Coldwater Fishery streams. Garrett and Allegany Counties, Maryland, contain many coldwater, recreational trout waters, and trout-stocked streams.
  - **Maryland Nontidal Wetlands of Special State Concern:** There are 37 Nontidal Wetlands of Special Concern within the Study Area. These wetlands are protected under Maryland's Nontidal Wetlands Protection Act and Code of Maryland Regulations (COMAR 26.23.06) and require a 100-foot protective buffer.
  - **Forests of Recognized Importance (Maryland):** In Maryland, Forests of Recognized Importance are forested areas that receive special attention and protection due to their ecological and water-quality significance. This includes 100-foot forested buffers along important streams.
  - **Biodiversity Conservation Network (Maryland):** The Biodiversity Conservation Network (BioNet) in Maryland is a dataset designed to guide conservation efforts across the state. Developed and maintained by Maryland Department of Natural Resources, BioNet identifies and maps biologically significant lands using multiple ecological criteria.
  - **Irreplaceable Natural Areas (Maryland):** Maryland established Irreplaceable Natural Areas (INAs) in June 2022 to preserve native biodiversity on state lands. There are 47 INAs in the Study Area that are part of Savage River State Forest, Dan's Mountain WMA, and the Youghiogheny River Natural Environmental Area.
  - **Virginia Natural Landscape Assessment Ecological Cores:** This dataset identifies large patches of natural land with at least 100 acres of interior cover known as a core area. These cores are broken down into categories of ecological importance (C1—Outstanding, C2—Very High, C3—High, C4—Moderate, and C4—General).

3.3 FIELD RECONNAISSANCE AND STAKEHOLDER ENGAGEMENT

The Routing Team conducted field reconnaissance reviews of various locations within the MARL Project Study Area and along identified route segments from public roads during 2025. These site visits were used to visually assess terrain, land use, vegetation, residential development, and existing infrastructure conditions. Photographs and field observations collected during these visits supplemented the desktop data to aid in the analysis and evaluation of route segments. Field reconnaissance also provided valuable on-the-ground context, helped the Routing Team verify data accuracy and identify potential constraints not visible in the high-resolution aerial imagery flown for the MARL Project, and helped refine the Routing Team's understanding of local conditions.

Starting in early 2025, the Routing Team initiated outreach to agencies and stakeholders as part of route development and evaluation. Throughout the outreach, the Routing Team gathered feedback on the Study Area and then the preliminary draft route options through engagement with the public, elected officials, regulatory and planning groups, land managing agencies, and the public. This led to the development of the final Alternative Routes identified in Section 4.5. NEET MA and NEET VA announced the MARL Project via mail and website in February 2025 and held eight in-person open houses in May to share information and receive feedback. NEET MA and NEET VA maintains the website with up-to-date Project information and an interactive online map displaying the current routes and high-level constraint and opportunity data. Additionally, during open comment periods, the public was able to pin geographically related comments on this platform. The Routing Team used stakeholder feedback to refine and optimize routes and help support decisions to remove segments from further consideration. Refer to Section 4 for how the routes were identified. A detailed list of agencies and stakeholders that have been engaged on the MARL Project can be found in the state commission applications and supporting testimony.

4. ROUTE IDENTIFICATION

The routing process for the MARL Project was structured as a multi-phased, iterative approach that integrated both quantitative and qualitative assessments at each stage. The Routing Team began by identifying broad conceptual route corridors within the MARL Project Study Area that generally followed existing transmission lines that maintained a similar directional alignment between the two MARL Project endpoints. From these conceptual route corridors, the Routing Team developed preliminary route segments that were evaluated using measurable criteria such as line length, potential for paralleling, and parcel crossings, as well as qualitative factors including land use compatibility, community context, and field observations. These route segments were presented as preliminary draft route options for public input through open houses and an online survey (Appendix I, Public Open House Content).

Following the public input period, the Routing Team assessed the input and further refined route segments. These refined route segments were consolidated into longer "trunks" or route groupings that were further evaluated quantitatively and qualitatively. Through continued refinement and comparative evaluation of the route groupings, the Routing Team ultimately identified six full end-to-end route alternatives that reflect technical and regulatory requirements and address stakeholder preferences. These six Alternative Routes and their respective features are presented in Table 1.4-1.

4.1 IDENTIFICATION OF CONCEPTUAL ROUTE CORRIDORS

As stated in Section 2, ERM collected data and analyzed the MARL Project Study Area for constraints and opportunities to identify route alternatives. To initiate the process, conceptual route corridors were developed as broad, general areas within which the MARL Project could feasibly be located and generally followed the existing transmission lines within the Study Area. The conceptual route corridors were developed at a high level to avoid mapped large area constraints and/or incorporate notable opportunity features—existing transmission lines—that could be paralleled. The conceptual route corridors were designed to provide options that allowed for:

- Paralleling existing transmission lines where feasible;
- Maximizing the separation distance from or minimizing impacts on residential dwellings; and
- Minimizing conservation easement crossings.

Additional considerations during conceptual route corridor development included:

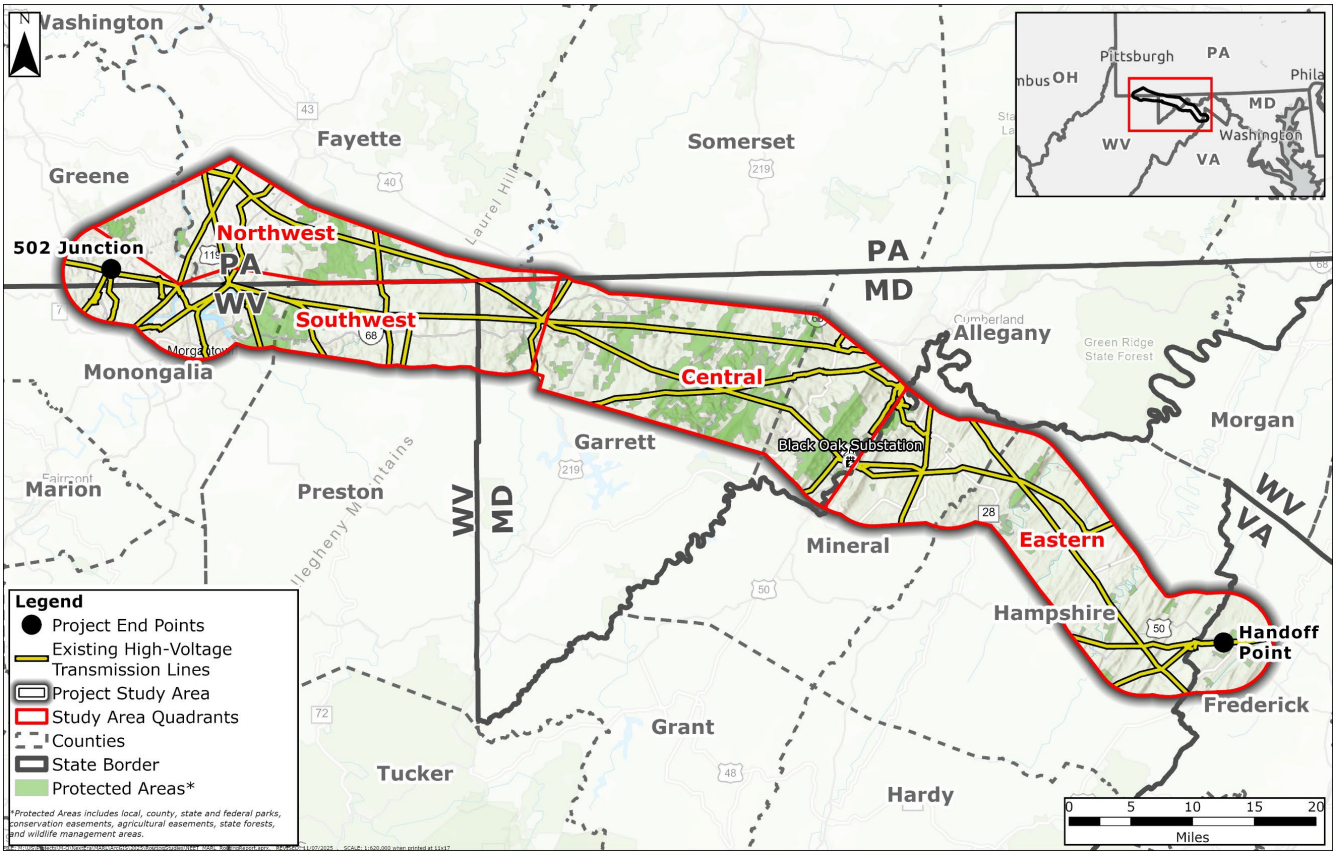
- Natural environment constraints (e.g., wetlands, wildlife habitats, protected lands);
- Built environment patterns (e.g., land use, residential neighborhoods, residential structures, commercial buildings);
- Engineering constructability (e.g., topography, access); and
- Regulatory and permitting constraints.

The conceptual route corridors were developed to parallel existing transmission lines to the greatest extent possible, focusing on those that traveled in the same general direction between the MARL Project's endpoints. This reduced the overall line length and associated potential

impacts. Appendix E-1 provides detailed mapping of the existing transmission lines within the Study Area.

To help facilitate development of conceptual route corridors, the Study Area was subdivided into four quadrants—Northwest, Southwest, Central, and Eastern—to facilitate a more organized and efficient review of routing alternatives across the large Study Area (Figure 4.1-1).

FIGURE 4.1-1 MARL PROJECT STUDY AREA QUADRANTS



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

Quantitatively, this enabled the evaluation of the criteria identified in Table 2.7-1 (e.g., length, paralleling, parcel crossings). Qualitatively, this allowed for an assessment of constraints that could not be quantitatively compared (e.g., land use patterns, community development, terrain characteristics). The combination of quantitative analysis and qualitative insight supported a transparent, data-driven decision-making process and made sure that development of route segments and alternatives were evaluated consistently throughout the process. This framework enabled the Routing Team to identify, evaluate, and refine potential route segments within each quadrant, ultimately supporting the development of end-to-end Alternative Routes.

Within each quadrant, routing efforts prioritized opportunities to parallel existing transmission lines and other compatible linear features, where feasible, while also avoiding large concentrations of developed areas. This approach was intended to:

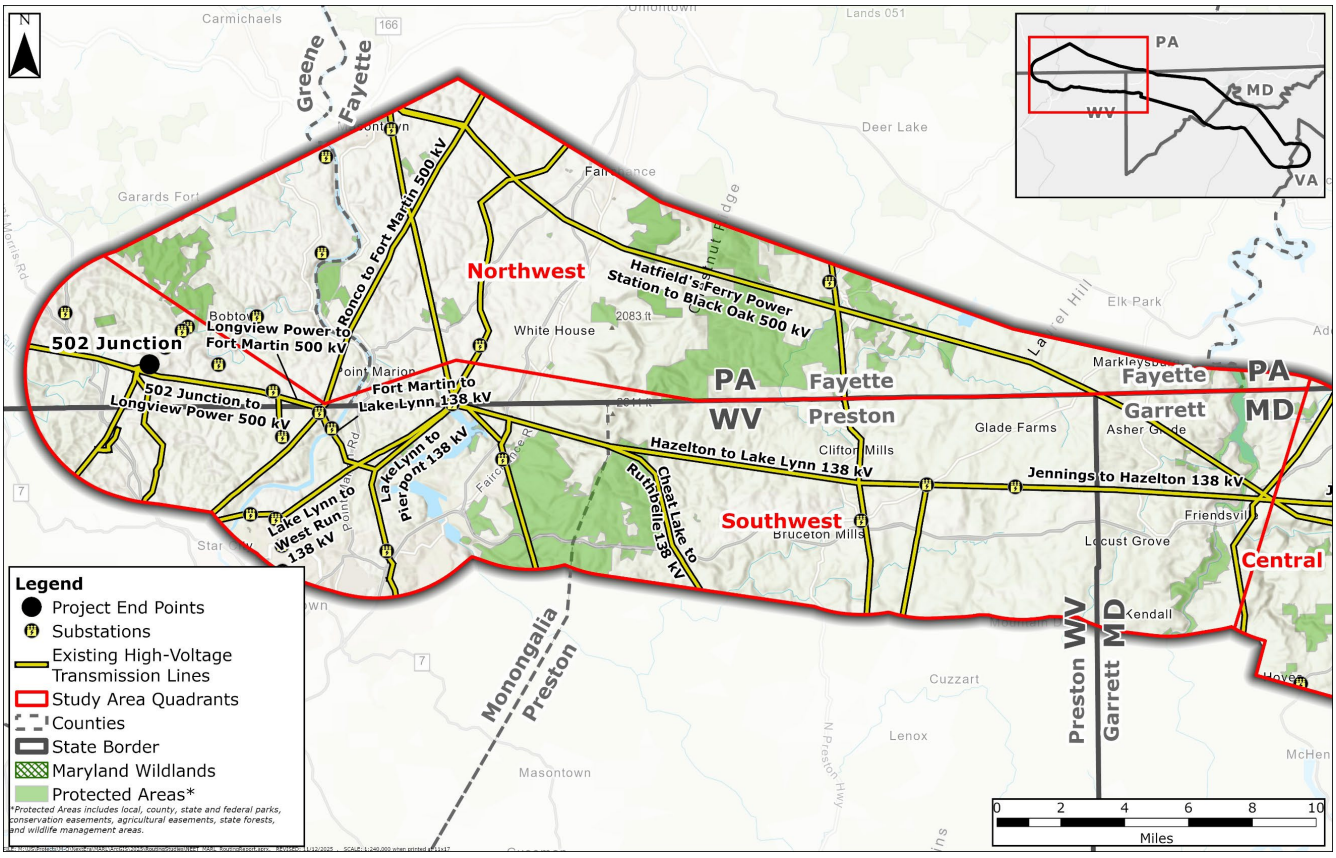
- Minimize impacts on the natural environment;
- Reduce potential conflicts with the existing built environment;
- Streamline permitting and stakeholder engagement; and
- Enhance constructability and long-term operational efficiency.

The Study Area has four quadrants that are as follows.

4.1.1 SOUTHWEST QUADRANT

Beginning at 502 Junction in Greene County, Pennsylvania, this area includes the southern portion of Greene and Fayette Counties. It also includes areas of northern Monongalia County and northern Preston County, West Virginia. This quadrant ends after the Youghiogheny River near Friendsville in Maryland where two primary existing transmission lines cross (Jennings to Hazelton 138 kV and Hatfield's Ferry Power Station to Black Oak 500 kV). Refer to Figure 4.1-2 for the southwest quadrant details.

FIGURE 4.1-2 EXISTING TRANSMISSION LINES IN THE SOUTHWEST AND NORTHWEST QUADRANTS



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

The southwest quadrant includes the following existing transmission lines targeted for paralleling:

- **502 Junction to Longview Power 500 kV Transmission Line:** This line travels east to southeast near the 502 Junction Substation and offered an opportunity for paralleling the existing transmission line immediately at the western terminus of the MARL Project. In this area, conceptual route corridors deviated from the existing transmission line in certain locations to reduce potential impacts on residential developments near Bald Hill Church Road and Matthews Road. Instead, the conceptual route corridors shifted south to traverse large expanses of undeveloped land and open fields, thereby minimizing residential proximity and potential land use conflicts.
- **Longview Power to Fort Martin 500 kV Transmission Line:** This line presented an opportunity for paralleling the existing transmission line to the southwest between Fort Martin and Longview Power, near Walnut Hill Road, where minimal residential development is present along the existing transmission lines.
- **Hazelton to Lake Lynn 138 kV Transmission Line:** This line extends approximately 18 miles west to east between the Lake Lynn Generating Station and the Hazelton Substation, offering numerous opportunities for paralleling the existing transmission line. It crosses through the northern section of Coopers Rock State Forest. Conceptual route corridors deviated from the existing transmission line in localized areas of residential development—such as near Fairchance Road in Monongalia County and Route 26 in Preston County, West Virginia—to minimize potential impacts on residents. The Routing Team also considered a conceptual route corridor to the north of the existing transmission line. Not directly paralleling adjacent to the existing transmission line provided options to avoid impacts on Coopers Rock State Forest, to the greatest extent possible, as well as crossings of the Cheat River north of Lake Lynn Dam, a Federal Energy Regulatory Commission-regulated hydroelectric dam. This conceptual route corridor to the north required approximately 16 miles of a greenfield section across private lands versus approximately 11 miles of paralleling adjacent to the existing transmission line.
- **Lake Lynn to West Run 138 kV Transmission Line and Fort Martin to Lake Lynn 138 kV Transmission Line:** The area between the Monongahela River and the Cheat River in Monongalia County contains two existing transmission lines: Lake Lynn to West Run 138 kV and Fort Martin to Lake Lynn 138 kV. These existing lines were initially considered for potential paralleling for the MARL Project conceptual route corridor; however, subsequent due diligence identified extensive residential development, and no routes within this area were advanced that met the criteria outlined in Section 2.7.
- **Cheat Lake to Ruthbelle 138 kV Transmission Line:** This line parallels the Hazleton to Lake Lynn 138 kV transmission line through Coopers Rock State Forest and deviates south toward Laurel Run West Virginia. Conceptual route corridors paralleled this existing transmission line through Coopers Rock State Forest.
- **Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line:** This line extends southeast through Forbes State Forest in Pennsylvania and crosses the Youghiogheny River into Maryland. Conceptual route corridors generally paralleled this existing transmission line, except in areas with higher residential density. As one of two existing transmission lines

that cross the Youghiogheny River near Friendsville, Maryland, it was specifically targeted for paralleling at the river crossing.

- **Jennings to Hazelton 138 kV:** This line runs approximately 18 miles west to east from Preston County, West Virginia, to Garrett County, Maryland, crossing the Youghiogheny River. It is the second of the two existing transmission lines that cross the Youghiogheny River near Friendsville, Maryland, and was similarly targeted for paralleling at that location.

4.1.2 NORTHWEST QUADRANT

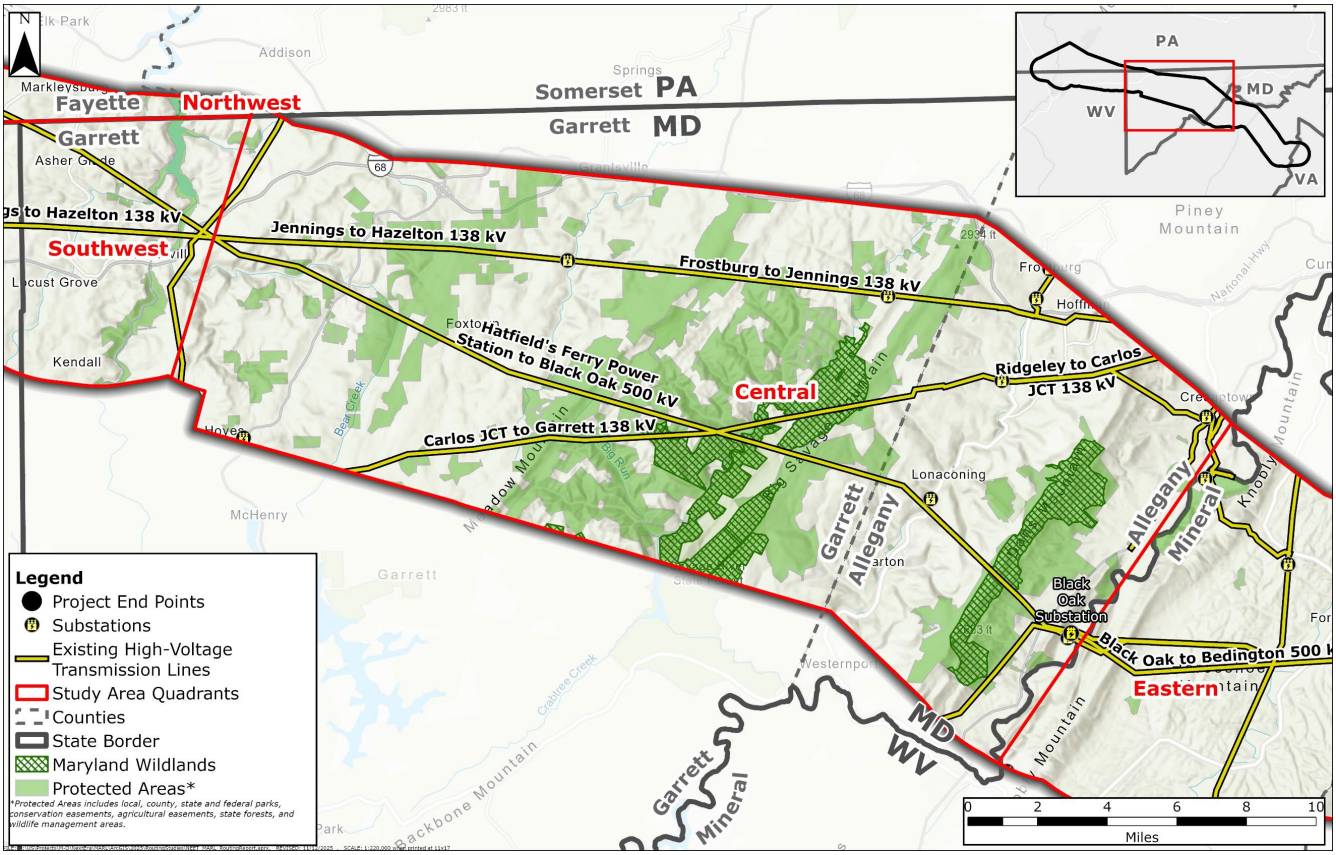
The northwest quadrant includes the southeastern corner of Greene County, Pennsylvania, and the southern portion of Fayette County, Pennsylvania, from the Friendship Hill National Historic Site in the east, through Haydentown, Elliotsville, and ending near Markleysburg, Pennsylvania. Refer to Figure 4.1-2 for the northwest quadrant details. The northwest quadrant includes two existing transmission lines targeted for paralleling: the Ronco to Fort Martin 500 kV Transmission Line and the Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line, which continues through the southwest and central quadrants.

These existing transmission lines provided conceptual route corridor optionality that avoided crossing Cheat Lake, Coopers Rock State Forest, and developed areas in Monongalia County. These conceptual route corridors provided a higher percentage of paralleling existing transmission lines. However, they required an overall longer length compared to the southern conceptual route corridors and had an increased amount of stream and state land crossings by crossing through three Pennsylvania state-managed lands (SGL 138, Quebec Run Wild Area, and Forbes State Forest).

4.1.3 CENTRAL QUADRANT

The central quadrant of the MARL Project Study Area begins after the Youghiogheny River in Friendsville, Maryland, extends through Garrett County into Allegany County, and ends at the North Branch of the Potomac River, which is the state line between Allegany County, Maryland, and Mineral County, West Virginia, near Danville, Maryland. Refer to Figure 4.1-3 for the central quadrant details.

FIGURE 4.1-3 EXISTING TRANSMISSION LINES IN THE CENTRAL QUADRANT OF THE MARL PROJECT STUDY AREA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

The central quadrant includes the following existing transmission lines targeted for paralleling:

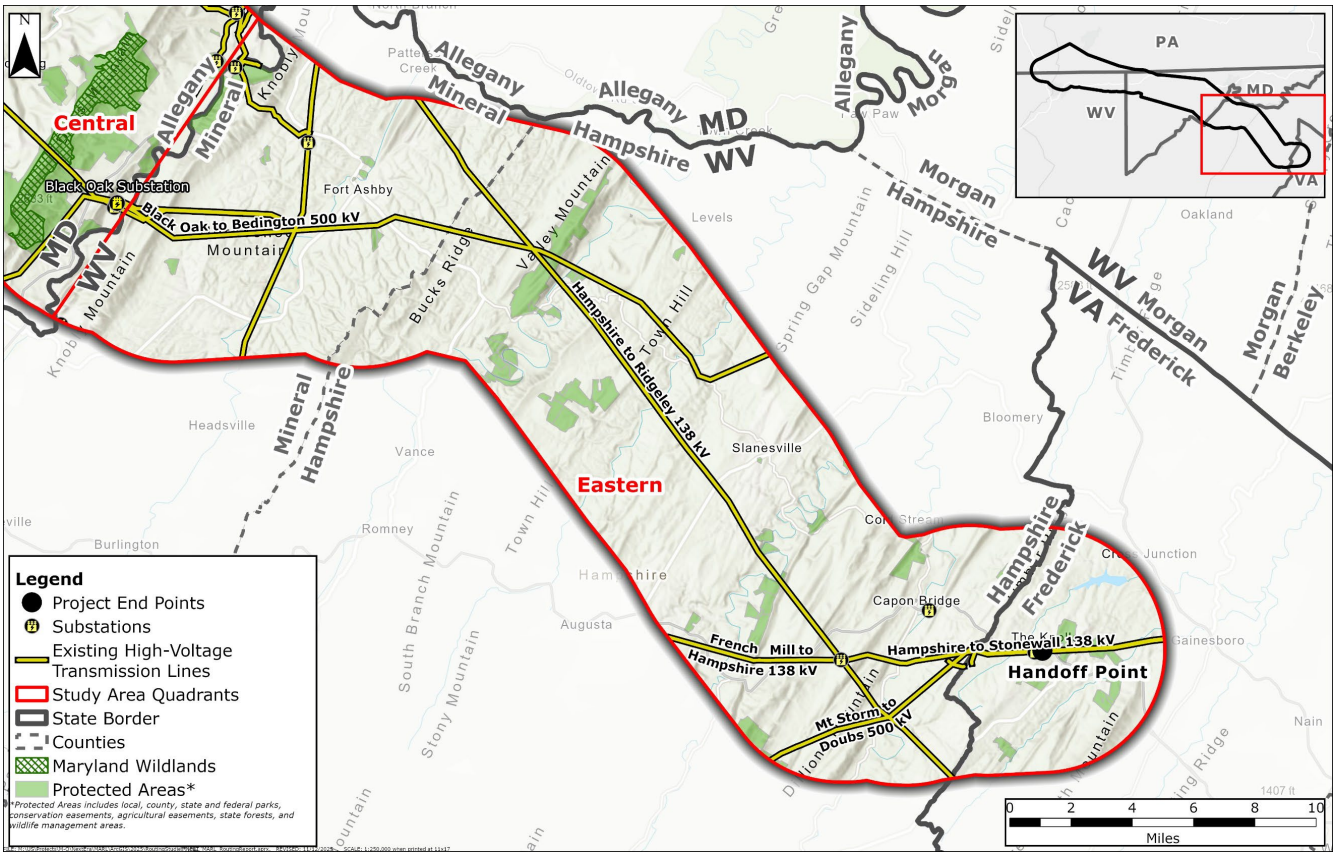
- **Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line:** This line travels in a southeast direction through the central portion of the MARL Project Study Area for 28 miles. It crosses through Savage River State Forest, Big Savage Wildlands, Dan's Mountain WMA, and Dan's Mountain Wildlands. The conceptual route corridors paralleled this existing transmission line through most of the central quadrant except in areas of residential development such as Fairview Road in Garrett County, Bear Creek Area near Kaese Mill, and as the line approaches Black Oak Substation.
- **Jennings to Hazelton 138 kV Transmission Line and Frostburg to Jennings 138 kV Transmission Line:** These two lines travel west to east for 25 miles through the central quadrant of the MARL Project Study Area. The conceptual route corridors paralleling these existing transmission lines provided optionality to avoid crossing larger sections of Savage River State Forest and avoid crossing through the Maryland Wildlands, including Dan's Mountain, Big Savage, and Bear Pen. The conceptual route corridors paralleled these lines for approximately 18 miles before a greenfield section heading south to avoid the built-up areas of Frostburg and connecting with the other existing transmission lines near Black Oak Substation. To avoid the Maryland Wildlands and Savage River State Forest crossings, these conceptual route corridors required approximately 12 miles of additional greenfield sections.

- **Carlos JCT to Garrett 138 kV:** This line travels west to northeast for 18 miles and crosses through Savage River State Forest, Bear Pen Wildlands, Big Savage Wildlands, and Savage Ravine Wildlands. Generally, this existing transmission line does not travel in the direction needed for the MARL Project to reach the endpoint; however, there were small sections of the existing transmission line targeted for paralleling adjacent to Bear Pen Wildlands to reduce greenfield sections in this part of Savage River State Forest.

4.1.4 EASTERN QUADRANT

The eastern quadrant of the MARL Project Study Area begins at the North Branch of the Potomac River, which is the state line between Allegany County, Maryland, and Mineral County, West Virginia, near Danville, Maryland, extends southeast through Hampshire County, West Virginia, and ends at the handoff point in Frederick County, Virginia. Refer to Figure 4.1-4 for the eastern quadrant details.

FIGURE 4.1-4 EXISTING TRANSMISSION LINES IN THE EASTERN QUADRANT OF THE MARL PROJECT STUDY AREA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

The eastern quadrant includes the following existing transmission lines targeted for paralleling:

- **Black Oak to Bedington 500 kV Transmission Line:** This line extends east from the existing Black Oak Substation in Maryland and then through Fort Ashby and White Horse Mountain WMA. The conceptual route corridors parallel this existing transmission line to the extent feasible except for the residential development around the Fort Ashby area, which required greenfield sections of the conceptual route corridor further south that traverse through large undeveloped private lands. The Routing Team also considered a conceptual route corridor to the south that avoided impacts on White Horse Mountain WMA. This conceptual route corridor starts east of the Black Oak Substation, south of the existing transmission line and travels southeast to eventually parallel the Hampshire to Ridgeley 138 kV Transmission Line. However, this conceptual route corridor required approximately 12 miles of a greenfield section through private land and a new crossing of the South Branch of the Potomac River.
- **Hampshire to Ridgeley 138 kV Transmission Line:** This line travels southeast and crosses the Black Oak to Bedington 500 kV line just north of the White Horse Mountain WMA. The conceptual route corridors parallel this existing transmission line south through Hampshire County, West Virginia, until the Hampshire to Stonewall 138 kV line. The conceptual route corridors deviate from the existing transmission line in areas of residential development such as Points, Augusta, and Timber Mountain, West Virginia. The conceptual route corridors also deviate around newly developed conservation easements near North River.
- **French Mill to Hampshire 138 kV Transmission Line and Hampshire to Stonewall 138 kV Transmission Line:** These lines travel west to east for 16 miles from Hampshire County, West Virginia, to Frederick County, Virginia. The MARL Project terminates at the handoff point on the Hampshire to Stonewall 138 kV Transmission Line. The conceptual route corridors parallel these two existing transmission lines where feasible but deviate in areas of dense residential development such as Sycamore Drive and Sirbaugh Road in Capon Bridge, West Virginia, and around Fletcher Road in Gore, Virginia.
- **Mt. Storm to Doubs 500 kV Transmission Line:** This line travels east to northeast. There is significant residential development around the existing transmission line as it approaches the Virginia border. The MARL Project terminates at a handoff point adjacent to this existing transmission line. The conceptual route corridors parallel this line where feasible but deviate in areas of dense residential development in Capon Bridge, West Virginia, and Gore, Virginia.

4.2 IDENTIFICATION OF PRELIMINARY DRAFT ROUTE OPTIONS

After identification of the conceptual route corridors, the Routing Team identified and mapped preliminary route segments within the MARL Project Study Area quadrants for initial evaluation against the routing criteria and guidelines identified in Section 2.7. The preliminary route segments were quantitatively and qualitatively assessed on a continual basis by the Routing Team and adjusted as needed to support the development of preliminary route options for the MARL Project open houses and online survey, which were designed to gather stakeholder and public feedback. The objective of this process was to reduce the number of route segments such that those remaining were more suitable for routing a new transmission line and could be combined

into reasonable full end-to-end preliminary draft route options. These assessments were conducted by the Routing Team using a combination of data sources, including digital datasets, stakeholder and agency input, and windshield field reconnaissance.

Through the windshield field reconnaissance, additional qualitative observations were made that informed further refinement of the preliminary route segments. As a result, certain preliminary route segments were adjusted or removed based on field-verified conditions not observable in the high-resolution imagery, such as newly constructed homes, residences obscured from aerial view, unmarked cemeteries, engineering constraints, and other site-specific factors. These field-based insights complemented the quantitative data and verified that route development was grounded in both spatial analysis and real-world conditions.

The Routing Team compiled data analytics for each preliminary route segment using common starting and ending points and compared them against each other in the four quadrants of the MARL Project Study Area, removed those preliminary route segments that were less favorable, and then carried forward those remaining route segments. These remaining routes segments compromised the MARL Project "preliminary draft route options" that were presented to the public at the open houses and through the online survey. The preliminary draft route options that were shared publicly included route segments spanning approximately 310 total miles within the Study Area. These preliminary draft route options are shown on Appendix E-3, Preliminary Draft Route Options, and Appendix I.

4.3 STAKEHOLDER AND PUBLIC FEEDBACK

Stakeholder and public engagement played a critical role in shaping the routing process for the MARL Project. The Routing Team recognized the importance of gathering local knowledge, understanding community concerns, and incorporating stakeholder input into the development of route alternatives. To achieve this, a multi-faceted public outreach effort was launched, combining digital tools with in-person engagement across the four-state MARL Project Study Area and can be found in the state commission applications and supporting testimony.

The first step was an interactive online mapping survey, conducted in two phases. The initial online mapping survey, active from February 22 to April 5, 2025, invited landowners and stakeholders to share their primary concerns within the MARL Project Study Area. A total of 22,769 postcards were mailed to landowners within 2 miles of existing transmission lines that were targeted for paralleling to notify them of the survey. Landowners and the public were able to provide geographically-referenced specific feedback through an intuitive online platform. The MARL Project received 540 survey responses that helped the Routing Team identify sensitive areas and refine preliminary route segments.

The second phase of the online mapping survey, active from May 3 to June 6, 2025, presented the preliminary draft route options to the public. A total of 10,398 postcards were mailed to landowners within 1 mile of the preliminary draft route options. Using the interactive mapping tool, participants could explore the preliminary draft route options, highlight areas of concern, and submit comments directly tied to specific locations. The MARL Project received 719 survey responses that helped the Routing Team identify concerns along the preliminary draft route options, prioritize sensitive areas, and refine preliminary draft route options.

Concurrent with the second phase of the online mapping survey, the Routing Team hosted eight in-person open house meetings across the MARL Project Study Area in May 2025 and a virtual open house option on October 14, 2025, specific to the Maryland portion of the MARL Project. This public engagement effort aimed to educate the public about the MARL Project, gather constraint information not captured in existing datasets, and solicit input for route adjustments (please see Testimony of Kaitlin McCormick). The goal of the public engagement initiative was to collect any additional data to inform the route evaluation and selection process. Landowners within a 1-mile buffer of preliminary route options, along with local and state officials, received mailed invitations to attend the open houses:

- Monday, May 5, 2025, in Hampshire County, Slanesville, West Virginia 25444
- Tuesday, May 6, 2025, in Garrett County, Friendsville, Maryland 21531
- Wednesday, May 7, 2025, in Allegany County, Lonaconing, Maryland 21539
- Thursday, May 8, 2025, in Mineral County, Willey Ford, West Virginia 26767
- Monday, May 12, 2025, in Monongalia County, Morgantown, West Virginia 26506
- Tuesday, May 13, 2025, in Fayette County, Fairchance, Pennsylvania 15436
- Wednesday, May 14, 2025, in Preston County, Bruceton Mills, West Virginia 26525
- Tuesday, May 20, 2025, in Fredrick County, Gore, Virginia 22637
- Tuesday, October 14, 2025 (Virtual Maryland Open House)

At the end of the close of the online survey on June 6, 2025, a total of 1,259 comments were received in addition to feedback heard at the open houses. These comments provided critical qualitative insights that complemented the Routing Team's quantitative analysis, helping to refine route segments and eliminate routes that posed unacceptable impacts or constraints.

The team also held a virtual open house on October 14, 2025, related to the evaluation of the route options that crossed the designated Maryland Wildlands Preservation System. The team continued to receive input on the MARL Project from the community-project hotline and e-mail address.

In addition to public input, the Routing Team engaged with a wide range of local, state, and federal agencies across the four states. These agencies provided technical feedback, regulatory guidance, and data that further informed the routing process. This comprehensive public engagement effort—combining digital tools, in-person meetings, virtual open house, and agency coordination—was instrumental in shaping the final routes. The feedback received helped guide the transition from conceptual route corridors to refined route segments, ultimately contributing to the identification of six full end-to-end route alternatives for regulatory review. A full list of agencies consulted is included in the state commission applications and supporting testimony.

4.4 ROUTE REFINEMENT AND ROUTE SEGMENT ELIMINATION

Following the public engagement efforts outlined in Section 4.3, the Routing Team conducted additional evaluations to refine the preliminary draft route options/route segments using the evaluation criterion in Table 2.7-1.

As part of the route refinement process, route segments were combined, modified, or dismissed based on stakeholder concerns, engineering constructability, and natural environment, built environment, cultural, and social criteria. In total, 84 route segments were evaluated, each representing a potential part of the Alternative Routes. Refer to Appendix E-4, Route Segments. These segments were not static; they were dynamic elements subject to change based on engineering constructability, land use compatibility, environmental sensitivity, and most importantly, public and stakeholder feedback.

Through the combination of the online surveys, open house meetings, and agency coordination, the Routing Team gathered extensive input. This feedback was paired with quantitative data—such as segment length, proximity to existing infrastructure, and parcel crossings—and qualitative insights from field reconnaissance, community context, and land ownership patterns.

The results of this comprehensive evaluation are detailed below and are shown in Table 4.4-1. Table 4.4-1 provides details on each route segment and provides rationale on why a route segment was dismissed, carried forward, and/or refined. As a result, the following was determined:

- Thirty-five segments were dismissed due to constraints such as engineering, built environment, or natural environmental concerns highlighted by agencies and reiterated by public input.
- Forty-nine segments were carried forward, forming the backbone of the final route alternatives.

Of the segments carried forward, 41 were refined—some shortened, rerouted, or adjusted—to better align with stakeholder concerns and constructability. These route segments were then combined into longer, more continuous route groupings, which served as the foundation for assembling the final end-to-end route alternatives. Route groupings represented feasible routing paths that span significant portions of the MARL Project Study Area and were used to narrow down final route alternatives. The same quantitative and qualitative assessment was performed on these route groupings that resulted in the identification of the full end-to-end final Alternative Routes. The preliminary route options presented to the public and the final route alternatives identified are shown on Appendix E-5, Preliminary Draft Route Options and Final Route Alternatives.

This process was not only about dismissing routes but also about refining and adapting potential route segment options. Segments like 13d and 20b, each over 8 and 14 miles respectively, were reevaluated to account for engineering, and natural and built environment factors, demonstrating the complexity and scale of the routing effort.

Ultimately, this overall routing and siting approach led to the development of six full end-to-end route alternatives, each composed of carefully selected and refined route segments. These routes represent not only technical feasibility but input from the public, stakeholders, and regulatory agencies.

TABLE 4.4-1 ROUTE SEGMENTS

Segment	County [a]	Status	Length (miles)	Notes
Pennsylvania				
1a	Greene	Route segment considered but dismissed	0.9	Dismissed due to engineering considerations to meet the existing utilities requirements in 502 Junction Substation
1b	Greene	Final route segment	0.9	Added due to engineering considerations to meet the existing utilities requirements in 502 Junction Substation
2	Greene	Final route segment	1.8	No change
3a	Greene	Route segment considered but dismissed	3.2	Dismissed due to residential property land use considerations and to narrow the number of segments to more favorable routing options
15	Greene	Final route segment	2.1	Refined due to topographical constraints and to reduce sharp turn angles
4a	Fayette	Final route segment	3.4	Refined due to planned residential development discovered during open houses
5a	Fayette	Final route segment	4.2	Refined due to topographical constraints and to reduce sharp turn angles
15a	Fayette	Final route segment	5.4	Refined to reflect stakeholder feedback received during open houses, including indications of landowner openness to allow the route on their property
15b	Fayette	Route segment considered but dismissed	5.2	Dismissed due to proximity to residential dwellings, sharp turn angles, and to narrow the number of segments to more favorable routing options
16	Fayette	Final route segment	4.2	Refined due to topographical constraints and planned residential development discovered during open houses
17a	Fayette	Final route segment	2.9	Refined due to engineering considerations to reduce the number of sharp turn angles
17b	Fayette	Route segment considered but dismissed	3.0	Dismissed due to proximity to residential dwellings
18a	Fayette	Final route segment	3.3	Refined to more closely parallel the existing transmission line, reduce proximity to residential dwellings, and reduce impacts to a commercial business
18b	Fayette	Route segment considered but dismissed	5.2	Dismissed due to longer route length, proximity to residential dwellings, and extensive greenfield development
19	Fayette	Final route segment	4.1	Refined due to engineering considerations to reduce the number of sharp turn angles
20a	Fayette	Route segment considered but dismissed	15.1	Dismissed due to proximity to residential dwellings and impacts to an agricultural easement

Segment	County [a]	Status	Length (miles)	Notes
20b	Fayette	Final route segment	15.0	Refined due to topographical constraints and to reduce the number of sharp turn angles
West Virginia				
3b	Monongalia	Final route segment	3.6	Refined to reflect stakeholder feedback received during open houses, including indications of landowner openness to allow the route on their property
4b	Monongalia	Route segment considered but dismissed	3.8	Dismissed due to planned residential development discovered during open houses
4b to 5a	Monongalia	Route segment considered but dismissed	0.7	Dismissed due to planned residential development discovered during open houses
5b	Monongalia	Final route segment	5.4	Refined due to planned residential development discovered during open houses
5c	Monongalia	Route segment considered but dismissed	4.0	Dismissed due to proximity to residential dwellings, planned residential development, and infrastructure crossing constraints
5c to 5b	Monongalia	Route segment considered but dismissed	0.5	Dismissed due to proximity to residential dwellings
6a	Monongalia	Final route segment	1.2	Added to more closely parallel the existing transmission line and reduce impacts on residents on the north side of the existing line
7a	Monongalia	Route segment considered but dismissed	1.1	Dismissed due to greenfield development and topographical constraints
7b	Monongalia	Route segment considered but dismissed	2.3	Dismissed due to proximity to residential dwellings
7c	Monongalia	Final route segment	1.4	No change
8a	Preston	Route segment considered but dismissed	4.5	Dismissed due to its greater route length, increased greenfield development, and higher water resource impacts
8b	Preston	Route segment considered but dismissed	2.2	Dismissed due to topographical constraints, sharp turn angles, and additional greenfield development
8c	Preston	Final route segment	2.7	Refined due to engineering considerations to more closely parallel the existing transmission line corridor
8d	Preston	Route segment considered but dismissed	2.6	No change
8e	Preston	Final route segment	3.0	Added to provide greater optionality to parallel existing transmission lines through Coopers Rock State Forest
9a	Preston	Final route segment	1.6	No change
9c	Preston	Final route segment	7.5	No change
10a	Preston	Route segment considered but dismissed	4.7	Dismissed due to its greater route length and increased greenfield development

Segment	County [a]	Status	Length (miles)	Notes
10b	Preston	Final route segment	3.9	No change
11	Preston	Final route segment	2.1	No change
12a	Preston	Route segment considered but dismissed	1.7	Dismissed due to planned residential development discovered at the open houses
12b	Preston	Final route segment	1.6	Refined to reduce proximity to residential dwellings and reduce the number of sharp turn angles
13b	Preston	Route segment considered but dismissed	1.9	Dismissed due to infrastructure crossing considerations
28	Mineral	Final route segment	9.1	Refined to more closely parallel the existing transmission line based on landowner feedback received during open houses
29a	Mineral	Route segment considered but dismissed	4.8	Dismissed due to proximity to residential dwellings and crossing of a local park
29b	Mineral	Final route segment	4.7	Refined due to topographical constraints and to reduce the number of sharp turn angles
29c	Hampshire	Final route segment	13.4	Refined due to engineering considerations to reduce the number of sharp turn angles
30	Hampshire	Final route segment	4.3	Refined to more closely parallel the existing transmission line and follow property boundaries
30a	Hampshire	Final route segment	5.6	Refined to more closely parallel the existing transmission line based on stakeholder feedback during the open houses
30b	Hampshire	Route segment considered but dismissed	2.6	Dismissed due to increased greenfield development, sharp turn angles, and proximity to residential dwellings
31a	Hampshire	Route segment considered but dismissed	5.5	Dismissed due to sharp turn angles, proximity to residential dwellings, and to narrow the number of segments to more favorable routing options
31b	Hampshire	Final route segment	5.1	Refined due to engineering considerations to reduce the number of sharp turn angles
32a	Hampshire	Final route segment	1.0	Refined due to topographical constraints
32b	Hampshire	Route segment considered but dismissed	1.8	Dismissed due to crossing a new conservation easement discovered during the stakeholder engagement process
33a	Hampshire	Final route segment	5.4	Refined due to engineering considerations to reduce the number of sharp turn angles
33b	Hampshire	Final route segment	6.5	Refined to more closely parallel the existing transmission line and reduce the complexity of infrastructure crossings
34	Hampshire	Final route segment	0.2	No change
35	Hampshire	Final route segment	1.1	No change

Segment	County [a]	Status	Length (miles)	Notes
36a	Hampshire	Final route segment	1.3	Added to parallel the existing transmission line and reduce the number of 500 kV crossings
36b	Hampshire	Route segment considered but dismissed	1.6	Dismissed due to greenfield development and complexity of the existing transmission line crossings
Maryland				
13a	Garrett	Final route segment	8.7	Refined due to engineering considerations to reduce the number of sharp turn angles
13c	Garrett	Route segment considered but dismissed	1.8	Dismissed due to proximity to residential dwellings and to narrow the number of segments to more favorable routing options
13d	Garrett	Final route segment	8.8	Refined due to new residential development discovered during open houses and residential dwelling proximity when crossing the Youghiogheny River on the south side of the existing transmission line
14	Garrett	Final route segment	1.4	Refined due to infrastructure crossing considerations
21a	Garrett	Final route segment	1.9	Refined due to engineering and topographical constraints when crossing the Youghiogheny River
21b	Garrett	Route segment considered but dismissed	1.8	Dismissed due to proximity to residential dwellings and engineering and topographical constraints when crossing the Youghiogheny River
22a	Garrett	Final route segment	4.4	Refined due to proposed residential development discovered during open houses
22b	Garrett	Route segment considered but dismissed	3.7	Dismissed due to proposed residential development discovered during open houses
22c	Garrett	Final route segment	3.7	Refined to more closely parallel the existing transmission line through the Bear Creek Rural Legacy easement
22d	Garrett	Route segment considered but dismissed	5.6	Dismissed due to topographical constraints and greenfield development
23	Garrett	Final route segment	9.2	Refined due to engineering constraints and aerial blowout requirements near Big Run stream
23a	Garrett	Route segment considered but dismissed	2.0	Dismissed due to longer route length and greenfield development
24a	Garrett	Route segment considered but dismissed	2.8	Dismissed due to proposed residential development discovered during open houses
24b	Garrett	Route segment considered but dismissed	1.4	Dismissed due to greenfield Maryland Wildland crossing and proximity to Fairview Road residential dwellings

Segment	County [a]	Status	Length (miles)	Notes
24c	Garrett	Final route segment	2.8	Added to reduce impacts on residential dwellings near Fairview Road and to increase paralleling the existing transmission line
25b	Garrett	Final route segment	11.9	Refined due to topographical and engineering constraints while crossing Georges Creek and to more closely parallel the existing transmission line in response to landowner feedback
26	Garrett	Final route segment	1.7	Refined due to topographical constraints and to reduce the number of sharp turn angles
26a	Garrett	Route segment considered but dismissed	5.8	Dismissed due to longer route length
26b	Garrett	Final route segment	5.5	Refined due to topographical constraints and to reduce the number of sharp turn angles and reduce stream crossing impacts
25a	Allegany	Route segment considered but dismissed	13.1	Dismissed due to topographical constraints on the north side of the existing transmission line
27	Allegany	Final route segment	23.8	Refined due to topographical and new wind farm development constraints and to reduce the number of sharp turn angles
Virginia				
37a	Frederick	Final route segment	0.8	Refined due to engineering considerations to reduce the number of sharp turn angles
37b	Frederick	Final route segment	0.8	Refined due to engineering considerations to reduce the number of sharp turn angles
38a	Frederick	Route segment considered but dismissed	1.8	Dismissed due to proximity to residential dwellings and greenfield development
38b	Frederick	Route segment considered but dismissed	1.5	Dismissed due to proximity to residential dwellings
38c	Frederick	Final route segment	1.7	Added to more closely parallel the existing transmission line corridors on the south side
39	Frederick	Route segment considered but dismissed	6.0	Dismissed due to extensive greenfield development and longer route length

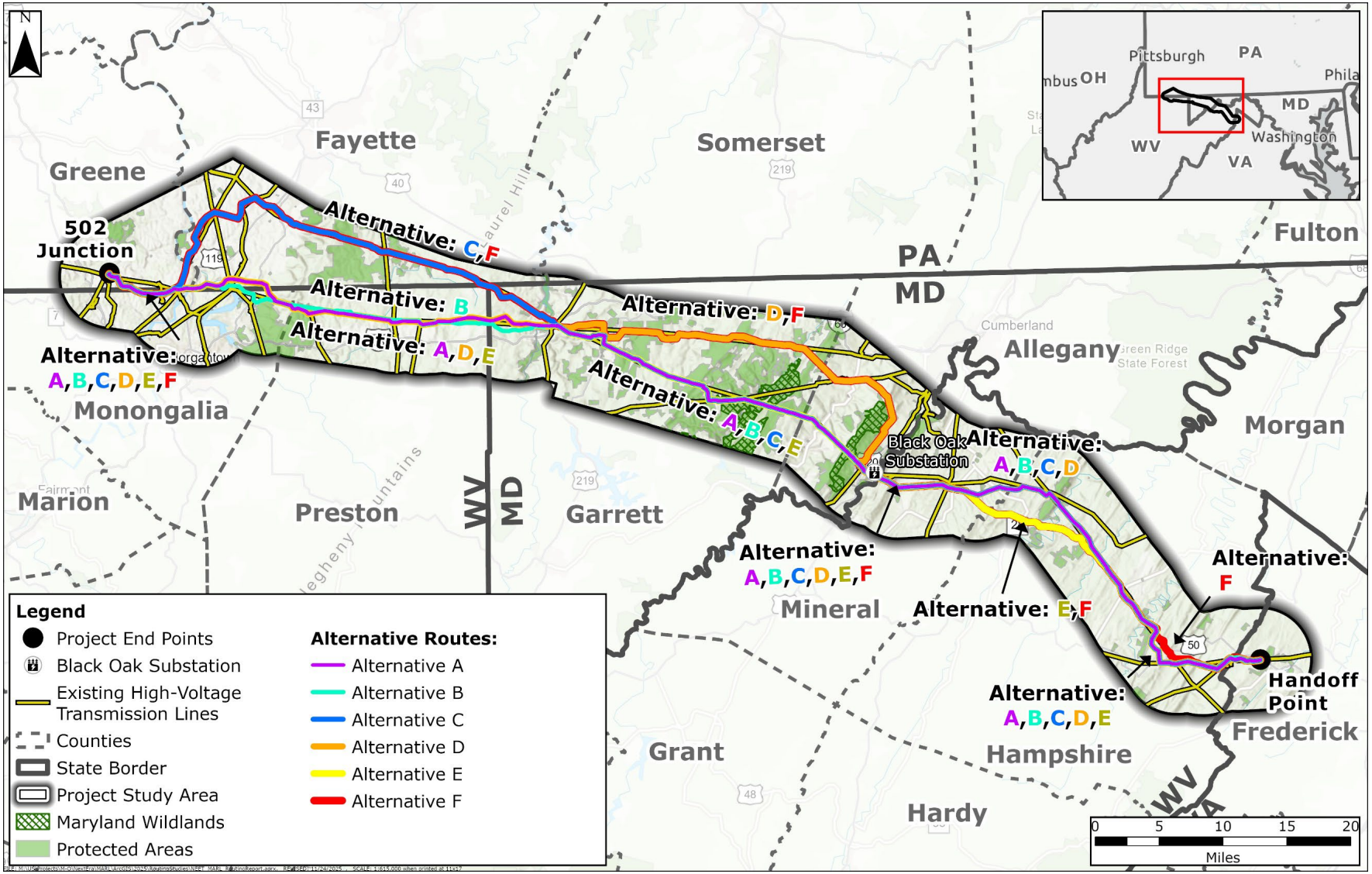
[a] Several route segments extend across county boundaries. The listed county represents the county in which the center point of the segment is located.

4.5 IDENTIFICATION OF FINAL ALTERNATIVE ROUTES

The Routing Team analyzed and combined the 49 route segments into six end-to-end Alternative Routes (A through F) for a detailed comparative analysis to ultimately determine a superior Proposed Route. From the more than 350 possible end-to-end routing combinations generated through the route segment analysis, a focused set of six representative alternatives was identified for detailed comparison. These six feasible Alternative Routes were selected to capture the full range of routing opportunities while minimizing overlap, making sure that each option meaningfully differed in terms of geographic alignment, land use context, and environmental setting. Selection emphasized routes that balanced engineering constructability with opportunities to avoid or reduce impacts on natural environmental and built environmental resources, cultural or social and/or recreational resources.

These six Alternative Routes (A through F) are described in the following sections and are shown on Figure 4.5-1. Appendix E-6, Alternative Routes Multi Panel, provides a detailed panel overview of the six feasible Alternative Routes that were identified by the Routing Team and Appendix E-7, Alternative Routes, provides a detailed mapbook of the MARL Project six feasible Alternative Routes that were identified by the Routing Team.

FIGURE 4.5-1 ALTERNATIVE ROUTES



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

4.5.1 ALTERNATIVE ROUTE A

Alternative Route A is comprised of route segments 1b, 2, 3b, 4a, 5a, 6a, 7c, 8e, 9c, 12b, 13a, 14, 22c, 23, 24c, 25b, 28, 29b, 30, 30a, 31b, 32a, 33b, 34, 35, 36a, 37b, and 38c. Alternative Route A was developed to parallel existing transmission lines and reduce greenfield sections to the extent possible. Alternative Route A parallels portions of the following transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Cheat Lake to Ruthbelle 138 kV Transmission Line
- Hazelton to Lake Lynn and Jennings to Hazelton 138 kV Transmission Lines
- Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line
- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line
- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route A is 107.5 miles long, crosses all four states (10.7 miles through Pennsylvania, 58.9 miles through West Virginia, 35.4 miles through Maryland, and 2.4 miles through Virginia), and requires 2,669.0 acres of ROW. Alternative Route A parallels existing transmission lines for 56.4 miles (52.5 percent of the total alignment) and proposes 51.0 miles of a greenfield section (47.5 percent of the total alignment). Alternative Route A crosses Coopers Rock State Forest, Youghiogheny River Lake and the Potomac Heritage Trail, Bear Creek Hatchery Fisheries Management Area (FMA), Savage River State Forest, including the associated Bear Pen and Big Savage Mountain Wildlands, Dans Mountain WMA and the associated Dans Mountain Wildlands, and the White Horse Mountain WMA—all of which have existing transmission lines that Alternative A parallels.

4.5.2 ALTERNATIVE ROUTE B

Alternative Route B is comprised of route segments 1b, 2, 3b, 4a, 5b, 8c, 11, 12b, 13d, 14, 22c, 23, 24c, 25b, 28, 29b, 30, 30a, 31b, 32a, 33b, 34, 35, 36a, 37a, and 38c. Alternative Route B was developed to traverse more into West Virginia, while paralleling the following existing transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Hazelton to Lake Lynn and Jennings to Hazelton 138 kV Transmission Line
- Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line
- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line

- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route B is 107.3 miles long, crosses all four states (8.5 miles through Pennsylvania, 60.9 miles through West Virginia, 35.5 miles through Maryland, and 2.4 miles through Virginia), and requires 2,671.4 acres of ROW. Alternative Route B parallels existing transmission lines for 59.7 miles (55.6 percent of the total alignment) and proposes 47.6 miles of a greenfield section (44.4 percent of the total alignment). Alternative Route B crosses Coopers Rock State Forest, Youghiogheny River Lake and the Potomac Heritage Trail, Bear Creek Hatchery FMA, Savage River State Forest, including the associated Bear Pen and Big Savage Mountain Wildlands, Dans Mountain WMA and the associated Dans Mountain Wildlands, and the White Horse Mountain WMA.

4.5.3 ALTERNATIVE ROUTE C

Alternative Route C is comprised of route segments 1b, 2, 3b, 15, 15a, 16, 17a, 18a, 19, 20b, 21a, 22c, 23, 24c, 25b, 28, 29b, 30, 30a, 31b, 32a, 33b, 34, 35, 36a, 37b, and 38c. Alternative Route C was developed to provide an alternative to crossing Coopers Rock State Forest and Preston County, West Virginia, while paralleling the existing 500 kV transmission lines in the northwestern quadrant of the MARL Project Study Area in Pennsylvania. Alternative Route C parallels portions of the following transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Ronco to Fort Martin 500 kV Transmission Line
- Hatfield’s Ferry Power Station to Black Oak 500 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line
- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line
- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route C is 113.6 miles long, crosses all four states (34.2 miles through Pennsylvania, 40.5 miles through West Virginia, 36.4 miles through Maryland, and 2.4 miles through Virginia), and requires 2,835.5 acres of ROW. Alternative Route C parallels existing transmission lines for 64.5 miles (56.8 percent of the total alignment) and proposes 49.1 miles of a greenfield section (43.2 percent of the total alignment). Alternative Route C crosses SGL 138, Forbes State Forest, Quebec Run Wild Area, Youghiogheny River Lake and the Potomac Heritage Trail, Bear Creek Hatchery FMA, Savage River State Forest, including the associated Bear Pen and Big Savage Mountain Wildlands, Dans Mountain WMA and the associated Dans Mountain Wildlands, and the White Horse Mountain WMA.

4.5.4 ALTERNATIVE ROUTE D

Alternative Route D is comprised of route segments 1b, 2, 3b, 4a, 5a, 6a, 7c, 8e, 9c, 12b, 13a, 14, 22a, 26, 26b, 27, 28, 29b, 30, 30a, 31b, 32a, 33b, 34, 35, 36a, 37b, and 38c. Alternative Route D was developed to provide an alternative that minimizes impacts on the Savage River

State Forest and associated Wildlands and Dan's Mountain WMA and associated Wildlands. Alternative Route D deviates from Alternative Routes A, B, and C after crossing the Youghiogheny River to continue paralleling the Jennings to Hazelton 138 kV transmission line traveling west to east, after which the route requires a large greenfield section traveling south to connect back to the existing transmission lines near Black Oak Substation. Alternative Route D parallels portions of the following transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Cheat Lake to Ruthbelle 138 kV Transmission Line
- Hazelton to Lake Lynn and Jennings to Hazelton 138 kV Transmission Line
- Frostburg to Jennings 138 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line
- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line
- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route D is 115.2 miles, crosses all four states (10.7 miles through Pennsylvania, 58.9 miles through West Virginia, 43.2 miles through Maryland, and 2.4 miles through Virginia), and requires 2,839.0 acres of ROW. Alternative Route D parallels existing transmission lines for 43.1 miles (37.4 percent of the total alignment) and proposes 72.1 miles of a greenfield section (62.6 percent of the total alignment). Alternative Route D crosses Coopers Rock State Forest, Youghiogheny River Lake and the Potomac Heritage Trail, Savage River State Forest, Dans Mountain WMA, and the White Horse Mountain WMA.

4.5.5 ALTERNATIVE ROUTE E

Alternative Route E is comprised of route segments 1b, 2, 3b, 4a, 5a, 6a, 7c, 8e, 9c, 12b, 13a, 14, 22c, 23, 24c, 25b, 8, 29c, 31b, 32a, 33b, 34, 35, 36a, 37b, and 38c. Alternative Route E was developed to provide an alternative to crossing the White Horse Mountain WMA by routing a greenfield section traveling south of White Horse Mountain WMA and north of a grouping of agricultural conservation easements before crossing the South Branch of the Potomac River. Alternative Route D parallels portions of the following transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Cheat Lake to Ruthbelle 138 kV Transmission Line
- Hazelton to Lake Lynn and Jennings to Hazelton 138 kV Transmission Line
- Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line

- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line
- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route E is 106.3 miles, crosses all four states (10.7 miles through Pennsylvania, 57.8 miles through West Virginia, 35.4 miles through Maryland, and 2.4 miles through Virginia), and requires 2,651.5 acres of ROW. Alternative Route E parallels existing transmission lines for 50.8 miles (47.7 percent of the total alignment) and proposes 55.6 miles of a greenfield section (52.3 percent of the total alignment). Alternative Route E crosses Coopers Rock State Forest, Youghiogheny River Lake and the Potomac Heritage Trail, Bear Creek Hatchery FMA, Savage River State Forest, including the associated Bear Pen and Big Savage Mountain Wildlands, and Dan's Mountain WMA and the associated Dans Mountain Wildlands.

4.5.6 ALTERNATIVE ROUTE F

Alternative Route F is comprised of route segments 1b, 2, 3b, 15, 15a, 16, 17a, 18a, 19, 20b, 21a, 22a, 26, 26b, 27, 28, 29c, 31b, 32a, 33a, 34, 35, 36a, 37a, and 38c. Alternative Route F was developed to provide an alternative that parallels existing transmission lines in the northwest quadrant of the MARL Project Study Area, and avoid impacts on the Coopers Rock State Forest, Bear Pen Wildlands, Big Savage Mountain Wildlands, Dans Mountain Wildlands and White Horse Mountain WMA. Alternative Route F parallels portions of the following transmission lines (listed in order from west to east):

- 502 Junction to Longview Power 500 kV Transmission Line
- Ronco to Fort Martin 500 kV Transmission Line
- Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line
- Jennings to Hazelton and Frostburg to Jennings 138 kV Transmission Line
- Carlos JCT to Garrett 138 kV Transmission Line
- Black Oak to Bedington 500 kV Transmission Line
- Hampshire to Ridgeley 138 kV Transmission Line
- French Mill to Hampshire 138 kV Transmission Line
- Hampshire to Stonewall 138 kV Transmission Line
- Mt. Storm to Doubs 500 kV Transmission Line

Alternative Route F is 119.1 miles, crosses all four states (34.2 miles through Pennsylvania, 38.3 miles through West Virginia, 44.1 miles through Maryland, and 2.4 miles through Virginia), and requires 2,964.3 acres of ROW. Alternative Route F parallels existing transmission lines for 43.2 miles (36.3 percent of the total alignment) and proposes 75.9 miles of a greenfield section (63.7 percent of the total alignment). Alternative Route F crosses SGL 138, Forbes State Forest, Quebec Run Wild Area, Youghiogheny River Lake and the Potomac Heritage Trail, Savage River State Forest, and Dans Mountain WMA.

5. ALTERNATIVE ROUTE COMPARISON

Section 2 identifies the goal of the Routing Study for the MARL Project and the criteria and guidelines used for the development of route selection. The Routing Team recognizes that no single route can simultaneously minimize all potential impacts or eliminate the need for non-standard design elements. Routing decisions inherently involve trade-offs. For example, in forested regions, a route that avoids residential development may require extensive tree clearing, while a route that minimizes ecological disturbance may affect more dwellings.

Accordingly, the routing process aimed not to only reduce impacts across all resource categories, but also to achieve a balanced outcome when competing constraints cannot be avoided. This balance was achieved by a comparative evaluation of Alternative Routes, stakeholder input, and technical feasibility.

The multi-criteria evaluation (Table 2.7-1) for analysis of the Alternative Routes was a comprehensive process that integrated the natural environment, built environment, cultural resources, social resources, and engineering constructability to identify the superior and least impactful route. Each route was assessed using a robust framework outlined in Section 2.7. The Routing Team systematically compared the identified Alternative Routes across quantitative and qualitative measures, including route length and footprint; land use considerations such as paralleling existing infrastructure, impacts on communities, protected lands, cultural resources and land cover; natural environment considerations such as water resources, and ecological and sensitive species; engineering and infrastructure; and estimated costs.[11] This process achieved an optimal balance among all evaluation criteria and identified a Proposed Route that is superior to the five other Alternative Routes.

As outlined in Section 2.7, the Routing Team decided not to assign explicit numerical weights or scores to individual routing criteria. Instead, the Routing Team opted for a hybrid quantitative-qualitative approach on route selection based on a comprehensive and balanced assessment rather than rigid numerical weighting. Section 2.7 provides an explanation on why this approach was taken for the MARL Project. The sections below evaluate the Alternative Routes against the quantitative criteria outlined in Table 2.7-1. Using a combination of quantitative and qualitative information, each Alternative Route was assigned a category of performance:

- Superior—High performance for the listed criteria with low impacts on category resources relative to the other Alternative Routes.
- Moderate—Average performance for the listed criteria with moderate impacts on category resources relative to the other Alternative Routes.
- Inferior—Poor performance for the listed criteria with high impacts on category resources relative to the other Alternative Routes.

[11] In the sections below, "criteria" are the benchmarks used in the Alternatives Routes analysis. The criteria are Route Length, Construction Footprint, Paralleling Existing Infrastructure, Community and Recreational Resources, Protected Areas, Cultural Resources, Agricultural and Land Cover, Water Resources, Sensitive Species and Habitats, Engineering and Infrastructure, and Estimated Costs. "Metric" is used when discussing an individual measure within the criteria, e.g., number of parcels, number unique landowners, acreage of wetland resources.

The results of this analysis are discussed in detail in Sections 5.1 through 5.5 and are summarized in Section 5.6 to help provide clarity and transparency on the decision-making process for the selection of the Proposed Route. For consistent evaluation across multiple states, the Routing Team relied on MARL Project Study Area-wide datasets and, where possible, merged state-specific data for a more accurate comparison. For state-specific analysis, please refer to the Environmental Review Documents (Appendices A, B, C, and D).

5.1 ROUTE LENGTH AND CONSTRUCTION FOOTPRINT

Route length and construction footprint were evaluated to assess the physical scale and potential land disturbance associated with each Alternative Route. Route length reflects the total linear mileage of the transmission line, while construction footprint represents the area required for the ROW Corridor. These criteria helped to characterize the extent of land disturbance and the relative efficiency of each Alternative Route. The "efficiency" of an Alternative Route refers to its total length in comparison to the straight-line distance between two points, commonly described "as the crow flies." As shown on Figure 1.1-1, the MARL Project's straight-line distance between the two endpoints is 95.0 miles. Shorter routes with smaller footprints reduce impacts on the natural environment and built environment, provide cost savings, and improve efficiency and constructability.

Evaluating against these criteria helped identify Alternative Routes that balanced engineering feasibility and efficiency with natural environment and built environment considerations (Table 5.1-1).

TABLE 5.1-1 ROUTE LENGTH AND CONSTRUCTION FOOTPRINT EVALUATION CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Centerline Length	Miles	107.5	107.3	113.6	115.2	106.3	119.1
ROW Corridor	Acres	2,669.0	2,671.4	2,835.5	2,839.0	2,651.5	2,964.3

Alternative Route A

Alternative Route A had superior performance for route length and construction footprint evaluation criteria. It has a total centerline length of 107.5 miles and a ROW Corridor footprint of 2,669.0 acres. Among the six Alternative Routes, Alternative Route A is one of three that minimize both route length and area required for the ROW Corridor, supporting the MARL Project objective of reducing total disturbance while maintaining a technically feasible alignment.

Alternative Route B

Alternative Route B had superior performance for route length and construction footprint evaluation criteria. It has a total centerline length of 107.3 miles and a ROW Corridor footprint of 2,671.4 acres, nearly identical to Alternative Route A. These two routes performed comparably, with Alternative Route B being slightly shorter; however, it resulted in a marginally larger footprint (due to additional aerial easement blowout requirements).

Alternative Route C

Alternative Route C had moderate performance for route length and construction footprint evaluation criteria. It has a total centerline length of 113.6 miles and a ROW Corridor footprint of 2,835.5 acres. Alternative Route C is one of three routes that resulted in longer total centerline length and ROW Corridor. The longer centerline and larger footprint would result in greater overall disturbance. Alternative Route C overlaps with Alternative Route A for 75.2 miles (66.2 percent of total length) except for a 38.4-mile-long section in Greene and Fayette Counties, Pennsylvania, and Garrett County, Maryland, designed to parallel the existing 500 kV transmission lines in the northwest quadrant of the MARL Project Study Area. This resulted in an additional 6.1 miles of line length as compared to Alternative Route A.

Alternative Route D

Alternative Route D had moderate performance for route length and construction footprint evaluation criteria. It has a total centerline length of 115.2 miles and a ROW Corridor footprint of 2,839.0 acres. Alternative Route D has the second-longest route and second-largest total footprint evaluated. Alternative Route D overlaps with Alternative Route A for 77.7 miles (67.5 percent of total length) except in Maryland, where it deviates to avoid potential impacts on the Maryland Wildlands. This required an additional 7.7 miles of route length. As a result, Alternative Route D would have a larger impact on the natural environment and built environment relative to the shorter Alternative Routes.

Alternative Route E

Alternative Route E had superior performance for route length and construction footprint evaluation criteria. It is the shortest route (106.3 miles) and has the smallest ROW Corridor footprint (2,651.5 acres). Alternative Route E resulted in a reduction of 1.0 to 1.2 miles in total length, and a decrease in ROW Corridor area of 17.5 to 19.9 acres when compared to Alternative Routes A and B. Alternative Route E overlaps with Alternative Route A for 92.6 miles (87.1 percent of total length) except in Mineral and Hampshire Counties, West Virginia, to avoid potential impacts on White Horse Mountain WMA. While this results in a slightly shorter alignment (1.2 miles shorter), it does so with a higher percentage of greenfield development as shown in Section 5.2.1.

Alternative Route F

Alternative Route F had an inferior performance for route length and construction footprint evaluation criteria. At 119.1 miles and 2,964.3 acres of ROW Corridor, Alternative Route F is the longest and has the largest ROW Corridor of all Alternative Routes. Its greater linear extent and broader footprint would result in a higher overall land disturbance.

Superior Alternative Routes

Alternative Routes A, B, and E have the shortest route length and smallest ROW Corridor footprint. These routes vary by 1.2 miles in total length and less than 1 percent in ROW Corridor area, reflecting consistently compact and efficient alignments with reduced land disturbance. Alternative Route E achieved the shortest total distance and smallest footprint overall, while

Alternative Routes A and B were comparable in length and ROW Corridor, and fell within the same category of minimized impact.

Moderate and Inferior Alternative Routes

Alternative Route F had inferior performance, with the greatest total length and largest overall construction footprint of 7 to 12 percent greater than the best performing Alternative Routes (A, B, and E). Additionally, Alternative Routes C and D had moderate performance. Alternative Routes C, D, and F have broader ROW Corridor footprints and longer route alignments, resulting in lower performance than the other Alternative Routes.

5.2 LAND USE AND SOCIAL RESOURCES

The land use and social resources criteria used in the Alternative Routes evaluation covered many different topics and datasets. Each subsection below highlights groups of thematic information to provide a more nuanced and detailed review of each specific criterion.

5.2.1 PARALLELING EXISTING INFRASTRUCTURE

Paralleling new transmission facilities adjacent to established utility corridors helps reduce visual, natural environment, and built environment impacts by concentrating infrastructure within areas previously cleared by utility development. Where feasible, the Routing Team prioritized paralleling existing transmission lines to reduce impacts. Figure 2.1-2 provides an illustration of the MARL Project definition of paralleling. Benefits to paralleling are discussed in Section 2.1. Appendix E-8, Alternative Routes—Land Use and Social Resources—Paralleling, Community and Recreation, and Protected Areas, shows where each Alternative Route parallels existing transmission lines compared to where the Alternative Routes are greenfield development. Appendix J includes a Visual Impact Assessment conducted for the MARL Project.

The Routing Team evaluated each route for the following metrics associated with the Paralleling Existing Infrastructure evaluation criteria presented in Table 5.2-1:

- **Paralleling sections**—Evaluating both the percentage and total mileage of paralleling provided a balanced assessment of each route's efficiency. The percentage of paralleling allowed the Routing Team to compare routes on an equal basis, independent of overall route length, while the total mileage of paralleling highlighted the absolute extent of total paralleling along each Alternative Route. Section 2.1 provides the benefits of paralleling; each criteria evaluation section below, where appropriate, takes this into account.
- **Greenfield sections**—Similar to paralleling, the Routing Team also evaluated the total length and percentage of greenfield development. Alternative Routes with a high percentage of paralleling, but a longer section of greenfield development, might be less favorable than a route with a slightly lower percentage of paralleling.

TABLE 5.2-1 PARALLELING EXISTING INFRASTRUCTURE EVALUATION CRITERIA

Criteria	Alternative Route A		Alternative Route B		Alternative Route C		Alternative Route D		Alternative Route E		Alternative Route F	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
Paralleling existing transmission lines [a]	56.4	52.5	59.7	55.6	64.5	56.8	43.1	37.4	50.8	47.7	43.2	36.3
Greenfield section development [b]	51.0	47.5	47.6	44.4	49.1	43.2	72.1	62.6	55.6	52.3	75.9	63.7
Paralleling railroad ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paralleling natural gas pipelines ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paralleling highways	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Rextag Infrastructure data

ROW = right-of-way

[a] Paralleling for the MARL Project is defined as siting the proposed transmission line so the MARL Project ROW Corridor abuts the existing transmission line corridor.

[b] Greenfield section for the MARL Project is defined as a section of the MARL Project ROW Corridor for any portion of the route that does not abut an existing transmission line corridor.

Alternative Route A

Alternative Route A had superior performance for paralleling existing infrastructure and greenfield development criteria. It achieved a strong balance between maximizing paralleling and minimizing total greenfield development. With 56.4 miles (52.5 percent) of paralleling existing transmission lines, Alternative Route A maintained a high overall paralleling ratio among all route options. With regards to greenfield development, Alternative Route A has a total greenfield length of 51.0 miles (47.5 percent).

Alternative Route B

Alternative Route B had superior performance for paralleling existing infrastructure and greenfield development criteria. It also achieved a strong balance between maximizing paralleling and minimizing greenfield development, with 59.7 miles (55.6 percent) of its length located along existing transmission lines. Alternative Route B maintained a high overall paralleling ratio among all the route options. Alternative Route B had a total greenfield development of 47.6 miles (44.4 percent). This alternative maximized paralleling of existing transmission lines while maintaining the shortest route length.

Alternative Route C

Alternative Route C had superior performance for paralleling existing infrastructure and greenfield development criteria. It achieved the highest percentage of paralleling with 56.8 percent (64.5 miles); however, this was achieved at the expense of a longer overall route. Alternative Route C resulted in a total greenfield length of 49.1 miles. Although the paralleling percentage is the highest overall, this route's total length and greater construction footprint offset some of those benefits.

Alternative Route D

Alternative Route D had inferior performance for paralleling existing infrastructure and greenfield development criteria. It has only 37.4 percent paralleling (43.1 miles) and the second-largest percentage for greenfield development at 62.6 percent (72.1 miles). Alternative Route D has the same alignment as Alternative Route A except in Maryland, where it deviates to avoid crossing through the Maryland Wildlands. Avoiding the Maryland Wildlands necessitates an additional 21.1 miles of greenfield development, for a total of 31.1 miles of greenfield development in Maryland compared to 10.0 miles of greenfield development for Alternative Route A in Maryland.

Alternative Route E

Alternative Route E had moderate performance for paralleling existing infrastructure and greenfield development criteria. It achieved less balance between maximizing paralleling and minimizing greenfield development with 47.7 percent paralleling (50.8 miles) and 52.3 percent greenfield (55.6 miles). Alternative Route E has the same alignment as Alternative Route A except in Mineral and Hampshire Counties, West Virginia, where the route deviates to avoid crossing through the White Horse Mountain WMA. Avoiding White Horse Mountain WMA necessitates an additional 4.6 miles of greenfield development in West Virginia compared to Alternative Route A.

While efficient in overall route length, Alternative Route E has a lower percentage of paralleling compared to the top three shortest routes (Alternative Route A, B, and E).

Alternative Route F

Alternative Route F had an inferior performance for paralleling existing infrastructure and greenfield development criteria. It has the lowest percentage of paralleling existing transmission lines (43.2 miles; 36.3 percent). Alternative Route F also had the highest total greenfield mileage with 75.9 miles (63.7 percent). These characteristics suggest greater potential visual, land use, and natural environment impacts compared to the other Alternative Routes.

Superior Alternative Routes

Alternative Routes A, B, and C exhibit the highest degrees of paralleling with existing transmission lines, ranging from 52.5 to 56.8 percent paralleling which is more than half of the route length. Alternative Route B has the best combination of total paralleling percent (55.6 percent) to total greenfield mileage with the lowest total greenfield mileage (47.6 miles). Alternative Route C had the highest percentage of paralleling existing transmission lines; however, it does so at a longer overall route length when compared to Alternative Routes A and B. While Alternative Route A had 3.3 fewer miles of paralleling than Alternative Route B, and 8.1 fewer miles of paralleling than Alternative Route C, it had similar total greenfield mileage compared to Alternative Route C (51.0 miles for Alternative Route A versus 49.1 miles for Alternative Route C). All three routes qualify as superior in terms of maximizing paralleling of existing transmission lines and minimizing total greenfield mileage.

Moderate and Inferior Alternative Routes

Alternative Routes D and F had an inferior performance in terms of paralleling, with less than 50 percent of their alignments paralleling with existing transmission lines, which resulted in substantially higher greenfield mileage. Alternative Route F performed the worst, with the lowest percentage of paralleling (36.3 percent) and the highest total greenfield length (75.9 miles). Alternative Route E performed moderately for these criteria.

5.2.2 COMMUNITY AND RECREATIONAL RESOURCES

Routing criteria for the MARL Project was developed to minimize impacts on the community and recreation resources. The resulting evaluation data are provided in Table 5.2-2 and shown on Appendix E-8. Key indicators included buildings—both residential and non-residential—located at varying distances from the route centerline, including within the ROW Corridor, within 250 feet of the centerline, and within 500 feet of the centerline. This provided a graduated view of potential impacts on the built environment. Within this category, residential dwellings were of particular concern and Alternative Routes were developed to minimize impacts, to the extent practical, on dwellings while balancing the goal of maximizing paralleling existing transmission lines. For the MARL Project, building footprints were digitized using high-resolution (3-inch) aerial imagery contracted by NEET MA and NEET VA and captured during leaf-off conditions between December 2023 and February 2024 and county property data. This dataset may not reflect proposed or recently built structures and could include classification errors inherent to desktop study limitations (e.g., forest cover, image resolution, interpretation of aerial data).

TABLE 5.2-2 COMMUNITY AND RECREATIONAL RESOURCES EVALUATION CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Parcels / unique landowners	Count	500	531	532	518	476	535
		388	403	405	394	367	399
Residential dwellings [a,b] within ROW Corridor/ 250 feet / 500 feet of centerline	Count	1	1	1	1	1	1
		29	40	29	37	26	42
		151	192	161	170	142	184
Residential outbuildings [a,c] within ROW Corridor / 250 feet / 500 feet of centerline	Count	6	6	9	7	5	9
		50	56	57	62	44	63
		273	286	280	308	222	269
Non-residential buildings [a,d] within ROW Corridor / 250 feet / 500 feet of centerline	Count	25	21	25	24	22	19
		74	68	79	81	58	67
		187	178	193	199	166	180
Places of worship within 500 feet of the centerline	Count	1	1	1	1	1	0
Childcare facilities within 500 feet of the centerline	Count	0	0	0	0	0	0
Public / private schools within 500 feet of centerline	Count	0	0	0	0	0	0
Trails crossings—Potomac Heritage National Scenic Trail and Hiking Trails	Count	3	3	3	2	3	2
		9	9	9	16	9	16
State Scenic Byways	Count	4	4	5	4	4	5

Source: ReportAll, HIFLD, MDOT, WVDOT, MDiMap, WVGISTC, PASDA, ERM

[a] Footprints were digitized using high-resolution (3-inch) aerial imagery contracted by NEET MA and NEET VA and captured during leaf-off conditions between December 2023 and February 2024 and county property data. This dataset may not reflect proposed or recently built structures and could include classification errors inherent to desktop study limitations (e.g., forest cover, image resolution, interpretation of aerial data).
[b] A residential dwelling is defined as a building used for people to live in and includes buildings such as single-family homes, multi-family units, mobile/manufactured homes, etc.
[c] A residential outbuilding is defined as a secondary structure located on the same property as a residential dwelling and includes buildings such as detached garages, sheds, greenhouses, etc.
[d] A non-residential building is defined as any structure located on a non-residential property and includes buildings used for commercial purposes industrial use, agricultural, community, or government.

Of note, there is one dwelling located within the ROW Corridor of all six Alternative Routes. This single dwelling, located in Hampshire County, West Virginia, was identified via field reconnaissance after open house route refinement. The Routing Team is currently investigating a solution to avoid direct impacts on this dwelling.

In addition to buildings, parcels, and landowners, the Routing Team also analyzed hiking trails, scenic byways, and community resources such as schools, childcare facilities, and places of worship. Appendix E-8 shows the community and recreational resources.

Alternative Route A

Alternative Route A was one of two routes, along with Alternative Route E, that had superior performance for community and recreational resources criteria. It consistently performed near the top across most metrics in this category. This route has the second-lowest number of unique landowners within the ROW Corridor, with 388 landowners across 500 parcels. In terms of residential proximity, Alternative Route A has the second-lowest number of residential dwellings within 500 feet of the centerline (151) and one of two routes with the second lowest within 250 feet (29), indicating limited direct impact on resident dwellings. The residential outbuildings count is also the second lowest among the Alternative Routes, further minimizing potential impacts on landowners. For non-residential buildings, Alternative Route A fell within the middle of the routes. Trail crossings, scenic byways, and places of worship are generally similar across all Alternative Routes.

Alternative Route B

Alternative Route B had inferior performance for community and recreational resources criteria. It has the highest number of residential dwellings within 500 feet of the centerline (192) and the second highest within 250 feet (40), highlighting its greater proximity to homes and the built environment in certain areas. This route has the second-highest number of unique landowners affected, with 403 landowners across 531 parcels (third highest). Additionally, Alternative Route B has the second-highest count of residential outbuildings within 500 feet of the centerline (286), further increasing potential landowner impacts. However, Alternative Route B performed well for non-residential buildings, with the second-lowest number among all Alternative Routes within 500 feet of the centerline (178). Trail crossings, scenic byways, and places of worship are generally similar across all Alternative Routes.

Alternative Route C

Alternative Route C had moderate performance for community and recreational resources criteria. It has the highest number of unique landowners (405) impacted by the ROW Corridor while crossing 532 unique parcels (second highest). Alternative Route C has the second-lowest number of residential dwellings within 250 feet of the centerline (29) and third-lowest number within 500 feet of the centerline (161). This route has the second-highest number of non-residential buildings within 500 feet of the centerline (193). Additionally, Alternative Route C crosses the highest number of scenic byways (5).

Alternative Route D

Alternative Route D had moderate performance for community and recreational resources criteria, with the metrics for parcels, unique landowners, and residential dwellings falling near the middle of the range compared to other Alternative Routes. However, Alternative Route D has the highest number of residential outbuildings (308) and non-residential buildings (199) located within 500 feet of the centerline, indicating a greater degree of proximity to built structures. While the counts for trail crossings, scenic byways, and places of worship are generally similar across the Alternative Routes, Alternative Route D has the highest total number of trail crossings overall (16); however, it crosses the Potomac Heritage National Scenic Trail twice, while most Alternative Routes cross this trail three times.

Alternative Route E

Alternative Route E was one of two routes, along with Alternative Route A, that had superior performance for community and recreational resources criteria. It has the lowest number of unique landowners (367) and crosses the lowest number of parcels (476). In terms of building proximity, Alternative Route E also has the lowest number of residential dwellings within 250 feet (26) and within 500 feet (142) of the centerline. Furthermore, this route has the fewest number of outbuildings and non-residential buildings within 250 and 500 feet of the centerline. Trail crossings, scenic byways, and places of worship are generally similar across all Alternative Routes.

Alternative Route F

Alternative Route F had inferior performance for community and recreational resources criteria. It crosses the greatest number of parcels (535); however, the number of unique landowners (399) affected is moderate compared to the other Alternative Routes. With respect to proximity to built features, Alternative Route F has the highest number of residential dwellings (42) and residential outbuildings (63) located within 250 feet of the centerline, indicating a greater degree of proximity to homes and associated structures. However, this route has the lowest count of non-residential buildings within the ROW Corridor and the second lowest within 250 feet. Similar to Alternative Route D, it has the highest number of trail crossings at 16; however, it crosses the Potomac Heritage National Scenic Trail twice, while most Alternative Routes cross this trail three times. Alternative Route F crosses the highest number of scenic byways (5).

Superior Alternative Routes

Alternative Routes A and E had superior performance in this category across most metrics and had the lowest number of impacts on the built environment. Focusing on residential proximity, these two Alternative Routes performed the best with Alternative Route E having the lowest number of residential dwellings within 250 feet and 500 feet of the centerline. Alternative Route A had the second-best performance regarding residential dwellings with the second-lowest proximity to dwellings within 250 feet and 500 feet of the centerline. Both Alternative Routes A and E also had the lowest proximity to residential outbuildings in addition to dwellings. Alternative Routes A and E had the lowest number of parcels and unique landowners crossed by the ROW Corridor, further indicating their smaller impact on the community and residents when compared to the other

Alternative Routes. These two Alternative Routes also performed well for trail crossings, scenic byways, and places of worship.

Moderate and Inferior Alternative Routes

Alternative Routes B and F had inferior performance because they have the largest impact on the built environment and notably the largest impact on residential dwellings within 250 feet of the centerline (40 and 42, respectively) and residential dwellings within 500 feet of the centerline (192 and 184, respectively). Additionally, Alternative Route B has the second-highest number of unique landowners crossed by the ROW Corridor (403). Alternative Route F crosses through the highest number of parcels (535) and highest number of hiking trails (16). Alternative Routes C and D had moderate performance with the third and fourth highest number of residential dwellings within 500 feet (161 and 170, respectively).

5.2.3 PROTECTED AREAS

Avoiding protected lands, including designated areas such as state forests, WMAs, FMAs, Maryland Wildlands, conservation easements, and recreational areas managed by the USACE, was part of the siting criteria used for the MARL Project. By minimizing potential impacts on these protected areas, the Routing Team was able to minimize impacts on sensitive ecological resources and the likelihood of cumbersome environmental permitting. Due to the location of these resources throughout the MARL Project Study Area as well as the fact that the existing transmission lines cross through these resources, all Alternative Routes cross the Youghiogheny River Lake, the Potomac Heritage National Scenic Trail, and the Maryland Savage River State Forest. However, some Alternative Routes were designed to avoid crossing through these resources, resulting in trade-offs with potential impacts. Alternative Routes C and F avoid crossing Coopers Rock State Forest in West Virigina, and Alternative Routes A, B, D, and E avoid crossing Pennsylvania SGL 138, Forbes State Forest, and Quebec Run Wild Area. Alternative Routes E and F also avoid crossing the White Horse Mountain WMA. Alternative Routes D and F avoid crossing through Maryland Wildlands associated with Savage River State Forest and Dan’s Mountain WMA.

Alternative Routes A, B, C, and E cross two privately owned conservation easements that are part of Maryland’s Rural Legacy Program. The Routing Team is working with the landowners of these conservation easements. The Routing Team made concerted efforts to minimize crossing protected lands, where possible, and avoid crossing conservation easements. As shown in this report, Alternative Routes were developed to reduce the impact on these resources. When crossing protected lands, the Routing Team focused, where feasible, on paralleling existing transmission lines. The Routing Team evaluated each Alternative Route for the criteria presented in Table 5.2-3 and as shown on Appendix E-8. In addition, Table 5.2-4 details the specific protected lands each Alternative Route crosses and any existing transmissions lines paralleled within the protected lands.

TABLE 5.2-3 PROTECTED LAND EVALUATION CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
State Forest	Count	2	2	2	2	2	2
	Miles	9.7	9.6	11.1	9.9	9.7	11.3
	Acres	248.3	246.1	281.4	245.6	248.3	278.7
State Park	Count	0	0	0	0	0	0
	Miles	0.0	0.0	0.0	0.0	0.0	0.0
	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Fisheries / Wildlife Management Area	Count	3	3	3	2	2	1
	Miles	3.1	3.1	3.1	3.3	2.5	2.7
	Acres	75.8	75.8	75.8	79.1	61.0	64.2
Pennsylvania State Wilderness Area	Count	0	0	1	0	0	1
	Miles	0.0	0.0	0.2	0.0	0.0	0.2
	Acres	0.0	0.0	3.6	0.0	0.0	3.6
Pennsylvania State Game Lands	Count	0	0	1	0	0	1
	Miles	0.0	0.0	0.8	0.0	0.0	0.8
	Acres	0.0	0.0	20.0	0.0	0.0	20.0
Maryland Wildlands	Count	3	3	3	0	3	0
	Miles	2.4	2.4	2.4	0.0	2.4	0.0
	Acres	57.0	57.0	57.0	0.0	57.0	0.0
Conservation Easements	Count	3	3	3	1	2	0
	Miles	2.2	2.2	2.2	0.6	1.7	0.0
	Acres	55.2	55.2	55.2	14.9	40.4	0.0
USACE Recreation Areas	Count	1	1	1	1	1	1
	Miles	0.1	0.1	0.4	0.1	0.1	0.4
	Acres	3.9	4.3	14.3	3.9	3.9	14.3

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Total Protected Lands [a,b]	Count	8	8	10	5	7	6
	Miles	14.6	14.5	17.2	13.3	14.0	15.3
	Acres	368.4	366.6	435.5	328.6	353.5	380.9

Source: PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR

WMA = Wildlife Management Area; WVDNR = West Virginia Division of Natural Resources

[a] Total protected lands excludes the Maryland Wildlands to avoid double counting since Wildlands are within a state forest or WMA. In addition, White Horse Mountain WMA has an associated conservation easement. The White Horse Mountain WMA is a 1,725-acre conservation and recreation area located in Hampshire County, West Virginia, and is managed by the WVDNR. The Potomac Conservancy held a conservation easement on White Horse Mountain to protect it from development and transferred ownership to WVDNR to manage the land as a public recreation area and WMA. The statistics associated with White Horse Mountain WMA are included in both the "Conservation Easements" and "Fisheries / Wildlife Management Area" categories but are not double counted in total impact calculations.

[b] Totals may not match the sum of addends due to rounding.

TABLE 5.2-4 SPECIFIC PROTECTED LANDS CROSSED BY THE ALTERNATIVE ROUTES

Specific Protected Area [a]	State	Existing Transmission Line Corridor in Resource?	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Coopers Rock State Forest	WV	Yes—138 kV	Yes	Yes	No	Yes	Yes	No
State Game Lands 138	PA	Yes—500 kV	No	No	Yes	No	No	Yes
Forbes State Forest	PA	Yes—500 kV	No	No	Yes	No	No	Yes
Quebec Run Wild Area	PA	Yes—500 kV	No	No	Yes	No	No	Yes
Youghiogheny River Lake Recreation Area (USACE)	MD	Yes—500 kV and 138 kV	Yes	Yes	Yes	Yes	Yes	Yes
Maryland Rural Legacy Property (Bear Creek RL-0396)	MD	Yes—500 kV	Yes	Yes	Yes	No	Yes	No
Maryland Rural Legacy Property (Bear Creek RL-35354)	MD	Yes—500 kV	Yes	Yes	Yes	No	Yes	No
Bear Creek Hatchery FMA	MD	Yes—500 kV	Yes	Yes	Yes	No	Yes	No
Savage River State Forest	MD	Yes—500 kV and two 138 kV	Yes	Yes	Yes	Yes	Yes	Yes
Bear Pen Wildlands	MD	Yes—138 kV	Yes	Yes	Yes	No	Yes	No
Big Savage Mountain Wildlands	MD	Yes—500 kV and 138 kV	Yes	Yes	Yes	No	Yes	No
Dan’s Mountain WMA	MD	Yes—500 kV and 138 kV	Yes	Yes	Yes	Yes	Yes	Yes
Dan’s Mountain Wildlands	MD	Yes—500 kV	Yes	Yes	Yes	No	Yes	No
White Horse Mountain WMA	WV	Yes—500 kV and 138 kV	Yes	Yes	Yes	Yes	No	No

Source: PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR

FMA = Fisheries Management Area; kV = kilovolt; MD = Maryland; PA = Pennsylvania; USACE = U.S. Army Corps of Engineers; WMA = Wildlife Management Area; WV = West Virginia

[a] Protected area listed west to east.

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Alternative Route A

Alternative Route A parallels existing transmission lines through the following resources: Coopers Rock State Forest, the Youghiogheny River Lake Recreation Area (USACE), two Bear Creek Rural Legacy conservation easements, Bear Creek Hatchery FMA, Savage River State Forest, Bear Pen Wildlands, Big Savage Mountain Wildlands, Dan's Mountain WMA and Wildlands, and White Horse Mountain WMA. Alternative Route A avoided crossing through SGL 138, Forbes State Forest and Quebec Run Wild Area.

Alternative Route A had moderate performance for protected areas criteria. It is one of two routes with the second-lowest mileage (9.7 miles) of crossings through state forest lands and is one of three routes with the lowest acreage (3.9 acres) of impact within the USACE-managed Youghiogheny River Lake Recreation Area. However, like Alternative Routes B, C, and E, Alternative Route A crosses the Maryland Wildlands and two Rural Legacy conservation easements. While Alternative Route A crosses the Maryland Wildlands, the Routing Team designed the crossing to parallel the existing transmission line and maintain a ROW Corridor width of 200 feet based on statutory requirements. In total, Alternative Route A crosses eight protected land areas over 14.6 miles (368.4 acres), placing it near the middle of the Alternative Routes in terms of overall protected land acreage disturbance.

Alternative Route B

Similar to Alternative Route A, Alternative Route B parallels existing transmission lines through the following resources: Coopers Rock State Forest, the Youghiogheny River Lake Recreation Area (USACE), two Bear Creek Rural Legacy conservation easements, Bear Creek Hatchery FMA, Savage River State Forest, Bear Pen Wildlands, Big Savage Mountain Wildlands, Dan's Mountain WMA and Wildlands, and White Horse Mountain WMA. Alternative Route B avoids crossing SGL 138, Forbes State Forest and Quebec Run Wild Area.

Alternative Route B had a moderate performance for protected areas criteria (similar to Alternative Route A) with slightly higher impacts (4.3 acres) to the USACE-managed Youghiogheny River Lake Recreation Area. However, like Alternative Routes A, C, and E, Alternative Route B crosses the Maryland Wildlands and two Rural Legacy conservation easements. While Alternative Route B crosses the Maryland Wildlands, the Routing Team designed the crossing to parallel the existing transmission line and maintain a ROW Corridor width of 200 feet based on statutory requirements. In total, Alternative Route B crosses eight protected land areas over 14.5 miles (366.6 acres), placing it near the middle of the Alternative Routes in terms of overall protected land acreage disturbance.

Alternative Route C

Alternative Route C parallels existing transmission lines through the following resources: SGL 138, Forbes State Forest, Quebec Run Wild Area, the Youghiogheny River Lake Recreation Area (USACE), two Bear Creek Rural Legacy conservation easements, Bear Creek Hatchery FMA, Savage River State Forest, Bear Pen Wildlands, Big Savage Mountain Wildlands, Dan's Mountain WMA and Wildlands, and White Horse Mountain WMA. Alternative Route C avoids crossing Coopers

Rock State Forest by paralleling existing 500 kV transmission lines in the northwest quadrant of the MARL Project Study Area in Pennsylvania.

Alternative Route C had an inferior performance for protected areas criteria. It has the highest impacts in comparison to the other Alternative Routes. In total, it crosses ten protected lands totaling 17.2 miles and 435.5 acres of impact. However, like other Alternative Routes, Alternative Route C parallels existing transmission lines through these protected resources. Similar to Alternative Routes A, B, and E, Alternative Route C crosses the Maryland Wildlands and two Rural Legacy conservation easements. While Alternative Route C crosses the Maryland Wildlands, the Routing Team designed the crossing to parallel the existing transmission line and maintain a ROW Corridor width of 200 feet based on statutory requirements.

Alternative Route D

Alternative Route D parallels existing transmission lines through the following resources: Coopers Rock State Forest, the Youghiogheny River Lake Recreation Area (USACE), Savage River State Forest, Dan's Mountain WMA (greenfield section), and White Horse Mountain WMA. Alternative Route D avoids crossing SGL 138, Forbes State Forest, Quebec Run Wild Area, Bear Pen Wildlands, Big Savage Mountain Wildlands, and Dan's Mountain Wildlands.

Alternative Route D had superior performance for protected areas criteria. It has the lowest total impact on protected lands by crossing five protected lands totaling 13.3 miles and 328.6 acres. However, Alternative Route D does so because of a higher percentage of greenfield development and longer overall route length. Avoiding the Maryland Wildlands necessitates an additional 21.1 miles of greenfield development in Maryland and an additional 7.7 miles of total line length in Maryland compared to Alternative Routes A and E.

Alternative Route E

Alternative Route E parallels existing transmission lines through the following resources: Coopers Rock State Forest, the Youghiogheny River Lake Recreation Area (USACE), two Rural Legacy conservation easements, Bear Creek Hatchery FMA, Savage River State Forest, Bear Pen Wildlands, Big Savage Mountain Wildlands, and Dan's Mountain WMA and Wildlands. Alternative Route E avoids crossing White Horse Mountain WMA by routing a greenfield section further south.

Alternative Route E had moderate performance for protected areas criteria. It has average total mileage (14.0 miles) and acreage (353.5 acres) through seven protected lands. Similar to Alternative Routes A, B, and C, Alternative Route E crosses the Maryland Wildlands and two Rural Legacy conservation easements. While Alternative Route E crosses the Maryland Wildlands, the Routing Team designed the crossing to parallel the existing transmission line and maintain a ROW Corridor width of 200 feet based on statutory requirements.

Alternative Route F

Alternative Route F parallels existing transmission lines through the following resources: SGL 138, Forbes State Forest, Quebec Run Wild Area, the Youghiogheny River Lake Recreation Area (USACE), Savage River State Forest, and Dan's Mountain WMA. Alternative Route F avoids crossing Coopers Rock State Forest by paralleling an existing 500 kV transmission line in the

northwest quadrant of the MARL Project Study Area in Pennsylvania, and avoids crossing the Maryland Wildlands by routing north via a large greenfield segment. Alternative Route F also avoids White Horse Mountain WMA by routing a greenfield section to the south.

Alternative Route F had moderate performance for protected areas criteria. It has the second-highest impact on protected areas with a total of 15.3 miles and 380.9 acres. Additionally, it has the highest state forest lands crossed by miles (11.3 miles), the second-lowest impacts on WMA, and no impacts on Maryland Wildlands and conservation easements. While Alternative Route F avoids these resources it did so with trade-offs of more miles of greenfield development to navigate around these resources, resulting in the lowest amount of parallelling existing transmission lines (36.3 percent).

Superior Alternative Routes

Alternative Route D demonstrated the lowest overall impact on protected lands compared to the other Alternative Routes. While all Alternative Routes cross through protected lands, Alternative Route D did so while paralleling existing transmission lines, and has the fewest number (5), and results in the lowest mileage (13.3 miles) and acreage (328.6 acres) of protected lands. This reduced impact on protected lands could result in less permitting requirements and potentially fewer ecological impacts. However, avoiding the Maryland Wildlands necessitates an additional 21.1 miles of greenfield development in Maryland and an additional 7.7 miles of total line length in Maryland compared to Alternative Routes A and E.

Moderate and Inferior Alternative Routes

Alternative Route C had inferior performance and exhibited the greatest level of impact on protected lands, both in mileage (17.2 miles), number of crossed areas (10), and the largest acreage of impact (435.5 acres). These higher impacts on protected lands could result in more permitting, more ecological impacts, and increased mitigation requirements and ecological impacts. Alternative Routes A, B, E, and F had a moderate performance across these criteria, with all four having average total acreage of impacts (368.4, 366.6, 353.5, and 380.9, respectively) and average count of crossings (8, 8, 7, and 6, respectively).

5.2.4 CULTURAL RESOURCES

The evaluation of cultural resources along the Alternative Routes is an important component of the MARL Project's siting process, by making sure that historic, archaeological, and community assets are identified and protected. Each route was assessed for proximity to NRHP listed or eligible resources, and National Historic Landmark (NHL) listed resources. These included archaeological sites, architectural resources, historic districts, cemeteries, and battlefields. Assessment was also made of designated heritage areas and historic easements. The Routing Team consulted each state's historic preservation offices to obtain relevant data, as well as relevant federal databases to conduct the analysis. The Routing Team evaluated each route for the criteria presented in Table 5.2-5 and shown on Appendix E-9, Alternative Routes—Land Use and Social Resources—Cultural Resources.

TABLE 5.2-5 CULTURAL RESOURCES EVALUATION CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Cemeteries within ROW Corridor; 500 feet of centerline	Count	0	0	0	0	0	0
		4	5	4	4	4	3
Archaeological Resources within ROW Corridor	Count	6	7	6	5	6	5
Architecture Resources—NRHP eligible, NRHP listed, or NHL listed within ROW Corridor; 0.5-mile buffer from centerline	Count	4	4	4	4	4	4
		7	10	13	6	7	12
Historic Districts Crossed	Count	6	5	4	6	6	4
Battlefields	Count	1	1	1	1	1	1
	Acres	38.0	38.0	38.0	38.0	38.0	12.9
MD—Heritage Areas	Count	1	1	1	1	1	1
	Acres	128.3	140.0	120.4	164.1	128.3	156.1

Source: PASHPO, WVSHPO, MHT, VADHR

MD = Maryland; NHL = National Historic Landmarks; NRHP = National Register of Historic Places; ROW = right-of-way

Alternative Route A

Alternative Route A had superior performance for cultural resources criteria. It is one of four that has the second-lowest number of cemeteries within 500 feet of the centerline (4) and one of three routes that has the second-lowest number of archaeological resources within the ROW Corridor (6). All Alternative Routes cross the same number of NRHP-eligible/NRHP-listed/NHL-listed resources within the ROW Corridor (4); however, Alternative Route A is one of two routes that has the second-lowest number of architecture resources within 0.5-mile of the centerline (7). It is one of three routes that has the highest number of historic districts crossed (6), along with Alternative Routes D and E. All Alternative Routes cross one Maryland heritage area (Mountain Maryland Gateway to the West Heritage Area), with Alternative Route A being one of two routes having the second-lowest amount of Maryland heritage areas within the ROW Corridor (128.3 acres). Additionally, all Alternative Routes cross one battlefield site (Hanging Rock), located in Capon Bridge, Hampshire County, West Virginia. Alternative Routes A, B, C, D, and E parallel an existing transmission line through the eastern corner of Hanging Rock Battlefield, and all have the same amount of acreage impacts (38.0 acres).

Alternative Route B

Alternative Route B had moderate performance for cultural resources criteria. It has the highest number of cemeteries within 500 feet of the centerline (5) and archaeological resources within the ROW Corridor (7). Alternative Route B also had moderate performance for architecture resources within 0.5-mile of the centerline. It crossed the second-lowest number of historic districts (5). Additionally, Alternative Route B crossed the one Maryland heritage area (Mountain Maryland Gateway to the West Heritage Area), with this route having the third-highest amount within the ROW Corridor (140.0 acres). Alternative Routes A, B, C, D, and E parallel an existing transmission line through the eastern corner of Hanging Rock Battlefield, and all have the same amount of acreage impacts (38.0 acres).

Alternative Route C

Alternative Route C had inferior performance for cultural resources criteria. For cemeteries within 500 feet of the centerline and archaeological resources within the ROW Corridor, Alternative Route C performed similar to Alternative Route A. Alternative Route C crossed the highest number of architecture resources within 0.5-mile of the centerline (13). Alternative Route C was one of two routes that crossed the lowest number of historic districts (4) and had the least impact on Mountain Maryland Gateway to the West Heritage Area. However, Alternative Route C crosses near one NHL, Friendship Hill National Historic Site in Point Marion, Fayette County, Pennsylvania. Alternative Routes A, B, C, D, and E parallel an existing transmission line through the eastern corner of Hanging Rock Battlefield, and all have the same amount of acreage impacts (38.0 acres).

Alternative Route D

Alternative Route D had superior performance for cultural resources criteria, falling near the top across most metrics. Alternative Route D is one of two routes that crosses the lowest number of archaeological resources (5) and one of four routes that had the second-lowest number of

cemeteries (4). Alternative Route D crosses the lowest number of NRHP-eligible/NRHP-listed/NHL-listed resources within 0.5-mile (6) of the centerline. However, the route is one of three routes that crosses the highest number of historic districts (6) and had the highest amount of Mountain Maryland Gateway to the West Heritage Area within the ROW Corridor (164.1 acres). Alternative Routes A, B, C, D, and E parallel an existing transmission line through the eastern corner of Hanging Rock Battlefield, and all have the same amount of acreage impacts (38.0 acres).

Alternative Route E

Alternative Route E had superior performance for cultural resources criteria. Its impacts are identical to Alternative Route A. It crosses the same number of cemeteries (4), archaeological resources (6), and historic districts (6). Alternative Route E is one of two routes that has the second-lowest number of architecture resources within 0.5-mile of the centerline (7). The impacts on Mountain Maryland Gateway to the West Heritage Area are identical to Alternative Route A, with 128.3 acres within the ROW Corridor. Alternative Routes A, B, C, and D, and E parallel an existing transmission line through the eastern corner of Hanging Rock Battlefield, and all have the same amount of acreage impacts (38.0 acres).

Alternative Route F

Alternative Route F had an inferior performance for cultural resources criteria. It has the second-highest count within 0.5-mile of the centerline (12). However, Alternative F provides the smallest impact on the Hanging Rock Battlefield by crossing 12.9 acres of the site and has the lowest number of cemeteries with 500 feet of the centerline (3). Alternative Route F is one of two routes that has lowest count of archaeological resources within the ROW Corridor (5) and historic districts crossed (4). Alternative Route F had the second-highest amount of Mountain Maryland Gateway to the West Heritage Area within the ROW Corridor, and crosses near one NHL, Friendship Hill National Historic Site in Point Marion, Fayette County, Pennsylvania.

Superior Alternative Routes

Alternative Routes A, D, and E provide the lowest impact on cultural resources. While the variability among cultural data is minimal, these Alternative Routes cross the second-lowest number of cemeteries (4) and have a low number of impacts on archaeological resources and architecture resources. Alternative Route D slightly outperformed Alternative Route A. However, Alternative Route D has the highest impact on heritage areas, impacting 35.8 acres more of Mountain Maryland Gateway to the West Heritage Area.

Moderate and Inferior Alternative Routes

Alternative Routes C and F had inferior performance and have the highest impacts on cultural resources. The variability among cultural data is minimal, but these Alternative Routes performed slightly worse than the other Alternative Routes. Alternative Routes C and F cross the highest number of architecture resources within 0.5-mile of the centerline. While Alternative Route F provided the lowest impact on the Hanging Rock Battlefield, and Alternative Route C provided the lowest impact on the Mountain Maryland Gateway to the West Heritage Area, both Alternative Routes cross near an NHL, Friendship Hill National Historic Site. Alternative Route B had moderate

performance, with Alternative Route B having the highest impacts on cemeteries and archaeological resources.

5.2.5 AGRICULTURAL AND LAND COVER

Agricultural lands within the MARL Project Study Area range from prime farmland—characterized by exceptional soil quality and productivity—to less fertile soils that may still hold local significance. Land cover refers to the varying footprints of an area and may be developed (e.g., residential and commercial land uses) and undeveloped areas (e.g., forested, pastureland, wetlands). Together, agricultural land classifications and land cover data provide a basis for evaluating how a project may affect soils, water resources, aquatic habitats and species, wetlands, floodplains, vegetation, wildlife, and special-status species. For example, forested vegetation may be converted to herbaceous or scrub/shrub land cover for the duration of the MARL Project.

To minimize new fragmentation of forested habitat, the MARL Project has been designed to parallel existing transmission line ROWs to the greatest extent practicable. Agricultural lands located within the ROW Corridor—many of which are also found along paralleling opportunities—would be temporarily unavailable for agricultural production during construction. However, once the MARL Project is in operation, most farming activities could continue to occur within the ROW Corridor in coordination with the landowners. This may result in short-term impacts on farming operations, including crop harvesting and grazing. However, agricultural activities will generally be permitted to resume during operation, and no long-term change in land cover is anticipated.

Each Alternative Route presents a distinct footprint and associated level of impact on agricultural lands and land cover. The analysis considers factors such as soil quality, crop productivity, and the extent of forest, wetland, and pastureland crossed. Routes with larger total acreage within the ROW Corridor generally correlate with greater impacts. Alternative Routes A, B, and E provide the least impact on the total footprint because of the lower ROW Corridor acres required for the routes, whereas Alternative Routes C, D, and F provide greater impacts. The Routing Team evaluated each route for the following criteria presented in Table 5.2-6 and Table 5.2-7 and as shown on Appendix E-10, Alternative Routes—Land Use and Social Resources—Agricultural and Land Cover.

TABLE 5.2-6 AGRICULTURAL LAND EVALUATION CRITERIA

Agricultural Land	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Not Prime Farmland Class	Acres	1,789.5	1,780.9	1,926.7	1,895.7	1,782.4	2,033.6
State Importance Farmland Class	Acres	389.7	411.7	325.7	426.1	379.7	338.8
Local Importance Farmland Class	Acres	399.3	399.7	399.3	399.3	389.2	369.1
Prime Farmland Class	Acres	90.4	79.1	183.8	101.0	100.2	205.8

Source: USA SSURGO

TABLE 5.2-7 LAND COVER EVALUATION CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Barren Land (Rock/Sand/Clay)	Acres	20.2	25.2	21.4	29.9	20.2	31.0
Cultivated Crops	Acres	45.4	61.6	41.7	39.5	45.4	35.9
Deciduous Forest	Acres	1,836.0	1,821.8	1,927.6	1,906.3	1,820.5	1,960.4
Developed, High Intensity	Acres	0.0	0.0	1.3	0.0	0.0	1.3
Developed, Low Intensity	Acres	16.2	18.2	19.5	14.1	15.4	16.2
Developed, Medium Intensity	Acres	2.0	1.4	5.3	2.0	2.0	5.3
Developed, Open Space	Acres	82.2	84.1	86.4	85.0	80.3	91.7
Emergent Herbaceous Wetlands	Acres	0.0	0.0	2.2	0.0	0.0	2.2
Evergreen Forest	Acres	24.0	27.1	26.1	27.1	15.3	18.8
Grassland/Herbaceous	Acres	25.3	32.0	13.7	35.8	27.1	27.4
Mixed Forest	Acres	171.4	171.8	191.3	184.6	166.9	198.8
Open Water	Acres	13.0	13.7	8.1	13.0	14.3	9.6
Pasture/Hay	Acres	415.7	399.2	466.8	478.5	426.7	536.3
Shrub/Scrub	Acres	15.3	12.9	13.1	17.8	15.0	15.4
Woody Wetlands	Acres	2.5	2.5	11.1	5.5	2.5	14.1
Forest Lands Total [a] (Deciduous Forest, Evergreen Forest, and Mixed Forest)	Acres	2,031.4	2,020.7	2,145.0	2,118.0	2,002.7	2,178.0
Agricultural Lands Total [a] (Pasture/Hay and Cultivated Crops)	Acres	461.1	460.8	508.5	518.0	472.1	572.2
Developed Lands Total [a] (High, Low, Medium, Open Space)	Acres	100.4	103.7	112.5	101.1	97.7	114.5

Source: USGS NLCD 2024

[a] Totals may not match the sum of addends due to rounding.

Alternative Route A

Alternative Route A had superior performance for agricultural and land cover criteria. It has the second-smallest ROW Corridor (2,669.0 acres) and therefore would have less impact on select land cover than the longer Alternative Routes C, D, and F. Alternative Route A provides the second-lowest amount of agricultural land acreage within the ROW Corridor (461.1 acres), the third-lowest amount of forested land acreage within the ROW Corridor (2,031.4 acres) and the second-lowest amount of prime farmland acreage within the ROW Corridor (90.4 acres). Developed lands were similar across all Alternative Routes.

Alternative Route B

Alternative Route B had superior performance for agricultural and land cover criteria. It has the third-smallest ROW Corridor (2,671.4 acres) and therefore would have less impact on select land cover than the longer Alternative Routes C, D, and F. Alternative Route B has the lowest amount of agricultural land acreage within the ROW Corridor (460.8 acres), the second-lowest amount of forested land acreage within the ROW Corridor (2,020.7 acres) and the lowest amount of prime farmland in the ROW Corridor (79.1 acres). Developed lands were similar across all Alternative Routes.

Alternative Route C

Alternative Route C had inferior performance for agricultural and land cover criteria. It has the third-largest ROW Corridor (2,835.5 acres) and therefore would have more impact on select land cover than other Alternative Routes. Alternative Route C also has the third-highest amount of agricultural land acreage within the ROW Corridor (508.5 acres), the second-highest amount of forested land acreage within the ROW Corridor (2,145.0 acres) and the second-highest amount of prime farmland within the ROW Corridor (183.8 acres). Developed lands were similar across all Alternative Routes.

Alternative Route D

Alternative Route D had moderate performance for agricultural and land cover criteria. It has the second-largest ROW Corridor (2,839.0 acres) and therefore would have more impact on select land cover than other Alternative Routes. Alternative Route D has the second-highest amount of agricultural land acreage within the ROW Corridor (518.0 acres), but has the fourth-lowest amount of forested land acreage within the ROW Corridor (2,118.0 acres) and the fourth-lowest amount of prime farmland in the ROW Corridor (101.0 acres). Developed lands were similar across all Alternative Routes.

Alternative Route E

Alternative Route E had superior performance for agricultural and land cover criteria. It has the smallest ROW Corridor (2,651.5 acres) and therefore would have less impact on select land cover than the longer Alternative Routes C, D, and F. Alternative Route E has the third-lowest agricultural land acreage within the ROW Corridor (472.1 acres) and the lowest amount of forested land acreage within the ROW Corridor (2,002.7 acres). Developed lands were similar across all Alternative Routes.

Alternative Route F

Alternative Route F had inferior performance for agricultural and land cover criteria. It has the largest ROW Corridor (2,964.3 acres) and therefore would have more impact on select land cover than other Alternative Routes. Alternative Route F has the highest amount of agricultural land acreage within the ROW Corridor (572.2 acres), the highest amount of forested land acreage within the ROW Corridor (2,178.0 acres) and the highest amount of prime farmland within the ROW Corridor (205.8 acres). Developed lands were similar across all Alternative Routes.

Superior Alternative Routes

Alternative Routes A, B, and E have the lowest impacts on agricultural and forested lands and are three of the smaller ROW Corridors as well as three of the shortest alignments proposed. Alternative Routes A and B also include the highest percentage of paralleling existing transmission lines. Therefore, crossing these land cover types—forested and/or agricultural lands—minimizes potential additional habitat fragmentation and/or conflicting uses with agricultural lands. Overall, these three routes are less impactful to various land covers, and their shorter lengths have less overall impact on the existing environment.

Moderate and Inferior Alternative Routes

Alternative Routes C and F have the highest impacts on agricultural and forested lands, are two or the larger ROW Corridors, and are the two longest alignments proposed. Alternative Routes C and F are the two routes with the least percentage of paralleling and include more greenfield development, thereby increasing the impact on habitat fragmentation, conversion of forested habitat type, and potential conflicting uses with agricultural lands. Alternative Route D had moderate performance.

5.3 NATURAL ENVIRONMENT

The natural environment criteria used in the Alternative Routes evaluation covered many different environmental features and datasets. Each subsection below highlights groups of information for a detailed review of these topics.

5.3.1 WATER RESOURCES

Assessing the potential impact of transmission lines on water resources is essential because these areas provide critical ecological functions, support recreational uses, and are subject to additional permitting requirements and/or mitigation measures. The Routing Team prioritized minimizing impacts on sensitive water resources within the MARL Project Study Area, including coldwater fisheries and trout streams, wetlands, and floodplains. For consistent evaluation across multiple states, the team relied on study-area-wide datasets and, where possible, merged state-specific data for a more accurate comparison. This included merging trout stream and coldwater fishery data from individual state databases, which included the following datasets:

- Pennsylvania:
  - Class A Trout Streams
  - Naturally Reproducing Trout Streams

    - Wilderness Trout Streams
    - Designated Use Streams for Coldwater Fishes, Exceptional Value, High Quality, and Trout Stocking
- West Virginia:
    - Trout Streams
- Maryland:
    - Maryland Department of Natural Resources Trout Stock Streams
    - Designated Use III: Nontidal Cold Water—Natural Trout Water
    - Designated Use III-P: Nontidal Cold Water and Public Water Supply
    - Designated Use IV: Recreational Trout Waters
    - Designated Use IV-P: Recreational Trout Waters and Public Water Supply
- Virginia:
    - Virginia Water Quality Standards Trout Streams and Rivers

Some state-specific databases and details are presented in Table 5.3-1. Reducing impacts on water resources not only preserves natural ecosystems but also helps to reduce permitting processes. Where possible, the Routing Team attempted to parallel existing transmission lines across waterbodies to avoid additional habitat fragmentation and/or removal of canopy cover for these streams to minimize impacts on the species within the streams. Additionally, where feasible, the Routing Team proposed placing transmission structures peak to peak, to potentially reduce forested habitat as well as forested riparian buffers from being impacted. At these locations—referred to as riparian habitat exclusion zones—engineering solutions were developed to retain existing riparian vegetation within 100 feet on either side of the center of the stream. No vegetation clearing or ground disturbance will occur within these zones. These riparian habitat exclusion zones are discussed in more detail in Section 6.3.

All Alternative Routes cross some of the same large waterbodies. Where feasible, the Routing Team developed Alternative Routes that parallel existing transmission lines while crossing these large waterbodies. The waterbodies and crossing types for each Alternative Route are listed in Table 5.3-1. Notably, Alternative Route B is the only Alternative Route that crosses both the Cheat River and Cheat Lake (the impounded area south of the Lake Lynn Dam). Impacts on Cheat Lake can also be considered an impact on both land use and water resources as it is an area surrounded by campgrounds, trails, and other recreational, commercial, and residential developments. The Routing Team evaluated each route for the criteria presented in Table 5.3-2 and as shown on Appendix E-11, Alternative Routes—Natural Environment—Water Resources, which shows study-area-wide datasets for water resources. For more specific analysis on state-specific resources, please refer to the Environmental Review Documents (Appendices A, B, C, and D).

TABLE 5.3-1 WATERBODIES AND CROSSING TYPES FOR EACH ALTERNATIVE ROUTE

Large Waterbody [a]	State	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Monongahela River	PA	Greenfield crossing south of Point Marion Lock and Dam	Same as Alternative Route A	Greenfield crossing north of Point Marion Lock and Dam	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route C
Cheat River (north of Lake Lynn Dam)	PA	Greenfield crossing 0.8 mile north of Lake Lynn Dam	Greenfield crossing 0.3 mile north of Lake Lynn Dam	Does not cross	Same as Alternative Route A	Same as Alternative Route A	Does not cross
Cheat Lake (impounded area south of Lake Lynn Dam)	WV	Does not cross	Greenfield crossing	Does not cross	Does not cross	Does not cross	Does not cross
Georges Creek	PA	Does not cross	Does not cross	Greenfield crossing	Does not cross	Does not cross	Greenfield crossing
Big Sandy Creek	WV	Crossing parallel to existing 138 kV corridor northside	Crossing parallel to existing 138 kV corridor southside	Does not cross	Same as Alternative Route A	Same as Alternative Route A	Does not cross
Youghiogheny River	MD	Crossing parallel to existing 138 kV corridor	Same as Alternative Route A	Crossing parallel to existing 500 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route C
Savage River	MD	Crossing parallel to existing 500 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Greenfield crossing	Same as Alternative Route A	Greenfield crossing
Georges Creek	MD	Crossing parallel to existing 500 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Crossing parallel to existing 138 kV corridor	Same as Alternative Route A	Crossing parallel to existing 138 kV corridor
North Branch Potomac River	MD/WV	Crossing parallel to existing 138 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A
Patterson Creek	WV	Greenfield crossing	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A

Large Waterbody [a]	State	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
South Branch Potomac River	WV	Crossing within 500 feet to an existing 138 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Greenfield crossing	Greenfield crossing
North River	WV	Greenfield crossing	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative A	Same as Alternative Route A
Cacapon River	WV	Crossing parallel to existing 138 kV corridor	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A	Same as Alternative Route A

Source: USGS NHD

kV = kilovolt; MD = Maryland; NHD = National Hydrography Dataset; PA = Pennsylvania; WV = West Virginia

[a] Large waterbodies are defined as polygon areas in the NHD

TABLE 5.3-2 WATER RESOURCES CRITERIA

Water Resources	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
NHD Stream/River—Perennial	Count	81	77	76	99	79	93
	Corridor Length (feet)	27,326.6	26,002.9	24,614.3	30,557.4	27,231.4	27,948.3
NHD Stream/River—Intermittent	Count	37	37	47	37	37	43
	Corridor Length (feet)	9,911.6	9,403.4	13,628.2	9,911.6	9,663.1	12,156.6
NHD Waterbody	Count	14	12	13	17	13	14
	Area (acres)	4.2	5.2	5.0	6.6	4.1	7.1
Section 10 Navigable Waters	Count	3	3	2	3	3	2
Trout Streams and Coldwater Fisheries (all states) [a]	Count	39	33	50	50	39	61
	Corridor Length (feet)	13,513.2	10,950.6	16,728.8	15,891.5	13,512.9	19,350.3
PA Trout Streams	Count	1	0	2	1	1	2
	Corridor Length (feet)	258.2	0.0	729.4	258.2	258.2	729.4
WV Trout Streams	Count	7	7	3	7	7	3
	Corridor Length (feet)	1,821.7	1,867.9	703.6	1,821.7	1,821.7	946.9
VA Trout Streams	Count	0	0	0	0	0	0
	Corridor Length (feet)	0.0	0.0	0.0	0.0	0.0	0.0
PA—Designated Use Streams (CWF, EV, HQ, TSF)	Count	3	1	17	3	3	17
	Corridor Length (feet)	1,556.0	20.6	4,794.7	1,556.0	1,555.7	4,794.7
MD—Designated Use Streams (Use III and III-P: Nontidal Cold Water and Public Water Supply)	Count	27	24	27	38	27	38
	Corridor Length (feet)	9,410.2	8,595.0	10,034.0	12,043.5	9,410.2	12,667.3
MD—Designated Use Streams (Use IV and IV-P: Recreational Trout Waters and Public Water Supply)	Count	1	1	1	1	1	1
	Corridor Length (feet)	467.1	467.1	467.1	212.1	467.1	212.1

Water Resources	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
VA—Threatened & Endangered Species Waters	Count	1	1	1	1	1	1
	Corridor Length (feet)	438.6	438.6	438.6	438.6	438.6	438.6
WV—Mussel Streams	Count	8	8	6	8	8	6
	Corridor Length (feet)	2,221.3	2,218.3	1,612.8	2,221.3	2,394.1	1,996.5
MD—Designated Use Streams (Use I and I-P Water Contact Recreation, Protection of Aquatic Live, and Public Water Supply)	Count	1	1	1	5	1	5
	Corridor Length (feet)	264.6	264.6	264.6	1,117.1	264.6	1,117.1
Modeled Wetlands [b]	Acres	42.6	43.1	59.6	43.3	44.8	63.0
NWI—All Types [a]	Acres	42.7	43.6	53.9	48.8	44.1	62.8
NWI—Freshwater Emergent	Acres	3.9	3.6	5.3	3.4	3.7	5.0
NWI—Freshwater Shrub Scrub	Acres	11.7	10.9	20.8	15.9	11.8	26.1
NWI—Freshwater Pond	Acres	3.9	5.6	4.1	5.1	3.1	4.5
NWI—Lake	Acres	0.0	1.8	0.0	0.0	0.0	0.0
NWI—Riverine	Acres	23.2	21.6	23.7	24.4	25.6	27.2
WV—DEP Wetlands	Acres	8.0	9.3	5.6	8.0	10.4	7.9
MD—DNR Wetlands of Special Concern	Acres	0.0	0.0	0.0	0.0	0.0	0.0
MD—DNR Wetlands	Acres	5.7	4.3	5.2	7.0	5.7	6.5
FEMA Flood Zone A/AE/AO—Areas with a 1% annual chance of flooding (100-year flood area)	Acres	98.4	103.5	109.1	97.3	103.3	115.3
	Structure Count	8	8	7	9	7	7
FEMA Flood Zone X—Areas with 0.2% annual chance of flooding (500-year flood area)	Acres	3.5	3.5	4.0	3.0	5.0	5.1
	Structure Count	0	0	0	0	1	1
FEMA Flood Zones Combined [a]	Acres	101.9	107.0	113.1	100.3	108.3	120.4

Source: USGS NHD, FEMA's National Flood Hazard Layer (NFHL), USFWS, MDE, PFBC, PADEP, WVDNR, VADWR

CWF = Coldwater Fishes; DEP = Department of Environmental Protection; DNR = Department of Natural Resources; EV = Exceptional Value; FEMA = Federal Emergency Management Agency; HQ = High Quality; MD = Maryland; NHD = National Hydrography Dataset; NWI = National Wetlands Inventory; PA = Pennsylvania; TSF = Trout Stocking; VA = Virginia; WV = West Virginia

[a] Totals may not match the sum of addends due to rounding.

[b] ERM conducted a deep learning model to predict wetlands in the MARL Project Study Area. See Appendix H, Wetland Identification Model Report.

Alternative Route A

Alternative Route A had superior performance for water resources criteria. It has the lowest impact on modeled wetlands (42.6 acres) and National Wetlands Inventory (NWI) wetlands (42.7 acres). The route also has the second-lowest impact on National Hydrography Dataset waterbodies with 4.2 acres within the ROW Corridor and is one of two routes with the second-lowest number of trout stream crossings and coldwater fisheries, with 39 crossings and 13,513.2 feet. In addition, Alternative Route A has the second-lowest acreage of floodplains within the ROW Corridor (101.9 acres).

Alternative Route B

Alternative Route B had superior performance for water resources criteria. It has the second-lowest number of perennial stream crossings (77) and the smallest number of trout stream crossings and coldwater fisheries (33) as well as linear feet (10,950.6). This route has the second-lowest impact by acres on both modeled and NWI wetlands but has the lowest acreage of impact on NWI freshwater shrub scrub wetlands. In addition, Alternative Route B has the third-lowest acreage of floodplains within the ROW Corridor (107.0 acres).

Alternative Route C

Alternative Route C had inferior performance for water resources criteria. It has the second-highest impact by acres on both modeled and NWI wetlands (59.6 acres and 53.9 acres, respectively). However, Alternative Route C has the lowest linear feet of perennial streams within the ROW Corridor (24,614.3) but was one of two routes with the second-highest number of crossings of trout streams and coldwater fisheries (50 crossings and 16,728.8 linear feet). In addition, Alternative Route C has the second-highest acreage of floodplains within the ROW Corridor (113.1 acres).

Alternative Route D

Alternative Route D had moderate performance for water resources criteria. It has the highest number and linear feet of perennial stream crossings (99 and 30,557.4). Alternative Route D has the third-lowest impact by acres on modeled wetlands (43.3 acres) but has the fourth lowest for NWI wetlands (48.8 acres). However, Alternative Route D is one of two routes with the second-highest number of trout stream crossings and coldwater fisheries (50 crossings and 15,891.5 linear feet). Alternative Route D has the second-lowest acreage of floodplains within the ROW Corridor (100.3 acres).

Alternative Route E

Alternative Route E had moderate performance for water resources criteria. It is one of two routes with the lowest number of on trout stream crossings and coldwater fisheries, with 39 crossings and 13,512.9 linear feet. Alternative Route E has the third-lowest impact by acres on NWI wetlands (44.1 acres) and the fourth lowest for modeled wetlands (44.8 acres). Alternative Route E has the third-largest acreage of floodplains within the ROW Corridor (108.3 acres).

Alternative Route F

Alternative Route F had inferior performance for water resources criteria. It has the highest overall impact on water resources, and generally poor performance across these criteria. It has the second-highest impacts on perennial streams with 93 crossings and 27,948.3 linear feet within the ROW Corridor. In addition, it has the highest number of crossings and linear feet of trout streams and coldwater fisheries within the ROW Corridor, with almost twice the level of impacts on sensitive streams compared to Alternative Route B. This route has the highest impact on both modeled and NWI wetlands within the ROW Corridor compared to the other Alternative Routes. Alternative Route F has the highest acreage of floodplains within the ROW Corridor (120.4 acres).

Superior Alternative Routes

Alternative Routes A and B had the best performance across water resources and generally have the lowest impacts on water resources. Alternative Route B has the smallest number of trout streams and coldwater fisheries crossings and Alternative Route A is one of two routes with the second-smallest number of trout streams and coldwater fisheries crossings. In addition, Alternative Route A performed well with the lowest impact on wetlands; Alternative Route B has the second-lowest impact on wetlands. Overall, these two routes have the lowest impacts on water resources, likely due to their short length and small footprint relative to the other Alternative Routes.

Moderate and Inferior Alternative Routes

Alternative Routes C and F performed poorly across water resources with the highest impacts on streams, wetlands, and floodplains. Of these two Alternative Routes, Alternative Route F had the worst performance across most water resources with the largest impacts on wetlands and trout streams and coldwater fisheries compared to the other five Alternative Routes. Alternative Routes D and E had moderate performance across water resources.

5.3.2 SENSITIVE SPECIES AND HABITATS

Impacts on sensitive ecological resources, including impacts on known occupied individual species habitats, potentially suitable habitat for sensitive species, and sensitive habitat types have been minimized to the extent practicable across all Alternative Routes.

For consistent evaluation of impacts on these resources across multiple states, the Routing Team relied on study-area-wide datasets and, where possible, merged state-specific data for a more accurate comparison across the various Alternative Routes. This included merging known state- and federally listed species occurrence data from each state. However, there are multiple state-specific datasets that cannot be merged; these are presented in Table 5.3-3. The variability in state-specific information created challenges in evaluating Alternative Routes that cross four different states, with varying lengths in each state.

TABLE 5.3-3 SENSITIVE SPECIES AND HABITATS

Ecological Resources	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
USFWS Critical Habitat Final	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
USFWS Critical Habitat Proposed	Area (acres)	0.9	0.9	0.9	0.9	0.9	0.9
State-listed Species Occurrence (from state NHI Element Occurrence Data)	Area (acres)	235.1	237.5	228.4	235.5	197.4	183.5
Potentially Suitable State-listed Species, MBTA, and Foraging Bat Habitat	Area (acres)	2,650.8	2,651.8	2,809.5	2,823.0	2,634.2	2,941.5
Potentially Suitable Monarch Butterfly	Area (acres)	538.4	528.2	582.2	617.1	549.1	673.0
Bat Known Occupied Summer Habitat (all states)	Area (acres)	104.3	104.3	104.3	179.4	104.3	179.4
Bat Hibernacula (all states)	Area (acres)	388.9	388.8	420.3	388.9	388.8	420.3
Potentially Suitable Bat Roosting Habitat	Area (acres)	2,033.9	2,023.1	2,156.1	2,123.5	2,005.2	2,192.1
MD—Irreplaceable Natural Areas	Count	11	11	11	7	11	7
MD—Irreplaceable Natural Areas	Area (acres)	88.7	88.7	88.7	49.9	88.7	49.9
MD—Forest Interior Dwelling Species Confirmed	Area (acres)	0.0	0.0	0.0	5.3	0.0	5.3
MD—Forest Interior Dwelling Species Probable	Area (acres)	83.0	99.5	105.7	134.4	83.0	157.1
MD—Natural Heritage Areas	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
MD—Forests of Recognized Importance	Count	27	25	27	31	27	31
MD—Forests of Recognized Importance	Area (acres)	38.9	35.8	40.7	44.5	38.9	46.3
MD—Federal or State-Listed Species	Area (acres)	268.7	271.1	284.0	242.9	268.7	258.2
MD—Species of Concern	Area (acres)	7.2	7.2	7.2	36.6	7.2	36.6
MD—BioNet Tier 1 (critically significant)	Area (acres)	96.1	92.7	97.7	51.8	96.1	53.4
MD—BioNet Tier 2 (Extremely Significant)	Area (acres)	70.8	70.8	85.3	31.2	70.8	5.7
MD—BioNet Tier 3 (Highly Significant)	Area (acres)	345.1	351.2	339.9	534.9	345.1	529.7
MD—BioNet Tier 4 (Moderately Significant)	Area (acres)	226.3	209.3	240.9	195.0	226.3	209.0
MD—BioNet Tier 5 (Significant)	Area (acres)	76.9	89.1	103.1	117.7	76.9	144.0
PA—Natural Heritage Areas	Area (acres)	32.4	30.5	120.0	32.4	32.4	120.0
VA—Ecological Core C1 (Outstanding)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C2 (Very High)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C3 (High)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C4 (Moderate)	Area (acres)	24.4	24.4	24.4	24.4	24.4	24.4
VA—Ecological Core C5 (General)	Area (acres)	50.0	46.5	50.0	50.0	50.0	46.5

Source: USFWS, USGS, WVDNR, MDNR, VADWR, PNHP, PADCNR

BioNet = Biodiversity Conservation Network; MBTA = Migratory Bird Treaty Act; MD = Maryland; NHI = National Heritage Inventory; PA = Pennsylvania; USFWS = U.S. Fish and Wildlife Service; VA = Virginia

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Potentially suitable and known occupied habitats that are currently compatible with a maintained ROW (i.e., non-forested) would be temporarily unavailable to sensitive species that rely upon these habitats during construction. This may result in short-term impacts on species that use these habitats; however, individuals would be expected to return to the area following construction, and no long-term change in habitat suitability would be anticipated. Potentially suitable and known occupied forested habitats would be converted to herbaceous and shrub/scrub habitats and would no longer be available to species that use forested habitats.

Each Alternative Route presents a distinct footprint and associated level of impact on sensitive species and/or their habitats. Alternative Routes with larger total acreage within the ROW Corridor generally correlate with greater impacts. Alternative Routes A, B, and E provide the least impact on the total footprint because of their lower ROW Corridor acres, whereas Alternative Routes C, D, and F provide greater impacts. The Routing Team evaluated each route for the following criteria presented in Table 5.3-3 and as shown on Appendix E-12, Alternative Routes—Natural Environment—Sensitive Species and Habitat, which shows study-area-wide datasets for sensitive species and habitat resources. For more specific analysis on state-specific resources please refer to the Environmental Review Documents (Appendices A, B, C, and D), which also includes agency coordination for each respective state.

Alternative Route A

Alternative Route A had superior performance for sensitive species and habitat criteria. Alternative Route A has the second-lowest acreage for potentially suitable state-listed species, Migratory Bird Treaty Act (MBTA), and foraging bat habitat (2,650.8 acres) and also the second-lowest acreage for potentially suitable monarch butterfly habitat (538.4 acres). It has the fourth-lowest acreage within the ROW Corridor for state-listed species occurrence (235.1 acres) This route is one of four with the lowest acreage (104.3 acres) for bat known occupied summer habitat, one of four with the lowest acreage for bat hibernacula (388.9 acres), and third lowest for potentially suitable bat roosting habitat (2,033.9 acres).

Alternative Route B

Similar to Alternative Route A, Alternative Route B had superior performance for sensitive species and habitat criteria. While Alternative Route B has the highest acreage within the ROW Corridor for state-listed species occurrence (237.5 acres) it has the third-lowest acreage amount for potentially suitable state-listed species, MBTA, and foraging bat habitat (2,651.8 acres); the lowest acreage for potentially suitable monarch butterfly habitat (528.2 acres); one of four routes with the lowest acreage (104.3 acres) for bat known occupied summer habitat; one of four with the lowest acreage for bat hibernacula (388.8 acres); and second-lowest acreage for potentially suitable bat roosting habitat (2,023.1 acres).

Alternative Route C

Alternative Route C had moderate performance for sensitive species and habitat criteria. Alternative Route C has the third-lowest acreage within the ROW Corridor for state-listed species occurrence (228.4 acres); the fourth-lowest acreage for potentially suitable state-listed species, MBTA, and foraging bat habitat (2,809.5 acres); and the fourth-lowest acreage for potentially

suitable monarch butterfly habitat (582.2 acres). This route is one of four with the lowest acreage (104.3 acres) for bat known occupied summer habitat but is one of two routes with the largest acreage for bat hibernacula (420.3 acres) due primarily to its proximity to three known bat locations in Pennsylvania and the associated bat hibernation buffers. It also has the second-largest acreage impact for potentially suitable bat roosting habitat (2,156.1 acres).

Alternative Route D

Alternative Route D had inferior performance for sensitive species and habitat criteria. Alternative Route D has generally the second-largest impact acreage for state-listed species occurrence (235.5 acres); potentially suitable state-listed species, MBTA, and foraging bat habitat (2,823.0 acres); potentially suitable monarch butterfly habitat (617.1 acres); and bat known occupied summer habitat (179.4 acres). In addition, Alternative Route D has the third-largest impact on potentially suitable bat roosting habitat (2,123.5 acres) but is one of four routes with the lowest impact on bat hibernacula (388.9 acres).

Alternative Route E

Alternative Route E had superior performance for sensitive species and habitat criteria. Alternative Route E has the second-lowest acreage within the ROW Corridor for state-listed species occurrence (197.5 acres) and the lowest acreage for potentially suitable state-listed species, MBTA, and foraging bat habitat (2,634.2 acres). Alternative Route E has the third-lowest acreage for potentially suitable monarch butterfly habitat (549.1 acres), similar to Alternative Route A. This route is one of four with the lowest acreage (104.3 acres) for bat known occupied summer habitat, one of four for the lowest for bat hibernacula (388.8 acres), and lowest for potentially suitable bat roosting habitat (2,005.2 acres).

Alternative Route F

Alternative Route F had inferior performance for sensitive species and habitat criteria. Alternative Route F generally has the largest impact acreage for all criteria but has the lowest acreage for state-listed species occurrence.

Superior Alternative Routes

Alternative Routes A, B, and E demonstrated superior performance across multiple sensitive species and habitat criteria within the ROW Corridor. These routes consistently had the lowest or among the lowest acreage impacts on sensitive species habitats, including potentially suitable state-listed species, MBTA, monarch butterfly, foraging bat and roosting bat habitats. All three routes shared the lowest acreage (104.3 acres) for bat known occupied summer habitat and were among the lowest for bat hibernacula (388.8–388.9 acres).

Moderate and Inferior Alternative Routes

Alternative Routes D and F demonstrated inferior performance across the multiple sensitive species and habitat criteria. Although Alternative Route F has the lowest acreage for state-listed species occurrence (183.5 acres), it has the highest total acreage for potentially suitable state-listed species, MBTA, and foraging bat habitat; monarch butterfly habitat; bat known occupied

summer habitat; bat hibernacula; and potentially suitable bat roosting habitat. These cumulative impacts place Alternative Routes D and F as the least favorable options from a sensitive species and habitat standpoint. Alternative Route C had moderate performance.

5.4 ENGINEERING AND INFRASTRUCTURE

The engineering and infrastructure criteria used in the Alternative Routes evaluation are essential for selecting a Proposed Route that balances minimizing impacts on the natural environment and built environment while still maintaining Project feasibility through reduced technical complexity in design and construction considerations. Each Alternative Route introduces unique challenges, including the number of existing high-voltage transmission line crossings, structural turn angles, terrain steepness, and proximity to other infrastructure. For instance, Alternative Routes that have a higher number of existing high-voltage 500 KV transmission line crossings present unique engineering and logistical challenges (e.g., potential need for an outage). The MARL Project Study Area has mountainous terrain, and engineering a transmission line with steeper slopes may require specialized structure designs, longer span lengths, potentially more outages during construction, and increased construction effort, as well as longer access roads for construction and/or operation. To minimize impacts on the community, the Alternative Routes require navigating around the built-up environment. This may have resulted in the introduction of sharp turn angles that require more complex structure types, which increase costs. Additionally, proximity to oil and gas wells, pipelines, and karst features introduces the need for detailed geotechnical and safety assessments. By systematically comparing these variables, the Routing Team assessed the Alternative Routes that minimize the technical, engineering, and construction challenges. The Routing Team evaluated each Alternative Route for the criteria presented in Table 5.4-1 and as shown on Appendix E-13, Alternative Routes—Engineering and Infrastructure.

TABLE 5.4-1 ENGINEERING AND INFRASTRUCTURE CRITERIA

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Existing Transmission Line Crossings							
Electric Transmission Line Unknown kV Crossing	Count	11	10	13	10	11	12
Electric Transmission Line 69 kV Crossing	Count	0	0	0	0	0	0
Electric Transmission Line 115 kV Crossing	Count	1	1	1	1	1	1
Electric Transmission Line 132 kV Crossing	Count	1	1	0	1	1	0
Electric Transmission Line 138 kV Crossing	Count	21	22	17	23	19	15
Electric Transmission Line 500 kV Crossing	Count	7	7	11	7	7	11
Structures and Designs							
Number of Structures	Count	452	452	478	492	446	519
Structures with Turn Angles 0–20 degrees	Count	361	346	374	383	352	390
Structures with Turn Angles 20–30 degrees	Count	41	47	51	50	46	68
Structures with Turn Angles greater than 30 degrees	Count	50	59	53	59	48	61
Span Length Greater than 1,600 feet	Count	33	42	31	34	39	38
Topography							
Very Steep Slope (31–90 degrees)	Miles	1.6	1.6	1.5	1.3	1.5	1.2
Steep Slope (21–30 degrees)	Miles	6.4	6.4	6.4	5.7	6.6	5.9
Moderate Slope (16–20 degrees)	Miles	5.4	5.4	5.7	5.0	5.5	5.3
Strongly Sloping (6–15 degrees)	Miles	40.2	41.2	41.8	42.3	39.5	43.7
Flat to Gentle Slope (0–5 degrees)	Miles	53.9	52.7	58.2	61.0	53.2	63.0
Infrastructure Crossings							
Primary Road Crossing	Count	2	2	2	2	2	2

Criteria	Unit	Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Secondary Road Crossing	Count	14	13	16	14	14	16
Tertiary Road Crossing	Count	140	139	148	144	133	150
Railroad Crossing	Count	4	4	5	4	4	5
Oil and Gas Wells: within the ROW Corridor; 500 feet of centerline	Count	4	3	6	4	4	6
	Count	22	19	30	20	22	28
Natural Gas Pipeline Crossing (transmission / distribution / gathering)	Count	7	6	7	7	7	5
	Count	16	12	24	13	16	21
	Count	4	4	7	5	4	8
Wind turbines (within 500 feet and 0.5 mile of the centerline)	Count	0	0	0	0	0	0
	Count	0	0	0	7	0	7
Airports within 20,000 feet of the centerline: public/private	Count	0	0	0	0	0	0
	Count	4	4	6	4	5	7
Geologic Karst Features (miles / acres of ROW)	Miles	12.0	11.5	18.2	13.6	12.0	18.8
	Acres	302.9	291.8	454.2	336.9	302.9	464

Source: REXTAG, USGS

kV = kilovolt; ROW = right-of-way

Alternative Route A

Alternative Route A had superior performance for engineering and infrastructure criteria. It is one of two routes with the second-lowest number of total structures (452), the lowest number of structures with 20–30-degree angles (41), and the second-lowest number of structures with greater than 30-degree angles (50). Alternative Route A is one of four routes with the lowest number of 500 kV crossings (7). It also has the second-lowest number of spans greater than 1,600 feet (33). It does cross through 1.6 miles of very steep slope in the Bear Creek Area of Maryland while paralleling existing transmission lines. In addition, Alternative Route A is one of three routes with the second-lowest number of oil and gas wells within the ROW Corridor and a moderate number of natural gas pipeline crossings (27). Overall, Alternative Route A demonstrates a strong balance between minimizing structural complexity and maintaining efficient routing.

Alternative Route B

Alternative Route B had moderate performance for engineering and infrastructure criteria. Like Alternative Route A, it has the second-lowest number of total structures (452), but a much higher percentage of those structures have sharp turn angles with 47 structures with turn angles 20-30 degrees and 59 structures with turn angles greater than 30 degrees. Alternative Route B was one of four routes with the lowest number of 500 kV crossings (7). It crosses through the same very steep slope as Alternative Route A for 1.6 miles.

Alternative Route C

Alternative Route C had inferior performance for engineering and infrastructure criteria. It presents several engineering challenges that make it one of the least favorable routing options. It has some of the highest counts for transmission line crossings, gathering pipelines, and oil and gas wells located within the ROW Corridor and 500 feet of the centerline. Alongside Alternative Route F, it also has the highest number of 500 kV crossings (11), indicating greater potential complexity for construction and design. It also has an elevated presence of oil and gas infrastructure near the route, largely due to its alignment through heavily developed natural gas areas in Pennsylvania. It has an average number of transmission structures (478), including an average number of structures with sharp angles and the lowest number of spans greater than 1,600 feet at 31. These factors contribute to increased complexity, positioning Alternative Route C as a less desirable choice from an engineering standpoint.

Alternative Route D

Alternative Route D had moderate performance for engineering and infrastructure criteria. It has the highest number of 138 kV transmission line crossings (23) but is one of four routes with the lowest number of 500 kV crossings (7). It has the second-highest number of structures (492) and the second-highest number of turn angled structures greater than 20 degrees (109). It avoids some of the steeper terrain in the MARL Project Study Area by routing north of the Bear Creek area in Maryland and as a result has the second-flattest alignment. Alternative Route D does cross near two wind farms with seven turbines within 0.5-mile of the centerline, which presents engineering challenges.

Alternative Route E

Alternative Route E had superior performance for engineering and infrastructure criteria. It has the lowest total number of structures (446), indicating a potentially more cost-effective design. Additionally, it was second lowest in the number of structures with turn angles greater than 20 degrees (94), suggesting fewer complex directional changes. Like Alternative Routes A, B, and D, it also has the lowest number of 500 kV transmission line crossings (7), minimizing interference with major transmission infrastructure.

Alternative Route F

Alternative Route F had inferior performance for engineering and infrastructure criteria. Due to its longer length, it has the highest number of structures (519). It also has the highest number of structures with turn angles greater than 20 degrees (129). Like Alternative Route C, it has the highest number of 500 kV transmission line crossings (11), which present the significant engineering challenges described above. It avoids some of the steeper terrain in the MARL Project Study Area by routing north of the Bear Creek area in Maryland. As a result, it has the second-flattest alignment. Additionally, like Alternative Route C, Alternative Route F has an elevated presence of oil and gas infrastructure near the route, largely due to its alignment through heavily developed natural gas areas in Pennsylvania.

Superior Alternative Routes

Alternative Routes A and E demonstrated strong performance across the engineering evaluation criteria. Alternative Route A stood out for its balance among the criteria, including the fewest structures with turn angles greater than 20 degrees, a tie for the lowest number of 500 kV transmission line crossings—one of the most significant engineering challenges—and the second-lowest count of spans exceeding 1,600 feet. Similarly, Alternative Route E performed well, with the lowest total number of structures, the second-fewest structures with turn angles over 20 degrees, and it tied for the lowest number of 500 kV crossings. These characteristics suggest both Alternative Routes offer efficient and less complex routing options, making them favorable from an engineering standpoint.

Moderate and Inferior Alternative Routes

Alternative Routes C and F performed as the least favorable options based on engineering criteria. Alternative Routes C and F have the highest number of 500 kV transmission line crossings (11), which presents one of the largest engineering challenges. Additionally, Alternative Routes C and F traverse areas with dense oil and gas infrastructure—including elevated counts of wells and pipeline crossings—due to their alignment through heavily developed natural gas regions in Pennsylvania. Alternative Route D had moderate performance. Alternative Routes D and F also stand out for having the largest number of total structures and the highest counts of structures with turn angles greater than 20 degrees, indicating more complex design requirements. Alternative Routes D and F also pass near two wind farm developments, with seven turbines located within 0.5-mile of the centerline, presenting further engineering constraints that must be addressed during planning and construction.

5.5 ESTIMATED COSTS

Table 5.5-1 provides the estimated capital costs for the development and construction of each of the six end-to-end Alternative Routes.

TABLE 5.5-1 ESTIMATED CAPITAL COSTS FOR THE ALTERNATIVE ROUTES

Alternative Route A	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
$1,167,236,674	$1,175,521,094	$1,204,723,343	$1,241,099,297	$1,159,876,697	$1,256,130,573

5.6 SELECTION OF THE PROPOSED ROUTE

The Routing Team conducted a comprehensive multi-criteria evaluation of the Alternative Routes, assessing criteria described in Sections 5.1 through 5.5. These criteria included route length, construction footprint, paralleling existing infrastructure, community and recreational resources, protected areas, cultural resources, agricultural and land cover, natural environmental features—including water and ecological resources—engineering and infrastructure considerations, and estimated costs. Table 5.6-1 provides a summary matrix highlighting the performance of each Alternative Route for each set of criteria.

TABLE 5.6-1 ALTERNATIVE ROUTE EVALUATION RESULT MATRIX

Alternative Routes	Route Length and Construction Footprint	Paralleling Existing Infrastructure	Community and Recreational Resources	Protected Areas	Cultural Resources	Agricultural and Land Cover	Water Resources	Sensitive Species and Habitats	Engineering and Infrastructure	Estimated Cost
Alternative Route A	Superior	Superior	Superior	Moderate	Superior	Superior	Superior	Superior	Superior	Superior
Alternative Route B	Superior	Superior	Inferior	Moderate	Moderate	Superior	Superior	Superior	Moderate	Superior
Alternative Route C	Moderate	Superior	Moderate	Inferior	Inferior	Inferior	Inferior	Moderate	Inferior	Moderate
Alternative Route D	Moderate	Inferior	Moderate	Superior	Superior	Moderate	Moderate	Inferior	Moderate	Inferior
Alternative Route E	Superior	Moderate	Superior	Moderate	Superior	Superior	Moderate	Superior	Superior	Superior
Alternative Route F	Inferior	Inferior	Inferior	Moderate	Inferior	Inferior	Inferior	Inferior	Inferior	Inferior

Superior—High performance for the listed criteria with low impacts on category resources relative to the other Alternative Routes.
Moderate—Average performance for the listed criteria with moderate impacts on category resources relative to the other Alternative Routes.
Inferior—Poor performance for the listed criteria with high impacts on category resources relative to the other Alternative Routes.

5.6.1 ALTERNATIVE ROUTE A SELECTED AS THE PROPOSED ROUTE

As shown in Table 5.6-1, Alternative Route A had superior performance for all routing criteria except for one, where it had a moderate performance. Specifically, Alternative Route A had superior performance for route length and footprint, paralleling existing infrastructure, community and recreational resources, cultural resources, agricultural and land cover, water resources, sensitive species and habitats, and engineering criteria. It had moderate performance for protected lands. It did not have inferior performance for any criteria when compared to other Alternative Routes. Notably, Alternative Route A is the only Alternative Route with superior performance for three primary categories of criteria the Routing Team strived to achieve at the start of the MARL Project: route length and construction footprint, paralleling existing infrastructure, and community and recreational resource—which were important decision criteria for the selection of the Proposed Route. Therefore, based on this analysis, the Routing Team selected Alternative Route A as the Proposed Route for the MARL Project. Alternative Route A offers the most balanced solution that maximizes opportunities to parallel existing transmission lines, minimizes potential impacts on both natural environment and built environment, and minimizes the engineering and construction-related challenges.

For route length and construction footprint, Alternative Route A had superior performance with the second-smallest ROW Corridor (2,669.0 acres) and the third-smallest length (107.5 miles—almost identical to Alternative Route B [107.3 miles]). Alternative Routes A, B, and E vary by 1.2 miles in total length and less than 1 percent in ROW Corridor area, reflecting reduced impacts relative to the other three Alternative Routes. Alternative Route A has 6 to 10 percent less ROW Corridor area compared to Alternative Routes C, D, and F.

For paralleling existing infrastructure, Alternative Route A had superior performance. Although Alternative Route A only had the third-highest percent paralleling with 52.5 percent paralleling existing transmission lines, it had similar total mileage of greenfield development as Alternative C (51.1 miles for Alternative A versus 49.1 miles for Alternative C) and significantly higher percentage paralleling compared to Alternative Routes D, E, and F which were all below 50 percent. Alternative Route A has 20 percent more paralleling than Alternative F, 18 percent more than Alternative D, and 8 percent more than Alternative E.

For community and recreational resources, Alternative Route A had superior performance with the second-lowest impact on residential dwellings and landowners. It has 29 residential dwellings within 250 feet (second lowest), 151 residential dwellings within 500 feet (second lowest), and 388 unique landowners crossed (second lowest). These were key decision criteria for the selection of the Proposed Route. This represents 21 percent less impact on residential dwellings (41 fewer dwellings) within 500 feet of the centerline compared to the highest impact Alternative (Alternative B).

For protected areas, Alternative Route A had moderate performance when compared to the other Alternative Routes. It has the second-lowest mileage of crossings through state forest lands and has the lowest acreage of impact within the USACE-managed Youghiogheny River Lake. However, like Alternative Routes B, C, and E, it crosses the Maryland Wildlands and two Rural Legacy Easements. In total, Alternative Route A parallels existing transmission lines through eight

protected land areas over 14.6 miles. The strategy to parallel existing transmission lines contributes to its strong performance in other criteria (e.g., residential and community impacts) by leveraging existing infrastructure to minimize additional impacts, resulting in increased crossing of protected lands since many existing transmission corridors are located within these areas.

For cultural resources, the variability of impacts was small, but Alternative Route A had superior performance with generally the second-lowest number of impacts. It has the second-lowest number of cemeteries within 500 feet of the centerline (4), second-lowest number archaeological resources within the ROW Corridor (6), the second-lowest number of architecture resources within 0.5-miles (7) of the centerline.

For agricultural and land cover, Alternative Route A has superior performance. Alternative Route A has the second-smallest ROW Corridor (2,669.0 acres) and has the second-lowest amount of agricultural lands and the third lowest of forested lands within the ROW Corridor, and therefore presents less footprint of impacts on these resources than the longer Alternative Routes C, D, and F.

For the natural environment, Alternative Route A had superior performance for the water resources criteria. It has the smallest acreage of wetlands within the ROW Corridor—including both modeled wetlands and NWI wetlands. Additionally, Alternative A has the second-smallest number of crossings of trout streams and coldwater fisheries (39). For sensitive species and habitat criteria, Alternative Route A had superior performance with the second-lowest acreage amount for potentially suitable state-listed species, MBTA, and foraging bat habitat (2,650.8 acres) and the second-lowest acreage for potentially suitable monarch butterfly habitat (538.4 acres). This route is also one of four with the lowest acreage (104.3 acres) for bat known occupied summer habitat, and one of four for the lowest for bat hibernacula (388.9 acres).

For engineering and infrastructure criteria, Alternative Route A had superior performance. It has the second-lowest number of total structures (452) and the lowest number of structures with 20–30-degree angles and greater than 30-degree angles (41 and 50, respectively). Alternative Route A, along with Alternative Routes B, D, and E, have the lowest number of 500 kV crossings (7). It also has the second-lowest number of spans greater than 1,600 feet (33).

5.6.2 THE PROPOSED ROUTE COMPARED TO THE OTHER ALTERNATIVE ROUTES

This section presents a comparison between the Proposed Route and the other five Alternative Routes. While portions of the Alternative Routes overlap with the Proposed Route, the Proposed Route includes several key differences that result in fewer impacts and improved overall performance compared to the other Alternative Routes.

Table 5.6-2 provides a summary comparison of 1) the percentage of overlap between the Alternative Routes and the Proposed Route and 2) the high-level differences between the Alternative Routes compared to the Proposed Route. Table 5.6-3 highlights the difference in performance evaluation for the Alternative Routes compared to the Proposed Route. The performance of each Alternative Route is shown in Table 5.6-1.

TABLE 5.6-2 SUMMARY COMPARISON OF THE ALTERNATIVE ROUTES TO THE PROPOSED ROUTE

Alternative Route	Percent Overlap with the Proposed Route	Descriptive Difference
Alternative Route B	73.4	Overall, Alternative Route B performed well across most evaluation criteria, although it exhibited several notable differences from the Proposed Route, particularly in the community and recreational resources, and engineering criteria. Alternative Route B deviates from the Proposed Route in Fayette County, Pennsylvania; Monongalia and Preston Counties, West Virginia; and a small section in the northwest corner of Garrett County, Maryland, before the Youghiogheny River crossing. It was developed to provide an Alternative Route on the opposite side of the Hazelton–Lake Lynn 138 kV transmission line, offering a slightly higher percentage of paralleling with existing transmission infrastructure. While Alternative Route B achieved the second-highest level of paralleling among all routes (55.6 percent compared to 52.5 percent for the Proposed Route), this improvement came with a tradeoff in greater proximity to residential areas. Alternative Route B has more residential dwellings within 250 feet of the centerline (40 compared to 29 for the Proposed Route) and within 500 feet (192 compared to 150). Additionally, Alternative Route B crosses Cheat Lake and extends closer to residential developments along its eastern shore, whereas the Proposed Route avoids these dense residential areas by crossing farther north through less developed lands. Alternative Route B also crosses the FERC Project Boundary for the Lake Lynn Hydroelectric Project (P-2459-279) and parallels existing transmission lines through Federal Bureau of Prisons lands at United States Penitentiary Hazelton, both of which may introduce added permitting and coordination challenges. From an engineering perspective, Alternative Route B had lower performance due to a higher number of structures requiring turn angles greater than 20 degrees (106 versus 91) and a higher number of long spans exceeding 1,600 feet (42 versus 33), which introduce engineering challenges. Both Alternative Route B and the Proposed Route had similar performance for protected resources, water resources, and sensitive species and habitat criteria.
Alternative Route C	64.4	Alternative Route C demonstrated moderate to lower performance across most evaluation criteria, with the exception of its strong performance in paralleling existing infrastructure, where it achieved the highest percentage among all routes (56.8 percent). Alternative Route C deviates from the Proposed Route in Greene and Fayette Counties, Pennsylvania, and the northwestern portion of Garrett County, Maryland, prior to crossing the Youghiogheny River. Alternative Route C was developed to provide an alternative to crossing Coopers Rock State Forest in Preston County, West Virginia, and to parallel the existing 500 kV transmission lines in the northwestern quadrant of the MARL Project Study Area in Pennsylvania. However, while this Alternative Route increases paralleling, the northern deviation introduces additional line length—it is 6.1 miles longer than the Proposed Route—and requires an additional 166.6 acres of ROW. These factors contribute to greater land disturbance

Alternative Route	Percent Overlap with the Proposed Route	Descriptive Difference
		and higher potential impacts on community and recreational resources, intersecting 32 more parcels, 17 more unique landowners, and 10 more dwellings within 500 feet of the centerline compared to the Proposed Route. For protected areas, Alternative Route C performed worse than the Proposed Route with 67.1 more acres through protected lands and crossing through two additional resources. Alternative Route C also performed worse for cultural resources, agricultural and land cover, water resources, and engineering criteria. For the engineering criteria, Alternative Route C has 23 additional structures, 13 more structures with turn angles greater than 20 degrees, and four additional 500 kV transmission line crossings than the Proposed Route.
Alternative Route D	67.5	Alternative Route D demonstrated moderate to inferior performance across most evaluation criteria, with the exception of superior performance for the protected areas and cultural resources criteria. Alternative Route D shares 67.5 percent of its corridor with the Proposed Route but diverges in Maryland to avoid the Maryland Wildlands by paralleling the existing Jennings–Hazelton 138 kV transmission line north of the Proposed Route. It then transitions through a substantial greenfield segment near Midland, Maryland, crossing Dan's Mountain WMA traveling south before rejoining the Proposed Route near the Black Oak Substation. This deviation results in 7.7 additional miles of transmission line in Maryland and requires 170.0 more acres of ROW Corridor compared to the Proposed Route. Avoiding the Maryland Wildlands also necessitates an additional 21.1 miles of greenfield development in Maryland, for a total of 31.1 miles of greenfield compared to 10.0 miles of greenfield development for the Proposed Route in Maryland. Due to this larger greenfield development footprint, Alternative Route D has lower performance than the Proposed Route for community and recreational resources, agricultural and land cover, water resources, sensitive species and habitat, and engineering criteria.
Alternative Route E	87.1	Overall, Alternative Route E performed well across the evaluation criteria. It is the shortest Alternative Route (106.3 miles) with the smallest ROW Corridor (2,651.5 acres) and is 1.1 miles shorter and has 17.5 fewer acres of ROW Corridor than the Proposed Route. It overlaps with the Proposed Route for 87.1 percent of its ROW Corridor, with the exception of a greenfield section in Mineral and Hampshire Counties, West Virginia. Alternative Route E was developed to provide an alternative to crossing the White Horse Mountain WMA and demonstrate the differences a more direct, but greenfield path could create. To avoid crossing the White Horse WMA, Alternative Route E necessitates an additional 4.6 miles of greenfield development in West Virginia compared to the Proposed Route (35.7 miles versus 31.2 miles for the Proposed Route in West Virginia), resulting in 47.7 percent paralleling for Alternative Route E versus 52.5 percent for the Proposed Route. Alternative Route E also had slightly lower performance for the water resources evaluation criteria with higher acreage of NWI wetlands within the ROW Corridor (44.1 versus 42.7 for the Proposed Route), 2.2 additional acres of modeled wetlands, and 11.2 additional acres of ROW Corridor inside a flood zone than the Proposed Route. In addition to the criteria comparison outlined in Sections 5.1 through 5.5, Alternative Route E also received significantly more negative feedback from our online surveys, primarily in the area of greenfield development in Hampshire and Mineral Counties, West Virginia, compared to the Proposed Route.

Alternative Route	Percent Overlap with the Proposed Route	Descriptive Difference
Alternative Route F	20.2	Alternative F had inferior performance across most metrics in the evaluation criteria. Alternative Route F was developed to provide an Alternative Route that parallels existing transmission lines in the northwest quadrant of the MARL Project Study Area and avoids impacts on the Coopers Rock State Forest, Savage River State Forest and associated Wildlands, Dan's Mountain WMA and associated Wildlands, and White Horse Mountain WMA. To avoid these resources, Alternative Route F has an additional 11.6 miles of transmission line and 295.3 acres of ROW Corridor compared to the Proposed Route. It parallels existing transmission lines for 36.3 percent versus 52.5 percent for the Proposed Route, resulting in 24.9 additional miles of greenfield development compared to the Proposed Route. Alternative Route F performed worse than the Proposed Route in all evaluation criteria except for protected lands. For community and recreational resources, Alternative Route F has 33 additional dwellings within 500 feet of the centerline and crosses 35 more parcels compared to the Proposed Route. For water resources, Alternative Route F crosses 22 additional trout streams and coldwater fisheries (61 versus 39 for the Proposed Route), has 21 more acres of NWI wetlands and 35.3 more acres of floodplain inside the ROW Corridor compared to the Proposed Route. For the engineering criteria, Alternative Route F has four additional crossings of an existing 500 kV transmission line, 67 additional structures, and 38 additional structures with turn angles greater than 20 degrees when compared to the Proposed Route.

FERC =Federal Energy Regulatory Commission; kV = kilovolt; NWI = National Wetlands Inventory; ROW = right-of-way; WMA = Wildlife Management Area

Note: Totals may not match the sum of addends due to rounding.

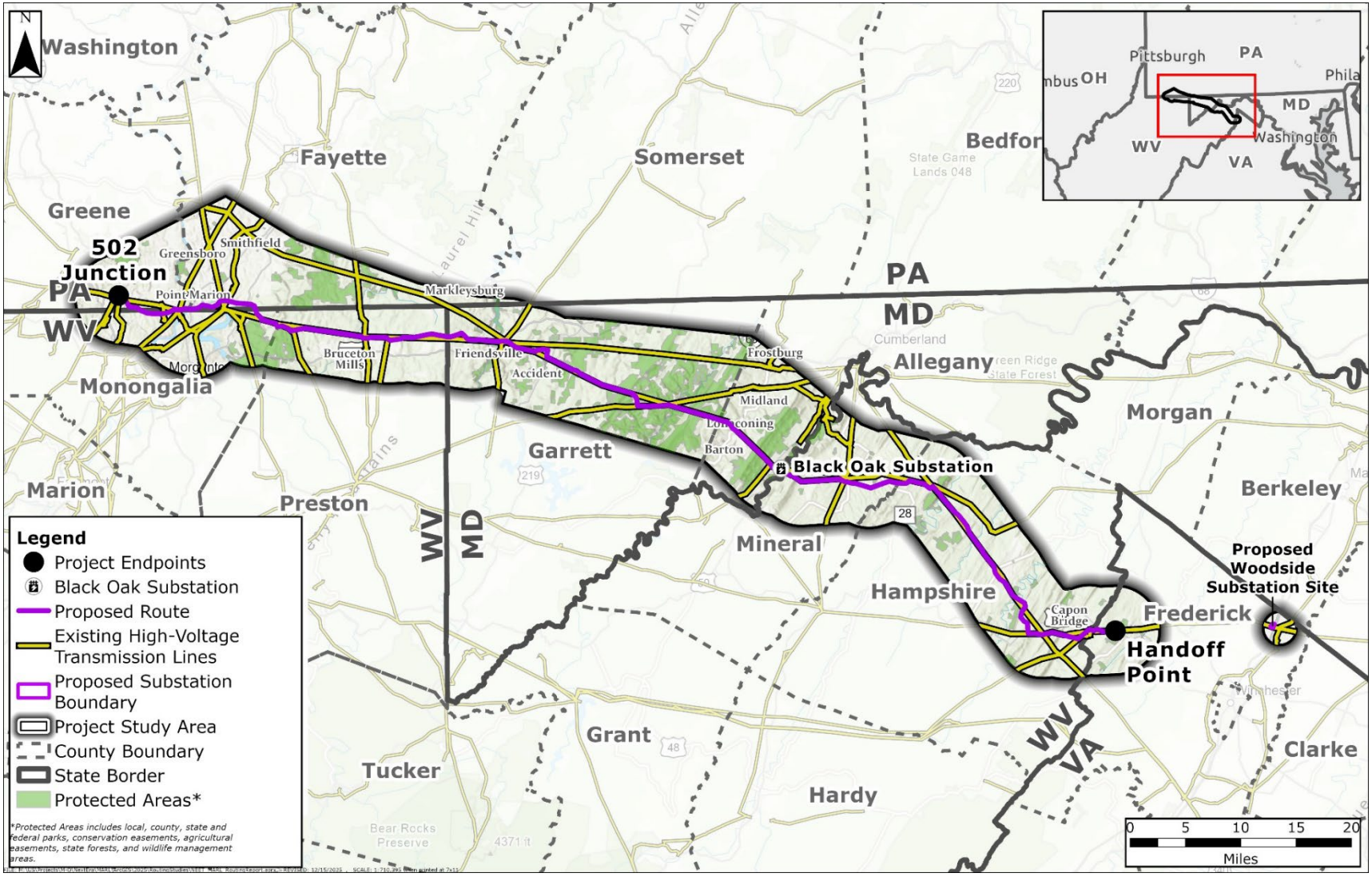
TABLE 5.6-3 SUMMARY OF COMPARISON TO THE PROPOSED ROUTE BASED ON EVALUATION CRITERIA

Alternative Route	Route Length and Construction Footprint	Paralleling Existing Infrastructure	Community and Recreational Resources	Protected Areas	Cultural Resources	Agricultural and Land Cover	Water Resources	Sensitive Species and Habitats	Engineering and Infrastructure	Estimated Cost
Alternative Route B	Same	Same	Lower	Same	Lower	Same	Same	Same	Lower	Same
Alternative Route C	Lower	Same	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
Alternative Route D	Lower	Lower	Lower	Higher	Lower	Lower	Lower	Lower	Lower	Lower
Alternative Route E	Same	Lower	Same	Same	Same	Same	Lower	Same	Same	Same
Alternative Route F	Lower	Lower	Lower	Same	Lower	Lower	Lower	Lower	Lower	Lower

6. CONCLUSION AND RECOMMENDATION

Based on the evaluation conducted in Section 5, Alternative Route A was selected as the Proposed Route (Figure 6-1). In addition to the Proposed Route, the MARL Project includes ancillary facilities required for both construction and long-term operation and maintenance. These ancillary facility workspaces consist of access roads, structure pads, and wire work areas as discussed in Section 6.2 and shown on Appendix E-14, Proposed Route. Additionally, where feasible, the MARL Project has identified locations where forested riparian buffers will be preserved to protect sensitive waterbodies. These riparian habitat exclusion zones are discussed in Section 6.3 and shown on Appendix E-14. The preservation of these sensitive riparian buffers reduces the potential impact on resource criteria that were considered in the evaluation in Section 5. Section 6.4 provides analysis tables showing the Proposed Route with and without maintaining the riparian habitat exclusion zones, the associated ancillary facility workspaces, and the Woodside Substation.

FIGURE 6-1 THE PROPOSED ROUTE



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

6.1 THE PROPOSED ROUTE DESCRIPTION

The Proposed Route will generally encompass the geographic area between the endpoints of the 502 Junction Substation in Greene County, Pennsylvania, and the handoff point (a new 500 kV transmission line to be constructed by FirstEnergy) in Frederick County, Virginia. The proposed Woodside Substation is also in Frederick County, Virginia, but approximately 11 miles to the east of the eastern terminus of the Proposed Route handoff point. The total Proposed Route will be 107.5 miles in length, with a ROW Corridor of 2,669.0 acres.

Beginning at 502 Junction in Greene County, Pennsylvania, the Proposed Route mostly parallels two existing transmission lines traveling southeast for 2.7 miles before entering Monongalia County, West Virginia, near MP 2.7. It then travels east for 3.1 miles before reentering Greene County, Pennsylvania, near Fort Martin Power Station at MP 5.8. The Proposed Route travels east for 1.4 miles in Greene County, Pennsylvania, before crossing the Monongahela River and entering Fayette County, Pennsylvania, at MP 13.8. In Fayette County, Pennsylvania, the Proposed Route travels east as a greenfield section through undeveloped private property for 6.6 miles before reentering Monongalia County, West Virginia, near MP 13.8. The Proposed Route travels east to southeast for 2.8 miles in northeastern corner of Monongalia County, West Virginia, while paralleling the existing Hazelton to Lake Lynn 138 kV Transmission Line near Coopers Rock State Forest. It crosses into Preston County, West Virginia, near Patterson Run at MP 16.6, where it primarily parallels the existing Hazelton to Lake Lynn 138 kV Transmission Line, traveling east for 15.8 miles before entering Garrett County, Maryland, near MP 32.5. In Garrett County, the Proposed Route parallels the existing Jennings to Hazelton 138 kV Transmission Line and Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line traveling east to southeast for 27.8 miles before entering Allegany County, Maryland, near MP 60.3. In Allegany County, Maryland, the Proposed Route parallels the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line, traveling southeast for 7.6 miles before entering Mineral County, West Virginia, near Black Oak Substation at MP 67.9. In Mineral County, West Virginia, the Proposed Route travels east while mostly paralleling the existing Black Oak to Bedington 500 kV Transmission Line for 10.9 miles before entering Hampshire County, West Virginia, at MP 78.8. The Proposed Route then travels southeast for 26.2 miles while mostly paralleling the existing Hampshire to Ridgeley 138 kV Transmission Line. The Proposed Route enters Frederick County, Virginia, near MP 105.0 and travels east for 2.4 miles following the Mount Storm to Doubs 500 kV and Stonewall to Hampshire 138 kV Transmission Lines and paralleling where feasible, except in areas with residential development adjacent to the existing transmission lines before handing off to a new 500 kV transmission line to be constructed by FirstEnergy at MP 107.5. A detailed description of the Proposed Route in each county is outlined below.

The Proposed Route will require 452 structures, with an average span length of 1,258 feet. It will parallel existing transmission lines for 56.4 miles (52.5 percent of the Proposed Route), and strive to limit impacts on sensitive areas and communities to the extent possible. Table 6.1-1 highlights the lengths, ROW Corridor, and percentage of paralleling existing transmission lines for the Proposed Route in each county.

TABLE 6.1-1 THE PROPOSED ROUTE AND COUNTY CROSSINGS

County and State [a]	Length (miles)	ROW Corridor (acres)	Paralleling Existing Transmission Line (%)
Greene County, PA	4.1	103.1	55.3
Fayette County, PA	6.6	163.8	0.0
Monongalia County, WV	5.9	143.5	23.1
Preston County, WV	15.8	392.6	49.4
Garrett County, MD	27.8	695.0	71.6
Allegany County, MD	7.6	202.9	72.6
Mineral County, WV	10.9	267.2	46.1
Hampshire County, WV	26.2	641.4	51.5
Frederick County, VA	2.4	59.4	41.8
Total [b]	**107.5**	**2,669.0**	**52.5**

MA = Maryland; PA = Pennsylvania; ROW = right-of-way; VA = Virginia; WV = West Virginia
[a] Counties are listed west to east
[b] Totals may not match the sum of addends due to rounding.

Greene County, Pennsylvania: MP 0.0 to MP 2.7

The Proposed Route begins at the 502 Junction Substation origin point in Greene County, Pennsylvania, heading southwest near Bald Hill while paralleling two separate existing transmission lines. The Proposed Route then proceeds in an easterly direction for 0.8 mile before crossing an existing 500 kV transmission line and heading in a general southeasterly direction for 1.8 miles to avoid residential development built up adjacent to the existing line near Bald Hill, exiting Pennsylvania near MP 2.7.

Monongalia County, West Virginia: MP 2.7 to MP 5.8

The Proposed Route enters Monongalia County, West Virginia, north of Maidsville, West Virginia, and west of Old Taylortown Road near MP 2.7, then heads in an easterly direction for 3.1 miles through undeveloped private land as a greenfield section of the line before heading north back into Greene County, Pennsylvania, to avoid Fort Martin Power Plant and its associated infrastructure.

Greene County, Pennsylvania: MP 5.8 to MP 7.1

The Proposed Route reenters Pennsylvania at MP 5.8, crosses the existing Longview Power property to Fort Martin 500 kV line, and heads in an easterly direction. The route then crosses the Monongahela River near MP 7.1 and enters Fayette County, Pennsylvania.

Fayette County, Pennsylvania: MP 7.1 to 13.8

The Proposed Route continues in an easterly-northeasterly direction, crossing undeveloped private land while avoiding residential developments near Davison Road and Bortz Road until it crosses the Cheat River near MP 10.1 north of the Lake Lynn Hydro Station. The Proposed Route avoids residential developments east of the Cheat River near Lake Lynn Road and continues east within Fayette County as a greenfield section of the line. It follows large, undeveloped private lands and crosses the Mon-Fayette Expressway (PA Turnpike 43) near MP 12.8. At MP 13.2, the Proposed

Route heads in a southeasterly direction, exiting the state of Pennsylvania at MP 13.8 and reentering West Virginia to begin paralleling the existing Hazelton to Lake Lynn 138 kV Transmission Line.

Monongalia County, West Virginia: MP 13.8 to 16.6

The Proposed Route heads south across undeveloped private property over Ryan Hollow. At MP 15.0, the Proposed Route crosses the existing Hazelton to Lake Lynn 138 kV Transmission Line to parallel it on the south side for 2.8 miles. It then deviates from the existing line to avoid residential homes before crossing into Preston County near MP 16.6.

Preston County, West Virginia: MP 16.6 to 32.4

The Proposed Route enters Coopers Rock State Forest for 0.3 mile for a greenfield section before paralleling the existing Cheat Lake to Ruthbelle 138 kV Transmission Line for 1.0 mile. At MP 18.0, the Proposed Route exits Coopers Rock State Forest and heads in a northeasterly direction, crossing over the existing Cheat Lake to Ruthbelle 138 kV Transmission Line and Patterson Run and Laural Run streams before paralleling the Hazelton to Lake Lynn 138 kV Transmission Line.

From MP 19.3 to MP 24.4, the Proposed Route continues paralleling the existing Hazelton to Lake Lynn 138 kV Transmission Line, deviating between MP 20.3 to MP 20.5 to avoid a residential structure. At MP 24.4, the Proposed Route heads in a southeasterly direction for 0.2 mile before heading in an easterly direction for 0.8 mile, where it deviates around residential and agricultural buildings near MP 24.8, crossing two existing 138 kV transmission lines before paralleling the Hazelton to Lake Lynn 138 kV Transmission Line at MP 25.5. It continues paralleling this line from MP 25.5 to MP 26.8 before turning in a southeasterly direction to avoid residential homes and a substation located between MP 26.8 to MP 28.3. At MP 28.3, the Proposed Route crosses to the northern side of the Hazelton to Lake Lynn 138 kV Transmission Line and heads in an easterly direction for 0.9 mile before deviating to avoid residential homes located along the existing transmission line between MP 29.3 and MP 32.4. At MP 32.4, the Proposed Route exits the state of West Virginia and enters the state of Maryland.

Garrett County, Maryland: MP 32.4 to 60.3

The Proposed Route begins at the West Virgina-Maryland border at the western end of the South Branch Laurel Run stream (MP 32.5) and west of Blue Goose Road, approximately 1 mile north of Interstate 68, then heads in a northeasterly direction for approximately 1.5 miles before crossing Route 42/Friendsville Road, turning in a southeasterly direction for approximately 0.6 mile. From this point, the Proposed Route crosses Buffalo Run stream and turns in an easterly direction, paralleling the existing Jennings to Hazelton 138 kV Transmission Line for 0.6 mile before deviating around some residential homes near MP 35.7, then continuing to parallel the Jennings to Hazelton 138 kV line for 1.1 miles, and crossing over the Youghiogheny River / USACE Recreation Management Area near MP 37.3. The Proposed Route then deviates from the existing 138 kV transmission line to avoid residential homes and crosses over Interstate 68 around MP 37.7. At MP 37.9 to 38.1, the Proposed Route crosses an existing 115 kV transmission line and the Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line. It then turns in a southeasterly direction, crosses the existing Jennings to Hazelton 138 kV Transmission Line, and

parallels the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line for 2.5 miles, crossing a tributary to Bear Creek and Fikes Run. At MP 41.0, the Proposed Route deviates from the existing transmission line to avoid residential development on Sale Barn Road, heading northeast-east for approximately 1.9 miles before heading in a southerly direction, crossing over Bear Creek and the associated challenging terrain. At MP 42.9 the Proposed Route begins paralleling the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line again.

The Proposed Route crosses over private lands from MP 42.9 to MP 43.8 before entering Maryland Department of Natural Resources (DNR) State Lands, where it parallels the existing transmission line from MP 43.9 to MP 45.2 and crosses the Bear Creek Hatchery FMA parcel, Bear Creek, and Savage River State Forest. The Proposed Route then crosses a small area of private lands from MP 45.2 to MP 45.7. At MP 45.3, the Proposed Route deviates from the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line to avoid spanning a Maryland DNR Wetlands of Special State Concern at MP 45.7 to MP 45.9, which is also located in Savage River State Forest. The Proposed Route crosses another portion of the Savage River State Forest, paralleling the existing transmission line, from MP 45.7 to 46.4. After exiting the Savage River State Forest, the Proposed Route parallels the existing transmission line for 3.1 miles across private lands before crossing another portion of Savage River State Forest from MP 49.6 to MP 49.9 and again from MP 50.2 to MP 51.6. Between MP 50.6 and MP 51.3, the Proposed Route shifts slightly from the existing transmission line to address terrain challenges and to meet the MARL Project's engineering requirements for aerial easement blowout. At MP 51.4, the Proposed Route crosses the existing 500 kV transmission line, heading south to avoid the residential area near Fairview Road. The Proposed Route continues in a southeasterly direction for 1.3 miles, crossing another small section of the Savage River State Forest. Beginning at MP 52.7, the Proposed Route travels in an easterly direction, paralleling the existing Carlos JCT to Garrett 138 kV Transmission Line crossing Savage River State Forest. At MP 53.3, the Proposed Route crosses the Carlos JCT to Garrett 138 kV Transmission Line on private property to continue paralleling it on the southern side. At MP 53.5, the Proposed Route enters Savage River State Forest and Bear Pen Wildlands, crossing Bear Pen Run until MP 54.6, where it exits and crosses private lands. The Proposed Route again enters Savage River State Forest and Bear Pen Wildlands at MP 55.1. At MP 55.5, the Proposed Route turns slightly in a southeasterly direction, again paralleling the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line and crossing Savage River through Savage River State Forest and Big Savage Mountain Wildlands (MP 56.2 to MP 56.7). From MP 56.7 to MP 57.6, the Proposed Route travels across private lands and then parallels the existing transmission line from MP 57.6 to MP 59 within Savage River State Forest across Big Savage Mountain. The Proposed Route continues from MP 59 to MP 60.3 on private lands before crossing another small section of Savage River State Forest from MP 60.3 to MP 60.6.

Allegany County, Maryland: MP 60.3 to 67.9

At MP 60.3, the Proposed Route enters Allegany County, Maryland, continuing to parallel the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line until MP 61.5, where it deviates from the existing transmission line due to terrain and engineering concerns. At MP 62.3, the Proposed Route continues to parallel the existing Hatfield's Ferry Power Station to

Black Oak 500 kV Transmission Line. At MP 64.4, the Proposed Route parallels the existing Hatfield's Ferry Power Station to Black Oak 500 kV Transmission Line through Maryland DNR State Lands, Dan's Mountain WMA, and Dan's Mountain Wildlands, exiting the Maryland DNR State Lands near MP 66.4. At MP 66.6, the Proposed Route deviates from the existing transmission line to traverse south around Black Oak Substation. At MP 67.9, the Proposed Route crosses the North Branch Potomac River and enters back into West Virginia.

Mineral County, West Virginia: MP 67.9 to 78.8

At MP 67.9, the Proposed Route exits the state of Maryland and reenters West Virginia after crossing the North Branch of the Potomac River in Mineral County. From MP 67.9 to MP 73.2, the Proposed Route parallels the existing Black Oak to Bedington 500 kV Transmission Line in a general easterly direction before heading southeasterly across Patterson Creek near MP 73.7, close to Potomac State College Farms. From MP 73.3 to MP 79.9, the Proposed Route heads in an easterly direction across private properties, deviating from the existing transmission line to avoid the built-up landscape of homes, the college, and Dam Site #21. The Proposed Route crosses into Hampshire County near MP 78.8.

Hampshire County, West Virginia: MP 78.8 to 105.0

In Hampshire County, the Proposed Route heads northeast to parallel the existing Black Oak to Bedington 500 kV Transmission Line near MP 79.9. It parallels the existing transmission line from MP 79.9 to MP 81.2 before deviating and turning in a southeasterly to northeasterly direction (MP 81.3 to MP 82.2) to avoid residential development near Greenspring Valley Road. The Proposed Route then heads in a southeasterly direction along an existing Hampshire to Ridgeley 138 kV Transmission Line. Near MP 82.5, the Proposed Route crosses the White Horse Mountain WMA and remains there for 0.6 mile. The Proposed Route continues in a southerly direction and crosses the South Branch of the Potomac River, paralleling the existing Hampshire to Ridgeley 138 kV Transmission Line from MP 83.5 to MP 85.1. At MP 85.1, the Proposed Route deviates from the existing transmission line to avoid residential homes and other structures before paralleling the existing Hampshire to Ridgeley 138 kV Transmission Line again at MP 87.6. The Proposed Route follows the existing Hampshire to Ridgeley 138 kV Transmission Line for 3.8 miles in a southeasterly direction before deviating from MP 91.4 to MP 93.5 to avoid residential and agricultural buildings near the existing line. At MP 93.5, the Proposed Route continues to parallel the existing Hampshire to Ridgeley 138 kV Transmission Line in a southeasterly direction for 1.1 miles before deviating to avoid the Cacapon & Lost Rivers Land Trust easement near MP 95.5. From MP 95.5 to MP 99.0, the Proposed Route heads in a southerly direction where it meets up with the existing French Mill to Hampshire 138 kV Transmission Line. At MP 99.0, the Proposed Route parallels this line, heading in an easterly direction along the northern side of the existing transmission line before crossing to the southern side around MP 99.8. The Proposed Route deviates for 0.6 mile from the existing French Mill to Hampshire 138 kV Transmission Line due to the convergence point of two existing transmission lines and a substation north of MP 100.4, at which point it parallels the existing Hampshire to Stonewall 138 kV Transmission Line, crossing the Cacapon River at MP 102.2. At MP 102.5, the Proposed Route deviates from the existing transmission line and heads in a southeasterly direction for a greenfield section, where it meets up

with the existing Mt. Storm to Doubs 500 kV Transmission Line at MP 103.6, paralleling it in a northeasterly direction from MP 103.7 to MP 105.0. At MP 105.0, the Proposed Route exits West Virginia and enters Virginia.

Frederick County, Virginia: MP 105.0 to 107.5

The Proposed Route enters Virginia in Frederick County at approximately MP 105.0, continuing southeast and paralleling the existing Mt. Storm to Doubs 500 kV Transmission Line for approximately 0.3 mile. The Proposed Route then deviates from the existing transmission line for approximately 0.6 mile to avoid residential properties off Fletcher Road. The Proposed Route then continues in a southeasterly direction until reaching the existing transmission line. At this point, it crosses the existing Mt. Storm to Doubs 500 kV and the Hampshire to Stonewall 138 kV Transmission Lines perpendicularly, crossing near MP 106.2. Once the Proposed Route crosses the transmission lines, it immediately heads east, paralleling the transmission lines on the south side, crossing over Isaacs Creek at MP 106.5. Near MP 106.7, the Proposed Route deviates from the existing transmission line to avoid a substation and residential development, crossing Parishville Road and terminating at the handoff point.

6.2 THE PROPOSED ROUTE ANCILLARY FACILITY WORKSPACES

The ancillary facility workspaces consist of both temporary and permanent access roads, temporary structure pads at each tower location, and temporary wire work areas for conductor stringing operations. These facilities will be located within and outside of the ROW Corridor. The ancillary facility workspaces vary in size due to topographic constraints and ground conditions.

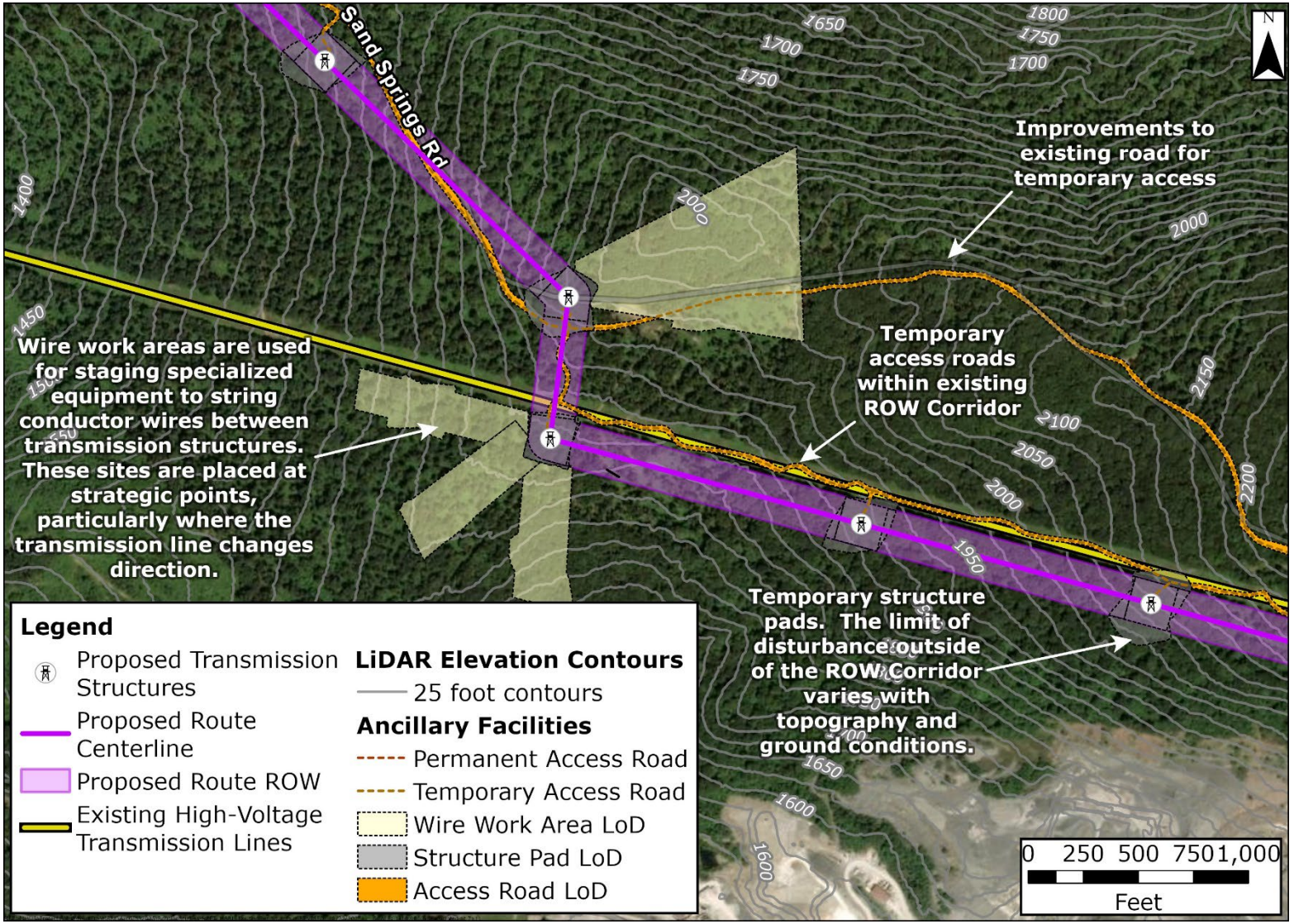
Access roads will include both improvements to existing roads and construction of new roads. They may be located within the ROW Corridor or extend beyond it, depending on site-specific access needs. Access roads are designated as either:

- Temporary—used solely during construction and treated as temporary impacts. Restoration is planned following construction.
- Permanent—required for ongoing operation and maintenance. These are reported in the Environmental Review Documents (Appendices A, B, C, and D) as permanent impacts.

Structure pads are constructed at each tower location to provide stable surfaces for equipment during installation and will have the appropriate dimensions to meet the terrain constraints. All structure pads are considered temporary construction impacts. The limit of disturbance associated with structure pads is variable and influenced by topography and ground conditions. These areas are treated as temporary impacts, with restoration planned post-construction.

Wire work areas are temporary work areas used for staging specialized equipment to string conductor wires between transmission structures. These sites are placed at strategic points, particularly where the transmission line changes direction. These areas are treated as temporary impacts, with restoration planned post-construction. Figure 6-2 depicts these ancillary facility workspaces relative to the Proposed Route near Sand Springs Road in Monongalia County, West Virginia.

FIGURE 6-2 EXAMPLE MAP OF THE ANCILLARY FACILITIES



LoD = limit of disturbance; ROW = right-of-way

Table 6.2-1 provides a summary of the ancillary facility workspaces within and outside of the ROW Corridor.

TABLE 6.2-1 ANCILLARY FACILITY WORKSPACES FOR THE PROPOSED ROUTE

Measure	Permanent Access Roads	Temporary Access Roads	Structure Pads	Wire Work Areas
Count of facility	NA	NA	452	108
LoD outside of the ROW Corridor (acres) [a]	7.1	231.4	123.3	233.9
Within ROW Corridor (miles)	2.7	70.7	NA	NA
Outside of the ROW Corridor (miles)	2.6	77.4	NA	NA

LoD = limit of disturbance; NA = not applicable; ROW = right-of-way

[a] Ancillary facility workspaces located inside the ROW Corridor are accounted for with the ROW Corridor acreage and are not presented to avoid double counting of impacts.

6.3 RIPARIAN HABITAT EXCLUSION ZONES

Where feasible, the MARL Project has identified initial locations of riparian habitat associated with streams that could be maintained to minimize impacts where topographic and engineering constraints allowed for such considerations along the Proposed Route. As part of this effort, the MARL Project has identified 20 locations where forested riparian buffers will be preserved to protect sensitive waterbodies (Table 6.3-1). These areas total 26.3 acres and contain 5,989.2 linear feet of stream length to be preserved. At these locations—referred to as riparian habitat exclusion zones—engineering solutions were developed to retain existing riparian vegetation within 100 feet on either side of the center of the stream. No vegetation clearing or ground disturbance will occur within these zones. As detailed MARL Project engineering continues to progress, additional areas that might be able to be maintained could be identified. If such a scenario arises, the impacts on resource areas could be reduced. Figure 6-3 is an example of a riparian habitat exclusion zone. Table 6.3-1 provides a list and descriptions of the identified riparian habitat exclusion zones.

Section 6.4 shows how resources will benefit from this engineering mitigation by comparing the results with and without incorporation of the riparian habitat exclusion zone. It also highlights how the preservation of riparian habitat exclusion zones contributes to minimizing impacts on sensitive environmental features and supports broader MARL Project mitigation objectives. The Proposed Route ROW Corridor incorporates the 20 riparian habitat exclusion zones. The associated statistics are shown in the tables below under the column headers “Proposed Route (with riparian).”

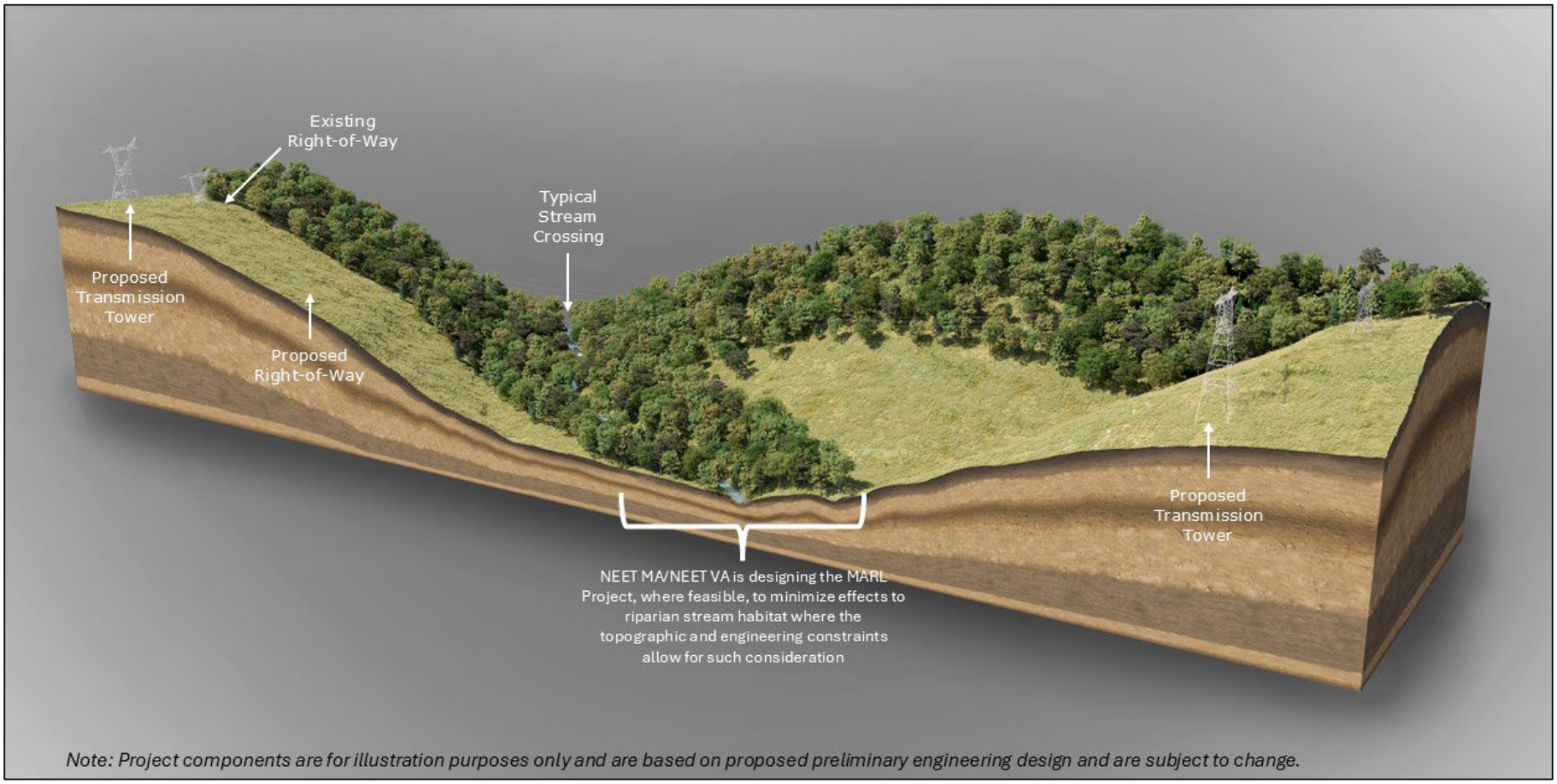
TABLE 6.3-1 IDENTIFIED RIPARIAN HABITAT EXCLUSION ZONES

Nearest MP	Stream Name	State	County	Stream Type	Linear Stream Length (feet)	Riparian Habitat Exclusion Zone (acres)
18.5	Patterson Run	WV	Preston	Trout Stream	384.1	1.8
19.1	Laurel Run / Big Sandy Creek	WV	Preston	Trout Stream/Mussel Stream	301.1	1.4
24.1	Big Sandy Creek	WV	Preston	High Quality Stream	204.5	0.9
37.3	Youghiogheny River	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	389.8	1.2
39.8	Unnamed Tributary to Bear Creek	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	201.8	0.9
40.7	Fikes Run	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	211.2	1.0
41.5	Unnamed Tributary to Bear Creek	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	271.4	1.2
41.9	Cove Run	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	356.8	1.6
42.4	Bear Creek	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	318.0	1.5
43.3	Bear Creek	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	206.1	0.9
44.8	Bear Creek 4	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	652.1	2.9
49.7	South Branch Casselman River	MD	Garrett	Use III: Nontidal Cold Water—Natural Trout Water	261.0	1.2
53.8	Bear Pen Run 1	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	203.4	0.9
54.4	Silver Bell Run	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	201.1	0.9
56.2	Savage River	MD	Garrett	Use III-P: Nontidal Cold Water and Public Water Supply	228.7	0.8
60.3	Laurel Run	MD	Allegany	Use III-P: Nontidal Cold Water and Public Water Supply	357.5	1.6
62.1	George's Creek	MD	Allegany	Use IV-P: Recreational Trout Waters and Public Water Supply	467.1	2.1
63.5	Unnamed Tributary to Jackson Run	MD	Allegany	Use III-P: Nontidal Cold Water and Public Water Supply	244.1	1.1
67.9	North Branch Potomac River [a]	MD/WV	Allegany / Mineral	Trout Streams	264.6	1.2
95.5	North River	WV	Hampshire	High Quality/Mussel Stream	264.8	1.2

MD = Maryland; MP = milepost; WV = West Virginia

[a] The North Branch of the Potomac River is located within both Maryland and West Virginia.

FIGURE 6-3 RIPARIAN HABITAT EXCLUSION ZONE



MARL Project = MidAtlantic Resiliency Link Project; NEET MA = NextEra Energy Transmission MidAtlantic, Inc.; NEET VA = NextEra Energy Transmission Virginia, Inc.

6.4 THE PROPOSED ROUTE ANALYSIS

The tables in this section (Table 6.4-1 through Table 6.4-11) correspond to those presented in Section 5[12] but are presented below to reflect the Proposed Route only. These tables show how the preservation of riparian habitat exclusion zones minimizes impacts on sensitive environmental features by comparing the results with and without the riparian habitat exclusion zones. The tables also outline the criteria within the ancillary facility workspaces outside of the ROW Corridor as well as the Woodside Substation.

TABLE 6.4-1 ROUTE LENGTH AND CONSTRUCTION FOOTPRINT ANALYSIS

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Centerline length	Miles	107.5	107.5	2.6	77.4	NA	NA
ROW Corridor / Workspace / Substation	Acres	2,669.0	2,642.4	7.1	231.4	357.2	72.1

NA= not applicable; ROW = right-of-way

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Acreage was calculated for areas outside of the ROW Corridor only.

TABLE 6.4-2 PARALLELING EXISTING INFRASTRUCTURE ANALYSIS

Criteria	Proposed Route	
	Miles	%
Paralleling existing transmission lines [a]	56.4	52.5
Greenfield section development [b]	51.1	47.5
Paralleling railroad ROW	0.0	0.0
Paralleling natural gas pipelines ROW	0.0	0.0
Paralleling highways	0.0	0.0

Source: Rextag Infrastructure data

ROW = Right-of-Way

[a] Paralleling for the MARL Project is defined as siting the proposed transmission line so the MARL Project ROW Corridor abuts the existing transmission line corridor.

[b] Greenfield section for the MARL Project is defined as a section of the MARL Project ROW Corridor for any portion of the route that does not abut an existing transmission line corridor.

[12] Table 5.3-1 is not included in Section 6 of the Routing Study as it is not a table that reported analytics for the Proposed Route.

TABLE 6.4-3 COMMUNITY AND RECREATIONAL RESOURCES ANALYSIS

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Parcels / unique landowners	Count	500	500	27	468	413	2
		388	388	24	364	335	2
Residential dwellings [b,c] within ROW Corridor or LoD / 250 feet / 500 feet of centerline	Count	1	1	0	0	0	1
		29	29	NA	NA	NA	NA
		151	151	NA	NA	NA	NA
Residential outbuildings [b,d] within ROW Corridor or LoD / 250 feet / 500 feet of centerline	Count	6	6	0	4	1	2
		50	50	NA	NA	NA	NA
		273	273	NA	NA	NA	NA
Non-residential buildings [b,e] within ROW Corridor or LoD / 250 feet / 500 feet of centerline	Count	25	25	0	3	3	0
		74	74	NA	NA	NA	NA
		187	187	NA	NA	NA	NA
Places of worship within 500 feet of the centerline	Count	1	1	NA	NA	NA	NA
Childcare facilities within 500 feet of the centerline	Count	0	0	NA	NA	NA	NA
Public / private schools within 500 feet of centerline	Count	0	0	NA	NA	NA	NA
Trails crossings—Potomac Heritage National Scenic Trail and Hiking Trails	Count	3	3	0	0	0	0
		9	9	0	5	0	0
State Scenic Byways	Count	4	4	0	0	0	0

Source: ReportAll, HIFLD, MDOT, WVDOT, MDiMap, WVGISTC, PASDA, ERM

LoD= limit of disturbance; NA= not applicable; ROW = right-of-way

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

[a] Acreage was calculated for areas outside of the ROW Corridor only.

[b] Footprints were digitized using high-resolution (3-inch) aerial imagery contracted by NEET MA and NEET VA and captured during leaf-off conditions between December 2023 and February 2024 and county property data. This dataset may not reflect proposed or recently built structures and could include classification errors inherent to desktop study limitations (e.g., forest cover, image resolution, interpretation of aerial data).

[c] A residential dwelling is defined as a building used for people to live in and includes buildings such as single-family homes, multi-family units, mobile/manufactured homes, etc.
[d] A residential outbuilding is defined as a secondary structure located on the same property as a residential dwelling and includes buildings such as detached garages, sheds, greenhouses, etc.
[e] A non-residential building is defined as any structure located on a non-residential property and includes buildings used for commercial purposes industrial use, agricultural, community, or government.

TABLE 6.4-4 PROTECTED LAND ANALYSIS

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
State Forest	Count	2	2	1	2	2	0
	Miles	9.7	9.7	0.3	6.0	NA	NA
	Acres	248.3	241.5	0.8	15.4	47.3	0.0
State Park	Count	0	0	0	0	0	0
	Miles	0.0	0.0	0.0	0.0	NA	NA
	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Fisheries / WMA	Count	3	3	0	3	3	0
	Miles	3.1	3.1	0.0	2.2	NA	NA
	Acres	75.8	75.8	0.0	5.7	3.7	0.0
Pennsylvania State Wilderness Area	Count	0	0	0	0	0	0
	Miles	0.0	0.0	0.0	0.0	NA	NA
	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Pennsylvania State Game Lands	Count	0	0	0	0	0	0
	Miles	0.0	0.0	0.0	0.0	NA	NA
	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Maryland Wildlands	Count	3	3	0	0	0	0
	Miles	2.4	2.4	0.0	0.0	NA	NA
	Acres	57.0	55.3	0.0	0.0	0.0	0.0
Conservation Easements	Count	3	3	0	3	5	0
	Miles	2.2	2.2	0.0	3.1	NA	NA
	Acres	55.2	54.4	0.0	8.7	12.0	0.0
USACE Recreation Areas	Count	1	1	0	0	0	0
	Miles	0.1	0.1	0.0	0.0	NA	NA
	Acres	3.9	2.7	0.0	0.0	0.0	0.0

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Total Protected Lands [b,c]	**Count**	**8**	**8**	**1**	**7**	**9**	**0**
	Miles	**14.6**	**14.6**	**0.3**	**9.3**	**NA**	**NA**
	Acres	**368.4**	**359.6**	**0.8**	**24.5**	**62.1**	**0.0**

Source: PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR

NA= not applicable; ROW = right-of-way; USACE = U.S. Army Corps of Engineers; WMA = Wildlife Management Area; WVDNR = West Virginia Division of Natural Resources

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Acreage was calculated for areas outside of the ROW Corridor only.

[b] Total protected lands excludes the Maryland Wildlands to avoid double counting since Wildlands are within a state forest or WMA. In addition, White Horse Mountain WMA has an associated conservation easement. The White Horse Mountain WMA is a 1,725-acre conservation and recreation area located in Hampshire County, West Virginia, and is managed by the WVDNR. The Potomac Conservancy held a conservation easement on White Horse Mountain to protect it from development and transferred ownership to WVDNR to manage the land as a public recreation area and WMA. The statistics associated with White Horse Mountain WMA are included in both the "Conservation Easements" and "Fisheries / Wildlife Management Area" categories but are not double counted in total impact calculations.

[c] Totals may not match the sum of addends due to rounding.

TABLE 6.4-5 SPECIFIC PROTECTED LANDS ANALYSIS

Specific Protected Area [a]	State	Existing Transmission Line in Resource?	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [b]	Temporary Access Roads [b]	Other Temporary Ancillary Facilities [b]	Woodside Substation
Coopers Rock State Forest	WV	Yes—138 kV	Yes	Yes	No	Yes	Yes	No
State Game Lands 138	PA	Yes—500 kV	No	No	No	No	No	No
Forbes State Forest	PA	Yes—500 kV	No	No	No	No	No	No
Quebec Run Wild Area	PA	Yes—500 kV	No	No	No	No	No	No
Youghiogheny River Lake Recreation Area (USACE)	MD	Yes—500 kV and 138 kV	Yes	Yes	No	No	No	No
Maryland Rural Legacy Property (Bear Creek RL-0396)	MD	Yes—500 kV	Yes	Yes	No	Yes	Yes	No
Maryland Rural Legacy Property (Bear Creek RL-35354)	MD	Yes-500 kV	Yes	Yes	No	Yes	Yes	No
Bear Creek Hatchery FMA	MD	Yes—500 kV	Yes	Yes	No	Yes	Yes	No
Savage River State Forest	MD	Yes—500 kV and two 138 kV	Yes	Yes	Yes	Yes	Yes	No
Bear Pen Wildlands	MD	Yes—138 kV	Yes	Yes	No	No	No	No
Big Savage Mountain Wildlands	MD	Yes—500 kV and 138 kV	Yes	Yes	No	No	No	No
Dan’s Mountain WMA	MD	Yes—500 kV and 138 kV	Yes	Yes	No	Yes	Yes	No
Dan’s Mountain Wildlands	MD	Yes—500 kV	Yes	Yes	No	No	No	No

Specific Protected Area [a]	State	Existing Transmission Line in Resource?	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [b]	Temporary Access Roads [b]	Other Temporary Ancillary Facilities [b]	Woodside Substation
White Horse Mountain WMA	WV	Yes—500 kV and 138 kV	Yes	Yes	No	Yes	Yes	No

Source: PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR

FMA = Fisheries Management Area; kV = kilovolt; MD = Maryland; PA = Pennsylvania; USACE = U.S. Army Corps of Engineers; WMA = Wildlife Management Area; WV = West Virginia

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

[a] Protected area listed west to east

[b] Acreage was calculated for areas outside of the ROW Corridor only.

TABLE 6.4-6 CULTURAL RESOURCES ANALYSIS

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Cemeteries within ROW Corridor or Workspace; 500 feet of centerline	Count	0	0	0	0	0	0
		4	4	NA	NA	NA	NA
Archaeological Resources within ROW Corridor or Workspace	Count	6	6	0	3	1	0
Architecture Resources—NRHP eligible, NRHP listed or NHL listed within ROW Corridor; 0.5-mile buffer from centerline / Workspace	Count	4	4	0	1	0	0
		7	7	NA	NA	NA	NA
Historic Districts Crossed	Count	6	6	0	1	0	0
Battlefields	Count	1	1	0	1	1	0
	Acres	38.0	38.0	0.0	0.1	14.5	0.0
MD—Heritage Areas	Count	1	1	1	1	1	0
	Acres	128.3	126.1	0.02	9.8	16.5	0.0

Source: PASHPO, WVSHPO, MHT, VADHR

NA= not applicable; ROW = right-of-way; MD = Maryland; NHL = National Historic Landmarks; NRHP = National Register of Historic Places; ROW = right-of-way

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Acreage was calculated for areas outside of the ROW Corridor only.

TABLE 6.4-7 AGRICULTURAL LAND ANALYSIS

Agricultural Land	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Not Prime Farmland Class	Acres	1,789.5	1,764.3	5.1	161.1	247.3	2.7
State Importance Farmland Class	Acres	389.7	389.3	0.7	33.5	61.1	8.1
Local Importance Farmland Class	Acres	399.3	398.9	1.1	27.5	45.4	0.0
Prime Farmland Class	Acres	90.4	90.0	0.2	9.4	3.5	61.3

Source: USA SSURGO

Notes:
No riparian = Proposed Route without riparian habitat exclusion zones
With riparian = Proposed Route with riparian habitat exclusion zones
Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).
[a] Acreage was calculated for areas outside of the ROW Corridor only.

TABLE 6.4-8 LAND COVER ANALYSIS

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
Barren Land (Rock/Sand/Clay)	Acres	20.2	20.2	0.1	3.7	2.8	0.0
Cultivated Crops	Acres	45.4	45.3	0.0	0.7	6.7	28.5
Deciduous Forest	Acres	1,836.0	1,823.8	6.1	142.5	265.6	2.8
Developed, High Intensity	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Developed, Low Intensity	Acres	16.2	14.4	0.0	7.8	0.3	0.9
Developed, Medium Intensity	Acres	2.0	2.0	0.0	0.5	0.0	0.0
Developed, Open Space	Acres	82.2	79.9	0.1	39.9	4.5	6.3
Emergent Herbaceous Wetlands	Acres	0.0	0.0	0.0	0.0	0.0	0.0
Evergreen Forest	Acres	24.0	24.0	0.0	1.6	2.4	0.0
Grassland/Herbaceous	Acres	25.3	24.8	0.0	2.3	2.2	0.0
Mixed Forest	Acres	171.4	163.2	0.0	9.3	23.4	0.0
Open Water	Acres	13.0	11.3	0.0	0.0	0.0	0.0
Pasture/Hay	Acres	415.7	415.7	0.7	22.1	47.6	33.7
Shrub/Scrub	Acres	15.3	15.3	0.0	1.1	1.8	0.0
Woody Wetlands	Acres	2.5	2.5	0.0	0.0	0.0	0.0
Forest Lands Total [b] (Deciduous Forest, Evergreen Forest, and Mixed Forest)	**Acres**	**2,031.4**	**2,011.0**	**6.1**	**153.4**	**291.4**	**2.8**
Agricultural Lands Total [b] (Pasture/Hay and Cultivated Crops)	**Acres**	**461.1**	**461.0**	**0.7**	**22.8**	**54.3**	**62.2**
Developed Lands Total [b] (High, Low, Medium, Open Space)	**Acres**	**100.4**	**96.3**	**0.1**	**48.2**	**4.8**	**7.2**

Source: USGS NLCD 2024

Notes:
No riparian = Proposed Route without riparian habitat exclusion zones
With riparian = Proposed Route with riparian habitat exclusion zones
Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).
[a] Acreage was calculated for areas outside of the ROW Corridor only.
[b] Totals may not match the sum of addends due to rounding.

TABLE 6.4-9 WATER RESOURCES ANALYSIS

Water Resources	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
NHD Stream/River—Perennial	Count	81	61	0	23	8	0
	Corridor Length (feet)	27,326.6	21,432.4	0.0	958.5	269.1	0.0
NHD Stream/River—Intermittent	Count	37	37	1	9	5	0
	Corridor Length (feet)	9,911.6	9,911.6	171.0	614.7	827.5	0.0
NHD Waterbody	Count	14	14	0	0	3	0
	Area (acres)	4.2	3.2	0.0	0.0	0.1	0.0
Section 10 Navigable Waters	Count	3	2	0	0	0	0
Trout Streams and Coldwater Fisheries (all states) [b]	Count	39	22	0	6	1	0
	Corridor Length (feet)	13,513.2	8,150.1	0.0	391.3	3.6	0.0
PA Trout Streams	Count	1	1	0	0	0	0
	Corridor Length (feet)	258.2	258.2	0.0	0.0	0.0	0.0
WV Trout Streams	Count	7	3	0	0	0	0
	Corridor Length (feet)	1,821.7	668.4	0.0	0.0	0.0	0.0
VA Trout Streams	Count	0	0	0	0	0	0
	Corridor Length (feet)	0.0	0.0	0.0	0.0	0.0	0.0
PA—Designated Use Streams (CWF, EV, HQ, TSF)	Count	3	3	0	2	0	0
	Corridor Length (feet)	1,556.0	1,556.0	0.0	56.9	0.0	0.0
MD—Designated Use Streams (Use III and III-P: Nontidal Cold Water and Public Water Supply)	Count	27	15	0	4	1	0
	Corridor Length (feet)	9,410.2	5,667.6	0.0	334.5	3.6	0.0

Water Resources	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
MD—Designated Use Streams (Use IV and IV-P: Recreational Trout Waters and Public Water Supply)	Count	1	0	0	0	0	0
	Corridor Length (feet)	467.1	0.0	0.0	0.0	0.0	0.0
VA—Threatened & Endangered Species Waters	Count	1	1	0	0	0	0
	Corridor Length (feet)	438.6	438.6	0.0	0.0	0.0	0.0
WV—Mussel Streams	Count	8	6	0	1	0	0
	Corridor Length (feet)	2,221.3	1,752.0	0.0	45.0	0.0	0.0
MD—Designated Use Streams (Use I and I-P Water Contact Recreation, Protection of Aquatic Live, and Public Water Supply)	Count	1	0	0	0	0	0
	Corridor Length (feet)	264.6	0.0	0.0	0.0	0.0	0.0
Modeled Wetlands [c]	Acres	42.6	36.6	0.0	0.8	3.4	0.0
NWI—All Types [b]	Acres	42.7	37.5	0.0	1.0	0.9	0.0
NWI—Freshwater Emergent	Acres	3.9	3.9	0.0	0.1	0.2	0.0
NWI—Freshwater Shrub Scrub	Acres	11.7	11.4	0.0	0.3	0.3	0.0
NWI—Freshwater Pond	Acres	3.9	3.9	0.0	0.1	0.3	0.0
NWI—Lake	Acres	0.0	0.0	0.0	0.0	0.0	0.0
NWI—Riverine	Acres	23.2	18.3	0.0	0.4	0.2	0.0
WV—DEP Wetlands	Acres	8.0	6.0	0.0	0.2	0.2	0.0
MD—DNR Wetlands of Special Concern	Acres	0.0	0.0	0.0	0.0	0.0	0.0
MD—DNR Wetlands	Acres	5.7	3.2	0.0	0.0	3.3	0.0
FEMA Flood Zone A/AE/AO—Areas with a 1% annual chance of flooding (100-year flood area)	Acres	98.4	88.6	0.0	6.7	0.8	0.0
	Structure Count	8	8	NA	NA	NA	NA
FEMA Flood Zone X—Areas with 0.2% annual chance of flooding (500-year flood area)	Acres	3.5	3.2	0.0	0.2	0.0	0.0
	Structure Count	0	0	NA	NA	NA	NA

Water Resources	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
FEMA Flood Zones Combined [b]	Acres	101.9	91.8	0.0	6.9	0.8	0.0

Source: USGS NHD, FEMA's National Flood Hazard Layer (NFHL), USFWS, MDE, PFBC, PADEP, WVDNR, VADWR

CWF = Coldwater Fishes; DEP = Department of Environmental Protection; DNR = Department of Natural Resources; EV = Exceptional Value; FEMA = Federal Emergency Management Agency; HQ = High Quality; MD = Maryland; NHD = National Hydrography Dataset; NWI = National Wetlands Inventory; NA = not applicable; PA = Pennsylvania; TSF = Trout Stocking; VA = Virginia; WV = West Virginia

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Acreage was calculated for areas outside of the ROW Corridor only.

[b] Totals may not match the sum of addends due to rounding.

[c] ERM conducted a deep learning model to predict wetlands in the MARL Project Study Area. See Appendix H, Wetland Identification Model Report.

TABLE 6.4-10 SENSITIVE SPECIES AND HABITATS

Ecological Resources	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
USFWS Critical Habitat Final	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
USFWS Critical Habitat Proposed	Area (acres)	0.9	0.9	0.0	0.0	0.0	0.0
State-Listed Species Occurrence (from state NHI Element Occurrence Data)	Area (acres)	235.1	233.5	3.0	25.2	24.3	0.0
Potentially Suitable State-listed Species, MBTA, and Foraging Bat Habitat	Area (acres)	2,650.8	2,626.0	7.1	223.2	356.9	71.3
Potentially Suitable Monarch Butterfly Habitat	Area (acres)	538.4	535.7	0.9	65.4	56.0	40.0
Bat Known Occupied Summer Habitat (all states)	Area (acres)	104.3	102.4	0.7	11.8	17.3	0.0
Bat Hibernacula (all states)	Area (acres)	388.9	385.7	1.6	37.6	54.2	0.0
Potentially Suitable Bat Roosting Habitat	Area (acres)	2,033.9	2,013.5	6.1	153.3	291.4	2.8
MD—Irreplaceable Natural Areas	Count	11	10	0	3	7	0
MD—Irreplaceable Natural Areas	Area (acres)	88.7	82.4	0.0	0.2	12.3	0.0
MD—Forest Interior Dwelling Species Confirmed	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
MD—Forest Interior Dwelling Species Probable	Area (acres)	83.0	79.5	0.0	5.3	22.4	0.0
MD—Natural Heritage Areas	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
MD—Forests of Recognized Importance	Count	27	15	0	2	8	0
MD—Forests of Recognized Importance	Area (acres)	38.9	20.9	0.0	0.1	0.6	0.0
MD—Federal or State-Listed Species	Area (acres)	268.7	260.7	0.8	25.2	47.9	0.0
MD—Species of Concern	Area (acres)	7.2	6.2	0.0	0.0	0.2	0.0

Ecological Resources	Unit	Proposed Route (no riparian)	Proposed Route (with riparian)	Permanent Access Roads [a]	Temporary Access Roads [a]	Other Temporary Ancillary Facilities [a]	Woodside Substation
MD—BioNet Tier 1 (critically significant)	Area (acres)	96.1	93.0	0.8	19.5	15.9	0.0
MD—BioNet Tier 2 (Extremely Significant)	Area (acres)	70.8	67.8	0.0	1.2	12.1	0.0
MD—BioNet Tier 3 (Highly Significant)	Area (acres)	345.1	340.6	0.0	13.3	47.2	0.0
MD—BioNet Tier 4 (Moderately Significant)	Area (acres)	226.3	223.9	0.2	13.9	29.0	0.0
MD—BioNet Tier 5 (Significant)	Area (acres)	76.9	73.9	0.0	5.4	22.4	0.0
PA—Natural Heritage Areas	Area (acres)	32.4	32.4	0.0	5.4	5.9	0.0
VA—Ecological Core C1 (Outstanding)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C2 (Very High)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C3 (High)	Area (acres)	0.0	0.0	0.0	0.0	0.0	0.0
VA—Ecological Core C4 (Moderate)	Area (acres)	24.4	24.4	0.0	0.3	4.0	0.0
VA—Ecological Core C5 (General)	Area (acres)	50.0	50.0	0.0	0.4	13.1	0.0

Source: USFWS, USGS, WVDNR, MDNR, VADWR, PNHP, PADCNR

BioNet = Biodiversity Conservation Network; MBTA = Migratory Bird Treaty Act; MD = Maryland; NHI = National Heritage Inventory; PA = Pennsylvania; USFWS = U.S. Fish and Wildlife Service; VA = Virginia

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Acreage was calculated for areas outside of the ROW Corridor only.

TABLE 6.4-11 ENGINEERING AND INFRASTRUCTURE CRITERIA

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian) [a]	Permanent Access Roads [b]	Temporary Access Roads [b]	Other Temporary Ancillary Facilities [b]	Woodside Substation
Existing Transmission Line Crossings							
Electric Transmission Line Unknown kV Crossing	Count	11	11	NA	NA	NA	NA
Electric Transmission Line 69 kV Crossing	Count	0	0	NA	NA	NA	NA
Electric Transmission Line 115 kV Crossing	Count	1	1	NA	NA	NA	NA
Electric Transmission Line 132 kV Crossing	Count	1	1	NA	NA	NA	NA
Electric Transmission Line 138 kV Crossing	Count	21	21	NA	NA	NA	NA
Electric Transmission Line 500 kV Crossing	Count	7	7	NA	NA	NA	NA
Structures							
Number of Structures	Count	452	452	NA	NA	NA	NA
Structures with Turn Angles 0-20 degrees	Count	361	361	NA	NA	NA	NA
Structures with Turn Angles 20-30 degrees	Count	41	41	NA	NA	NA	NA
Structures with Turn Angles greater than 30 degrees	Count	50	50	NA	NA	NA	NA
Span Length Greater than 1,600 feet	Count	33	33	NA	NA	NA	NA
Topography							
Very Steep Slope (31-90 degrees)	Miles	1.6	1.6	NA	NA	NA	NA
Steep Slope (21-30 degrees)	Miles	6.4	6.4	NA	NA	NA	NA
Moderate Slope (16-20 degrees)	Miles	5.4	5.4	NA	NA	NA	NA
Strongly Sloping (6-15 degrees)	Miles	40.2	40.2	NA	NA	NA	NA
Flat to Gentle Slope (0-5 degrees)	Miles	53.9	53.9	NA	NA	NA	NA

Criteria	Unit	Proposed Route (no riparian)	Proposed Route (with riparian) [a]	Permanent Access Roads [b]	Temporary Access Roads [b]	Other Temporary Ancillary Facilities [b]	Woodside Substation
Infrastructure Crossings							
Primary Road Crossing	Count	2	2	NA	NA	NA	NA
Secondary Road Crossing	Count	14	14	NA	NA	NA	NA
Tertiary Road Crossing	Count	140	140	NA	NA	NA	NA
Railroad Crossing	Count	4	4	NA	NA	NA	NA
Oil and Gas Wells: within the ROW Corridor or Workspace; 500 feet of centerline	Count	4	4	0	1	3	0
		22	22	NA	NA	NA	NA
Natural Gas Pipeline Crossing (transmission / distribution / gathering)	Count	7	7	NA	NA	NA	NA
		16	16	NA	NA	NA	NA
		4	4	NA	NA	NA	NA
Wind turbines (within 500 feet and 0.5 mile of the centerline)	Count	0	0	NA	NA	NA	NA
		0	0	NA	NA	NA	NA
Airports within 20,000 feet of the centerline: public/private	Count	0	0	NA	NA	NA	NA
		4	4	NA	NA	NA	NA
Geologic Karst Features (miles / acres of ROW)	Miles	12.0	12.0	0.5	11.0	NA	NA
	Acres	302.9	301.9	1.3	41.6	60.7	72.1

Source: REXTAG, USGS

kV = kilovolt; NA = not applicable; ROW = right-of-way

Notes:

No riparian = Proposed Route without riparian habitat exclusion zones

With riparian = Proposed Route with riparian habitat exclusion zones

Bolded/italicized values are different from the values shown for the Proposed Route (no riparian).

[a] Statistics for the Proposed Route including the riparian habitat exclusion zones is the same for all engineering and infrastructure criteria except for Geologic Karst Features due to counts and mileage lengths which do not change.

[b] Acreage was calculated for areas outside of the ROW Corridor only.

6.5 CONCLUSION

The purpose of the Routing Study was to identify a Proposed Route across all four states that met the following criteria:

1. Reasonably minimized potential impacts on the natural and built environment (including both the transmission line as well as the access roads and temporary workspaces to facilitate construction).
2. Maximized placement of proposed infrastructure adjacent to existing linear infrastructure and routing opportunities, where available.
3. Minimized special design requirements that could result in increased costs (e.g., engineering factors or special structure designs), and can be constructed and operated in a safe, timely, and reliable manner.

Following the steps outlined in in this Routing Study, the Routing Team identified six end-to-end Alternative Routes (A through F) that were comparatively analyzed using both quantitative and qualitative information that ultimately determined a superior Proposed Route. From this analysis, Alternative Route A was selected as the Proposed Route.

Alternative Route A offers the most balanced solution that maximizes opportunities to parallel existing transmission lines, minimizes potential impacts on both natural environment and built environment, and minimizes the engineering and construction-related challenges. As shown in Table 5.6-1, Alternative Route A had superior performance for all routing criteria except for one, where it had a moderate performance. Specifically, Alternative Route A had superior performance for route length and footprint, paralleling existing infrastructure, community and recreational resources, cultural resources, agricultural and land cover, water resources, sensitive species and habitats, and engineering criteria. It had moderate performance for protected lands. It did not have inferior performance for any criteria when compared to other Alternative Routes. Notably, Alternative Route A is the only Alternative Route with superior performance for three primary categories of criteria the Routing Team strived to achieve at the start of the MARL Project: route length and construction footprint, paralleling existing infrastructure, and community and recreational resource—which were important decision criteria for the selection of the Proposed Route.

The Proposed Route incorporates ancillary facility workspaces, including both temporary and permanent access roads, temporary structure pads at each tower location, and temporary wire work areas for conductor stringing operations. Additionally, where feasible, the Routing Team was able to identify 20 initial locations of riparian habitat associated with streams that could be maintained to minimize impacts where the topographic and engineering constraints allowed for such considerations along the Proposed Route. Therefore, the Proposed Route for the MARL Project is inclusive of the ancillary facility workspaces and the initial riparian habitat exclusive zones.

7. REFERENCES

See Appendix G, Data Sources.

Appendix A: Pennsylvania Environmental Review Document

MidAtlantic Resiliency Link Project

PREPARED FOR
NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc.

DATE
January 2026

REFERENCE
0718854



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SIGNATURE PAGE

Appendix A: Pennsylvania Environmental Review Document

MidAtlantic Resiliency Link Project

0718854



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ATTACHMENT 1B, SOILS MAPBOOK
ATTACHMENT 1C, WATER RESOURCES MAPBOOK
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ATTACHMENT 1E, ECOLOGICAL AND SENSITIVE SPECIES MAPBOOK
ATTACHMENT 1F, RECREATIONAL LANDS AND PROTECTED LANDS MAPBOOK
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ACRONYMS AND ABBREVIATIONS

Acronym	Description
amsl	above mean sea level
BCC	bird of conservation concern
BMP	best management practice
CFR	Code of Federal Regulations
CPCN	Certificate of Public Convenience and Necessity
CWA	Clean Water Act
CWF	Cold Water Fishes
DCNR	Pennsylvania Department of Conservation and Natural Resources
Dominion Energy	Virginia Electric and Power Company d/b/a Dominion Energy Virginia
EMF	electromagnetic field
ERD	Environmental Review Document
ERM	Environmental Resources Management, Inc.
ESA	Endangered Species Act
ESC	erosion and sediment control

Acronym	Description
EV	Exceptional Value
FE	Federally Endangered
FEMA	Federal Emergency Management Agency
FirstEnergy	FirstEnergy Corp.
FPE	Federally Proposed for Endangered
ft	feet
HQ	High Quality
IPaC	Information for Planning and Consultation System
kV	kilovolt
LIII	Level III Ecoregion
LIV	Level IV Ecoregion
LiDAR	Light Detection and Ranging
LoD	limit of disturbance
MARL Project	MidAtlantic Resiliency Link Project
MBTA	Migratory Bird Treaty Act
MF	Migratory Fishes
MHPW	modeled high probability wetlands
MP	milepost
MPC	Municipalities Planning Code
NA	not applicable
NEET MA	NextEra Energy Transmission MidAtlantic, Inc.
NEET VA	NextEra Energy Transmission Virginia, Inc.
NHA	Natural Heritage Area
NHD	National Hydrography Dataset
NHDPlus HR	National Hydrography Dataset Plus High-Resolution
NHL	National Historic Landmark
NLCD	National Land Cover Database
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetlands Inventory
PA SHPO	Pennsylvania State Historic Preservation Office
PA-SHARE	Pennsylvania’s Historic and Archaeological Resource Exchange
Pa. Code	Pennsylvania Code
PADEP	Pennsylvania Department of Environmental Protection
PAPUC	Pennsylvania Public Utility Commission
PASDA	Pennsylvania Spatial Data Access Portal
PCSM	Post-Construction Stormwater Management

Acronym	Description
PEM	Palustrine Emergent
PFBC	Pennsylvania Fish and Boat Commission
PFO	Palustrine Forested
PGC	Pennsylvania Game Commission
PJM	PJM Interconnection LLC
PNDI	Pennsylvania Natural Diversity Inventory
P.S.	Pennsylvania Statutes
PSS	Palustrine Scrub-Shrub
PUB	Palustrine Unconsolidated Bottom
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
RTE	rare, threatened, and endangered
SALDO	Subdivision and Land Development Ordinance
SE	State Endangered
SPCC	Spill Prevention, Control, and Countermeasures
TCP	Traffic Control Plan
TMDL	Total Maximum Daily Load
TSF	Trout Stocked Fishery
US	U.S. Route
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WSR	Wild and Scenic Rivers
WIM	Wetland Identification Model
WOTUS	Waters of the United States
WWF	Warm Water Fishes

1. INTRODUCTION AND BACKGROUND

This report includes the environmental findings of the Proposed Route and five Alternative Routes that were identified in the Routing Study conducted by Environmental Resources Management, Inc. (ERM) on behalf of NextEra Energy Transmission MidAtlantic, Inc. (NEET MA) and NextEra Energy Transmission Virginia, Inc. (NEET VA). The Routing Study (Attachment 3 to the Siting Application) presented for the MidAtlantic Resiliency Link (MARL) Project included the following: 1) introduction and background; 2) methodology used for the routing and siting for the MARL Project; 3) Study Area and major constraints and opportunities within the Study Area; 4) route identification, including routes carried forward and dismissed for consideration; 5) comparison of routes carried forward; and 6) identification of the Proposed Route. The Routing Study evaluated the natural environment, built environment, cultural resources, social resources, and engineering constructability for the MARL Project for NEET MA's and NEET VA's proposed new 107.5-mile, 500 kilovolt (kV) transmission line that will traverse portions of Pennsylvania, West Virginia, Maryland, and Virginia, as well as the new 500/138 kV Woodside Substation to be located in Frederick County, Virginia.[1]

NEET MA and NEET VA will be filing four state siting applications with the relative state public utility commissions[2] and specifically two counties in Pennsylvania (Greene and Fayette Counties), pursuant to the provisions of the Pennsylvania Public Utility Code regulations at Title 52 Public Utilities § 57.71-57.77, an approval from the Pennsylvania Public Utility Commission (PAPUC) is required for the siting and construction of overhead electric transmission lines with an operating voltage of 100 kV or higher. In addition, transmission line projects must adhere to *Interim Guidelines for the Filing of Electric Transmission Line Siting Applications* established by the PAPUC under Title 52, Chapter 69 of the Pennsylvania Code (Pa. Code). This Environmental Review Document (ERD) provides the environmental information required by Pennsylvania, and Table 1-1 summarizes these filing requirements and the ERD sections in which the specific information may be found.

[1] NEET MA is responsible for constructing the portions of the MARL Project in Pennsylvania, West Virginia, and Maryland. NEET VA is responsible for constructing the portions of the MARL Project in Virginia, as well as a new 500/138 kV Woodside Substation in Frederick County, Virginia. The permitting of the substation is subject to the siting authority of Frederick County, and information in this Routing Study related to the Woodside Substation is provided for overall context of the full MARL Project.

[2] NEET MA is filing a Certificate of Public Convenience and Necessity (CPCN) application with the following state utility commissions: Maryland Public Service Commission and Public Service Commission of West Virginia. NEET MA is also filing a Certificate of Public Convenience and a Siting application with the Pennsylvania Public Utilities Commission. NEET VA is filing a CPCN application with the Virginia State Corporation Commission.

TABLE 1-1 PENNSYLVANIA PUBLIC UTILITY CODE REQUIREMENTS

Filing Requirements	Application / ERD Section(s)
57.72. Form and content of application	
57.72 (a) Applications shall be in conformity with §1.31 (relating to form of documentary filings generally). Supporting exhibits such as maps, photographs and other engineering materials may be on paper not exceeding 28 inches by 40 inches.	See Siting Application.
57.72 (b) The application shall be signed by a person having authority with respect thereto and having knowledge of the matters therein set forth and shall be verified under oath.	See Siting Application.
57.72 (c)(1) The name of the Applicant and the address of its principal business office.	See Siting Application.
57.72 (c)(2) The name, title and business address of the attorney of the applicant and the person authorized to receive notice and communications with respect to the application if other than the attorney of the applicant.	See Siting Application.
57.72 (c)(3) A general description – not a legal or metes and bounds description – of the proposed route of the HV line, to include the number of route miles, the rights-of-way width and the location of the proposed HV line within each city, borough, town, and township traversed.	See Siting Application.
57.72 (c)(4) The names and addresses of known persons, corporations, and other entities of record owning property within the proposed rights-of-way, together with an indication of HV line rights-of-way acquired by the applicant.	See Siting Application.
57.72 (c)(5) A general statement of the need of the proposed HV line in meeting identified present & future demands for service, how the proposed line will meet that need, and engineering justifications	See Siting Application.
57.72 (c)(6) A statement of the safety considerations which will be incorporated into the design, construction, and maintenance of the proposed HV line.	See Siting Application.
57.72 (c)(7) A description of the studies which had been made as to the projected environmental impact of the HV line as proposed and of the efforts which have been and will be made to minimize the impact of the HV line upon the environment and upon scenic and historic areas.	See Section 2, Environmental Setting and Impacts for the Proposed Route and Alternative Routes.
57.72 (c)(8) A description of the efforts of the applicant to locate and identify archaeologic, geologic, historic, scenic, or wilderness areas within 2 miles of the proposed right-of-way and the location and identity of the areas.	See Section 2.2.1, Physiographic Setting, Geology, and Groundwater; Section 2.3.4, Aesthetics and Scenic Areas; and Section 2.3.5, Cultural Resources.
57.72 (c)(9) The location and identity of airports within 2 miles of the nearest limit of the right-of-way of the proposed HV line.	See Section 2.3.6, Linear Infrastructure and Transportation.
57.72 (c)(10) A general description of reasonable alternative routes to the proposed HV line, including a description of the corridor planning methodology, a comparison of the merits and detriments of each route, and a statement of the reasons for selecting the proposed HV line route.	See Siting Application and Attachment 3 to the Siting Application (Routing Study).

Filing Requirements	Application / ERD Section(s)
57.72 (c)(11) A list of the local, state, and federal governmental agencies which have requirements that shall be met in connection with the construction or maintenance of the proposed HV line and a list of documents which have been or are required to be filed with those agencies.	See Siting Application.
57.72 (c)(12) The estimated cost of construction of the proposed HV line and the projected date for completion.	See Siting Application.
57.72 (c)(13)(i) A depiction of the proposed route on aerial photographs and topographic maps of suitable detail.	See Attachment 1, Pennsylvania ERD Resource Mapbooks.
57.72 (c)(13)(ii) A description of the proposed HV line, including the length of the line, the design voltage, the size, number, and materials of conductors, the design of the supporting structures and their height, configuration and materials of construction, the average distance between supporting structures, the number of supporting structures, the line to structure clearances and the minimum conductor to ground clearance at mid-span under normal load and average weather conditions and under predicted extreme load and weather conditions.	See Siting Application and Section 1, Introduction and Background, and Table 1-1.
57.72 (c)(13)(iii) A simple drawing of a cross section of the proposed rights-of-way of the HV line and any adjoining rights-of-way showing the placement of the supporting structures at typical locations, with the height and width of the structures, the width of the right-of-way and the lateral distance between the conductors and the edge of the right-of-way indicated.	See Siting Application.
57.72 (c)(13)(iv) A system map which shows in suitable detail the location and voltage of existing transmission lines and substations of the applicant and the location and voltage of the proposed HV line and associated substations.	See Siting Application.
57.72 (c)(14) A statement identifying litigation concluded or in progress which concerns property or matter relating to the proposed HV line, right-of-way route, or environmental matters.	See Siting Application.
57.72 (c)(15) Additional information as the Commission may require.	See Siting Application.
57.74 – Filing and service of application and notice of filing.	
57.74(a) Filing. The applicant shall file with the Commission the original of the application. An affidavit of service showing the identity of those served under subsections (b) and (c) shall accompany the original application filed with the Commission.	See Siting Application.
57.74(b) Copies. At the time of filing, the applicant shall serve a copy of the application by registered or certified mail, return receipt requested, upon the following: (1) The chief executive officer, the governing body and the body charged with the duty of planning land use in each city, borough, town, township and county in which any portion of the HV line is proposed to be located. (2) The president of the public utility, other than the applicant, in whose service territory any portion of the HV line is proposed to be located. (3) The Department of Environmental Resources, Attention: Bureau of Environmental Planning; Post Office Box 2357, 101 S. Second Street, Harrisburg, Pennsylvania 17120.	See Siting Application.

Filing Requirements	Application / ERD Section(s)
57.74(c)(1) At the time of filing, the applicant shall serve a notice of filing and a map of suitable detail showing the proposed route of the proposed facility by registered or certified mail, return receipt requested, upon the following: (i) The Secretary of the Department of Transportation, Room 1200 Transportation and Safety Building, Harrisburg, Pennsylvania 17120. (ii) The Chairman of the Historical and Museum Commission, Post Office Box 1026, Harrisburg, Pennsylvania 17120. (iii) Other local, State or Federal agencies designated in § 57.72(c)(11) (relating to form and content of application). (iv) The persons, corporations and other entities designated in § 57.72(c)(4), unless they are served with a copy of the application under § 57.75(i) (relating to hearing and notice).	See Siting Application.
57.74(c)(2) The notice of filing shall contain a statement identifying the filing, the date on which the filing was or is to be made, a description of the proposed line, the design voltage, the number of route miles, the right-of-way width and the location of the proposed HV line within each township traversed and a statement that a copy of the application is available for public examination as provided in subsection (d).	See Siting Application.
57.74(d) Examination. On the day of filing of the application, the applicant shall make a copy of the application available for public examination during ordinary business hours at a convenient location within a county in which any part of the proposed HV line will be located.	See Siting Application.
Chapter 69 Interim Guidelines – § 69.3102. Public Notice Filing Requirements	
69.3102 (a) Applications for electric transmission siting authority should provide the following information with the initial application for siting approval demonstrating its efforts to fully notify landowners who are either owners of land that will be purchased for the transmission project or will be subject to right-of-way/easement requirements:	See Siting Application.
69.3102 (a)(1) A Code of Conduct/Internal Practices governing the manner in which public utility employees or their agents interact with landowners along proposed rights of way.	See Siting Application.
69.3102 (a)(2) Copies of information provided to landowners by the public utility of any publicly disseminated notices advising landowners to contact the Commission or OCA in the event of improper land agent practices.	See Siting Application.
69.3102 (a)(3) Copies of all notices sent pursuant to §57.91 (relating to disclosure of eminent domain power of electric utilities).	See Siting Application.
69.3102 (b) Applicants for transmission siting authority should serve a copy of the Code of Conduct on all landowners along the proposed route whose property is to be purchased, subject to easement rights or borders the transmission corridor. The Code of Conduct should also be available on the applicant's website.	See Siting Application.
69.3102 (c) Applicants for transmission siting authority should provide prior notice to the Commission's Office of Communications of informational presentations to community groups by the public utility scheduled after the filing of the transmission siting application so that the Commission, OCA and other interested parties can attend meetings or obtain copies of information being disseminated at the presentations.	See Siting Application.
Chapter 69 Interim Guidelines – § 69.3103. Eminent Domain Filing Requirements	
69.3103 (1) Applicants for transmission siting authority should file applications for all known eminent domain authority as separate filings, but simultaneously with the associated transmission siting applications. Testimonial evidence in support of an eminent domain application should be filed with the application. All subsequent eminent domain authority applications should be filed as soon as reasonably known during the course of the transmission siting application.	See Siting Application.

Filing Requirements	Application / ERD Section(s)
69.3103 (2) As part of an eminent domain application, the public utility applicant should present, for those properties subject to condemnation at the time the transmission siting application is filed or later in the siting proceeding, the reason for the exercise of condemnation power for each property and the precise location of the affected property. Supporting maps or legal descriptions of the property to be condemned should be supplied to the extent feasible. Submission of information pursuant to this guideline should be consistent with the filing requirements for the exercise of eminent domain powers under §302(b) (5) of the Eminent Domain Code.	See Siting Application.
69.3103 (3) A public utility transmission siting application should include a summary status report for those properties along the proposed transmission route where negotiations for either property acquisition or rights of way/easements may be ongoing. This information should be supplemented as requested by the ALJ or the parties during the course of the transmission siting proceeding.	See Siting Application.
Chapter 69 Interim Guidelines – § 69.3104. Exemption from Municipal Zoning Standards	
69.3104 (1) Copies of comprehensive land use plans, zoning ordinances and other documentation relevant to the buildings affected by the exemption request. This information may be filed in either hard copy or electronic format.	Not Applicable
69.3104 (2) Provision of metes and bounds or site maps of building sites.	Not Applicable
69.3104 (3) A procedure for providing notice to affected municipalities of the request for exemption	Not Applicable
Chapter 69 Interim Guidelines – § 69.3105. Route Evaluation and Siting	
69.3105 (1) Transmission applicants should utilize a combination of transmission route evaluation procedures including high-level GIS data, traditional mapping (including US Geological Survey data and compilation), aerial maps and analysis of physical site-specific constraints raised by affected landowners.	See Attachment 3 to the Siting Application (Routing Study).
69.3105 (2) Transmission applicants should summarize the status of property acquisitions (including fee simple acquisitions and rights of way/easements) as part of the application. The applicant should provide the current status and continuing updates on property acquisition litigation or settlements during the course of the siting proceeding.	See Siting Application.
69.3105 (3)(i) In providing information regarding the reasonable alternative routes the utility actively considered in its final phase of the route selection process, and the relative merits of each, in accordance with §57.72(c)(10), the applicant should include the following information: The environmental, historical, cultural and aesthetic considerations of each route.	See Attachment 3 to the Siting Application (Routing Study).
69.3105 (3)(ii) The proximity of these alternative routes to residential and non-residential structures.	See Attachment 3 to the Siting Application (Routing Study).
69.3105 (3)(iii) The applicant’s consideration of relevant existing rights of way.	See Siting Application.
69.3105 (3)(iv) The comparative construction costs associated with each route.	See Siting Application.
69.3105 (4) With reference to the proposed route, applicants should provide a summary of efforts made to contact and solicit assistance from local governments and non-governmental organizations regarding areas encompassed within the requirement of §57.72(c)(8).	See Siting Application.
Chapter 69 Interim Guidelines – § 69.3106. Environmental Filing Requirements	
69.3106 (1) A matrix or list showing all expected federal, state and local government regulatory permitting or licensing approvals that may be required for the project at the time the application is filed, the issuing agency, approximate timeline for approval and current status. The applicant should provide an update on the status of the regulatory permitting/licensing approvals as the case progresses.	See Siting Application.

Filing Requirements	Application / ERD Section(s)
Chapter 69 Interim Guidelines – § 69.3107. Health and Safety Considerations	
69.3107(a)(1) Applicants for transmission line siting authority should provide a detailed vegetation management plan that includes the following components: A general description of the utility's vegetation management plan.	See Appendix F, Vegetation Management Plan, of Attachment 3 to the Siting Application (Routing Study).
69.3107(a)(2) Factors that dictate when each method, including aerial spraying, is utilized.	See Appendix F of Attachment 3 to the Siting Application (Routing Study).
69.3107(a)(3) Vegetation management practices near aquatic and other sensitive locations.	See Appendix F of Attachment 3 to the Siting Application (Routing Study).
69.3107(a)(4) Notice procedures to affected landowners regarding vegetation management practices.	See Appendix F of Attachment 3 to the Siting Application (Routing Study).
69.3107(a)(5) Provision of a copy of a landowner maintenance agreement that describes the duties and responsibilities of landowners and the utility for vegetation management to the extent utilized.	See Appendix F of Attachment 3 to the Siting Application (Routing Study).
69.3107(b)(1) Transmission siting applications should include the following: A description of the EMF mitigation procedures that the utility proposes to utilize along the transmission line route. This description should include a statement of policy approach for evaluating design and siting alternatives and a description of the proposed measures for mitigating EMF impacts.	See Siting Application.

EMF = electromagnetic field; ERD = Environmental Review Document; GIS = Geographic Information System; HV = high voltage

1.1 MARL PROJECT DESCRIPTION

PJM Interconnection LLC (PJM) has directed NEET MA and NEET VA to develop, construct, own, operate, and maintain the MARL Project to resolve significant and widespread reliability criteria violations on the Bulk Electric System that serves the PJM Region, due to load growth and anticipated resource retirements in the PJM Region. To meet this purpose and need, the MARL Project will have the following facilities:

- A new single-circuit 500 kV transmission line on lattice structures from the FirstEnergy Corp. (FirstEnergy)-owned 502 Junction Substation to the existing FirstEnergy-owned Black Oak 500/138kV Substation to an interconnection with new 500 kV transmission lines to be constructed by FirstEnergy and Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion Energy).[3]
- A new Woodside 500/138 kV substation in Frederick County, Virginia, which will connect to existing Dominion Energy and FirstEnergy infrastructure.[4]

The proposed transmission line will generally encompass the geographic area between the endpoints of the 502 Junction Substation in Greene County, Pennsylvania, and the handoff point (a new 500 kV transmission line to be constructed by FirstEnergy) in Frederick County, Virginia. The proposed Woodside Substation site is also in Frederick County, Virginia, but approximately 11 miles to the east of the eastern terminus of the proposed transmission line handoff point. These facilities are collectively referred to as "the MARL Project." Figure 1.1-1 depicts the MARL Project Proposed Route and the Alternative Routes.

All mileposts (MPs) and distances associated with the MARL Project facilities listed above are rounded to the nearest 0.1 mile, and all land areas are rounded to the nearest 0.1 acre (unless otherwise specified). All references to MPs, distances, and acreages in this document are assumed to be approximate (e.g., a reference to "MP 1.2" or "124.3 acres" means "approximately at MP 1.2" or "approximately 124.3 acres," respectively).

NEET MA and NEET VA identified six end-to-end route alternatives (the Proposed Route and Alternative Routes B through F) for the overall MARL Project between the 502 Junction Substation and the handoff point (Attachment 3 to the Siting Application, Routing Study). As identified in the Routing Study, the Routing Team has selected Alternative Route A as the Proposed Route. Figure 1.1-2 provides an overview of the Proposed Route and Alternative Routes in Pennsylvania. Table 1.1-1 summarizes MARL Project features of the Proposed Route and Alternative Routes in Pennsylvania.

[3] The MARL Project does not include the FirstEnergy and Dominion Energy portions of the PJM-approved West Cluster solutions.
[4] Specifically, the Woodside Substation will connect to Dominion Energy's existing 500 kV Bismark-Doubs transmission line, FirstEnergy's existing Stonewall 138 kV Substation via the Hampshire to Stonewall 138 kV line, and to FirstEnergy's upgraded Gore-Stonewall-Doubs 500 kV transmission line.

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TABLE 1.1-1 MARL PROJECT FEATURES FOR THE PROPOSED ROUTE AND ALTERNATIVE ROUTES

MARL Project Feature	Proposed Route		Alternative Route B		Alternative Route C		Alternative Route D		Alternative Route E		Alternative Route F	
	PA Counties	Total	PA Counties	Total	PA Counties	Total	PA Counties	Total	PA Counties	Total	PA Counties	Total
Centerline length (miles)	10.7	107.5	8.5	107.3	34.2	113.6	10.7	115.2	10.7	106.3	34.2	119.1
Siting Corridor (acres)	638.5	6,208.6	504.3	6,197.5	2,013.2	6,598.5	638.5	6,798.1	638.5	6,181.6	2,013.2	7,112.0
ROW Corridor (acres)	266.9	2,669.0	214.2	2,671.4	841.5	2,835.5	266.9	2,839.0	266.9	2,651.5	841.4	2,964.3
Aerial easement blowout area [a,b] (count)	4	24	4.5	31	5	28	4	24	4	28	5	32
Paralleling existing transmission line ROW (miles)	2.3	56.4	2.3	59.7	16.9	64.5	2.3	43.1	2.3	50.8	16.9	43.2
Paralleling existing transmission line ROW (%)	21.1	52.5	26.6	55.6	49.4	56.8	21.1	37.4	21.1	47.7	49.4	36.3
Structures (count)	44	452	35	452	150	478	44	493	44	446	153	519
Minimum structure height (feet)	85	85	85	85	85	85	85	85	85	85	85	85
Maximum structure height (feet)	190	190	190	190	190	190	190	190	190	190	190	190
Average structure height (feet)	145	145	135	145	145	145	145	145	145	145	145	140
Average span length (feet)	1,292	1,258	1,288	1,256	1,184	1,240	1,292	1,222	1,292	1,259	1,179	1,213
Maximum span length (feet)	2,665	2,927	2,665	2,927	2,468	2,955	2,665	2,739	2,665	2,927	2,468	2,955
Spans greater than 1,600 feet (count)	5	33	5	42	6	31	5	34	5	39	5	38

ROW = right-of-way; PA = Pennsylvania

[a] The aerial easement blowout area is a designated section within the ROW Corridor that requires additional transmission line easement area to accommodate engineering considerations (e.g., increased span lengths), which can result in greater line sway. These areas are necessary due to constraints, such as uneven terrain, steep slopes, or natural obstructions that make the standard ROW Corridor width impractical or unsafe.

[b] An aerial easement blowout area that are listed as "+0.5" under the "PA Counties" heading indicates that a portion of the aerial easement blowout area spans between two states. For example, Alternative Route B indicates 4.5 aerial easement blowout areas, and one of those areas spans across the Pennsylvania-West Virginia border.

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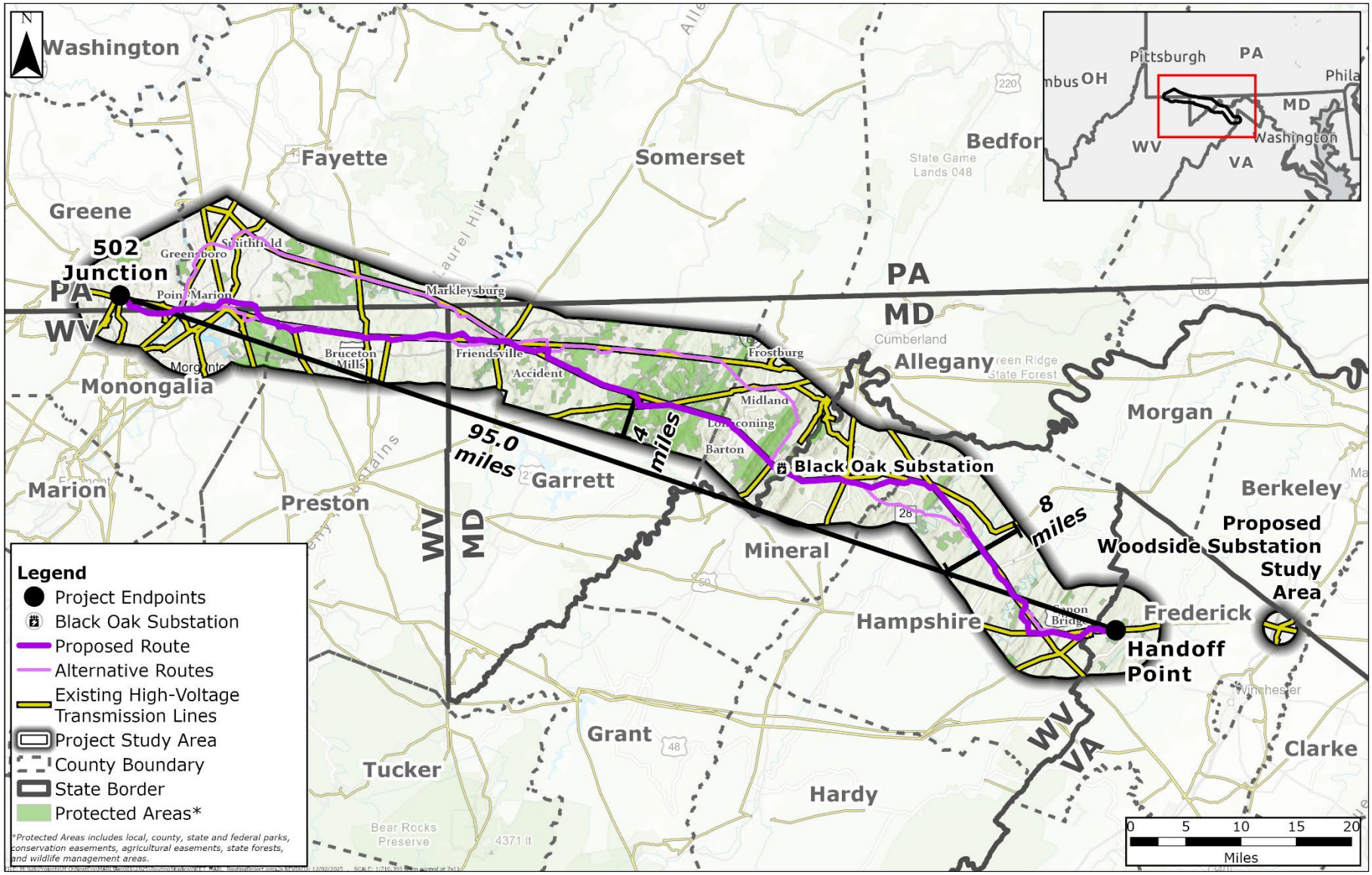
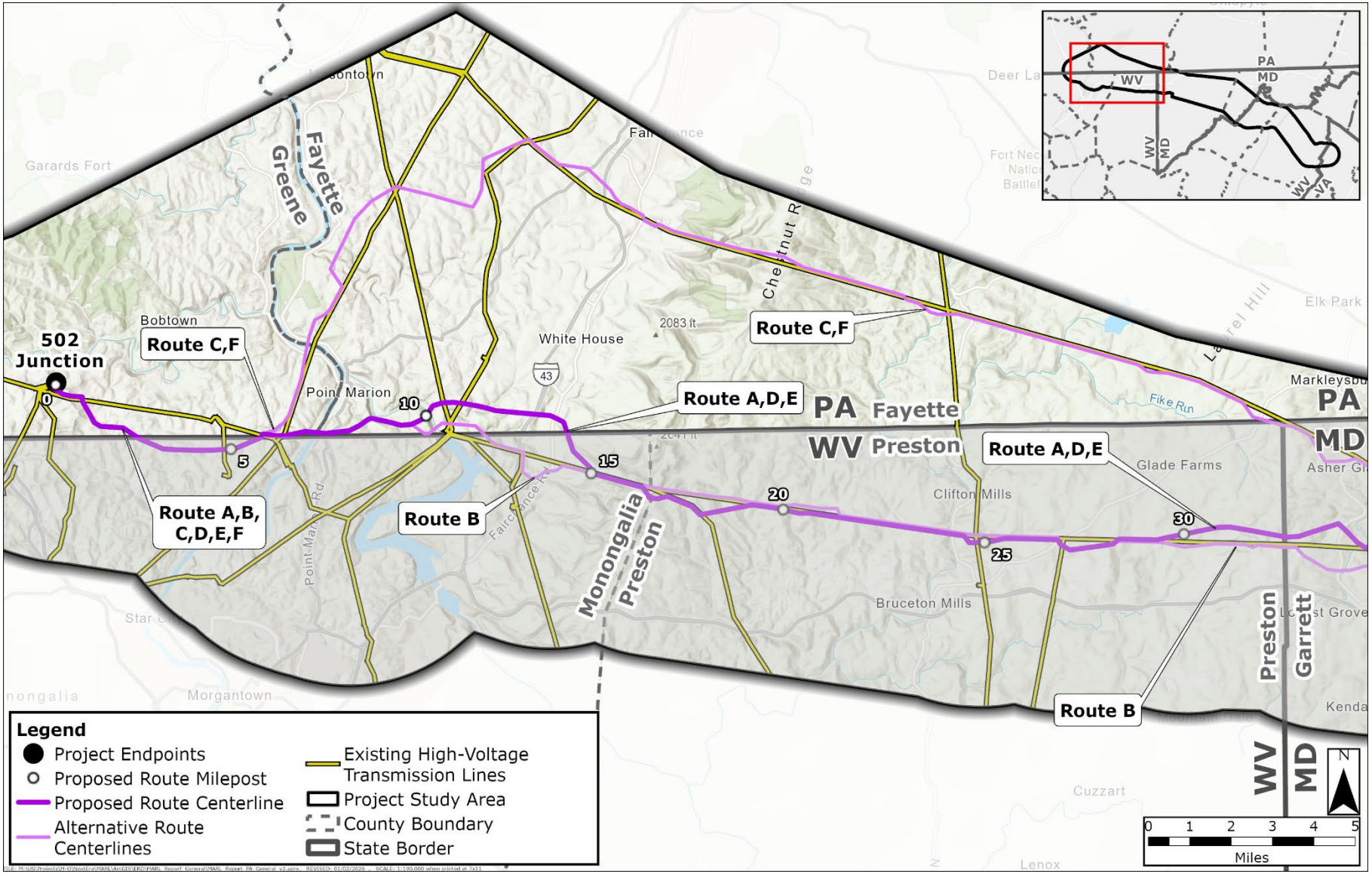
FIGURE 1.1-1 MARL PROJECT OVERVIEW, PROPOSED ROUTE, AND ALTERNATIVE ROUTES



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

FIGURE 1.1-2 MARL PROJECT IN PENNSYLVANIA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

1.2 OBJECTIVES OF THE ENVIRONMENTAL REVIEW DOCUMENT

The Routing Study (Attachment 3 to the Siting Application) presented ERM's overall approach to developing route alternatives that have an endpoint in Pennsylvania and another endpoint in Virginia. In developing the end-to-end route alternatives, ERM considered state-specific requirements and data, while also recognizing that the state-specific environmental data are different in each of the four states; therefore, ERM has developed state-specific appendices to present the different information that each of the state authorities expect to see. The objective of this ERD is to detail the environmental, cultural, and social existing conditions and potential impacts associated with the MARL Project Proposed Route and Alternative Routes for the specific state of Pennsylvania requirements. Regardless of the state, specific information that is associated with the overall MARL Project may be found in the Routing Study and is not repeated herein.

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2. ENVIRONMENTAL SETTING AND IMPACTS FOR THE PROPOSED ROUTE AND ALTERNATIVE ROUTES

The following section of the ERD describes the existing environmental, cultural, and social conditions, as well as the potential impacts associated with the Proposed Route and Alternative Routes for the MARL Project within Greene and Fayette Counties, Pennsylvania. This information was developed using publicly available data sources and includes data obtained from relevant agencies. The information presented herein was developed by ERM based on best practices and extensive experience in transmission line routing and siting projects. While there are no published studies or formal industry standards, the approach reflects methodologies that have been applied to other greenfield projects and, in some cases, accepted by state commissions. The approach was considered and applied to the MARL Project, incorporating natural environment and built environment resources, as well as land and engineering considerations. Where appropriate for a resource area, ERM provides in that resource discussion the regulatory driver that may be applicable to the MARL Project once permits are determined upon completion of the CPCN application. In addition to the publicly available data sources that are used for the ERD, a number of enhanced desktop assessments have been completed in combination with extensive agency outreach and coordination to provide a robust analysis of resource impacts in support of this CPCN application. Additional enhanced desktop assessments, in combination with select field surveys, will be conducted and submitted to the Public Service Commission as a supplemental amendment to this ERD. Full field surveys will be conducted following approval of a final route to facilitate state and federal permitting. Attachment 1, Pennsylvania ERD Resource Mapbooks, provides detailed resource information, pursuant to the requirements in Pa. Code Title 52.

Each resource area includes a discussion of existing conditions, an assessment of potential impacts, and the identification of potential mitigation measures. Where feasible, Geographic Information System (GIS) analysis was used to quantify both existing conditions and projected impacts. In cases where quantitative data was unavailable or insufficient, qualitative information was provided to characterize certain resource areas.

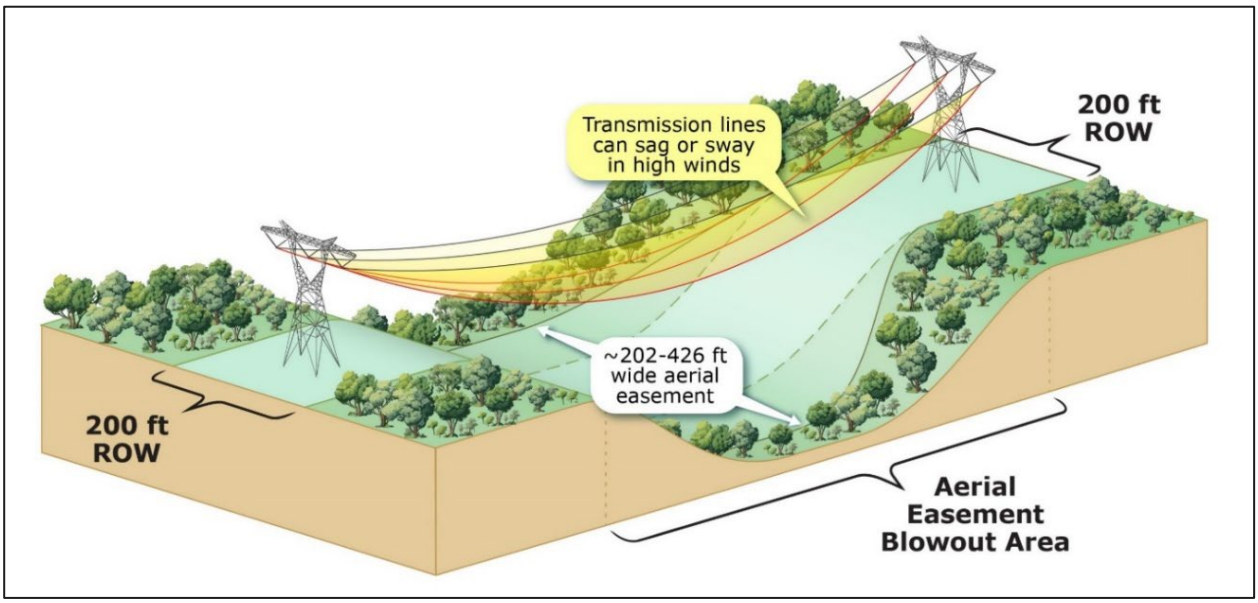
2.1 PROJECT COMPONENTS AND SITE DESCRIPTION

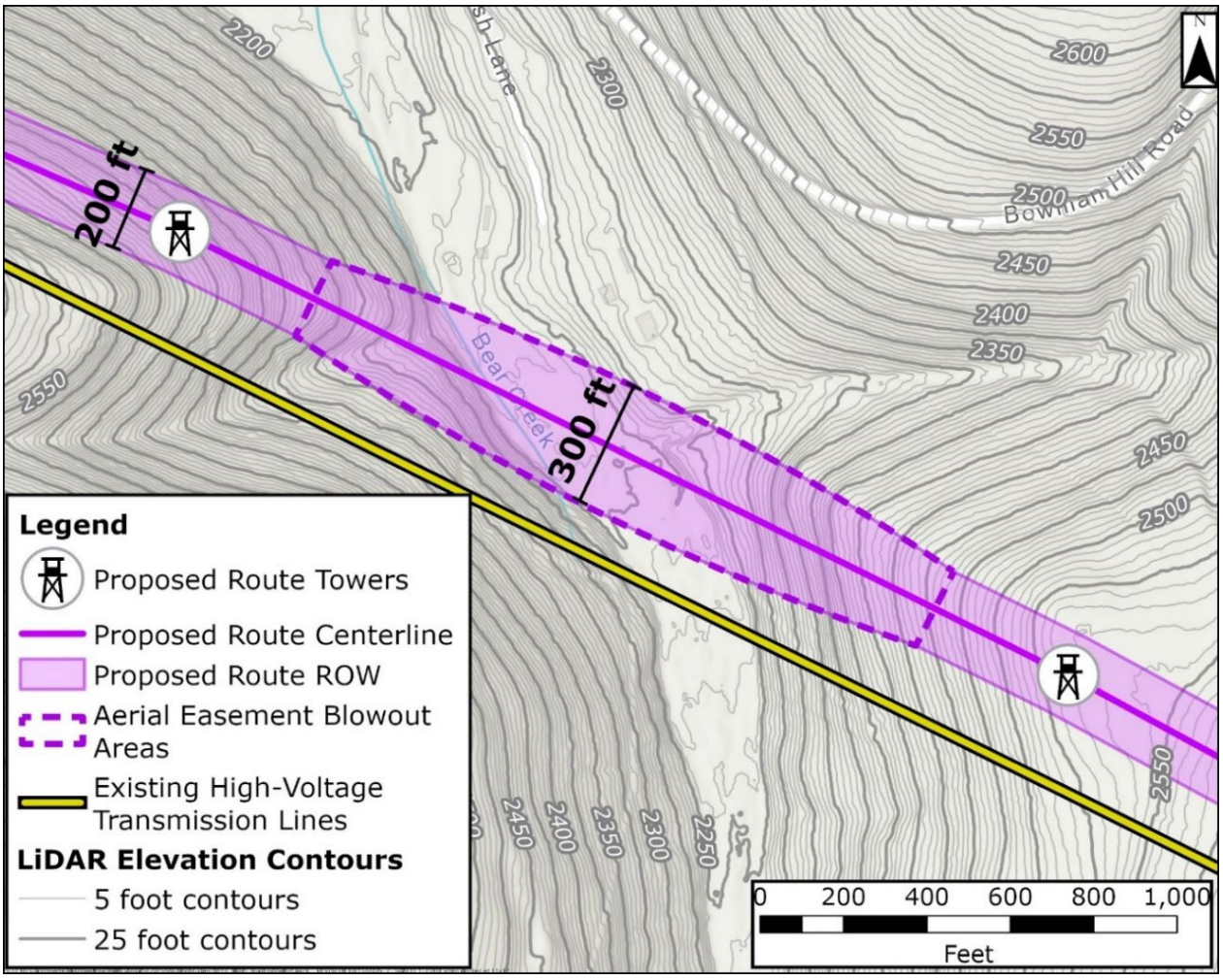
2.1.1 CORRIDOR WIDTHS

The MARL Project will be constructed in a new right-of-way (ROW) Corridor measuring, on average, 200 feet wide. The MARL Project will require a wider ROW Corridor in some areas where additional aerial easement rights are necessary to comply with electrical standards and requirements[5] (Figure 2.1-1). The full area of required MARL Project-specific ROW Corridor at any given point along the route is hereafter referred to as the "ROW Corridor." The number of aerial easement blowout areas for the Proposed Route and Alternative Routes is shown in Table 1.1-1, and the ROW Corridor for these areas ranges from 202 feet to 426 feet, averaging 289 feet wide (Figure 2.1-1). Attachment 1a also identifies where the MARL Project will require a wider ROW Corridor in some areas where additional aerial easement rights are necessary to comply with electrical standards and requirements.

[5] The aerial easement blowout area is a designated section within the ROW Corridor that requires additional transmission line easement area to accommodate engineering considerations (e.g., increased span lengths), which can result in greater line sway. These areas are necessary due to constraints like uneven terrain, steep slopes, or natural obstructions that make the standard ROW Corridor width impractical or unsafe.

FIGURE 2.1-1 GRAPHICAL DEPICTION OF ADDITIONAL AERIAL EASEMENT BLOWOUT AREAS





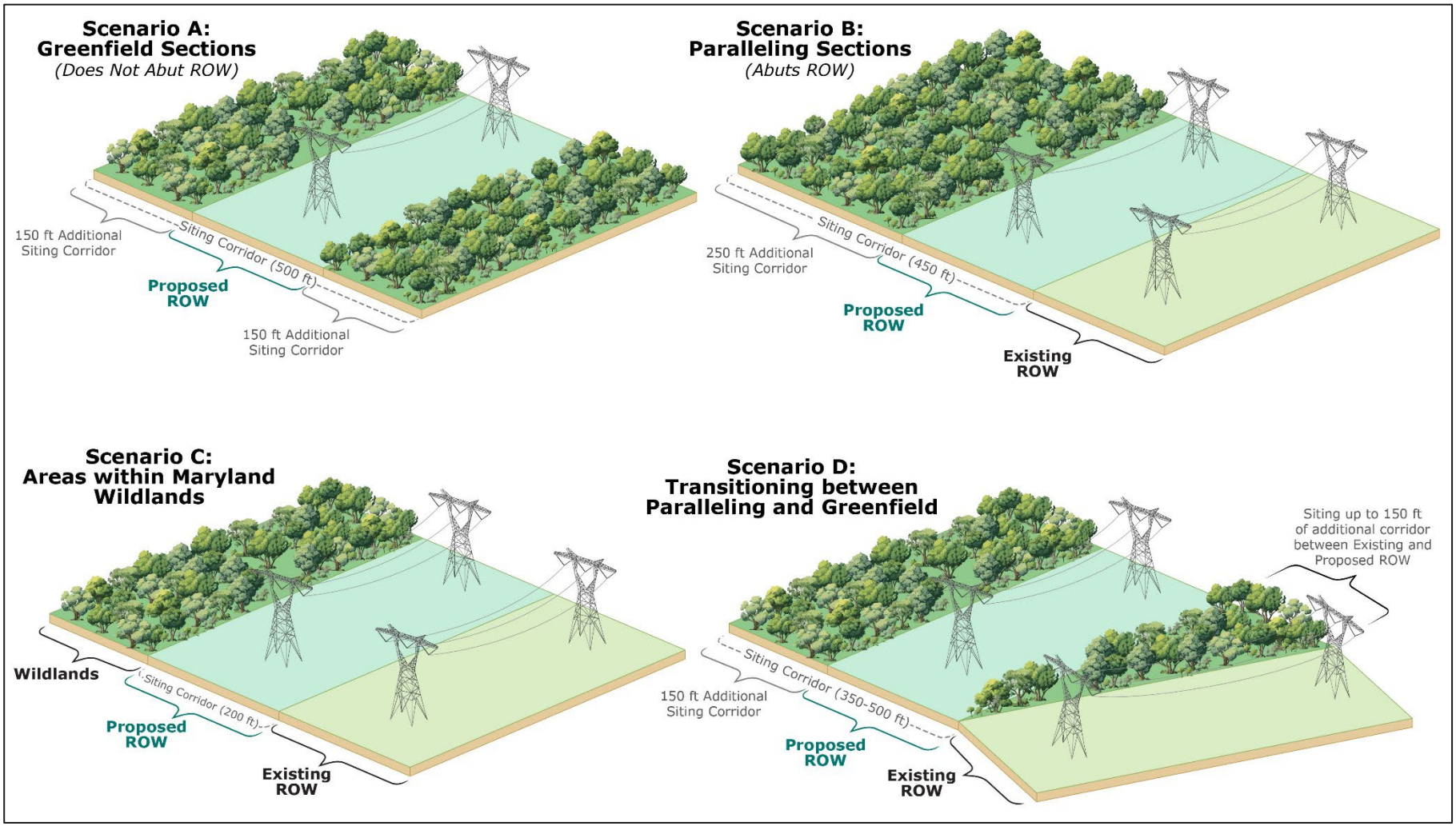
ft = feet; LiDAR = Light Detection and Ranging; ROW = right-of-way

The MARL Project developed a predefined, Project-specific Siting Corridor, hereafter referred to as the "Siting Corridor," in which existing conditions were assessed to allow for reasonable flexibility to adjust the centerline on either side of the Alternative Routes, if necessary. The Siting Corridor was designed to abut and not overlap the ROW of any existing transmission lines when paralleling. The Siting Corridor width will range from 200 to 500 feet; however, in those areas that require aerial easement blowout, the maximum width for the Siting Corridor will be 715 feet. The Siting Corridor is inclusive of the MARL Project's ROW Corridor. The width of the Siting Corridor varies based on the MARL Project's ROW Corridor width and proximity to existing transmission lines (Figure 2.1-2).

The Routing Team aimed to parallel existing transmission line corridors to the extent practicable, as this allows for minimizing visual, environmental, and access impacts. Figure 2.1-3 provides an illustration of MARL Project paralleling. Benefits to paralleling existing transmission line corridors include the following:

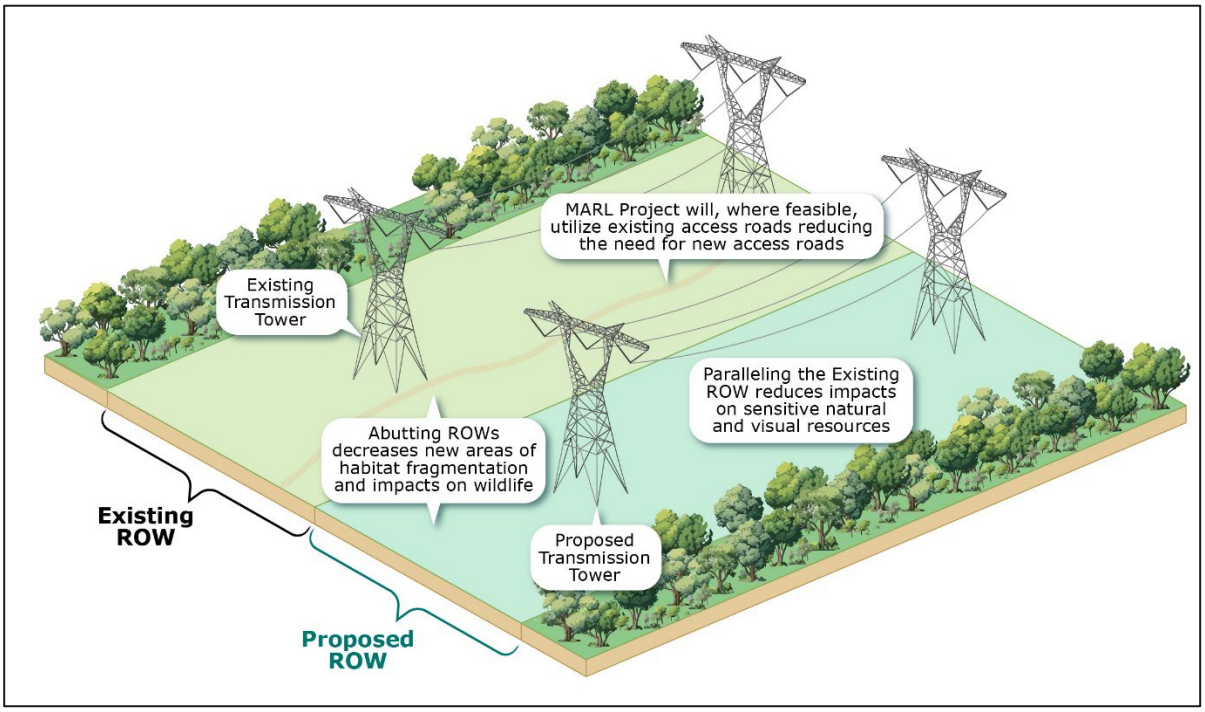
- Limits impacts on the local community;
- Provides easier construction access;
- Reduces the need for new access roads;
- Reduces impacts on sensitive natural and visual resources; and
- Decreases new areas of habitat fragmentation and impacts on wildlife.

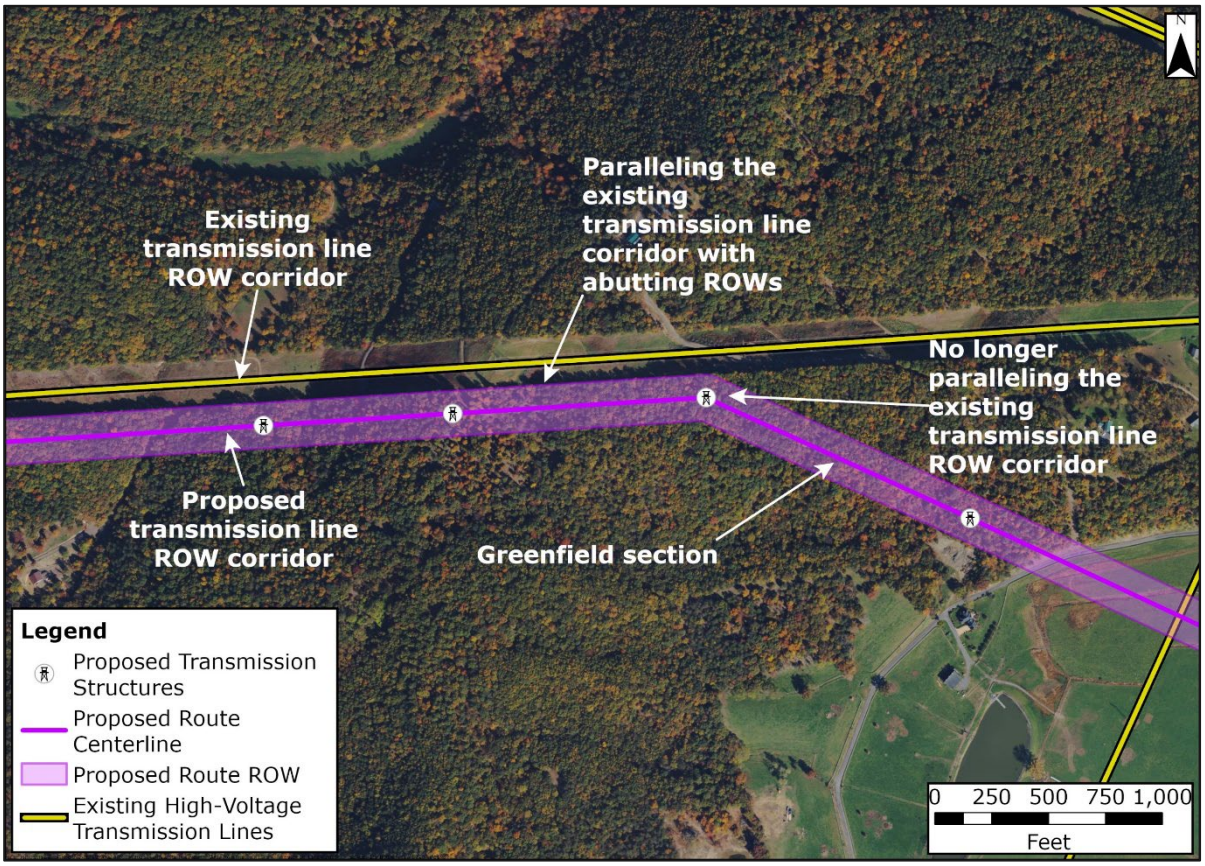
FIGURE 2.1-2 SITING CORRIDOR SCHEMATIC



ft = feet; ROW = right-of-way

FIGURE 2.1-3 ILLUSTRATION OF MARL PROJECT PARALLELING





MARL Project = MidAtlantic Resiliency Link Project; ROW = right-of-way

2.1.2 AERIAL EASEMENT LOCATIONS

There are 11 unique locations along the Proposed Route and the five Alternative Routes within Pennsylvania that require a wider ROW Corridor, where additional aerial easement rights are necessary to comply with electrical standards and requirements (Figure 2.1-1). These locations are shown in Table 2.1-1.

TABLE 2.1-1 AERIAL EASEMENT LOCATIONS WITHIN PENNSYLVANIA

County	Proposed Route/ Alternative Routes (B–F)	Pole Span Length (feet) [a]	Aerial Easement Beginning (MP)	Aerial Easement Ending (MP)	Maximum Width (feet) [a]	Length of Aerial Easement (feet) [a]	Stream Crossing
Greene	Proposed Route, B, D, E	1,824	6.0	6.1	227	899	Crooked Run
Greene	Proposed Route, B, D, E	2,665	7.0	7.4	377	2,156	Monongahela River
Greene	C, F	2,420	8.2	8.6	337	1,893	Monongahela River
Fayette	Proposed Route, B, D, E	1,633	8.3	8.4	210	535	Camp Run
Fayette	Proposed Route, D, E	1,947	10.0	10.2	248	1,161	Cheat River
Fayette	B	2,123	10.1	10.4	280	1,476	Cheat River
Fayette	C, F	2,304	10.7	11.0	310	1,680	Georges Creek
Fayette	C, F	1,953	12.1	12.3	247	1,083	No stream
Fayette	C, F	2,468	23.1	23.5	340	1,873	Victor Hollow
Fayette	C, F	1,594	27.3	27.4	206	390	No stream
Fayette [b]	B	1,905	11.5	11.7	234	955	Cheat Lake

MP = milepost

[a] All widths and lengths are presented as approximate measures.

[b] This aerial easement blowout area has a portion of the area within Fayette County, Pennsylvania, and a portion within Monongalia County, West Virginia.

2.1.3 ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE ROW CORRIDOR

In addition to the transmission line, the MARL Project includes ancillary facility workspaces required for both construction and long-term operation and maintenance. These ancillary facility workspaces consist of the following (Figure 2.1-4):

- Access roads;
- Structure pads at each tower location; and
- Wire work areas for conductor stringing operation.

The limit of disturbance (LoD) associated with ancillary facility workspaces is addressed exclusively within the impact sections of the ERD for the Proposed Route only. These LoD areas vary in size due to topographic constraints and ground conditions. Because the ancillary facility workspaces are located within or immediately adjacent to the Siting Corridor, the existing conditions of the Siting Corridor are considered representative of those at the ancillary facility

locations. For the purposes of impact analysis, the entire extent of the LoD outside of the ROW Corridor is treated as affected.

Access roads will include both improvements to existing roads and the construction of new roads. They may be located within the ROW Corridor or extend beyond it, depending on site-specific access needs. Access roads are designated as either:

- Temporary—used solely during construction and treated as temporary impacts. Restoration is planned following construction.
- Permanent—required for ongoing operation and maintenance. These are reported in the ERD as permanent impacts.

Structure pads are constructed at each tower location to provide stable surfaces for equipment during installation and will have the appropriate dimensions to meet the terrain constraints. All structure pads are considered temporary construction impacts. The LoD associated with structure pads is variable and influenced by topography and ground conditions. These areas are treated as temporary impacts, with restoration planned post-construction.

Wire work areas are temporary work areas used for staging specialized equipment to string conductor wires between transmission structures. These sites are placed at strategic points, particularly where the transmission line changes direction. These areas are treated as temporary impacts, with restoration planned post-construction.

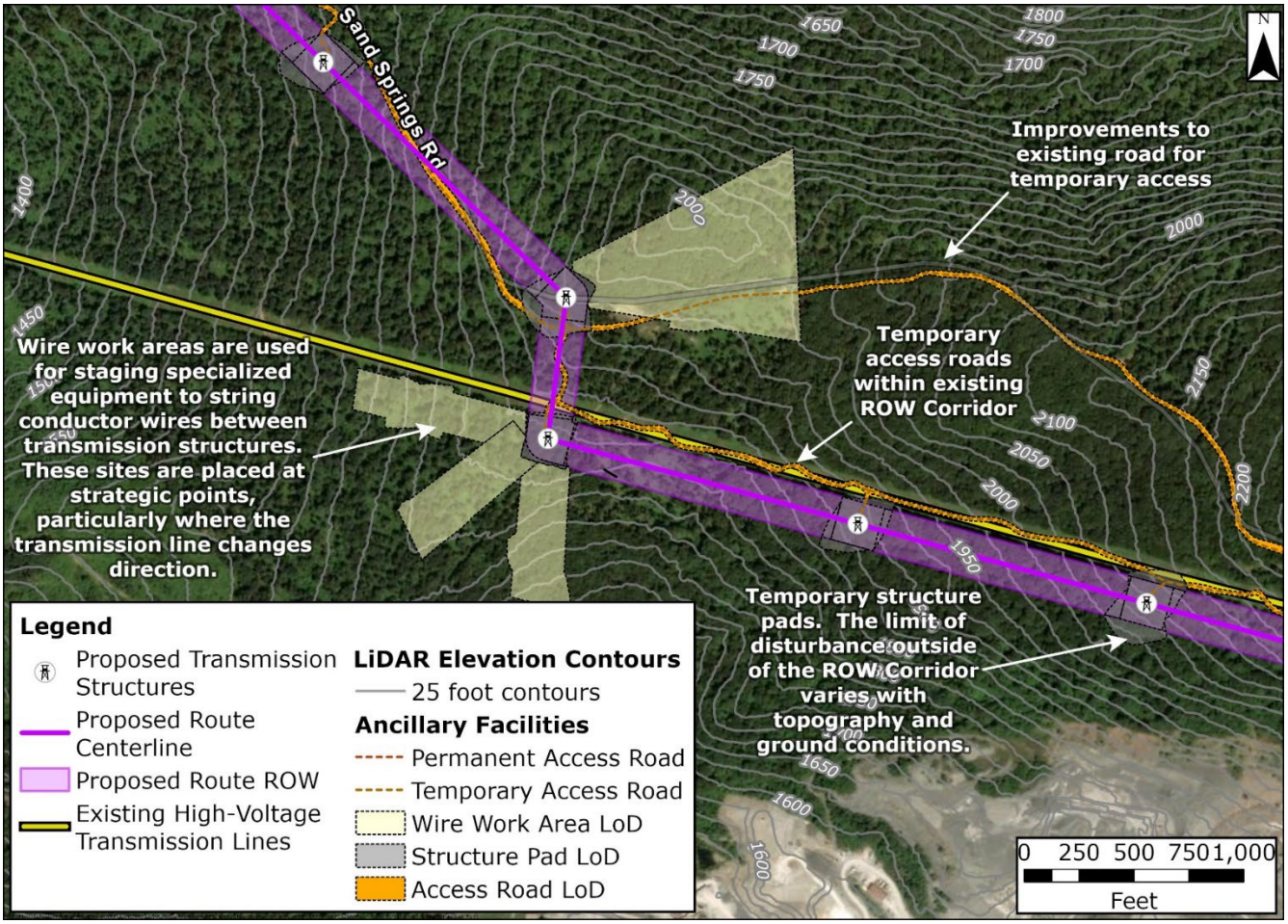
Table 2.1-2 shows the ancillary facility workspaces and associated LoD in Pennsylvania.

TABLE 2.1-2 ANCILLARY FACILITY WORKSPACES FOR THE PROPOSED ROUTE

Measure	Permanent Access Roads		Temporary Access Roads		Structure Pads		Wire Work Areas	
	PA Counties	Total Proposed Route	PA Counties	Total Proposed Route	PA Counties	Total Proposed Route	PA Counties	Total Proposed Route
Workspace Facility (count)	NA	NA	NA	NA	44	452	13	108
LoD Outside ROW Corridor (acres)	1.6	7.1	24.7	231.4	16.5	123.3	17.0	233.9
Within ROW Corridor (miles)	0.4	2.7	4.9	70.7	NA	NA	NA	NA
Outside ROW Corridor (miles)	0.6	2.6	8.5	77.4	NA	NA	NA	NA

LoD = limit of disturbance; PA = Pennsylvania; NA = not applicable; ROW = right-of-way

FIGURE 2.1-4 EXAMPLE MAP OF ANCILLARY FACILITY WORKSPACES



LiDAR = Light Detection and Ranging; LoD = limit of disturbance; ROW = right-of-way

2.1.4 PENNSYLVANIA SITE DESCRIPTION

The Proposed Route and the five Alternative Routes all vary in length (Table 1.1-1) through the two counties in Pennsylvania, as shown on Figure 1.1-2. The Proposed Route and each Alternative Route within Pennsylvania are described below in detail; however, all six routes follow the same alignment from the 502 Junction Substation origin point in Pennsylvania for 2.7 miles while paralleling two separate existing transmission line corridors until the Alternative Routes cross into West Virginia at MP 2.7. The Proposed Route and each Alternative Route then reenter Pennsylvania at MP 5.8 where the routes proceed for 0.1 mile before splitting at MP 5.9. Alternative Routes C and F continue north in a shared alignment to parallel the Ronco to Fort Martin 500 kV transmission line, while the Proposed Route and Alternative Routes B, D, and E continue east in a shared alignment. From MP 5.9, a high-level summary is provided below; however, each individual route is described in detail for those portions within Pennsylvania.

- The shared alignment of the Proposed Route and Alternative Routes B, D, and E continue east for 3.7 miles (1.3 miles in Greene County and 2.4 miles in Fayette County) crossing over the Monongahela River, and traversing through undeveloped private lands, while avoiding residential development along Davison and Bortz Road until MP 9.6 (as measured on the Proposed Route).
- At approximate MP 9.6 in Fayette County, Alternative B diverges from the shared alignment for 2.0 miles, crossing over the Cheat River north of the Lake Lynn Hydro Station and avoiding residential developments adjacent to the existing transmission lines east of Lake Lynn Hydro Station. Alternative Route B then travels south to cross over Cheat Lake and parallel an existing 138 kV transmission line, reentering into West Virginia at MP 11.6 (as measured on Alternative Route B).
- From MP 9.6 in Fayette County, the shared alignment of the Proposed Route and Alternative Routes D and E continues through Fayette County for 4.2 miles, crossing over the Cheat River north of Lake Lynn Hydro Station and avoiding residential development on the east side of the river near Lake Lynn Road. The shared alignment continues east through undeveloped private lands before the routes reenter West Virginia at MP 13.8 (as measured on the Proposed Route).
- From MP 5.9, the shared alignment of Alternative Routes C and F turns north to parallel the existing Ronco to Fort Martin 500 kV transmission line corridor and travels 2.5 miles through Greene County before crossing the Monongahela River and entering Fayette County at MP 8.4. This shared alignment continues north through undeveloped private lands, avoiding residential development adjacent to the existing transmission line corridor. At MP 17.6, the shared alignment then travels east and east-southeast through Fayette County for 28.9 miles while paralleling the Hatfield's Ferry Power Station to Black Oak 500 kV existing transmission line corridor before entering West Virginia at MP 37.3 (as measured on Alternative Route C).

The Proposed Route and Alternative Routes D and E follow the same alignment in Pennsylvania and are therefore discussed together throughout this ERD. Similarly, Alternative Routes C and F follow the same alignment as each other and are therefore discussed together throughout this ERD. Route B is discussed separately.

2.1.4.1 PROPOSED ROUTE AND ALTERNATIVE ROUTES D AND E

The Proposed Route and Alternative Routes D and E begin at the 502 Junction Substation origin point in Greene County, Pennsylvania, heading southwest near Bald Hill while paralleling two separate existing transmission line corridors. The Proposed Route and Alternative Routes D and E then proceed in an easterly direction for 0.8 mile before crossing over an existing 500 kV transmission line. The Proposed Route and Alternative Routes D and E then head in a general southeasterly direction for 1.8 miles to avoid residential development built up adjacent to the existing line near Bald Hill, exiting Pennsylvania near MP 2.7. The Proposed Route and Alternative Routes D and E then reenter Pennsylvania at MP 5.8 crossing the existing 500 kV line and then heading in an easterly direction crossing the Monongahela River near MP 7.1 (also where the shared alignment crosses into Fayette County). The Proposed Route and Alternative Routes D and E continue heading in an easterly-northeasterly direction crossing undeveloped private land while avoiding residential development near Davison Road and Bortz Road until the shared alignment

crosses the Cheat River near MP 10.1 north of the Lake Lynn Hydro Station. The shared alignment avoids residential development east of Cheat River near Lake Lynn Road and continuing east within Fayette County as a greenfield portion of the line following large undeveloped private lands. At MP 13.2, the Proposed Route and Alternative Routes D and E head in a southeasterly direction, exiting the state of Pennsylvania at MP 13.8 and reentering West Virginia to begin paralleling the existing Hazelton to Lake Lynn 138 kV transmission line corridor.

2.1.4.2 ALTERNATIVE ROUTE B

Similar to the Proposed Route and Alternative Routes D and E, Alternative Route B begins at the 502 Junction Substation origin point in Greene County, Pennsylvania, heading southwest near Bald Hill while paralleling two separate existing transmission line corridors. Alternative Route B then proceeds in an easterly direction for 0.8 mile before B crossing over an existing 500 kV transmission line heading. Alternative Route B then heads in a general southeasterly direction for 1.8 miles to avoid residential development built up adjacent to the existing line near Bald Hill, exiting Pennsylvania near MP 2.7. Alternative Route B then reenters Pennsylvania at MP 5.8, crossing the existing 500 kV line and then heading in an easterly direction, crossing the Monongahela River near MP 7.1 (also crossing into Fayette County). Alternative Route B continues heading in an easterly-northeasterly direction, crossing undeveloped private land while avoiding residential development near Davison Road and Bortz Road until MP 9.6 where Alternative B turns and heads in a southeasterly direction and crosses the Cheat River (MP 10.3) in a different location than the Proposed Route and Alternative Routes D and E. Alternative Route B generally heads in an east-southeasterly direction from MP 10.5 to 11.5, avoiding residential development built up adjacent to the existing transmission line corridors near Lake Lynn Hydro Station, at which point Alternative Route B crosses Cheat Lake and exits the state of Pennsylvania at MP 11.6 and reenters West Virginia to begin paralleling the Hazelton to Lake Lynn 138 kV transmission line corridor.

2.1.4.3 ALTERNATIVE ROUTES C AND F

Alternative Routes C and F follow a shared alignment, following the Proposed Route and Alternative Routes D and E up until MP 5.9 in Greene County, just north of an existing 500 kV transmission line. Alternative Routes C and F then deviate from the other Alternative Routes, traveling 0.8 mile in a northeasterly direction before paralleling the existing Ronco to Fort Martin 500 kV transmission line corridor from MP 6.7 to 7.6, deviating to the west to avoid a built-up area at the Monongahela River (MP 8.3). Alternative Routes C and F cross the Monongahela River near MP 8.4 at which point the routes enter Fayette County. Alternatives C and F continue heading in a general northeasterly direction from MP 8.5 to 13.3, primarily as a greenfield development to avoid residential development built up adjacent to the existing transmission line corridor near Crow Hollow Road, Tomcat Hollow Road, and Township Highway 336. At MP 11.4, the shared alignment uses property owned by a willing landowner that was identified during the stakeholder outreach process. At MP 13.2, the shared alignment travels east, avoiding residential development around Smithfield New Geneva Road. At MP 15.2, the shared alignment heads north to avoid the town of Smithfield and begins paralleling the existing Hatfield's Ferry to Black Oak 500 kV transmission line corridor at MP 17.6. At this point, the Alternative Routes turn in a southeasterly

direction paralleling the existing 500 kV transmission line corridor where applicable, crossing Interstate 43 while avoiding residential development in Smithfield and Haydentown near Goodwin Road. Between MP 21.1 and 21.5, Alternative Routes C and F cross over the existing 500 kV transmission line twice to avoid residential and commercial development near Haydentown Hill Road. The shared alignment continues southeast and parallels the existing 500 kV transmission line corridor through State Game Lands 138, Forbes State Forest, and the Quebec Run Wild Area. At MP 27.7, Alternative C and F cross the existing 500 kV transmission line to avoid residential impacts and a Fayette County Agricultural Easement. This segment continues southeast paralleling the existing 500 kV transmission line corridor through various sections of Forbes State Forest. At MP 37.3, Alternative Routes C and D exit the state of Pennsylvania and reenters West Virginia.

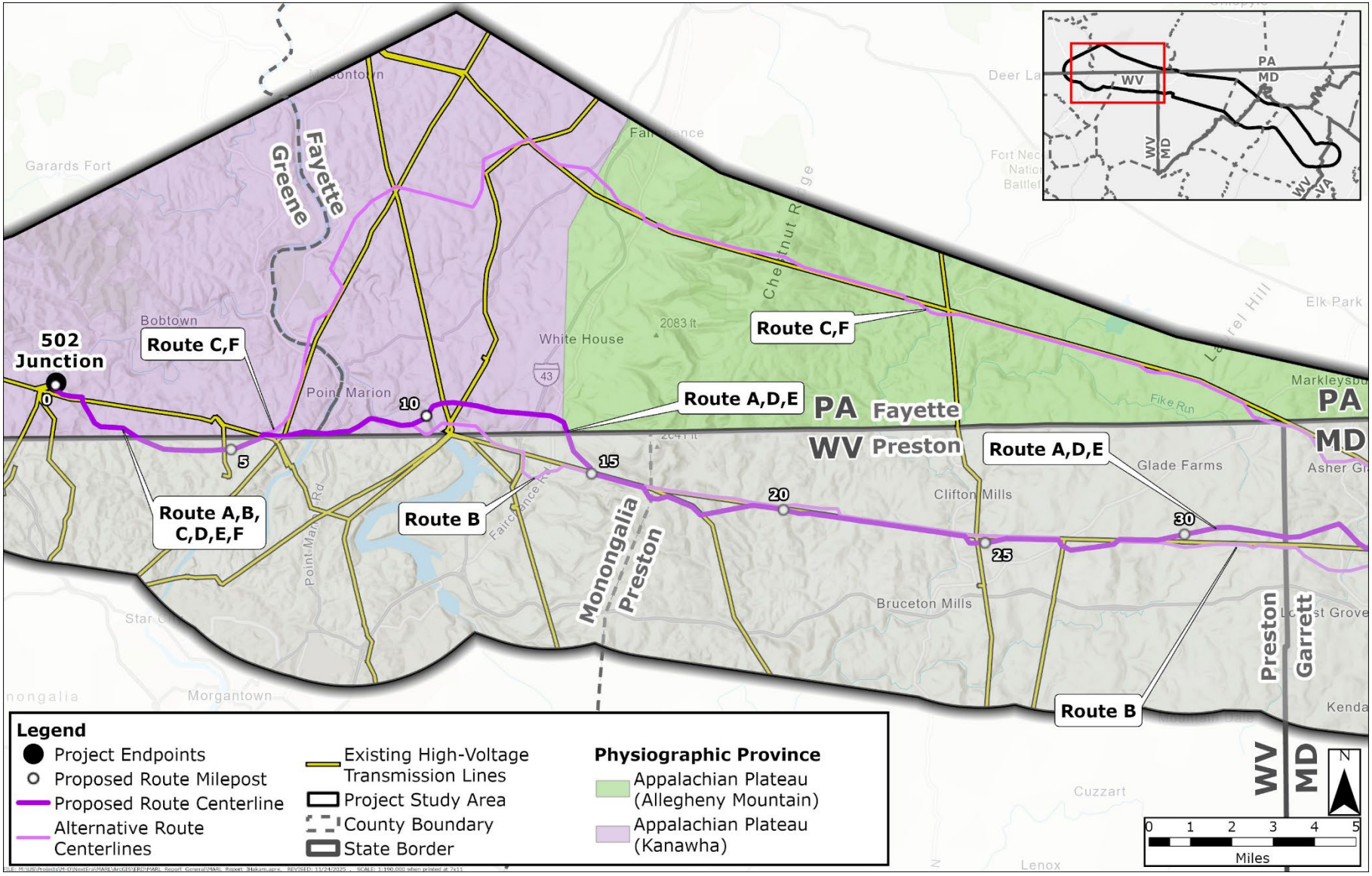
2.2 NATURAL ENVIRONMENT

Southwestern Pennsylvania has a complex geologic history of sedimentation, mountain building events, and subsequent erosion. Coal deposits formed during the Carboniferous and Permian periods are a valuable economic resource and have been extensively mined. The Monongahela River shaped much of eastern Greene County and western Fayette County. Chestnut Ridge, a prominent geologic feature running through Fayette County, is an anticline formed during the Appalachian mountain-building event. More recent erosion has carved the rolling hill topography seen today.

2.2.1 PHYSIOGRAPHIC SETTING, GEOLOGY, AND GROUNDWATER

The Proposed Route and all five Alternative Route Siting Corridors lie within the Appalachian Plateau physiographic province (NPS 2017) (Figure 2.2-1). West of Chestnut Ridge, the Siting Corridors are within the Kanawha section and east of Chestnut Ridge within the Allegheny Mountain section (DCNR 2025a). The topography is relatively flat, with local highs and lows and rolling hills and an average elevation of approximately 1,100 feet above mean sea level (amsl). At Chestnut Ridge, the elevation increases to approximately 2,700 feet amsl. To the east of the ridge, the elevation drops to approximately 1,600 feet amsl and gradually rises to approximately 2,300 feet amsl at the West Virginia border.

FIGURE 2.2-1 PHYSIOGRAPHIC PROVINCES IN PENNSYLVANIA (GREENE AND FAYETTE COUNTIES)



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.2.1.1 EXISTING CONDITIONS

The Proposed Route and Alternative Route Siting Corridors west of the Monongahela River, within Greene County, are primarily within the relatively younger rock formations exposed in the Monongahela River valley. The Siting Corridors cross the following geologic formations from youngest to oldest (DCNR 2025a).

- Washington Formation (Pw): This formation is mainly sandstone, divided into an upper limestone member, middle member, and lower limestone member, all of which have cyclic rock sequences. The upper limestone member consists of limestone and shale and ranges in thickness from zero to about 50 feet. The basal and upper limestones contain freshwater ostracodes and some fish remains. The middle member contains shale, sandstone, siltstone, and the Jollytown coal and ranges in thickness from about 120 to 225 feet. The sandstone is light-gray to olive gray, micaceous, and, in some places, massive. Some of the shale is red. The lower limestone member is limestone and coal and ranges in thickness from about 10 to 30 feet. The Washington coal is at the base of the Washington Formation and ranges in thickness from about 160 to 260 feet.
- Waynesburg Formation (PPw): This formation is mainly sandstone, divided into upper, middle, and lower members, all of which have cyclic rock sequences. The upper member consists chiefly of gray to black, locally calcareous shale containing siderite nodules, and medium- and light-gray sandstone and ranges in thickness from about 5 to 50 feet, and the Little Washington coal occurs at the base. The middle member is predominantly medium-gray shale, sandstone, and light-gray siltstone and ranges in thickness from about 50 to 110 feet. Its basal unit is the Waynesburg A coal. The lower member is medium-gray shale, sandstone, and siltstone and ranges in thickness from about 50 to 100 feet. The Waynesburg coal is at its base. The Waynesburg sandstone, which overlies the Waynesburg coal, is light-gray, massive, and crossbedded and locally grades laterally and vertically to siltstone and shale. Some limestone, as well as freshwater ostracodes and plant fossils, are found in the formation, and the thickness ranges from about 140 to 245 feet.
- Monongahela Group (Pm): This group is mostly cyclic sequences of limestone, shale, sandstone, and coal in the Uniontown and Pittsburgh Formations. The Uniontown Formation consists of two members. The upper member has shale, siltstone, sandstone, and coal. The lower member is made up of limestone, shale, siltstone, sandstone, and coal. In some places, the basal unit is the Uniontown coal. The sandstone is light-gray, fine-grained, and locally massive; the shale is greenish-gray to medium-gray and locally calcareous; and the limestone is light olive gray and argillaceous. The Pittsburgh Formation consists chiefly of limestone, shale, sandstone, and coal and contains three major coals: Sewickley, Redstone, and Pittsburgh. Ostracodes, “Spirorbis,” fish remains, and plant fossils are found in the Monongahela and it ranges in thickness from about 275 feet to 410 feet.
- Casselman Formation (Pcc): This formation is mainly shale; characterized by a few locally persistent red beds, calcareous claystones, freshwater limestones, thin sandstones, shales, siltstones, and thin coal beds. Most of the shales overlying coals contain plant fossils, and several also contain freshwater fauna. This formation thickens in a southeasterly direction, from about 230 feet in western Washington County to about 575 feet in the Wellersburg basin.

East of the Monongahela River, Proposed Route / Alternative Routes D and E Siting Corridors cross the following geologic formations from youngest to oldest (DCNR 2025a).

- Glenshaw Formation (Pcg): This formation is mainly shale, consisting of repeated sequences of sandstone, siltstone, shale, claystone (including red beds), limestone, and coal. It contains four major marine zones that are (from lowest to highest in stratigraphic position) the Brush Creek, Pine Creek, Woods Run, and Ames. The coal beds in the Glenshaw Formation are sporadically mined, and the formation increases in thickness from about 280 feet in the southwest to about 410 feet in the northeast.
- Allegheny Formation (Pa): This formation is mainly sandstone, composed primarily of cyclic sequences of clay shale, claystone, siltstone, sandstone, limestone, and coal. Freshwater limestone beds (commonly less than 5 feet thick) or calcareous claystone with limestone nodules commonly underlie the coal beds in the upper third of the formation. The Allegheny is characterized by the presence of major coal beds (the Upper and Lower Freeport coals; the Upper, Middle, and Lower Kittanning coals; the Clarion coal; and the Brookville coal). These coal beds (or coal horizons where there is underclay but no coal) occur on average at 50-foot intervals. The Johnstown limestone underlies the Upper Kittanning coal. The sandstones are fine to medium-grained, sometimes conglomeratic, lenticular fluvial channel deposits that average 10 to 30 feet in thickness but can coalesce to 100-foot-thick sequences. The Allegheny Formation ranges from about 280 to 320 feet in thickness.

East of the Monongahela River, the Alternative Routes C and F Siting Corridors cross Chestnut Ridge where the oldest rocks along the Siting Corridors are exposed. These routes cross the following geologic formations ordered from youngest to oldest: Casselman Formation (Pcc), Monongahela Group (Pm), Glenshaw Formation (Pcg), Allegheny Formation (Pa), Pottsville Formation (Pp), Mauch Chunk Formation (Mmc), Burgoon Sandstone (Mb), Shenango Formation through Oswayo Formation, undivided (MDso). Formations crossed not previously described are described below (DCNR 2025a).

- Pottsville Formation (Pp): This formation is mainly sandstone, consisting mainly of well- to very well-cemented, medium-grained to conglomeratic sandstone beds ranging in thickness from about 10 to 70 feet with minor amounts of siltstone, claystone, shale, thin discontinuous coals, and, in Mercer and adjacent counties, two marine limestones. Mining of coal in the Pottsville is limited. Because it contains resistant rock units, it tends to underlie ridges, including the highest point in Pennsylvania: Mount Davis (3,213 feet). Total thickness ranges from about 20 to 275 feet, with variations of 100 feet observed in locations a mile apart. This variability appears to occur in the basal part of the formation.
- Mauch Chunk Formation (Mmc): This formation is mainly shale, consisting of grayish-red shale and siltstone, brown, gray, and white sandstone, and some conglomerate. In western Pennsylvania, it contains the Deer Valley Limestone and fossiliferous Wymps Gap Limestone and has the Loyalhanna Member (an intensely crossbedded sandy limestone) at or near its base. In the Broad Top area, the Mauch Chunk Formation contains the Trough Creek Limestone. The top of the Mauch Chunk Formation is unconformable with the overlying Pottsville Group, except in the area of the Southern Anthracite field, where the two units are

interbedded. Maximum thickness is probably in the 8,000- to 9,000-foot range. It thins to the north and west and is cut out erosionally along the margins of the Northern Anthracite field.

- Burgoon Sandstone (Mb): This is mainly sandstone, consisting of crossbedded, quartzitic sandstone with some conglomerate near its base. It contains minor siltstone, shale, and some very thin coaly horizons. The basal sandstone and conglomerate unit is very light-gray to medium-light-gray. The sandstone above the basal member is gray and fine to medium-grained and weathers to buff or light brown. Extensive pitting of weathered boulders is found in rocks from the very top of the formation where the Loyalhanna Formation is present. Because it contains resistant rock units, it tends to underlie ridges, and its maximum thickness is about 300 feet.
- Shenango Formation through Oswayo Formation, undivided (MDso): This formation is mainly sandstone, and the upper part of the formation is soft, medium- to dark-gray shale, medium-light-gray siltstone, and limy siltstone. The lower part is light-gray to yellowish-gray, fossiliferous, crossbedded, fine-grained sandstone containing some interbedded dark- to medium-gray shale and siltstone and is well-bedded. The shale is fissile, the sandstone is flaggy to massive with planar lamination, and the siltstone is thin and its maximum thickness is about 190 feet. Members of the Cuyahoga Group are the Meadville Shale, a medium- to dark-gray shale with siltstone, lenses of fine-grained sandstone, and local beds of limestone; Sharpsville Sandstone, a very fine-grained, light-gray sandstone with medium- to dark-gray shale and siltstone; and Orangeville Shale, a dark-gray shale that locally contains some siltstone. Its maximum thickness is about 240 feet. The Corry Sandstone is very fine to medium-grained, crossbedded sandstone and is yellowish white and buff gray and may contain some pebbles. It is well-bedded and generally massive and may contain thin beds near the top, and its maximum thickness is about 40 feet. The Bedford Shale is made up of a hard, micaceous, light- to medium-dark-gray shale and interbedded siltstone and some very fine-grained, light-gray sandstone. Its bedding is well developed and thin, and its maximum thickness is about 40 feet. The Cussewago Sandstone is a fine-grained, micaceous, light-gray, tightly cemented sandstone interbedded with medium- to dark-gray, micaceous siltstone. Its basal portion is coarse-grained, light-gray, poorly cemented sandstone interbedded with fine-grained, micaceous sandstone having quartz and chert pebbles. It is well to poorly bedded, with thin to thick beds, and its maximum thickness is about 100 feet. The Oswayo Formation consists of interbedded olive-brown and greenish-gray sandy shale, olive-brown, fine-grained sandstone, and gray to olive shale, mudstone, and siltstone. Its bedding is well developed and thin and flaggy, and there are local thick beds. It contains marine fossils and its maximum thickness is about 250 feet.

Mining

The presence of economical coal deposits has resulted in extensive coal mining in southwestern Pennsylvania using both subsurface and surface mining operations (PADEP 2025a, 2025b). The Siting Corridors cross several abandoned underground mine areas within the Pittsburgh coal seam west of the Monongahela River (MPs 0.0 to 2.7). The Proposed Route / Alternative Routes D and E, as well as Alternative Route B cross abandoned subsurface mine areas immediately west of Cheat Lake (MPs 7.9 to 8.3 and MPs 9.3 to 10.0). Alternative Route B crosses another abandoned

mine area east of Cheat Lake (MPs 10.7 to 11.3). Alternative Route B crosses abandoned subsurface mine areas between approximate MPs 6.8 to 7.8, MPs 10.8 to 13.3, MPs 15.8 to 16.5, and MPs 17.2 to 20.1. Mine depths are not known. The overburden[6] above the Pittsburgh coal seam has been mapped as approximately 100 to 500 feet thick along the Siting Corridors (Iannacchione et al. 2008), but specific overburden thickness is not known.

Pursuant to 52 Pa. Code § 57.72(c)(8), 194 mine features have been identified within 2 miles of the Proposed Route ROW Corridor (PADEP 2025a, 2025b). These features include abandoned mine lands (85), underground coal mining operations (11), surface coal mining operations (20), surface industrial mineral operations (4), underground industrial mineral operations permits (2), and historic underground coal permits (72). The mine features are summarized in Table 1 of Attachment 2, Geological Features Within 2 Miles of the Proposed Route.

Karst

Based on data from Pennsylvania Bureau of Geological Survey, there are no karst features within 2 miles of any of the Siting Corridors (DCNR 2025a). The potential for karst to be present is associated with the interbedded carbonate rocks of the Monongahela Group and Mauch Chunk Formation (Weary and Doctor 2014); however, the likelihood of karst developing within these formations is low due to the interbedded nature of the relatively thin carbonate and non-carbonate rocks. The areas defined by these formations greatly overstate the potential karst areas, as both are primary clastic units (Weary 2008). The Siting Corridors cross either the Monongahela Group or the Mauch Chuck Formation, and the locations of potential karst crossed by the Siting Corridors are listed in Table 2.2-1.

TABLE 2.2-1 POTENTIAL KARST WITHIN THE SITING CORRIDORS

Karst Formation	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Monongahela Group	MPs 0.8 – 1.0	MPs 0.8 – 1.0	MPs 0.8 – 1.0
	MPs 1.3 – 1.5	MPs 1.3 – 1.5	MPs 1.3 – 1.5
	MPs 1.7 – 2.3	MPs 1.7 – 2.3	MPs 1.7 – 2.3
	MPs 2.5 - 2.7	MPs 2.5 - 2.7	MPs 2.5 - 2.7
	MPs 8.1 – 8.3	MPs 8.1 – 8.3	MPs 6.6 – 7.2
	MPs 8.5 - 8.6	MPs 8.5 - 8.6	MPs 7.3 – 7.6
	MPs 9.4 – 9.5	MPs 9.4 – 9.5	MPs 8.6 – 8.8
	MPs 9.6 – 10.0	MPs 9.6 – 10.1	MPs 9.0 – 10.3
	MPs 10.4 – 11.2	MPs 10.7 – 11.0	MPs 11.0 – 12.6
	MPs 11.8 – 12.1	MPs 11.2 – 11.4	MPs 12.7 – 13.0
			MPs 13.3 – 13.9
			MPs 14.0 – 14.4
			MPs 15.7 - 16.2
			MPs 16.9 – 17.0
			MPs 17.5 – 18.3
			MPs 18.9 – 19.7

[6] Overburden is the rock and soil above a mineral resource.

Karst Formation	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Mauch Chunk Formation	NA	NA	MPs 23.0 – 23.2
			MPs 24.6 – 24.8
			MPs 25.7 – 26.0

Source: Weary and Doctor 2014

MP = milepost; NA = not applicable

Groundwater

Groundwater in Greene and Fayette Counties typically occurs in fractures within bedrock units and is primarily used for domestic purposes, with limited public/municipal supply use, and quality is generally good; however, groundwater has been influenced by decades of coal mining activities from dewatering and/or impacts on water quality (McElroy 1988; Stoner et al. 1987).

ERM reviewed available water well and spring data within Greene and Fayette Counties from the Pennsylvania Bureau of Geological Survey GEOlogic Data Exploration database (DCNR 2025a), the U.S. Geological Survey (USGS) National Water Information System (USGS n.d.), the National Water Quality Monitoring Council (NWQMC n.d.), and the U.S. Environmental Protection Agency (USEPA) Drinking Water Mapping Application to Protect Source Waters (USEPA n.d.-a). There are no known water wells or springs within the Siting Corridors of the Proposed Route or any of the Alternative Routes. There are several domestic water wells listed within the Pennsylvania GEOlogic Data Exploration database without specific location data available. The public water supply wells of Greene and Fayette Counties are not located within or in close proximity to the Siting Corridors of the Proposed Route or any of the Alternative Routes. Additionally, there are no groundwater or source water protection areas identified within any of the Siting Corridors.

Based on the publicly available records (DCNR 2025a; USGS n.d.), there are 48 water wells within 2 miles of the Proposed Route ROW Corridor, including 11 monitoring wells, 16 water withdrawal wells, 15 abandoned wells, and 6 listed as unused. Details about these wells are summarized in Table 2 of Attachment 2. Water wells vary in depth based on target formation. Shallow wells (less than 50 feet below ground surface) are commonly installed within the alluvial sediments of the valleys, with deeper wells being installed in bedrock. Within shallow alluvium, the water table can be within a few feet of the surface. Deeper bedrock wells typically have a water level of 50 feet below ground surface or greater.

2.2.1.2 IMPACTS

Geology

Impacts on geology within the ROW Corridors include temporary impacts from construction activities and permanent impacts from installation of transmission structures. The number of structures varies by route and ranges from 35 for Alternative Route B to 153 for Alternative Route F in Pennsylvania. Structure foundations and footers will be embedded into ground surface. The footprint of the permanent structures is limited to a small area of the tower foundations and footers and does not extend the entire length of the ROW Corridor. The average span length between towers is approximately 1,258 feet.

Structure foundation types are subject to final engineering design, geophysical surveys, and geotechnical investigations. Typical installations will be drilled piers with reinforced concrete; however, micropiles could be used in certain circumstances and other foundation types will be considered on an as-needed basis. The need for blasting is not anticipated for the MARL Project. If blasting is needed pending future engineering design and construction planning, NEET MA will prepare a Blasting Plan. If a Blasting Plan is determined to be needed, NEET MA will obtain the necessary state and/or local permits. Drilling, if used, may be localized at structure foundation locations, particularly if karst is present. Best management practices (BMPs) will be implemented if karst features are identified during construction.

Groundwater

Impacts on groundwater are not anticipated, as permanent structures will be located within the shallow subsurface, above anticipated groundwater levels. No new groundwater withdrawal wells will be installed for use during construction activities; however, where necessary, NEET MA may use existing groundwater wells with approval from municipalities and/or landowners. BMPs for protecting groundwater include containment for leachable materials and/or chemicals, low permeability liners for liquids retention/detention, restricting discharge, and stormwater runoff control. Karst features are not anticipated, but if encountered, NEET MA will notify the Pennsylvania Department of Environmental Protection (PADEP) Regional Office and conduct additional investigations, as necessary.

Drilling or other earthwork required for installation of the structural foundations will be limited to the footprint of the transmission structures and will not cover the entire length of the ROW Corridor. Groundwater extracted from within the Siting Corridors is not anticipated to be used during construction activities. Temporary construction activities are not expected to interfere with groundwater recharge, usage, or quality. No shallow unconfined groundwater or artesian conditions are known within the ROW Corridors that would be encountered during construction activities, including drilling. If groundwater is encountered during drilling, dewatering may be required during construction as a temporary measure. Dewatering is expected to be localized to the immediate construction area. BMPs for water discharge, such as water diversion and the use of liners will be implemented, as appropriate, to minimize surface erosion. Due to the anticipated limited extent of dewatering, subsidence is not expected to affect the MARL Project or surrounding overburden.

Construction activities are not expected to affect existing water wells. If water wells are encountered during preconstruction or construction activities, the surface completion and any other aboveground appurtenances will be protected using fencing or guarding. If wells are damaged during construction, NEET MA will notify the property owner along with the PADEP.

2.2.2 SOILS

This section describes existing soils within the Proposed Route and Alternative Route Siting Corridors and soil-related impacts within the ROW Corridor for the Proposed Route and Alternative Routes in Pennsylvania.

2.2.2.1 EXISTING CONDITIONS

ERM reviewed data available from the U.S. Department of Agriculture National Resources Conservation Service Web Soil Survey (USDA NRCS 2025) for soil map units (soil types), prime farmland, corrosiveness of concrete and steel, drainage class, and hydric rating. Attachment 1b, Soils Mapbook, shows soil types in detail.

There are 256 different soil types in the MARL Project Study Area in Pennsylvania, and the most abundant soil types include the following:

- Dormont-Culleoka complex—25 to 50 percent slopes (DtF);
- Dormont-Culleoka complex—15 to 25 percent slopes (DtD);
- Macove-Gilpin channery silt loams—35 to 70 percent slopes, extremely stony (McF);
- Gilpin-Weikert channery silt loams—25 to 70 percent slopes (GwF);
- Dormont silt loam—8 to 15 percent slopes (DoC);
- Fairpoint channery silt loam—8 to 25 percent slopes, unreclaimed (FpD);
- Guernsey silt loam—8 to 15 percent slopes (GyC);
- Gilpin channery silt loam—8 to 15 percent slopes (GcC);
- Gilpin channery silt loam—3 to 8 percent slopes (GcB);
- Gilpin channery silt loam—15 to 25 percent slopes (GcD);
- Buchanan loam—8 to 25 percent slopes, extremely stony (BuD); and
- Fairpoint very channery silt loam—15 to 25 percent slopes (FaD).

All the other soil types individually account for less than 2 percent of the MARL Project Study Area in Pennsylvania. Several of the most abundant soil types listed above are also among the most abundant in the Siting Corridor, including GwF, DtF, DtD, McF, and FpD.

Soils can be listed as prime farmland, unique farmland, or farmland of state or local importance. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops that are available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. Farmland of statewide or local importance does not meet all the criteria of prime farmland but is still recognized as valuable for agriculture. Table 2.2-2 summarizes farmland class within the Siting Corridors for the Proposed Route and Alternative Routes. While there are areas of prime farmland in the Siting Corridors, the MARL Project is not subject to the Farmland Protection Policy Act because its permitting, development, and operation does not involve federal funding. Per guidance from the National Resources Conservation Service, projects without federal funding, management, or technical assistance are not subject to the Farmland Protection Policy Act.

TABLE 2.2-2 FARMLAND SOIL CLASSES WITHIN THE SITING CORRIDORS (ACRES)

Farmland Class [a]	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
All areas are prime farmland	64.6	33.6	308.9
Farmland of statewide importance	125.0	106.3	324.4
Farmland of local importance	0.0	0.0	0.0
Not prime farmland	448.8	364.4	1,379.9
Total [b]	**638.5**	**504.3**	**2,013.2**

Source: USDA NRCS 2025

[a] Prime farmland includes the following farmland class categories: all areas are prime farmlands, farmland of statewide importance, and farmland of local importance.
[b] Totals may not match the sum of addends due to rounding.

Ratings are also given for the risk of corrosion to steel and concrete, which indicates the potential for a soil to corrode steel or concrete. The rate of corrosion of steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based primarily on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Ratings for corrosion of steel and concrete are given in qualitative terms, including "high," "moderate," "low," and "NA." Table 2.2-3 summarizes corrosion to steel within the Siting Corridors for the Proposed Route and Alternative Routes, while Table 2.2-4 summarizes corrosion to concrete within the Siting Corridors for the Proposed Route and the Alternative Routes.

TABLE 2.2-3 RISK RATINGS FOR CORROSION TO STEEL FROM SOIL CONTACT WITHIN THE SITING CORRIDORS (ACRES)

Risk Rating	Proposed Route/ Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
High	271.6	182.5	1,074.3
Moderate	282.7	256.7	637.1
Low	63.0	44.1	274.1
NA	21.3	20.9	27.7
Total [a]	**638.5**	**504.3**	**2,013.2**

Source: USDA NRCS 2025

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-4 RISK RATINGS FOR CORROSION TO CONCRETE FROM SOIL CONTACT WITHIN THE SITING CORRIDORS (ACRES)

Risk Rating	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
High	254.6	156.1	906.7
Moderate	291.1	267.9	961.5
Low	71.5	59.3	117.3
NA	21.3	20.9	27.7
Total [a]	**638.5**	**504.3**	**2,013.2**

Source: USDA NRCS 2025

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Changes in Hydric Soils of the United States; 59 *Federal Register* 133 [July 13, 1994]). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. Table 2.2-5 summarizes the presence/absence of hydric soils in the Siting Corridors for the Proposed Route and Alternative Routes.

TABLE 2.2-5 PRESENCE OF HYDRIC SOILS WITHIN THE SITING CORRIDORS (ACRES)

Hydric Soil	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
Yes	3.3	5.5	69.8
No	616.1	480.1	1,930.0
NA	19.0	18.7	13.3
Total [a]	**638.5**	**504.3**	**2,013.2**

Source: USDA NRCS 2025

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

Drainage class refers to the frequency and duration of wet periods with conditions similar to those under which the soil formed. The drainage class of a soil helps determine its suitability for different types of use (e.g., agriculture, forestry, development). Table 2.2-6 summarizes drainage classification for the Siting Corridors of the Proposed Route and Alternative Routes.

TABLE 2.2-6 SOIL DRAINAGE CLASSIFICATIONS WITHIN THE SITING CORRIDORS (ACRES)

Drainage Class	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
Well-drained	374.7	299.7	1,146.6
Moderately well-drained	227.7	165.9	681.7
Somewhat excessively drained	1.5	1.5	11.7
Somewhat poorly drained	10.1	10.7	75.6
Poorly drained	3.3	5.5	69.3
Very poorly drained	0.0	0.0	0.5
NA	21.3	20.9	27.7
Total [a]	**638.5**	**504.3**	**2,013.2**

Source: USDA NRCS 2025

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

Proposed Route and Alternative Routes D and E

The number of unique soil types in the Proposed Route and Alternative Routes D and E Siting Corridor varies by county. There are 21 and 33 different soil types in the Siting Corridor in Greene and Fayette and County, respectively.

The Proposed Route and Alternative Routes D and E are largely categorized in total acreage as not prime farmland; the second-largest total acreage is farmland of statewide importance. The Proposed Route and Alternative Routes D and E have no farmland of local importance within the Siting Corridors (Table 2.2-2).

The Proposed Route and Alternative Routes D and E are largely comprised of soils that pose either a high or moderate risk of corrosion to steel (Table 2.2-3) and a high or moderate risk of corrosion to concrete (Table 2.2-4).

The Proposed Route and Alternative Routes D and E are mainly comprised of non-hydric soils, with a small amount represented by hydric soils (Table 2.2-5). Most of the soils within the Proposed Route and Alternative Routes D and E have well-drained classifications followed by moderately well-drained (Table 2.2-6).

Alternative Route B

The number of unique soil types in Alternative Route B Siting Corridor varies by county. There are 21 and 33 different soil types in the Siting Corridor in Greene and Fayette Counties, respectively.

Similar to the Proposed Route and Alternative Routes D and E, Alternative Route B is largely categorized in total acreage as not prime farmland; the second-largest total acreage is farmland of statewide importance. Alternative Route B has no farmland of local importance within the Siting Corridor (Table 2.2-2).

Alternative Route B is largely comprised of soils that pose a moderate risk of corrosion to steel (Table 2.2-3) and a moderate risk of corrosion to concrete (Table 2.2-4).

Alternative Route B is mainly comprised of non-hydric soils, with a small amount of the route represented by hydric soils (Table 2.2-5). Most of the soils within Alternative Route B have well-drained classifications followed by moderately well-drained (Table 2.2-6).

Alternative Routes C and F

The number of unique soil types in Alternative Routes C and F Siting Corridor varies by county. There are 22 and 95 different soil types in the Siting Corridor in Greene and Fayette Counties, respectively.

Similar to the Proposed Route and Alternative Routes D and E and Alternative Route B, Alternative Routes C and F are largely categorized in total acreage as not prime farmland; the second-largest total acreage is farmland of statewide importance. Alternative Routes C and F have no farmland of local importance within the Siting Corridor (Table 2.2-2).

Alternative Routes C and F are largely comprised of soils that pose either a high risk of corrosion to steel (Table 2.2-3) and a high to moderate risk of corrosion to concrete (Table 2.2-4).

Alternative Routes C and F are mainly comprised of non-hydric soils (Table 2.2-5). Most of the soils within Alternative Routes C and F have well-drained classifications followed by moderately well-drained (Table 2.2-6).

2.2.2.2 IMPACTS

A summary of soil impacts in the ROW Corridors for the Proposed Route and Alternative Routes, as well as ancillary facilities for the Proposed Route, is presented below.

In general, the MARL Project would affect a limited amount of the prime farmlands in the ROW Corridors for the Proposed Route and Alternative Routes (Table 2.2-7), as well as within ancillary facility workspaces (Table 2.2-8). Of the 33.6 to 308.9 acres of prime farmland within the Siting Corridors, 15.2 to 128.3 acres are within the ROW Corridors and would potentially be affected by the MARL Project. An additional 42.1 to 133.6 acres of farmland of statewide importance could also be affected within the ROW Corridors. Temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor would affect 4.3 acres of prime farmland and 14.8 acres of farmland of statewide importance. Permanent access roads would affect 0.2 acre of prime farmland but would not affect farmland of statewide importance.

The Proposed Route and Alternative Routes D and E and Alternative Routes C and F would pose a high risk of corrosion to steel in the ROW Corridors, while Alternative Route B would pose a moderate risk (Table 2.2-9). Soils within the temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor generally pose a moderate to high risk of corrosion to steel, if any steel is used in the temporary workspaces (Table 2.2-10). Permanent access roads would also generally pose a moderate to high risk of corrosion to steel.

All routes would pose a moderate risk of corrosion to concrete in the ROW Corridors (Table 2.2-11). Soils within the temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor would generally pose a moderate to high risk of corrosion to concrete, if any concrete is used in the temporary workspaces (Table 2.2-12). Permanent access roads would also generally pose a moderate to high risk of corrosion to concrete.

Most of the soils in the Proposed Route and each of the Alternative Route ROW Corridors are not hydric (Table 2.2-13); all impacts within ancillary facility workspaces are within soils that are not hydric (Table 2.2-14). Soils along the Proposed Route, each of the Alternative Route ROW Corridors, and within ancillary facility workspaces fall mostly within well-drained to moderately well-drained classifications, although there are limited areas with poorly drained soils (Table 2.2-15 and Table 2.2-16).

In the short term, the MARL Project would result in ground-disturbing activities from vegetation clearing in the ROW Corridor; grading, excavation, and construction of the transmission line structures; and equipment and vehicle use in the ROW Corridor. These activities would result in direct disturbance of soils, loss of prime farmland and increase the risk of immediate and long-term erosion, loss of topsoil, and compaction. The magnitude of soil impacts would depend on many factors, including existing vegetative cover, slope, and soil types. To help minimize impacts on soil resources in the ROW Corridor, NEET MA will follow BMPs for the protection of topsoil and avoidance of degradation of farmland, including minimization of soil disturbance where possible, salvage of topsoil removed during grading activities for redistribution during the final reclamation of a site to facilitate the re-establishment of desirable vegetation, and stabilization of post-construction soil (i.e., re-vegetation).

A MARL Project-specific Erosion and Sediment Control (ESC) Plan and Stormwater Pollution Prevention Plan will be prepared as part of the permit application and pursuant to 25 Pa. Code Chapter 102. NEET MA will coordinate with state and local agencies during the development of the ESC Plan and Stormwater Pollution Prevention Plan to incorporate and implement applicable state and local requirements. Appropriate BMPs will be used to manage stormwater runoff, including silt sock, silt fence, construction entrances, temporary matting and bridges, and erosion matting. Once construction is complete, any exposed soils will be stabilized with vegetation to prevent erosion. Additional ESC permitting and BMPs related to water quality standards are addressed in Section 2.2.4, Wetlands.

The percentage of ROW Corridors that would impact prime farmland and/or farmland of statewide importance ranges from 36.5 to 45.2 percent. BMPs for the protection of topsoil (see above) and avoidance of degradation of farmland that should be followed in these areas include minimization of soil disturbance where possible, salvage of topsoil removed during grading activities for redistribution during the final reclamation of a site to facilitate the re-establishment of desirable vegetation, and post-construction soil stabilization.

Exposure to soils that corrode steel and/or concrete may pose a risk to MARL Project infrastructure, in particular the transmission towers (steel) and footings (concrete). More than 80 percent of soils within the ROW Corridors have a moderate to high risk of corrosion to steel and concrete. In areas where concrete and steel are planned for installation, NEET MA will test soils for corrosivity prior to construction. For tower locations with identified corrosivity based on soil tests, NEET MA will use industry BMPs during construction and design for soil conditions, including concrete design (e.g., type, strength, admixtures), physical barriers (e.g., sleeves, jackets, geomembranes, vaults), coatings (e.g., epoxy), sacrificial steel, and engineered soil (e.g., excavation of native soil and backfill with non-corrosive soil), among others.

During operation and maintenance of the MARL Project, impacts on soils would be minimal (assuming any construction-related impacts have been adequately addressed). There would be a limited amount of permanent reduction in prime farmland in the ROW Corridor, but soil erosion or other soil-related issues caused by operation and maintenance of the transmission line would be limited. NEET MA will periodically monitor the ROW Corridor for soil concerns and address with appropriate remedies, as needed, during the operational lifespan of the MARL Project.

TABLE 2.2-7 FARMLAND SOIL CLASSES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Farmland Class [a]	Proposed Route / Alternative Route D / Alternative Route E		Alternative Route B		Alternative Route C / Alternative Route F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
All areas are prime farmland	64.6	29.2	33.6	15.2	308.9	128.3
Farmland of statewide importance	125.0	48.8	106.3	42.1	324.4	133.6
Farmland of local importance	0.0	0.0	0.0	0.0	0.0	0.0
Not prime farmland	448.8	189.0	364.4	156.9	1,379.9	579.6
Total [b]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.2**	**841.5**

Source: USDA NRCS 2025

ROW = right-of-way
[a] Prime farmland includes the following farmland class categories: all areas are prime farmlands, farmland of statewide importance, and farmland of local importance.
[b] Totals may not match the sum of addends due to rounding.

TABLE 2.2-8 FARMLAND SOIL CLASSES WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Farmland Class [a]	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
All areas are prime farmland	0.2	2.5	1.8
Farmland of statewide importance	0.0	6.1	8.7
Farmland of local importance	0.0	0.0	0.0
Not prime farmland	1.3	16.1	23.0
Total [b]	**1.6**	**24.7**	**33.5**

Source: USDA NRCS 2025

[a] Prime farmland includes the following farmland class categories: all areas are prime farmlands, farmland of statewide importance, and farmland of local importance.
[b] Totals may not match the sum of addends due to rounding.

TABLE 2.2-9 RISK RATINGS FOR CORROSION TO STEEL FROM SOIL CONTACT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Risk Rating	Proposed Route / Alternative Route D / Alternative Route E		Alternative Route B		Alternative Route C / Alternative Route F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
High	271.6	115.2	182.5	78.3	1,074.3	449.4
Moderate	282.7	114.6	256.7	107.1	637.1	265.5
Low	63.0	26.1	44.1	18.1	274.1	113.8
NA	21.3	11.1	20.9	10.7	27.7	12.7
Total [a]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.2**	**841.5**

Source: USDA NRCS 2025

NA = not applicable; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-10 RISK RATINGS FOR CORROSION TO STEEL FROM SOIL CONTACT WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Risk Rating	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
High	0.4	14.5	16.6
Moderate	1.2	8.6	14.5
Low	0.0	1.6	2.4
NA	0.0	0.0	0.0
Total [a]	**1.6**	**24.7**	**33.4**

Source: USDA NRCS 2025

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-11 RISK RATINGS FOR CORROSION TO CONCRETE FROM SOIL CONTACT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Risk Rating	Proposed Route / Alternative Route D / Alternative Route E		Alternative Route B		Alternative Route C / Alternative Route F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
High	254.6	102.8	156.1	64.9	906.7	373.1
Moderate	291.1	123.8	267.9	115.1	961.5	408.8
Low	71.5	29.2	59.3	23.6	117.3	46.9
NA	21.3	11.1	20.9	10.7	27.7	12.7
Total [a]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.2**	**841.5**

Source: USDA NRCS 2025

NA = not applicable; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-12 RISK RATINGS FOR CORROSION TO CONCRETE FROM SOIL CONTACT WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Risk Rating	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
High	0.4	8.6	9.1
Moderate	1.0	13.5	20.9
Low	0.2	2.6	3.5
NA	0.0	0.0	0.0
Total [a]	**1.6**	**24.7**	**33.5**

Source: USDA NRCS 2025

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-13 PRESENCE OF HYDRIC SOILS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Hydric Soil	Proposed Route / Alternative Route D / Alternative Route E		Alternative Route B		Alternative Route C / Alternative Route F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Yes	3.3	1.3	5.5	2.4	69.8	29.2
No	616.1	255.7	480.1	202.3	1,930.0	805.5
NA	19.0	9.9	18.7	9.4	13.3	6.8
Total [a]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.2**	**841.5**

Source: USDA NRCS 2025

NA = not applicable; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-14 PRESENCE OF HYDRIC SOILS WITHIN THE ANCILLARY FACILITY WORKSPACE OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Hydric Soil	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Yes	0.0	0.0	0.0
No	1.6	24.7	33.4
NA	0.0	0.0	0.0
Total [a]	**1.6**	**24.7**	**33.4**

Source: USDA NRCS 2025

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-15 SOIL DRAINAGE CLASSIFICATIONS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Drainage Class	Proposed Route / Alternative Route D / Alternative Route E		Alternative Route B		Alternative Route C / Alternative Route F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Well-drained	374.7	154.8	299.7	124.5	1,146.6	471.4
Moderately well-drained	227.7	95.1	165.9	72.1	681.7	291.1
Somewhat excessively drained	1.5	0.7	1.5	0.7	11.7	5.5
Somewhat poorly drained	10.1	3.9	10.7	3.8	75.6	31.6
Poorly drained	3.3	1.3	5.5	2.4	69.3	28.9
Very poorly drained	0.0	0.0	0.0	0.0	0.5	0.3
NA	21.3	11.1	20.9	10.7	27.7	12.7
Total [a]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.2**	**841.5**

Source: USDA NRCS 2025

NA = not applicable; ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-16 SOIL DRAINAGE CLASSIFICATIONS WITHIN THE ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Drainage Class	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Well-drained	1.2	10.5	17.1
Moderately well-drained	0.4	12.7	16.1
Somewhat excessively drained	0.0	0.9	0.1
Somewhat poorly drained	0.0	0.5	0.1
Poorly drained	0.0	0.0	0.0
Very poorly drained	0.0	0.0	0.0
NA	0.0	0.0	0.0
Total [a]	**1.6**	**24.7**	**33.4**

Source: USDA NRCS 2025

[a] Totals may not match the sum of addends due to rounding.

2.2.3 STREAMS AND LAKES

This section describes existing surface water resources, including linear waterbodies (streams/rivers) and open waterbodies (lakes/ponds) within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor.

The U.S. Army Corps of Engineers (USACE) has jurisdiction over wetlands and waterbodies under Section 404 of the Clean Water Act (CWA), which regulates the discharge of dredged or fill material into Waters of the United States (WOTUS), including wetlands; and under Section 10 of the Rivers and Harbors Act of 1899, which regulates work in, over, and under navigable WOTUS. Wetlands and waterbodies in Pennsylvania are also regulated under Pa. Code Chapter 105, which

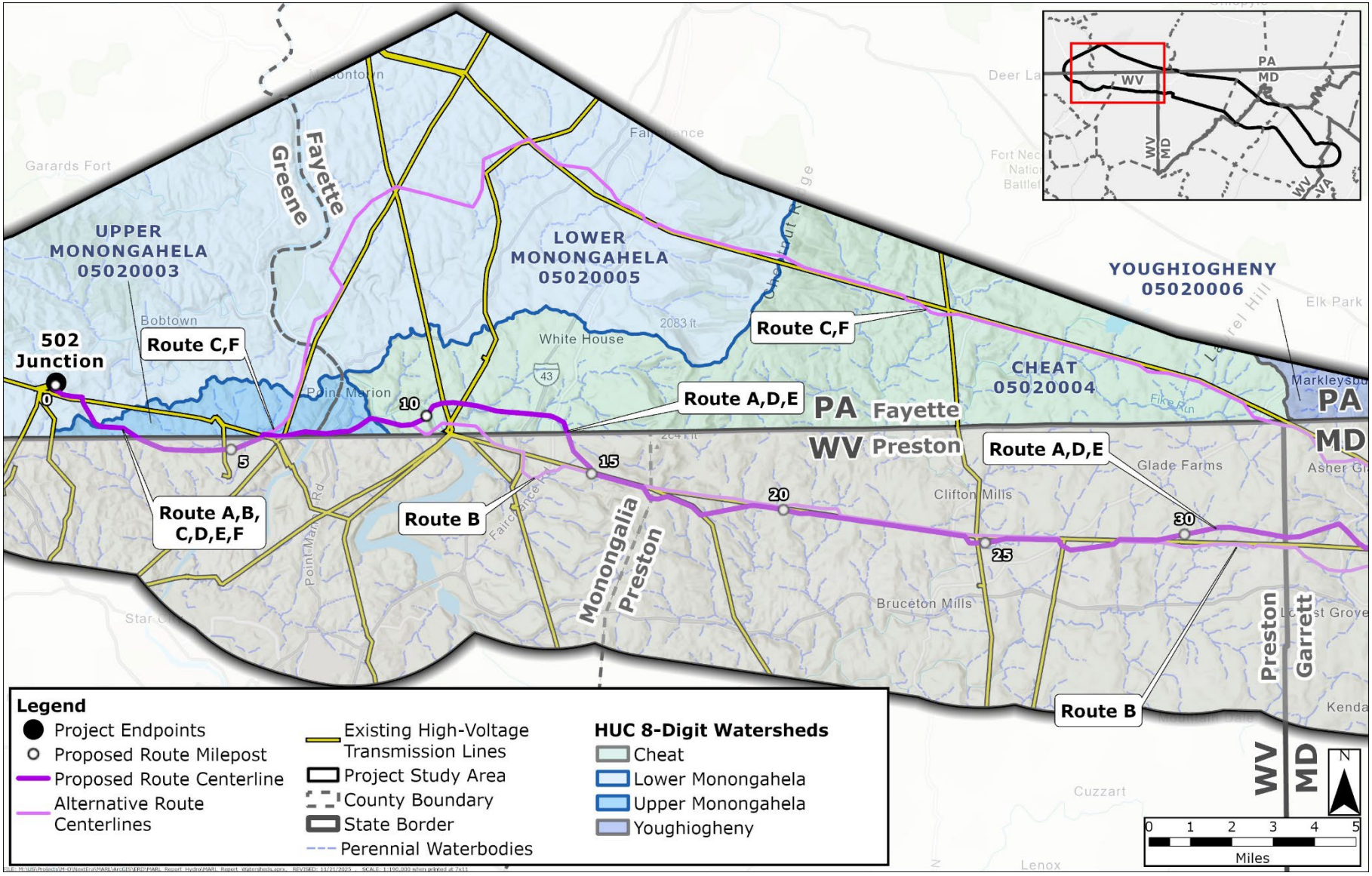
authorizes water obstructions and encroachments in streams, floodways, wetlands, and other bodies of water independently from Section 401 authorization. Under Section 401 of the CWA, the PADEP issues water quality certifications for projects requiring federal permits, including those under Section 404 for discharge of dredged or fill material into WOTUS. Pennsylvania uses its Section 401 authority to ensure federally permitted activities comply with state water quality standards and state permitting requirements. On July 21, 2022, ephemeral features that flow only in direct response to precipitation, including ephemeral streams, swales, gullies, rills, and pools, were excluded under the Navigable Waters Protection Rule but are considered Waters of the Commonwealth and are, therefore, regulated by the PADEP. On November 17, 2025, the USEPA and USACE announced proposed revisions to the 2023 definition of WOTUS. The proposed rule, if finalized, would "ensur[e] federal jurisdiction is focused on relatively permanent, standing or continuously flowing bodies of water... and wetlands that are connected and indistinguishable from such waterbodies." The proposed rule would further clarify the definitions of "relatively permanent" and "continuous surface connection" (USEPA 2025b).

Existing wetland resources within the Siting Corridors are discussed further in Section 2.2.4, along with a description of potential impacts associated with the Proposed Route and Alternative Routes. Within Pennsylvania, the MARL Project is located entirely within the USACE Pittsburgh District Regulatory boundary and USACE Pittsburgh District Civil Works boundary.

2.2.3.1 EXISTING CONDITIONS

Watersheds are used to define the geographic area within the boundaries of drainage divides throughout the country. For purposes of classifying watersheds, the United States is divided into four levels of hydrologic units—regions, subregions, accounting units, and cataloging units—which may contain all or part of a watershed. Each level is identified by a hydrologic unit code (HUC). The MARL Project in Pennsylvania is within the Upper Monongahela (USGS HUC 8-digit 05020003), Lower Monongahela (USGS HUC 8-digit 05020005), and Cheat (USGS HUC 8-digit 05020004) watersheds (Figure 2.2-2). Although the Youghiogheny watershed (USGS HUC 8-digit 05020006) is shown on Figure 2.2-2, the MARL Project does not cross this watershed in Pennsylvania.

FIGURE 2.2-2 WATERSHEDS WITHIN PENNSYLVANIA



MD = Maryland; HUC = Hydrologic Unit Code; PA = Pennsylvania; VA = Virginia; WV = West Virginia

Data from the USGS National Hydrography Dataset Plus High-Resolution (NHDPlus HR), USGS topographic maps, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, and PADEP data and mapping were reviewed to identify potential waterbodies within the Siting Corridors for the Proposed Route and Alternative Routes. Table 2.2-17 and Table 2.2-18 include a summary of the length and acreage of National Hydrography Dataset (NHD) linear waterbodies (streams/rivers) and open waterbodies (lakes/ponds), respectively, within the Proposed Route and Alternative Route Siting Corridors. Attachment 3, Waterbody Crossing Table, provides a comprehensive table for both linear and open waterbody crossings. Attachment 1c, Water Resources Mapbook, provides detailed waterbody mapping.

TABLE 2.2-17 NATIONAL HYDROGRAPHY DATASET LINEAR WATERBODIES WITHIN THE SITING CORRIDORS (LINEAR FEET)

Waterbody Features	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Stream/River—Intermittent	0.0	0.0	9,095.9
Stream/River—Perennial	9,702.8	5,382.6	14,724.5
Total [a]	**9,702.8**	**5,382.6**	**23,820.4**

Source: USGS 2025

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-18 NATIONAL HYDROGRAPHY DATASET OPEN WATERBODIES WITHIN THE SITING CORRIDORS (ACRES)

Waterbody Features	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Lake/Pond—Perennial	0.1	1.3	3.3
Total [a]	**0.1**	**1.3**	**3.3**

Source: USGS 2025

[a] Totals may not match the sum of addends due to rounding.

Table 2.2-19 provides a summary of NWI-mapped and Pennsylvania Spatial Data Access Portal (PASDA)-mapped waterbodies within the Proposed Route and Alternative Route Siting Corridors based on the Cowardin classification, including Palustrine Unconsolidated Bottom (PUB), Riverine, and Lacustrine features. PUB features are open waterbodies with unconsolidated bottom substrates. Riverine features are wetlands directly connected to a river or stream that are characterized by flowing water. Lacustrine features are wetlands directly associated with lakes and other bodies of standing water such as ponds or reservoirs. Data developed by PASDA includes potential wetland and waterbody areas based on Light Detection and Ranging (LiDAR) data, orthoimagery, high-resolution land cover, and moderate-resolution predictive wetlands maps incorporating topography, hydrological flow potential, and climate data. The NWI and PASDA datasets provide these features as polygons. As a result, acreages are provided in Table 2.2-19 rather than measurements in linear feet.

TABLE 2.2-19 NATIONAL WETLANDS INVENTORY AND PENNSYLVANIA SPATIAL DATA ACCESS PORTAL OPEN WATERBODY FEATURES WITHIN THE SITING CORRIDORS (ACRES)

Cowardin Classification	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
NWI			
L1UB	0.0	1.1	0.0
PUB [a]	0.6	0.4	4.0
R2UB	10.6	10.6	10.0
R3UB	6.0	6.2	1.2
R3US	0.1	0.0	0.0
R4SB	0.0	0.0	4.4
R5UB	4.9	1.7	5.3
Total NWI [b]	**22.1**	**20.1**	**24.9**
PASDA			
Water	19.4	20.0	12.5
Total PASDA [b]	**19.4**	**20.0**	**12.5**

Source: USFWS n.d.-a; PASDA 2013

NWI = National Wetlands Inventory; L1UB = Unconsolidated Bottom, Limnetic, Lacustrine; PASDA = Pennsylvania Spatial Data Access Portal; PUB = Palustrine Unconsolidated Bottom; R2UB = Unconsolidated Bottom, Lower Perennial, Riverine; R3UB = Unconsolidated Bottom, Upper Perennial Riverine; R3US = Unconsolidated Shore, Upper Perennial, Riverine; R4SB = Streambed, Intermittent, Riverine; R5UB = Unconsolidated Bottom, Unknown Perennial, Riverine

[a] This includes Semi-Permanently Flooded, Beaver Modifier; Permanently Flooded; Permanently Flooded, Diked/Impounded; and Permanently Flooded, Excavated.

[b] Totals may not match the sum of addends due to rounding.

Water Quality

Pa. Code Chapter 93 establishes water quality standards for surface waters and includes wetlands. These standards are based on water uses which are to be protected and will be considered by the PADEP in implementing its authority under Pennsylvania's Clean Streams Law, 35 Pennsylvania Statutes (P.S.) §§ 691.1 *et seq.,* and other statutes that authorize protection of surface water quality. Protected water uses based on aquatic life include Warm Water Fishes (WWF), Trout Stocked Fishery (TSF), Cold Water Fishes (CWF), and Migratory Fishes (MF). Streams may also be classified as High Quality (HQ) or Exceptional Value (EV) Waters for special protection. Waters may have a single protected use or a combination of protected uses (e.g., HQ-CWF) (PADEP 2003). Other protected uses include water supply, recreation and fish consumption, and navigation.

Under Pa. Code Chapter 93, waterbodies in Pennsylvania are assigned a designated use, which is the intended use for a particular stream segment. Some streams may also have an existing use, which is the actual use supported by the existing water quality. Under the state's antidegradation policy, both the existing use and the underlying water quality needed to support existing uses are protected, as well as streams qualifying as HQ or EV. Per 25 Pa. Code Chapter 102 and to satisfy the antidegradation implementation requirements, non-discharge alternatives and antidegradation

best available combination of technologies must be considered as part of the ESC and Post-Construction Stormwater Management (PCSM) Plans if discharging to HQ or EV waters. Table 2.2-20 identifies designated use classifications for waterbodies in the Proposed Route and Alternative Route Siting Corridors. No streams in either the Proposed Route or Alternative Route Siting Corridors have a listed existing use (PASDA 2025b). There are no streams designated as TSF in the Siting Corridor.

TABLE 2.2-20 DESIGNATED USE CLASSIFICATIONS FOR LINEAR WATERBODIES WITHIN THE SITING CORRIDORS (LINEAR FEET)

Designated Use Classification	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
CWF	5,235.3	181.5	1,625.7
WWF	6,010.9	6,185.4	12,192.6
HQ-CWF	0.0	0.0	11,996.3
Total [a]	**11,246.2**	**6,366.9**	**25,814.6**

Source: PASDA 2025a

CWF = Cold Water Fishes; HQ = High Quality; WWF = Warm Water Fishes
[a] Totals may not match the sum of addends due to rounding.

In accordance with Sections 303(d) and 305(b) of the CWA, the state of Pennsylvania is mandated to perform annual evaluations of its surface water resources and publish a list of waters that fail to meet the established water quality standards. As defined in 25 Pa. Code Chapter 93, each waterbody must be assessed for four different statewide uses, which include Aquatic Life, Fish Consumption, Recreation, and Potable Water Supply (PADEP 2023). Water quality assessment methods and criteria for individual parameters (e.g., chemical constituents, and biological and physical parameters) can vary depending on the statewide use (PADEP 2023). Assessment determinations identify waterbodies as supporting, impaired, or unassessed; waterbodies considered impaired fail to meet one or more water quality standards (PADEP 2024). There is a subset of impaired streams that are formally listed under Section 303(d) of the CWA (PADEP 2023). The PADEP issues an Integrated Report to the USEPA every 2 years to satisfy the requirements of Sections 305(b) and 303(d) of the CWA (PADEP 2024). The PADEP categorizes impaired waters into categories based on whether they meet water quality standards and can achieve designated uses (PADEP 2024):

- Category 1: Waters supporting all uses.
- Category 2: Waters where some but not all uses are supported. The assessment status of the remaining uses may be unknown because data are insufficient to assess the water, or it may be impaired.
- Category 3: Waters for which there are insufficient or no data to determine if any uses are supported.
- Category 4a: Waters impaired for one or more uses, not needing a Total Maximum Daily Load (TMDL) because a TMDL has been completed.

- Category 4b: Waters impaired for one or more uses, not needing a TMDL because uses are expected to be supported within a reasonable timeframe.
- Category 4c: Waters impaired for one or more uses, not needing a TMDL because the impairment is not caused by a pollutant.
- Category 5: Waters impaired for one or more uses by a pollutant that requires the development of a TMDL.
- Category 5r: Waters impaired for one or more uses by a pollutant that are selected for advance restoration implementation. A TMDL is still required if the advance restoration is not successful.

Pennsylvania uses the above categories to assess waterbodies in alignment with the assessment unit parameter framework reported in the USEPA's Assessment, TMDL Tracking and Implementation System (ATTAINS; USEPA n.d.-b). Table 2.2-21 identifies the watersheds within the Siting Corridors that are listed in Categories 2, 4a, and 5, along with their respective impairment status according to Pennsylvania's Final 2024 Integrated Water Quality Monitoring and Assessment Report (PADEP 2024). Information in Table 2.2-21 is based on PADEP's 8-digit HUC watersheds, and only specific segments within these larger watersheds may be impaired. For Alternative Routes C and F, York Run has approved TMDLs for metals (i.e., aluminum, iron, and manganese) and pH, and the Lower Monongahela River has approved TMDLs for polychlorinated biphenyls and chlordane (USEPA 1999, 2008). No other streams crossed by the Proposed Route and Alternative Routes have listed TMDLs.

TABLE 2.2-21 IMPAIRED WATERBODIES WITHIN THE SITING CORRIDORS (LINEAR FEET)

Listing Category	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
2	7,914.3	3,238.0	20,738.9
4a	0.0	0.0	3,619.8
5	5,789.8	6,347.8	14,120.4
Total [a]	**13,704.1**	**9,585.8**	**38,479.1**

Source: PADEP n.d.

[a] Totals may not match the sum of addends due to rounding.

Section 10

Under Section 10 of the Rivers and Harbors Act of 1899, navigable waters are defined as waters subject to the ebb and flow of the tide and/or are presently used, have been used in the past, or could be susceptible for use to transport interstate or foreign commerce. The Proposed Route and Alternative Routes B, D, and E cross two Section 10 waterbodies, the Monongahela River and the Cheat River. Alternative Route C and F cross one Section 10 waterbody, the Monongahela River.

Wild and Scenic Rivers

Passed by Congress in 1968, the Wild and Scenic Rivers (WSR) Act protects the natural, cultural, and/or recreational values of designated rivers or segments of a river "for the benefit and enjoyment of future generations." Since there are no federally designated WSRs in Greene and

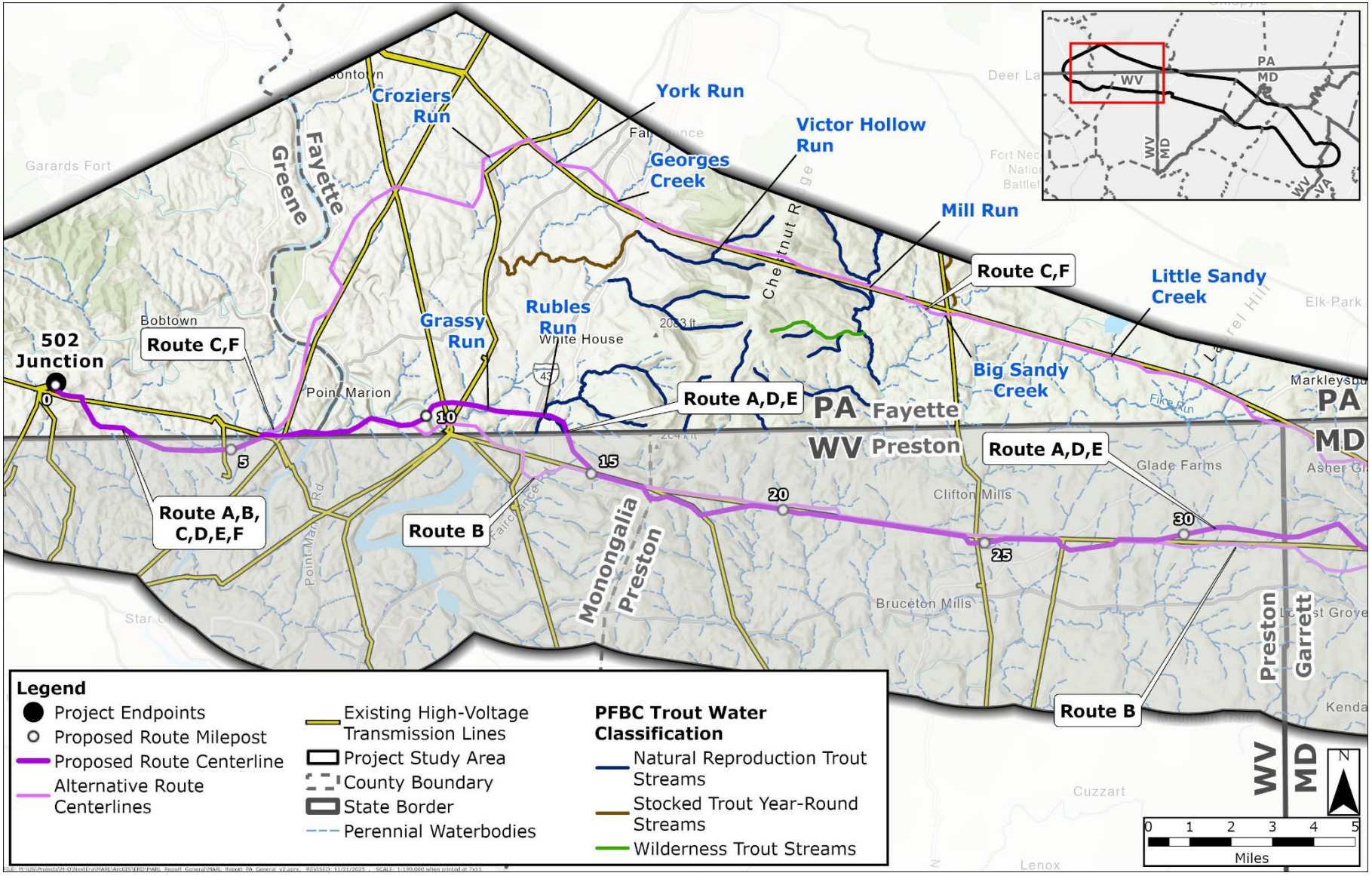
Fayette Counties, none of the routes cross a WSR. Additionally, none of the routes cross a river that is listed on the Nationwide Rivers Inventory (NRI; NPS 2024). NRI-listed rivers have characteristics that make them potentially eligible for WSR designation, and federal agencies must seek to avoid or mitigate actions that will affect NRI segments.

Aquatic Species and Habitat

Publicly available data from the PADEP was reviewed to assess designated trout streams crossed by the Proposed Route and Alternative Route Siting Corridors (PADEP n.d.). The PADEP extends the trout stream use designation to upstream tributaries and the entire watershed. TSF are streams stocked by the Pennsylvania Fish and Boat Commission (PFBC) for recreational fishing during certain times of year. Naturally Reproducing / Wild Trout Waters support wild trout populations that reproduce naturally and/or may be stocked with hatchery trout by the PFBC. Class A Wild Trout Streams are streams that support populations of wild (naturally reproducing) trout of sufficient size and abundance to support recreational fishing. Wilderness trout streams support wild trout reproduction and offer recreational fishing in more natural environments. These streams are given the highest level of protection by the PFBC and watersheds containing wilderness trout streams are considered EV watersheds by the PADEP (PFBC n.d.).

Figure 2.2-3 displays the locations of natural reproduction trout streams, stocked trout year-round streams, and wilderness trout streams within Pennsylvania.

FIGURE 2.2-3 TROUT STREAMS WITHIN PENNSYLVANIA



MD= Maryland; PA= Pennsylvania; PFBC = Pennsylvania Fish and Boat Commission; VA = Virginia; WV = West Virginia

No TSF, wilderness trout streams, trout stocking streams, or Class A Wild Trout Streams are crossed by the Proposed Route and Alternative Route Siting Corridors in Pennsylvania. Table 2.2-22 summarizes the linear feet of trout streams in the Siting Corridors.

TABLE 2.2-22 TROUT STREAMS WITHIN THE SITING CORRIDORS (LINEAR FEET)

Trout Stream Designation	Proposed Route/ Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Naturally Reproducing Trout Waters	1,871.3	0.0	1,402.8
Total	**1,871.3**	**0.0**	**1,402.8**

Source: PADEP n.d.

Located within the Upper and Lower Monongahela and Cheat watersheds, the aquatic habitats within the Siting Corridors (i.e., the Monongahela River and Cheat River) are the primary river systems within these watersheds. The Monongahela River is part of an altered riverine ecosystem heavily affected by navigation infrastructure and industrial activity. Navigation dams along the river result in deepwater habitats with low water velocities and simplified flow patterns. These impoundments have replaced natural features such as riffle habitat, gravel bars, and wetlands, often leading to a loss of habitat complexity and biological integrity (PFBC n.d.). Additionally, this area is heavily affected by acid mine drainage from legacy coal mines (USGS 2000). Shallow water areas are still found near tributary mouths and provide critical spawning, foraging, and nursery habitats for fish and invertebrates. Only a small portion of the Cheat watershed is located in Pennsylvania; however, this watershed offers high-gradient streams and deep forest cover that support diverse aquatic life. The Cheat watershed is also affected by acid mine drainage from legacy coal mines, and reclamation efforts have been ongoing, particularly in the Lower Cheat River near the border of Pennsylvania and West Virginia (USGS 1999). Streams and rivers located in the Siting Corridors are predominantly perennial (Table 2.2-17). Alternative Routes C and F are the only routes to contain streams designated as HQ-CWF; Alternative Route B predominantly contains WWF; and the Proposed Route and Alternative Routes D and E contain a mix of CWF and WWF (Table 2.2-20).

Typical recreational fish species associated with the waterbodies within the Proposed Route and Alternative Routes include smallmouth bass (*Micropterus dolomieu*), muskellunge (*Esox masquinongy*), tiger muskellunge (*Esox masquinongy* x *Esox lucius* hybrid), channel catfish (*Ictalurus punctatus*), rock bass (*Ambloplites rupestris*), white bass (*Morone chrysops*), white crappie (*Pomoxis annularis*), sauger (*Sander canadensis*), and walleye (*Sander vitreus*) (PASDA n.d.).

Big Sandy Creek, Cheat River, Little Sandy Creek, and the Monongahela River are listed as mussel streams per the PFBC Field Guide to Pennsylvania's Freshwater Mussels (PFBC 2018). Big Sandy Creek, a tributary of Conodoguinet Creek, supports habitat for the eastern elliptio mussel (*Elliptio complanate*). The Cheat River supports habitat for 17 mussel species, and representative species include the mucket mussel (*Actinonaias ligamentina*), elktoe mussel (*Alasmidonta marginata*), threeridge mussel (*Amblema plicata*), and cylindrical papershell mussel (*Anodontoides ferussacianus*). Little Sandy Creek has a single attributed mussel species, the

creeper mussel (*Strophitus undulatus*). The Monongahela River supports habitat for 25 mussel species, and representative species include the mucket mussel, butterfly mussel (*Ellipsaria lineolata*), elephant-ear mussel (*Elliptio crassidens*), and spike mussel (*Eurynia dilatata*).

Aquatic species of concern and rare, threatened, and endangered (RTE) aquatic species are discussed in Section 2.2.8, Rare, Threatened, and Endangered Species.

2.2.3.2 IMPACTS

This section details the waterbody and aquatic habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors, as well as ancillary facility workspaces outside of the Proposed Route ROW Corridor. Waterbodies will be aerially spanned by the transmission line conductors, and transmission structures will not be placed in waterbodies to avoid direct impacts on waterbodies and aquatic habitats associated with construction and transmission line operation.

In some areas, forested riparian buffers adjacent to waterbodies would be cut and permanently converted to maintained scrub/shrub or herbaceous cover within the ROW Corridor during operation. Removal of forested riparian vegetation would result in indirect impacts on waterbodies, including localized increases in water temperature and decreased dissolved oxygen levels. In addition, vegetation clearing, grading, or other earth-disturbing activities associated with construction in proximity to waterbodies would temporarily result in an increased potential for erosion and stormwater runoff impacts, including increased nutrient loading, turbidity, and sedimentation in waterbodies. Impacts on waterbodies as a result of temporary access road construction and/or culvert placement in waterbodies, if required, could include increased sedimentation, flow disruption, and aquatic habitat alteration during construction and/or operation.

Table 2.2-23 summarizes the length of NHD linear waterbodies within the Proposed Route and Alternative Route Siting and ROW Corridors. The NHD linear waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 0.5 percent of the 2,111,223.6 linear feet of NHD linear waterbodies present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-23 NATIONAL HYDROGRAPHY DATASET LINEAR WATERBODIES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (LINEAR FEET)

Waterbody Features	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Stream/River—Intermittent	0.0	0.0	0.0	0.0	9,095.9	3,716.6
Stream/River—Perennial	9,702.8	4,149.6	5,382.6	2,541.5	14,724.5	6,764.5
Total [a]	**9,702.8**	**4,149.6**	**5,382.6**	**2,541.5**	**23,820.4**	**11,158.8**

Source: USGS 2025

ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

Impacts on waterbodies and aquatic species/habitat would also occur associated with access roads outside of the Proposed Route ROW Corridor, as shown in Table 2.2-24. There are no permanent access road impacts or other temporary ancillary facility impacts on NHD linear waterbodies associated with the Proposed Route and Alternative Routes. Impacts associated with temporary access roads represents less than 0.1 percent of the 1,307,943.2 linear feet of perennial NHD linear waterbodies in the MARL Project Study Area in Pennsylvania.

TABLE 2.2-24 NATIONAL HYDROGRAPHY DATASET LINEAR WATERBODIES WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (LINEAR FEET)

Waterbody Feature	Permanent Access Roads	Temporary Access Road	Other Temporary Ancillary Facilities
Stream/River—Perennial	0.0	81.9	0.0
Total [a]	**0.0**	**81.9**	**0.0**

Source: USGS 2025

[a] Totals may not match the sum of addends due to rounding.

Table 2.2-25 summarizes the acreage of NHD open waterbodies within the Proposed Route and Alternative Route Siting and ROW Corridors. The NHD open waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from less than 0.1 percent to 0.4 percent of the 353.0 acres of NHD open waterbodies present within the MARL Project Study Area in Pennsylvania. There are no permanent access road, temporary access road, or other temporary ancillary facility impacts on NHD open waterbodies associated with the Proposed Route.

TABLE 2.2-25 NATIONAL HYDROGRAPHY DATASET OPEN WATERBODIES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Waterbody Features	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Lake/Pond—Perennial	0.1	0.1	1.3	0.3	3.3	1.4
Total [a]	**0.1**	**0.1**	**1.3**	**0.3**	**3.3**	**1.4**

Source: USGS 2025

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Table 2.2-26 summarizes the acreage of NWI- and PASDA-mapped open waterbodies within the Proposed Route and Alternative Route Siting and ROW Corridors. The NWI-mapped waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.4 percent to 0.5 percent of the 2,548.6 acres of NWI-mapped waterbodies present within the MARL Project Study Area in Pennsylvania. The PASDA-mapped waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.3 percent to 0.6 percent of the 1,802.6 acres of PASDA-mapped waterbodies present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-26 NATIONAL WETLANDS INVENTORY AND PENNSYLVANIA SPATIAL DATA ACCESS PORTAL OPEN WATERBODIES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Waterbody Features	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
NWI						
L1UB	0.0	0.0	1.1	0.2	0.0	0.0
PUB [a]	0.6	0.0	0.4	0.0	4.0	1.4
R2UB	10.6	5.1	10.6	5.1	10.0	5.3
R3UB	6.0	2.7	6.2	3.0	1.2	0.5
R3US	0.1	0.0	0.0	0.0	0.0	0.0
R4SB	0.0	0.0	0.0	0.0	4.4	2.0
R5UB	4.9	2.1	1.7	0.8	5.3	2.3
Total NWI [b]	**22.1**	**9.9**	**20.1**	**9.1**	**24.9**	**11.6**
PASDA						
Water	19.4	10.2	20.0	10.0	12.5	6.0
Total PASDA [b]	**19.4**	**10.2**	**20.0**	**10.0**	**12.5**	**6.0**

Source: USFWS n.d.-a

L1UB = Unconsolidated Bottom, Limnetic, Lacustrine; NWI = National Wetlands Inventory; PASDA = Pennsylvania Spatial Data Access Portal; PUB = Palustrine Unconsolidated Bottom; R2UB = Unconsolidated Bottom, Lower Perennial, Riverine; R3UB = Unconsolidated Bottom, Upper Perennial, Riverine; R3US = Unconsolidated Shore, Upper Perennial, Riverine; R4SB = Streambed, Intermittent, Riverine; R5UB = Unconsolidated Bottom, Unknown Perennial, Riverine; ROW = right-of-way

[a] This includes Semi-Permanently Flooded, Beaver Modifier; Permanently Flooded; Permanently Flooded, Diked/Impounded; and Permanently Flooded, Excavated.

[b] Totals may not match the sum of addends due to rounding.

Table 2.2-27 summarizes the acreage of NWI- and PASDA-mapped waterbodies within the ancillary facility workspaces outside of the Proposed Route ROW Corridor. There are no permanent access road impacts on NWI and PASDA-mapped waterbodies associated with the Proposed Route. Impacts associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 2,548.6 acres of NWI-mapped waterbodies and less than 0.1 percent of the 1,802.6 acres of PASDA-mapped waterbodies present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-27 NATIONAL WETLANDS INVENTORY AND PENNSYLVANIA SPATIAL DATA ACCESS PORTAL OPEN WATERBODIES WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Cowardin Classification	Permanent Access Roads	Temporary Access Road	Other Temporary Ancillary Facilities
NWI			
PUB [a]	0.0	0.1	0.1
R5UB	0.0	<0.1	<0.1
Total NWI [b]	**0.0**	**0.1**	**0.1**
PASDA			
Water	0.0	0.0	0.1
Total PASDA [b]	**0.0**	**0.0**	**0.1**

Source: USFWS n.d.-a

NWI = National Wetlands Inventory; PASDA = Pennsylvania Spatial Data Access Portal; PUB = Palustrine Unconsolidated Bottom; R5UB = Unconsolidated Bottom, Unknown Perennial, Riverine
[a] This includes Semi-Permanently Flooded, Beaver Modifier; Permanently Flooded; Permanently Flooded, Diked/Impounded; and Permanently Flooded, Excavated.
[b] Totals may not match the sum of addends due to rounding.

Table 2.2-28 identifies designated use classifications for waterbodies within the Proposed Route and Alternative Route Siting and ROW Corridors. The designated use waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 0.6 percent of the 2,128,374.8 linear feet of designated CWF, WWF, and HQ-CWF streams present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-28 DESIGNATED USE CLASSIFICATIONS FOR WATERBODIES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (LINEAR FEET)

Designated Use Classification	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
CWF	5,235.1	2,438.3	181.5	20.6	1,625.7	671.0
WWF	6,010.9	2,758.9	6,185.4	2,965.0	12,192.6	6,104.2
HQ-CWF	0.0	0.0	0.0	0.0	11,996.3	5,153.6
Total [a]	**11,246.2**	**5,197.2**	**6,366.9**	**2,985.6**	**25,814.6**	**11,928.8**

Source: PASDA 2025a

CWF = Cold Water Fishes; HQ = High Quality; ROW = right-of-way; WWF = Warm Water Fishes
[a] Totals may not match the sum of addends due to rounding.

Table 2.2-29 summarizes the length of waterbodies with an assigned designated use within ancillary facility workspaces outside of the Proposed Route ROW Corridor. There are no temporary or permanent access road impacts on waterbodies with an assigned designated use associated with the Proposed Route. Impacts on waterbodies with an assigned designated use associated with other temporary ancillary facilities represent less than 0.1 percent of the 2,128,374.8 linear feet of waterbodies with assigned designated uses present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-29 DESIGNATED USE CLASSIFICATIONS FOR WATERBODIES WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (LINEAR FEET)

Designated Use Classification	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
CWF	0.0	0.0	56.9
WWF	0.0	0.0	25.0
HQ-CWF	0.0	0.0	0.0
Total [a]	**0.0**	**0.0**	**81.9**

Source: PADEP n.d.

CWF = Cold Water Fishes; HQ = High Quality; WWF = Warm Water Fishes
[a] Totals may not match the sum of addends due to rounding.

Table 2.2-30 summarizes the length of impaired waters within the Proposed Route and Alternative Route Siting and ROW Corridors. The impaired waterbody impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 0.5 percent of the 3,850,098.7 linear feet of waterbodies listed as Categories 2, 4a, and 5 present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-30 IMPAIRED WATERS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (LINEAR FEET)

Listing Category	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
2	7,914.3	3,428.3	3,238.0	1,482.7	20,738.9	9,171.6
4a	0.0	0.0	0.0	0.0	3,619.8	1,595.4
5	5,789.8	2,456.3	6,347.8	3,000.0	14,120.4	7,811.6
Total [a]	**13,704.1**	**5,884.6**	**9,585.80**	**4,482.6**	**38,479.1**	**18,578.6**

Source: PADEP n.d.

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Table 2.2-31 summarizes the length of impaired waters within ancillary facility workspaces outside of the Proposed Route ROW Corridor. There are no permanent access road or other temporary ancillary facility impacts on impaired waters associated with the Proposed Route. Impacts on impaired waterbodies associated with temporary access roads represent less than 0.1 percent of the 3,588,403.1 linear feet of waterbodies listed as Categories 2, and 5 present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-31 IMPAIRED WATERS WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (LINEAR FEET)

Listing Category	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
2	0.0	56.9	0.0
5	0.0	50.1	0.0
Total [a]	**0.0**	**107.0**	**0.0**

Source: PADEP n.d.

[a] Totals may not match the sum of addends due to rounding.

Table 2.2-32 summarizes the linear feet of trout streams within the Proposed Route and Alternative Route Siting and ROW Corridors. There are no permanent access road, temporary access road, or other temporary ancillary facility impacts on trout streams associated with the Proposed Route. The naturally reproducing trout stream impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 0.3 percent of the 215,015.9 linear feet of naturally reproducing trout streams present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-32 TROUT STREAMS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (LINEAR FEET)

Trout Stream Designation	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Naturally Reproducing Trout Waters	1,871.3	258.2	0.0	0.0	1,402.8	728.3
Total [a]	**1,871.3**	**258.2**	**0.0**	**0.0**	**1,402.8**	**728.3**

Source: PADEP n.d.

ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

During construction, NEET MA will adhere to in-stream timing restrictions and requirements contained within applicable federal, state, and local permits for construction within waterbodies, as needed. NEET MA will coordinate with the appropriate agencies if it cannot adhere to designated time-of-year restrictions. Additionally, where stream crossings are required for access, temporary span bridges will be used where possible to minimize impacts. If permanent stream crossings are required, NEET MA will install bridges with in-stream support and/or culverts of appropriate size, as needed, to maintain flow and comply with the PADEP ESC Program Manual and 25 Pa. Code Chapter 102, as applicable.

To comply with state stormwater requirements, NEET MA will obtain coverage either under the PADEP General Permit for Discharges of Stormwater Associated with Construction Activities (PAG-02) or an individual permit, as described in Section 2.2.3.2. A MARL Project-specific ESC Plan and PCSM Plan will be developed in coordination with state and local agencies to meet applicable requirements and implement BMPs. Appropriate BMPs will be used to manage stormwater runoff, including silt sock, silt fence, construction entrances, temporary matting and bridges, and erosion matting, as needed. In addition, a Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed, if required, to avoid or minimize impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids in accordance with the USEPA regulations (Code of Federal Regulations, Title 40, Part 112 [40 CFR Part 112]). Implementation of these plans will further minimize impacts on waterbodies within the ROW Corridor.

Waterbodies affected by the construction of the ROW Corridor, temporary access roads, or other temporary ancillary facilities will be restored to preconstruction conditions to the maximum extent practicable. NEET MA will comply with the mitigation requirements of permits to compensate for unavoidable permanent impacts on waterbodies. Final mitigation requirements will be determined by the USACE and PADEP.

2.2.4 WETLANDS

This section describes existing wetland resources within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor.

WOTUS, including wetlands, are federally protected under Section 404 of the CWA and reviewed as part of the Pennsylvania Section 401 process and Pa. Code Chapter 105. The PADEP has authority under Pa. Code Chapter 105 to regulate impacts on all wetlands, including isolated and artificial wetlands, regardless of federal jurisdiction. The definition of a wetland is "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (40 CFR § 230.3(t); 25 Pa. Code § 105.1).

On December 30, 2022, the USEPA and USACE announced the final "Revised Definition of WOTUS" rule. On January 18, 2023, the rule was published in the *Federal Register,* and the rule took effect on March 20, 2023. On May 25, 2023, the U.S. Supreme Court overruled the new WOTUS ruling and defined a wetland as having a direct and continuous surface water connection to a WOTUS regardless of significant nexus. A WOTUS was defined as a permanent geographical feature

excluding ephemeral streams. The conforming rule, "Revised Definition of 'Waters of the United States'; Conforming," was published in the *Federal Register* and became effective on September 8, 2023. On March 24, 2025, the USEPA and USACE published a notice seeking public comment on clarifying the scope of "relatively permanent waters," defining "continuous surface connection" for wetlands and determining when ditches should be considered jurisdictional (USEPA 2025a). On November 17, 2025, USEPA and USACE announced proposed revisions to the 2023 definition of WOTUS. The proposed rule, if finalized, would "ensur[e] federal jurisdiction is focused on relatively permanent, standing or continuously flowing bodies of water... and wetlands that are connected and indistinguishable from such waterbodies." The proposed rule would further clarify the definitions of "relatively permanent" and "continuous surface connection" (USEPA 2025b).

The following presents the wetland desktop assessment for the Proposed Route and Alternative Route Siting Corridors. This assessment is comprised of a review of publicly available data and the results of deep learning wetland modeling to provide a comprehensive desktop characterization of wetland resources and an assessment of impacts.

2.2.4.1 EXISTING CONDITIONS

Publicly available data from the NWI and PASDA wetland inventory were reviewed to assess the extent of wetland features within the Proposed Route and Alternative Route Siting Corridors. The USFWS NWI and PASDA characterize wetlands based on the Cowardin classification system, which is a system for categorizing wetlands and deepwater habitats. It classifies wetlands into five major "systems" that include Palustrine, Riverine, Lacustrine, Marine, and Estuarine. Palustrine wetlands are inland, nontidal wetlands characterized by the presence of trees, shrubs, and emergent vegetation, often found in areas with standing water or saturated soil. Palustrine wetlands are further classified as Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested (PFO) wetlands. Riverine and Lacustrine wetlands were discussed previously in Section 2.2.3, Streams and Lakes, and the Siting Corridor does not cross Marine and Estuarine wetlands.

PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes (excluding mosses and lichens) that provide at least 30 percent aerial cover. PSS wetlands are dominated by woody vegetation less than 20 feet tall that provide at least 30 percent areal coverage. PFO wetlands are dominated by woody vegetation 20 feet tall or taller with trunk diameter at breast height of 3 or more inches that provide at least 30 percent areal coverage.

As stated in Section 2.2.3, wetlands associated with wilderness trout streams, specifically wetlands within the Federal Emergency Management Agency (FEMA) or PADEP-designated floodplain of a wild trout stream or waters listed as EV under Chapter 93 or the floodplain of tributaries to these waters, are considered an EV wetland. Additionally, wetlands that are hydrologically connected to or located within 0.5 mile of wetlands serving as habitat for RTE species and wetlands located in areas designated by the PADEP as "natural" or "wild" within state forests, park lands, and federal wilderness areas are considered EV wetlands (25 Pa. Code § 105.17(1)). There are no NWI-mapped EV wetlands crossed by the Proposed Route and Alternative Route Siting Corridors. RTE species are discussed further in Section 2.2.8, and state forests, park lands, and federal wilderness areas are discussed further in Section 2.2.3.

Table 2.2-33 provides a summary of NWI and PASDA wetland acreages within the Proposed Route and Alternative Route Siting Corridors; Attachment 3 provides a comprehensive table for wetland crossings, and Attachment 1c provides detailed wetland mapping. There are no NHD wetland features (e.g., swamp/marsh) located within the Proposed Route and Alternative Route Siting Corridors.

TABLE 2.2-33 NATIONAL WETLANDS INVENTORY AND PENNSYLVANIA SPATIAL DATA ACCESS PORTAL WETLANDS WITHIN THE SITING CORRIDORS (ACRES)

Cowardin Classification [a]	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
NWI			
PEM	0.0	0.0	3.9
PSS	0.0	0.0	14.4
PFO	0.0	0.0	11.7
NWI Total [b]	**0.0**	**0.0**	**30.0**
PASDA			
Emergent	0.9	1.2	24.9
Scrub-shrub	0.0	0.2	5.3
Forested	9.1	4.1	54.2
Total PASDA [b]	**10.0**	**5.5**	**84.4**

Source: USFWS n.d.-a; PASDA 2013

L1UB = Unconsolidated Bottom, Limnetic, Lacustrine; NWI = National Wetlands Inventory; PASDA = Pennsylvania Spatial Data Access Portal; PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub; PUB = Palustrine Unconsolidated Bottom

[a] PUB, Riverine, and L1UB features are discussed in Section 2.2.3.

[b] Totals may not match the sum of addends due to rounding.

In addition to the review of publicly available data discussed above, a deep learning Wetland Identification Model (WIM) was used to further evaluate wetland resources within each Siting Corridor and provide a more robust and enhanced desktop analysis. The WIM was trained on and predicts all wetland types collectively and does not differentiate between Cowardin classifications (e.g., Palustrine, Riverine, Lacustrine).

The following resources were used to facilitate the WIM assessment for the Proposed Route and Alternative Route Siting Corridors:

- Maryland Department of Natural Resources wetlands / NWI wetlands;
- LiDAR Digital Elevation Models;
- Land Cover Data;
- NHD Streams/waterbodies; and
- National Agriculture Imagery Program multi-spectral imagery and derivative products.

Using the base datasets above, eight predictor variables were created to help the deep learning model identify potential wetlands by recognizing complex patterns that correspond to wetland characteristics. These predictor variables consider characteristics in the Siting Corridor such as hydrology, topography, and geomorphology. The Maryland Department of Natural Resources wetland data was used to facilitate model training across the MARL Project Study Area in Pennsylvania, West Virginia, Maryland, and Virginia, as this dataset has greater accuracy than the NWI data and covers a substantial portion of the MARL Project Study Area. A more detailed discussion of the modeling assessment is presented in Appendix H, Wetland Identification Model Report, of the Routing Study.

Table 2.2-34 provides a summary of the acreage of modeled high probability wetlands (MHPW) within the Proposed Route and each Alternative Route Siting Corridors. MHPW were predicted using seven out of the eight variables, excluding a soil moisture index that historically overpredicts wetlands based on nearby surface water.

TABLE 2.2-34 WETLAND IDENTIFICATION MODEL HIGH PROBABILITY WETLANDS WITHIN THE SITING CORRIDORS (ACRES)

Wetland Features [a]	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
MHPW [a]	27.9	25.5	60.9

MHPW = modeled high probability wetland; PUB = Palustrine Unconsolidated Bottom; WIM = Wetland Identification Model

[a] The WIM was trained on all wetland types, including PUB, Riverine, and Lacustrine waterbodies discussed in Section 2.2.3. See Appendix Hof the Routing Study for additional details.

2.2.4.2 IMPACTS

This section describes the wetland impacts associated with the Proposed Route and Alternative Route ROW Corridors, as well as the ancillary facility workspaces outside of the Proposed Route ROW Corridor. Temporary impacts on PEM and PSS wetlands would occur as a result of construction activities, including vegetative clearing, matting, and equipment access; permanent wetland impacts would be associated with operation of the MARL Project, as further discussed below. Wetland areas would be aerially spanned by transmission line conductors; however, there would be permanent conversion of some PFO wetlands to PEM and/or PSS wetlands within the maintained ROW Corridor as a result of operational vegetative maintenance activities. Additionally, due to engineering design constraints, two permanent structures are located in NWI-mapped wetlands associated with Alternative Routes C and F ROW Corridors. One structure is located in a PEM wetland, and one structure is located in a PSS wetland. Structure placement in wetlands would result in permanent fill within the affected wetland area for tower foundations.

Table 2.2-35 summarizes the acreage of NWI- and PASDA-mapped wetlands within the Proposed Route and Alternative Route Siting Corridors and ROW Corridors. There are no NWI wetland impacts associated with the Proposed Route and Alternative Routes B, D, and E ROW Corridors. The NWI wetland impacts associated with Alternative Routes C and F represent 2.3 percent of the 632.3 acres of NWI wetlands present within the MARL Project Study Area in Pennsylvania. The

PASDA-mapped wetland impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 1.1 percent of the 3,276.8 acres of PASDA-mapped wetlands within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-35 NATIONAL WETLANDS INVENTORY AND PENNSYLVANIA SPATIAL DATA ACCESS PORTAL WETLANDS CROSSED WITHIN THE SITING CORRIDORS AND ROW CORRIDORS IN PENNSYLVANIA (ACRES)

Wetland Features [a]	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
NWI						
PEM	0.0	0.0	0.0	0.0	3.9	2.7
PSS	0.0	0.0	0.0	0.0	14.4	7.2
PFO	0.0	0.0	0.0	0.0	11.7	4.5
Total NWI [b]	**0.0**	**0.0**	**0.0**	**0.0**	**30.0**	**14.4**
PASDA						
Emergent	0.9	0.5	1.2	0.7	24.9	12.0
Scrub-shrub	0.0	0.0	0.2	0.0	5.3	2.4
Forested	9.1	3.8	4.1	1.2	54.2	22.9
Total PASDA [b]	**10.0**	**4.3**	**5.5**	**1.9**	**84.4**	**37.3**

Source: USFWS n.d.-a; PASDA 2013

L1UB = Unconsolidated Bottom, Limnetic, Lacustrine; NWI = National Wetlands Inventory; PASDA = Pennsylvania Spatial Data Access Portal; PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub; PUB = Palustrine Unconsolidated Bottom; ROW = right-of-way

[a] PUB, Riverine, and L1UB features are discussed in Section 2.2.3.

[b] Totals may not match the sum of addends due to rounding.

Impacts on wetlands would also occur associated with access roads and other ancillary facilities outside of the Proposed Route ROW Corridor, as shown in Table 2.2-36. There are no permanent access road, temporary access road, or other ancillary facility workspace impacts on NWI- or NHD-mapped wetlands associated with the Proposed Route. There are no permanent access road impacts on PASDA-mapped wetlands associated with the Proposed Route and Alternative Routes. Impacts associated with temporary access roads and other temporary ancillary facility workspaces each represent less than 0.1 percent of the 3,276.8 acres of PASDA-mapped wetlands present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-36 PENNSYLVANIA SPATIAL DATA ACCESS PORTAL WETLANDS WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Wetland Features	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Emergent	0.0	<0.1	<0.1
Forested	0.0	0.2	<0.1
Total [a]	**0.0**	**0.2**	**<0.1**

Source: PASDA 2013

PASDA = Pennsylvania Spatial Data Access
[a] Totals may not match the sum of addends due to rounding.

Table 2.2-37 summarizes the WIM MHPW acreages within the Proposed Route and Alternative Route Siting Corridors and ROW Corridors. The MHPW impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.3 percent to 0.8 percent of the 3,678.9 acres of MHPW present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-37 WETLAND IDENTIFICATION MODEL HIGH PROBABILITY WETLANDS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Wetland Features	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
MHPW [a]	27.9	13.1	25.5	12.0	60.9	28.4

MHPW = modeled high probability wetland; PUB = Palustrine Unconsolidated Bottom; ROW = right-of-way; WIM = Wetland Identification Model
[a] The WIM was trained on all wetland types, including PUB, Riverine, and Lacustrine features. See Appendix H of the Routing Study for additional details.

Table 2.2-38 summarizes the WIM MHPW acreages within ancillary facility workspaces outside of the Proposed Route ROW Corridor. There are no permanent access road impacts on WIM MHPW associated with the Proposed Route. Temporary impacts on WIM MHPW associated with temporary access roads and other temporary ancillary facilities represent less than 0.1 percent of the 3,678.93 acres of MHPW present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-38 WETLAND IDENTIFICATION MODEL HIGH PROBABILITY WETLANDS WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Wetland Features	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
MHPW [a]	0.0	0.1	0.2

MHPW = modeled high probability wetland; PUB = Palustrine Unconsolidated Bottom; WIM = Wetland Identification Model
[a] The WIM was trained on all wetland types, including PUB, Riverine, and Lacustrine features. See Appendix H of the Routing Study for additional details.

The ROW Corridor and ancillary facility workspaces have been designed to minimize impacts on wetlands, including siting structures and access roads outside of wetland areas, to the maximum extent practicable. Existing roads will be used, when feasible, to minimize new disturbance. Where equipment crossing is necessary in wetlands, construction matting will be used to minimize disturbance to these resources. Prior to construction, applicable permits will be obtained through the USACE and PADEP for authorization under Section 404 and Section 401 of the CWA and Pa. Code Chapter 105.

While PFO wetlands within the ROW Corridor will be permanently converted to PEM or PSS wetlands during operation due to long-term vegetation management requirements, PEM and PSS wetlands temporarily affected by construction will be restored to their preconstruction conditions to the maximum extent practicable. In addition, PFO wetlands will be allowed to reestablish within ancillary facility workspaces; however, this will typically occur over a longer period of time. NEET MA will comply with the mitigation requirements and ratios of permits to compensate for unavoidable permanent impacts on wetlands, including conversion impacts and structure placement. Wetlands shall be replaced at a minimum area ratio of 1:1 (replacement acres to affected acres) unless mitigation cannot be achieved, in which the wetland shall be replaced at a minimum area ratio of 2:1 (25 Pa. Code § 105.20a). Mitigation requirements will be determined by the USACE and PADEP.

To comply with state stormwater requirements, NEET MA will obtain coverage either under the National Pollutant Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activities (PAG-02) or an individual National Pollutant Discharge Elimination System permit, as described in Section 2.2.3.2. A MARL Project-specific ESC Plan will be developed in coordination with state and local agencies to meet applicable requirements and implement BMPs (25 Pa. Code Chapter 102). Appropriate BMPs will be used to manage stormwater runoff including silt sock, silt fence, construction entrances, temporary matting and bridges, and erosion matting as needed. Dewatering, if necessary, will be discharged in accordance with the practices described in the PADEP ESC Manual and comply with applicable permit requirements. If other devices are proposed, NEET MA will obtain approval from the PADEP prior to use. Implementation of these plans will further minimize impacts on wetlands within the ROW Corridor.

An SPCC Plan will be developed, if required, to avoid or minimize impacts on wetlands due to inadvertent releases of fuel or mechanical fluids in accordance with the USEPA regulations (40 CFR Part 112).

2.2.5 FLOODPLAINS

This section describes existing floodplain resources within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor.

ERM reviewed the FEMA maps to determine whether mapped floodplains are present within the Proposed Route and Alternative Route Siting Corridors (FEMA n.d.-a). Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area. Special Flood Hazard Areas are defined as the area that will be inundated by the flood event having a

1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the base flood, or 100-year flood. High risk flood zones are labeled Zone A (with a floodplain present) or Zone AE (with a floodplain and floodway present). Moderate risk flood zones are labeled Zone X. These flood zones are referred to as 0.2 percent annual chance floods, or 500-year floods. Attachment 1c provides detailed FEMA floodplain mapping.

2.2.5.1 EXISTING CONDITIONS

Pennsylvania participates in the National Flood Insurance Program and all counties have adopted local floodplain ordinances to regulate development in flood prone areas. The PADEP regulates impacts over, under, and through floodplains, which includes the 50-foot floodway on intermittent and perennial waterbodies where no FEMA maps or studies have defined the boundary of the 100-year flood frequency (25 Pa. Code 105.1). Impacts on floodplain features may also require coordination with townships and municipalities. Table 2.2-39 summarizes the acreage of FEMA-mapped floodplains crossed by the Proposed Route and Alternative Route Siting Corridors.

TABLE 2.2-39 FEDERAL EMERGENCY MANAGEMENT AGENCY FLOODPLAINS WITHIN THE SITING CORRIDORS (ACRES)

Flood Zone	Flood Zone Definition	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
		Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
A	1% Annual Chance Flood Hazard	0.0	0.0	0.0	0.0	24.1	10.5
AE	1% Annual Chance Flood Hazard	14.4	5.8	18.4	7.7	10.9	5.4
	Regulatory Floodway	12.1	6.7	12.1	6.7	10.6	5.6
X	0.2% Annual Chance Flood Hazard	2.3	0.9	2.3	0.9	3.5	1.4
Total [a]		**28.8**	**13.4**	**32.8**	**15.3**	**49.1**	**22.9**

Source: FEMA n.d.-b

[a] Totals may not match the sum of addends due to rounding.

2.2.5.2 IMPACTS

This section describes the floodplain impacts associated with the Proposed Route and Alternative Route ROW Corridors, as well as ancillary facility workspaces outside of the Proposed Route ROW Corridor. Floodplains will be aerially spanned by the transmission line conductors, and transmission structures will not be placed in floodplains to avoid direct impacts on floodplains during operation of the MARL Project.

While temporary impacts on floodplains may result from vegetative clearing and ground disturbance associated with ROW construction activities, these areas will be restored as close to preconstruction conditions as practicable and only minimal direct impacts on floodplains are

expected during operation. Activities within floodplains would comply with local floodplain ordinances, state requirements, and the National Flood Insurance Program standards. Avoidance and mitigation strategies would be implemented where possible.

Table 2.2-40 summarizes the acreage of floodplains crossed by the Proposed Route ROW Corridor and Alternative Route ROW Corridors. There are no impacts on floodplains associated with ancillary facility workspaces outside of the Proposed Route ROW Corridor. The floodplain impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.3 percent to 0.5 percent of the 5,041.9 acres of floodplains present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-40 FLOODPLAINS CROSSED WITHIN THE SITING CORRIDORS AND ROW CORRIDORS IN PENNSYLVANIA (ACRES)

Flood Zone	Flood Zone Definition	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
		Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
A	1% Annual Chance Flood Hazard	0.0	0.0	0.0	0.0	24.1	10.5
AE	1% Annual Chance Flood Hazard	14.4	5.8	18.4	7.7	10.9	5.4
	Regulatory Floodway	12.1	6.7	12.1	6.7	10.6	5.6
X	0.2% Annual Chance Flood Hazard	2.3	0.9	2.3	0.9	3.5	1.4
Total [a]		**28.8**	**13.4**	**32.8**	**15.3**	**49.1**	**22.9**

Source: FEMA n.d.-b

ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

To comply with state stormwater requirements, NEET MA will obtain coverage either under the PADEP General Permit for Discharges of Stormwater Associated with Construction Activities (PAG-02) or an individual permit, as described in Section 2.2.3.2. A MARL Project-specific ESC Plan and PCSM Plan will be developed in coordination with state and local agencies to meet applicable requirements and implement BMPs. Appropriate BMPs will be used to manage stormwater runoff including silt sock, silt fence, construction entrances, temporary matting and bridges, and erosion matting. In addition, an SPCC Plan will be developed, if required, to avoid or minimize impacts on floodplains due to inadvertent releases of fuel or mechanical fluids in accordance with the USEPA regulations (40 CFR Part 112). Implementation of these plans will further minimize impacts on floodplains within the ROW Corridor.

2.2.6 VEGETATION

This section describes existing vegetation resources within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor. The Siting Corridors for the Proposed Route and Alternative Routes B through F include two Level III and four Level IV Ecoregions in Pennsylvania (Woods et al. 1999). The ecoregions described here are defined by the following criteria:

- Climate
- Elevation
- Land use
- Land form
- Potential natural vegetation
- Soil
- Structural/bedrock geology
- Surficial/quaternary geology

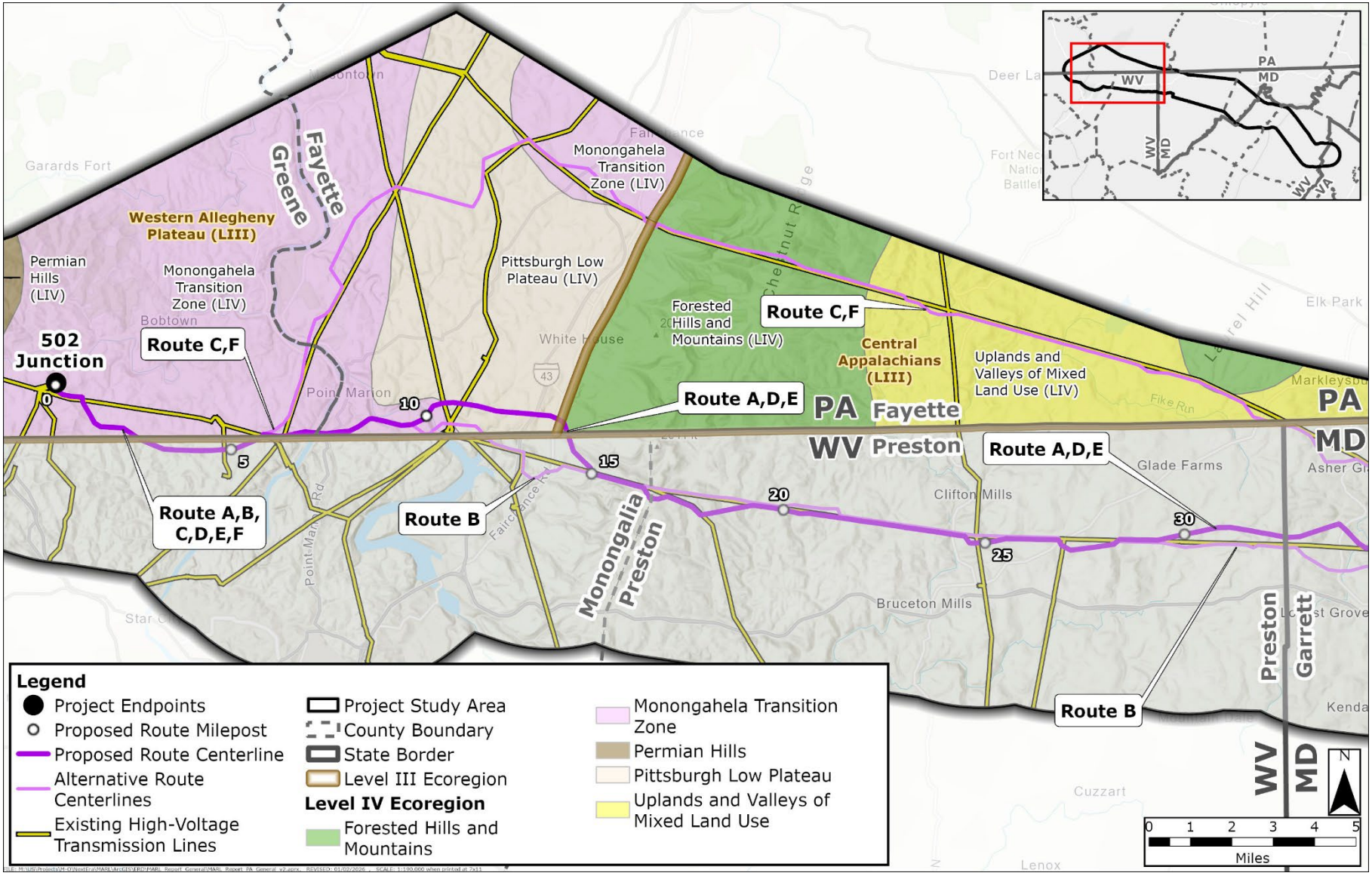
The Siting Corridors cross two Level III Ecoregions—Western Allegany Plateau (70) and Central Appalachians (69)—and four Level IV Ecoregions, as follows:

- Wester Allegany Plateau (70)
  - Monongahela Transition Zone (70b)
  - Pittsburg Low Plateau (70c)
- Central Appalachians (69)
  - Forested Hills and Mountains (69a)
  - Uplands and Valleys of Mixed Land Use (69b)

The following describes each of the Level III Ecoregions, incorporating additional information describing Level IV Ecoregions as applicable. Figure 2.2-4 depicts the extent of Level III and Level IV Ecoregions within each county.

The Western Allegheny Plateau Level III Ecoregion (70) is located in Greene County. The natural vegetation communities in the Western Allegheny Plateau Ecoregion were historically dominated by Appalachian oak forest dominated by red oak (*Quercus rubra*) and white oak (*Quercus alba*) and mixed mesophytic forest dominated by American beech (*Fagus grandifolia*), basswood (*Tillia americana*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), northern red oak, shagbark hickory (*Carya ovata*), sugar maple (*Acer saccharum*), and tuliptree (*Liriiodendron tulipifera*) (DCNR 2025b; Woods et al. 1999; Cuff et al. 1989). Today, forested habitats remain common and extensive, with scattered agricultural production in some portions of the ecoregion. Bituminous coal mining is also widespread, and associated environmental impacts have degraded water quality in the region.

FIGURE 2.2-4 LEVEL III AND IV ECOREGIONS



LIII = Level III Ecoregion; LIV = Level IV Ecoregion; MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

The Central Appalachians Level III Ecoregion (69) is located in Greene and Fayette Counties. The natural vegetation communities in the Central Appalachians Ecoregion are dominated by forested habitats. Historically, Appalachian oak forest habitats were most prevalent, with areas of northern hardwoods (dominated by sugar maple, yellow birch [*Betula alleghaniensis*], beech, and hemlock [*Tsuga canadensis*]), mixed mesophytic forest, oak-hickory forest (dominated by red and white oak, as well as red hickory [*Carya ovails*] and shagbark hickory), and sporadic areas of northern spruce-fir forest (dominated by red spruce [*Picea rubens*] and balsam fir [*Abies balsamea*]) at higher elevations. Stands of red oak, white oak, and sugar maple occurred on steeper slopes with limestone soils (Woods et al. 1999; Cuff et al. 1989; Wiegman 1985; Williams and Fridley 1938). Today, extensive areas of birch, black cherry, hard maple (*Acer nigrum*), and red oak dominate many areas and are used as commercial woodlands. Conifer belts dominated by red spruce and hemlock are found in higher, cooler locations (Woods et al. 1999). Additionally, many areas that were cleared in the late 18th century remain productive agricultural areas.

2.2.6.1 EXISTING CONDITIONS

The USGS National Land Cover Database (NLCD; USGS 2024a) was used to identify the land cover types within each of the Siting Corridors for the Proposed Route and Alternative Routes B through F. The total acreage of all land cover types within the Siting Corridors ranges from 504.3 to 2,013.2 acres. Table 2.2-41 summarizes the land cover types, and Figure 2.2-5 illustrates the land cover type existing conditions within the MARL Project Study Area in Pennsylvania. See Attachment 1d, Land Use Mapbook, for additional land cover mapping.

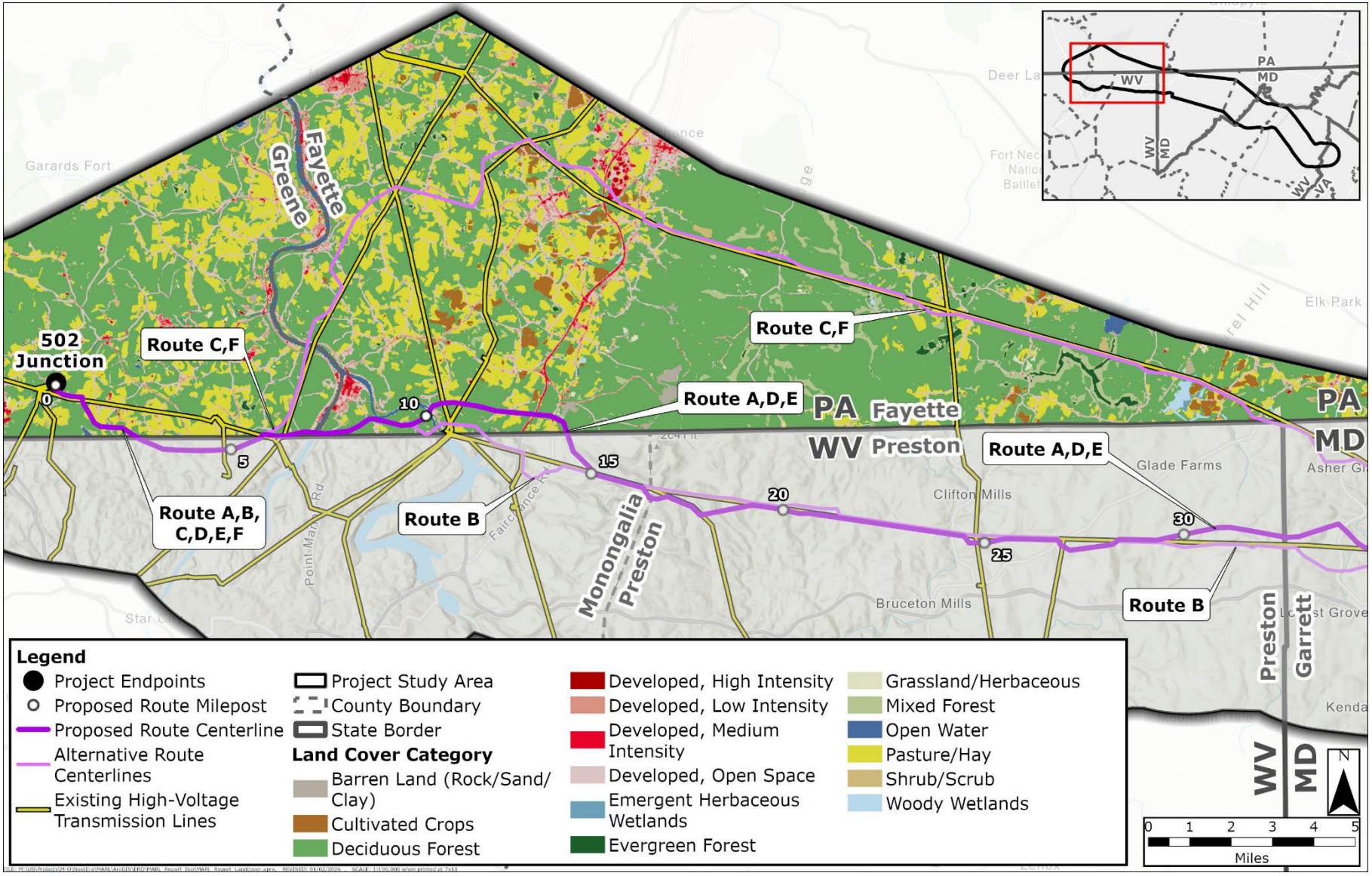
TABLE 2.2-41 LAND COVER TYPES WITHIN THE SITING CORRIDORS (ACRES)

Land Cover Type	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Barren Land (Rock/Sand/Clay)	3.1	3.1	11.2
Cultivated Crops	0.0	0.0	45.3
Deciduous Forest	445.7	352.8	1,316.2
Developed, High Intensity	0.0	0.0	3.8
Developed, Low Intensity	7.8	4.5	22.3
Developed, Medium Intensity	1.8	0.2	9.0
Developed, Open Space	35.1	26.0	58.2
Emergent Herbaceous Wetlands	0.0	0.0	4.1
Evergreen Forest	0.0	0.0	6.1
Grassland/Herbaceous	3.2	5.5	2.9
Mixed Forest	9.9	12.4	83.4
Open Water	17.6	17.4	8.2
Pasture/Hay	112.3	80.0	401.1
Shrub/Scrub	1.9	2.4	24.9
Woody Wetlands	0.0	0.0	16.4
Total [a]	**638.5**	**504.3**	**2,013.1**

Source: USGS 2024a

[a] Totals may not match the sum of addends due to rounding.

FIGURE 2.2-5 LAND COVER TYPES



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

Existing natural vegetation within the Proposed Route and Alternative Route Siting Corridors includes the following land cover types:

- Deciduous Forest
- Developed, Open Space
- Emergent Herbaceous Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Pasture/Hay
- Shrub/Scrub
- Woody Wetlands

The total acreage of natural vegetation within the Siting Corridors ranges from 479.1 to 1,913.3 acres (Table 2.2-42; Figure 2.2-5).

TABLE 2.2-42 NATIVE VEGETATION WITHIN THE SITING CORRIDORS (ACRES)

Native Vegetation	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Non-forested	152.5	113.9	491.2
Forested	455.6	365.2	1,422.1
Total [a]	**608.1**	**479.1**	**1,913.3**

Source: USGS 2024a

[a] Totals may not match the sum of addends due to rounding.

2.2.6.2 IMPACTS

Construction and operation would result in various temporary and permanent impacts on existing land cover types, including natural vegetation, within the ROW Corridor for the Proposed Route and Alternative Routes, as well as the ancillary facility workspaces outside of the Proposed Route ROW Corridor. Impacts on all land cover types are summarized in Table 2.2-43 and shown on Figure 2.2-5. Attachment 1d provides more detailed mapping.

TABLE 2.2-43 LAND COVER TYPES WITHIN THE SITING AND ROW CORRIDORS (ACRES)

Land Cover Types	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting	ROW	Siting	ROW	Siting	ROW
Barren Land (Rock/Sand/Clay)	3.1	1.6	3.1	1.6	11.2	4.8
Cultivated Crops	0.0	0.0	0.0	0.0	45.3	21.0
Deciduous Forest	445.7	185.1	352.8	147.6	1,316.2	549.7
Developed, High Intensity	0.0	0.0	0.0	0.0	3.8	1.3
Developed, Low Intensity	7.8	3.4	4.5	2.1	22.3	8.9
Developed, Medium Intensity	1.8	0.7	0.2	0.0	9.0	3.9

Land Cover Types	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting	ROW	Siting	ROW	Siting	ROW
Developed, Open Space	35.1	14.2	26.0	10.3	58.2	24.8
Emergent Herbaceous Wetlands	0.0	0.0	0.0	0.0	4.1	2.2
Evergreen Forest	0.0	0.0	0.0	0.0	6.1	2.1
Grassland/Herbaceous	3.2	0.8	5.5	2.3	2.9	1.0
Mixed Forest	9.9	4.1	12.4	5.5	83.4	37.0
Open Water	17.6	8.7	17.4	8.8	8.2	4.3
Pasture/Hay	112.3	48.0	80.0	35.5	401.1	162.7
Shrub/Scrub	1.9	0.4	2.4	0.5	24.9	9.8
Woody Wetlands	0.0	0.0	0.0	0.0	16.4	8.0
Total [a]	**638.5**	**266.9**	**504.3**	**214.1**	**2,013.1**	**841.4**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Impacts on natural vegetation range from 201.7 to 797.3 acres within the ROW Corridors (Table 2.2-44). Impacts on natural vegetation would be generally temporary if the existing land use type is:

- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Pasture/Hay
- Shrub/Scrub

The above habitats will be restored or allowed to regenerate with select vegetation management as required by site conditions.

Permanent impacts on forested habitats would result from construction and operation, mainly from the conversion of forested habitats to maintained ROWs. Impacts on natural vegetation would be generally permanent if the existing land cover is:

- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Woody Wetlands

Temporary impacts on non-forested vegetation associated with the ROW Corridors range from 0.1 percent to 0.6 percent of the 35,434.1 acres of non-forested vegetation within the MARL Project Study Area in Pennsylvania. Similarly, permanent impacts on forested vegetation associated with habitat conversion within the ROW Corridor range from 0.2 percent to 0.7 percent of the 83,038.4 acres of forested vegetation within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-44 NATIVE VEGETATION WITHIN THE SITING AND ROW CORRIDORS (ACRES)

Native Vegetation	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Non-forested	152.5	63.4	113.9	48.6	491.2	200.5
Forested	455.6	189.2	365.2	153.1	1,422.1	596.8
Total [a]	**608.1**	**252.6**	**479.1**	**201.7**	**1,913.3**	**797.3**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Impacts on land cover and natural vegetation would also occur associated with access roads and other ancillary facilities outside of the Proposed Route ROW Corridor, as shown in Table 2.2-45 and Table 2.2-46, respectively. Impacts on existing land cover types, including natural vegetation, associated with ancillary facility workspaces are shown on Figure 2.2-5 and in detail on Attachment 1d.

Impacts on non-forested vegetation associated with temporary access roads and other temporary ancillary facilities each represent 0.1 percent or less of the 35,434.1 acres of non-forested vegetation within the MARL Project Study Area in Pennsylvania. Similarly, impacts on forested vegetation associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 83,038.4 acres of forested vegetation within the MARL Project Study Area in Pennsylvania. Impacts associated with permanent access roads represent less than 0.1 percent of the 118,472.5 acres of natural vegetation within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-45 EXISTING LAND COVER WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Land Cover	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Barren Land (Rock/Sand/Clay)	0.0	0.4	0.1
Cultivated Crops	0.0	0.0	0.0
Deciduous Forest	1.3	11.3	20.5
Developed, High Intensity	0.0	0.0	0.0
Developed, Low Intensity	0.0	2.9	0.3
Developed, Medium Intensity	0.0	0.1	0.0
Developed, Open Space	<0.1	6.6	1.8
Emergent Herbaceous Wetlands	0.0	0.0	0.0
Evergreen Forest	0.0	0.0	0.0
Grassland/Herbaceous	0.0	0.0	0.0
Mixed Forest	0.0	0.3	0.4
Open Water	0.0	0.0	0.0
Pasture/Hay	0.2	2.9	9.9
Shrub/Scrub	0.0	0.2	0.5

Land Cover	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Woody Wetlands	0.0	0.0	0.0
Total [a]	**1.6**	**24.7**	**33.4**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-46 NATIVE VEGETATION WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Native Vegetation	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Non-forested	0.2	9.7	12.2
Forested	1.3	11.7	20.9
Total [a]	**1.6**	**21.3**	**33.1**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

The MARL Project has been designed to minimize tree clearing, wetland impacts, and other vegetation impacts to the greatest extent practicable. Additionally, the MARL Project was designed to parallel existing transmission lines to avoid and minimize impacts arising from new forested habitat fragmentation to the extent practicable (Table 2.2-47). The total length where the MARL Project will parallel existing ROWs varies by Alternative Route.

TABLE 2.2-47 TOTAL LENGTH AND PERCENTAGE OF THE MARL PROJECT THAT PARALLELS EXISTING TRANSMISSION LINES IN PENNSYLVANIA

Paralleling	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Miles	%	Miles	%	Miles	%
Pennsylvania route length	10.7	NA	8.5	NA	34.2	NA
Pennsylvania paralleling existing transmission lines	2.3	21.1	2.3	26.6	16.9	49.4

NA = not applicable

NEET MA will coordinate with applicable federal and state agencies and other stakeholders to determine avoidance and minimization measures, as appropriate, to minimize and prevent impacts and loss of natural vegetation and the proliferation of non-native invasive species within the ROW Corridor and ancillary facility workspaces. Construction and routine maintenance activities will comply with all MARL Project-specific permit requirements and conditions and will be conducted under MARL Project-specific plans and procedures to avoid impacts on natural vegetation during construction and throughout operation. Following construction, the MARL Project will result in the establishment and maintenance of natural vegetation within the ROW Corridor and temporary ancillary facility workspaces in accordance with applicable federal, state, and local requirements.

2.2.7 WILDLIFE

This section describes existing wildlife species that may potentially be present within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor. The following discussion of potentially suitable habitat for wildlife species likely overstates the potential for wildlife occurrence within the Siting and ROW Corridors and ancillary facility workspaces, as not all habitats discussed below provide potentially suitable habitat for all species. Further, not all potentially suitable habitat for all species is actively, recently, or historically occupied by any particular species.

2.2.7.1 EXISTING CONDITIONS

The vegetation present within the Proposed Route and Alternative Route Siting Corridors B through F provides potentially suitable habitat for a variety of mammals, birds, and herpetofauna. A desktop review of publicly available data was conducted to identify potential wildlife use within and in the vicinity of the Siting Corridors. The total number of each species group identified is provided in Table 2.2-48.

TABLE 2.2-48 MAMMALS, BIRDS, AND HERPETOFAUNA THAT OCCUR IN COUNTIES CROSSED BY THE SITING CORRIDORS

Species Group	Greene	Fayette
Mammals	21	36
Birds	227	266
Herpetofauna	37	52
Total	**285**	**354**

Source: iNaturalist 2025

Common mammalian species that are expected to occur include mice and other small rodents, squirrels, bats, racoon (*Procyon lotor*), and rabbits, as well as large mammals such as white-tailed deer (*Odocoileus virginiana*), American black bear (*Ursus americanus*), and coyote (*Canus latrans*) (iNaturalist 2025). Additional information regarding mammals with state and federal protections is provided in Section 2.2.8.

Common avian species that are expected to occur include redwing blackbird (*Agelaius phoeniceus*), American crow (*Corvus brachyrhynchos*), turkey (*Meleagris gallopavo*), sparrows, mourning dove (*Zenaida macroura*), owls, hawks, and woodpeckers (GCTPA 2024). Additional information regarding birds and protections provided under the Migratory Bird Treaty Act (MBTA) is provided in Section 2.2.8.

Common herpetofuana species that are expected to occur include northern dusky salamander (*Demognathus fuscus*), northern two-lined salamander (*Eurycea bislineata*), eastern red-backed salamander (*Plethodon cinereus*), eastern American toad (*Anaxyrus americanus*), Cope's gray tree frog (*Hyla chryososcelis*), spring peeper (*Pseudacris crucifer*), green frog (*Lithobates clamitans*), snapping turtle (*Chelydra serpentina*) eastern box turtle (*Tarrapene Carolina*), northern ring-necked snake (*Diadophis punctatus*), eastern rat snake northern water snake (*Neroidia sipedon*), eastern rat snake (*Lampropeltis triangulum*), and eastern gartersnake

(*Thanophis sirtalis*) (PARS 2025). Additional information regarding reptiles and amphibians with state and federal protections is provided in Section 2.2.8.

The total acreage of potentially suitable wildlife habitat within the Siting Corridors may be used to describe the potential for wildlife use. A complete discussion of vegetation (i.e., habitat) within the Siting Corridors is provided in Section 2.2.6, Vegetation.

Potentially suitable habitats for terrestrial wildlife include the following land cover types:

- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Developed, Open Space
- Emergent Herbaceous Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Open Water
- Pasture/Hay
- Shrub/Scrub
- Woody Wetlands

The total acreage of potentially suitable wildlife habitat within the Proposed Route and Alternative Route Siting Corridors ranges from 499.6 to 1,978.0 acres (Table 2.2-49). Of this, the extent of forested habitats within the Siting Corridors ranges from 365.2acres to 1,22.2 acres.

TABLE 2.2-49 POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN THE SITING CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Non-forested	173.2	134.4	555.8
Forested	455.6	365.2	1422.2
Total [a]	**628.8**	**499.6**	**1,978.0**

Source: USGS 2024a

[a] Totals may not match the sum of addends due to rounding.

Several areas containing high-quality and/or sensitive habitats that could be used by wildlife species have been identified within the Siting Corridors for the Proposed Route and Alternative Route Siting Corridors, including protected lands and Natural Heritage Areas (NHAs). Protected lands include state forest, wild areas, and state game lands. The protected lands providing potentially suitable wildlife habitat within the Siting Corridors include Forbes State Forest, Quebec Run Wild Area, and State Game Lands 138. Forbes State Forest encompasses approximately 59,000 acres in Fayette, Somerset, and Westmorland Counties and is managed, in part, to provide wildlife habitat, as well as other uses. Quebec Run Wild Area encompasses 7,441 acres within Forbes State Forest and is "managed" to protect plant and animal communities and preserve the

wild character of Pennsylvania forests with little direct human intervention (DCNR 2025c). State Game Lands 138 encompass 2,918.7 acres and is managed to provide wildlife habitat and provide hunting, trapping, and recreational and opportunities (PGC 2025). The total acreage of protected lands within the Siting Corridors is provided in Table 2.2-50 and shown on Attachment 1e, Ecological and Sensitive Species Mapbook.

TABLE 2.2-50 PROTECTED LANDS PROVIDING POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN THE SITING CORRIDORS (ACRES)

Site Name	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Forbes State Forest	NA	NA	155.2
Quebec Run Wild Area	NA	NA	8.8
State Game Lands 138	NA	NA	51.7
Total [a]	**NA**	**NA**	**215.7**

Source: USGS 2024b

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

NHAs include areas that support exemplary ecological communities, native species diversity, and/or rare plants or wildlife (DCNR 2025d). A summary of the NHAs within the Siting Corridors is provided in Table 2.2-51, along with a brief site description for each. The total acreage of NHAs within the Siting Corridors is provided in Table 2.2-52 (Attachment 1e). Additional information regarding RTE species is provided in Section 2.2.8.

TABLE 2.2-51 NATURAL HERITAGE AREAS WITHIN THE SITING CORRIDORS

Site Name	Description
Cheat River at West Virginia Border	Forested habitats along the Cheat River, north of Cheat River Dam; supports several sensitive species
Cheat River Confluence	Naturalized former industrial areas and floodplain forest; supports several sensitive species
Chestnut Ridge South of Lick Run	Forested habitats with scattered bedrock outcrops; supports several sensitive species
Dooley Run	Forested and open habitats; supports several sensitive species
Mine Road	Forested habitats and rural residential development; supports a sensitive species
Mountain Creek	Mostly forested riparian habitat along Mountain Creek; supports a sensitive species
Rubles Run	Rich forest on western slope of Chestnut Ridge; supports several sensitive species
The Glades-Fayette County	Extensive wetland complex; supports several sensitive species
Upper Little Sandy Creek Valley	Mature forest community along Little Sandy Creek; supports a sensitive species
Upper Quebec Run	Forested eastern slopes of Chestnut Ridge; supports several sensitive species

Source: PNHP 2019

TABLE 2.2-52 NATURAL HERITAGE AREAS WITHIN THE SITING CORRIDORS (ACRES)

Site Name	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Cheat River at West Virginia Border	21.7	18.1	NA
Cheat River Confluence	NA	NA	14.6
Chestnut Ridge South of Lick Run	NA	NA	9.8
Dooley Run	27.7	27.7	27.7
Mine Road	26.7	26.7	NA
Mountain Creek	NA	NA	7.0
Rubles Run	3.7	NA	NA
The Glades-Fayette County	NA	NA	116.6
Upper Little Sandy Creek Valley	NA	NA	14.1
Upper Quebec Run	NA	NA	94.6
Total [a]	**79.8**	**72.5**	**284.3**

Source: Kierstin Carlson 2024, pers. comm.

NA = not applicable
[a] Totals may not match the sum of addends due to rounding.

2.2.7.2 IMPACTS

Construction and operation would result in both temporary and permanent impacts on potentially suitable wildlife habitat within the ROW Corridor for the Proposed Route and Alternative Routes B through F, as well as the ancillary facility workspaces outside of the Proposed Route ROW Corridor (Table 2.2-53; Figure 2.2-5; Attachment 1d). Seasonal presence and use of the existing habitat will vary by season and species. The following discussion likely overstates the potential for impacts on wildlife, as not all habitat provides potentially suitable habitat for all species. Further, not all potentially suitable habitat is actively, recently, or historically occupied by any particular species.

Impacts on wildlife habitat associated with the Proposed Route and Alternative Route ROW Corridors range from 212.1 to 827.3 acres (Table 2.2-53; Figure 2.2-5; Attachment 1d). Temporary impacts on non-forested wildlife habitat associated with the ROW Corridors range from 0.1 percent to 0.6 percent of the 39,674.5 acres of non-forested habitat present within the MARL Project Study Area in Pennsylvania. Similarly, permanent impacts on forested wildlife habitat associated with habitat conversion within the ROW Corridors range from 0.2 percent to 0.7 percent of the 83,038.4 acres of forested habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-53 POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Non-forested	173.2	73.7	134.4	59.0	555.8	230.5
Forested	455.6	189.2	365.2	153.1	1,422.2	596.8
Total [a]	**628.8**	**262.9**	**499.6**	**212.1**	**1,978.0**	**827.3**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

The total acreage of protected lands and NHAs crossed by the ROW Corridors is provided in Table 2.2-54 and Table 2.2-55, respectively. Alternative Routes C and F ROW Corridor impacts on protected lands represent 1.7 percent of the 3,788.5 acres of Forbes State Forest, less than 0.1 percent of the 7,412.6 acres of Quebec Run Wild Area, and 1.2 percent of the 1,702.9 acres of State Game Lands 138.

TABLE 2.2-54 PROTECTED LANDS PROVIDING POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Site Name	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Forbes State Forest	NA	NA	NA	NA	155.2	64.5
Quebec Run Wild Area	NA	NA	NA	NA	8.8	3.6
State Game Lands 138	NA	NA	NA	NA	51.7	20.0
Total [a]	**NA**	**NA**	**NA**	**NA**	**215.6**	**88.1**

NA = not applicable; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.2-55 NATURAL HERITAGE AREAS PROVIDING POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Site Name	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Cheat River at West Virginia Border	21.7	8.8	18.1	7.7	NA	NA
Cheat River Confluence	NA	NA	NA	NA	14.6	7.6
Chestnut Ridge South of Lick Run	NA	NA	NA	NA 0	9.8	2.9
Dooley	27.7	12.0	27.7	12.0	27.7	12.0

Site Name	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Mine Road	26.7	10.8	26.7	10.8	NA	NA
Mountain Creek	NA	NA	NA	NA	7.0	2.7
Rubles Run	3.7	0.7	NA	NA	NA	NA
The Glades-Fayette County	NA	NA	NA	NA	116.6	50.7
Upper Little Sandy Creek Valley	NA	NA	NA	NA	14.1	5.3
Upper Quebec Run	NA	NA	NA	NA	94.6	38.8
Total [a]	**79.8**	**32.4**	**72.5**	**30.5**	**284.3**	**120.0**

Source: USGS 2024b

NA = not applicable; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

As indicated in Table 2.2-56, the ROW Corridor impacts on each listed NHA represent only a small proportion of the NHA within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-56 PROPORTION OF NATURAL HERITAGE AREAS WITHIN THE MARL PROJECT STUDY AREA IN PENNSYLVANIA AFFECTED BY ROW CORRIDORS (PERCENT)

Site Name	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Cheat River at West Virginia Border	2.0	1.7	NA
Cheat River Confluence	NA	NA	2.5
Chestnut Ridge South of Lick Run	NA	NA	0.2
Dooley Run	1.0	1.0	1.0
Mine Road	8.8	8.8	NA
Mountain Creek	NA	NA	1.4
Rubles Run	< 0.1	NA	NA
The Glades-Fayette County	NA	NA	3.0
Upper Little Sandy Creek Valley	NA	NA	2.1
Upper Quebec Run	NA	NA	1.3

NA = not applicable

Impacts on potentially suitable wildlife habitat would also occur associated with access roads and ancillary facilities outside of the Proposed Route ROW Corridor. The total acreage of ancillary facility workspace impacts on each land cover type is provided in Table 2.2-45. Impacts on existing land cover types associated with ancillary facility workspaces are shown on Figure 2.2-5 and in detail on Attachment 1d. Impacts on non-forested wildlife habitat associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 35,434.1 acres of non-forested vegetation within the MARL Project Study Area in Pennsylvania (Table 2.2-57). Similarly, impacts on forested vegetation associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 83,038.4 acres of forested vegetation within the MARL Project Study Area in Pennsylvania (Table 2.2-57). Impacts associated with permanent access roads represent less than

0.1 percent of the 122,712.9 acres of potentially suitable wildlife habitat within the MARL Study Area in Pennsylvania (Table 2.2-57).

TABLE 2.2-57 POTENTIALLY SUITABLE WILDLIFE HABITAT WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Potentially Suitable Habitat	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Non-forested	0.2	11.7	20.9
Forested	1.3	10.1	12.2
Total [a]	**1.6**	**21.7**	**33.2**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Construction and operation would result in both temporary and permanent impacts on terrestrial wildlife species and/or their habitats. Impacts on potentially suitable wildlife habitat would be temporary if the existing land cover type is:

- Barren Land (Rock/Sand/Clay)
- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Open Water
- Pasture/Hay
- Shrub/Scrub

These habitats will be restored or allowed to regenerate with select vegetation management as required by site conditions. Impacts from construction activities (e.g., noise and vibration) could cause temporary displacement of more mobile species such as mammals, birds, and some insects to areas outside of construction zones. Loss of potentially suitable habitat within the ROW Corridor will occur during construction of the MARL Project. Most displaced wildlife is expected to return to the area following construction and would be expected to use the newly established and revegetated herbaceous and shrub/scrub habitat during operation. Loss of less mobile species, such as reptiles, amphibians, and plants, could occur as a result of ground disturbances associated with construction and routine maintenance activities.

Impacts on forested habitats and associated wildlife would result from the construction, mainly from the conversion of forested habitats to maintained ROW Corridor. In addition, cutting of forested vegetation could also potentially increase forest fragmentation in some areas. The MARL Project has been designed to minimize the total amount of tree clearing to the greatest extent practicable to minimize impacts on forested habitats and associated wildlife species. The MARL Project was also designed to parallel existing ROWs to avoid and minimize impacts arising from new forested habitat fragmentation to the greatest extent practicable. The total length where the MARL Project will parallel existing ROWs varies by Alternative Route (Table 2.2-47).

NEET MA will coordinate with applicable federal and state agencies and other stakeholders to determine avoidance and minimization measures, as appropriate, to minimize and prevent impacts on wildlife and loss of wildlife habitat within the MARL Project ROW Corridor. Construction and routine maintenance activities for the MARL Project will comply with all MARL Project-specific permit requirements and conditions and will be conducted under MARL Project-specific plans and procedures to avoid impacts on wildlife and wildlife habitat during construction and throughout operation. Following construction, the MARL Project will result in the establishment and maintenance of natural vegetation and habitats in accordance with applicable federal, state, and local requirements that would be expected to be used by wildlife species during the MARL Project's operational life.

2.2.8 RARE, THREATENED, AND ENDANGERED SPECIES

This section describes existing RTE species that may potentially be present within the Siting Corridors and ROW Corridors for the Proposed Route and Alternative Routes B through F, as well as impacts associated with the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor.

RTE species are generally defined as animal and plant species that are protected to varying degrees under state or federal law. ERM reviewed protected species according to the following regulations:

- Federal- and state-listed RTE species protected under the federal Endangered Species Act (ESA) enacted in 1973 and administered by the USFWS and the National Oceanic and Atmospheric Administration, in cooperation with the Pennsylvania Game Commission (PGC), PFBC, and the Pennsylvania Department of Conservation and Natural Resources (DCNR) and Western Pennsylvania Conservancy;
- Migratory birds protected under the MBTA enacted in 1918 and administered by the USFWS; and
- Bald eagles (*Haliaeetus leucocephalus*) protected under the federal Bald and Golden Eagle Protection Act enacted in 1940 and administered by the USFWS.

The following sources were used to identify protected species along and near the Siting Corridors:

- USFWS Information for Planning and Consultation System (IPaC) online system (USFWS n.d.-b); and
- Species occurrence records, obtained through ongoing coordination with applicable Pennsylvania resources agencies via a Pennsylvania Natural Diversity Inventory (PNDI) review.

The following discussion likely overstates the potential for RTE species use of the Siting and ROW Corridors and the resulting impacts associated with construction and routine maintenance activities, as not all habitats within the Siting and ROW Corridors provide potentially suitable habitat for all species. Further, not all potentially suitable habitat is actively, recently, or historically occupied by any particular species.

2.2.8.1 EXISTING CONDITIONS

Federally Listed Threatened and Endangered Species

To protect and recover imperiled species and the ecosystems they depend on, Congress passed the ESA in 1973, which states that listed plant and animal species are of "[a]esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people" and that protection of these species and their habitats is required. The ESA is administered by both the National Oceanic and Atmospheric Administration and the USFWS, and it protects fish, wildlife, plants, and invertebrates that are federally listed as endangered or threatened by prohibiting the "take" of these species and the interstate or international trade of the species, including their parts and products, unless permitted by federal law.

Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (United States Code, Title 33, Section 1532 [33 U.S.C. § 1532]). A federally endangered species is any species that is in danger of extinction throughout all or a significant portion of its range, with exceptions for certain insect pests, and a federally threatened species is any species that is likely to become endangered in the near future throughout all or a significant portion of its range (33 U.S.C. § 1532).

Review of publicly available databases and coordination with applicable resource agencies identified two federally listed species and two species proposed for federal listing within and adjacent to the Proposed Route and Alternative Route Siting Corridors, including Indiana bat (*Mytois sodalis*), northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), and monarch butterfly (*Danaus plexippus*). The Virginia big-eared bat is noted on the IPaC report; however, subsequent coordination with applicable resource agencies has determined that the record in proximity to the Siting Corridors for the Proposed Route and Alternative Routes is historic, and the species is not expected to be present within the Siting Corridors for the Proposed Route and Alternative Routes. Therefore, the species is not discussed further in the following analysis. Table 2.2-58 provides information on the identified species (USFWS n.d.-b; Attachment 4, Pennsylvania Agency Correspondence).

TABLE 2.2-58 FEDERALLY LISTED AND FEDERALLY PROPOSED THREATENED OR ENDANGERED SPECIES THAT COULD OCCUR WITHIN THE SITING CORRIDORS

Common Name	Scientific Name	Protection Status [a]	Preferred Habitat
Indiana bat	*Myotis sodalist*	FE	Old-growth or late-successional interior forests. Partially dead or decaying trees are used for summer roosting and foraging. Hibernation occurs primarily in caves, mines, and tunnels.
Monarch Butterfly	*Danaus Plexippus*	FPE	Migratory; in fields, roadside areas, and open fields that contain milkweed.
Northern long-eared bat	*Myotis septentrionalis*	FE	Old-growth or late-successional interior forests. Partially dead or decaying trees are used for summer roosting and foraging. Hibernation occurs primarily in caves, mines, and tunnels.

Common Name	Scientific Name	Protection Status [a]	Preferred Habitat
Tricolored Bat	*Perimyotis subflavus*	FPE, SE	Partly open landscapes with large trees and plentiful woodland edge.
Virginia big-eared Bat	*Corynorhinus townsendii virginianus*	FE	Cave obligate; in caves, mine portals, or rock crevices year-round; forested to open habitats for foraging.

Source: USFWS n.d.-b

FE = Federally Endangered; FPE = Federally Proposed for Endangered; SE = State Endangered

The total acreage of potentially suitable habitat for listed and proposed species within the Siting Corridors may be used to describe the potential for identified species use of the corridors. Existing vegetation and wildlife habitats present within the Siting Corridors provides potentially suitable habitat to varying degrees based upon species-specific life history and/or Alternative Route. Further details regarding the existing conditions and impacts on natural vegetation and wildlife habitat are provided in Section 2.2.6 and Section 2.2.7, Wildlife, respectively. See Attachment 1d and Attachment 1e for supporting mapping.

Bats

Indiana, northern long-eared, and tricolored bats (listed bats) require forested habitat for roosting from April 1 to October 15. Potentially suitable roosting habitats include:

- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Woody Wetlands

Based on current land cover data, the total acreage of potentially suitable habitat for roosting bats within the Proposed Route and Alternative Route Siting Corridors range from 365.2 to 1,422.1 acres (Table 2.2-59; Figure 2.2-5; Attachment 1d).

TABLE 2.2-59 POTENTIALLY SUITABLE BAT HABITAT AND KNOWN OCCURRENCES WITHIN THE SITING CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Potential roosting habitat	455.6	365.2	1,422.1
Potential foraging habitat	628.8	499.6	1,978.0
Known occupied maternity habitat	0.0	0.0	0.0
Staging/hibernacula/swarming habitat	662.3	396.1	905.4

Source: USGS 2024a; Jason Ryndock 2025, pers. comm.

During the active seasons (staging, maternity, swarming), listed bats use additional land cover types for foraging, including:

- Barren Land (Rock/Sand/Clay)
- Cultivated Crops
- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Open Water
- Pasture/Hay
- Shrub/Scrub

The total acreage of habitat potentially suitable for use by foraging bats within the Siting Corridors ranges from 499.6 to 1,978.0 acres (Table 2.2-59; Figure 2.2-5; Attachment 1d).

Indiana bats, northern long-eared bat, and tricolored bat require subterranean habitat for hibernation from November 16 to March 31. ERM coordinated with the USFWS Pennsylvania Ecological Services Field Office to obtain data for listed bat habitat buffers within the Siting Corridors. The Siting Corridors for the Proposed Route and Alternative Routes intersect four known occupied hibernacula buffers for listed bats. These buffers represent a 5-mile radius around known occupied hibernacula for listed species where additional protections are applied to habitats that are used during active periods, as well as protections for the subterranean habitat during hibernation. The total acreage of habitat potentially suitable for use by swarming and staging bats within the Siting Corridors ranges from 396.1 to 905.4 acres (Table 2.2-59; Figure 2.2-5; Attachment 1d and Attachment 1e). Species are considered present for some or all the date ranges listed above.

Monarch Butterfly

The monarch butterfly relies on open grassland and herbaceous habitats that meet the species' habitat requirements. The species is typically found in open areas where milkweed is present. Potentially suitable habitats include the following land cover types:

- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Pasture/Hay
- Shrub/Scrub

Potentially suitable habitat for monarch butterfly within the Proposed Route and Alternative Route Siting Corridors ranges from 111.7 to 500.4 acres (Table 2.2-60; Figure 2.2-5; Attachment 1d).

TABLE 2.2-60 POTENTIALLY SUITABLE MONARCH BUTTERFLY HABITAT WITHIN THE SITING CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Monarch butterfly habitat	152.5	113.9	491.2

Source: USGS 2024a

Pennsylvania Protected Species

The Pennsylvania Natural Heritage Program developed the PNDI to provide accurate ecological data to support conservation, natural resources management actions, protection of threatened and endangered species, and project development. The PNDI database is managed by the Pennsylvania DCNR and contains input from the PGC, PFBC, USFWS, and Western Pennsylvania Conservancy (PADEP 2013). The PFBC, PGC, and Pennsylvania DCNR provided Environmental Review letters; and the Pennsylvania DCNR provided geospatial data regarding current known occurrences of listed species of concern and/or their habitats and associated buffers that occur within and adjacent to the Siting Corridors (Table 2.2-61). The PFBC, PGC, and Pennsylvania DCNR's responses are provided in Attachment 4.

TABLE 2.2-61 PENNSYLVANIA RARE, THREATENED, AND ENDANGERED SPECIES AND PREFERRED HABITAT WITHIN THE SITING CORRIDORS

Common Name	Scientific Name	Preferred Habitat
Allegheny woodrat	*Neotoma magister*	Extensive patches of rocky outcrops, rocky cliffs, and talus slopes with boulders, crevices, and caves within varied forest habitats
Appalachian gametophyte fern	*Vittaria appalachiana*	Heavily shaded moist crevices and overhangs in noncalcareous rock
Bailey's graybark grape	*Vitis cinerea* var. *baileyana*	Lowland woods
Balsam poplar	*Populus balamifera*	Grassland/herbaceous, mixed forest, old field, woodlands
Blue monkshood	*Aconitum uncinatum*	Moist woods and slopes
Bog goldenrod	*Solidago uliginosa*	Bogs and swamps
Bushy St. John's-wort	*Hypericum densiflorum*	Rocky river banks, swampy meadows, and sphagnum bogs
Carey's sedge	*Carex careyana*	Rich calcareous woods
Crested dwarf iris	*Iris cristata*	Wooded slopes and banks
Timber rattlesnake	*Crotalus horridus*	Deciduous or mixed deciduous/coniferous forest, often with rock outcrops, ledges, and talus slopes
Eastern paintbrush	*Castilleja coccinea*	Moist meadows
Elliott's beardgrass	*Andropogon gyrans*	Dry or moist fields or open woods
Green salamander	*Aneides aeneus*	Damp rock outcrops and ledges in hardwood forest
Harbinger-of-spring	*Erigenia bulbosa*	Dry shaded rock crevices in subacidic to circumneutral soils
Little brown bat	*Myotis lucifugus*	Wooded slopes
Lobed spleenwort	*Asplenium pinnatifidum*	Moist rich wooded slopes and floodplains

Common Name	Scientific Name	Preferred Habitat
Mountain bellwort	*Uvularia puberula*	moist soils of mountain valleys in hardwood forests
Mountain bugbane	*Actaea podocarpa*	Rocky wooded slopes
Mountain magnolia	*Magnolia fraseri*	Moist to wet woods in humus-rich strongly acidic soils
Mountain pepper-bush	*Clethra acuminata*	Dry shaded rock crevices in subacidic to circumneutral soils
Netted chainfern	*Lorinseria areolata*	Wooded slopes
Ghost shiner	*Notropis buchanani*	Low gradient area of large creeks to large rivers with moderate flow and clear to turbid water
Nuttall's hedge-nettle	*Stachys cordata*	Wooded mountain slopes
October ladies'-tresses	*Spiranthes ovalis*	Dry limestone slopes and roadsides
Pine siskin	*Spinus Pinus*	Varied forest and woodland habitats
Pistolgrip	*Tritogonia verrucosa*	Large rivers with gravel to rocky substrates
Purple bluets	*Houstonia purpurea* var. *purpurea*	Open woods and roadsides
Purple-fringeless orchid	*Platanthera peramoena*	Moist meadows, low wet woods, and ditches
Red mulberry	*Morus rubra*	Rich moist alluvial soils
Regal fritillary	*Argynnis idalia*	Grasslands and herbaceous habitat, as well as wetland habitats
Rough-leaved aster	*Eurybia radula*	Moist woods, swamps, and bogs
Running buffalo clover	*Trifolium stoloniferum*	Periodically disturbed forest openings and edges
Single-headed pussy-toes	*Antennaria solitaria*	Wooded slopes and banks
Soapwort gentian	*Gentiana saponaria*	Bogs, moist open woods and roadsides
St. Andrew's-cross	*Hypericum stragulum*	Open woods, banks, ROWs, thickets, and serpentine barrens in dry sandy soil
Stiff cowbane	*Oxypolis rigidior*	Swamps, bogs, sedge meadows, sandy shores, abandoned railroad beds
Three-ridge	*Amblema plicata*	Small streams to big rivers, with no current to very fast current and various substrates
Tooth-cup	*Rotala ramosior*	Wet sandy shores and other swampy open ground
Wabash pigtoe	*Fusconaia flava*	Lakes and low gradient flowing water with coarse sand to gravel substrates
Wavy-rayed lampmussel	*Lampsilis fasciola*	Riffle areas of clear, small to medium streams and rivers with sand and gravel substrates
White monkshood	*Aconitum reclinatum*	Mountain woods
Wild oat	*Chasmanthium latifolium*	River banks and alluvial woods
Yellow passion-flower	*Passiflora lutea*	Wooded slopes, edges, openings, thickets, streambanks

Source: Jason Ryndock 2025, pers. comm.

ROWs = rights-of-way

The vegetation and other natural features present within the Proposed Route and Alternative Route Siting Corridors provide a variety of potentially suitable habitat for RTE species to varying degrees based on species and/or Alternative Route. Potentially suitable habitat for the above species includes the following land cover types:

- Barren Land (Rock/Sand/Clay)
- Cultivated Crops
- Deciduous Forest
- Developed, Open Space
- Emergent Herbaceous Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Open Water
- Pasture/Hay
- Shrub/Scrub
- Woody Wetlands

The total acreage of potentially suitable non-forested RTE habitat within the Siting Corridors ranges from 133.6 to 568.9 acres (Table 2.2-62; Figure 2.2-5; Attachment 1d). Further, the extent of forested habitats within the Siting Corridors ranges from 366.1 acres to 1,412.0 acres.

TABLE 2.2-62 POTENTIALLY SUITABLE RARE, THREATENED, AND ENDANGERED SPECIES HABITAT WITHIN THE SITING CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Non-forested	173.2	134.4	555.8
Forested	455.6	365.2	1,422.2
Total [a]	**628.8**	**499.6**	**1,978.0**

Source: USGS 2024a

[a] Totals may not match the sum of addends due to rounding.

The Pennsylvania Natural Heritage Program provided geospatial data depicting known occurrences of RTE species within and adjacent to the Siting Corridors. The acreages of known occurrences /occupied habitat and associated buffers for state-listed species is provided in Table 2.2-63 (Attachment 1e). Discussion of impacts on waterbodies and aquatic habitats that may potentially be used by some state-listed species is provided in Section 2.2.3.

TABLE 2.2-63 RARE, THREATENED, AND ENDANGERED SPECIES OCCURRENCE BUFFERS WITHIN AND ADJACENT TO THE SITING CORRIDORS (ACRES)

Species	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Balsam poplar	0.0	4.5	0.0
Bushy St. John's-wort	0.0	0.0	0.0
Passion-flower	< 0.1	< 0.1	< 0.1
Pine siskin	4.4	4.4	1.7
Regal fritillary	28.3	28.3	22.9
Single-headed pussy-toes	0.2	0.2	0.2
Total [a,b]	**32.8**	**37.3**	**24.8**

Source: Jason Ryndock 2025, pers. comm.

[a] Total acreage may overstate the actual impacts as species-specific occurrence buffers overlap in some areas.
[b] Totals may not match the sum of addends due to rounding.

Migratory Bird Treaty Act Species

Migratory birds are protected under the MBTA, which is administered by the USFWS. Table 2.2-64 lists the migratory bird species of concern that may occur within the Siting Corridors according to the USFWS IPaC database. In total, there were 18 species of migratory birds with the potential to occur within the Siting Corridors, of which 16 are birds of conservation concern and 2 are protected under the Bald and Golden Eagle Protection Act (further discussed below).

TABLE 2.2-64 MIGRATORY BIRDS WITH POTENTIAL TO OCCUR WITHIN THE SITING CORRIDORS

Common Name	Scientific Name	Status	Breeding Season
Bald eagle	*Haliaeetus leucocephalus*	Vulnerable [a]	September 1 to August 31
Black-billed cuckoo	*Coccyzus erythropthalmus*	BCC	May 15 to October 10
Black-capped chickadee	*Poecile atricapillus practicus*	BCC	April 10 to July 31
Bobolink	*Dolichonyx oryzivorus*	BCC	May 20 to July 31
Canada warbler	*Cardellina canadensis*	BCC	May 20 to August 10
Cerulean warbler	*Setophaga cerulea*	BCC	August 27 to July 20
Chimney swift	*Chaetura pelagica*	BCC	March 15 to August 25
Eastern whip-poor-will	*Antrostomus vociferus*	BCC	May 1 to August 20
Golden eagle	*Aquila chrysaetos*	Vulnerable [a]	NA [b]
Golden-winged warbler	*Vermivora chrysoptera*	BCC	May 1 to July 20
Henslow's sparrow	*Centronyx henslowii*	BCC	May 1 to August 31
Kentucky warbler	*Geothlypis formosa*	BCC	April 20 to August 20
Northern saw-whet owl	*Aegolius acadicus*	BCC	March 1 to July 31
Prairie warbler	*Setophaga discolor*	BCC	May 1 to July 31
Prothonotary warbler	*Protonotaria citrea*	BCC	April 1 to July 31

Common Name	Scientific Name	Status	Breeding Season
Red-headed woodpecker	*Melanerpes erythrocephalus*	BCC	May 10 to September 10
Rusty blackbird	*Euphagus carolinus*	BCC	NA [b]
Wood thrush	*Hylocichla mustelina*	BCC	May 10 to August 31

Source: USFWS n.d.-b

BCC = bird of conservation concern; NA = not applicable
[a] Not a BCC but protected under the Bald and Golden Eagle Protection Act
[b] Does not occur within the Siting Corridor for the Proposed Route and Alternative Routes during the breeding season.

Seasonal presence and use of the Siting Corridors by avian species listed in Table 2.2-65 will vary in duration and intensity by season and species, but use of the Siting Corridors is expected year-round. Potentially suitable habitats for MBTA species include:

- Barren Land (Rock/Sand/Clay)
- Cultivated Crops
- Deciduous Forest
- Developed, Open Space
- Emergent Herbaceous Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Open Water
- Pasture/Hay
- Shrub/Scrub
- Woody Wetlands

The total acreage of potentially suitable habitat for MBTA species within the Siting Corridors ranges from 499.6 to 1,978.0 acres (Table 2.2-65).

TABLE 2.2-65 POTENTIALLY SUITABLE RARE, THREATENED, AND ENDANGERED SPECIES HABITAT WITHIN THE SITING CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Non-forested	173.2	134.4	555.8
Forested	455.6	365.2	1,422.2
Total [a]	**628.8**	**499.6**	**1,978.0**

Source: USGS 2024a

[a] Totals may not match the sum of addends due to rounding.

Bald and Golden Eagle Protection Act

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and MBTA. Through review of publicly available databases, it was determined that there is one known bald eagle nest within a 660-foot buffer of the Alternative Routes B and F Siting Corridor in Fayette County. The lack of additional nest observations does not mean bald eagle nests do not exist but only that they have not been observed. The Siting Corridors provide potentially suitable habitat and are located in proximity to areas that have high potential for bald eagle nesting habitat. Golden eagles do not occur in the Siting Corridors during the breeding season.

2.2.8.2 IMPACTS

Construction and operation would result in both temporary and permanent impacts on RTE species and/or their habitats within the Proposed Route and Alternative Routes B through F ROW Corridors, as well as the ancillary facility workspaces outside of the Proposed Route ROW Corridor (Table 2.2-65; Figure 2.2-5; Attachment 1d). The terrestrial and aquatic habitats present within the ROW Corridor and ancillary facility workspaces provide potentially suitable habitat for individual species to varying degrees based upon species-specific habitat requirements and life histories. The following discussion likely overstates the potential for impacts on RTE species and/or their habitats, as not all areas discussed below provide potentially suitable habitat for all species. Further, not all potentially suitable habitat for all species is actively, recently, or historically occupied by any particular species.

Temporary impacts on RTE species and/or their habitats, if present, could occur within the ROW Corridors and ancillary facility workspaces outside of the Proposed Route ROW Corridor. Impacts on potentially suitable RTE habitat would be temporary if the existing land cover type is:

- Barren Land (Rock/Sand/Clay)
- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Open Water
- Pasture/Hay
- Shrub/Scrub

These habitats will be restored or allowed to regenerate with select vegetation management as required by site conditions and would be expected to provide suitable habitat for the life of the MARL Project. Other temporary impacts from construction activities (e.g., noise and vibration) could cause temporary displacement of more mobile species to areas outside of construction zones. Most displaced species are expected to return to the area following construction, many of which would be expected to use the newly established and revegetated herbaceous and shrub/scrub habitat during operation. Loss of less mobile species could occur as a result of ground disturbances associated with construction and routine maintenance activities.

Impacts on forested habitats would result from construction, mainly from the conversion of forested habitats to maintained ROW Corridor. The permanent conversion of forested habitat to herbaceous and shrub/scrub habitat would result in the loss of potentially suitable roosting habitat

for listed bat species and could potentially increase forest fragmentation in the ROW Corridors. The MARL Project has been designed to minimize the total amount of tree clearing to the greatest extent practicable to minimize impacts on forested habitats and associated RTE species. The MARL Project was also designed to parallel existing ROWs to avoid and minimize impacts from new forested habitat fragmentation to the greatest extent practicable. The total length where the MARL Project will parallel existing ROWs varies by Alternative Route (Table 2.2-47).

NEET MA will coordinate with applicable federal and state agencies and other stakeholders to determine avoidance and minimization measures, as appropriate, to minimize and prevent impacts on RTE species and loss of RTE species habitat within the ROW Corridor and ancillary facility workspaces. Construction and routine maintenance activities will comply with all MARL Project-specific permit requirements and conditions and will be conducted under MARL Project-specific plans and procedures to minimize or avoid impacts on RTE species and/or their habitat during construction and throughout operation. Following construction, the MARL Project will result in the establishment and maintenance of natural vegetation and habitats in accordance with applicable federal, state, and local requirements that would be expected to be used by some RTE species during the MARL Project's operational life.

Federally Listed Threatened and Endangered Species

Bats

Impacts on Indiana, northern long-eared, and tricolored bats are largely driven by the loss of potentially suitable forested roosting habitat used by individuals, if present, from April 1 to October 15. The total acreage of potentially suitable roosting habitat that would be affected by construction ranges from 153.1 to 596.8 acres within the ROW Corridors (Table 2.2-66; Figure 2.2-5; Attachment 1d). These acres would be converted to herbaceous and shrub/scrub habitat following construction and no longer provide potentially suitable roosting habitat. Temporary impacts on roosting individuals from disturbance associated with construction and routine maintenance activities could occur, if present adjacent to the ROW Corridors. Displaced individuals would be expected to return to areas adjacent to the ROW Corridors following construction. The potentially suitable roosting habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.2 percent to 0.7 percent of the 83,038.4 acres of potentially suitable roosting bat habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-66 POTENTIALLY SUITABLE BAT HABITAT AND KNOWN OCCURRENCES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Potential roosting habitat	455.6	189.2	365.2	153.1	1,422.1	596.8
Potential foraging habitat	628.8	262.9	499.6	212.1	1,978.0	827.4
Staging/hibernacula/swarming habitat	662.3	271.4	396.1	165.8	905.4	375.1

Source: USGS 2024a

ROW = right-of-way

Additional impacts on listed and proposed bat species could occur from the temporary loss of foraging habitat within the Proposed Route and Alternative Route ROW Corridors during construction and routine maintenance activities. The total acreage of potential foraging habitat that would be affected by construction within the ROW Corridors ranges from 212.1 to 827.4 acres (Table 2.2-67; Figure 2.2-5; Attachment 1d). These impacts would remain until vegetation is established within the ROW Corridor following construction. Displaced individuals would be expected to return to the area and use the newly established ROW Corridor for foraging after construction is complete. Foraging habitat quality would improve as the ROW Corridor is revegetated. The potentially suitable foraging habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.2 percent to 0.7 percent of the 122,712.9 acres of potentially suitable foraging habitat present within the MARL Project Study Area in Pennsylvania.

The Proposed Route and Alternative Route ROW Corridors intersect four known occupied hibernacula buffers for listed bats in Greene and Fayette Counites. Trees within these buffers may be used by roosting and foraging bats during spring staging, summer maternity, and fall swarming. Species are considered present from April 1 to November 15. The total acreage of potentially suitable swarming/staging habitat within these buffers that would be affected by construction ranges from 165.8 to 375.1 acres within the ROW Corridor (Table 2.2-67; Figure 2.2-5; Attachment 1d and Attachment 1e). The potentially suitable swarming/staging habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.3 percent to 0.6 percent of the 64,947.7 acres of potentially suitable bat swarming/staging habitat present within the MARL Project Study Area in Pennsylvania.

No impacts on subterranean winter hibernacula would occur during construction or routine maintenance activities. Further, it is assumed that tree clearing activities associated with construction and routine maintenance in areas where bats are known to be present during the active season(s) would occur during the winter months when bats are hibernating (November 16 through March 31). No direct impacts on listed and proposed bats would be expected.

Impacts on potentially suitable bat habitat would also occur associated with access roads and other temporary ancillary facilities outside of the Proposed Route ROW Corridor (Table 2.2-67). Impacts on bat habitat associated with both temporary access roads and other temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor represent less than 0.1 percent of the 83,038.4 acres of potentially suitable roosting habitat, less than 0.1 percent of the 122,712.9 acres of potentially suitable foraging habitat, and less than 0.1 percent of the 64,947.7 acres of potentially suitable bat swarming/staging habitat present within the MARL Project Study Area in Pennsylvania. Similarly, impacts associated with permanent access roads represent less than 0.1 percent of the 83,038.4 acres of potentially suitable roosting habitat, less than 0.1 percent of the 122,712.9 acres of potentially suitable foraging habitat, and less than 0.1 percent of the 64,947.7 acres of potentially suitable bat swarming/staging habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-67 POTENTIALLY SUITABLE BAT HABITAT AND KNOWN OCCURRENCES WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Potentially Suitable Habitat	Permanent Access Roads	Temporary Access Roads	Temporary Ancillary Facilities
Potential roosting habitat	0.3	9.5	11.7
Potential foraging habitat	1.3	12.0	21.0
Hibernation/staging/swarming habitat	1.6	21.5	32.7

Source: USGS 2024a

ROW = right-of-way

Monarch Butterfly

Impacts on monarch butterfly are largely driven by the loss of open grassland and herbaceous habitats that meet the species' habitat requirements. The total acreage of potentially suitable monarch butterfly habitat that would be temporarily disturbed within the ROW Corridors ranges from 48.6to 200.5 acres (Table 2.2-68; Figure 2.2-5; Attachment 1d). Some loss of individual larvae and/or eggs could occur, if present within the ROW Corridor. Loss of adults would not be expected given their volant nature. Following construction, the MARL Project would result in the establishment and maintenance of potentially suitable habitats that could be used by resident and migrating monarch butterflies during operation. The potentially suitable monarch butterfly habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.1 percent to 0.6 percent of the 35,434.1 acres of potentially suitable monarch butterfly habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-68 POTENTIALLY SUITABLE MONARCH BUTTERFLY HABITAT WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Monarch butterfly habitat	152.5	63.4	113.9	48.6	491.2	200.5

Source: USGS 2024a

ROW = right-of-way

Impacts on potentially suitable monarch butterfly habitat would also occur associated with access roads and other temporary ancillary facilities outside of the Proposed Route ROW Corridor (Table 2.2-69). Impacts on monarch butterfly habitat associated with temporary access roads and other temporary ancillary facilities each represent 0.1 percent or less of the 35,434.1 acres of potentially suitable monarch butterfly habitat within the MARL Project Study Area in Pennsylvania. Similarly, impacts associated with permanent access roads represent less than 0.1 percent of the 35,434.1 acres of potentially suitable monarch butterfly habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-69 POTENTIALLY SUITABLE MONARCH BUTTERFLY HABITAT WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Potentially Suitable Habitat	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Monarch butterfly habitat	0.3	9.5	11.7

Source: USGS 2024a

ROW = right-of-way

Pennsylvania Protected Species

Impacts on RTE species are largely driven by loss of potentially suitable habitat and direct impacts on less mobile species. Construction and operation could result in both temporary and permanent impacts on these species and/or their habitats. The extent of impacts on potentially suitable habitat for general wildlife species, if present, that could occur within the ROW Corridors was summarized in Table 2.2-70.

Impacts would be temporary if existing land cover type is:

- Barren Land (Rock/Sand/Clay)
- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Open Water
- Pasture/Hay
- Shrub/Scrub

These habitats will be restored or allowed to regenerate with select vegetation management as required by site conditions. The total acreage of potentially suitable non-forested habitat that would be temporarily disturbed within the ROW Corridors ranges from 59.0 to 230.6 acres (Table 2.2-70). The non-forested habitat impacts associated with the ROW Corridors range from 0.1 percent to 0.6 percent of the 39,674.5 acres of non-forested habitat present within the MARL Project Study Area in Pennsylvania.

Permanent impacts on forested habitats within the ROW Corridors would result from construction, mainly from the conversion of forested habitats to maintained ROW and would affect species that use forested habitat. The total acreage of permanent impacts on forested habitats ranges from 153.8 to 597.5 acres within the ROW Corridors (Table 2.2-70). The forested habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.2 percent to 0.7 percent of the 83,038.4 acres of forested habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-70 POTENTIALLY SUITABLE HABITAT FOR PENNSYLVANIA RARE, THREATENED, AND ENDANGERED SPECIES WITHIN THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Potentially Suitable Habitat	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Non-forested	173.2	73.7	134.2	59.0	555.9	230.6
Forested	455.6	189.2	365.2	153.1	1,422.1	596.8
Total [a]	**628.8**	**262.9**	**499.6**	**212.1**	**1,978.0**	**827.4**

Source: USGS 2024a

ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

In addition to potentially suitable habitat impacts, impacts on RTE species could occur, if present within and adjacent to the ROW Corridors. Temporary impacts from construction activities (e.g., noise and vibration) could cause temporary displacement of more mobile species to areas outside of construction zones. Due to the volant nature of some of these species, direct impacts would not be expected during construction and routine maintenance. Displaced mobile state protected species are expected to return to the area following construction and would be expected to use the newly established and revegetated herbaceous and shrub/scrub habitat during operation. Loss of less mobile species such as plants, if present within the ROW Corridors, could occur as a result of ground disturbances associated with construction and routine maintenance activities.

The total acreage of occupied RTE habitat within the Siting Corridor and ROW Corridor ranges from 0.0 to 28.3 acres, depending on the species (Table 2.2-71; Figure 2.2-5; Attachment 1d and Attachment 1e).

TABLE 2.2-71 OCCUPIED RARE, THREATENED, AND ENDANGERED SPECIES HABITAT WITHIN AND ADJACENT TO THE SITING CORRIDORS AND ROW CORRIDORS (ACRES)

Species	Proposed Route / Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Balsam poplar	0.0	0.0	4.5	2.1	0.0	0.0
Bushy St. John's-wort	0.0	0.0	0.0	0.0	< 0.1	< 0.1
Passion-flower	< 0.1	0.0	< 0.1	0.0	< 0.1	0.0
Pine siskin	4.4	0.8	4.4	0.8	1.7	0.6
Regal fritillary	28.3	12.5	28.3	12.5	22.9	9.1
Single-headed pussy-toes	0.2	0.1	0.2	0.1	0.2	0.1
Wild oat	0.0	0.0	0.0	0.0	0.0	0.0
Total [a,b]	**32.8**	**13.4**	**37.3**	**15.5**	**24.8**	**9.8**

Source: Jason Ryndock 2025, pers. comm.

ROW = right-of-way
[a] Total acreage may overstate the actual impacts as species-specific occurrence buffers overlap in some areas.
[b] Totals may not match the sum of addends due to rounding.

Impacts on potentially suitable habitat for RTE species would also occur associated with access roads and other temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor (Table 2.2-72). Impacts on non-forested habitat associated with temporary access roads and other temporary ancillary facilities each represent 0.1 percent or less of the 39,647.5 acres of non-forested habitat within the MARL Project Study Area in Pennsylvania. Similarly, impacts on forested habitat associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 83,038.4 acres of forested habitat within the MARL Project Study Area in Pennsylvania. Impacts associated with permanent access road represent less than 0.1 percent of the 122,712.9 acres of potentially suitable RTE habitat present within the MARL Project Study Area in Pennsylvania.

TABLE 2.2-72 POTENTIALLY SUITABLE RARE, THREATENED, AND ENDANGERED SPECIES HABITAT WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Potentially Suitable Habitat	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Non-forested	0.3	9.5	11.7
Forested	1.3	12.0	21.0
Total [a]	**1.6**	**21.5**	**32.7**

Source: USGS 2024a

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

Migratory Bird Treaty Act Species

Impacts on MBTA species are largely driven by loss of potentially suitable habitat and direct impacts during the nesting season when eggs or non-volant chicks are present. Construction and operation would result in both temporary and permanent impacts on MBTA species and/or their habitats. The extent of impacts on potentially suitable habitat for MBTA species, if present, that could occur within the ROW Corridors are described in Table 2.2-70.

Impacts would be temporary if existing land cover type is:

- Barren Land (Rock/Sand/Clay)
- Developed, Open Space
- Emergent Herbaceous Wetland
- Grassland/Herbaceous
- Open Water
- Pasture/Hay
- Shrub/Scrub

These habitats will be restored or allowed to regenerate with select vegetation management as required by site conditions. The total acreage of non-forested habitat that would be temporarily disturbed within the ROW Corridors ranges from 59.0 to 230.6 acres, which represents 0.1 percent to 0.6 percent of the 39,674.5 acres of non-forested habitat present within the MARL Project Study Area in Pennsylvania.

Impacts on forested habitats within the ROW Corridor would primarily result from the permanent conversion of forested habitats to maintained ROW and would affect MBTA species that use forested habitat. In addition, cutting of forested vegetation could also potentially increase forest fragmentation in some areas. The total acreage of permanent impacts on forested habitats ranges from 153.1 to 596.8acres within the ROW Corridors (Table 2.2-70). The forested habitat impacts associated with the Proposed Route and Alternative Route ROW Corridors range from 0.2 percent to 0.7 percent of the 83,038.4 acres of forested habitat present within the MARL Project Study Area in Pennsylvania.

Impacts on potentially suitable habitat for MBTA species would also occur associated with access roads and other temporary ancillary facility workspaces outside of the Proposed Route ROW Corridor land cover (Table 2.2-72). Impacts on non-forested habitat associated with temporary access roads and other temporary ancillary facilities each represent 0.1 percent or less of the 39,4674.5 acres of non-forested habitat within the MARL Project Study Area in Pennsylvania. Similarly, impacts on forested habitat associated with temporary access roads and other temporary ancillary facilities each represent less than 0.1 percent of the 83,038.4 acres of forested vegetation within the MARL Project Study Area in Pennsylvania. Impacts associated with permanent access roads represent less than 0.1 percent of the 122,712.9 acres of potentially suitable MBTA habitat present within the MARL Project Study Area in Pennsylvania.

Bald and Golden Eagle Protection Act

As discussed above, there is one known bald eagle nest within a 660-foot buffer of the Alternative Routes B and F Siting Corridor in Fayette County. However, the ROW Corridors where impacts will occur are outside of the 660-foot buffer recommend by the National Bald Eagle Management Guidelines to be protective of nesting bald eagles (USFWS 2007). Construction and routine maintenance activities will be conducted in consultation with applicable resource agencies to avoid and minimize impacts on nesting bald eagles. If additional nests or individuals are identified before, during, or after construction, NEET MA will coordinate with applicable stakeholders to avoid and minimize impacts on bald eagle throughout operation.

2.3 HUMAN ENVIRONMENT

This section describes human-influenced elements of the environment, including land use / land cover (hereafter, "land cover"), local comprehensive plans and zoning, conservation and protected lands and recreation resources, aesthetics and scenic areas, cultural resources, linear infrastructure and transportation, and hazardous material sites within and applicable to the MARL Project.

2.3.1 LAND USE AND LAND COVER

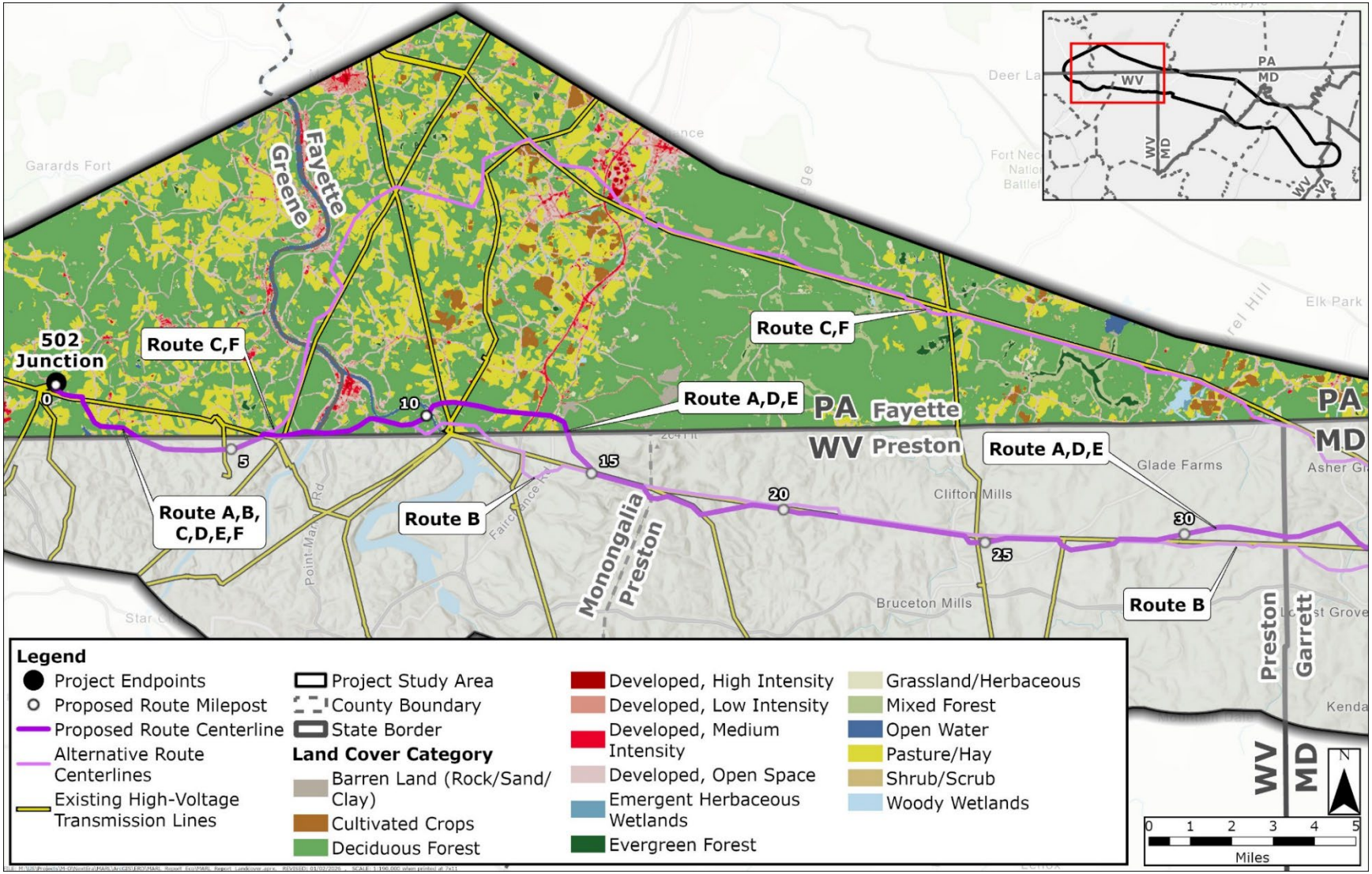
This section describes existing land cover classifications within and applicable to the Proposed Route and each Alternative Route. Land cover refers to the visible, topographic, vegetation, and human-influenced characteristics of land, whereas land use refers to the actual way that land is used, regardless of what land cover is visible. For example, an area of Developed, Medium Intensity land cover could include a variety of land use types, such as low or medium intensity residential or other developed uses such as commercial or industrial.

2.3.1.1 EXISTING CONDITIONS

ERM cataloged land cover within the Siting Corridors for the Proposed Route and the Alternative Routes B through F using Geographic Information System (GIS) data from the NLCD (USGS 2024). Figure 2.3-1 shows land cover existing conditions within the MARL Study Area in Pennsylvania; Attachment 1d shows this information in more detail for the Siting Corridor. Table 2.3-1 shows the approximate acreage of land cover classifications within the Proposed Route and Alternative Route Siting Corridors. The Proposed Route and Alternative Routes D and E are completely collocated in Pennsylvania and, therefore, described together. Similarly, Alternative Routes C and F are completely collocated in Pennsylvania and also described together.

As shown in Table 2.3-1, forest is the primary land cover within each Siting Corridor (69.8 to 72.4 percent), the large majority of which is Deciduous Forest. Agricultural land (primarily Pasture/Hay) is the second most common land cover type (15.9 to 22.2 percent), while developed land (nearly all of which is Developed, Open Space) accounts for 4.6 to 7.0 percent of each Siting Corridor.

FIGURE 2.3-1 LAND COVER EXISTING CONDITIONS



Source: USGS 2024

MD = Maryland; NLCD = National Land Cover Database; PA = Pennsylvania; VA = Virginia; WV = West Virginia

TABLE 2.3-1 LAND COVER CLASSIFICATIONS WITHIN THE SITING CORRIDORS

Land Cover Category	Proposed Route/ Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
	Acres	%	Acres	%	Acres	%
Barren Land (Rock/Sand/Clay)	3.1	0.5	3.1	0.6	11.2	0.6
Cultivated Crops	0.0	0.0	0.0	0.0	45.3	2.2
Deciduous Forest	445.7	69.8	352.8	70.0	1,316.2	65.4
Developed, High Intensity	0.0	0.0	0.0	0.0	3.8	0.2
Developed, Low Intensity	7.8	1.2	4.5	0.9	22.3	1.1
Developed, Medium Intensity	1.8	0.3	0.2	<0.1	9.0	0.4
Developed, Open Space	35.1	5.5	26.0	5.2	58.2	2.9
Emergent Herbaceous Wetlands	0.0	0.0	0.0	0.0	4.1	0.2
Evergreen Forest	0.0	0.0	0.0	0.0	6.1	0.3
Grassland/Herbaceous	3.2	0.5	5.5	1.1	2.9	0.1
Mixed Forest	9.9	1.6	12.4	2.5	83.4	4.1
Open Water	17.6	2.7	17.4	3.4	8.2	0.4
Pasture/Hay	112.3	17.6	80.0	15.9	401.1	19.9
Shrub/Scrub	1.9	0.3	2.4	0.5	24.9	1.2
Woody Wetlands	0.0	0.0	0.0	0.0	16.4	0.8
Total [a]	**638.5**	**100.0**	**504.3**	**100.0**	**2,013.1**	**100.0**

Source: USGS 2024

[a] Totals may not match the sum of addends due to rounding.

Alternative Routes C and F cross approximately three times as much land in Pennsylvania when compared with the Proposed Route and other Alternative Routes and also cross a more diverse set of land cover categories than the other routes. The Siting Corridor for Alternative Routes C and F also crosses several land cover types not crossed by other routes: Developed, High Intensity; Wetlands; Evergreen Forest; and Mixed Forest.

Forestry Uses and Open Lands

Nearly all forested land within the Siting Corridors is Deciduous Forest (65.4 to 69.8 percent of total land cover). Small areas of Mixed Forest (including deciduous and evergreen trees) are present in each Siting Corridor, while only the shared Siting Corridor for Alternative Routes C and F crosses Evergreen Forest.

The forest land cover category includes large uninterrupted areas of undeveloped wooded land typically associated with public or recreational uses, as well as smaller forested areas that are interspersed with agricultural land or associated with residential development. Some of the largest areas of forested lands in the MARL Project Study Area in Pennsylvania are within portions of the Quebec Run Wild Area, Forbes State Forest, and State Game Lands 138, which are crossed by the shared Siting Corridor of Alternative Routes C and F, as discussed further in Section 2.3.3, Conservation and Protected Lands and Recreation Resources.

Open Lands are undeveloped, non-agricultural natural areas, including Barren Land, Emergent Herbaceous Wetlands, Grassland/Herbaceous, Open Water, Scrub/Shrub, and Woody Wetlands land cover categories. Open lands comprise 3.2 to 4.5 percent of the land cover in the Siting Corridors.

Agricultural Uses

As shown in Table 2.3-1, agriculture (primarily Pasture/Hay land cover) comprises a notable portion of the Proposed Route and Alternative Route Siting Corridors. Pasture/Hay accounts for 17.6 percent of the Siting Corridor for the Proposed Route and Alternative Routes D and E and 15.9 percent of the Siting Corridor for Alternative Route B. Agricultural land—including both Cultivated Crops and Pasture/Hay—accounts for 22.2 percent of the shared Siting Corridor for Alternative Routes C and F.

The Commonwealth of Pennsylvania has several mechanisms for protecting farmland, including agricultural security areas, agricultural conservation easements, and Act 319 of 1974 (the Clean and Green Act).

The Pennsylvania Agricultural Security Law of 1981 (Title 3, Pennsylvania Consolidated Statutes §§ 901–915) provides protections for farmland voluntarily enrolled as an agricultural security area. A minimum acreage of 250 acres is required to establish an agricultural security area; new parcels of farmland may be added to an established agricultural security area. Participants receive special consideration regarding regulations, nuisance complaints, and conflicting land uses (PDA 2025a).

The Pennsylvania Agricultural Conservation Easement Purchase Program, created in 1989, enables state and local governments to pay farmers for agreeing to limit the use of their land to

agricultural production or agriculture and related activities (PDA 2025b). The Pennsylvania Farmland and Forest Land Assessment Act 319 of 1974 (also known as the Clean and Green Act) assists in preserving farmland by setting property taxes based on the agricultural land use instead of the prevailing market rate (Greene County n.d.).

In accordance with Pennsylvania agricultural security area regulations (Title 7, Pa. Code § 1381.20(b)(4)), public utility facilities (including transmission lines such as the MARL Project) that have been reviewed and approved by the PAPUC are permitted within an agricultural security area. Agricultural Conservation Easement Purchase Program regulations allow public utilities in agricultural conservation easements if the property owner grants a ROW (7 Pa. Code § 138e.241(2)).

Developed Lands

Developed lands within the Siting Corridors include roads, residential properties, commercial, industrial, and institutional land uses. For this analysis, developed lands also include the Developed, Open Space land cover designation (which typically identifies maintained recreation areas such as golf courses, athletic fields, and parks). Only the shared Siting Corridor for Alternative Routes C and F crosses Developed, High Intensity land cover. This occurs where the Siting Corridor crosses industrial land approximately 1 mile northeast of Smithfield, Pennsylvania.

Cemeteries, Schools, and Places of Worship

ERM reviewed Homeland Infrastructure Foundation-Level Data (DHS 2025) to identify cemeteries, schools, and places of worship within the Siting Corridor for the Proposed Route and Alternative Routes. ERM's review of schools considered public and private pre-kindergarten through secondary schools, religious schools, daycare centers (excluding in-home daycares), technical schools, after-school enrichment and tutoring programs, and college/university campuses. No schools, cemeteries, or places of worship are with the Siting Corridor for the Proposed Route and Alternative Routes; therefore, these resources are not further discussed.

Proposed Developments

To identify proposed developments within the Siting Corridor, ERM reviewed published development plans; meeting minutes and agendas from 2020 through 2025, including records from Greene County Planning Commission and the Springfield Township Board of Supervisors; and available news articles, as cited below. Fayette County Planning Commission meeting records were not available online, and few townships in Greene or Fayette Counties maintain a publicly available list of development proposals or approved plans.

The Longview Power Clean Energy Center is a planned expansion and upgrade of the Longview coal power plant in West Virginia, south of Dunkard Township. The plans call for 70 megawatts of solar power produced on parcels in Pennsylvania and West Virginia. The exact siting of the solar component is not known but would likely include land in Dunkard Township. The facility was approved by the West Virginia Public Service Commission in 2019, and a time extension through 2030 was granted in 2024 (Greene County 2019a; WV Public Broadcasting 2024; Conley 2024).

Development in Fayette County is generally focused along the Pennsylvania State Route (PA) 43 and U.S. Route (US) 119 corridors in and around the Cities of Uniontown and Connellsville and Fairchance Borough. Two available development sites are advertised within the Fayette Business Park in Georges Township (Fay-Penn EDC n.d.). The shared Siting Corridor for Alternative Routes C and F crosses the Fayette Business Park, south of the sites identified as available for development.

In January 2025, the Fayette County Planning Commission approved a site plan for the Bollinger Solar Plant, a utility-scale solar facility in Nicholson Township along Woodside Old Farm Road. The solar facility would be approximately 600 feet north of the shared Siting Corridor for Alternative Routes C and F (Leonard Minnick 2025, pers. comm.).

2.3.1.2 IMPACTS

This section discusses the impacts of the Proposed Route and each Alternative Route on land cover. Table 2.3-2 summarizes the acreage of land cover crossed by each ROW Corridor and Siting Corridor. Table 2.3-3 summarizes the acreage of land cover category affected by workspaces for temporary and permanent ancillary facilities outside of the Proposed Route ROW Corridor. Section 2.2, Natural Environment, describes how these land cover changes would affect physiographic setting, geology, groundwater, soils, streams, lakes, wetlands, floodplains, vegetation, wildlife, and RTE species. The remainder of this section describes the general land cover impacts of the Proposed Route and Alternative Routes, highlights notable differences in land cover impacts among the Alternative Routes, and provides contextual comparisons between the land cover in the ROW Corridors and the MARL Project Study Area in Pennsylvania.

Proposed Route and Alternative Routes D and E

The distribution of land uses within the ROW Corridor for the Proposed Route and Alternative Routes D and E will be similar to the distribution described for the Siting Corridor. The ROW Corridor will primarily affect Deciduous Forests (69.4 percent of the ROW Corridor) and Pasture/Hay (18.0 percent) land cover types, while developed land will be 6.8 percent of the ROW Corridor (the large majority of which is Developed, Open Space). Of the 59.7 acres within ancillary facility workspaces outside of the Proposed Route ROW corridor during construction, 55.6 percent (33.2 acres) will be Deciduous Forest, while 21.8 percent (13.0 acres) will be Pasture/Hay.

MARL Project construction would result in temporary restrictions on access to land used for work areas within the ROW Corridor, which affects the ability to use that land. In addition, MARL Project construction would result in temporary access restrictions to land used for ancillary facility workspaces, including temporary and permanent access roads, construction work areas, construction equipment staging areas, laydown areas, and other construction workspaces. These areas would be restricted prior to and during construction and reopened to previous uses upon completion of construction.

During construction, forested portions of the shared ROW Corridor for the Proposed Route and Alternative Routes D and E will be cleared of trees and vegetation coverage will be converted to herbaceous and scrub/shrub land cover for the life of the MARL Project. The 189.2 acres of forest within the ROW Corridor represent 0.2 percent of the total forested land in the MARL Project Study Area in Pennsylvania. The 33.5 acres of forest within the ancillary facility workspaces outside of the Proposed Route ROW Corridor represent less than 0.1 percent of forest in the MARL Project Study Area in Pennsylvania.

TABLE 2.3-2 LAND COVER CLASSIFICATIONS WITHIN THE SITING CORRIDORS AND ROW CORRIDORS

Land Cover Category	Proposed Route / Alternative Routes D and E				Alternative Route B				Alternative Routes C and F			
	Siting Corridor		ROW Corridor		Siting Corridor		ROW Corridor		Siting Corridor		ROW Corridor	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Barren Land (Rock/Sand/Clay)	3.1	0.5	1.6	0.6	3.1	0.6	1.6	0.7	11.2	0.6	4.8	0.6
Cultivated Crops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.3	2.2	21.0	2.5
Deciduous Forest	445.7	69.8	185.1	69.4	352.8	70.0	147.6	68.9	1,316.2	65.4	549.7	65.3
Developed, High Intensity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.2	1.3	0.1
Developed, Low Intensity	7.8	1.2	3.4	1.3	4.5	0.9	2.1	1.0	22.3	1.1	8.9	1.1
Developed, Medium Intensity	1.8	0.3	0.7	0.2	0.2	<0.1	0.0	0.0	9.0	0.4	3.9	0.5
Developed, Open Space	35.1	5.5	14.2	5.3	26.0	5.2	10.3	4.8	58.2	2.9	24.8	2.9
Emergent Herbaceous Wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.2	2.2	0.3
Evergreen Forest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.3	2.1	0.2
Grassland/Herbaceous	3.2	0.5	0.8	0.3	5.5	1.1	2.3	1.1	2.9	0.1	1.0	0.1
Mixed Forest	9.9	1.6	4.1	1.5	12.4	2.5	5.5	2.6	83.4	4.1	37.0	4.4
Open Water	17.6	2.7	8.7	3.3	17.4	3.4	8.8	4.1	8.2	0.4	4.3	0.5
Pasture/Hay	112.3	17.6	48.0	18.0	80.0	15.9	35.5	16.6	401.1	19.9	162.7	19.3
Shrub/Scrub	1.9	0.3	0.4	0.1	2.4	0.5	0.5	0.2	24.9	1.2	9.8	1.2
Woody Wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	0.8	8.0	0.9
Total [a]	**638.5**	**100.0**	**266.9**	**100.0**	**504.3**	**100.0**	**214.1**	**100.0**	**2,013.1**	**100.0**	**841.4**	**100.0**

Source: USGS 2024

ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

TABLE 2.3-3 LAND COVER CLASSIFICATIONS WITHIN ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR (ACRES)

Land Cover Category	Permanent Access Roads	Temporary Access Roads	Other Temporary Ancillary Facilities
Barren Land (Rock/Sand/Clay)	0.0	0.4	0.1
Deciduous Forest	1.3	11.3	20.5
Developed, Low Intensity	0.0	2.9	0.3
Developed, Medium Intensity	0.0	0.1	0.0
Developed, Open Space	<0.1	6.6	1.8
Grassland/Herbaceous	0.0	0.0	0.0
Mixed Forest	0.0	0.3	0.4
Pasture/Hay	0.2	2.9	9.9
Shrub/Scrub	0.0	0.2	0.5
Total [a]	**1.6**	**24.7**	**33.4**

Source: USGS 2024

[a] Totals may not match the sum of addends due to rounding.

Except for permanent access roads, land cover within ancillary facility workspace areas would be allowed to return to its preconstruction condition. Reforestation of previously forested areas would be possible after construction, with trees taking at least 20 years to reach maturity. Similarly, the Developed, Open Space and agricultural areas will return to their previous function once construction is completed.

The cleared ROW for permanent access roads would result in permanent conversion of 1.6 acres of land—including 1.3 acre of Deciduous Forest, 0.2 acre of Pasture/Hay, and a minimal area of Developed, Open Space—to roads. Conversion of open space to permanent access roads would result in little change in overall land use character. Deciduous forest will be cleared and converted to shrub/scrub and will remain as such in perpetuity to make sure permanent access is provided for maintenance and upkeep for the duration of the transmission infrastructure.

To the greatest extent practicable, the MARL Project will parallel existing ROWs to avoid and minimize impacts from new forested habitat fragmentation. If construction and operation results in fragmentation of existing forested areas, this fragmentation would not likely meaningfully change the overall forest patterns in West Virginia due to the extensive remaining forested areas in the counties crossed by the routes.

The shared ROW Corridor workspaces for the Proposed Route and Alternative Routes D and E cross 48.0 acres of Pasture/Hay, while the ancillary facility workspaces outside of the Proposed Route ROW Corridor cross 13.0 acres of Pasture/Hay. This represents less than 0.1 percent of all Pasture/Hay land in the MARL Project Study Area in Pennsylvania. During construction, agricultural lands within the ROW Corridor and ancillary facility workspaces will be unavailable for agricultural production, resulting in temporary impacts on farming such as crop harvesting and grazing. Additionally, the land clearing associated with the transmission ROW infrastructure could have impacts on soil erosion and compaction. As stated in Section 2.2.2, Soils, BMPs for the protection

of topsoil and avoidance of degradation of farmland could include minimization of soil disturbance where possible, salvage of topsoil removed during grading activities for redistribution during the final reclamation of a site to facilitate the re-establishment of desirable vegetation, and stabilization of soil post-construction. During operation, agricultural activities within the ROW Corridor and ancillary facility workspaces will generally be allowed to continue, resulting in no long-term change in land cover.

In developed areas, the ROW Corridor would avoid encroachment on residential and nonresidential structures to the greatest degree possible. Construction in developed areas would temporarily affect typical activities due to the presence of construction equipment and MARL Project components. Operation will not change the land cover categorization or land uses in developed areas, except that new third-party structures will not be permitted by NEET MA within the ROW Corridor.

During MARL Project operation, changes in land cover would occur where structures are installed, as well as where forested land is converted to herbaceous and shrub / scrub habitat to accommodate the ROW Corridor. MARL Project operation will have minimal impact on farming operations, because livestock grazing and row crops can typically coexist with the transmission line. To the degree that the ROW Corridor crosses orchards, nurseries, tree farms, or other agricultural activities that involve trees or other vegetation with a natural mature height of greater than 10 feet, such vegetation will be replaced with herbaceous and scrub / shrub habitat. Equipment and vehicles that do not exceed 14 feet in height (including those that can be extended to no more than 14 feet in height) will also be allowed to operate within the ROW Corridor. Operation will not change the land cover categorization or land uses in developed areas, except that new third-party structures will not be permitted by NEET MA within the ROW Corridor.

To minimize permanent changes to land cover, NEET MA will use existing paved and/or gravel/dirt roads for temporary construction and long-term maintenance access within and outside of the ROW Corridor, where feasible. To minimize tree clearing in forested areas, the MARL Project will only clear trees required to establish the ROW Corridor and within the ancillary facility workspaces. NEET MA will coordinate with affected landowners prior to establishment of ROW easements and construction to negotiate measures to minimize impacts on the long-term viability of the use of the property.

The shared ROW Corridor for Proposed Route and Alternative Routes would not affect any proposed development, other than supporting increased power reliability for the MARL Project Study Area in Pennsylvania, including areas targeted for future development. Similarly, the ancillary facility workspaces would not affect proposed development.

Alternative Route B

The ROW Corridor for Alternative Route B covers less land in Pennsylvania (214.3 acres) than the Proposed Route (266.9 acres). The distribution of land cover types within the ROW Corridor for Alternative Route B is similar to the distribution for the Proposed Route. The 153.1 acres of forested lands and 35.5 acres of agricultural lands in the ROW Corridor for Alternative Route B represent less than 0.2 percent of forested land and less than 0.1 percent of agricultural land within the MARL Project Study Area in Pennsylvania. Impacts on agricultural land and developed

land are consistent with those discussed for the Proposed Route and Alternative Routes D and E. The ROW Corridor for Alternative Route B would not affect cemeteries, schools, places of worship, or any proposed development.

Impacts of Alternative Route B on land cover are similar to those discussed for the Proposed Route and Alternative Routes D and E, most notably those impacts discussed regarding forestry uses and open lands. These include long-term conversion of forest to herbaceous and scrub/shrub land cover within the ROW Corridor, as well as temporary access restrictions to the ROW Corridor, which will restrict agricultural activities during construction.

NEET MA will employ the same approaches to avoid or minimize impacts from Alternative Route B as described for the Proposed Route and Alternative Routes D and E.

Alternative Routes C and F

The shared ROW Corridor for Alternative Routes C and F covers substantially more land area in Pennsylvania (841.4 acres) than the Proposed Route (266.9 acres). As shown in Table 2.3-2, Alternative Routes C and F cover similar percentages of total forested land as the Proposed Route and proportionately more agricultural land—including Cultivated Crops and Pasture/Hay land cover categories—than the Proposed Route (21.8 percent versus 18.0 percent). The 588.8 acres of forested lands and 183.6 acres of agricultural land in the ROW Corridor for Alternative Routes C and F each represent 0.7 percent of forested land and agricultural land within the MARL Project Study Area in Pennsylvania.

Impacts of Alternative Routes C and F on land cover are similar to those discussed for the Proposed Route and Alternative Routes D and E, most notably those impacts discussed regarding forestry uses and open lands. These include long-term conversion of forest to herbaceous and scrub/shrub land cover within the ROW Corridor, as well as temporary access restrictions to the ROW Corridor, which will restrict agricultural activities during construction. Impacts on agricultural land and developed land are consistent with those discussed for the Proposed Route and Alternative Routes D and E. The ROW Corridor for Alternative Routes C and F would not affect cemeteries, schools, places of worship, or any proposed development.

NEET MA will employ the same approaches to avoid or minimize impacts of Alternative Routes C and F as described for the Proposed Route and Alternative Routes D and E.

2.3.2 LOCAL COMPREHENSIVE PLANS AND ZONING

Comprehensive plans in Pennsylvania identify existing conditions, determine a jurisdiction’s overall vision for future growth and development, and set a framework to achieve this vision through goals, objectives, and policies. In Pennsylvania, counties and individual municipalities may prepare comprehensive plans. Zoning and other development regulations are laws that govern the allowed types of uses and physical characteristics and relationships of those uses. All counties in Pennsylvania have a Subdivision and Land Development Ordinance (SALDO), which can include zoning provisions. Municipalities may adopt a municipal SALDO, which supplants the county ordinance. Because County and municipal SALDOs generally apply to structures (e.g., residences or commercial buildings) these regulations would not apply to the MARL Project unless a nonresidential building is proposed in relation to the transmission line.

This section discusses available comprehensive plans and development regulations for the Pennsylvania municipalities crossed by the corridors, as well as the comprehensive plans and development regulations for Greene and Fayette Counties. This section also describes the current local land development regulations—including zoning—and comprehensive land use planning documents, including existing and future land use, designated or proposed growth areas, and designated or proposed preservation areas within the Siting Corridor.

The analysis also identifies impacts from the MARL Project on these existing and future land use planning priorities. This section also discusses applicable local zoning provisions.

2.3.2.1 EXISTING CONDITIONS

Comprehensive Planning Overview

The Pennsylvania Municipalities Planning Code (MPC) (53 P.S. §§ 10101-11202, as amended) empowers counties and municipalities to develop and adopt comprehensive plans (DCED 2022). State guidance explains that "comprehensive plan components should convey a clear strategy for residential, recreational, agricultural, open space, commercial, industrial, resource extraction and institutional uses as well as the necessary infrastructure to serve development as planned" (DCED 2020).

Under Article III of the MPC, comprehensive plans must include elements related to development regulations, land use identification, housing, transportation, community facilities and utilities, energy conservation, implementation strategies, interrelationships among plan components, natural and historic resources, and water resources (DCED 2022). However, the MPC states that no action by the governing body of a county or municipality "shall be invalid nor shall the same be subject to challenge or appeal on the basis that such action is inconsistent with, or fails to comply with, the provisions of a comprehensive plan." (53 P.S. 10303(c)). The MPC allows counties and municipalities to designate growth areas and rural resource areas within their comprehensive plans. These designations guide where development is encouraged and where public infrastructure investments are prioritized (DCED 2022).

The Pennsylvania Department of Community and Economic Development, through the Governor's Center for Local Government Services, provides guidance and technical assistance for comprehensive planning. Counties and municipalities are required to review their comprehensive plans every 10 years. While the Pennsylvania Department of Community and Economic Development does not formally approve comprehensive plans, municipalities and counties may be ineligible for certain state grants or funding programs if their plans are outdated or inconsistent with county or regional plans, respectively.

Greene County

The 2019 Greene County draft comprehensive plan (Greene County 2019b) provides a framework for guiding future growth, development, and public investment. The comprehensive plan includes six "pillars" that serve as the guiding framework for county growth: mobility, infrastructure and transportation; workforce and education; business and industry; quality of life; grow and protect assets; and local government (Greene County 2019b).

Under the business & industry pillar, the Greene County comprehensive plan recommends promoting investment and expansion of existing infrastructure, specifically electric transmission lines. This initiative supports the county's goal of capitalizing on the region's energy production: Greene County produces 3 percent of the nation's total natural gas output and is still active in coal production. The comprehensive plan describes the goal of attracting investment based on these energy-sector strengths and the availability of transmission infrastructure (Greene County 2019b).

The comprehensive plan's future land use component provides an infrastructure investment areas map (Figure 2.3-2) that depicts areas where specific infrastructure is planned. Downstream Infrastructure Investment Areas and Rail Investment Areas are locations the county has identified as being best suited to accommodate downstream manufacturers and where the county encourages and incentivizes the development of infrastructure that supports manufacturing operations and activities, such as compressor stations, processing facilities, broadband, fractionators, intermodal rail, and dam system upgrades (Greene County 2019b). Electricity Transmission Lines Investment Areas identify corridors (which overlap other investment area designations) where the county wishes to concentrate new transmission infrastructure (Greene County 2019b). Table 2.3-4 summarizes the percent of each Alternative Route within Downstream Infrastructure Investment and Electricity Transmission Lines Investment areas.

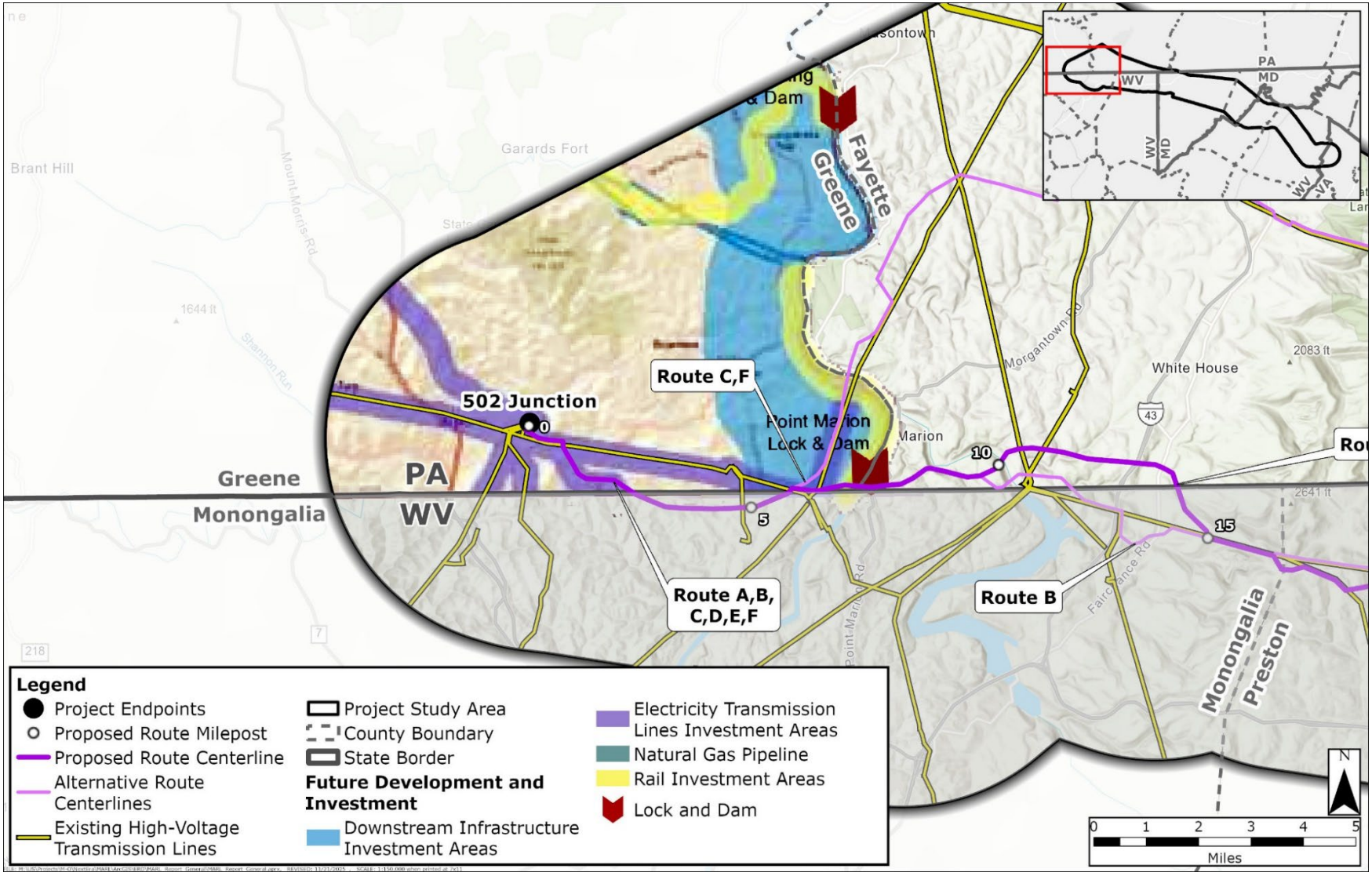
TABLE 2.3-4 PERCENT OF PROPOSED ROUTE AND ALTERNATIVE ROUTES WITHIN GREEN COUNTY INFRASTRUCTURE INVESTMENT AREAS

Infrastructure Investment Area Type	Proposed Route and Alternative Routes B, D, and E	Alternative Routes C and F
Downstream Infrastructure Investment Area	35.2	50.9
Electricity Transmission Lines Investment Area	80.8	96.1

Fayette County

The 2019 Fayette County comprehensive strategy, the county's comprehensive plan (Fayette County 2019), addresses economic growth, housing and quality of life, recreation and tourism, future land use, and plan implementation strategies. Unlike Greene County, Fayette County's comprehensive plan does not identify priority areas for infrastructure. Figure 2.3-3 shows the comprehensive plan's future land use map. The Fayette County comprehensive plan focuses on revitalizing existing communities, leveraging transportation corridors, expanding services in areas with the capacity to accommodate new development, and fostering regional collaboration. Key goals include supporting redevelopment and infill within boroughs and older towns, enhancing access to housing and employment opportunities, and aligning infrastructure improvements with targeted growth areas.

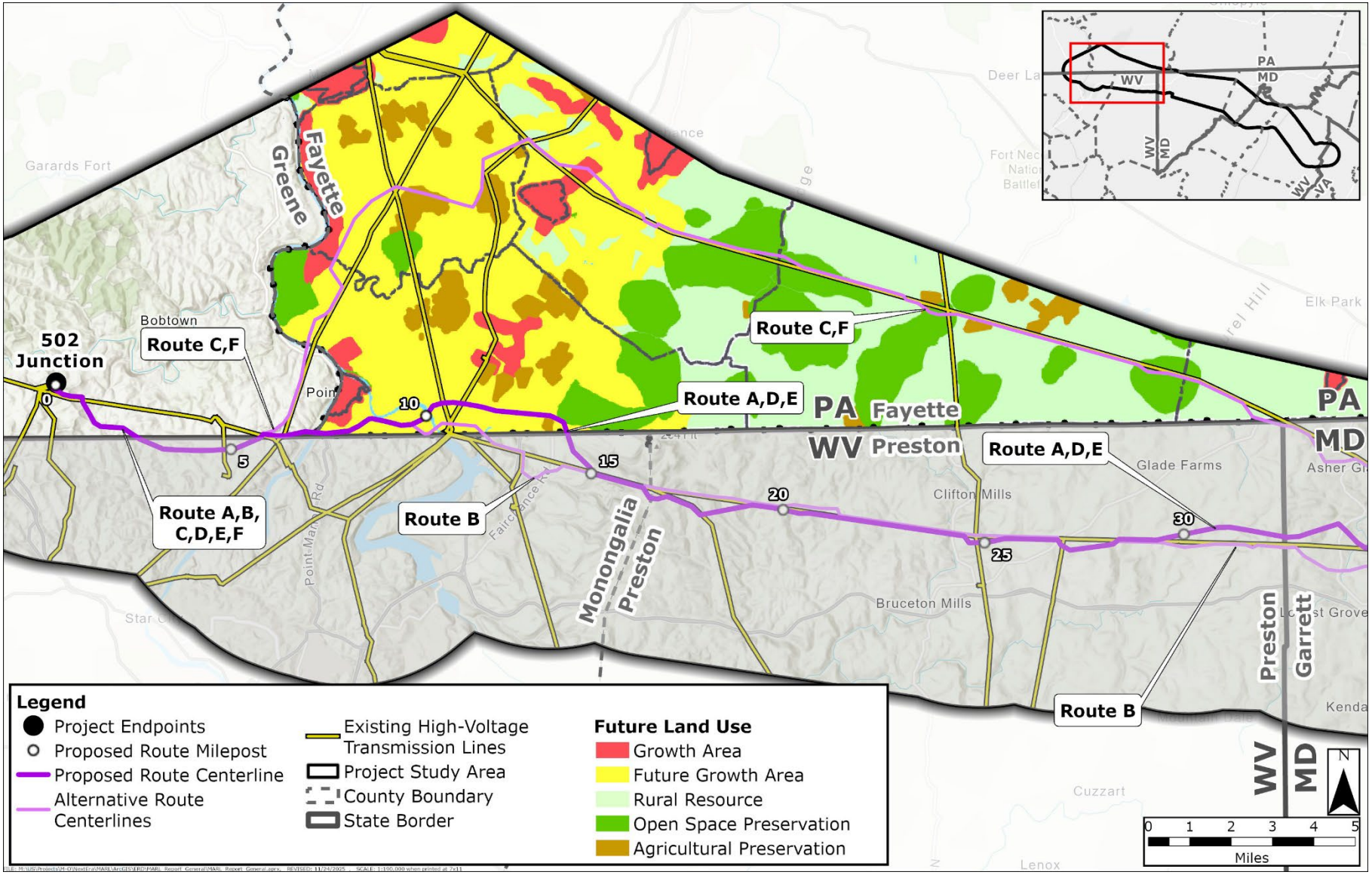
FIGURE 2.3-2 GREENE COUNTY INFRASTRUCTURE INVESTMENT AREAS MAP



Source: Greene County 2019b

MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

FIGURE 2.3-3 FAYETTE COUNTY FUTURE LAND USE



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

Zoning Overview

Under Pennsylvania Law, public utility facilities are exempt from local ordinances as a general rule.[7] Nevertheless, the PAPUC considers the impact of its decisions related to applications for certificates of public convenience, the siting and construction of transmission lines, and the siting of public utility "buildings" (52 Pa. Code § 69.1101). Substations and other facilities may be subject to local land use approvals and screening standards, including buffers and landscaping.

Through the MPC, Pennsylvania grants zoning jurisdiction to counties and municipalities. Counties and municipalities are not required to adopt zoning; however, any adopted zoning ordinance must adhere to the provisions of the MPC. If the county chooses to have zoning, the county zoning ordinance applies to municipalities that do not have a zoning ordinance. If a municipality chooses to have zoning, the county zoning ordinance does not apply. Table 2.3-5 summarizes the zoning status of the counties and municipalities crossed by the Proposed Route and/or Alternative Routes. This section describes the provisions of zoning codes in jurisdictions potentially crossed by MARL Project facilities to discuss the degree to which the MARL Project would be consistent with local land development priorities.

TABLE 2.3-5 LAND DEVELOPMENT ORDINANCES IN JURISDICTIONS CROSSED BY THE MARL PROJECT

Jurisdiction	Zoning Ordinance	Subdivision and Land Development Ordinance
Greene County	No	Yes
Dunkard Township	No	No
Fayette County	Yes	Yes
Springhill Township	Yes	No
Nicholson Township	No	No
Georges Township	No	No
Wharton Township	Yes	Yes
Henry Clay Township	Yes	No

Greene County

Greene County does not have a countywide zoning ordinance. Dunkard Township—the only municipality in Greene County crossed by the Proposed Route and Alternative Routes—has no established zoning districts or zoning provisions; therefore, zoning in Greene County is not further discussed.

[7] *See, e.g.*¸ *PPL Elec. Utils. Corp. v. City of Lancaster*, 654 Pa. 203, 214 A.3d 639, 655 (Pa. 2019) (affirming that the General Assembly has "vested in the [PUC] exclusive authority over the complex and technical service and engineering questions arising in the location, construction and maintenance of all public utility facilities"). However, a limited exception to this general rule is that a municipality may apply local zoning rules to a public utility "building" unless the Commission finds that the location of the building is reasonably necessary for the convenience or welfare of the public pursuant to Section 619 of the MPC, Act of July 31, 1968, P.L. 805, *as amended*, 53 P.S. § 10619.

Fayette County

The Fayette County Planning and Zoning Office administers the zoning and planning for 31 of the 42 municipalities in Fayette County (Fayette County n.d.). Within the MARL Project Study Area, Henry Clay, Springhill, and Wharton Townships administer their own zoning, while Henry Clay and Wharton Townships also administer their own planning.

Within the portion of Fayette County within the MARL Project Study Area, Henry Clay and Wharton Townships administer their own zoning ordinances. Springhill Township's 2022 Zoning Ordinance includes procedures to approve zoning requests but does not define or provide regulations specific to districts. This analysis assumes that Springhill Township implements Fayette County's zoning districts and related provisions.[8] Fayette County administers zoning for all other jurisdictions that the MARL Project Siting Corridors cross (including Georges and Nicholson Townships) under the Fayette County Zoning Ordinance, which is administered by the County's Planning and Zoning Office. The zoning maps for Fayette County (except for Springhill Township) and Wharton Township were not readily available; therefore, the applicability of specific zoning provisions to the MARL Project in these jurisdictions could not be determined at this time.

The Fayette County Zoning Ordinance does not include provisions specific to transmission lines, though distribution lines are considered an "essential service," permitted in all zoning districts. Wharton Township's Zoning Ordinance defines electrical distribution and transmission infrastructure as "essential services," with transmission infrastructure further categorized as "non-local" (Wharton Township Zoning Ordinance, Article II, Section 202). Nonlocal transmission infrastructure is considered a conditional use in most zoning districts. Similarly, Henry Clay Township defines transmission lines as a "public utility" (Henry Clay Township Zoning Ordinance, Article II), which is permitted by conditional use in applicable zoning districts. Conditional uses typically require approval by a township's Board of Supervisors following a recommendation by the township's Planning Commission; however, land use regulations of public utility transmission lines through the zoning ordinance are of questionable validity under *Duquesne Light Co. v. Upper St. Clair Twp.*, 105 A.2d 287 (Pa. 1954) and could be subject to a substantive validity challenge or a declaratory judgment action filed by a public utility.

Proposed Route and Alternative Routes D and E

The shared Siting Corridor for the Proposed Route and Alternative Routes D and E crosses the southern portions of Greene and Fayette Counties. In Greene County, the Siting Corridor intersects areas designated for electricity transmission line investment and related infrastructure

[8] Prior to November 22, 2022, Springhill Township was governed by the Fayette County Zoning Ordinance. The Township adopted Ordinance No. 2022-3 on November 22, 2022, purportedly providing for administration and enforcement of the Fayette County Zoning Ordinance by the Township, rather than the County. A challenge to the procedural validity of Ordinance No. 2022-3 has been filed which, if ultimately successful, could return administration of zoning regulation in the Township to Fayette County. However, the parties in that matter are engaged in settlement discussions which may allow the Township to retain jurisdiction over zoning matters. Ordinance No. 2022-3 adopted the substantive terms of the County Zoning Ordinance. However, the Township has subsequently adopted other ordinances which purport to adopt a zoning map, and certain substantive amendments to the terms of the zoning ordinance.

development (Figure 2.3-2). These areas are primarily rural, with scattered residential development (Greene County 2019b).

As shown on Figure 2.3-3, nearly all of the Siting Corridor for the Proposed Route and Alternative Routes D and E is within the Future Growth Area designation, indicating areas that are targeted for future development (Fayette County 2019). The portion of Proposed Route and Alternative Routes D and E in Fayette County is entirely within Springhill Township and are thus subject to Springhill Township zoning regulations at this time (Fayette County 2019).

Alternative Route B

The portion of the Siting Corridor for Alternative Route B within Greene County is the same as described for the Proposed Route. In Fayette County, the Siting Corridor is entirely within areas designated for future growth (Figure 2.3-3). The portion of Alternative Route B in Fayette County is entirely within Springhill Township and is thus subject Springhill Township zoning regulations at this time (Fayette County 2019).

Alternative Routes C and F

The shared Siting Corridor for Alternative Routes C and F intersects areas designated for electricity transmission lines investment, downstream infrastructure investment, and rail investment in Greene County (Figure 2.3-2).

In Fayette County, the majority of the Siting Corridor west of PA 43 traverses areas designated for future growth, while the portion of the corridor east of PA 43 crosses primarily Rural Resource and Open Space Preservation areas (Figure 2.3-3). Alternative Routes C and F within Springhill, Georges, and Nicholson Townships will be subject to Fayette County zoning regulations, and Alternative Routes C and F will be subject to the Henry Clay and Wharton Townships zoning regulations.

2.3.2.2 IMPACTS

This section describes the consistency of the MARL Project with comprehensive planning and zoning in Greene and Fayette Counties.

Proposed Route and Alternative Routes D and E

The MARL Project will be generally consistent with comprehensive plan land use goals for Greene County and Fayette County. Specifically, the ROW Corridor and ancillary facility workspaces will not change the overall intended land use patterns in either county. The MARL Project will provide long-term benefits by improving regional electric system reliability, which will support future development and growth in areas identified in the comprehensive plans. The ROW Corridor for the Proposed Route and Alternative Routes D and E will cross designated Future Growth Areas in Fayette County and could affect development on specific parcels adjacent to the Proposed Route.

Alternative Route B

In Greene County, the ROW Corridor for Alternative Route B crosses areas designated for future electricity transmission lines investment and crosses areas intended for future growth. The MARL Project is generally consistent with these future land use designations and general land use goals, particularly to the degree that it supports regional electric system reliability.

Alternative Routes C and F

In Greene County, the ROW Corridor for Alternative Routes C and F crosses areas designated for downstream infrastructure investment, rail investment, and electricity transmission lines investment. In Fayette County, the ROW Corridor for Alternative Routes C and F crosses several low-density municipalities, including rural boroughs and townships. While the ROW Corridor generally aligns with the broader land use objectives outlined in both Greene County and Fayette County comprehensive plans, the presence of state protected lands in Fayette County (Section 2.3.3) introduces additional considerations that may affect land use compatibility and require mitigation measures. As such, the ROW Corridor may require coordination with state agencies.

The ROW Corridor for Alternative Routes C and F will not significantly alter the overall intended land use patterns within the affected municipalities. It is not expected to induce urban sprawl or exert development pressure inconsistent with the comprehensive plans. Furthermore, the ROW Corridor for Alternative Routes C and F will not preclude the establishment of future land uses as envisioned in the counties' growth strategies, particularly in areas designated for low-density residential, agricultural, or conservation purposes. The ROW Corridor for Alternative Routes C and F will have negligible impacts on current or future preservation land use areas.

2.3.3 CONSERVATION AND PROTECTED LANDS AND RECREATION RESOURCES

This section describes existing lands designated for conservation and/or protection, lands and resources designated for recreation uses, the applicable programs designed to protect Pennsylvania's agricultural heritage and natural resources, and the MARL Project's impacts on those lands and programs.

There are no federal conservation, protected, or recreational lands within the Siting Corridors in Pennsylvania. The Proposed Route and Alternative Routes B, D, and E also do not cross any state or local conservation or recreation lands in Pennsylvania. The Siting Corridors for the Proposed Route and Alternative Routes all cross recreational trails. The remainder of this section discusses recreational trails crossed by the Siting Corridors for the Proposed Route and Alternative Routes, as well as the state conservation, protected, and recreational lands crossed by the ROW Corridors for Alternative Routes C and F.

2.3.3.1 EXISTING CONDITIONS

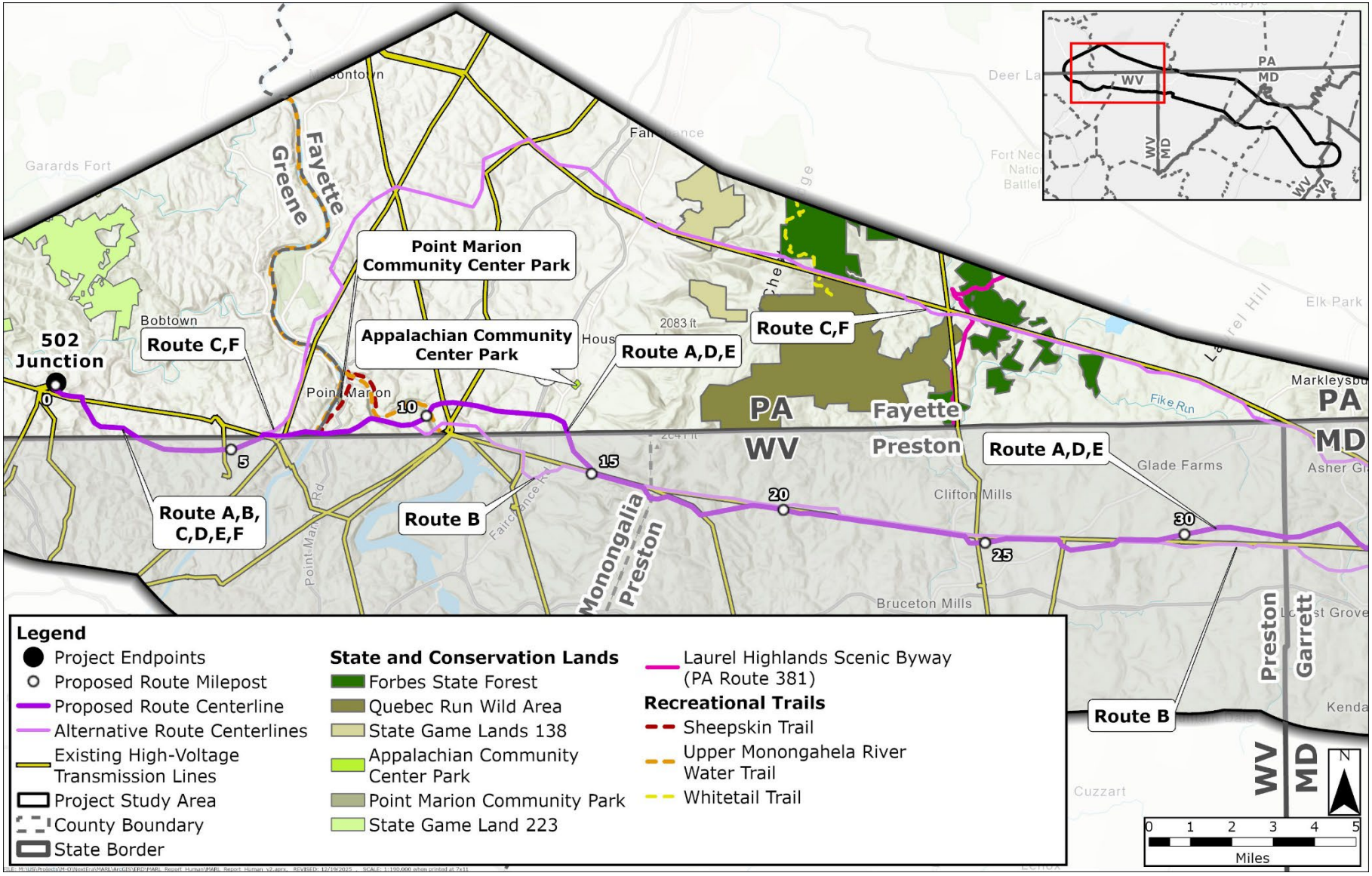
Conservation and protected lands are designated for protection, preservation, and/or recreation are managed by federal, state, or local agencies. ERM compiled information on protected lands in the MARL Project Study Area in Pennsylvania, including areas within 2 miles of the Proposed Route ROW Corridor, pursuant to 52 Pa. Code § 57.72(c)(8), through publicly available digital datasets, maps, and other information from federal, state, and other agencies. ERM collected information on recreational resources using publicly available datasets from ArcGIS Online, the USGS Protected Areas Database, and state and local GIS sources. The trails and properties crossed by at least one Alternative Route are described below.

- Upper Monongahela River Water Trail: The Upper Monongahela River Water Trail offers over 70 miles of accessible public trails, parks, and multiple launch points, supporting riverfront recreational activities such as canoeing, kayaking, and hiking along the Monongahela River (the boundary between Greene and Fayette Counties) and the Cheat River (in Fayette County) (Upper Monongahela River Water Trail Partnership 2025)
- Sheepskin Trail: A segment of a planned 34-mile Fayette County trail system, the Sheepskin Trail follows the former Baltimore and Ohio railroad line along the east bank of the Monongahela River in Fayette County, from the West Virginia / Pennsylvania border to Point Marion (Sheepskin Railtrail 2025).
- Forbes State Forest: Forbes State Forest covers approximately 59,000 acres in multiple parcels in the Laurel Highlands areas of Fayette, Somerset, and Westmoreland Counties. The forest offers trails for hiking, biking, horseback riding, and winter sports, as well as opportunities for fishing, hunting, camping, and scenic sightseeing (DCNR 2025c).
- State Game Lands 138: State Game Lands encompasses 2,918.7 acres of rugged terrain on the western slope of Chestnut Ridge in Fayette County. The property offers opportunities for hunting, hiking, birdwatching, and wildlife conservation (PGC 2014).
- Whitetail Trail: The Whitetail Trail in Forbes State Forest extends 9.5 miles across Chestnut Ridge, connecting the Pine Knob Trail to Quebec Run Wild Area and offering scenic, challenging terrain for hikers and backpackers (Pennsylvania Bureau of Forestry 2016).
- Quebec Run Wild Area: The Quebec Run Wild Area covers 7,441 acres within Forbes State Forest in Fayette County and offers approximately 25 miles of interconnected trails for hiking, backpacking, and primitive camping (DCNR 2025b).
- Laurel Highlands Scenic Byway: This state-designated Scenic Byway follows PA 381 in Fayette County, as part of a 68-mile route between the West Virginia state line and Seward in Westmoreland County. The Scenic Byway provides access to recreational experiences such as hiking, biking, rafting, tubing, and historic architectural sites (Pennsylvania Tourism Office n.d.).
- Point Marion Community Park: This local park within the Borough of Point Marion includes a playground, basketball courts, ballfields, and other community recreation amenities (Borough of Point Marion 2024). It is also the current northern terminus of the Sheepskin Trail.

- Appalachian Community Center Park: This local park on Springhill Furnace Road in Springhill Township includes ballfields and a community center building.
- State Game Lands 223: These state game lands encompass 7,688 acres of land in Greene County, north Fairchance. The property offers opportunities for hunting, hiking, birdwatching, and wildlife conservation (PGC 2023).

Figure 2.3-4 shows these resources, as well as Attachment 1f, Recreational Lands and Protected Lands Mapbook. Table 2.3-6 provides acreages of conservation, protected, and recreational lands within the shared Siting Corridor for Alternative Routes C and F. Table 2.3-7 summarizes recreational trails crossed by or within the Siting Corridor for each Alternative Route. Table 2.3-8 summarizes conservation, protected, and recreational lands within 2 miles of the Proposed Route ROW Corridor (excluding lands listed in Table 2.3-6).

FIGURE 2.3-4 RECREATION AND SPECIAL USE LANDS



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

TABLE 2.3-6 CONSERVATION, PROTECTED, AND RECREATION LANDS WITHIN THE SITING CORRIDOR FOR ALTERNATIVE ROUTES C AND F (ACRES)

Protected Land [a]	Management Entity	Protected Land Type	Siting Corridor
Forbes State Forest	Pennsylvania Bureau of Forestry	State Forest	155.2
Quebec Run Wild Area	Pennsylvania Bureau of Forestry	Wild Area	8.8
State Game Lands 138	PGC	Game Land	51.7
Total			**215.6**

Source: USGS 2024

PGC = Pennsylvania Game Commission
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.3-7 RECREATIONAL TRAILS CROSSED BY THE SITING CORRIDORS (MILES)

Resource	Agency	Recreation Type	County	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Upper Monongahela River Water Trail	DCNR	Water trail	Greene, Fayette	0.3	0.3	0.1
Sheepskin Trail	Fayette County	Natural surface trail	Fayette	0.1	0.1	0.0
Whitetail Trail	DCNR	Natural surface trail	Fayette	0.0	0.0	0.2
Laurel Highlands Scenic Byway	Pennsylvania Department of Transportation / Pennsylvania Tourism Office	Scenic byway	Fayette	0.0	0.0	0.1
Total [a]				**0.4**	**0.4**	**0.4**

Source: USGS 2024

DCNR = Pennsylvania Department of Conservation and Natural Resources
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.3-8 CONSERVATION, PROTECTED, AND RECREATION LANDS WITHIN 2 MILES OF THE PROPOSED ROUTE ROW CORRIDOR

Protected Land [a]	**Management Entity**	**Protected Land Type**	**Acres [b]**
Perry Township Community Center Park	Perry Township	Local Park	0.7
Pennsylvania State Game Lands 223	PGC	State Game Lands	157.0
Point Marion Community Park	Point Marion Borough	Local Park	13.6
Total			**286.3**

Source: USGS 2024

PGC = Pennsylvania Game Commission

[a] Totals may not match the sum of addends due to rounding.

[b] Includes acreage within 2 miles of the ROW Corridor for the Proposed Route or Alternative Routes. Excludes resources crossed by the Siting Corridors and listed in Table 2.3-6.

2.3.3.2 IMPACTS

This section describes the impacts of construction and operation on conservation, protected, and recreational lands and resources. Table 2.3-9 shows the acreage of conservation, protected, and recreational lands within the shared Siting Corridor and ROW Corridor for Alternative Routes C and F. Table 2.3-10 shows the mileage of recreational trails crossed by the Siting Corridor and ROW Corridor for each Alternative Route. Each ROW Corridor will cross a comparable extent of recreational trails. The ancillary facility workspaces for the Proposed Route would not affect any conservation, protected, or recreational lands, and recreational trails.

The acres of conservation, protected, and recreational lands within the ROW Corridor for Alternative Routes C and F represent 1.7 percent of the portions of Forbes State Forest, less than 0.1 percent of the portion of Quebec Run Wild Area, and 1.2 percent of the portions of State Game Lands 138 within the MARL Project Study Area in Pennsylvania. The 0.2 to 0.3 mile of recreational trails crossed by each of ROW Corridors listed in Table 2.3-10 represent less than 0.1 percent of the recreational trails within the MARL Project Study Area in Pennsylvania.

ROW Corridor construction and operation impacts on natural resources that could affect conservation, preservation, and/or recreational activity are discussed in Section 2.2. The impacts of construction and operation on visual resources are discussed in Section 2.3.4, Aesthetics and Scenic Areas. The impacts of crossing roads, including the Laurel Highlands Scenic Byway (PA 381), are discussed in Section 2.3.6, Linear Infrastructure and Transportation. Other potential impacts on conservation, protection, and/or recreation are listed below:

- Temporary restrictions on access to or use of recreational lands and/or trail segments during construction at each trail or resource crossing;
- Hunting activity disruption of wildlife habitat areas, specifically State Game Lands 138;
- Fragmentation of areas that may be suitable for new or expanded land protections, especially adjacent to existing protected lands;
- Permanent aesthetic changes within and visible from recreation lands and trails due to the presence of new transmission infrastructure where no such infrastructure currently exists (including some previously undisturbed lands), which could affect the abilities of recreationists to experience natural and natural-appearing settings, especially for users whose intended recreational activities include viewing habitat, wildlife, and natural (or natural-appearing) settings (Section 2.3.4);
- Changes in the behavior and habitat of wildlife (one of the primary reasons for trail use) due to new aboveground transmission infrastructure, surface disturbance, and increased human access to the ROW Corridor;
- Alterations or modifications to existing trail routes to accommodate new infrastructure; and
- Opportunities for new trail routes, improved access to existing trails and recreation amenities, and support for regional trail connectivity.

During MARL Project construction, closures or restrictions on recreational trails and in recreational areas would occur during construction across a trail or other recreational resource, which would typically be no more than several days at any single location.

NEET MA will coordinate with applicable land management agencies, organizations, and affected landowners to construct the Proposed Route consistent with permit requirements, or other recommended measures, to address and mitigate impacts. These measures would include (among others) early coordination with recreation agencies, such as the Pennsylvania DCNR, to discuss impacts and mitigation efforts.

TABLE 2.3-9 CONSERVATION, PROTECTED, AND RECREATION LANDS WITHIN THE SITING CORRIDOR AND ROW CORRIDOR FOR ALTERNATIVE ROUTES C AND F (ACRES)

Conservation/Protected Land [a]	Siting Corridor	ROW Corridor
Forbes State Forest	155.2	64.5
Quebec Run Wild Area	8.8	3.6
State Game Lands 138	51.7	20.0
Total [a]	**215.6**	**88.1**

Source: USGS 2024

ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

TABLE 2.3-10 RECREATIONAL TRAILS CROSSED BY THE SITING CORRIDORS AND ROW CORRIDORS (MILES)

Resource	Recreation Type	Proposed Route and Alternative Routes D and E		Alternative Route B		Alternative Routes C and F	
		Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor	Siting Corridor	ROW Corridor
Upper Monongahela River Water Trail	Water trail	0.3	0.1	0.3	0.1	0.1	0.1
Sheepskin Trail	Natural surface trail	0.1	0.1	0.1	0.1	0.0	0.0
Whitetail Trail	Natural surface trail	0.0	0.0	0.0	0.0	0.2	0.1
Laurel Highlands Scenic Byway	Scenic byway	0.0	0.0	0.0	0.0	0.1	0.1
Total [a]		**0.4**	**0.2**	**0.4**	**0.2**	**0.4**	**0.3**

Source: USGS 2024

DCNR = Pennsylvania Department of Conservation and Natural Resources; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

2.3.4 AESTHETICS AND SCENIC AREAS

The aesthetic or scenic character of a landscape refers to the overall visual qualities that give a landscape its distinct and recognizable identity. It generally captures the features (e.g., topography/terrain, vegetation, waterbodies, human development), elements (forms, lines, colors, textures), patterns and spatial relationships, and visual composition of the landscape.

This section describes the existing visual characteristics of the landscapes for the Proposed Route and all five Alternative Route Siting Corridors in Pennsylvania, as well as the primary viewer groups and their sensitivity to landscape changes. In addition, this section describes anticipated changes (impacts) in visual characteristics, identifies sensitive visual resources, and addresses potential visibility of the MARL Project as it crosses different types of landscapes. Refer to Appendix J, Visual Impact Assessment, of the Routing Study for additional detail.

2.3.4.1 EXISTING CONDITIONS

The Proposed Route and Alternative Route Siting Corridors cross portions of Greene and Fayette Counties. In general, the aesthetic character of both Greene and Fayette Counties is visually diverse with a mix of natural landforms, varied vegetation cover, water features, and patterns of largely rural development. The Siting Corridors are slightly different, but several share the same alignment. Specifically, the Proposed Route shares the same alignment as Alternative Routes D and E, and Alternative Routes C and F share the same alignment. Alternative Route B follows a unique alignment in Pennsylvania. While these three alignments are different, they are generally routed through similar landscape types.

Greene and Fayette Counties are in the Appalachian Plateau physiographic province (NPS 2017). This province is characterized by mountainous terrain incised by rivers and streams that contribute to the rolling, gently undulating terrain and curvilinear forms. The vegetation cover is mixed with large, contiguous forested areas interspersed with open agricultural fields. The forests add vertical features, textural complexity, and seasonal color dynamics to the landscape. The forest canopy often obscures underlying landforms and creates a sense of visual enclosure in many areas. Human development is generally low-density and rural in character. Residential, agricultural, and commercial/industrial structures tend to be found along transportation corridors and add geometric forms and straight lines to the landscape. Linear infrastructure (e.g., highways, roads, transmission and distribution lines) throughout the area introduces strong linear and geometric forms with their visual prominence dependent on the scale of the structures (mass and height), topography, and vegetative screening.

Neither the Greene County nor Fayette County comprehensive plans have a scenic or visual resource section (Greene County 2019; Fayette County 2019); however, the plans recognize the scenic setting and availability of scenic vistas in both counties, although specific scenic vistas are not identified.

The Siting Corridors cross a variety of parks, trails, and other protected areas. The scenic character of these opportunities contributes to their designation and enhances the visitor experience. The recreation and protected areas crossed by one or more of the Siting Corridors are listed in Section 2.3.3. Pursuant to 52 Pa. Code § 57.72 (c)(8), Section 2.3.3 also identifies recreation areas and protected lands within 2 miles of the ROW Corridor for the Proposed Route. Additionally, cultural/historic and archaeological sites within the Siting Corridors and within 2 miles of the Proposed Route ROW Corridor are addressed in Section 2.3.5, Cultural Resources.

The existing landscapes are grouped into landscape units, which are geographic areas that share similar land cover and corresponding visual characteristics. These units are intended to capture representative visual characteristics across an entire landscape area. They provide a useful

macro-scale framework for capturing existing conditions and identifying potential changes in visual conditions from a proposed project. The landscape units are primarily delineated based on aerial imagery, topographic maps, and photographs from the MARL Project Study Area in Pennsylvania. These landscape units alternate primarily between Forested Mountains and Rural Agriculture areas that are representative of the larger Appalachian Plateau physiographic province. The existing landscape units crossed by the Proposed Route and Alternative Route Siting Corridors are described in Table 2.3-11 and shown on Figure 2.3-5.

Landscape characteristics are a set of attributes, qualities, or traits that make the landscape unit identifiable or unique. Landscape characteristics are described based on the specific combination of visual features in a landscape unit, including:

- Landforms: The topography/terrain features of the landscape including any waterbodies or rivers;
- Vegetation: The variety of vegetation/vegetative communities present on the landscape; and
- Built environment: The existing structures, facilities, or other built modifications on the landscape.

These features are described in terms of their primary forms, lines, colors, and textures. These common visual elements are used to describe landscape features across many of the established visual resource management systems, including the Federal Highway Administration (FHWA) visual impact assessment for highway projects (FHWA 2015), the Bureau of Land Management visual resource management system (BLM 1984), the U.S. Forest Service scenery management system (USFS 1995), and others.

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TABLE 2.3-11 SCENIC RESOURCE LANDSCAPE UNITS CROSSED BY THE PROPOSED AND ALTERNATIVE ROUTE SITING CORRIDORS IN PENNSYLVANIA

Landscape Unit	Description	Scenic Characteristics		
		Landform/Water	Vegetation	Built Environment
River Valley	Similar to rural agriculture landscapes but serpentine river as a focal feature of the valley	Broad, north-to-south oriented valleys; flat to gentle slopes, horizontal profile; sinuous, meandering form with curvilinear lines delineating transition from water to riparian vegetation; except for river, most underlying terrain obscured by vegetation and built features	Open, wide, low, regular to irregular horizontal lines; strips, vertical amorphous forms, continuous patches of uniform textures and colors; broken and contiguous tall, rounded forms along rivers; dominated by tan, green, brown, and other natural hues and subject to seasonal variation	Smooth, hard, flat, gray strips with straight to curvilinear horizontal lines; geometric forms, defined straight and angular lines, multiple colors (e.g., white, gray, tan, yellow, red, blue), ordered, sparse; repeating tall, vertical geometric and linear forms with thin, slightly undulating horizontal lines
Rural Agricultural	Dominated by agricultural fields, natural grass and shrublands, and pockets of dense forest; extend through the valleys between areas of forested mountains; small towns and other areas of low-density development are located along roadways in these valleys	Broad, gentle slopes, rounded, horizontal profile, with most underlying terrain obscured by vegetation and built features	Open, wide, low, regular to irregular horizontal lines; strips, vertical amorphous forms, continuous patches of uniform textures and colors; dominated by tan, green, brown, and other natural hues and subject to seasonal variation	Smooth, flat, gray strips with straight to curvilinear horizontal lines; geometric forms, straight and angular lines, multiple colors (e.g., white, gray, tan, yellow), ordered, sparse; tall, vertical geometric forms with thin, slightly undulating horizontal lines; sporadic geometric forms with straight vertical and horizontal lines and various colors
Rural Development	Areas of low-density development (e.g., residential and commercial buildings) primarily aligned along a travel corridor interspersed with forested areas and/or agricultural fields	Rolling to flat, narrow gentle to moderate slopes, irregular; long, soft horizontal and diagonal lines, colors, and textures obscured by aboveground vegetation and structures	Low, flat, geometric bounded by tall, irregular, vertical, amorphous forms; regular, simple, soft and repeating vertical lines; mix of natural green hues with splashes of bright hues (e.g., red, pink, orange) and subject to seasonal variation; smooth to medium, patchy, discontinuous textures	Low, geometric, smooth, regular forms; bold, straight, simple, vertical and horizontal lines; multiple colors (e.g., white, gray, black, blue, yellow), smooth to medium, patchy, scattered textures
Developed	Dominated by cleared lands with a high level of development including residential, commercial, and/or industrial buildings and structures, aboveground infrastructure, and maintained lawns/planting areas and remnant native vegetation	Broad benches, flat to rolling areas with rounded ridgetops and steep drainage cuts; long horizontal and diagonal lines; colors and textures generally obscured by aboveground buildings and structures, as well as vegetation	Low, smooth, simple, geometric to irregular with medium to high repeated forms adding vertical context; regular horizontal and vertical, simple lines; vibrant to matte greens, tans, browns with pops of brilliant colors and subject to seasonal variation; smooth to coarse textures	Rectilinear, geometric, definite, solid, multi-height, linear forms; bold, angular, horizontal, vertical, simple, hard lines; subtle to vivid, multiple hues (gray, white, blue, green, yellow, etc.); coarse to fine, patchy, ordered, discontinuous, granular textures
Forested Mountains	Mountainous terrain dominated by native forest cover and other vegetation with periodic clusters of low-density development and linear infrastructure	Generally obscured by vegetation but underlying landform is gently rolling, rounded, wide, and nondirectional	Dominated by deciduous mixed forest with vertical layering, tall and amorphous forms, repeating vertical lines, irregular horizontal line across the canopy, short, rounded forms, mix of green hues with assorted browns and grays, medium to coarse textures, and seasonal variability	Low, flat, gray, lightly textured; tall, vertical geometric forms with thin, slightly undulating horizontal lines; sporadic geometric forms with straight vertical and horizontal lines and various colors

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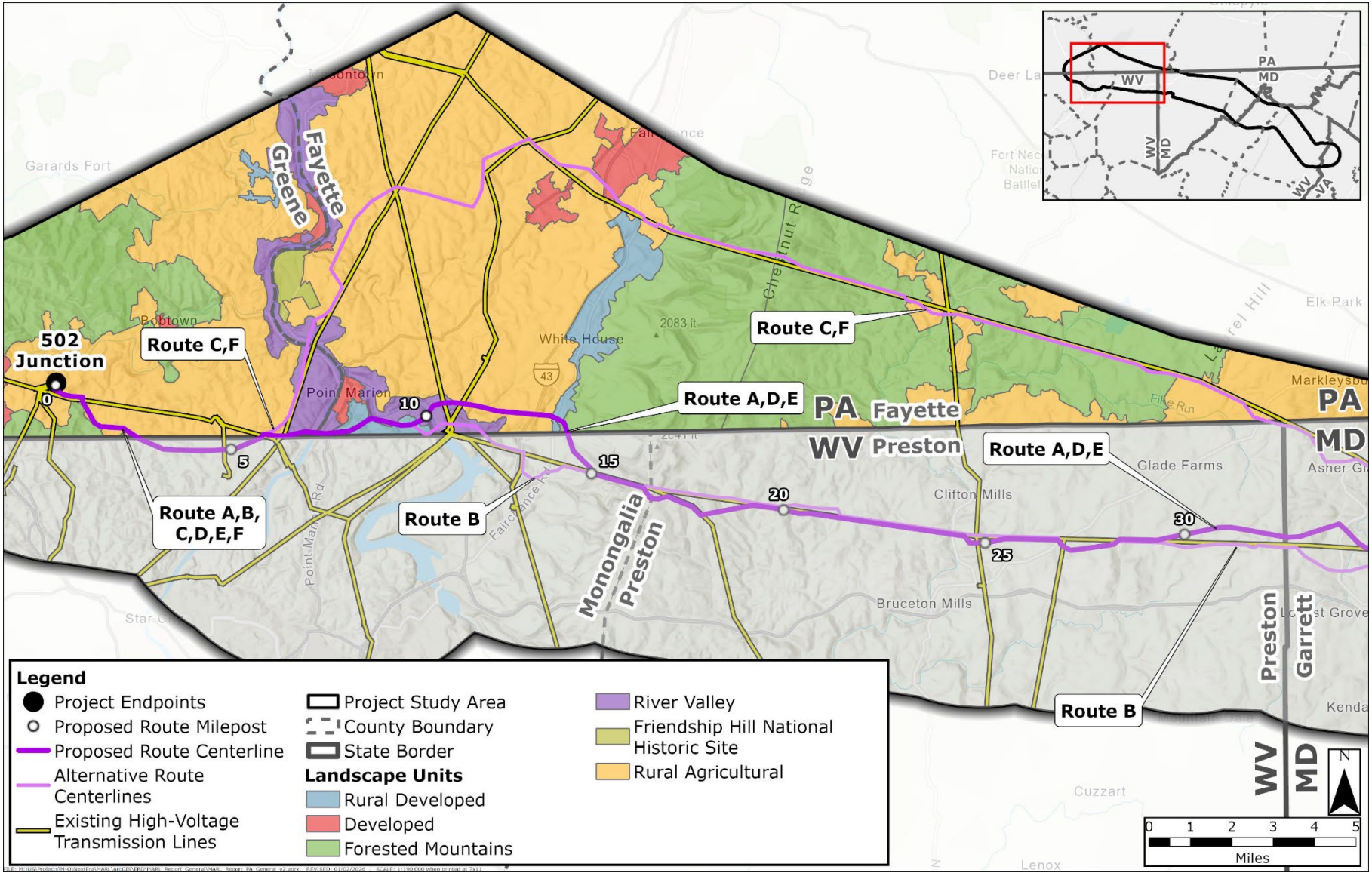
FIGURE 2.3-5 LANDSCAPE UNITS IN PENNSYLVANIA



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

Viewer groups are defined by their interaction with a landscape (e.g., residents, motorists, recreationists) and their preferences or sensitivity to changes or modifications to the landscape. The way that viewer groups perceive visual resources provides additional context for assessing a project's visual impacts. In general, viewers with a strong attachment to a landscape and/or with an expectation of scenic quality have higher sensitivity to changes on a landscape compared to viewers for which scenic resources and quality are incidental or irrelevant to their activity. Across the landscapes in Pennsylvania, there are several types of viewer groups, including:

- Area residents: These viewers live in the vicinity of the MARL Project. They are more likely to be sensitive to potential changes in landscape characteristics because they tend to value the scenic integrity of the landscape around their homes and may have more frequent and longer duration views from their residences. In addition, area residents tend to be most familiar with the area landscape and are, therefore, more perceptive of changes over time.
- Motorists, commuters, and other travelers: These viewers traverse the primary travel corridors in the area and have multiple opportunities to view the landscape. This means that their potential exposure to views of the MARL Project changes based on speed, direction of travel, and length of trip, as well as viewing angles and screening, among other factors. Due to this variability, these viewers (particularly along high-speed roadways) are typically less sensitive to changes in scenic conditions.
- Recreationists and tourists: These viewers select area parks, recreation areas, and other tourist attractions, in part, based on the scenic setting and quality of these areas; therefore, they also tend to be more sensitive to changes in the landscape.

Sensitivity and perception of visual resource changes (i.e., impacts) tend to vary by setting and viewer group. Many factors influence viewer sensitivity and the perception of impacts. In general, users with static, direct, frequent, or longer duration views (e.g., area residents), as well as those viewers engaged in setting-dependent activities (e.g., some types of recreation, tourism), tend to have higher levels of sensitivity to change compared to others. Anticipating viewer sensitivity is thus important in the overall evaluation of impacts from a proposed project on visual resources.

Table 2.3-12 lists existing scenic characteristics (landscape units) and primary viewer groups for the Proposed Route and Alternative Route Siting Corridors in each county.

TABLE 2.3-12 LANDSCAPE UNITS AND VIEWER GROUPS IN THE PROPOSED ROUTE AND ALTERNATIVE ROUTE SITING CORRIDORS

Landscape Units / Primary Viewer Groups	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Greene County			
Landscape units	Rural Agriculture River Valley	Rural Agriculture River Valley	Rural Agriculture River Valley
Viewer group(s)	Area residents Motorists Recreationists	Area residents Motorists Recreationists	Area residents Motorists Recreationists

Landscape Units / Primary Viewer Groups	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Fayette County			
Landscape units	River Valley Rural Development Rural Agriculture Forested Mountains	River Valley Rural Development	River Valley Rural Agriculture Developed Forested Mountains
Viewer group(s)	Area residents Motorists Recreationists	Area residents Motorists Recreationists	Area residents Motorists Recreationists

2.3.4.2 IMPACTS

The MARL Project involves the construction and operation of a new 500 kV transmission line and associated ROW Corridor that will cross portions of Greene and Fayette Counties. The degree to which overhead transmission lines influence and are visible on a landscape depends on a number of factors, including, but not limited to, structure height and color, existing landscape features (e.g., topography, vegetation, built environment), duration of the view, and distances from the viewer. The specific combination of these factors changes by location, contributing to a range of potential influences and impacts as noted for the Proposed Route and each Alternative Route. The existing landscape character features and characteristics were used to evaluate the degree of visual change from the MARL Project (i.e., the degree to which the MARL Project would change the existing landscape characteristics across each landscape unit).

The Proposed Route and Alternative Routes will cross through various landscape types with varying degrees of visibility. Visibility of the new transmission line will be influenced by the amount of existing screening, viewing distances, and background colors and textures, among other factors; however, visibility is not considered an impact on its own. Rather, visibility, current landscape characteristics, the degree of visual change, and viewer sensitivity are all considered holistically in determining the level of potential impact. Visibility considerations including roads, parks and other designated natural areas, and nearby residential dwellings are described below.

Lattice structures connected by overhead conductors will be constructed within the ROW Corridor. The lattice structures will range in height from 85 feet to 190 feet, and the average conductor span lengths will be 1,258 feet. In general, visibility of these new structures will be most pronounced at shorter distances (generally under 0.5 mile). Views of the new transmission line and any permanent access roads and changes to existing visual conditions will be greatest from within the cleared ROW Corridor, at and adjacent to permanent ancillary facilities, at road crossings, across open fields or other clearings, and from elevated areas. Some segments of the Proposed Route and Alternative Routes ROW Corridors will cross through forested areas (e.g., Forested Mountains Landscape Unit) that generally provide a substantial amount of screening that will help limit views. While the new transmission line may also be visible at greater distances (generally over 0.5 mile), including from higher elevation areas that provide panoramic views of the regional landscape, its presence on the landscape would diminish at longer distances.

Construction activities within the ROW Corridor and at ancillary facilities outside of the ROW Corridor (e.g., permanent and temporary access roads, wire work area) would be temporary and visible during the construction period (anticipated to be approximately 24 months). The initial construction phase would involve clearing and grading portions of the ROW Corridor and ancillary facilities. Trees and other vegetation would be exposed and potentially open previously screened areas to view. Grading activities would create exposed earth surfaces, cut slopes, and fill areas that may contrast with and be visible on the landscape. Once cleared, construction activities would progress to excavating pole foundations, assembling the transmission towers, pouring concrete, and stringing the conductors, among other activities. These activities create dynamic movement on the landscape along the ROW Corridor and at temporary ancillary facilities. The presence of machines and other equipment, material stockpiles, worker vehicles, construction support facilities, and other temporary features would create visual disruptions that would be most visible within the ROW Corridor and at adjacent ancillary facilities but may also be visible in other nearby locations. In particular, the use of cranes and other tall equipment that extend above the existing tree line would potentially be visible from more distant locations. Additionally, disturbed areas will be revegetated with native species to help establish similar colors and textures as the surrounding landscape.

During operation, the new transmission line would add tall, geometric structures and long, linear lines to the landscape. The transmission structures will create a series of repetitive, dominant vertical features that would extend above existing trees canopies and add new focal points that shift the vertical structure of the landscape. The conductors will appear as multiple undulating, overhead horizontal lines spanning the areas between transmission poles. The thin conductors would be most apparent in foreground views (under 0.5 mile), in particular where they span open fields and roads with few to no screening features. In forested areas, the conductors are better absorbed into the landscape and at greater distances (into the middle ground and background) they would be harder to discern against background features and the sky. The MARL Project construction materials are not expected to result in significant glare; therefore, no visual impacts are anticipated.

A limited number of permanent access roads will also be constructed outside of the ROW Corridor. These access roads would appear as flat, smooth, curvilinear forms with distinct lines delineating the transition from adjacent vegetation to the roads. Permanent access roads would be most noticeable within the cleared ROW but would also create visual changes in some areas outside of the ROW Corridor.

Where feasible, Proposed Route and Alternative Route ROW Corridors were designed to maximize paralleling opportunities with existing high-voltage transmission lines in the area to the maximum extent practicable. Paralleling the ROW Corridors with these existing lines helps minimize visual impacts by repeating landscape elements that are already present and better absorbing these elements into the existing landscape. Paralleling also helps maintain existing vegetative screening, in particular in forested areas. Table 2.3-13 indicates the miles of paralleling opportunities by county for the Proposed Route and each Alternative Route.

TABLE 2.3-13 MILES OF PARALLELING OPPORTUNITIES BY ROUTE

County [a]	Proposed Route / Alternative Routes D and E	Alternative Route B	Alternative Routes C and F
Greene County	2.3	2.3	3.2
Fayette County	0.0	0.0	13.7
Total [b]	**2.3**	**2.3**	**16.9**

[a] Table 1.1-1 summarizes the MARL Project features of the Proposed Route and Alternative Routes in Pennsylvania and the overall MARL Project—including the centerline length—and the miles and percentage of paralleling.
[b] Totals may not match the sum of addends due to rounding.

In Pennsylvania, Alternative Routes C and F have the greatest percentage of paralleling opportunities, while the Proposed Route / Alternative Routes D and E have the least amount. However, Alternative Routes C and F also have the highest mileage in Pennsylvania. All of the paralleling opportunities in Pennsylvania are along existing 500 kV transmission lines. The similarities in ROW widths and structure forms between these existing transmission lines and the MARL Project will help minimize visual changes and maximize the ability of the landscape to better absorb these changes.

Appendix J of the Routing Study provides a more detailed description of visual changes and impacts from specific locations near the ROW Corridors.

Proposed Route / Alternative Routes D and E

Proposed Route / Alternative Routes D and E ROW Corridors cross Rural Agricultural and River Valley landscape units in Greene County. In Fayette County, the ROW Corridors also cross River Valley and Agricultural Landscape units, as well as Rural Development and Forested Mountain landscape units. In most of these landscape units, lawns, agricultural fields, grasslands, river corridors, and other open/low-profile parcels offer broader sightlines, making the MARL Project infrastructure (tall lattice towers and long, thin overhead conductors) visually prominent and apparent from area roads, residences, farm buildings, and other facilities in the area. In forested areas, dense vegetation and rugged terrain will help screen views of the transmission line, limiting visibility primarily to road crossings.

The Proposed Route / Alternative Routes D and E ROW Corridors cross multiple roads (Section 2.3.6):

- No primary roads, two secondary, and five tertiary roads in Greene County; and
- One primary, two secondary, and seven tertiary roads in Fayette County.

At these crossings, the Proposed Route / Alternative Routes D and E would result in changes to vegetation forms and lines within the cleared ROW Corridor. Additionally, the tall, geometric transmission structures and overhead undulating horizontal lines would also be perceptible at these crossings. The duration of these views (structure visibility) would be dependent on the speed and direction of travel for motorists on these roads.

To help reduce visual impacts, portions of Proposed Route / Alternative Routes D and E ROW Corridors parallel an existing 500 kV high-voltage transmission lines in Greene County. The MARL Project will increase the width of cleared ROW and concentrate new transmission infrastructure within a wider ROW Corridor. The MARL Project will add similar lattice structures and overhead conductors (i.e., similar forms, lines, colors, and textures) as the existing transmission line. There are no paralleling opportunities in Fayette County.

There are no parks, recreation areas, or other designated natural resource areas in Proposed Route / Alternative Routes D and E ROW Corridors in Greene or Fayette Counties (Section 2.3.3). There are several conservation, protected, and recreation lands within 2 miles of the Proposed Route ROW Corridor including (Table 2.3-8):

- Perry Township Community Center Park;
- Point Marion Community Park; and
- Pennsylvania State Game Lands 223.

Across both counties, there are 16 residential dwellings within 500 feet of Proposed Route / Alternative Routes D and E centerlines, including 1 in Greene County and 15 in Fayette County. While this proximity does not mean that these residents will have unobstructed views of the ROW Corridor, it increases the likelihood that there may be perceivable changes in foreground (under 0.5 mile) scenic conditions from these residences.

Alternative Route B

The Alternative Route B ROW Corridor generally follows the Pennsylvania-West Virginia state border and crosses fewer landscape units compared to the Proposed Route / Alternative Routes D and E. It crosses Rural Agricultural, River Valley, and Rural Development landscape units. As noted previously, the landscape features (e.g., lawns, fields, river corridor) across these landscape units would offer broader, more extensive views of new transmission line infrastructure.

The Alternative Route B ROW Corridor crosses the same number of primary, secondary, and tertiary roads as the Proposed Route / Alternative Routes D and E in Greene County (Section 2.3.6). In Fayette County, the Alternative Route B ROW Corridor would cross fewer area roads than Proposed Route / Alternative Routes D and E ROW Corridors (no primary, one secondary, and six tertiary roads).

The Alternative Route B ROW Corridor parallels the same existing high-voltage transmission lines over the same distance (2.3 miles) as the Proposed Route / Alternative Routes D and E in Greene County. Similarly, Alternative Route B does not parallel any existing transmission lines in Fayette County.

Similar to the Proposed Route / Alternative Routes D and E, there are no parks, recreation areas, or other designated natural resource areas in the Alternative Route B ROW Corridor in Greene or Fayette Counties (Section 2.3.3).

In Greene and Fayette Counties, there are 10 residential dwellings within 500 feet of the Alternative Route B centerline, including 1 in Greene County and 9 in Fayette County, which has fewer residential dwellings than the Proposed Route / Alternative Routes D and E.

Alternative Routes C and F

Alternative Routes C and F ROW Corridors cross similar types of landscapes as Proposed Route / Alternative Routes D and E ROW Corridors in Greene and Fayette Counties. Similarly, lawns, fields, and other low-profile parcels would offer broader, more extensive views of the new transmission line infrastructure, while dense vegetation and rugged terrain would help screen views of the transmission line in forested areas.

Alternative Routes C and F ROW Corridors cross multiple roads (Section 2.3.6):

- No primary roads, 1 secondary, and 7 tertiary roads in Greene County; and
- 1 primary, 5 secondary, and 36 tertiary roads in Fayette County.

In total, there are more road crossings associated with Alternative Routes C and F compared to the Proposed Route / Alternative Routes D and E. Common to all road crossings, the MARL Project would result in changes to vegetation forms and lines within the cleared ROW Corridor and the addition of tall, geometric transmission structures and overhead undulating horizontal lines. The duration of these views (ROW and structure visibility) would be dependent on the speed and direction of travel for motorists on these roads.

Portions of Alternative Routes C and F ROW Corridors parallel existing high-voltage transmission lines to help concentrate and minimize visual resource impacts, including:

- In Greene County, 3.2 miles along two existing 500 kV transmission lines; and
- In Fayette County, 13.9 miles along an existing 500 kV transmission line.

Similar to the Proposed Route / Alternative Routes D and E, Alternative Routes C and F do not cross any parks, recreation areas, or other designated natural resource areas in Greene County (Section 2.3.3); however, Alternative Routes C and F ROW Corridors cross three of these areas in Fayette County, including:

- State Game Land 138 (20.0 acres);
- Quebec Run Wild Area (3.6 acres); and
- Forbes State Forest (65.5 acres).

There are 47 residential dwellings within 500 feet of Alternative Routes C and F centerlines across both counties. This is greater than under the Proposed Route / Alternative Routes D and E and includes 3 residential dwellings in Greene County and 44 residential dwellings in Fayette County.

2.3.5 CULTURAL RESOURCES

A desktop review of previously recorded aboveground architectural resources, archaeological sites, cemeteries, and battlefields was conducted to evaluate constraints and opportunities to support the MARL Project with data obtained in June and September 2025 (ABPP n.d.; NPS 2018; NRHP 2025; PA SHPO 2025b). This section is presented differently than other resources due to the regulatory nature of cultural resources. The cultural resources existing conditions assessment discussed in this section include archaeological sites and aboveground architectural resources within a 1-mile buffer of the route centerline. The potential impact assessment for the architectural resources includes those resources within a 0.5-mile buffer from the route centerline, whereas potential impacts for archaeological resources were considered for the ROW Corridor

(Attachment 1g, Cultural Resources Mapbook). For ancillary facility workspaces, potential impacts are considered to be the footprint of the ancillary facility workspace for archaeology and up to 500 feet on either side of the ancillary facility workspace (e.g., access road) or radius around the workspace for potential visual impacts.

As part of the siting application process, PAPUC may require further assessment of the integrity of each archaeological site and evaluation of aboveground architectural resources. Such investigations will be performed during a subsequent phase of the MARL Project.

According to 36 CFR § 60.4, cultural resources eligible for listing on the National Register of Historic Places (NRHP) are defined as buildings, structures, objects, sites, and districts that have integrity and meet one or more of the significance criteria outlined below. Integrity can be broadly interpreted but generally refers to a resource's location, design, setting, materials, workmanship, feeling, and/or association through which the resource's significance is evident. Depending on the ultimate permitting needs for the MARL Project, the Pennsylvania State Historic Preservation Office (PA SHPO) will review or assist the federal agency in determining potential MARL Project impacts on significant cultural resources as outlined in the federal or state laws. Consideration of the below criteria evaluation will likely guide the PA SHPO in its determination of what constitutes a significant cultural resource. For the purposes of this report, MARL Project impacts are generally considered adverse when they result in the loss of a resource's integrity to the point where it may no longer be eligible for the NRHP.

The following criteria for evaluation of NRHP eligibility are outlined in 36 CFR § 60.4:

- **Criterion A (Event)**: Association with one or more events that have made a significant contribution to the broad patterns of national, state, or local history;
- **Criterion B (Person)**: Association with the lives of persons significant in the past;
- **Criterion C (Design/Construction)**: Embodiment of distinctive characteristics of a type, period, or method of construction; or representation of the work of a master; or possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction; and
- **Criterion D (Information Potential)**: Properties that yield, or are likely to yield, information important in prehistory or history.

2.3.5.1 EXISTING CONDITIONS

The existing conditions for the Proposed Route and each of the other Alternative Routes are discussed in more detail below. The Proposed Route and Alternative Routes D and E are identical. Alternative Routes C and F are identical, and Alternative Route B follows a unique path. The below subsections discuss resources within a 1-mile buffer from the Proposed Route and Alternative Route centerlines as depicted on Attachment 1g. Furthermore, in accordance the requirements of 52 Pa. Code § 57.72(c)(8), previously recorded cultural resources recommended eligible or potentially eligible for listing on the NRHP were considered within 2 miles of the edge of the Proposed Route ROW Corridor and are summarized in their own section below.

In some cases, PA SHPO Pennsylvania's Historic and Archaeological Resource Exchange (PA-SHARE) did not include NRHP eligibility or status information for archaeological and architectural resources; therefore, ERM has presumed their status to be not evaluated for the purposes of this report.

Battlefields

Neither the Proposed Route nor any Alternative Routes cross or are within 1 mile of any previously recorded battlefields (ABPP n.d.).

Cemeteries

The PA-SHARE dataset does not broadly include cemeteries; rather, cemeteries may be assigned site numbers in the archaeological or architecture resource datasets. Five cemeteries, noted in the archaeological and architecture resource sections below, are included in the PA-SHARE dataset. Cemeteries not previously recorded as cultural resources are addressed in Section 2.3.1, Land Use and Land Cover.

Archaeological Resources

This section presents information on previously recorded archaeological sites within the 1-mile buffer from the centerline of the Proposed Route and Alternative Route centerlines. Attachment 1g depicts the locations of these sites. In total, there are 61 previously recorded archaeological sites (14 in Greene County, 47 in Fayette County) within the 1-mile buffer from the route centerline of the Proposed Route and Alternative Route centerlines (Table 2.3-14). Eight archaeological sites are NRHP-listed or NRHP-eligible. Two archaeological sites are noted in the PA-SHARE dataset as Demolished, and one archaeological site has been determined Not Eligible. The remaining 50 sites have not been evaluated for inclusion on the NRHP. Table 2.3-14 shows archaeological sites within the 1-mile buffer from the route centerline of the Proposed Route and Alternative Route centerlines. Archaeological sites that are within the ROW Corridors are discussed in more detail in Section 2.3.5.2.

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TABLE 2.3-14 ARCHAEOLOGICAL SITES WITHIN THE 1-MILE BUFFER FROM THE PROPOSED ROUTE AND ALTERNATIVE ROUTE CENTERLINES

Entity Number	Site Number	Site Name	Description	NRHP Status	Proposed Route A / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
Greene County							
1972RE00491	36GR0054	Hamilton & Co. Pottery	Historic; Industrial Site	Not Evaluated			x
1981RE01306	36GR0121	Raber	Pre-Contact; Open Habitation	Not Evaluated	x	x	x
1981RE01616	36GR0125	Thomas Farm	Pre-Contact; Open Habitation	Not Evaluated	x	x	x
1989RE01065	36GR0197	NA	Pre-Contact; Open Habitation	Not Evaluated	x	x	x
1989RE01154	36GR0198	NA	Pre-Contact; Open Habitation	Not Evaluated	x [a]	x [a]	x
1996RE01179	36GR0240	Warriors Trail	Pre-Contact; Open Habitation	Not Evaluated			x
1996RE01279	36GR0241	Greensboro	Historic; Unknown Site Type	Not Evaluated			x
1996RE01231	36GR0242	Treatment site #1	Historic; Open Habitation	Not Evaluated			x
1996RE01332	36GR0243	Treatment Site #2	Historic; Industrial Site	Not Evaluated			x
2001RE02882	36GR0263	Field 7 Farmhouse	Historic; Domestic Site	Not Evaluated	x	x	x
2001RE02813	36GR0264	Watson Farmhouse	Historic; Domestic Site	Not Evaluated	x	x	x
2001RE02876	36GR0265	Russell Farmhouse	Historic; Domestic Site	Not Evaluated	x	x	x
2001RE02748	36GR0266	Russell Cemetery	Historic; Cemetery	Not Evaluated	x	x	x
2001RE02747	36GR0267	Hand Mine	Historic; Industrial Site	Not Evaluated	x	x	x
Fayette County							
1958RE00083	36FA0037	New Geneva Petroglyphs	Pre-Contact; Petroglyphs	Eligible			x
1960RE00050	36FA0056	New Geneva	Late Woodland; Village	Demolished			x
1960RE00052	36FA0057	Deffenbaugh (NRHP 84003368)	Late Woodland; Village	Listed			x
1964RE00045	36FA0064	Kenneth B. Evans	Late Woodland; Open Habitation	Not Evaluated			x
1964RE00070	36FA0065	Jake Cagey	Pre-Contact; Open Habitation	Not Evaluated			x
1964RE00030	36FA0066	Winstead South	Pre-Contact; Open Habitation	Not Evaluated			x
1964RE00080	36FA0067	George T. Cagey	Pre-Contact; Open Habitation	Not Evaluated			x
1964RE00066	36FA0068	Manganese	Both Pre-Contact and Historic; Open Habitation	Not Evaluated			x
1964RE00040	36FA0072	Island	Late Woodland; Open Habitation	Not Evaluated	x	x	
1964RE00063	36FA0073	Sweder	Pre-Contact; Open Habitation	Not Evaluated	x	x	
1964RE00055	36FA0078	Georges Creek	Pre-Contact; Open Habitation	Not Evaluated			x
1965RE00445	36FA0085	Lynn/Old Cagey Farm	Late Woodland; Village	Not Evaluated			x
1971RE00225	36FA0091	New Geneva Potteries	Both Pre-Contact and Historic; Industrial Site	Listed			x
1993RE01667	36FA0093	Fike	Late Woodland; Open Habitation	Not Evaluated	x		
1975RE00532	36FA0128	Gallatin Glassworks (NRHP 95000120)	Both Pre-Contact and Historic; Industrial Site	Listed			x
1978RE01324	36FA0168	PHMC 23	Pre-Contact; Rock Shelter/Cave	Not Evaluated			x
1979RE01063	36FA0225	Valasik	Both Pre-Contact and Historic; Campsite	Not Evaluated			x
1981RE01982	36FA0256	New Geneva 2/MST-1	Late Woodland; Village	Not Evaluated			x
1981RE01584	36FA0263	Laurel Caverns Petroglyphs	Pre-Contact; Petroglyphs	Not Evaluated			x
1983RE03182	36FA0328	Bench Mark	Pre-Contact; Open Habitation	Demolished			x [a]
1989RE01307	36FA0389	Savage	Both Pre-Contact and Historic; Open Habitation, Domestic Site	Not Evaluated			x
1987RE01110	36FA0404	New Geneva Pottery/Loading Dock Site	Historic; Industrial Site	Listed			x
1993RE01883	36FA0423	Chess	Pre-Contact; Open Habitation	Not Evaluated			x
1993RE01741	36FA0424	Batcho	Pre-Contact; Open Habitation	Not Evaluated			x
1993RE01791	36FA0425	Miller	Archaic; Open Habitation	Eligible			x

Entity Number	Site Number	Site Name	Description	NRHP Status	Proposed Route A / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
1993RE01752	36FA0426	Miller	Archaic, Woodland; Open Habitation	Eligible			x
1993RE01837	36FA0427	Rugh	Historic; Domestic Site	Not Evaluated			x [a]
1995RE56424	36FA0428	Eberhart Grist Mill & Dam	Historic; Industrial Site	Eligible			x
2016RE03201	36FA0430	Brecker House & Well	Historic; Domestic Site	Not Evaluated			x
2013RE01037	36FA0431	Provance House & Well	Historic; Domestic Site	Not Evaluated			x
1994RE01817	36FA0432	Krysak Brick Scatter	Historic; Domestic Site	Not Evaluated			x
1994RE01703	36FA0433	Krysak Wall	Historic; Domestic Site	Not Evaluated			x
1994RE02023	36FA0434	O.R. #10	Both Pre-Contact and Historic; Lithic Scatter and Well	Not Eligible			x
1994RE01971	36FA0435	North Cobble Road	Historic; Domestic Site	Not Evaluated			x
1996RE01157	36FA0440	Gray & Pape Site 95-0125-L5	Woodland; Rockshelter/Cave	Not Evaluated	x		
1996RE01343	36FA0441	Gray & Pape Site 95-0125-L6	Historic; Domestic Site	Not Evaluated	x		
1996RE01131	36FA0442	NA	Pre-Contact; Open Habitation	Not Evaluated			x
1996RE01259	36FA0443	Gray & Pape Site 95-0125-L7	Historic; Domestic Site	Not Evaluated	x		
2005RE01523	36FA0513	Field 1	Both Pre-Contact and Historic; Lithic Scatter, Artifact Scatter	Not Evaluated			x
2006RE02722	36FA0514	Field 2	Both Pre-Contact and Historic; Lithic Scatter, Artifact Scatter	Not Evaluated			x
2006RE02708	36FA0515	Field 3	Both Pre-Contact and Historic; Lithic Scatter, Artifact Scatter	Not Evaluated			x
2006RE02906	36FA0516	Field 4/5	Both Pre-Contact and Historic; Lithic Scatter, Artifact Scatter	Not Evaluated			x
2007RE01708	36FA0523	Mountain Creek #2	Historic; Unknown Site Type	Not Evaluated			x
2012RE01052	36FA0545	South Trunk Rejiss A	Historic; Domestic Site	Not Evaluated			x
2012RE00839	36FA0546	South Trunk Rejiss C	Historic; Domestic Site	Not Evaluated			x
2014RE01032	36FA0547	Guthrie Road	Pre-Contact; Lithic Scatter	Not Evaluated			x
2016RE02916	36FA0570	Carroll Cabin	Historic; Domestic Site	Not Evaluated			x

Source: PA SHPO 2025b; NRHP 2025

NA = not applicable; NRHP = National Register of Historic Places
An "x" indicates the archaeological site is within the 1-mile buffer from the Proposed Route or Alternative Route centerline.
[a] These sites are within the Proposed Route or Alternative Route ROW Corridor, as discussed in Section 2.3.5.2.

Aboveground Architectural Resources

This section presents information on previously recorded aboveground architectural resources in the 1-mile buffer from the Proposed Route and Alternative Route centerlines. The locations of resources relevant to the Proposed Route and Alternative Route centerlines are depicted in Attachment 1g.

Table 2.3-15 lists the number of previously recorded aboveground architectural resources within the 1-mile buffer from the Proposed Route and Alternative Route centerlines and within each of the Proposed Route and Alternative Route ROW Corridors, as well as the number of NRHP-listed and NRHP-eligible resources within the 1-mile buffer from the Proposed Route and Alternative Route centerlines. In total, there are 220 previously recorded aboveground architectural resources within the 1-mile buffer from the Proposed Route and Alternative Route centerlines (Table 2.3-16).

Twenty-six resources within the 1-mile buffer from the Proposed Route and Alternative Route centerlines are National Historic Landmarks (NHLs), NRHP-listed, or NRHP-eligible. A brief description of these resources and their eligibility criteria are provided below.

TABLE 2.3-15 SUMMARY OF ARCHITECTURAL RESOURCES WITHIN THE 1-MILE BUFFER FROM THE PROPOSED ROUTE AND ALTERNATIVE ROUTE CENTERLINES

Route	Architectural Resources			
	Within ROW Corridor	Within 0.5-Mile Buffer from the Route Centerline	Within 1-Mile Buffer from the Route Centerline	NRHP-Listed or NRHP-Eligible Within 1-Mile Buffer from the Route Centerline
Proposed Route / Alternative Route D / Alternative Route E	6	31	66	4
Alternative Route B	6	25	34	4
Alternative Route C / Alternative Route F	6	78	185	26 [a]

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NHL= National Historic Landmark; NRHP = National Register of Historic Places; ROW = right-of-way
[a] One of the NRHP resources is also on the NHL.

National Historic Landmarks

- Albert Gallatin House / Friendship Hill National Historic Site (1965RE00010/NRHP# 66000663) is a federal style dwelling built in 1789, associated outbuildings, and landscape that was the home of Albert Gallatin, a U.S. Congressman and Secretary of the Treasury under Presidents Thomas Jefferson and James Madison and Minister to France and Great Britain. It is significant under Criterion B for its association with Albert Gallatin (PA SHPO 2025b). The resource is within the 0.5-mile buffer from the centerline of Alternative Routes C and F.

National Register of Historic Places-Listed Architectural Resources

- Greensboro Historic District (1989RE00085/NRHP# 95000118) is an early trading and pottery industry town consisting of dwellings, commercial buildings, and a church with a period of significance between 1791 and 1949. It is listed under Criterion A for its significance to transportation, commerce, and industry, Criterion C for architecture, and Criterion D for an archaeological site that could yield more information on the town's pottery industry (PA SHPO 2025b). The resource is within the 0.5-mile buffer from the centerline of Alternative Routes C and F.
- Greensboro School (1991RE00243/NRHP# 95000113) is a Richardson Romanesque school built in 1904 and is significant under Criteria A and C because of its associations with the development of educational resources in Greensboro and for architecture (PA SHPO 2025b). It is within the 1.0-mile buffer from the centerline of Alternative Routes C and F.
- James Jones House (1991RE00455/NRHP# 95000112) is a circa 1879 Italianate dwelling listed under Criterion C for its architecture and is within the 1.0-mile buffer for Alternative Routes C and F (PA SHPO 2025b).
- Glassworks/Gabler House (1991RE00634/NRHP# 95000120) is a circa 1810 log vernacular style dwelling listed under Criterion A as one of the few surviving houses associated with the development of the glass industry in southwestern Pennsylvania (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- Reppert/Gabler House (1991RE00635/NRHP# 95000117) is a circa 1810 vernacular dwelling with federal style details. It is listed under Criterion A for its association with the development of southwestern Pennsylvania's early glass industry and Criterion C for its architecture. It is within the 1.0-mile buffer from the centerline of Alternative Routes C and F (PA SHPO 2025b).
- James Parreco House (1991RE00744/NRHP# 95000115) is a circa 1910 Prairie styled dwelling listed under Criterion C for its architecture and is within the 1-mile buffer for Alternative Routes C and F (PA SHPO 2025b).
- Glassworks/Core House (1991RE01004/NRHP# 95000121) is a circa 1820 vernacular I-House listed under Criterion A for its association with the development of southwestern Pennsylvania's early glass industry (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- John Minor Crawford House (1992RE00157/NRHP# 95000122) is a circa 1878 Italianate dwelling listed under Criterion C for architecture and is within the 1-mile buffer for Alternative Routes C and F (PA SHPO 2025b).
- Peters-Graham House (1993RE01131/NRHP# 95000116) is a circa 1859 single pen log house listed under Criterion A for its associations with southwestern Pennsylvania's pottery industry and the African American community in Greensboro (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- New Geneva Historic District (1989RE00596/NRHP# 95000119) is an early glass and pottery industry town consisting of dwellings and commercial buildings with a period of significance between 1791 and 1930. It is listed under Criterion A for its significance to transportation, industry and commerce, Criterion C for architecture, and Criterion D for archaeological sites

that could yield more information on the town's glass and pottery industries (PA SHPO 2025b). It is within the 0.5-mile buffer from the centerline of Alternative Routes C and F.

- Phillips-Wheat Residence (1989RE00612) is a circa 1907 vernacular dwelling in the New Geneva Historic District. The dwelling is a contributing resource to the NRHP-listed New Geneva Historic District but appears to be mislabeled as individually NRHP-listed on PA-SHARE (PA SHPO 2025b). Furthermore, the resource is not identified on the NRHP database (NRHP 2025). It is within the 1.0-mile buffer from the centerline of Alternative Routes C and F.
- Alexander V. Boughner House (1993RE01264/NRHP# 95000114) is a circa 1857 Greek Revival dwelling listed under Criterion C for its architecture and is within the 1-mile buffer for Alternative Routes C and F (PA SHPO 2025b).
- Hager Property (1997RE00329) is a circa 1890 Late Victorian Cottage in the New Geneva Historic District. The dwelling is likely a contributing resource to the New Geneva Historic District but was mislabeled as individually NRHP-listed on PA-SHARE (PA SHPO 2025b). Furthermore, the resource is not identified on the NRHP database (NRHP 2025). It is within the 0.5-mile buffer from the centerline of Alternative Routes C and F.
- Deffenbach Residence (1997RE00792) is a circa 1887 Queen Anne dwelling in the New Geneva Historic District. The dwelling is likely a contributing resource to the New Geneva Historic District but was mislabeled as individually NRHP-listed on PA-SHARE (PA SHPO 2025b). Furthermore, the resource is not identified on the NRHP database (NRHP 2025). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.

National Register of Historic Places-Eligible Architectural Resources

- Monongahela River Lock & Dam 7 (1991RE00717) is a circa 1920 lock and dam facility that supported the economic development of West Virginia and western Pennsylvania. It was recommended eligible under Criterion A for its associations with long term industrial, commercial, and residential development of the region and Criterion C as an individually notable engineering feature showing the evolution of lock and dam technology (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- Monongahela River Navigation System Historic District (1996RE00823) is a 1836 slack water navigation system consisting of locks and dams. It was recommended eligible under Criterion A for associations with development in the area by improving transportation access and Criterion C for the technological innovations of the lock and dam construction (PA SHPO 2025b). It is within the 0.5-mile buffer from the centerline of the Proposed Route and Alternative Routes.
- Monongahela Railroad (Brownsville Junction to state line) Historic District (2002RE01662) is a circa 1900 railroad used for passenger travel and coal transportation. It was recommended eligible under Criteria A and C for its role in regional economic development through its association with mining operations and as an intact and good representative example of an early 20th century railroad corridor (PA SHPO 2025b). It is within the 0.5-mile buffer from the centerline of the Proposed Route and Alternative Routes.

- Monongahela Railway Historic District (2010RE00735) is a circa 1900 railroad used for passenger travel and coal transportation. It was recommended eligible under Criterion A as a significant coal/ore hauler in western Pennsylvania (PA SHPO 2025b). It is within the 0.5-mile buffer from the centerline of the Proposed Route and Alternative Routes.
- Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District (1992RE00590) is an 1883 railroad used for passenger travel and coal transportation that is now a public trail. It was recommended eligible under Criteria A and C for importance in transportation and development of the bituminous coal and coke industry and engineering (PA SHPO 2025b). It is within the 0.5-mile buffer from the centerline of the Proposed Route and Alternative Routes.
- Clark Swaney House (1992RE01074) is a circa 1910 Bungalow dwelling eligible under Criterion A as a representative example of farm housing influenced by the coal and coke boom and is within the 1-mile buffer from the centerline of Alternative Routes C and F (PA SHPO 2025b).
- Robert Britt House (1993RE00262) is a circa 1850 Folk Victorian dwelling eligible under Criterion A as a representative example of a mid-19th century prosperous agricultural farmhouse and is within the 0.5-mile buffer for Alternative Routes C and F (PA SHPO 2025b).
- Smithfield Historic District (1997RE00102) is a 1799 town consisting of federal, Greek Revival, Second Empire, and vernacular dwellings and commercial buildings. It was recommended eligible in 1997. This district was added to a 2023 PA SHPO memo requesting re-evaluation due to inadequate documentation (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- Martin Historic District (1997RE01075) is a circa 1890 coal mining town consisting of semi-detached and single-family dwellings. It was recommended eligible in 1997. This district was added to a 2023 PA SHPO memo requesting re-evaluation due to inadequate documentation (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.
- County Bridge No. 14 (2004RE00800) was recorded in 1998 as a reinforced concrete slab bridge built in 1908 and recommended eligible under Criterion C for being the oldest documented example of this type of bridge in the state. The resource appears to be mis-mapped in PA-SHARE and is actually located 1.4 miles northwest of the currently mapped location, well outside 1 mile of the routes (PA SHPO 2025b). However, the currently mapped location is within the 0.5-mile buffer from the centerline of Alternative Routes C and F.
- Carroll Cabin (2017RE02097) is a circa 1840 log cabin and springhouse. It was recommended eligible under Criterion C for being a good example of vernacular architecture constructed in the Midland tradition and Criterion D for its potential to provide archaeological information on early Euro-American settlements (PA SHPO 2025b). It is within the 1-mile buffer from the centerline of Alternative Routes C and F.

TABLE 2.3-16 ARCHITECTURAL RESOURCES WITHIN THE 1-MILE BUFFER FROM THE PROPOSED ROUTE AND ALTERNATIVE ROUTE CENTERLINES

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
Greene County					
1984RE02652	Monongahela House	Demolished			x
1987RE00327	Reppert & Williams House	Not Evaluated			x
1988RE00043	Mapel-Sterling Mine	Not Evaluated			x
1989RE00085/ NRHP# 95000118	Greensboro Historic District	Listed			x
1991RE00243/ NRHP# 95000113	Greensboro School	Listed			x
1991RE00455/ NRHP# 95000112	James Jones House	Listed			x
1991RE00634/ NRHP# 95000120	Glassworks/Gabler House	Listed			x
1991RE00635/ NRHP# 95000117	Reppert/Gabler House	Listed			x
1991RE00744/ NRHP# 95000115	James Parreco House	Listed			x
1991RE01004/ NRHP# 95000121	Glassworks/Core House	Listed			x
1992RE00157/ NRHP# 95000122	John Minor Crawford House	Listed			x
1993RE01131/ NRHP# 95000116	Peters-Graham House	Listed			x
1995RE33363	Rosemary Mine, Multi/Single Dwelling	Not Evaluated			x
2002RE02763	Dilliner Chimney	Not Eligible			x
2004RE02427	Bridge	Not Eligible	x	x	x
2004RE06940	Bridge	Not Eligible			x
2008RE00683	Haney Residence	Not Evaluated	x	x	x
2009RE00105	Jarrell Residence	Not Eligible	x	x	x
2009RE00125	McCord Residence	Not Eligible	x	x	x
2009RE00127	Barn	Not Evaluated	x	x	x
2009RE00271	Bald Hill School	Not Evaluated	x	x	x
2009RE00396	King Residence	Not Evaluated	x	x	x
2009RE00486	Long Residence	Not Eligible	x	x	x
2009RE00619	Phillips Farmstead	Not Eligible	x	x	x
2010RE01790	Agricultural Building	Not Evaluated			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
2010RE02755	Animal Facility	Not Evaluated	x	x	x
2018RE00141	James L. Rumble Property	Not Evaluated			x
2019RE06272	Vernacular dwelling	Not Evaluated	x	x	x
2019RE09668	Bridge	Not Evaluated	x	x	x
2019RE16666	Vernacular dwelling	Not Evaluated	x	x	x
2019RE16667	Building	Not Evaluated	x	x	x
2019RE20320	Building	Not Evaluated	x	x	x
2019RE20321	Vernacular dwelling	Not Evaluated	x	x	x
2019RE23397	Vernacular dwelling	Not Evaluated	x	x	x
2019RE26907	Building	Not Evaluated	x	x	x
2019RE26908	Vernacular dwelling	Not Evaluated	x	x	x
2023RE04439	Federal style dwelling	Not Evaluated	x	x	x
2023RE04440	Late 19th and 20th Century Revival style Dwelling	Not Evaluated	x	x	x
2023RE04441	Vernacular dwelling	Not Evaluated	x	x	x
2023RE04495	Mid-20th Century style dwelling	Not Evaluated			x
2023RE04511	Vernacular dwelling	Not Evaluated			x
2023RE04525	Mobile Home	Not Evaluated	x	x	x
2023RE04526	Vernacular dwelling	Not Evaluated	x	x	x
2023RE04527	Vernacular dwelling	Not Evaluated	x	x	x
2023RE04529	Vernacular dwelling	Not Evaluated	x	x	x
2023RE04551	Nathaniel Greene Community Development Corporation	Not Evaluated			x
2023RE04553	Late 19th and 20th Century Revival style Dwelling	Not Evaluated			x
2023RE04632	Late 19th and 20th Century Revival style Dwelling	Not Evaluated			x
2023RE04633	Old Greensboro Cemetery	Not Evaluated			x
2023RE05093	Ice Plant Restaurant	Not Evaluated			x
2023RE05094	Mon View Park and Pool (also SAE)	Not Evaluated			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
Greene and Fayette Counties					
1986RE01059	Marion Bridge	Demolished			x
1991RE00717	Monongahela River Lock & Dam 7	Eligible			x
1996RE00823	Monongahela River Navigation System Historic District	Eligible	x [a]	x [a]	x [a]
2002RE01662	Monongahela Railroad (Brownsville Junction to state line), Historic District	Eligible	x [a]	x [a]	x [a]
2010RE00735	Monongahela Railway Historic District	Eligible	x [a]	x [a]	x [a]
2023RE06905	Point Marion Lock and Dam	Not Evaluated	x	x	x
2025RE06602	Bridge carrying Route 88 over the Monongahela River in Point Marion and Dunkard Township	Not Evaluated			x
Fayette County					
1965RE00010 /NRHP# 66000663	Albert Gallatin House / Friendship Hill National Historic Site	Listed, NHL			x
1983RE00708	L.R. 116 Bridge 26 1 0 0116 0 006485	Not Eligible	x	x	
1983RE00710	County Bridge No. 139 26 20 0081 0 014910	Demolished			x [a]
1983RE01190	L.R. 26081 Bridge	Demolished			x
1983RE01876	L.R. 26081 Bridge 26 2 0 0081 0 0009665	Demolished			x
1989RE00133	Spanish Colonial dwelling	Not Eligible			x
1989RE00478	Minimal Traditional dwelling	Not Eligible	x	x	
1989RE00596 /NRHP 95000119	New Geneva Historic District	Listed			x
1989RE00612	Phillips-Wheat Residence	Listed			x
1989RE00702	McClintock-Rosinsky House	Not Eligible			x
1991RE00965	Hague House	Not Evaluated			x
1992RE00038	Joseph F. Andria House	Not Eligible			x
1992RE00039	Osman Sutton Tenant House	Not Eligible			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
1992RE00258	Shaffer Gas Station	Not Eligible	x		
1992RE00259	Darnell, Johnnie L., House, Single Dwelling	Not Eligible	x		
1992RE00463	Bessie Swaney House	Not Eligible			x
1992RE00590	Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District	Eligible	x [a]	x [a]	x [a]
1992RE00859	Osman Sutton Springhouse	Not Eligible			x
1992RE00860	Tony Kremposky House	Not Eligible			x
1992RE01074	Clark Swaney House	Eligible			x
1992RE01076	Raymond Chess House	Not Eligible			x
1993RE00046	Adnire Shuff House	Not Eligible	x	x	
1993RE00231	George Shuff Farm	Not Eligible	x	x	
1993RE00233	Pa./W.Va. State Line Marker	Not Evaluated	x	x	
1993RE00262	Robert Britt House	Eligible			x
1993RE00264	Charles & Amy Blaney House	Not Eligible	x		
1993RE00408	A. Moser Farm	Not Evaluated			x
1993RE01032	Mary & Samuel McDowell House	Not Eligible			x
1993RE01084	William Barton House	Not Eligible			x
1993RE01085	Harry J. Ruble House	Not Eligible	x		
1993RE01264/ NRHP# 95000114	Alexander V. Boughner House	Listed			x
1993RE01417	Nancy L. Ruble Farm	Not Evaluated	x		
1993RE01418	Mary McDowell House	Not Evaluated			x
1995RE03783	Sidwell Building	Not Evaluated	x	x	
1995RE03784	Late Victorian dwelling	Not Evaluated	x	x	
1995RE03788	Federal style dwelling	Not Evaluated			x
1995RE03789	Second Empire style dwelling	Not Evaluated			x
1995RE34915	Fairview Furnace	Not Evaluated			x
1995RE40475	Old Stone Church	Not Evaluated			x
1995RE52769	Italianate dwelling	Not Evaluated			x
1996RE00241	Harry A. Ruble House	Not Eligible	x		

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
1996RE00551	Abe Stewart Log House	Not Eligible			x
1996RE00837	James Low House	Not Eligible			x
1996RE00980	Brackett A. & Lee Smith House	Not Eligible	x		
1996RE00981	James F. Porter Farm	Not Eligible	x		
1996RE01046	Lucy & Gilbert Price House	Not Evaluated			x
1996RE01047	James Low M.D., Store & Post Office	Not Eligible			x
1996RE01048	Mary R. Rhodes House	Not Eligible			x
1996RE01050	Spring Hill Presbyterian Church	Not Evaluated	x		
1997RE00068	Gans Historic District	Not Eligible	x		
1997RE00069	Greater Point Marion Historic District	Not Eligible			x
1997RE00102	Smithfield Historic District	Eligible			x
1997RE00150	Late Victorian dwelling	Not Evaluated			x
1997RE00151	Dwelling	Not Evaluated			x
1997RE00153	Dwelling	Not Evaluated			x
1997RE00155	Oak Hill Baptist Church Cemetery	Not Evaluated			x
1997RE00329	Hager Property	Listed			x
1997RE00337	Winstead Historic District	Not Eligible			x
1997RE00360	Brown Family Cemetery	Not Evaluated			x
1997RE00363	Dwelling	Not Evaluated			x
1997RE00403	Dwelling	Not Evaluated			x
1997RE00404	Dwelling	Not Evaluated			x
1997RE00405	Dwelling	Not Evaluated			x
1997RE00408	Old Frame Historic District	Not Eligible			x
1997RE00409	Bowood Mine Historic District	Not Eligible			x
1997RE00417	McKinley Historic District	Not Evaluated	x	x	
1997RE00425	Haydentown Historic District	Not Evaluated			x
1997RE00607	Springhill Historic District	Not Eligible	x [a]		
1997RE00792	Deffenbach Residence	Listed			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
1997RE00868	Markleysburg: Manufacturing Facility, Commercial Building, Church, and Single Dwelling	Not Evaluated			x
1997RE01024	Goodwin Property	Not Evaluated			x
1997RE01025	Kennison Property	Not Evaluated			x
1997RE01028	Harmony House	Not Evaluated			x
1997RE01054	Dwelling	Not Evaluated			x
1997RE01055	Late Victorian dwelling	Not Evaluated			x
1997RE01075	Martin Historic District	Eligible			x
1997RE01077	Friendship Hill Historic District	Not Eligible			x
1997RE01143	Dwelling	Not Evaluated			x
1997RE01321	Church	Not Evaluated			x
1997RE01347	Sprucetown Historic District	Not Eligible			x
1997RE01348	Atlantic Historic District	Not Eligible			x
1997RE01349	Nilan Historic District	Not Eligible	x	x	
1997RE01372	Point Marion Historic District	Not Eligible	x	x	
1997RE01374	Lake Lynn Historic District	Not Evaluated	x [a]	x [a]	
1997RE01424	Showalter Homestead	Not Evaluated			x
1997RE01426	Greek Revival dwelling	Not Evaluated			x
1997RE01428	Dwelling	Not Evaluated			x
1997RE01435	Gibbon Glade Historic District	Not Eligible			x
1997RE01436	Elliotsville Historic District	Not Eligible			x
1997RE01534	Greek Revival dwelling	Not Evaluated			x
1997RE01606	Acme: Mine & Coke Works Mine	Not Evaluated			x
1997RE01623	Gillmore Historic District	Not Evaluated			x
1997RE01664	Dwelling	Not Evaluated			x
1997RE01665	Dwelling	Not Evaluated			x
1997RE02076	Fiketown Historic District	Not Evaluated			x
1997RE02119	Potter School	Not Evaluated			x
1997RE02125	Dwelling	Not Evaluated			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
1997RE02126	Greek Revival dwelling	Not Evaluated			x
1997RE02127	Cemetery	Not Evaluated			x
1998RE00068	Mt. Moriah Cemetery	Not Evaluated			x
1998RE00107	Building	Not Evaluated			x
1998RE00108	Davenport General Store	Not Evaluated			x
1998RE00413	Building	Not Evaluated			x
1998RE00414	Building	Not Evaluated			x
1998RE00763	Building	Not Evaluated			x
1998RE00872	Greek Revival Dwelling	Not Evaluated	x		
1998RE00874	Andrew Hertzog Homestead	Not Evaluated	x	x	
1998RE00898	Building	Not Evaluated			x
1998RE00899	Building	Not Evaluated			x
1998RE01238	Building	Not Evaluated			x
1998RE01239	Harry Davenport House	Not Evaluated			x
1998RE01492	Building	Not Evaluated			x
1998RE01783	Building	Not Evaluated			x
1998RE01785	Building	Not Evaluated			x
1998RE01939	Building	Not Evaluated			x
1999RE01658	Lake Lynn Dam: Penn Hill Housing	Not Evaluated	x	x	
2002RE00579	Mount Moriah Baptist Church	Not Evaluated			x
2002RE00941	Camp Run Bridge	Not Eligible	x	x	
2002RE01585	Point Marion/L.J. House Glass Co. Historic District	Not Eligible	x	x	x
2004RE00800	County Bridge No. 14	Eligible			x
2004RE00802	County Bridge No. 103	Demolished			x
2004RE00803	Bridge	Demolished			x
2004RE00804	Township Bridge No. 176	Not Eligible			x
2004RE00817	County Bridge No. 49	Demolished			x
2004RE00818	Bridge	Not Eligible			x
2004RE02143	Fayette County Bridge No. 15	Not Eligible			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
2004RE03939	Bridge	Not Eligible			x
2004RE03940	Bridge	Not Eligible			x
2004RE05286	County Bridge No. 2	Not Eligible			x
2004RE05288	Township Bridge No. 2	Not Eligible			x
2004RE06846	Bridge	Not Eligible			x
2004RE06851	Bridge	Not Eligible			x
2004RE06862	Bridge No. 1	Not Eligible	x	x	
2004RE06866	Bridge	Not Eligible			x
2004RE08342	Township Bridge No. 4	Not Eligible			x
2004RE08344	Bridge	Not Eligible			x [a]
2004RE08350	Bridge	Not Eligible			x
2004RE08354	Borough Bridge No. 1	Not Eligible	x	x	
2004RE09967	Bridge	Not Eligible			x
2004RE09974	Bridge	Not Eligible			x
2004RE11425	County Bridge No. 175	Not Eligible			x
2004RE11640	Township Bridge No. 510	Not Eligible			x
2004RE11641	County Bridge No. 13	Not Eligible			x
2004RE11663	Bridge	Not Eligible			x
2015RE00128	Mason-Dixon Line Boundary Markers, Pennsylvania-Maryland, Historic District	Not Evaluated			x
2017RE02097	Carroll Cabin	Eligible			x
2018RE02063	Dunaphey Service Station	Not Evaluated			x
2018RE02340	Hazardous Equipment Facility 4732-06 (HEF) and 4732-12 (HEF)	Not Evaluated	x	x [a]	
2019RE00829	Goodwin Property	Not Evaluated			x
2019RE07740	Timothy Fraser Property	Not Evaluated			x
2019RE11246	Willard Property	Not Evaluated			x
2019RE21517	Goodwin Property	Not Evaluated			x
2022RE07250	Dwelling	Not Evaluated	x	x	
2022RE07251	Dwelling	Not Evaluated	x	x	

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C / Alternative Route F
2022RE07279	Hotel	Not Evaluated	x	x	
2022RE07283	Motel	Not Evaluated	x	x	
2022RE10030	Queen Anne dwelling	Not Evaluated	x	x	
2023RE08155	Dwelling	Not Evaluated			x
2025RE06742	Late Victorian church	Not Evaluated			x
2025RE09947	Murals by Roman Verostko at Carroll Cabin	Not Evaluated			x
2025RE10056	Gibbon Glade Whitetail Ranch Hunting Camp—54 Mockler Road	Not Evaluated			x

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NHL = National Historic Landmark; NRHP = National Register of Historic Places
An "x" indicates the architectural resource is within the 1-mile buffer from the Proposed Route or Alternative Route centerlines.
[a] This indicates that the resource is within the 0.5-mile buffer from the Proposed Route or Alternative Route ROW Corridor, as discussed in Section 2.3.5.2.

Summary of Previously Recorded National Register of Historic Places-Listed and Eligible Cultural Resources Within 2 Miles from the Edge of the Proposed Route ROW Corridor

In addition to the resources identified above that are within the 1-mile buffer from the Proposed Route centerline, ERM reviewed resources that are located 2 miles from the edge of the Proposed Route ROW Corridor. There are no previously recorded battlefields or cemeteries within 2 miles from the edge of the Proposed Route ROW Corridor that are recommended eligible for listing on the NRHP. There are two previously recorded archaeological sites within 2 miles from the edge of the Proposed Route ROW Corridor that are recommended eligible for listing on the NRHP are (Table 2.3-17). There are six previously recorded architectural resources within 2 miles of the edge of the Proposed Route ROW Corridor that are recommended eligible for listing on the NRHP (Table 2.3-18).

TABLE 2.3-17 ARCHAEOLOGICAL SITES BETWEEN 1 AND 2 MILES FROM THE EDGE OF THE PROPOSED ROUTE ROW CORRIDOR

Entity Number	Site Number	Site Name	Description	NRHP Status
Greene County				
1999RE02059 [a]	36GR0474	Meadow Ridge #1	Pre-Contact	Eligible
Fayette County				
1993RE01824 [a]	36FA0411	NA	Pre-Contact	Eligible

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NRHP = National Register of Historic Places; ROW = right-of-way
[a] This indicates that the resource is within the 1-mile buffer from the Proposed Route Centerline.

TABLE 2.3-18 ARCHITECTURAL RESOURCES BETWEEN 1 AND 2 MILES FROM THE EDGE OF THE PROPOSED ROUTE ROW CORRIDOR

Resource Number	Description	NRHP Status
Greene County		
1996RE00823 [a]	Monongahela River Navigation System Historic District	Eligible
2002RE01662 [a]	Monongahela Railroad Historic District	Eligible
Fayette County		
1992RE00590 [a]	Fairmont, Morgantown & Pittsburg Railroad Historic District	Eligible
2010RE00735 [a]	Monongahela Railway Historic District	Eligible
2002RE00940 [b]	Dilliner Ferry	Eligible
1993RE01033 [b]	Conn, John L., Farm	Eligible

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NRHP = National Register of Historic Places; ROW = right-of-way
[a] This indicates that the resource is also within the 1-mile buffer from the Proposed Route Centerline (Table 2.3-16).
[b] This indicates that the resource is within the 1-mile buffer from the Proposed Route Centerline.

2.3.5.2 IMPACTS

This section discusses the potential impacts associated with the MARL Project where the potential impacts on archaeological sites and cemeteries are associated with the ROW Corridors and potential impacts on aboveground architecture resources are associated with the 0.5-mile buffer from the Proposed Route and Alternative Route centerlines (Attachment 1g). Based on prior agency consultation and guidance from the PA SHPO's *Guidelines for Projects with Potential Visual Effects,* the 0.5-mile buffer is expected to be the maximum extent of consideration for visual potential impacts (PA SHPO 2025a). Additionally, potential impacts for the Proposed Route ancillary facility workspaces were considered within the workspaces for archaeological sites and within a 500-foot buffer for aboveground architectural resources.

Battlefields

Neither the Proposed Route nor any Alternative Routes cross or are within 0.5 mile of any battlefields. Furthermore, there are no battlefields associated with ancillary facility workspaces.

Cemeteries

There are no cemeteries within any of the Proposed Route or Alternative Route ROW Corridors. No potential impacts on previously recorded cemeteries are anticipated as a result of construction or operation of the MARL Project. In addition, there are no cemeteries within any of the Proposed Route ancillary facility workspaces.

Archaeological Sites

Two previously identified archaeological sites (36FA028 and 36FA0427) are within the ROW Corridor for Alternative Routes C and F; the former is Demolished, and the latter has not been evaluated for the NRHP. Site 36GR0198 is within the ROW Corridor for the Proposed Route and Alternative Routes B, D, and E. It has not been evaluated for the NRHP (Table 2.3-19).

Two sites (36FA0440 and 36FA0441) are within Proposed Route ancillary facility workspaces, specifically along temporary access roads (Table 2.3-20). Neither site has been evaluated for inclusion on the NRHP.

The MARL Project archaeological resources investigation will include a field survey of these locations and their immediate vicinity to determine site boundary, depth, and the condition and nature of any artifact assemblage to assess information potential and applicability of all NRHP eligibility criteria. Should MARL Project construction or operation potentially affect a site location, an evaluation of site eligibility for inclusion on the NRHP will be required. Should the potential impact be considered an adverse effect, NEET MA will review opportunities to avoid or minimize potential MARL Project impacts. Should an adverse effect be unavoidable, NEET MA will evaluate avoidance minimization measures such as the use of environmental mats or treatment options, which could include data recovery excavations. Archaeological work at these sites will be executed in coordination with the PA SHPO.

NEET MA will conduct a Phase I archaeological resources investigation of the Siting Corridor in coordination with the PA SHPO, as it is anticipated that any resource within the ROW Corridor could be directly affected. The investigation will concentrate efforts in areas of high potential for

both pre-contact and historic period archaeological sites. Should the investigation result in the identification of archaeological resources, additional archaeological investigations (including Phase II site evaluations) may be required to assess each site's eligibility for inclusion on the NRHP. NEET MA will coordinate treatment of an adverse effect through avoidance, minimization, or mitigation with the PA SHPO.

TABLE 2.3-19 ARCHAEOLOGICAL SITES WITHIN THE PROPOSED ROUTE AND ALTERNATIVE ROUTE ROW CORRIDORS

Entity Number	Site Number	Site Name	Description	NRHP Status	Proposed Route A/ Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
1983RE03182	36FA0328	Bench Mark	Pre-Contact; Open Habitation	Demolished			x
1993RE01837	36FA0427	Rugh	Historic; Domestic Site	Not Evaluated			x
1989RE01154	36GR0198	NA	Pre-Contact; Open Habitation	Not Evaluated	x	x	

Source: PA SHPO 2025b

NA = not applicable; NRHP = National Register of Historic Places; ROW = right-of-way

TABLE 2.3-20 ARCHAEOLOGICAL SITES WITHIN THE ANCILLARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR

Entity Number	Site Number	Site Name	Description	NRHP Status	Facility Type		
					Permanent Access Road	Temporary Access Road	Other Temporary Ancillary Facility
1996RE01157	36FA0440	Gray & Pape Site 95-0125-L5	Pre-Contact	Not Evaluated		x	
1996RE01343	36FA0441	Gray & Pape Site 95-0125-L6	Historic	Not Evaluated		x	

Source: PA SHPO 2025b

NRHP = National Register of Historic Places; ROW = right-of-way

Aboveground Architectural Resources

ERM conducted viewshed modeling to determine the potential distance of visual impact for architectural resources and determined that a 0.5-mile buffer from the route centerlines of the Proposed Route and Alternative Routes provided a sufficient distance to conduct a preliminary desktop potential impact assessment for the NRHP-listed and NRHP-eligible architectural resources (Table 2.3-21 and Table 2.3-22).

Additionally, ERM conducted a desktop investigation on aboveground architectural resources within 500 feet of the Proposed Route ancillary facility workspaces; however, no additional resources were identified that were not already identified within 0.5-mile buffer of the Proposed Route and Alternative Route centerlines. Table 2.3-23 shows the aboveground architectural resources within 500 feet of the Proposed Route ancillary facility workspaces. Three are eligible for listing on the NRHP.

Ten NHL-listed, NRHP-listed, or NRHP-eligible resources are within this 0.5-mile buffer from the route centerlines for potential impact assessment (Table 2.3-21 and Table 2.3-22). Resources that have not yet been evaluated for NRHP eligibility may require further assessment and evaluation.

MARL Project potential impacts on NRHP-listed and NRHP-eligible architectural resources are based on visual assessment findings. These potential impact statements are preliminary and could change when ERM conducts the field survey.

TABLE 2.3-21 ARCHITECTURAL RESOURCES WITHIN THE 0.5-MILE BUFFER FROM THE PROPOSED ROUTE AND ALTERNATIVE ROUTE CENTERLINES

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
Greene County					
1989RE00085/ NRHP# 95000118	Greensboro Historic District	Listed			x
2004RE06940	Bridge	Not Eligible			x
2009RE00127	Barn	Not Evaluated	x	x	x
2009RE00271	Bald Hill School	Not Evaluated	x	x	x
2009RE00396	King Residence	Not Evaluated	x	x	x
2009RE00619	Phillips Farmstead	Not Eligible	x	x	x
2019RE16666	Vernacular dwelling	Not Evaluated	x	x	x
2019RE16667	Building	Not Evaluated	x	x	x
2019RE20321	Vernacular dwelling	Not Evaluated	x	x	x
2019RE23397	Vernacular dwelling	Not Evaluated	x	x	x
2019RE26907	Building	Not Evaluated	x	x	x
2023RE04439	Federal style dwelling	Not Evaluated	x	x	x
2023RE04440	Late 19th and 20th Century Revival style Dwelling	Not Evaluated	x	x	x
2023RE04525	Mobile Home	Not Evaluated			x
2023RE04526	Vernacular dwelling	Not Evaluated			x
2023RE04527	Vernacular dwelling	Not Evaluated			x
2023RE04529	Vernacular dwelling	Not Evaluated			x
Greene and Fayette Counties					
1996RE00823	Monongahela River Navigation System Historic District	Eligible	x [a]	x [a]	x [a]
2002RE01662	Monongahela Railroad (Brownsville Junction to state line) Historic District	Eligible	x [a]	x [a]	x [a]
2010RE00735	Monongahela Railway Historic District	Eligible	x [a]	x [a]	x [a]
2023RE06905	Point Marion Lock and Dam	Not Evaluated	x	x	

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
Fayette County					
1965RE00010/ NRHP# 66000663	Albert Gallatin House / Friendship Hill National Historic Site	Listed, NHL			x
1983RE00710	County Bridge No. 139 26 20 0081 0 014910	Demolished			x [a]
1983RE01190	L.R. 26081 Bridge	Demolished			x
1983RE01876	L.R. 26081 Bridge 26 2 0 0081 0 0009665	Demolished			x
1989RE00133	Spanish Colonial dwelling	Not Eligible			x
1989RE00596/ NRHP# 95000119	New Geneva Historic District	Listed			x
1991RE00965	Hague House	Not Evaluated			x
1992RE00039	Osman Sutton Tenant House	Not Eligible			x
1992RE00258	Shaffer Gas Station	Not Eligible	x		
1992RE00590	Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District	Eligible	x [a]	x [a]	x [a]
1992RE00859	Osman Sutton Springhouse	Not Eligible			x
1992RE00860	Tony Kremposky House	Not Eligible			x
1993RE00046	Adnire Shuff House	Not Eligible	x	x	
1993RE00231	George Shuff Farm	Not Eligible	x		
1993RE00233	Pa./W.Va. State Line Marker	Not Evaluated	x		
1993RE00262	Robert Britt House	Eligible			x
1995RE40475	Old Stone Church	Not Evaluated			x
1996RE00980	Brackett A. & Lee Smith House	Not Eligible	x		
1996RE01050	Spring Hill Presbyterian Church	Not Evaluated	x		
1997RE00150	Late Victorian dwelling	Not Evaluated			x
1997RE00151	Dwelling	Not Evaluated			x
1997RE00155	Oak Hill Baptist Church Cemetery	Not Evaluated			x
1997RE00329	Hager Property	Listed			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
1997RE00337	Winstead Historic District	Not Eligible			x
1997RE00360	Brown Family Cemetery	Not Evaluated			x
1997RE00363	Dwelling	Not Evaluated			x
1997RE00404	Dwelling	Not Evaluated			x
1997RE00405	Dwelling	Not Evaluated			x
1997RE00408	Old Frame Historic District	Not Eligible			x
1997RE00417	McKinley Historic District	Not Evaluated	x	x	
1997RE00607	Springhill Historic District	Not Eligible	x [a]		
1997RE01024	Goodwin Property	Not Evaluated			x
1997RE01025	Kennison Property	Not Evaluated			x
1997RE01028	Harmony House	Not Evaluated			x
1997RE01077	Friendship Hill Historic District	Not Eligible			x
1997RE01321	Church	Not Evaluated			x
1997RE01347	Sprucetown Historic District	Not Eligible			x
1997RE01348	Atlantic Historic District	Not Eligible			x
1997RE01349	Nilan Historic District	Not Eligible	x	x	
1997RE01372	Point Marion Historic District	Not Eligible	x	x	
1997RE01374	Lake Lynn Historic District	Not Evaluated	x [a]	x [a]	
1997RE01426	Greek Revival dwelling	Not Evaluated			x
1997RE01428	Dwelling	Not Evaluated			x
1997RE01623	Gillmore Historic District	Not Evaluated			x
1997RE01665	Dwelling	Not Evaluated			x
1997RE02125	Dwelling	Not Evaluated			x
1997RE02127	Cemetery	Not Evaluated			x
1998RE00068	Mt. Moriah Cemetery	Not Evaluated			x
1998RE00107	Building	Not Evaluated			x
1998RE00763	Building	Not Evaluated			x
1998RE00874	Andrew Hertzog Homestead	Not Evaluated	x		
1998RE00898	Building	Not Evaluated			x
1998RE00899	Building	Not Evaluated			x
1998RE01939	Building	Not Evaluated			x

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
1999RE01658	Lake Lynn Dam: Penn Hill Housing	Not Evaluated		x	
2002RE01585	Point Marion/L.J. House Glass Co. Historic District	Not Eligible	x	x	
2004RE00800	County Bridge No. 14	Eligible			x
2004RE00817	County Bridge No. 49	Demolished			x
2004RE00818	Bridge	Not Eligible			x
2004RE05288	Township Bridge No. 2	Not Eligible			x
2004RE06846	Bridge	Not Eligible			x
2004RE06851	Bridge	Not Eligible			x
2004RE06862	Bridge No. 1	Not Eligible	x	x	
2004RE08342	Township Bridge No. 4	Not Eligible			x
2004RE08344	Bridge	Not Eligible			x [a]
2004RE11640	Township Bridge No. 510	Not Eligible			x
2004RE11641	County Bridge No. 13	Not Eligible			x
2015RE00128	Mason-Dixon Line Boundary Markers, Pennsylvania-Maryland, Historic District	Not Evaluated			x
2018RE02340	Hazardous Equipment Facility 4732-06 (HEF) and 4732-12 (HEF)	Not Evaluated	x	x [a]	
2019RE00829	Goodwin Property	Not Evaluated			x
2019RE07740	Timothy Fraser Property	Not Evaluated			x
2019RE11246	Willard Property	Not Evaluated			x
2019RE21517	Goodwin Property	Not Evaluated			x
2025RE06742	Late Victorian church	Not Evaluated			x

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NHL = National Historic Landmark; NRHP = National Register of Historic Places
An "x" indicates the archaeological resource is within the 0.5-mile buffer from the Proposed Route or Alternative Route centerlines.
[a] This indicates that the resource is within the Proposed Route or Alternative Route ROW Corridor, as discussed below.

TABLE 2.3-22 ELIGIBLE AND LISTED ARCHITECTURAL RESOURCES WITHIN THE 0.5-MILE BUFFER FROM THE PROPOSED ROUTE AND ALTERNATIVE ROUTE CENTERLINES BY NATIONAL REGISTER OF HISTORIC PLACES AND NATIONAL HISTORIC LANDMARK STATUS

Resource Number	Description	NRHP Status	Proposed Route / Alternative Route D / Alternative Route E	Alternative Route B	Alternative Route C/ Alternative Route F
1989RE00085/ NRHP# 95000118	Greensboro Historic District	Listed			x
1965RE00010/ NRHP# 66000663 NHL	Albert Gallatin House / Friendship Hill National Historic Site	Listed			x
1989RE00596/ NRHP# 95000119	New Geneva Historic District	Listed			x
1993RE00262	Robert Britt House	Eligible			x
1996RE00823	Monongahela River Navigation System Historic District	Eligible	x	x	x
1997RE00329	Hager Property	Listed			x
2002RE01662	Monongahela Railroad (Brownsville Junction to state line) Historic District	Eligible	x	x	x
2004RE00800	County Bridge No. 14	Eligible			x
2010RE00735	Monongahela Railway Historic District	Eligible	x	x	x
1992RE00590	Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District	Eligible	x	x	x

Source: PA SHPO 2025b; NPS 2018; NRHP 2025

NRHP = National Register of Historic Places; NHL = National Historic Landmark
An "x" indicates the architectural resource is within the 0.5-mile buffer from the Proposed Route or Alternative Route centerlines.

TABLE 2.3-23 ABOVEGROUND ARCHITECTURAL RESOURCES WITHIN 500 FEET OF PROPOSED ROUTE ANCILLIARY FACILITY WORKSPACES OUTSIDE OF THE PROPOSED ROUTE ROW CORRIDOR

Resource Number	Description	NRHP Status	Facility Type		
			Permanent Access Road	Temporary Access Road	Other Temporary Ancillary Facility
1992RE00258	Shaffer Gas Station	Not Eligible			x
1992RE00590	Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District	Eligible		x [a]	x
1997RE00607	Springhill Historic District	Not Eligible		x	x
1997RE01372	Point Marion Historic District	Not Eligible		x	
1997RE01374	Lake Lynn Historic District	Not Evaluated		x	x
2002RE01662	Monongahela Railroad (Brownsville Junction to state line) Historic District	Eligible	x	x	x
2010RE00735	Monongahela Railway Historic District	Eligible	x	x	x

Source: PA SHPO 2025b; NRHP 2025

NRHP = National Register of Historic Places; ROW = right-of-way
An "x" indicates the aboveground architectural resource is within 500 feet of Proposed Route ancillary facility workspace.
[a] This indicates that the site is also within the Proposed Route or Alternative Route ROW Corridor, as discussed below.

National Historic Landmarks

- Albert Gallatin House / Friendship Hill National Historic Site (1965RE00010/NRHP# 66000663) is located 0.2 mile northwest of Alternative Routes C and F at MP 10.4 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource consists of dense vegetation and residences. The existing West Penn transmission line is located east of the Alternative Routes and is likely visible from the resource's eastern boundary. As Alternative Routes C and F are closer to the resource than the existing transmission line, they are also likely to be visible from the resource. This could introduce additional modern elements to the eastern viewshed.

National Register of Historic Places-Listed Architectural Resources

- Greensboro Historic District (1989RE00085/NRHP# 95000118) is located 0.5 mile northwest of Alternative Routes C and F at MP 11.4 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource consists of Greensboro borough to the north and west and the Monongahela River to the east. The existing West Penn transmission line is located northeast and northwest of the resource and has introduced modern infrastructure to the area surrounding the resource. Portions of the Alternative Routes that are located on areas of

higher elevation could be visible from areas within the district, especially during leaf-off seasons. This could introduce modern elements to the eastern viewshed where there currently are none.

- New Geneva Historic District (1989RE00596/NRHP# 95000119) is located 0.3 mile north-northwest of Alternative Routes C and F at MP 11.1 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource consists of the unincorporated community of New Geneva to the east, the Monongahela River and the Monongahela Railway to the north, and dense vegetation to the south. Portions of the Alternative Routes could be visible from areas within the district, especially at the easternmost edge of the resource during off-leaf seasons. This could introduce modern elements to the eastern viewshed where there currently are none.
- Hager Property (1997RE00329) is located 0.5 mile northwest of Alternative Routes C and F at MP 11.0 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource consists of the unincorporated community of New Geneva to the south and east and the Monongahela River and the Monongahela Railway to the north. It is unlikely that the Alternative Routes would be visible from the resource due to the steep elevation and dense vegetation directly east of the resource.

National Register of Historic Places-Eligible Architectural Resources

- Fairmont, Morgantown & Pittsburg Railroad (Greene Junction to West Virginia state line) Historic District (1992RE00590) crosses the Proposed Route and Alternative Routes D and E at MP 7.3, 10.2, and 11.7; Alternative Route B at MPs 7.3, 10.4, and 10.6; and Alternative Routes C and F at MP 20.3 (Attachment 1g). The resource traverses through mostly rural areas with dense vegetation and is crossed seven times by the existing West Penn transmission line. Because this is a long linear resource that traverses a large geographic area, it could not be completely avoided during routing. Construction of the Proposed Route and Alternative Routes would be visible but only in areas where they cross the resource, as most of the resource is flanked by thick vegetation. A temporary access road also intersects the resource south of the ROW Corridor near MP 11.4. It is anticipated that there would not be potential impacts on the resources due to any other facilities as currently planned.
- Robert Britt House (1993RE00262) is located 0.4 mile southwest of Alternative Routes C and F at MP 20.0 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource is rural with dense vegetation. The existing Mon Power transmission line is located approximately 434 feet northwest of the resource and is likely visible during off-leaf seasons; however, it is unlikely that construction of the Alternative Routes would be visible because of distance and dense vegetation between the Alternative Routes and the resource.
- Monongahela River Navigation System Historic District (1996RE00823) crosses the Proposed Route and Alternative Routes B, D, and E at MP 7.2 and Alternative Routes C and F at MP 8.4 (Attachment 1g). The resource traverses near a mixture of rural, forested, and small towns; is flanked by dense vegetation; and is crossed twice by the existing West Penn transmission line. Because this is a long linear resource that traverses a large geographic area, it could not be

completely avoided during routing. Construction of the Proposed Route and Alternative Routes would be visible but only in areas where the routes cross the resource, as most of the resource is flanked by dense vegetation.

- Monongahela Railroad (Brownsville Junction to state line) Historic District (2002RE01662) crosses the Proposed Route and Alternative Routes B, D, and E at MP 7.0 and Alternative Routes C and F at MP 8.2 (Attachment 1g). The railroad runs along the Monongahela River, and the majority of the resource is flanked by dense vegetation. The existing West Penn transmission line and other existing transmission lines traverse the resource multiple times. Because this is a long linear resource that traverses a large geographic area, it could not be completely avoided during routing. Construction of the Proposed Route and Alternative Routes would be visible but only in areas where the routes cross the resource, as most of the resource is flanked by dense vegetation. Additionally, a temporary and permanent access road is located approximately 390 feet west of the resource near MP 7.0. Neither access road will be visible from the resource due to dense vegetation. It is anticipated that there would be no potential impacts on the resources due to any other facilities as currently planned.
- County Bridge No. 14 (2004RE00800) is located 0.5 mile north of Alternative Routes C and F at MP 19.2 (Attachment 1g). Both Alternative Routes are identical in the location of the resource and, thus, would have the same potential impacts. The area surrounding the resource is rural with dense vegetation and agricultural land. The existing Mon Power transmission line is located south of the resource, introducing modern infrastructure. As stated previously, the resource appears to be mis-mapped; however, at its current location, construction of the Alternative Routes would add modern elements to the southwest viewshed and could be visible across the agricultural fields but would not be visible in any other direction due to dense vegetation.
- Monongahela Railway Historic District (2010RE00735) crosses the Proposed Route and Alternative Routes B, D, and E at MP 7.0 and Alternative Routes C and F at MP 8.2 (Attachment 1g). The railroad runs along the Monongahela River, and the majority of the resource is flanked by dense vegetation. The existing West Penn transmission line and other existing transmission lines traverse the resource multiple times. Because this is a long linear resource that traverses a large geographic area, it could not be completely avoided during routing. Construction of the Proposed Route and Alternative Routes would be visible but only in areas where the routes cross the resource, as most of the resource is flanked by dense vegetation. Additionally, a temporary and permanent access road is located approximately 390 feet west of the resource near MP 7.0. Neither access road will be visible from the resource due to dense vegetation. It is anticipated that there would be no potential impacts on the resources due to any other facilities as currently planned.

2.3.6 LINEAR INFRASTRUCTURE AND TRANSPORTATION

Linear infrastructure includes electrical and natural gas transmission infrastructure, while transportation includes roads, railroads, and airports. This section describes linear infrastructure within the Siting Corridor for the Proposed Route and Alternative Routes B through F. This section also identifies impacts from the MARL Project on existing linear infrastructure within the ROW Corridors for the Proposed Route and each Alternative Route. There are no airports located within

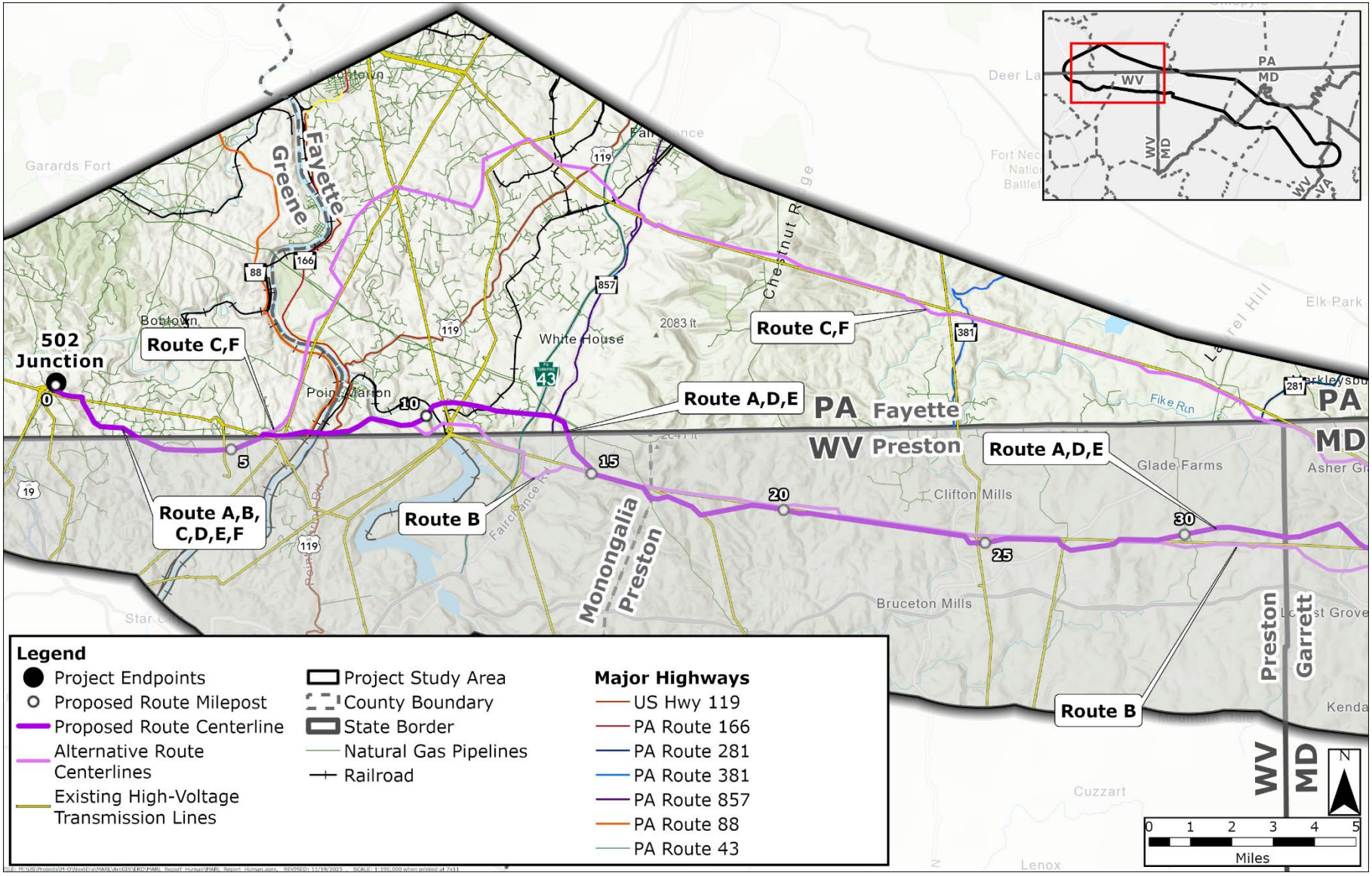
2 miles of the Proposed Route or any Alternative Route; therefore, pursuant to 52 Pa. Code § 57.72 (c)(9), airports are not further discussed in this document.

2.3.6.1 EXISTING CONDITIONS

Transportation and other forms of infrastructure crossed by the Siting Corridors for the Proposed Route and Alternative Routes (B through F) were cataloged using GIS data from federal and state sources, as well as publicly available aerial images of roads. Figure 2.3-6 shows the major roads crossed by the Proposed Route and Alternative Routes, as well as electrical transmission lines and natural gas pipelines.[9] Table 2.3-24 provides information about these roads. In addition to the major roadways listed below, the Proposed Route and each Alternative Route cross numerous county and local roads in southern Greene and Fayette Counties. These roads typically have no more than two paved lanes, often have no lane markings, and rarely have shoulders or pullouts.

[9] For purposes of this analysis, major roads include state routes with route numbers that contain three or fewer digits, as well as US routes.

FIGURE 2.3-6 TRANSPORTATION FEATURES



MD = Maryland; PA = Pennsylvania; US = U.S. Route; VA = Virginia; WV = West Virginia

TABLE 2.3-24 ANNUAL AVERAGE DAILY TRAFFIC FOR ROADS CROSSED BY THE PROPOSED ROUTE AND ALTERNATIVE ROUTES

Road	Segment	Alternative Route(s) Crossed	2024 Annual Average Daily Traffic (vehicles per day)
PA 88	From S Main Street to Holbert Stretch	Alternative Routes C and F	2,677
US 119	Pennsylvania state line to Ruble Mill Road	Proposed Route, Alternative Routes B, D, and E	4,567
	Goodwin Road to Big Six Road	Alternative Routes C and F	6,297
PA 166	US 119 to Friendship Hill Road	Alternative Routes C and F	1,394
PA 43	Pennsylvania state line to Ruble Mill Road	Proposed Route, Alternative D and E	10,024
	Ruble Mill Road to Big Six Road	Alternative Routes C and F	7,358
PA 857	Pennsylvania state line to intersection of Tobin School Road	Proposed Route, Alternative Routes B, D, and E	3,482
PA 381	Cole Road to Quebec Road	Alternative Routes C and F	346
PA 281	Pennsylvania state line to Main Street	Alternative Routes C and F	699

Source: PennDOT 2025

PA = Pennsylvania State Route; US = U.S. Route

Proposed Route and Alternative Routes D and E

The shared Siting Corridor for the Proposed Route and Alternative Routes D and E cross the three following major roads:

- US 119: This is a two-lane arterial road with a typical paved width of approximately 26 feet and occasional, narrow, gravel shoulders.
- PA 43: This is the only limited access freeway and toll road in the MARL Project Study Area in Pennsylvania. The road has two lanes in each direction separated by a wide, landscaped median, as well as a wide, paved, outer shoulder and grade-separated interchanges.
- PA 857 (Fairchance Road): This is a two-lane arterial road with a paved width of approximately 34 feet and paved shoulders.

The Norfolk Southern Railway's Loveridge rail line runs along the west bank of the Monongahela River in Greene County, adjacent to PA 88. The Proposed Route and Alternative Routes D and E cross this railroad line 0.1 mile north of the West Virginia border.

The shared Siting Corridor of the Proposed Route and all five Alternative Routes begins at the 502 Junction substation and parallels existing transmission lines to the West Virginia Border. After re-entering Pennsylvania west of the Monongahela River, the shared Siting Corridor for the Proposed Route and Alternative Routes D and E crosses multiple transmission lines along the West Virginia-Pennsylvania border that emanate from the Longview Power Plant and Fort Martin Power Station in West Virginia (less than 1 mile south of the Pennsylvania border), as well as the Lake Lynn Hydroelectric Power Station, which is adjacent to the state line at the northern end of Cheat Lake. Overhead transmission lines in Pennsylvania associated with these facilities include 500 kV and 138 kV lines (Rextag 2025).

The shared Siting Corridor for the Proposed Route and Alternative Routes D and E crosses several natural gas gathering pipeline corridors and one transmission pipeline corridor, primarily near PA 43. A natural gas pipeline corridor runs southeast-to-northwest, entering Pennsylvania near the southeastern corner of the Siting Corridor. Distribution pipelines serve rural residential areas east of the Cheat River (PHMSA 2025).

Alternative Route B

The Siting Corridor for Alternative Route B crosses US 119 and the Norfolk Southern Railway's Loveridge rail line, as described for the Proposed Route. Alternative Route B crosses the same transmission lines described for the first portion of the Proposed Route but re-enters West Virginia before crossing any natural gas transmission pipelines.

Alternative Routes C and F

The shared Siting Corridor for Alternative Routes C and F cross the following six major roads:

- PA 88 (South Eighty Eight Road): This is a two-lane arterial road with paved width of approximately 22 feet with occasional narrow shoulders.
- PA 166 (New Geneva Road): This is a two-lane arterial road with paved width of approximately 22 feet with the occasional narrow shoulders.

- US 119: This is the same as described for the Proposed Route.
- PA 43: This is the same as described for the Proposed Route.
- PA 381 (Elliotsville Road): This is a two-lane arterial road with paved width of approximately 24 feet with no shoulders.
- PA 281 (Wharton Furnace Road): This is a two-lane arterial road with paved width of approximately 22 feet with the occasional narrow shoulders.

In addition to the Norfolk Southern Railway's Loveridge rail line, as described for the Proposed Route, the shared Siting Corridor for Alternative Routes C and F crosses two rail lines (a mainline and an industrial spur) of the Southwest Pennsylvania Railroad's Fairchance, Masontown, and Point Marion railroad line. This railroad runs through Fayette County, crossing PA 43 just south of US 119.

The shared Siting Corridor for Alternative Routes C and F crosses multiple high-voltage transmission lines. The western portion of the Siting Corridor—between the 502 Junction substation and Point Marion—is the same as described for the Proposed Route. North and east of MP 5.9, substantial portions of the Siting Corridor for Alternative Routes C and F are parallel with existing 500 kV transmission lines, including another existing transmission line from the Point Marion area to east of Martin, Pennsylvania, and from north of Smithfield, Pennsylvania, to where the Siting Corridor enters West Virginia and Maryland (Rextag 2025).

The shared Siting Corridor for Alternative Routes C and F crosses multiple natural gas pipelines in both Greene and Fayette Counties. These pipelines are owned by Diversified, Laurel Mountain, MarkWest Liberty, Columbia Gas, Columbia Gas Transmission, and CMD. The Columbia Gas pipeline corridor described for the Proposed Route also crosses the Siting Corridor for Alternative Routes C and F near Atlantic, Pennsylvania. A cluster of Columbia Gas pipelines run along the Pennsylvania border with West Virginia and Maryland at the southeastern end of the Siting Corridor (PHMSA 2025).

2.3.6.2 IMPACTS

This section describes the MARL Project's impacts on transportation (roads, railroads) and linear utilities (electrical transmission, natural gas transmission).

Transportation

During MARL Project construction, crossings of the roads described in Section 2.3.6.1 would result in temporary impacts on traffic. These impacts would take the form of multiple, separate, short-duration (i.e., a few minutes) intermittent closures of some roads for safety while the transmission line is being installed between the structures on either side of each road crossing.

On local roads and the state roads listed in Table 2.3-24, which typically have low traffic volumes, these closures would not result in substantial traffic impacts. Cable installation is unlikely to cause full closures during the crossing of larger roads such as PA 43 and US 119. NEET MA will coordinate road closures with the Pennsylvania Department of Transportation, county road officials, and other entities responsible for roads to minimize traffic impacts to the extent feasible. The MARL Project's construction protocols include protective measures, such as clearance poles,

cranes, or bucket trucks placed on each side of the road to protect the roadway during cable-pulling activities.

In addition, the MARL Project would require the use and upgrade of some existing roads to access the ROW Corridor, as well as the installation of temporary construction and long-term maintenance access roads from existing public roads along the ROW Corridor. The existing roads outside of the ROW Corridor proposed for use as access roads for the Proposed Route (whether temporary or permanent) are generally small, local roads. Upgrade of existing roads and installation of new temporary or permanent access roads may result in temporary traffic impacts, such as single lane or shoulder closures, especially where new access roads meet existing roads. MARL Project operation (including routine maintenance) will require minimal use of access roads and, therefore, will not meaningfully affect local traffic.

Crossing of the Norfolk Southern Railway and Southwest Pennsylvania Railroad lines in Greene and Fayette Counties, respectively, will require activities similar to those described for road crossings. NEET MA will coordinate with railroads to execute crossing agreements, which will incorporate state, local, and railroad-specific safety procedures and other requirements. Construction across railroads will occur when no train traffic is scheduled and, thus, will not affect railway operations.

NEET MA will coordinate with state and local road authorities to implement any upgrades of existing roads or temporary closure of shoulders or lanes on public roads necessary to install temporary or permanent access roads. As part of the permitting process for the MARL Project, NEET MA will prepare a Traffic Control Plan (TCP) for all road crossings and road upgrades in coordination with the Pennsylvania Department of Transportation, county road officials, and other entities responsible for roads to minimize traffic impacts. The TCP will include traffic management measures, such as the use of road signs, flagging crews, lane closures, and detours. The TCP will also include measures to maintain access for emergency vehicles during construction. Additionally, NEET MA will avoid construction activities during school bus drop-off and pick-up times, as well as peak traffic times on affected roads, to the degree possible. Other typical protective measures for transmission line installation include, but are not limited to, clearance poles, cranes, or bucket trucks placed on each side of the road to protect the roadway during cable-pulling activities.

The MARL Project would not affect any public airports. MARL Project construction may require the use of helicopters to facilitate construction on an as-needed basis (for structure setting, wire-pulling operations, or equipment transport) due to topographic, constructability, or environmental constraints. Helicopter activity would primarily remain above the ROW Corridor and/or ancillary facilities workspaces (or between airports/heliports and the MARL Project). Helicopter flights would originate at existing public airports and heliports or possibly at temporary helipads closer to the MARL Project facilities. The frequency and duration of such flights (if any) and the location of temporary helipads (if any) would be determined as part of MARL Project design and permitting. The location of any temporary helipads in Pennsylvania would be identified as further design of the MARL Project advances and in accordance with all necessary approvals, if any. This analysis assumes that airports or heliports used for these flights would have sufficient capacity to accommodate MARL Project-related flights. Pilots would obey relevant laws and regulations applicable to air operations.

Other Linear Infrastructure

For all utility crossings, NEET MA will work with owner entities to obtain crossing agreements that comply with each entity's technical requirements. Depending on the preferences of the owner company, NEET MA may pursue either a full crossing agreement or a letter of no objection. Transmission line crossings will require that the existing transmission line be deenergized until the crossing is complete. NEET MA will coordinate with the owner company to determine outage timing based on availability as determined by the owner; however, the owner entity would be responsible for engaging with PJM Interconnection (the regional transmission organization) to ensure no impacts on the overall grid during the outage.

For pipeline crossings, NEET MA will place transmission poles at least 50 feet from the pipeline centerline, or the minimum distance required by applicable laws. As part of development of crossing agreements for pipelines, NEET MA will implement mitigations identified by and agreed to with the pipeline owner, as well as those required by regulatory agencies.

As a result of the efforts described above, construction of the MARL Project across transmission and natural gas infrastructure described in Section 2.3.6.1 either would not result in impacts or will include mitigations that address potential impacts prior to the start of construction. Operation of the selected route for the MARL Project (whether the Proposed Route or one of the Alternative Routes) will not affect operation or maintenance of other linear infrastructure.

2.3.7 HAZARDOUS MATERIAL SITES

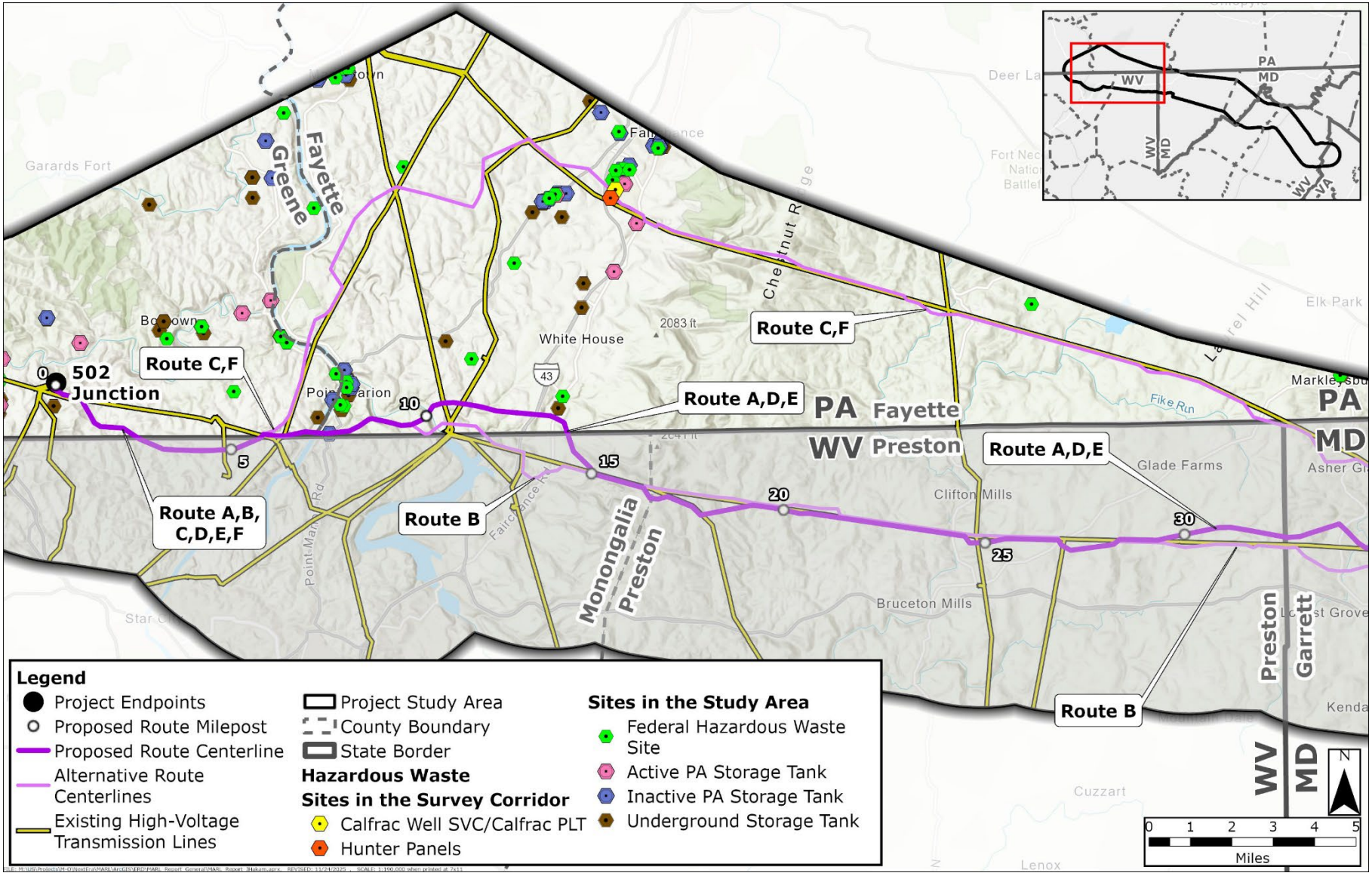
This section describes hazardous material sites within the Siting Corridor for the Proposed Route and Alternative Routes B through F. Hazardous material sites are those properties regulated under the Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act (RCRA) for hazardous substances and waste, respectively. This section also discusses impacts from the MARL Project on the identified hazardous material sites within the ROW Corridor for the Proposed Route and Alternative Routes.

2.3.7.1 EXISTING CONDITIONS

Environmentally regulated sites that use and/or store hazardous materials or waste-producing facilities operating under regulatory permits in the Siting Corridors of the Proposed Route and Alternative Routes were identified using publicly available GIS databases obtained from the USEPA and PADEP. The USEPA databases include information on sites regulated by Comprehensive Environmental Response, Compensation, and Liability Act, RCRA, and Brownfield sites (USEPA 2024). PADEP’s database provides information about facilities, sites, or places subject to environmental regulation or of environmental interest, including Phase I environmental site assessments, permitting, licensing, inspection, compliance, discharges of pollution, site remediation, and enforcement (PADEP 2025a). PADEP maintains a database for both inactive and active aboveground or underground tanks regulated under the Storage Tank and Spill Prevention Act (35 P.S. § 6021 and 25 Pa. Code Chapter 245) (PADEP 2025b, 2025c). These data were used to inform locations and status of regulated storage tanks. However, the identification of a site in the databases does not mean the site necessarily has contaminated soil or groundwater.

Figure 2.3-7 shows the sites identified within the MARL Study Area in Pennsylvania based on federal and state records. There are no identified sites in the Siting Corridors of the Proposed Route and Alternative Routes B, D, and E. Table 2.3-25 summarizes information about the two identified sites in the shared Siting Corridor for Alternative Routes C and F. These sites are described below.

FIGURE 2.3-7 HAZARDOUS MATERIAL SITES



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

TABLE 2.3-25 HAZARD MATERIAL SITES WITHIN THE ALTERNATIVE ROUTE C AND F SITING CORRIDORS

Site Name and Address	Alternative Route	Underground Storage Tank Facility ID (if applicable), USEPA ID	Status	Source
Hunter Panels 2000 Summit View Drive, Smithfield, Pennsylvania 15478	Alternative Routes C and F	110025213294	Active	USEPA
Calfrac Well Services 2001 Summit View Drive, Smithfield, Pennsylvania 15478	Alternative Routes C and F	110055572688	Active	USEPA

Source: USEPA 2015, 2025

USEPA = U.S. Environmental Protection Agency

The Hunter Panels site is documented in the USEPA's Facility Registry Service and is characterized as a site of environmental interest for polystyrene foam product manufacturing. The site currently supports activities for oil and gas operations and contains an active storage tank on the site (USEPA 2015). The site is noted as participating in compliance activity (USEPA n.d.).

The Calfrac Well Services is registered as a facility with the USEPA under the RCRA. The facility is registered due to its support of activities for oil and gas operations. The site is noted as participating in compliance activity (USEPA 2025).

2.3.7.2 IMPACTS

Due to the regulatory activity executed at identified sites and the lack of any reported hazardous waste releases, there are no known sites with the potential to be of concern associated with construction and operation of the Proposed Route or Alternative Routes.

During construction, if NEET MA encounters hazardous substances in the soil during excavation, as determined by odor, sheen, or change in soil characteristics, work will stop at this location until the soil is characterized. Additionally, NEET MA will determine appropriate disposal requirements and implement necessary health and safety measures.

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3. SUMMARY OF MARL PROJECT IMPACTS

To address the requirements of 52 Pa. Code §§ 57.72(c)(7), 57.72(c)(8), 57.72(c)(9), 57.72(c)(10), and 57.72(c)(13)(i); 52 Pa. Code § 57.75(e)(3)-(4); 52 Pa. Code § 69.1101; and 52 Pa. Code §§ 69.3105(1), (3)(i), and (3)(ii), ERM has evaluated the potential impacts of the MARL Project on individual resources within the ROW Corridor of the Proposed Route and the Alternative Routes, as detailed throughout this ERD. Section 2, Environmental Setting and Impacts for the Proposed Route and Alternative Routes, outlines the potential temporary and permanent impacts the MARL Project may have on biophysical, cultural, land use, socioeconomic, and transportation resources. Other requirements of Pa. Code 52 are addressed in the Routing Study and Application.

This assessment includes the following:

- A description of existing resources within the Siting Corridors;
- An evaluation of potential impacts from activities within the ROW Corridors; and
- A summary of avoidance and mitigation measures.

For each resource, the impact assessment considered the MARL Project's ROW Corridor and incorporated applicable construction BMPs, along with other feasible avoidance and mitigation.

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4. REFERENCES

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SECTION 2.2, NATURAL ENVIRONMENT

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ATTACHMENT 1 PENNSYLVANIA ERD RESOURCE MAPBOOKS

ATTACHMENT 1A TOPOGRAPHY MAPBOOK

ATTACHMENT 1B SOILS MAPBOOK

ATTACHMENT 1C WATER RESOURCES MAPBOOK

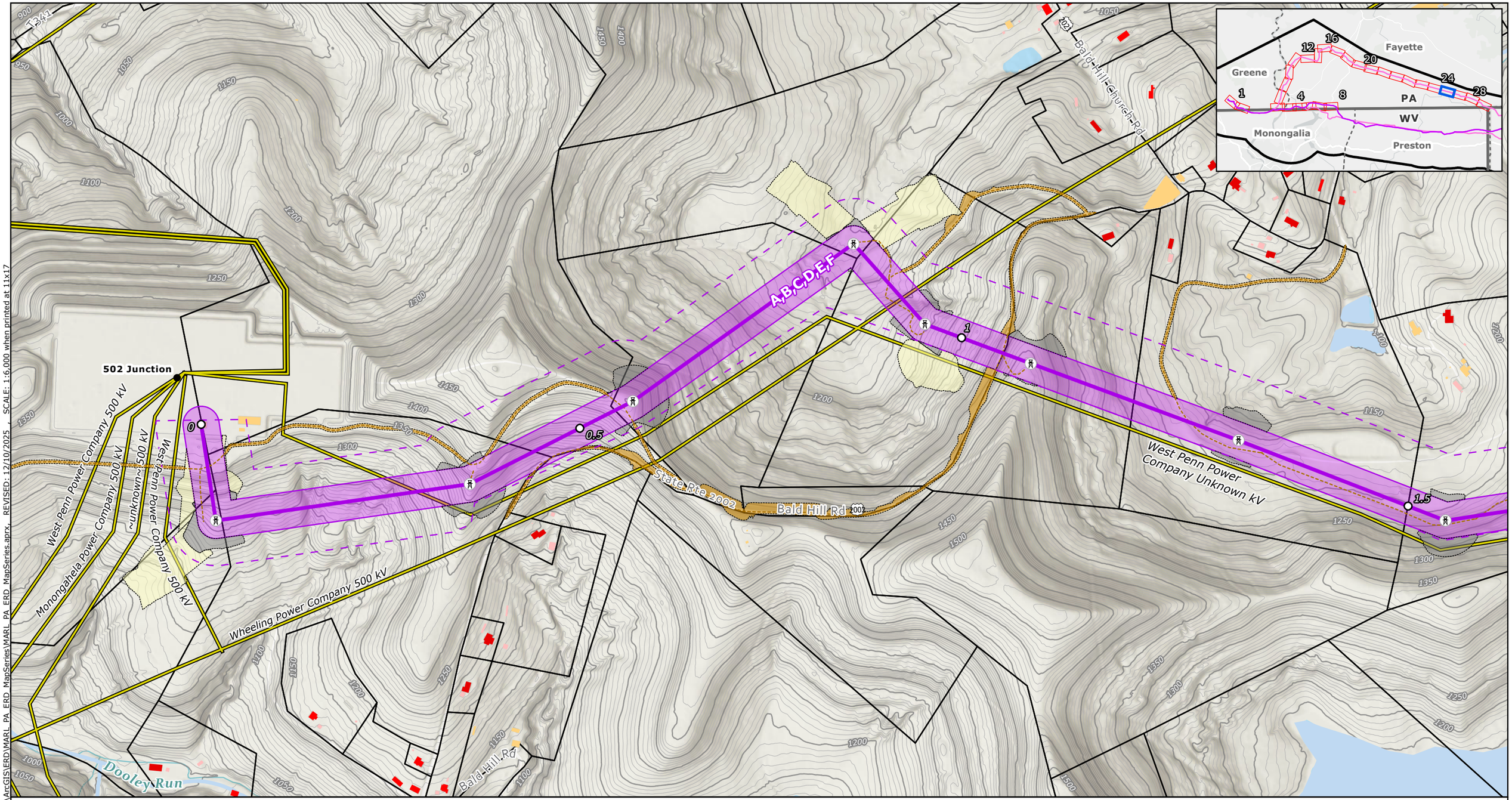
ATTACHMENT 1D LAND USE MAPBOOK

ATTACHMENT 1E ECOLOGICAL AND SENSITIVE SPECIES MAPBOOK

ATTACHMENT 1F RECREATIONAL LANDS AND PROTECTED LANDS MAPBOOK

ATTACHMENT 1G CULTURAL RESOURCES MAPBOOK (CONFIDENTIAL)

ATTACHMENT 1A TOPOGRAPHY MAPBOOK



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines(>69kV)
- State Border
- County Boundary
- Parcels

LiDAR Elevation Contours
- 5-foot contours
- 25-foot contours

Building Footprints
- Residential Dwelling
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- Non-residential buildings

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5. *Data source: NEET, ERM, USGS*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1a
Topography Mapbook
Page 1 of 28
MidAtlantic Resiliency Link

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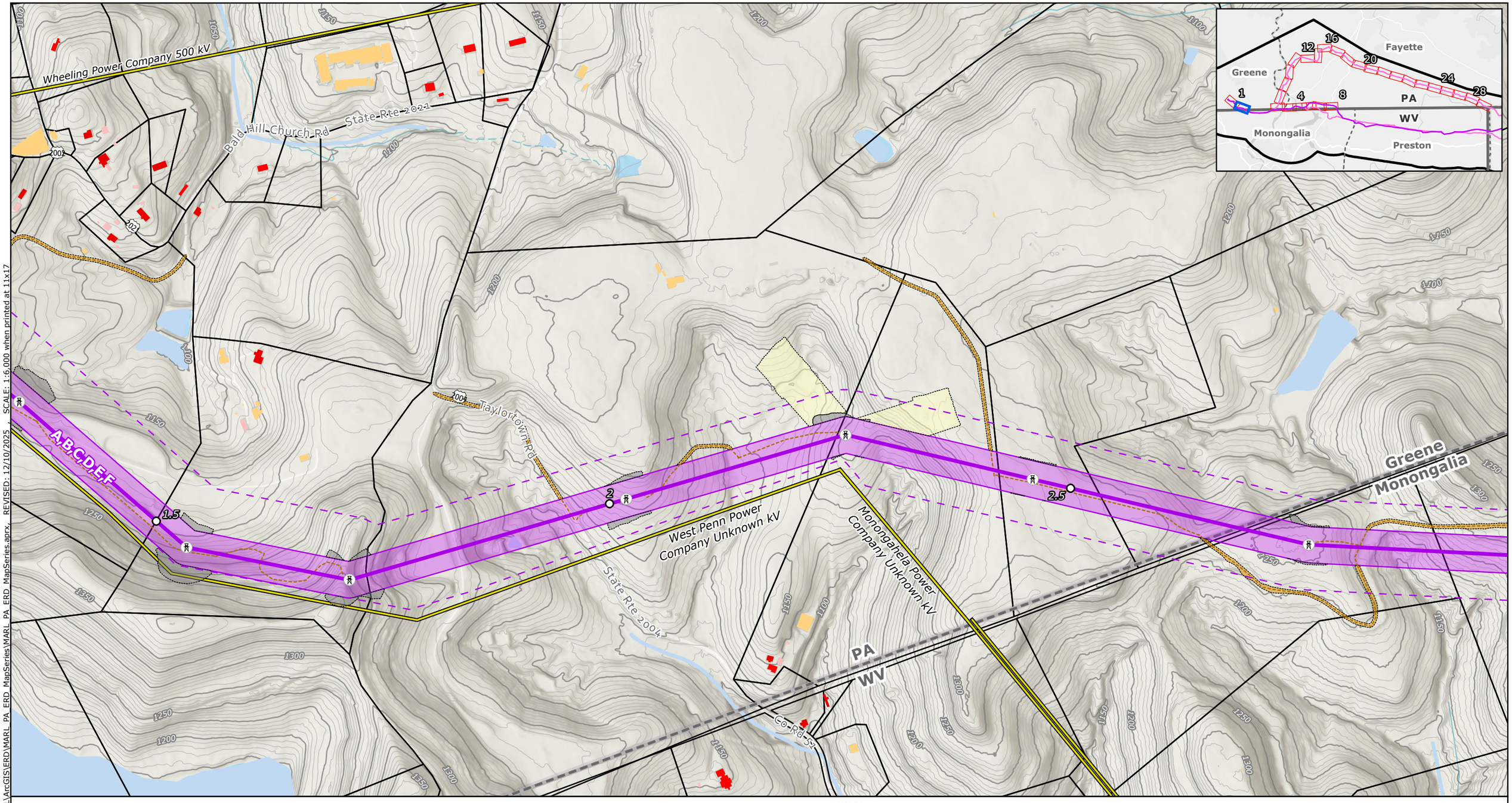

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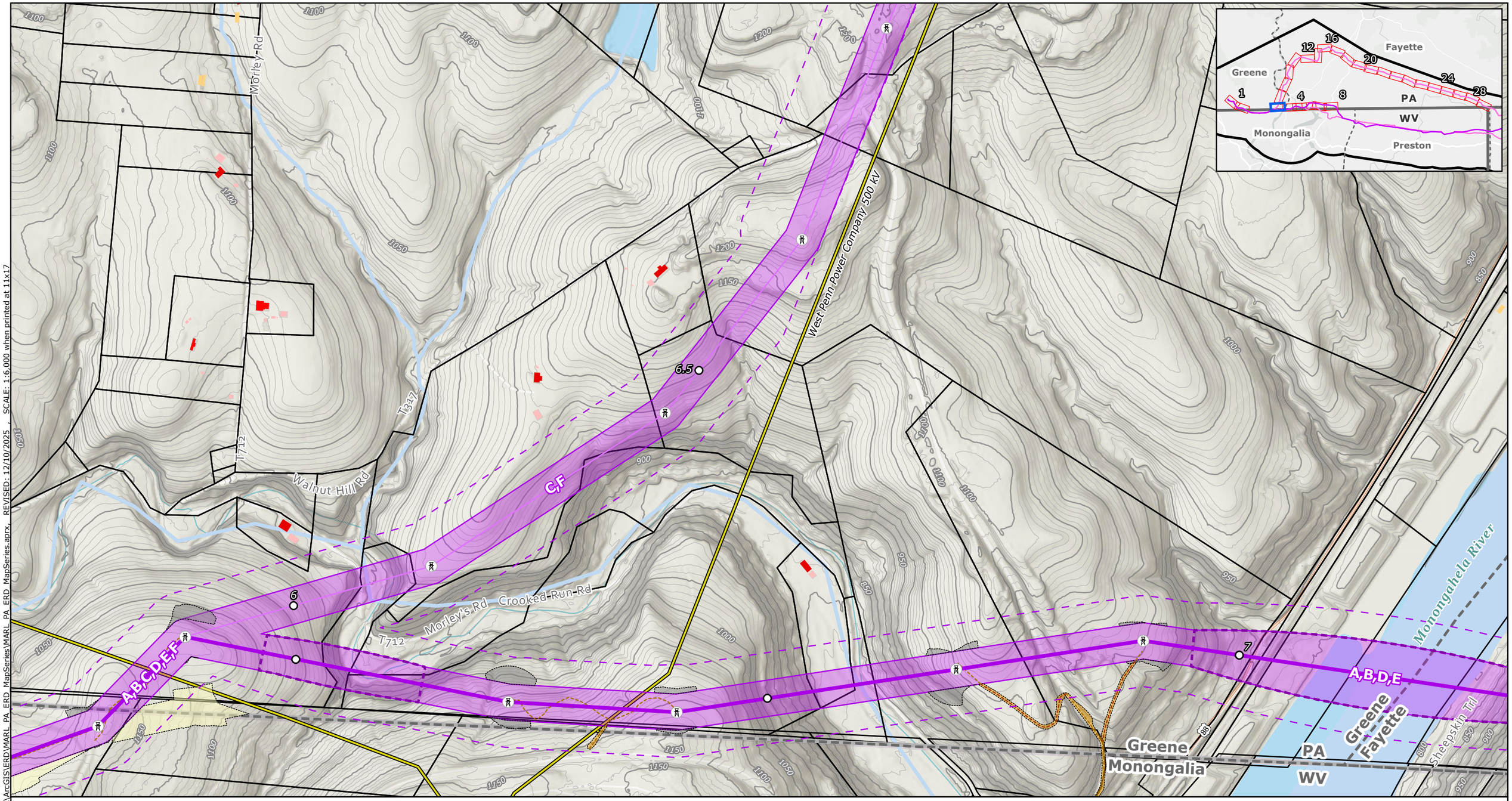

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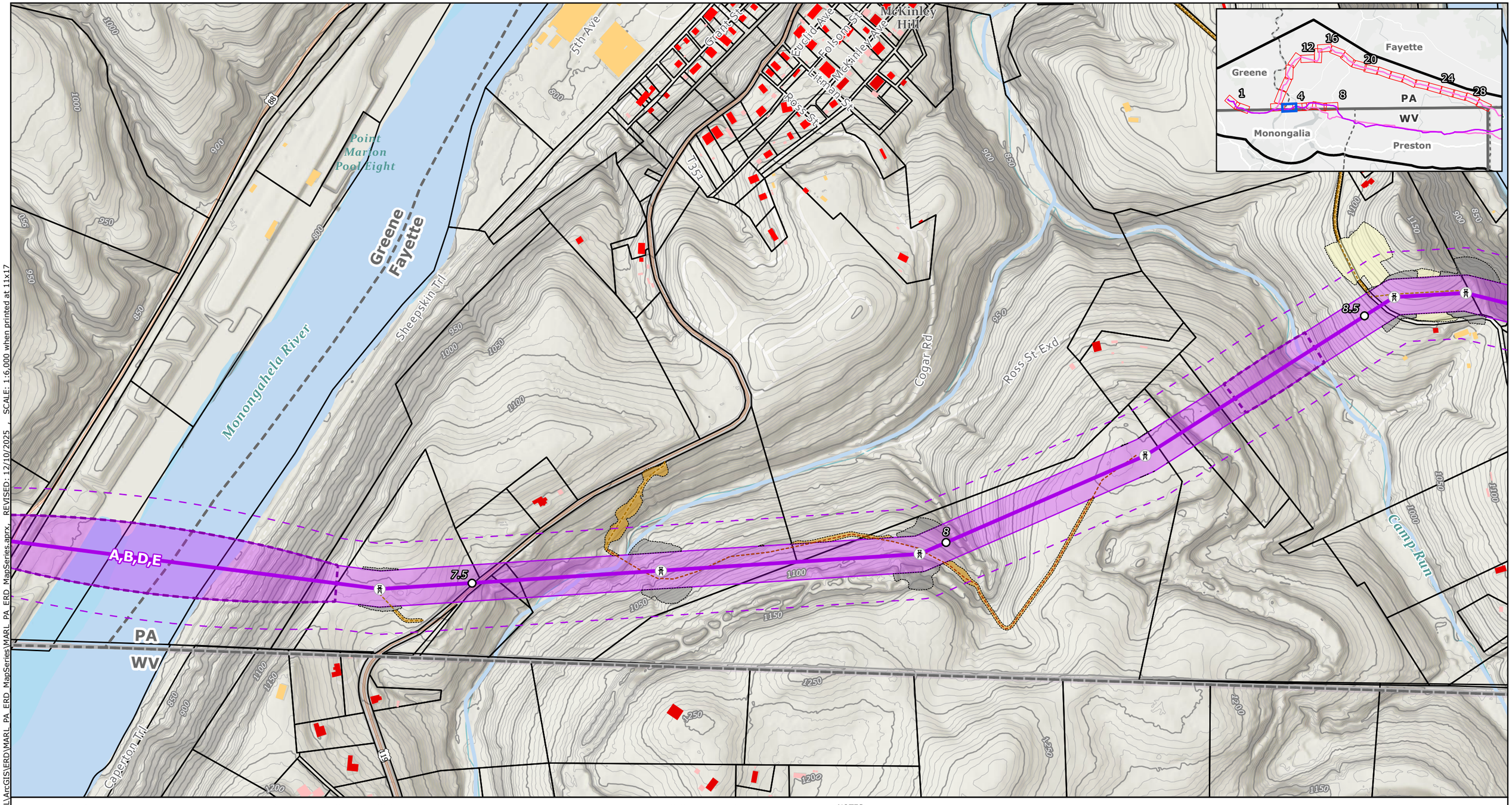

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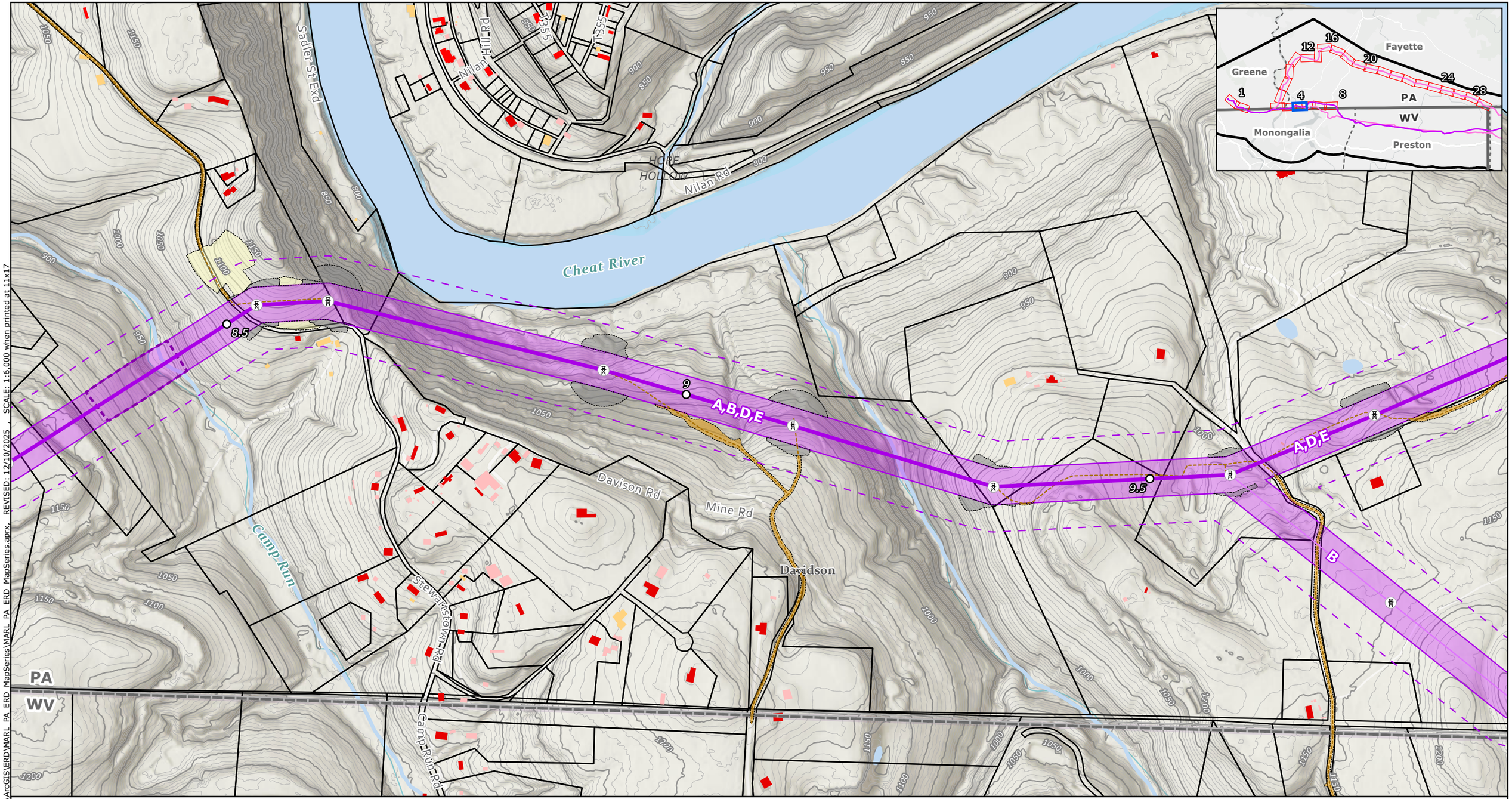

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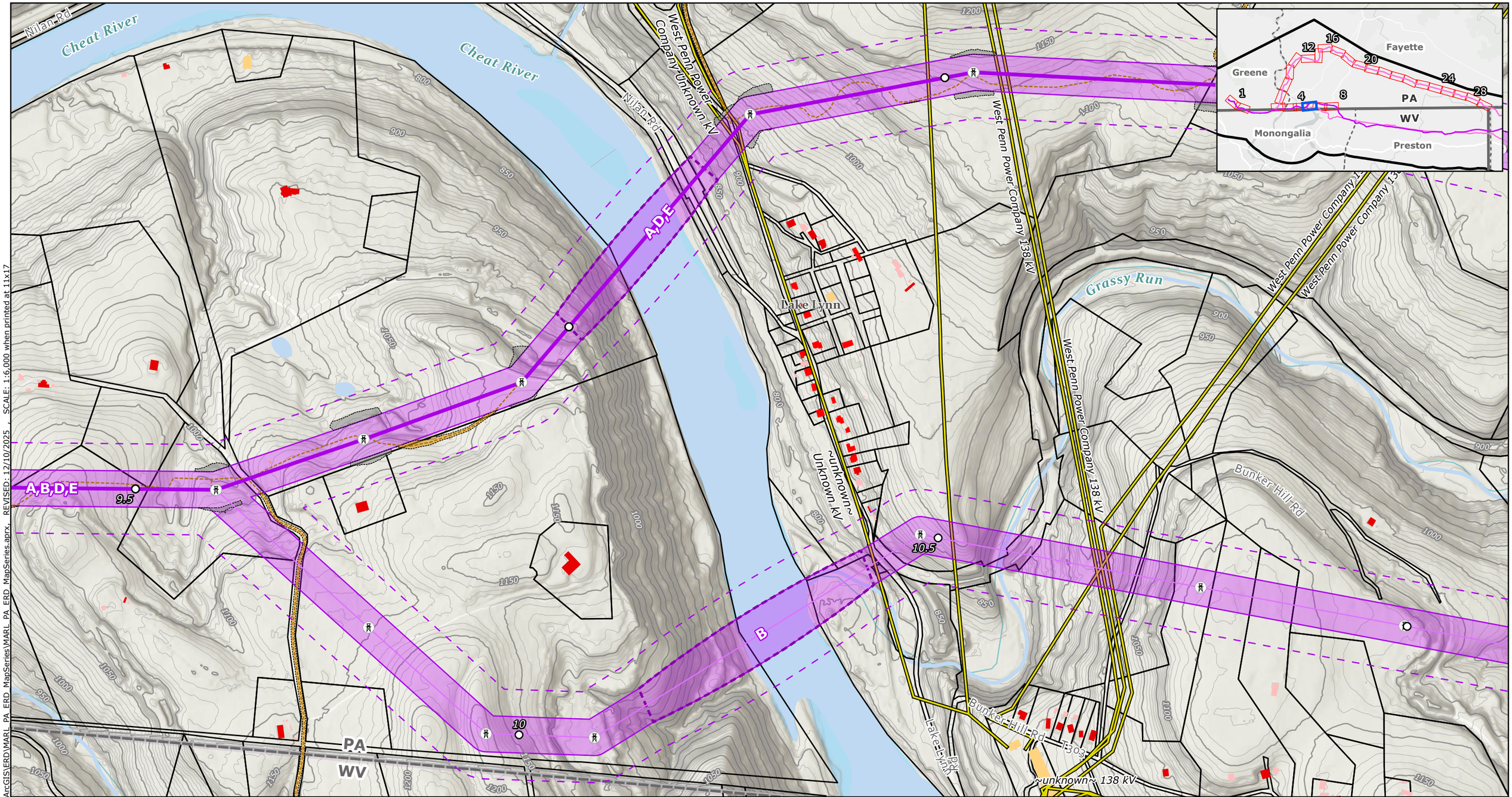

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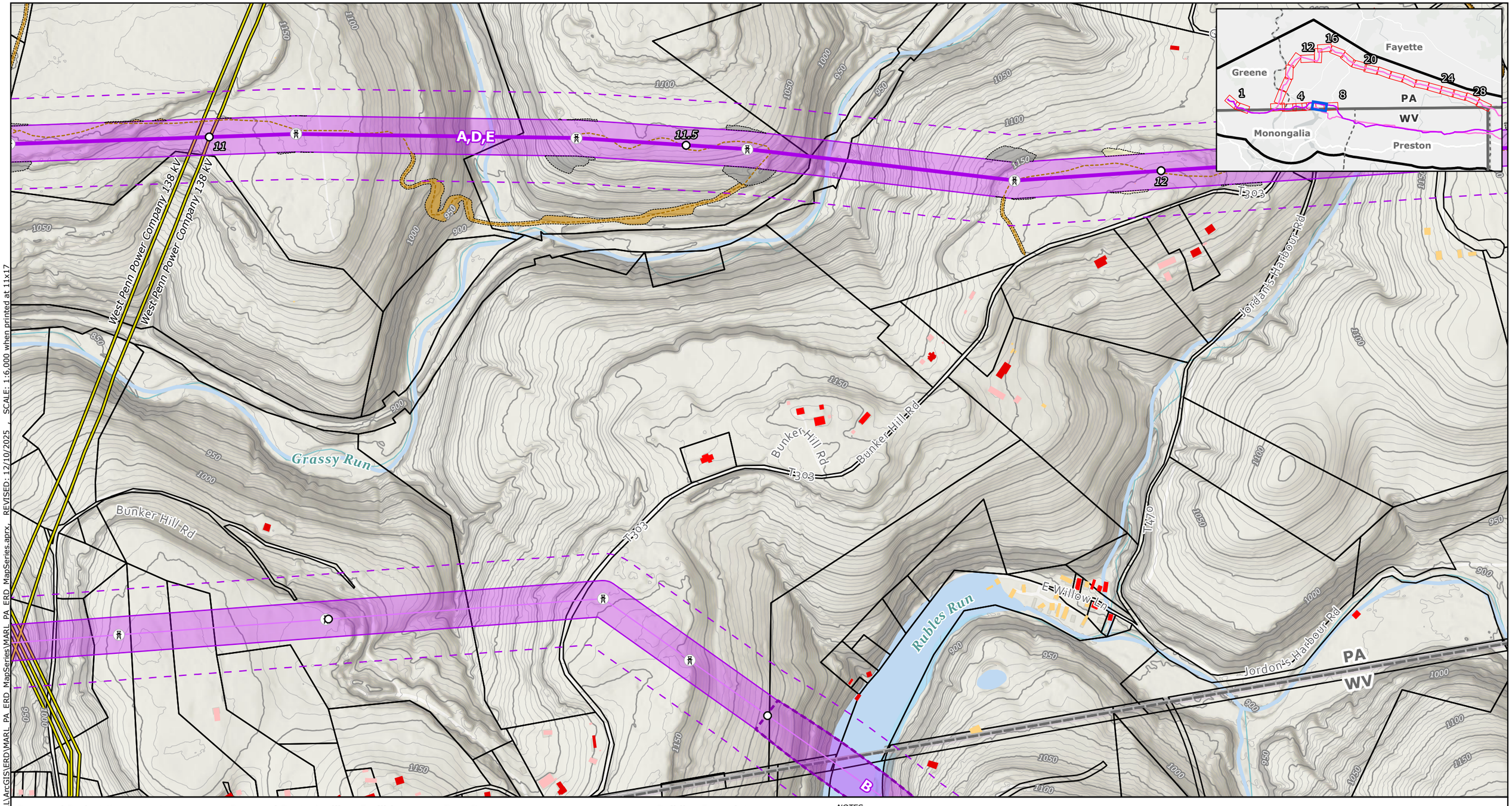

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- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

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- County Boundary
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0 250 500 750 1,000

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ERM

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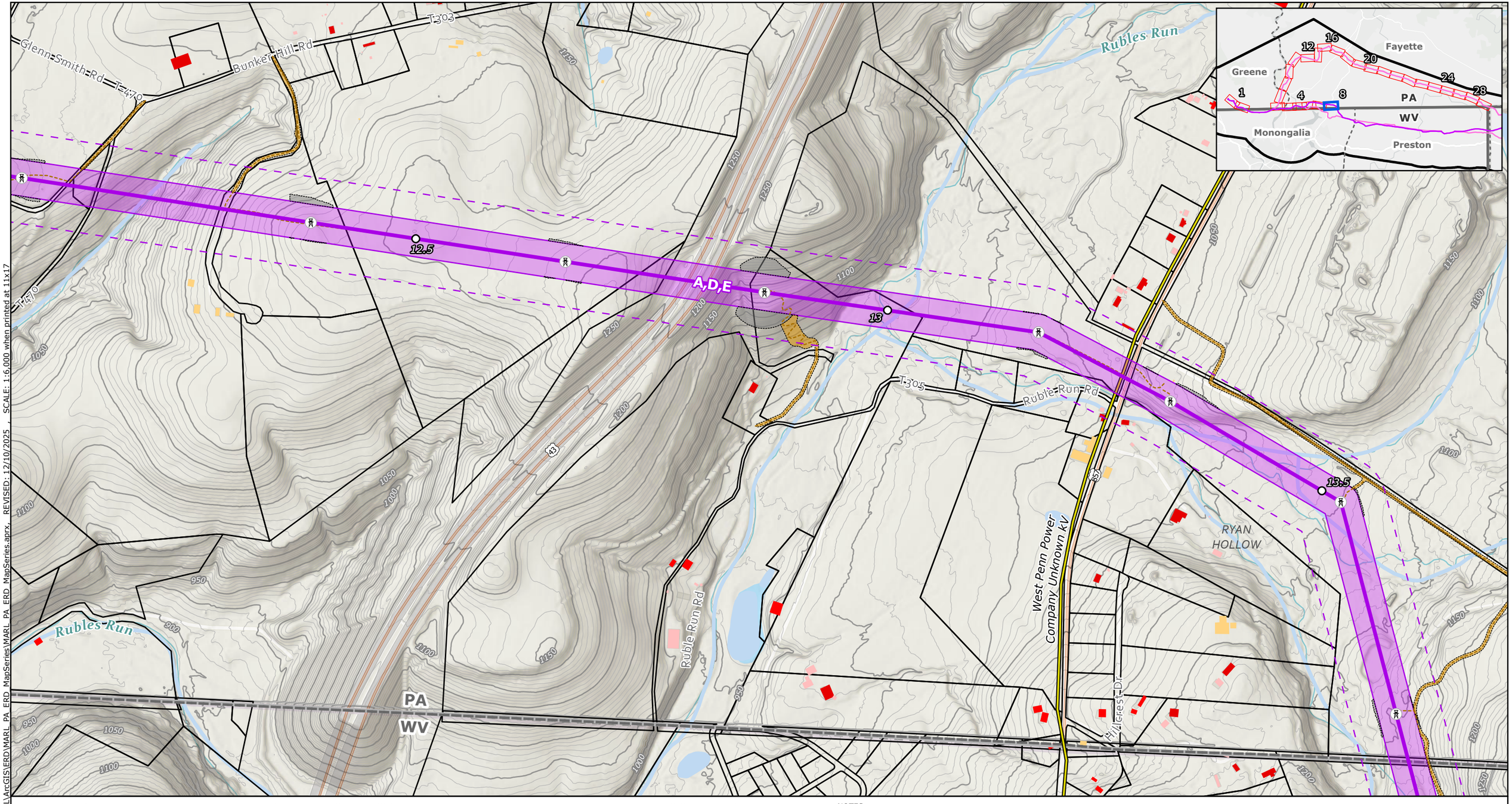

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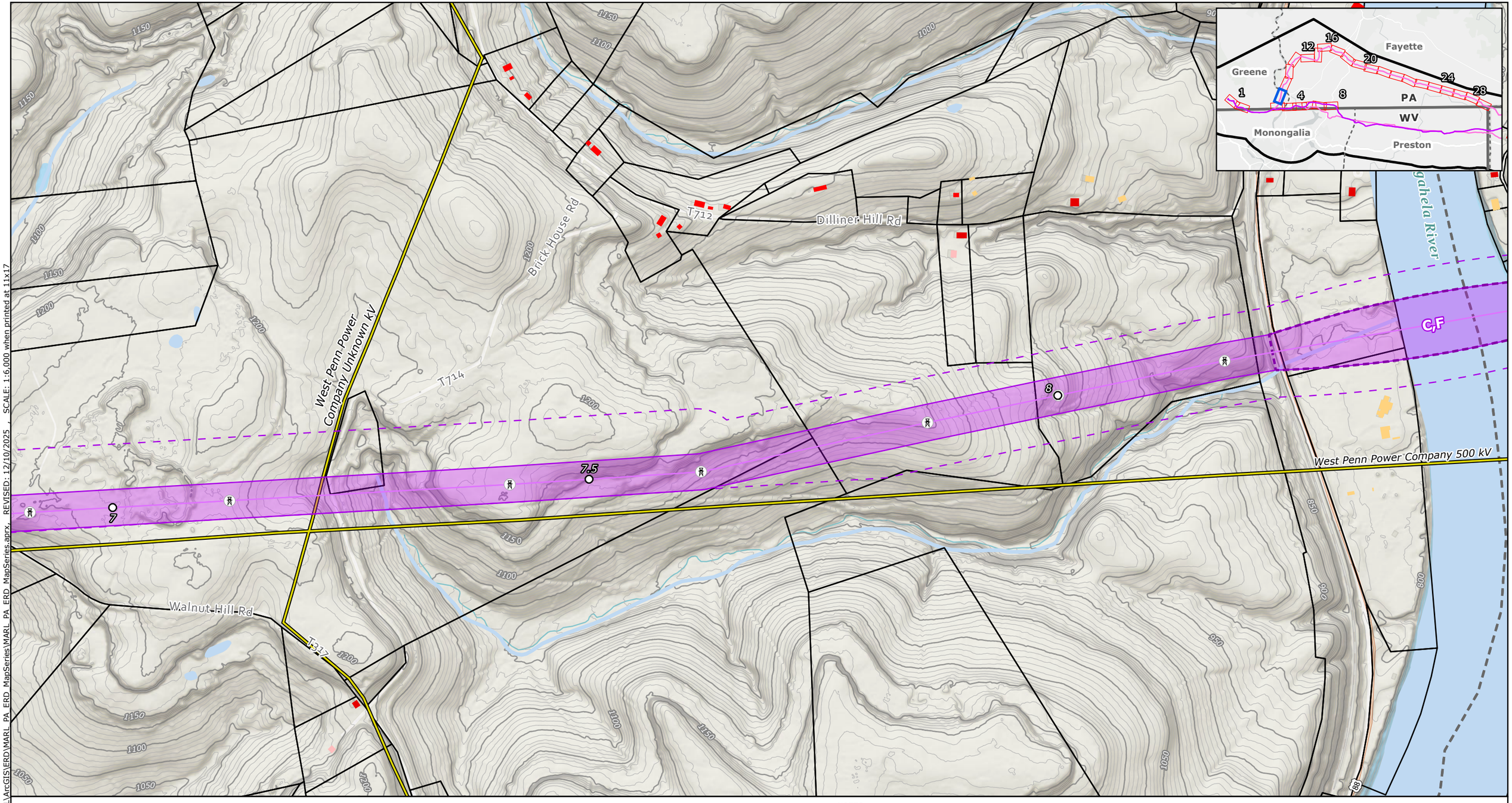

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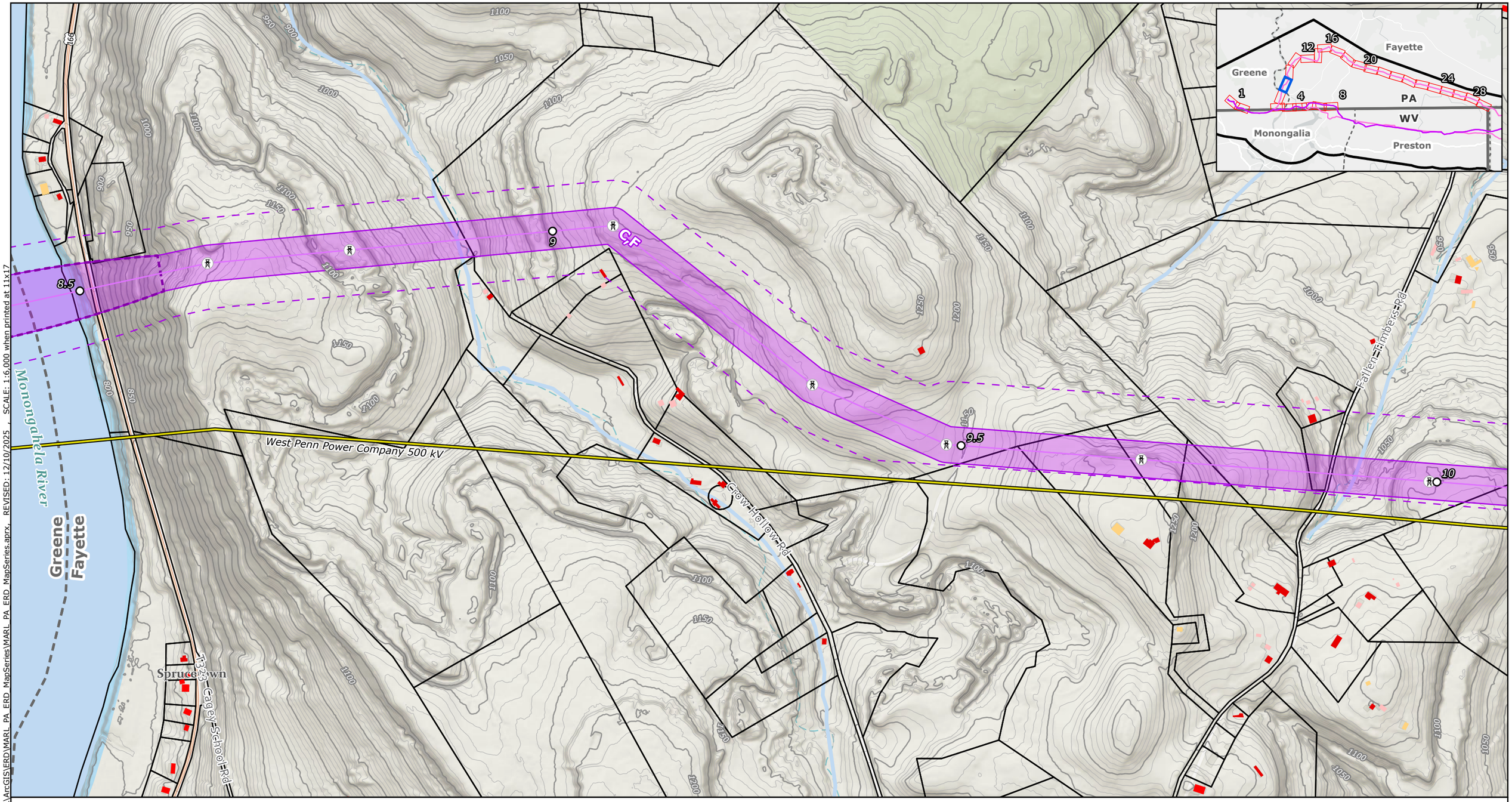

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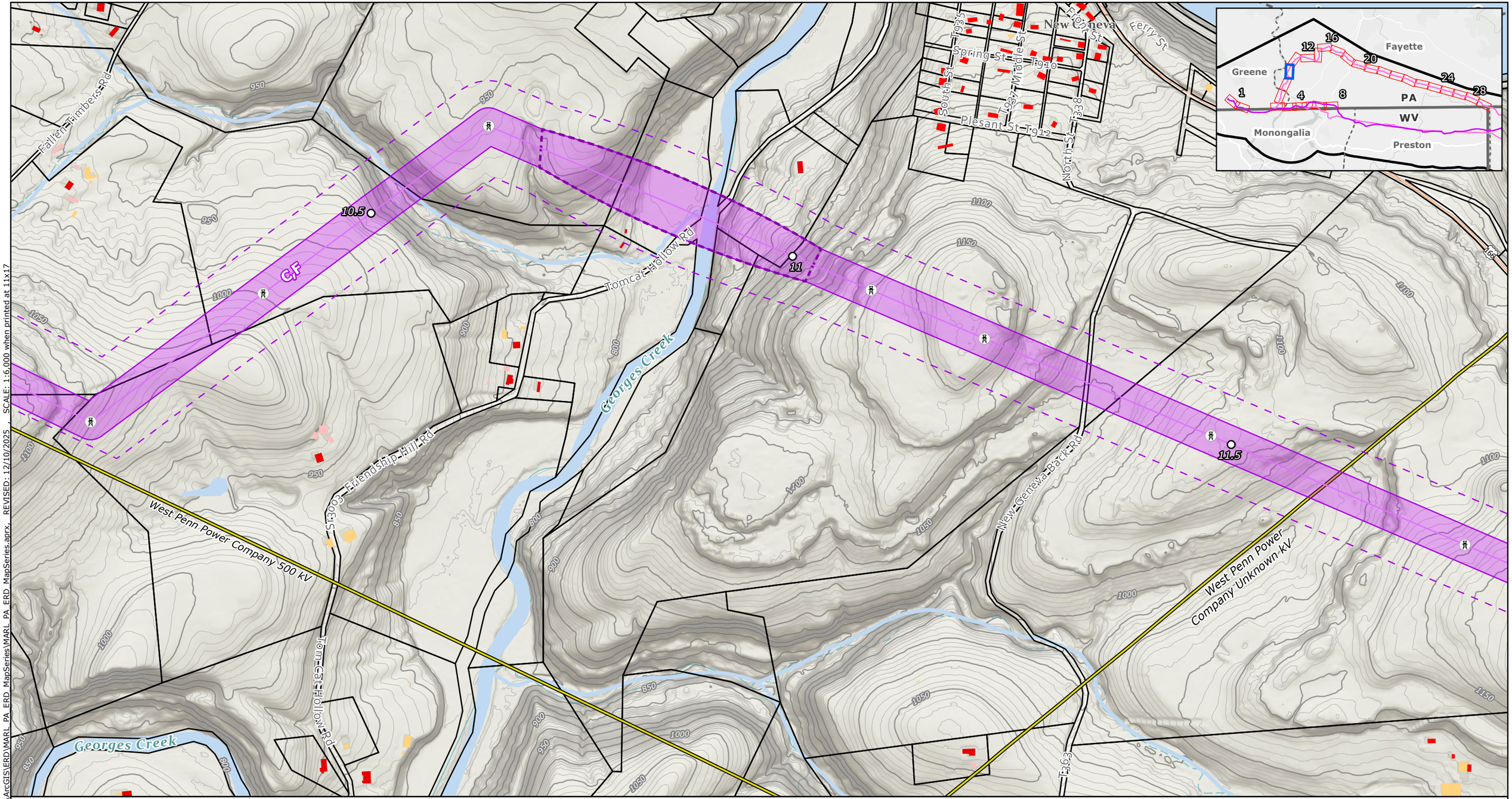

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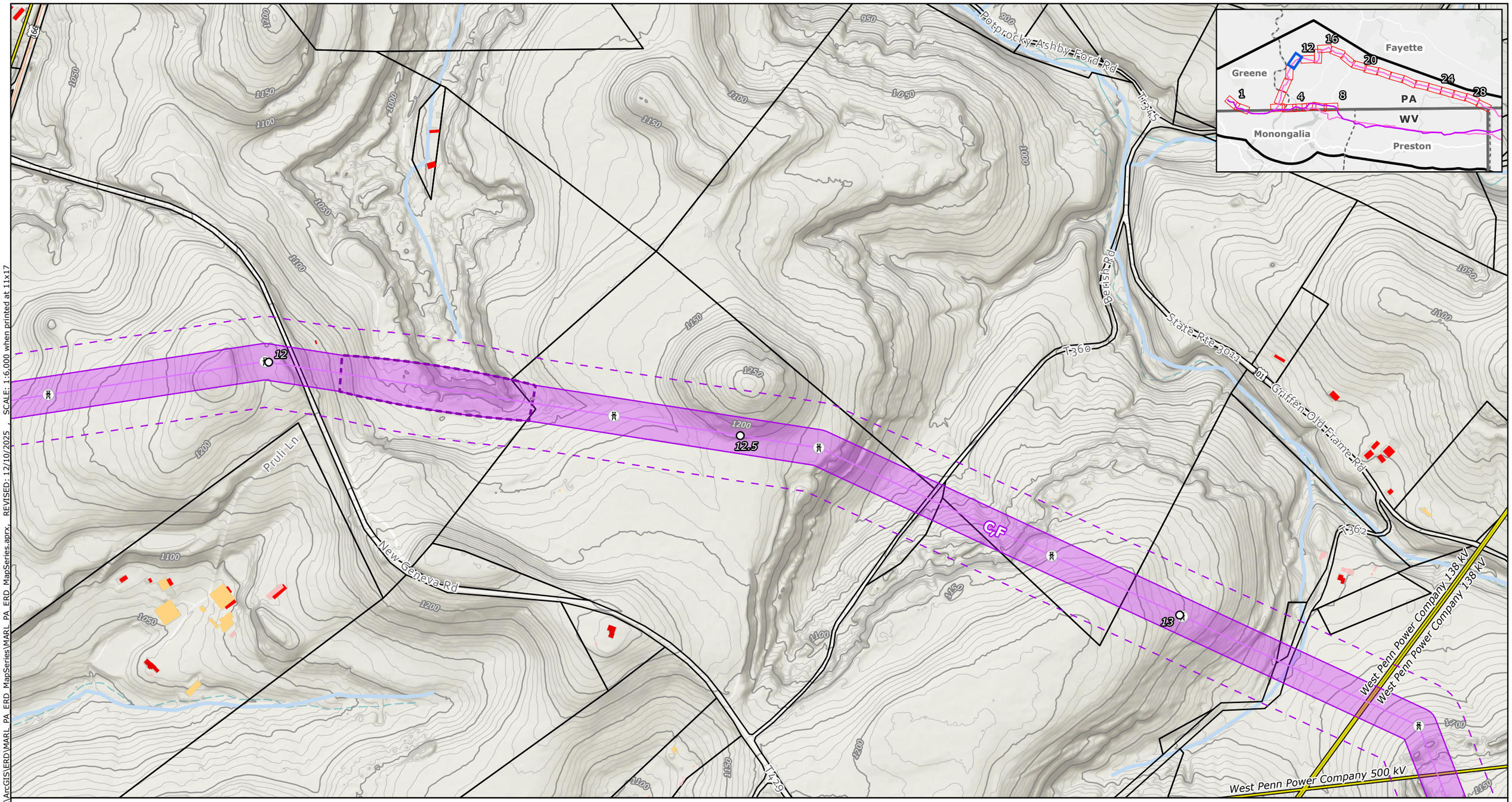

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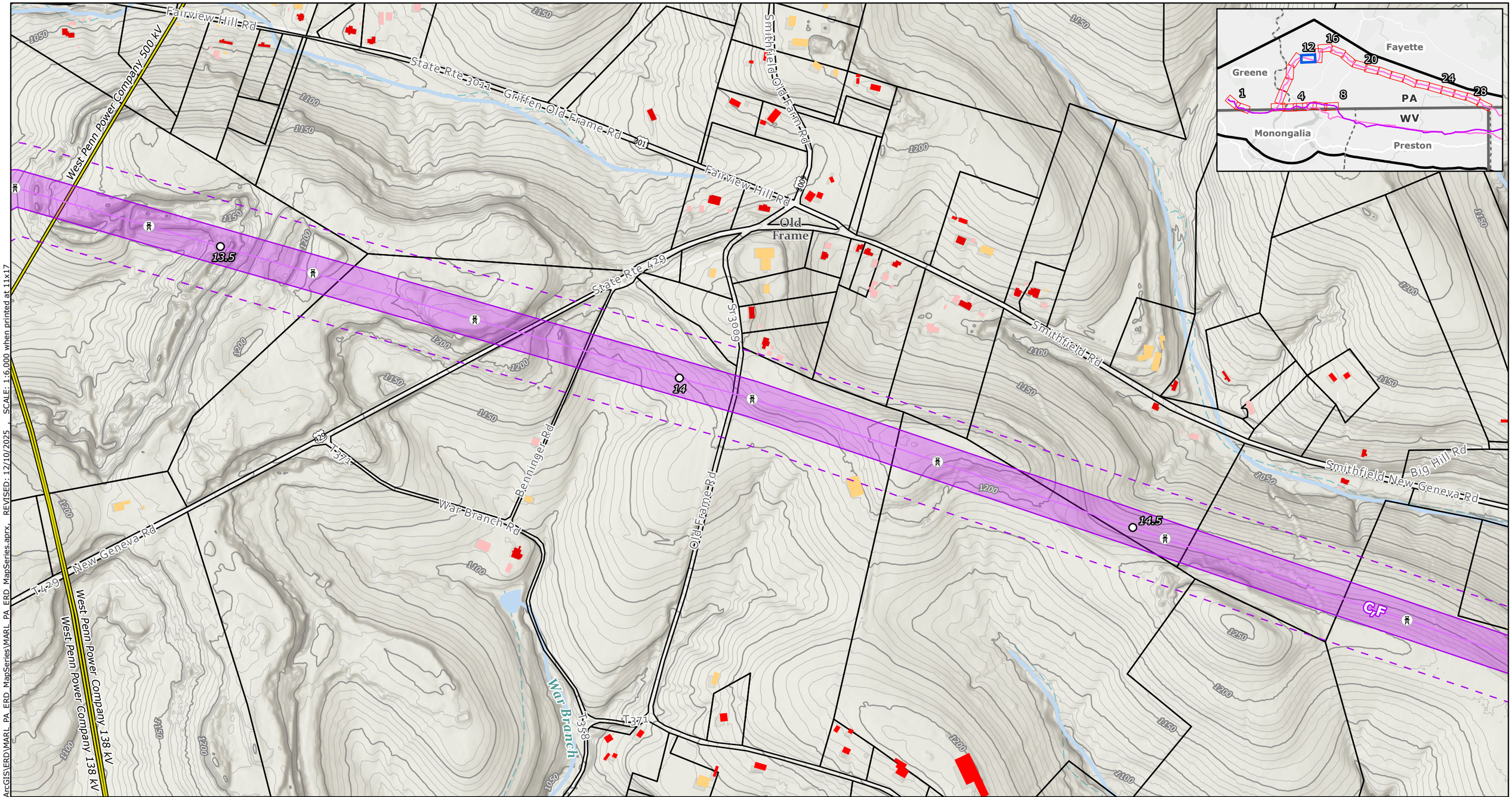

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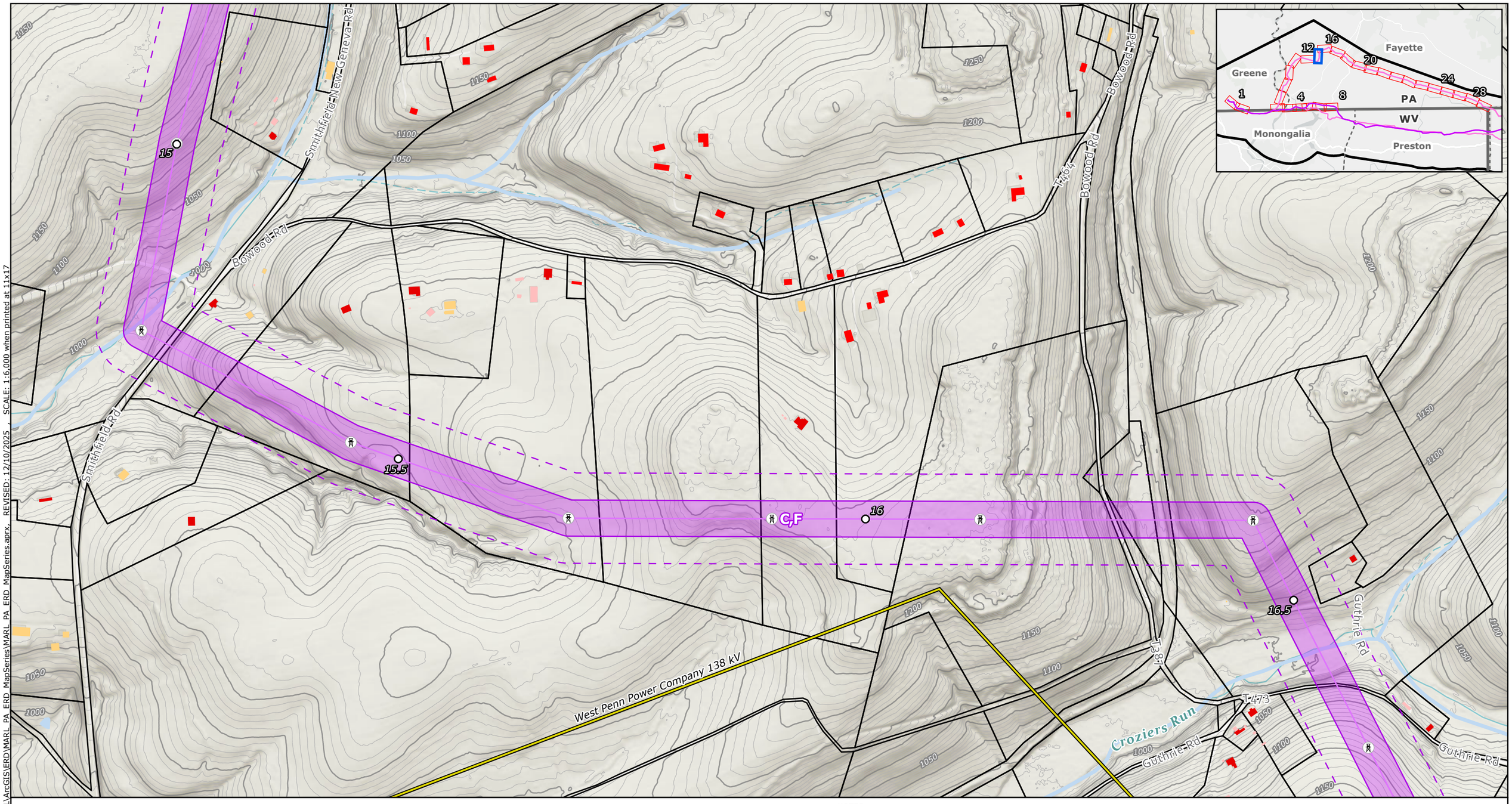

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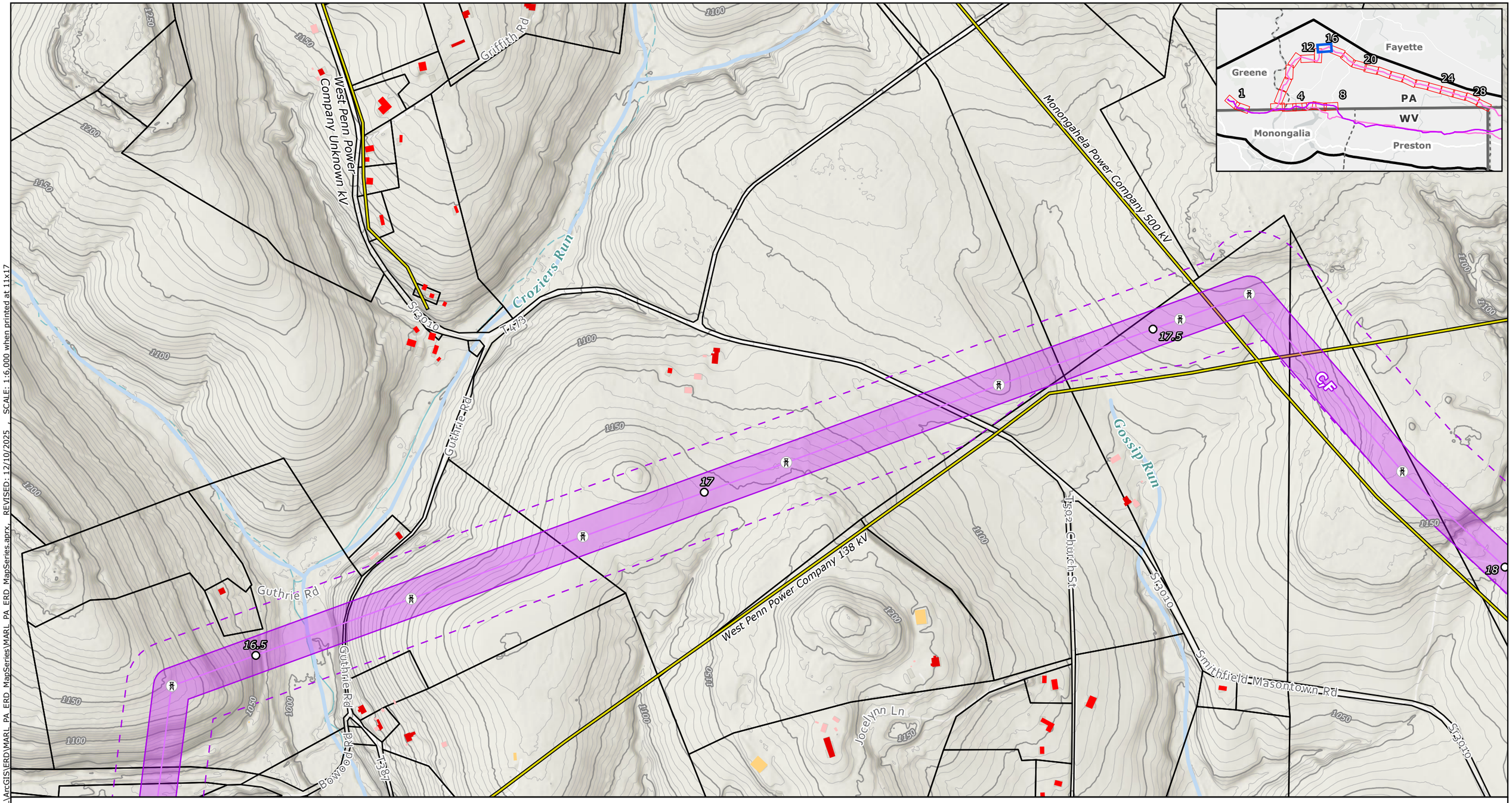

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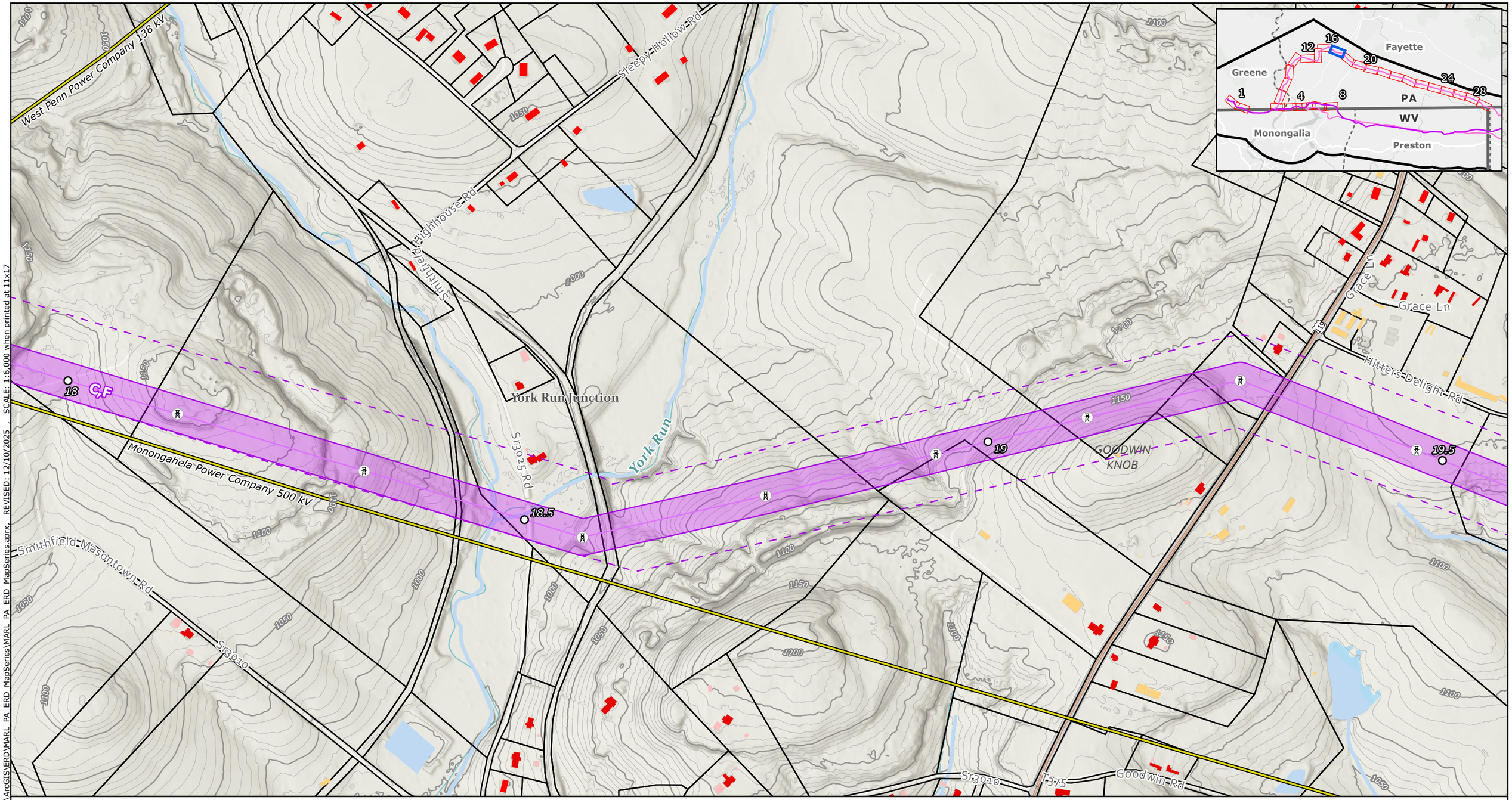

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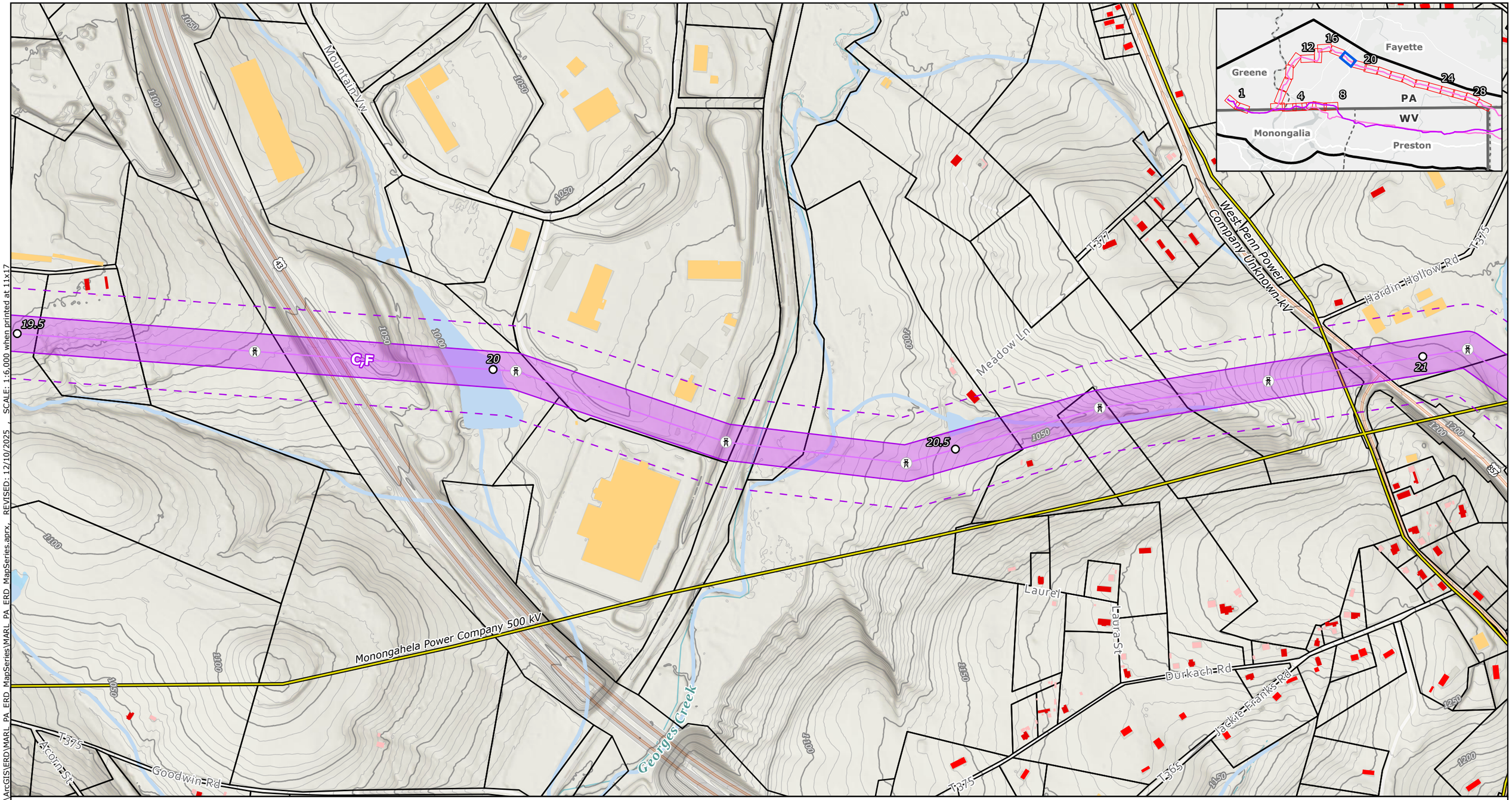

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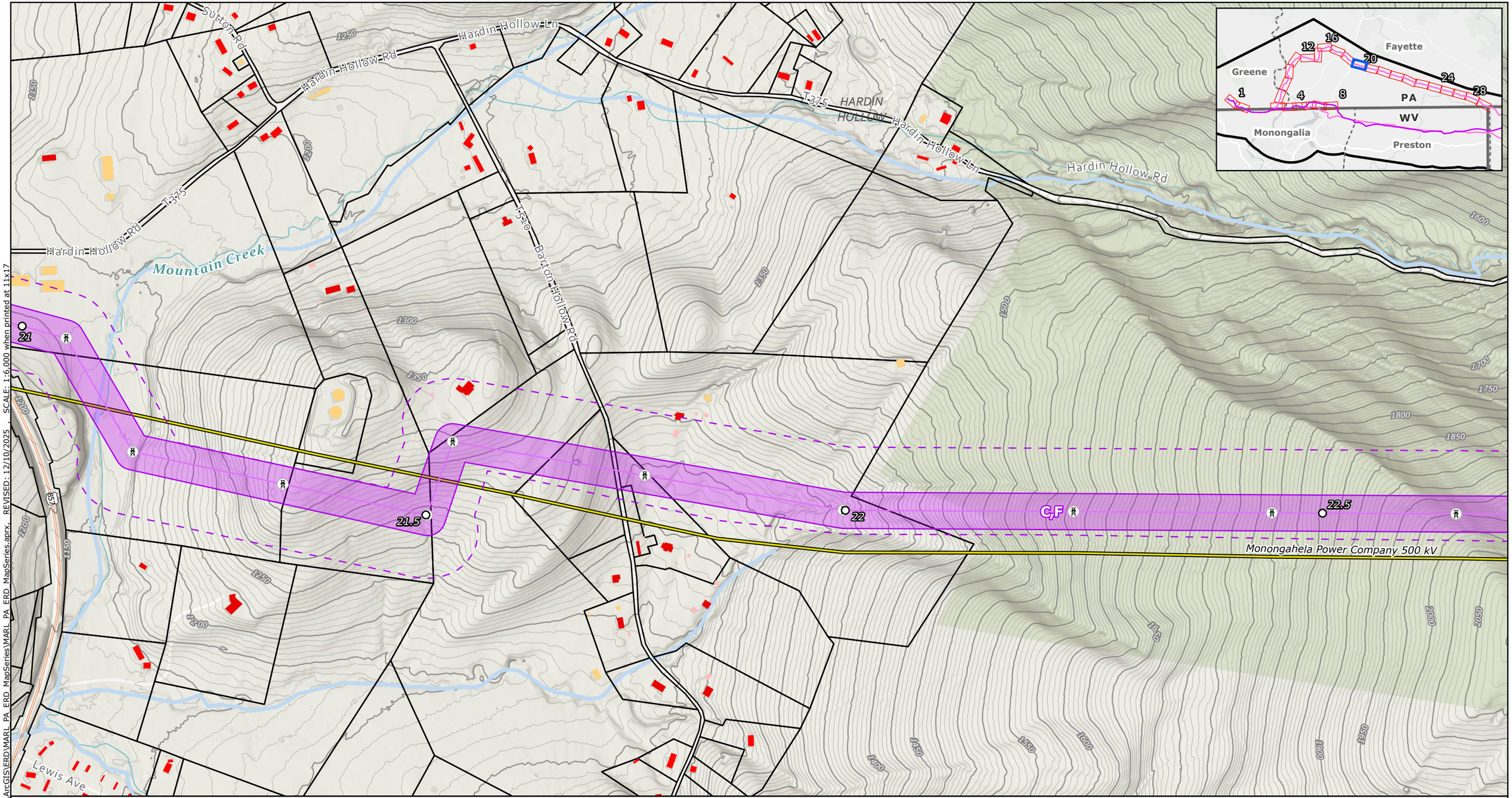

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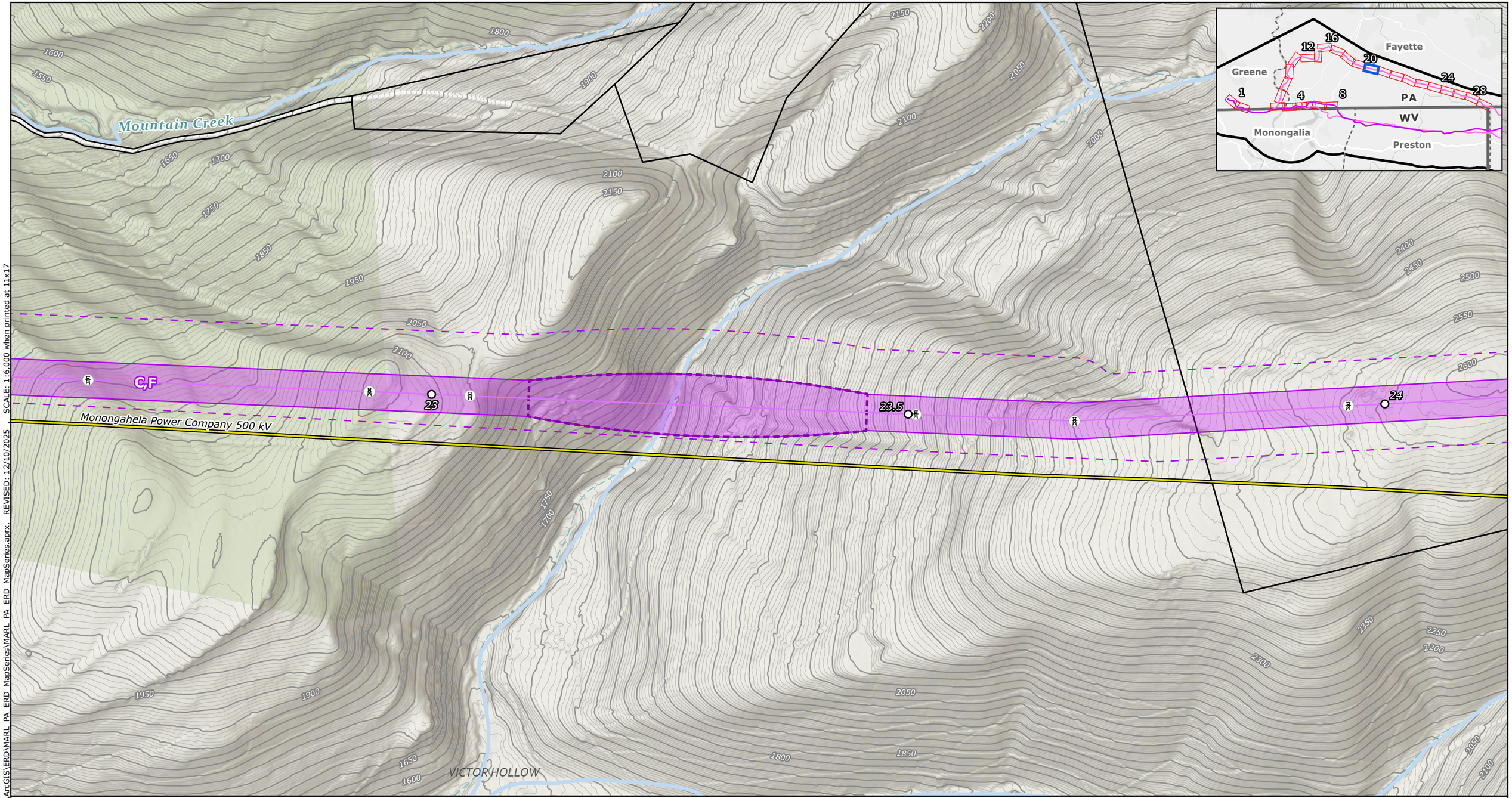

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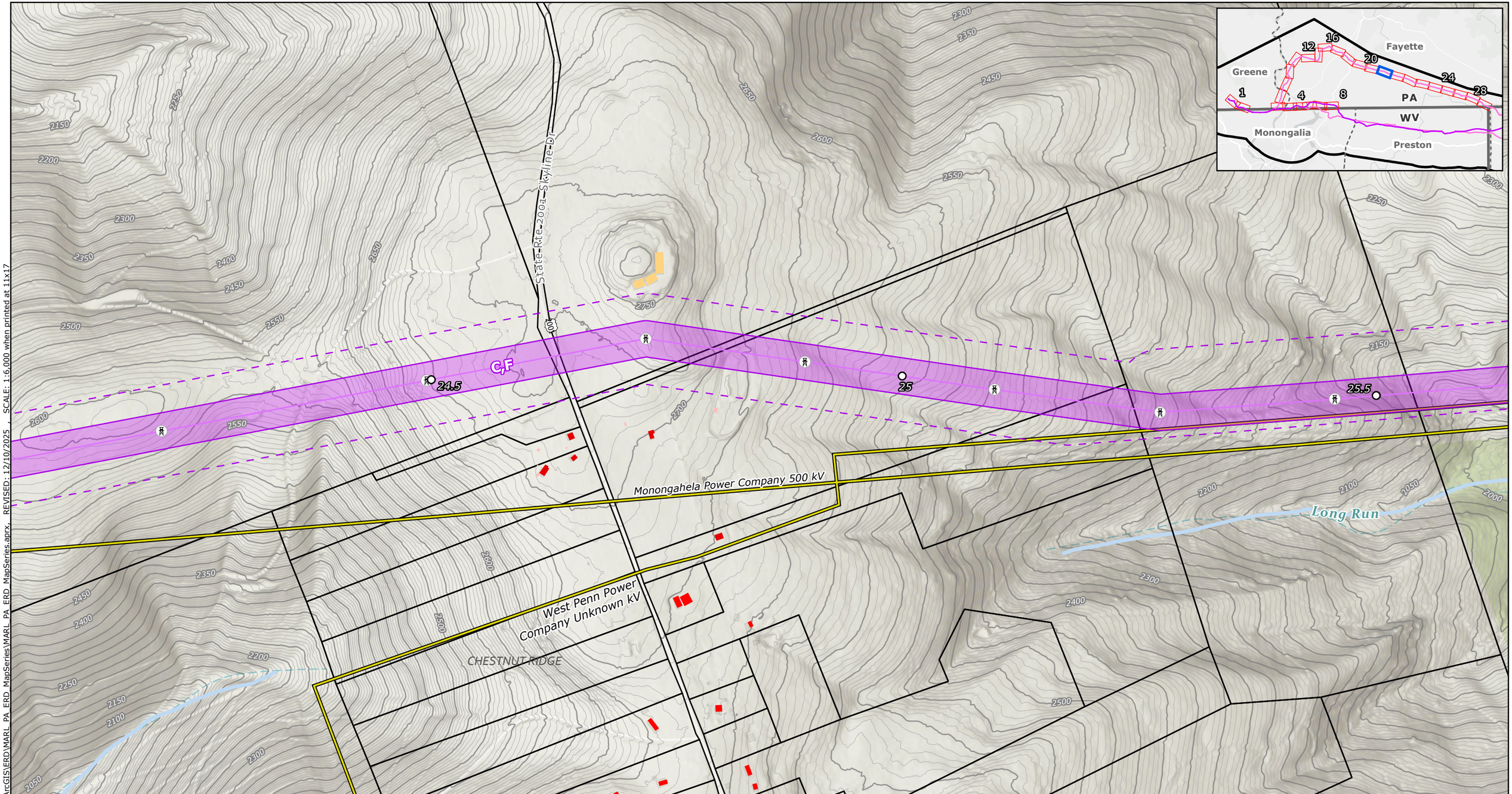

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3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USGS*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1a
Topography Mapbook
Page 20 of 28
MidAtlantic Resiliency Link

ERM

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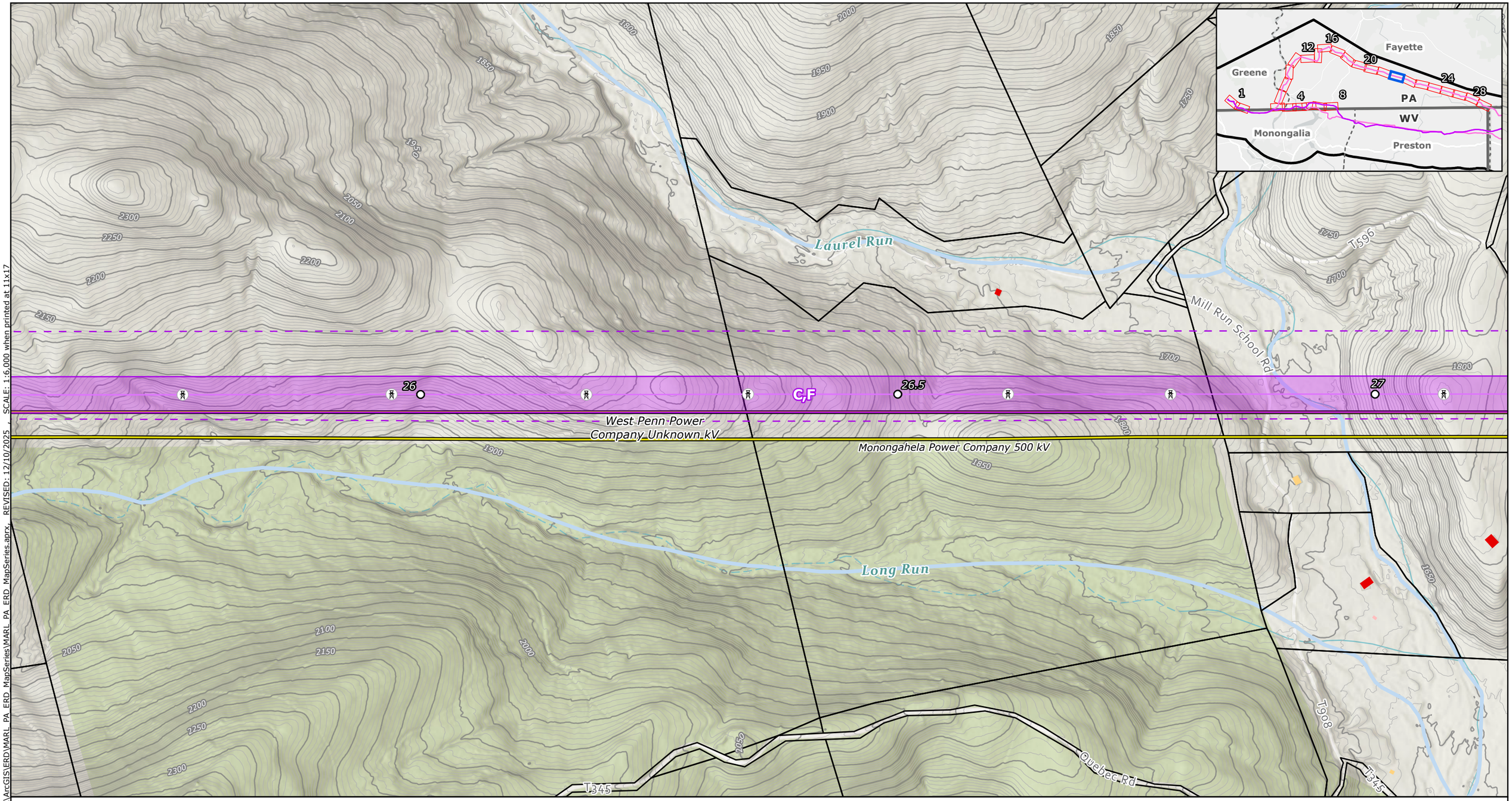
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines(>69kV)
- State Border
- County Boundary
- Parcels

LiDAR Elevation Contours
- 5-foot contours
- 25-foot contours

Building Footprints
- Residential Dwelling
- Residential Outbuilding (Shed,Garage,Other)
- Non-residential buildings

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
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5. *Data source: NEET, ERM, USGS*

N

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US Feet

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Topography Mapbook
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MidAtlantic Resiliency Link

ERM

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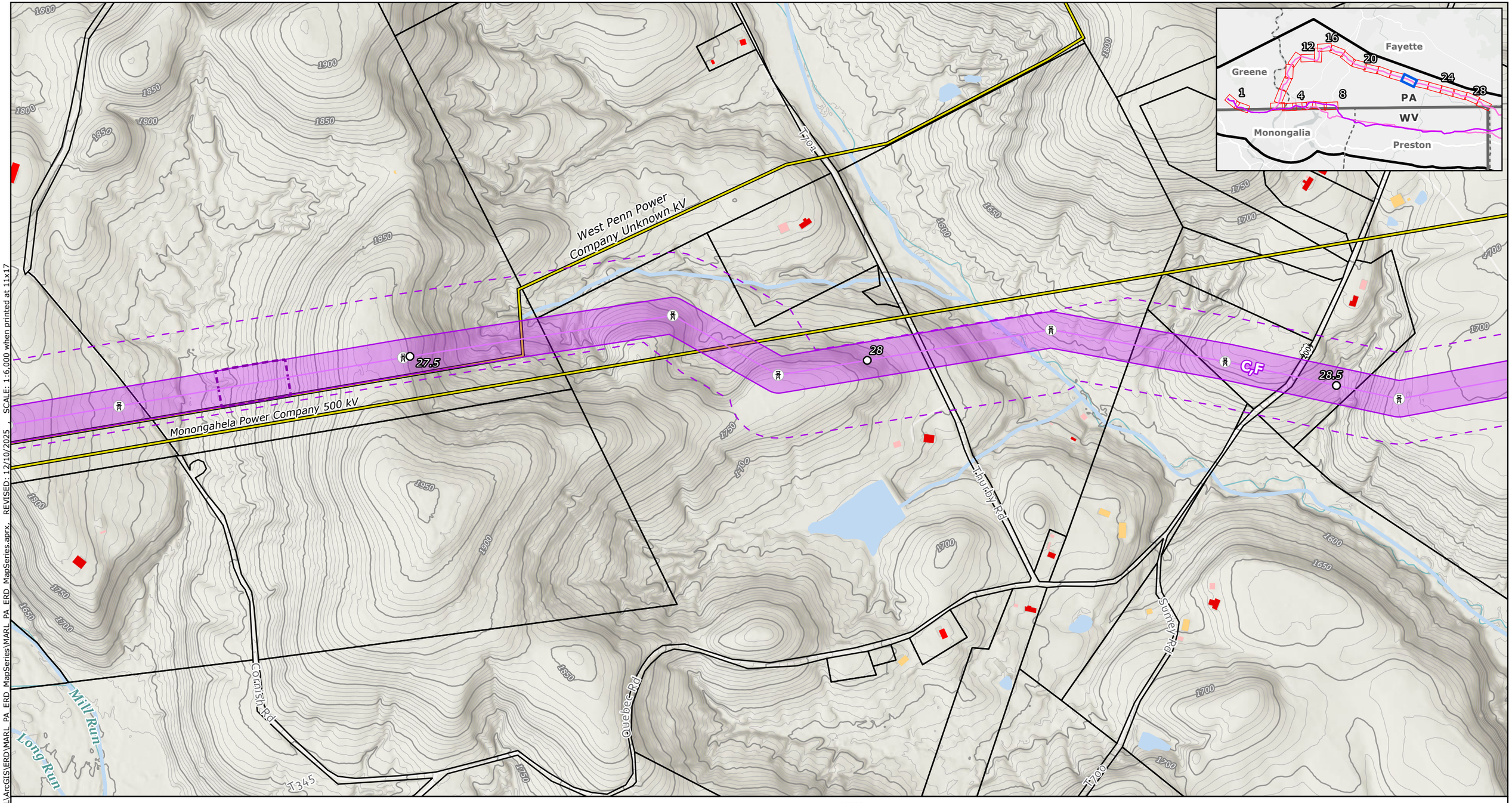

Proposed Project Components
- Project Endpoints
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- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines(>69kV)
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- County Boundary
- Parcels

LiDAR Elevation Contours
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Building Footprints
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NOTES
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US Feet

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Attachment 1a
Topography Mapbook
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MidAtlantic Resiliency Link

ERM

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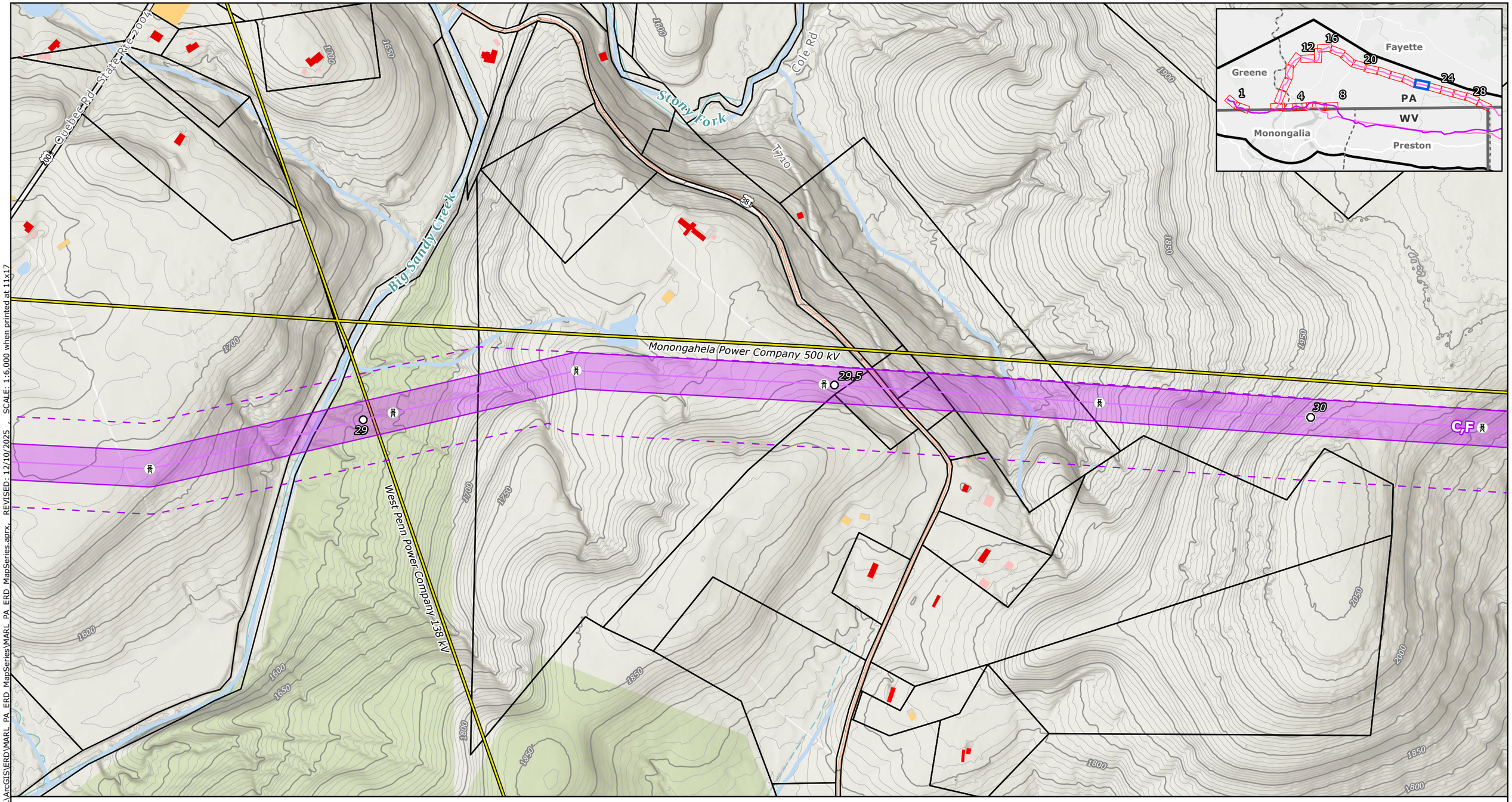

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
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- Access Road LoD
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Base Data
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Topography Mapbook
Page 23 of 28
MidAtlantic Resiliency Link

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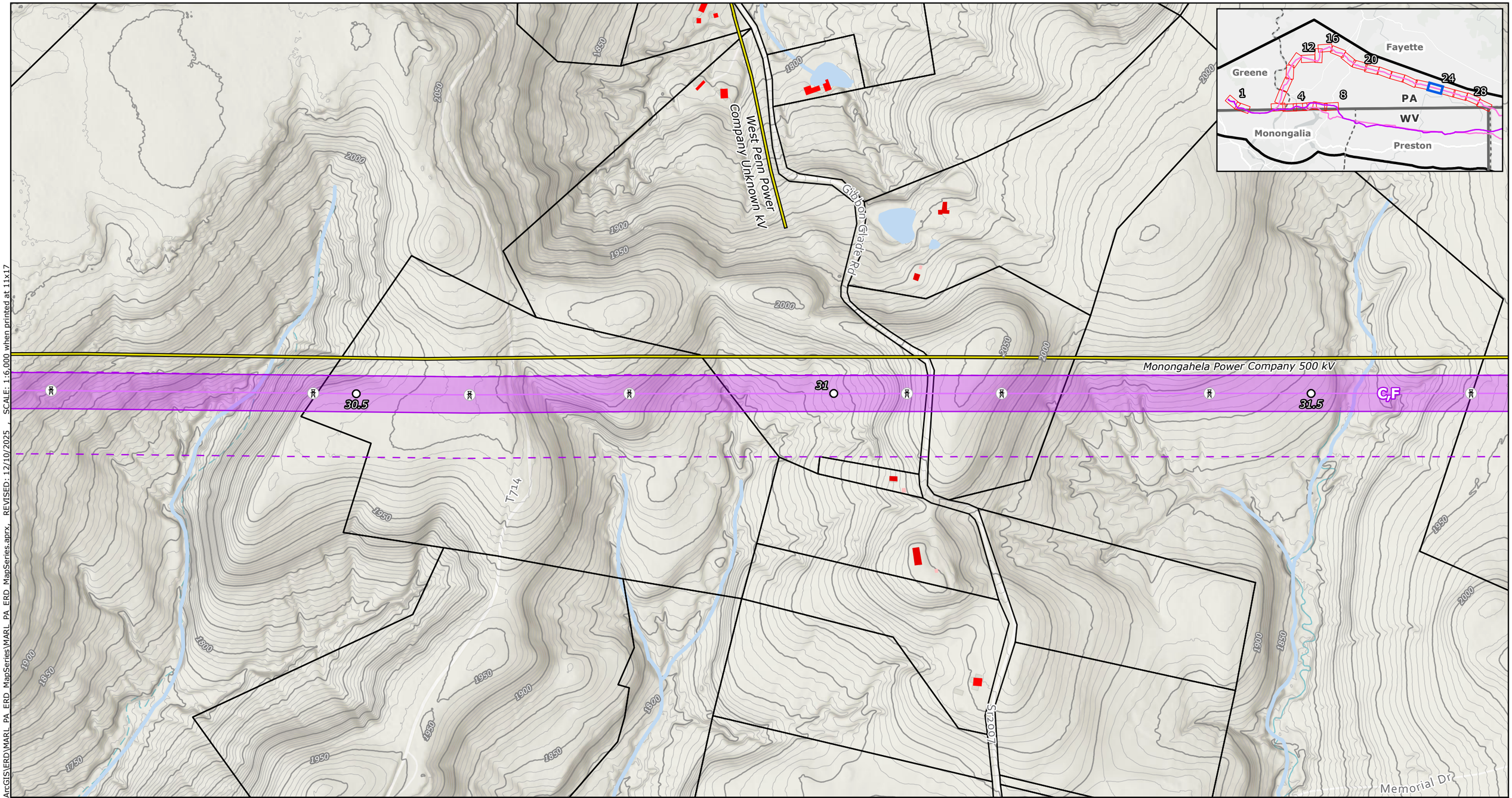

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
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Base Data
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Page 24 of 28
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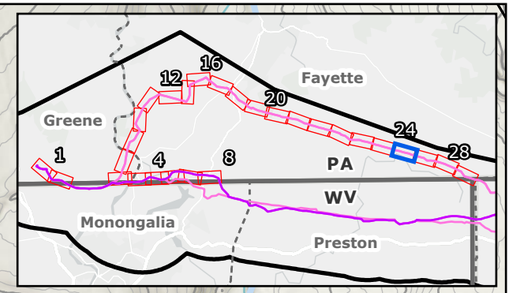

Monongahela Power Company 500 kV

C/F

32

32.5

33

Memorial Dr

T712

Little Sandy Creek

1850
1900
1950
2000
2050
2100
2150

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
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Proposed Route Ancillary Facilities
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Topography Mapbook
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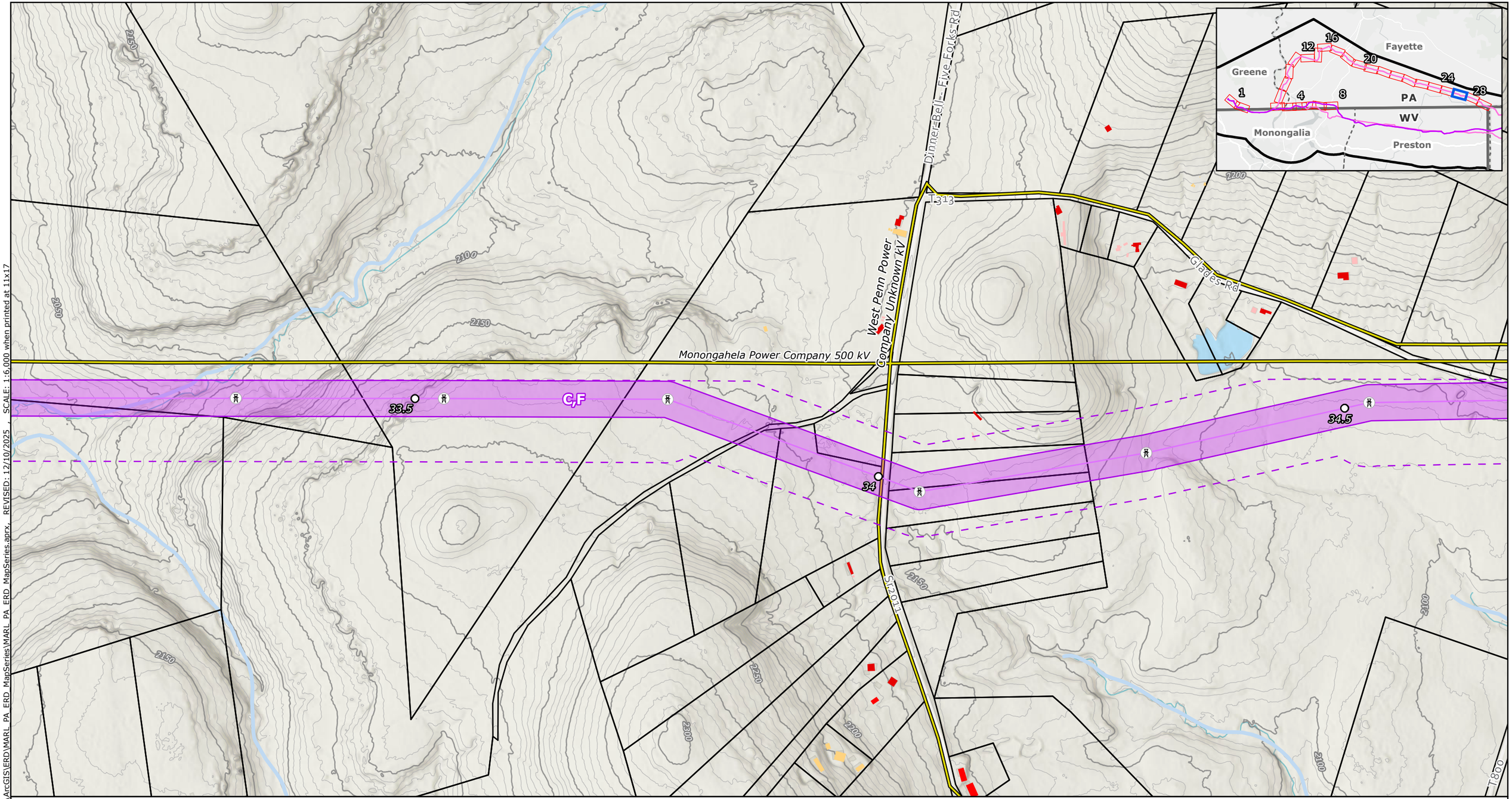

Proposed Project Components
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Topography Mapbook
Page 26 of 28
MidAtlantic Resiliency Link

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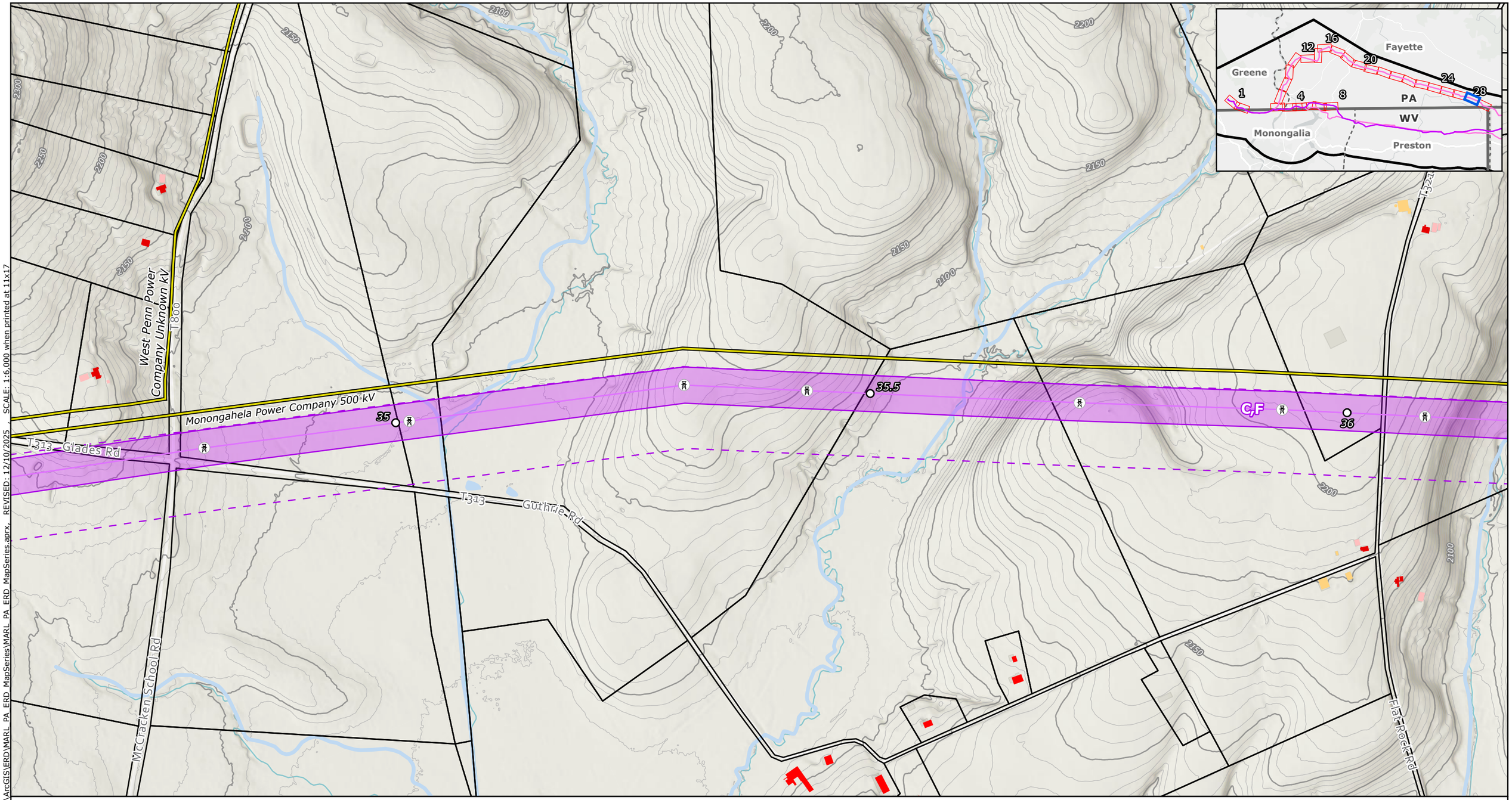

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Topography Mapbook
Page 27 of 28
MidAtlantic Resiliency Link

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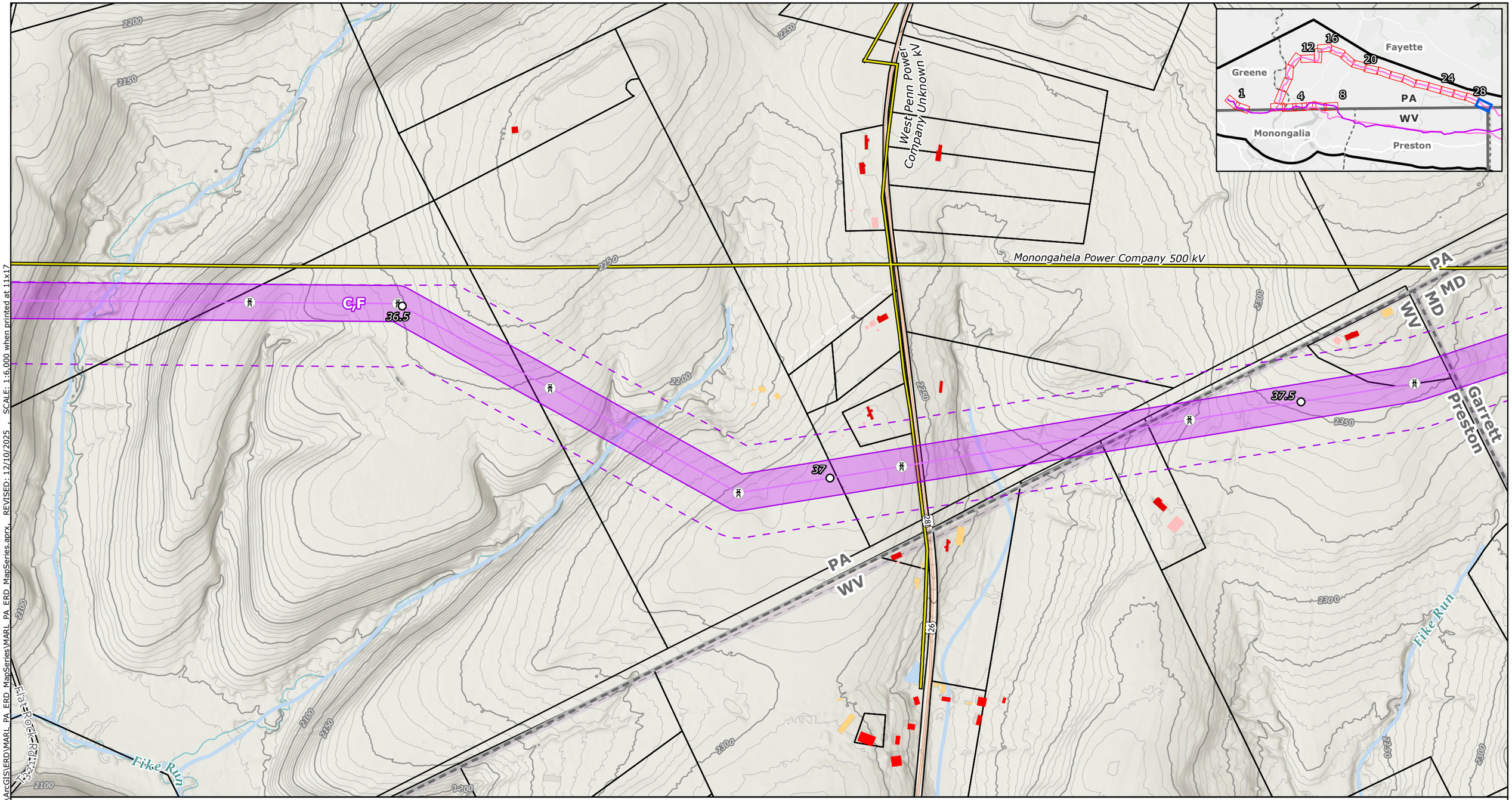

Proposed Project Components
- Project Endpoints
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- Proposed Route Centerline
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Proposed Route Ancillary Facilities
- Permanent Access Road
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Base Data
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LiDAR Elevation Contours
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Topography Mapbook
Page 28 of 28
MidAtlantic Resiliency Link

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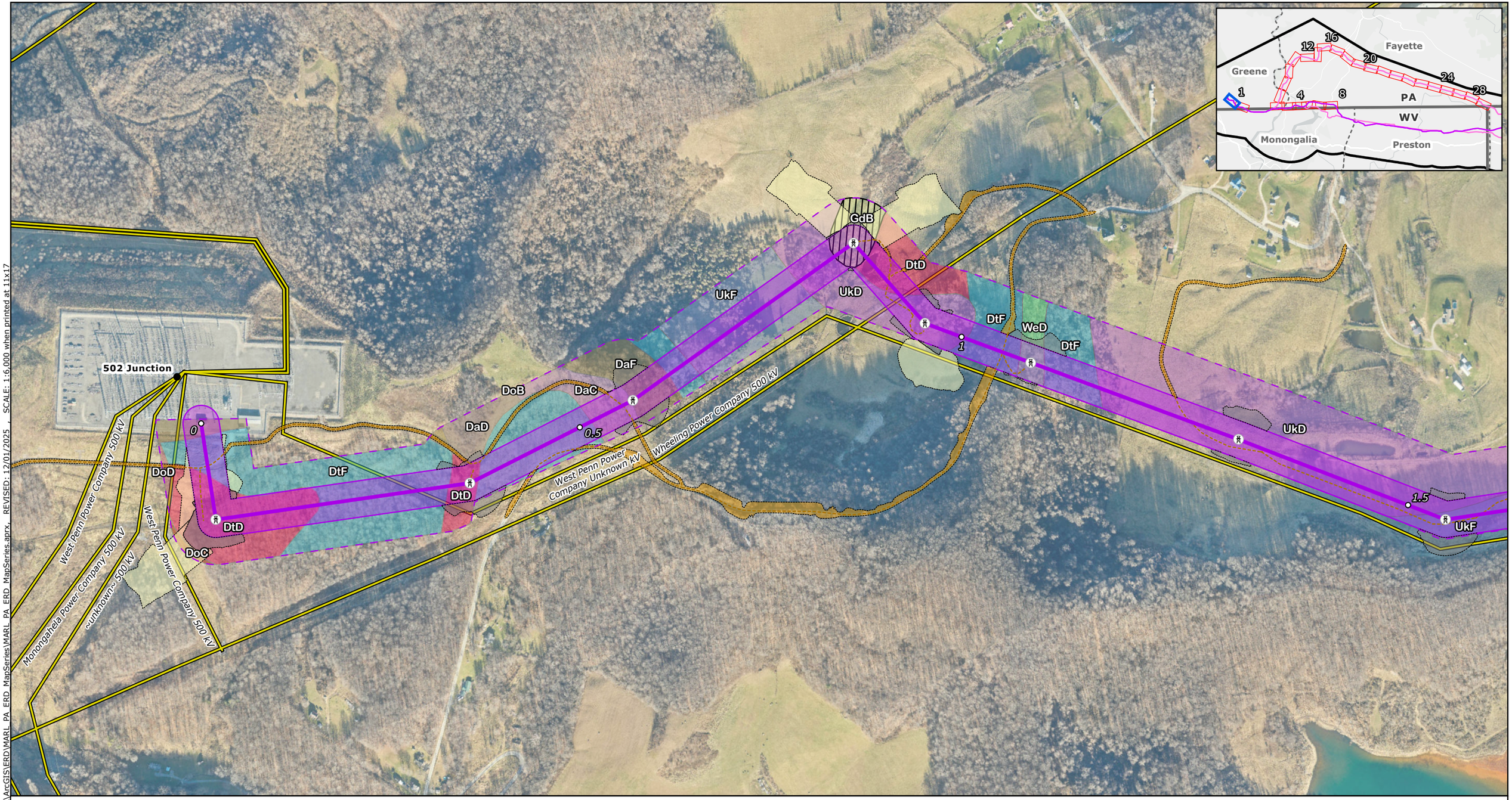
ATTACHMENT 1B SOILS MAPBOOK



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- DaC: Matewan channery loam, 8 to 15 percent slopes
- DaD: Matewan channery loam, 15 to 25 percent slopes
- DaF: Dekalb channery loam, 25 to 80 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DoD: Dormont silt loam, 15 to 25 percent slopes
- DtD: Dormont-Culleoka complex, 15 to 25 percent slopes
- DtF: Dormont-Culleoka complex, 25 to 50 percent slopes
- GdB: Glenford silt loam, 3 to 8 percent slopes
- UkD: Udorthents, strip mine, moderately steep
- UkF: Udorthents, strip mine, steep
- WeD: Weikert-Culleoka complex, 15 to 25 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
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5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

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US Feet

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Attachment 1b
Soils Mapbook
Page 1 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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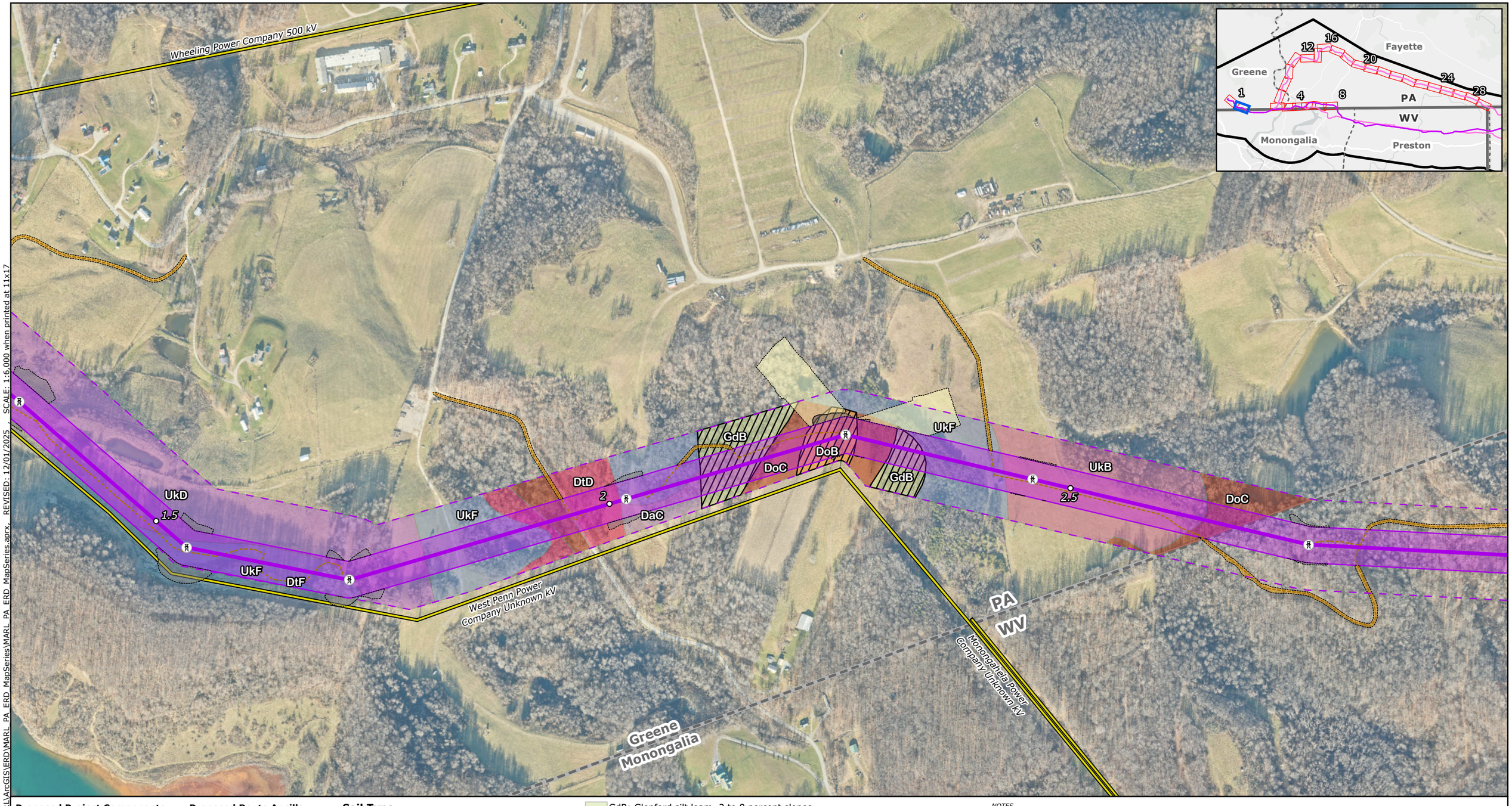

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- DaC: Matewan channery loam, 8 to 15 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DtD: Dormont-Culleoka complex, 15 to 25 percent slopes
- DtF: Dormont-Culleoka complex, 25 to 50 percent slopes
- GdB: Glenford silt loam, 3 to 8 percent slopes
- UkB: Udorthents, strip mine, gently sloping
- UkD: Udorthents, strip mine, moderately steep
- UkF: Udorthents, strip mine, steep
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
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Attachment 1b
Soils Mapbook
Page 2 of 28
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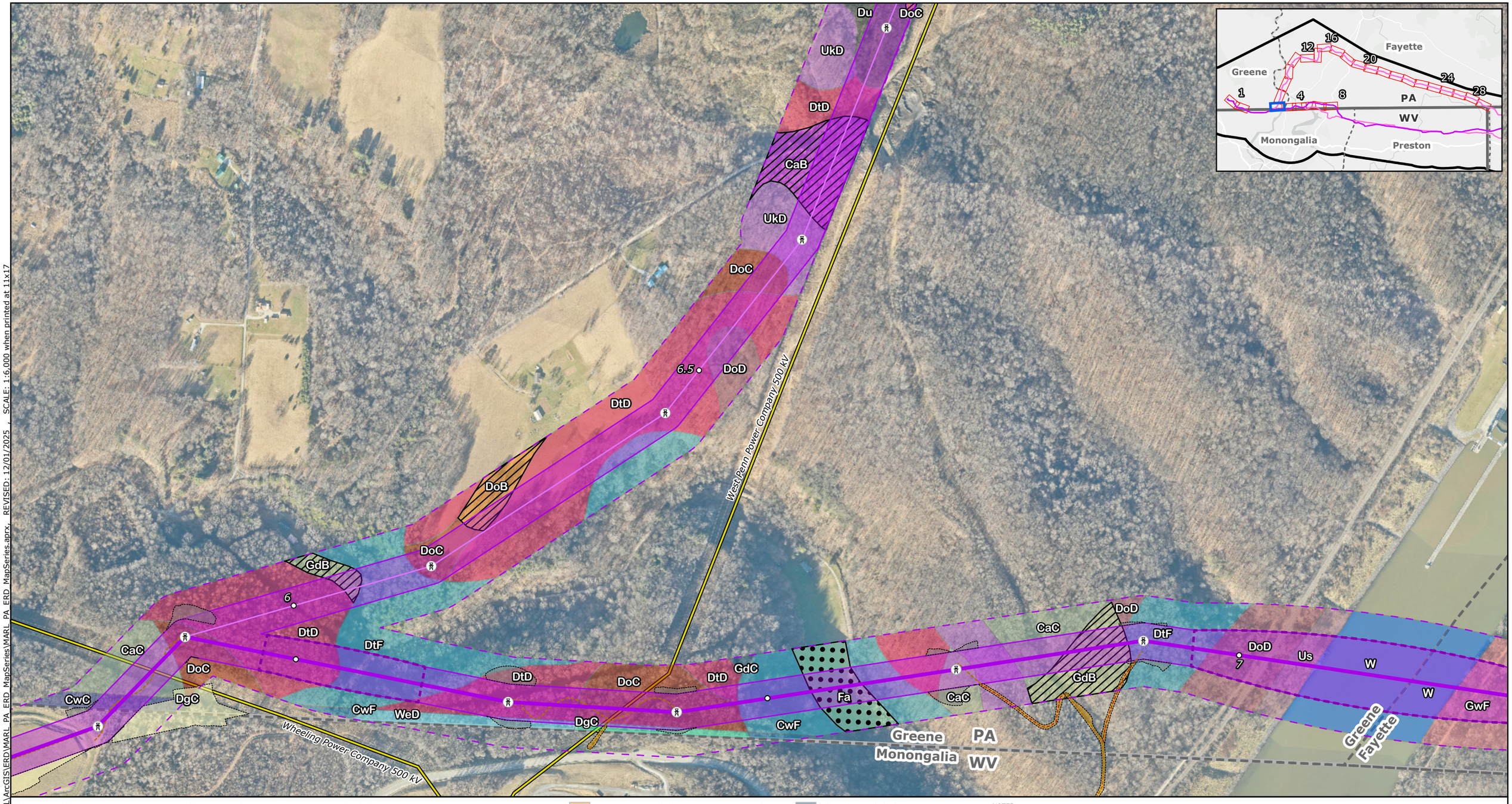

Proposed Project Components
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Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- CaB: Culleoka channery silt loam, 3 to 8 percent slopes
- CaC: Culleoka channery silt loam, 8 to 15 percent slopes
- CwC: Culleoka-Westmoreland silt loams, 8 to 15 percent slopes
- CwF: Culleoka-Westmoreland silt loams, 35 to 65 percent slopes
- DgC: Dormont and Guernsey silt loams, 8 to 15 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DoD: Dormont silt loam, 15 to 25 percent slopes
- DtD: Dormont-Culleoka complex, 15 to 25 percent slopes
- DtF: Dormont-Culleoka complex, 25 to 50 percent slopes
- Du: Dumps, mine
- Fa: Fluvaquents, loamy
- GdB: Glenford silt loam, 3 to 8 percent slopes
- GdC: Glenford silt loam, 8 to 15 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- UkD: Udorthents, strip mine, moderately steep
- Us: Urban land
- W: Water
- WeD: Westmoreland silt loam, 15 to 25 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
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N

0 250 500 750 1,000
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Attachment 1b
Soils Mapbook
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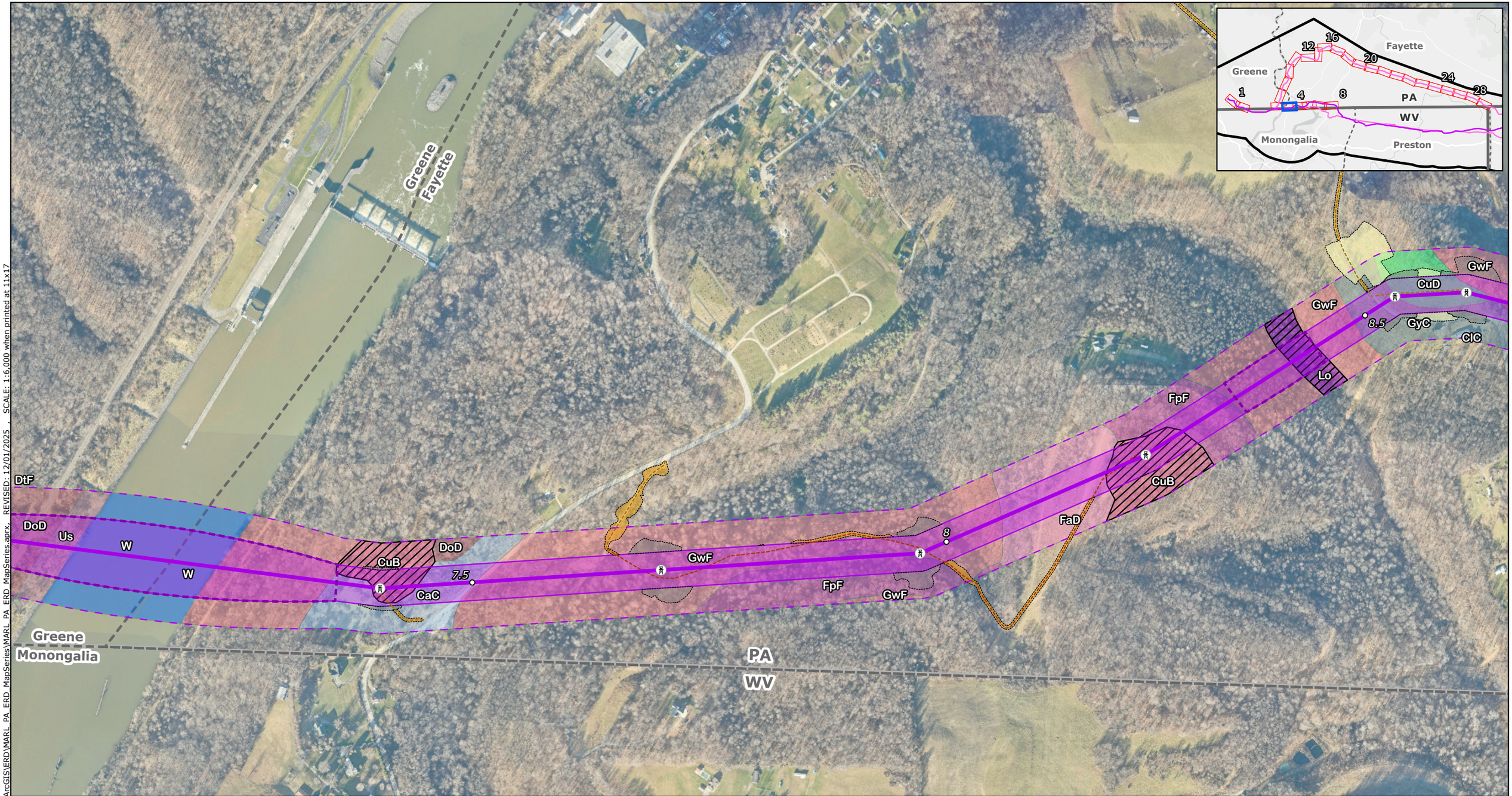

Proposed Project Components
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- Siting Corridors

Proposed Route Ancillary
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- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
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- State Border
- County Boundary

Soil Type
- CaC: Cavode silt loam, 8 to 15 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- DoD: Dormont silt loam, 15 to 25 percent slopes
- DtF: Dormont-Culleoka complex, 25 to 50 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- Lo: Lobdell silt loam, 0 to 3 percent slopes, occasionally flooded
- Us: Urban land
- W: Water
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000

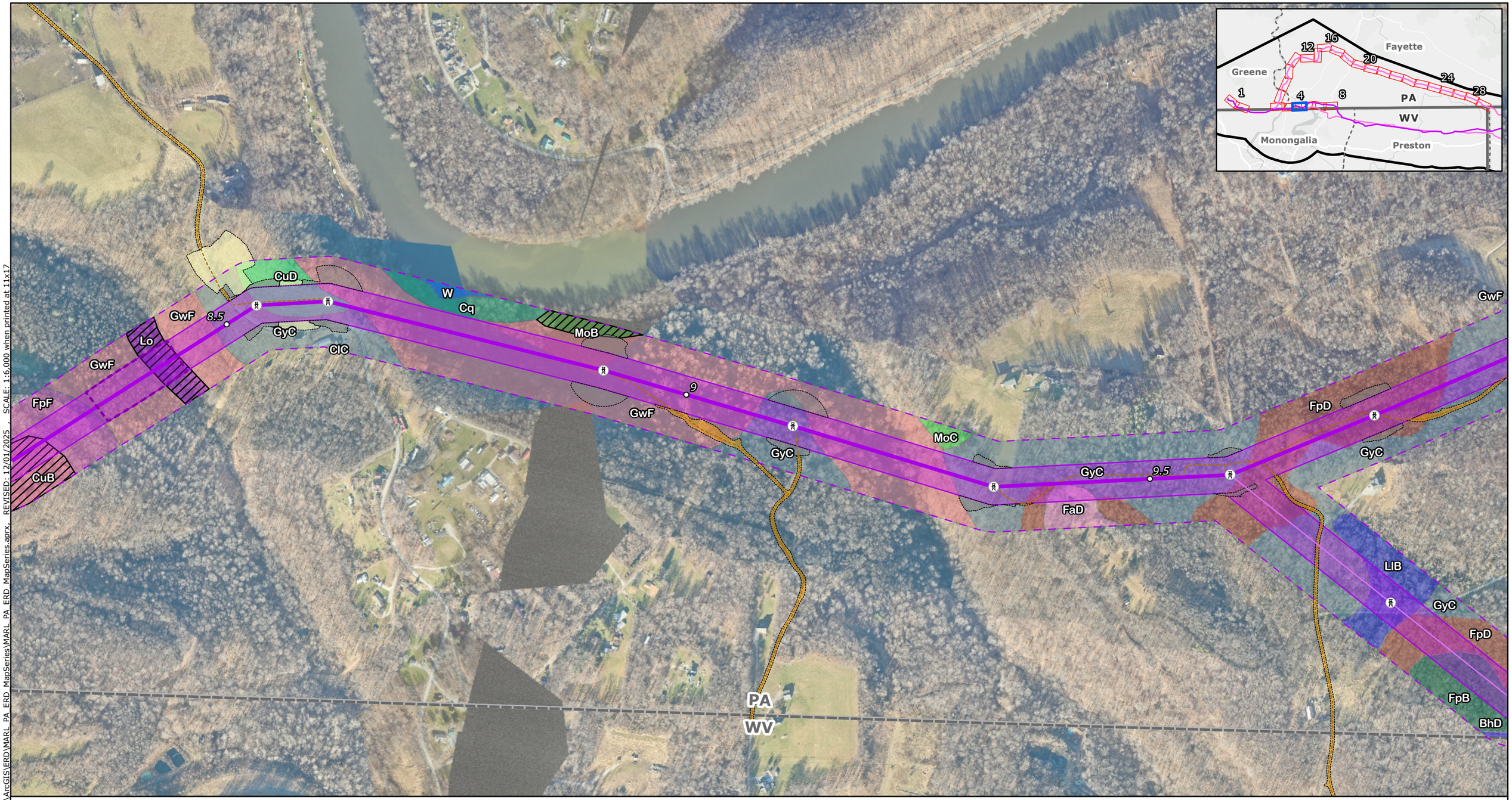
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 4 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\ERD\MARL_PA_ERD_MapSeries\MARL_PA_ERD_MapSeries.aprx, REVISED: 12/01/2025 , SCALE: 1:6,000 when printed at 11x17



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- BhD: Bethesda channery loam, 8 to 25 percent slopes, unreclaimed, highwall
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- Cq: Craigsville gravelly sandy loam
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- LIB: Library silt loam, 0 to 8 percent slopes
- Lo: Lobdell silt loam, 0 to 3 percent slopes, occasionally flooded
- MoB: Monongahela silt loam, 3 to 8 percent slopes
- MoC: Monongahela silt loam, 8 to 15 percent slopes
- W: Water
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

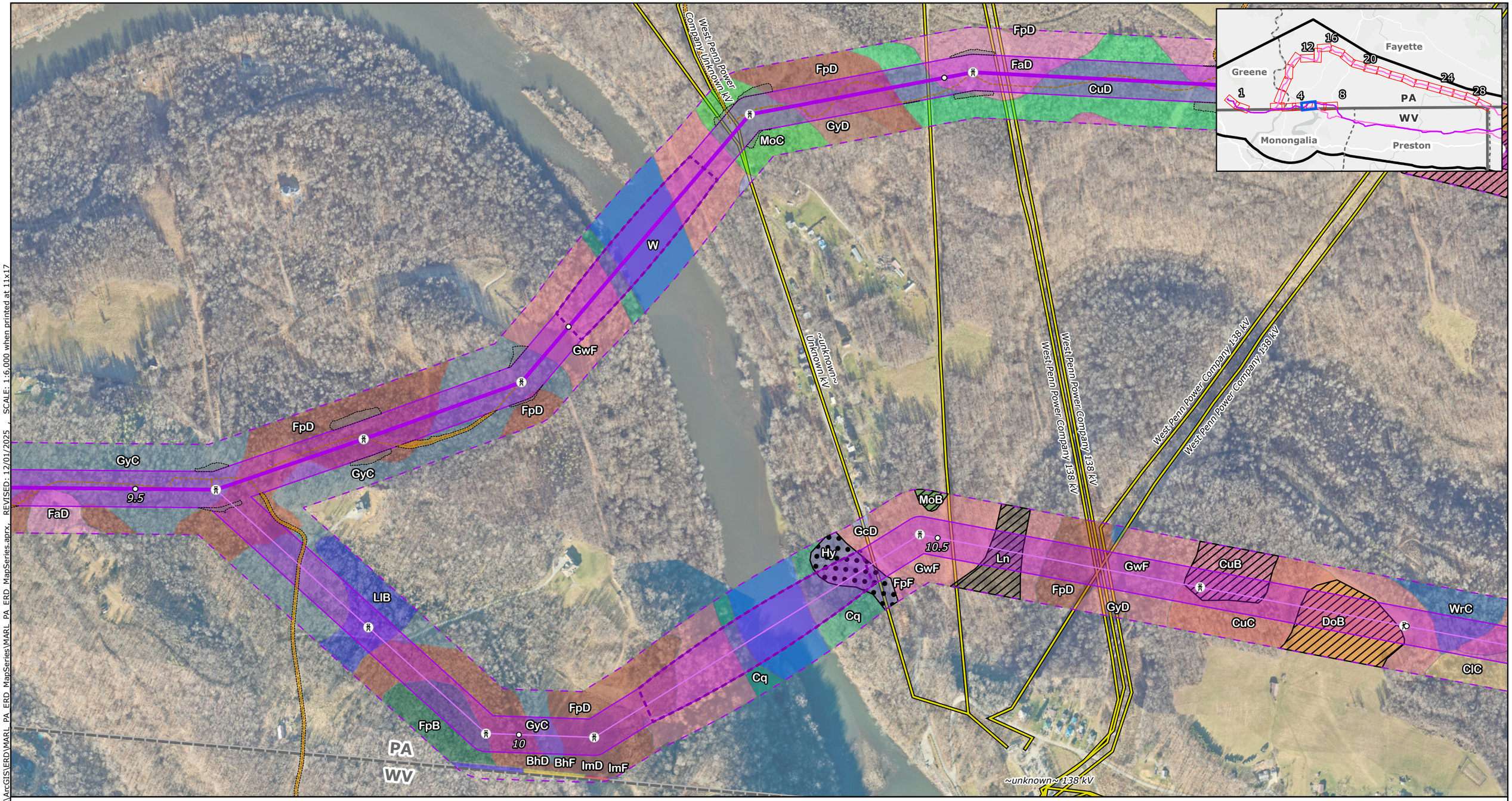
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 5 of 28
MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\ERD\MARL_PA_ERD_MapSeries\MARL_PA_ERD_MapSeries.aprx, REVISED: 12/01/2025 , SCALE: 1:6,000 when printed at 11x17

Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- BhD: Bethesda channery loam, 8 to 25 percent slopes, unreclaimed, highwall
- BhF: Bethesda channery loam, 25 to 70 percent slopes, unreclaimed, highwall
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- Cq: Craigsville gravelly sandy loam
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuC: Culleoka channery silt loam, 8 to 15 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- Hy: Holly silt loam, 0 to 2 percent slopes
- ImD: Itmann very channery loam, 8 to 25 percent slopes
- ImF: Itmann very channery loam, 25 to 70 percent slopes
- LIB: Library silt loam, 0 to 8 percent slopes
- Ln: Lindside silt loam, 0 to 3 percent slopes, occasionally flooded
- MoB: Monongahela silt loam, 3 to 8 percent slopes
- MoC: Monongahela silt loam, 8 to 15 percent slopes
- W: Water
- WrC: Wharton silt loam, 8 to 15 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 6 of 28
MidAtlantic Resiliency Link

ERM

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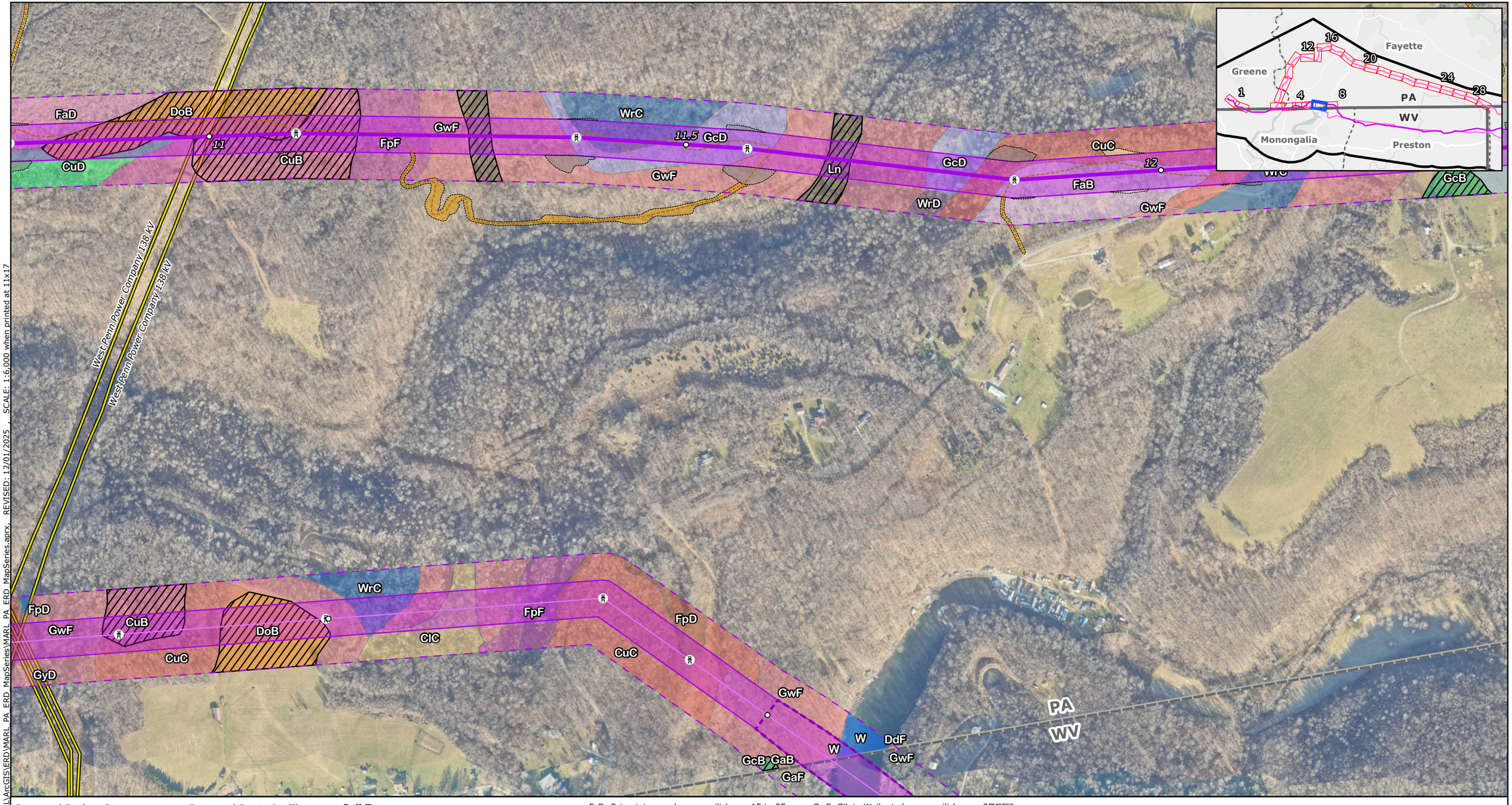
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- CaC: Cavode silt loam, 8 to 15 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuC: Culleoka channery silt loam, 8 to 15 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- DdF: Dekalb very stony loam, 35 to 65 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- FaB: Fairpoint very channery silt loam, 0 to 8 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GaB: Gilpin silt loam, 3 to 8 percent slopes
- GaF: Gilpin silt loam, 35 to 65 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- Ln: Lindside silt loam, 0 to 3 percent slopes, occasionally flooded
- W: Water
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrC: Wharton silt loam, 8 to 15 percent slopes
- WrD: Wharton silt loam, 15 to 25 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 7 of 28
MidAtlantic Resiliency Link

ERM

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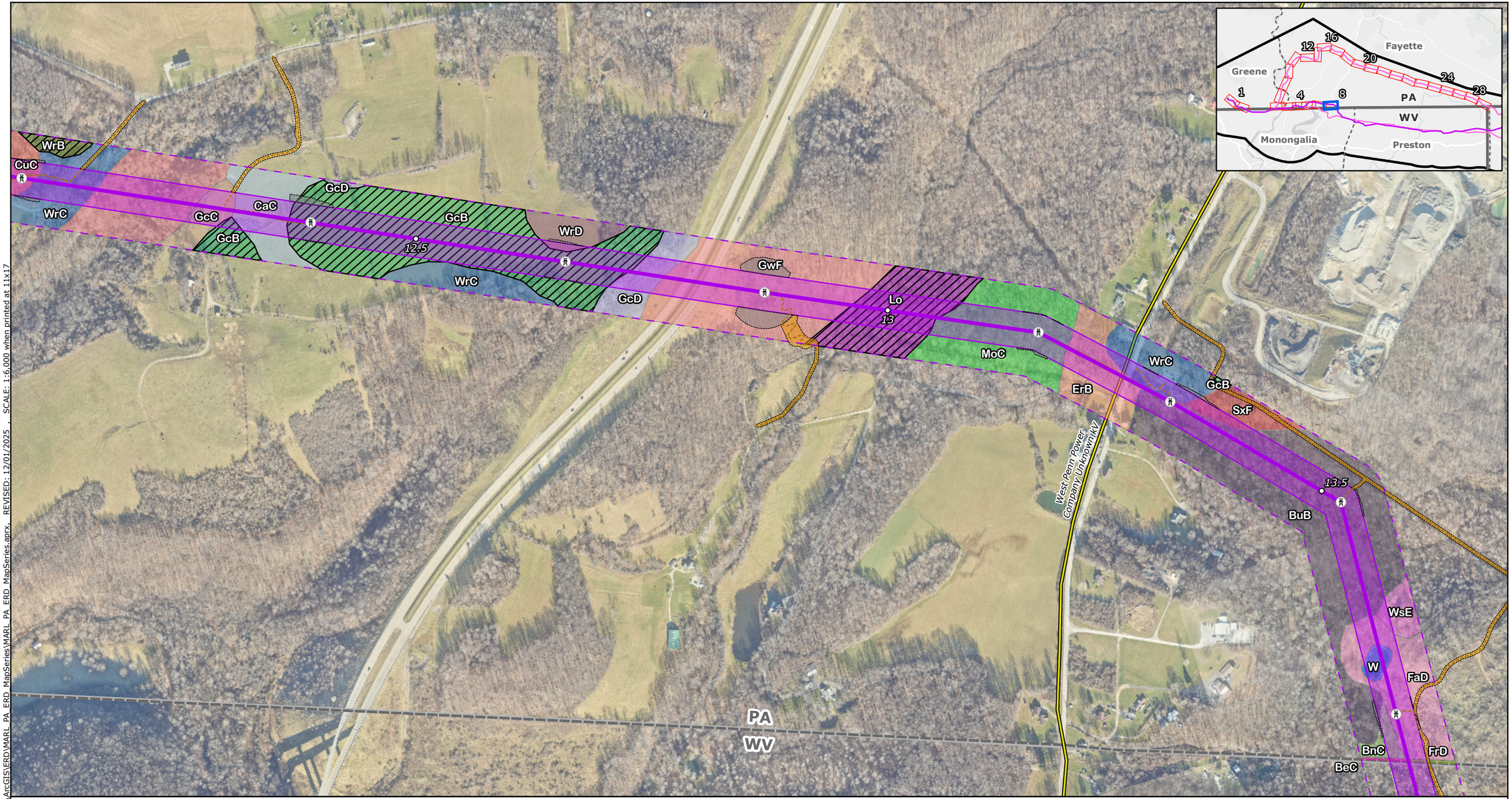
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- BeC: Buchanan and Ernest very stony soils, 8 to 15 percent slopes
- BnC: Buchanan loam, 8 to 15 percent slopes
- BuB: Buchanan loam, 0 to 8 percent slopes, extremely stony
- CaC: Cavode silt loam, 8 to 15 percent slopes
- CuC: Culleoka channery silt loam, 8 to 15 percent slopes
- ErB: Ernest silt loam, 3 to 8 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FrD: Fairpoint silt loam, 8 to 25 percent slopes, reclaimed
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- Lo: Lobdell silt loam, 0 to 3 percent slopes, occasionally flooded
- MoC: Monongahela silt loam, 8 to 15 percent slopes
- SxF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes, very stony
- W: Water
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrC: Wharton silt loam, 8 to 15 percent slopes
- WrD: Wharton silt loam, 15 to 25 percent slopes
- WsE: Wharton silt loam, 25 to 35 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor

Data source: NEET, ERM, USDA NRCS SSURGO

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 8 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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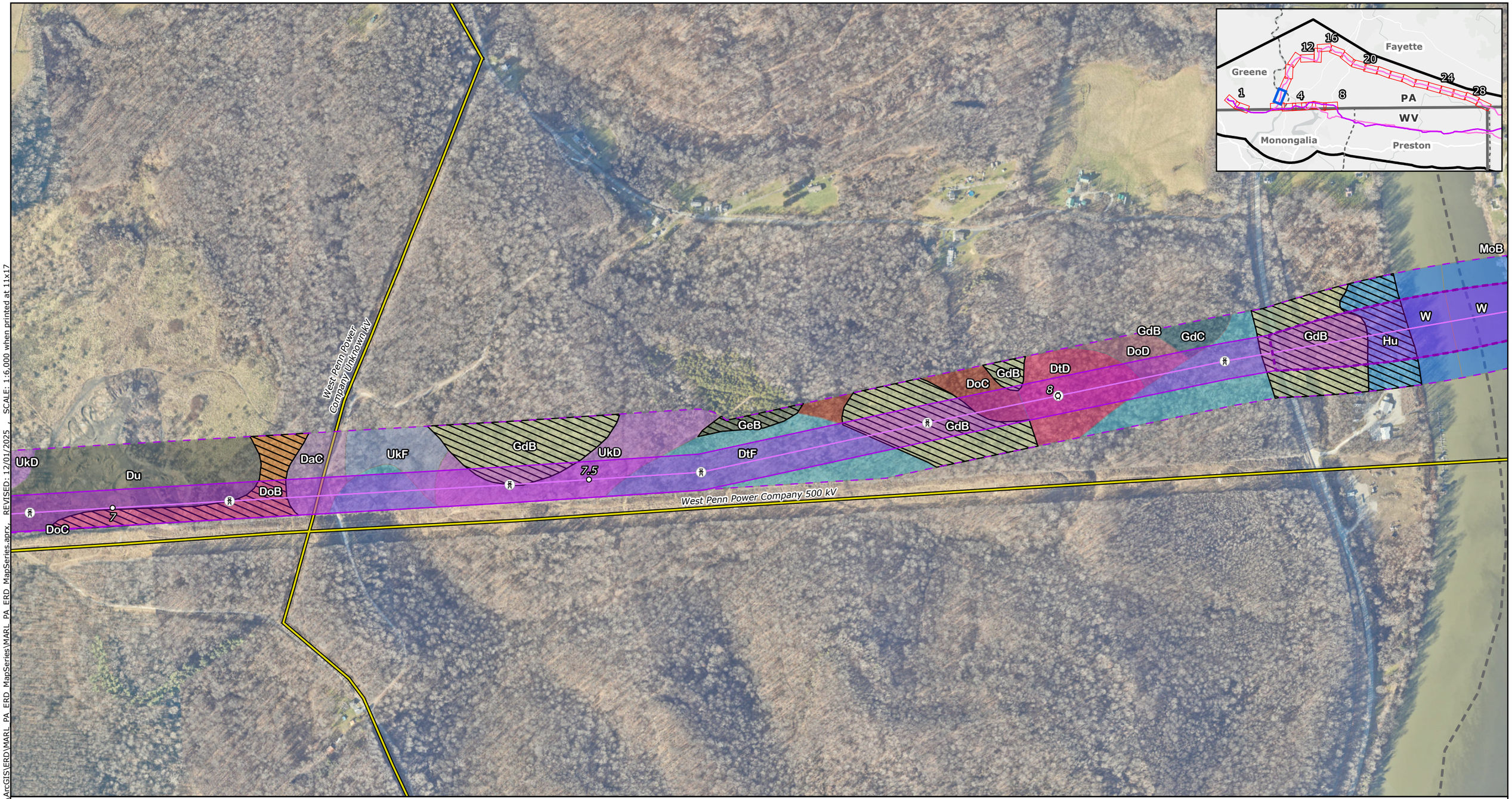

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- DaC: Matewan channery loam, 8 to 15 percent slopes
- DoB: Dormont silt loam, 3 to 8 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DoD: Dormont silt loam, 15 to 25 percent slopes
- DtD: Dormont-Culleoka complex, 15 to 25 percent slopes
- DtF: Dormont-Culleoka complex, 25 to 50 percent slopes
- Du: Dumps, mine
- GdB: Glenford silt loam, 3 to 8 percent slopes
- GdC: Glenford silt loam, 8 to 15 percent slopes
- GeB: Guernsey silt loam, 3 to 8 percent slopes
- Hu: Huntington silt loam
- MoB: Monongahela silt loam, 3 to 8 percent slopes
- UkD: Udorthents, strip mine, moderately steep
- UkF: Udorthents, strip mine, steep
- W: Water
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

N

0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 9 of 28
MidAtlantic Resiliency Link

ERM

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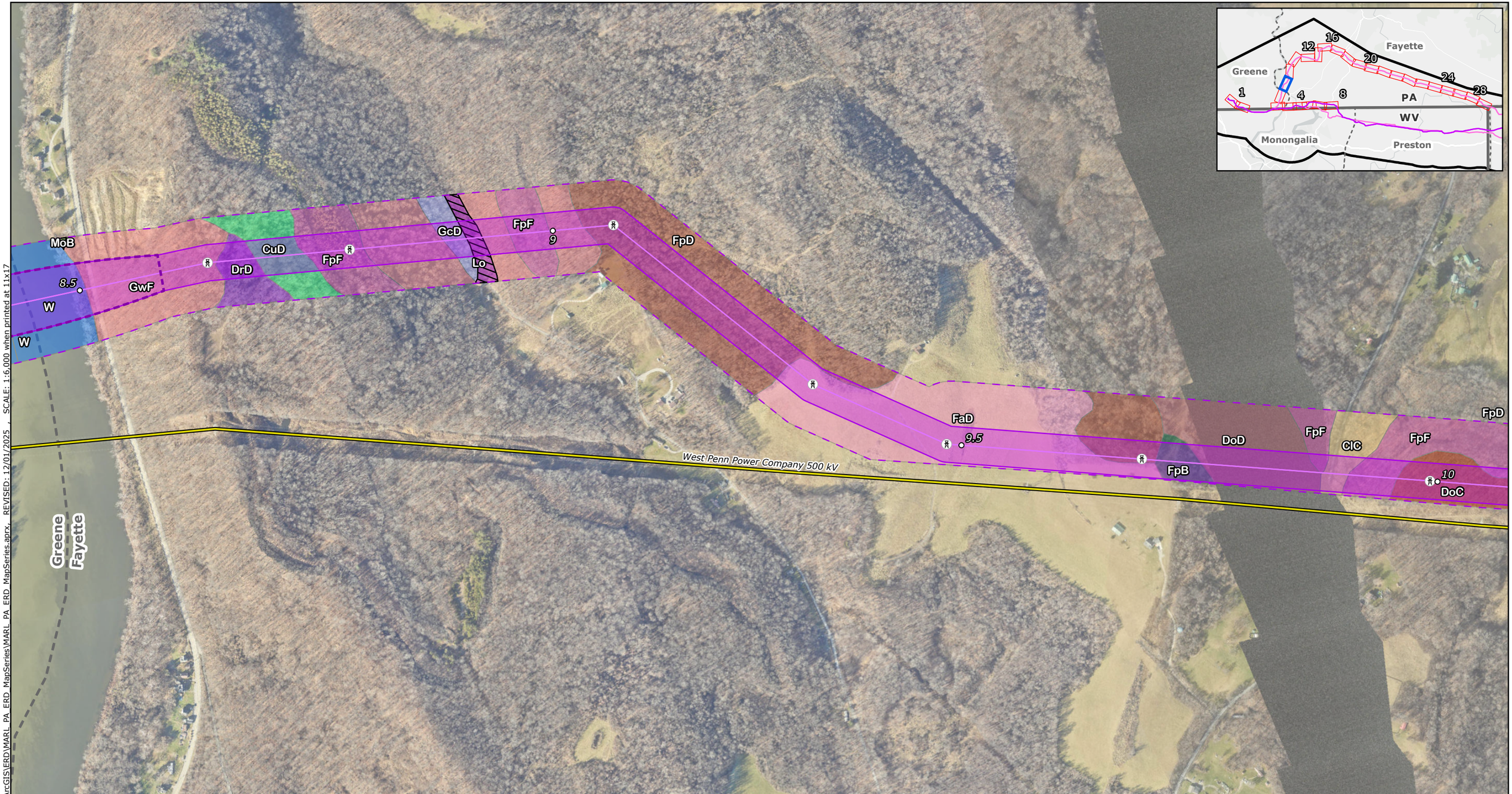

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DoD: Dormont silt loam, 15 to 25 percent slopes
- DrD: Dormont-Culleoka complex, 15 to 25 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- Lo: Lobdell silt loam, 0 to 3 percent slopes, occasionally flooded
- MoB: Monongahela silt loam, 3 to 8 percent slopes
- W: Water
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
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Attachment 1b
Soils Mapbook
Page 10 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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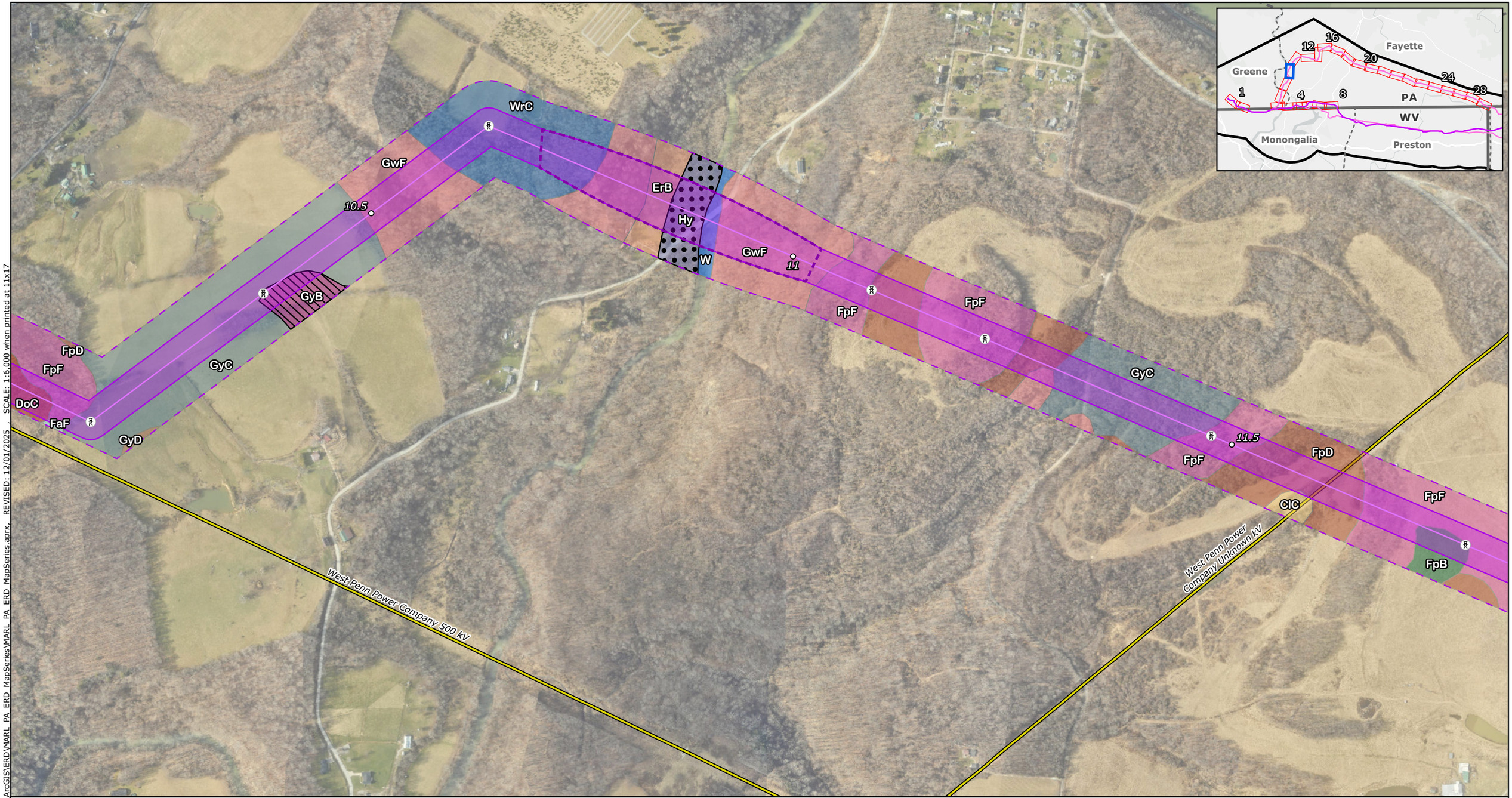

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- ErB: Ernest silt loam, 3 to 8 percent slopes
- FaF: Fairpoint very channery silt loam, 25 to 70 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- Hy: Holly silt loam, 0 to 2 percent slopes
- W: Water
- WrC: Wharton silt loam, 8 to 15 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000

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Attachment 1b
Soils Mapbook
Page 11 of 28
MidAtlantic Resiliency Link

ERM

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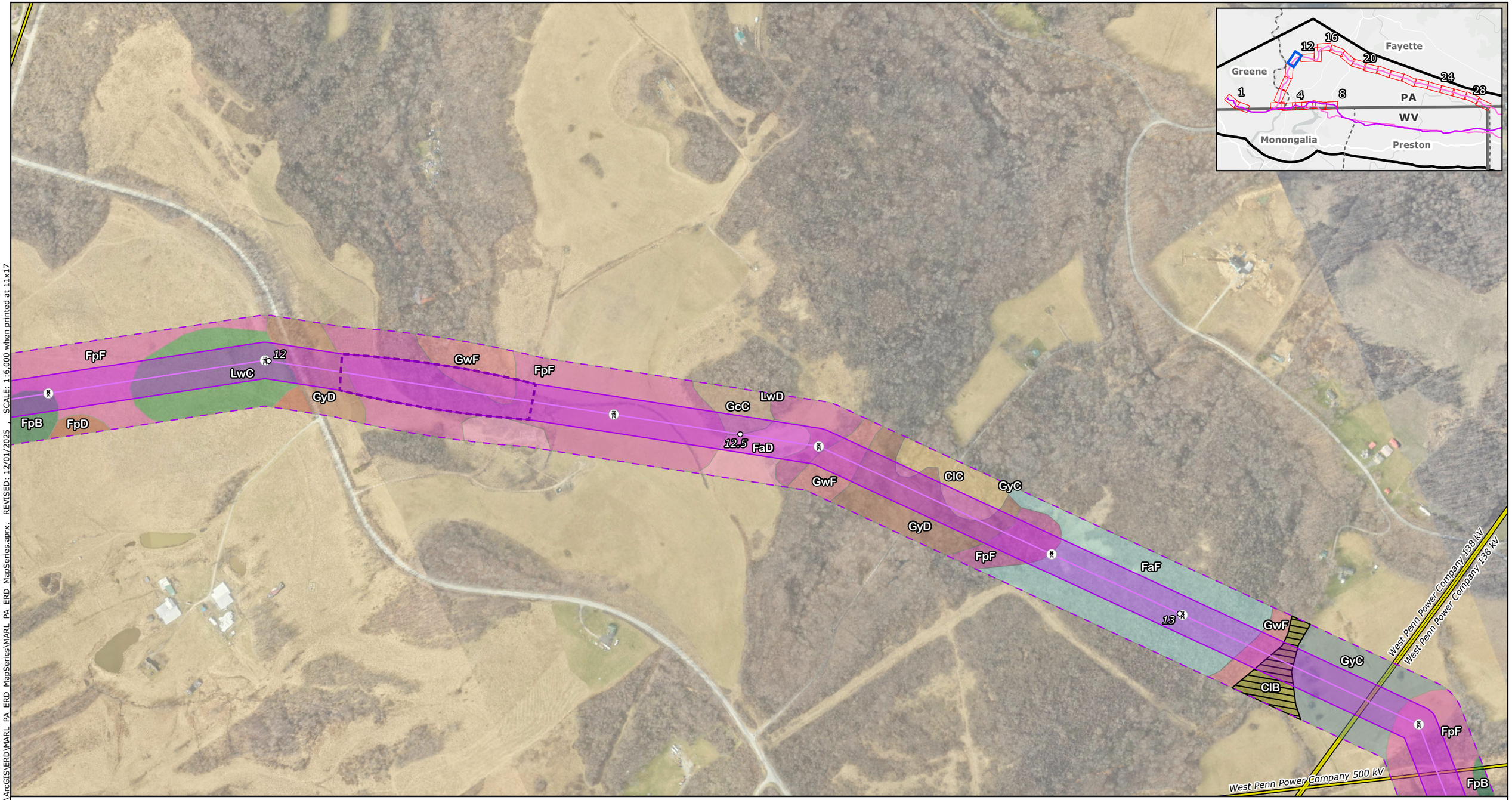

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClB: Clarksburg silt loam, 3 to 8 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FaF: Fairpoint very channery silt loam, 25 to 70 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- LwC: Lowell silty clay loam, 8 to 15 percent slopes, eroded
- LwD: Lowell silty clay loam, 15 to 25 percent slopes, eroded
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 12 of 28
MidAtlantic Resiliency Link

ERM

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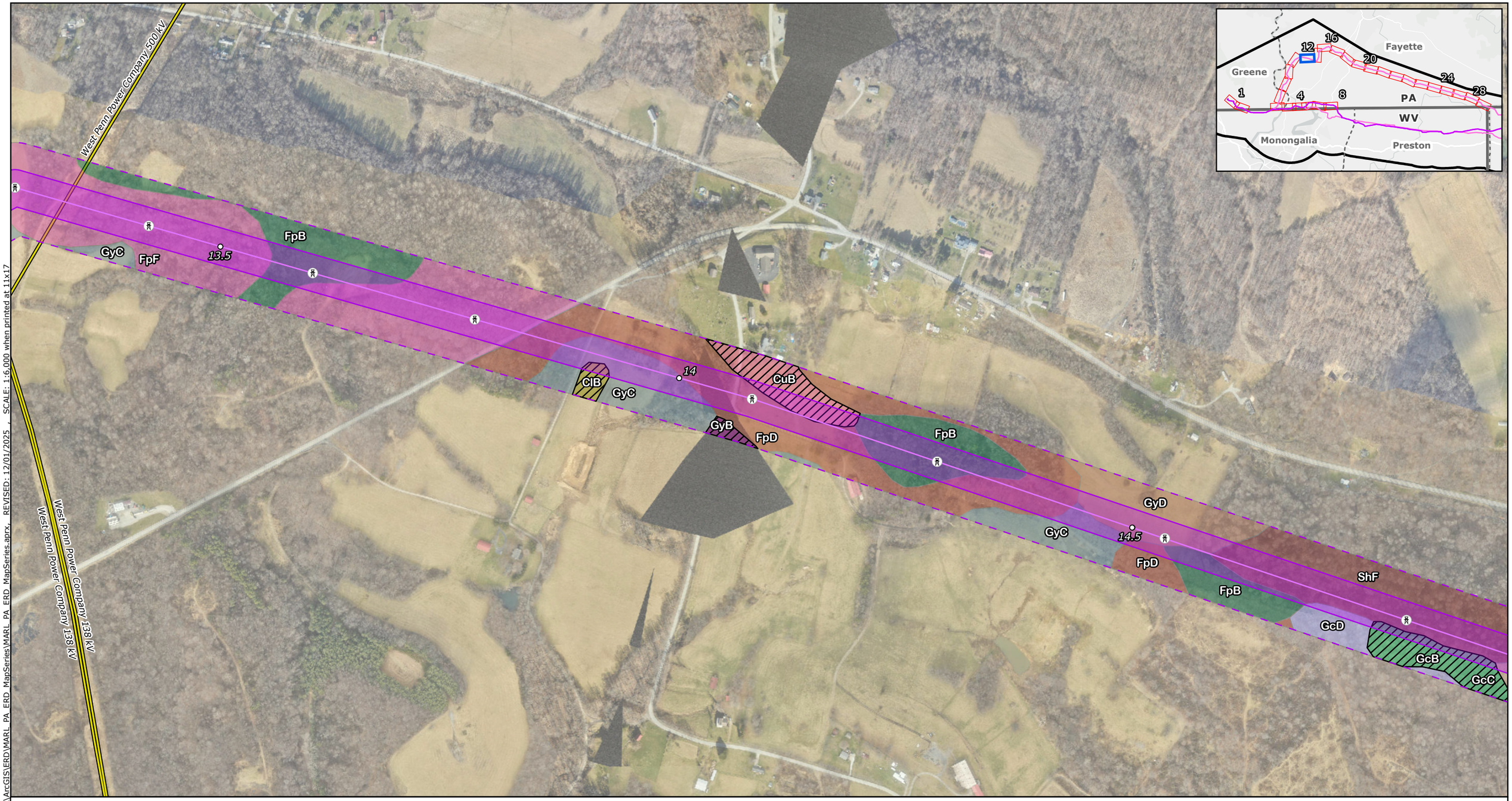


Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClB: Clarksburg silt loam, 3 to 8 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- FpB: Fairpoint very channery silt loam, 0 to 8 percent slopes, very stony
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- ShF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

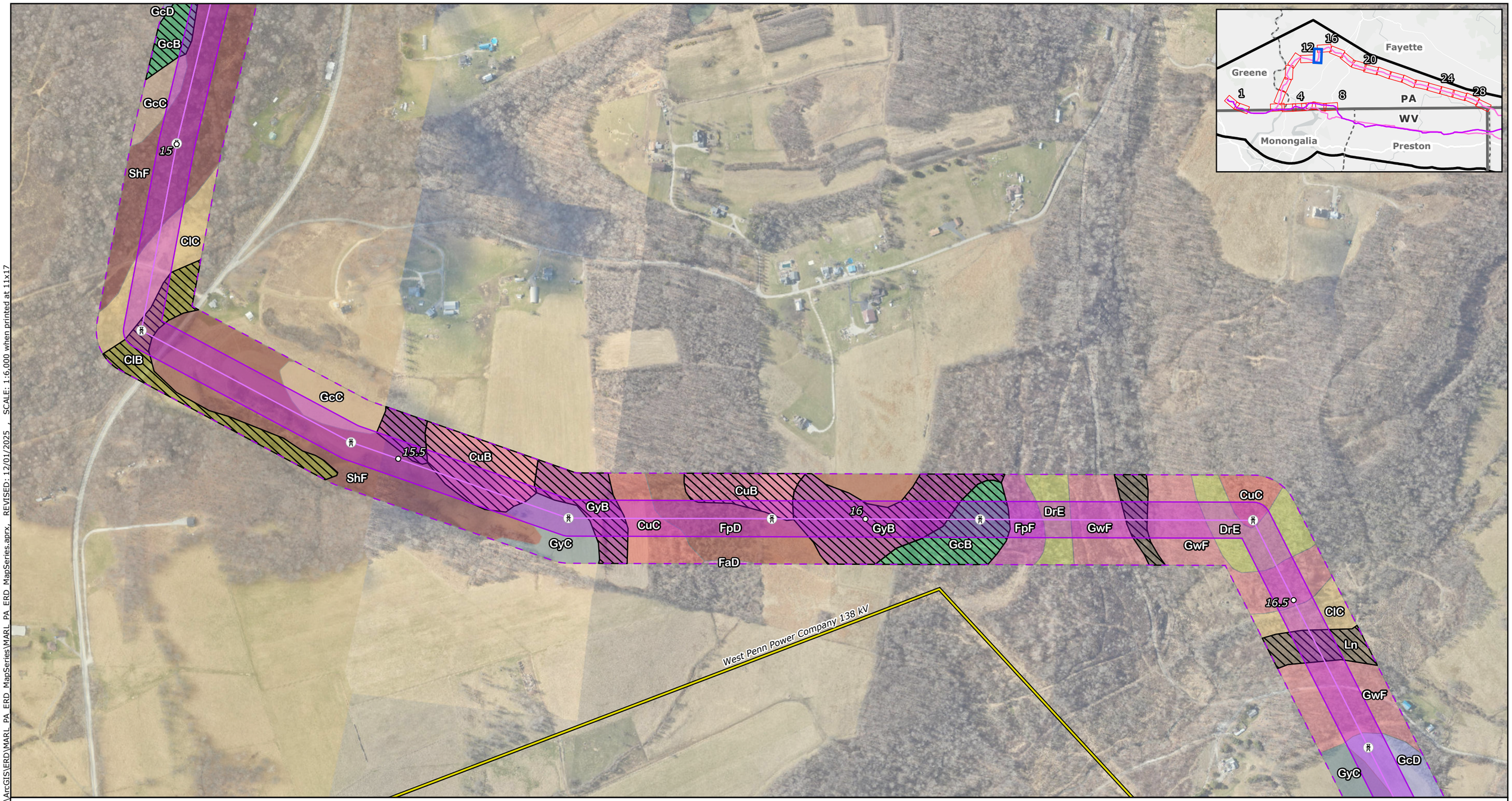
0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 13 of 28
MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\ERD\MARL_PA_ERD_MapSeries\MARL_PA_ERD_MapSeries.aprx, REVISED: 12/01/2025 , SCALE: 1:6,000 when printed at 11x17

Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClB: Clarksburg silt loam, 3 to 8 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuC: Culleoka channery silt loam, 8 to 15 percent slopes
- DrE: Dormont-Culleoka complex, 25 to 50 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- Ln: Lindside silt loam, 0 to 3 percent slopes, occasionally flooded
- ShF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

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US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 14 of 28
MidAtlantic Resiliency Link

ERM

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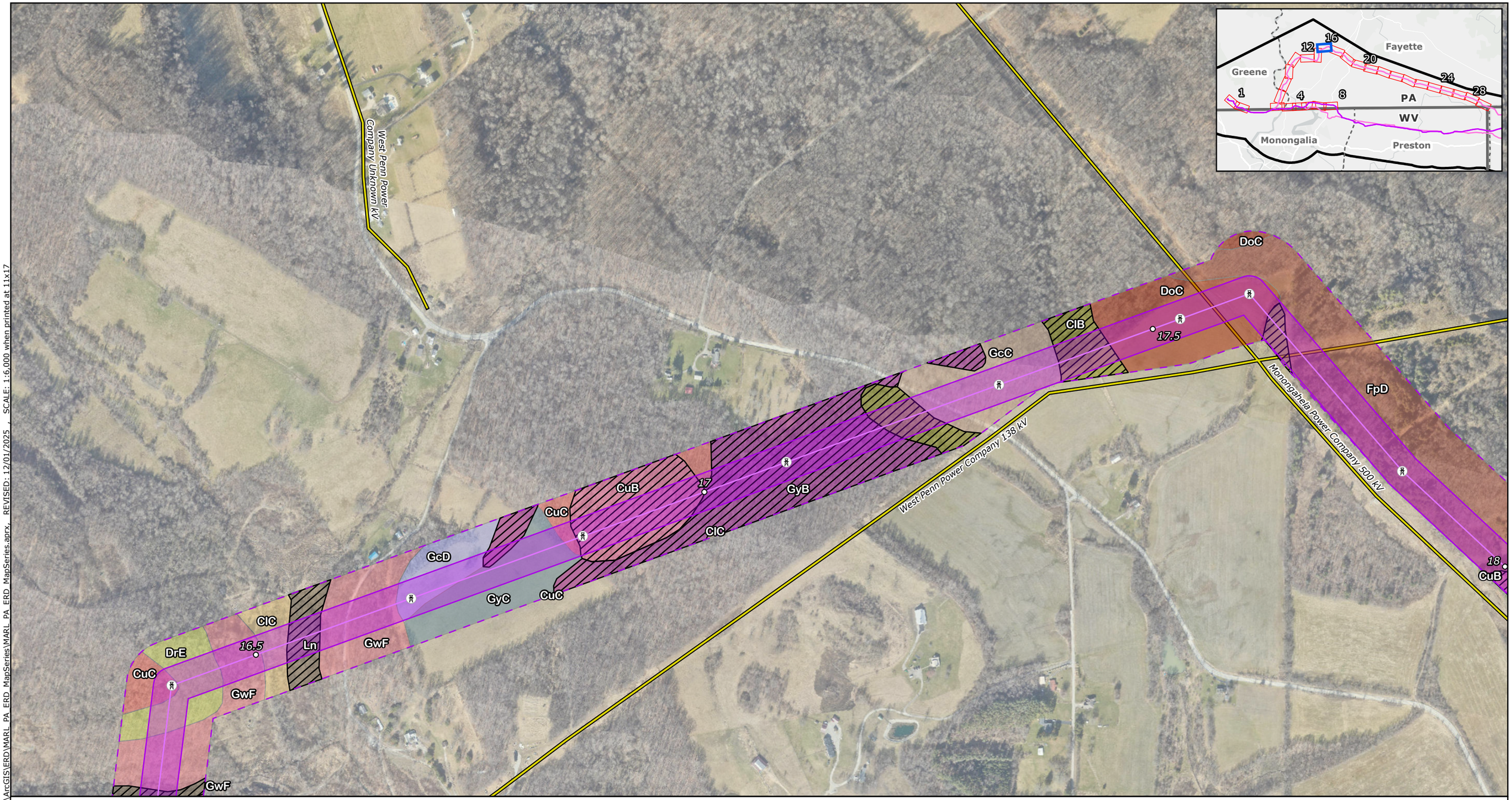

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClB: Clarksburg silt loam, 3 to 8 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuC: Culleoka channery silt loam, 8 to 15 percent slopes
- DoC: Dormont silt loam, 8 to 15 percent slopes
- DrE: Dormont-Culleoka complex, 25 to 50 percent slopes
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- Ln: Lindside silt loam, 0 to 3 percent slopes, occasionally flooded
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

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US Feet

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Attachment 1b
Soils Mapbook
Page 15 of 28
MidAtlantic Resiliency Link

ERM

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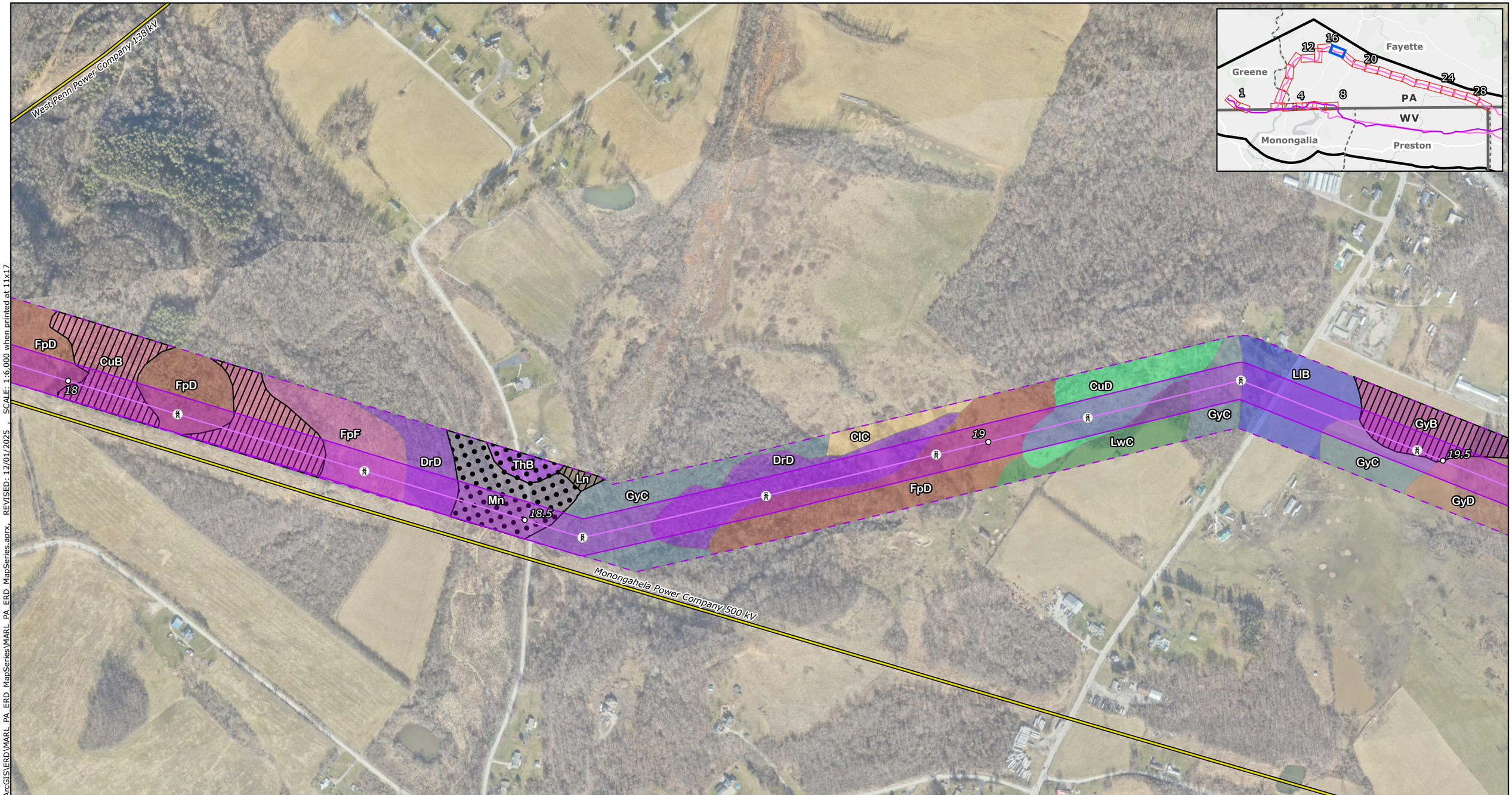

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- CuB: Culleoka channery silt loam, 3 to 8 percent slopes
- CuD: Culleoka channery silt loam, 15 to 25 percent slopes
- DrD: Dormont-Culleoka complex, 15 to 25 percent slopes
- FpD: Fairpoint very channery silt loam, 8 to 25 percent slopes, very stony
- FpF: Fairpoint very channery silt loam, 25 to 75 percent slopes, very stony
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- LIB: Library silt loam, 0 to 8 percent slopes
- Ln: Lindside silt loam, 0 to 3 percent slopes, occasionally flooded
- LwC: Lowell silty clay loam, 8 to 15 percent slopes, eroded
- Mn: Melvin and Newark silt loams
- ThB: Thorndale silt loam, 3 to 8 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

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US Feet

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Attachment 1b
Soils Mapbook
Page 16 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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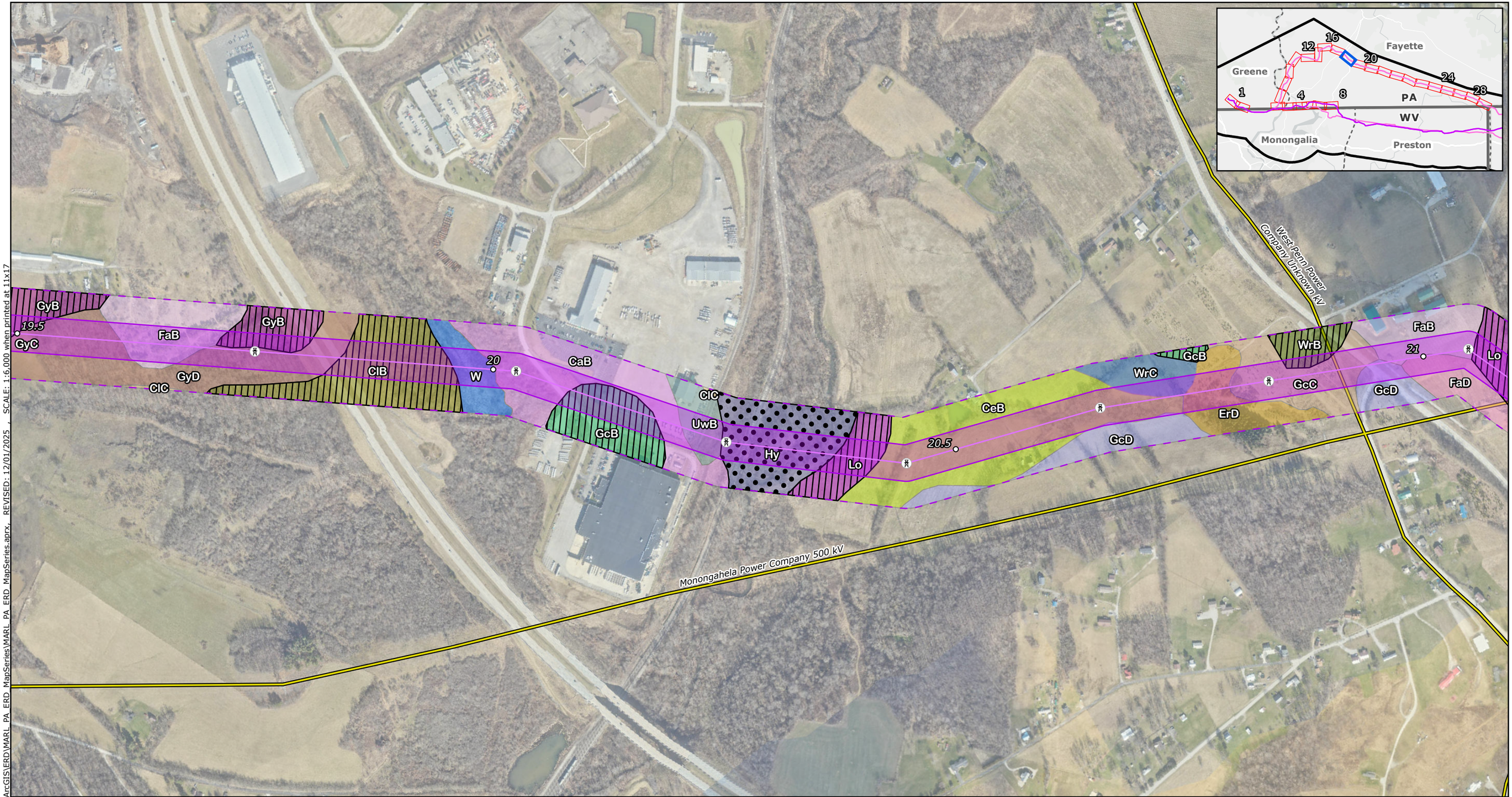

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- CaB: Cavode silt loam, 3 to 8 percent slopes
- CeB: Cavode silt loam, 0 to 8 percent slopes, very stony
- ClB: Clarksburg silt loam, 3 to 8 percent slopes
- ClC: Clarksburg silt loam, 8 to 15 percent slopes
- ErD: Ernest silt loam, 15 to 25 percent slopes
- FaB: Fairpoint very channery silt loam, 0 to 8 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GyB: Guernsey silt loam, 3 to 8 percent slopes
- GyC: Guernsey silt loam, 8 to 15 percent slopes
- GyD: Guernsey silt loam, 15 to 25 percent slopes
- Hy: Holly silt loam, 0 to 2 percent slopes
- Lo: Lobdell silt loam, 0 to 3 percent slopes occasionally flooded
- UwB: Urban land-Wharton complex, 0 to 8 percent slopes
- W: Water
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrC: Wharton silt loam, 8 to 15 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route

LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor

Data source: NEET, ERM, USDA NRCS SSURGO

N

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US Feet

Scale: 1:6,000

1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
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MidAtlantic Resiliency Link

ERM

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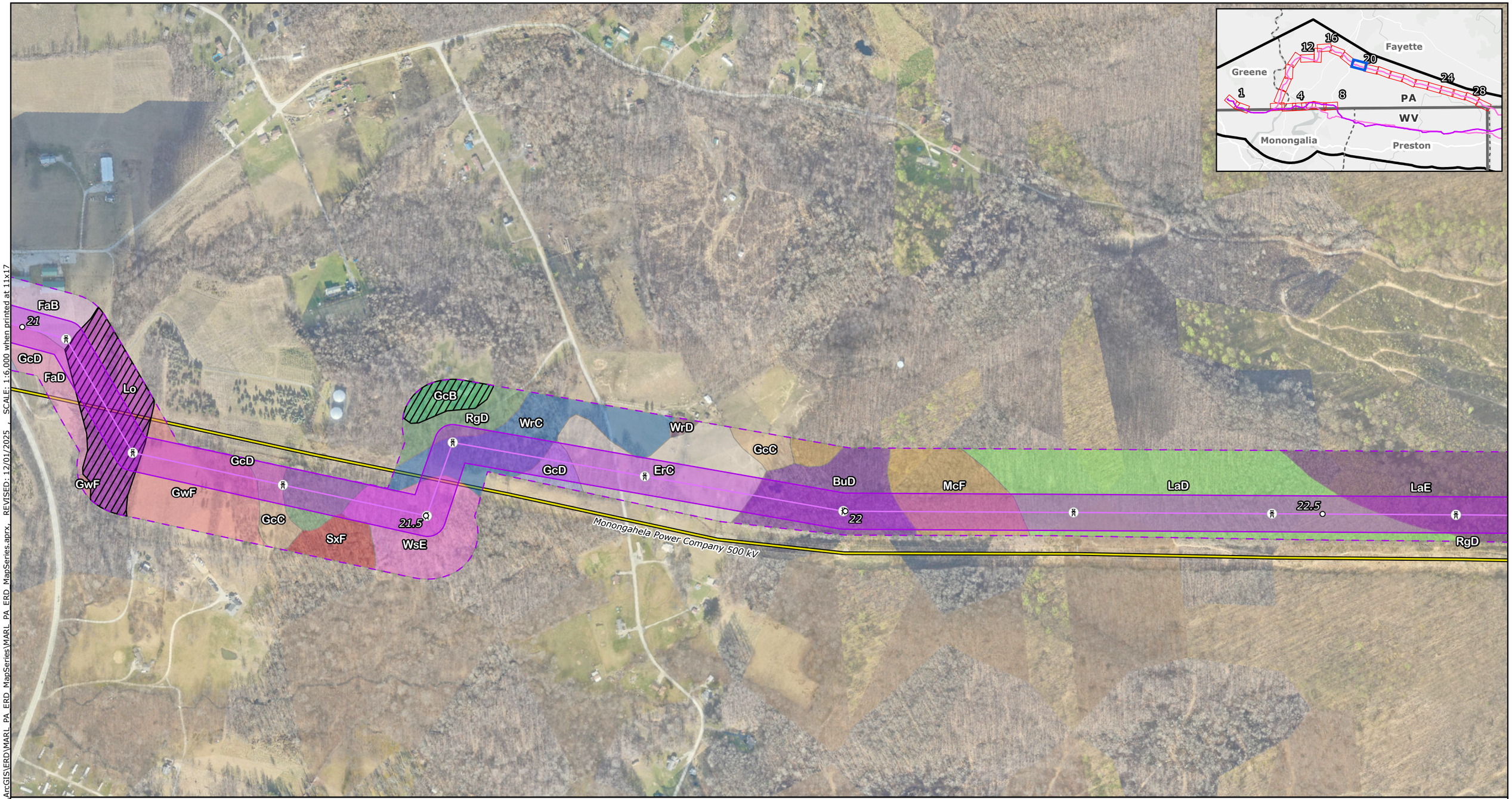

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- ErC: Ernest silt loam, 8 to 15 percent slopes
- FaB: Fairpoint very channery silt loam, 0 to 8 percent slopes
- FaD: Fairpoint very channery silt loam, 15 to 25 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- LaD: Laidig gravelly loam, 8 to 25 percent slopes, extremely stony
- LaE: Laidig gravelly loam, 25 to 35 percent slopes, extremely stony
- Lo: Lobdell silt loam, 0 to 3 percent slopes, occasionally flooded
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- RgD: Rayne channery silt loam, 8 to 25 percent slopes, very stony
- SxF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes, very stony
- WrC: Wharton silt loam, 8 to 15 percent slopes
- WrD: Wharton silt loam, 15 to 25 percent slopes
- WsE: Wharton silt loam, 25 to 35 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD defines the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 18 of 28
MidAtlantic Resiliency Link

ERM

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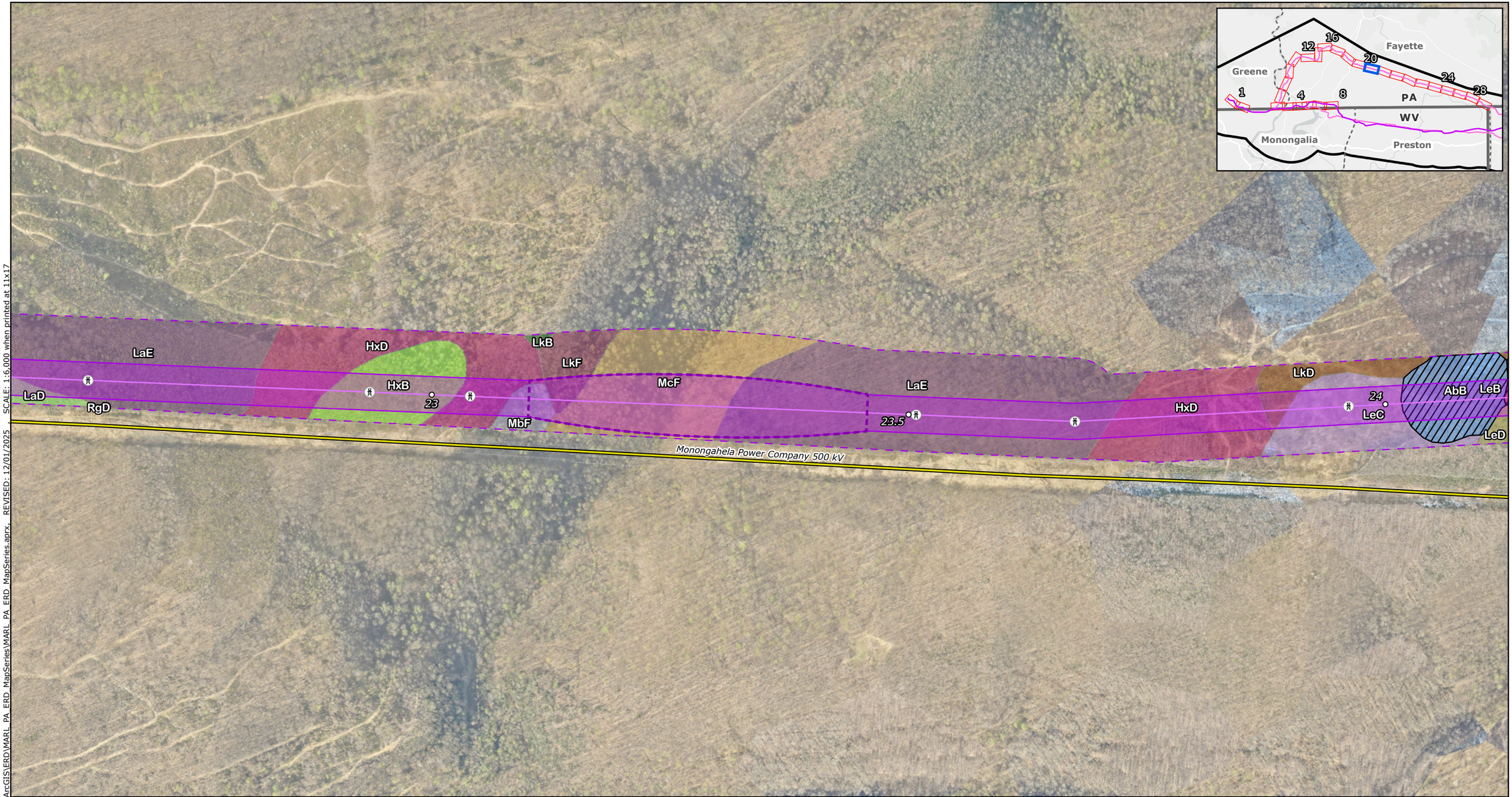
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- AbB: Albrights silt loam, 3 to 8 percent slopes
- HxB: Hazleton-Clymer complex, 0 to 8 percent slopes, extremely stony
- HxD: Hazleton-Clymer complex, 8 to 25 percent slopes, extremely stony
- LaD: Laidig gravelly loam, 8 to 25 percent slopes, extremely stony
- LaE: Laidig gravelly loam, 25 to 35 percent slopes, extremely stony
- LeB: Leck Kill channery silt loam, 3 to 8 percent slopes
- LeC: Leck Kill channery silt loam, 8 to 15 percent slopes
- LeD: Leck Kill channery silt loam, 15 to 25 percent slopes
- LkB: Leck Kill channery silt loam, 0 to 8 percent slopes, extremely stony
- LkD: Leck Kill channery silt loam, 8 to 25 percent slopes, extremely stony
- LkF: Leck Kill channery silt loam, 25 to 60 percent slopes, extremely stony
- MbF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, bouldery
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- RgD: Rayne channery silt loam, 8 to 25 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 19 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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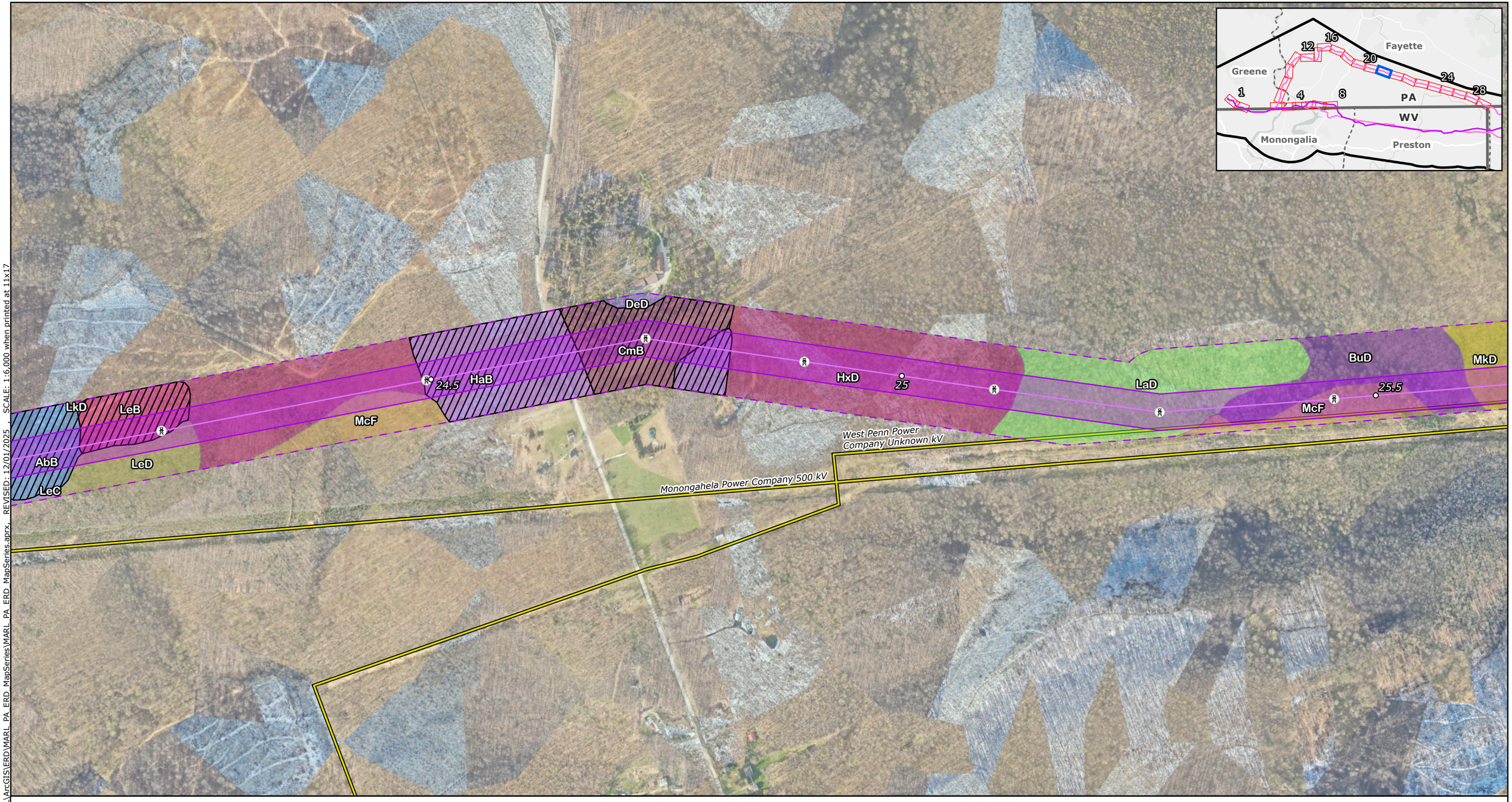

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- AbB: Albrights silt loam, 3 to 8 percent slopes
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CmB: Clymer channery loam, 3 to 8 percent slopes
- DeD: Dekalb-Hazleton channery sandy loams, 8 to 25 percent slopes, extremely stony
- HaB: Hazleton channery sandy loam, 3 to 8 percent slopes
- HxD: Hazleton-Clymer complex, 8 to 25 percent slopes, extremely stony
- LaD: Laidig gravelly loam, 8 to 25 percent slopes, extremely stony
- LeB: Leck Kill channery silt loam, 3 to 8 percent slopes
- LeC: Leck Kill channery silt loam, 8 to 15 percent slopes
- LeD: Leck Kill channery silt loam, 15 to 25 percent slopes
- LkD: Leck Kill channery silt loam, 8 to 25 percent slopes, extremely stony
- McF: Macove-Gilpin channery silt loams, 25 to 70 percent slopes, extremely stony
- MkD: Meckesville channery silt loam, 8 to 25 percent slopes, extremely stony
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

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US Feet
Scale: 1:6,000
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Attachment 1b
Soils Mapbook
Page 20 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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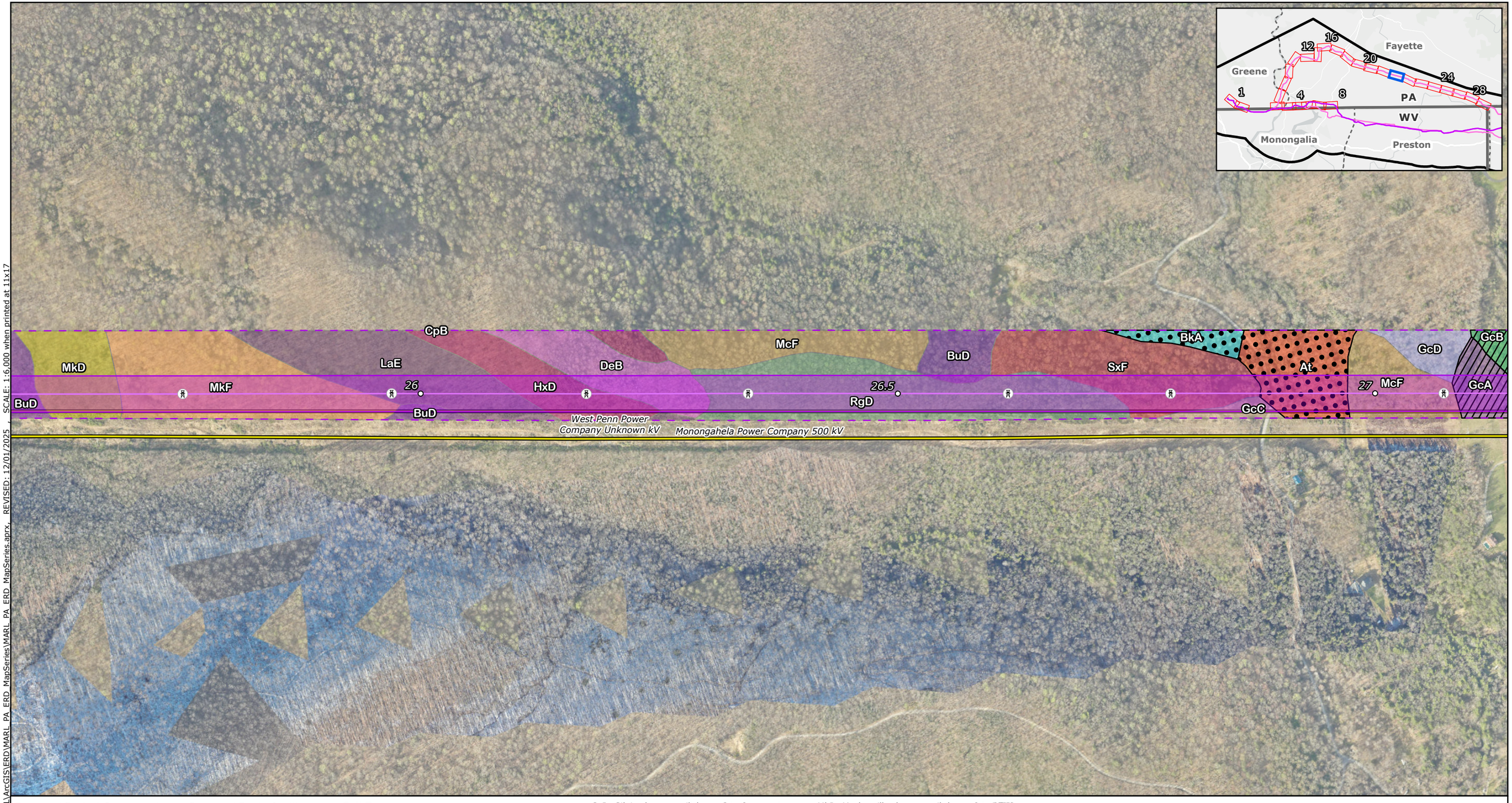

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BkA: Brinkerton soils, 0 to 3 percent slopes
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CpB: Cookport loam, 0 to 8 percent slopes, very stony
- DeB: Dekalb-Hazleton channery sandy loams, 0 to 8 percent slopes, extremely stony
- GcA: Gilpin channery silt loam, 0 to 3 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- HxD: Hazleton-Clymer complex, 8 to 25 percent slopes, extremely stony
- LaE: Laidig gravelly loam, 25 to 35 percent slopes, extremely stony
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- MkD: Meckesville channery silt loam, 8 to 25 percent slopes, extremely stony
- MkF: Meckesville channery silt loam, 25 to 70 percent slopes, extremely stony
- RgD: Rayne channery silt loam, 8 to 25 percent slopes, very stony
- SxF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 21 of 28
MidAtlantic Resiliency Link

ERM

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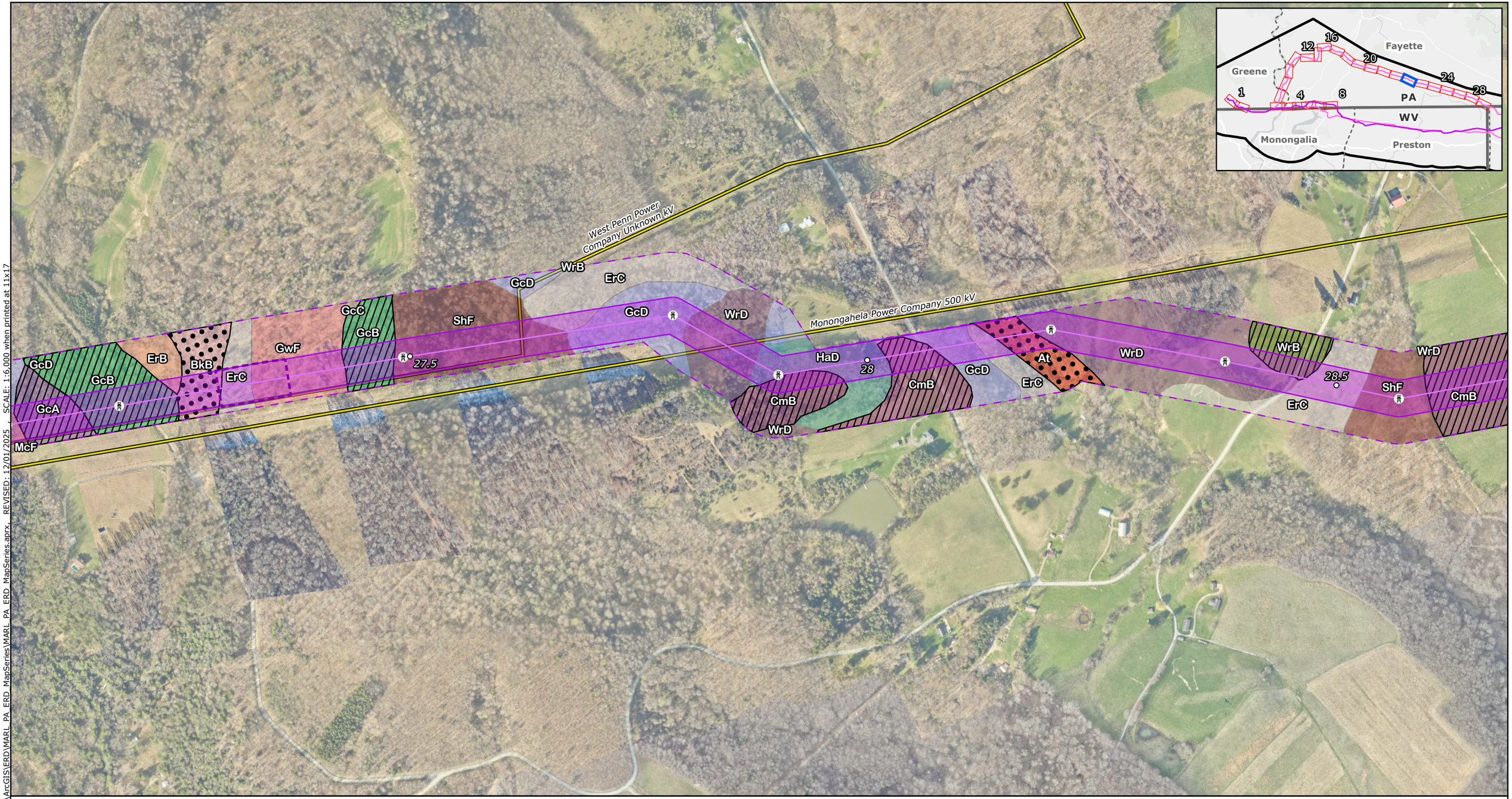

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Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BkB: Brinkerton soils, 3 to 8 percent slopes
- CmB: Clymer channery loam, 3 to 8 percent slopes
- ErB: Ernest silt loam, 3 to 8 percent slopes
- ErC: Ernest silt loam, 8 to 15 percent slopes
- GcA: Gilpin channery silt loam, 0 to 3 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- HaD: Hazleton channery sandy loam, 15 to 25 percent slopes
- McF: Macove-Gilpin channery silt loams, 30 to 70 percent slopes, extremely stony
- ShF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrD: Wharton silt loam, 15 to 25 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the Proposed route*
4. *Limits is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

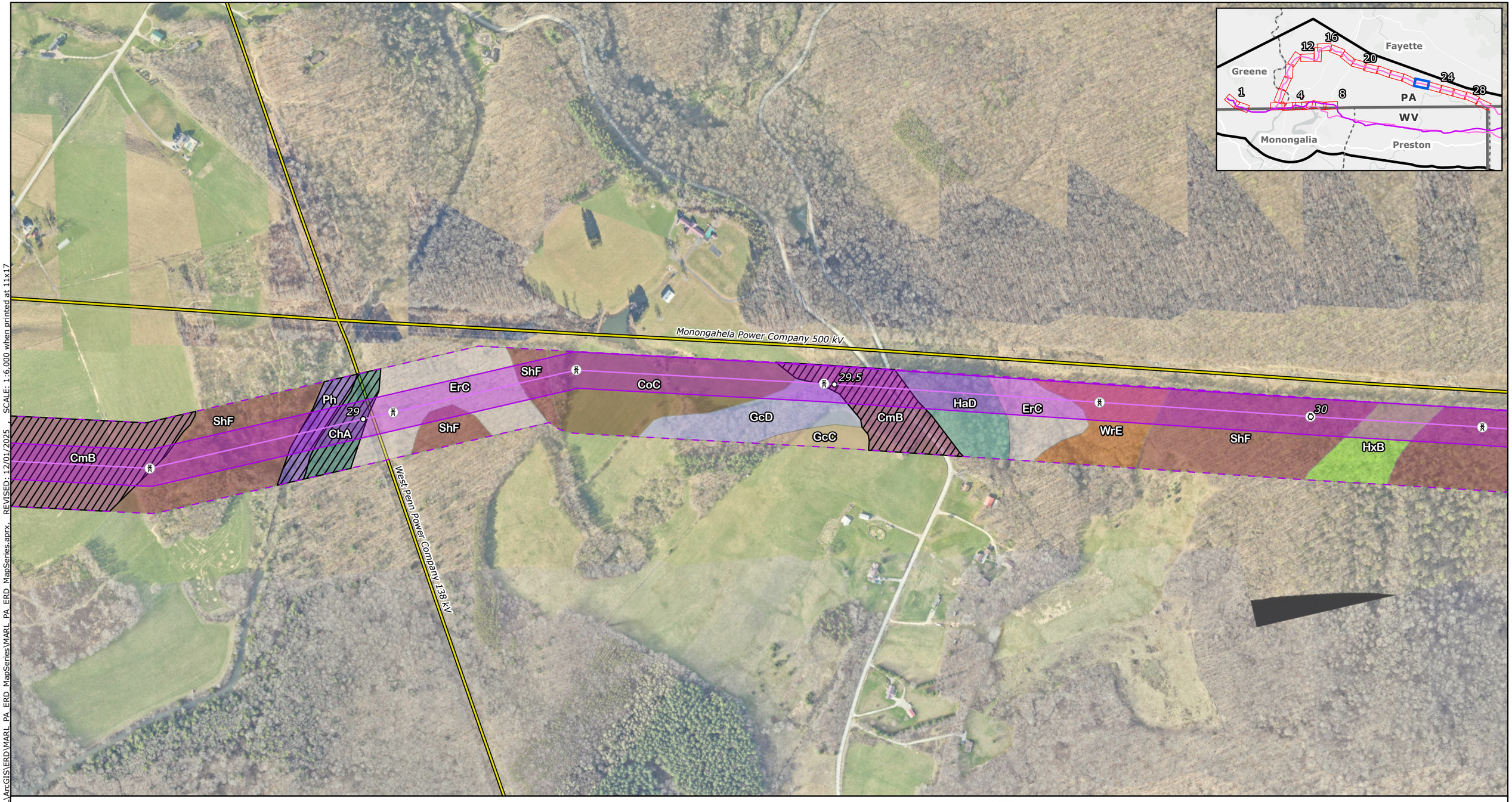
US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 22 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- ChA: Chavies fine sandy loam, 0 to 2 percent slopes
- CmB: Clymer channery loam, 3 to 8 percent slopes
- CoC: Cookport loam, 8 to 15 percent slopes
- ErC: Ernest silt loam, 8 to 15 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- HaD: Hazleton channery sandy loam, 15 to 25 percent slopes
- HxB: Hazleton-Clymer complex, 0 to 8 percent slopes, extremely stony
- Ph: Philo loam, 0 to 3 percent slopes, occasionally flooded
- ShF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes
- WrE: Wharton silt loam, 25 to 35 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000

1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 23 of 28
MidAtlantic Resiliency Link

ERM

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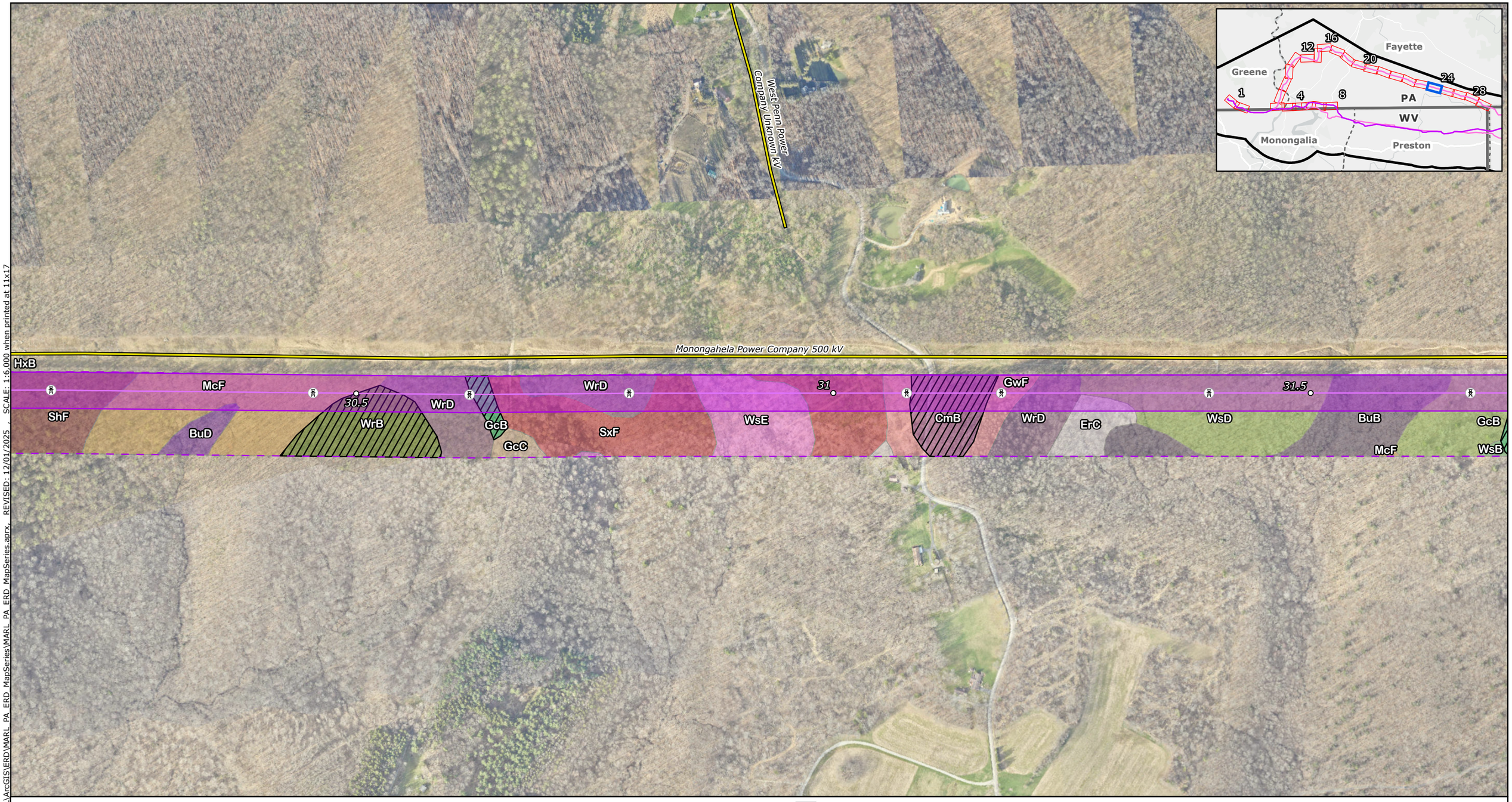
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- BuB: Buchanan loam, 0 to 8 percent slopes, extremely stony
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CmB: Clymer channery loam, 3 to 8 percent slopes
- ErC: Ernest silt loam, 8 to 15 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- HxB: Hazleton-Clymer complex, 0 to 8 percent slopes, extremely stony
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- ShF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes
- SxF: Shelocta-Gilpin channery silt loams, 25 to 75 percent slopes, very stony
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrD: Wharton silt loam, 15 to 25 percent slopes
- WsB: Wharton silt loam, 0 to 8 percent slopes, very stony
- WsD: Wharton silt loam, 8 to 25 percent slopes, very stony
- WsE: Wharton silt loam, 25 to 35 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

N

0 250 500 750 1,000
US Feet
Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 24 of 28
MidAtlantic Resiliency Link

ERM

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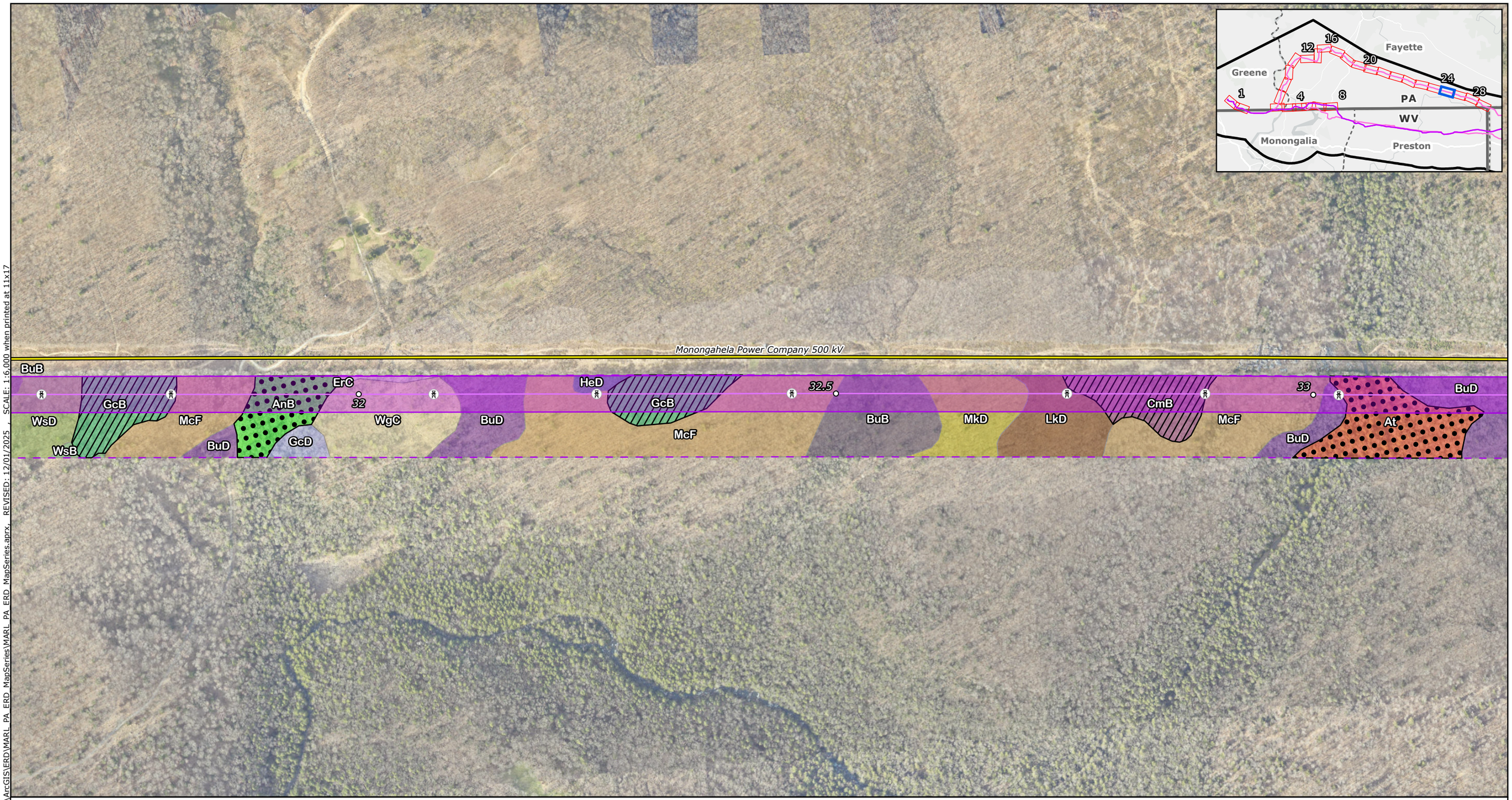
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- AnB: Andover gravelly loam, 0 to 8 percent slopes, very stony
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BuB: Buchanan loam, 0 to 8 percent slopes, extremely stony
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CmB: Clymer channery loam, 3 to 8 percent slopes
- ErC: Ernest silt loam, 8 to 15 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- HeD: Hazleton channery sandy loam, 15 to 25 percent slopes, extremely stony
- LkD: Leck Kill channery silt loam, 8 to 25 percent slopes, extremely stony
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- MkD: Meckesville channery silt loam, 8 to 25 percent slopes, extremely stony
- WgC: Wharton-Gilpin complex, 8 to 15 percent slopes
- WsB: Wharton silt loam, 0 to 8 percent slopes, very stony
- WsD: Wharton silt loam, 8 to 25 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.
2. Proposed tower locations are preliminary and subject to change
3. Ancillary facilities were only designed for the Proposed route
4. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
5. Data source: NEET, ERM, USDA NRCS SSURGO

N

0 250 500 750 1,000
US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 25 of 28
MidAtlantic Resiliency Link

ERM

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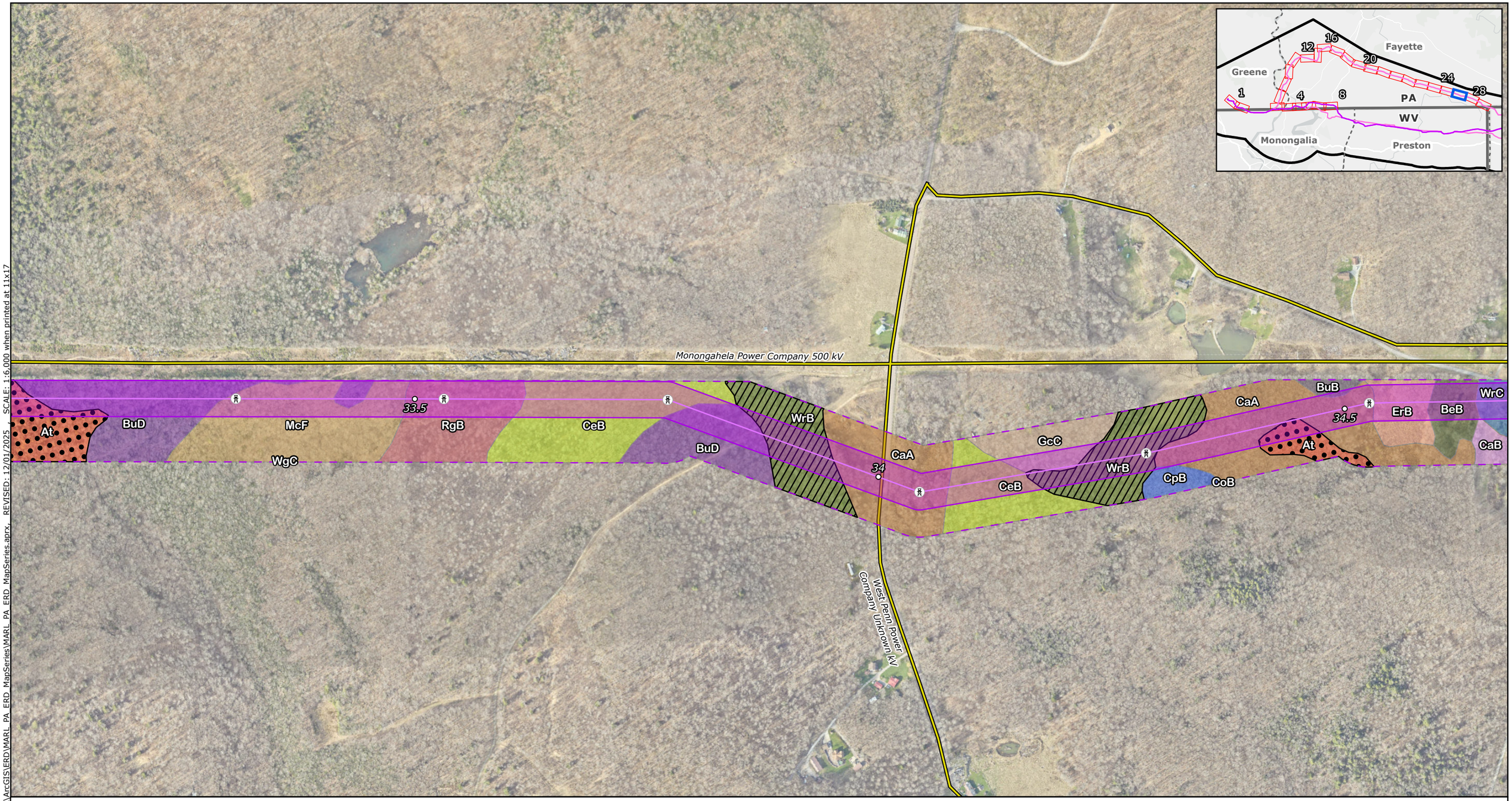

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BeB: Bethesda very channery silt loam, 0 to 8 percent slopes
- BuB: Buchanan loam, 0 to 8 percent slopes, extremely stony
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CaA: Cavode silt loam, 0 to 3 percent slopes
- CaB: Cavode silt loam, 3 to 8 percent slopes
- CeB: Cavode silt loam, 0 to 8 percent slopes, very stony
- CoB: Cookport loam, 3 to 8 percent slopes
- CpB: Cookport loam, 0 to 8 percent slopes, very stony
- ErB: Ernest silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- McF: Macove-Gilpin channery silt loams, 35 to 70 percent slopes, extremely stony
- RgB: Rayne channery silt loam, 0 to 8 percent slopes, very stony
- WgC: Wharton-Gilpin complex, 8 to 15 percent slopes
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrC: Wharton silt loam, 8 to 15 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
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Attachment 1b
Soils Mapbook
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MidAtlantic Resiliency Link

ERM

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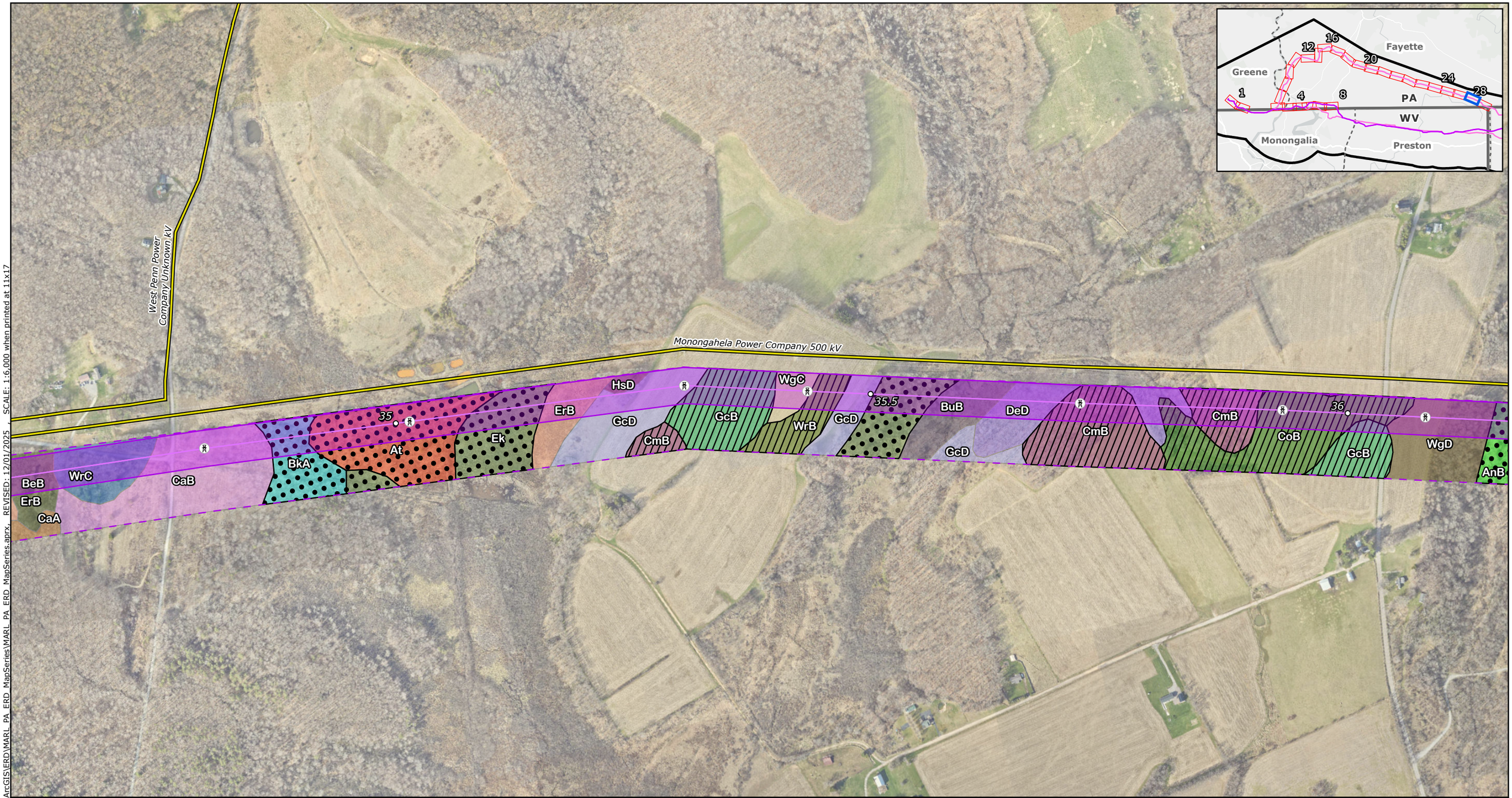

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- AnB: Andover gravelly loam, 0 to 8 percent slopes, very stony
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BeB: Bethesda very channery silt loam, 0 to 8 percent slopes
- BkA: Brinkerton soils, 0 to 3 percent slopes
- BuB: Buchanan loam, 0 to 8 percent slopes, extremely stony
- CaA: Cavode silt loam, 0 to 3 percent slopes
- CaB: Cavode silt loam, 3 to 8 percent slopes
- CmB: Clymer channery loam, 3 to 8 percent slopes
- CoB: Cookport loam, 3 to 8 percent slopes
- DeD: Dekalb-Hazleton channery sandy loams, 8 to 25 percent slopes, extremely stony
- Ek: Elkins silt loam, 0 to 3 percent slopes, occasionally flooded
- ErB: Ernest silt loam, 3 to 8 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcD: Gilpin channery silt loam, 15 to 25 percent slopes
- HsD: Hazleton channery sandy loam, 8 to 25 percent slopes, very bouldery
- WgC: Wharton-Gilpin complex, 8 to 15 percent slopes
- WgD: Wharton-Gilpin complex, 15 to 25 percent slopes
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WrC: Wharton silt loam, 8 to 15 percent slopes
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the Proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 27 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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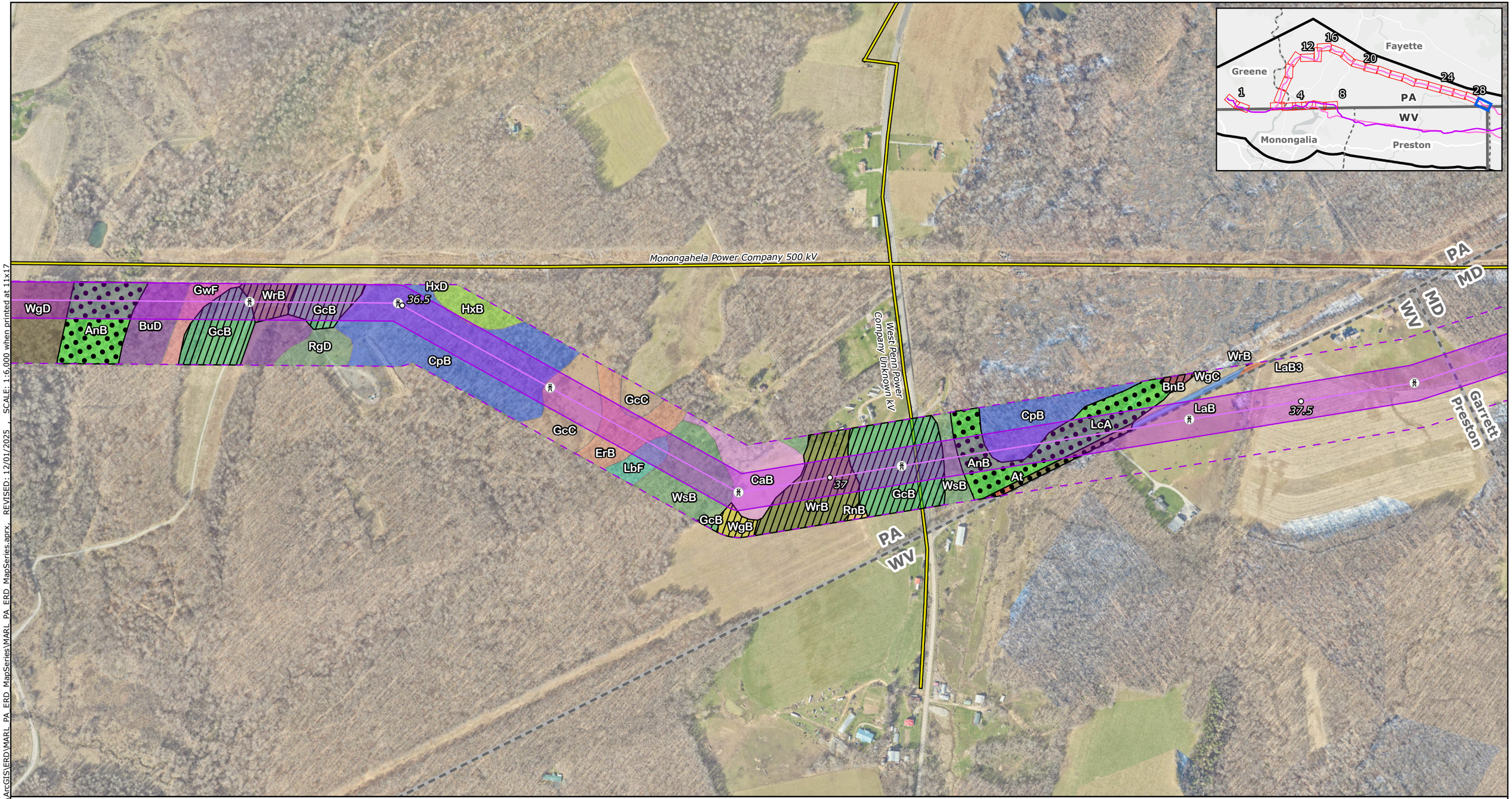

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Soil Type
- AnB: Andover gravelly loam, 0 to 8 percent slopes, very stony
- At: Atkins silt loam, 0 to 3 percent slopes, frequently flooded
- BnB: Buchanan loam, 3 to 8 percent slopes
- BuD: Buchanan loam, 8 to 25 percent slopes, extremely stony
- CaB: Cavode silt loam, 3 to 8 percent slopes
- CpB: Cookport loam, 0 to 8 percent slopes, very stony
- ErB: Ernest silt loam, 3 to 8 percent slopes
- GcB: Gilpin channery silt loam, 3 to 8 percent slopes
- GcC: Gilpin channery silt loam, 8 to 15 percent slopes
- GwF: Gilpin-Weikert channery silt loams, 25 to 70 percent slopes
- HxB: Hazleton-Clymer complex, 0 to 8 percent slopes, extremely stony
- HxD: Hazleton-Clymer complex, 8 to 25 percent slopes, extremely stony
- LaB3: Latham silt loam, 3 to 8 percent slopes, severely eroded
- LaB: Latham silt loam, 3 to 8 percent slopes
- LbF: Laidig-Hazleton complex, 35 to 80 percent slopes, bouldery
- LcA: Lickdale silt loam, 0 to 3 percent slopes
- RgD: Rayne channery silt loam, 8 to 25 percent slopes, very stony
- RnB: Rayne-Gilpin channery silt loams, 3 to 8 percent slopes
- WgB: Wharton-Gilpin complex, 3 to 8 percent slopes
- WgC: Wharton-Gilpin complex, 8 to 15 percent slopes
- WgD: Wharton-Gilpin complex, 15 to 25 percent slopes
- WrB: Wharton silt loam, 3 to 8 percent slopes
- WsB: Wharton silt loam, 0 to 8 percent slopes, very stony
- Prime Farmland
- Hydric Soils

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, USDA NRCS SSURGO*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000

1 inch equals 500 ft (when printed at 11x17)

Attachment 1b
Soils Mapbook
Page 28 of 28

MidAtlantic Resiliency Link

ERM

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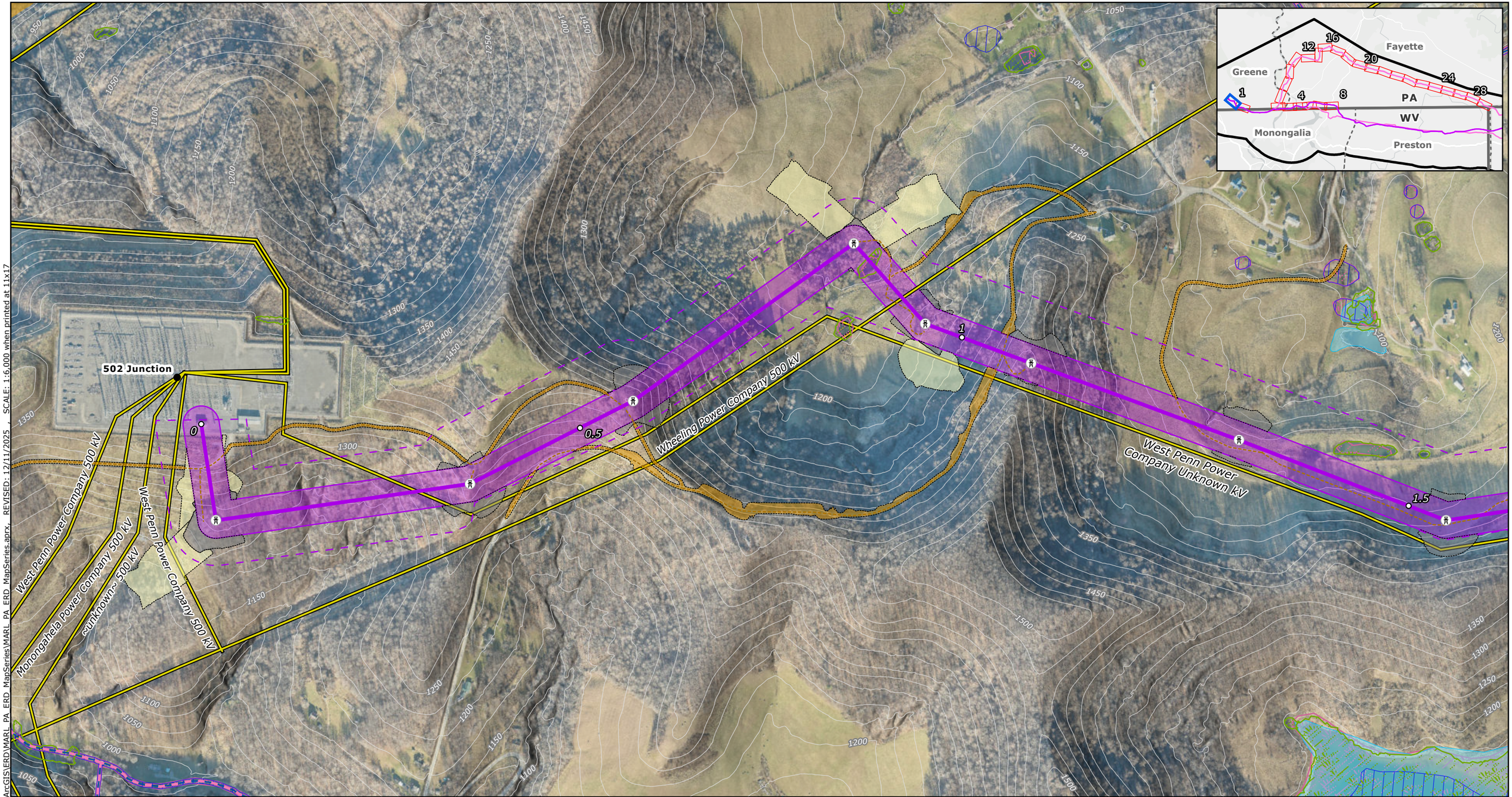
Coordinate System: NAD 1983 UTM Zone 17N

ATTACHMENT 1C WATER RESOURCES MAPBOOK



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors
- Riparian Habitat Exclusion Zone

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
- PASDA Wetlands
- NHD Waterbody
- NWI Wetlands
- High Probability Modeled Wetlands
- Section 10 Navigable Waters
- NHD Flowline

PFBC Trout Water Classification
- Naturally Reproducing Trout Streams
- Wilderness Trout Streams
- Stocked Trout Streams

Designated Use Streams
- Coldwater Fishes
- High Quality Coldwater Fishes
- Warm Water Fishes
- Trout Stocking

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, FEMA, USGS NHD, USFWS NWI, PASDA, PA DEP*

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US Feet
Scale: 1:6,000
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Attachment 1c
Water Resources Mapbook
Page 1 of 28
MidAtlantic Resiliency Link

ERM

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Coordinate system: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors
- Riparian Habitat Exclusion Zone

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
- PASDA Wetlands
- NHD Waterbody
- NWI Wetlands
- High Probability Modeled Wetlands
- Section 10 Navigable Waters
- NHD Flowline

PFBC Trout Water Classification
- Naturally Reproducing Trout Streams
- Wilderness Trout Streams
- Stocked Trout Streams

Designated Use Streams
- Coldwater Fishes
- High Quality Coldwater Fishes
- Warm Water Fishes
- Trout Stocking

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, FEMA, USGS NHD, USFWS NWI, PASDA, PA DEP*

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US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1c
Water Resources Mapbook
Page 2 of 28
MidAtlantic Resiliency Link

ERM

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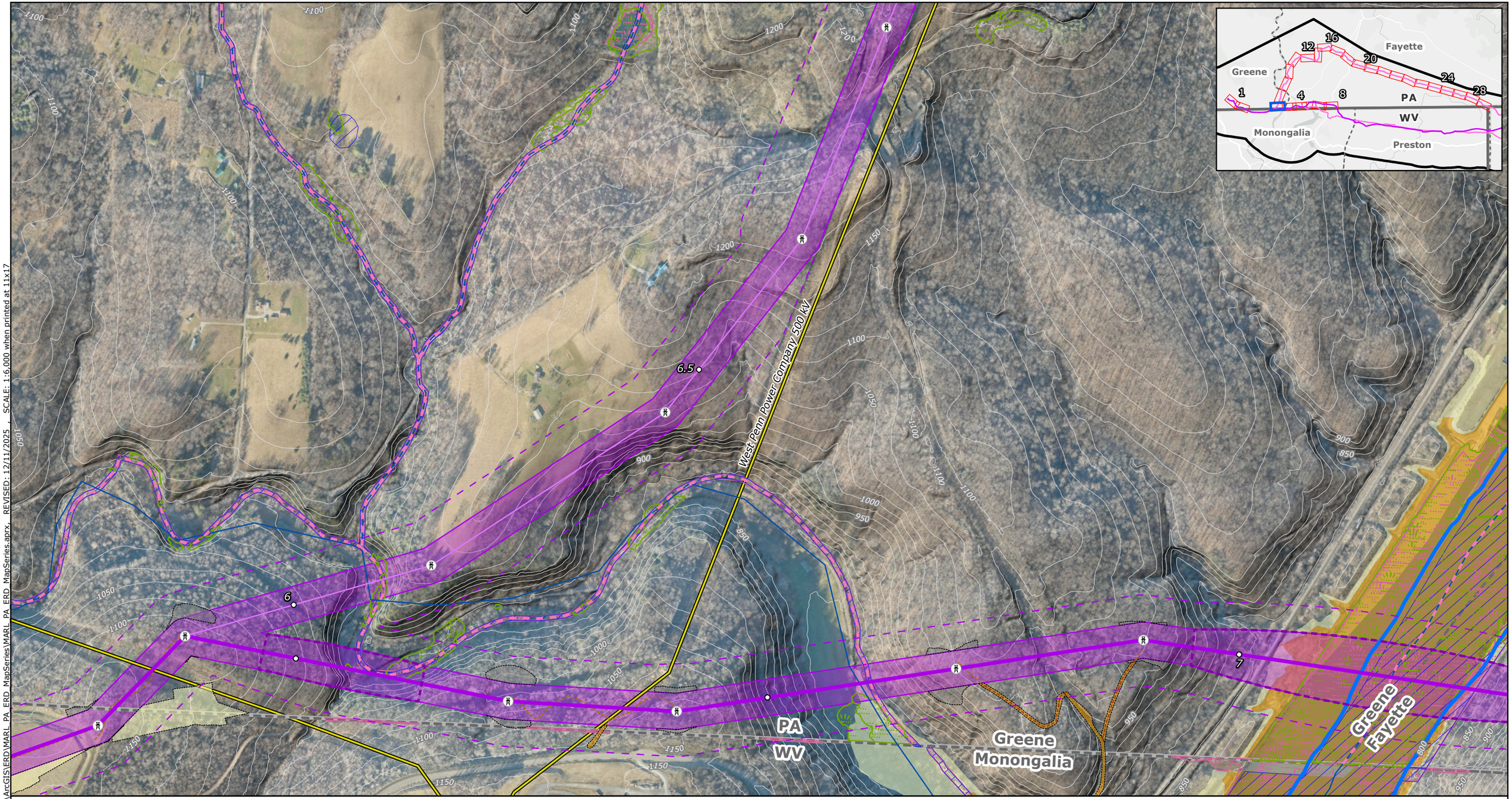

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors
- Riparian Habitat Exclusion Zone

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
- PASDA Wetlands
- NHD Waterbody
- NWI Wetlands
- High Probability Modeled Wetlands
- Section 10 Navigable Waters
- NHD Flowline

PFBC Trout Water Classification
- Naturally Reproducing Trout Streams
- Wilderness Trout Streams
- Stocked Trout Streams

Designated Use Streams
- Coldwater Fishes
- High Quality Coldwater Fishes
- Warm Water Fishes
- Trout Stocking

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
1. *The six Alternative Routes are labeled A through F. Alternative Route A is the Proposed Route.*
2. *Proposed tower locations are preliminary and subject to change*
3. *Ancillary facilities were only designed for the proposed route*
4. *LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor*
5. *Data source: NEET, ERM, FEMA, USGS NHD, USFWS NWI, PASDA, PA DEP*

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0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1c
Water Resources Mapbook
Page 3 of 28
MidAtlantic Resiliency Link

ERM

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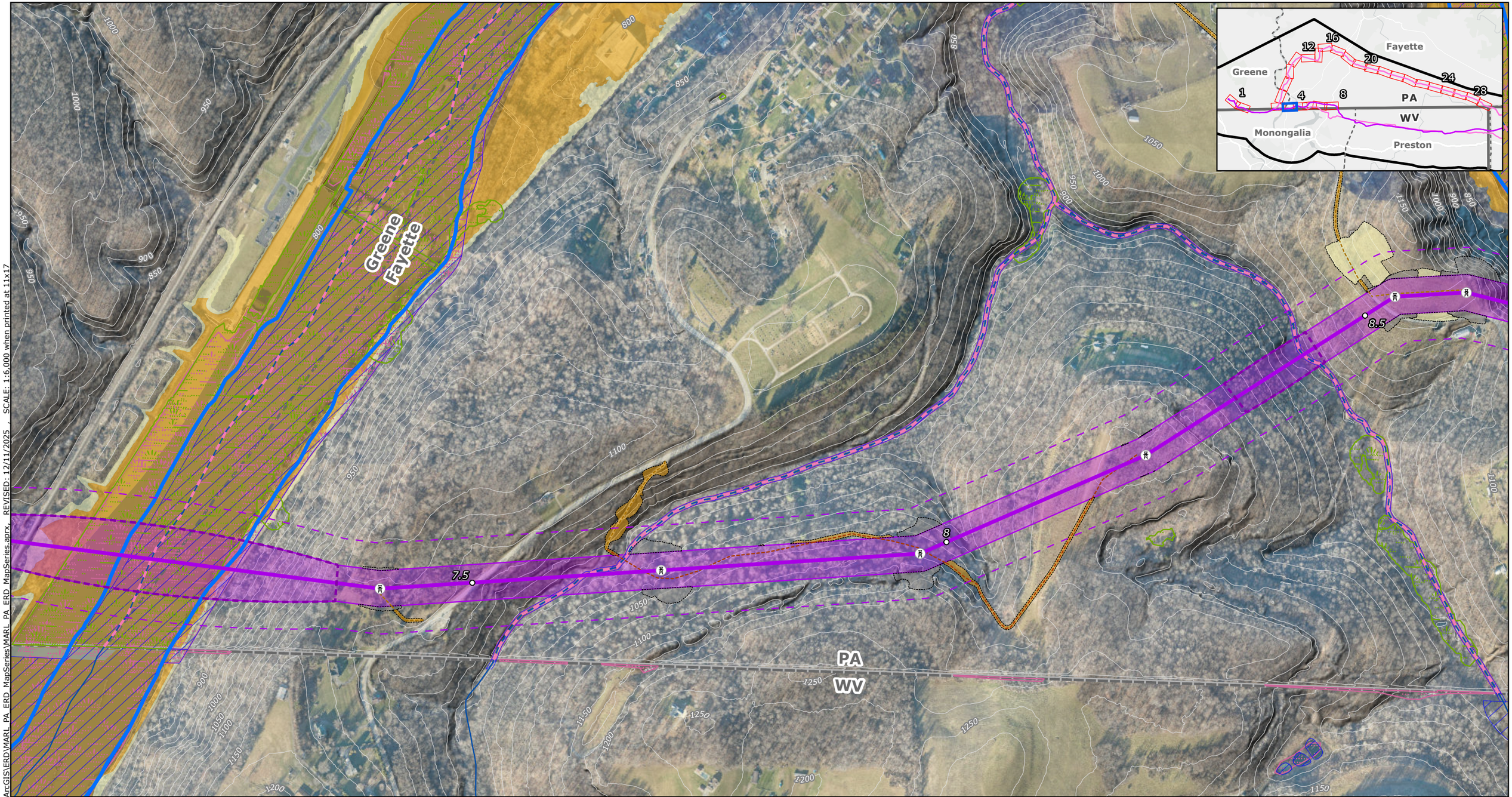
Coordinate system: NAD 1983 UTM Zone 17N



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- Access Road LoD
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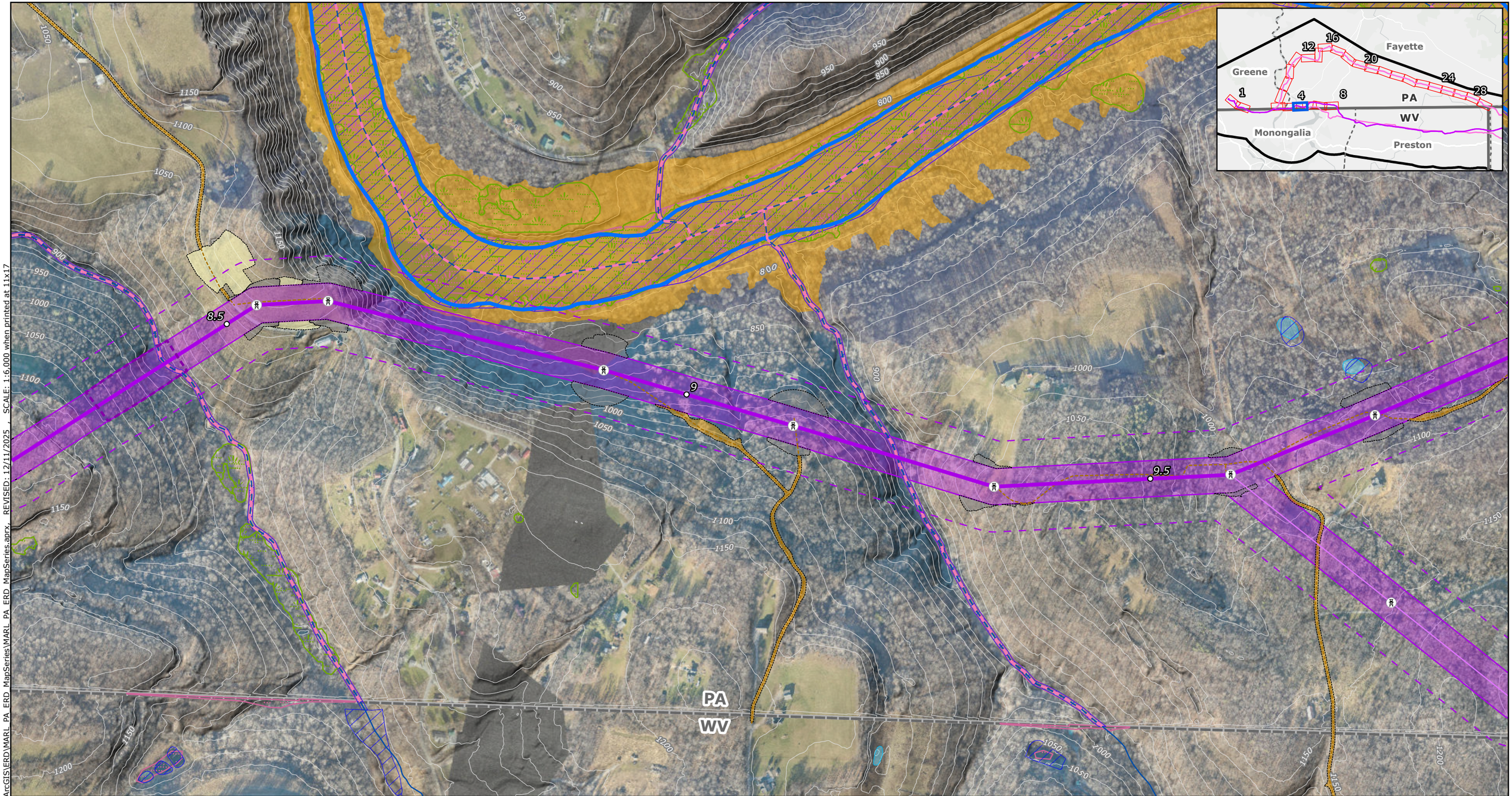

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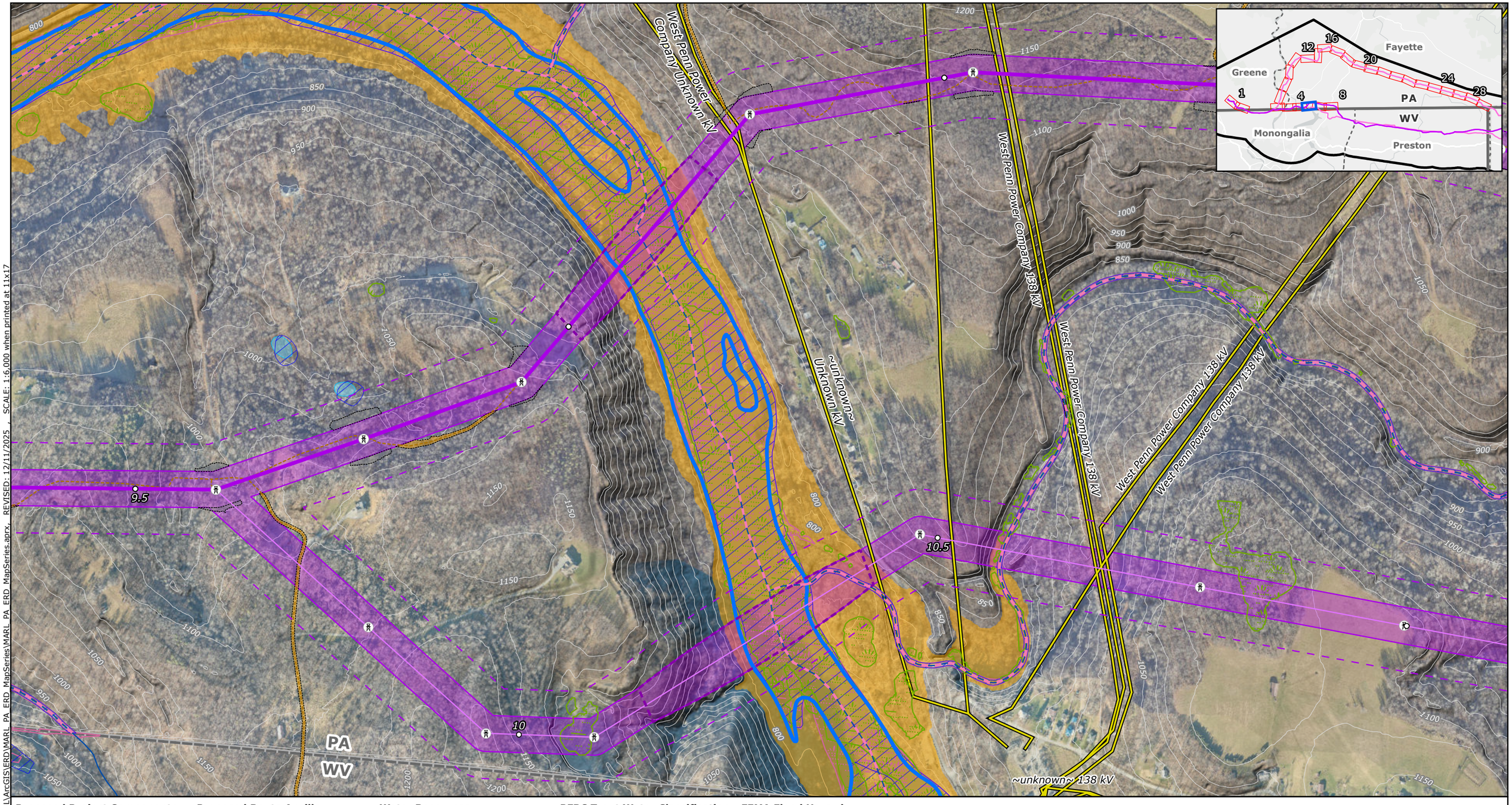

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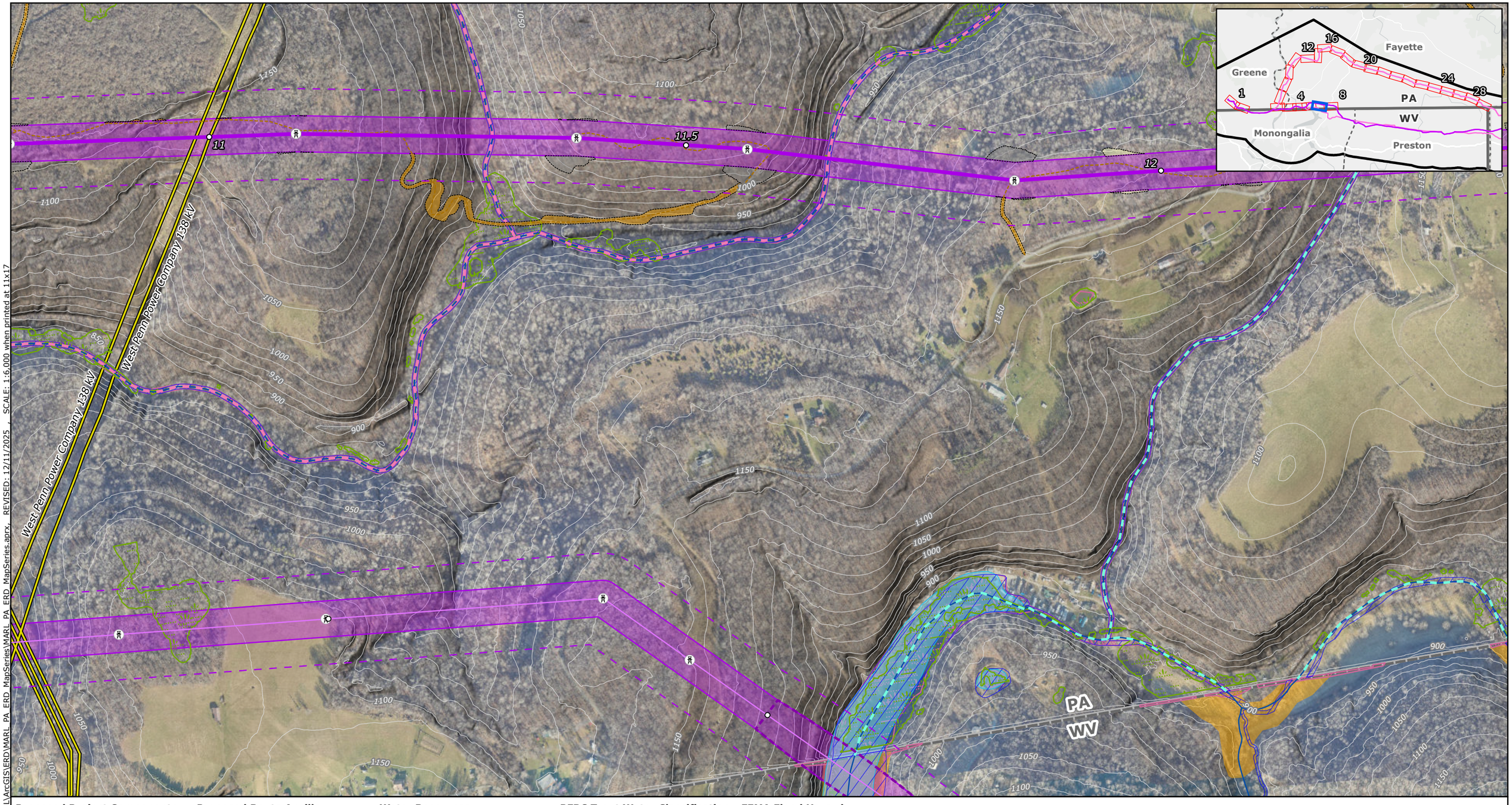

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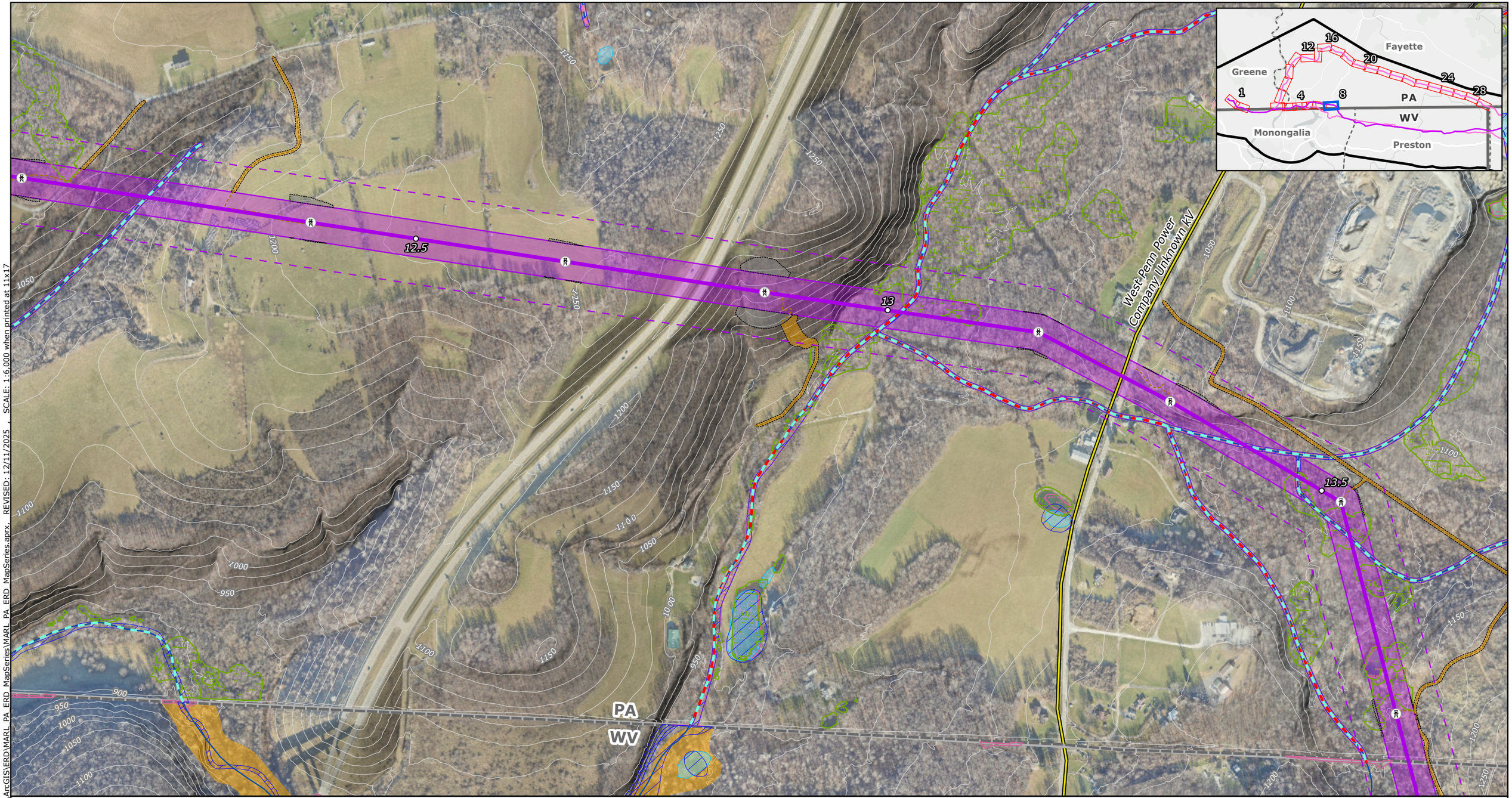

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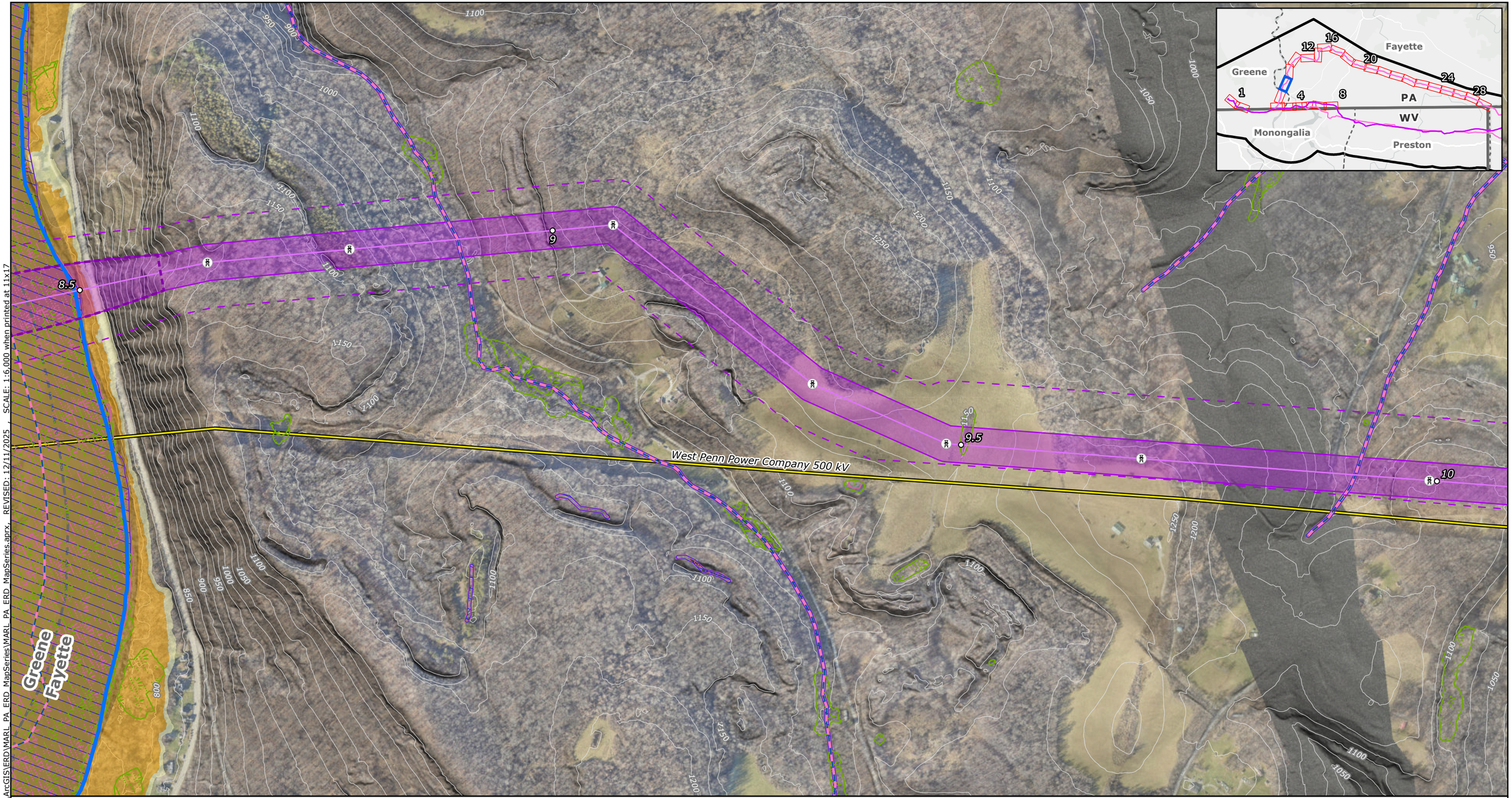

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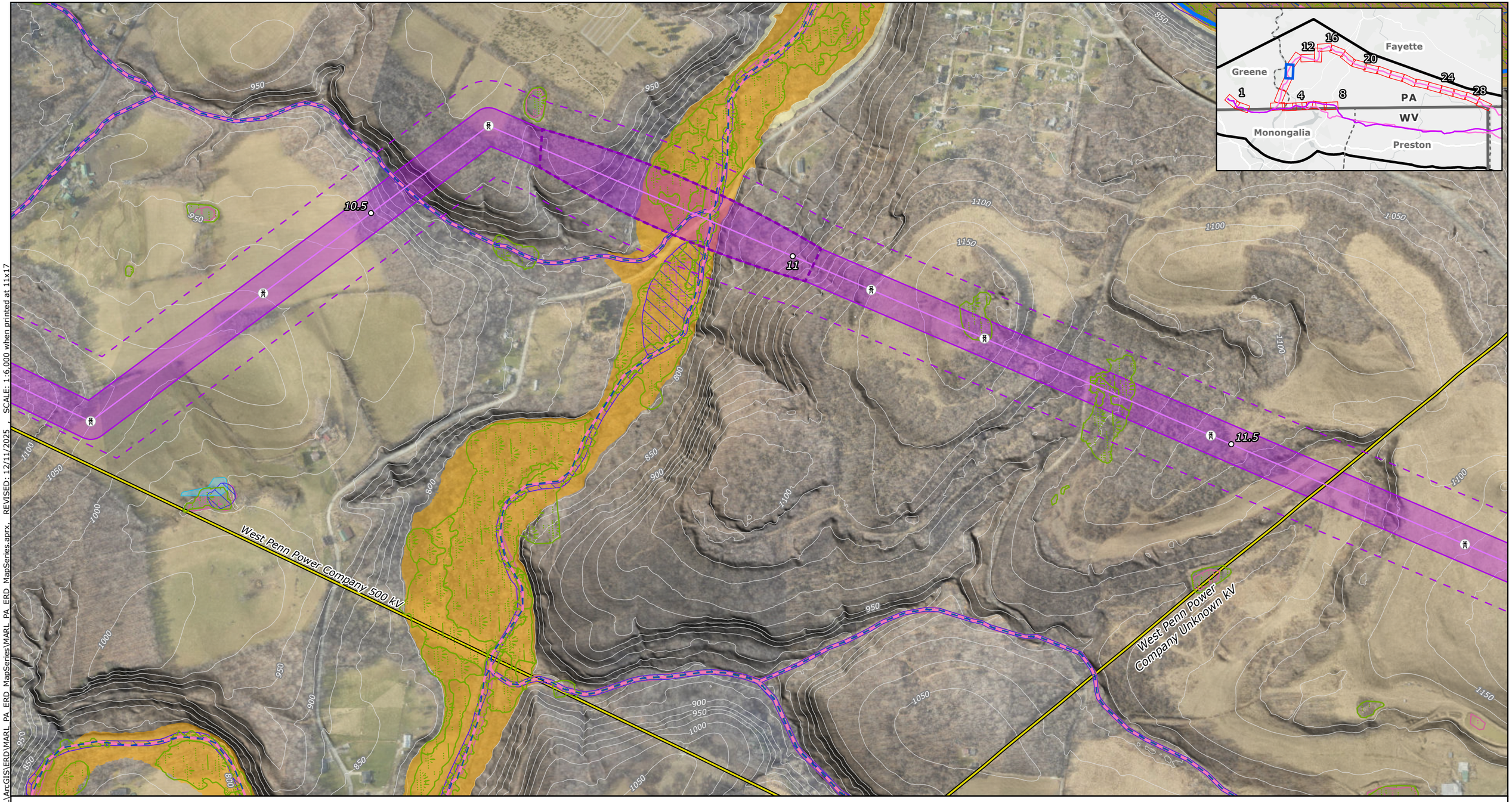

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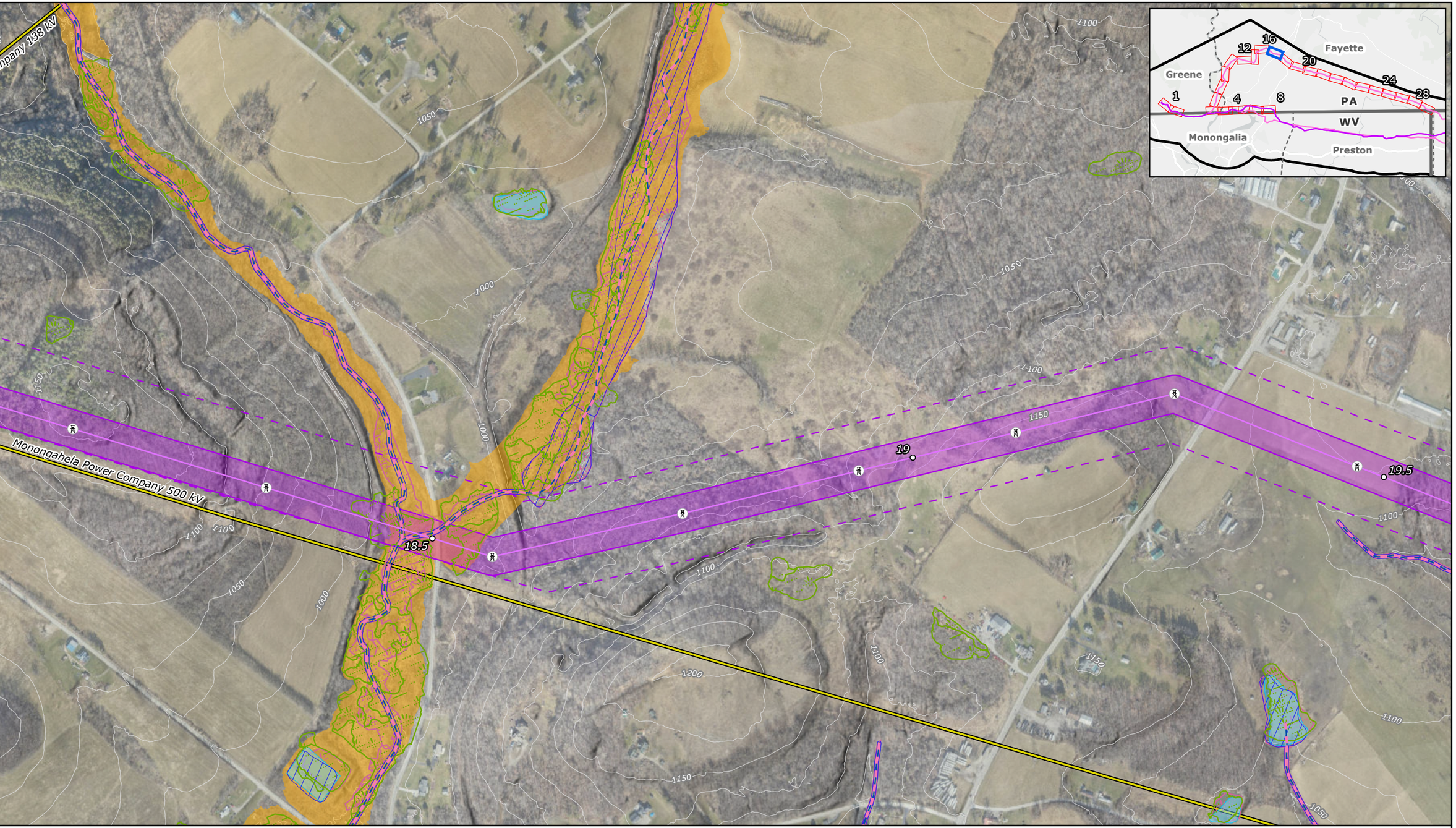

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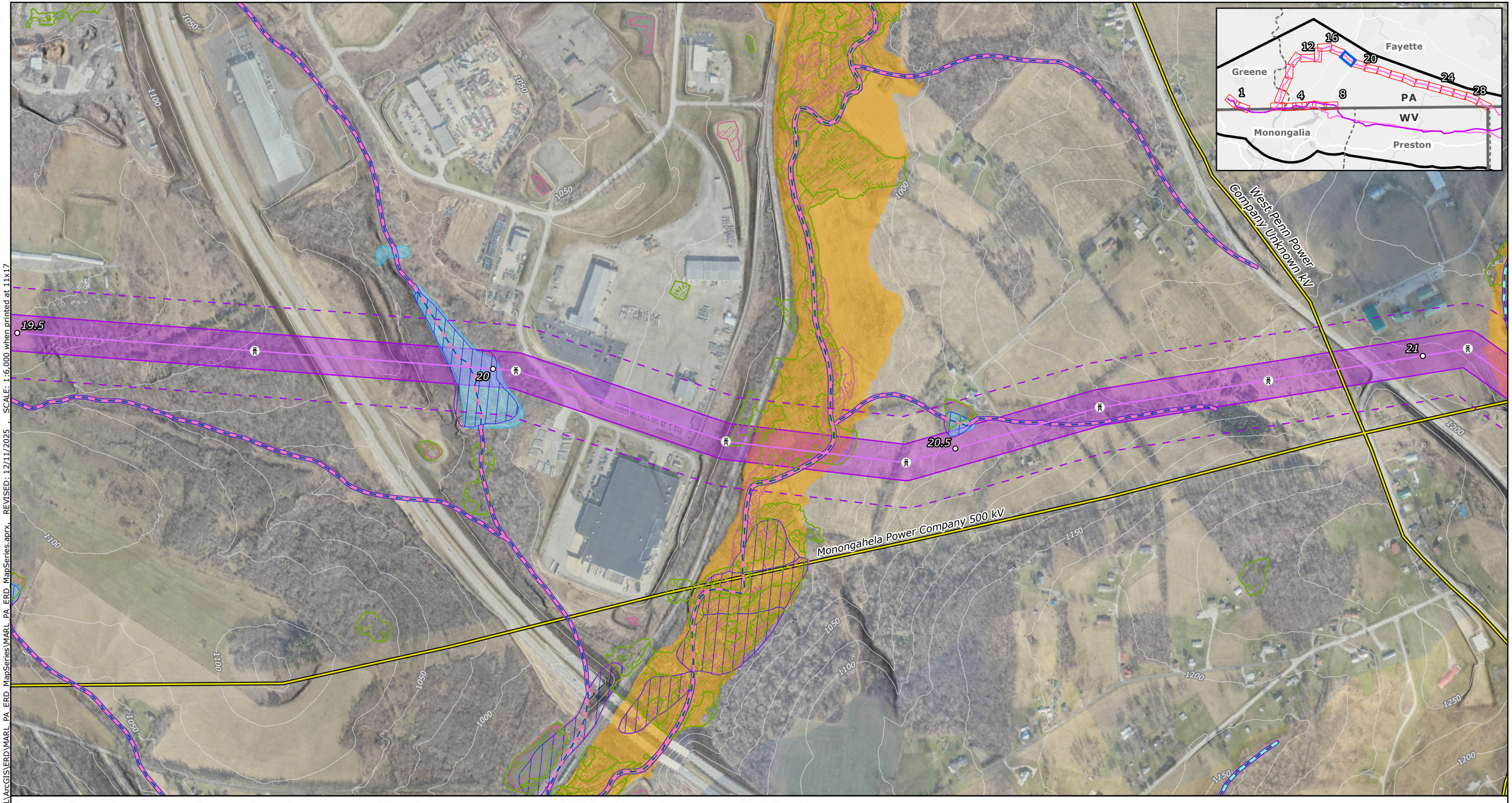

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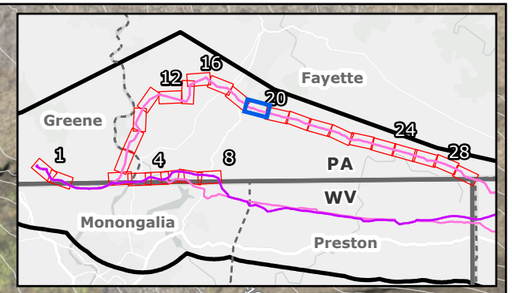

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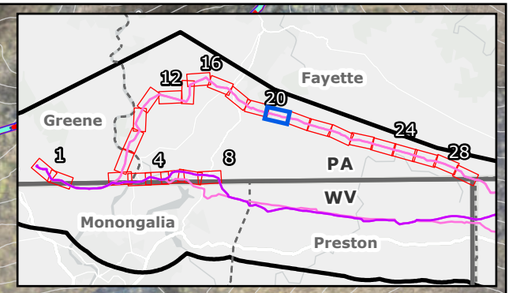

Monongahela Power Company 500 kV

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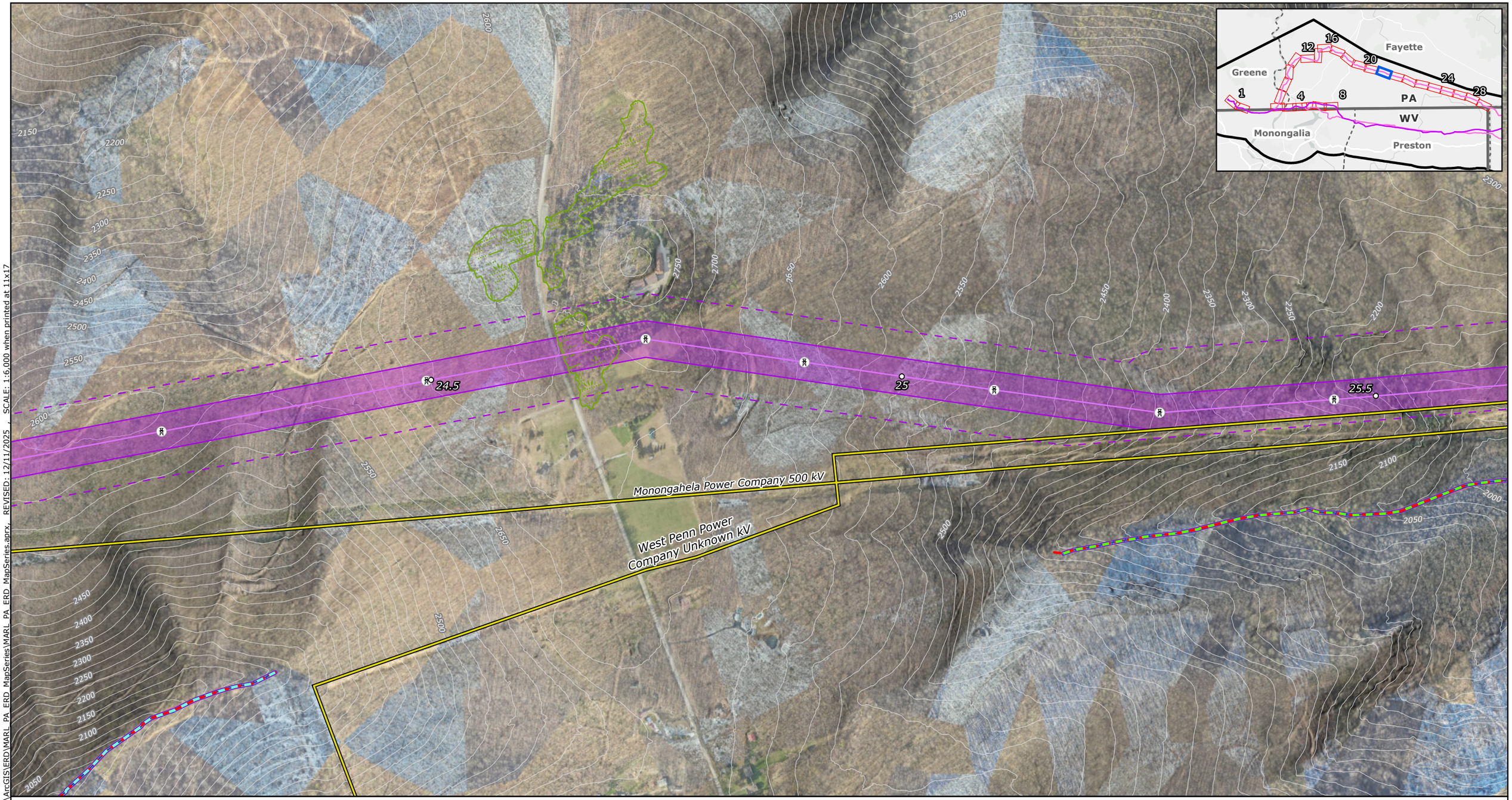

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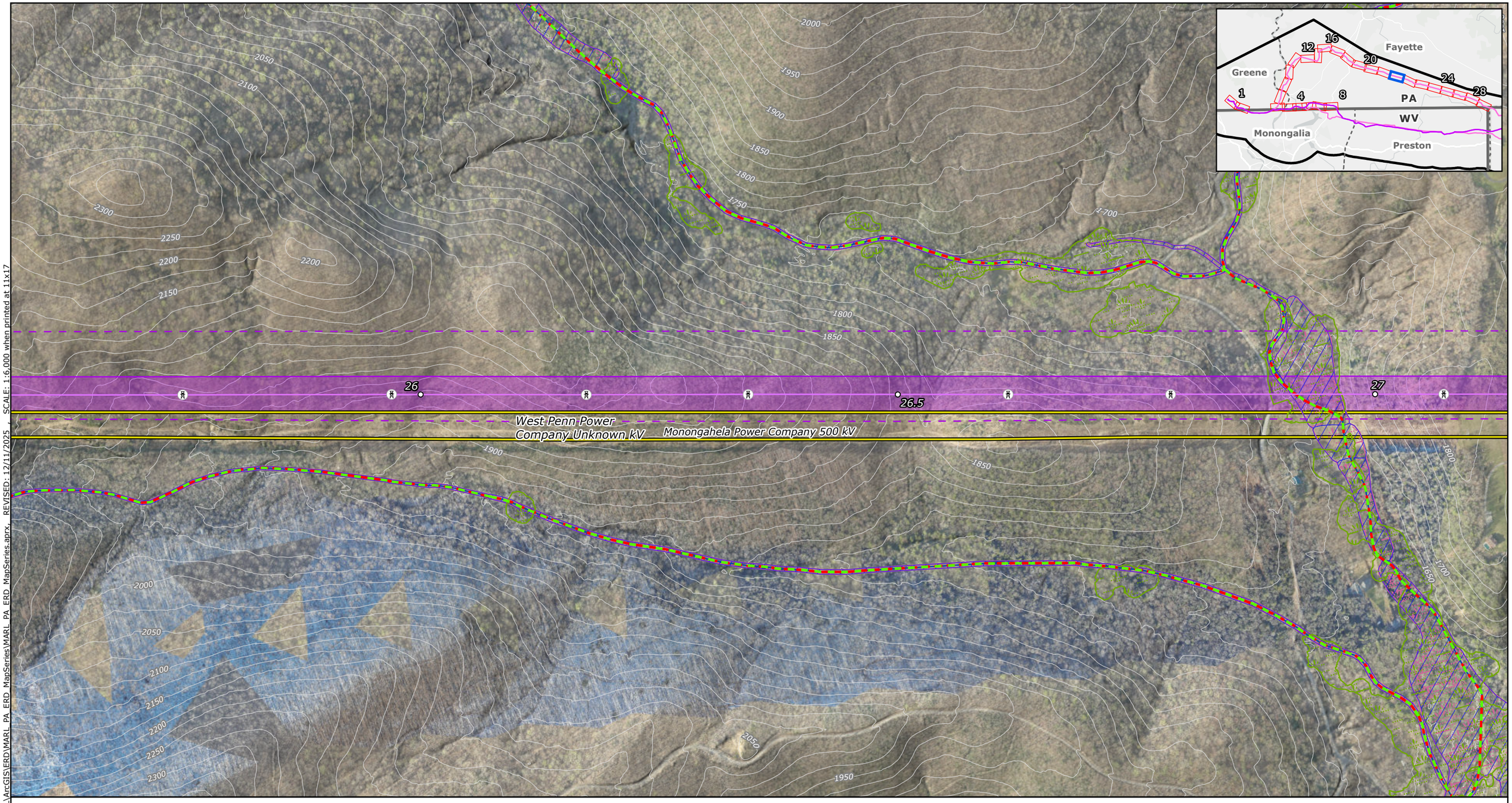

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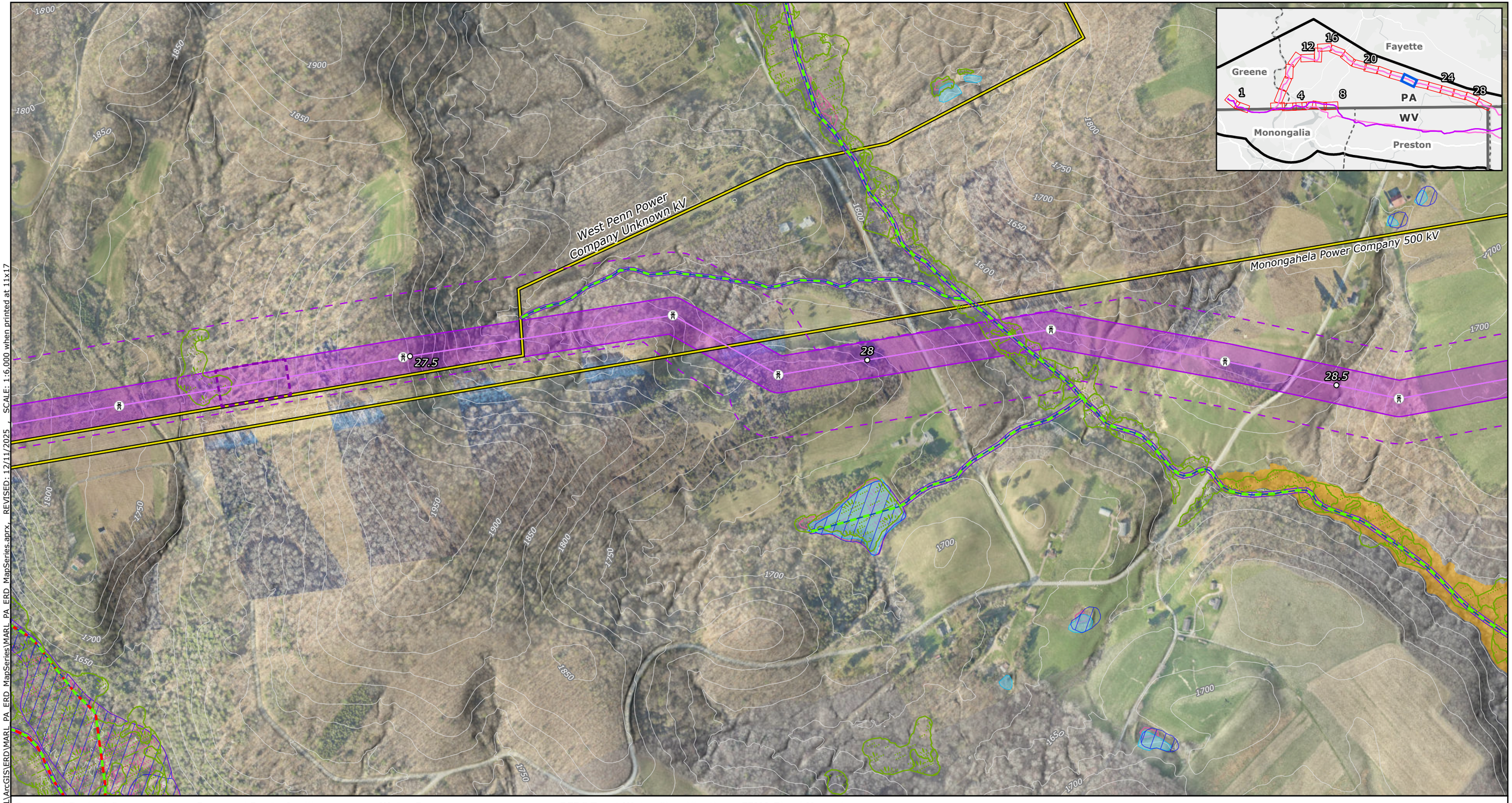

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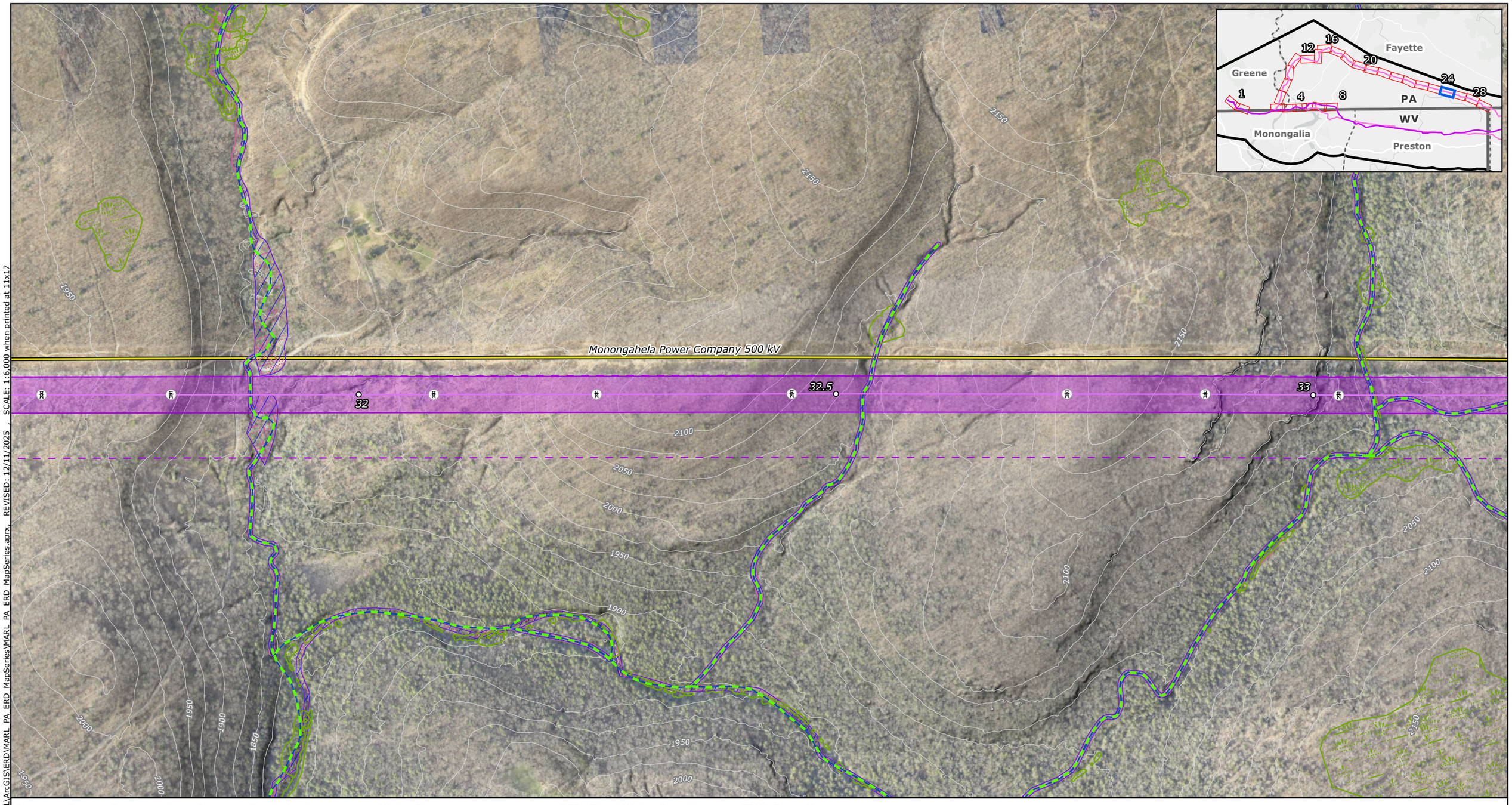

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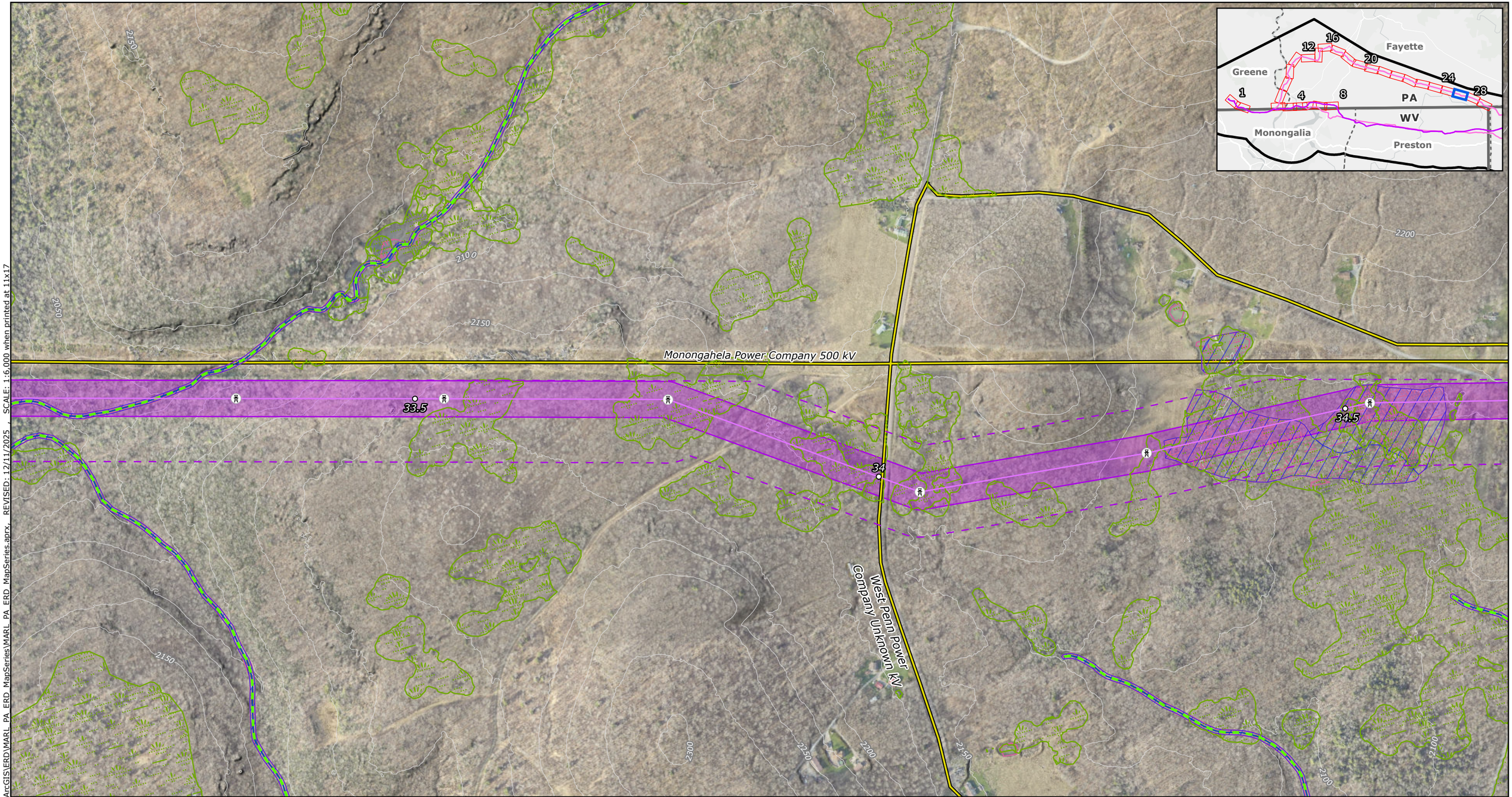

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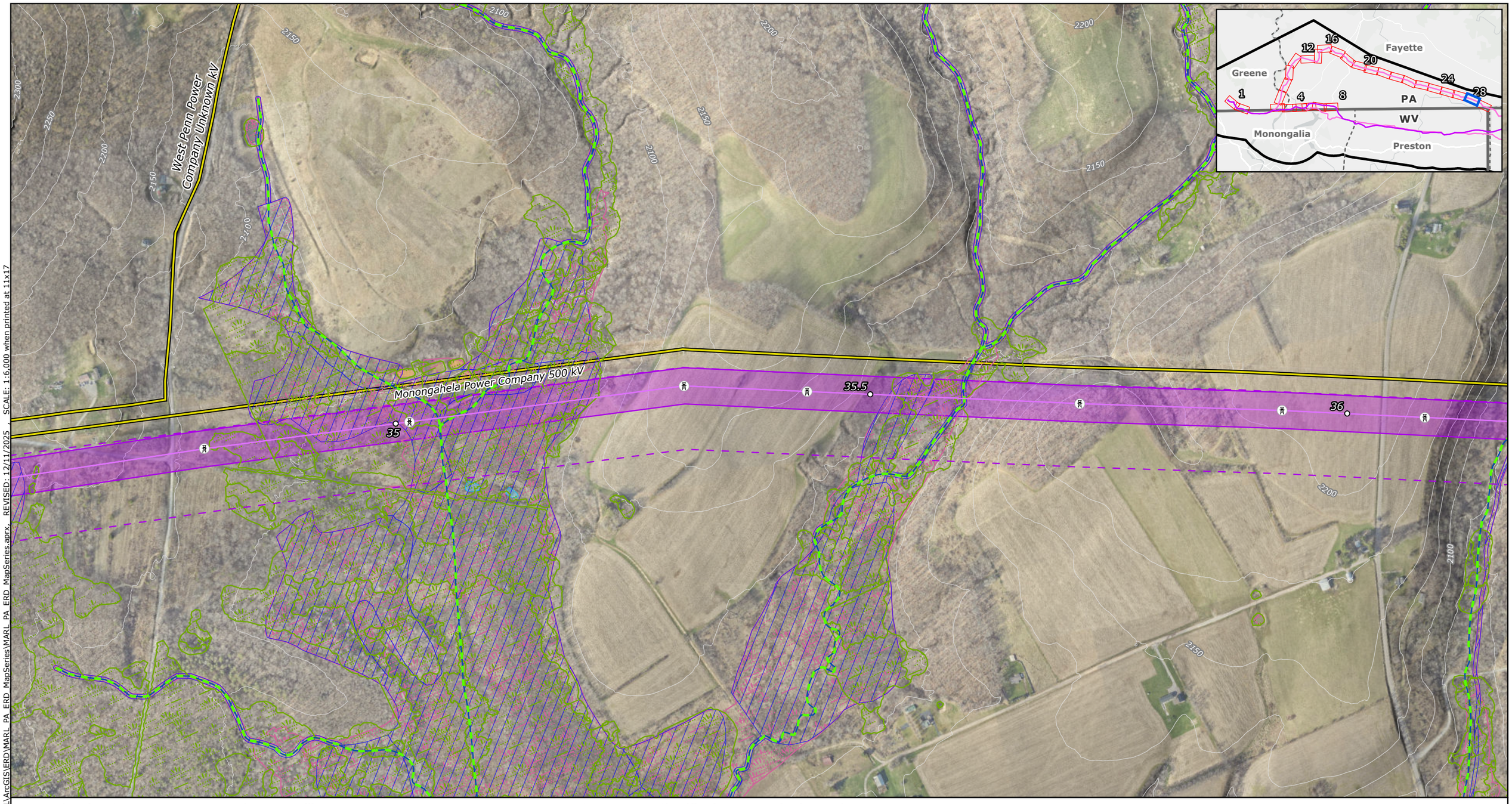

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- Aerial Easement Blowout Area
- Siting Corridors
- Riparian Habitat Exclusion Zone

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
- PASDA Wetlands
- NHD Waterbody
- NWI Wetlands
- High Probability Modeled Wetlands
- Section 10 Navigable Waters
- NHD Flowline

PFBC Trout Water Classification
- Naturally Reproducing Trout Streams
- Wilderness Trout Streams
- Stocked Trout Streams

Designated Use Streams
- Coldwater Fishes
- High Quality Coldwater Fishes
- Warm Water Fishes
- Trout Stocking

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
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5. *Data source: NEET, ERM, FEMA, USGS NHD, USFWS NWI, PASDA, PA DEP*

N

0 250 500 750 1,000
US Feet
Scale: 1:6,000
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Attachment 1c
Water Resources Mapbook
Page 27 of 28
MidAtlantic Resiliency Link

ERM

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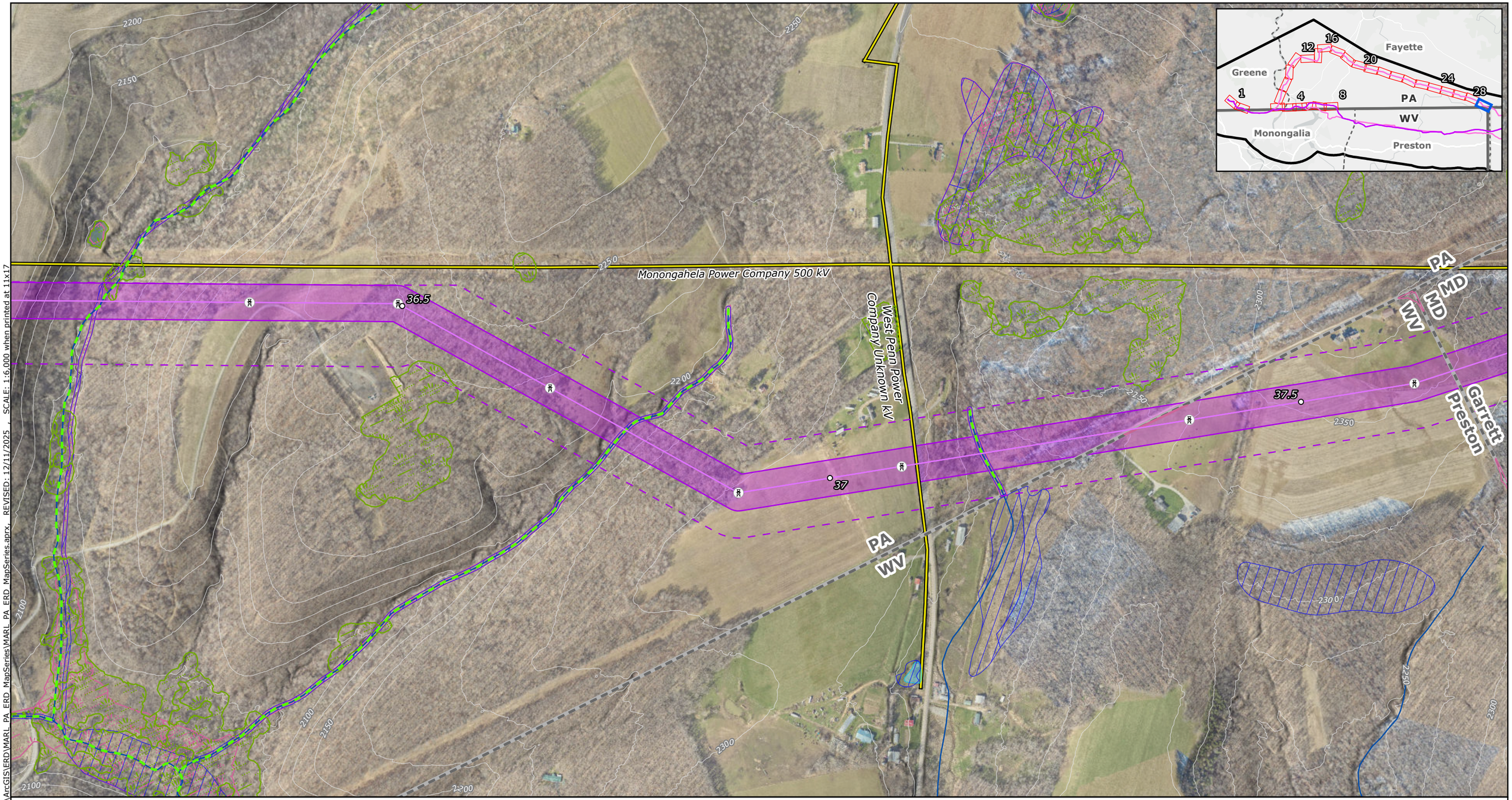
Coordinate system: NAD 1983 UTM Zone 17N



Proposed Project Components
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Water Resources Mapbook
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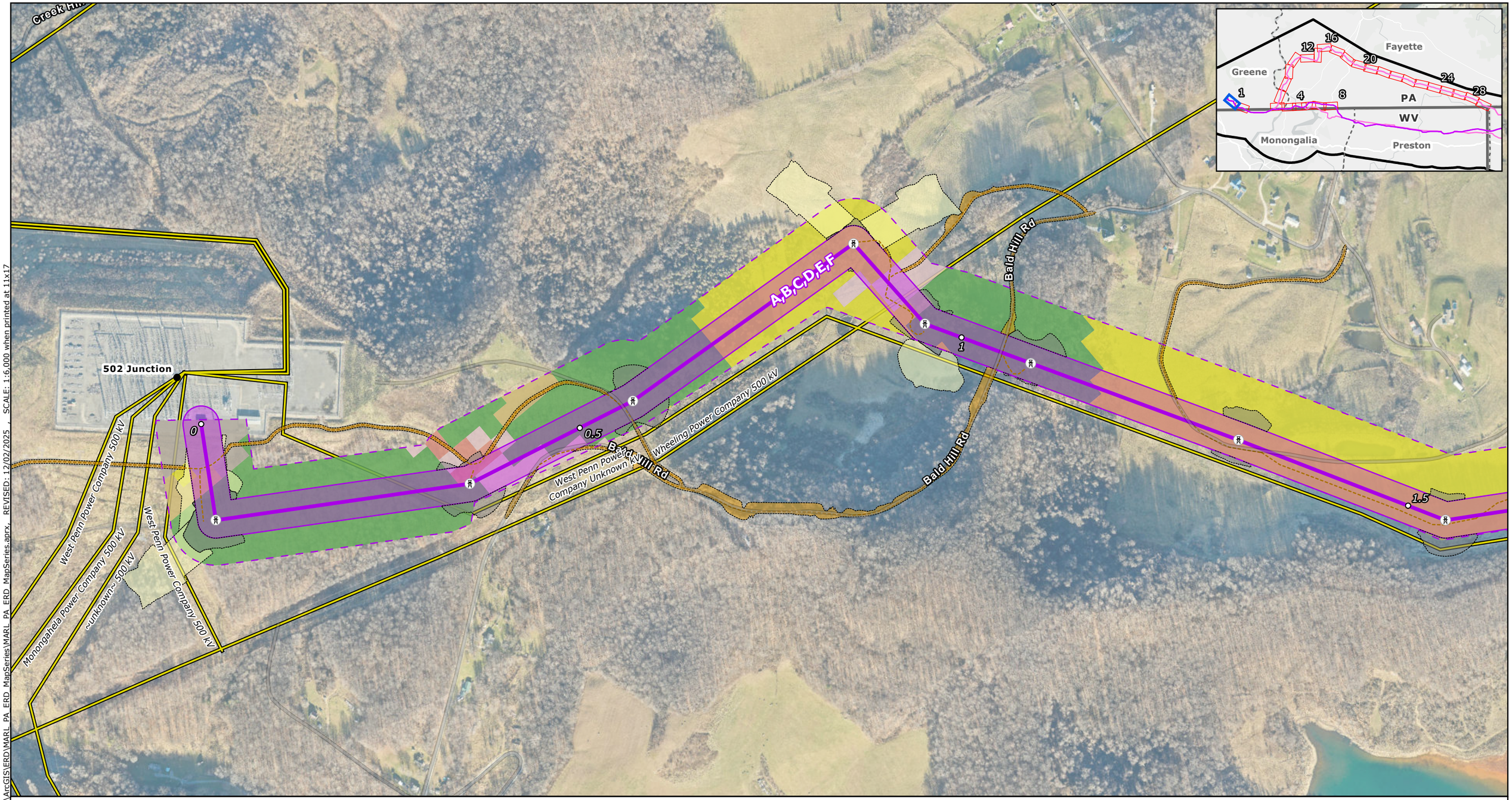
ATTACHMENT 1D LAND USE MAPBOOK



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Land Cover Mapbook
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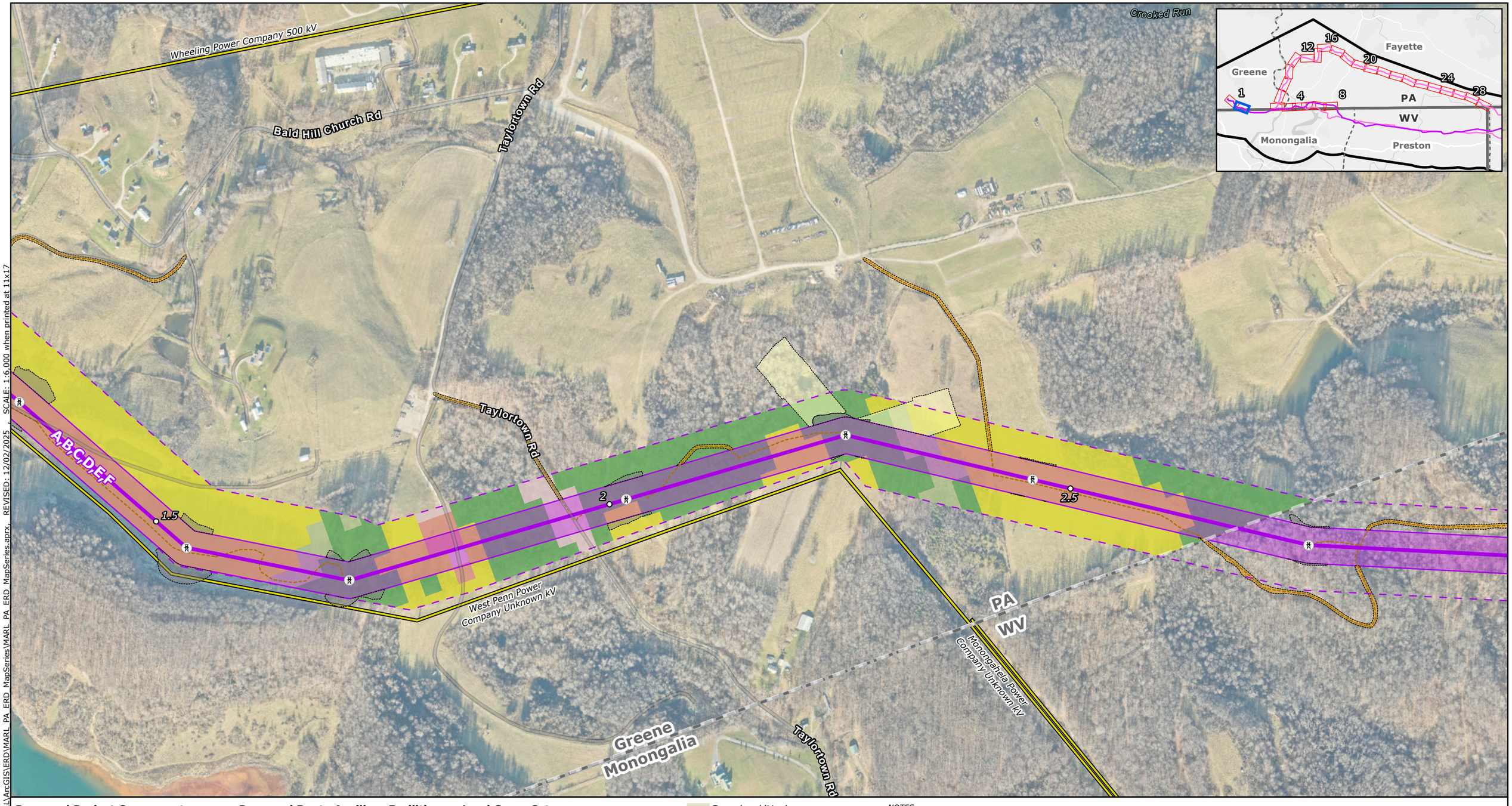

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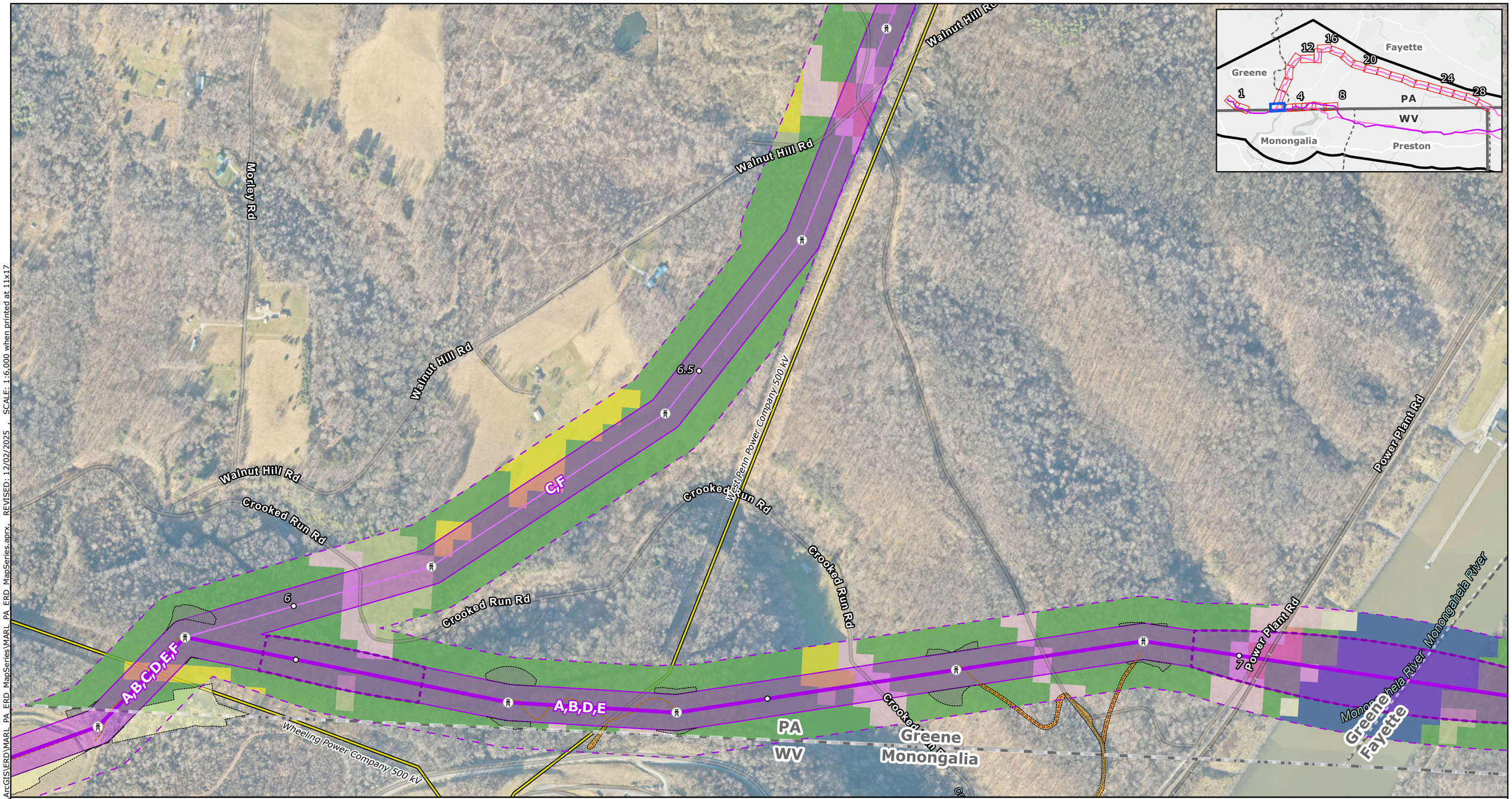

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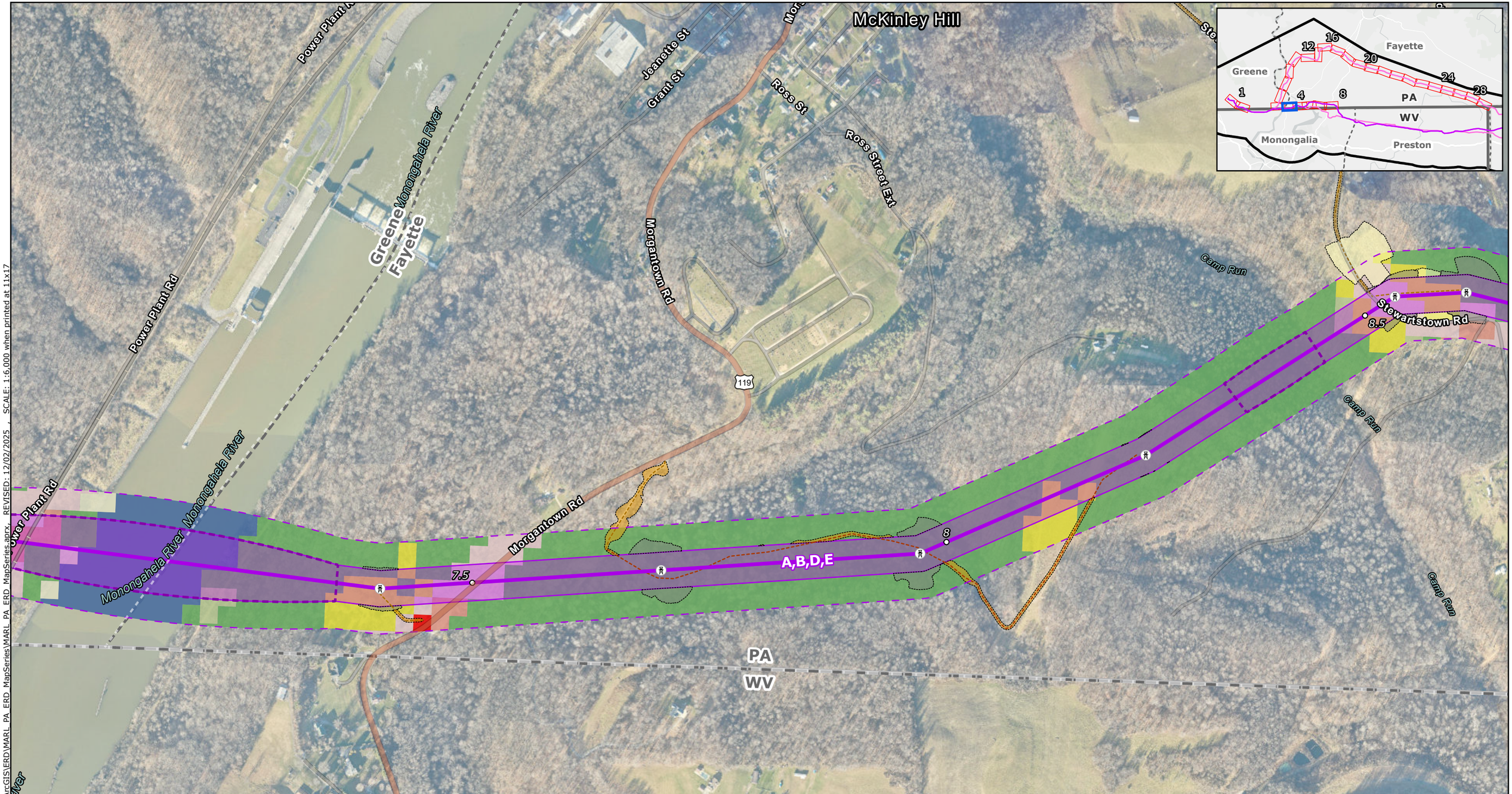

Proposed Project Components
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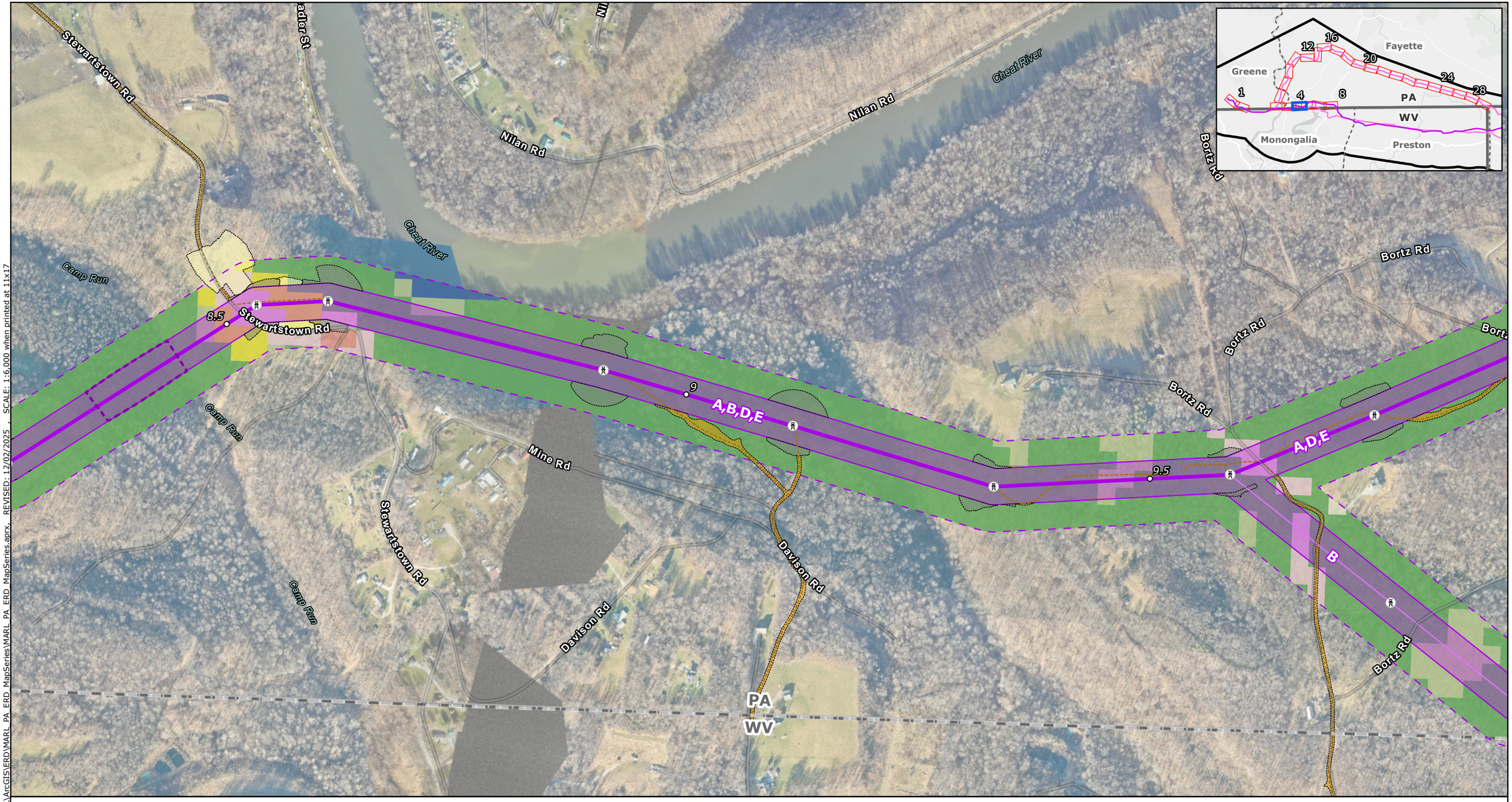

Proposed Project Components
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Page 5 of 28
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ERM

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Page 6 of 28
MidAtlantic Resiliency Link

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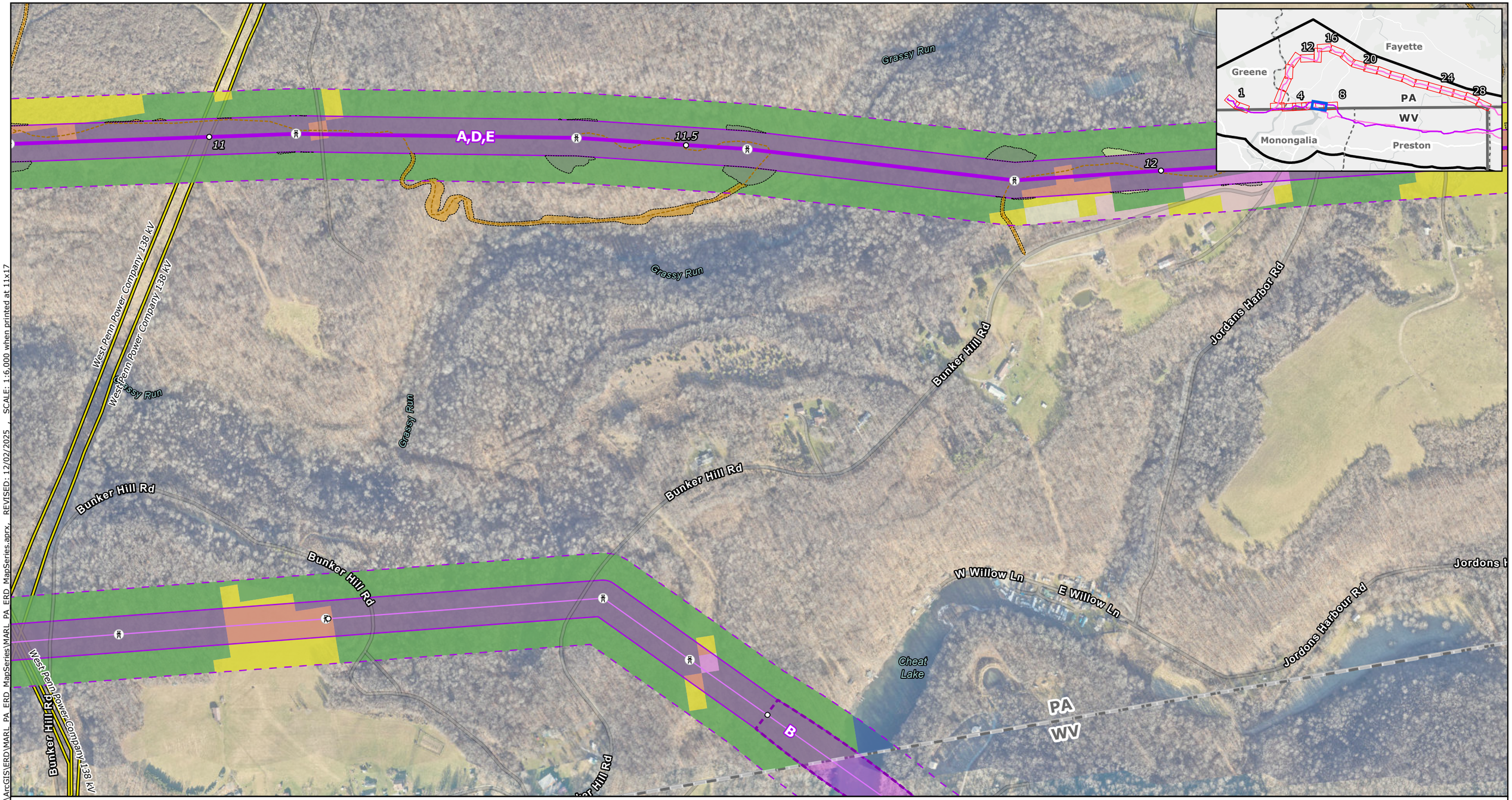

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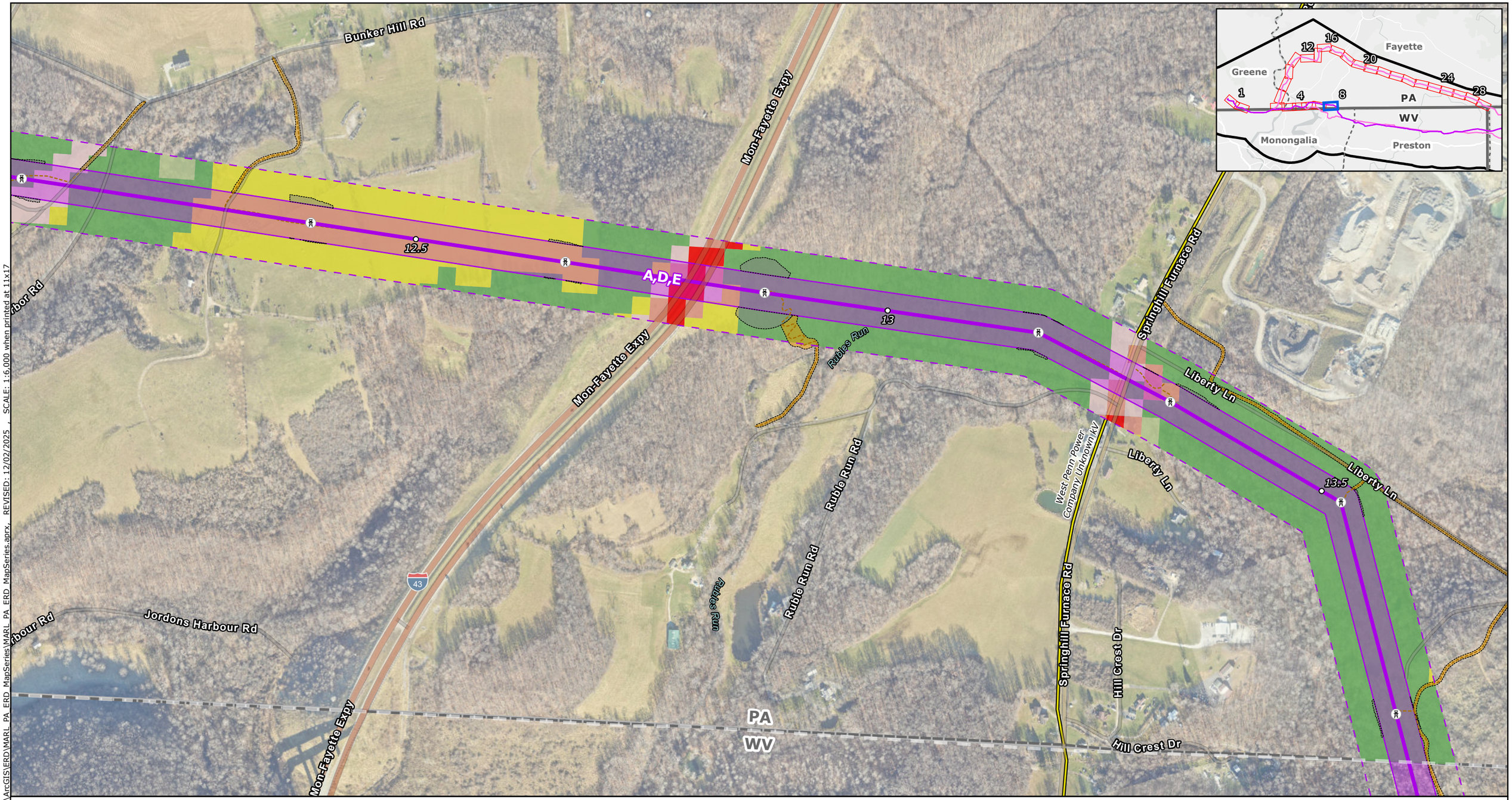

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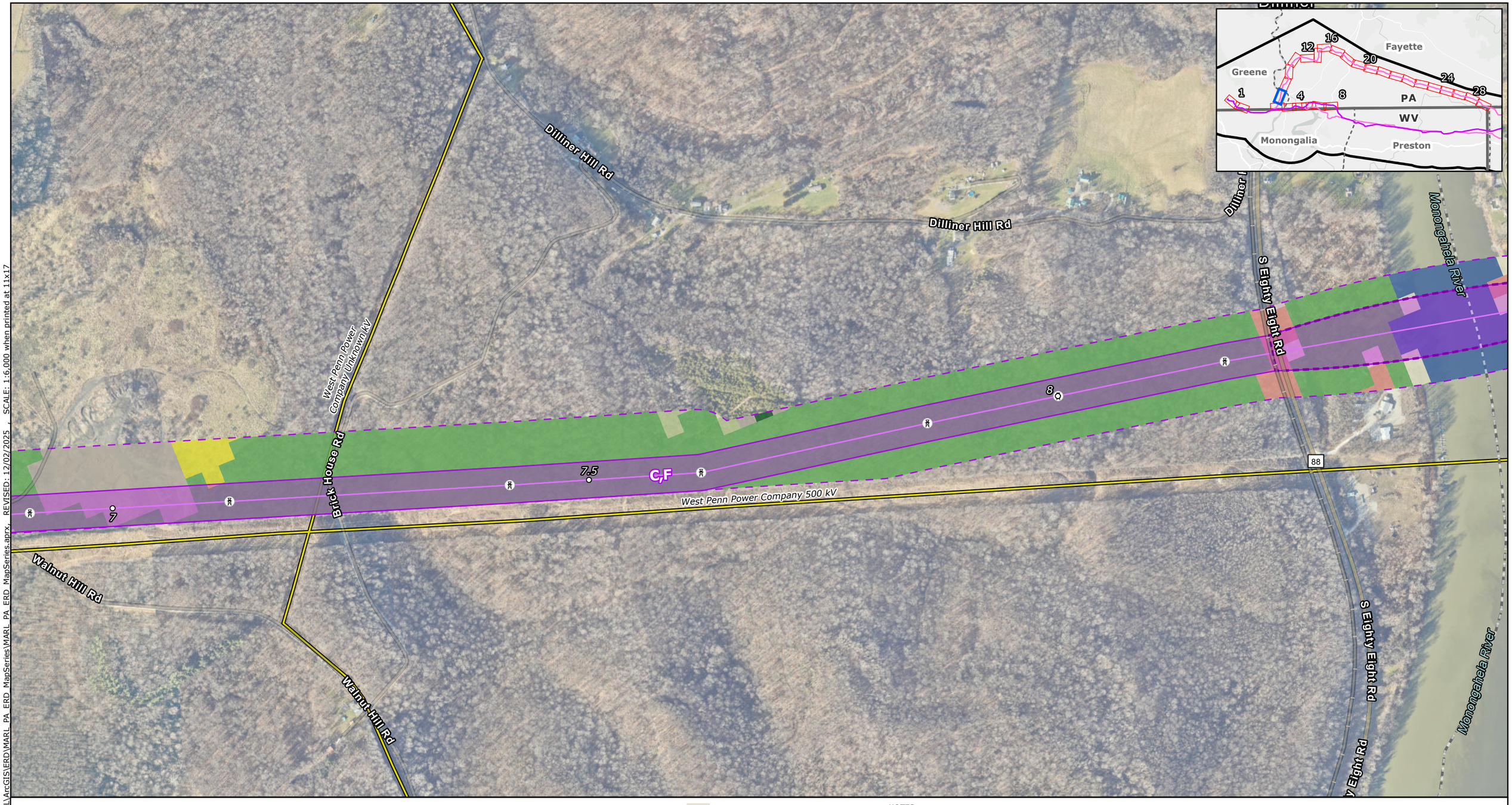

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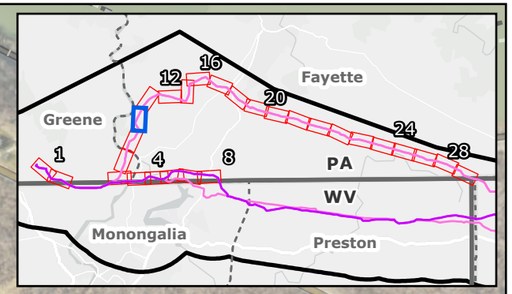

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ERM

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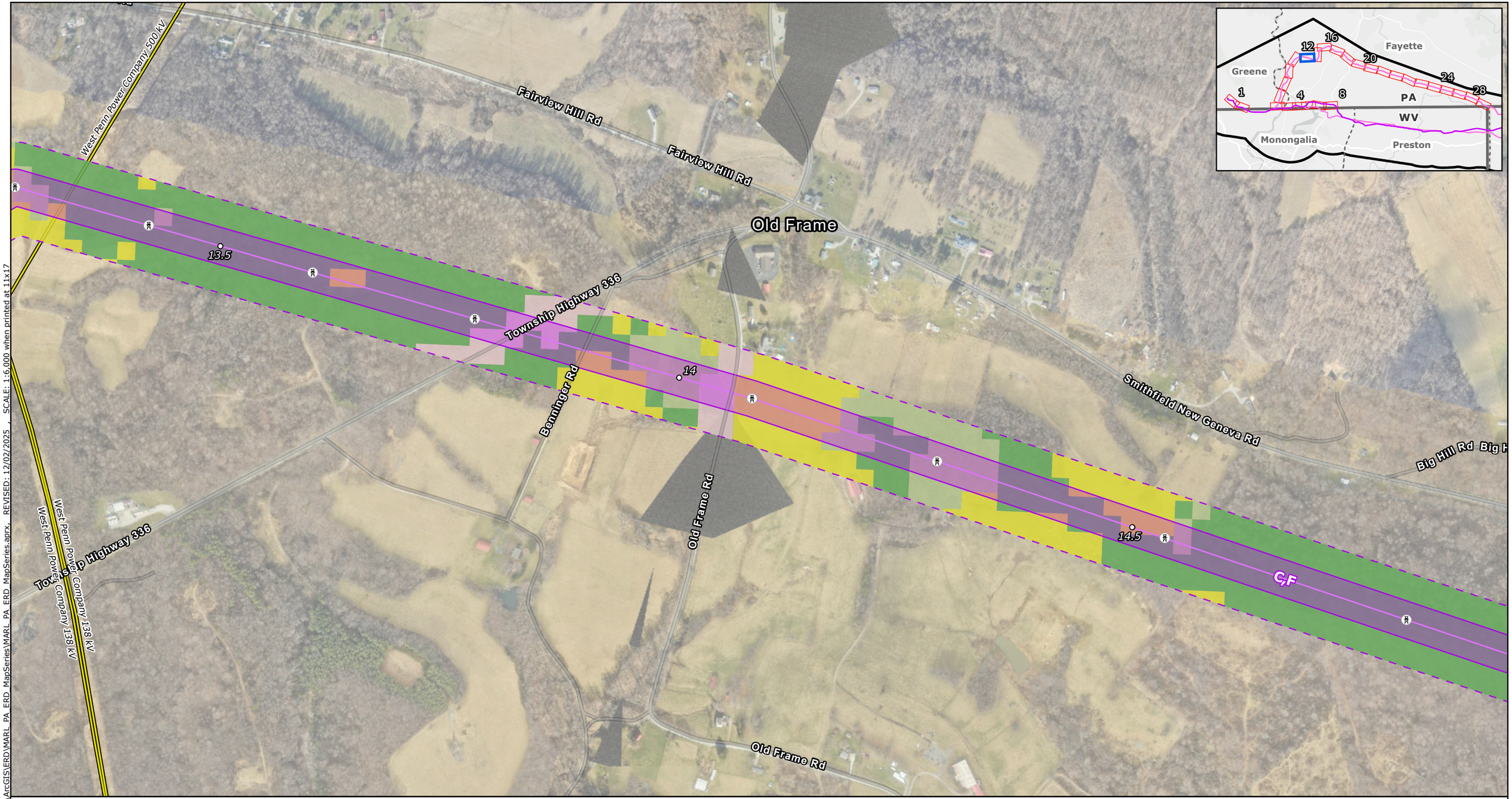

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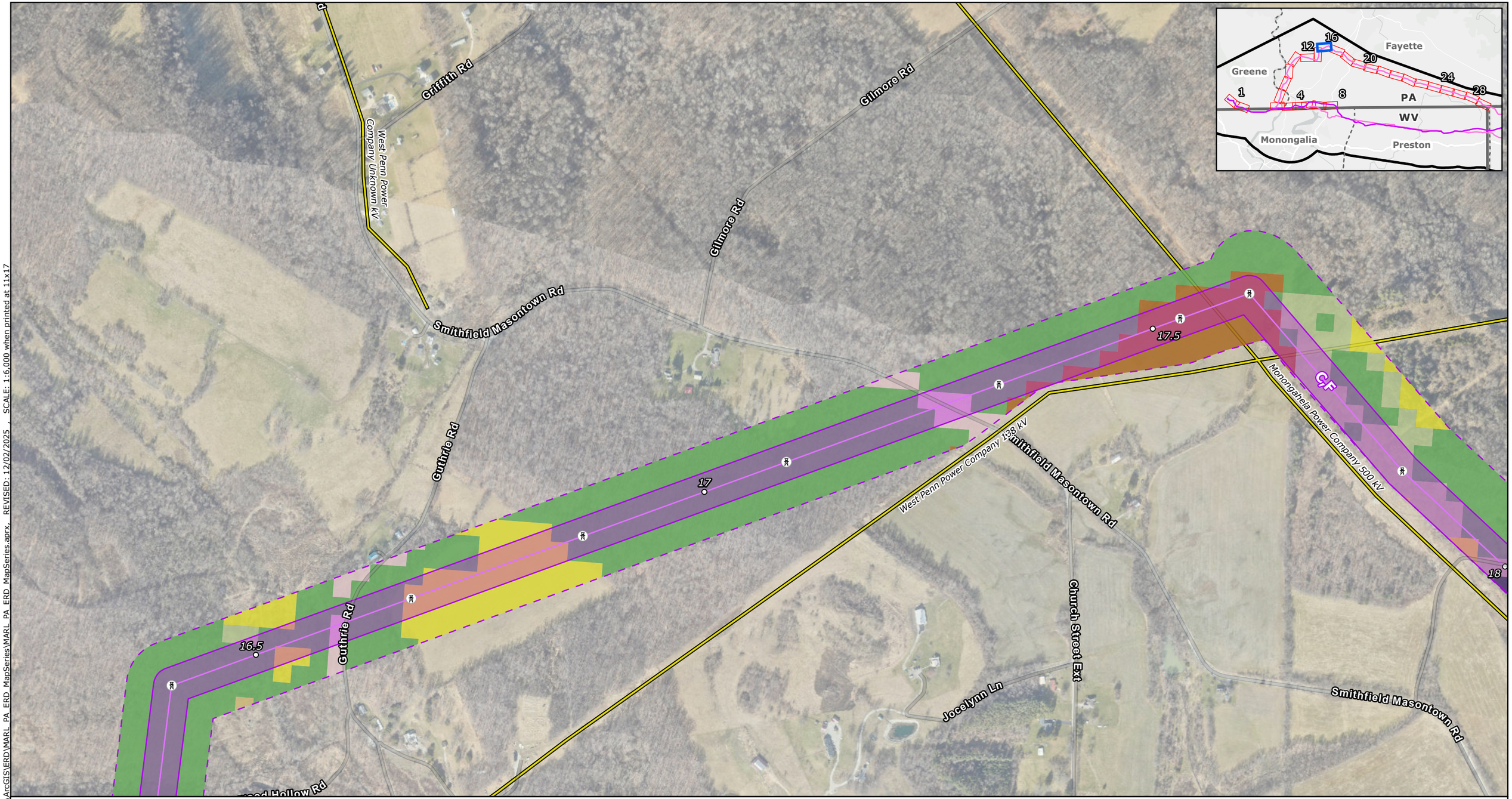

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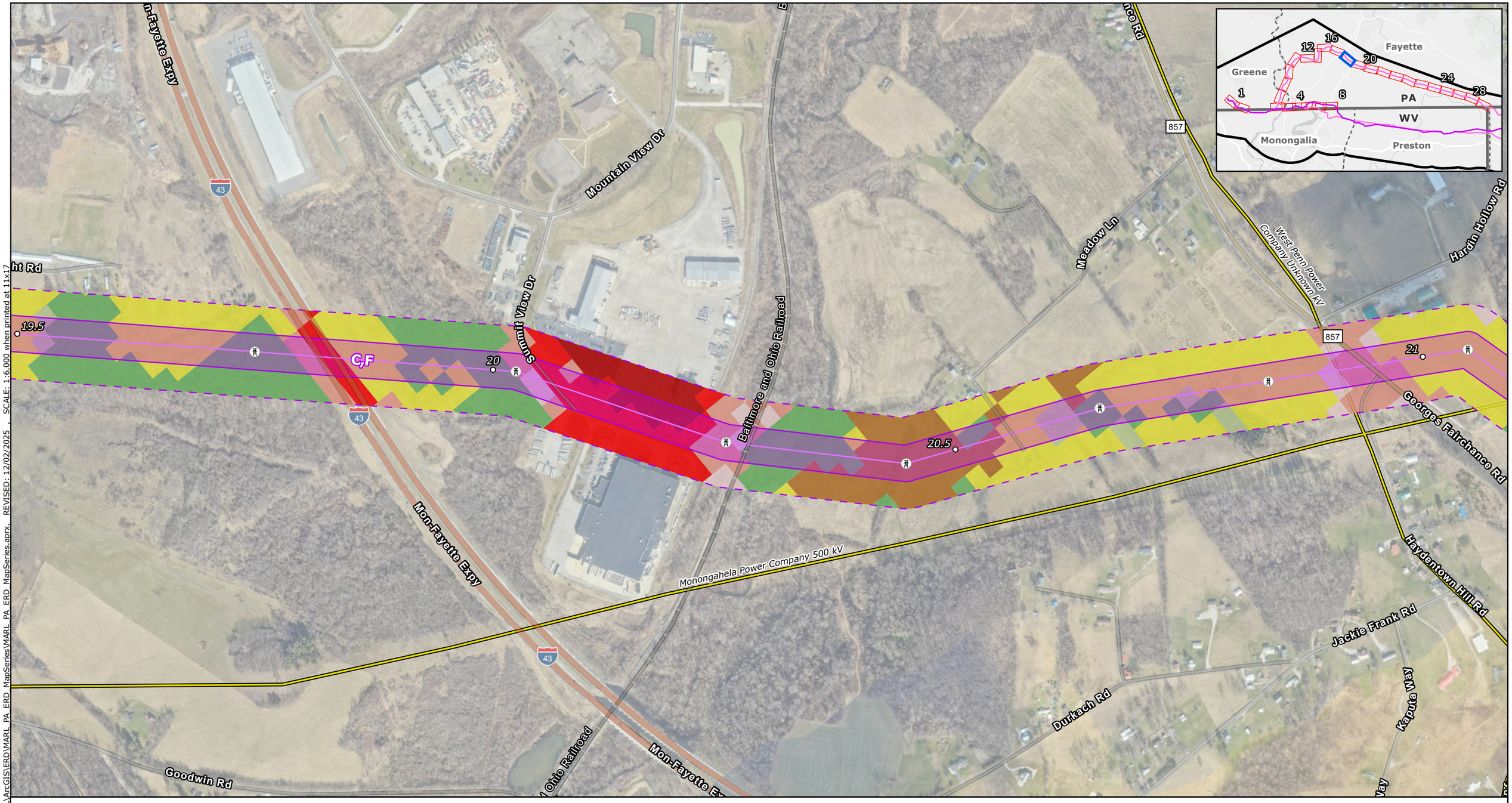

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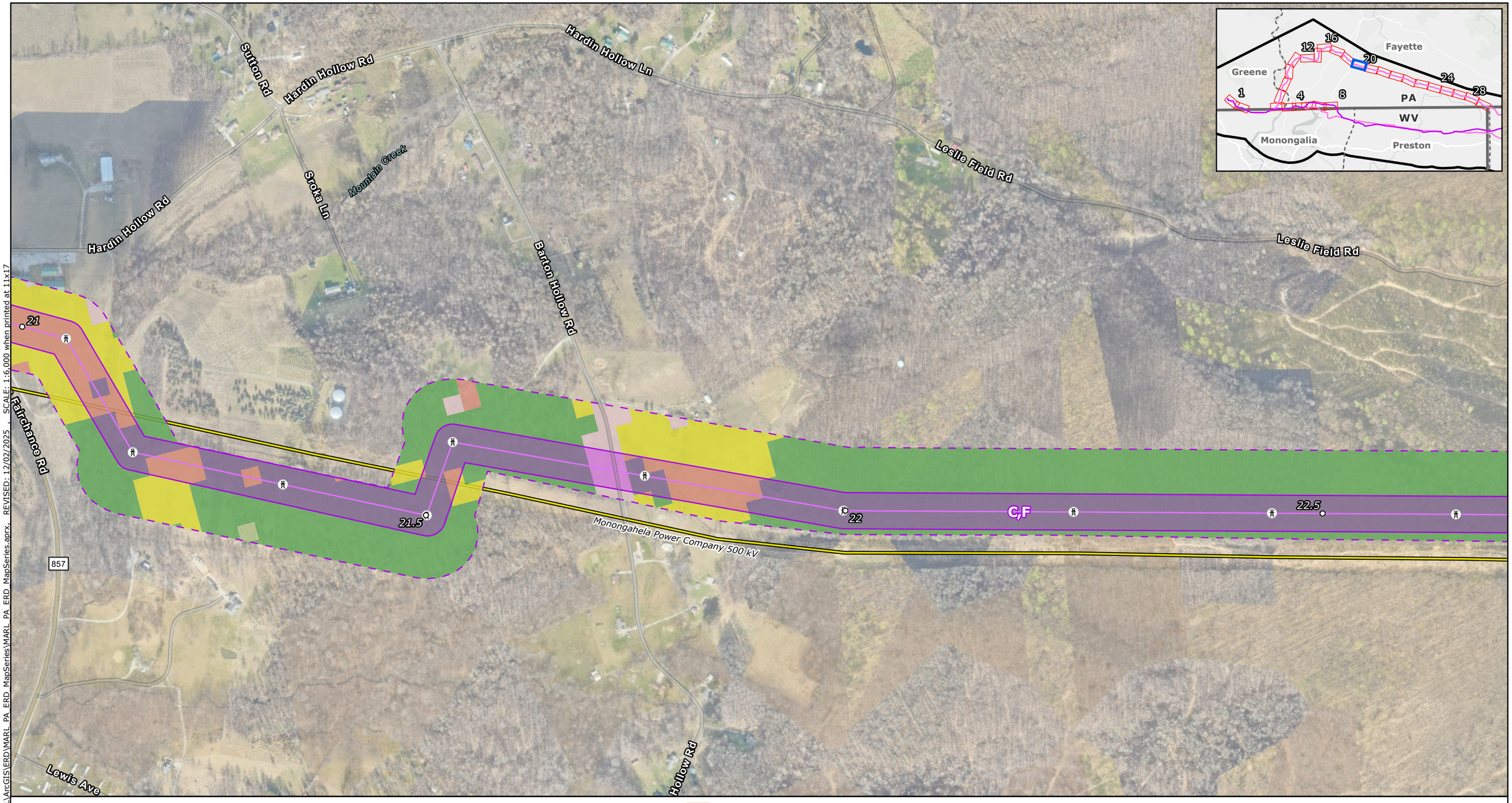

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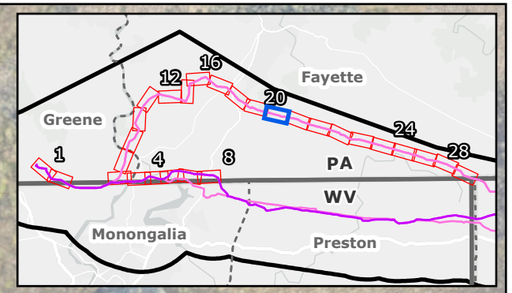

Leslie Field Rd

23

C,F

23.5

24

Monongahela Power Company 500 kV

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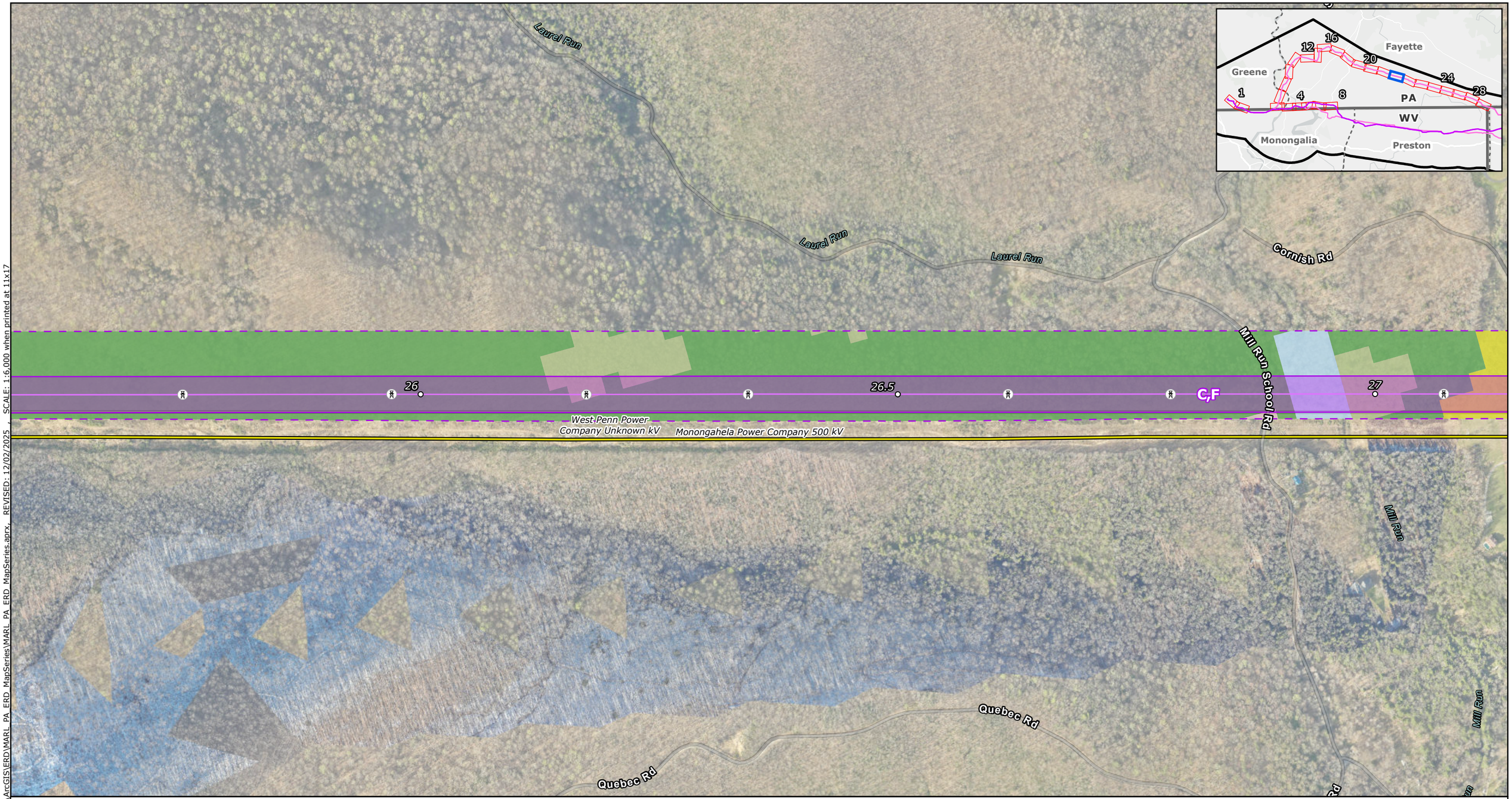

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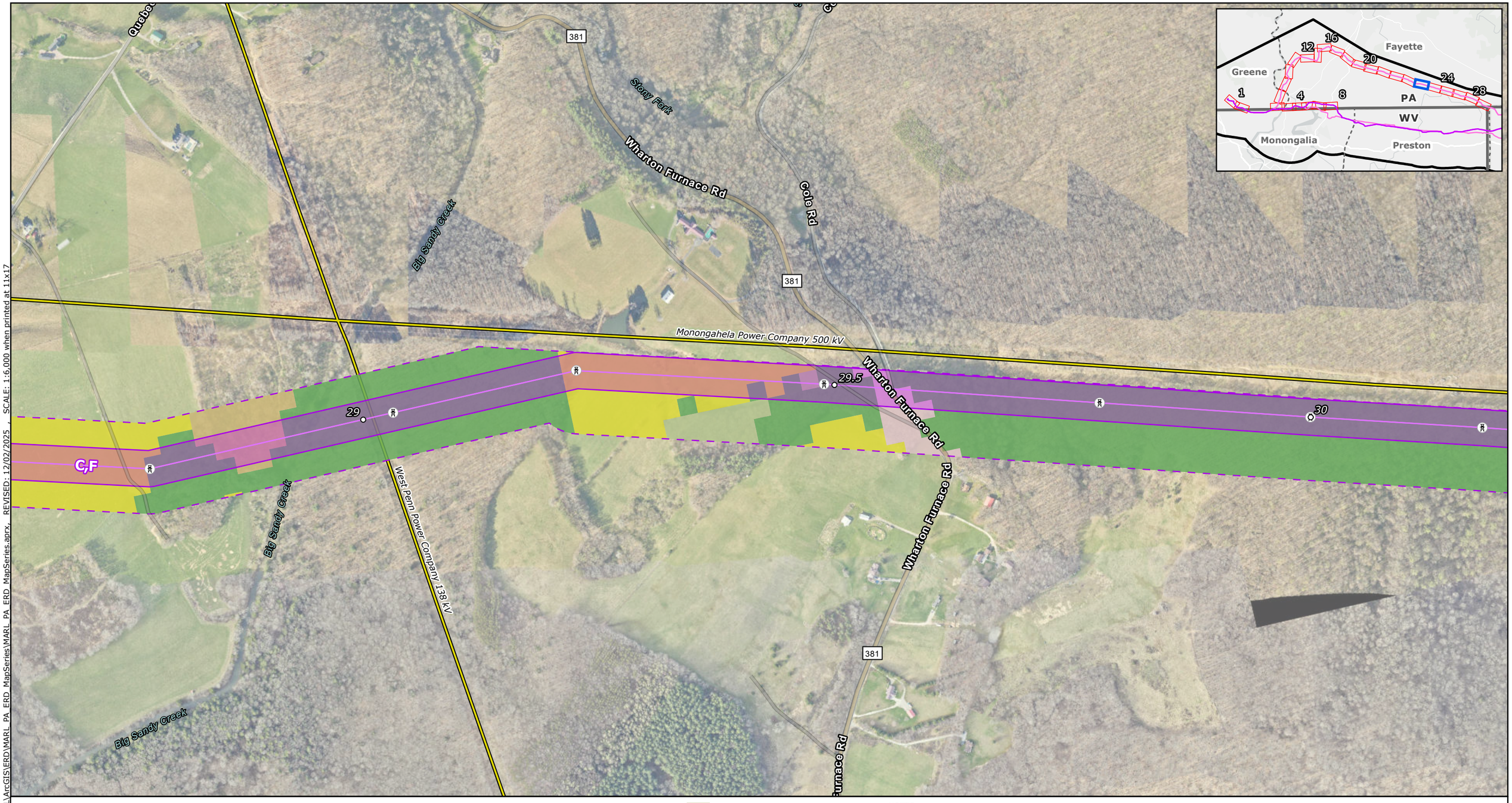

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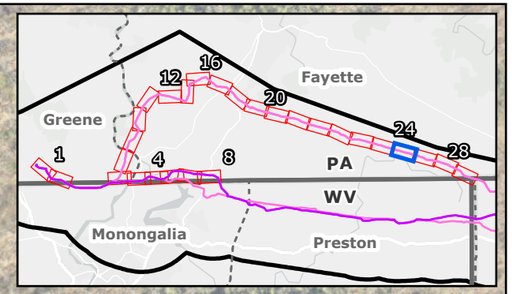

Monongahela Power Company 500 kV

C,F

32

32.5

33

Memorial Dr

Fike Run

Little Sandy Creek

Fike Run

orial Dr

Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Alternative Route Centerlines
- ROW Corridors
- Aerial Easement Blowout Area
- Siting Corridors

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Land Cover Category
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
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N

0 250 500 750 1,000

US Feet

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Attachment 1d
Land Cover Mapbook
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MidAtlantic Resiliency Link

ERM

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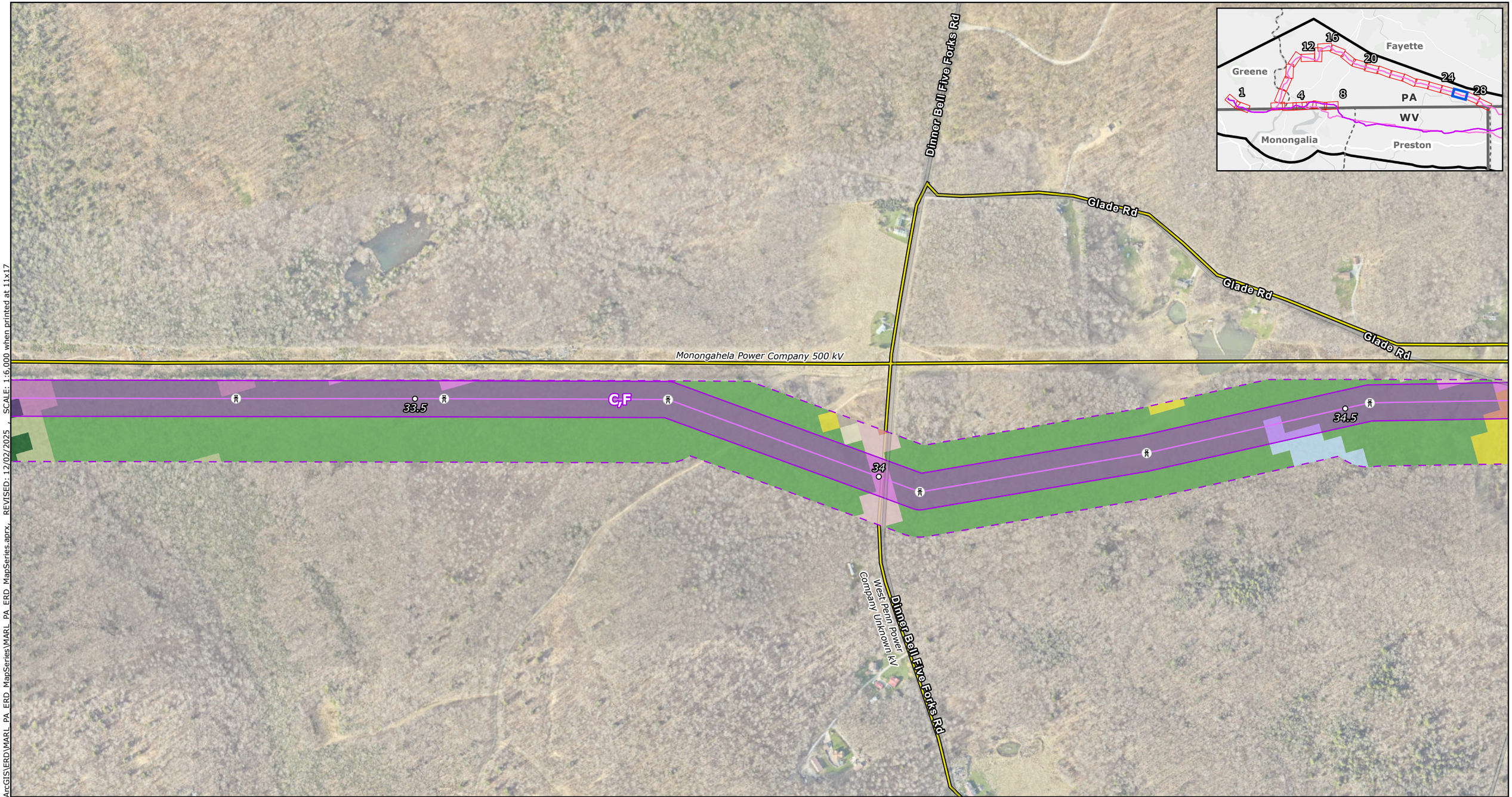

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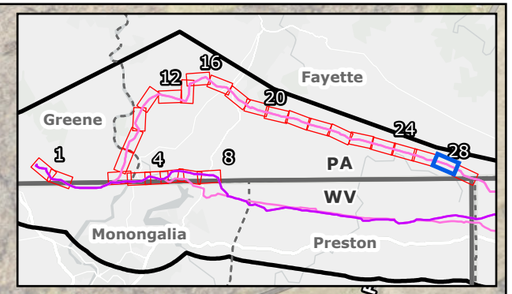

McCracken School Rd

West Penn Power Company Unknown kV

Monongahela Power Company 500 kV

C,F

35

35.5

36

Glade Rd

Guthrie Rd

Flat Rock Rd

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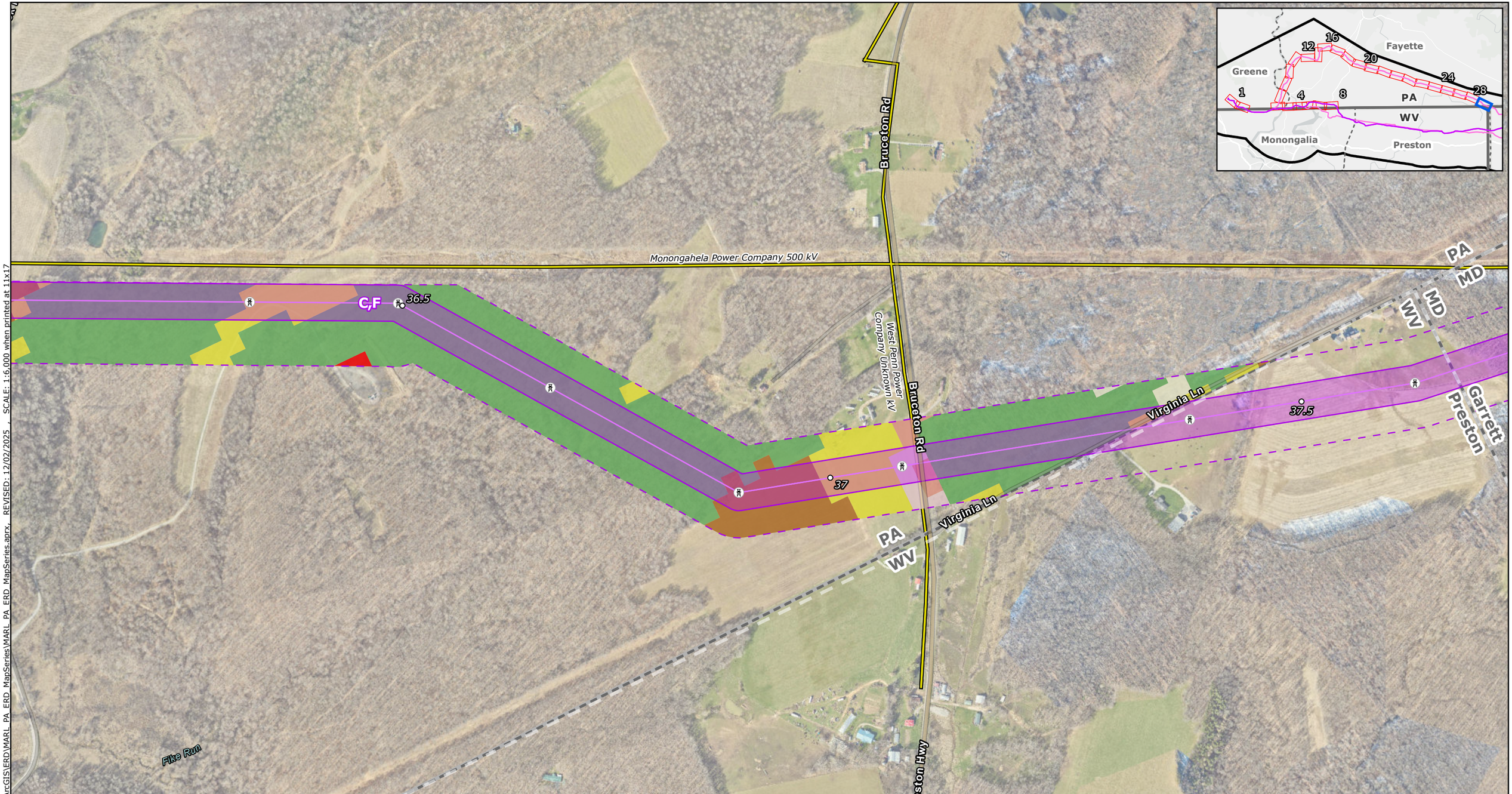

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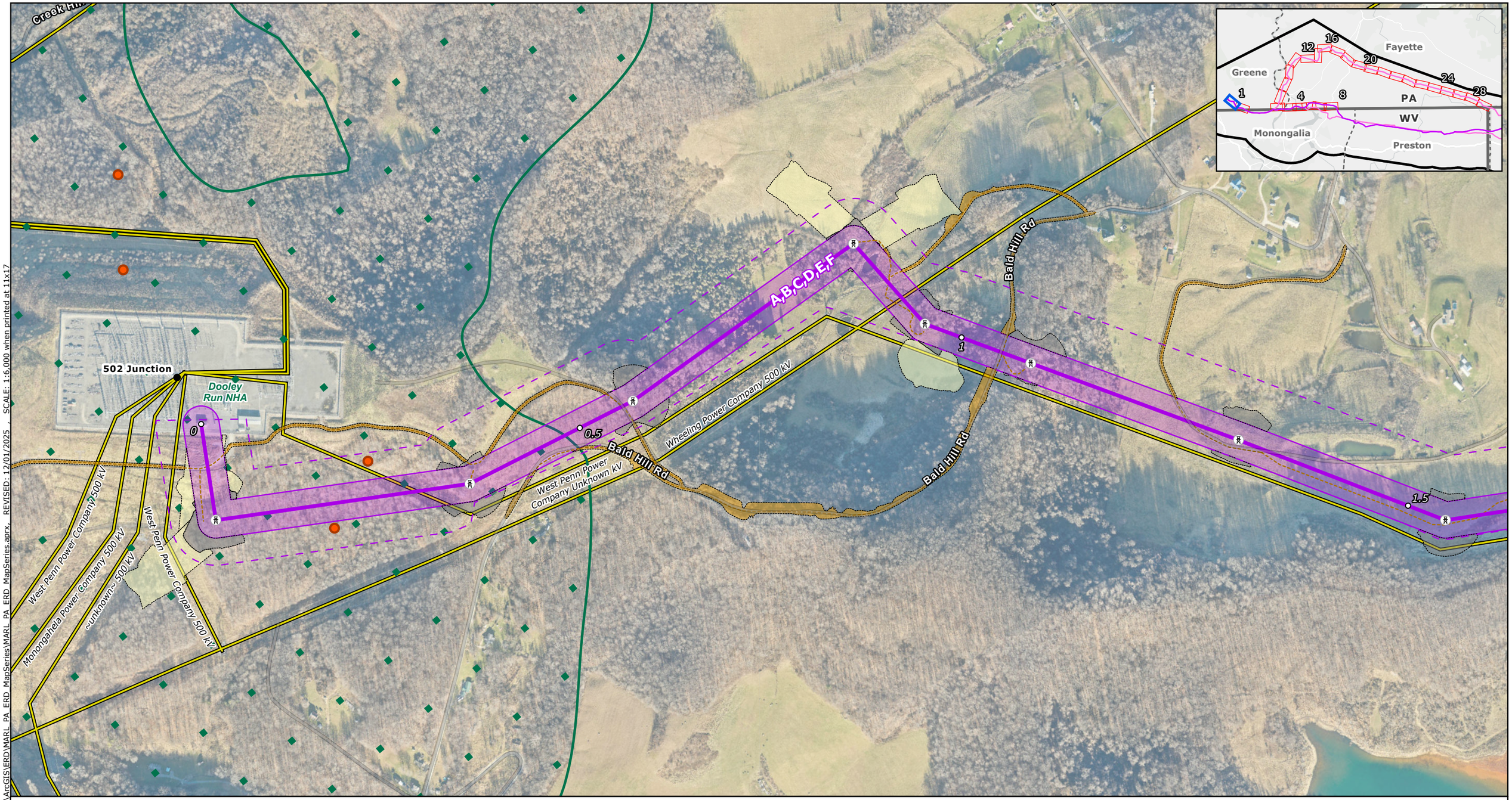
ATTACHMENT 1E ECOLOGICAL AND SENSITIVE SPECIES MAPBOOK



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Base Data
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Attachment 1e
Ecological and Sensitive Species Mapbook

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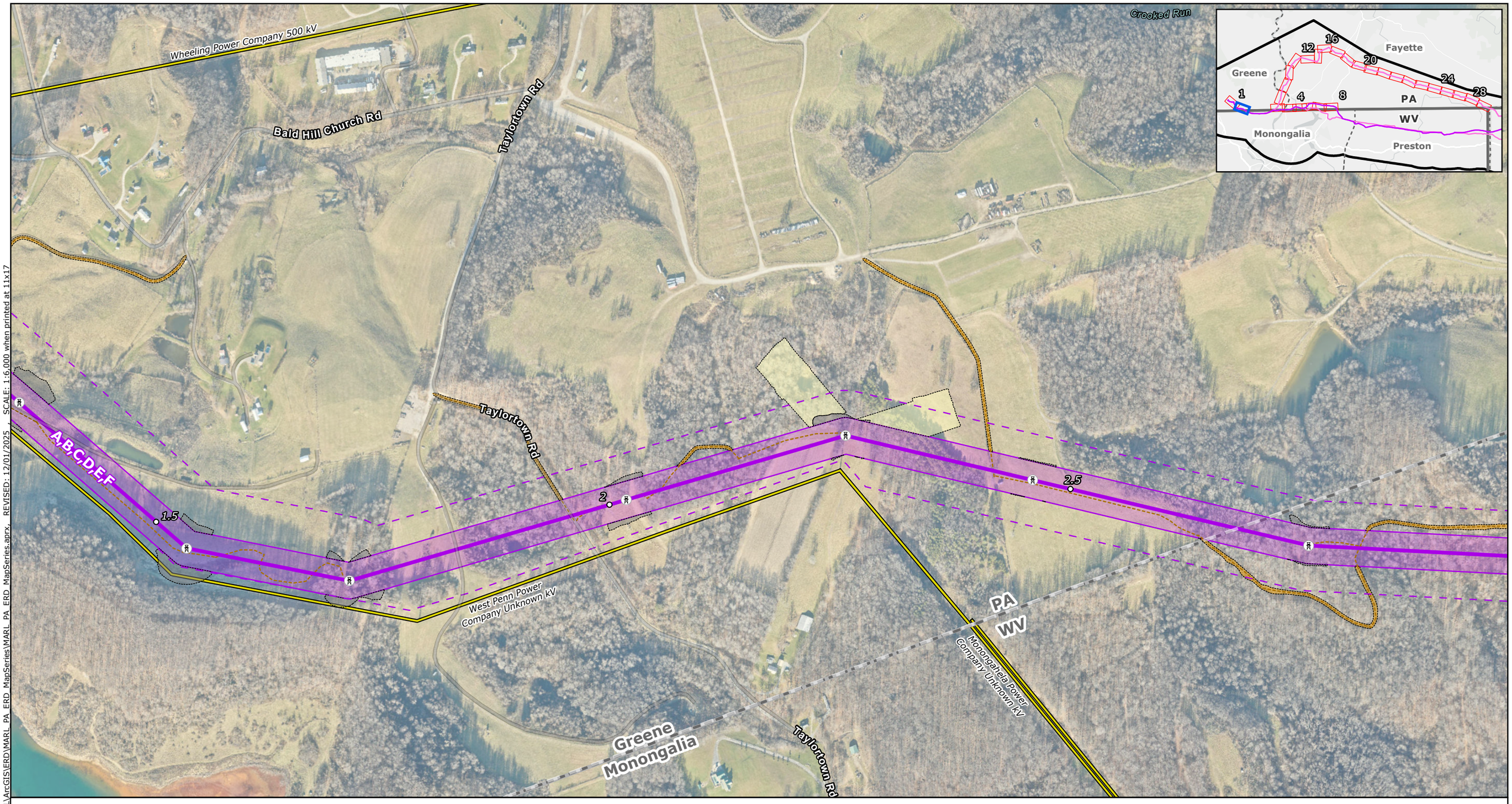

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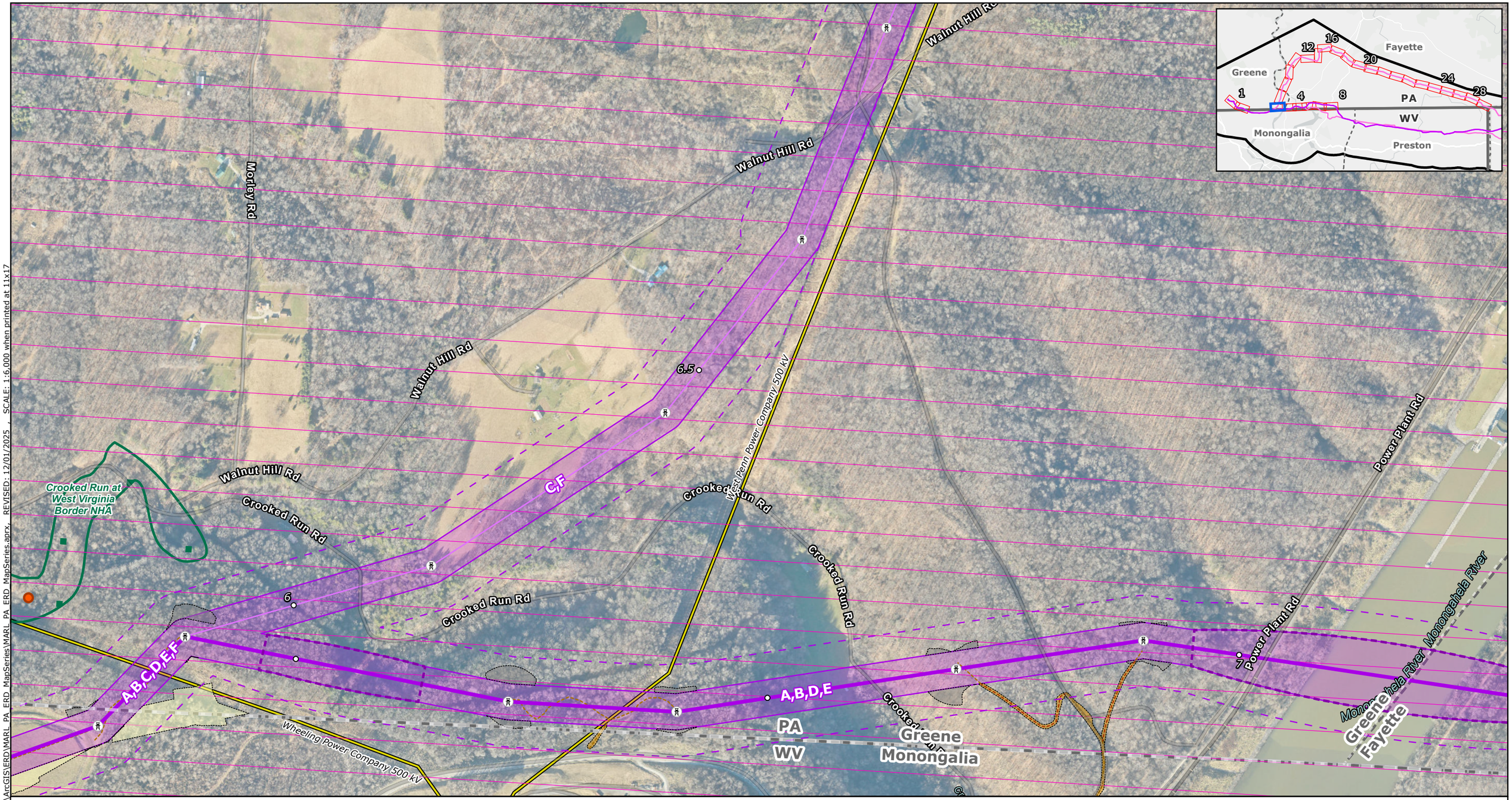

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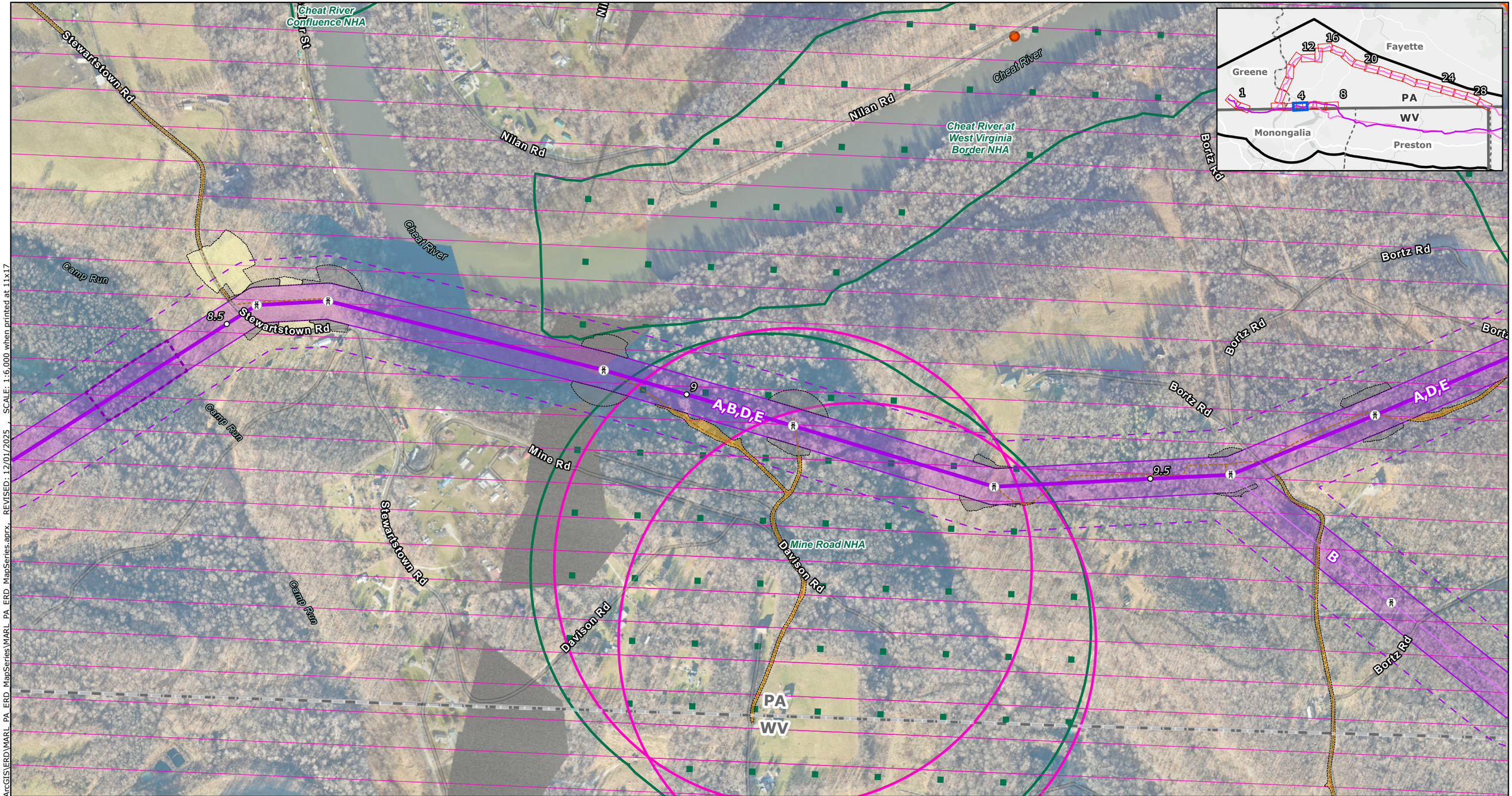

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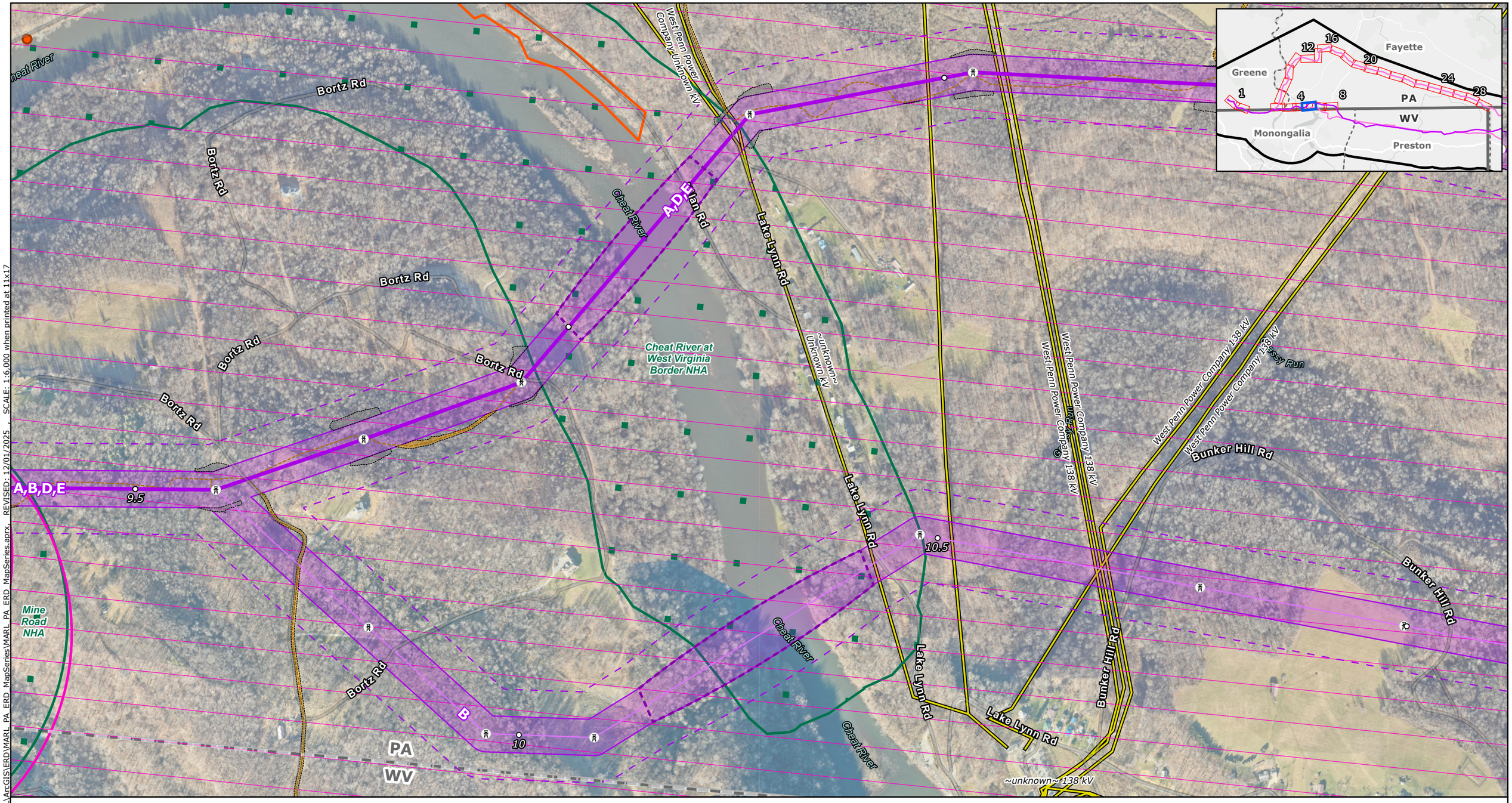

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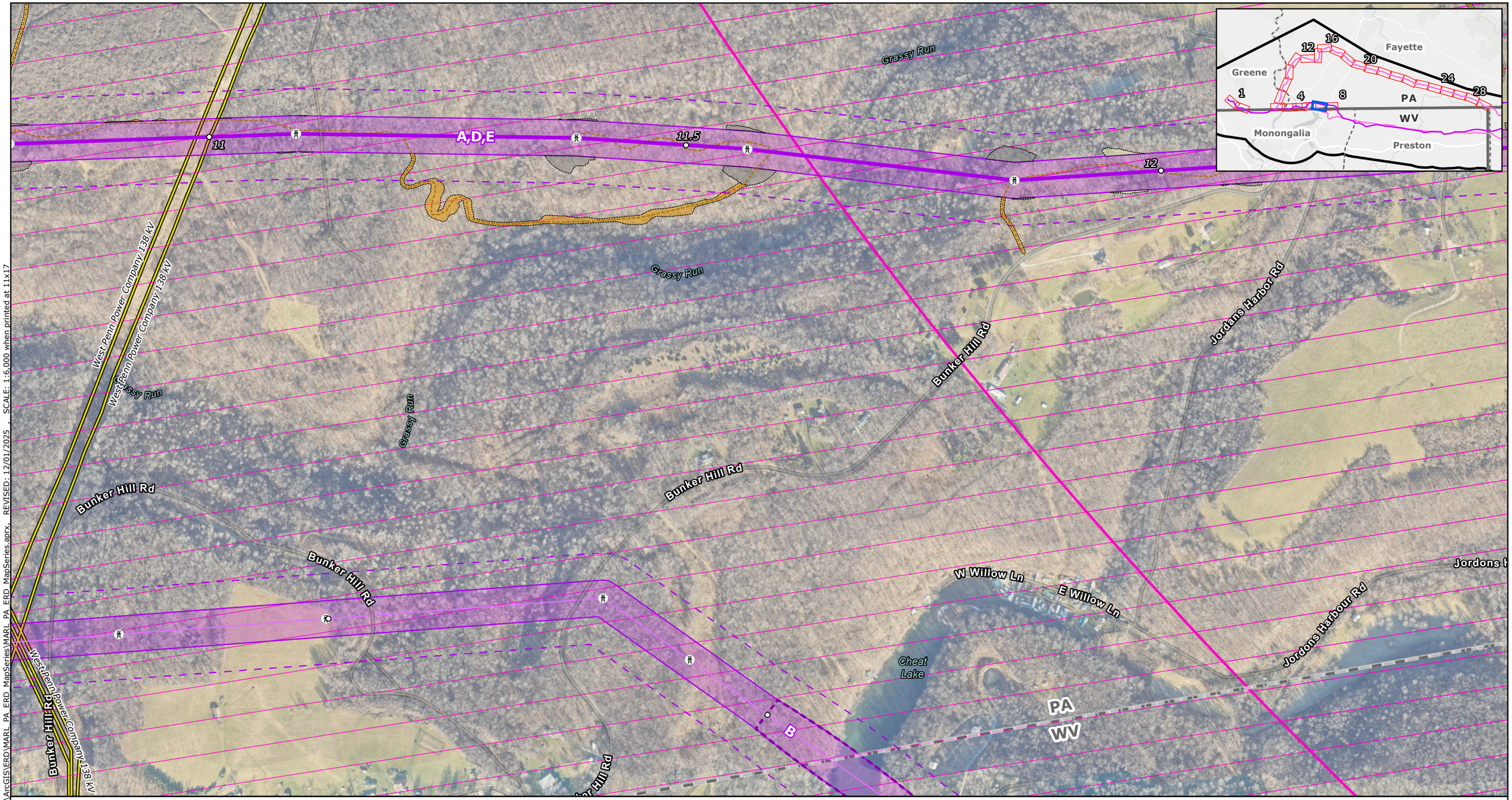

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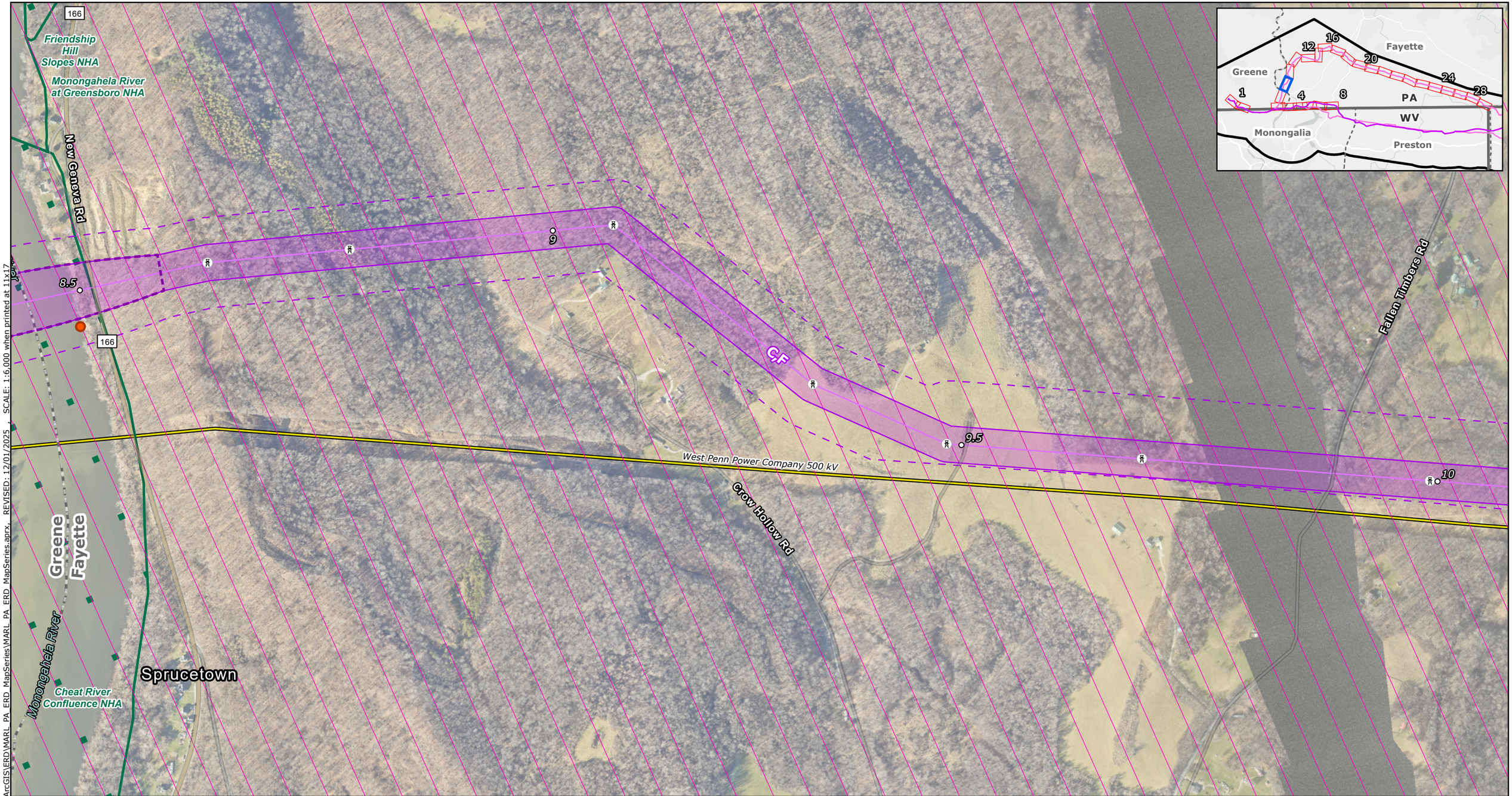

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Proposed Route Ancillary Facilities
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- Temporary Access Road
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- Wire Work Area LoD
- Structure Pad LoD

Base Data
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- County Boundary

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N

0 250 500 750 1,000
US Feet
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Attachment 1e
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ERM

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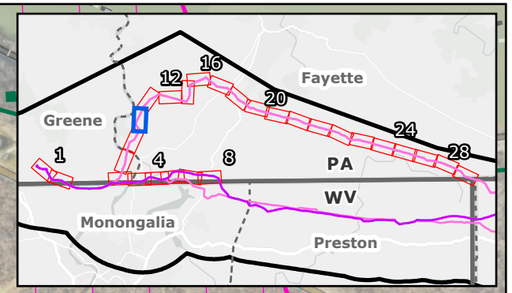

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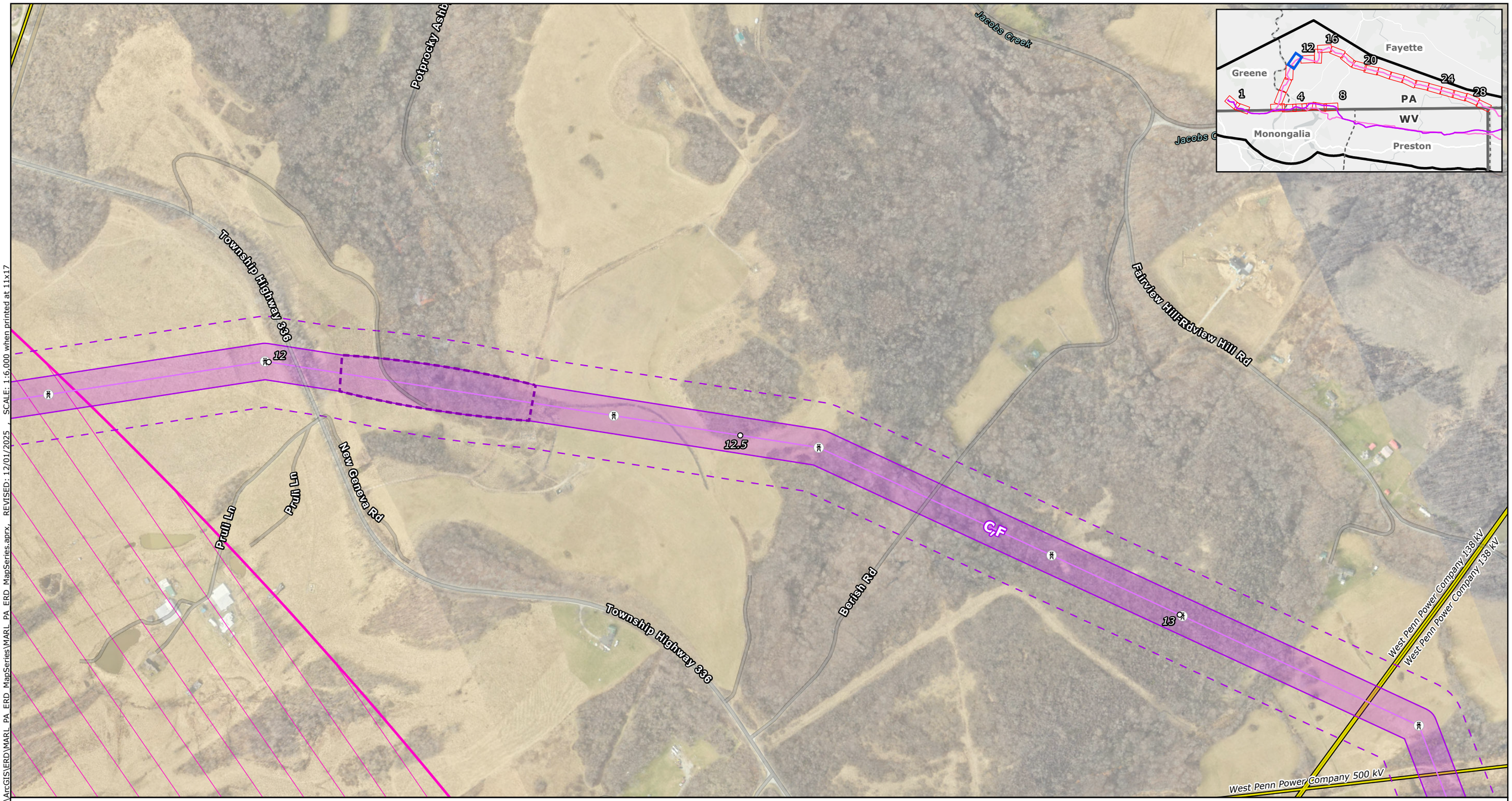

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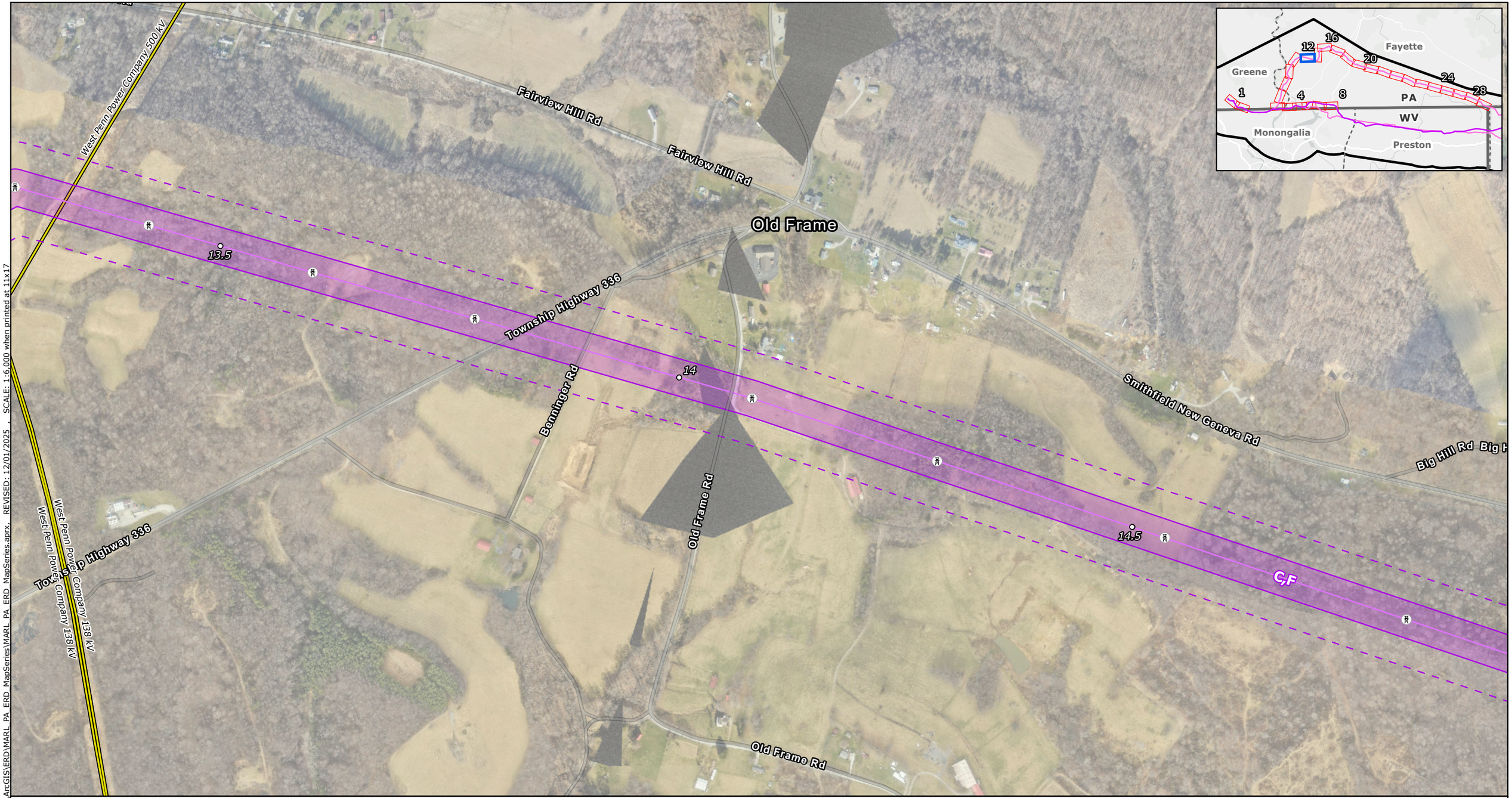

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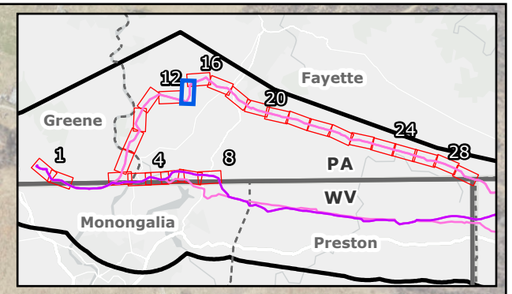

Bowood Rd
Big Hill Rd
Smithfield New Geneva Rd
Bowood Hollow Rd
Guthrie Rd
West Penn Power Company 138 kV
15
15.5
16
16.5
C,F

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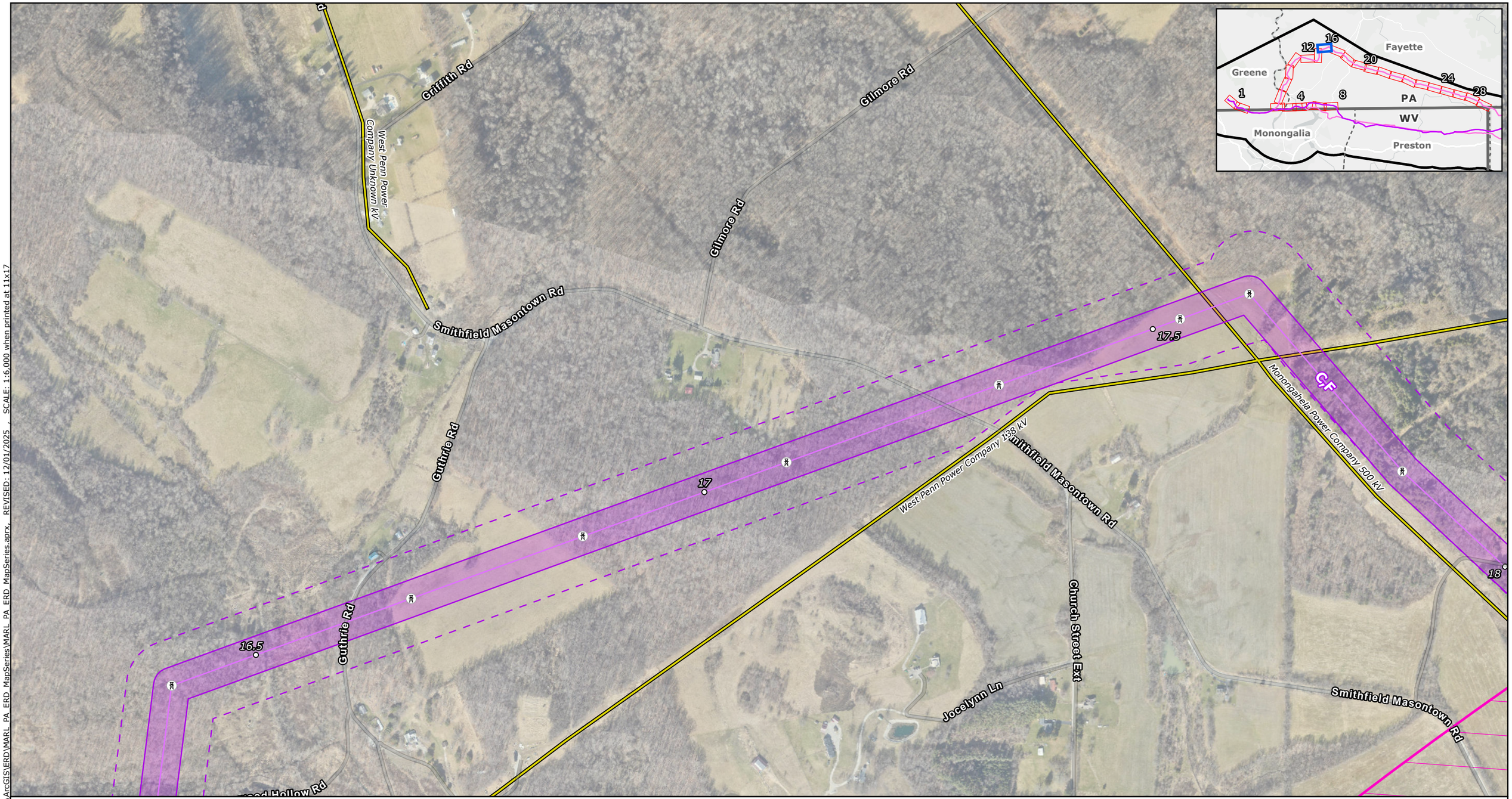

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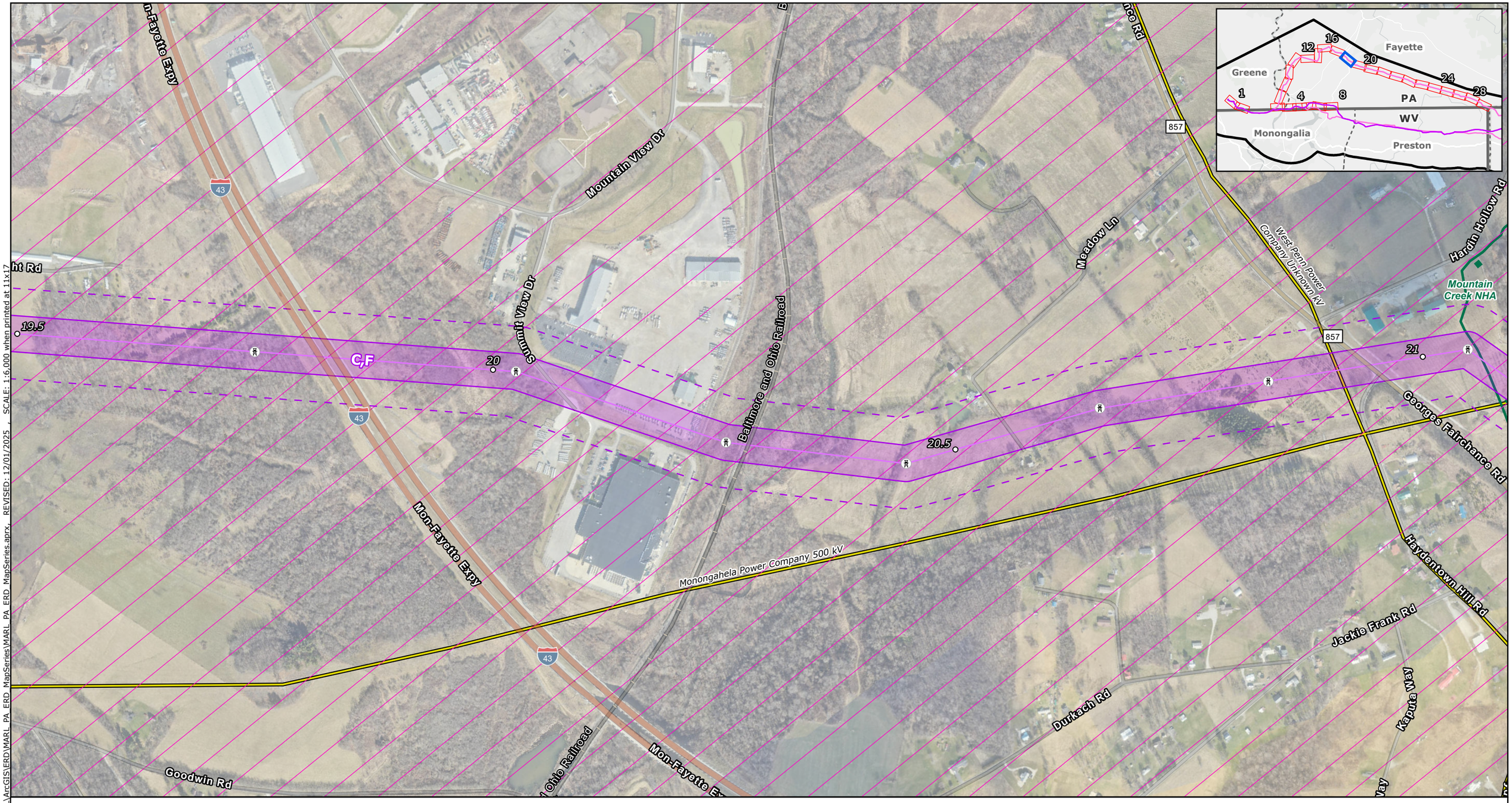

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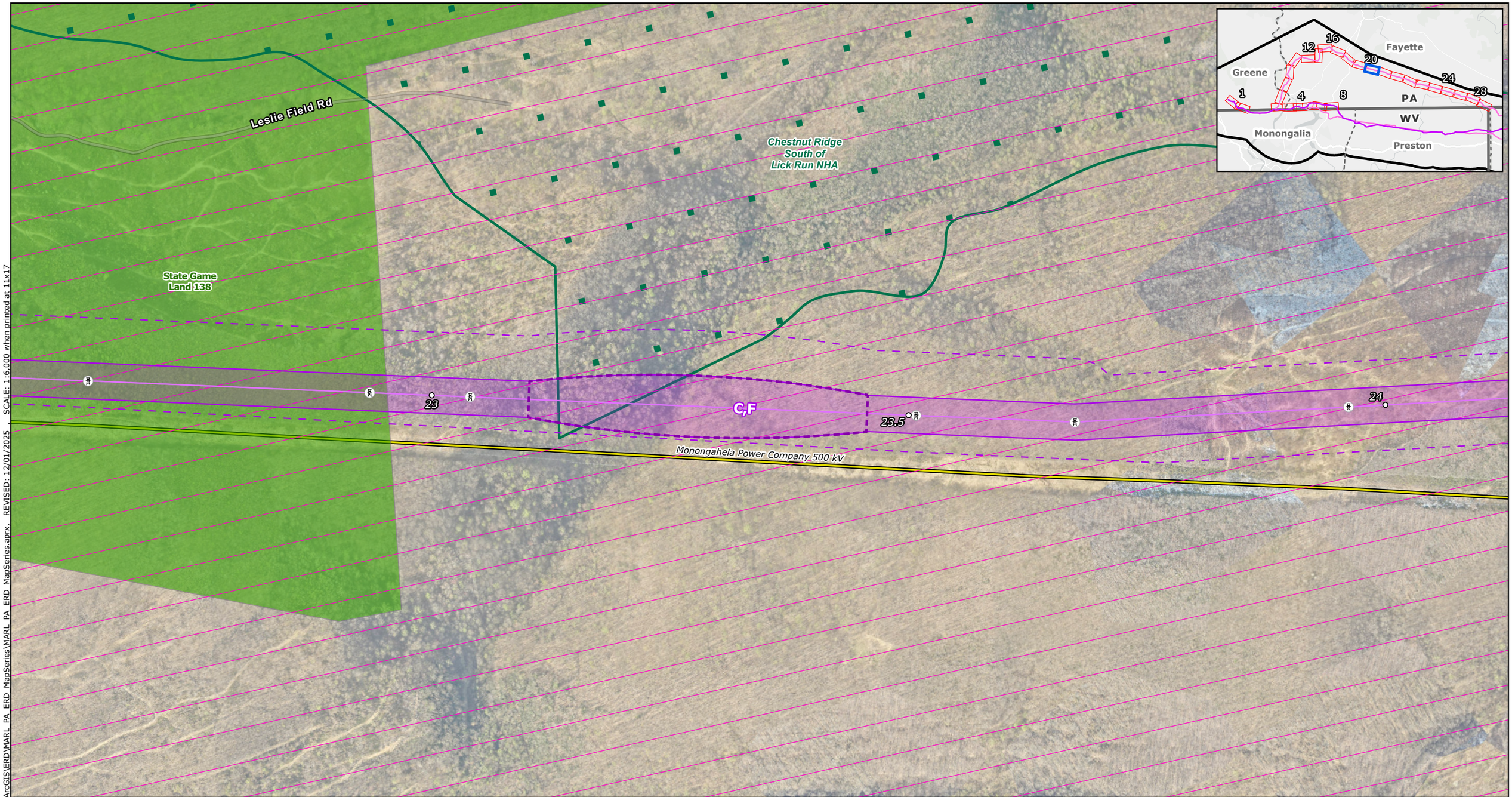

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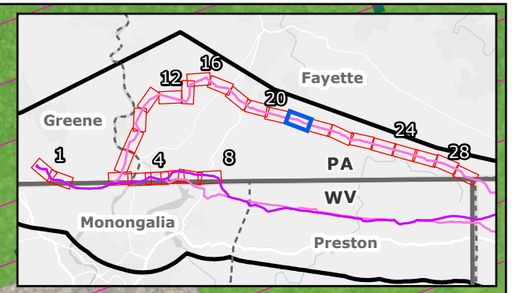

Chestnut Ridge South of Lick Run NHA

Forbes State Forest

C,F

24.5

25

25.5

Upper Quebec Run NHA

West Penn Power Company Unknown kV

Monongahela Power Company 500 kV

Skyline Dr

Quebec Run Wild Area

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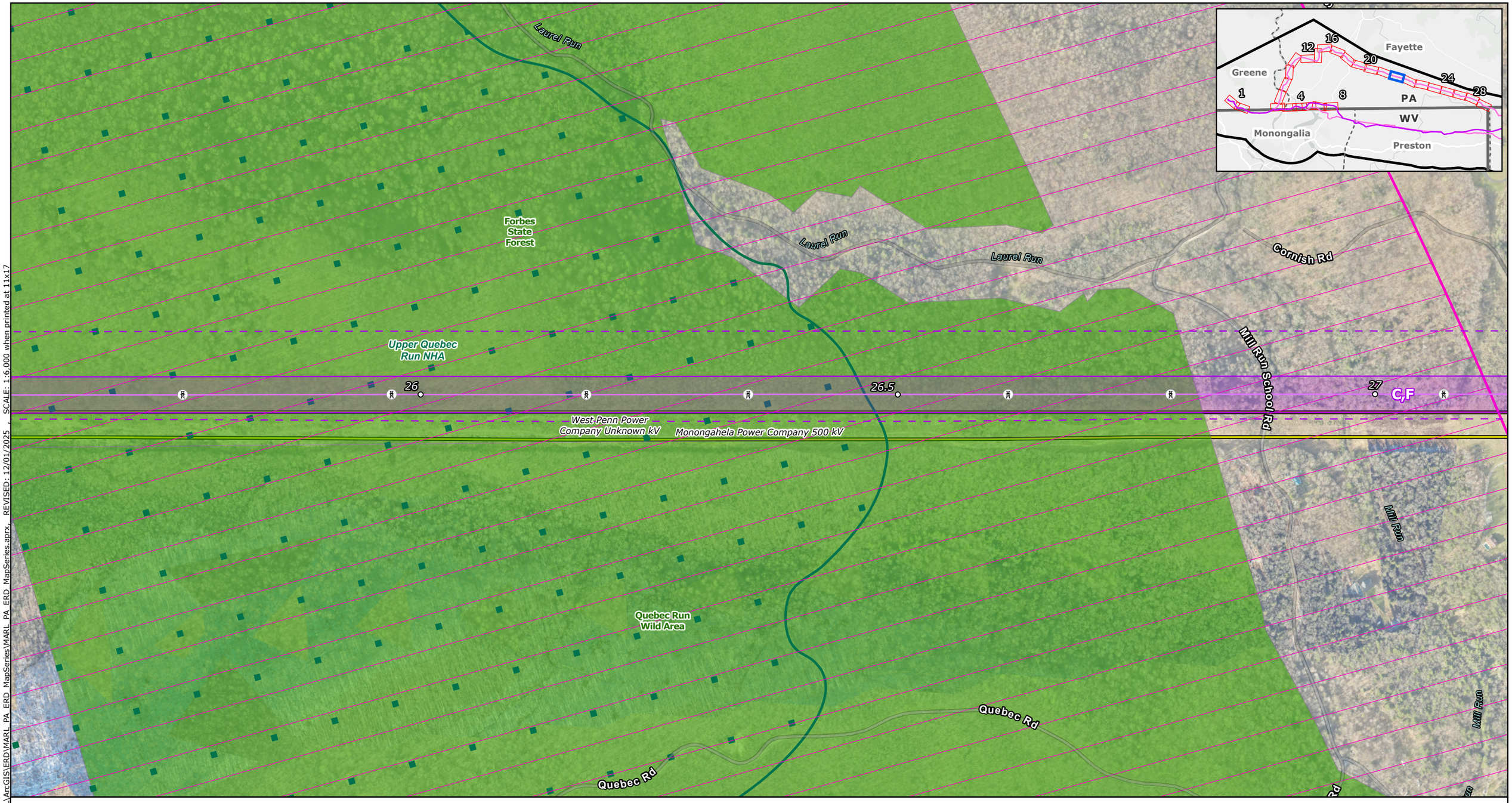

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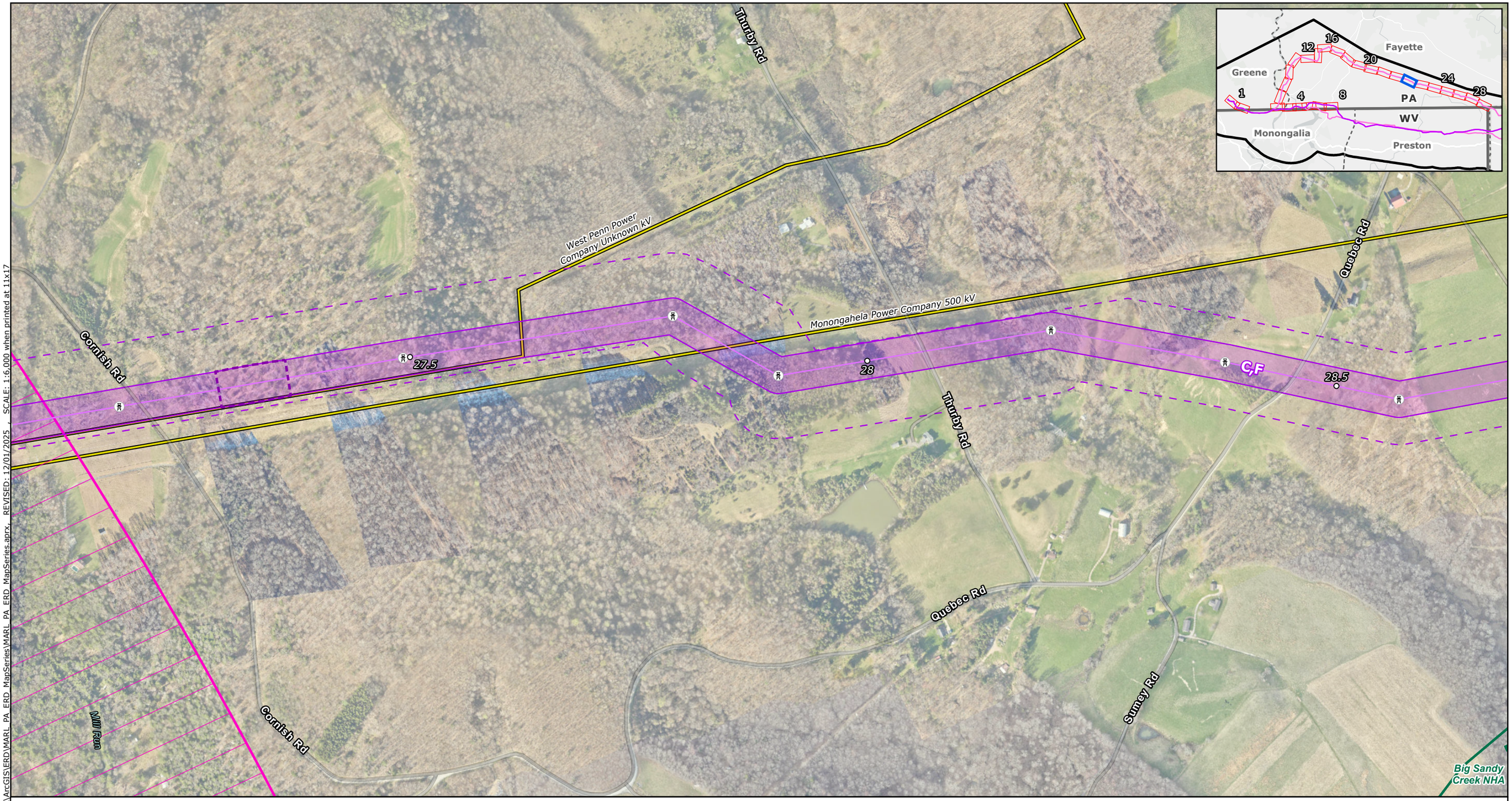

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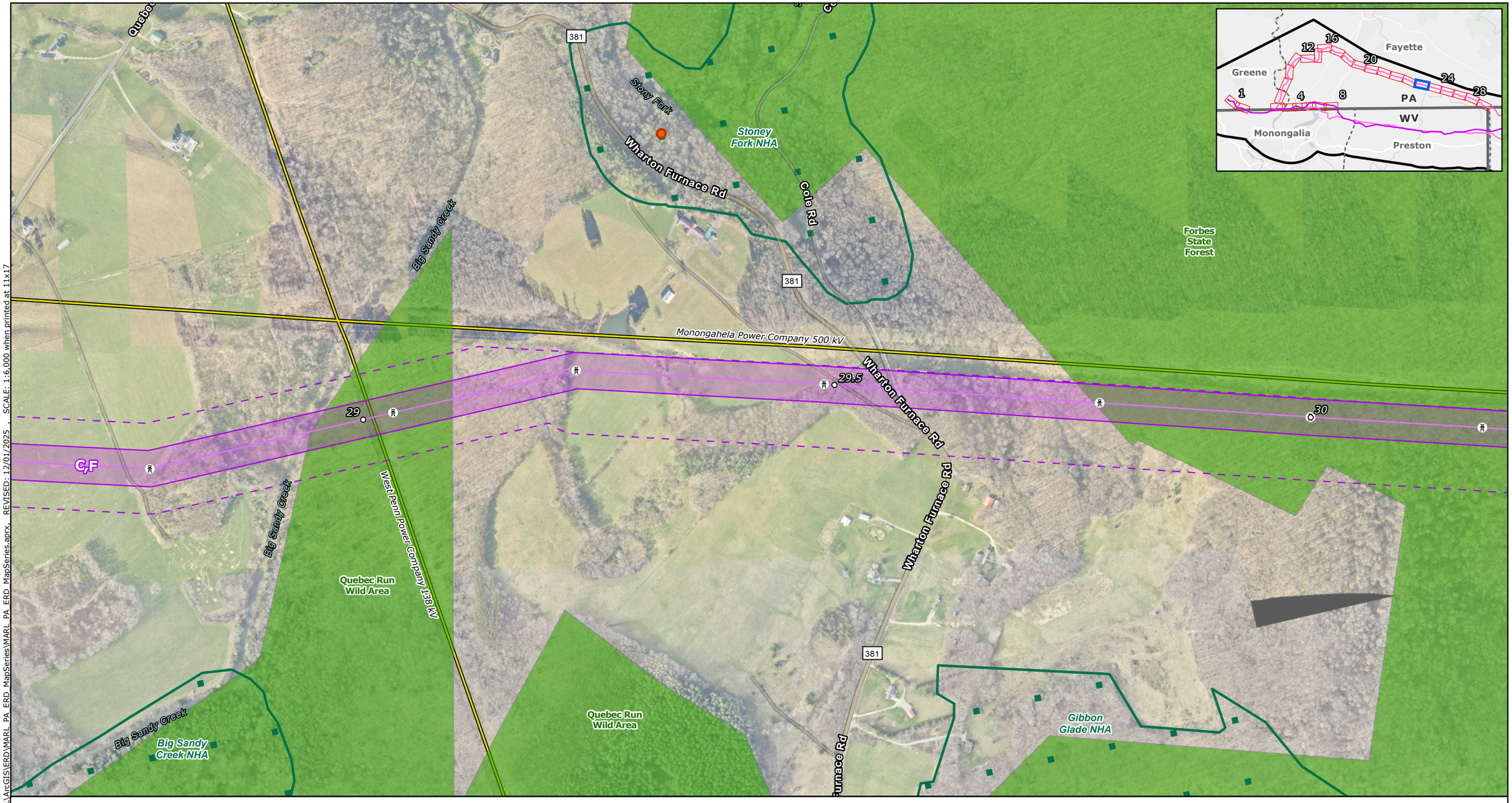

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- Aerial Easement Blowout Area
- Siting Corridors
- Riparian Habitat Exclusion Zone

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Ecological and Sensitive Species Resources
- Element Occurence Location
- Element Occurence Area
- Bat Habitat Hibernacula
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5. *Data source: NEET, ERM, USFWS, PA NHI, PAD-US*

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 1e
Ecological and Sensitive Species Mapbook

MidAtlantic Resiliency Link

ERM

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Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
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- Alternative Route Centerlines
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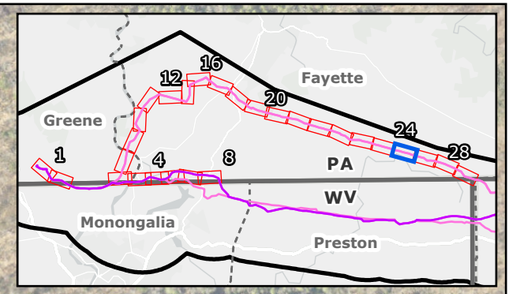

Monongahela Power Company 500 kV

Memorial Dr

Forbes State Forest

C,F

32

32.5

33

Memorial Dr

Fike Run

Upper Little Sandy Creek Valley NHA

Little Sandy Creek

Fike Run

Forbes State Forest

Forbes State Forest

orial Dr

Proposed Project Components
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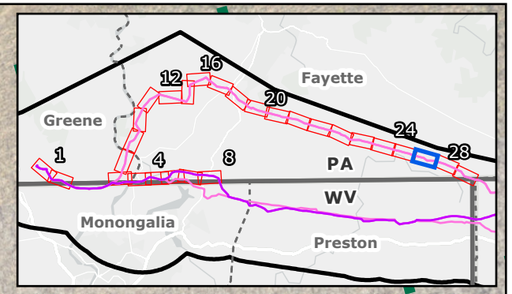

Dinner Bell Five Forks Rd

Glade Rd

Glade Rd

Glade Rd

Monongahela Power Company 500 kV

The Glades-Fayette County NHA

C,F

33.5

34

34.5

West Penn Power Company Unknown kV

Dinner Bell Five Forks Rd

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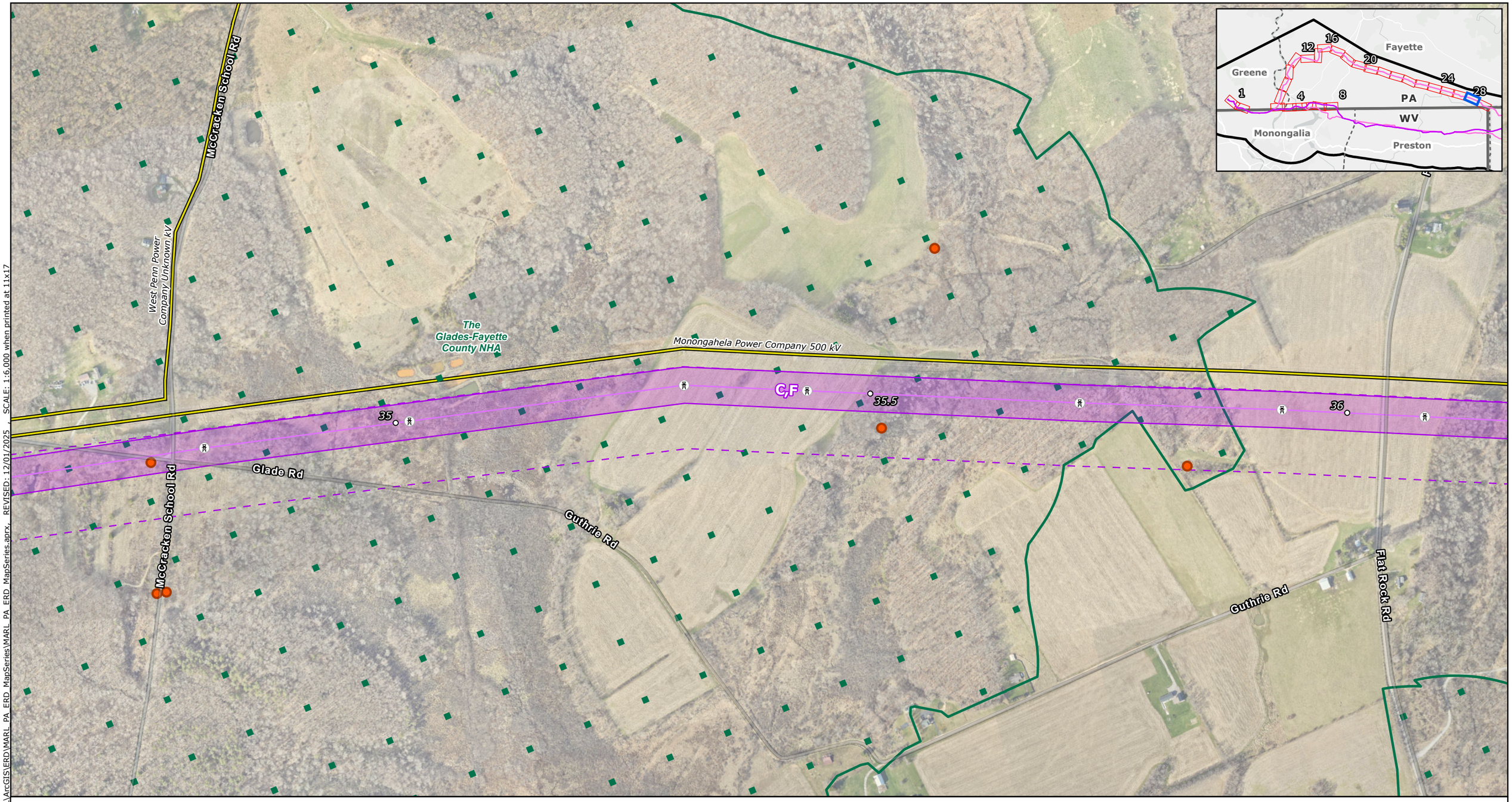

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US Feet
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Attachment 1e
Ecological and Sensitive Species Mapbook
Page 27 of 28
MidAtlantic Resiliency Link

ERM

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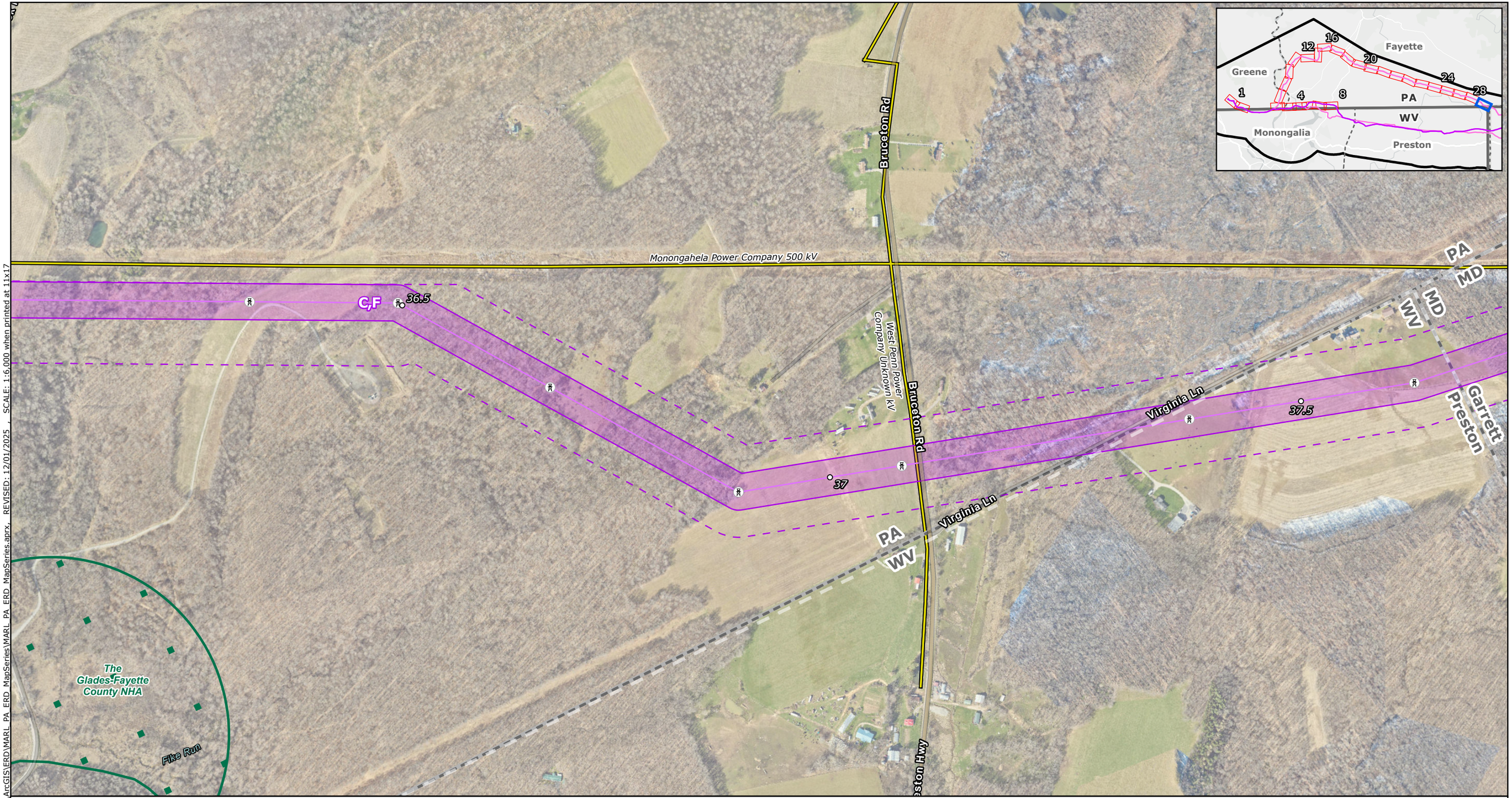

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0 250 500 750 1,000
US Feet
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Attachment 1e
Ecological and Sensitive Species Mapbook
Page 28 of 28
MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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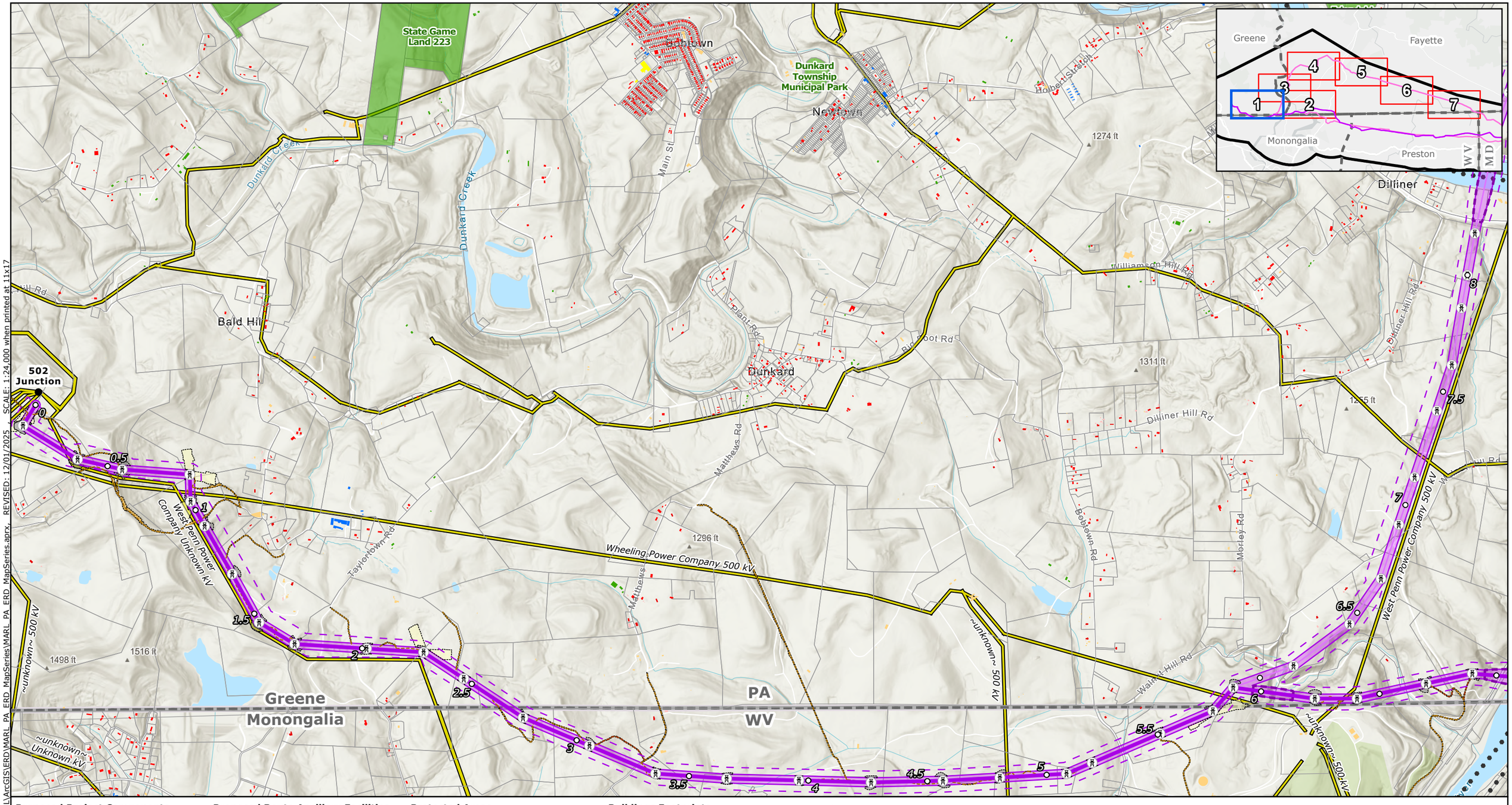
ATTACHMENT 1F RECREATIONAL LANDS AND PROTECTED LANDS MAPBOOK



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Base Data
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Protected Areas
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- Scenic Byways

Buildings Footprints
- Residential Dwelling
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N

0 1,000 2,000 3,000 4,000

US Feet

Scale: 1:24,000
1 inch equals 2,000ft (when printed at 11x17)

Attachment 1f
Recreational Lands and Protected Lands Mapbook

Page 1 of 7

MidAtlantic Resiliency Link

ERM

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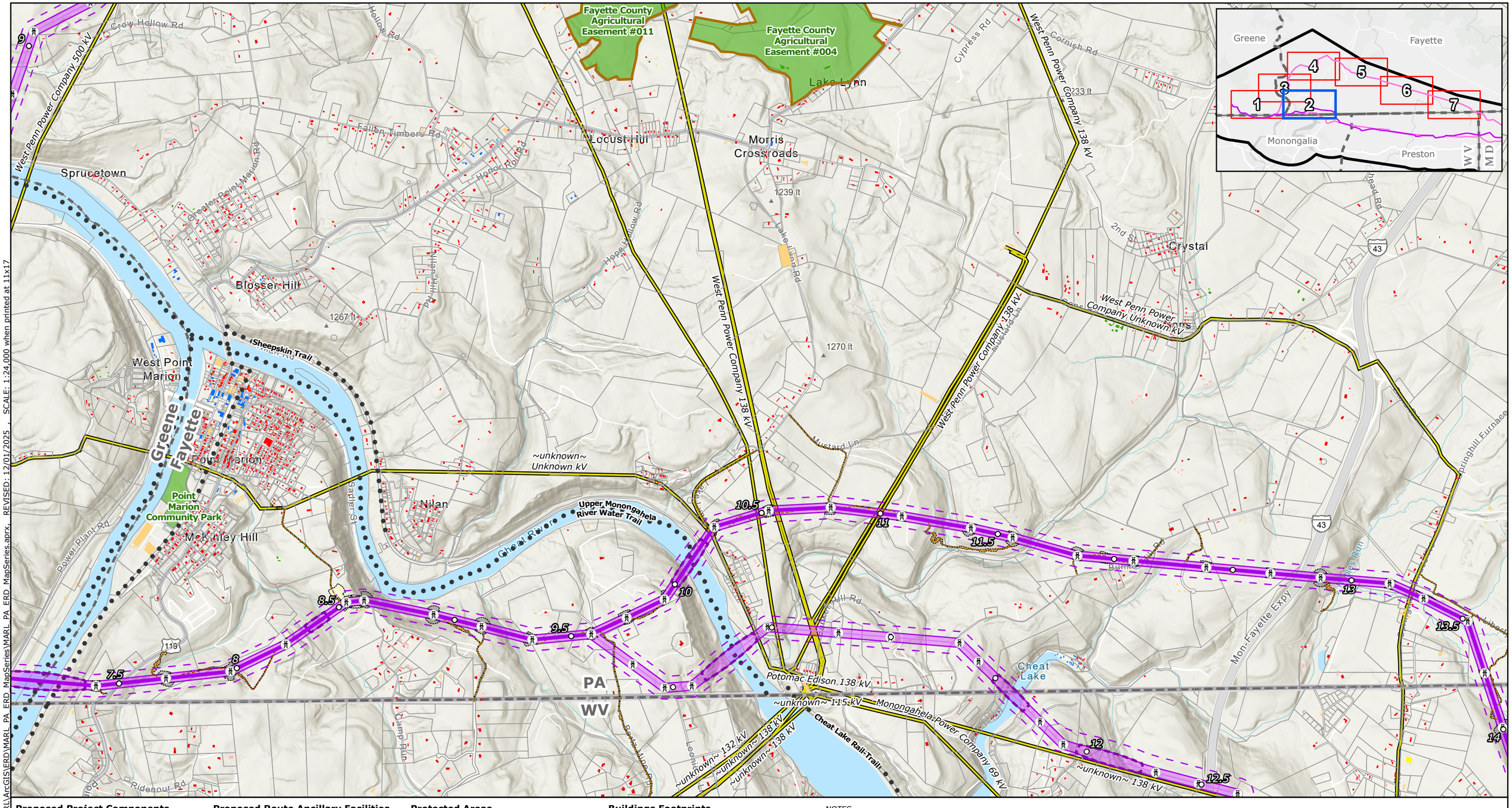

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N

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Recreational Lands and Protected Lands Mapbook

MidAtlantic Resiliency Link

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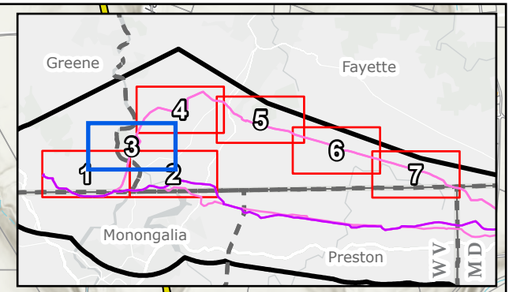

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Page 3 of 7

MidAtlantic Resiliency Link

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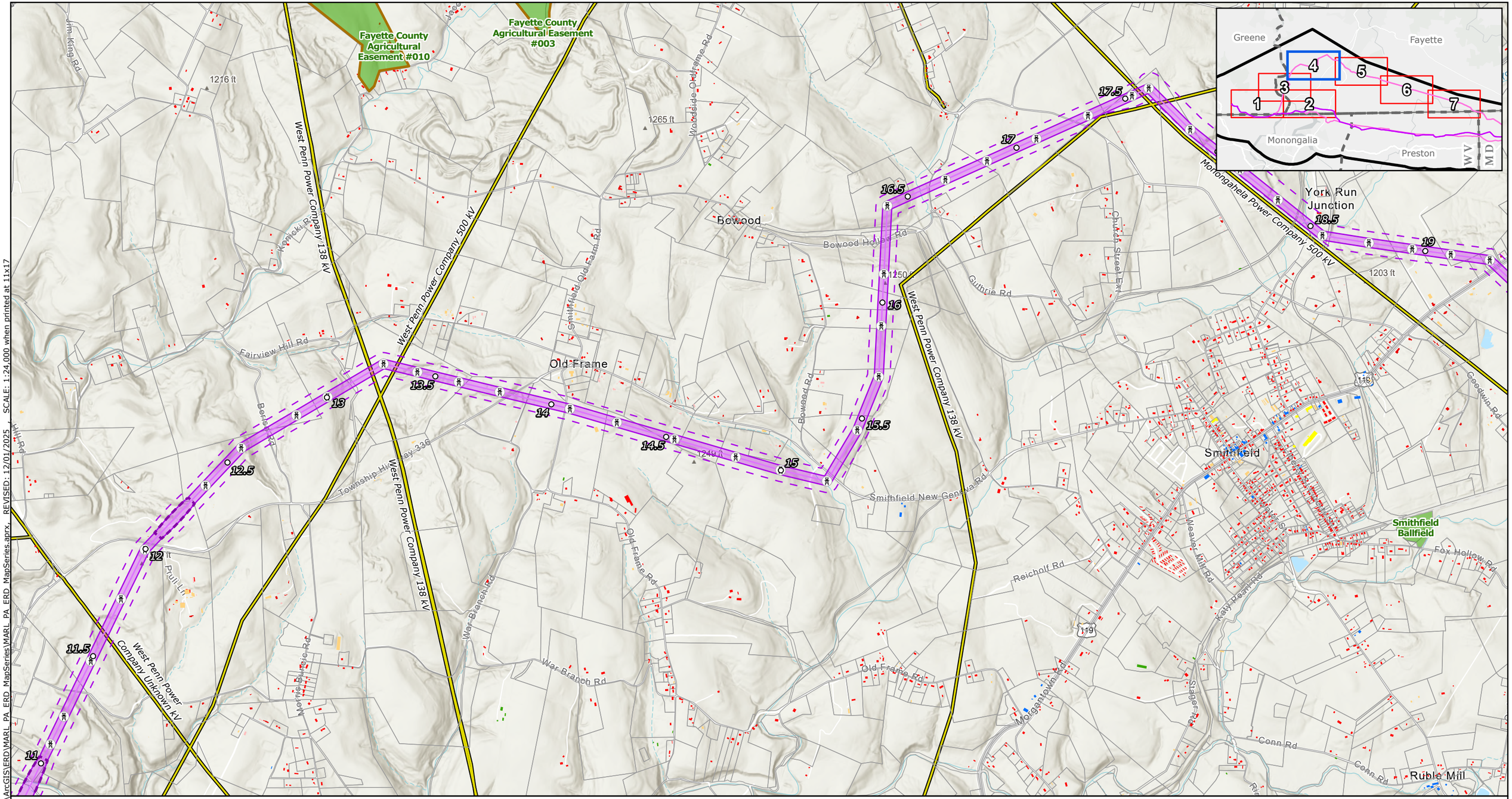

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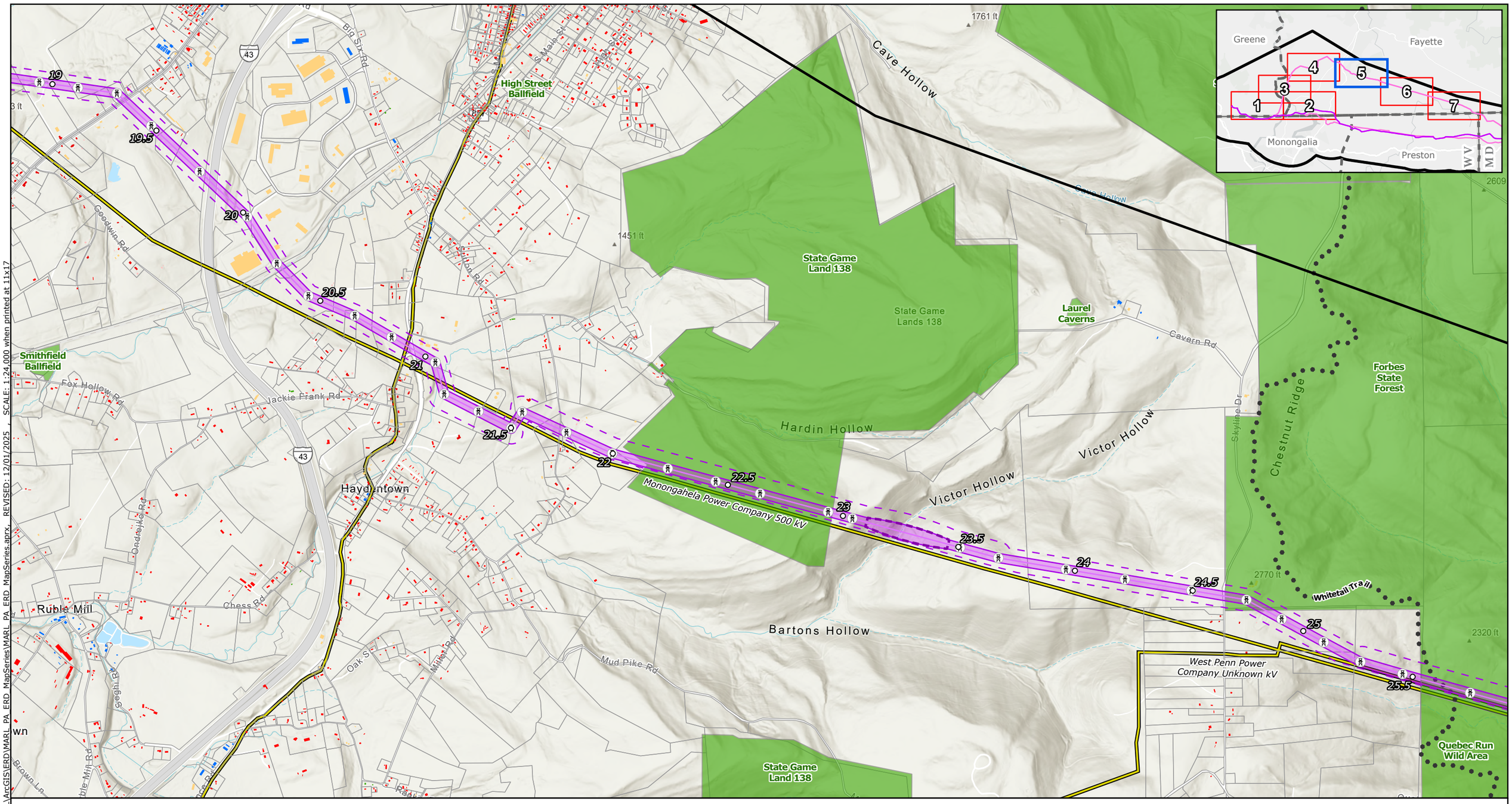

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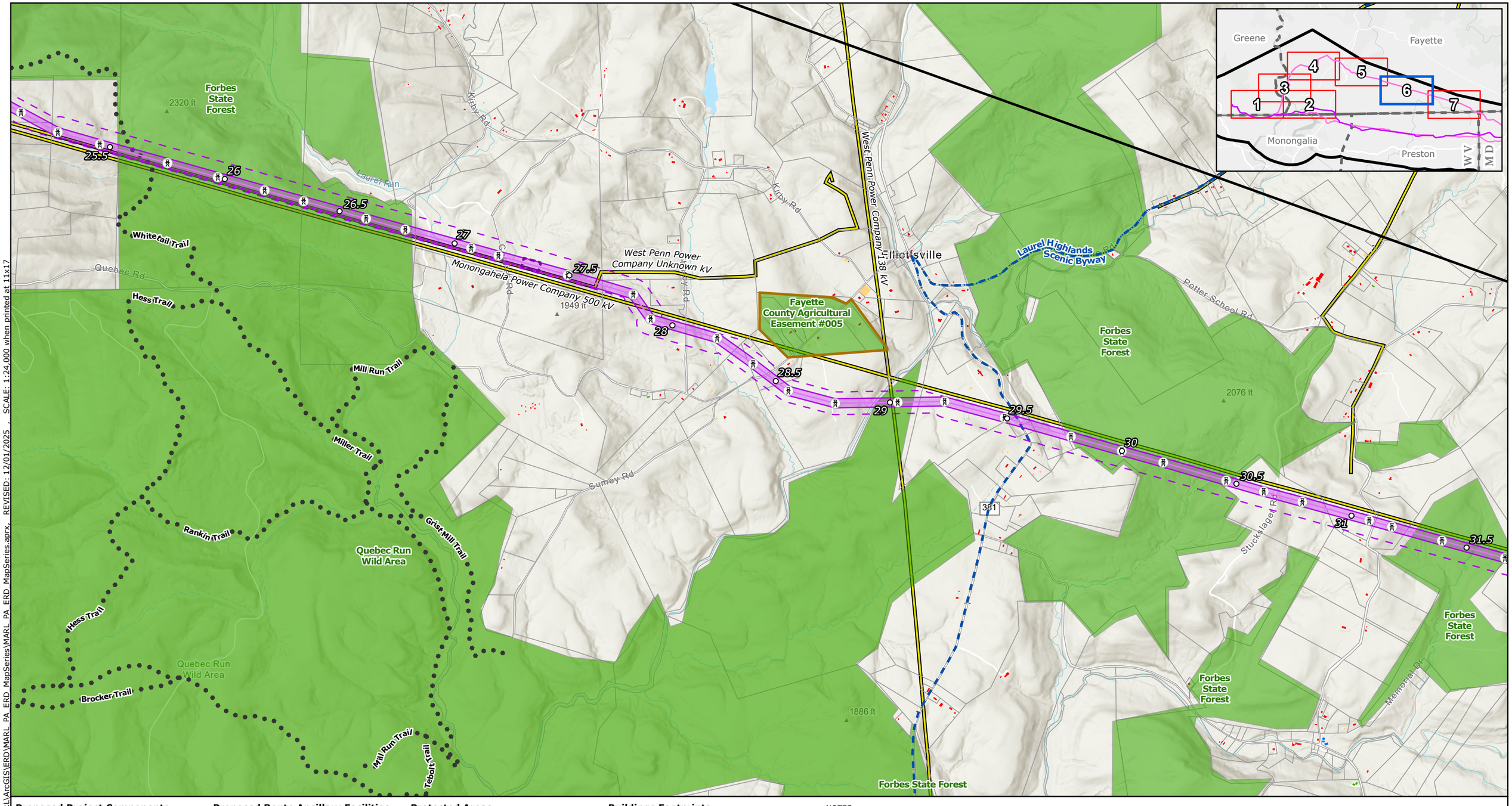

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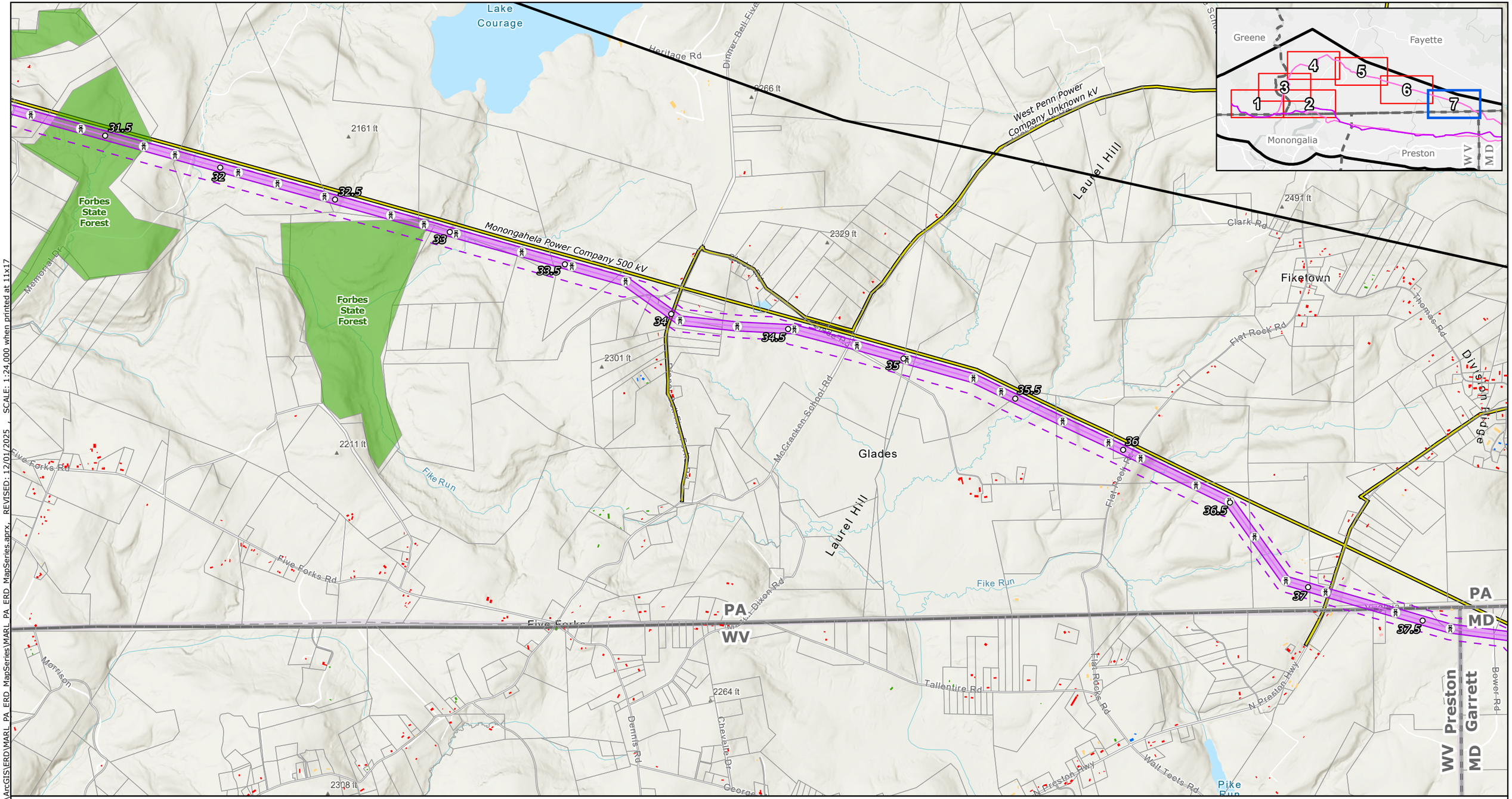

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Attachment 1f
Recreational Lands and Protected Lands Mapbook

Page 7 of 7

MidAtlantic Resiliency Link

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Coordinate system: NAD 1983 UTM Zone 17N

ATTACHMENT 1G CULTURAL RESOURCES MAPBOOK (CONFIDENTIAL)

ATTACHMENT 2 GEOLOGICAL FEATURES WITHIN 2 MILES OF THE PROPOSED ROUTE

DOCUMENT DETAILS

The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.	
DOCUMENT TITLE	Appendix A: Pennsylvania Environmental Review Document
DOCUMENT SUBTITLE	MidAtlantic Resiliency Link Project
PROJECT NUMBER	0718854
DATE	January 2026
AUTHOR	Environmental Resources Management, Inc.
CLIENT NAME	NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc.

TABLE 1 MINES WITHIN 2 MILES OF THE PROPOSED ROUTE ROW CORRIDOR

County	Site Name / Identification Number	Mine Type
Greene	0191-04	Abandoned
Greene	0197-05	Abandoned
Greene	0198-03	Abandoned
Greene	2776-01	Abandoned
Greene	2776-05	Abandoned
Greene	3264-04	Abandoned
Greene	3264-03	Abandoned
Greene	West Point Marion	Abandoned
Greene	Crooked Run I	Abandoned
Greene	Crooked Run II	Abandoned
Greene	Durrs Knob	Abandoned
Greene	Walnut Hill	Abandoned
Greene	Mt. Pleasant	Abandoned
Greene	Taylortown East	Abandoned
Greene	Dunkard Creek	Abandoned
Greene	Taylortown	Abandoned
Greene	Glade Run	Abandoned
Greene	Roberts Run	Abandoned
Greene	Bald Hill East	Abandoned
Greene	Mathews Deep Mine	Underground Coal
Greene	Crawdad Portal B	Underground Coal
Greene	Dunkard Deep Mine	Underground Coal
Greene	Dooley Run Mine	Underground Coal
Greene	Meadow Run Deep Mine	Underground Coal
Greene	B & M 2 Deep Mine	Underground Coal
Greene	C.W. Morgan Mine/30101301	Underground Coal
Greene	4 West Mine	Underground Coal
Greene	Titus Deep Mine	Underground Coal
Greene	Titus Deep Mine	Underground Coal
Greene	Petite 1 Deep Mine	Underground Coal
Greene	Van Voorhis Mine	Surface Coal
Greene	Mt. Morris Surface Mine	Surface Coal
Greene	Mathews Mine	Surface Coal
Greene	Van Voorhis Mine	Surface Coal
Greene	Bald Hill	Surface Coal
Greene	Chocolate Drop	Surface Coal
Greene	Laurita II	Surface Coal
Greene	Williamson Strip	Surface Coal
Greene	Sr 2008 Proj	Surface Coal
Greene	Emelio 2 Mine	Surface Coal
Greene	Brewer Site	Surface Coal
Greene	Raber	Historic Underground Coal Permit
Greene	#1	Historic Underground Coal Permit
Greene	No. 1	Historic Underground Coal Permit
Greene	Bren-Mar #3	Historic Underground Coal Permit
Greene		Historic Underground Coal Permit
Greene	Colpat	Historic Underground Coal Permit

County	Site Name / Identification Number	Mine Type
Greene	Titus	Historic Underground Coal Permit
Greene	Dunkard	Historic Underground Coal Permit
Greene	Dunkard	Historic Underground Coal Permit
Greene	No. 3	Historic Underground Coal Permit
Greene	V.I. No. 1	Historic Underground Coal Permit
Greene	McClure No. 1	Historic Underground Coal Permit
Greene	McClure No. 1	Historic Underground Coal Permit
Greene	Big D Coal Co.	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 3	Historic Underground Coal Permit
Greene	Warwick Portal No. 4	Historic Underground Coal Permit
Greene	Bren-Mar	Historic Underground Coal Permit
Greene	Dilworth	Historic Underground Coal Permit
Greene	Davistown	Historic Underground Coal Permit
Greene		Historic Underground Coal Permit
Greene	Francis	Historic Underground Coal Permit
Greene	Francis	Historic Underground Coal Permit
Greene	Jimmy #2	Historic Underground Coal Permit
Greene	Mathews	Historic Underground Coal Permit
Greene	Target No. 1	Historic Underground Coal Permit
Greene	Keg	Historic Underground Coal Permit
Greene	Darmac No. 1	Historic Underground Coal Permit
Greene	Emelio No. 1	Historic Underground Coal Permit
Greene	Target No. 1	Historic Underground Coal Permit
Greene	Target No. 1	Historic Underground Coal Permit
Greene	Emelio No. 2	Historic Underground Coal Permit
Greene	B & M No. 2	Historic Underground Coal Permit
Greene	Dunkard No. 2	Historic Underground Coal Permit
Greene	Bren-Mar	Historic Underground Coal Permit
Greene	Warwick Deep Mine No. 3	Historic Underground Coal Permit
Greene	Titus	Historic Underground Coal Permit
Greene	Petitte No. 1 Deep Mine	Historic Underground Coal Permit
Greene	Meadow Run	Historic Underground Coal Permit
Greene	Crawdad, Portal B Mine	Historic Underground Coal Permit
Greene	Dilworth	Historic Underground Coal Permit
Greene	Humphrey #7	Historic Underground Coal Permit
Greene	Shannopin	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Shannopin	Historic Underground Coal Permit
Greene	Shannopin	Historic Underground Coal Permit
Greene	Shannopin	Historic Underground Coal Permit

County	Site Name / Identification Number	Mine Type
Greene	Shannopin	Historic Underground Coal Permit
Greene	Shannopin	Historic Underground Coal Permit
Greene	Humphrey #7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey #7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey No. 7 Bowers Shaft	Historic Underground Coal Permit
Greene	#1	Historic Underground Coal Permit
Greene	Leneskie	Historic Underground Coal Permit
Greene	Bertha	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphrey No. 7	Historic Underground Coal Permit
Greene	Humphry No. 7	Historic Underground Coal Permit
Greene	Humphry No. 7	Historic Underground Coal Permit
Greene	Humphry No. 7 Mt. Morris	Historic Underground Coal Permit
Greene	Walnut Hill	Historic Underground Coal Permit
Fayette	4732-06	Abandoned
Fayette	4732-05	Abandoned
Fayette	4732-11	Abandoned
Fayette	4733-19	Abandoned
Fayette	1080-09	Abandoned
Fayette	4732-12	Abandoned
Fayette	1080-10	Abandoned
Fayette	4733-18	Abandoned
Fayette	1080-11	Abandoned
Fayette	4733-17	Abandoned
Fayette	1080-03	Abandoned
Fayette	1080-04	Abandoned
Fayette	1080-06	Abandoned
Fayette	1080-05	Abandoned
Fayette	4732-07	Abandoned
Fayette	4732-08	Abandoned
Fayette	4732-14	Abandoned
Fayette	4732-13	Abandoned
Fayette	2773-01	Abandoned
Fayette	0107-05	Abandoned
Fayette	0112-05	Abandoned
Fayette	0112-04	Abandoned
Fayette	0112-11	Abandoned
Fayette	0112-10	Abandoned
Fayette	0112-12	Abandoned
Fayette	0112-13	Abandoned
Fayette	0112-09	Abandoned
Fayette	0112-14	Abandoned
Fayette	0112-16	Abandoned
Fayette	0112-15	Abandoned
Fayette	4733-14	Abandoned
Fayette	0112-18	Abandoned

County	Site Name / Identification Number	Mine Type
Fayette	0112-17	Abandoned
Fayette	0122-02	Abandoned
Fayette	0107-04	Abandoned
Fayette	0112-03	Abandoned
Fayette	4733-15	Abandoned
Fayette	3871-01	Abandoned
Fayette	2717-15	Abandoned
Fayette	2777-02	Abandoned
Fayette	4734-08	Abandoned
Fayette	2777-10	Abandoned
Fayette	2777-05	Abandoned
Fayette	2777-01	Abandoned
Fayette	2777-07	Abandoned
Fayette	0564-04	Abandoned
Fayette	Hope Hollow	Abandoned
Fayette	Blosser Hill I	Abandoned
Fayette	Blosser Hill Ii	Abandoned
Fayette	Nilan	Abandoned
Fayette	Camp Run	Abandoned
Fayette	Cornish Northwest	Abandoned
Fayette	Morris Crossroads East	Abandoned
Fayette	Lake Lynn Northwest	Abandoned
Fayette	Davidson	Abandoned
Fayette	Locust Hill	Abandoned
Fayette	Point Marion	Abandoned
Fayette	Morris Crossroads	Abandoned
Fayette	Cornish South	Abandoned
Fayette	Lake Lynn West	Abandoned
Fayette	Gans Northwest	Abandoned
Fayette	Gans Hill School	Abandoned
Fayette	Dargoon Hollow North	Abandoned
Fayette	White House East	Abandoned
Fayette	Mays Strip	Surface Coal
Fayette	Redstone Strip	Surface Coal
Fayette	Baker Surface Mine	Surface Coal
Fayette	Baker Surface Mine	Surface Coal
Fayette	Hope Hollow GFCC Site	Surface Coal
Fayette	Wise Mine	Surface Coal
Fayette	Wise GFCC Site	Surface Coal
Fayette	Snider Strip Mine	Surface Coal
Fayette	Darr Surface Mine	Surface Coal
Fayette	DH Quarry	Surface Mineral
Fayette	Lake Lynn Quarry	Surface Mineral
Fayette	Zinn Site	Surface Mineral
Fayette	Crystal Site	Surface Mineral
Fayette	Bortz	Historic Underground Coal Permit
Fayette	Padle	Historic Underground Coal Permit
Fayette	Lake Lynn Quarry	Underground Mineral Permits

County	Site Name / Identification Number	Mine Type
Fayette	Lake Lynn Quarry	Underground Mineral Permits

TABLE 2 WELLS WITHIN 2 MILES OF THE PROPOSED ROUTE ROW CORRIDOR

County	Pennsylvania Well Identification Number	Well Type
Greene	633429	Abandoned
Greene	633430	Abandoned
Greene	633474	Abandoned
Greene	633475	Abandoned
Greene	633476	Abandoned
Greene	633477	Abandoned
Greene	633589	Abandoned
Greene	506087	Monitoring
Greene	506088	Monitoring
Greene	506115	Monitoring
Greene	506116	Monitoring
Greene	507635	Monitoring
Greene	507630	Monitoring
Greene	507631	Monitoring
Greene	507632	Monitoring
Greene	507633	Monitoring
Greene	508667	Monitoring
Greene	508668	Monitoring
Greene	20886	Unused
Greene	20887	Unused
Greene	20890	Unused
Greene	20891	Unused
Greene	20897	Unused
Greene	20900	Unused
Greene	115568	Withdrawal
Greene	684955	Withdrawal
Fayette	673849	Abandoned
Fayette	694206	Abandoned
Fayette	706975	Abandoned
Fayette	706981	Abandoned
Fayette	706983	Abandoned
Fayette	706988	Abandoned
Fayette	706992	Abandoned
Fayette	706993	Abandoned
Fayette	20698	Withdrawal
Fayette	20700	Withdrawal
Fayette	20554	Withdrawal
Fayette	504238	Withdrawal
Fayette	677681	Withdrawal
Fayette	677704	Withdrawal
Fayette	677515	Withdrawal
Fayette	677516	Withdrawal

County	Pennsylvania Well Identification Number	Well Type
Fayette	677517	Withdrawal
Fayette	677518	Withdrawal
Fayette	694205	Withdrawal
Fayette	694265	Withdrawal
Fayette	752480	Withdrawal
Somerset	746055	Withdrawal

ATTACHMENT 3 WATERBODY CROSSING TABLE

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TABLE 1 WATERBODY CROSSING TABLE—PROPOSED ROUTE

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	97.9
Fayette	05020004	Unnamed Waterbody	Perennial	196.6
Fayette	05020004	Grassy Run	Perennial	504.0
Fayette	05020004	Unnamed Waterbody	Perennial	611.2
Fayette	05020004	Rubles Run	Perennial	165.1
Fayette	05020004	Unnamed Waterbody	Perennial	581.3
Fayette	05020004	Unnamed Waterbody	Perennial	378.5
Fayette	05020004	Rubles Run	Perennial	451.9
Fayette	05020004	Unnamed Waterbody	Perennial	740.7
Fayette	05020004	Unnamed Waterbody	Perennial	287.6
Fayette	05020004	Unnamed Waterbody	Perennial	983.9
Fayette	05020004	Unnamed Waterbody	Perennial	699.2
Fayette	05020004	Cheat River	Perennial	708.4
Fayette	05020004	Unnamed Waterbody	Perennial	514.6
Fayette	05020003	Unnamed Waterbody	Perennial	998.5
Fayette	05020003	Camp Run	Perennial	528.1
Greene	05020003	Monongahela River	Perennial	726.9
Greene	05020003	Unnamed Waterbody	Perennial	528.4

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 2 WATERBODY FEATURE CROSSING TABLE—PROPOSED ROUTE

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Greene	05020003	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

TABLE 3 WATERBODY CROSSING TABLE—ALTERNATIVE ROUTE B

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	699.2
Fayette	05020004	Cheat River	Perennial	114.4
Fayette	05020003	Unnamed Waterbody	Perennial	998.5
Fayette	05020003	Camp Run	Perennial	528.1
Fayette	05020004	Cheat River	Perennial	489.5
Fayette	05020004	Grassy Run	Perennial	212.2
Fayette	05020004	Grassy Run	Perennial	533.6
Fayette	05020004	Grassy Run	Perennial	551.9
Greene	05020003	Monongahela River	Perennial	726.9
Greene	05020003	Unnamed Waterbody	Perennial	528.4

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 4 WATERBODY FEATURE CROSSING TABLE—ALTERNATIVE ROUTE B

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Fayette	05020004	Lake/Pond	Perennial	1.2
Greene	05020003	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

TABLE 5 WATERBODY CROSSING TABLE—ALTERNATIVE ROUTE C

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Little Sandy Creek	Perennial	247.4
Fayette	05020004	Unnamed Waterbody	Perennial	472.6
Fayette	05020004	Unnamed Waterbody	Perennial	573.1
Fayette	05020004	Little Sandy Creek	Perennial	265.3
Fayette	05020004	Little Sandy Creek	Perennial	189.4
Fayette	05020004	Unnamed Waterbody	Perennial	1,160.3
Fayette	05020004	Unnamed Waterbody	Perennial	526.0
Fayette	05020004	Unnamed Waterbody	Perennial	511.1
Fayette	05020004	Unnamed Waterbody	Perennial	554.6
Fayette	05020004	Unnamed Waterbody	Perennial	533.1

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	305.3
Fayette	05020004	Unnamed Waterbody	Perennial	172.2
Fayette	05020004	Unnamed Waterbody	Perennial	306.8
Fayette	05020004	Unnamed Waterbody	Intermittent	612.9
Fayette	05020004	Unnamed Waterbody	Perennial	554.1
Fayette	05020004	Unnamed Waterbody	Intermittent	501.4
Fayette	05020004	Big Sandy Creek	Perennial	612.0
Fayette	05020004	Unnamed Waterbody	Intermittent	464.8
Fayette	05020004	Unnamed Waterbody	Intermittent	535.7
Fayette	05020004	Mill Run	Perennial	714.1
Fayette	05020004	Unnamed Waterbody	Intermittent	1,299.3
Fayette	05020004	Unnamed Waterbody	Perennial	577.8
Fayette	05020005	Mountain Creek	Intermittent	937.0
Fayette	05020005	Unnamed Waterbody	Intermittent	688.7
Fayette	05020005	Croziers Run	Perennial	510.1
Fayette	05020005	York Run	Perennial	50.3
Fayette	05020005	Unnamed Waterbody	Perennial	469.7
Fayette	05020005	York Run	Perennial	617.7
Fayette	05020005	Unnamed Waterbody	Intermittent	1,363.8
Fayette	05020005	Georges Creek	Perennial	639.0
Fayette	05020005	Unnamed Waterbody	Intermittent	114.9
Fayette	05020005	Unnamed Waterbody	Intermittent	137.1
Fayette	05020005	Georges Creek	Perennial	100.4
Fayette	05020005	Unnamed Waterbody	Intermittent	521.0
Fayette	05020005	Unnamed Waterbody	Perennial	716.8
Fayette	05020005	Unnamed Waterbody	Intermittent	512.7
Fayette	05020005	Unnamed Waterbody	Intermittent	391.8
Fayette	05020005	Unnamed Waterbody	Perennial	26.9
Fayette	05020005	Georges Creek	Perennial	269.0
Fayette	05020005	Georges Creek	Perennial	355.4

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020005	Unnamed Waterbody	Intermittent	524.3
Fayette	05020005	Unnamed Waterbody	Intermittent	490.5
Greene	05020005	Monongahela River	Perennial	197.9
Greene	05020003	Unnamed Waterbody	Perennial	51.4
Greene	05020003	Unnamed Waterbody	Perennial	764.5
Greene	05020005	Unnamed Waterbody	Perennial	186.9
Greene	05020005	Unnamed Waterbody	Perennial	673.4
Greene	05020005	Unnamed Waterbody	Perennial	279.7
Greene	05020005	Monongahela River	Perennial	439.6
Greene	05020003	Unnamed Waterbody	Perennial	100.4

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 6 WATERBODY FEATURE CROSSING TABLE—ALTERNATIVE ROUTE C

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Fayette	05020005	Lake/Pond	Perennial	2.9
Fayette	05020005	Lake/Pond	Perennial	0.3
Greene	05020003	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

TABLE 7 WATERBODY CROSSING TABLE—ALTERNATIVE ROUTE D

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	97.9
Fayette	05020004	Unnamed Waterbody	Perennial	196.6
Fayette	05020004	Grassy Run	Perennial	504.0
Fayette	05020004	Unnamed Waterbody	Perennial	611.2
Fayette	05020004	Rubles Run	Perennial	165.1
Fayette	05020004	Unnamed Waterbody	Perennial	581.3
Fayette	05020004	Unnamed Waterbody	Perennial	378.5
Fayette	05020004	Rubles Run	Perennial	451.9

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	740.7
Fayette	05020004	Unnamed Waterbody	Perennial	287.6
Fayette	05020004	Unnamed Waterbody	Perennial	983.9
Fayette	05020004	Unnamed Waterbody	Perennial	699.2
Fayette	05020004	Cheat River	Perennial	708.4
Fayette	05020004	Unnamed Waterbody	Perennial	514.6
Fayette	05020003	Unnamed Waterbody	Perennial	998.5
Fayette	05020003	Camp Run	Perennial	528.1
Greene	05020003	Monongahela River	Perennial	726.9
Greene	05020003	Unnamed Waterbody	Perennial	528.4

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 8 WATERBODY FEATURE CROSSING TABLE—ALTERNATIVE ROUTE D

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Greene	05020003001072	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

TABLE 9 WATERBODY CROSSING TABLE—ALTERNATIVE ROUTE E

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	514.6
Fayette	05020004	Unnamed Waterbody	Perennial	97.9
Fayette	05020004	Unnamed Waterbody	Perennial	196.6
Fayette	05020004	Cheat River	Perennial	708.4
Fayette	05020003	Unnamed Waterbody	Perennial	998.5
Fayette	05020004	Unnamed Waterbody	Perennial	983.9
Fayette	05020004	Rubles Run	Perennial	451.9
Fayette	05020004	Unnamed Waterbody	Perennial	581.3
Fayette	05020004	Unnamed Waterbody	Perennial	378.5

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Grassy Run	Perennial	504.0
Fayette	05020004	Unnamed Waterbody	Perennial	287.6
Fayette	05020004	Rubles Run	Perennial	165.1
Fayette	05020003	Camp Run	Perennial	528.1
Fayette	05020004	Unnamed Waterbody	Perennial	740.7
Fayette	05020004	Unnamed Waterbody	Perennial	699.2
Fayette	05020004	Unnamed Waterbody	Perennial	611.2
Greene	05020003	Monongahela River	Perennial	726.9
Greene	05020003	Unnamed Waterbody	Perennial	528.4

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 10 WATERBODY FEATURE CROSSING TABLE—ALTERNATIVE ROUTE E

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Greene	05020003	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

TABLE 11 WATERBODY CROSSING TABLE—ALTERNATIVE ROUTE F

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020004	Unnamed Waterbody	Perennial	511.1
Fayette	05020004	Unnamed Waterbody	Perennial	554.6
Fayette	05020004	Unnamed Waterbody	Perennial	306.8
Fayette	05020005	Georges Creek	Perennial	355.4
Fayette	05020004	Little Sandy Creek	Perennial	189.4
Fayette	05020004	Unnamed Waterbody	Perennial	533.1
Fayette	05020004	Mill Run	Perennial	714.1
Fayette	05020005	Unnamed Waterbody	Perennial	469.7
Fayette	05020005	Croziers Run	Perennial	510.1
Fayette	05020004	Unnamed Waterbody	Perennial	172.2
Fayette	05020005	Mountain Creek	Intermittent	937.0
Fayette	05020005	York Run	Perennial	50.3

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020005	Unnamed Waterbody	Intermittent	524.3
Fayette	05020004	Unnamed Waterbody	Perennial	573.1
Fayette	05020004	Unnamed Waterbody	Intermittent	535.7
Fayette	05020005	Unnamed Waterbody	Intermittent	521.0
Fayette	05020005	Unnamed Waterbody	Intermittent	114.9
Fayette	05020005	Unnamed Waterbody	Intermittent	137.1
Fayette	05020004	Unnamed Waterbody	Perennial	577.8
Fayette	05020005	Georges Creek	Perennial	100.4
Fayette	05020004	Unnamed Waterbody	Intermittent	1,299.3
Fayette	05020004	Unnamed Waterbody	Intermittent	612.9
Fayette	05020005	Unnamed Waterbody	Intermittent	490.5
Fayette	05020005	Unnamed Waterbody	Intermittent	512.7
Fayette	05020005	Unnamed Waterbody	Intermittent	391.8
Fayette	05020005	Unnamed Waterbody	Intermittent	688.7
Fayette	05020004	Big Sandy Creek	Perennial	612.0
Fayette	05020004	Unnamed Waterbody	Perennial	1,160.3
Fayette	05020004	Little Sandy Creek	Perennial	265.3
Fayette	05020005	Georges Creek	Perennial	639.0
Fayette	05020005	Unnamed Waterbody	Perennial	26.9
Fayette	05020005	Unnamed Waterbody	Intermittent	1,363.8
Fayette	05020005	York Run	Perennial	617.7
Fayette	05020004	Little Sandy Creek	Perennial	247.4
Fayette	05020004	Unnamed Waterbody	Perennial	472.6
Fayette	05020004	Unnamed Waterbody	Perennial	526.0
Fayette	05020004	Unnamed Waterbody	Perennial	305.3
Fayette	05020004	Unnamed Waterbody	Perennial	554.1
Fayette	05020004	Unnamed Waterbody	Intermittent	464.8
Fayette	05020004	Unnamed Waterbody	Intermittent	501.4

County	HUC 8-Digit Code	GNIS Name	Flow Regime	Length in Existing Survey Corridor (ft)
Fayette	05020005	Georges Creek	Perennial	269.0
Fayette	05020005	Unnamed Waterbody	Perennial	716.8
Greene	05020003	Unnamed Waterbody	Perennial	100.4
Greene	05020003	Unnamed Waterbody	Perennial	51.4
Greene	05020005	Monongahela River	Perennial	439.6
Greene	05020005	Unnamed Waterbody	Perennial	279.7
Greene	05020005	Monongahela River	Perennial	197.9
Greene	05020005	Unnamed Waterbody	Perennial	186.9
Greene	05020005	Unnamed Waterbody	Perennial	673.4
Greene	05020003	Unnamed Waterbody	Perennial	764.5

Source: USGS 2025

ft = feet; GNIS = Geographic Names Information System; HUC = Hydrologic Unit Code

TABLE 12 WATERBODY FEATURE CROSSING TABLE—ALTERNATIVE ROUTE F

County	HUC 8-Digit Code	Mixed Description	Flow Regime	Area in Existing Survey Corridor (Acres)
Fayette	05020005	Lake/Pond	Perennial	0.3
Fayette	05020005	Lake/Pond	Perennial	2.9
Greene	05020003	Lake/Pond	Perennial	0.1

Source: USGS 2025

HUC = Hydrologic Unit Code

REFERENCES

USGS (U.S. Geological Survey). 2025. The National Map, Version 11.3: National Hydrography Dataset NHDPlus HR. Accessed: October 2025. Retrieved from: https://hydro.nationalmap.gov/arcgis/rest/services

ATTACHMENT 4 PENNSYLVANIA AGENCY CORRESPONDENCE

U.S. Fish and Wildlife Service
Pennsylvania Ecological Field Service Office

From: Ranalli, Nicole A
Sent on: Wednesday, July 3, 2024 4:04:56 PM
To: Michael Tincher
Subject: 2024-0082071 Proposed Linear Transmission Project

You don't often get email from nicole_ranalli@fws.gov. Learn why this is important

EXTERNAL MESSAGE

Michael,
Your project polygon contains swarming habitat for 5 northern long-eared bat hibercacula. 4 hibercacula are located within the polygon. The polygon is also within the range of the Indiana bat, and based on the large amount of tree removal (greater than 200 acres), more information may be necessary to determine if the project would result in adverse effects to Indiana bats.

Your polygon also contains 3 bald eagle nests. You can evaluate the project type, size, location and layout in light of the *National Bald Eagle Management Guidelines* to determine whether or not bald eagles might be disturbed as a direct or indirect result of this project. If it appears that disturbance may occur, we recommend that you consider modifying your project consistent with the *Guidelines*. These guidelines, as well as additional eagle information, are available at https://www.fws.gov/media/national-bald-eagle-management-guidelines

The following tools are also available:

Bald Eagle Screening Form: https://www.fws.gov/media/northeast-bald-eagle-project-screening-form

Bald Eagle Screening Tool: https://fws.maps.arcgis.com/apps/webappviewer/index.html?id=87ac96536654495b9f4041d81f75d7a0

Thank you for your time,
Nicole

Nicole Ranalli (she/her)
Endangered Species Biologist
U.S. Fish & Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801
814 206-7455
nicole_ranalli@fws.gov

FWS VALUES
STEWARDSHIP – INTEGRITY – RESPECT – COLLABORATION – INNOVATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Ecological Services Field Office
110 Radnor Road Suite 101
State College, PA 16801-7987
Phone: (814) 234-4090 Fax: (814) 234-0748

In Reply Refer To: 12/16/2025 19:05:50 UTC
Project Code: 2026-0027713
Project Name: MidAtlantic Resiliency Link

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Pennsylvania Ecological Services Field Office
110 Radnor Road Suite 101
State College, PA 16801-7987
(814) 234-4090

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

West Virginia Ecological Services Field Office
6263 Appalachian Highway
Davis, WV 26260-8061
(304) 866-3858

PROJECT SUMMARY

Project Code: 2026-0027713
Project Name: MidAtlantic Resiliency Link
Project Type: Transmission Line - New Constr - Above Ground
Project Description: Route A, Pennsylvania Segment
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.7267127,-79.81020403888476,14z



Counties: Pennsylvania and West Virginia

ENDANGERED SPECIES ACT SPECIES

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project

activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

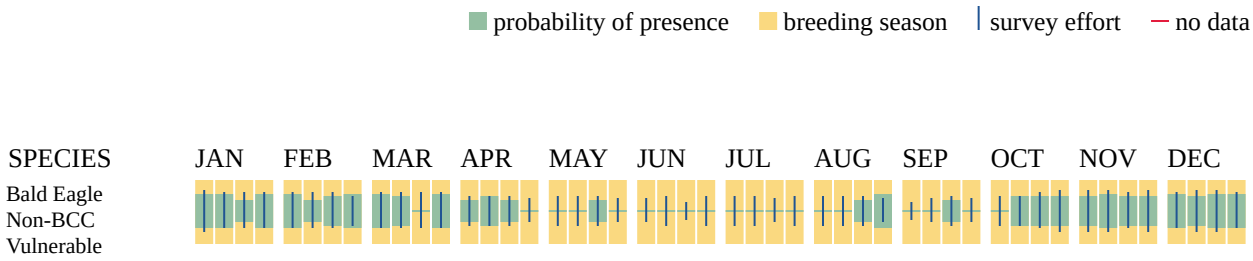
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Black-capped Chickadee *Poecile atricapillus practicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10645	Breeds Apr 10 to Jul 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Cerulean Warbler *Setophaga cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 27 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20

NAME	BREEDING SEASON
Henslow's Sparrow *Centronyx henslowii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Kentucky Warbler *Geothlypis formosa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Northern Saw-whet Owl *Aegolius acadicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9101	Breeds Mar 1 to Jul 31
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

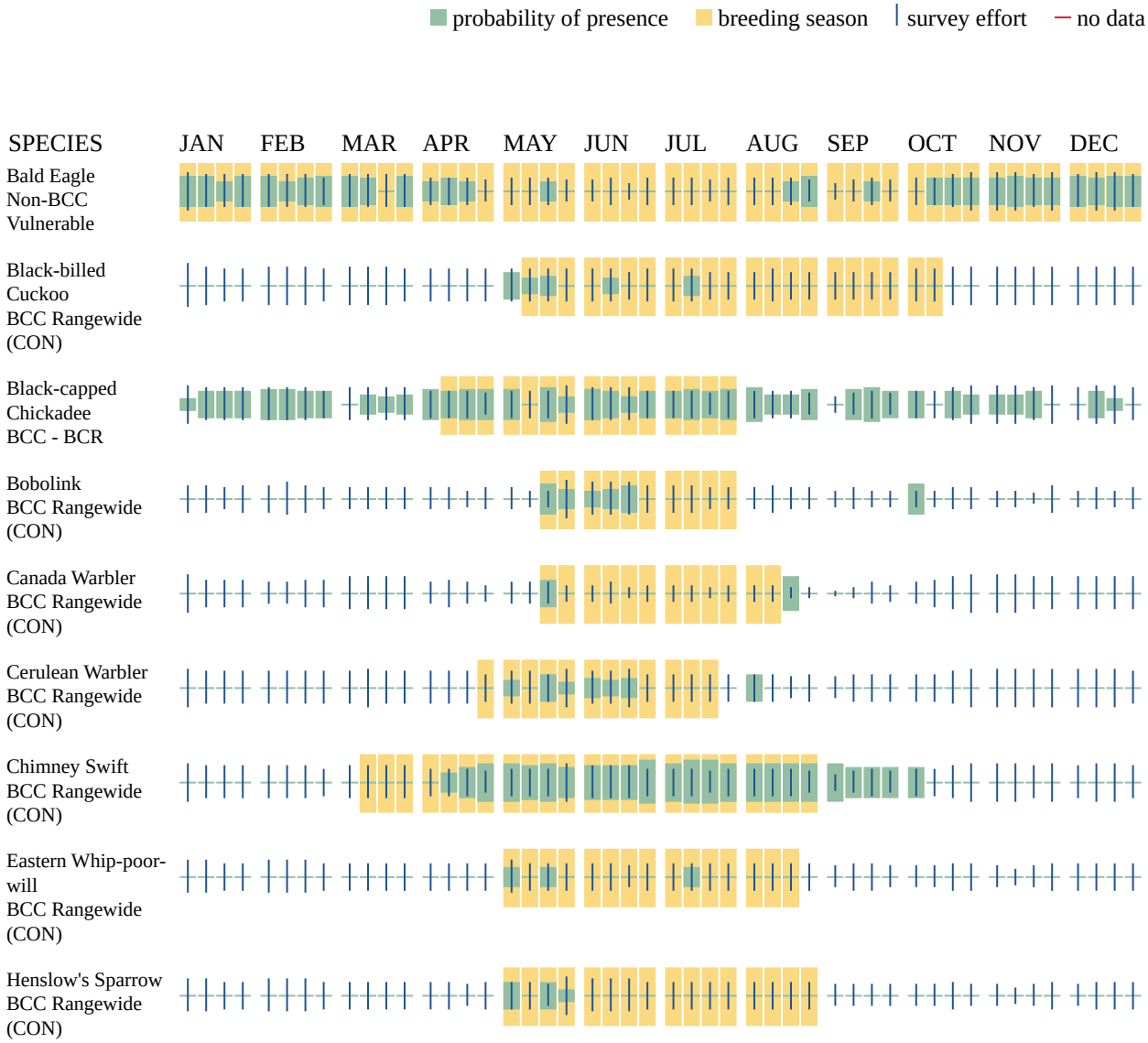
Probability of Presence (■)

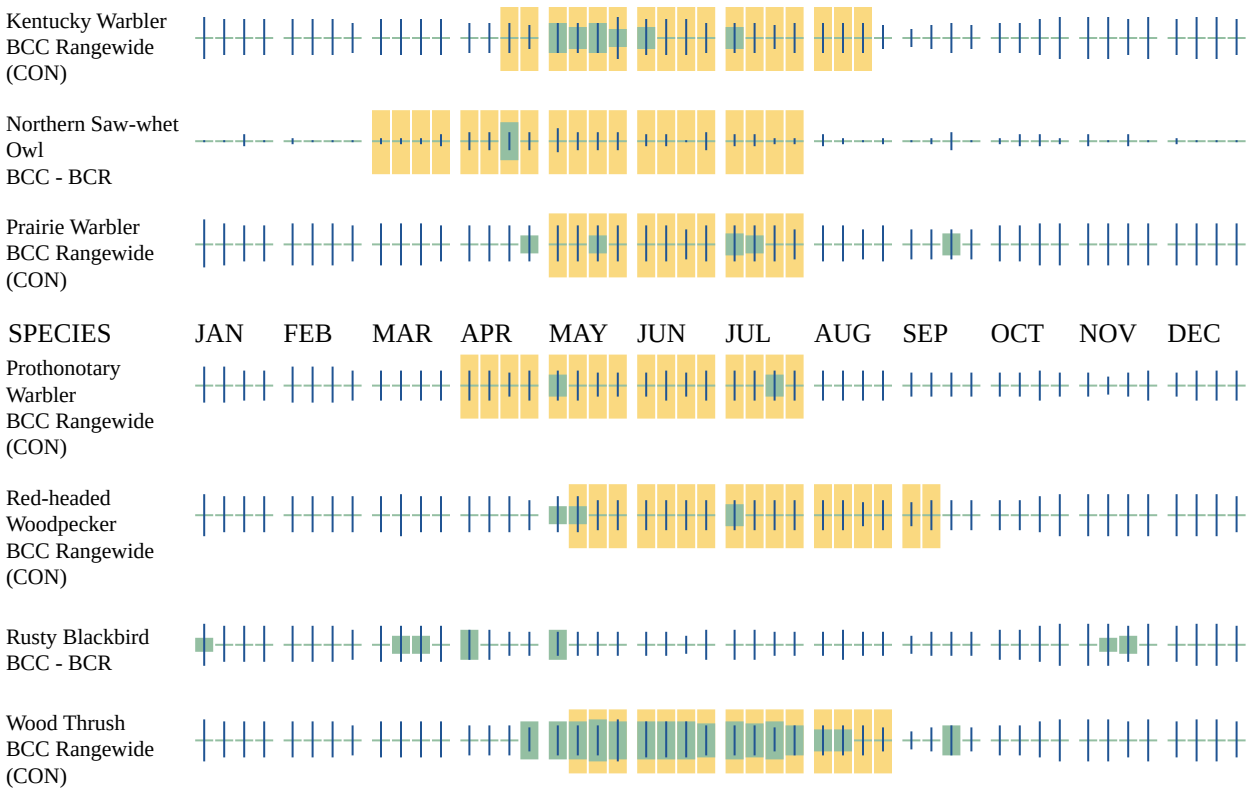
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.





Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R5UBH
- R3USC
- R3UBH
- R2UBH

FRESHWATER POND

- PUBHh

IPAC USER CONTACT INFORMATION

Agency: ERM
Name: Kathleen McDaniel
Address: 345 Woodcliff Dr 2nd floor
City: Rochester
State: NY
Zip: 14450
Email kathleen.mcdaniel@erm.com
Phone: 3153219174

Pennsylvania Department of Conservation and
Natural Resources

Pennsylvania Natural Heritage Program

Christine Essick, Partner, ERM
75 Valley Stream Parkway, Suite 200
Malvern, PA 19355

November 27, 2024

RE: Natural Heritage Areas in Greene, Fayette, and Somerset Counties

Dear Ms. Essick,

This letter is our response to your information request. Included with this letter is an ArcGIS geodatabase named **PNHP_NHA_Core_2024.gdb** containing the Pennsylvania Natural Heritage Program (PNHP) Natural Heritage Area Core Habitats for areas of Greene, Fayette, and Somerset Counties.

The feature class, **NHA_Core_20241126**, contains the Core Habitat polygons that were within six kilometers of or intersected your study area. The attribute table for the Core Habitats contains fields for the Site Name, Significance Rank, a brief description of each area, and link to a detailed site account if available.

Natural Heritage Areas

A Natural Heritage Area (NHA) is a specific geographic area containing one or more of the tracked species or natural communities of conservation concern in Pennsylvania. Natural Heritage Areas simplify biodiversity information, by grouping mapped species' occurrences into units that can be more easily used for conservation planning purposes. The geographic extent of an NHA consists of a central Core Habitat, containing the essential habitat area which hosts the species or communities of concern. The geographic area of the Core Habitat depends on a variety of factors, like the distribution of the population or species of concern, the amount of land required to meet their biological needs, current patterns of land use, suitable habitat extent, and species sensitivity to human activities. PNHP biologists determine the size and shape of the core habitat areas, based on these factors, for each known species and community occurrence in Pennsylvania. Note: NHAs are not regulatory tools - they compile location-specific information about biodiversity that can then be used to inform decision-making.

Accompanying most individual NHAs are descriptive site accounts, which are compiled and written by PNHP to make biodiversity data more accessible and immediately useful for planners, managers, educators, and the public. They are a key part of the County Natural Heritage Inventories (CNHI), which are available through the PNHP website. The data collected by PNHP is also incorporated into an interactive web mapping tool in PA Conservation Explorer (http://conservationexplorer.dcnr.pa.gov/content/map). This online platform allows PNHP data—primarily NHAs—to be combined with a variety of other conservation data layers, including state protected lands, political boundaries, streams classified by water quality, wetlands, and important bird areas. Check the boxes for Natural Heritage Area in the Conservation Planning layers pane on the left side of the map to see them.

Interpreting the Data

Western Pennsylvania Conservancy
800 Waterfront Drive
Pittsburgh, Pa 15222
412-288-2777
www.waterlandlife.org

Pennsylvania Dept. of Conservation and Natural Resources
Bureau of Forestry
PO Box 8552
Harrisburg, PA 17057-8522
717-787-3444
www.dcnr.pa.gov

The attribute table accompanying the NHA spatial dataset includes several key columns which are likely to be useful when using these data for projects.

- **Significance Rank** describes the conservation importance of each individual NHA, based on the numbers and identities of species and communities present there, as well as the quality of these occurrences. Sites of **Local** importance generally contain species or communities which have importance to biological diversity at the county scale but may not yet be known to contain species of concern or state-significant natural communities. These sites are often recognized because of their relative size, undisturbed character, or proximity to areas of known significance, and may be revisited in the future for further biodiversity surveys. **State** sites are important for biological diversity and ecological integrity at the state scale. **Regional** sites are important for maintaining representation of species or communities of concern in the greater Northeast /mid-Atlantic region. Sites in this category generally contain one or more occurrences of species of global concern, or higher concentrations of species of lower significance. **Global** sites have global importance for biological diversity, and Pennsylvania has a primary role in maintaining these elements (e.g. most of the known occurrences are within Pennsylvania). Sites in this category generally contain one or more occurrences of species of global concern or larger concentrations of species of lower significance.
- The **Brief Description** column provides a one sentence summary of the habitat and species or communities which occur in the NHA.
  The **Site Account PDF Link** column provides a link to detailed site accounts if available. For sites where a detailed Site Account PDF is not available, more information can be found in the County Natural Heritage Inventory Report available on our website: https://www.naturalheritage.state.pa.us/inventories.aspx.

The GIS files provided are primarily from the 2021 Greene and Fayette County Natural Heritage Inventories. There were no NHAs within six kilometers of the study area in Somerset County. The full CNHI reports for Greene, Fayette, and Somerset, plus additional information about the methodology for creating the polygons, are available on our website: https://www.naturalheritage.state.pa.us/inventories.aspx.

In addition to the information from the reports, some polygons and site descriptions may have been added or updated based on newer information collected since the publication of the reports.

PNHP Data Use

PNHP maintains a site-specific information system that describes significant natural resources of Pennsylvania. This system includes data that are descriptive of plant and animal species of special concern, exemplary natural communities, and unique geological features. PNHP is a partnership of the Department of Conservation and Natural Resources, the Pennsylvania Fish and Boat Commission, the Pennsylvania Game Commission, and the Western Pennsylvania Conservancy.

Western Pennsylvania Conservancy
800 Waterfront Drive
Pittsburgh, Pa 15222
412-288-2777
www.waterlandlife.org

Pennsylvania Dept. of Conservation and Natural Resources
Bureau of Forestry
PO Box 8552
Harrisburg, PA 17057-8522
717-787-3444
www.dcnr.pa.gov

The data provided in this release is a static snapshot of the NHA dataset provided as an online map on the PNHP website (http://www.naturalheritage.state.pa.us/). NHA data provided in this release will become outdated as new data are added or modifications are made to the database. Should a discrepancy develop between the data provided to the recipient and the data in the Heritage Program database, the data presented on the PNHP website are the correct data.

PNHP biologists and conservation planners continually update biodiversity information across Pennsylvania, but some counties have not had NHA boundaries revisited for many years. An absence of recorded information does not necessarily imply actual conditions on-site. A field survey of any site may reveal previously unreported populations.

Although the digital data should not be distributed to third parties outside of your organization without updates from the PNHP, the polygons provided to you are part of a publicly viewable data layer, and therefore may be included in project files, reports, and public displays. Publication, display or presentation of any product derived from the data provided by PNHP should contain an acknowledgment of PNHP as the data source. The data should be cited as follows:

> Pennsylvania Natural Heritage Program. 2024. County Natural Heritage Area Core Habitats. Western Pennsylvania Conservancy, Pittsburgh PA and the Pennsylvania Department of Conservation and Natural Resources, Harrisburg, PA. Exported November 26, 2024.

Please note: These data are being provided for conservation and project pre-planning and are not a substitute for conducting any PNDI searches that may be required as part of a permit application. PNHP County Natural Heritage Inventory polygon updates are ongoing as new information becomes available. Should a discrepancy develop between the data provided and the data in the PNHP databases, the data in the PNHP databases are the most current.

This letter is not an official Project Review response from any state or federal agency.

Please call (412-586-2314) or email me (kcarlson@paconserve.org) with any questions regarding this response, and to let me know if it is sufficient for your needs.

Sincerely,

Kierstin Carlson

Associate Information Manager
Western Pennsylvania Conservancy/ Pennsylvania Natural Heritage Program.

Attachments

1. PROJECT INFORMATION

Project Name: **500kV Transmission Line - Proposed Route**
Date of Review: **10/3/2025 08:49:18 AM**
Project Category: **Energy Storage, Production, and Transfer, Energy Transfer, Power/electric line - New (new location for above/under-ground line)**
Project Area: **638.84 acres**
County(s): **Fayette; Greene**
Watersheds HUC 8: **Cheat; Lower Monongahela; Upper Monongahela**
Watersheds HUC 12: **Cheat Lake-Cheat River; Meadow Run-Dunkard Creek; West Run-Monongahela River**
Decimal Degrees: **39.724759, -79.871324**
Degrees Minutes Seconds: **39° 43' 29.1314" N, 79° 52' 16.7653" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

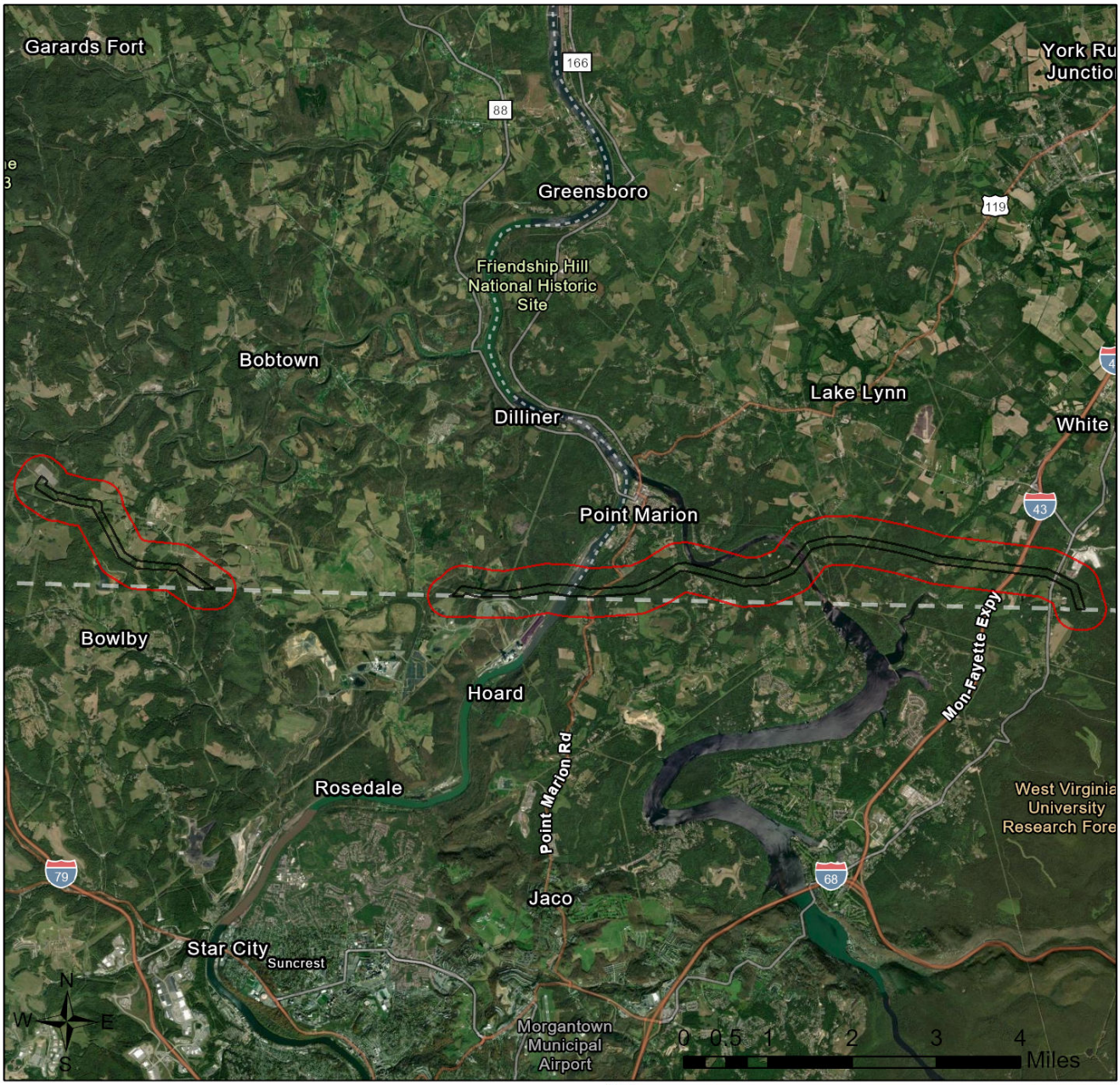
2. SEARCH RESULTS - LARGE PROJECT

Agency	Results	Response
PA Game Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

Large Project. The project area is greater than 10 miles and/or 5,165 acres and therefore is categorized as a Large Project, and is not analyzed by the PNDI tool. Coordination is therefore required with the four jurisdictional agencies to determine if potential impacts to threatened and endangered and/or special concern species and resources within the project area. Please see the DEP Information section of the receipt if a PA Department of Environmental Protection Permit is required.

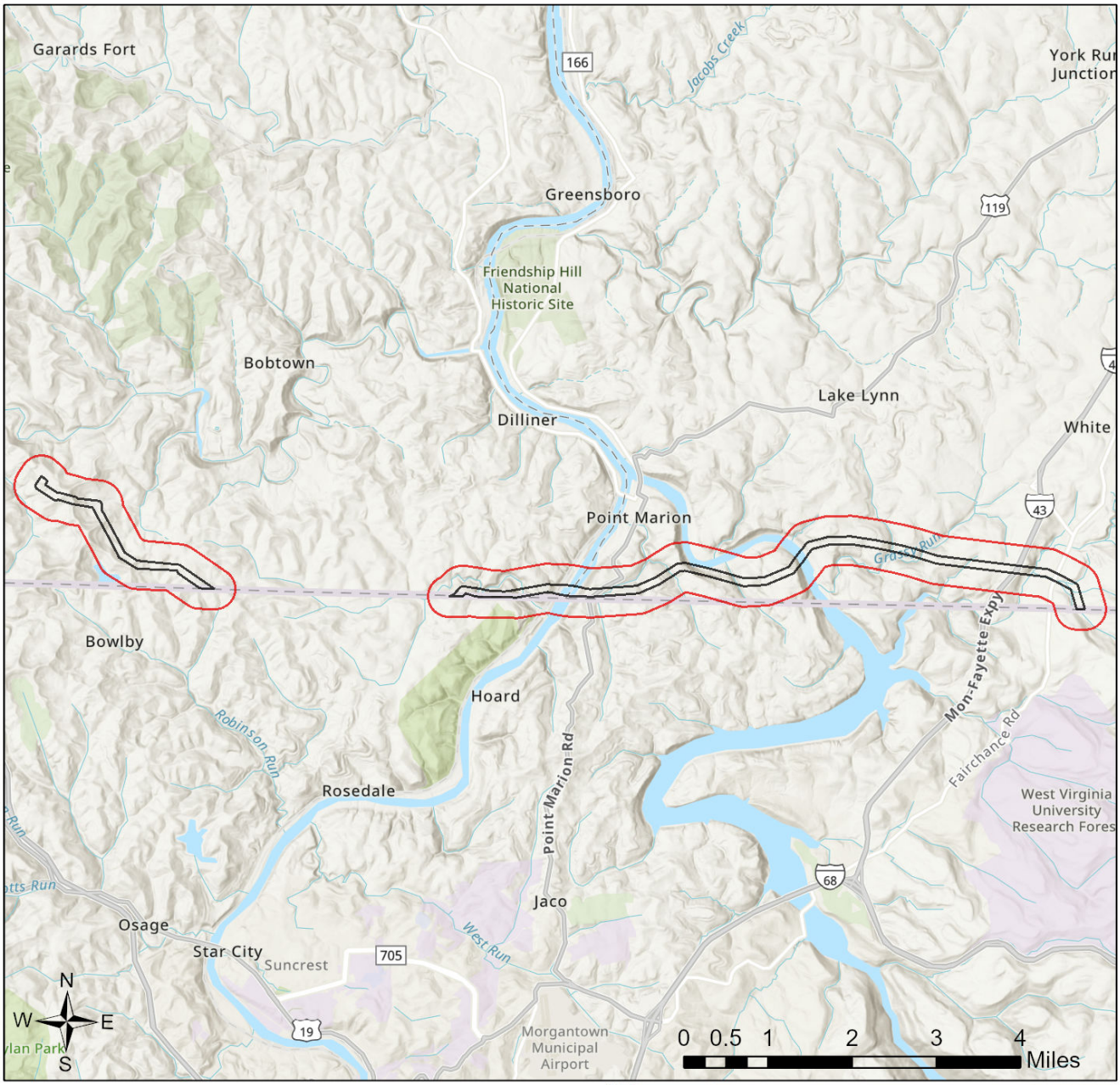
NOT FOR ACTIVE USE
DRAFT

500kV Transmission Line - Proposed Route



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

500kV Transmission Line - Proposed Route



Buffered Project Boundary

Project Boundary



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, Maxar, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA,

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PA Department of Conservation and Natural Resources

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PA Fish and Boat Commission

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

U.S. Fish and Wildlife Service

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DRAFT NOT FOR ACTUAL USE

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email the following information to the agency(s) (see AGENCY CONTACT INFORMATION). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies (but not USFWS).
*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

From: Ryndock, Jason
Sent on: Wednesday, August 6, 2025 12:32:23 PM
To: Alexandra Kenna
CC: Christine Essick; Seymour, Stephanie; Sitch, Kelly
Subject: Proposed 500kV Transmission Line Route Options (PNDI-844264)

EXTERNAL MESSAGE

Hi Lexi,

Thank you for submitting a PNDI for review. I had previously commented on this corridor constraints analysis and recommended the southernmost transmission line route option that dips into Maryland to avoid impacts to blue monkshood and other species locations, as well as Forbes State Forest.

A survey request letter and target species list are attached. This survey will be required for project work anywhere in the potential project corridor. Some of the RTE plant populations occur within this project corridor.

I understand that this PNDI submission is more a data request than a project review. I typically provide species locations prior to a botanical survey if they occur within the project area or will be used as a reference population. I don't typically give out species locations for planning purposes (I had previously suggested using the data request form on the PNHP website or the data available on the Conservation Explorer).

However, my supervisor has given me permission to share these data (attached; the "visits" field in the attribute table corresponds to the specific source feature point/line/polygon). In your email, you indicated that access to these data will be limited to ERM's GIS Specialists and biological subject matter experts and will be deleted from your servers once the study has been completed. We expect that the data will not be shared with anyone else and will be treated as sensitive.

If you have any questions, please let me know.

Thanks,

Jason Ryndock | Ecological Information Specialist 2
PA Department of Conservation & Natural Resources
Bureau of Forestry | Natural Heritage Section

400 Market Street, PO Box 8552 | Harrisburg, PA 17105
Phone: 717-705-2822 | E-mail: c-jryndock@pa.gov<mailto:c-jryndock@pa.gov>

Pennsylvania
Department of Conservation and Natural Resources

July 31, 2025

PNDI Number: 844264
Version: Manual_1; 7/9/2025

Alexandra Kenna
ERM
75 Valley Stream Parkway #200
Malvern, PA 19355
Email: alexandra.kenna@erm.com (hard copy will not follow)

Re: Proposed 500kV Transmission Line Route Options
Greene and Fayette Counties, PA

Dear Alexandra,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number **844264 (Manual_1)** for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

The proposed project will affect State Forest Lands within the Forbes State Forest District. Further coordination with the Bureau of Forestry is required. Additional information regarding this coordination is provided under the heading "Projects on State Forest Lands."

Potential Impact Anticipated – Survey Request

PNDI records indicate species or resources under DCNR's jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened, endangered, or special concern species **(see attached Excel spreadsheet)**.

- ✓ **Survey Request:** A botanical survey for the above species should be conducted by a qualified botanist at the appropriate time of year. Please submit the resulting report to our office for review. Contact our office prior to the survey for detailed information about the species or for a list of qualified surveyors.
- ✓ **Your botanist should carefully review the new DCNR Botanical Survey Protocols available at https://conservationexplorer.dcnr.pa.gov/content/survey-protocols**. These protocols are recommended to ensure that all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.
- ✓ **DCNR recommends that a Wild Plant Management Permit be obtained before conducting botanical surveys for Threatened, Endangered, and Special Concern PA Plant Species.** Permit information and application can be found here: https://conservationexplorer.dcnr.pa.gov/content/resources
- ✓ **A list of qualified botanists who have obtained our Wild Plant Management Permit can be found at https://conservationexplorer.dcnr.pa.gov/content/wild-plant-**

management-permit-holders. These botanists are suitable candidates to perform a survey to our scientific standards.

- ✓ All target and non-target state-listed species found during the botanical survey should be reported to our office. **Please submit a completed Botanical Field Survey Form for each occurrence or population identified: http://www.gis.dcnr.state.pa.us/PNDI/2015%20Field%20Survey%20Form.pdf**. Mitigation measures and monitoring may be requested if state-listed species are found on or adjacent to the site.
- ✓ If preferred habitat does not exist on site, a survey may not be necessary. Please submit a habitat assessment report which describes the current land cover, habitat types, and species found on site.

Projects on State Forest Lands:
A portion of this project takes place on the Forbes State Forest District. The DCNR Bureau of Forestry's *State Forest Resource Management Plan* sets forth guidelines for ecologically-sound management of State Forest Lands and resources including protection of wetlands, wildlife, native wild plants and invasive species management. As such, the DCNR Bureau of Forestry may request additional surveys in association with this project. **This letter applies to PNDI impacts only and does not authorize the initiation of any work on State Forest Lands. Further coordination with the Bureau of Forestry is required. If you have not already done so, please contact the Forbes State Forest District Office at (724) 238-1200.**

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Jason Ryndock, Ecological Information Specialist, by phone (717-705-2822) or via email (c-jryndock@pa.gov).

Sincerely,



Greg Podniesinski, Section Chief
Natural Heritage Section

From: Ryndock, Jason
Sent on: Thursday, June 5, 2025 3:21:05 PM
To: Christine Essick
CC: Michael Tincher; Alexandra Kenna; Rolfes, Bradley; danielle.hall
Subject: Re: [External] RE: Proposed Linear Transmission Project - DCNR review

[Some people who received this message don't often get email from c-jryndock@pa.gov. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

EXTERNAL MESSAGE

Hi Christine,

Thank you for providing GIS files of the draft route options. If you want species occurrence data, I encourage you to use the PNHP data request process: Submit or Request Data<https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.naturalheritage.state.pa.us%2FData.aspx&data=05%7C02%7CAlexandra.Kenna%40erm.com%7Ca8e00051ab434e35a5e608dda4662032%7Cf2fe6bd39c4a485bae69e18820a88 since I cannot make the decision to give out large amounts of data. You can also explore the environmental review polygons on the Conservation Explorer or submit each route option separately as a PNDI for review.

These routes are unfortunately going through large areas of natural habitat, so you should expect botanical surveys. This general area (39.722358, -79.942376) should be avoided. Blue Monkshood (Aconitum uncinatum; PA Threatened; G4 globally uncommon) was documented near here and close to the existing ROW. The southernmost route would probably be best to avoid most species locations and state lands in PA.

If you have any other questions, please let me know.

Thanks,

Jason Ryndock | Ecological Information Specialist 2
PA Department of Conservation & Natural Resources
Bureau of Forestry | Natural Heritage Section

400 Market Street, PO Box 8552 | Harrisburg, PA 17105
Phone: 717-705-2822 | E-mail: c-jryndock@pa.gov<mailto:c-jryndock@pa.gov>

_____
From: Christine Essick <Christine.Essick@erm.com>
Sent: Thursday, May 29, 2025 8:31 PM
To: Ryndock, Jason <c-jryndock@pa.gov>
Cc: Michael Tincher <Michael.Tincher@erm.com>; Alexandra Kenna <Alexandra.Kenna@erm.com>; Rolfes, Bradley <bradley.rolfes@nexteraenergy.com>; danielle.hall <danielle.hall@nexteraenergy.com>
Subject: RE: [External] RE: Proposed Linear Transmission Project - DCNR review

Hi Jason,

Thank you for the quick response! Attached is the zip file with an "abc" extension. Please save this file locally and then change the extension back to .zip. Please let me know if that does not work.

Thank you,
Christine

Christine Essick
PartnerShe/Her/Hers 75 Valley Stream Parkway | Suite 200 Malvern, PA 19355
erm.com
484-886-7418
-----Original Message-----
From: Ryndock, Jason <c-jryndock@pa.gov>
Sent: Wednesday, May 28, 2025 5:42 PM
To: Christine Essick <Christine.Essick@erm.com>
Cc: Michael Tincher <Michael.Tincher@erm.com>; Alexandra Kenna <Alexandra.Kenna@erm.com>; Rolfes, Bradley <bradley.rolfes@nexteraenergy.com>; danielle.hall <danielle.hall@nexteraenergy.com>
Subject: Re: [External] RE: Proposed Linear Transmission Project - DCNR review

EXTERNAL MESSAGE

Hi Christine,

I received the pdf attached to your most recent email, but not the zip file. Our server can be weird about zip files. You can try renaming the file extension (e.g., change .zip to .zap) or another file transfer method. Let me know if nothing seems to be working.

Thanks,

Jason Ryndock | Ecological Information Specialist 2 PA Department of Conservation & Natural Resources Bureau of Forestry | Natural Heritage Section

400 Market Street, PO Box 8552 | Harrisburg, PA 17105
Phone: 717-705-2822 | E-mail: c-jryndock@pa.gov<mailto:c-jryndock@pa.gov>

_____
From: Christine Essick <Christine.Essick@erm.com>
Sent: Tuesday, May 27, 2025 8:21 AM
To: Ryndock, Jason <c-jryndock@pa.gov>
Cc: Michael Tincher <Michael.Tincher@erm.com>; Alexandra Kenna <Alexandra.Kenna@erm.com>; Rolfes, Bradley <bradley.rolfes@nexteraenergy.com>; danielle.hall <danielle.hall@nexteraenergy.com>
Subject: [External] RE: Proposed Linear Transmission Project - DCNR review

ATTENTION: This email message is from an external sender. Do not open links or attachments from unknown senders. To report suspicious email, use the Report Phishing button in Outlook.
<https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.pa.gov%2Fcontent%2Fdam%2Fcopapwp-pagov%2Fen%2Foa%2Fdocuments%2Fdocuments%2Fcofense-report-phishing-

Crooked Run at West Virginia Border NHA

A site of State Significance

Crooked Run flows through a small forest patch near the West Virginia border. The surrounding landscape is a mix of agriculture and energy development, as well as forest. The canopy and understory along Crooked Run is a mix of sugar maple (*Acer saccharum*), black cherry (*Prunus serotina*), with witch-hazel (*Hamamelis virginiana*), American hophornbeam (*Ostrya virginiana*), American hornbeam (*Carpinus caroliniana*), and spicebush (*Lindera benzoin*). A powerline ROW also passes close to this site. A population of **blue monkshood** (*Aconitum uncinatum*) grows along the stream, in moist soils with filtered light.

This site is of State significance. It has been assigned this significance level because of the tracked species at the site, which are considered Secure (G5) or Apparently Secure (G4) at the global level. Within Pennsylvania, these species have limited numbers, due to occurring at the edge of their range or to loss of habitat.



Blue monkshood grows along Crooked Run. Photo: Steve Grund, PNHP

All species tracked by PNHP documented at this NHA include:

Species or Natural Community Name	Global[1]	State[1]	PA Legal Status[1]	PABS Status[1]	Last Observed	Quality[2]
Blue Monkshood (*Aconitum uncinatum*)	G4	S2	PT	PT	1988	BC

[1] See the PNHP (http://www.naturalheritage.state.pa.us/rank.aspx) for an explanation of PNHP ranks and legal status. PABS status refers to the status recommended by the Pennsylvania Biological Survey.

[2] See NatureServe (http://www.natureserve.org/explorer/eorankguide.htm) for an explanation of quality ranks.

Threats and Species Recommendations

The primary issues at this site are likely avoiding further fragmentation of the forest, monitoring for invasive plant species, and ensuring that the habitat for blue monkshood does not become too densely canopied, and other plant species, including aggressive native species, do not outcompete the rare plant. Specific threats and stresses to the elements present at this site, as well as conservation actions, include:

- Natural succession can convert open wetland habitats to closed canopy shrub swamps or wet forests, eliminating critical habitat for the species of concern documented here. Action may be needed to reverse the colonization of woody species, and prevent other more competitive herbaceous species from overtaking the rare plant.
- Avoid disturbances to the forest patch, including from expansion of energy or transportation infrastructure. Fragmentation can lead to the introduction of invasive species, as well as direct destruction of habitat.

We envision this NHA site account as one of the first steps for promoting conservation management actions to support the species of concern at the site. Many of these sites may have multiple habitat types present and require a mix of conservation strategies that may occasionally conflict. PNHP staff are available for additional consultation to help address specific site challenges. For additional information, please contact naturalheritage@paconserve.org.

Location

Municipalities: Greene County: Dunkard Township

USGS quads: Morgantown North

Previous CNHI reference: This site does not overlap a previously published site.

Associated NHAs: This site is not directly associated with another NHA.

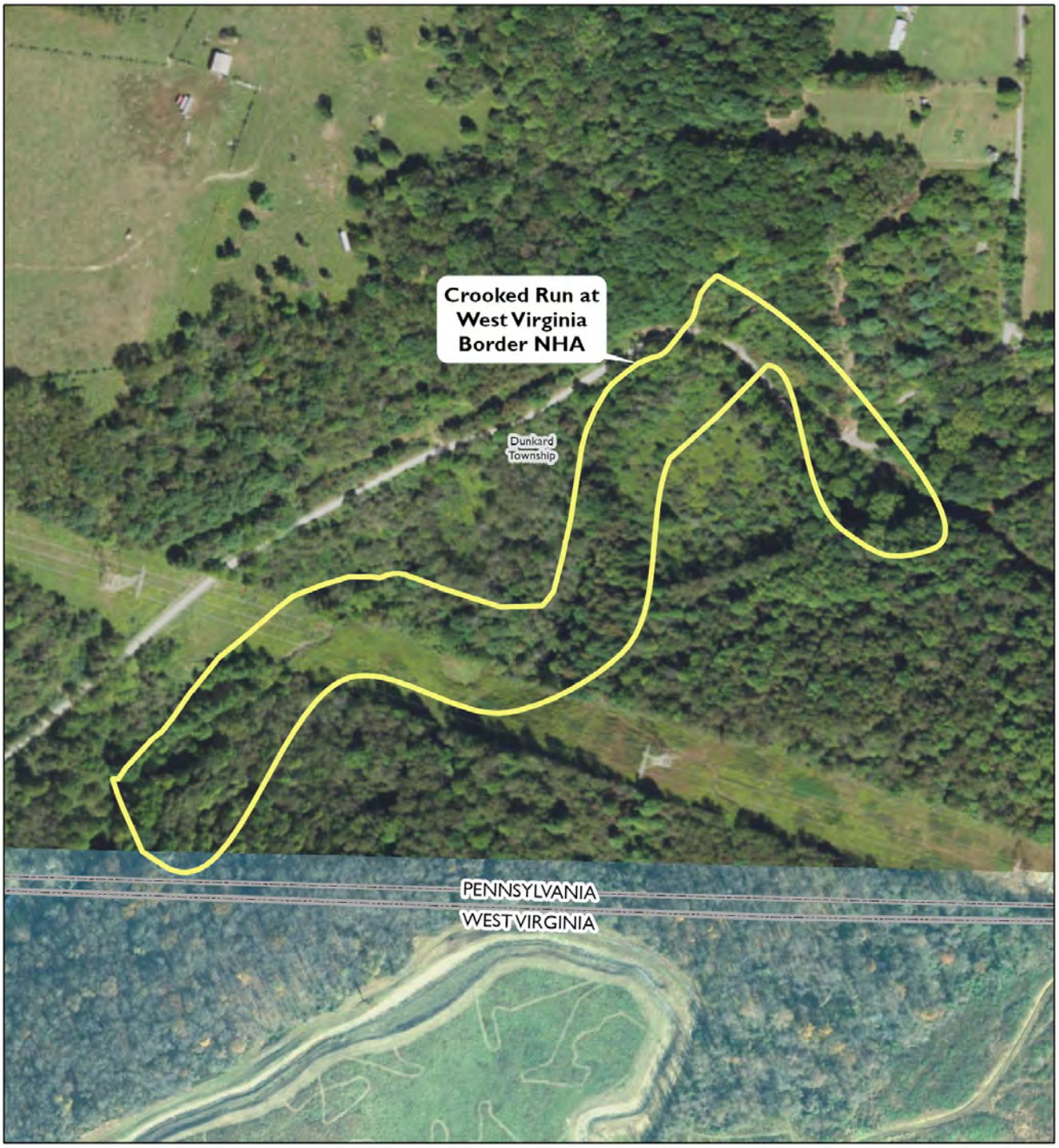
Overlapping Protected Lands: This site is not documented as overlapping with any Federal, state, or locally protected land or conservation easements.

Approximate Acreage: 13 acres

References

This Natural Heritage Area was developed as part of an update to the Southwest Pennsylvania Commission with funding from the DCNR Community Conservation Partnership Program.

Please cite this Natural Heritage Area as:
Pennsylvania Natural Heritage Program. 2021. Crooked Run at West Virginia Border NHA. Created on 13 Jan 2021. Available at: http://www.naturalheritage.state.pa.us/inventories.aspx


Crooked Run at West Virginia Border NHA
Dunkard Township
PENNSYLVANIA
WEST VIRGINIA
0 0.03 0.06 0.12 Miles
0 0.03 0.07 0.13 Kilometers
N
PNHP
Pennsylvania Natural Heritage Program
NHA Core Habitat
Other NHAs
Protected Land
Conservation Easement

pennsylvania
FISH AND BOAT COMMISSION

May 1, 2024

IN REPLY REFER TO
SIR# 59621

Michael Tincher
75 Valley Stream Parkway
Malvern, Pennsylvania 19355

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No.
Proposed Linear Transmission Project
FAYETTE County - GREENE County - SOMERSET County

Dear Michael Tincher:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish and Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish and Boat Code (Chapter 75), or the Wildlife Code.

Species of Concern, including Pennsylvania threatened and endangered species, occur with the proposed project area. Aquatic species of concern occur in the Monongahela River and Dunkard Creek. Additionally, terrestrial species of concern under our jurisdiction occur along Chestnut Ridge.

We will need to conduct a more thorough evaluation of the potential adverse impacts that the proposed project could have on the species of concern. We will need to review items **such as:** color photographs of the project area keyed to a site plan, basic site plans, a project narrative describing exactly how the construction/maintenance activity is to be conducted, waterway and/or wetland acreage to be impacted (directly and indirectly), a description of the onsite soils, and a water-body characterization (i.e., depth, width, flow velocity, substrate/bottom type, presence of aquatic vegetation, and woody debris or other basking areas, etc.). Follow-up information may be uploaded to the PA Conservation Explorer site PNDI project file. Pending the review of this information, further consultation may be needed and/or a survey targeting the species of concern may be warranted.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Josh Brown at 814-359-5129 or joshubrown@pa.gov and refer to the SIR # 59621. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,



Christopher A. Urban, Chief
Natural Diversity Section

CAU/JRB/dn

Pennsylvania Fish and Boat Commission

pennsylvania
FISH AND BOAT COMMISSION

June 24, 2025

IN REPLY REFER TO
SIR# 61630

ERM
Alexandra Kenna
75 Valley Stream Parkway
Malvern, Pennsylvania 19355

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No.
Proposed 500kV Transmission Line Route Options
FAYETTE County - GREENE County

Dear Alexandra Kenna:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish and Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish and Boat Code (Chapter 75), or the Wildlife Code.

Based on records maintained in the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files, several rare or protected species are known from the vicinity of the project site.

Pistolgrip (*Tritogonia verrucosa*, Endangered)
Three-ridge (*Amblema plicata*, Rare)
Wabash Pigtoe (*Fusconaia flava*, Rare)
Wavy-rayed Lampmussel (*Lampsilis fasciola*, Rare)

The above-listed species occur within 0.25 miles of the section of the proposed ROW West of the Monongahela River. No adverse impacts are anticipated to these species provided that best management practices for water quality are implemented.

Ghost Shiner (*Notropis buchanani*, Endangered)

The state-endangered Ghost Shiner is known to occur in the Monongahela River. We are concerned about direct and indirect (i.e., runoff) effects that the proposed project may have on the species of concern. Juvenile and adult fish are extremely vulnerable to physical (i.e., siltation, dredging, trenching, rip-rap, hydrologic alterations) and chemical (i.e., pH, temperature, dissolved oxygen, organic contaminants, heavy metals) changes to their aquatic environment. Measures to prevent the release of sediment and harmful chemicals into waterways should be implemented. I recommend that you minimize any instream disturbance or water quality degradation during and after the project

installation. Therefore, we recommend construction techniques that avoid instream work, sediment release, and changes to water quality and that fuel storage tanks for equipment re-fueling be located at least 100 feet away from waterways. Storm sewers and retention basins should be designed so as to minimize/remove all silt from the water before it is released into the stream. Strict erosion and sedimentation control measures, as well as best management practices should be employed.

Provided that these recommendations are followed, instream work is avoided, strict E&S control measures are maintained, and best management practices are employed, we do not foresee any significant adverse impacts from the proposed activity to the fish species of special concern.

Green Salamander (*Aneides aeneus*, Threatened)
Timber Rattlesnake (*Crotalus horridus*, Species of Concern)

The proposed project site encroaches known occurrences of Green Salamander and Timber Rattlesnake, along both the northern and southern proposed ROW between US Route 43 and PA281/WV26. Based on the review of this information and the proximity of the project to known element occurrences of the Green Salamander and Timber Rattlesnake potential habitat could be present within the proposed disturbance area. Therefore, additional evaluations are necessary to confirm whether or not the project site contains suitable habitat and to determine the potential for adverse impacts to this species. We request completion of a **habitat assessment** to characterize and determine if potential habitat exists within the vicinity of the proposed project area.

A qualified biologist, who possesses the necessary Scientific Collector's Permit issued by the Pennsylvania Fish and Boat Commission, must conduct this habitat assessment. A list of biologists recognized as qualified by the Pennsylvania Fish and Boat Commission to perform these assessments is enclosed. Upon completion of the habitat assessments, the qualified biologist is to submit a summary report to this office for further review and consultation. This information can be uploaded into Conservation Explorer.

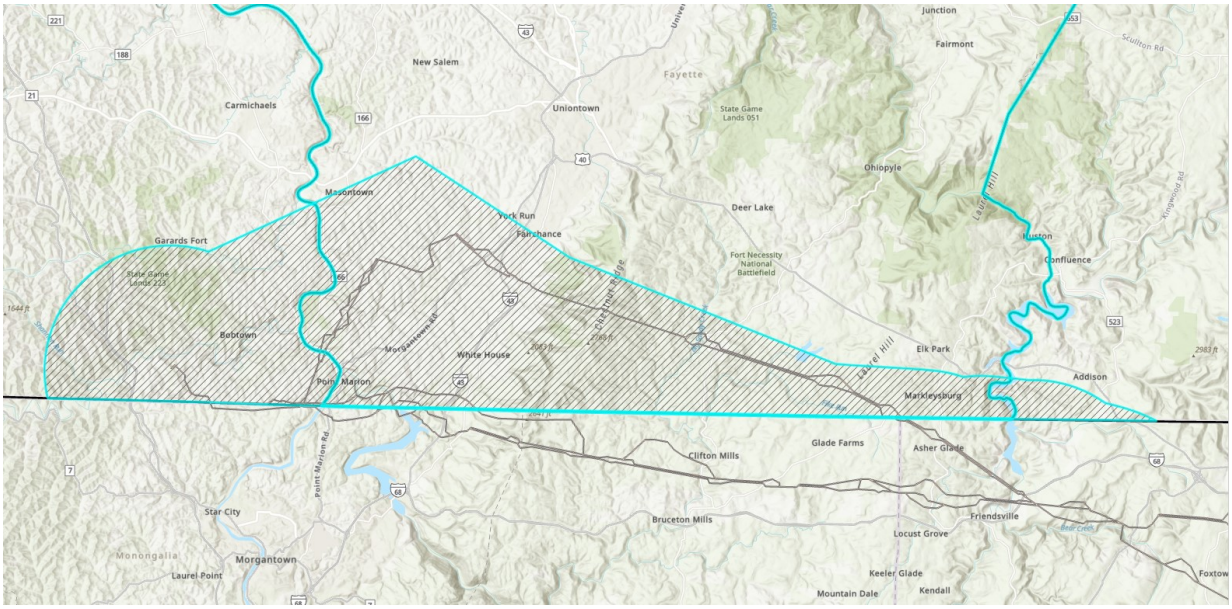


Figure 1. Map showing AOI in Pennsylvania, including route options for proposed transmission line.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Josh Brown at 814-359-5129 or joshubrown@pa.gov and refer to the SIR # 61630. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,



Christopher A. Urban, Chief
Natural Diversity Section

CAU/JRB/dn

Enclsoures

Pennsylvania Game Commission

PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT
2001 ELMERTON AVENUE HARRISBURG, PA 17110-9797 | (717) 787-5529

June 30, 2025 **PGC ID Number: 202506110201**

Alexandra Kenna
ERM
75 Valley Stream Parkway #200
Malvern, PA 19355
alexandra.kenna@erm.com

Re: *NextEra Energy Transmission MidAtlantic* – Proposed 500kV Transmission Line Route Options
PNDI Receipt File: *manual submission*
Multiple Municipalities and Townships; Greene and Fayette Counties, Pennsylvania

Dear Alexandra Kenna,

Thank you for submitting Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt *project_receipt_pabetw100_waterline_834022_FINAL_1.pdf* for review. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

Potential Impact Anticipated

PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that potential impacts to the following threatened, endangered, or special concern species of birds and mammals may be associated with your project. Therefore, additional measures are necessary to avoid potential impacts to the species listed below:

Common Name	Scientific Name	PA Status	Federal Status
Tri-colored Bat	*Perimyotis subflavus*	ENDANGERED	Proposed Endangered
Little Brown Bat	*Myotis lucifugus*	ENDANGERED	N/A
Allegheny Woodrat	*Neotoma magister*	THREATENED	N/A

Next Steps

Tri-colored and Little Brown Bats have been documented in the vicinity of the project area. The **Tri-colored Bat** is a PA state-endangered species and has been proposed by the U.S. Fish & Wildlife Service (USFWS) to be federally listed as endangered under the Endangered Species Act. As such, the PGC is still the jurisdictional agency for Tri-colored Bats in PA. To avoid potential impacts to **Tri-colored Bats and Little Brown Bats**, a seasonal tree clearing restriction is to be implemented:

- All trees greater than 3 inches in diameter at breast height that need to be removed to facilitate the project are NOT to be cleared between **April 1st and November 15th** for the portion of the proposed line route around the Cheat River and the PA/MD border.

In addition, a Habitat Suitability Assessment (HSA) should be performed for **Allegheny Woodrats** for the proposed line route around the Cheat River and the PA/MD border (Bortz Road).

- The HSA will be conducted using the guidelines in Appendix B of the PGC Allegheny Woodrat Environmental Review Guidance Document (attached).
- Submit HSA plans to the PGC for review at least 30 days prior to the start of surveys.
- Results of the HSA should be reported to the PGC no later than December 31 of the year the assessment was conducted.
- If suitable habitats are found, presence/absence surveys may be requested.

Further, a portion of the northern proposed line route is located on **State Game Lands No. 138**. Please contact Mr. Matthew Lucas, Land Management Supervisor at 724-238-9523 to discuss the project activities and coordinate obtaining the necessary approvals if your project will impact State Game Lands. It is recommended that you coordinate with Game Commission Staff early in your project planning process.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Please be sure to include the above-referenced PGC ID Number on any future correspondence with the PGC regarding this project.

Sincerely,



Sue Guers
Wildlife Biologist / Environmental Review Lead
Bureau of Wildlife Management
Phone: 717-787-4250, Extension 73412
Fax: 717-787-6957
E-mail: suguers@pa.gov

A PNHP Partner



SLG/slg

Attachment: *PGC Allegheny Woodrat Environmental Review Guidance Document*

cc: Pamela Shellenberger, USFWS
Schnupp
Williams
Lovallo
Turner
Farabaugh
Lucas
Trusso

H:\OIL&GAS_PNDI_Reviews\Southwest Region

APPENDIX E MAPBOOKS FOR ROUTING STUDY

APPENDIX E-1 MAJOR CONSTRAINTS AND OPPORTUNITIES MAPBOOK

APPENDIX E-2 TERRAIN AND SLOPE MAPBOOK

APPENDIX E-3 PRELIMINARY DRAFT ROUTE OPTIONS MAPBOOK

APPENDIX E-4 ROUTE SEGMENTS MAPBOOK

APPENDIX E-5 PRELIMINARY DRAFT ROUTE OPTIONS AND FINAL ROUTE ALTERNATIVES MAPBOOK

APPENDIX E-6 ALTERNATIVE ROUTES MAPBOOK

APPENDIX E-7 ALTERNATIVE ROUTES

APPENDIX E-8 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES, PARALLELING, COMMUNITY AND RECREATION AND PROTECTED AREAS MAPBOOK

APPENDIX E-9 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES—CULTURAL RESOURCES MAPBOOK (CONFIDENTIAL)

APPENDIX E-10 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES—AGRICULTURAL AND LAND COVER MAPBOOK

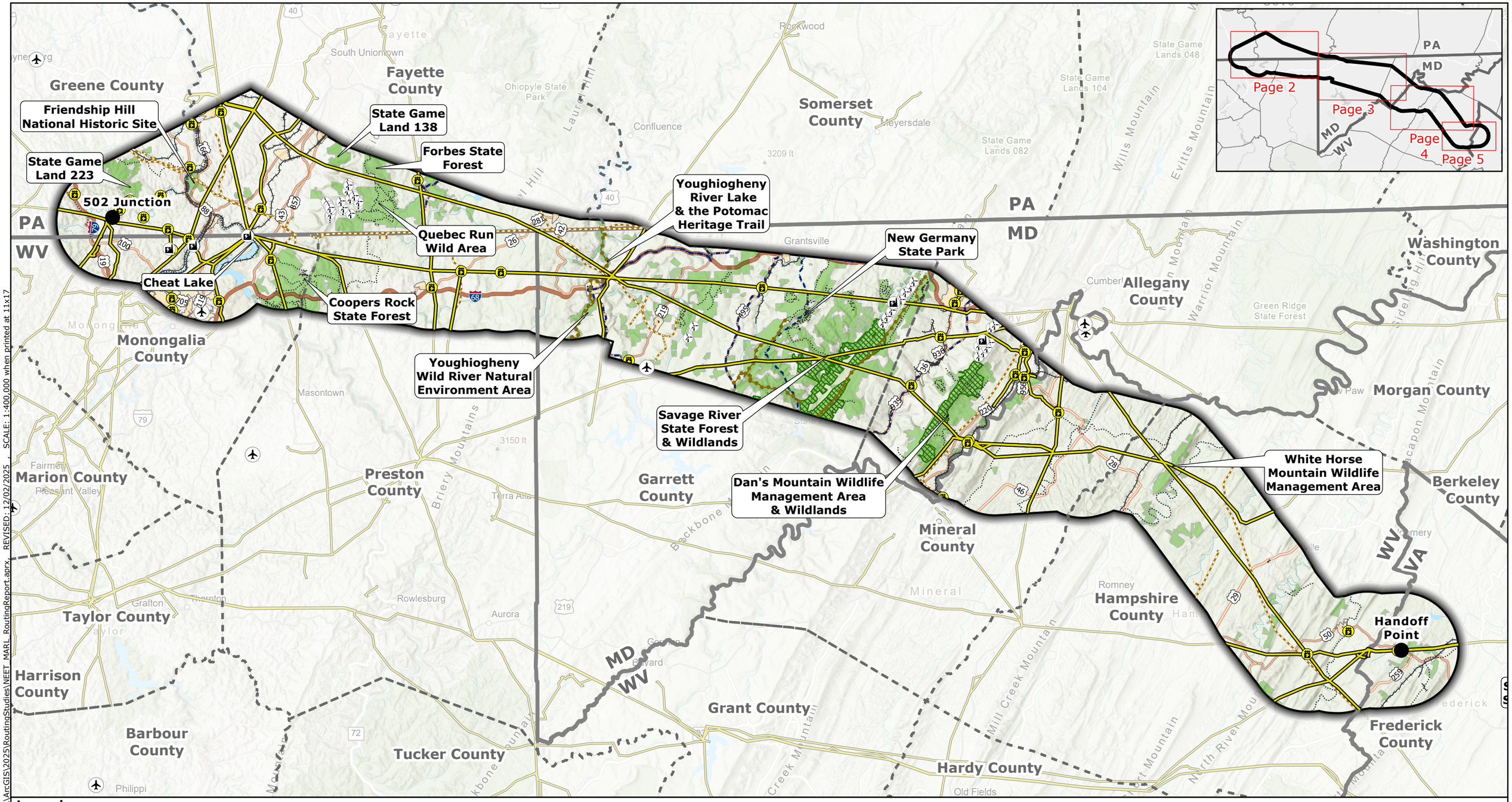
APPENDIX E-11 ALTERNATIVE ROUTES—NATURAL ENVIRONMENT—WATER RESOURCES MAPBOOK

APPENDIX E-12 ALTERNATIVE ROUTES—NATURAL ENVIRONMENT—SENSITIVE SPECIES AND HABITATS MAPBOOK (CONFIDENTIAL)

APPENDIX E-13 ALTERNATIVE ROUTES—ENGINEERING AND INFRASTRUCTURE MAPBOOK

APPENDIX E-14 THE PROPOSED ROUTE MAPBOOK

APPENDIX E-1 MAJOR CONSTRAINTS AND OPPORTUNITIES MAPBOOK


Friendship Hill National Historic Site
State Game Land 223
502 Junction
Cheat Lake
State Game Land 138
Forbes State Forest
Quebec Run Wild Area
Coopers Rock State Forest
Youghiogheny River Lake & the Potomac Heritage Trail
Youghiogheny Wild River Natural Environment Area
New Germany State Park
Savage River State Forest & Wildlands
Dan's Mountain Wildlife Management Area & Wildlands
White Horse Mountain Wildlife Management Area
Handoff Point
Page 2
Page 3
Page 4
Page 5
PA
WV
MD
VA
Greene County
Fayette County
Somerset County
Washington County
Allegany County
Morgan County
Berkeley County
Monongalia County
Marion County
Preston County
Garrett County
Mineral County
Hampshire County
Frederick County
Taylor County
Harrison County
Barbour County
Tucker County
Grant County
Hardy County
Legend
Project Endpoints
Substation
Wind Turbines
Power Plants
Public Airports
Project Study Area
County Boundary
State Border
High-Level Opportunities
Existing High-Voltage Transmission Lines (>69kV)
Railway
Major Pipelines
Interstate
U.S. / State Highway
High-Level Constraints
Potomac Heritage Trail
Hiking/Walking Trails
Scenic Byways
Protected Areas*
Maryland Wildlands
Incorporated Places
NOTES
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2. **Trout stream data was created using data from each state.
N
0 3.5 7 10.5 14
Miles
Scale: 1:400,000
1 inch equals 33,333ft (when printed at 11x17)
Appendix E-1
Major Constraints and Opportunities
Page 1 of 5
MidAtlantic Resiliency Link
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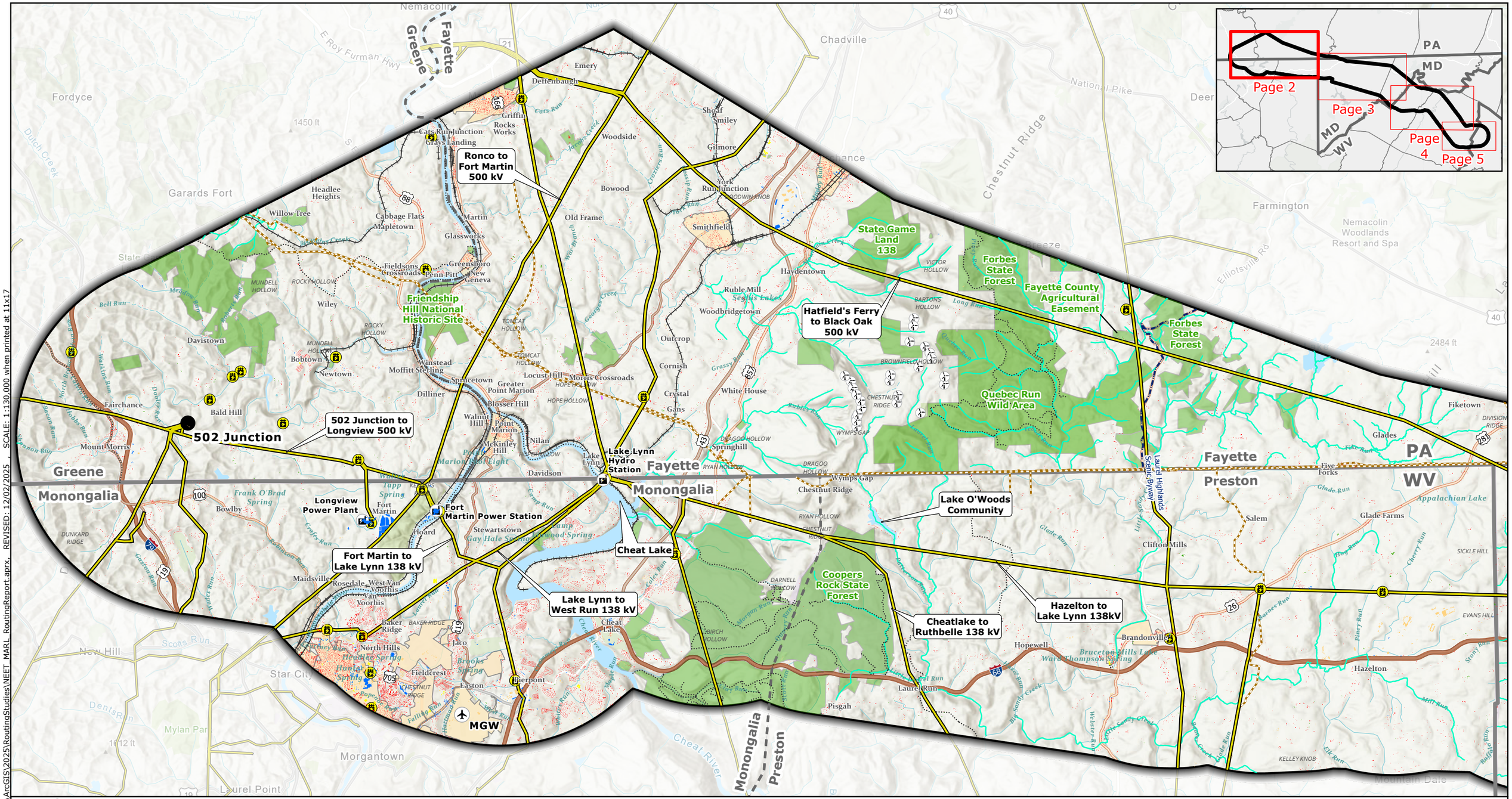

Legend

- Project Endpoints
- Substation
- Wind Turbines
- Power Plants
- Public Airports
- Project Study Area
- County Boundary
- State Border

High-Level Opportunities

- Existing High-Voltage Transmission Lines (>69kV)
- Railway
- Major Pipelines
- Interstate
- U.S. / State Highway

High-Level Constraints

- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways
- Trout Streams and Coldwater Fisheries**
- Protected Areas*
- Maryland Wildlands
- Incorporated Places

Buildings Footprints

- Residential (House)
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- Assembly
- Education
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Appendix E-1
Major Constraints and Opportunities

Page 2 of 5

MidAtlantic Resiliency Link

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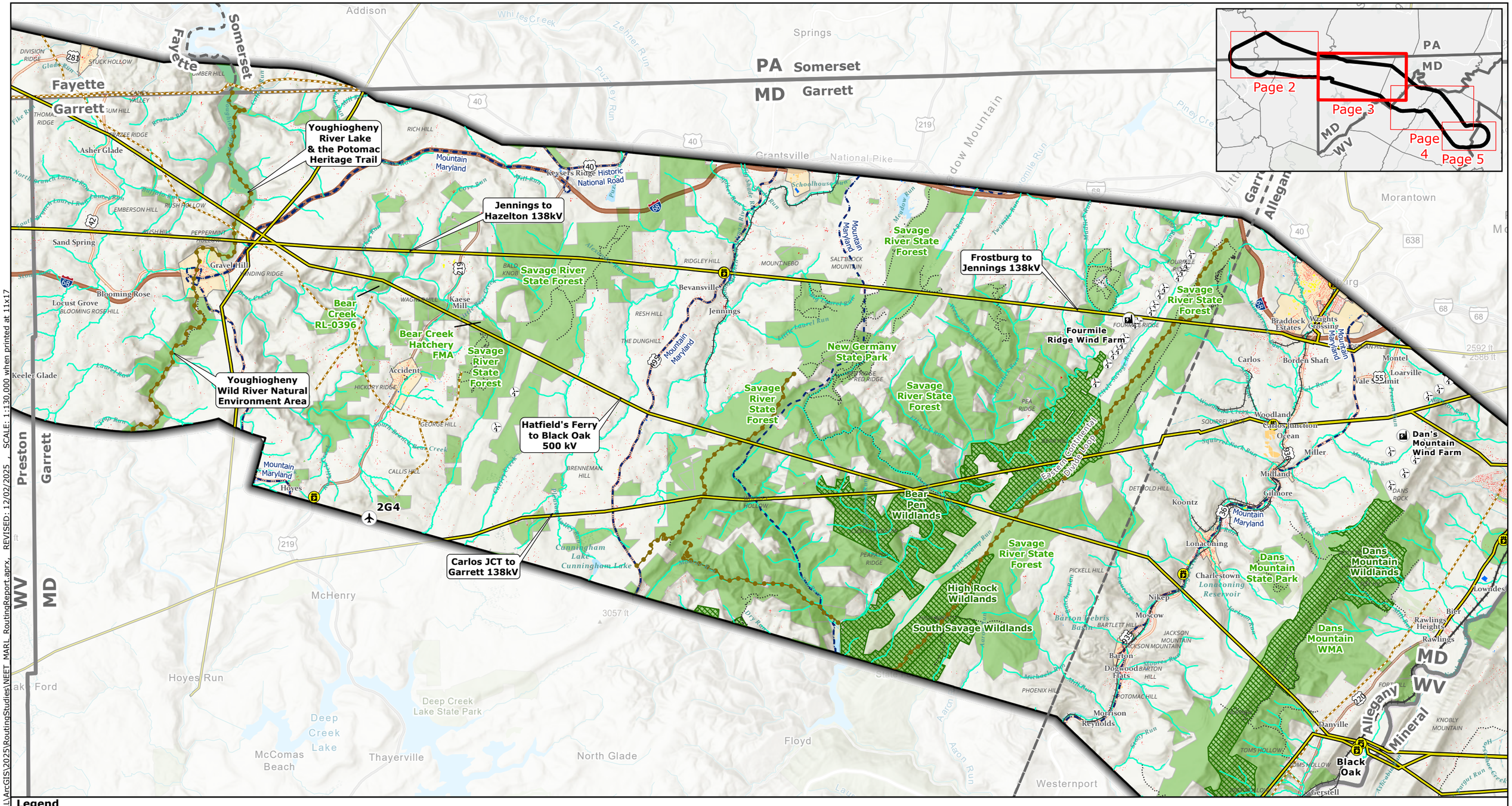

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Major Constraints and Opportunities
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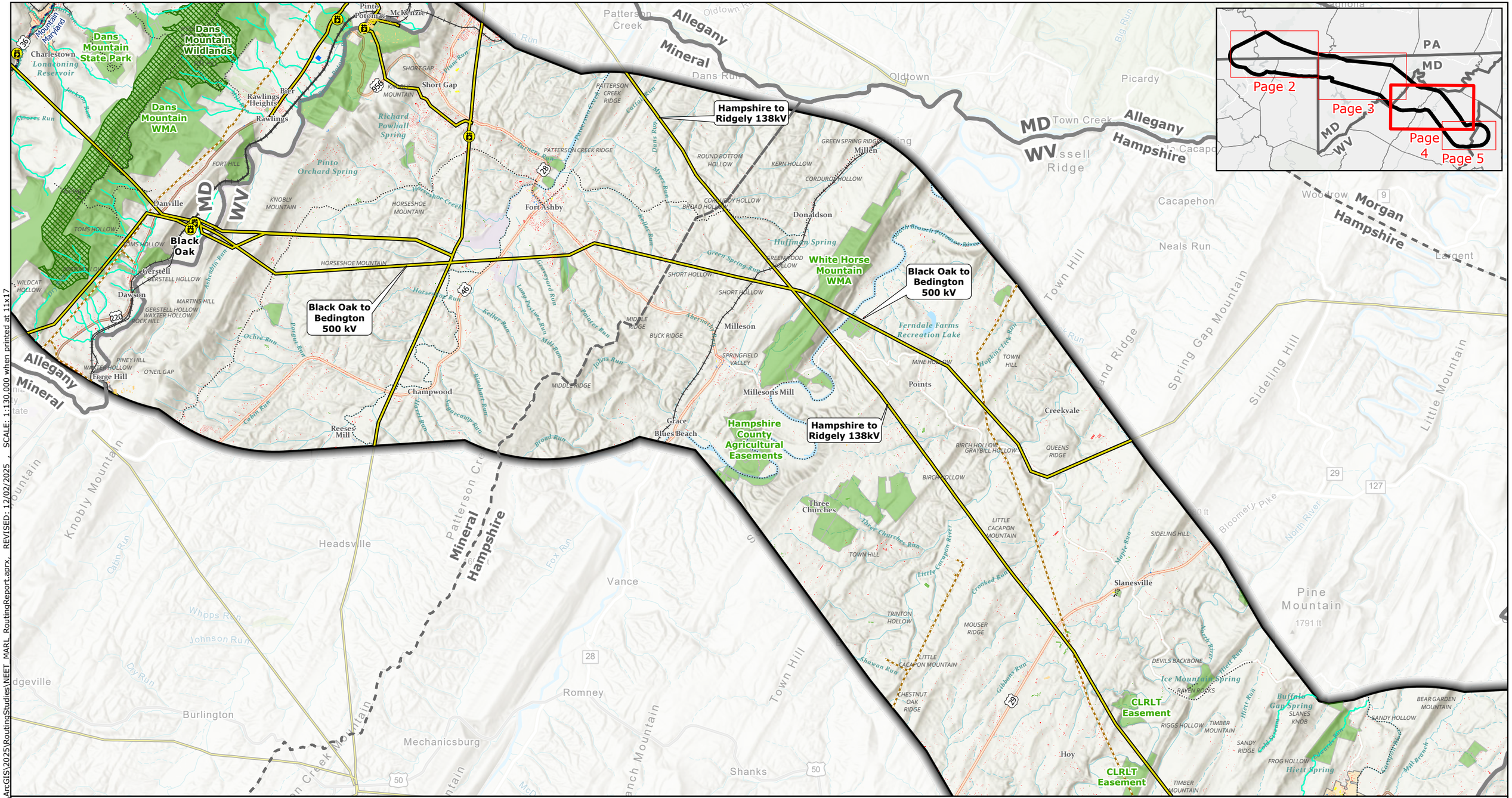

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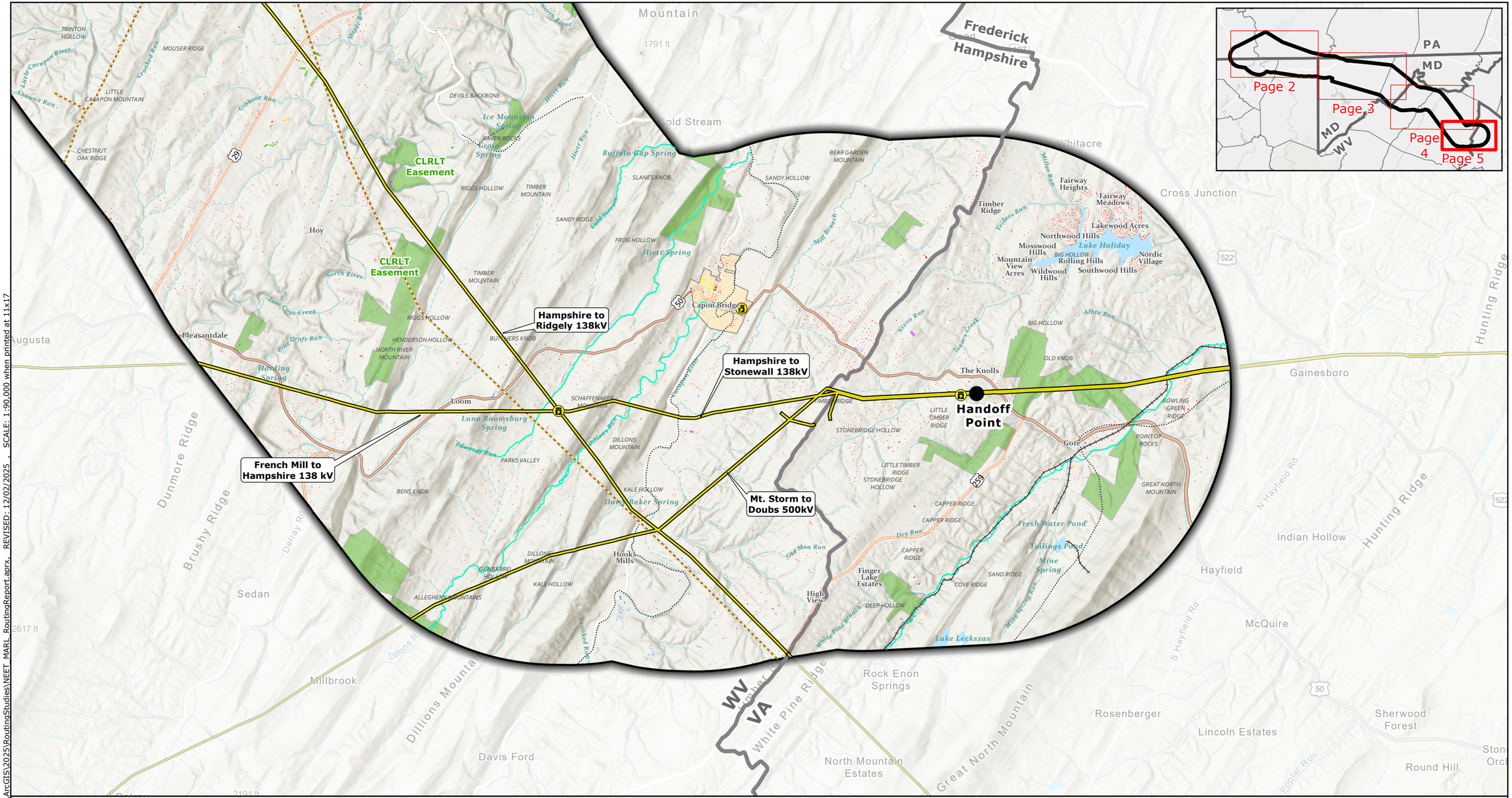

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0 0.8 1.6 2.4 3.2

Miles

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Appendix E-1
Major Constraints and Opportunities

Page 5 of 5

MidAtlantic Resiliency Link

ERM

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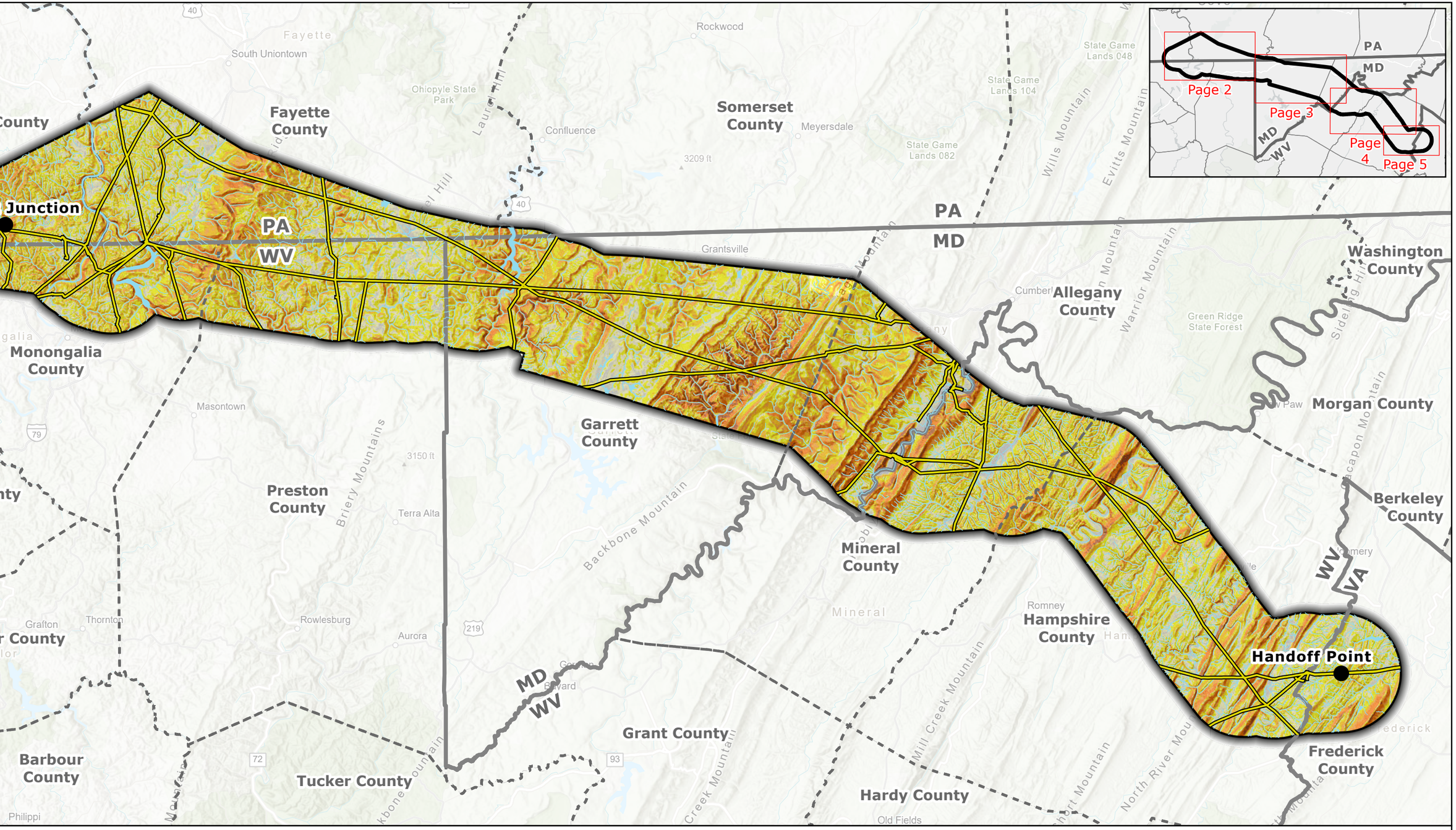
APPENDIX E-2 TERRAIN AND SLOPE MAPBOOK



Legend

- Project Endpoints
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border
- Stream/River (USGS NHD)
- Waterbody/Area (USGS NHD)

Terrain - Slope Map

- Flat (0°)
- Nearly level (1°)
- Gently level (2°)
- Gently sloping (3° - 5°)
- Strongly sloping (6° - 10°)
- Gently steep (11° - 15°)
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

NOTES
1. Terrain and Slope information derived from ESRI and publicly available LiDAR data

N

0 3.5 7 10.5 14
Miles

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Appendix E-2
Terrain and Slope
Page 1 of 5
MidAtlantic Resiliency Link

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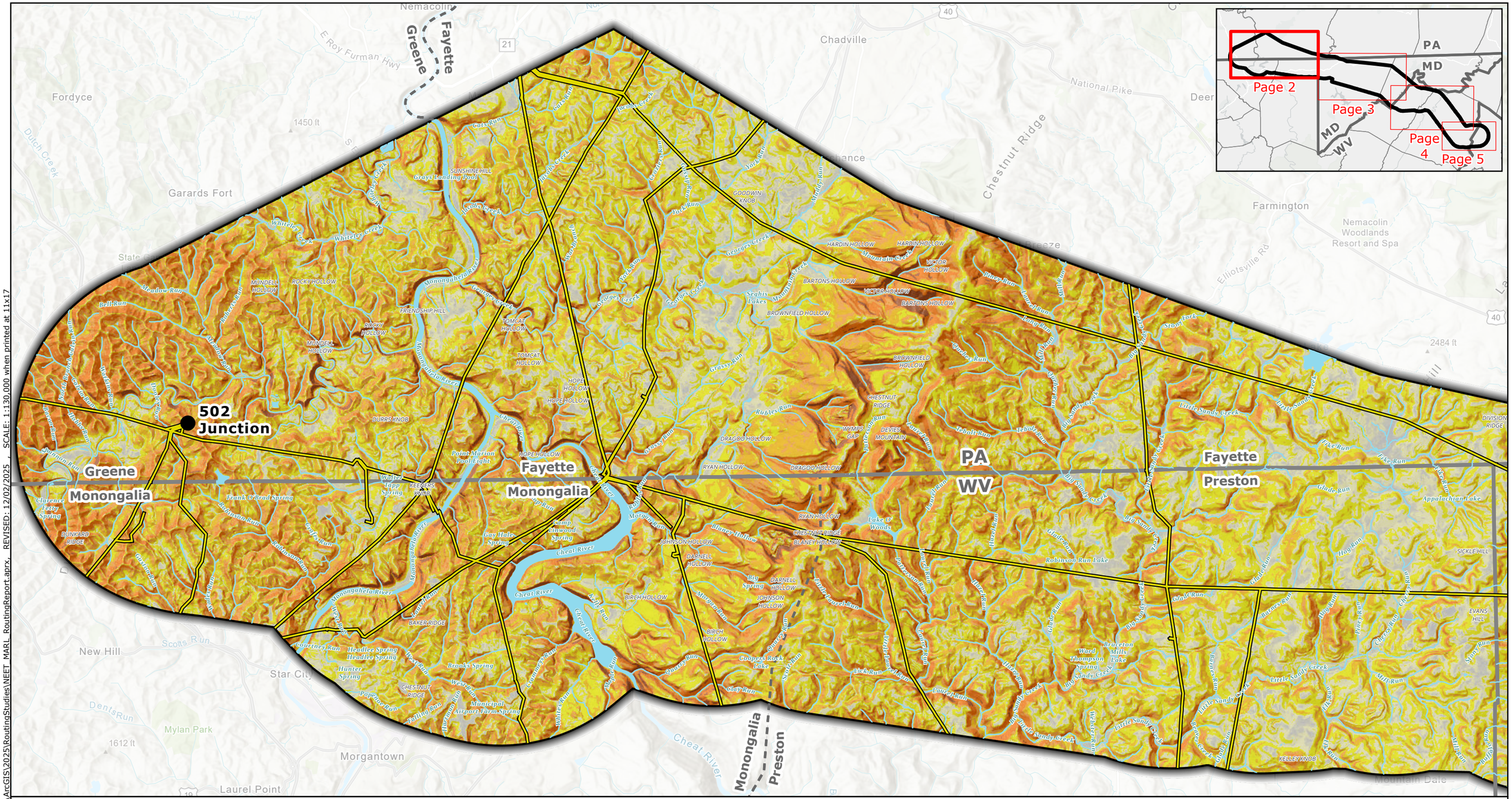

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Miles

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Appendix E-2
Terrain and Slope
Page 2 of 5
MidAtlantic Resiliency Link

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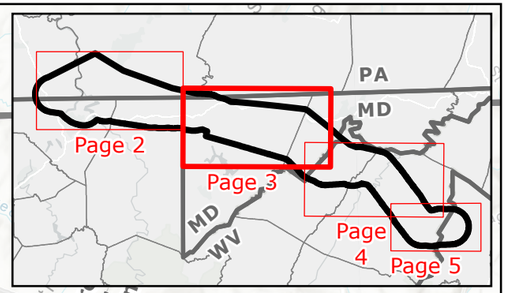

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Appendix E-2
Terrain and Slope
Page 3 of 5
MidAtlantic Resiliency Link

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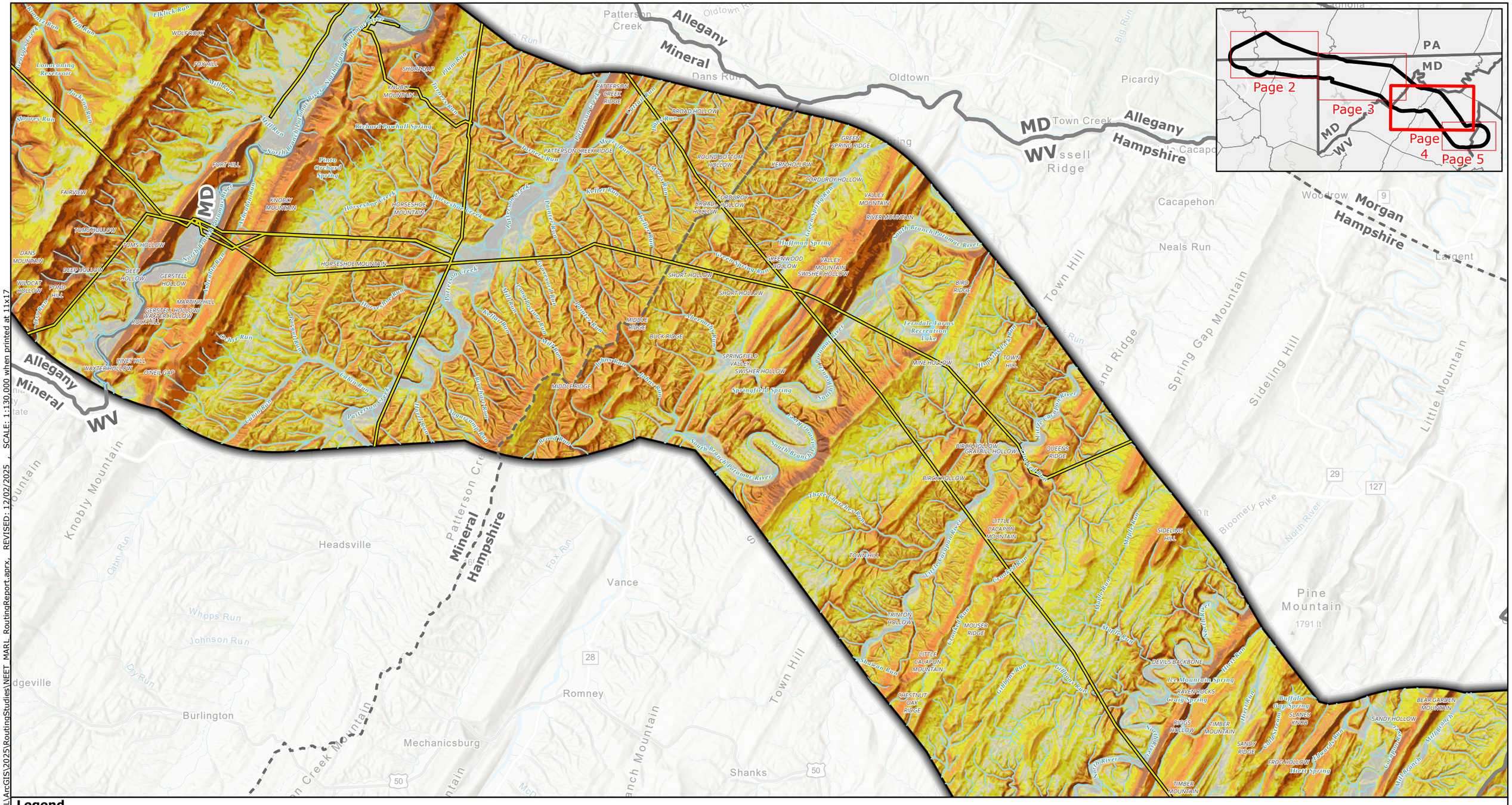

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Appendix E-2
Terrain and Slope
Page 4 of 5
MidAtlantic Resiliency Link

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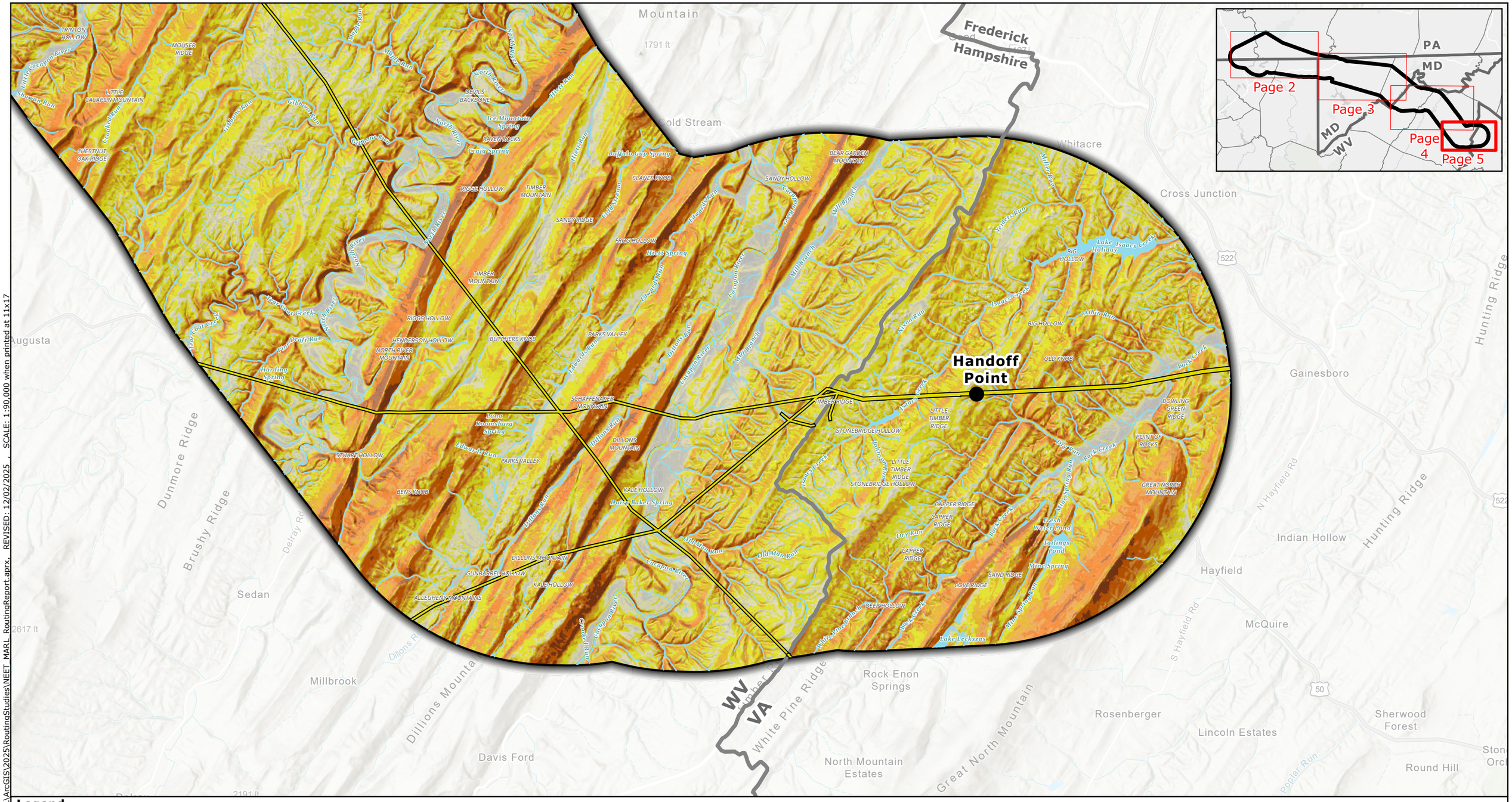

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NOTES
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N

0 0.8 1.6 2.4 3.2
Miles

Scale: 1:90,000
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Appendix E-2
Terrain and Slope
Page 5 of 5
MidAtlantic Resiliency Link

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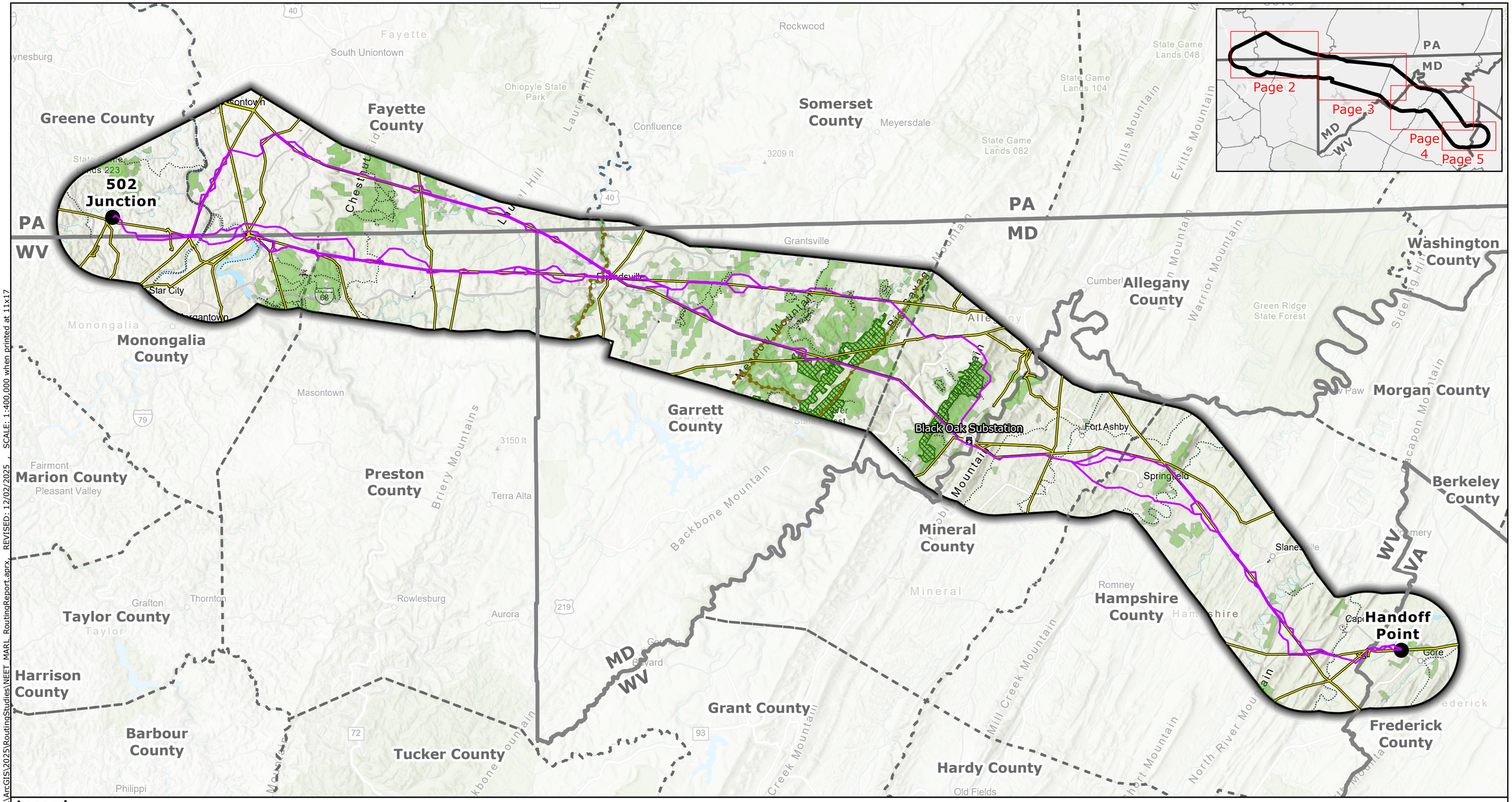
Source: NAD 1983 UTM Zone 17N

APPENDIX E-3 PRELIMINARY DRAFT ROUTE OPTIONS MAPBOOK



Legend

- Project Endpoints
- Black Oak Substation
- Preliminary Draft Route Options Presented at Open Houses
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border
- Hiking/Walking Trails
- Potomac Heritage Trail
- Protected Areas*
- Maryland Wildlands

NOTES

*1. *Protected Areas includes local, county, state and federal parks, conservation easements, agricultural easements, state forests, and wildlife management areas.*

N

0 3.5 7 10.5 14

Miles

Scale: 1:400,000

1 inch equals 33,333ft (when printed at 11x17)

Appendix E-3
Preliminary Draft Route Options
Page 1 of 5
MidAtlantic Resiliency Link

ERM

Source: NAD 1983 UTM Zone 17N

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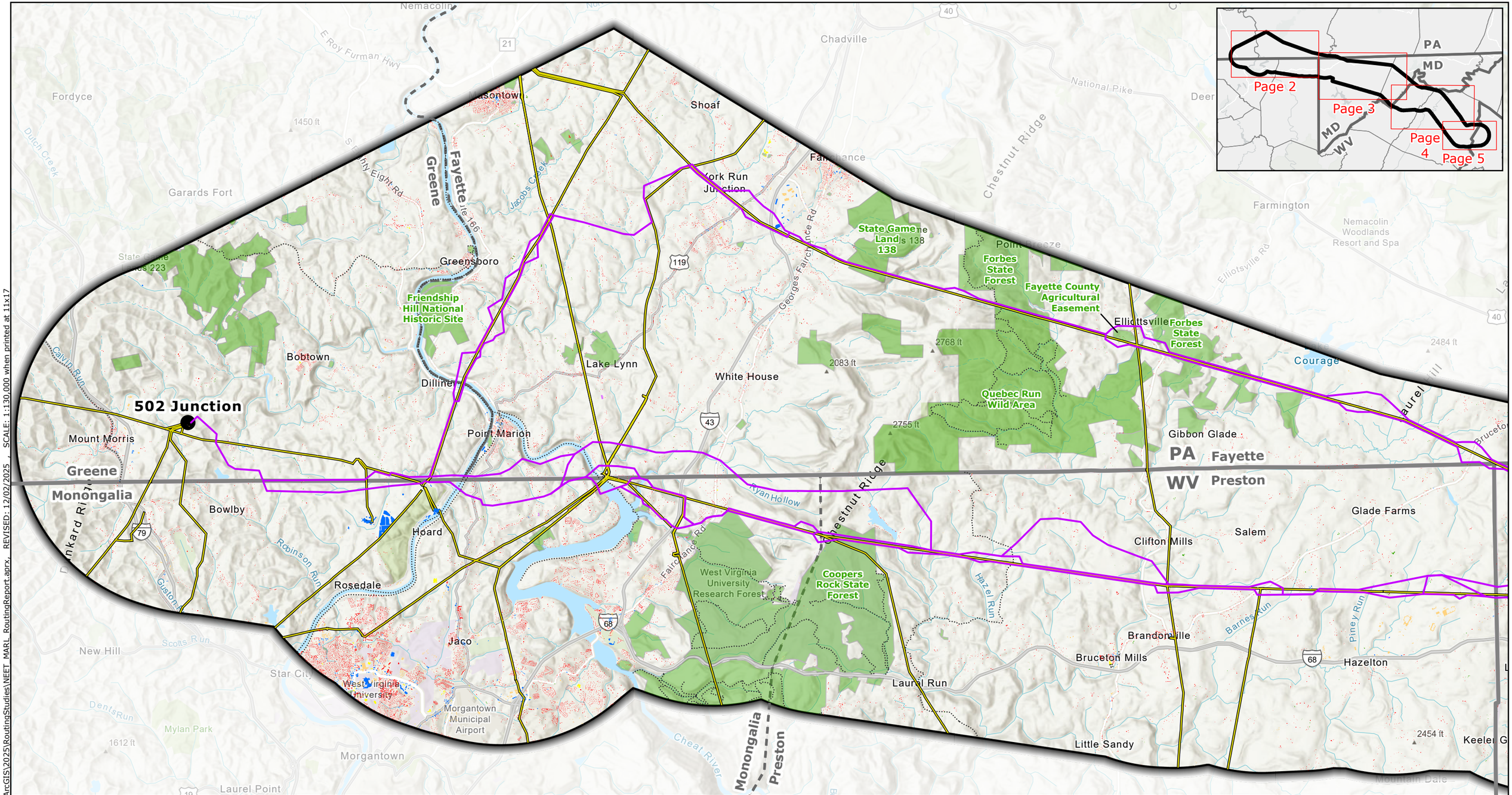

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- Residential (House)
- Residential Outbuilding (Shed,Garage,Other)
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N

0 1 2 3 4

Miles

Scale: 1:130,000

1 inch equals 10,833ft (when printed at 11x17)

Appendix E-3
Preliminary Draft Route Options
Page 2 of 5
MidAtlantic Resiliency Link

ERM

Source: NAD 1983 UTM Zone 17N

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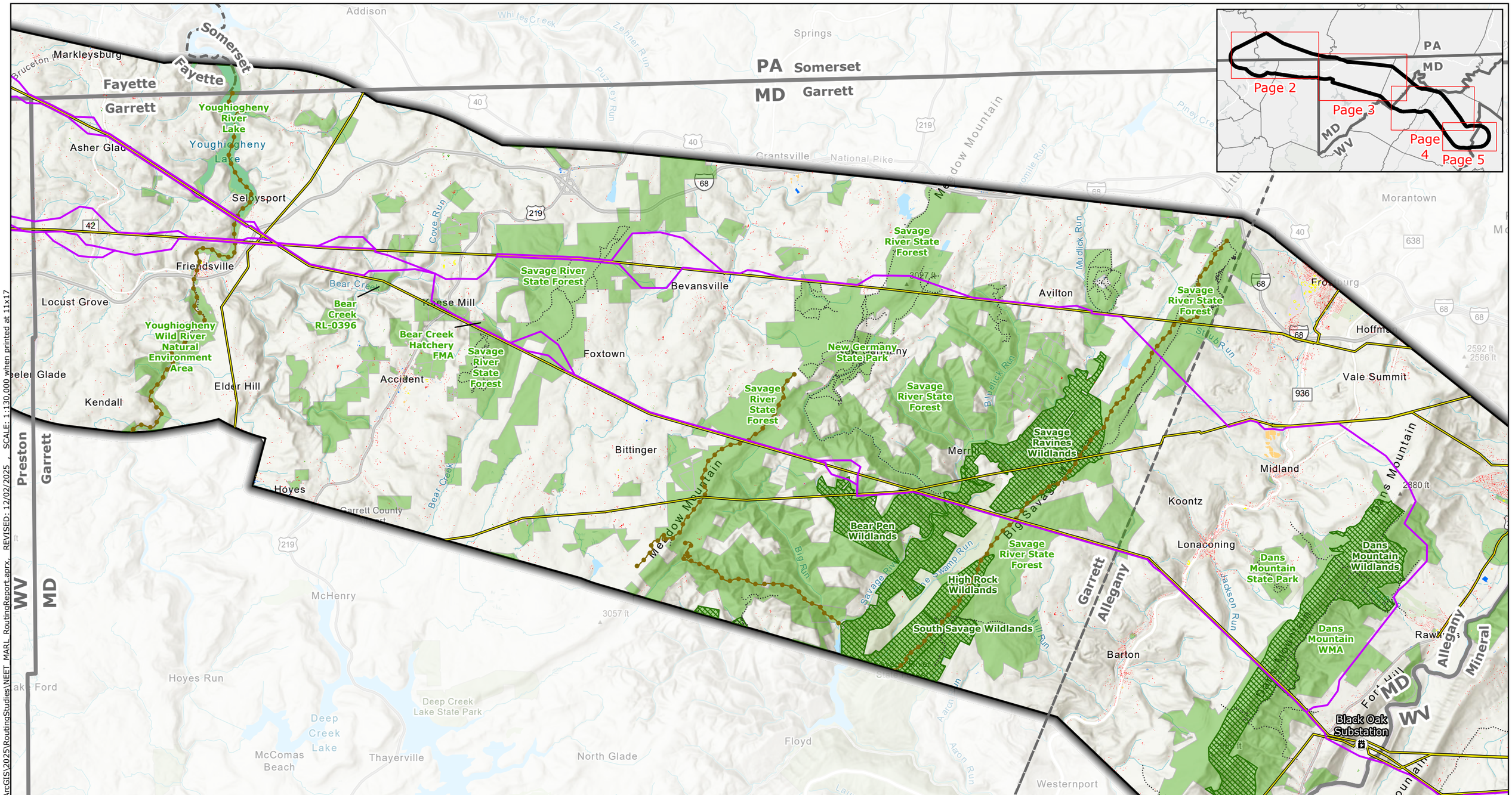

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Appendix E-3
Preliminary Draft Route Options
Page 3 of 5
MidAtlantic Resiliency Link

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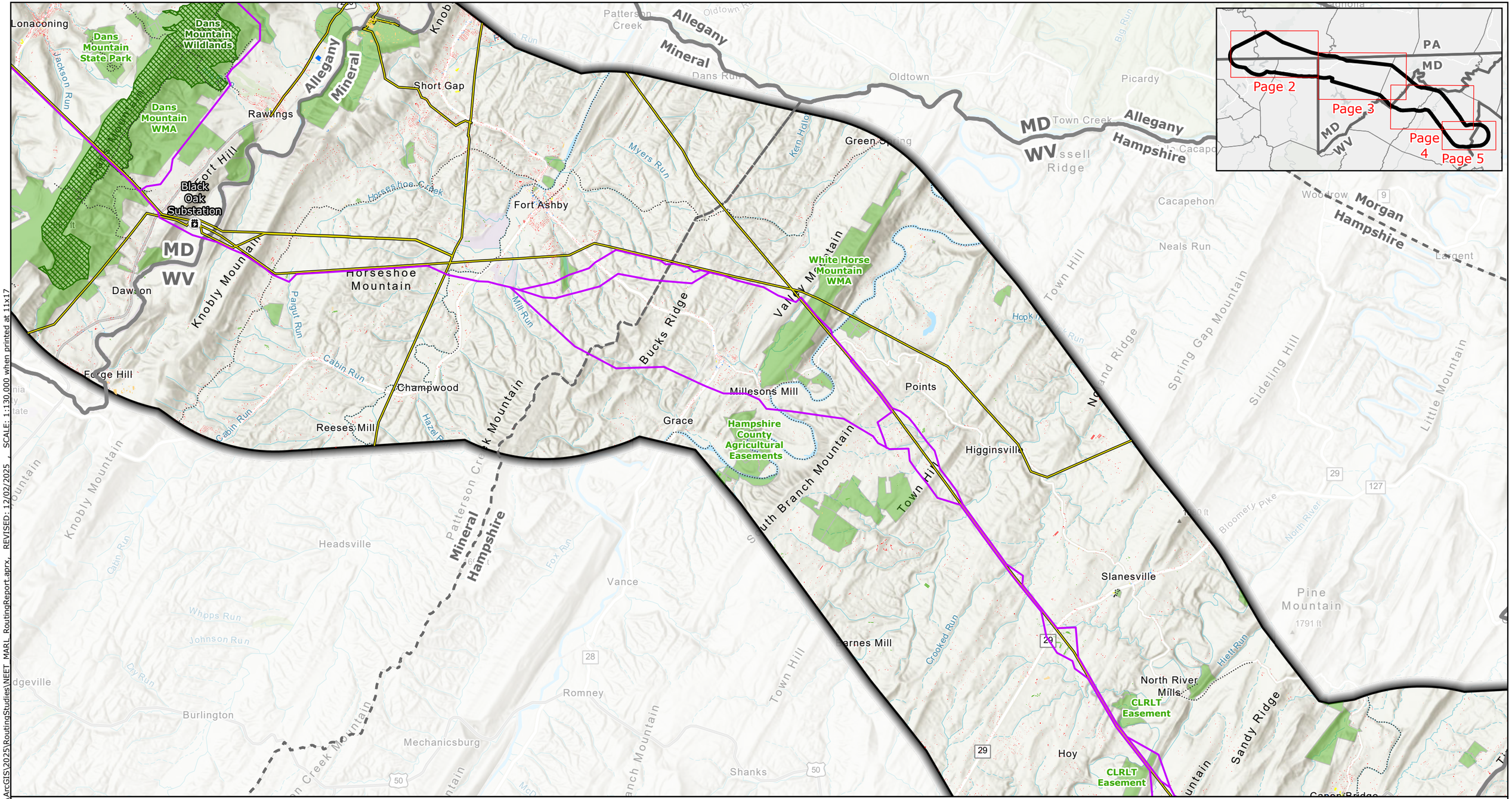

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Appendix E-3
Preliminary Draft Route Options
Page 4 of 5
MidAtlantic Resiliency Link

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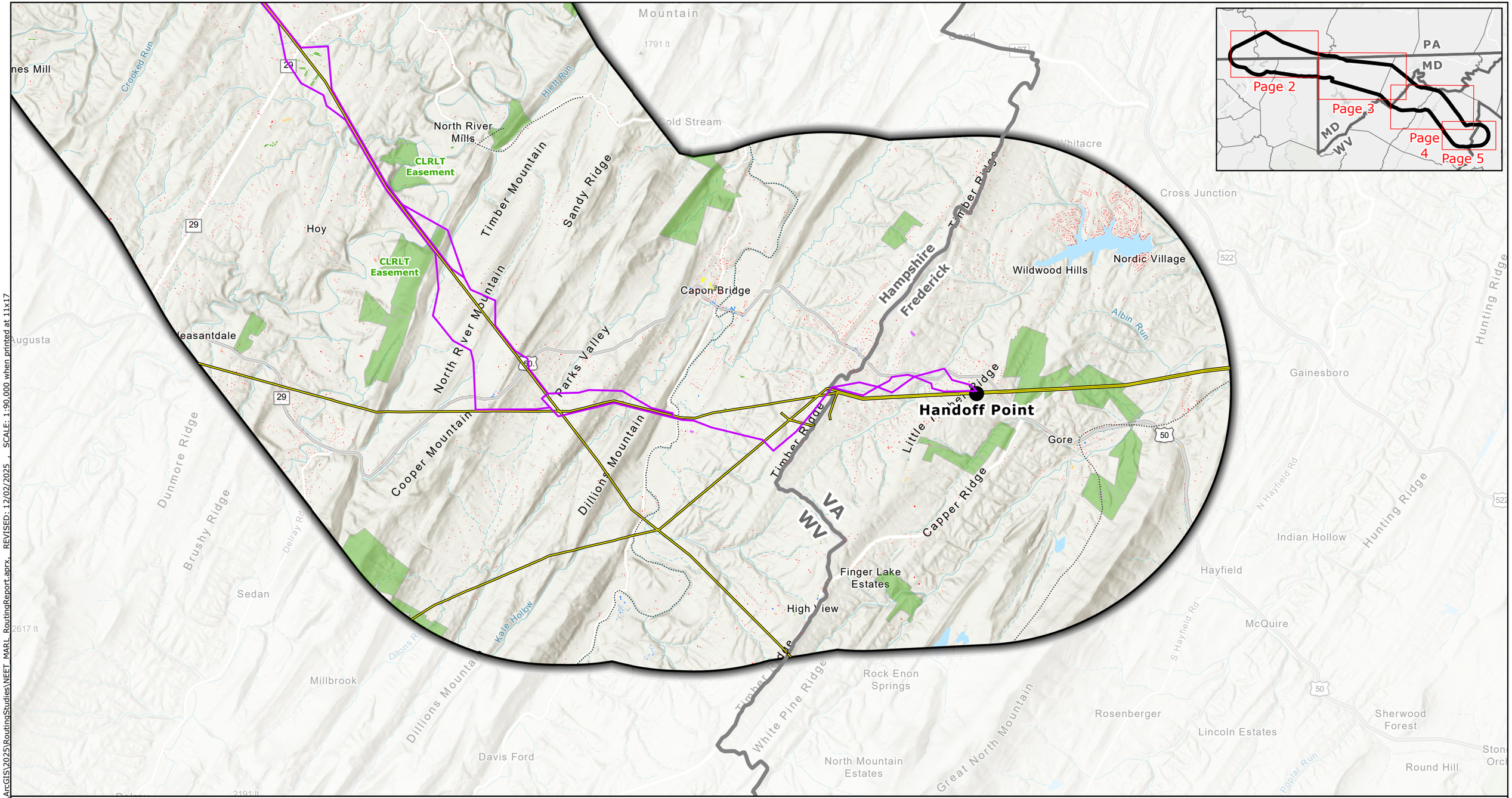

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N

0 0.8 1.6 2.4 3.2

Miles

Scale: 1:90,000

1 inch equals 7,500ft (when printed at 11x17)

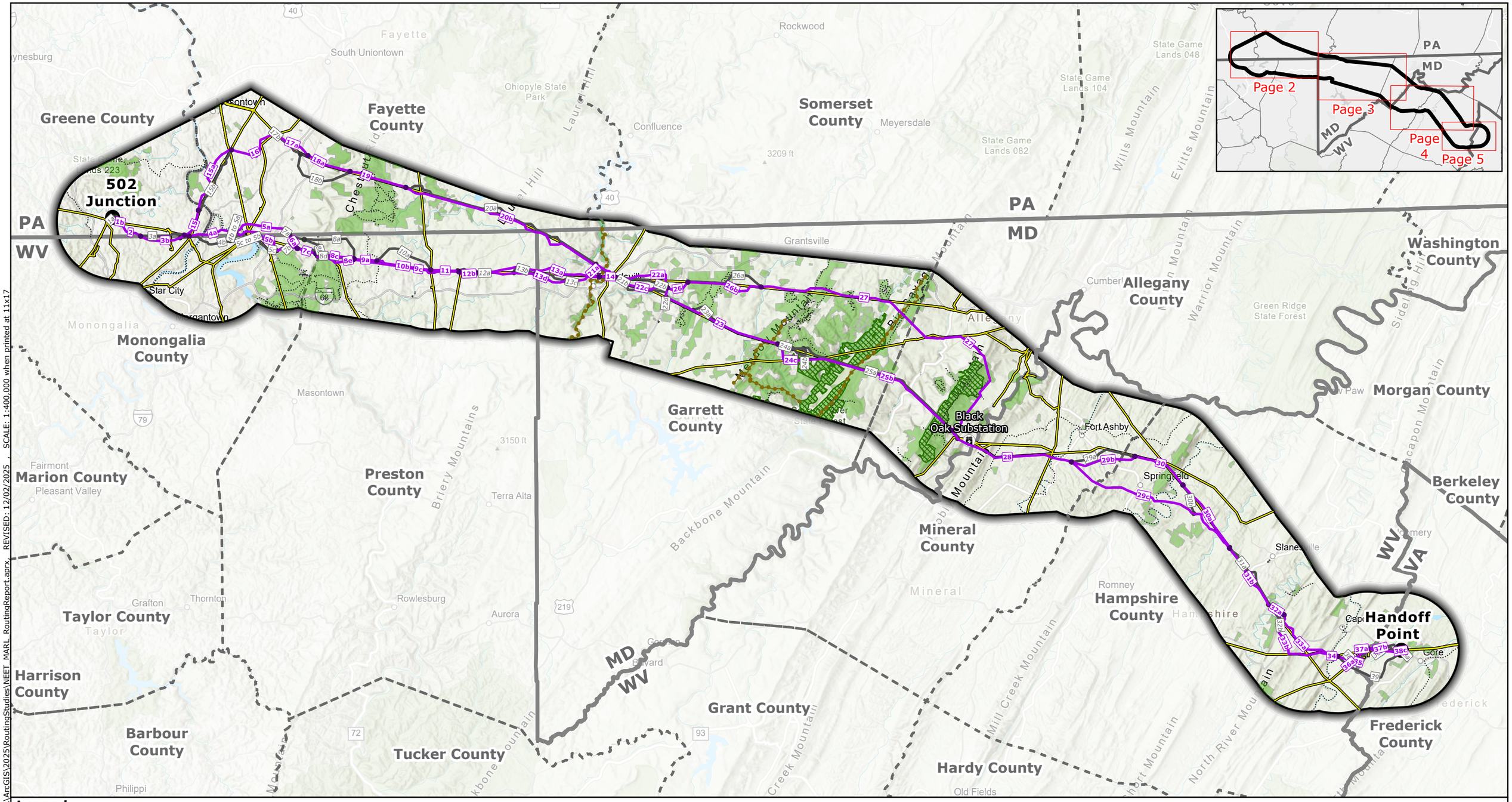
Appendix E-3
Preliminary Draft Route Options
Page 5 of 5
MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\RoutingStudies\NEET_MARL_RoutingReport.aprx, REVISED: 12/02/2025 , SCALE: 1:90,000 when printed at 11x17

Source: NAD 1983 UTM Zone 17N

APPENDIX E-4 ROUTE SEGMENTS MAPBOOK



Legend

- Project Endpoints
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- Route Segment Considered but Dismissed
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N

0 3.5 7 10.5 14

Miles

Scale: 1:400,000
1 inch equals 33,333ft (when printed at 11x17)

Appendix E-4
Route Segments
Page 1 of 5
MidAtlantic Resiliency Link

ERM

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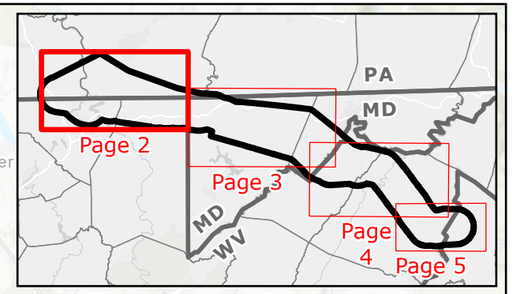
Coordinate system: NAD 1983 UTM Zone 17N



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N

0 1 2 3 4

Miles

Scale: 1:130,000

1 inch equals 10,833ft (when printed at 11x17)

Appendix E-4
Route Segments
Page 2 of 5
MidAtlantic Resiliency Link

ERM

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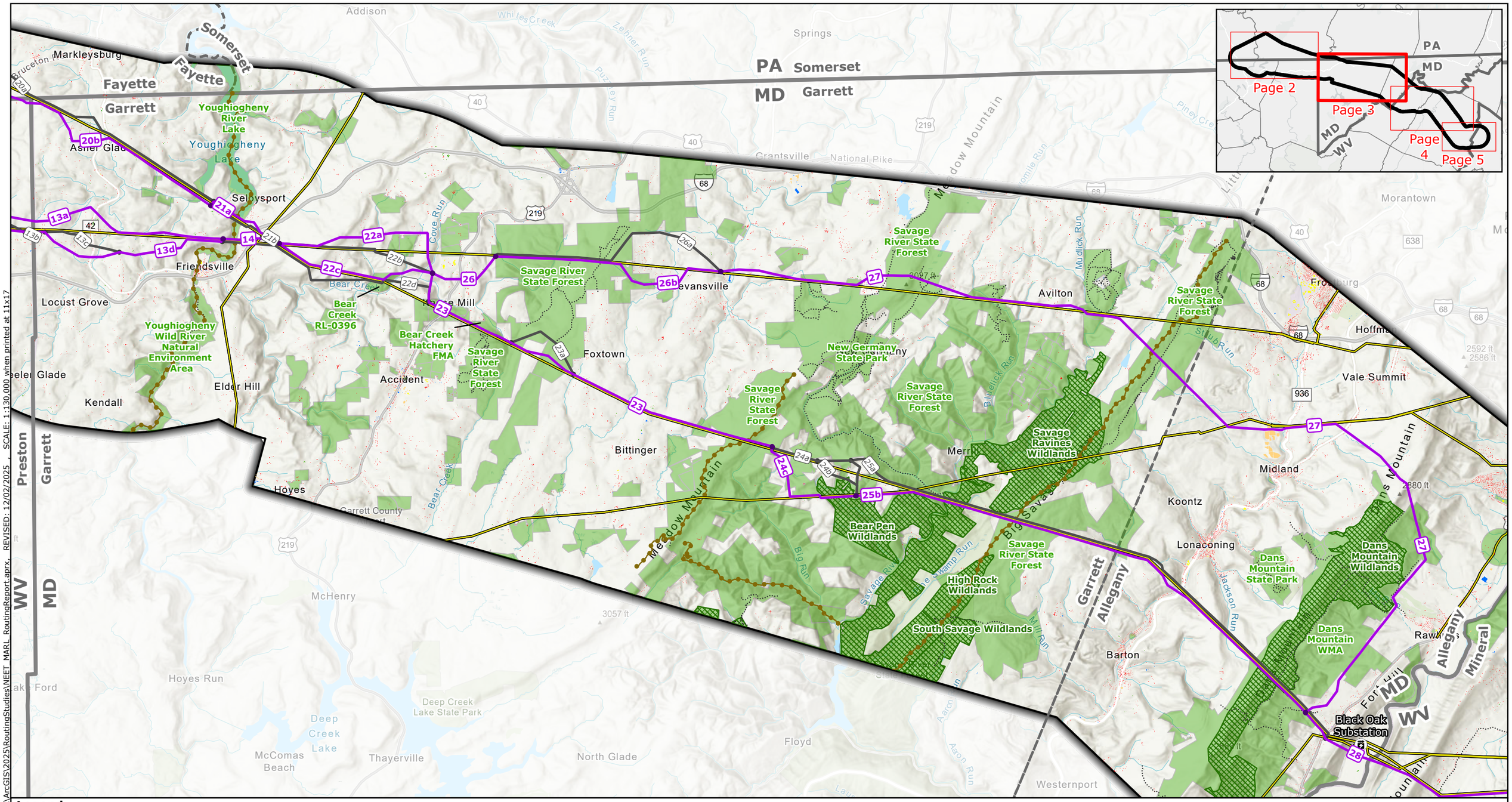

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Miles

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Appendix E-4
Route Segments
Page 3 of 5
MidAtlantic Resiliency Link

ERM

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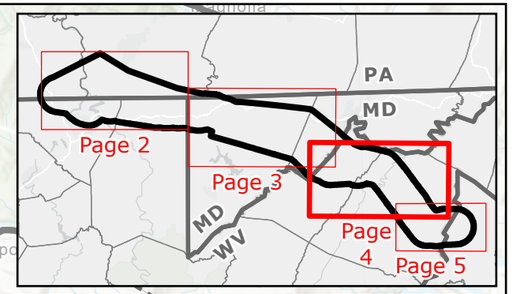

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Appendix E-4
Route Segments
Page 4 of 5
MidAtlantic Resiliency Link

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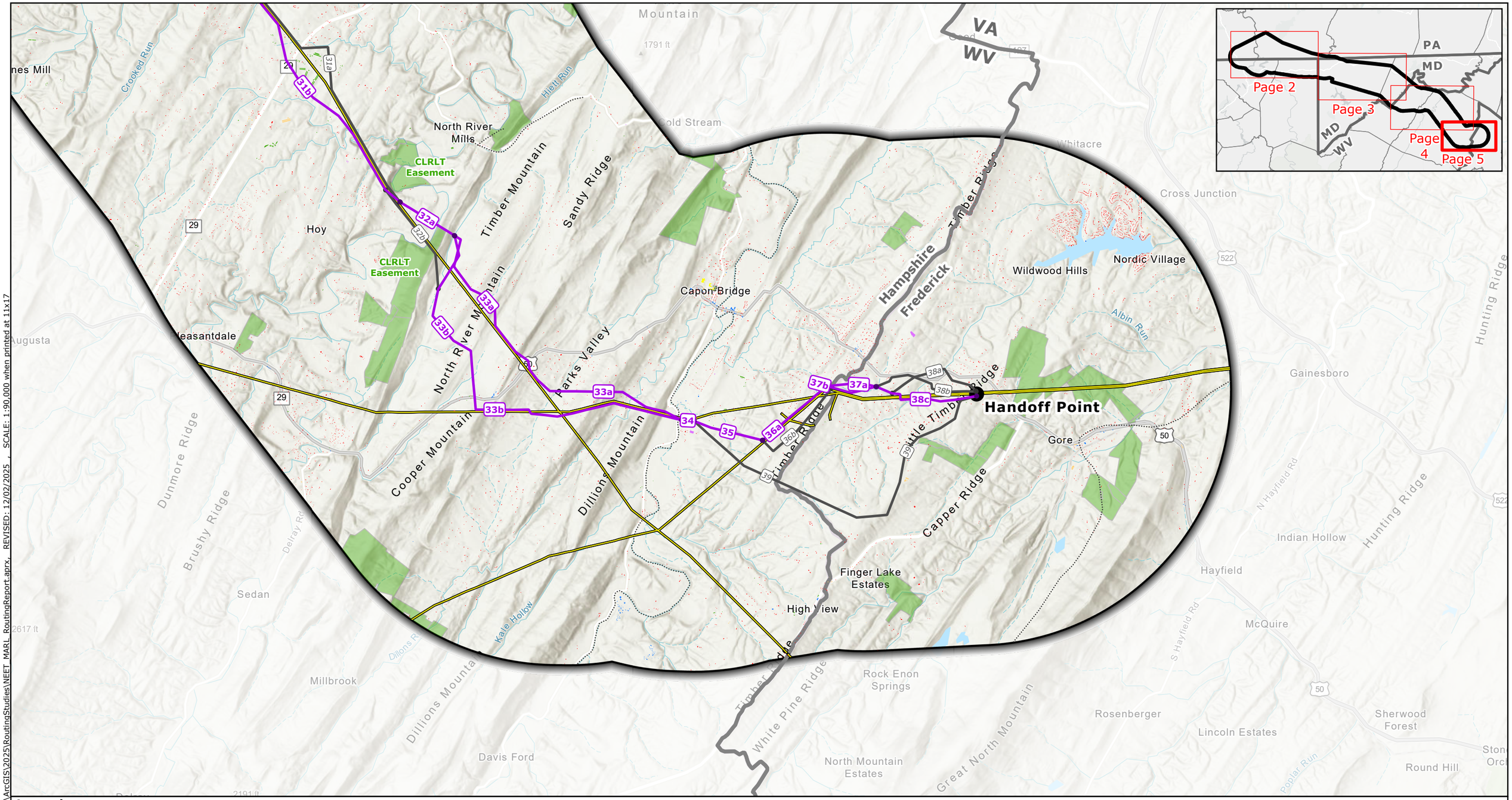

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0 0.8 1.6 2.4 3.2

Miles

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Appendix E-4
Route Segments
Page 5 of 5
MidAtlantic Resiliency Link

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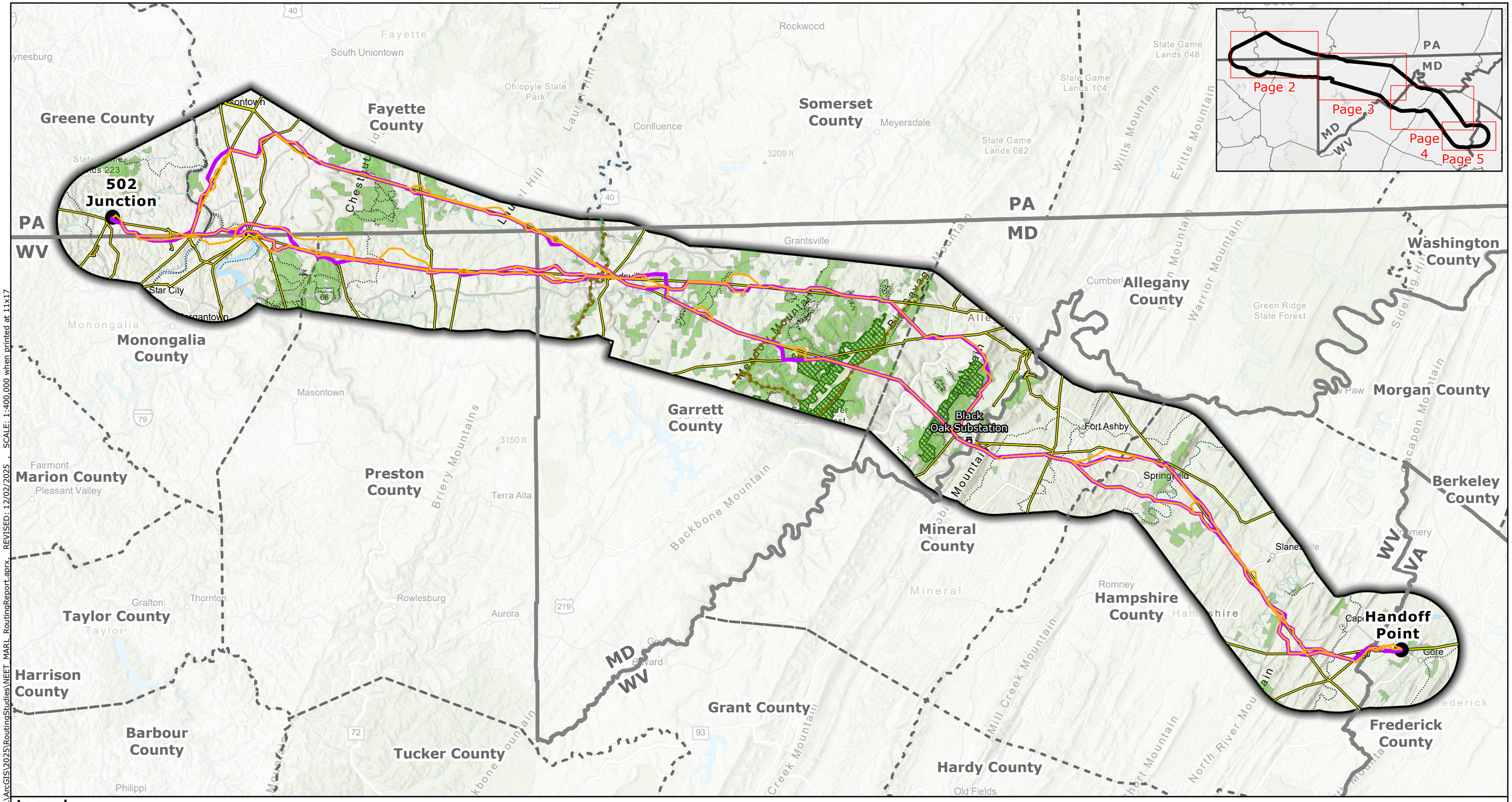
Coordinate system: NAD 1983 UTM Zone 17N

APPENDIX E-5 PRELIMINARY DRAFT ROUTE OPTIONS AND FINAL ROUTE ALTERNATIVES MAPBOOK



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N

0 3.5 7 10.5 14

Miles

Scale: 1:400,000

1 inch equals 33,333ft (when printed at 11x17)

Appendix E-5
Preliminary Draft Route Options and Final Route Alternatives

Page 1 of 5

MidAtlantic Resiliency Link

ERM

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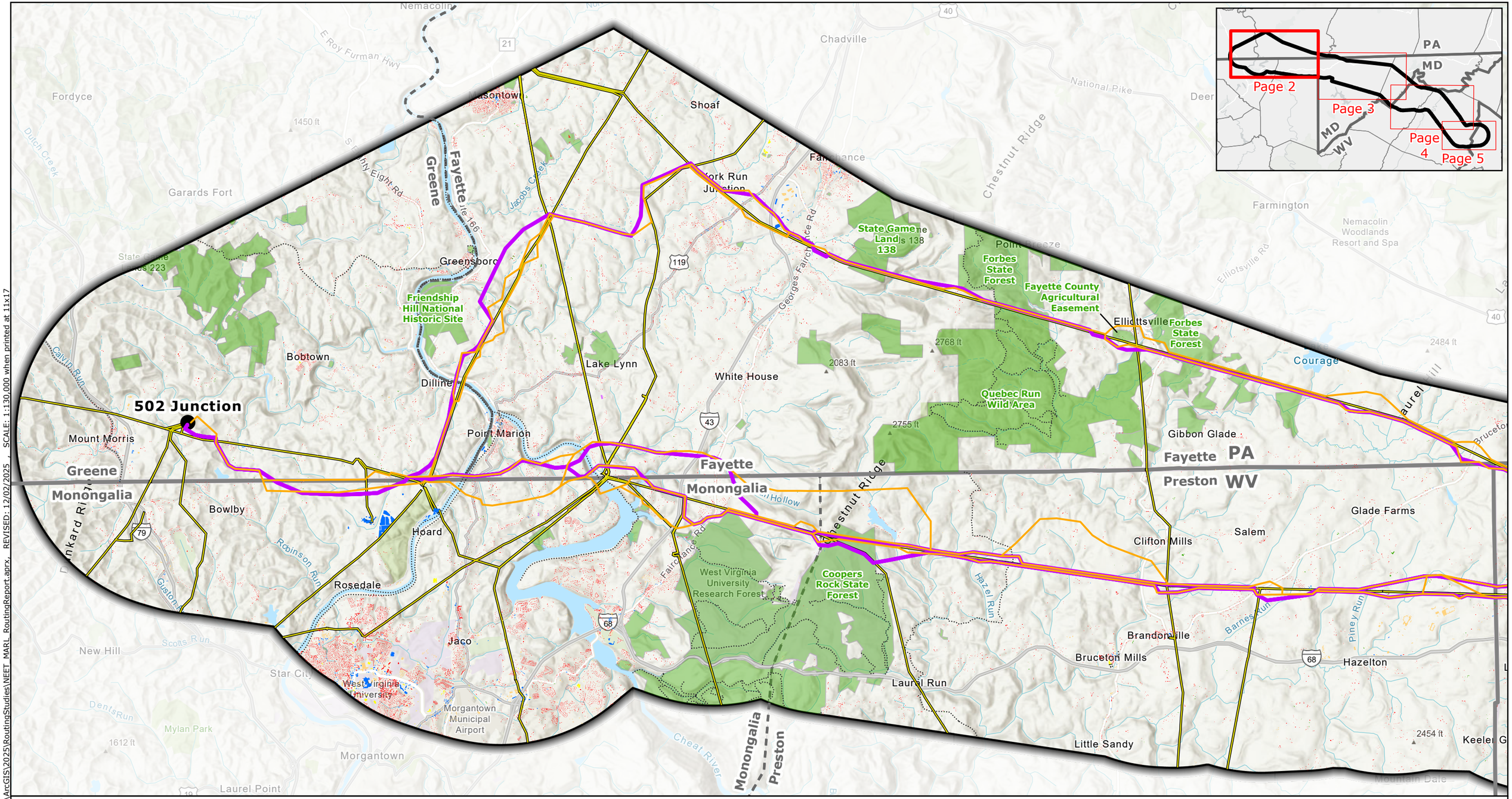

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N

0 1 2 3 4

Miles

Scale: 1:130,000

1 inch equals 10,833ft (when printed at 11x17)

Appendix E-5
Preliminary Draft Route Options and Final Route Alternatives
Page 2 of 5
MidAtlantic Resiliency Link

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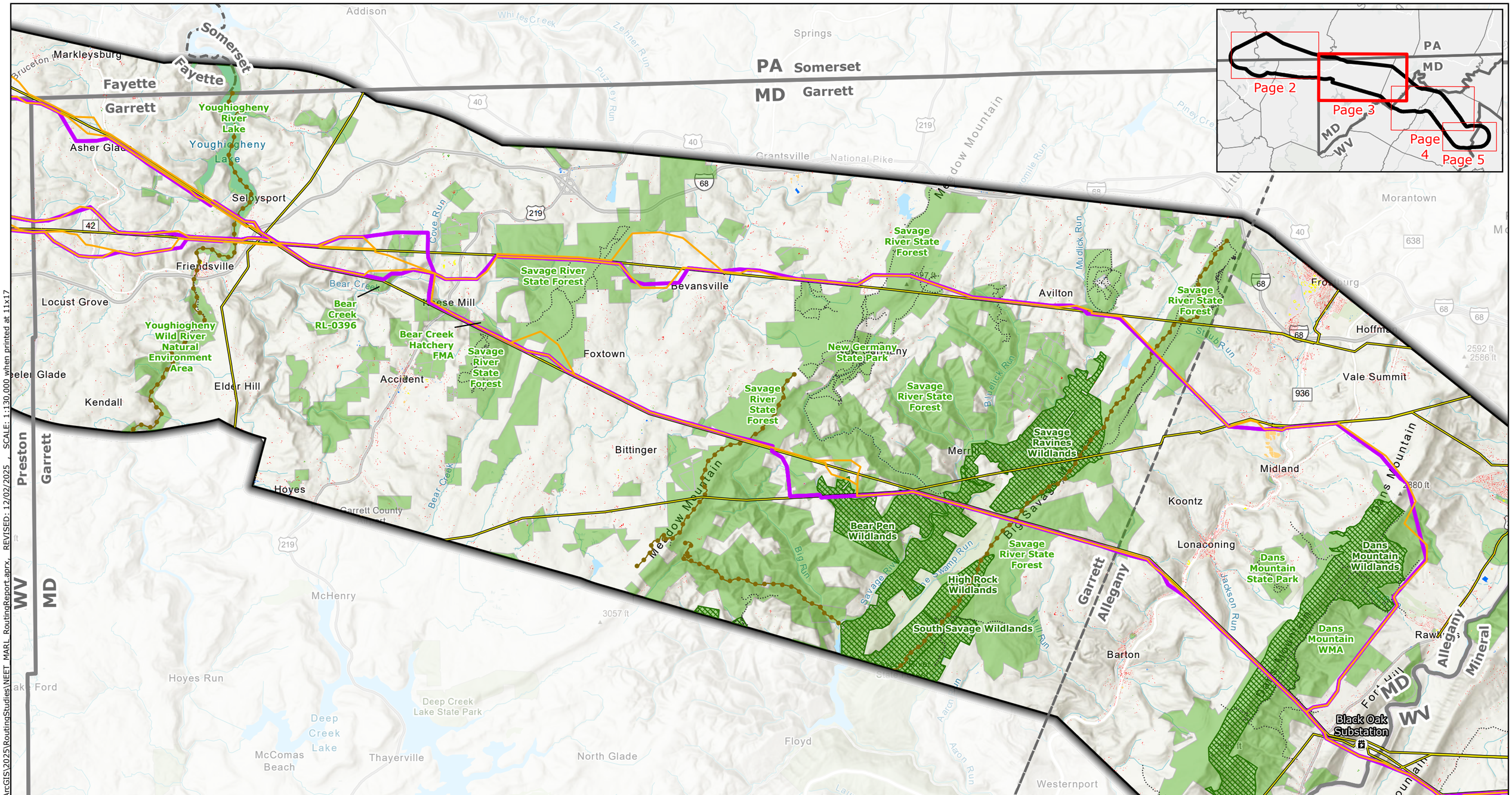

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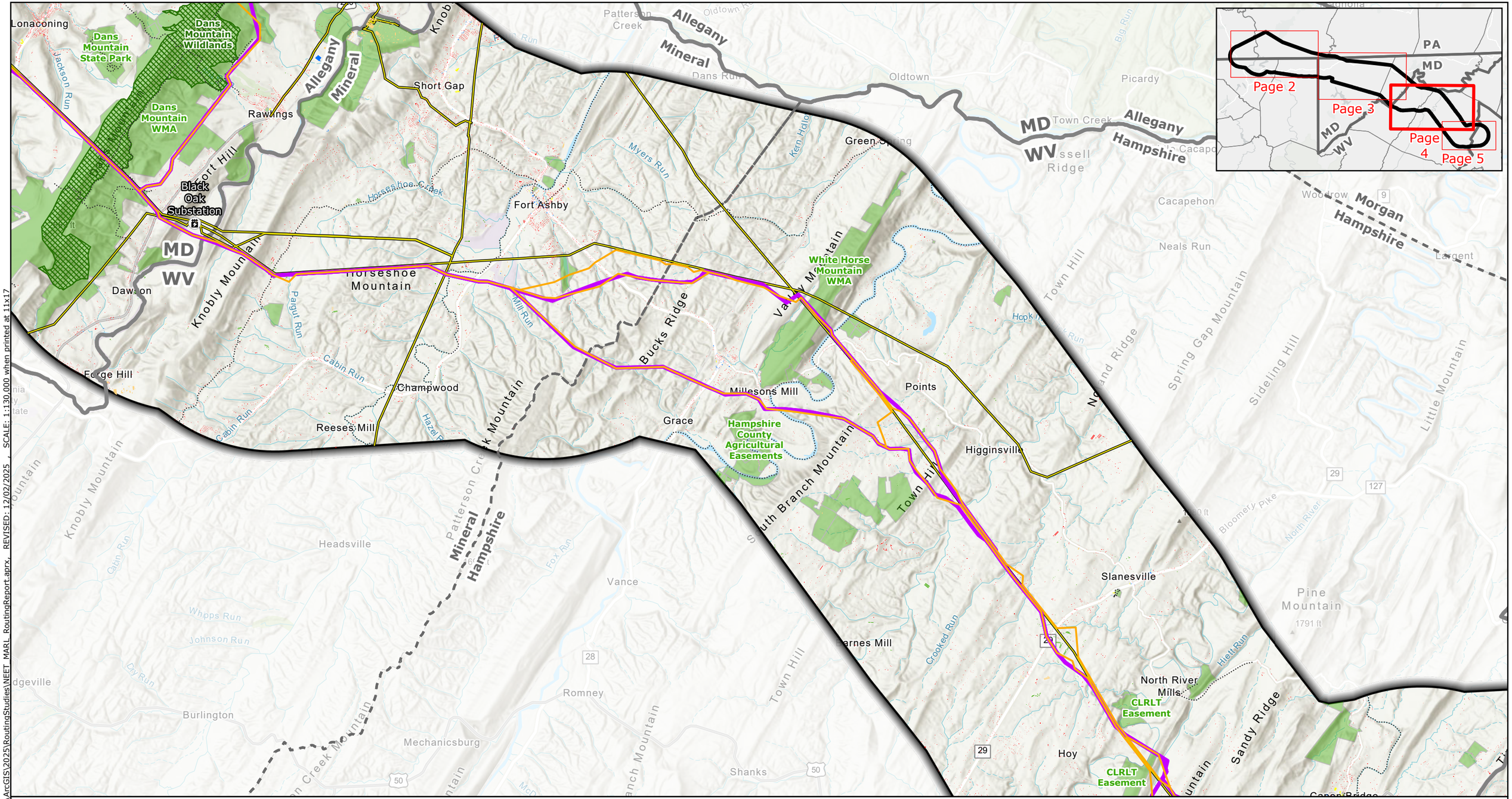

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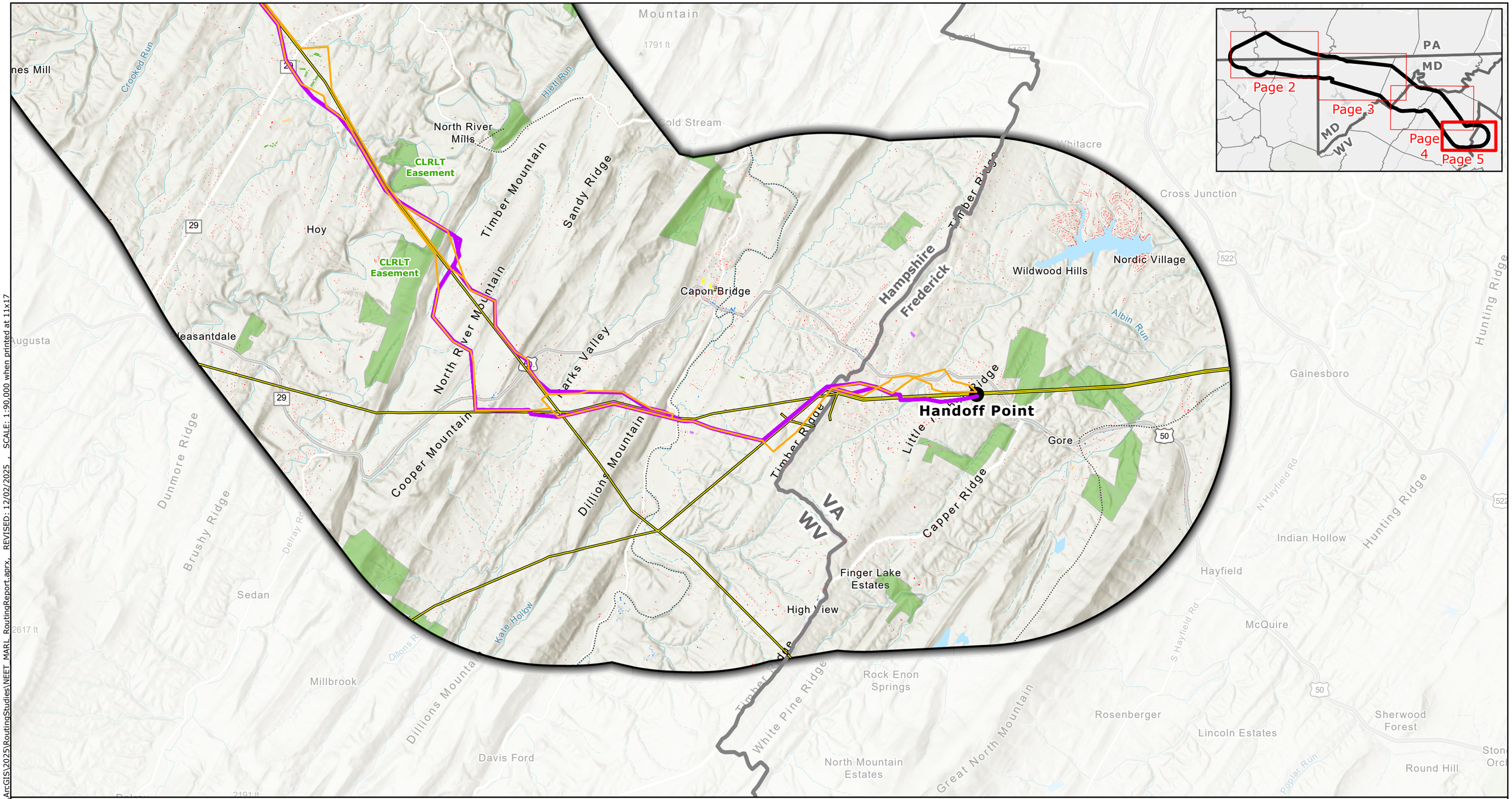

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Miles

Scale: 1:90,000

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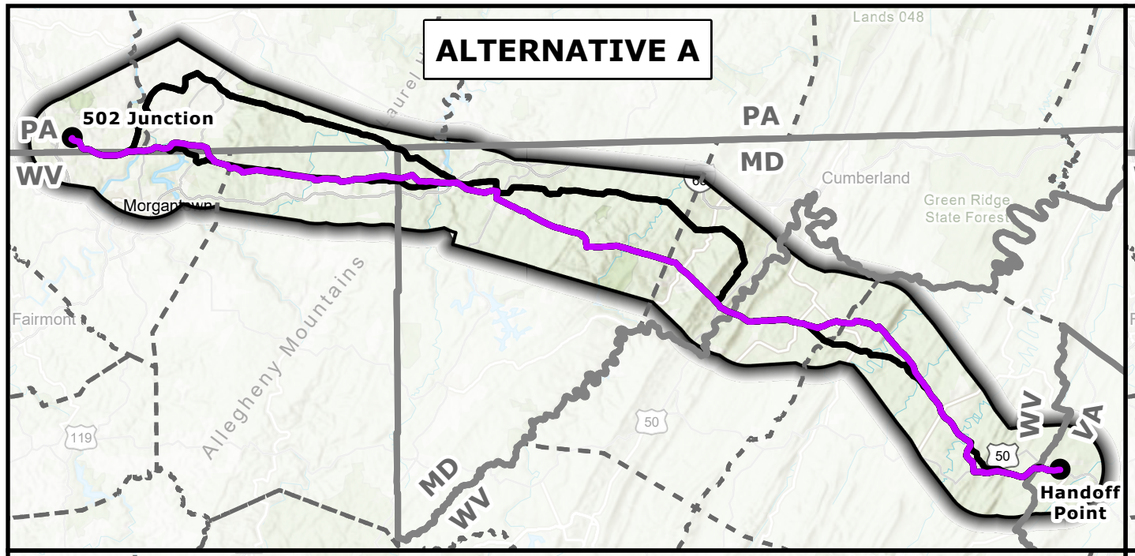
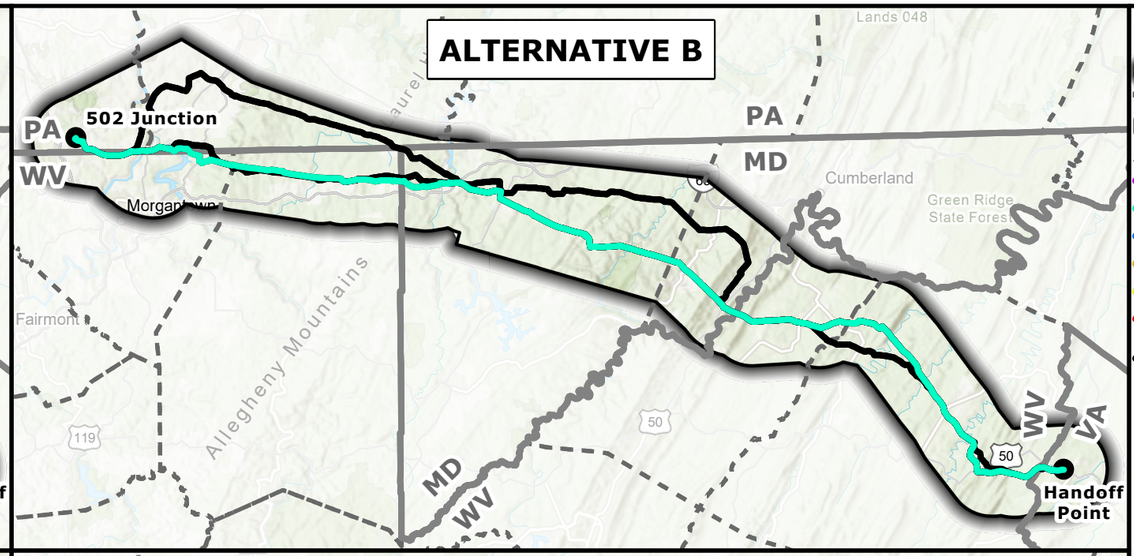
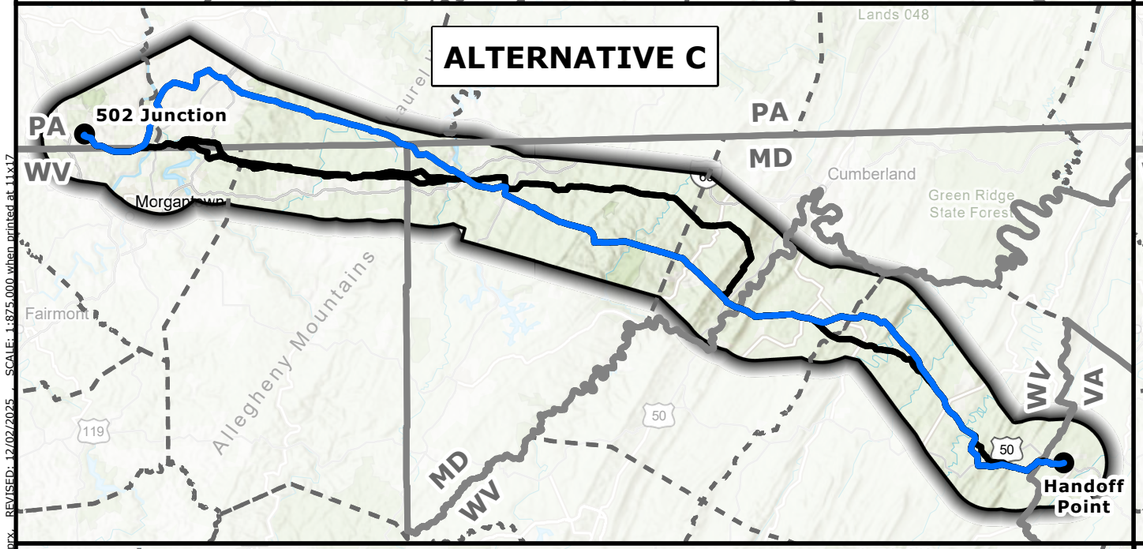
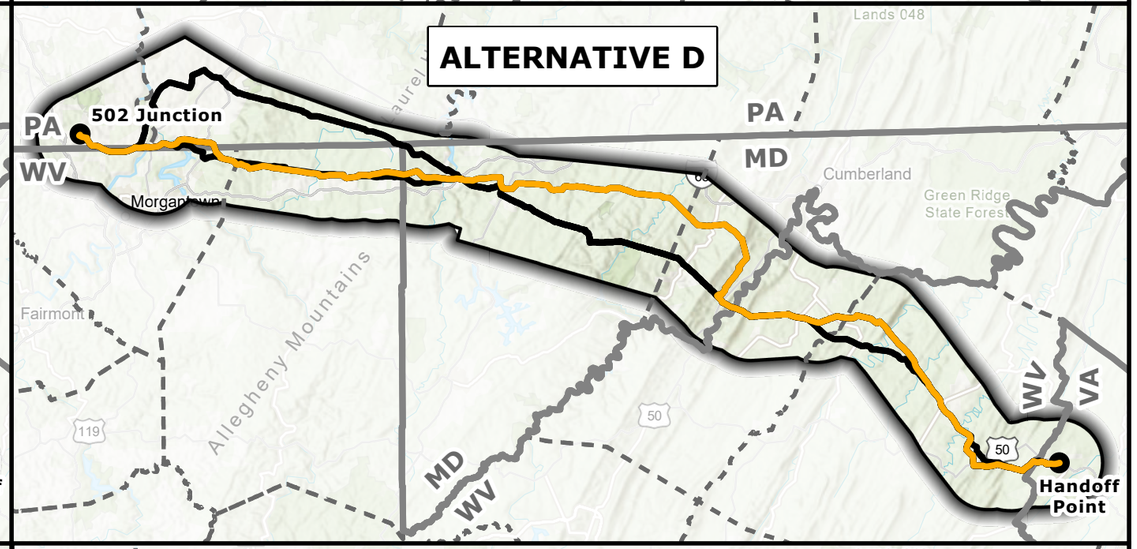
Source: NAD 1983 UTM Zone 17N

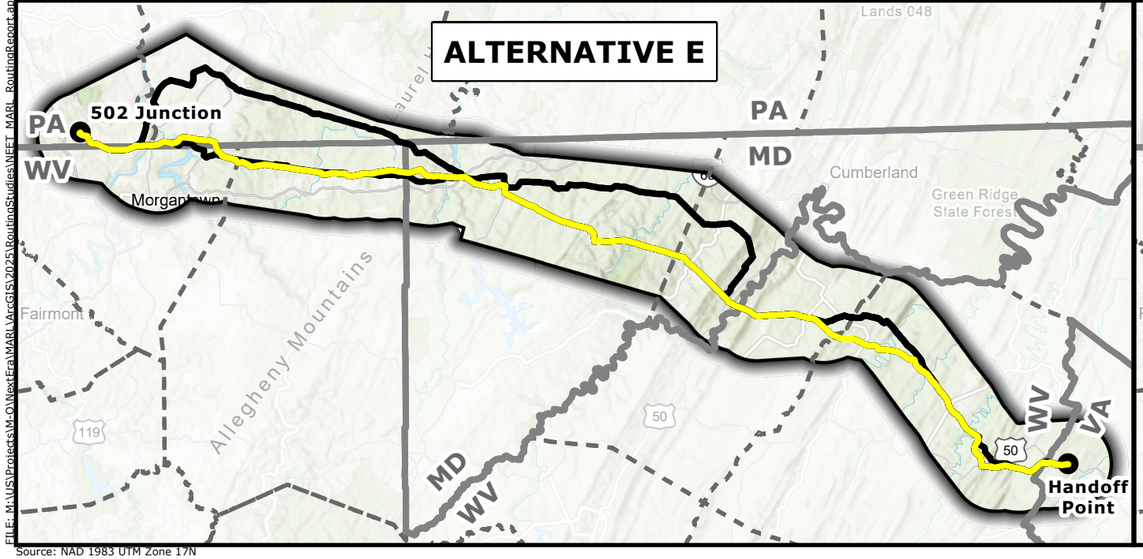
APPENDIX E-6 ALTERNATIVE ROUTES MAPBOOK

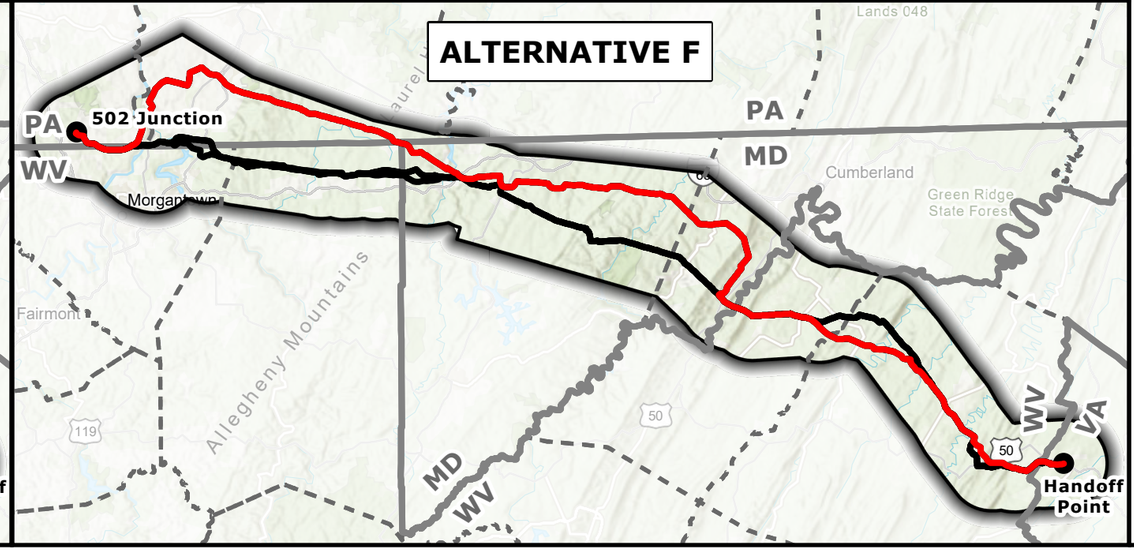












Legend

- Project Endpoints
- Project Study Area
- County Boundary
- State Border

Alternative Routes

- Alternative A
- Alternative B
- Alternative C
- Alternative D
- Alternative E
- Alternative F
- Other alternatives not shown on each map

N

0 5 10 15 20 25

Miles

Scale: 1:875,000
1 inch equals 72,917ft (when printed at 11x17)

Appendix E-6
Alternative Routes
MidAtlantic
Resiliency Link

ERM

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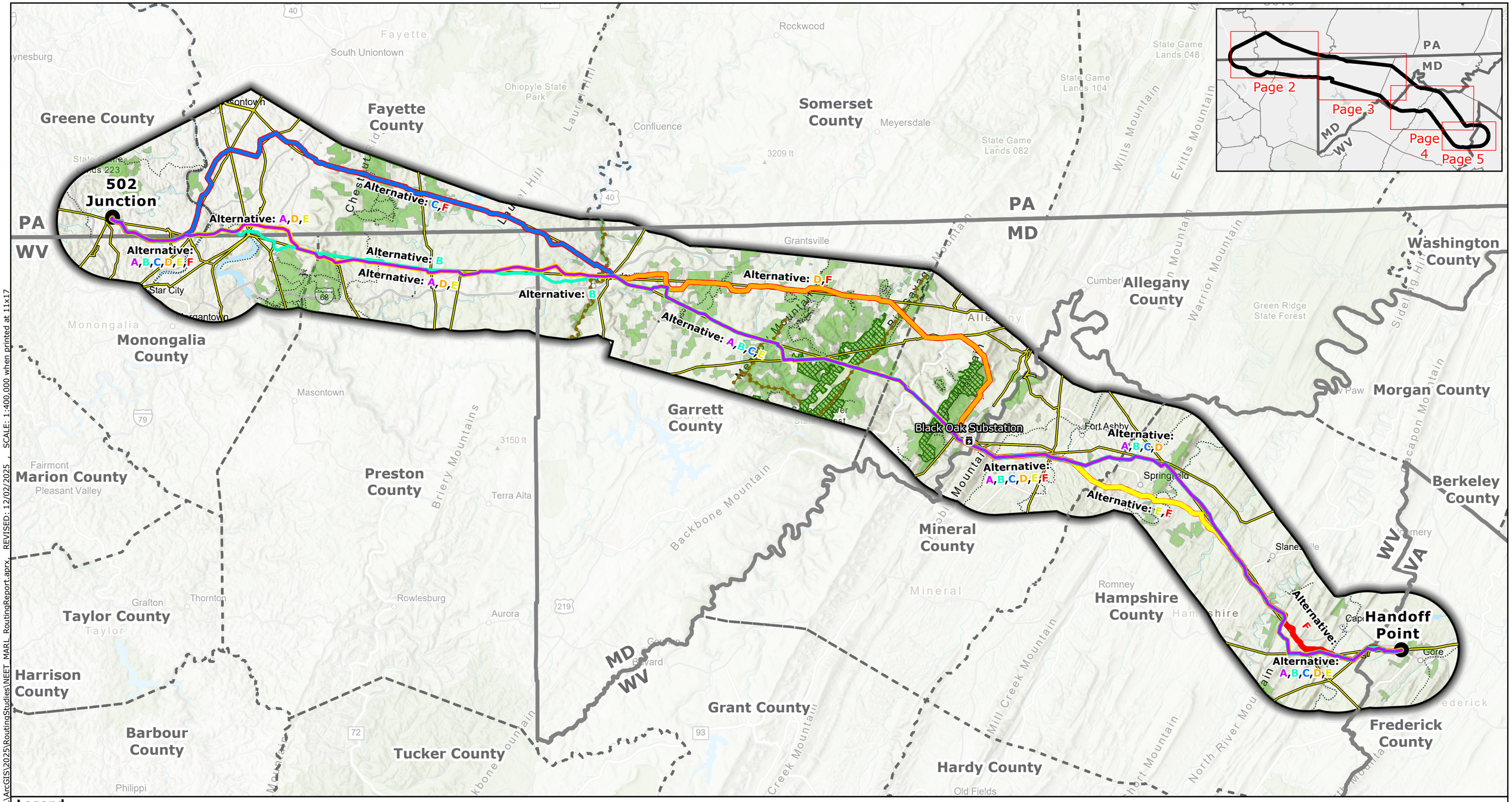
Source: NAD 1983 UTM Zone 17N

APPENDIX E-7 ALTERNATIVE ROUTES



Legend

- Project Endpoints
- Black Oak Substation
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border

Alternative Routes:

- Alternative A
- Alternative B
- Alternative C
- Alternative D
- Alternative E
- Alternative F

- Hiking/Walking Trails
- Potomac Heritage Trail
- Protected Areas*
- Maryland Wildlands

NOTES

1. *Protected Areas includes local, county, state and federal parks, conservation easements, agricultural easements, state forests, and wildlife management areas.

N

0 3.5 7 10.5 14

Miles

Scale: 1:400,000
1 inch equals 33,333ft (when printed at 11x17)

Appendix E-7
Alternative Routes
Page 1 of 5
MidAtlantic Resiliency Link

ERM

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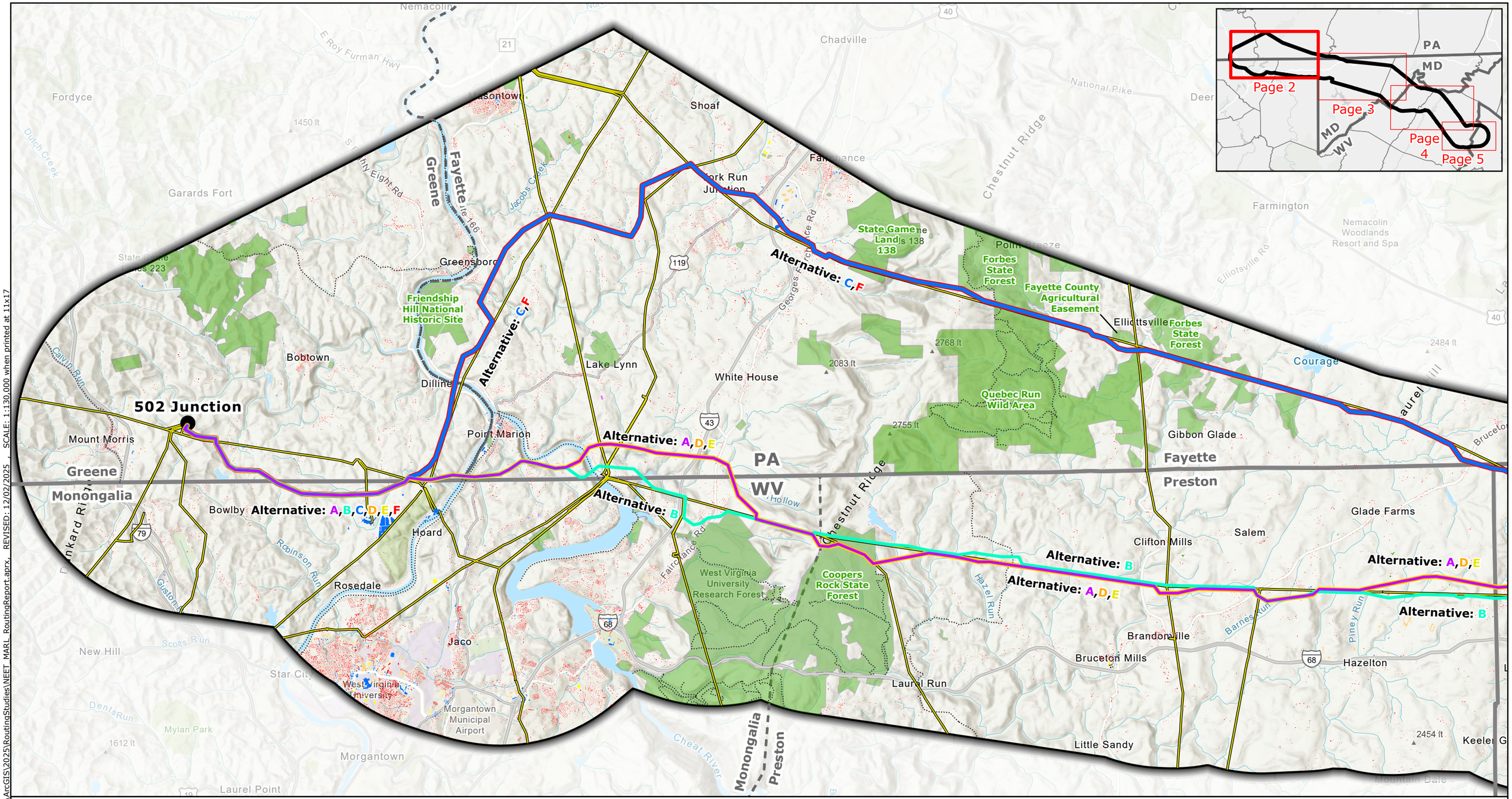
Source: NAD 1983 UTM Zone 17N



Legend

- Project Endpoints
- Black Oak Substation
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border

Alternative Routes:

- Alternative A
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- Alternative C
- Alternative D
- Alternative E
- Alternative F

- Hiking/Walking Trails
- Potomac Heritage Trail
- Protected Areas*
- Maryland Wildlands

Buildings Footprints

- Residential (House)
- Residential Outbuilding (Shed,Garage,Other)
- Agricultural Building
- Assembly
- Education
- Commercial/Industrial
- Other

NOTES

1. *Protected Areas includes local, county, state and federal parks, conservation easements, agricultural easements, state forests, and wildlife management areas.

N

0 1 2 3 4

Miles

Scale: 1:130,000

1 inch equals 10,833ft (when printed at 11x17)

Appendix E-7
Alternative Routes
Page 2 of 5
MidAtlantic Resiliency Link

ERM

Source: NAD 1983 UTM Zone 17N

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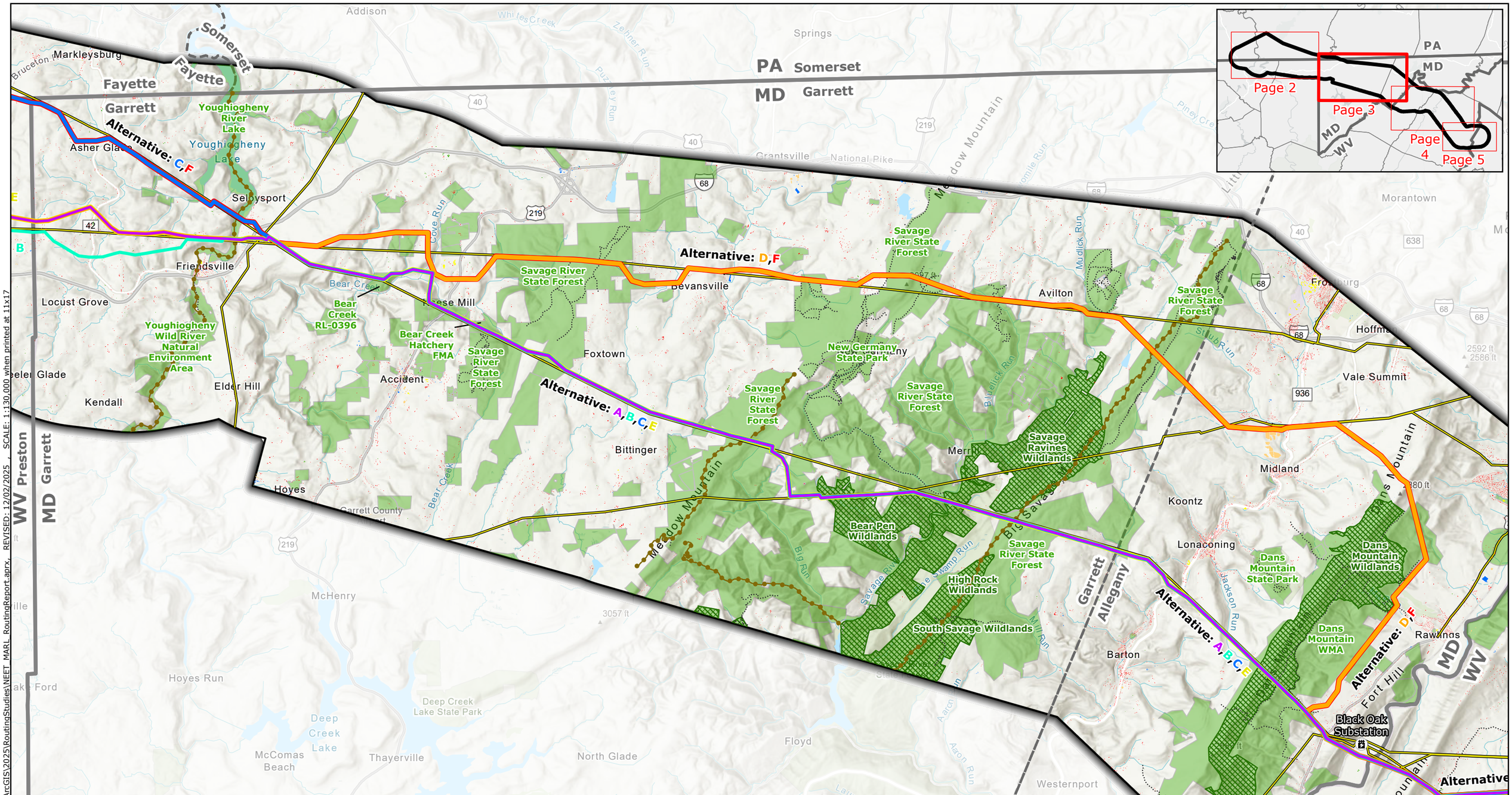

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- Project Endpoints
- Black Oak Substation
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- Project Study Area
- County Boundary
- State Border

Alternative Routes:

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N

0 1 2 3 4

Miles

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Appendix E-7
Alternative Routes
Page 3 of 5
MidAtlantic Resiliency Link

ERM

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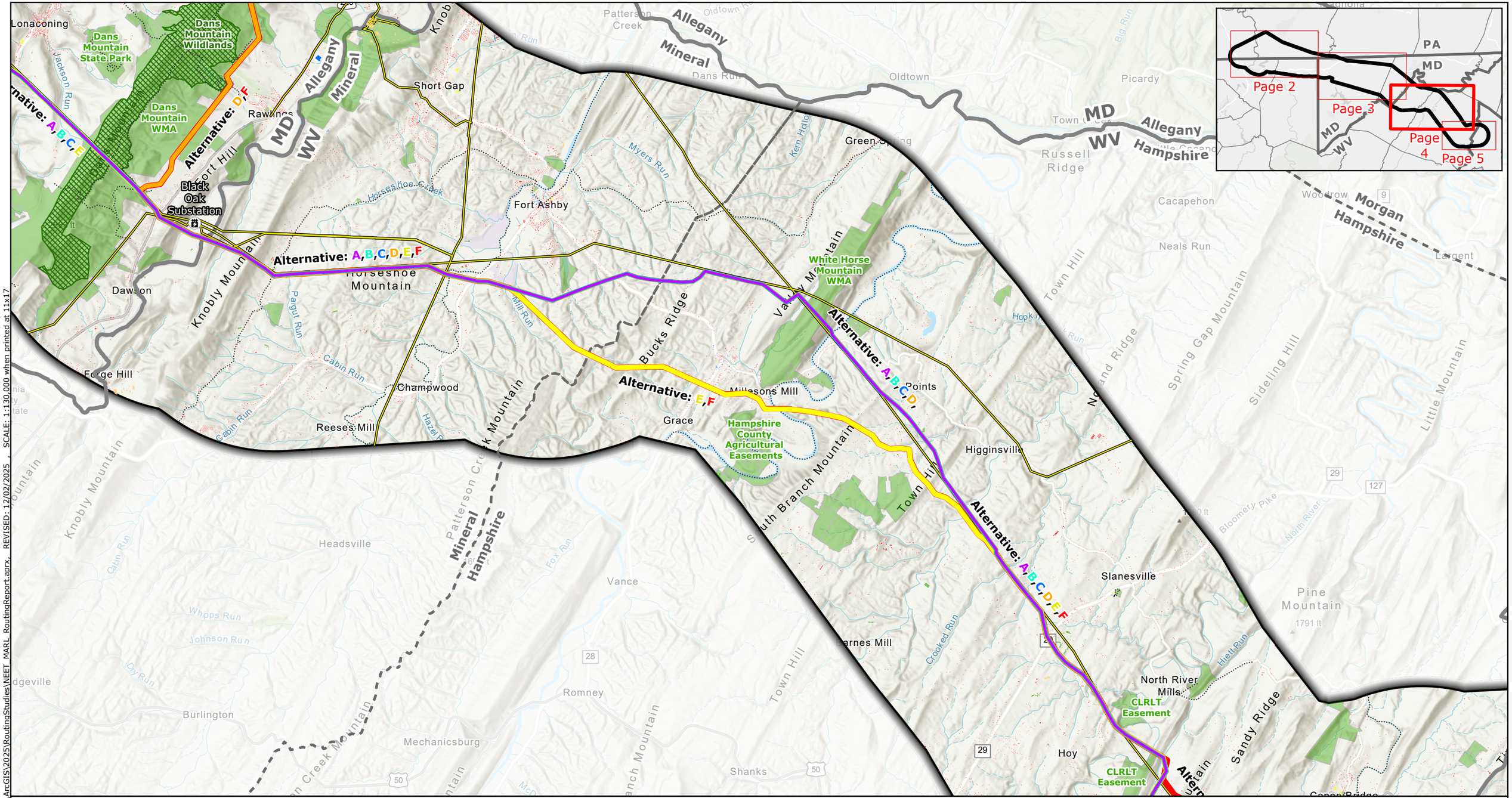

Legend

- Project Endpoints
- Black Oak Substation
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border

Alternative Routes:

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N

0 1 2 3 4

Miles

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Appendix E-7
Alternative Routes
Page 4 of 5
MidAtlantic Resiliency Link

ERM

Source: NAD 1983 UTM Zone 17N

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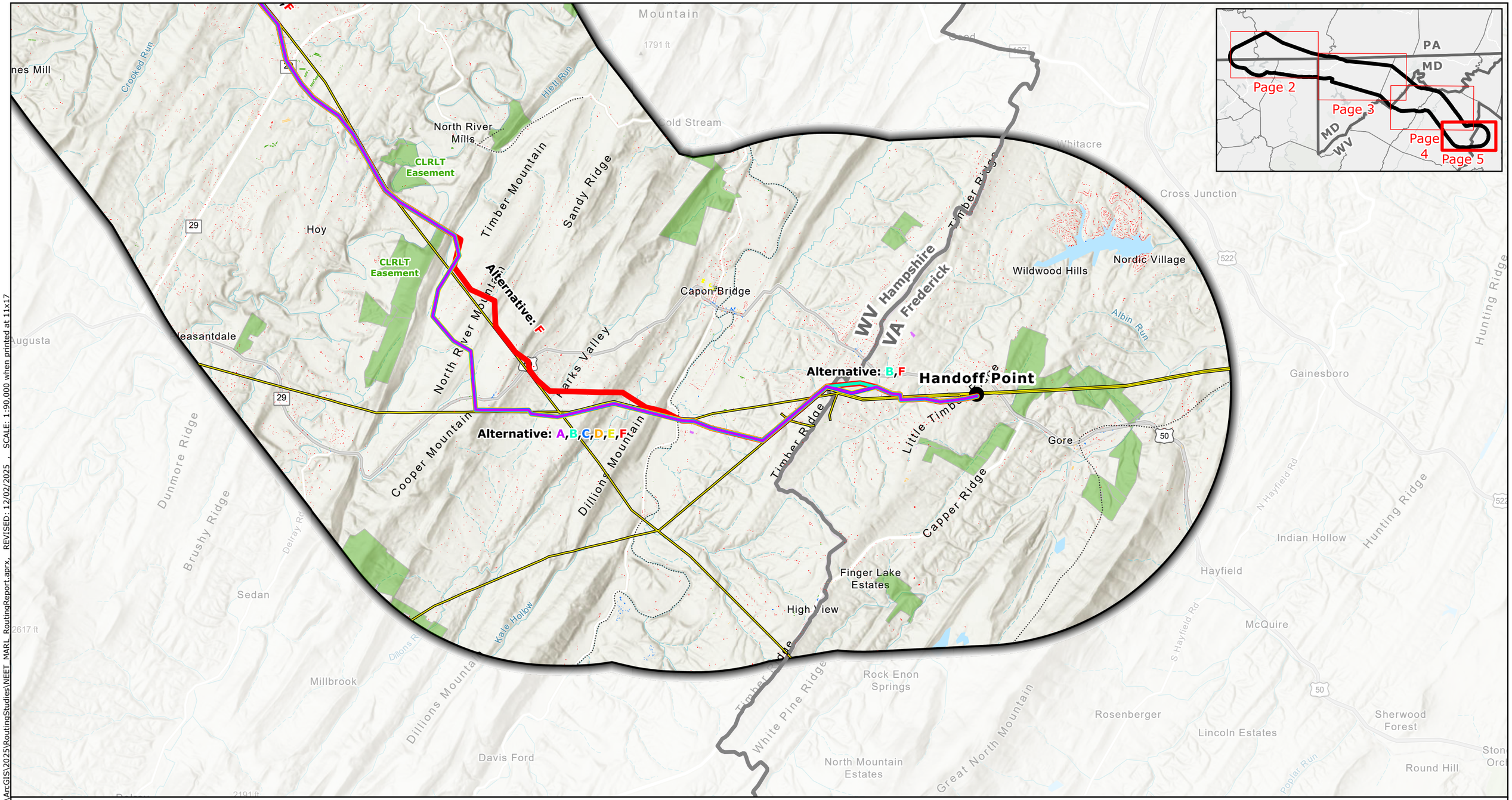

Legend

- Project Endpoints
- Black Oak Substation
- Existing High-Voltage Transmission Lines (>69kV)
- Project Study Area
- County Boundary
- State Border

Alternative Routes:

- Alternative A
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- Potomac Heritage Trail
- Protected Areas*
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Buildings Footprints

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- Agricultural Building
- Assembly
- Education
- Commercial/Industrial
- Other

NOTES

*1. *Protected Areas includes local, county, state and federal parks, conservation easements, agricultural easements, state forests, and wildlife management areas.*

N

0 0.8 1.6 2.4 3.2

Miles

Scale: 1:90,000
1 inch equals 7,500ft (when printed at 11x17)

Appendix E-7
Alternative Routes
Page 5 of 5
MidAtlantic Resiliency Link

ERM

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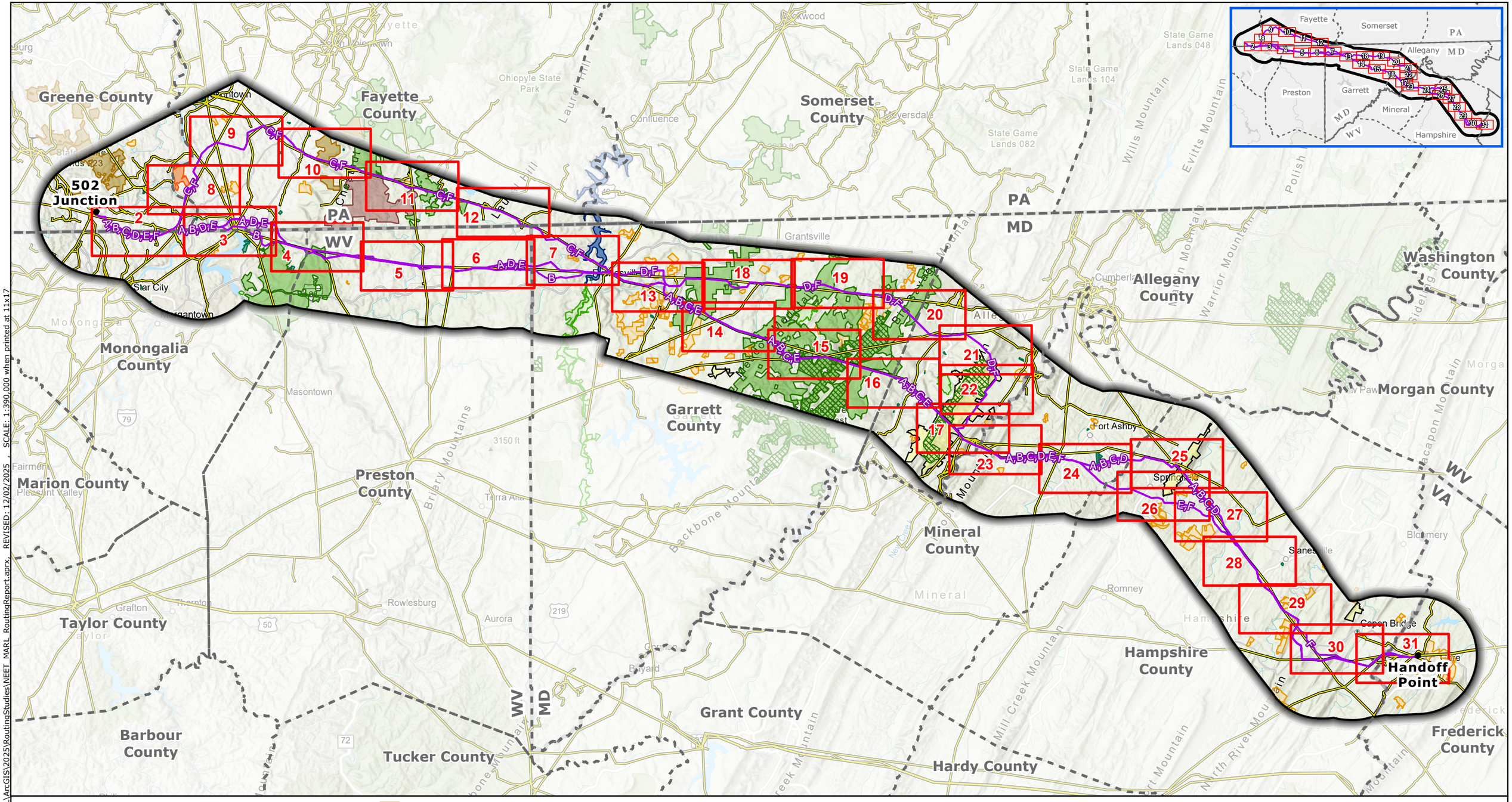
Source: NAD 1983 UTM Zone 17N

APPENDIX E-8 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES, PARALLELING, COMMUNITY AND RECREATION AND PROTECTED AREAS MAPBOOK



Proposed Project Components
- Project Endpoints
- Alternative Routes
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- Map Index Page
- State Border

Protected Areas
- State Forests
- State Parks*
- Fisheries / Wildlife Management Area
- Pennsylvania State Wilderness Area
- Pennsylvania State Game Lands
- Maryland Wildlands
- National Historic Site
- USACE Recreation Area
- Conservation Easements**
- Local Park

NOTES
1. Proposed tower locations are preliminary and subject to change
2. Data source: NEET, ERM, HIFLD, USGS, PAD-US, REXTAG, PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR
**Includes Youghiogheny River Natural Environment Area (NEA) managed by the Maryland Park Service*
***Includes privately owned conservation easements and fee-owned conservation lands held by nonprofit organizations*

N

0 4 8 12 16
Miles

Scale: 1:390,000
1 inch equals 32,500 ft (when printed at 11x17)

Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM

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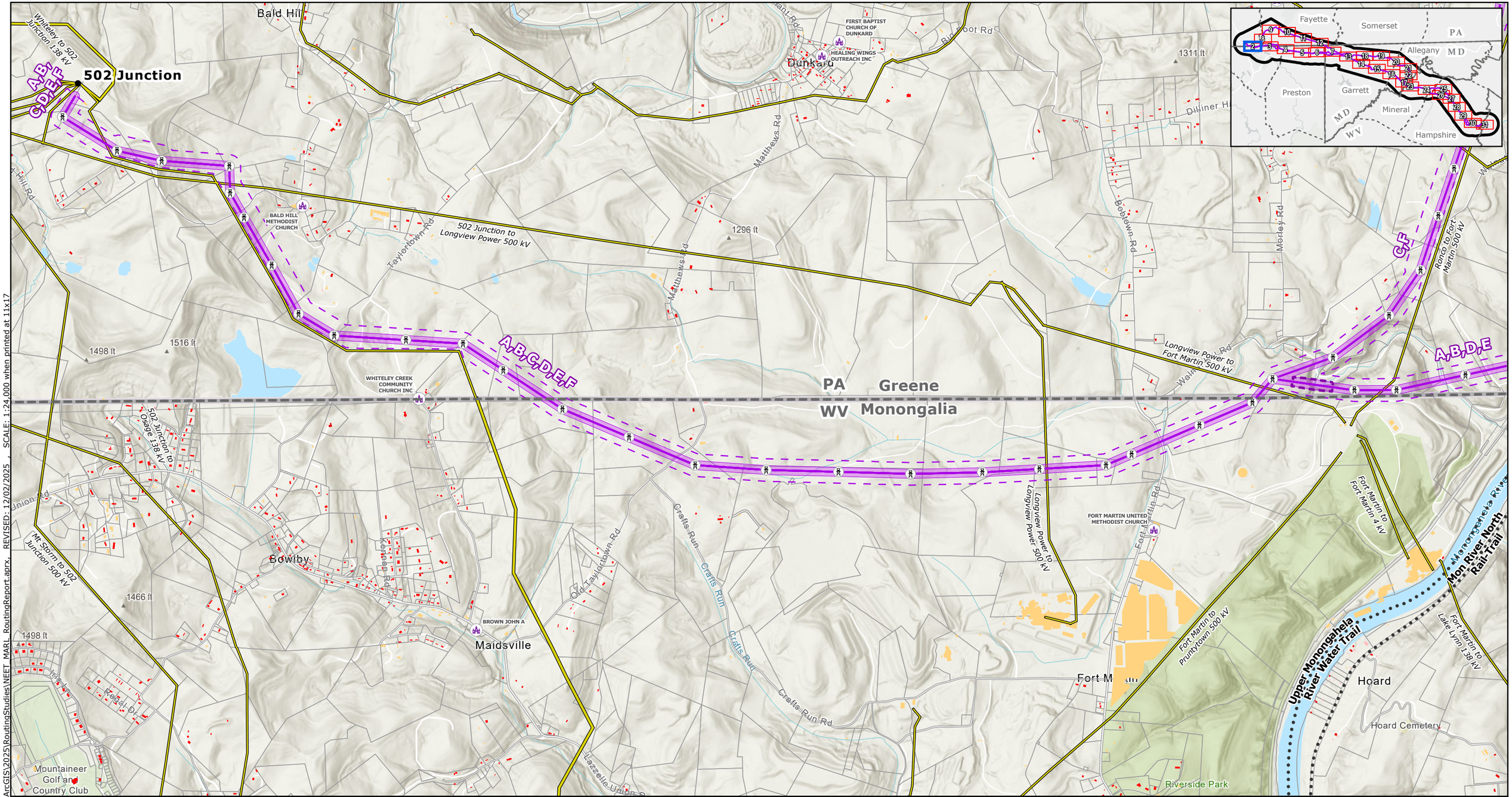

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Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- State Forests
- State Parks*
- Fisheries / Wildlife Management Area
- Pennsylvania State Wilderness Area
- Pennsylvania State Game Lands
- Maryland Wildlands
- National Historic Site
- USACE Recreation Area
- Conservation Easements**
- Local Park

Community and Recreational Resources
- Place of Worship
- Childcare Center
- School
- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways

Buildings Footprints
- Parcels
- Residential Dwelling
- Residential Outbuilding (Shed,Garage,Other)
- Non-residential buildings

NOTES
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N

0 0.25 0.5 0.75 1
Miles

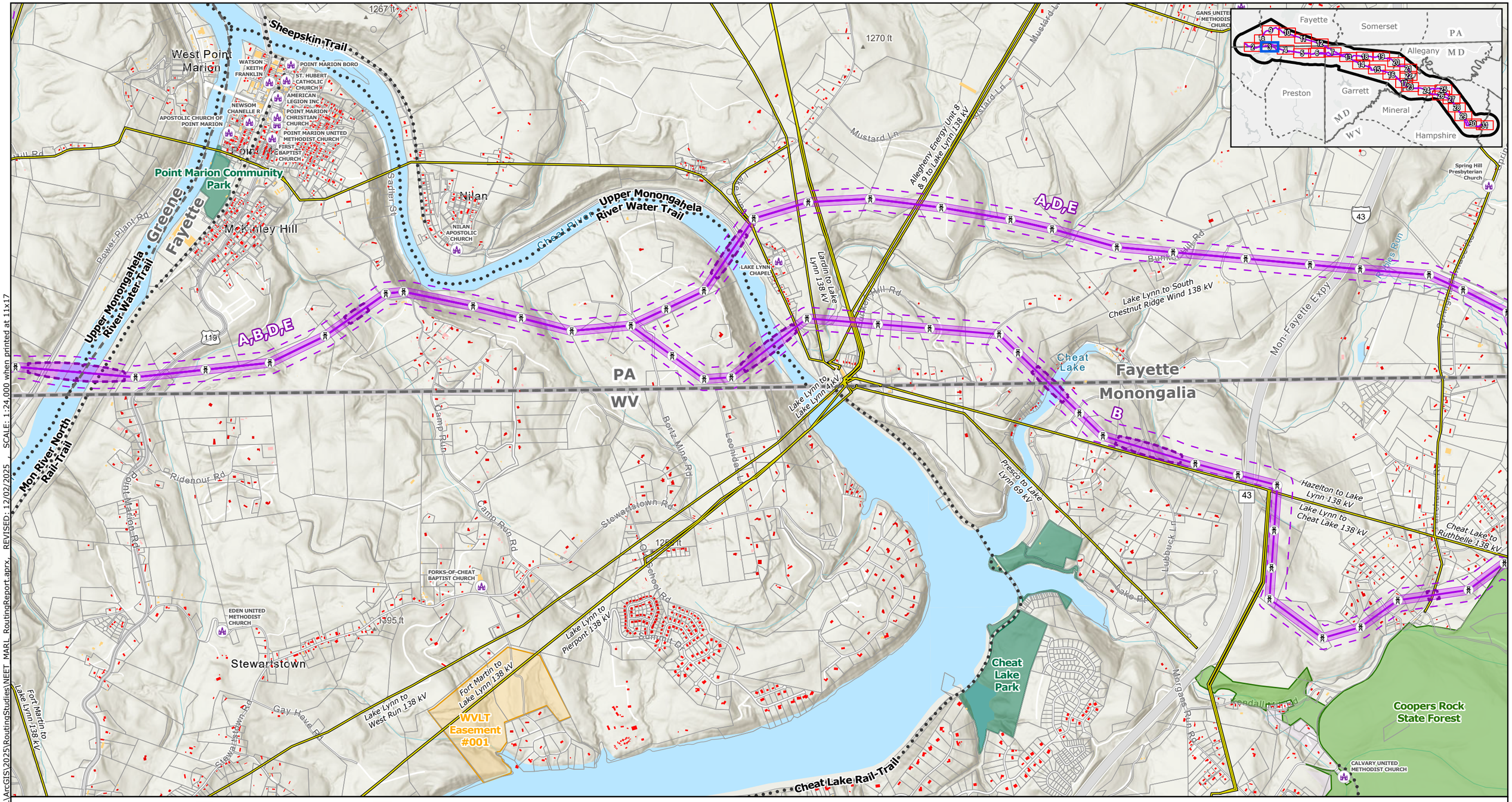
Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM



Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
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Base Data
- Existing High-Voltage Transmission Lines
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N

0 0.25 0.5 0.75 1
Miles

Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas
Page 3 of 31
MidAtlantic Resiliency Link

ERM

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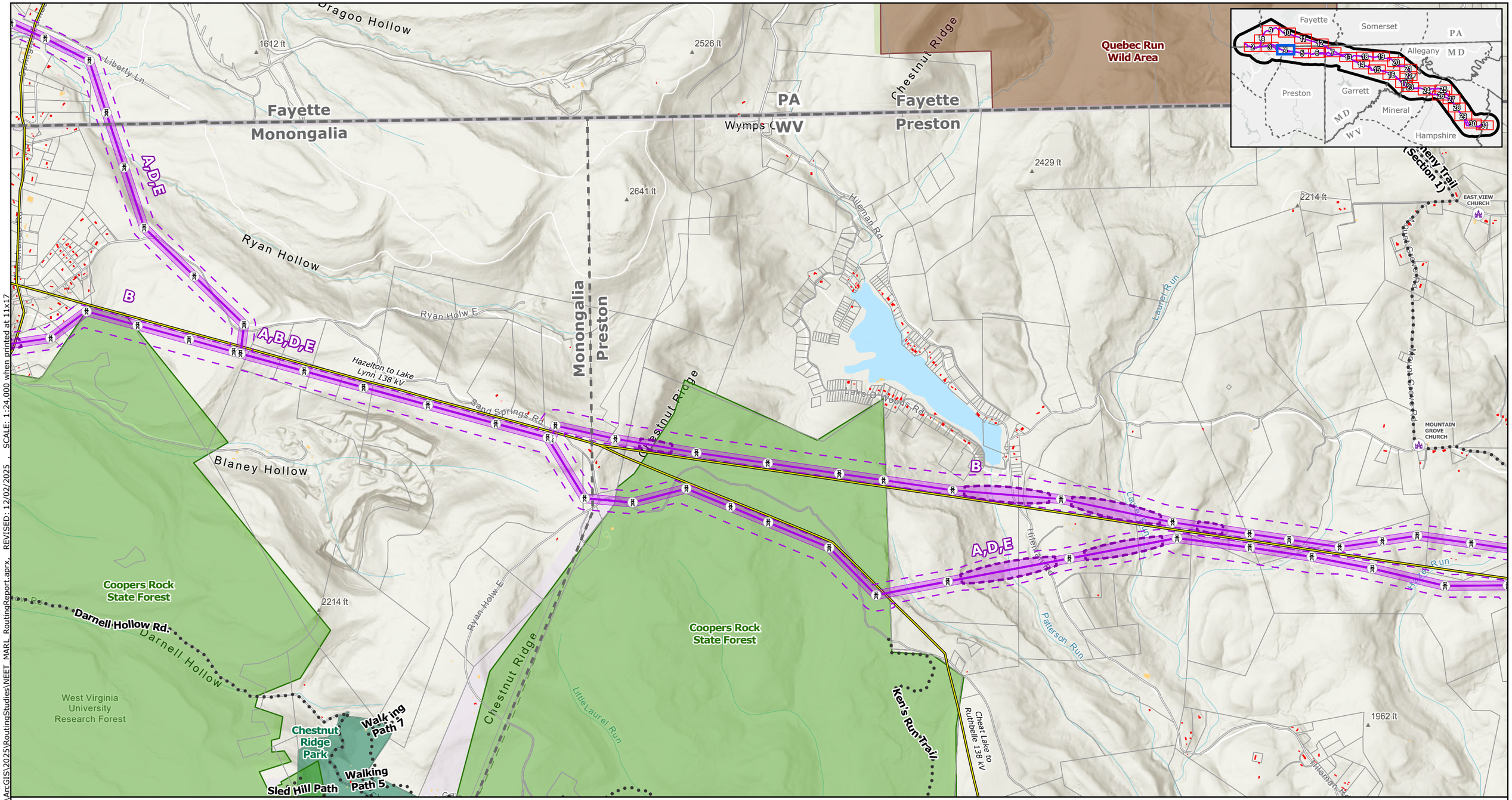

Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
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N

0 0.25 0.5 0.75 1
Miles

Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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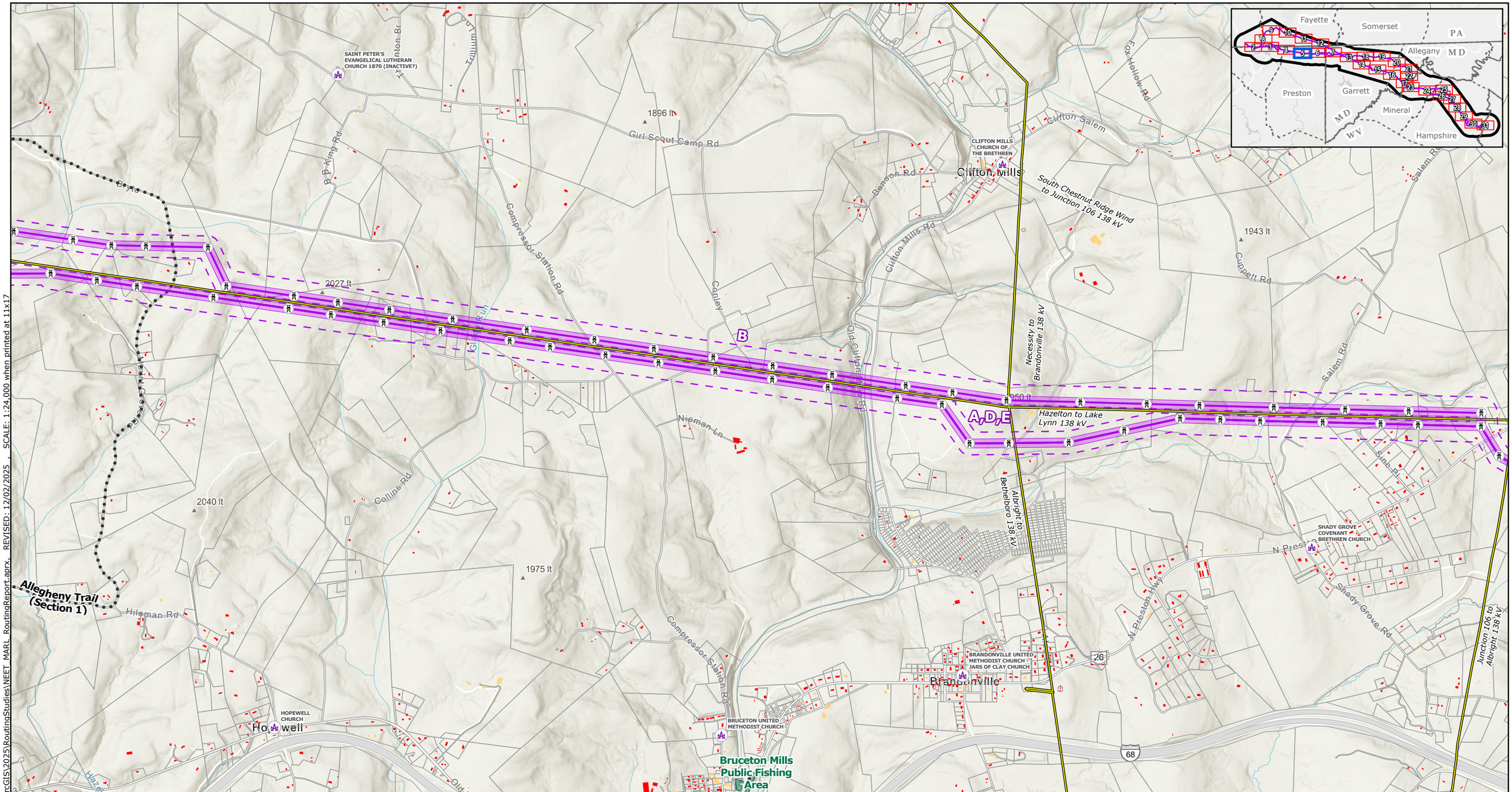

Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
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N

0 0.25 0.5 0.75 1
Miles
Scale: 1:24,000
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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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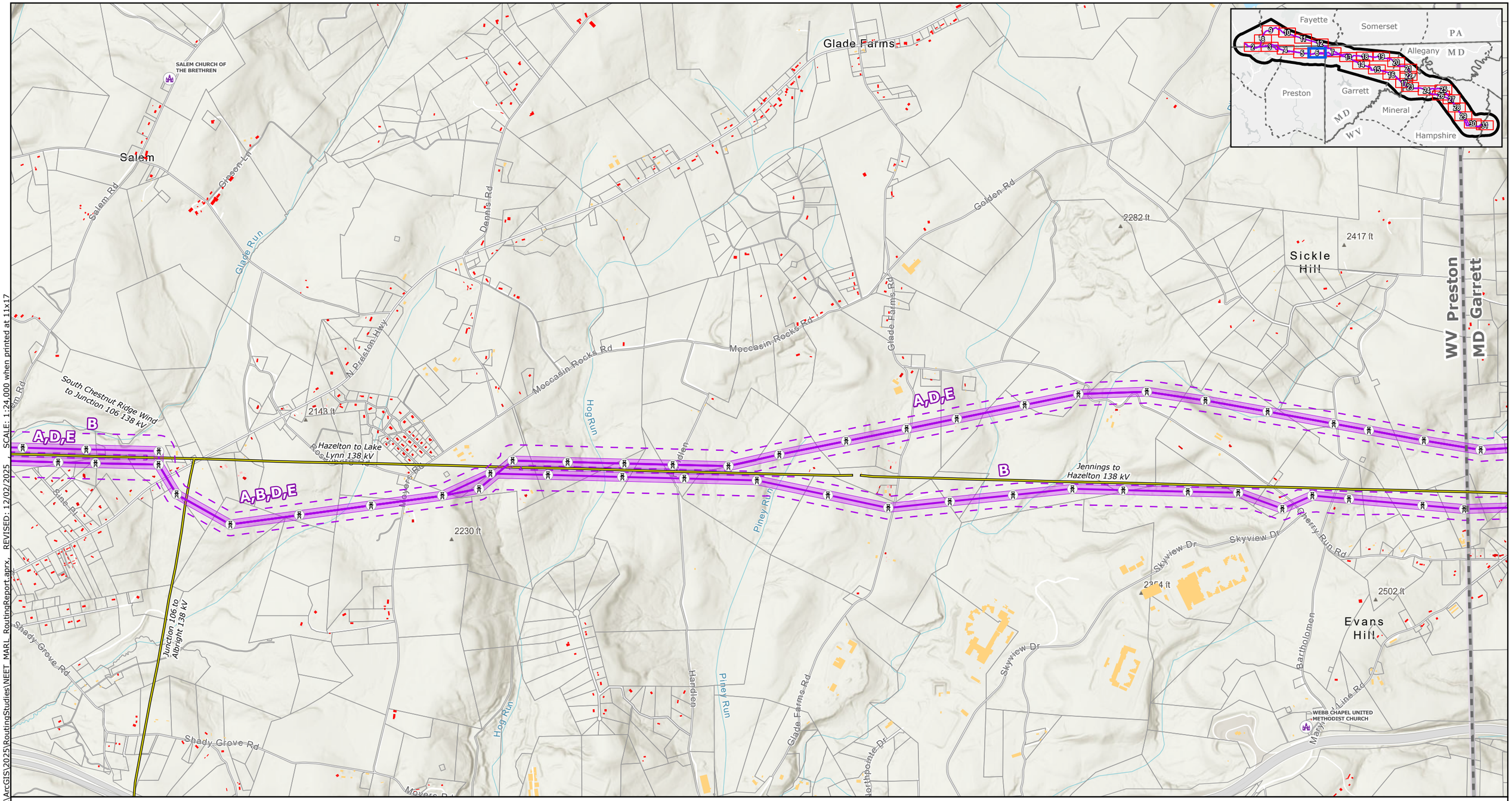

Proposed Project Components
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Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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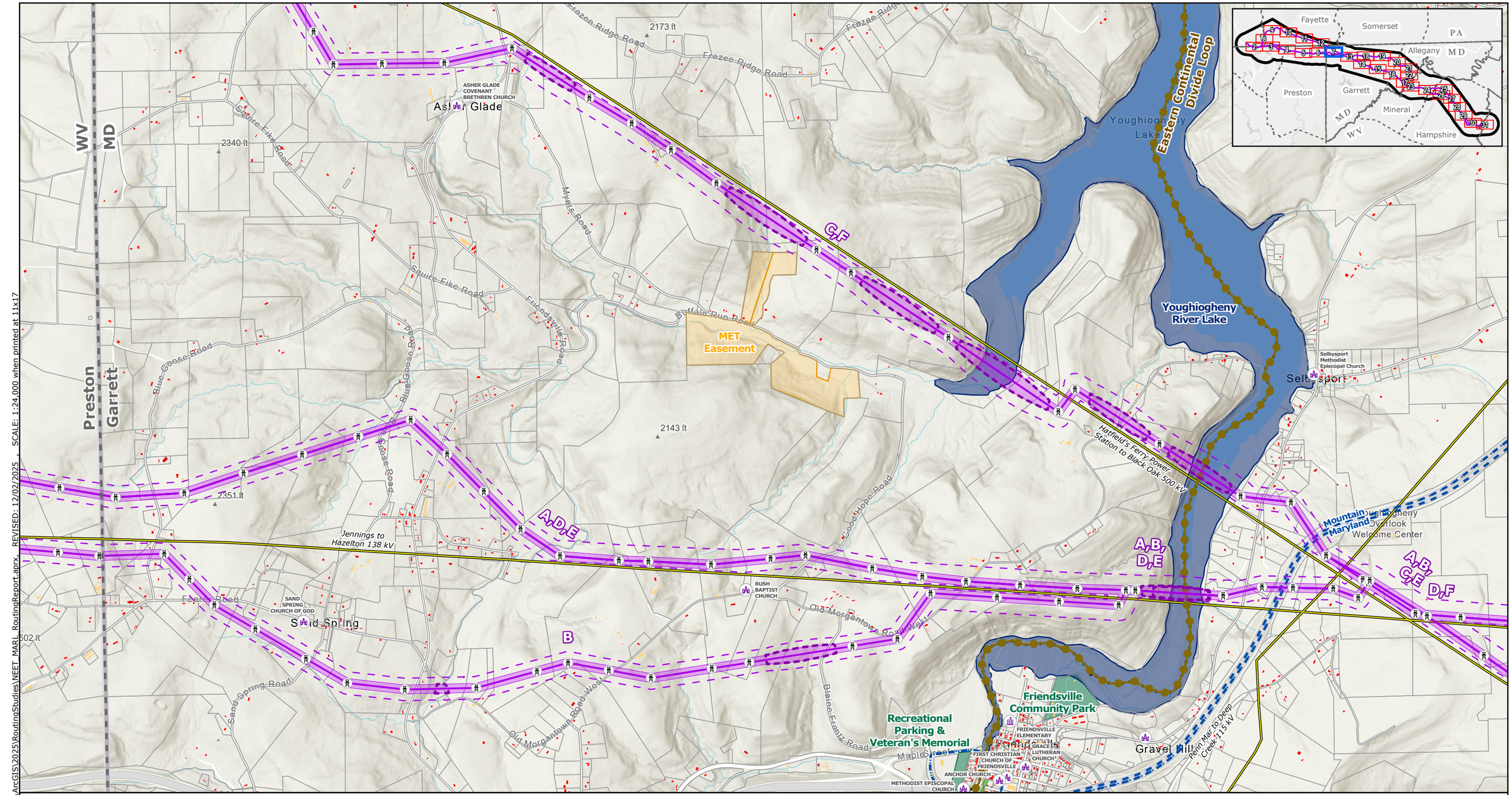

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Proposed Project Components
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Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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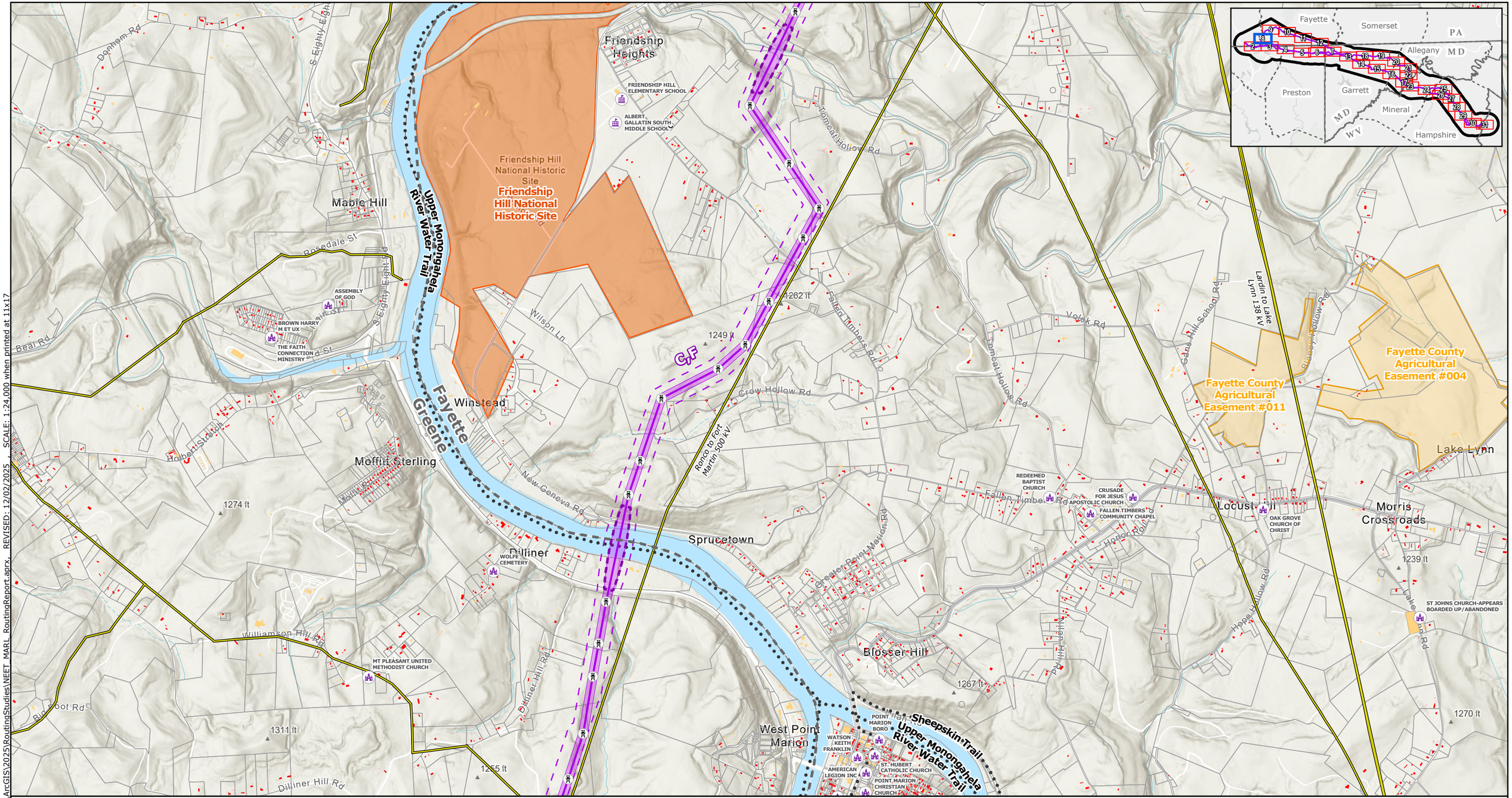

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Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
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N

0 0.25 0.5 0.75 1

Miles

Scale: 1:24,000

1 inch equals 2,000 ft (when printed at 11x17)

Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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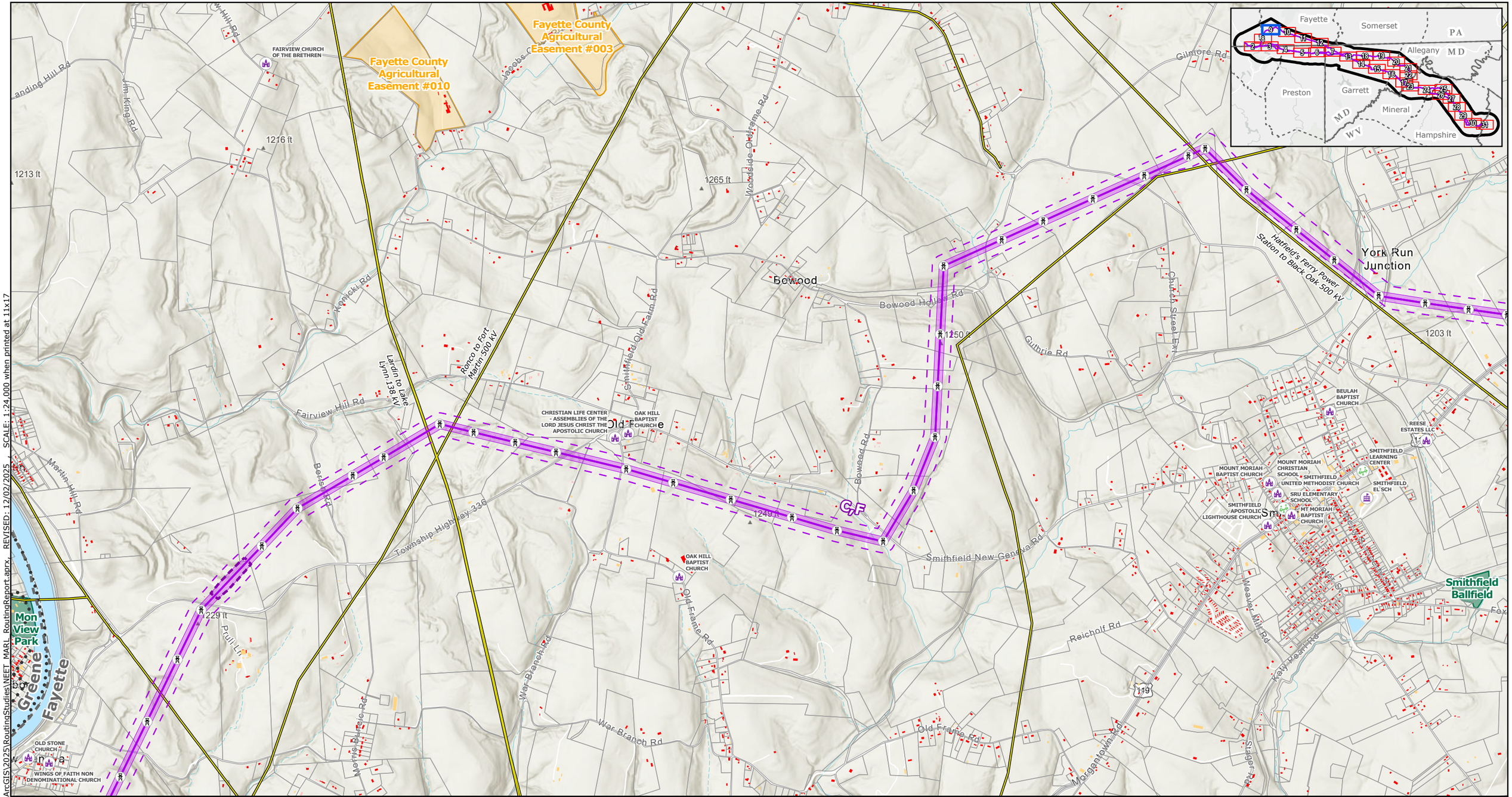

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Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
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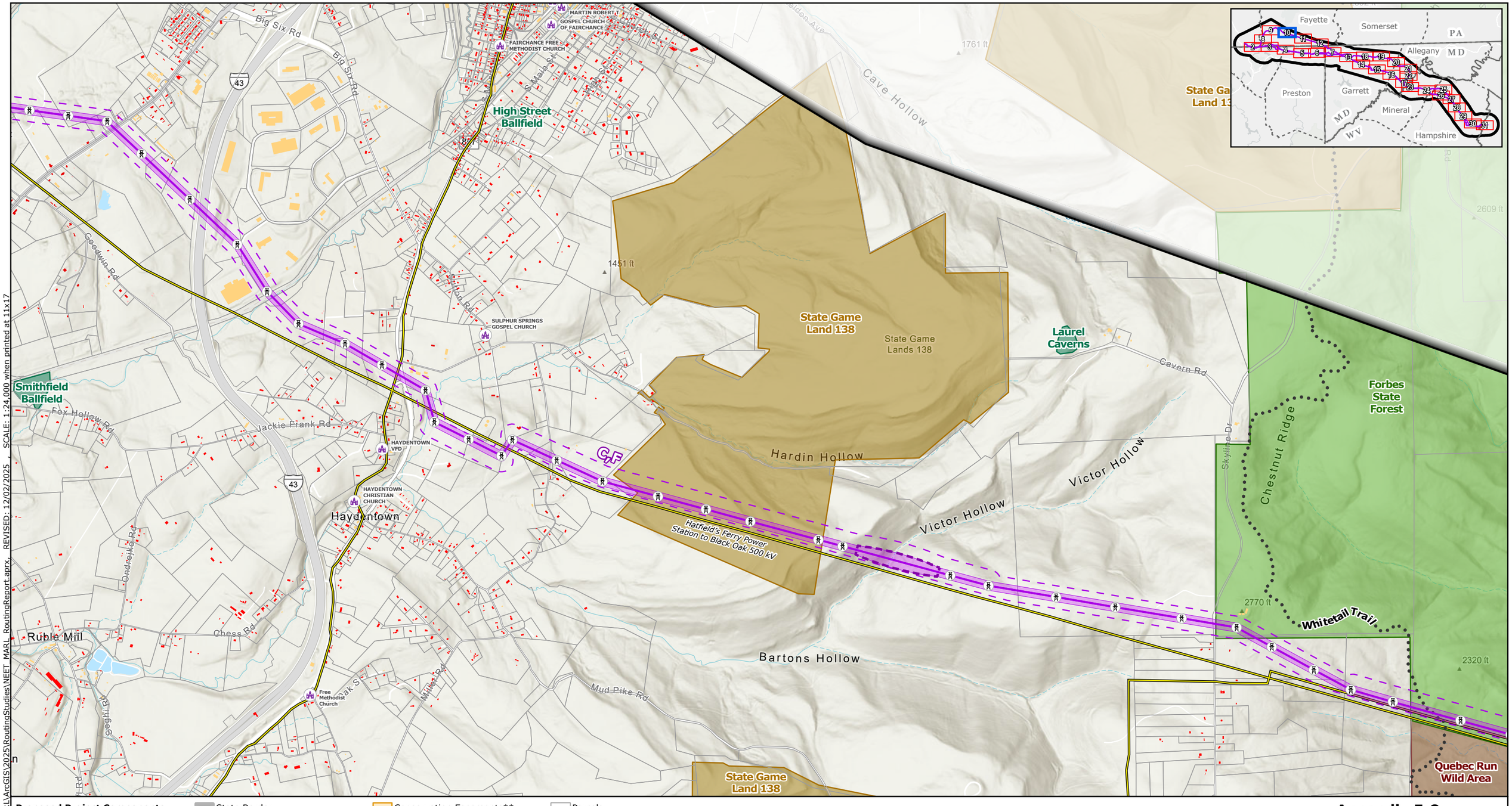
Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM



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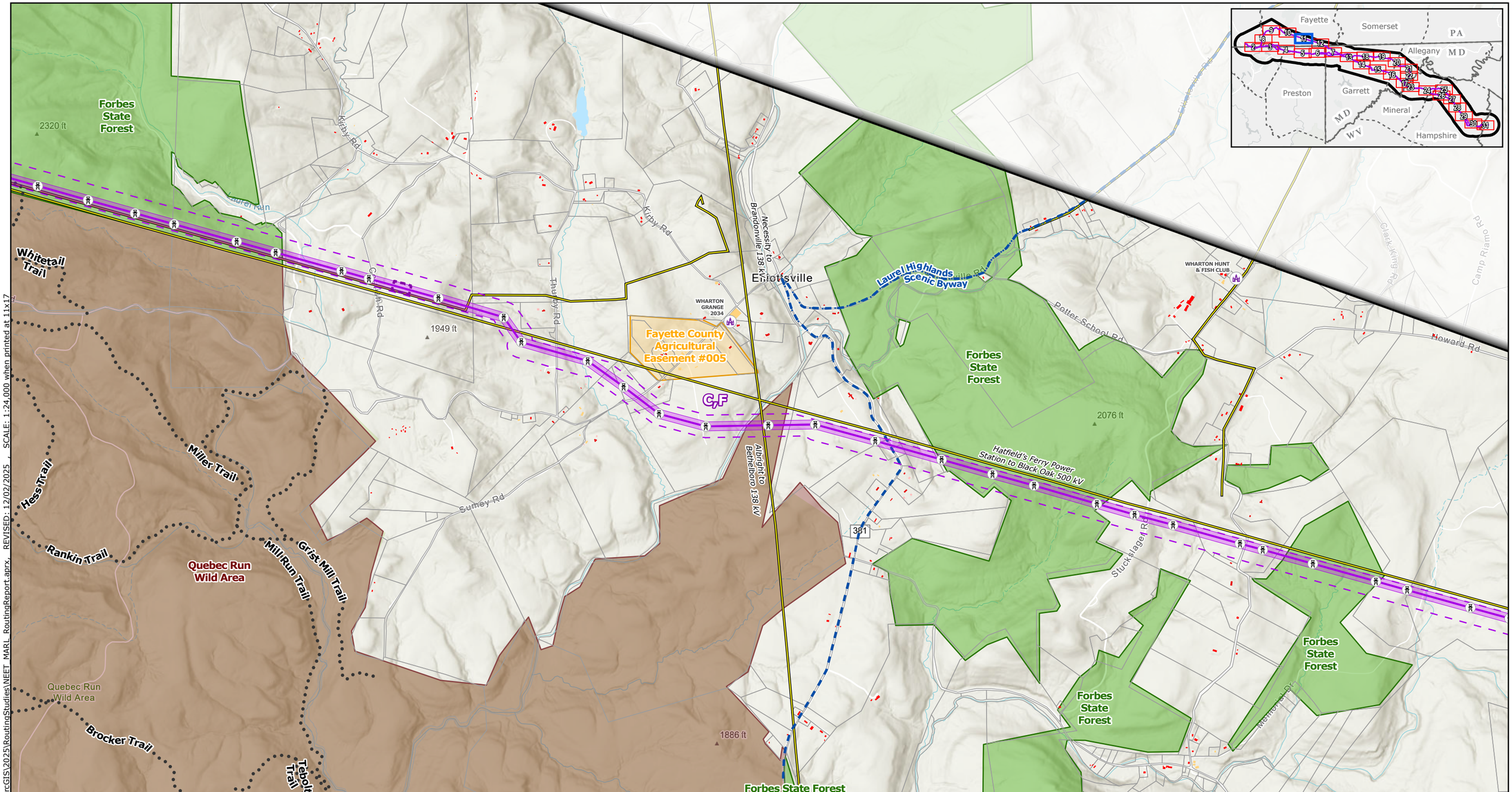

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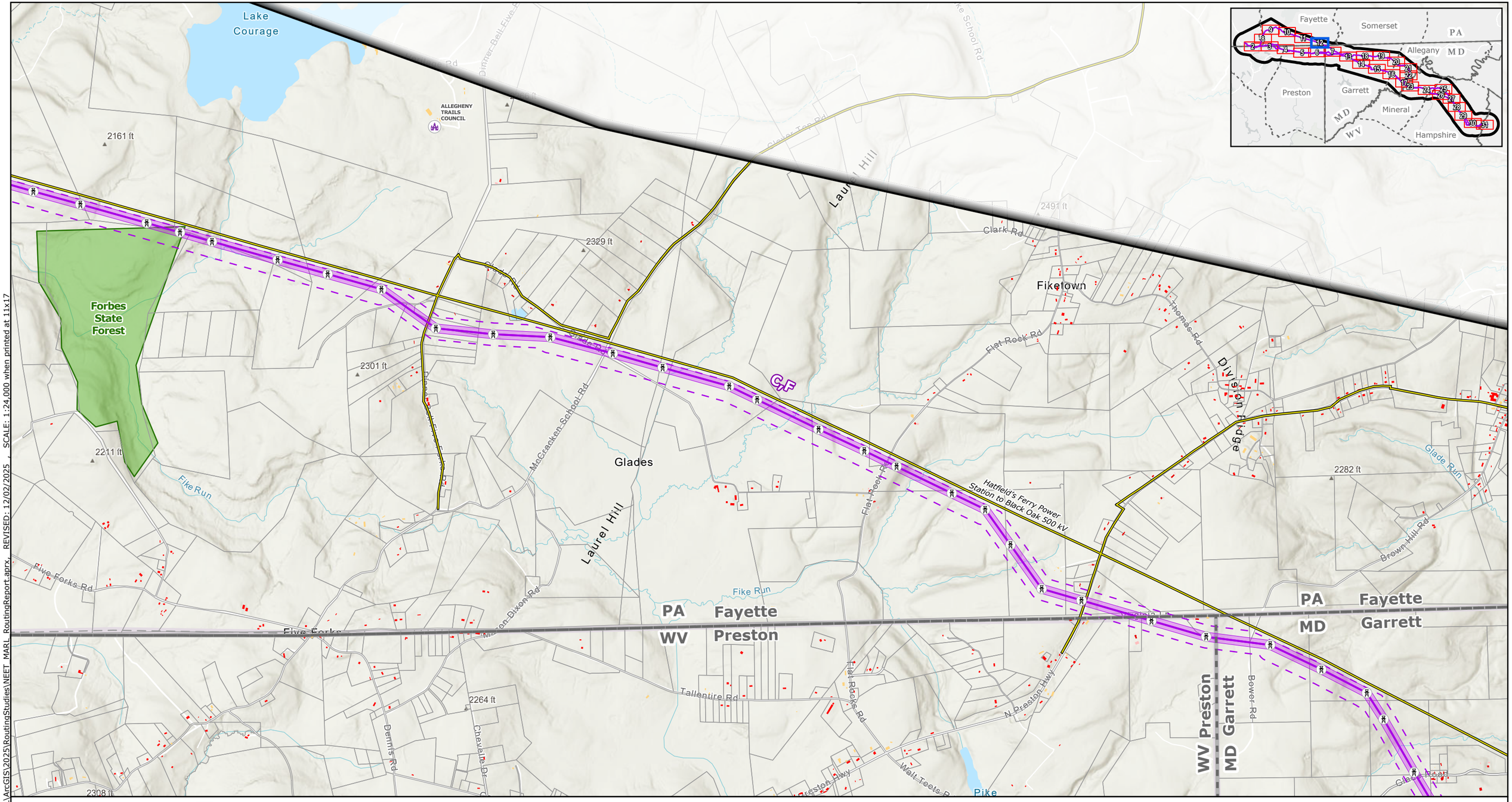

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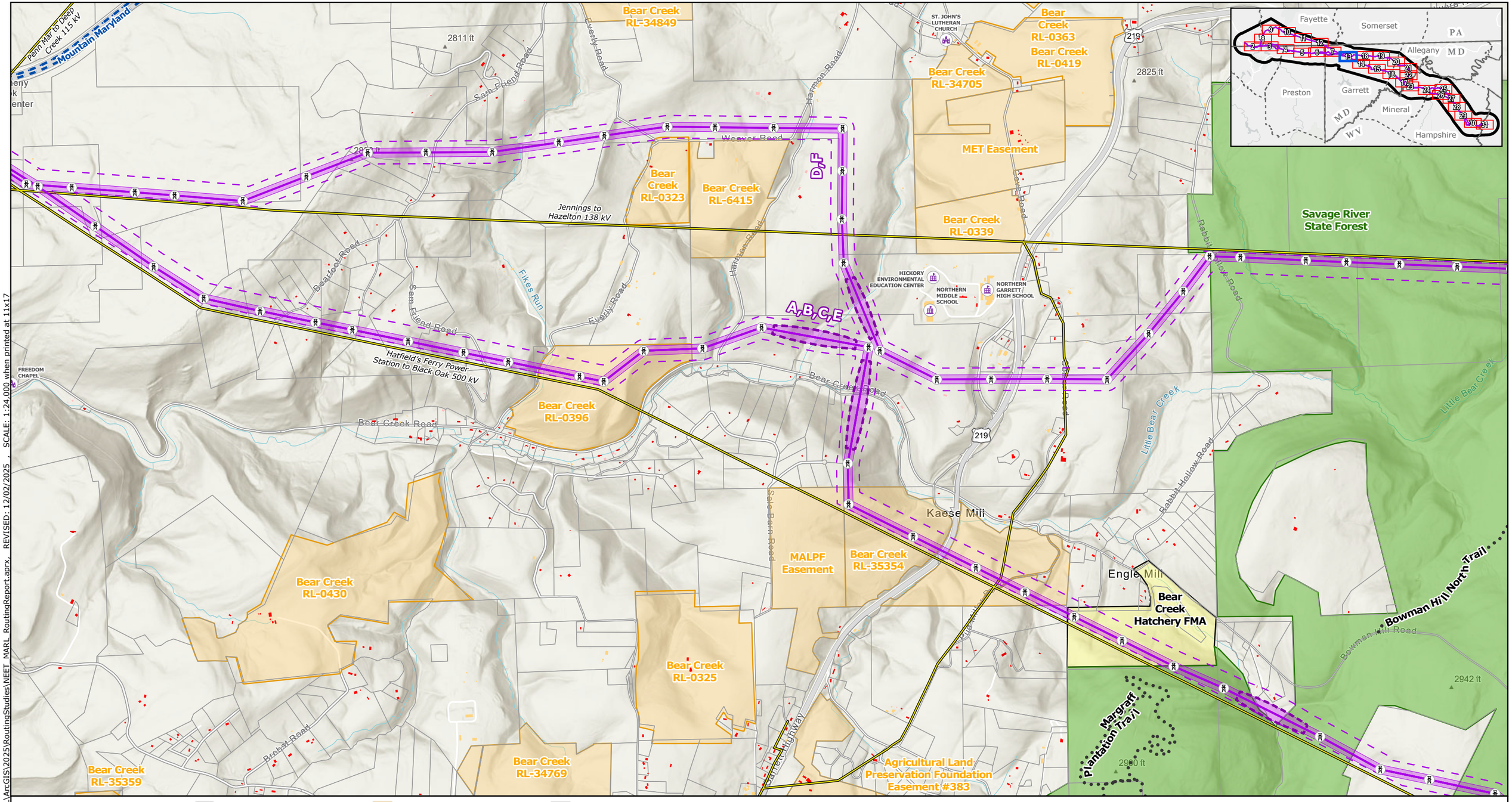

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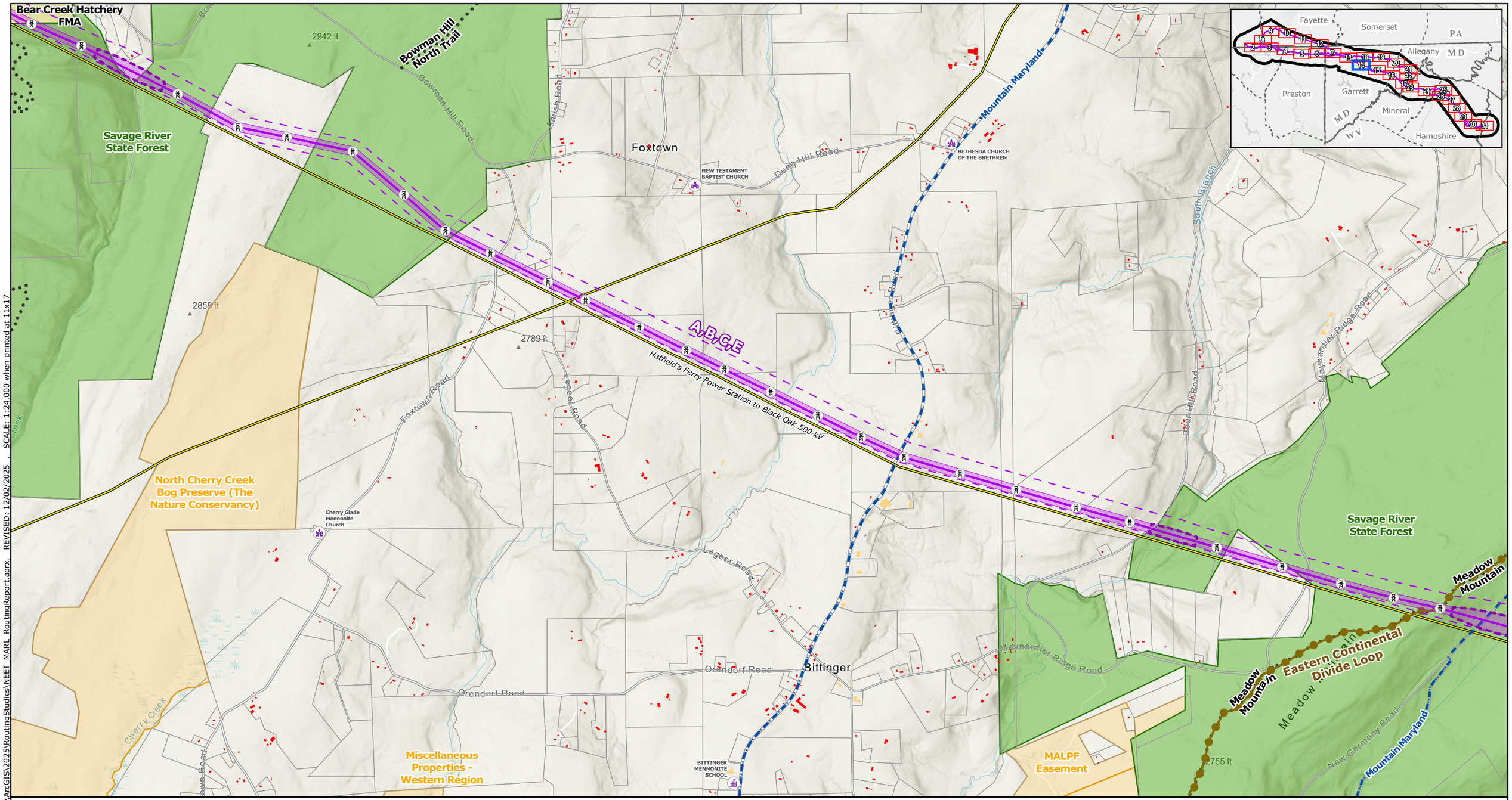

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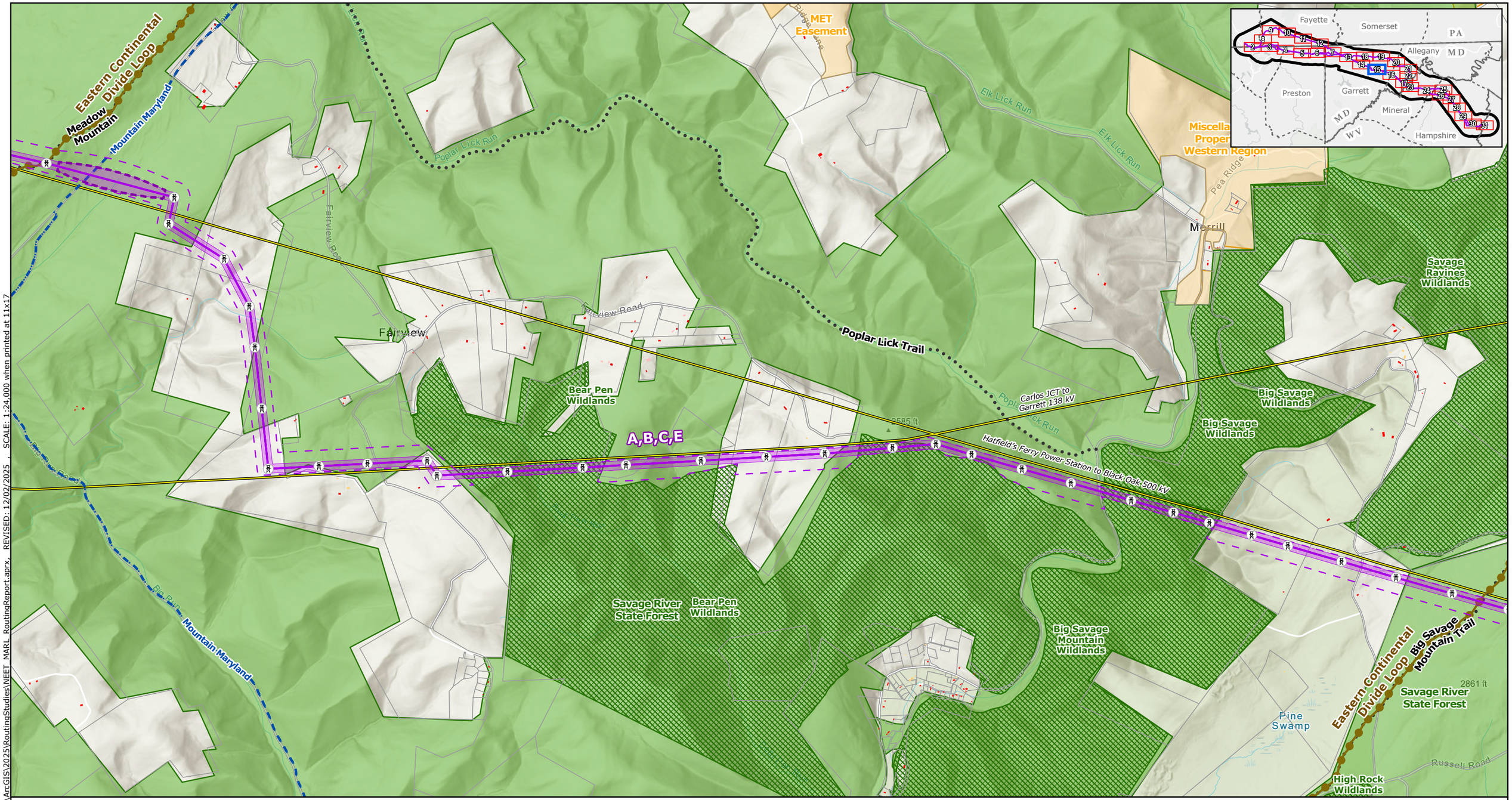

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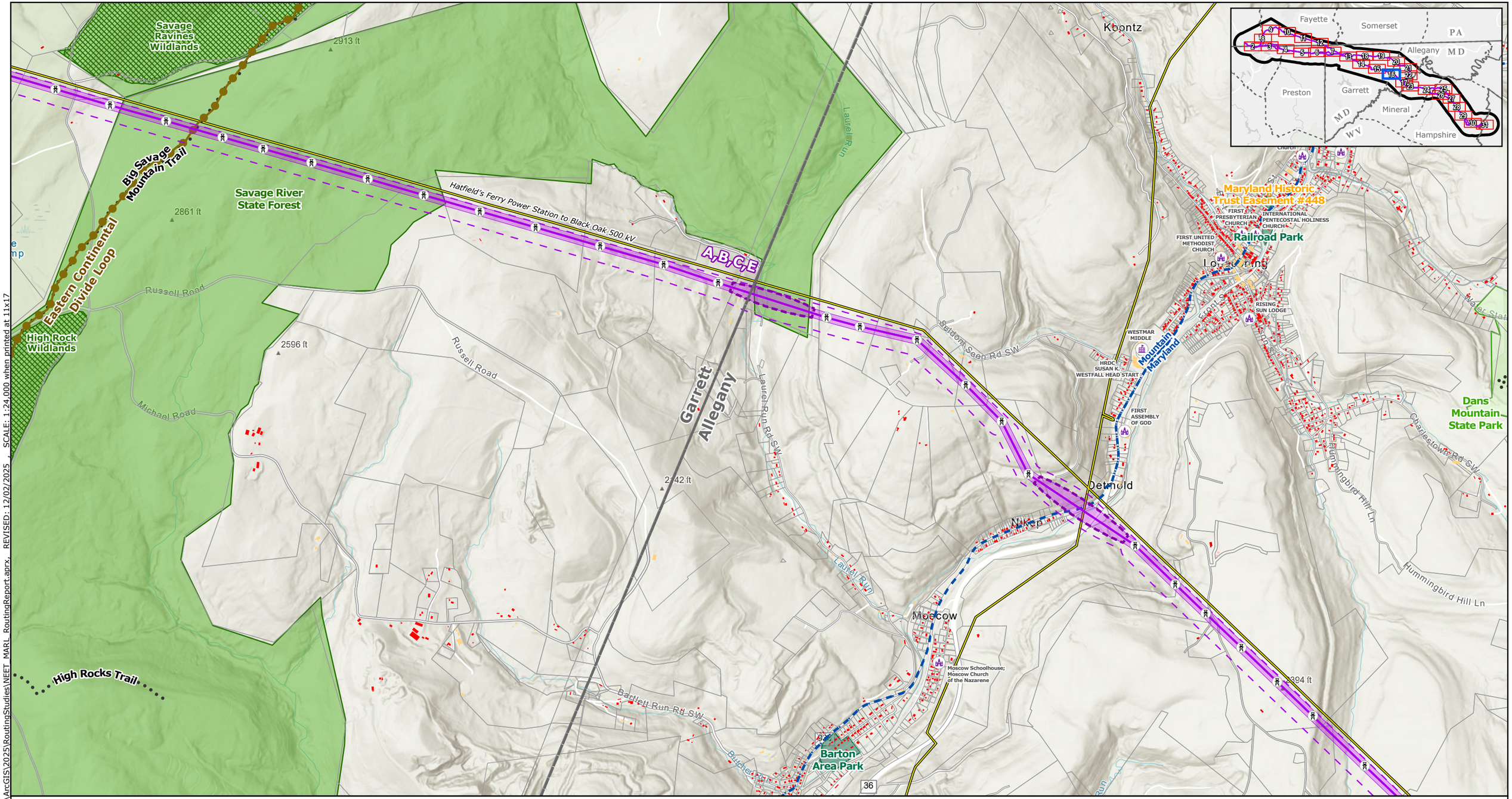

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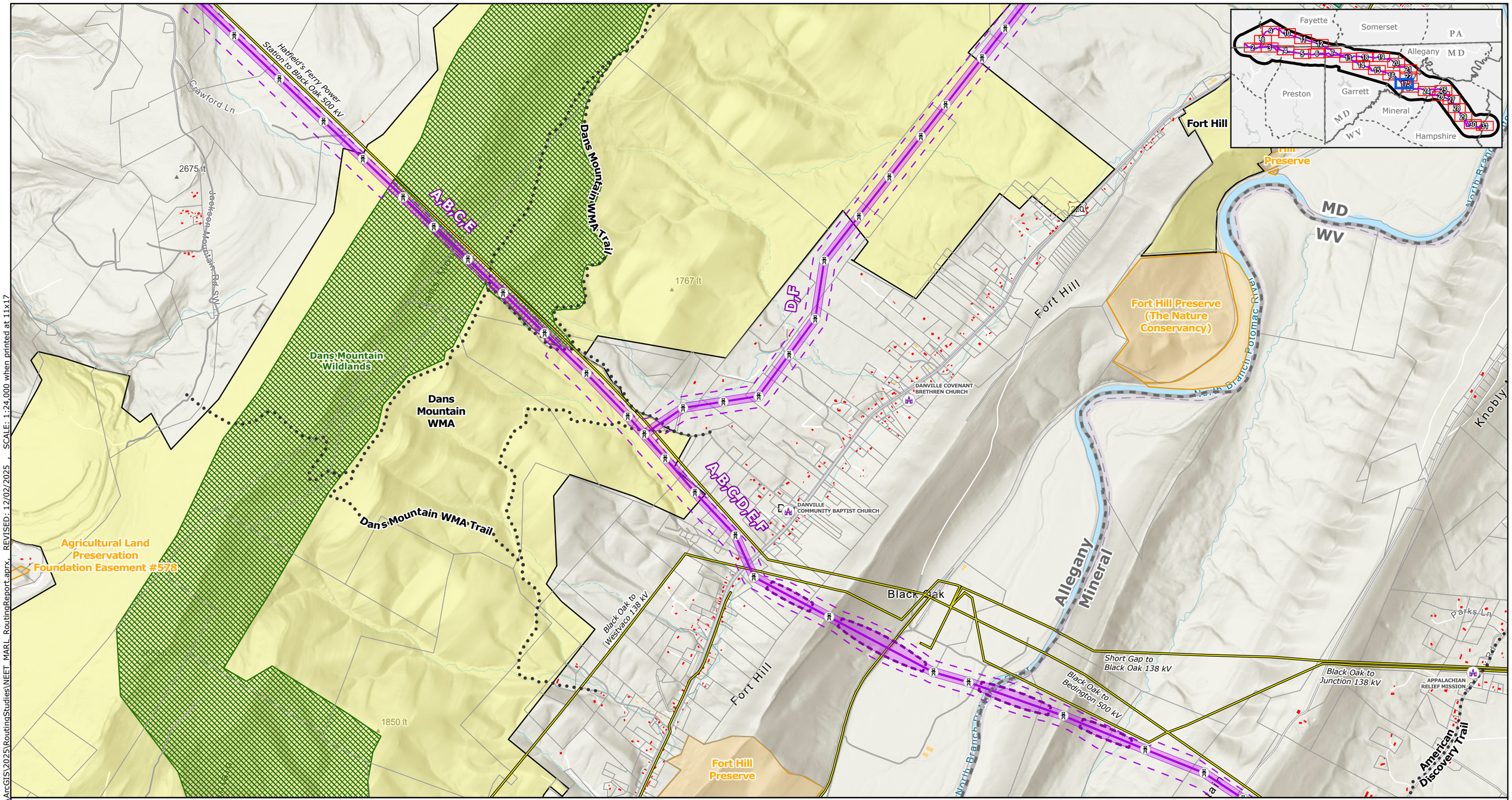

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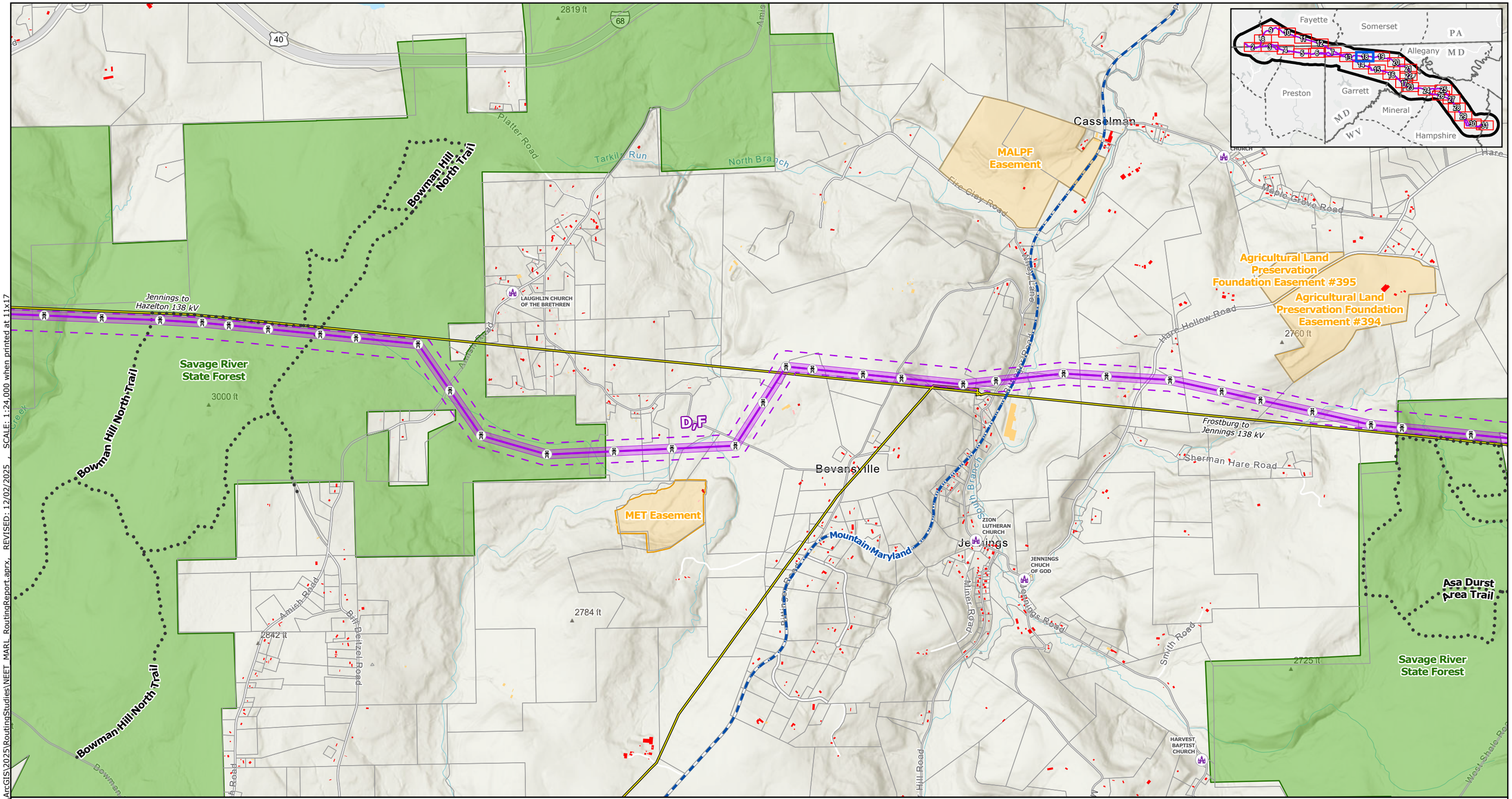

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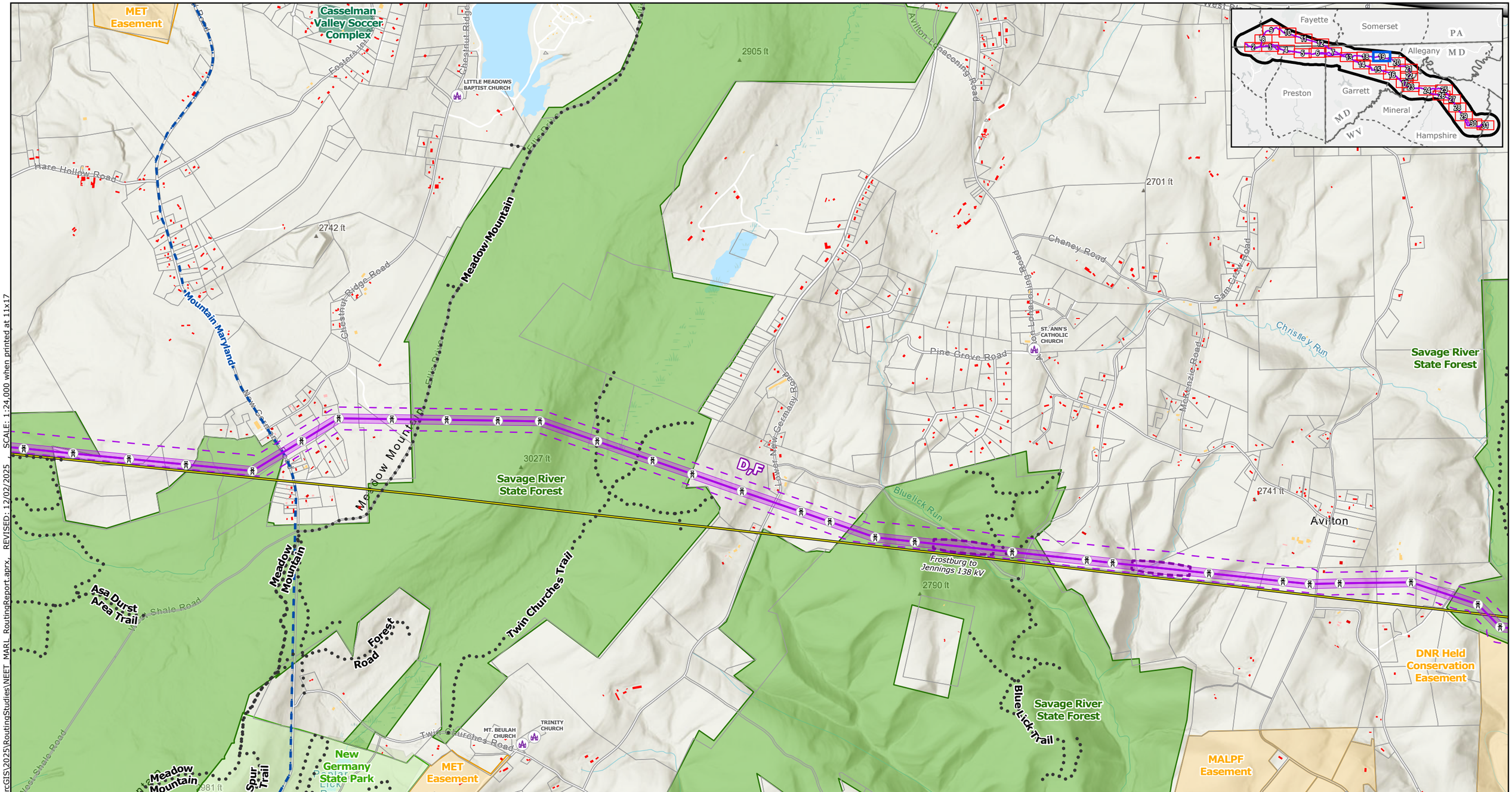

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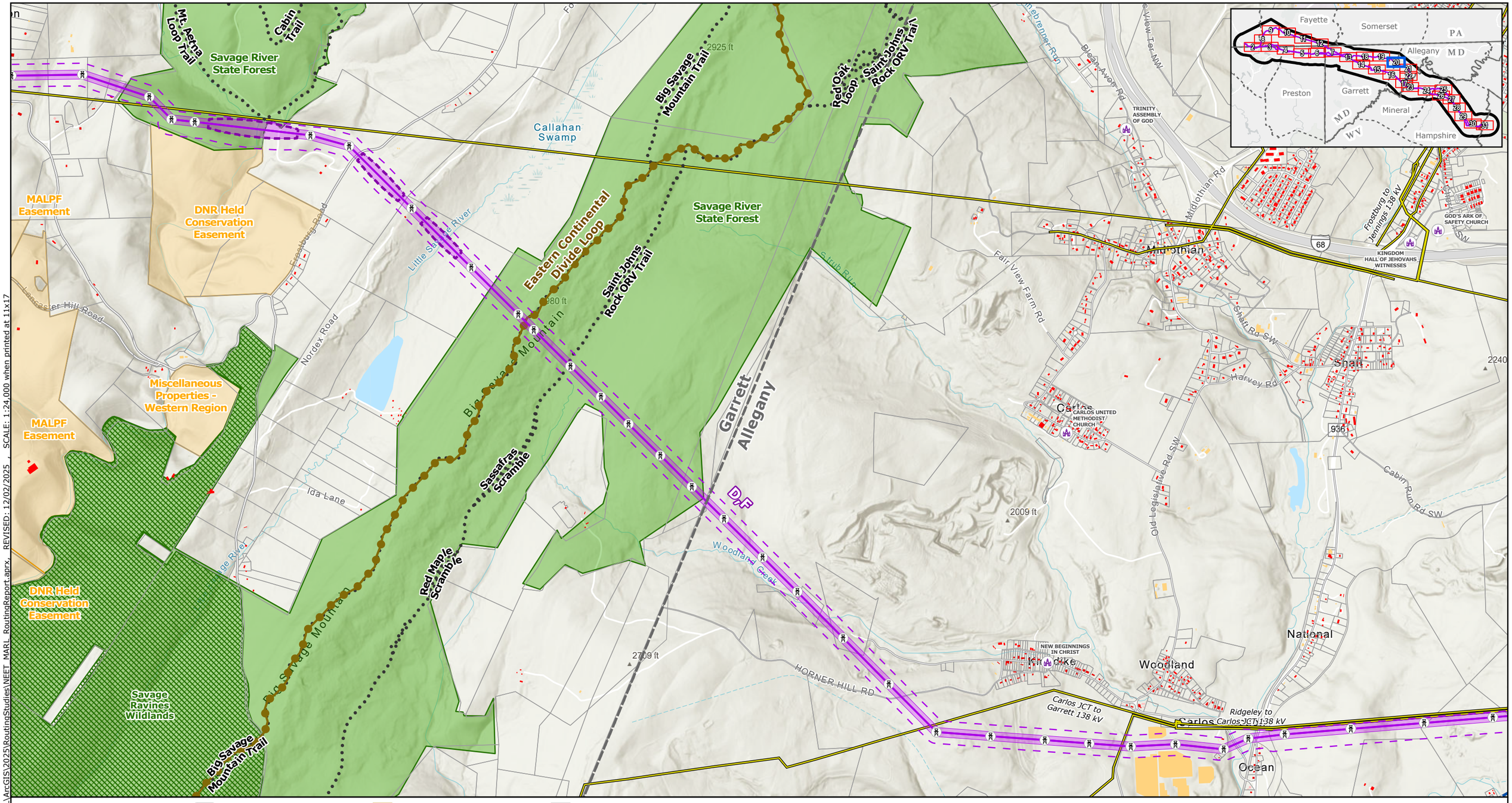

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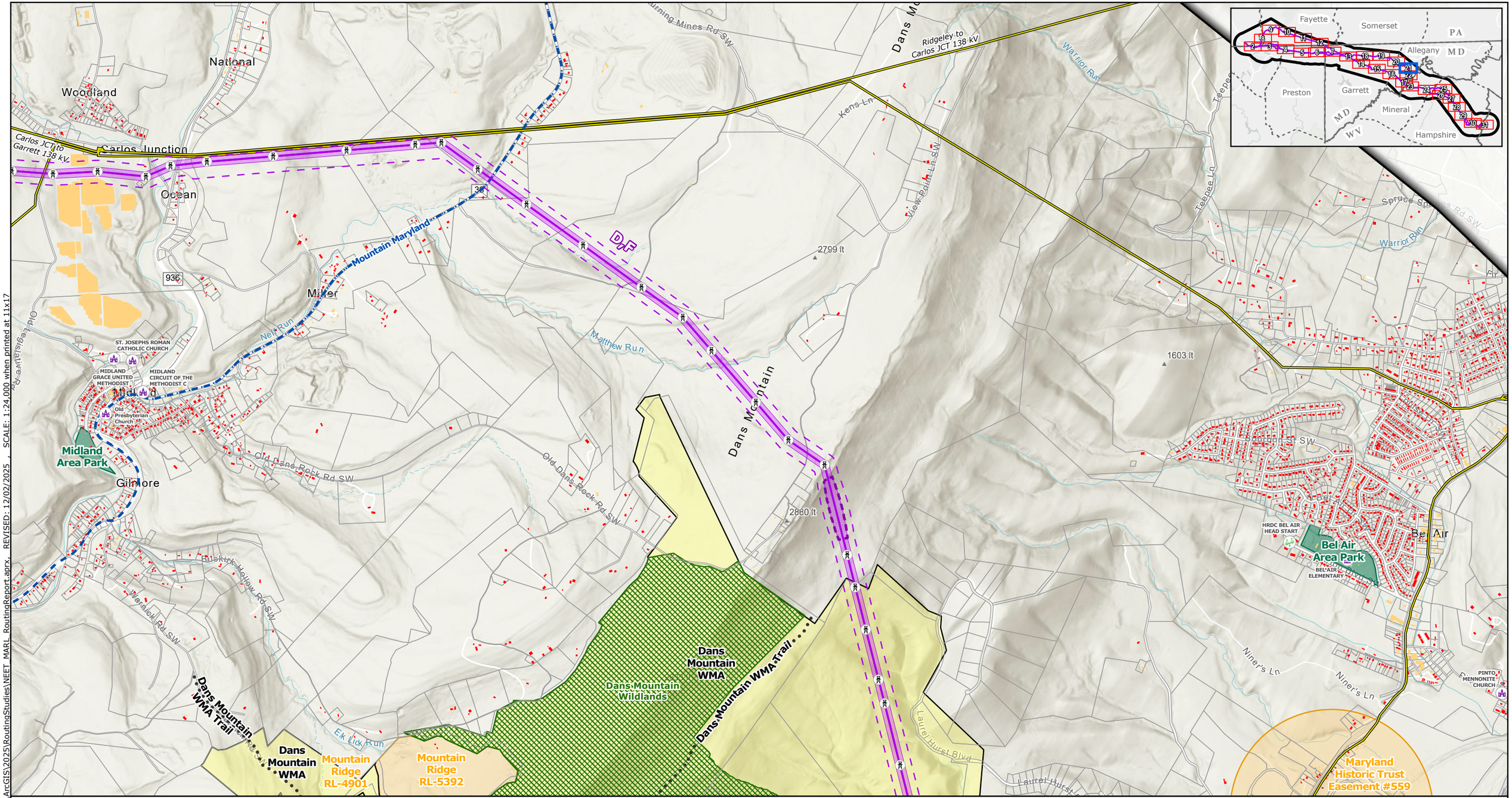

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- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- State Forests
- State Parks*
- Fisheries / Wildlife Management Area
- Pennsylvania State Wilderness Area
- Pennsylvania State Game Lands
- Maryland Wildlands
- National Historic Site
- USACE Recreation Area
- Conservation Easements**
- Local Park

Community and Recreational Resources
- Place of Worship
- Childcare Center
- School
- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways

- Parcels

Buildings Footprints
- Residential Dwelling
- Residential Outbuilding (Shed,Garage,Other)
- Non-residential buildings

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N

0 0.25 0.5 0.75 1
Miles

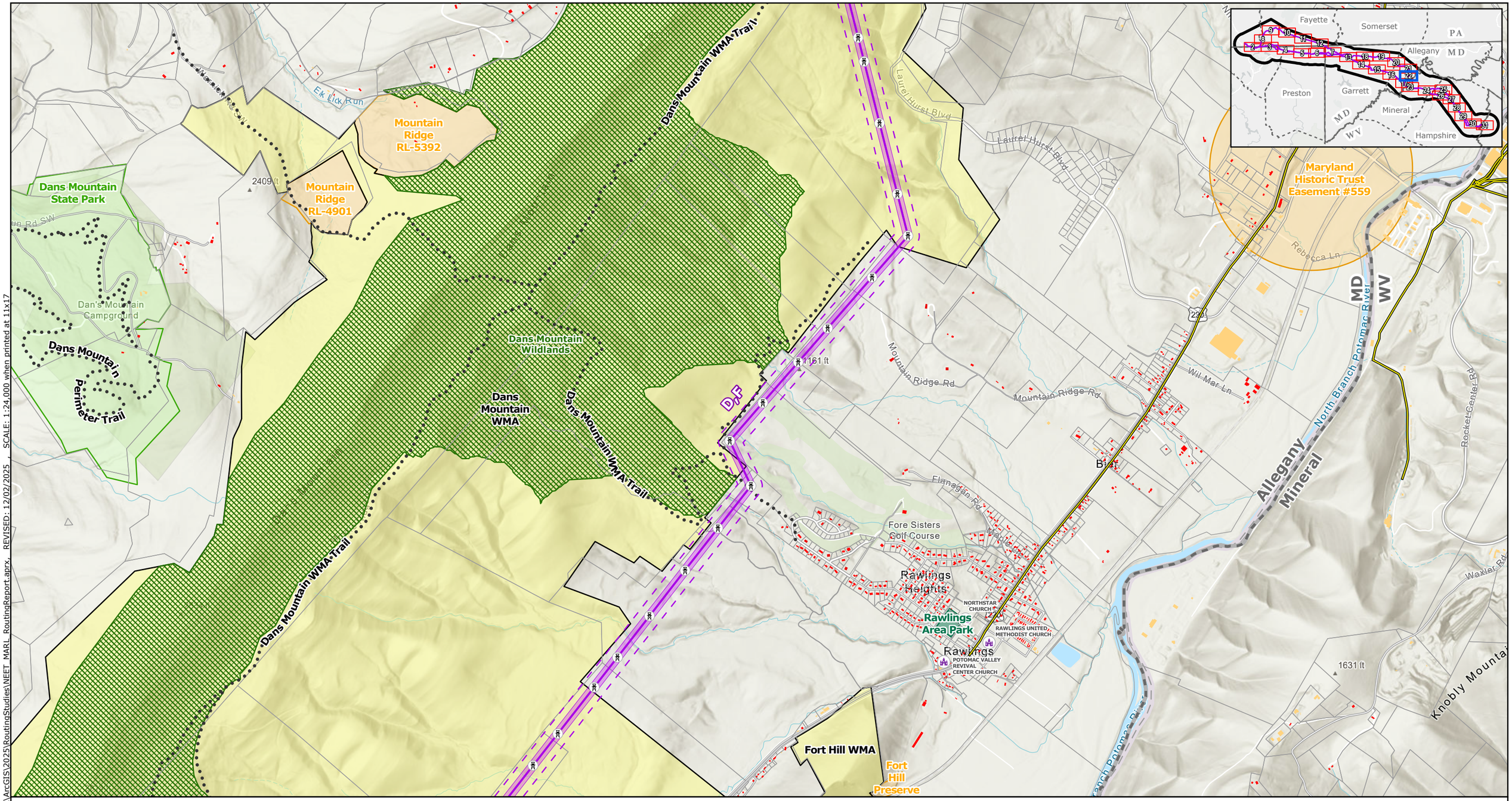
Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM



Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
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Miles

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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas
Page 22 of 31
MidAtlantic Resiliency Link

ERM

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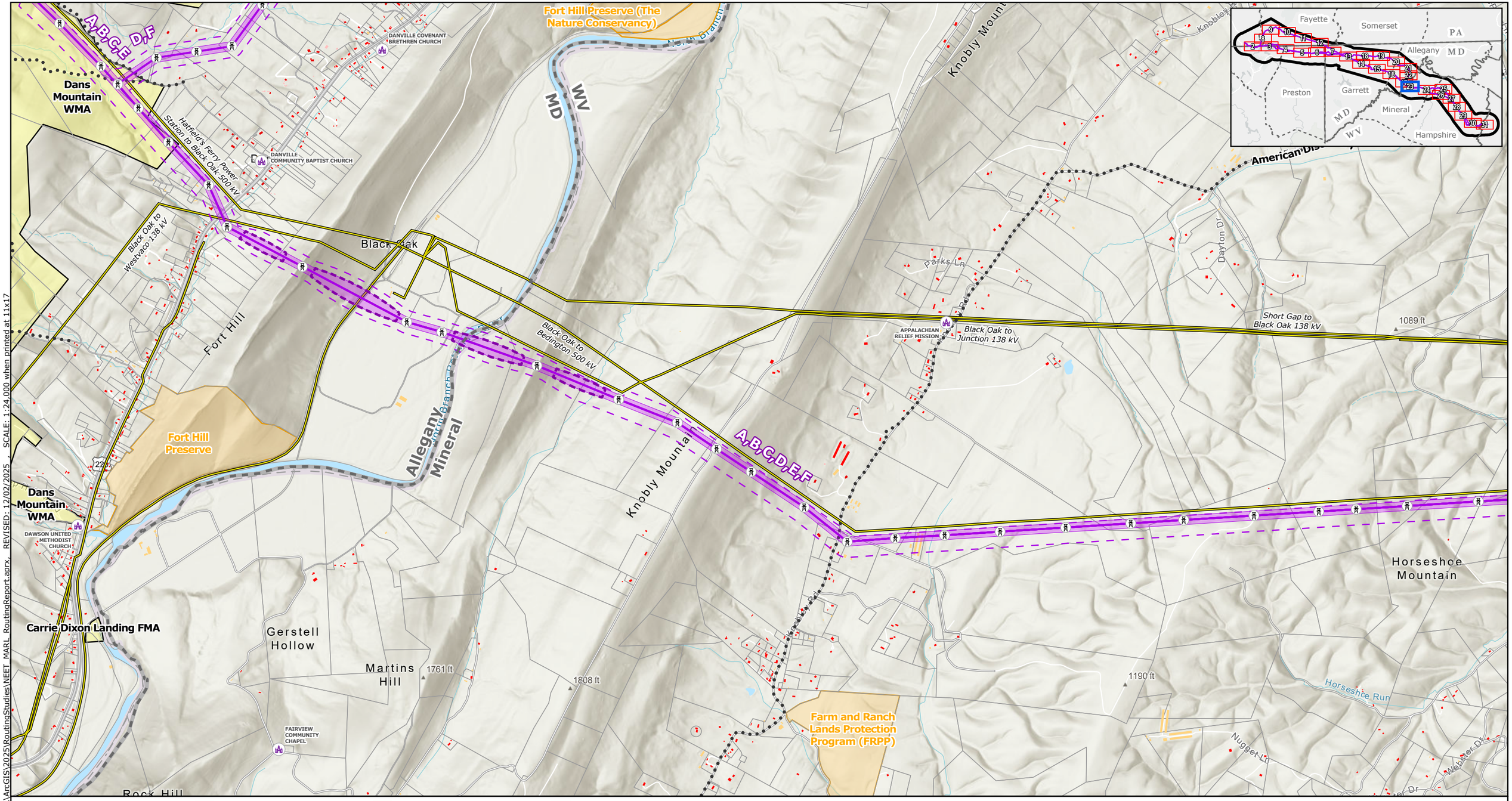

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Proposed Project Components
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Miles

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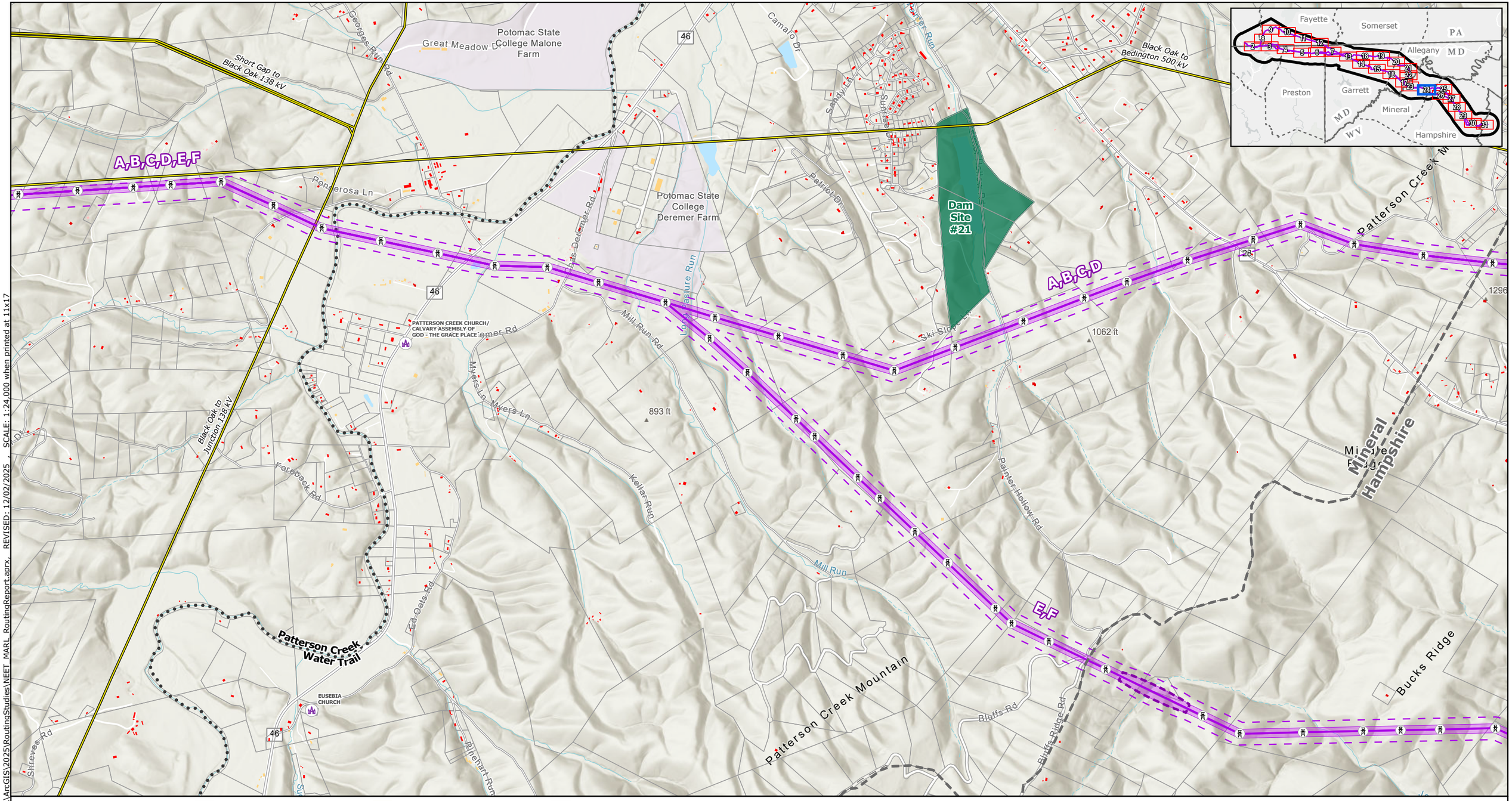
Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM



Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
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Base Data
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Miles

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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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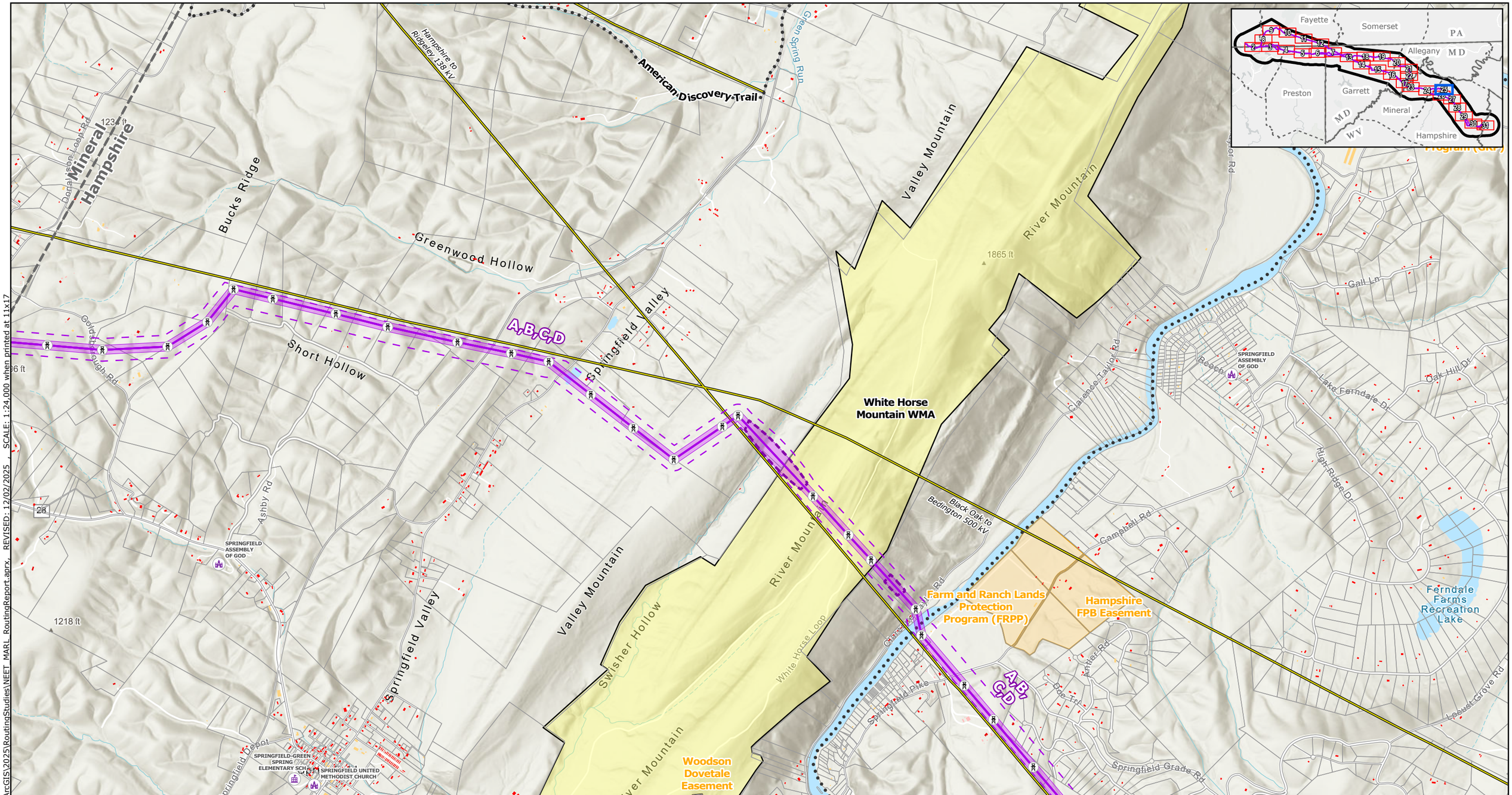

Proposed Project Components
- Project Endpoints
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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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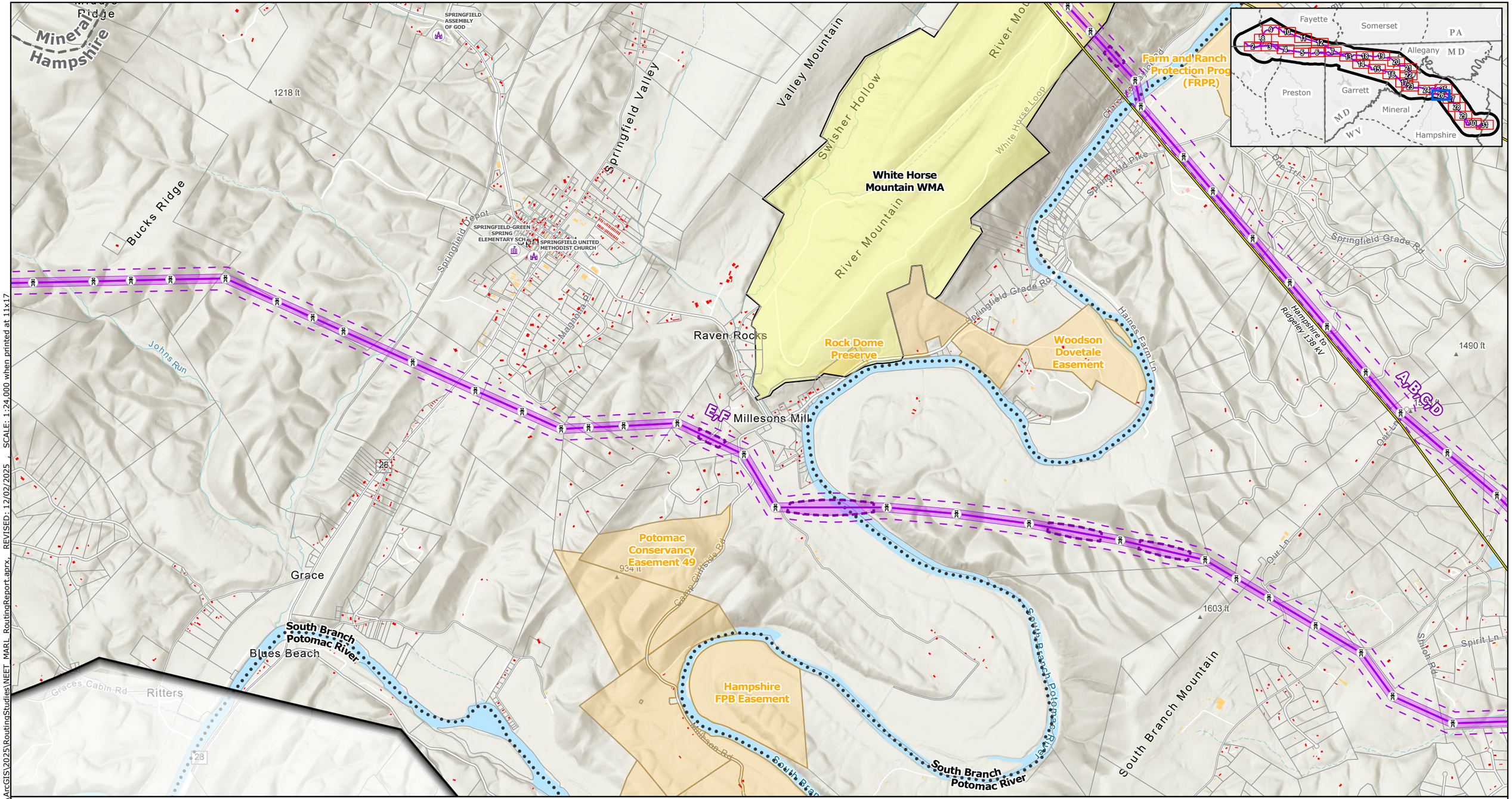

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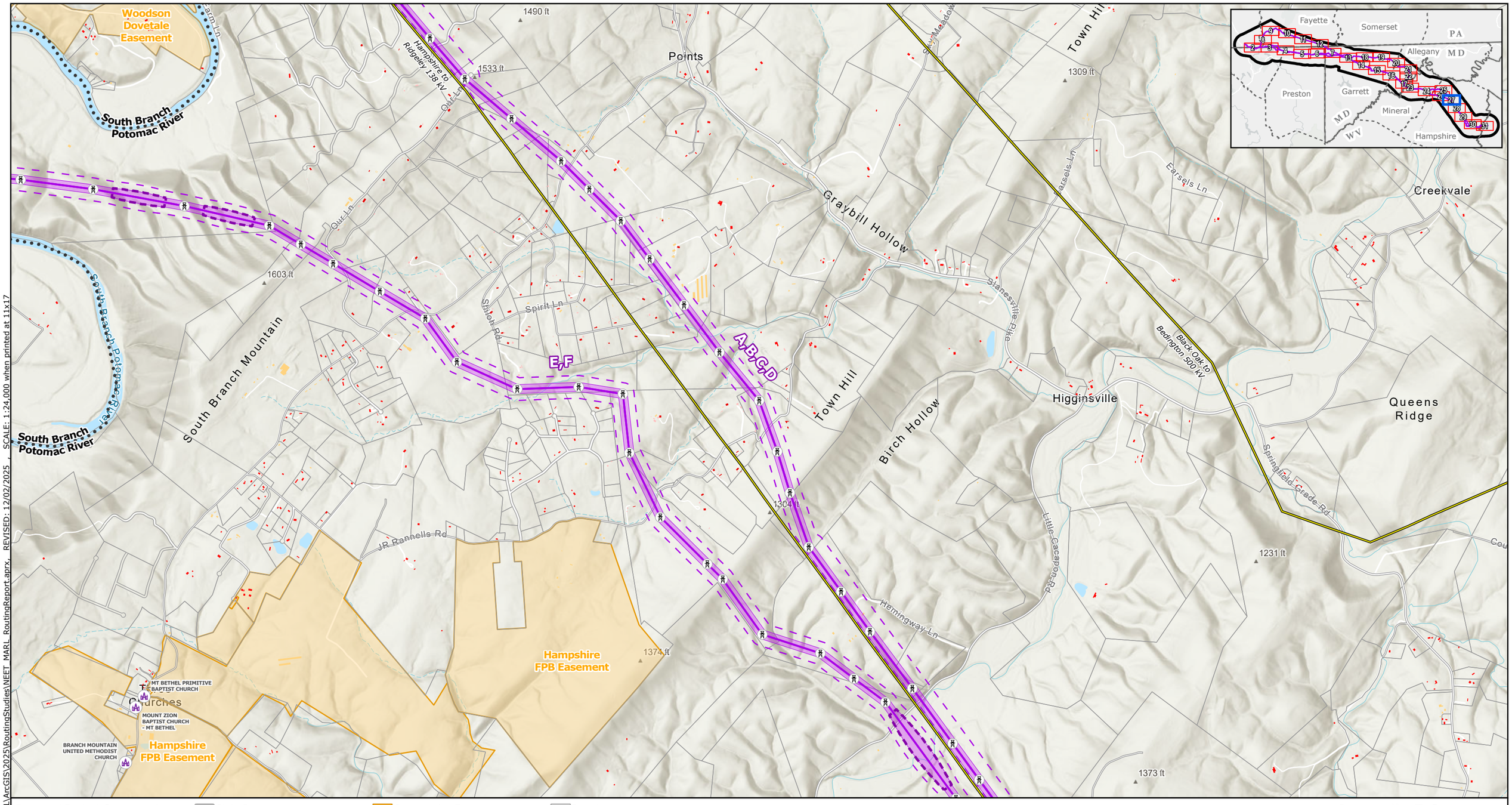
Appendix E-8
Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

ERM



Proposed Project Components
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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas
Page 27 of 31
MidAtlantic Resiliency Link

ERM

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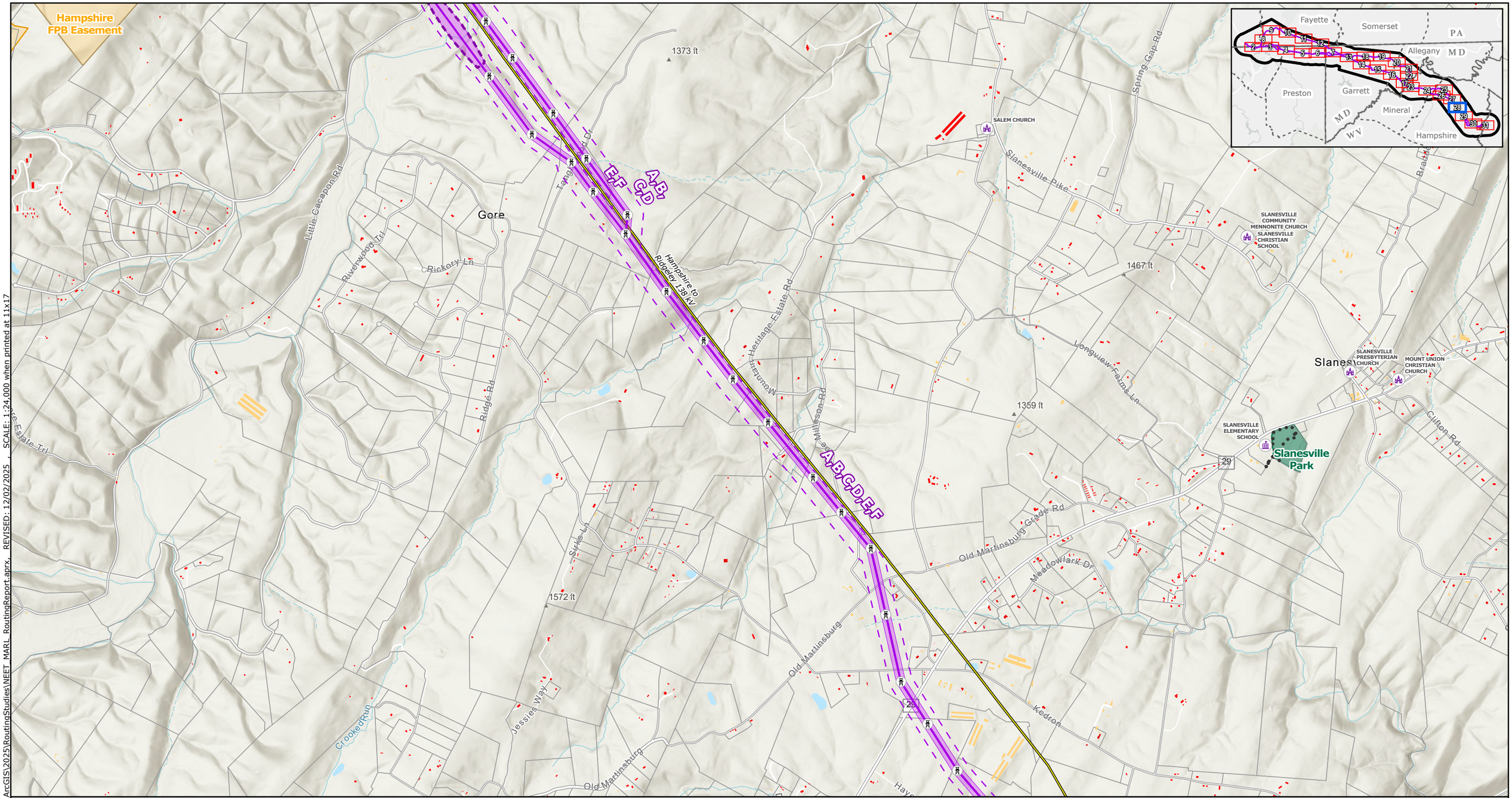

Proposed Project Components
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0 0.25 0.5 0.75 1
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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas
Page 28 of 31
MidAtlantic Resiliency Link

ERM

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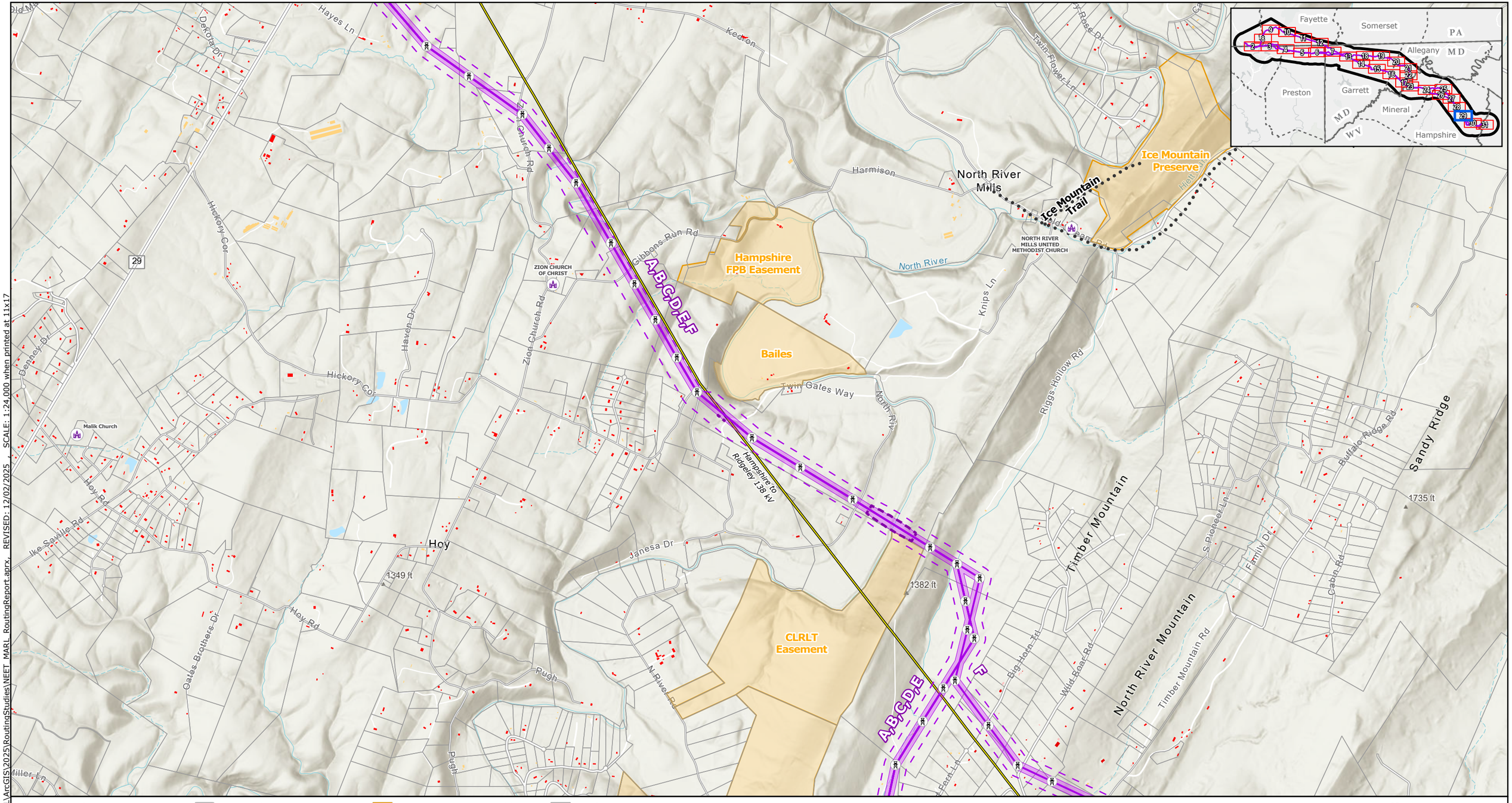

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0 0.25 0.5 0.75 1
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Alternative Routes
Land Use and Social Resources Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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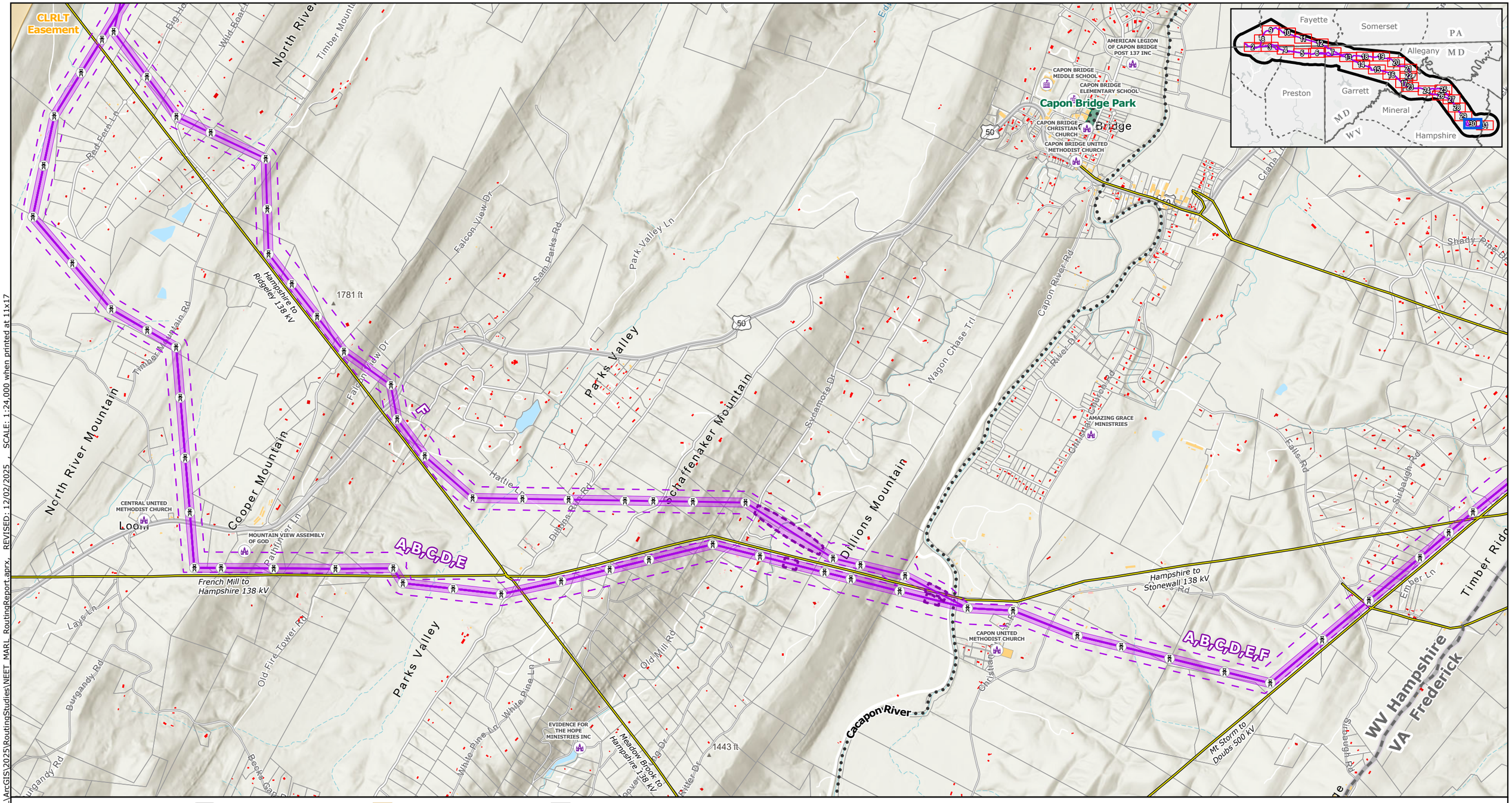

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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

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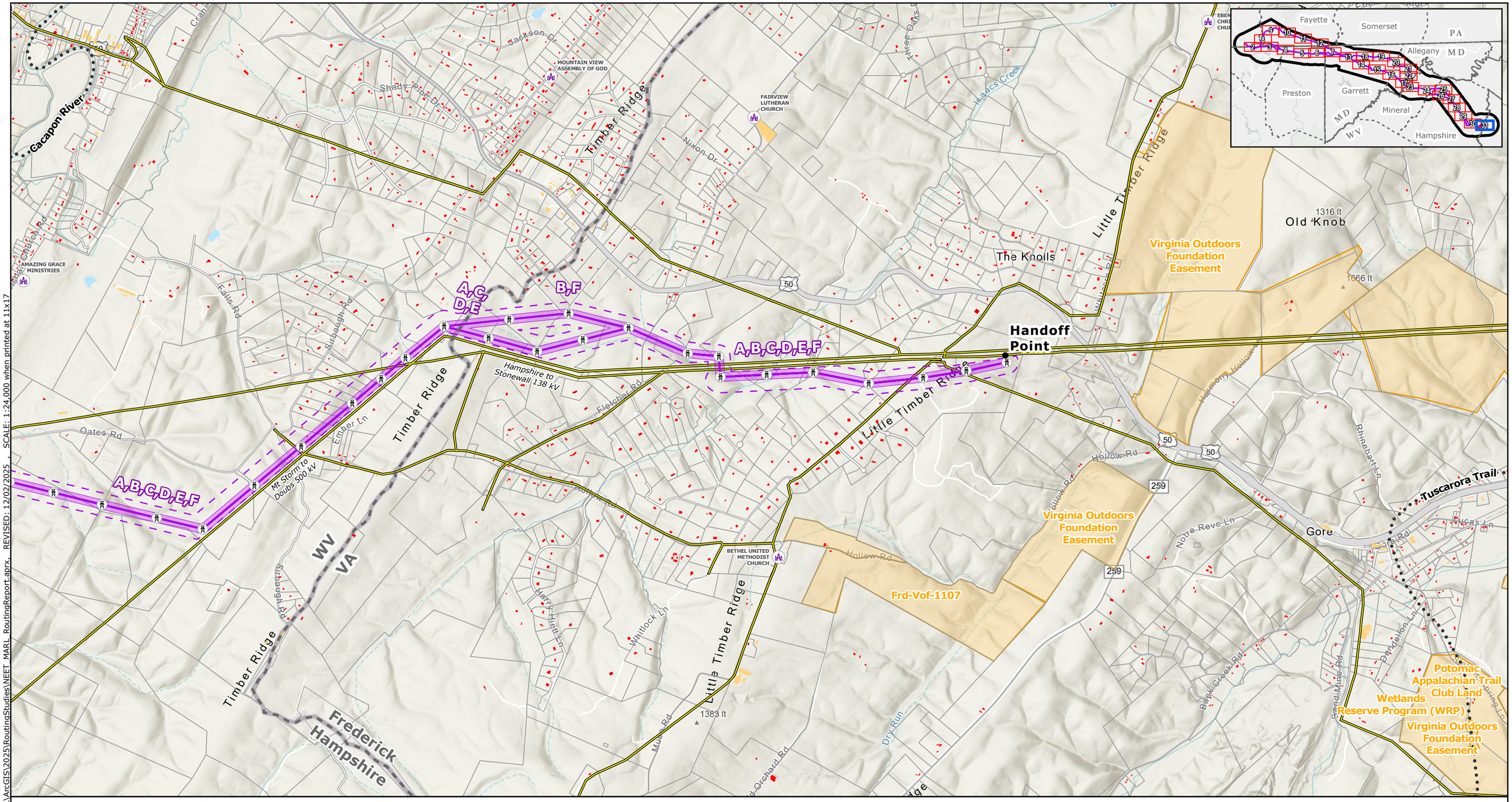

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Appendix E-8
Alternative Routes
Land Use and Social Resources
Paralleling, Community and Recreation, and Protected Areas

MidAtlantic Resiliency Link

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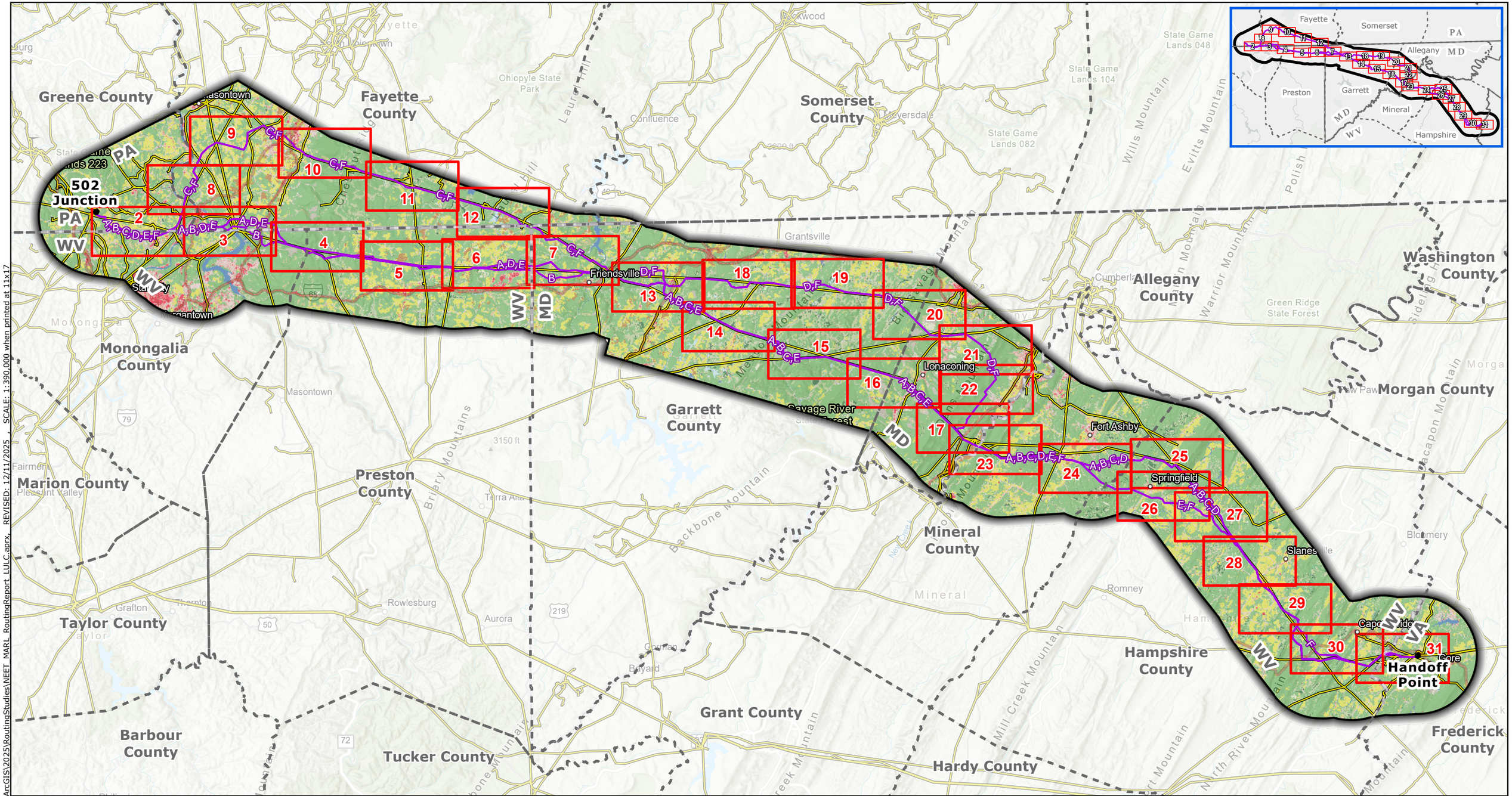
Coordinate System: NAD 1983 UTM Zone 17N

APPENDIX E-9 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES—CULTURAL RESOURCES MAPBOOK (CONFIDENTIAL)

APPENDIX E-10 ALTERNATIVE ROUTES—LAND USE AND SOCIAL RESOURCES—AGRICULTURAL AND LAND COVER MAPBOOK



Proposed Project Components
- Project Endpoints
- Alternative Routes
- Project Study Area
- Map Index Page

Base Data
- Existing High-Voltage Transmission Lines
- State Border
- County Boundary

NLCD Land Cover (2024)
- Open Water
- Perennial Snow/Ice
- Developed Open Space
- Developed Low Intensity
- Developed Medium Intensity
- Developed High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Dwarf Scrub
- Shrub/Scrub
- Grassland/Herbaceous
- Sedge/Herbaceous
- Lichens
- Moss
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

NOTES
1. *Proposed tower locations are preliminary and subject to change*
2. *Data source: NEET, ERM, USGS, NLCD 2024*

N

0 4 8 12 16
Miles

Scale: 1:390,000
1 inch equals 32,500 ft (when printed at 11x17)

Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

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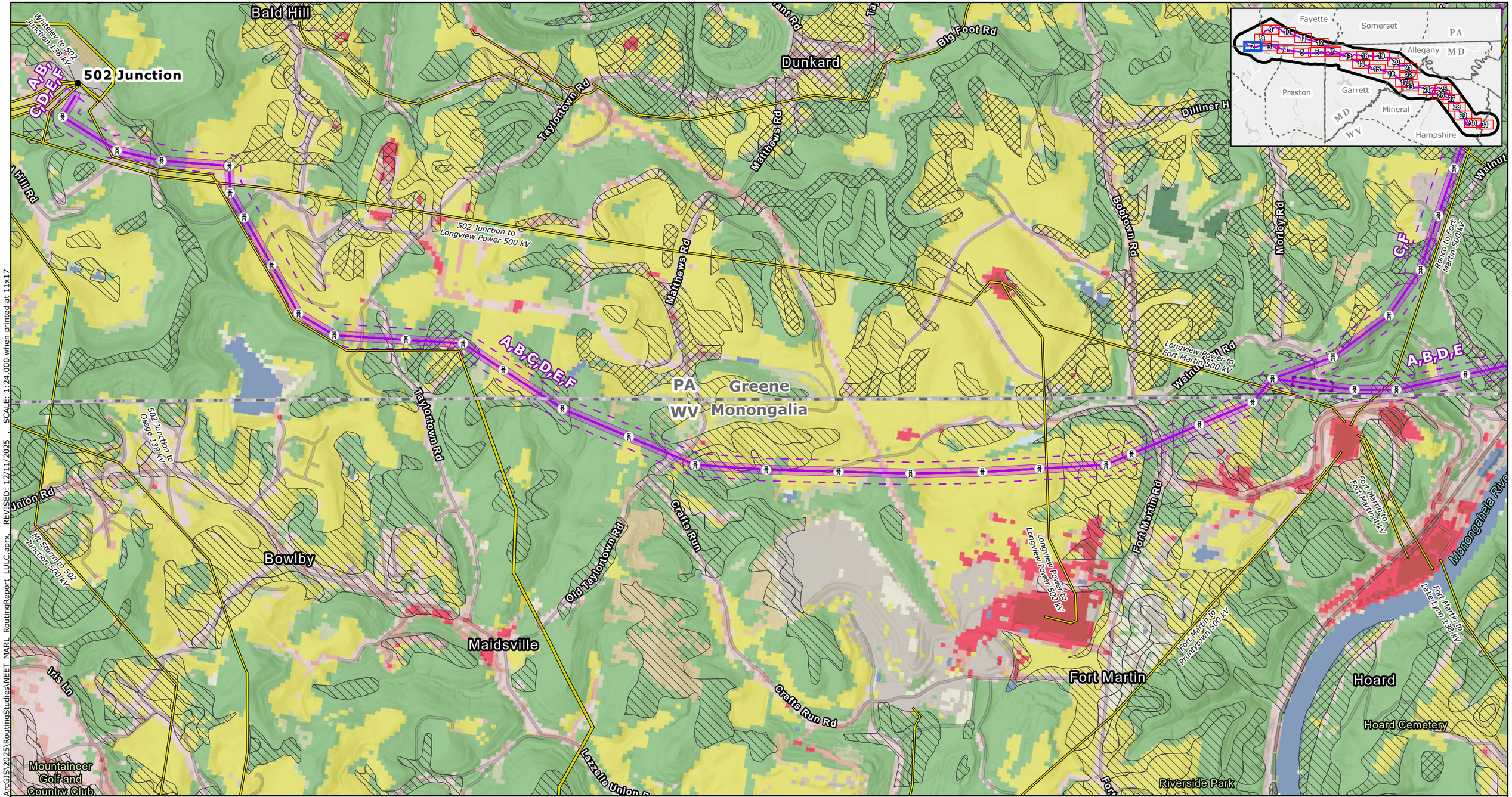

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Base Data
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Farmland Class
- Prime Farmland
- Farmland of Statewide Importance
- Farmland of Local Importance

NLCD Land Cover (2024)
- Open Water
- Perennial Snow/Ice
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N

0 0.25 0.5 0.75 1
Miles

Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

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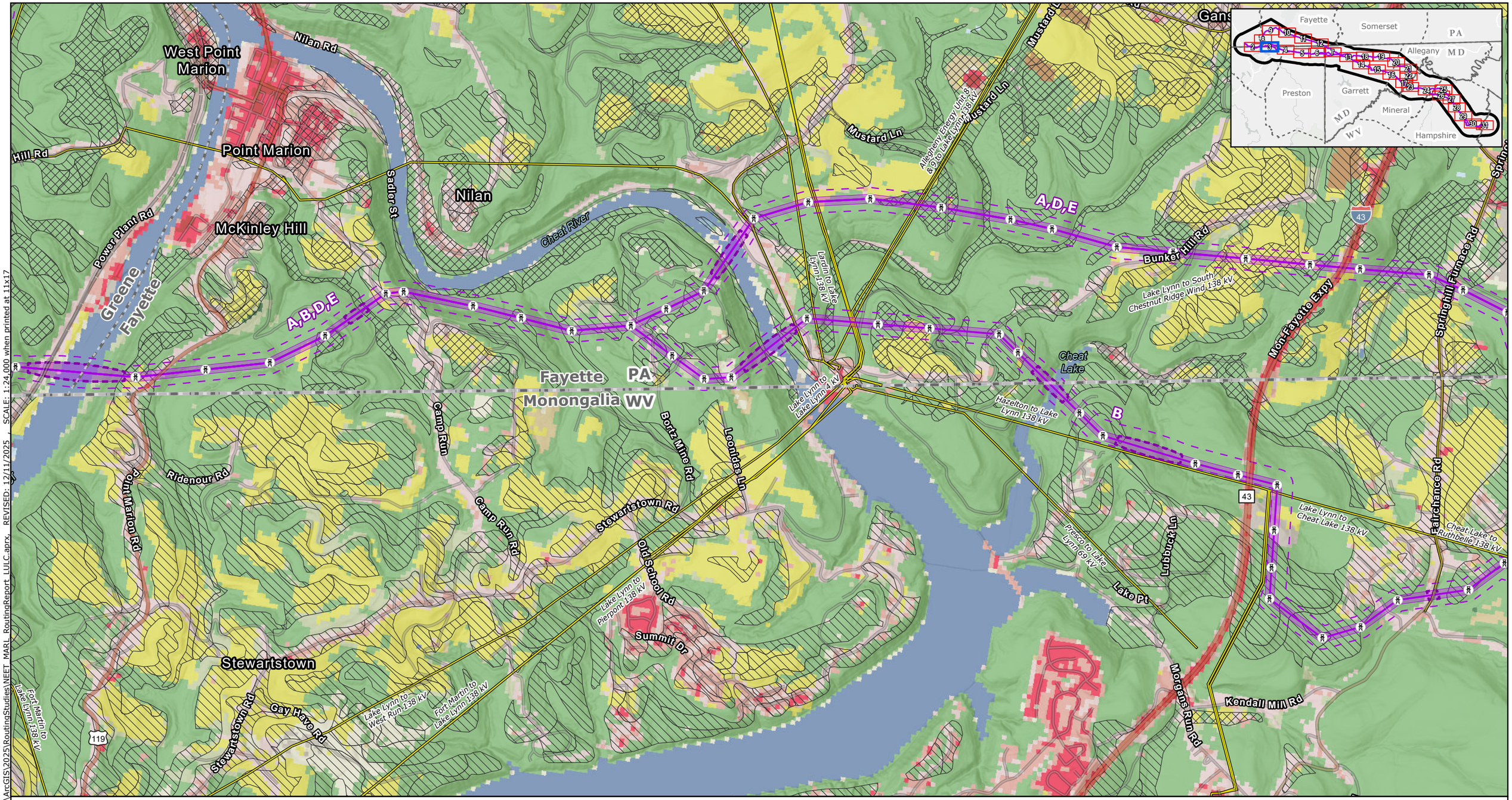

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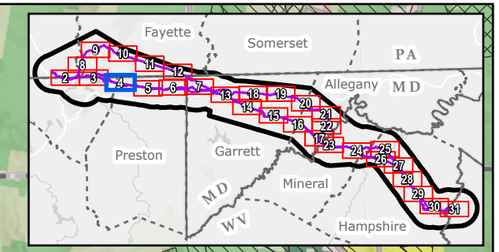

Springhill Furnace
Liberty Ln
Fayette
Monongalia
PA
WV
Wyn Gap
Fayette
Preston
Hileman Rd
Mount Grove Rd
Fairchance Rd
A,D,E
B
A,B,D,E
Ryan Holw E
Monongalia
Preston
Lake O Woods
Lake O Woods Rd
Hazelton to Lake Lynn 138 kV
Sand Springs Rd
Blaney Hollow Rd
B
A,D,E
Hileman Rd
Ryan Holw E
low Rd
Darnell Hollow Rd
West Virginia University Research Forest
Cheat Lake to Ruthbelle 138 kV
Hileman R

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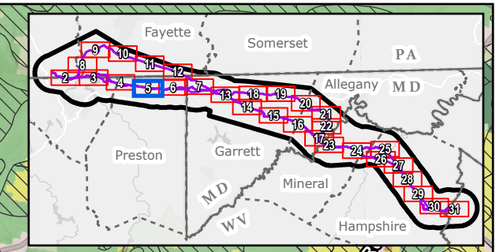

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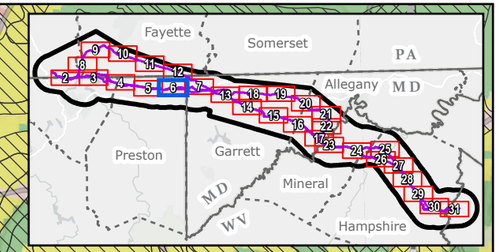

Salem
Salem Rd
Gipson Ln
Dennis Rd
Glade Farms
Golden Rd
Glade Farms Rd
N Preston Hwy
Moccasin Rocks Rd
Moccasin Rocks Rd
WV Preston
MD Garrett
South Chestnut Ridge Wind to Junction 106 138 kV
A,D,E
B
26
Rosenberg Rd
Hazelton to Lake Lynn 138 kV
Moyers Rd
Handlen
A,D,E
B
Jennings to Hazelton 138 kV
A,B,D,E
Sine Pl
Skyview Dr
Skyview Dr
Cherry Run Rd
Junction 106 to Albright 138 kV
Shady Grove Rd
Handlen
Glade Farms Rd
Skyview Dr
Bartholomew
Maryland Line Rd
Shady Grove Rd
Moyers Rd

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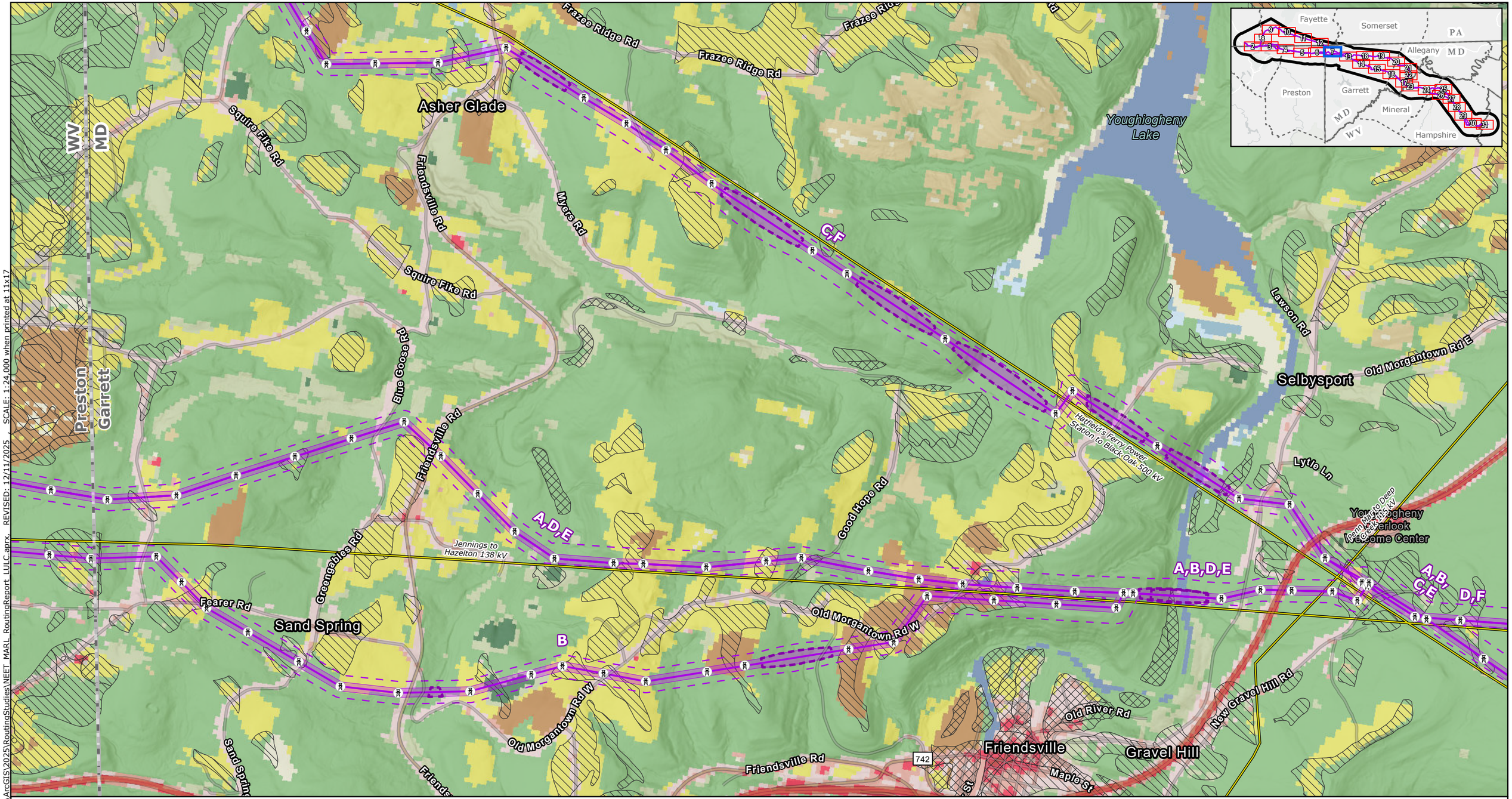

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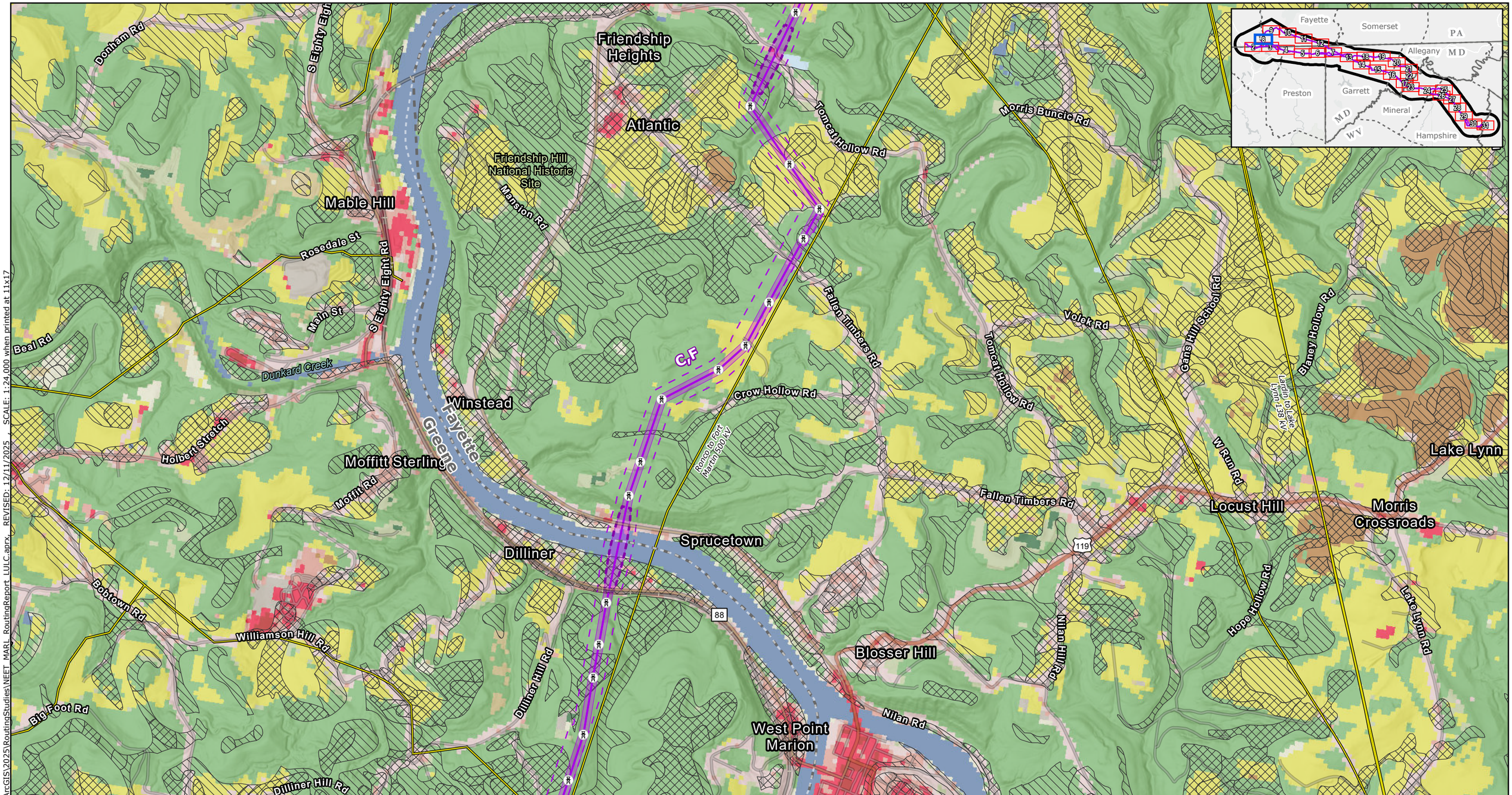

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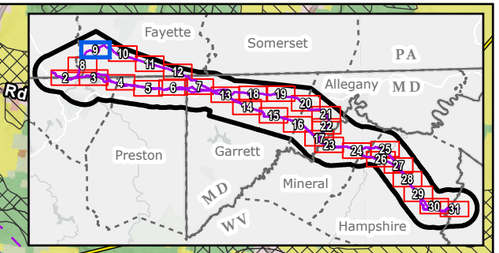

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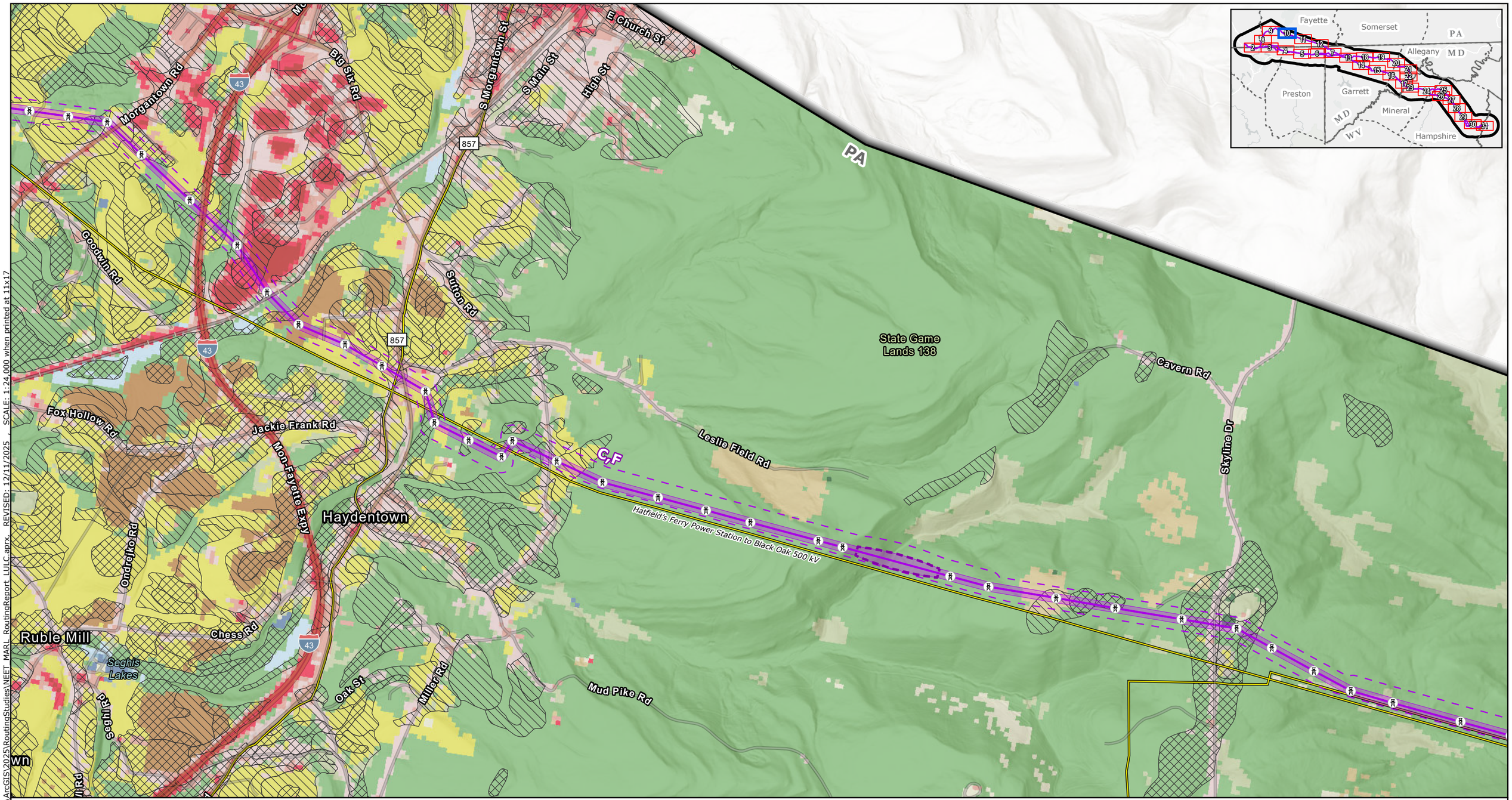

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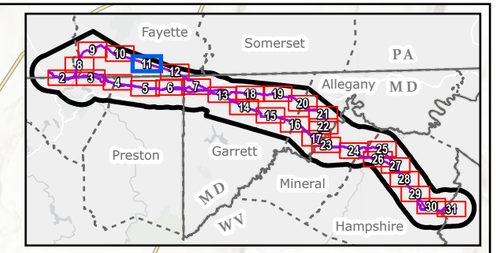

Kirby Rd
Kirby Rd
Cornish Rd
Thurby Rd
Elliottsville
Elliotsville Rd
Potter School Rd
381
Howard Rd
PA
Quebec Rd
C/F
Albright to Bethelboro 138 kV
Necessity to Brandonville 138 kV
Hatfield's Ferry Power Station to Black Oak 500 kV
Gibson Glade Rd
Sumey Rd
Stucksteger Rd
381
Memorial Dr
Quebec Run Wild Area

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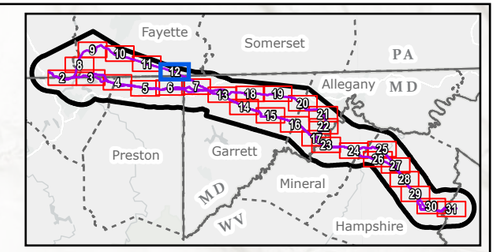

Lake Courage
PA
Clark Rd
Glade Rd
Glade Rd
Fiketown
Thomas Rd
Flat Rock Rd
C,F
Maust Rd
Dinner Bell Five Forks Rd
McCracken School Rd
Glades
Flat Rock Rd
281
Bruceton Rd
Hatfield's Ferry Power Station to Black Oak 500 kV
Brown Hill Rd
Five Forks Rd
Mason Dixon Rd
Five Forks
PA
WV
Fayette
Preston
Virginia Ln
PA
MD
Fayette
Garrett
Tallentire Rd
Flat Rocks Rd
N Preston Hwy
WV Preston
MD Garrett
Bower Rd
Dennis Rd
Chevelle Dr
Preston Hwy
Glade Rd

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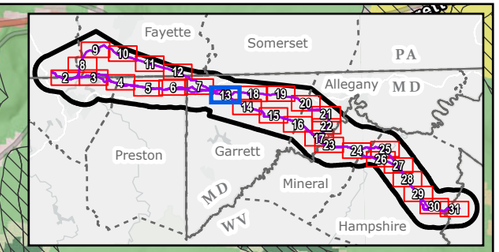

Penn Mar to Deep Creek 115 kV
Sam Friend Rd
Everly Rd
Harmon Rd
Garrett Hwy
Weaver Rd
D,F
Cove Rd
Jennings to Hazelton 138 kV
Harmon Rd
Bearfoot Rd
Everly Rd
A,B,C,E
Garrett Hwy
Collier Rd
Bear Creek Rd
Bear Creek Rd
Hatfield's Ferry Power Station to Black Oak 500 kV
Sale Barn Rd
Kaese Mill
Rabbit Hollow Rd
Garrett Hwy
Pud Miller Rd
Engle Mill
Bowman Hill Rd
Brobst Rd
Oak Hill Ln
Brobst Rd
Garrett Hwy

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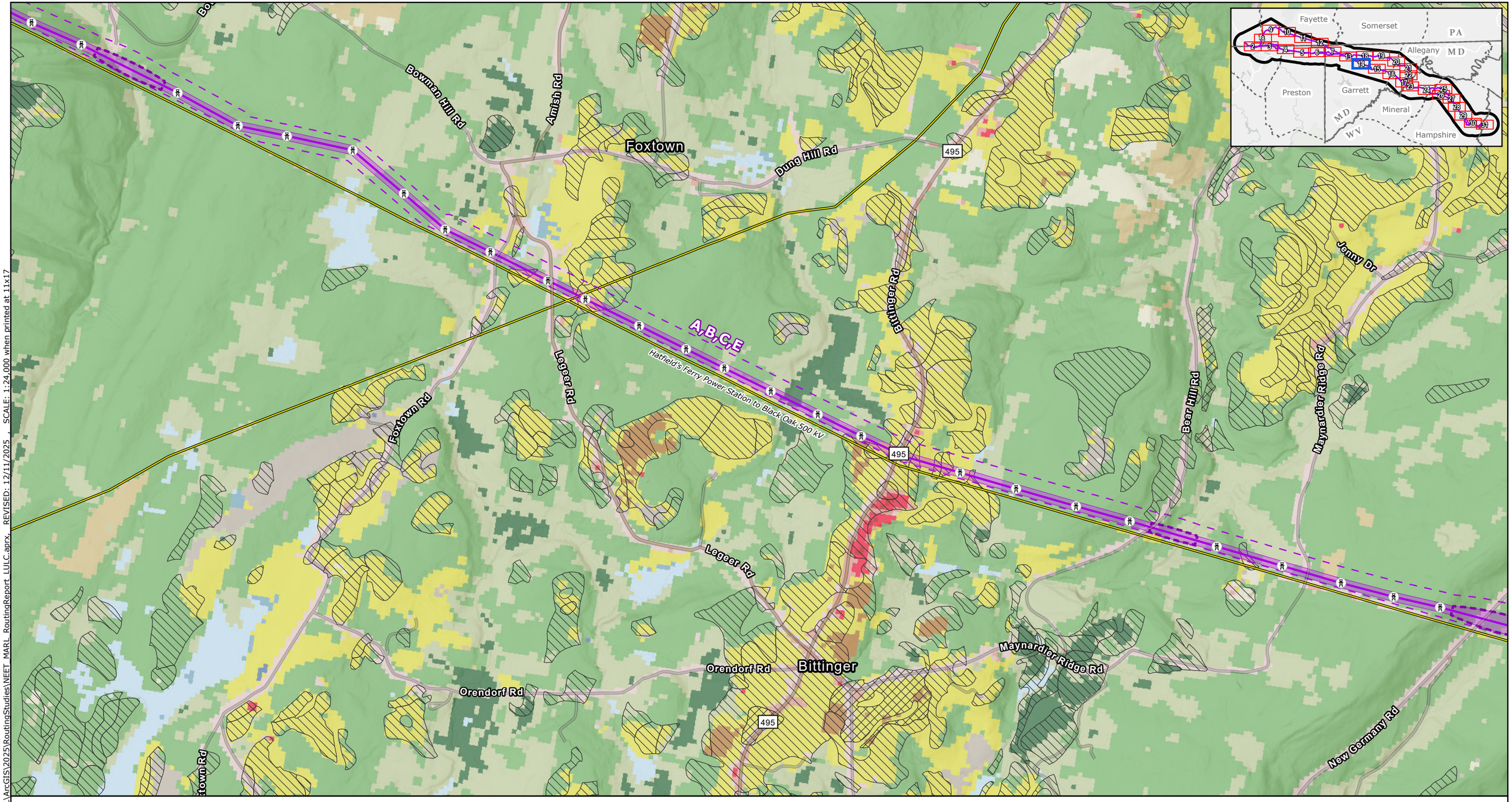

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- Siting Corridors
- Project Study Area

Base Data
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NLCD Land Cover (2024)
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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

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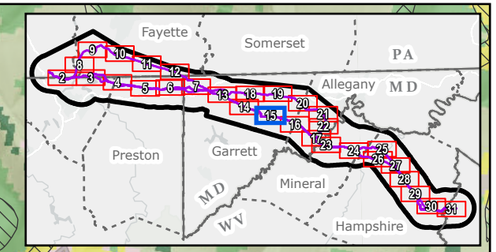

Fairview Rd
Fairview
Fairview Rd
Merrill
Hatfield's Ferry Power Station to Black Oak 500 kV
Carlos JCT to Garrett 138 kV
A,B,C,E
Big Run Rd
Westernport Rd
Swamp Rd
Pine Swamp
Russell Rd

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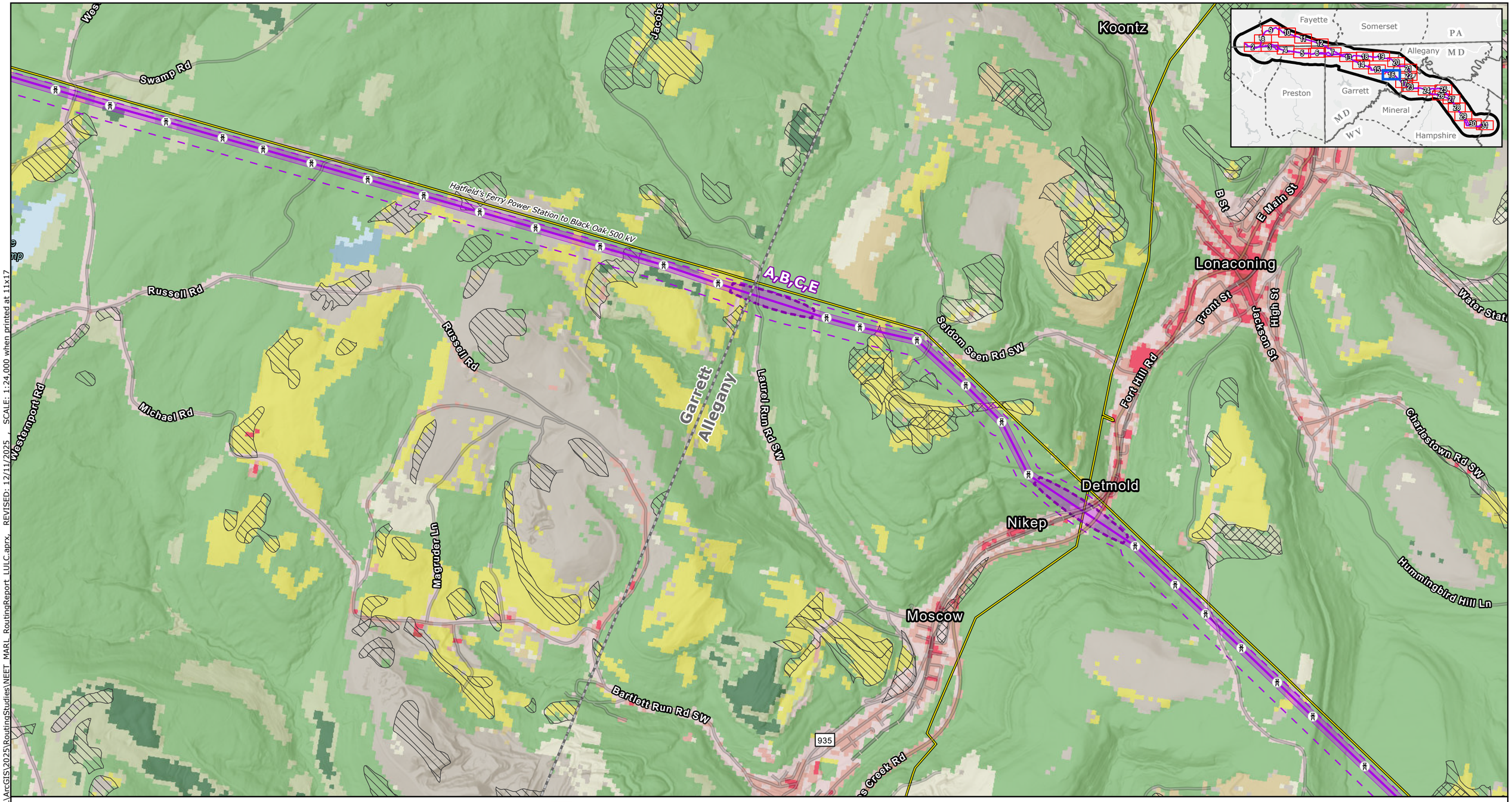

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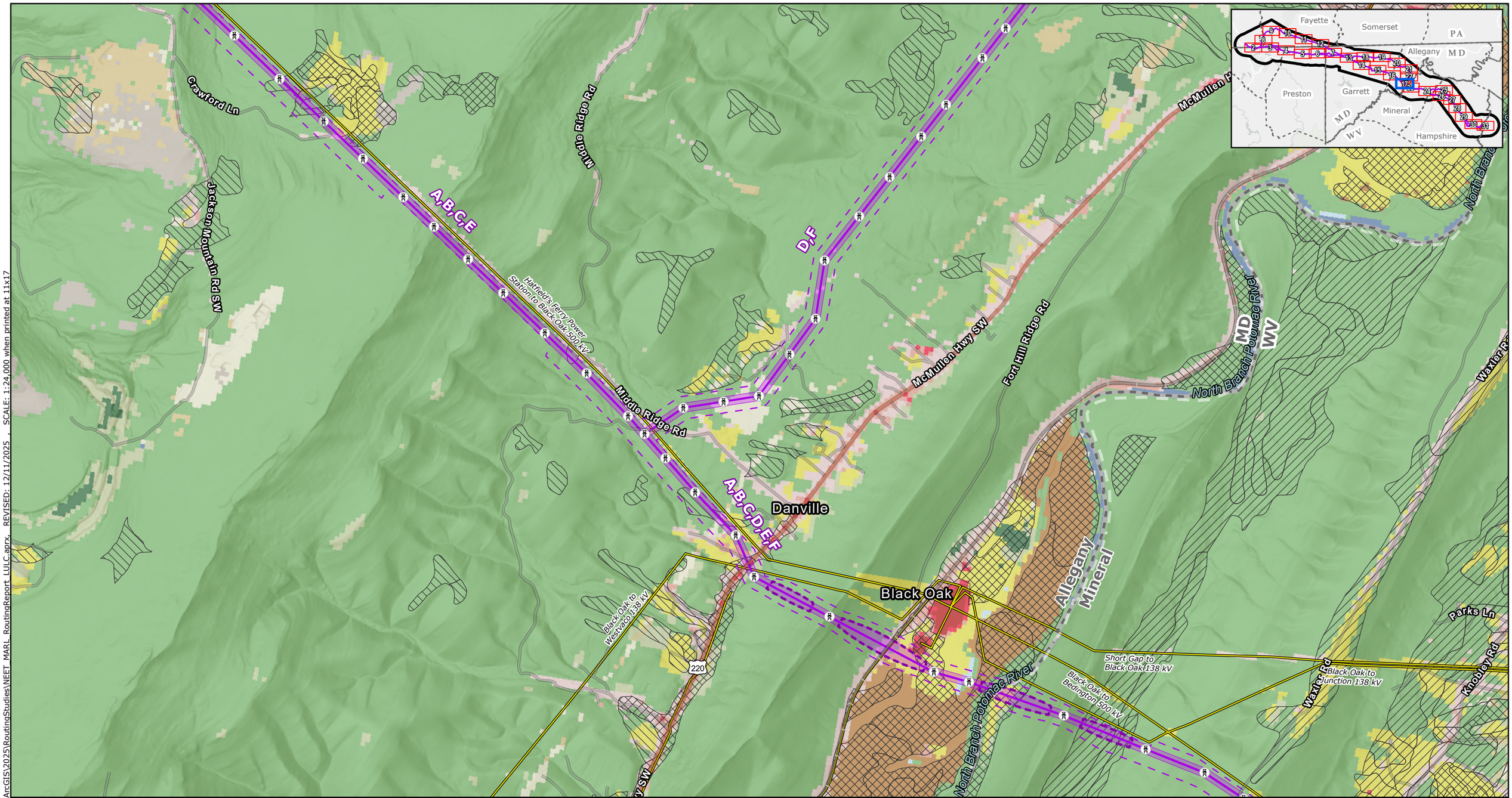

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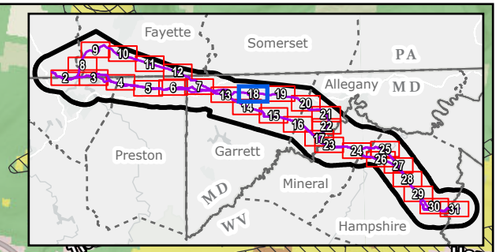

Casselman
Platter Rd
Fire Clay Rd
Maple Grove Rd
Hare Hollow Rd
Amish Rd
Bittinger Rd
Jennings to Hazelton 138 kV
Frostburg to Jennings 138 kV
Sherman Hare Rd
D/F
Bevansville
Jennings
Miller Rd
Miner Rd
Jennings Rd
Smith Rd
Bill Beitzel Rd
Bowman H
W Shale Rd

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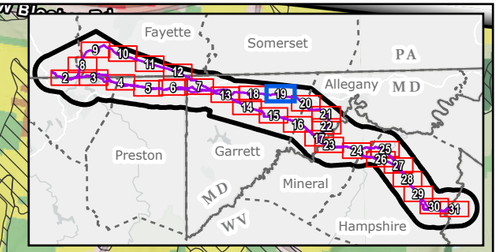

Fosters Inn Rd
Chestnut Ridge
Ellis Dr
Avilton Rd
Hare Hollow Rd
Salt Block Mountain Rd
Chestnut Ridge Rd
Ellis Dr
Chaney Rd
Sam Grow Rd
Avilton Connection Rd
Pine Grove Rd
McKenzie Rd
New Germany Rd
Lower New Germany Rd
D, P
Frostburg to Jennings 138 kV
Avilton
W Shale Rd
W Shale Rd
Twin Churches Rd
Poplar Lick Run
Pearridge Rd

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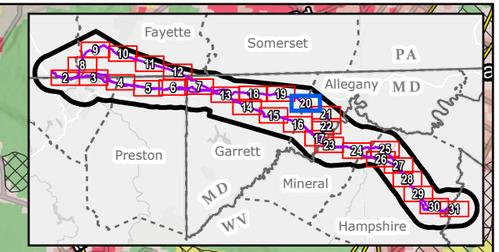

Callahan Swamp
Blean Avon Rd
View Ter NW
Midlothian Rd
Frostburg to Jennings 138 kV
68
Midlothian
Fair View Farm Rd
Shaft Rd SW
Shaft
Harvey Rd
Carlos
Frostburg Rd
Nordex Rd
Nordex Rd
Avilton Lonaconing Rd
Avilton Lonaconing Rd
Ida Ln
Garrett
Allegany
D
F
Old Legislative Rd SW
Cabin Run Rd SW
National
Klondike
Woodland
HORNER HILL RD
Carlos JCT to Garrett 138 kV
Ridgeley to Carlos JCT 138 kV
Carlos
Ocean

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MidAtlantic Resiliency Link

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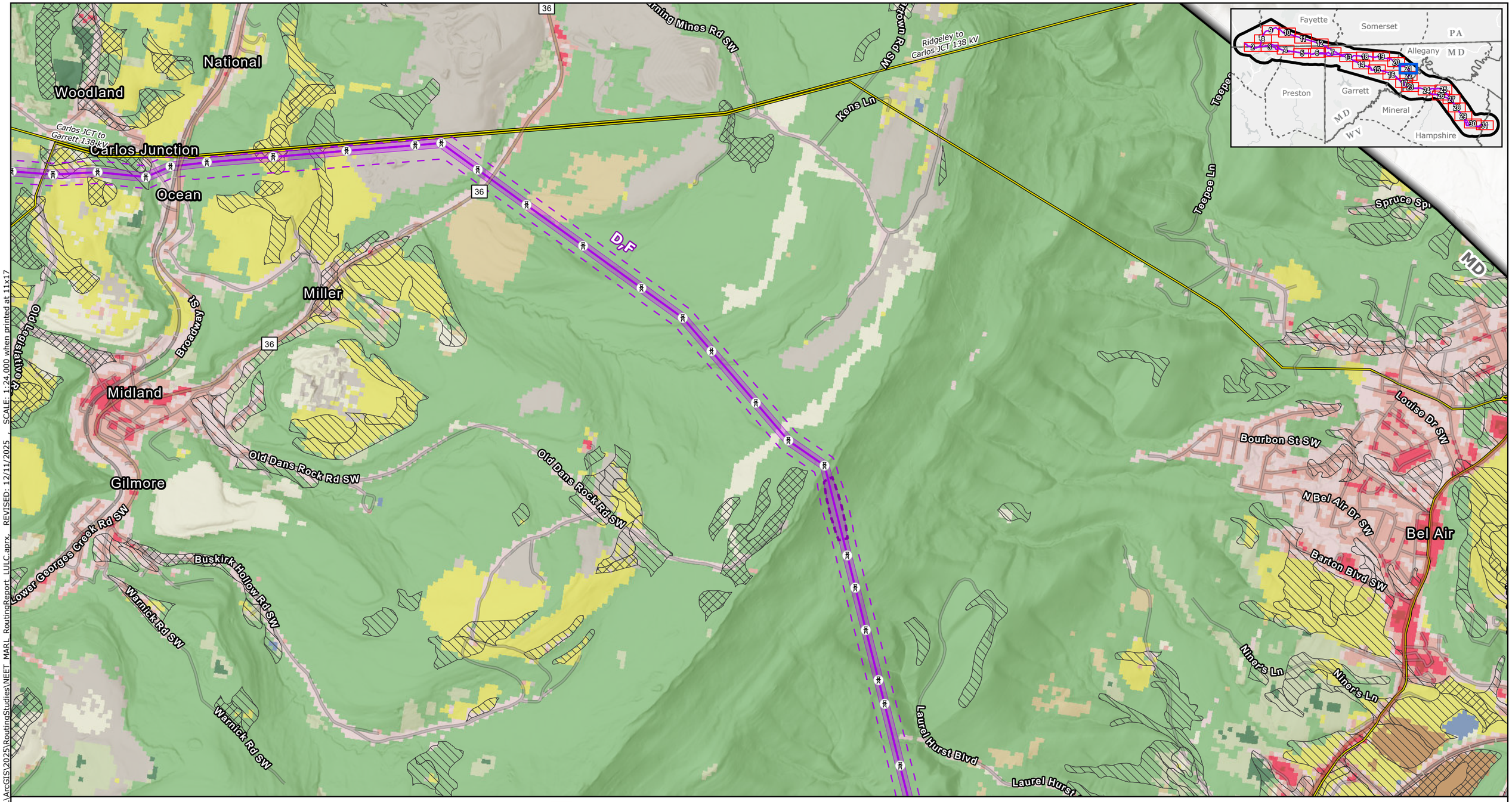

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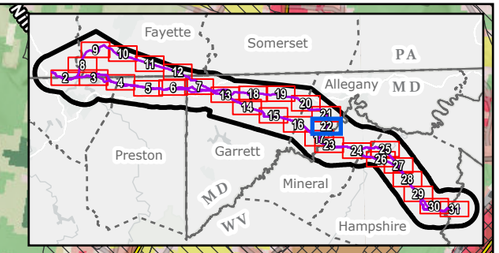

Warnick Rd SW
Laurel Hurst Blvd
Laurel Hurst Blvd
Barton Park Dr
Rebecca Ln
956
Dan's Mountain Campground
McMullen Hwy SW
MD
WV
Mountain Ridge Rd
Mountain Ridge Rd
D,F
Rocket Center Rd
Bier
Flanagan Rd
Fore Sisters Golf Course
Allegany
Mineral
956
Middle Ridge Rd
Rawlings Heights
220
Waxler Rd
Rawlings
McMullen Hwy SW
Waxler Rd
Middle Ridge Rd

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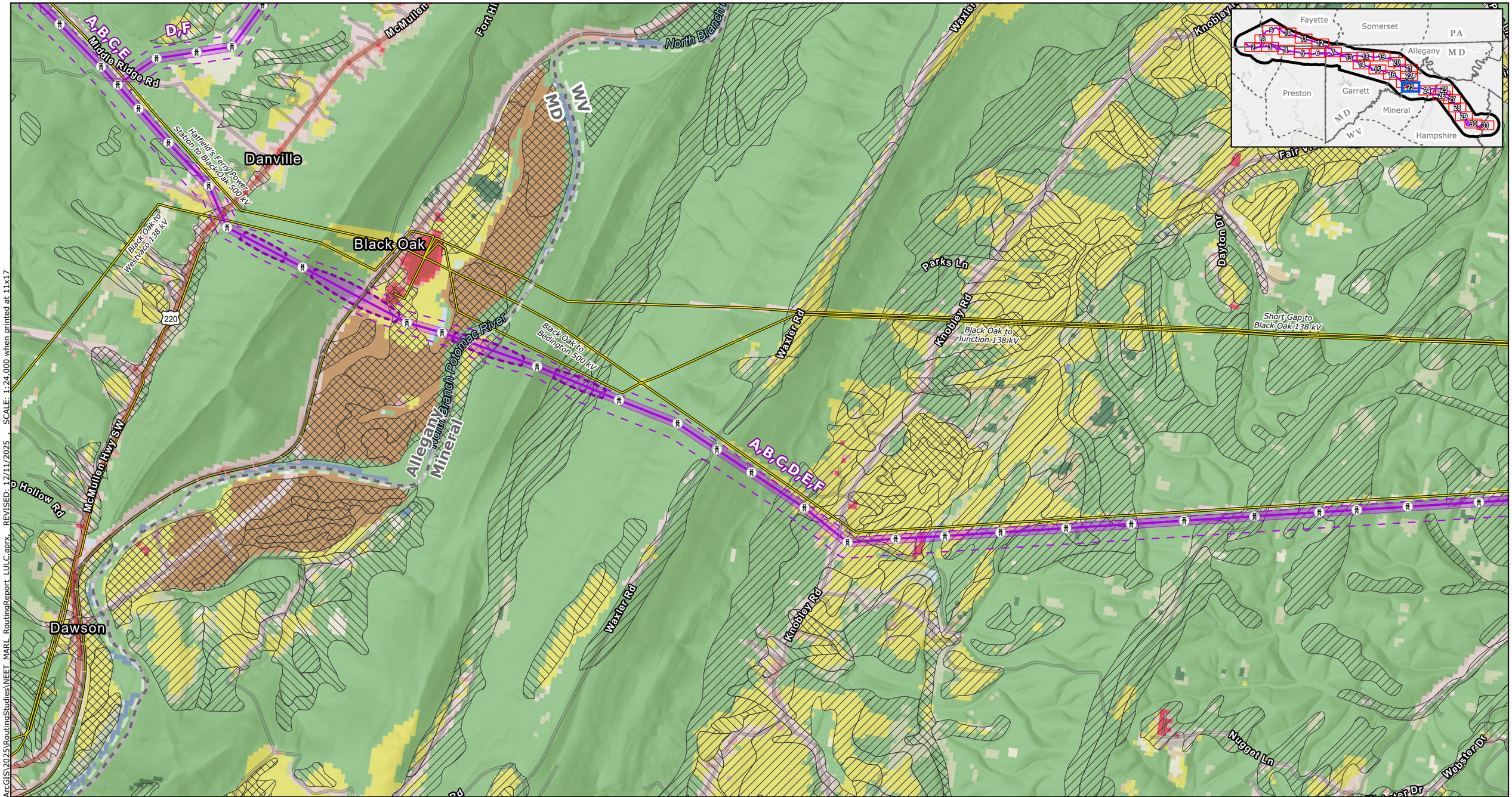

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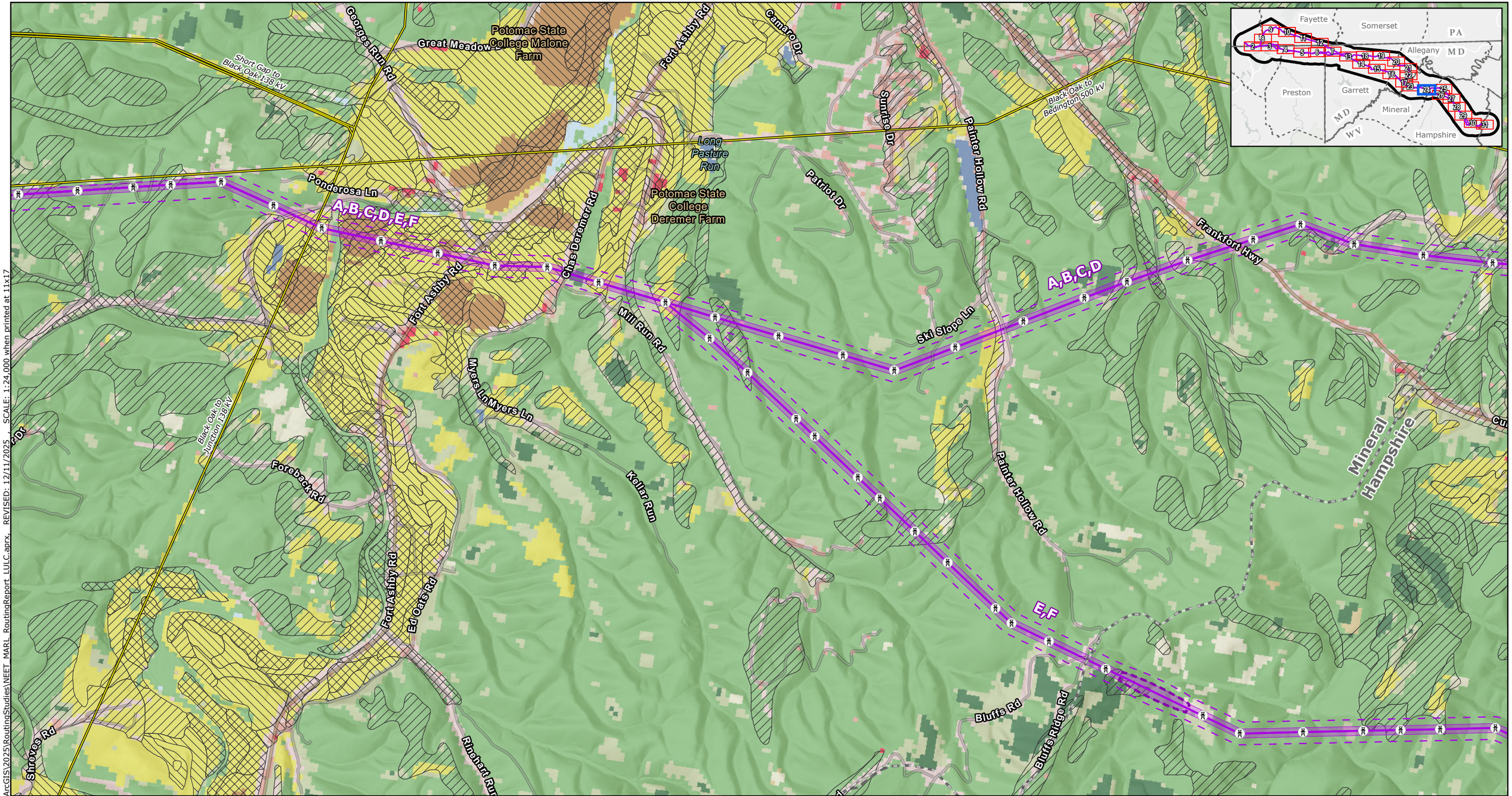

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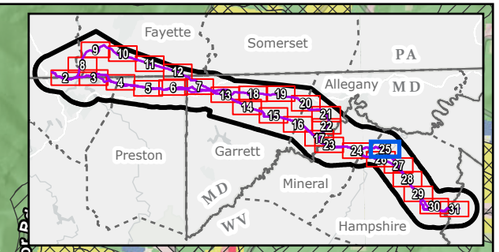

Donaldson Loop Rd
Mineral
Hampshire
Millerwood Ln
Greenspring Valley Rd
Goldsborough Rd
A,B,C,D
Campbell Rd
Gall Ln
Clarence Taylor Rd
Beach Rd
Lake Ferndale Dr
Oak Hill Dr
High Ridge Dr
Black Oak to Bedington 500 kV
Campbell Rd
Ferndale Farms Recreation Lake
Lake Ferndale Dr
Ashby Rd
Milleson
28
White Horse Rdg
White Horse Loop
White Horse Rdg
Clarence Taylor Rd
Hampshire to Ridgeley 138 kV
Springfield Pike
Antler Rd
A,B,C,D
Albino Dr
Locust Grove Rd
Springfield

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- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Dwarf Scrub
- Shrub/Scrub
- Grassland/Herbaceous
- Sedge/Herbaceous
- Lichens
- Moss
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

NOTES
1. Proposed tower locations are preliminary and subject to change
2. Data source: NEET, ERM, USGS, NLCD 2024

N

0 0.25 0.5 0.75 1
Miles

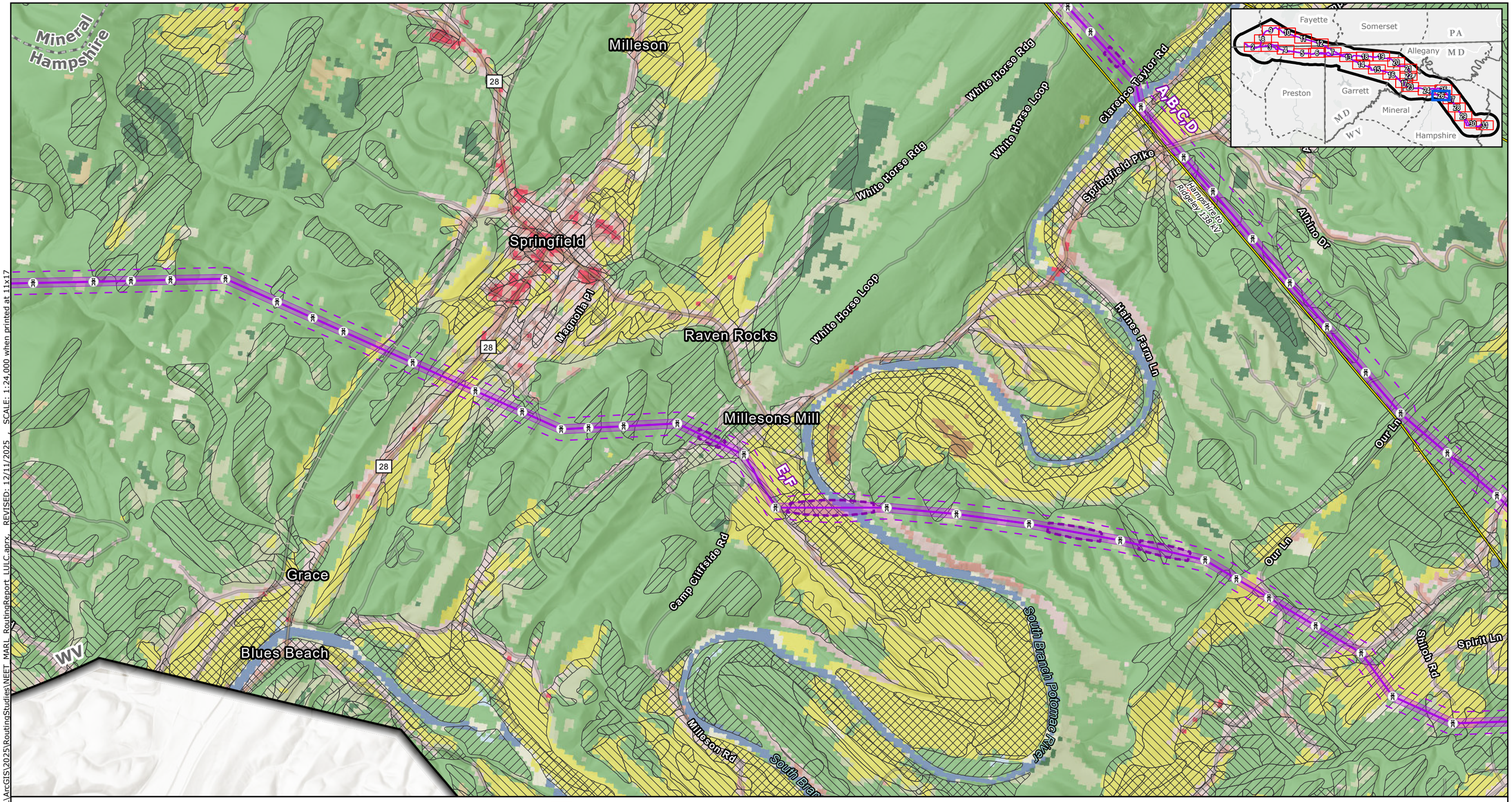
Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- State Border
- County Boundary

Farmland Class
- Prime Farmland
- Farmland of Statewide Importance
- Farmland of Local Importance

NLCD Land Cover (2024)
- Open Water
- Perennial Snow/Ice
- Developed Open Space
- Developed Low Intensity
- Developed Medium Intensity
- Developed High Intensity
- Barren Land
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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover
Page 26 of 31
MidAtlantic Resiliency Link

ERM

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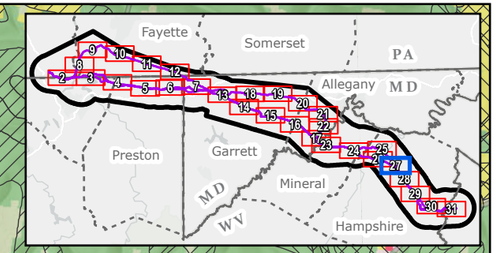
Coordinate System: NAD 1983 UTM Zone 17N



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0 0.25 0.5 0.75 1

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Appendix E-10
Alternative Routes
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Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

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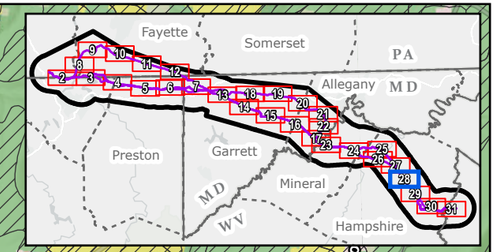

Three Churches Holw
Little Cacapon Rd
Riverwood Trl
Gore
Tanglewood Dr
County Route 3/5
Spring Gap Rd
Slanesville Pike
Braddo
E,F
A,B,C,D
Ridge Rd
Milleson Rd
A,B,C,D,E,F
Longview Farms Ln
Slanesville
Clifton Rd
Bloomery Pike
Sirks Ln
Old Martinsburg
Hampshire to Ridgeley 138 kV
Kedron
Jessies Way
Old Martinsburg
Hayf
apon Rd
o Estate Trl

Proposed Project Components
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Appendix E-10
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Land Use and Social Resources
Agricultural and Land Cover
Page 28 of 31
MidAtlantic Resiliency Link

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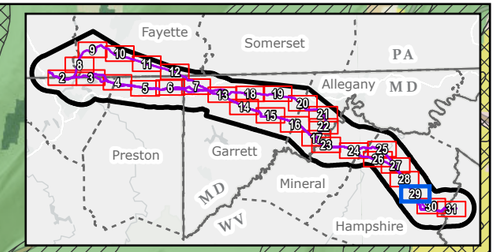

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Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover
Page 29 of 31
MidAtlantic Resiliency Link

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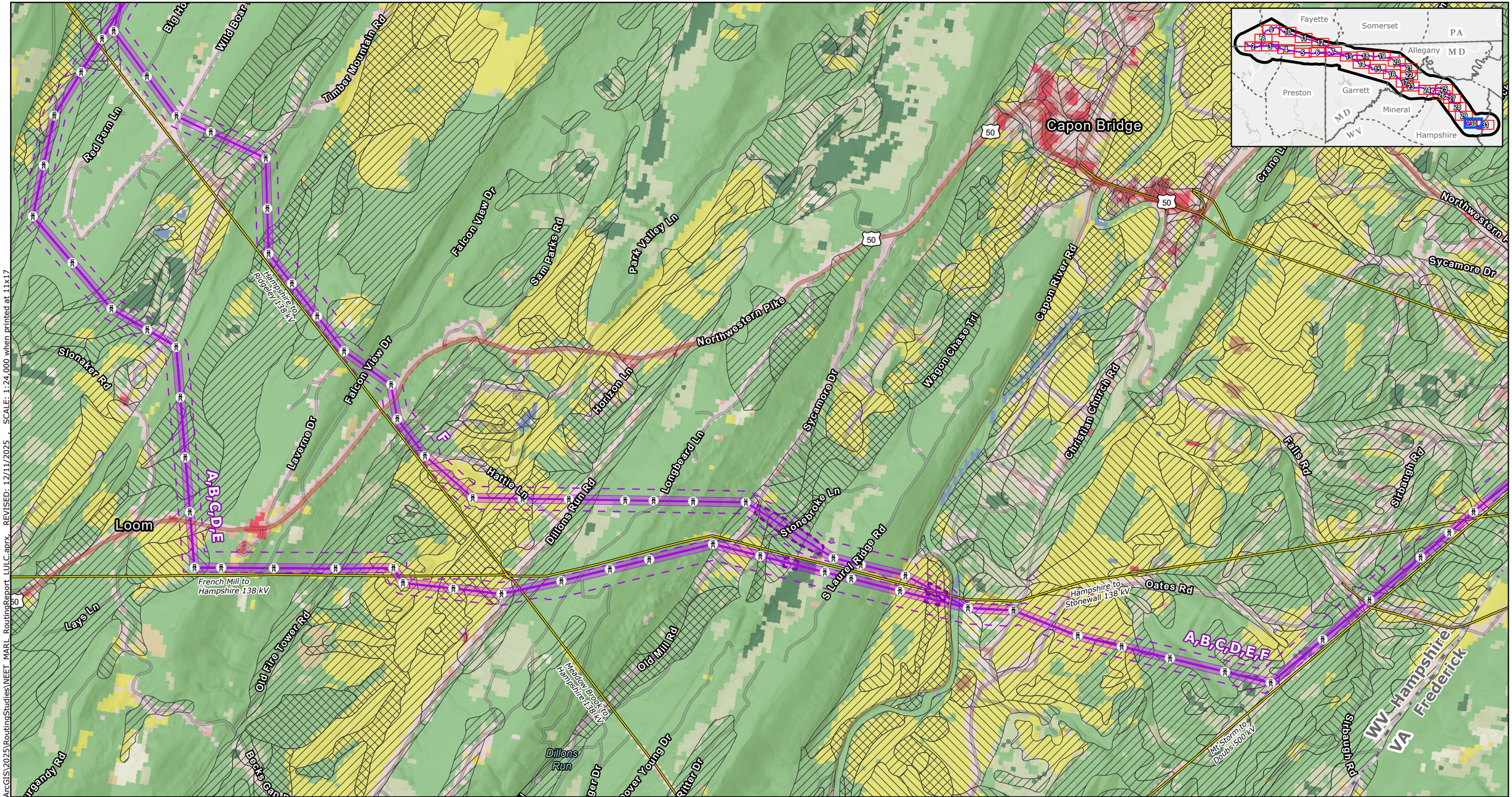

Proposed Project Components
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- Aerial Easement Blowout Areas
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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover
Page 30 of 31
MidAtlantic Resiliency Link

ERM

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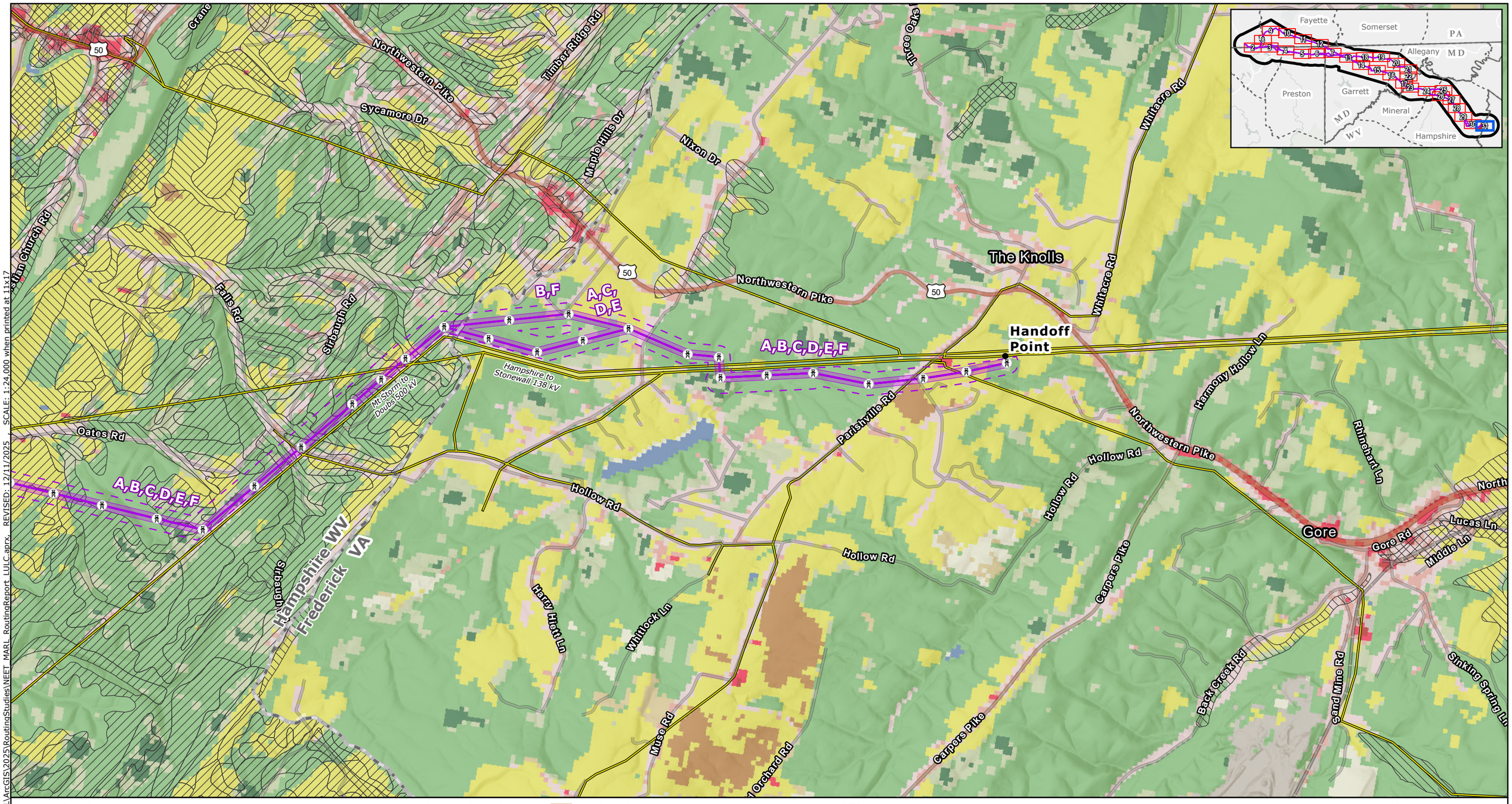

Proposed Project Components
- Project Endpoints
- Towers
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- Aerial Easement Blowout Areas
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Base Data
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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-10
Alternative Routes
Land Use and Social Resources
Agricultural and Land Cover

MidAtlantic Resiliency Link

ERM

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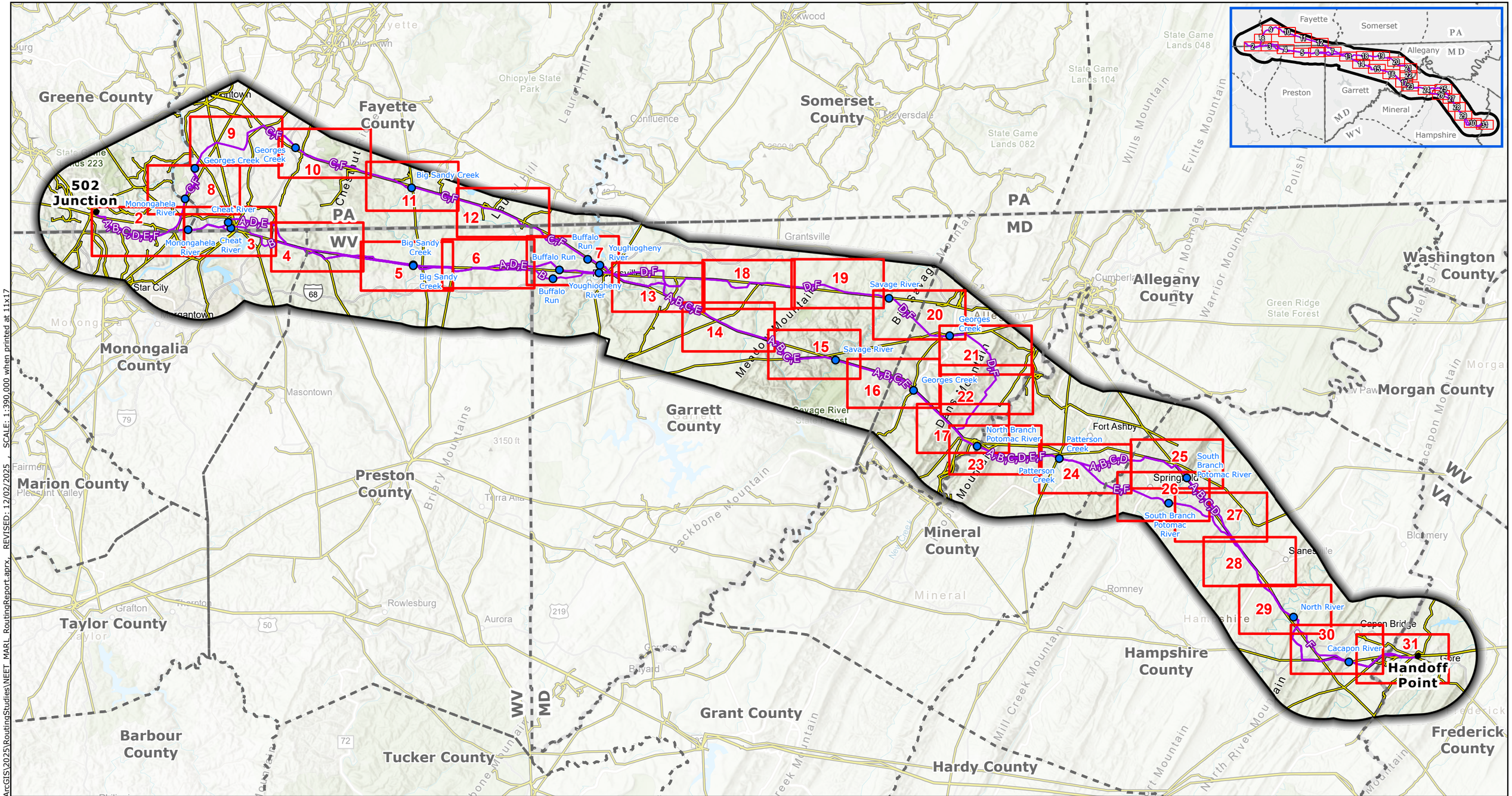
Coordinate System: NAD 1983 UTM Zone 17N

APPENDIX E-11 ALTERNATIVE ROUTES—NATURAL ENVIRONMENT—WATER RESOURCES MAPBOOK



Proposed Project Components
- Project Endpoints
- Alternative Routes
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- Map Index Page
- State Border
- Large Waterbody Crossings

NOTES
1. *Proposed tower locations are preliminary and subject to change*
2. *Data source: NEET, ERM, USGS, USFWS, REXTAG, MDNR, MDiMAP, PASDA, WVDEP, VADCR*

N

0 4 8 12 16
Miles

Scale: 1:390,000
1 inch equals 32,500 ft (when printed at 11x17)

Appendix E-11
Alternative Routes
Natural Environment
Water Resources
Page 1 of 31
MidAtlantic Resiliency Link

ERM

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Coordinate System: NAD 1983 UTM Zone 17N



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Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Water Resources
- Stream/River - Intermittent(NHD)
- Stream/River - Perennial (NHD)
- Trout Streams and Coldwater Fisheries (all states)
- NHD Waterbody
- NWI Wetlands (All Types)
- Modeled High Probability Wetlands

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
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N

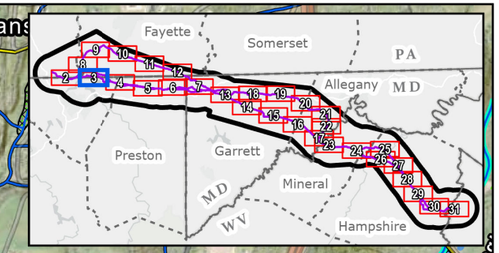
0 0.25 0.5 0.75 1
Miles

Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Coordinate System: NAD 1983 UTM Zone 17N

Appendix E-11
Alternative Routes
Natural Environment
Water Resources
Page 2 of 31
MidAtlantic Resiliency Link

ERM



West Point Marion
Nilan Rd
Monongahela River (Section 10 Navigable Waters)
Point Marion
Hill Rd
Power Plant Rd
Monongahela River
Greene
Fayette
McKinley Hill
Sadler St
Nilan
Cheat River (Section 10 Navigable Waters)
Lardin to Lake Lynn 138 kV
Mustard Ln
Allegheny Energy Unit 6 & 9 to Lake Lynn 138 kV
A,D,E
Grassy Run
Bunker Hill Rd
Lake Lynn to South Chestnut Ridge Wind 138 kV
Rubles Run
Springhill Furnace Rd
Ryan Hollow Run
Mon-Fayette Expy
Camp Run
A,B,D,E
Fayette
Monongalia
PA
WV
Cheat Lake
Rubles Run
B
Lake Lynn to Cheat Lake 138 kV
Hazelton to Lake Lynn 138 kV
Fairchance Rd
Cheat Lake to Ruthbelle 138 kV
Point Marion Rd
Ridenour Rd
Camp Run
Camp Run Rd
Stewartstown Rd
Bortz Mine Rd
Leonidas Ln
Lake Lynn to Lake Lynn 138 kV
Cheat River (Section 10 Navigable Waters)
Presco to Lake Lynn 69 kV
Lubbuck Ln
Lake Pt
Morgan Run
Old School Rd
Lake Lynn to Pierpont 138 kV
Summit Dr
Stewartstown
Stewartstown Rd
Gay Have Rd
Lake Lynn to West Run 138 kV
Fort Martin to Lake Lynn 138 kV
Fort Martin to Lake Lynn 138 kV
119
Cheat River
Morgans Run Rd
Kendall Mill Rd
Blaney Hollow
43

Proposed Project Components
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- ROW Corridors
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Water Resources
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NOTES
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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-11
Alternative Routes
Natural Environment
Water Resources
Page 3 of 31
MidAtlantic Resiliency Link

ERM

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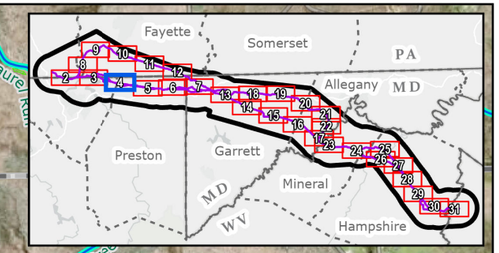

Springhill Furnace
Liberty Ln
Ryan Hollow Run
Dragoo Hollow Run
Patterson Run
Laurel Run
Fayette
Monongalia
PA
WV
Gap
Fayette
Preston
Monongalia
Preston
Hileman Rd
Laurel Run/Big Sandy Creek
Mount Grove Rd
Hazel Run
Fairchance Rd
A,D,E
B
A,B,D,E
Ryan Holw E
Hazelton to Lake Lynn 138 kV
Lake O Woods
Patterson Run
Lake O Woods Rd
Sand Springs Rd
B
Blaney Hollow Rd
Blaney Hollow
Hileman Rd
A,D,E
Hazel Run
low Rd
Darnell Hollow Rd
Ryan Holw E
West Virginia University Research Forest
Little Laurel Run
Little Laurel Creek
Cheat Lake to Ruthbelle 138 kV
Patterson Run
Hazel Run
Hileman R

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Appendix E-11
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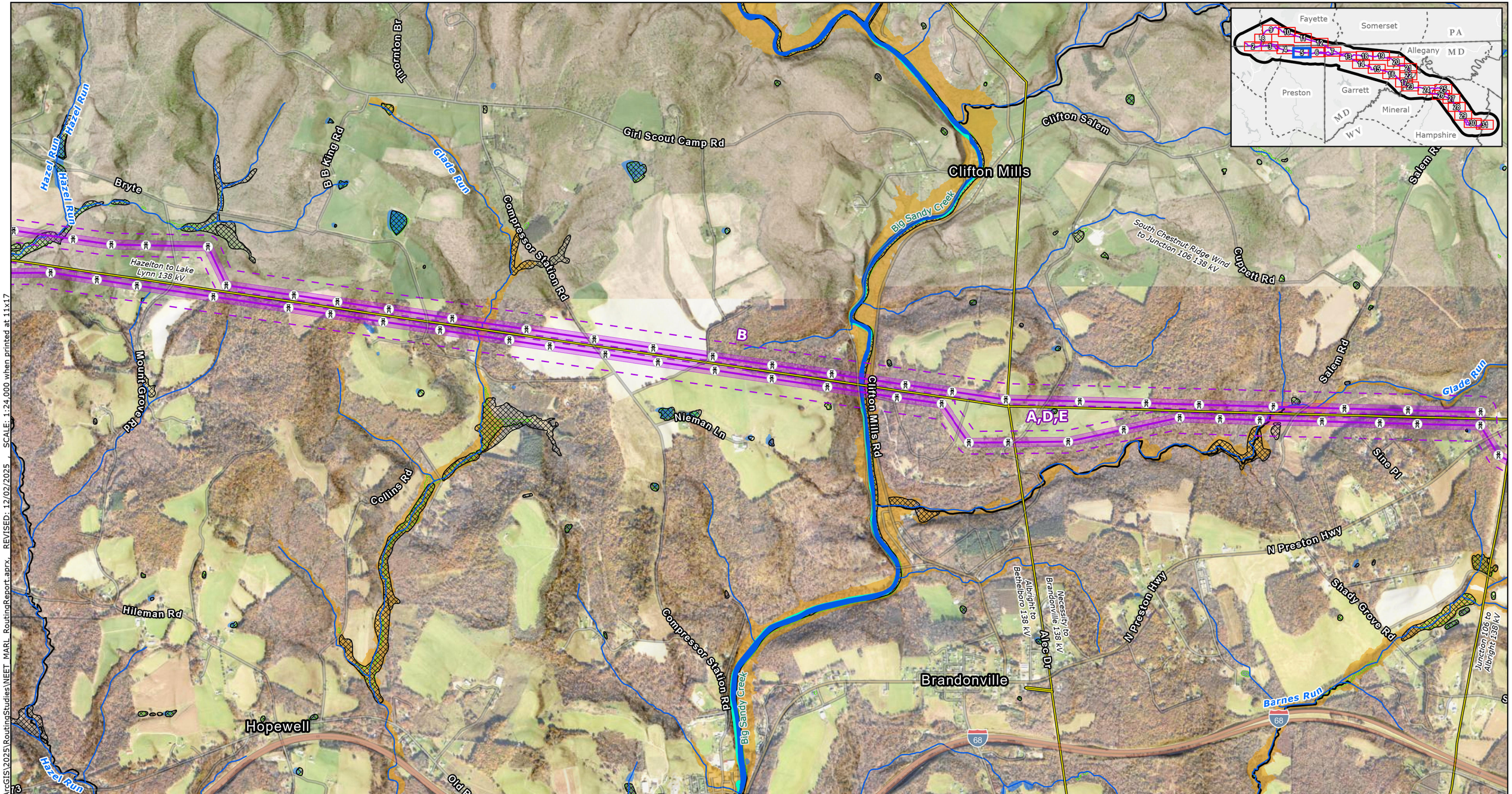

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Appendix E-11
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Page 5 of 31
MidAtlantic Resiliency Link

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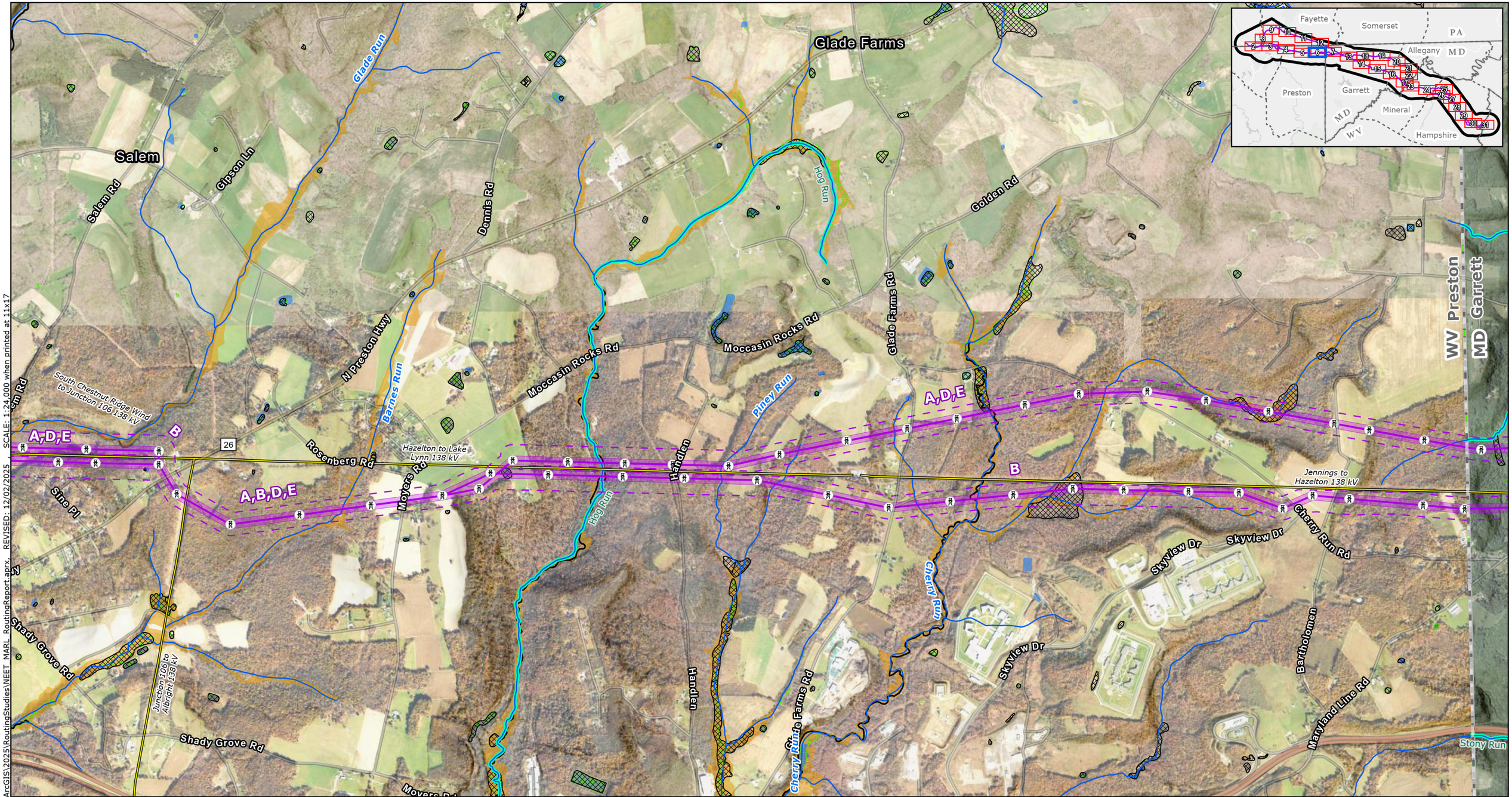

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Natural Environment
Water Resources
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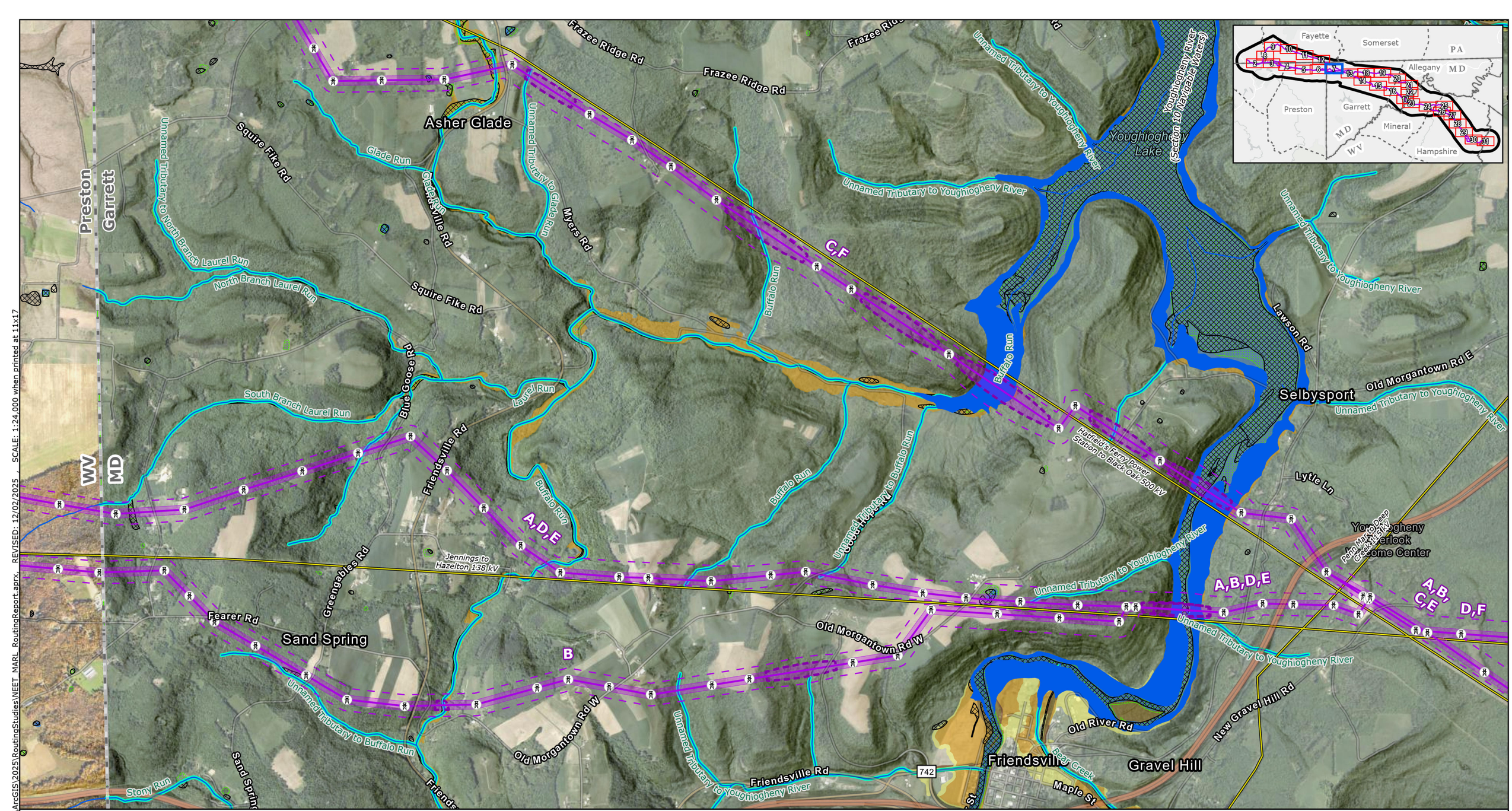

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N

0 0.25 0.5 0.75 1
Miles

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ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\RoutingStudies\NEET_MARL_RoutingReport.aprx, REVISED: 12/02/2025 , SCALE: 1:24,000 when printed at 11x17

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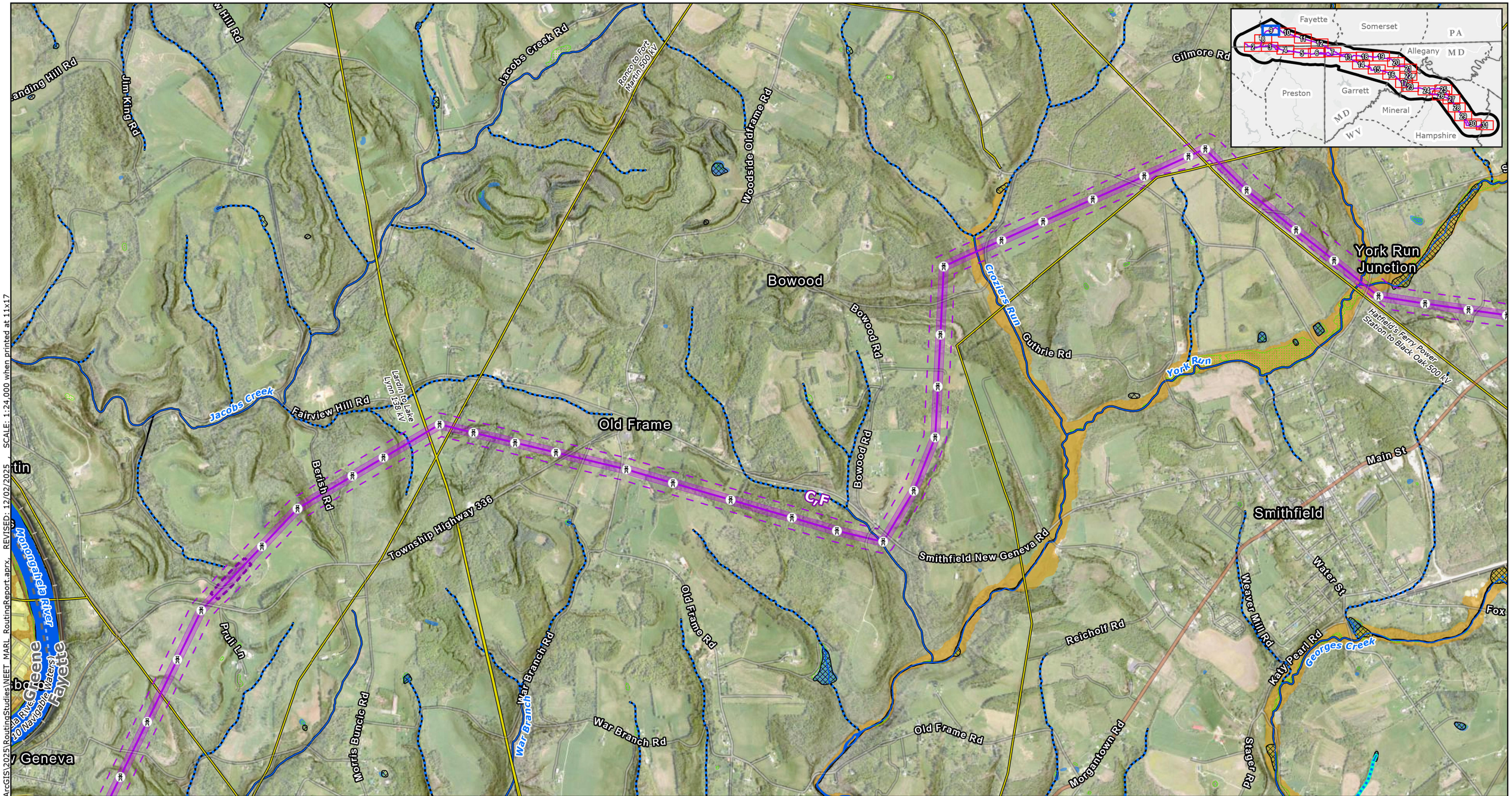

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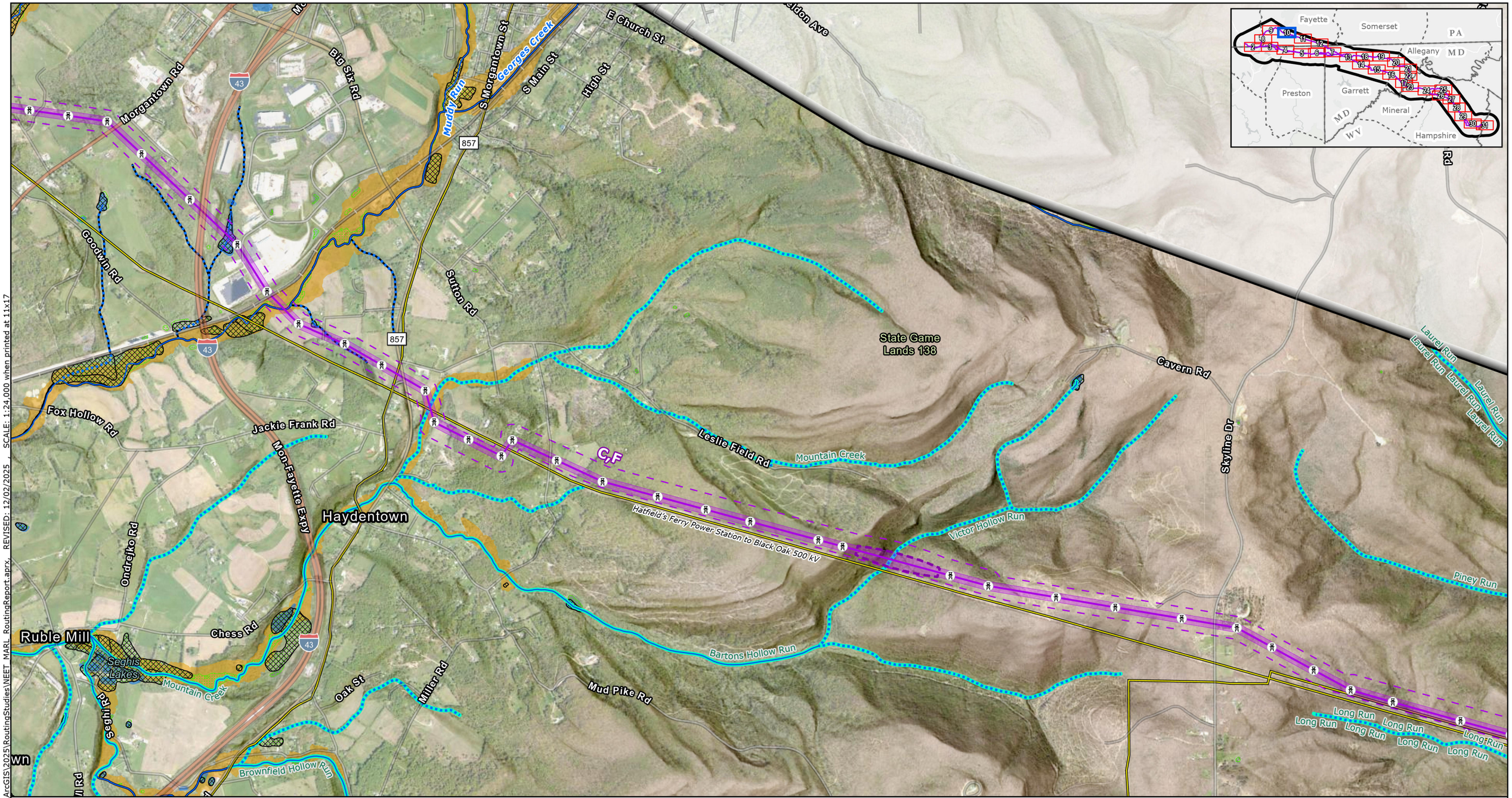

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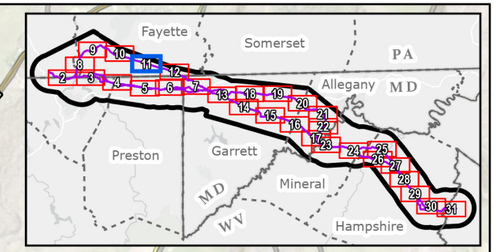

Laurel Run
Piney Run
Laurel Run
Laurel Run
Laurel Run
Laurel Run
Laurel Run
Laurel Run
Laurel Run
Long Run
Long Run
Long Run
Long Run
Long Run
Mill Run
Kirby Rd
Kirby Rd
Thurby Rd
Cornish Rd
Big Sandy Creek
Elliottsville
Necessity to Brandonville 138 kV
Albright to Bethelboro 138 kV
Elliotsville Rd
Stony Fork
Potter School Rd
Clark King Rd
Camp Riamo Rd
Howard Rd
Gibbon Glade Rd
Stucksager Rd
Memorial Dr
Little Sandy Creek
Quebec Rd
Sumey Rd
C,F
Hatfield's Ferry Power Station to Black Oak 500 kV
381
381
Quebec Run
UNT to Quebec Run (RM 2.01)
Quebec Run Wild Area
Big Sandy Creek

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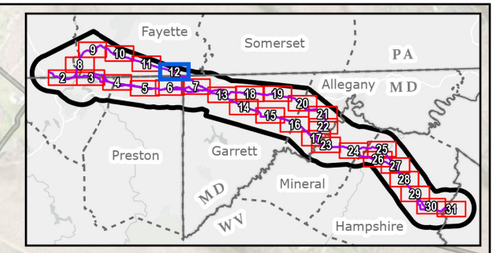

Lake Courage
Heritage Rd
Dinner Bell Five Forks Rd
Clover Top Rd
McCracken School Rd
Clark Rd
Fiketown
Glade Rd
Little Sandy Creek
Maust Rd
Flat Rock Rd
Thomas Rd
C,F
Glades
Bruceton Rd
281
Glade Run
Hatfield's Ferry Power Station to Black Oak 500 kV
Brown Hill Rd
Fike Run
Five Forks Rd
Mason Dixon Rd
Five Forks
Fayette
Preston
Virginia Ln
Fayette
Garrett
Tallentire Rd
Flat Rocks Rd
N Preston Hwy
Bower Rd
Preston
Garrett
Dennis Rd
Chevelle Dr
Preston Hwy
Glade Run
Glade Rd

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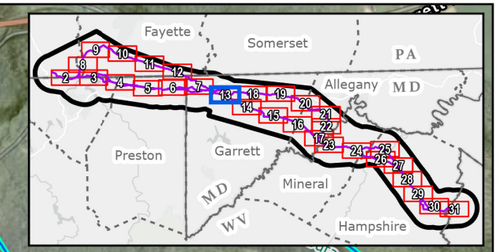

Penn Mar to Deep Creek 115 kV
Sam Friend Rd
Everly Rd
Fikes Run
Harmon Rd
Cove Run
Garrett Hwy
Weaver Rd
Unnamed Tributary to Bear Creek
Jennings to Hazelton 138 kV
D,F
Cove Rd
Unnamed Tributary to Little Bear Creek
Bearfoot Rd
Everly Rd
Unnamed Tributary to Bear Creek
A,B,C,E
Garrett Hwy
Collier Rd
Bear Creek Rd
Bear Creek
Hatfield's Ferry Power Station to Black Oak 500 kV
Sale Barn Rd
Unnamed Tributary to Bear Creek
Kaese Mill
Rabbit Hollow Rd
Little Bear Creek
Bear Creek
Unnamed Tributary to Bear Creek
Brobst Rd
Unnamed Tributary to Bear Creek
Garrett Hwy
Engle Mill
Pud Miller Rd
Bowman Hill Rd
Oak Hill Ln
Brobst Rd
Unnamed Tributary to Bear Creek
Garrett Hwy
Bear Creek
Bear Creek
Unnamed Tributary to Little Bear Creek

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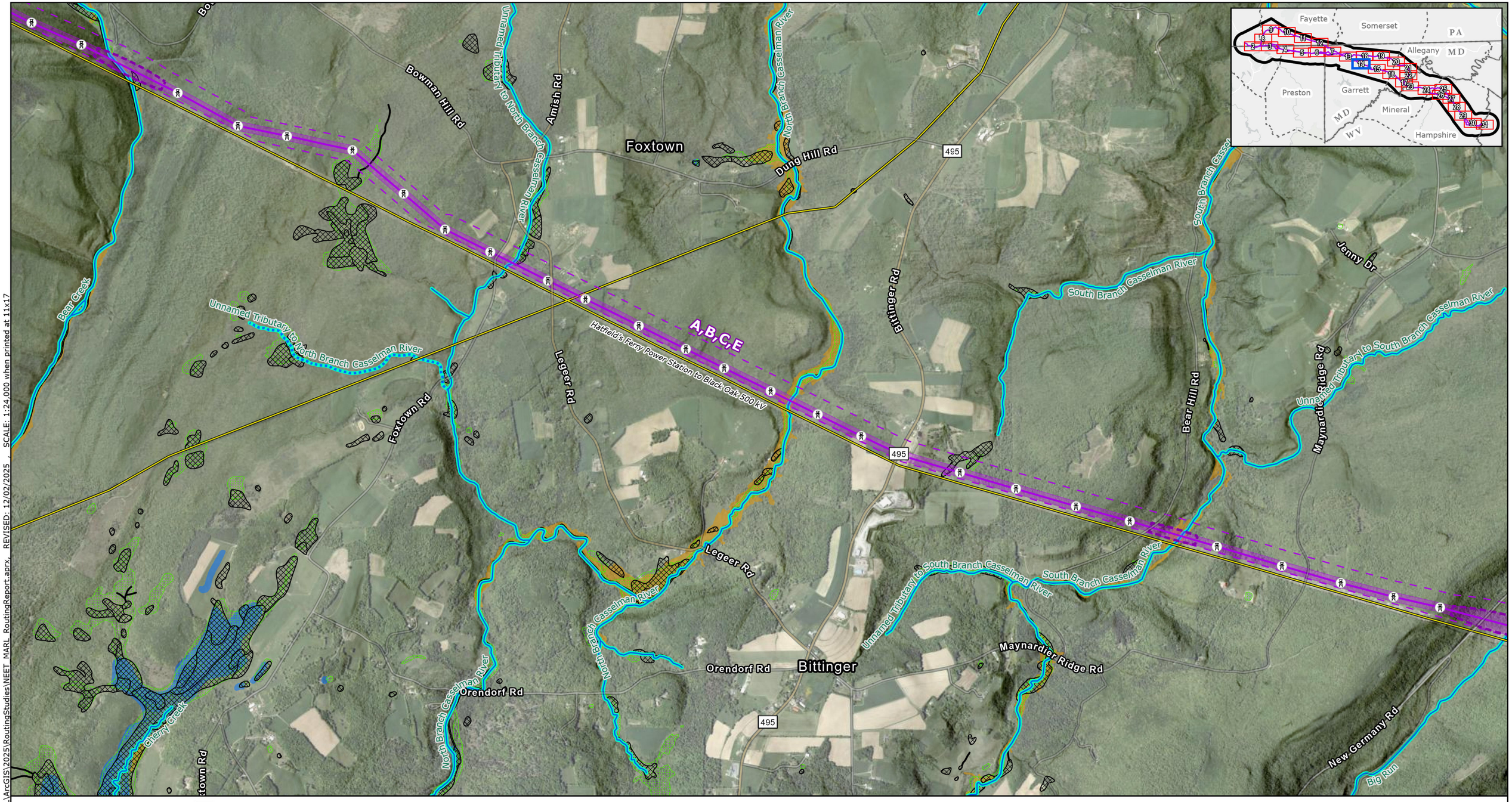

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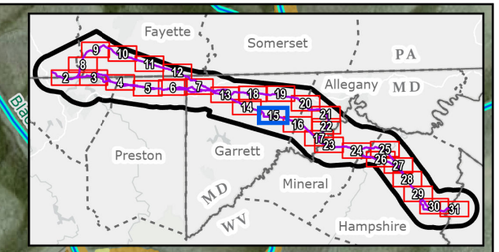

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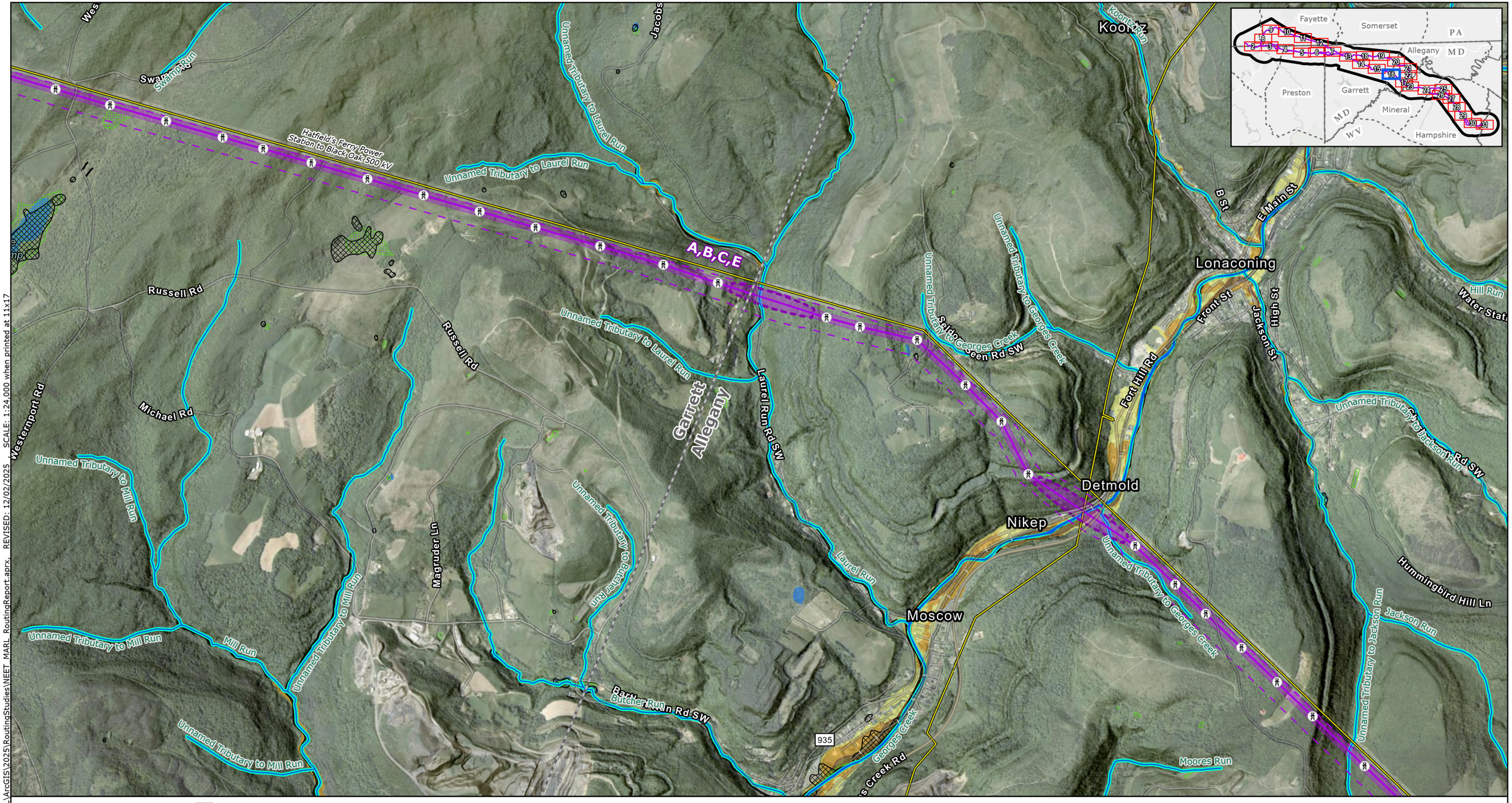

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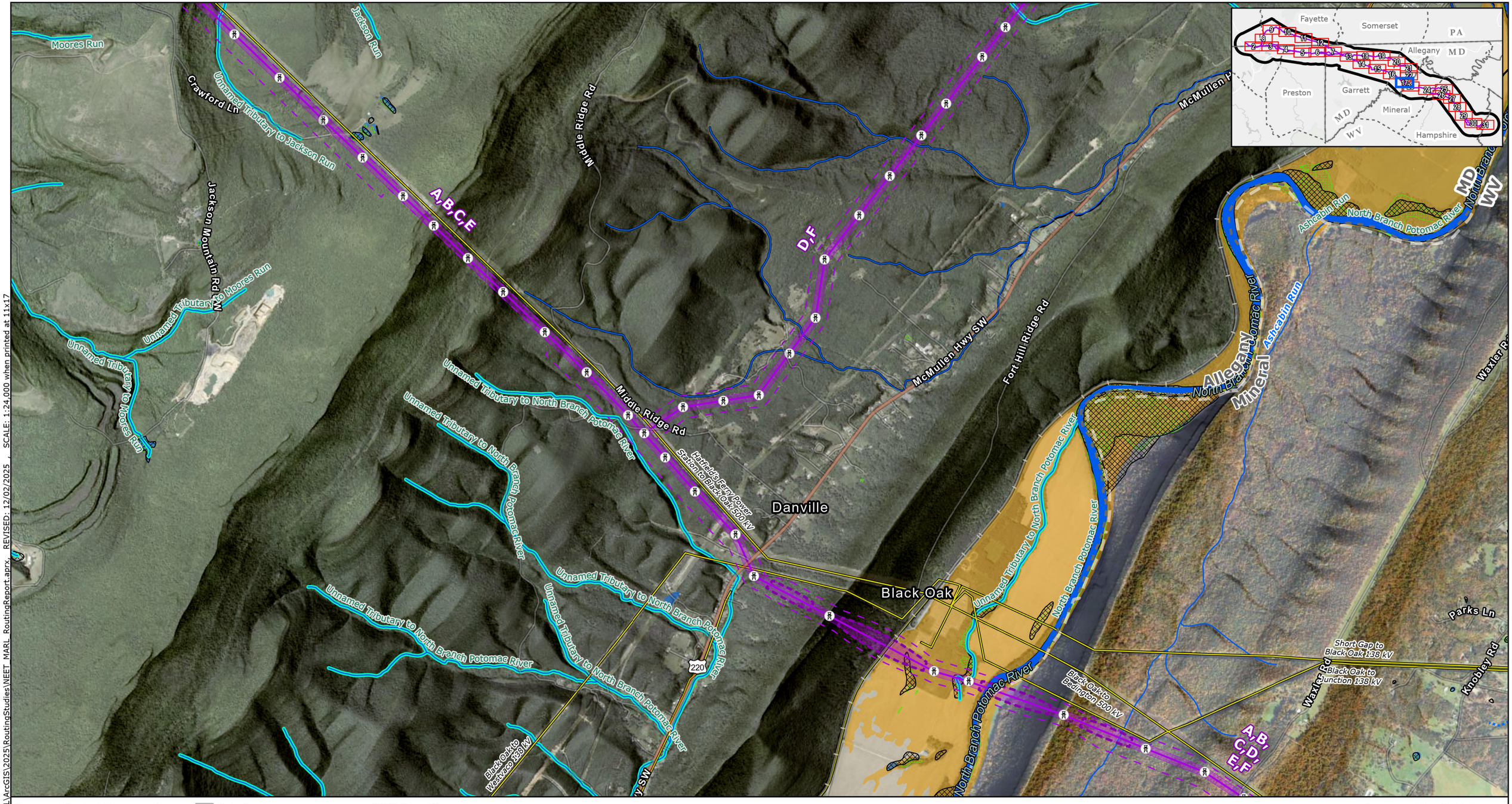

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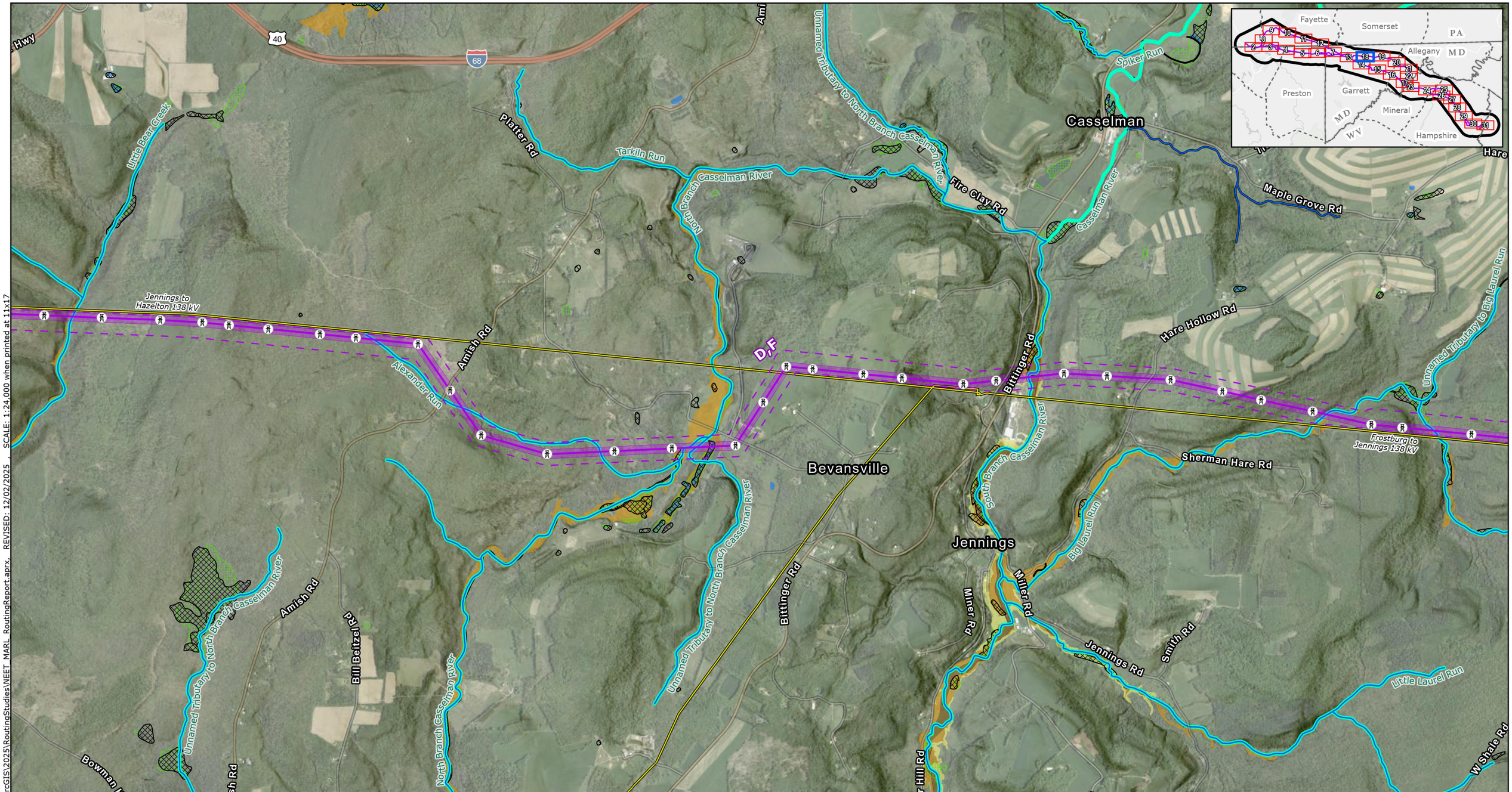

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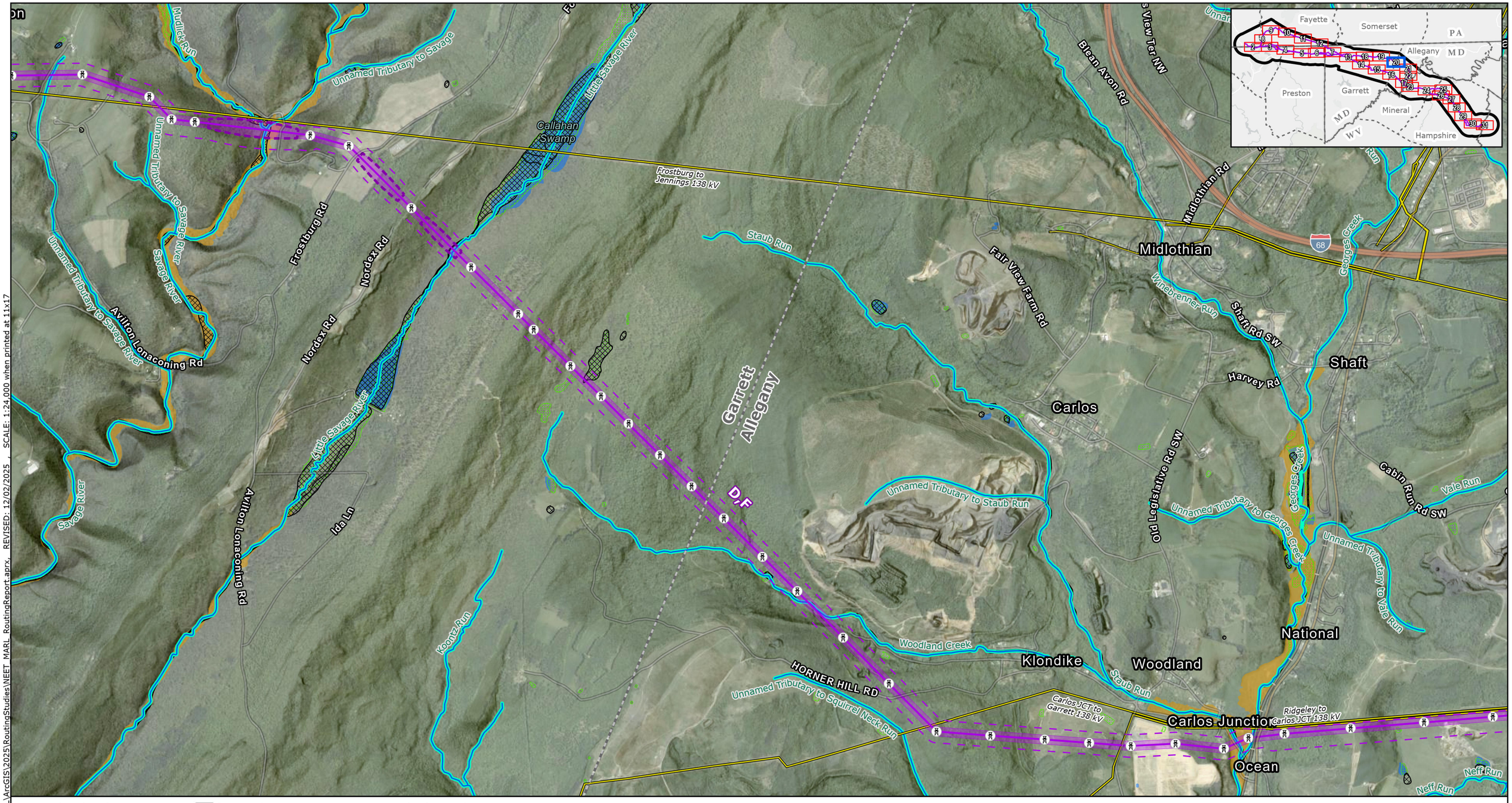

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ERM

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Proposed Project Components
- Project Endpoints
- Towers
- Alternative Routes
- ROW Corridors
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Water Resources
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- Modeled High Probability Wetlands

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- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

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N

0 0.25 0.5 0.75 1
Miles

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Appendix E-11
Alternative Routes
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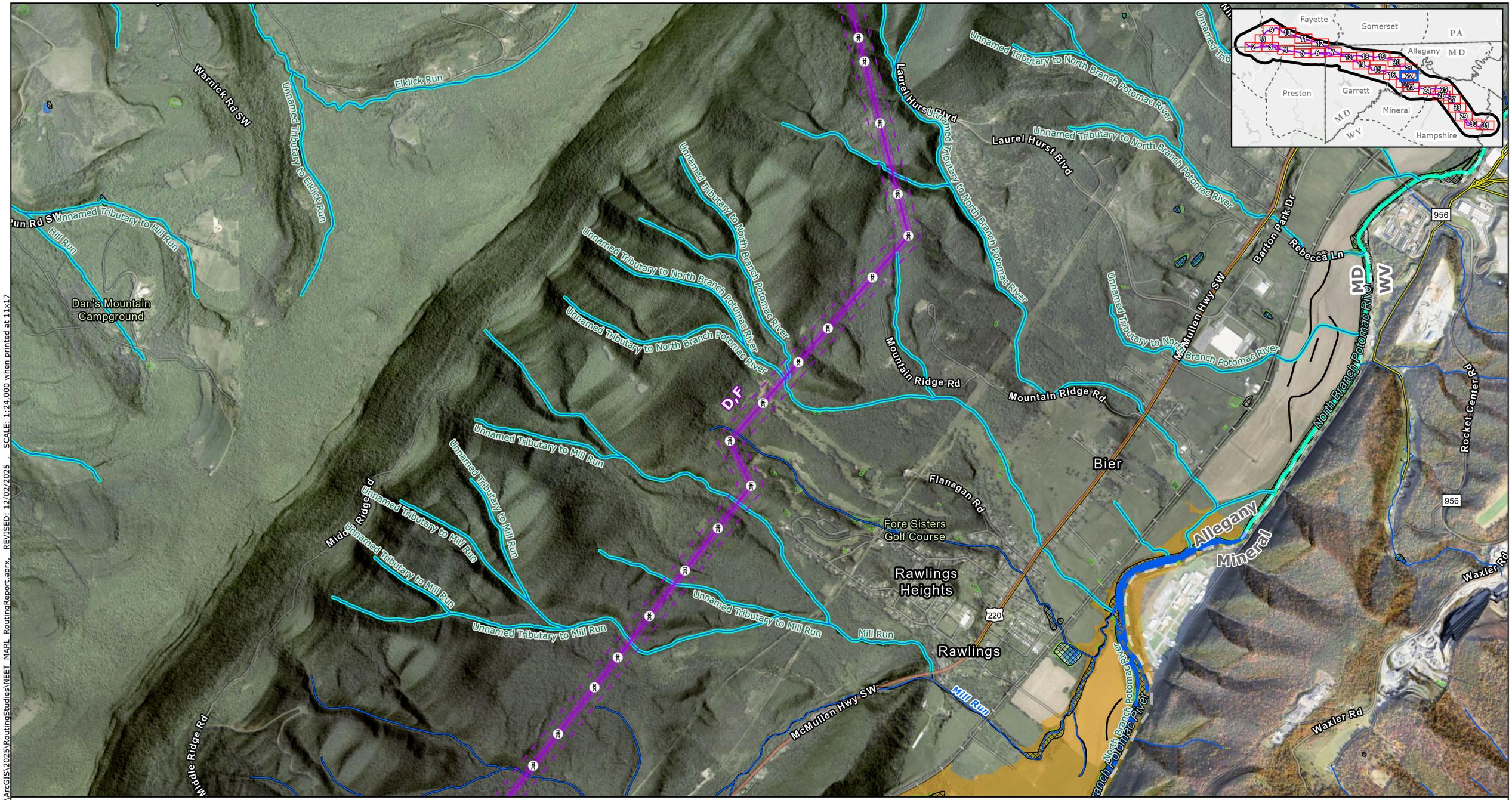

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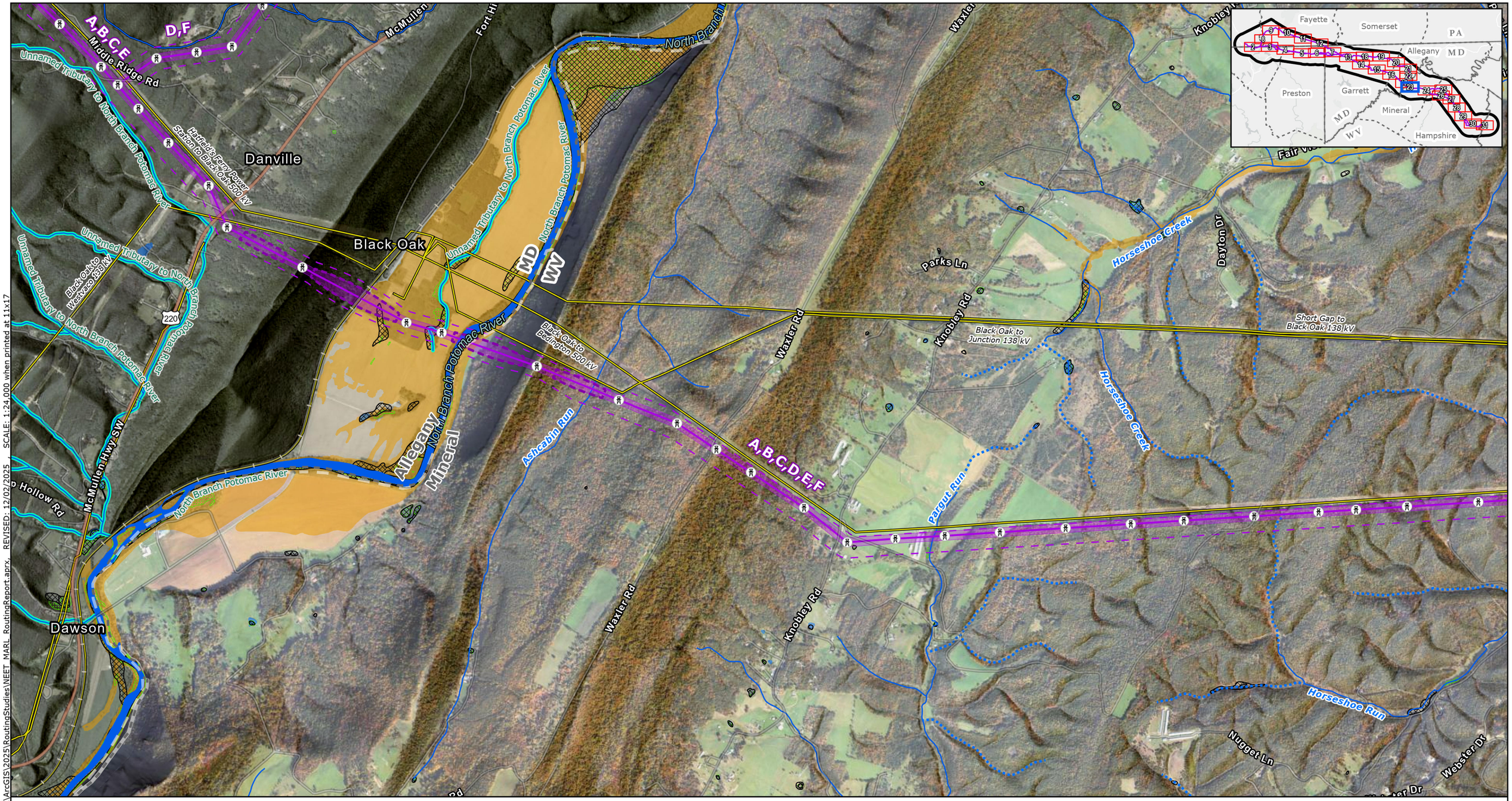

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Alternative Routes
Natural Environment
Water Resources
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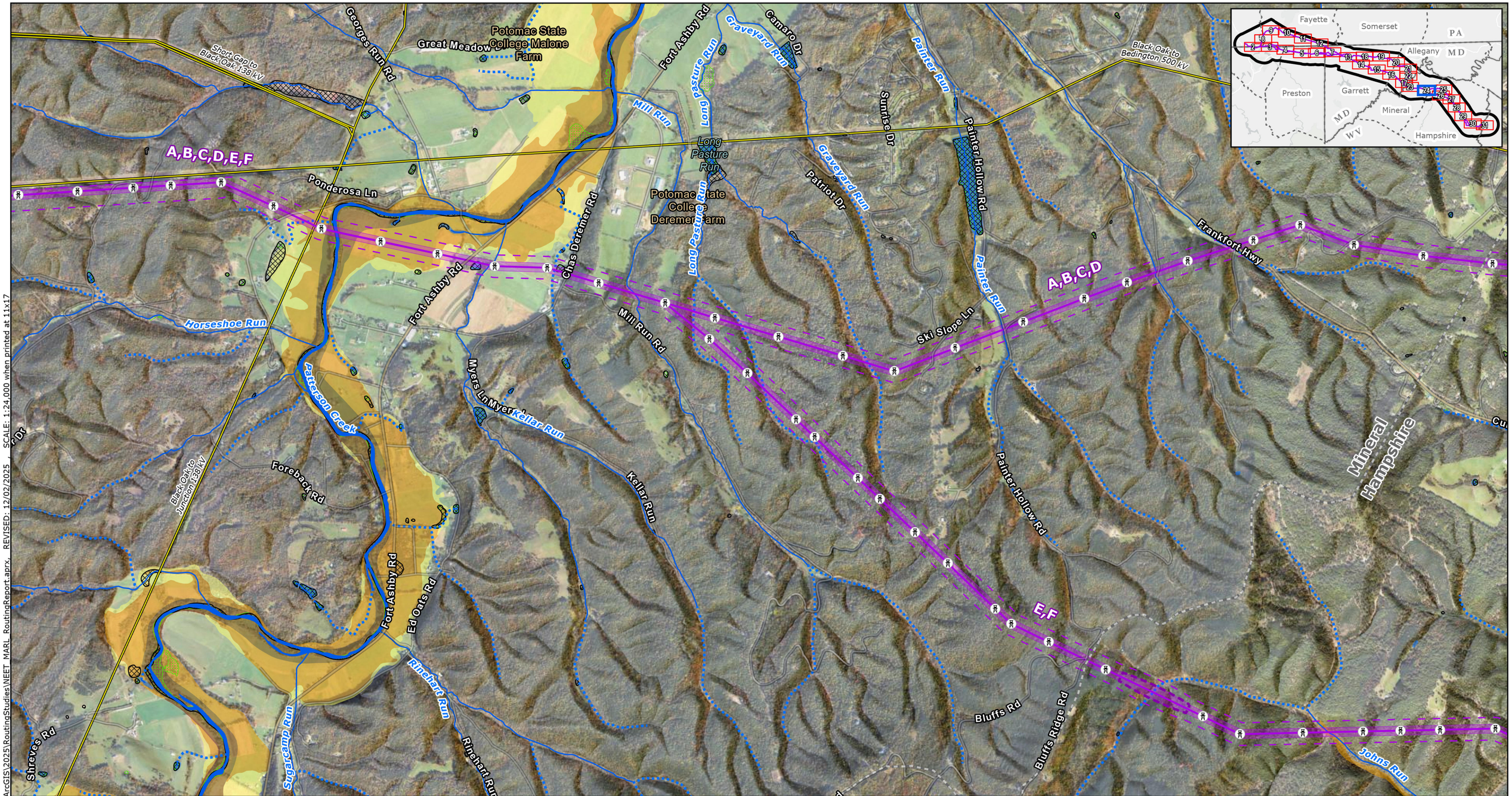
MidAtlantic Resiliency Link

ERM



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Miles

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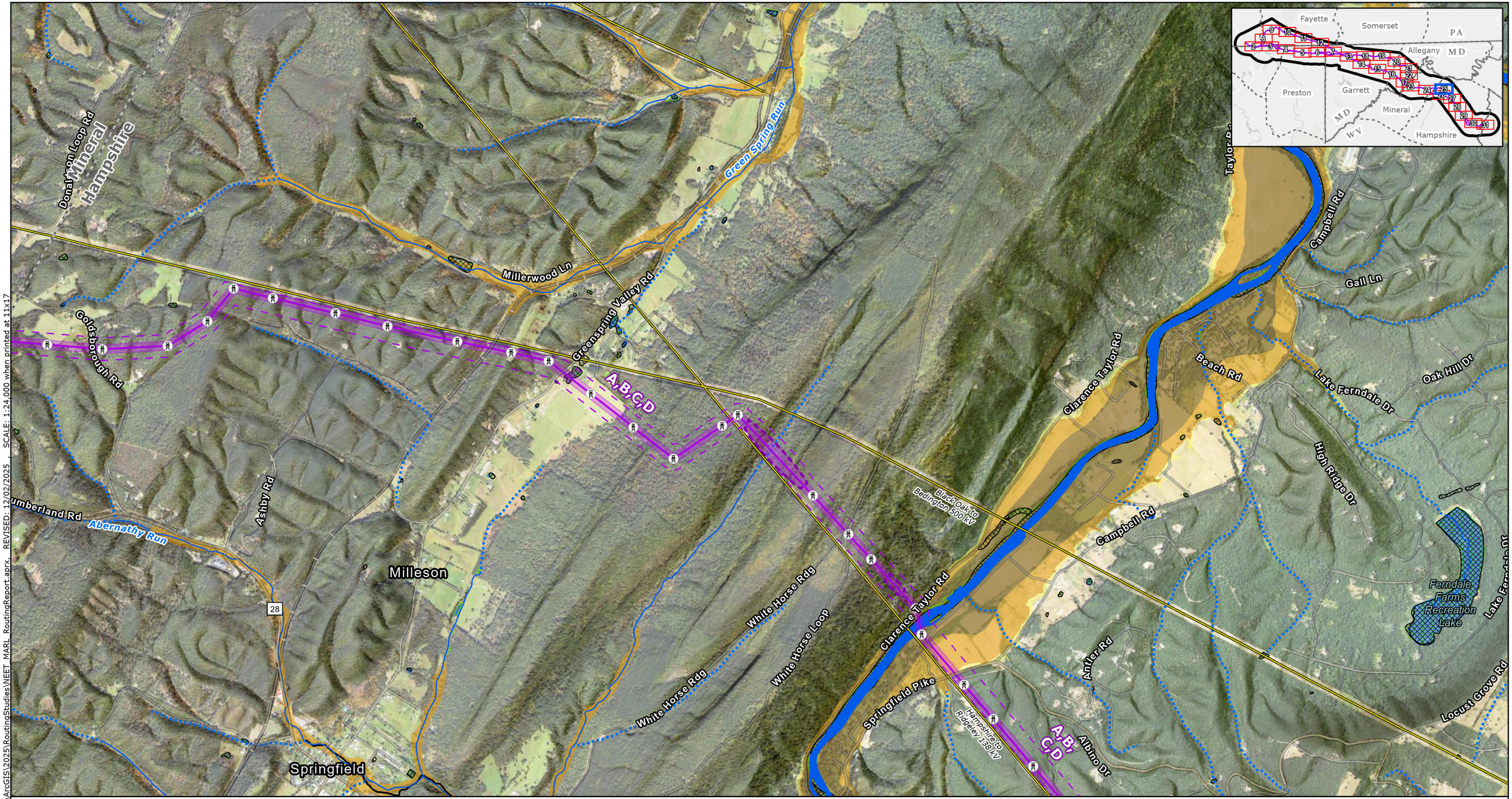

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Miles

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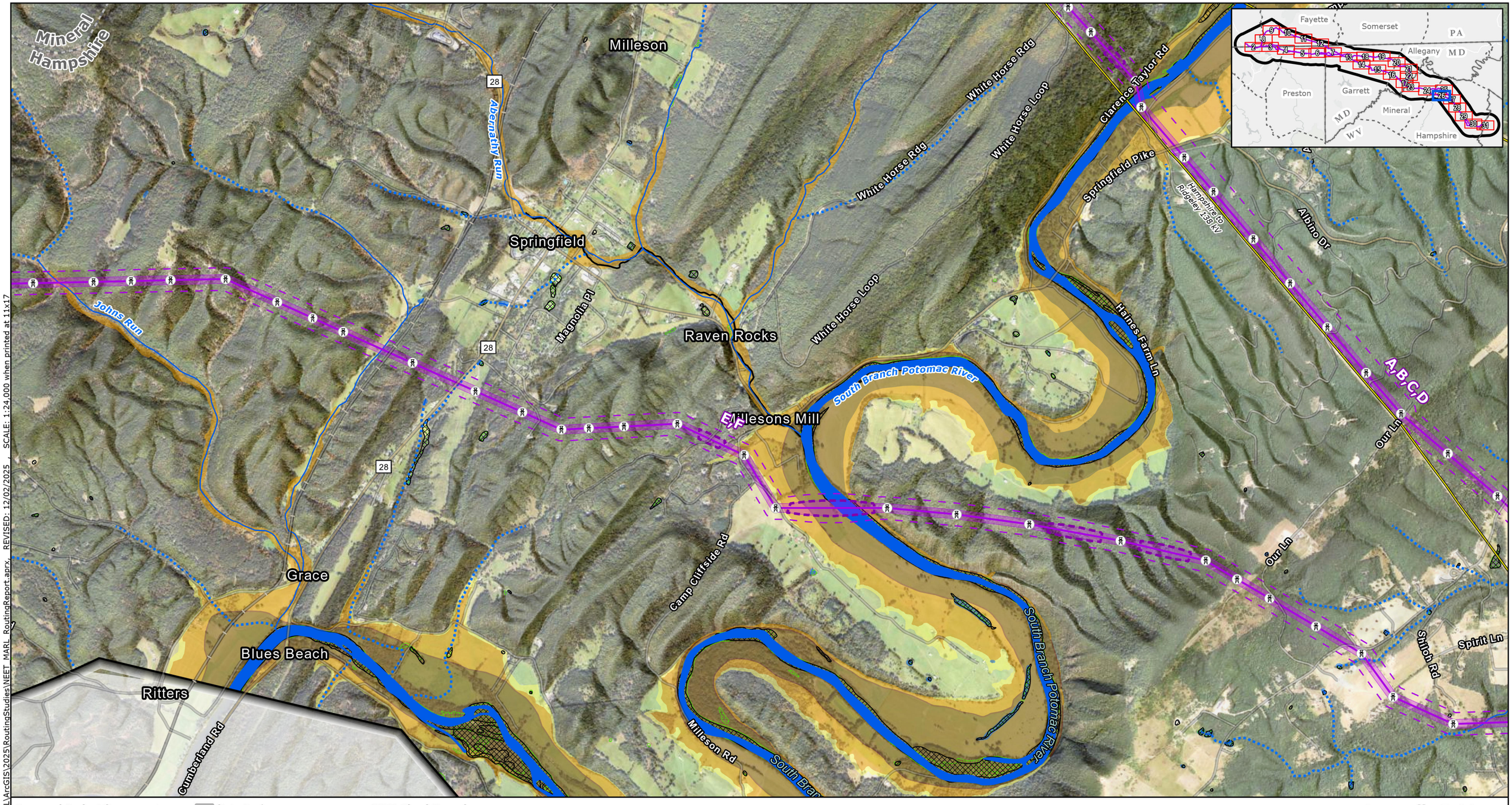

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Appendix E-11
Alternative Routes
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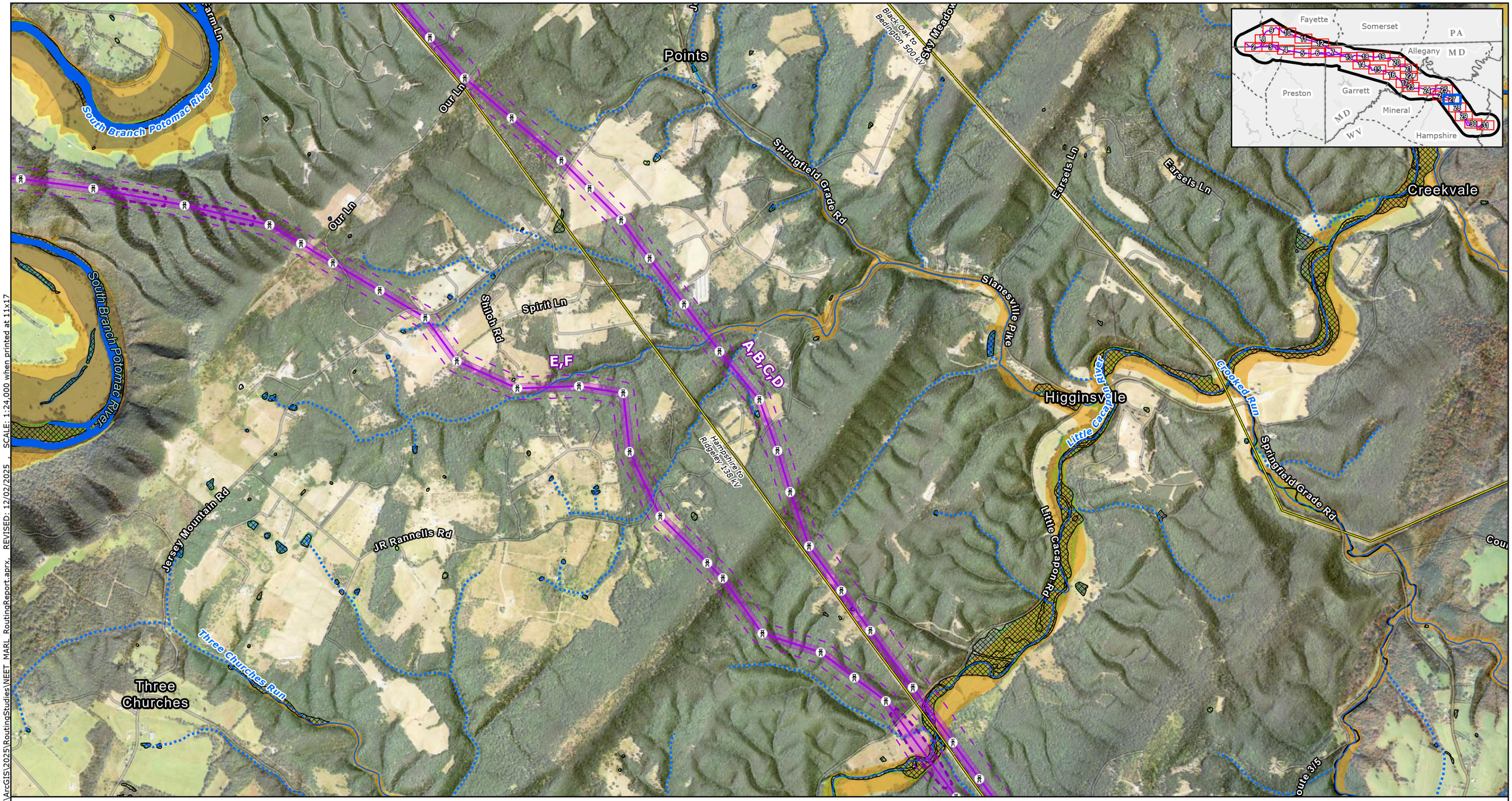

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Appendix E-11
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MidAtlantic Resiliency Link

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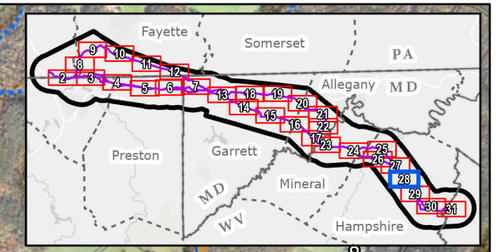

Gore

Slanesville

Three Churches Run

Three Churches Holw

Little Cacapon River

Little Cacapon Rd

Riverwood Trl

Ridge Rd

Tanglewood Dr

County Route 3/5

Spring Gap Rd

Slanesville Pike

Longview Farms Ln

Maple Run

Bloomery Pike

Clifton Rd

Millesons Rd

Sirks Ln

Crooked Run

Jessies Way

Old Martinsburg

Hampshire to Ridgeley 138 kV

Kedron

E,F

A,B, C,D

A,B,C,D,E,F

Proposed Project Components
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Appendix E-11
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Natural Environment
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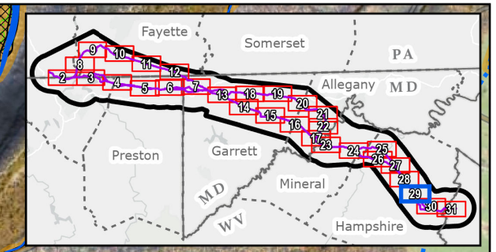

Gibbons Run
Dakota Dr
Hayes Ln
Bloomery Pike
Hickory Cor
Zion Church Rd
Kedron
Maple Run
Twin Flower Ln
Rose Dr
Harmison
North River Mills
Cold Stream Rd
A,B,C,D,E,F
Knips Ln
Ruth Bailes Ln
Riggs Hollow Rd
Buffalo Ridge Rd
Haven Dr
Denney Dr
Hickory Cor
29
29
Hoy Rd
Ike Saville Rd
Hoy
Janesa Dr
Hampshire to Ridgeley 138 kV
S Pioneer Ln
Family Dr
Cabin Rd
Cold Stream
N River Rd
Big Horn Trl
Wild Boar Rd
Timber Mountain Rd
A,B,C,D,E
Fern Ln
Pugh
iller Ln

Proposed Project Components
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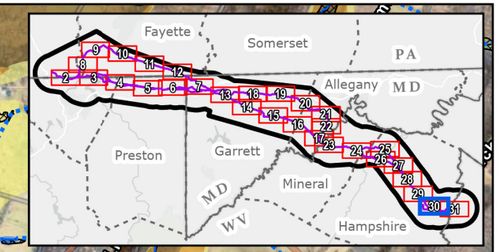

Capon Bridge
Red Fern Ln
Big Ho
Wild Boar
Timber Mountain Rd
Falcon View Dr
Sam Parks Rd
Park Valley Ln
Edwards Run
50
Hampshire to Ridgeley 138 kV
Northwestern Pike
Slonaker Rd
Laverne Dr
Falcon View Dr
Horizon Ln
Longbeard Ln
Hattie Ln
Dillons Run Rd
Sycamore Dr
Dillons Run
Stonebroke Ln
Wagon Chase Trl
Capon River Rd
Mill Branch
Christian Church Rd
Crane L
Northwestern
Sycamore Dr
Falls Rd
Sirbaugh Rd
A,B,C,D,E
F
Loom
French Mill to Hampshire 138 kV
Lays Ln
Old Fire Tower Rd
Edwards Run
Becks Ga
Meadow Brook to Hampshire 138 kV
Dillons Run
Old Mill Rd
Dover Young Dr
Ritter Dr
S Laurel Ridge Rd
Hampshire to Stonewall 138 kV
Pates Rd
A,B,C,D,E,F
Cacapon River
Mt Storm to Doubs 500 kV
WV Hampshire
VA Frederick

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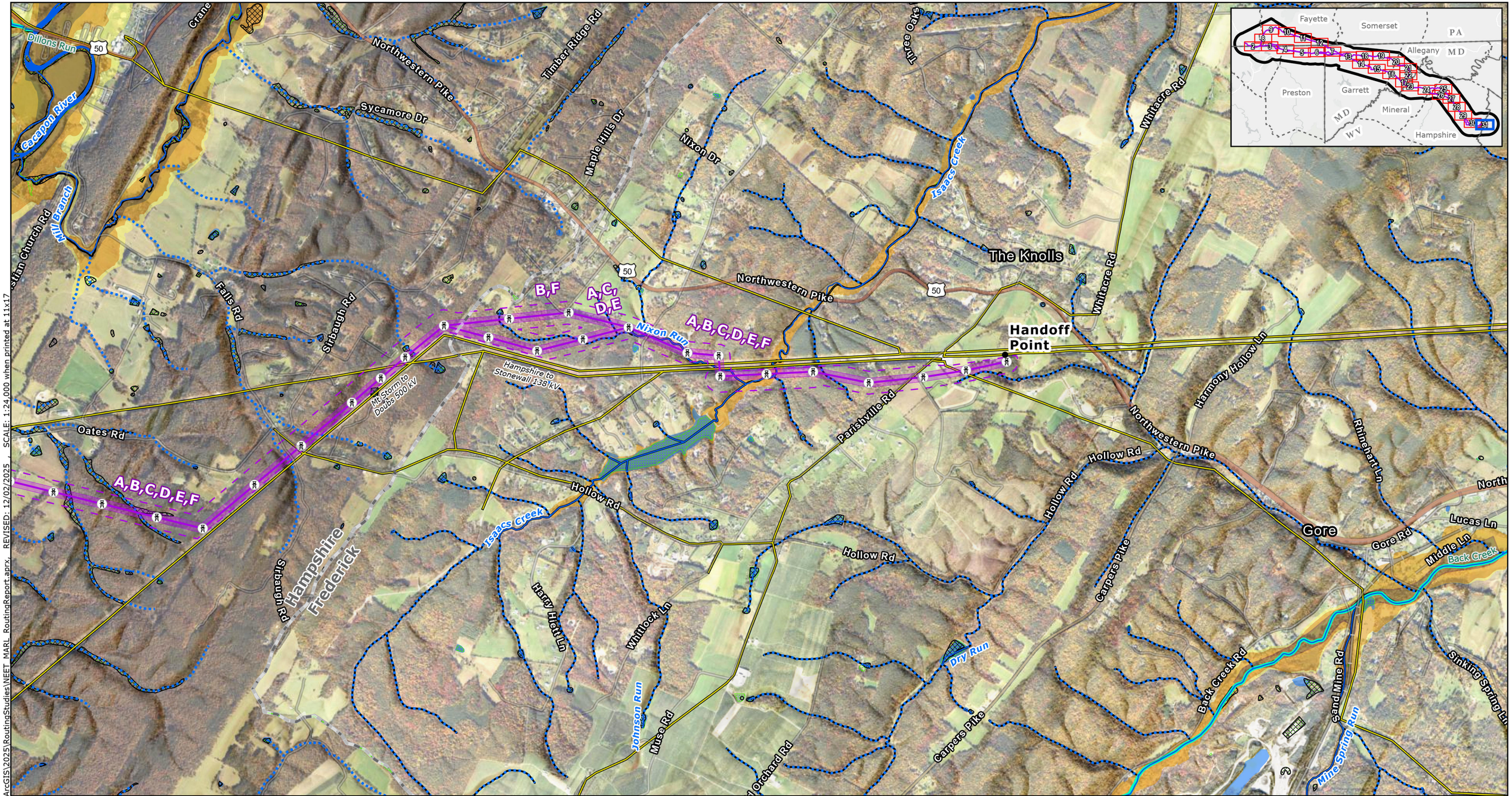

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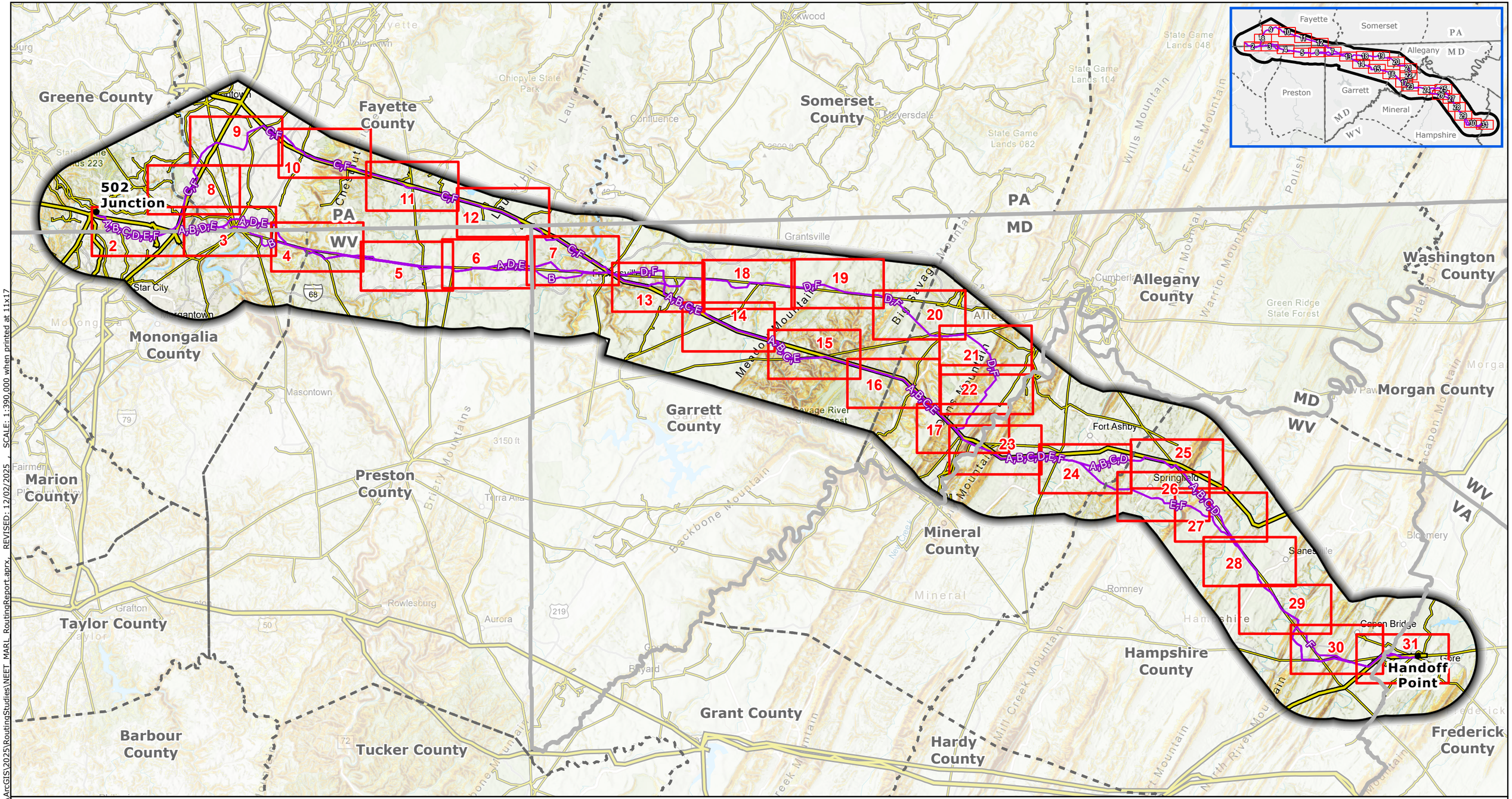
APPENDIX E-12 ALTERNATIVE ROUTES—NATURAL ENVIRONMENT—SENSITIVE SPECIES AND HABITATS MAPBOOK (CONFIDENTIAL)

APPENDIX E-13 ALTERNATIVE ROUTES—ENGINEERING AND INFRASTRUCTURE MAPBOOK



Proposed Project Components
- Project Endpoints
- Alternative Routes
- Project Study Area

Base Data
- County Boundary
- State Border
- Map Index Page

- Existing 500 kV High-Voltage Transmission Lines
- Existing High-Voltage Transmission Lines (<500 kV)

Terrain - Slope Map
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

NOTES
1. *Proposed tower locations are preliminary and subject to change*
2. *Data source: NEET, ERM, USGS, REXTAG*

N

0 4 8 12 16
Miles

Scale: 1:390,000
1 inch equals 32,500 ft (when printed at 11x17)

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Alternative Routes Engineering and Infrastructure
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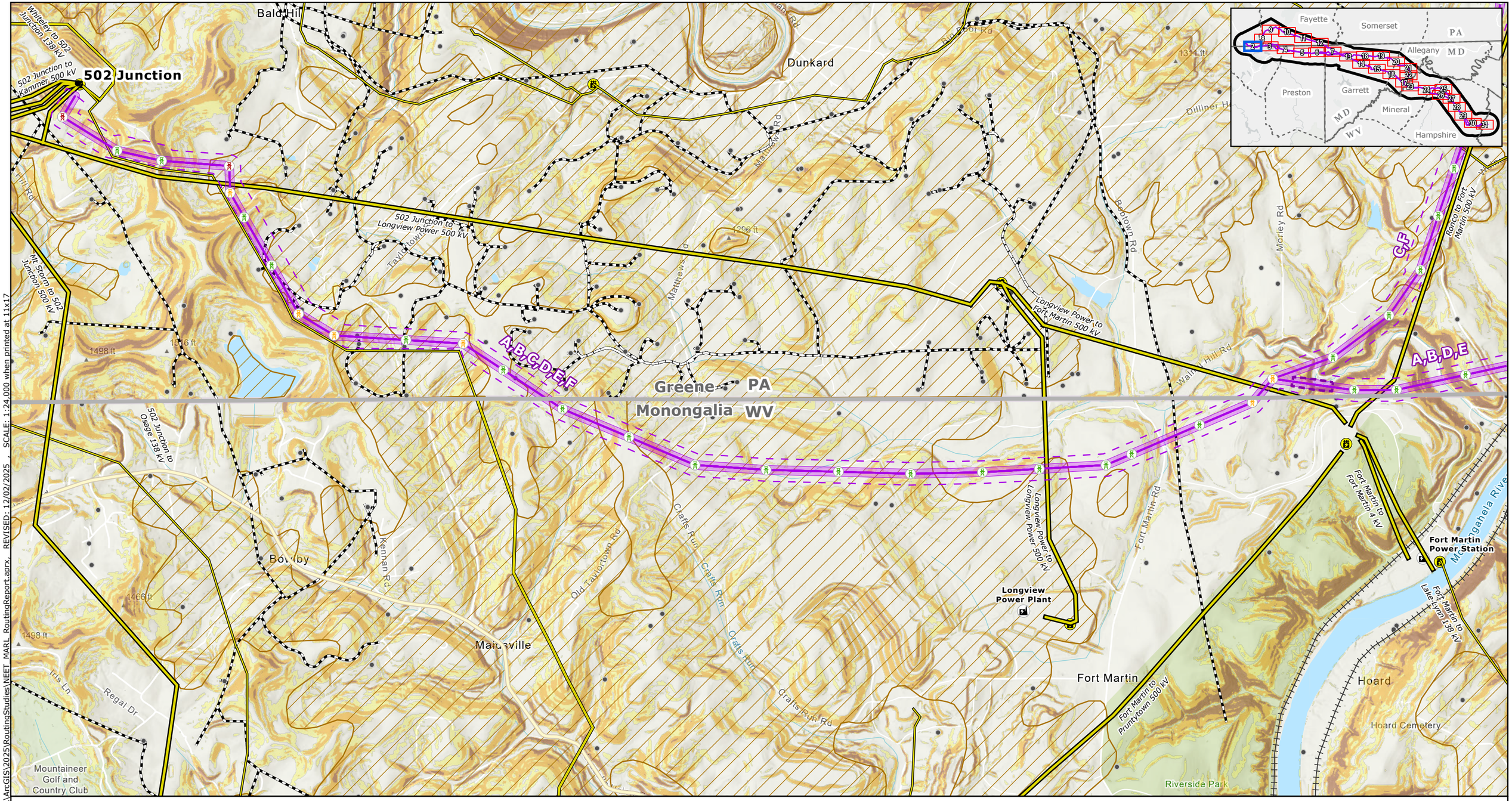

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Engineering and Infrastructure
- Airports
- Wind Turbines
- Substation
- Power Plants
- Oil and Gas Wells
- Natural Gas Distribution
- Natural Gas Gathering Pipeline
- Natural Gas Transmission Pipeline
- Existing 500 kV High-Voltage Transmission Lines
- Existing High-Voltage Transmission Lines (<500 kV)
- Railway
- Primary Road
- Secondary Road
- Geologic Karst Features
- Structures with Turn Angles 0-20 degrees
- Structures with Turn Angles 20-30 degrees
- Structures with Turn Angles >30 degrees

Terrain - Slope Map
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

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Engineering and Infrastructure

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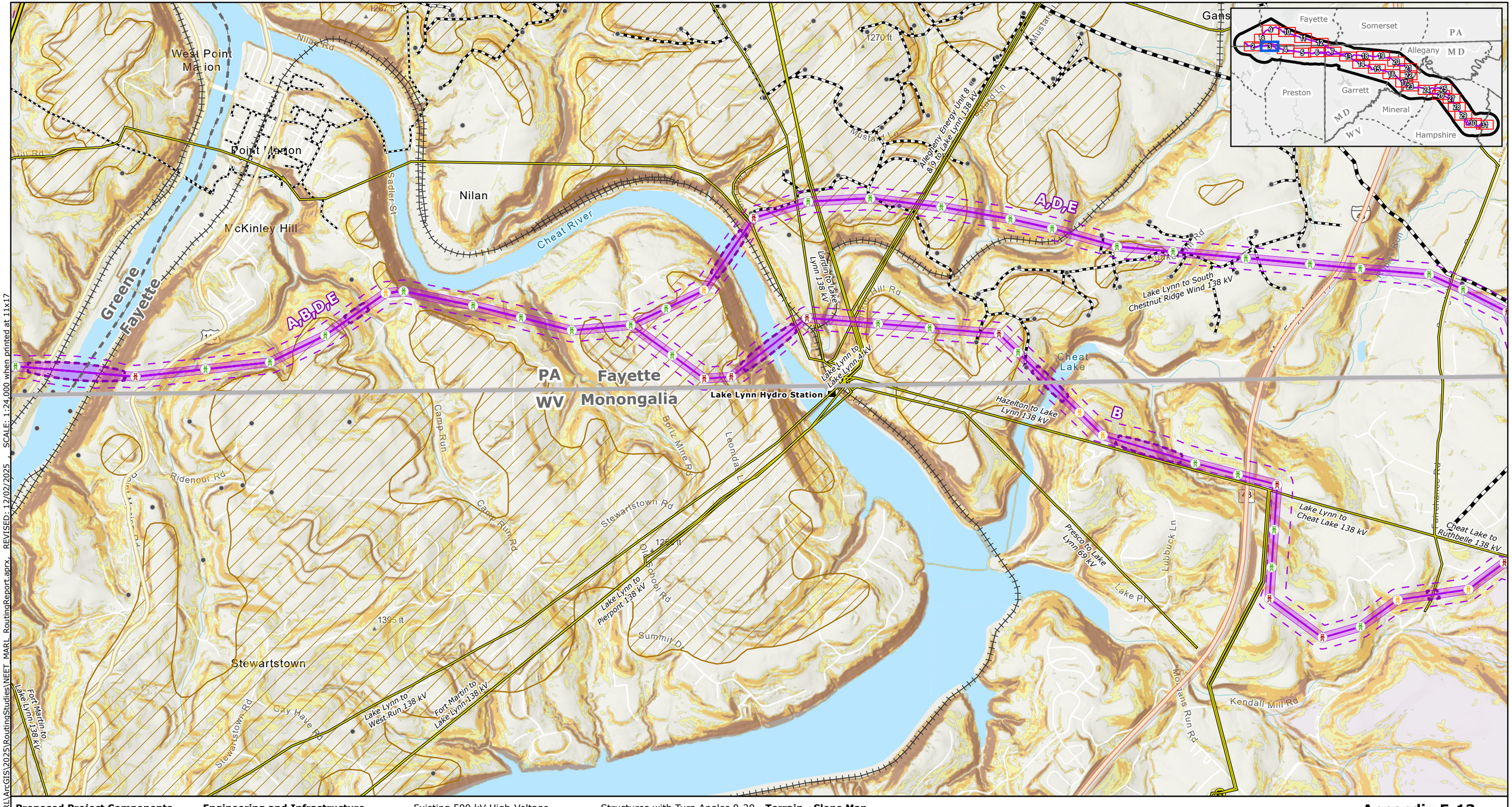

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N

0 0.25 0.5 0.75 1
Miles

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Alternative Routes Engineering and Infrastructure
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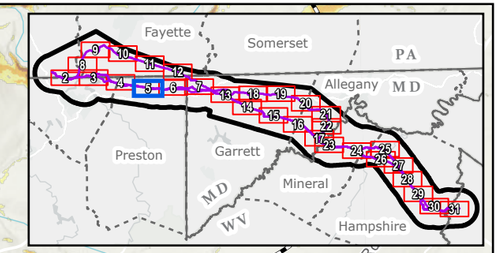

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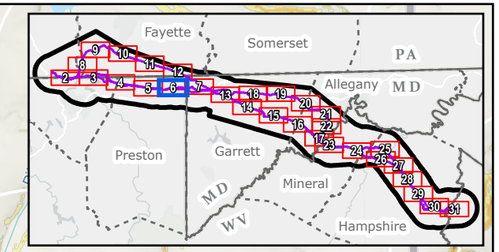

Salem
Salem Rd
Gipson Ln
Glade Run
Dennis Rd
Golden Rd
2282 ft
2417 ft
Sickle Hill
Moccasin Rocks Rd
Glade Farms Rd
WV Preston
MD Garrett
South Chestnut Ridge Wind to Junction 106 138 kV
A,D,E
B
2143 ft
Hazelton to Lake Lynn 138 kV
A,B,D,E
Sine Pl
Rosenberg Rd
Mowers Rd
HogRun
Handlen
Piney Run
2230 ft
Jennings to Hazelton 138 kV
Cherry Run Rd
Skyview Dr
2354 ft
2502 ft
Junction 106 to Albright 138 kV
Shady Grove Rd
Hog Run
Northpointe Dr
Bartholomew
Evans Hill
Maryland Line Rd

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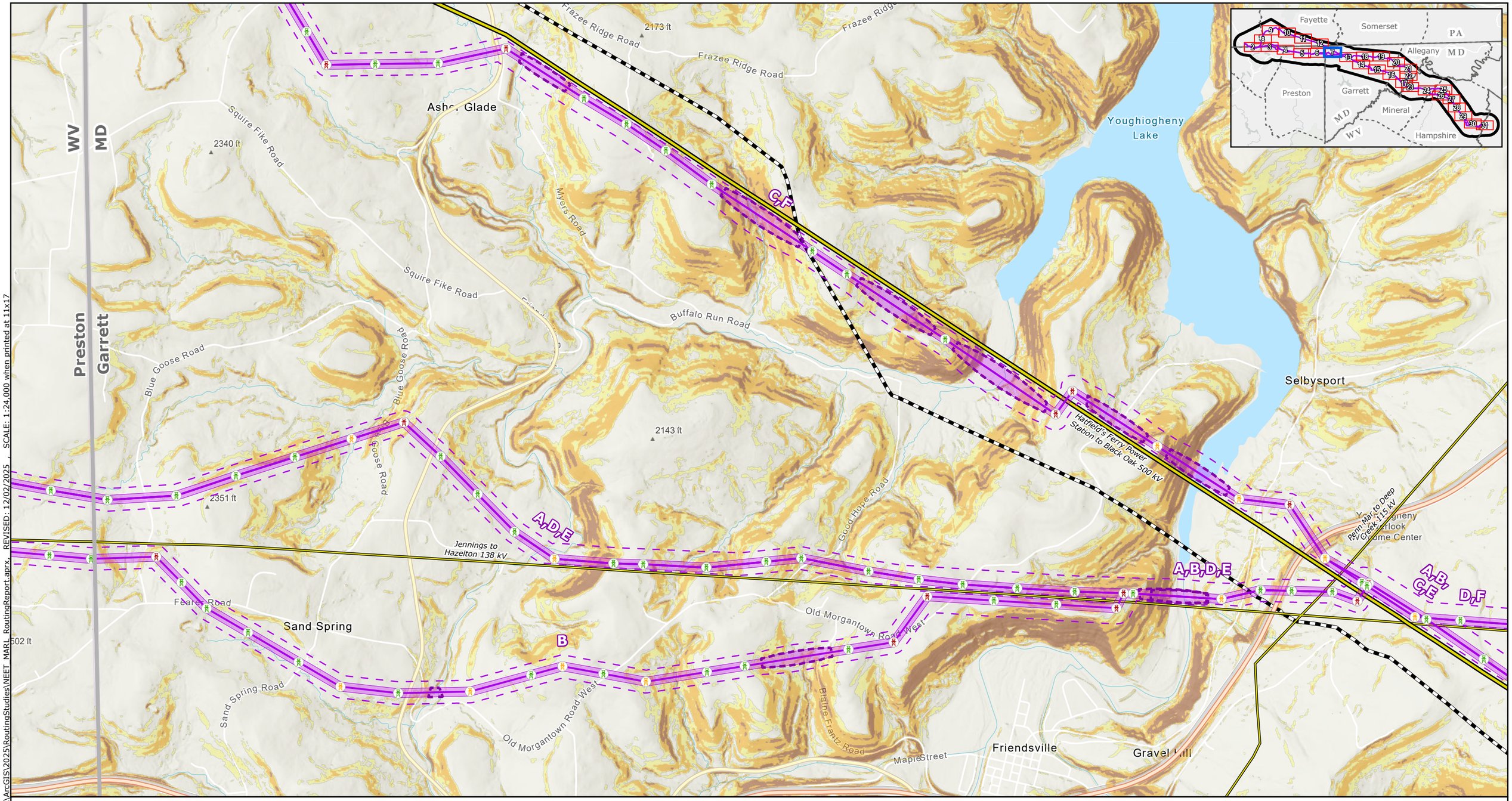

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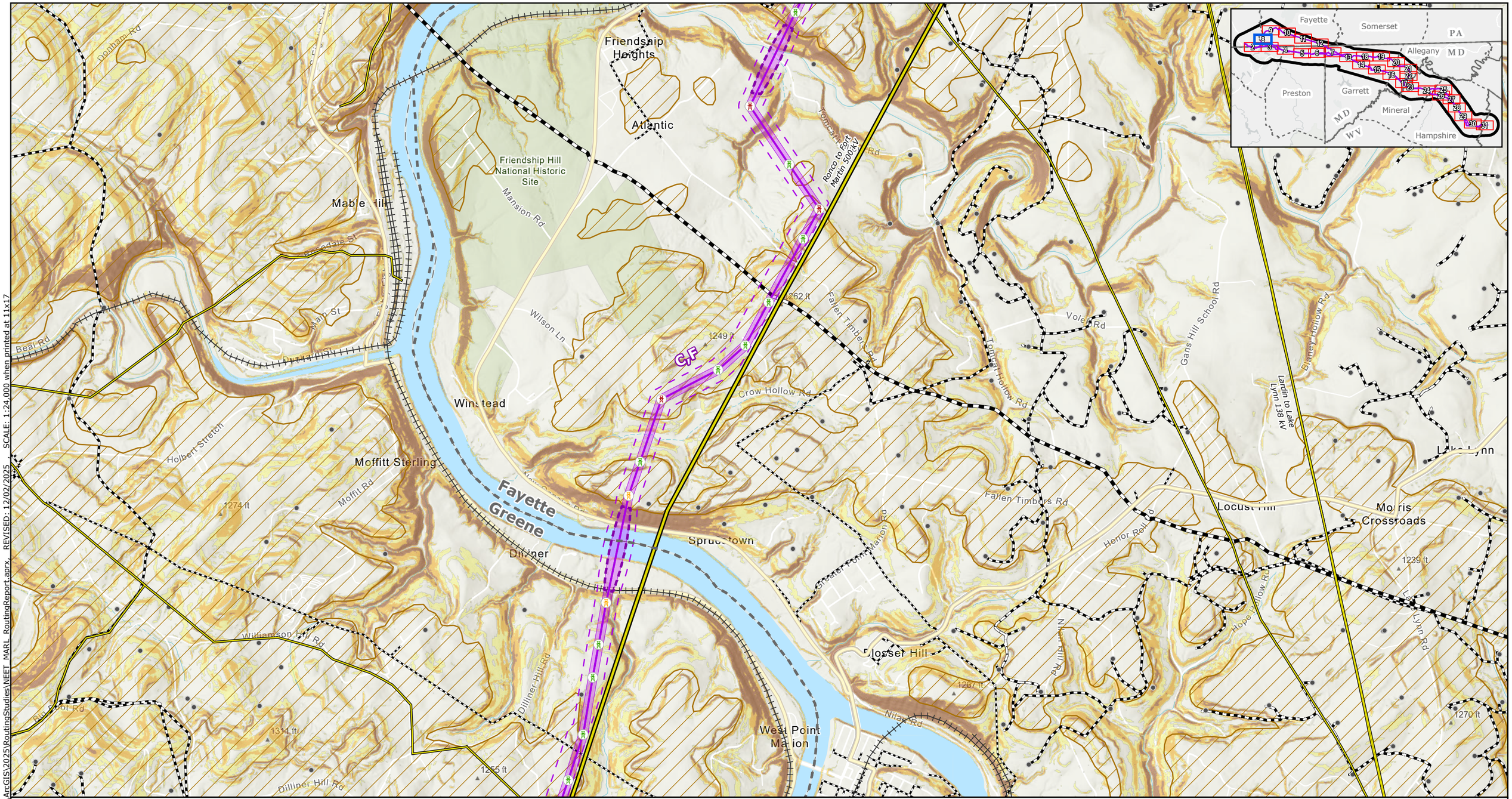

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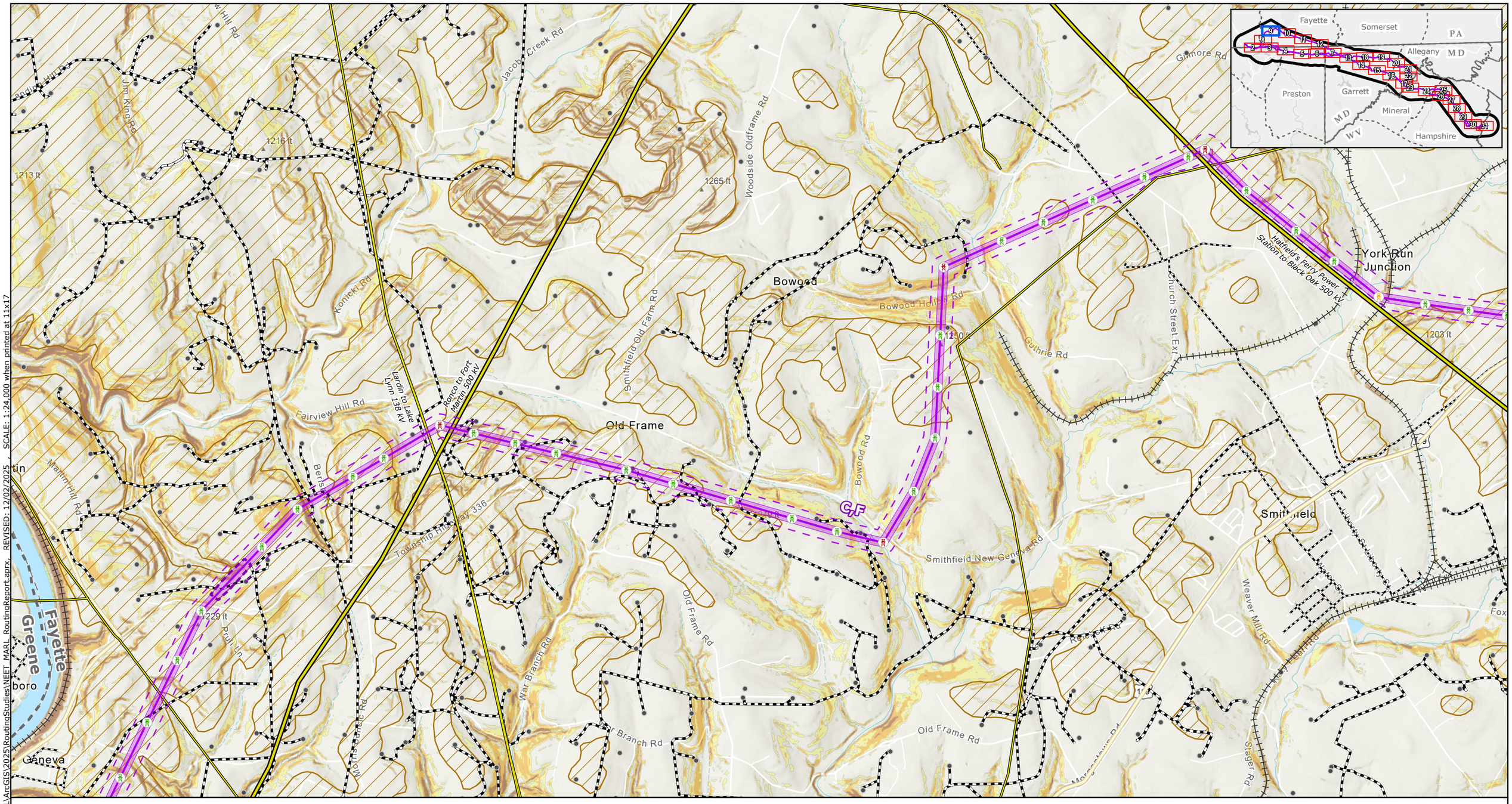

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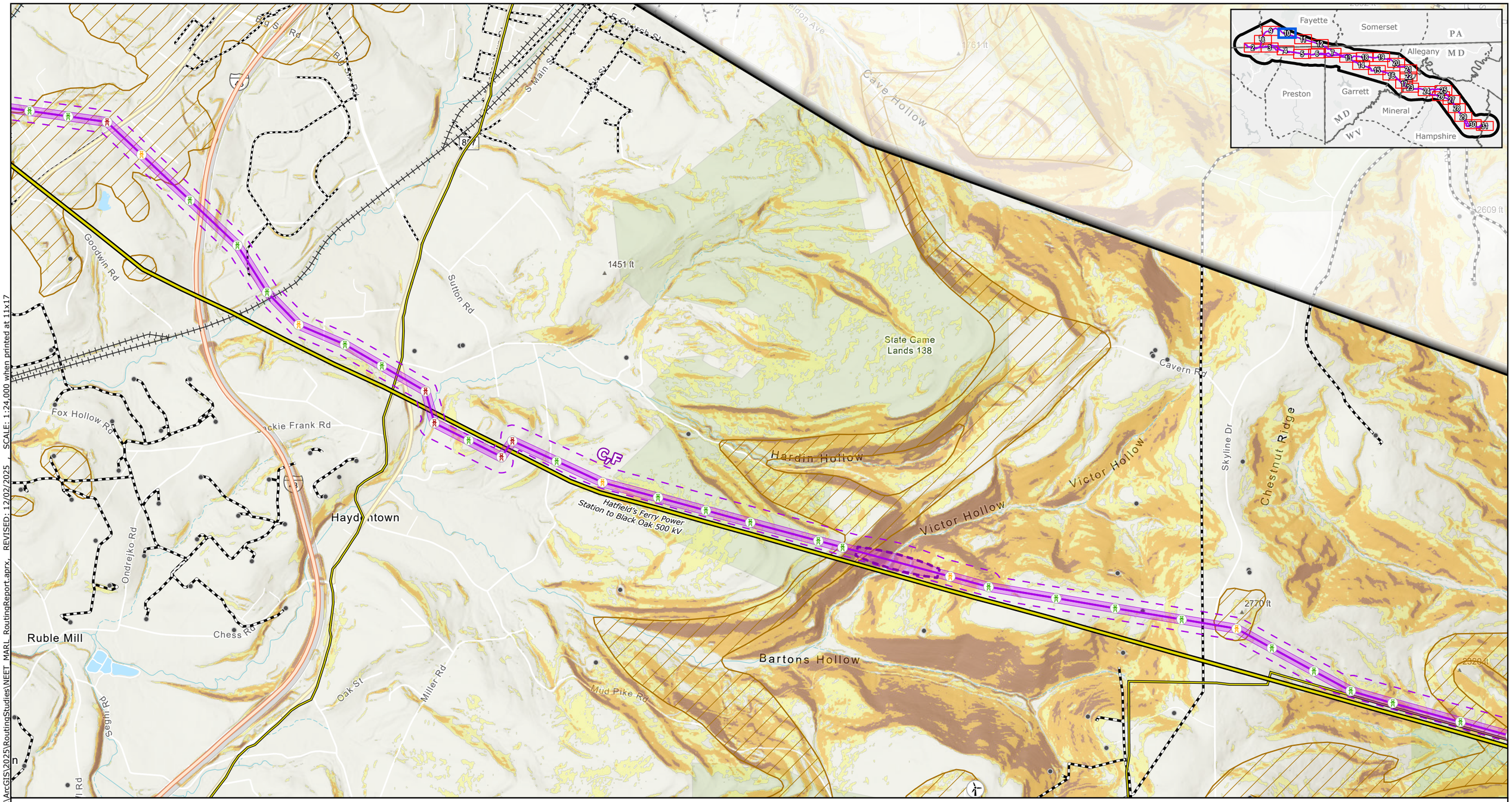

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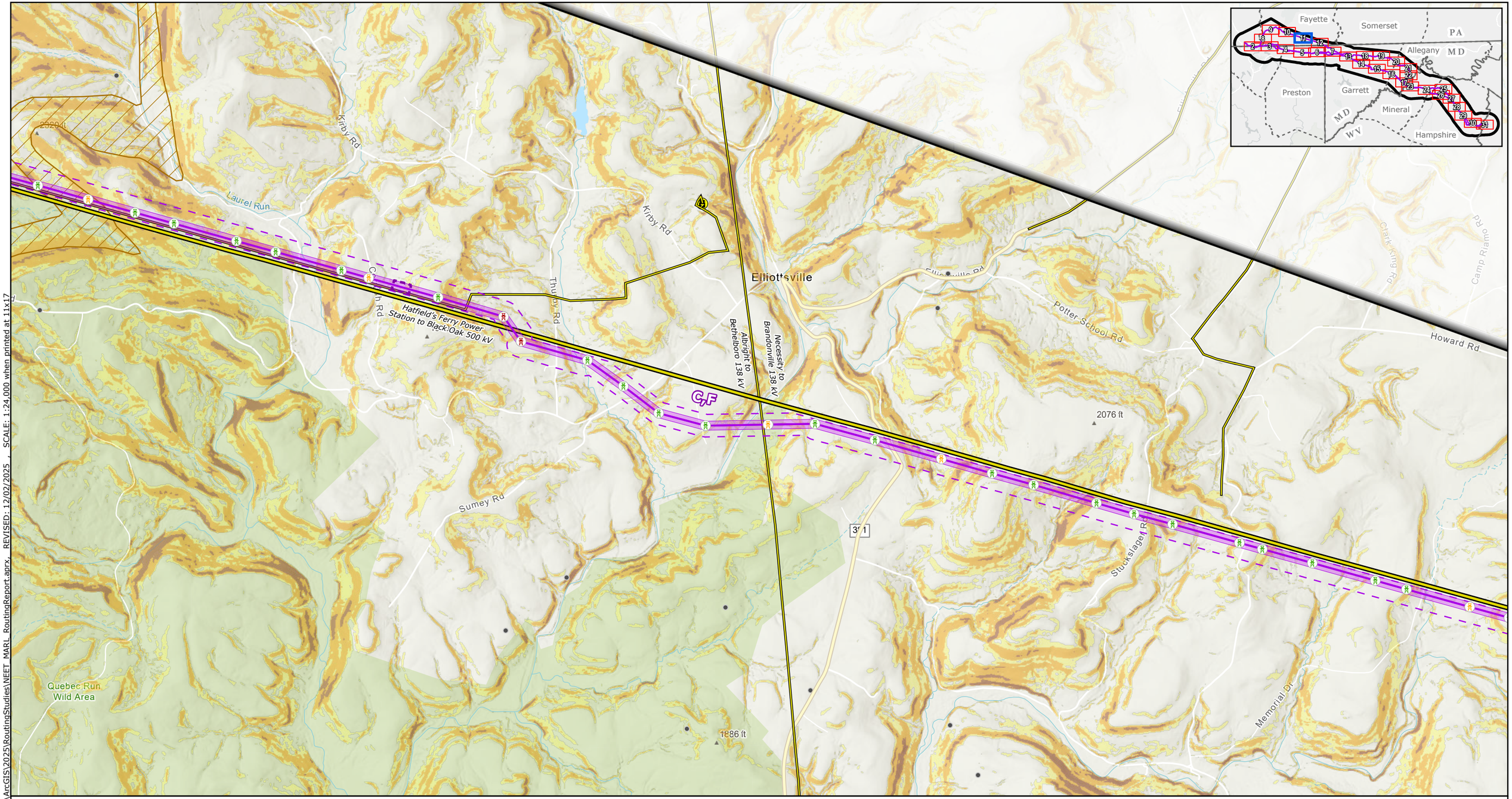

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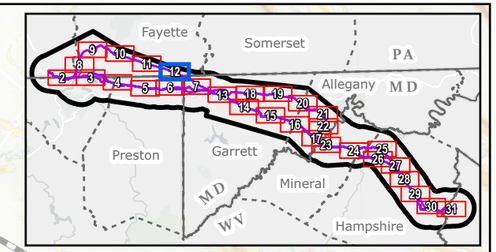

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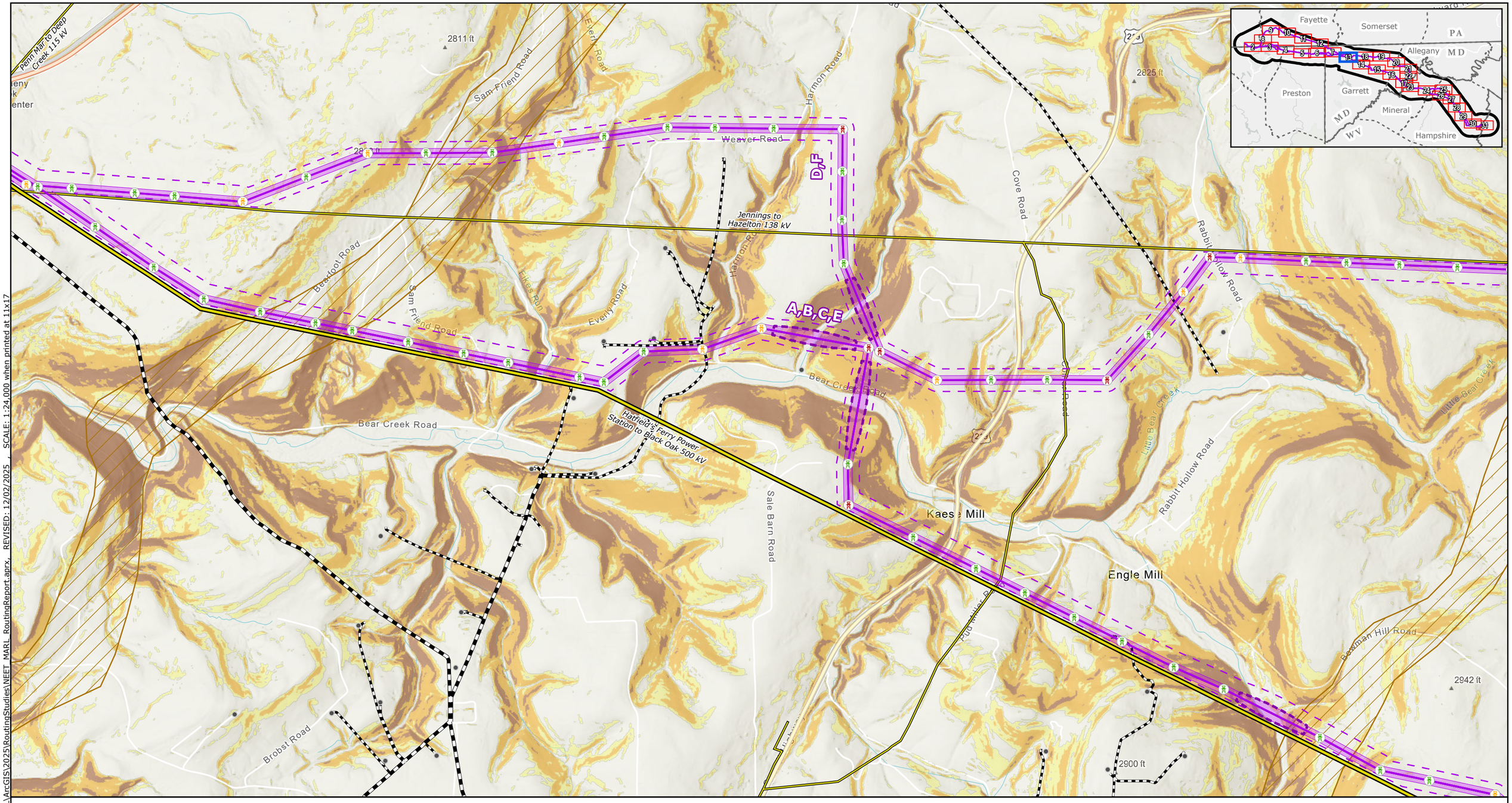

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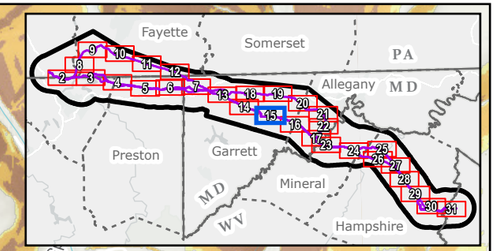

Fairview

Merrill

Hatfield's Ferry Power Station to Black Oak 500 kV

Carlos JCT to Garrett 138 kV

A,B,C,E

Fairview Road

Poplar Lick Run

Elk Lick Run

Pea Ridge Road

Westernport Road

Swamp Road

Big Run Road

Bear Pen Run

Big Run

Pine Swamp

2861 ft

Russell Road

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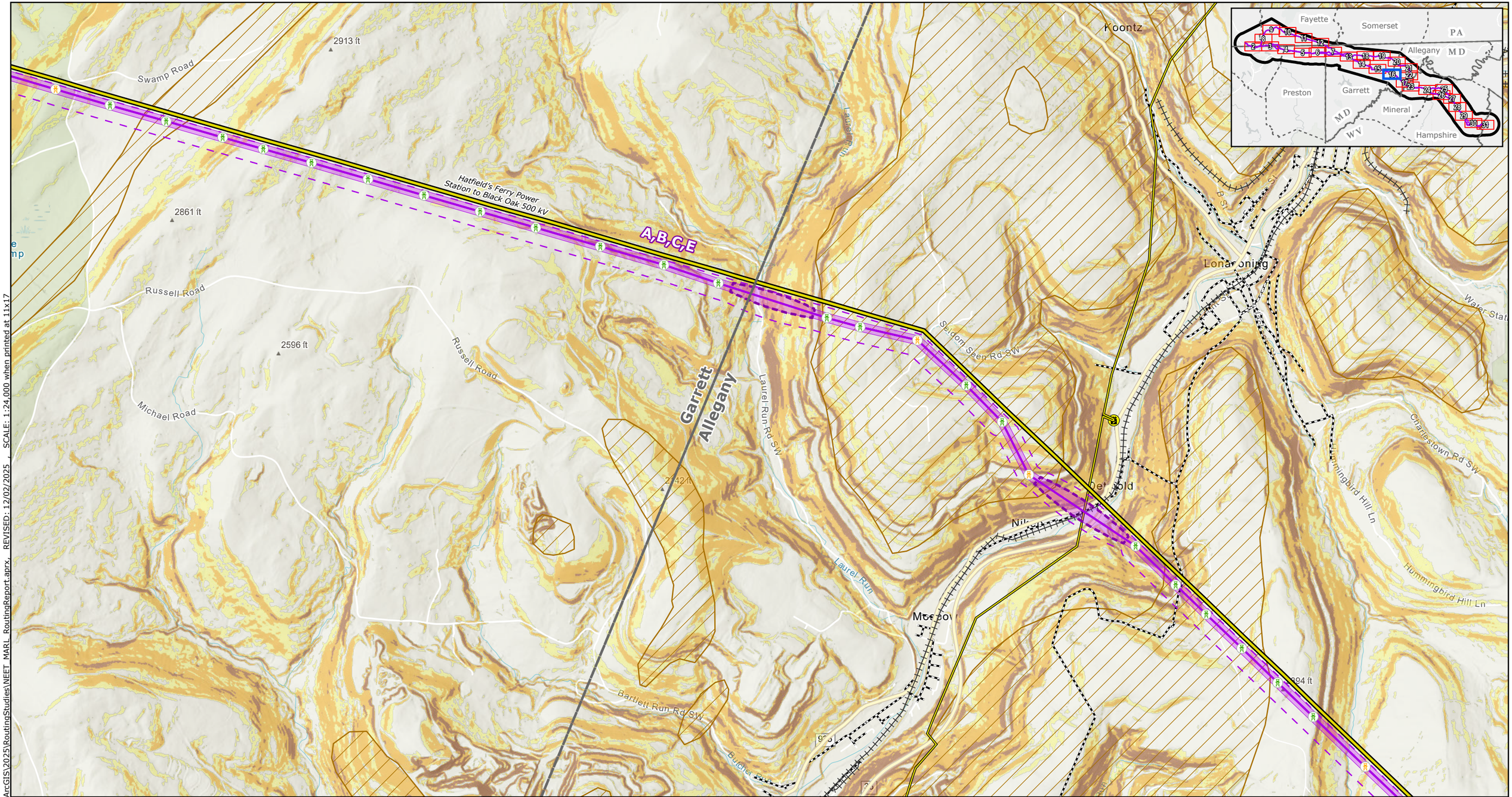

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N

0 0.25 0.5 0.75 1
Miles

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ERM

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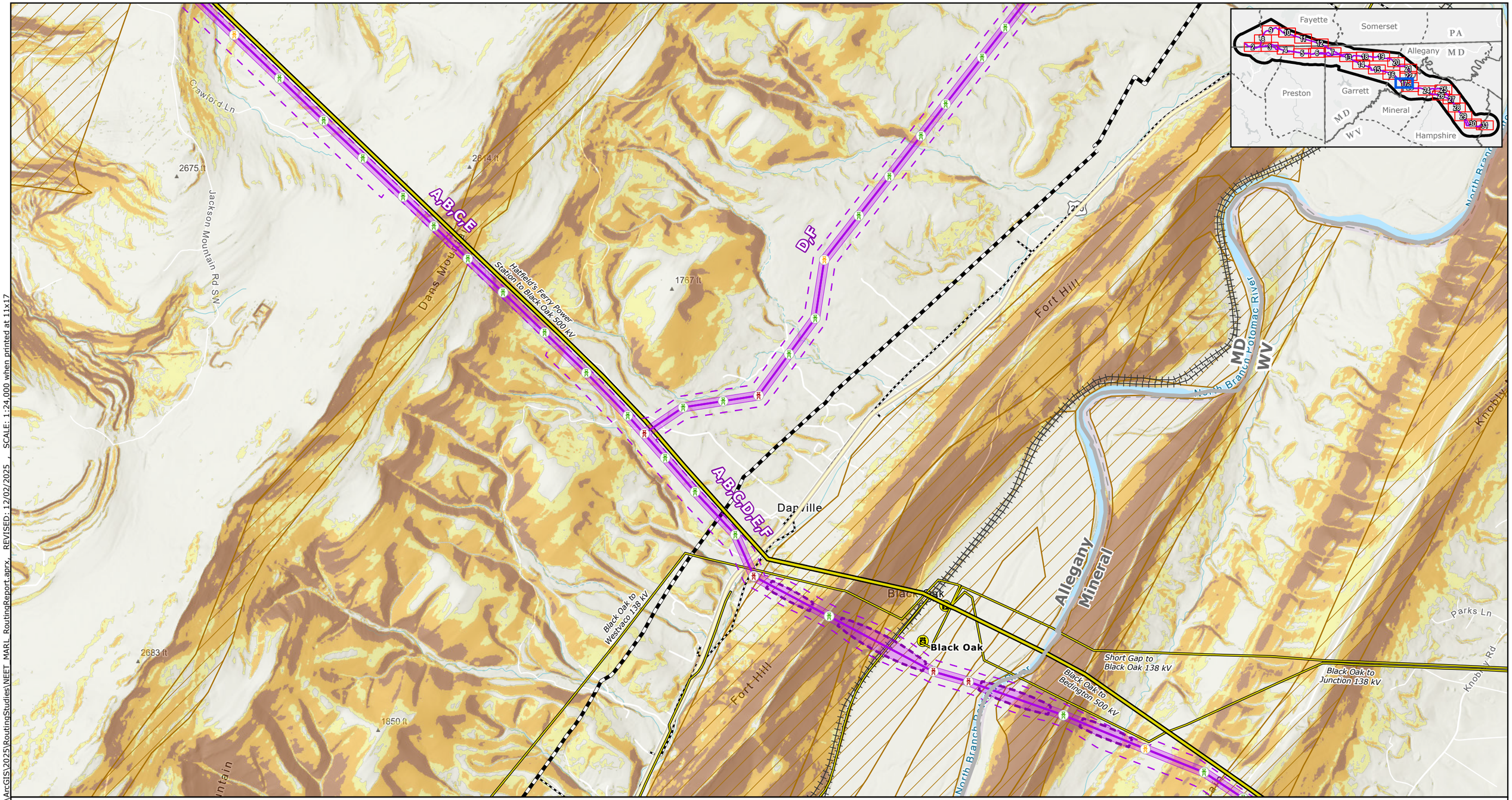

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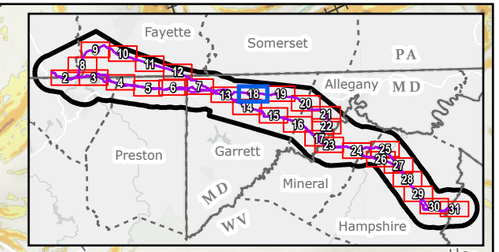

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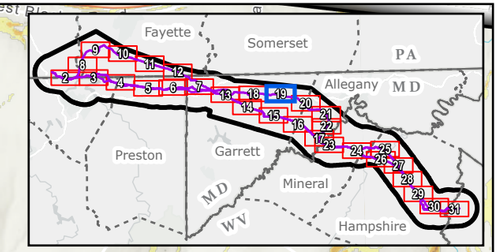

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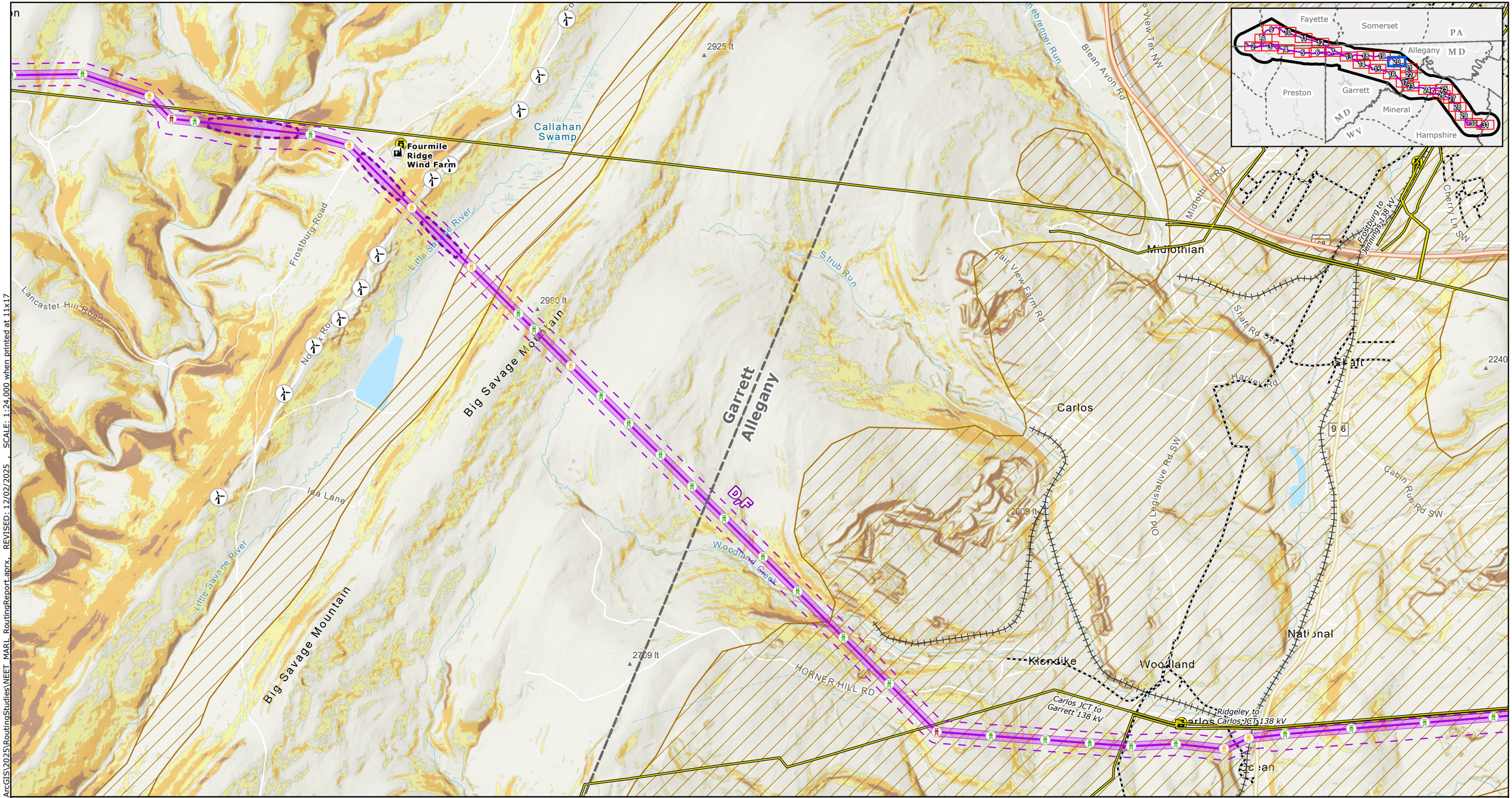

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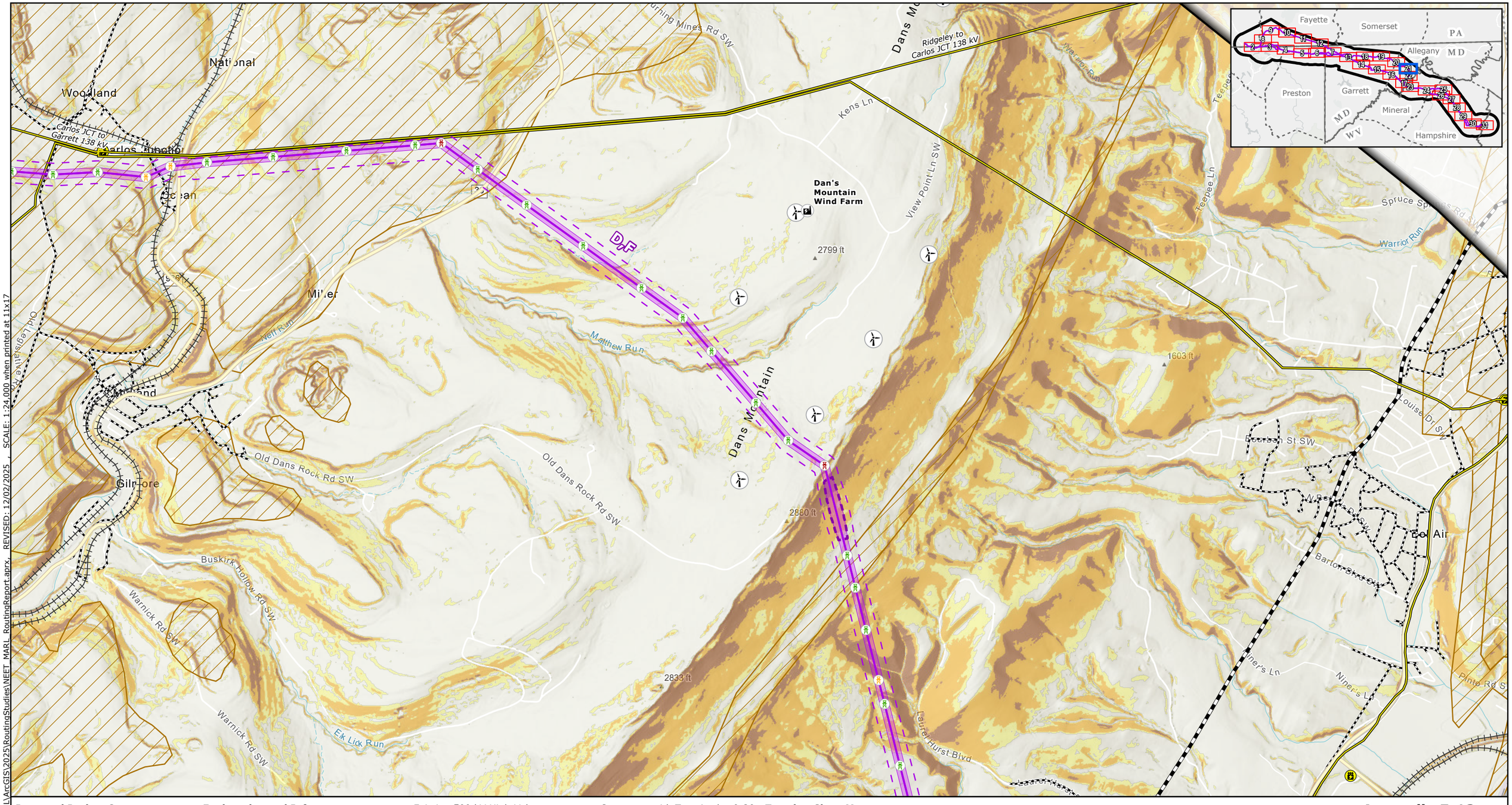

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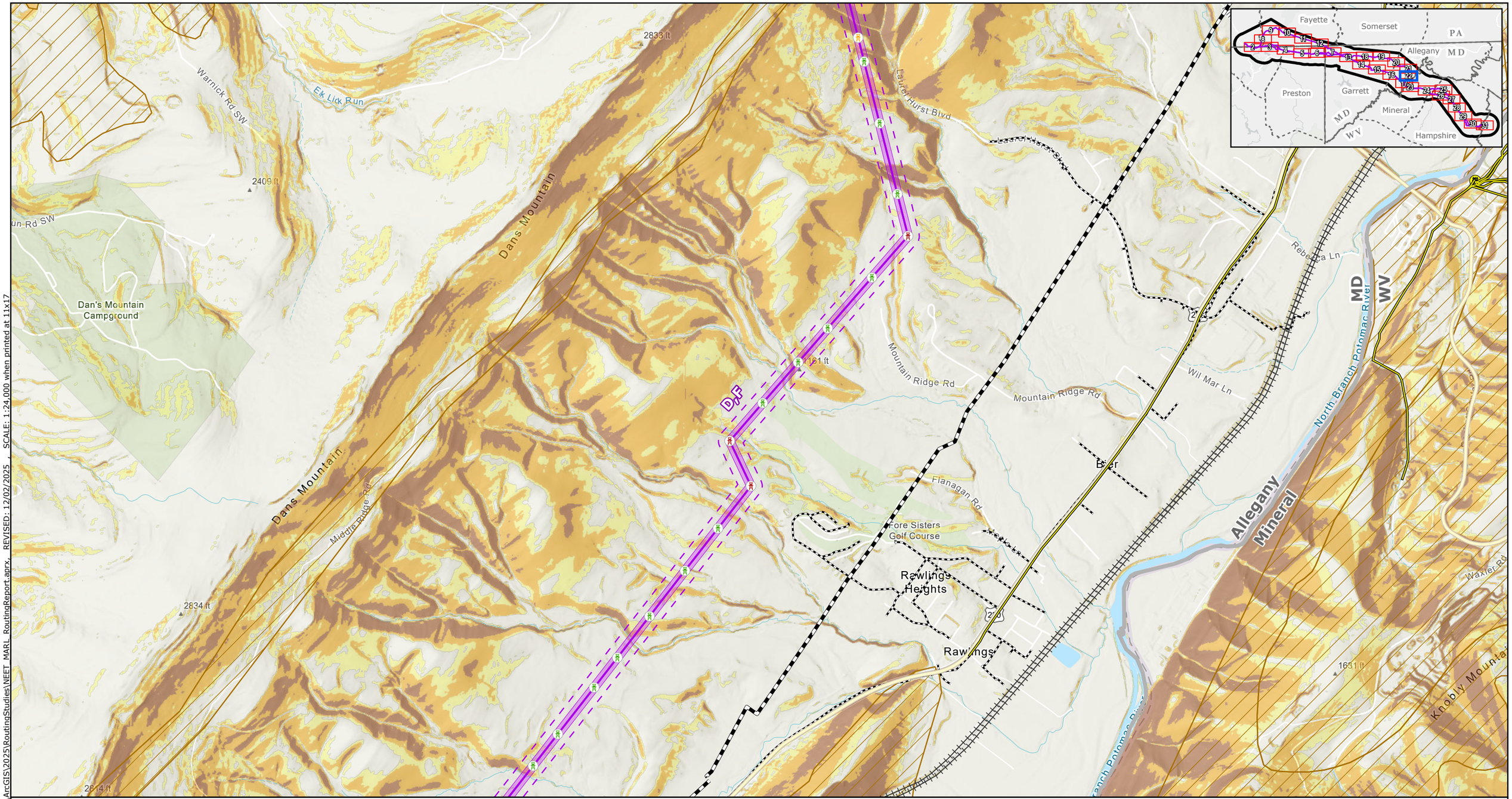

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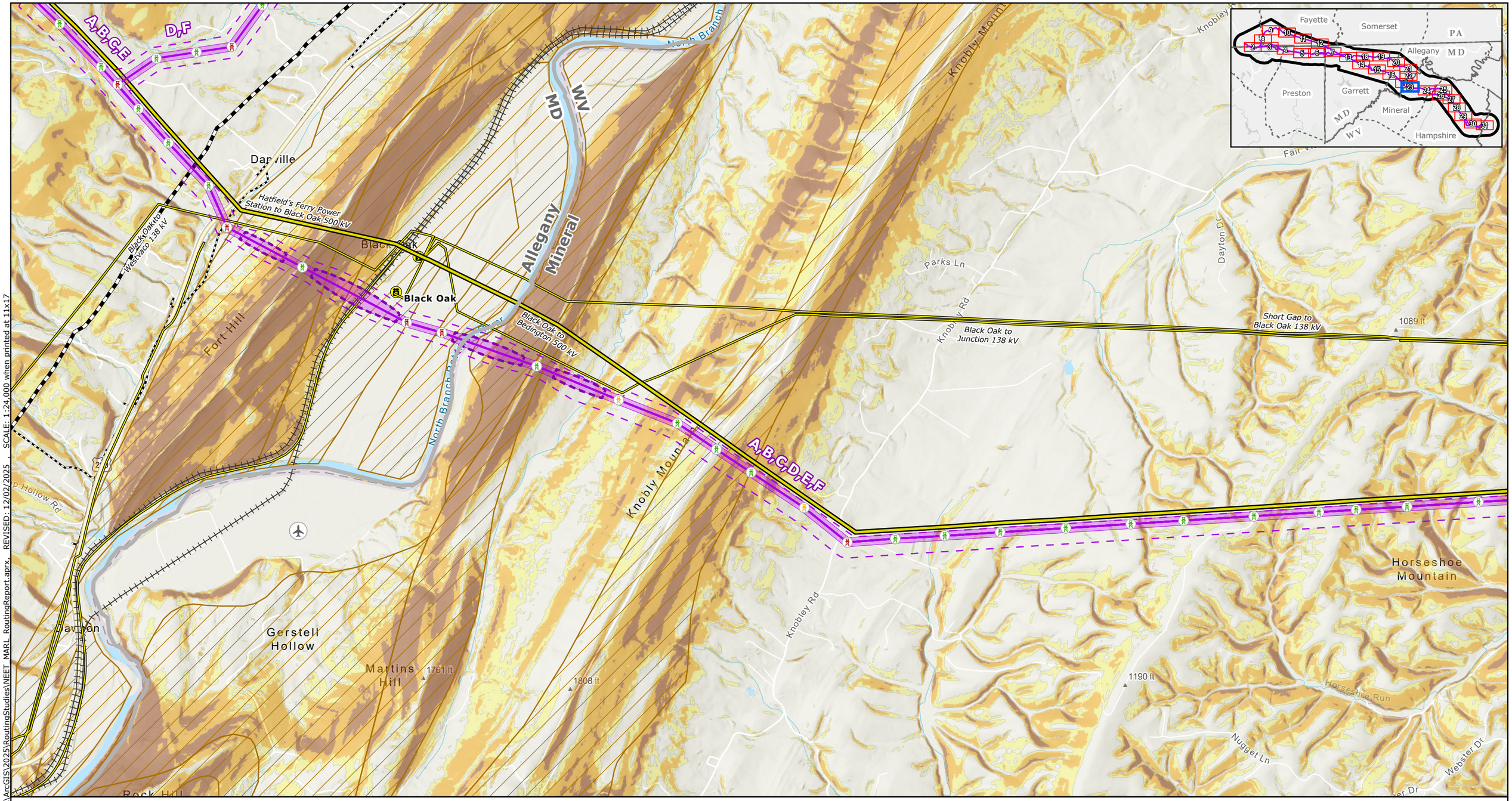

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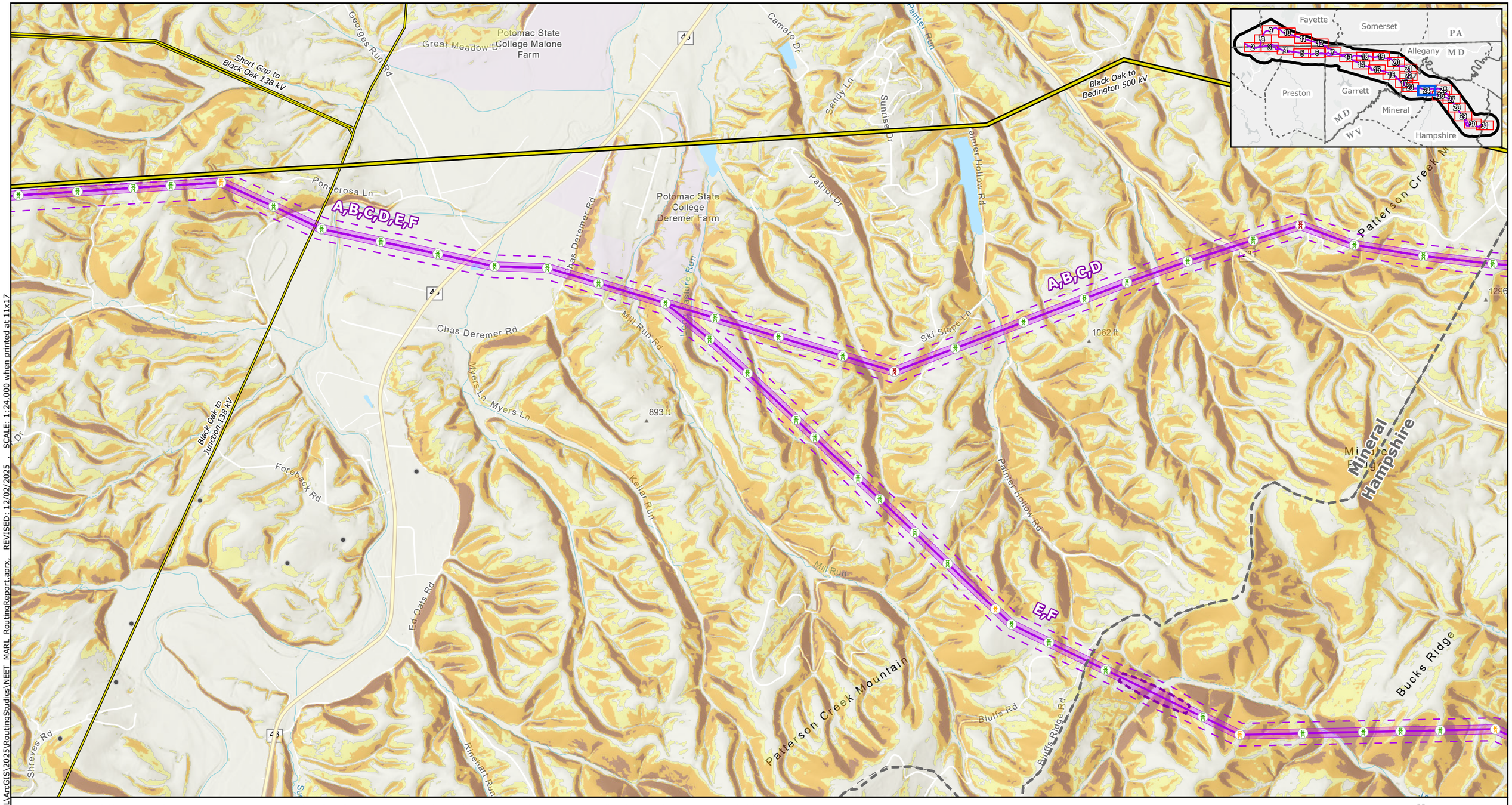

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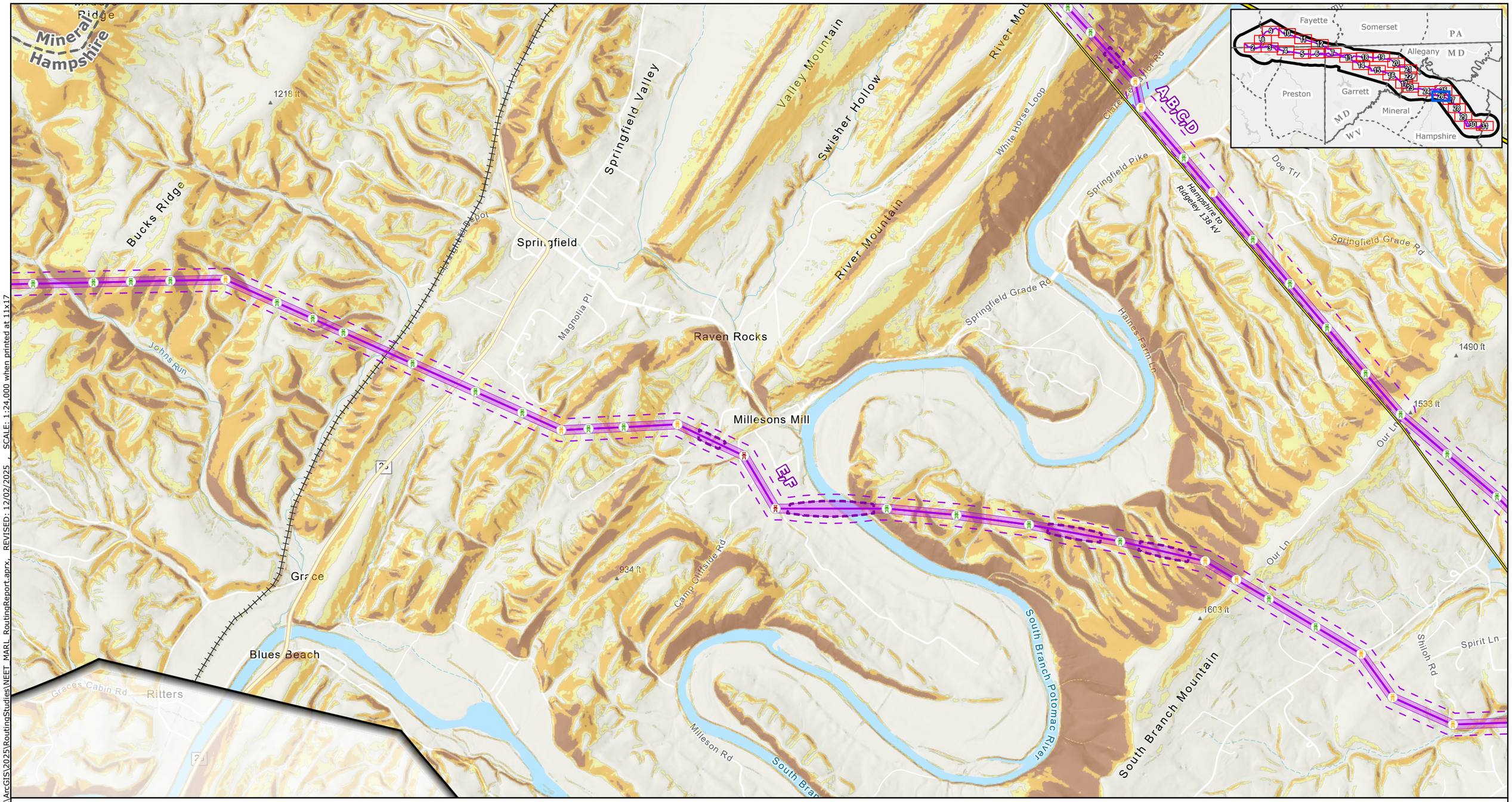

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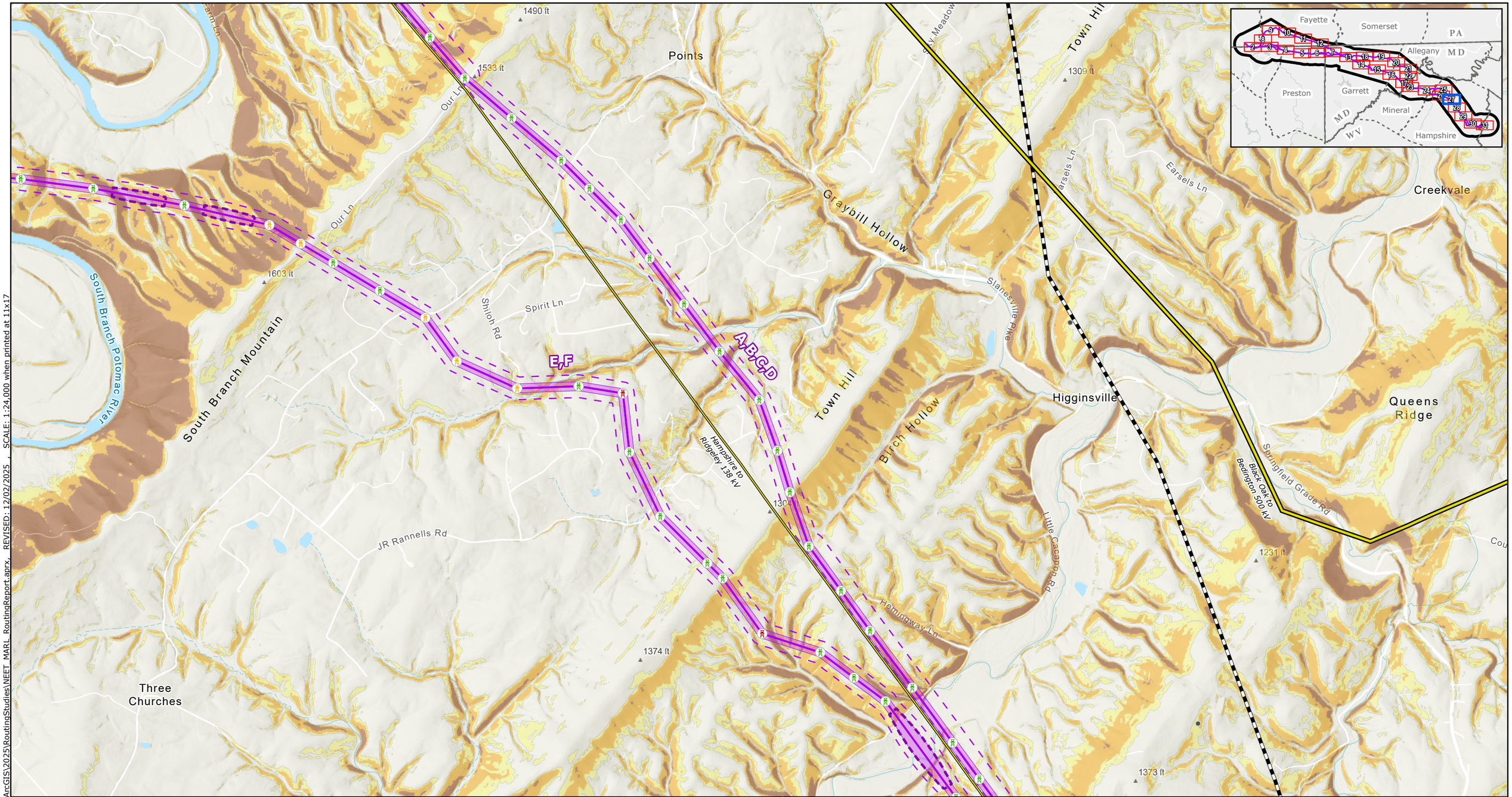

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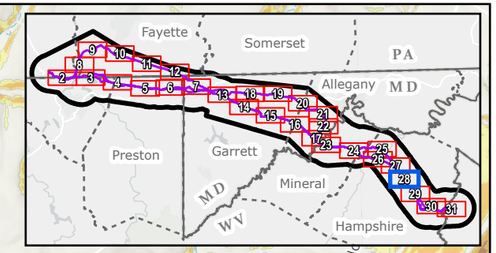

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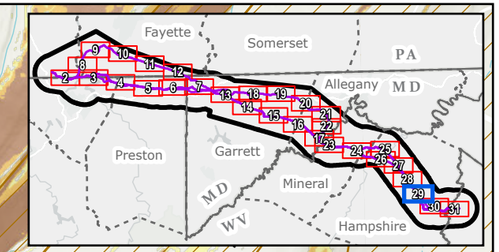

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- Power Plants
- Oil and Gas Wells
- Natural Gas Distribution
- Natural Gas Gathering Pipeline
- Natural Gas Transmission Pipeline

- Existing 500 kV High-Voltage Transmission Lines
- Existing High-Voltage Transmission Lines (<500 kV)
- Railway
- Primary Road
- Secondary Road
- Geologic Karst Features

- Structures with Turn Angles 0-20 degrees
- Structures with Turn Angles 20-30 degrees
- Structures with Turn Angles >30 degrees

Terrain - Slope Map
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

NOTES
1. Proposed tower locations are preliminary and subject to change
2. Data source: NEET, ERM, USGS, REXTAG

N

0 0.25 0.5 0.75 1
Miles
Scale: 1:24,000
1 inch equals 2,000 ft (when printed at 11x17)

Appendix E-13
Alternative Routes Engineering and Infrastructure
Page 30 of 31
MidAtlantic Resiliency Link

ERM

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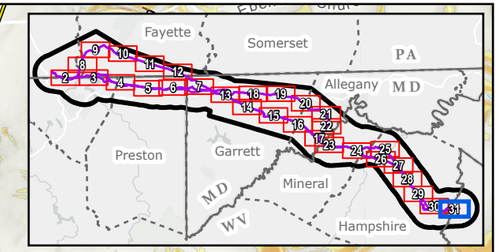
Coordinate System: NAD 1983 UTM Zone 17N



Proposed Project Components
- Project Endpoints
- ROW Corridors
- Alternative Routes
- Aerial Easement Blowout Areas
- Siting Corridors
- Project Study Area

Base Data
- County Boundary
- State Border

Engineering and Infrastructure
- Airports
- Wind Turbines
- Substation
- Power Plants
- Oil and Gas Wells
- Natural Gas Distribution
- Natural Gas Gathering Pipeline
- Natural Gas Transmission Pipeline
- Existing 500 kV High-Voltage Transmission Lines
- Existing High-Voltage Transmission Lines (<500 kV)
- Railway
- Primary Road
- Secondary Road
- Geologic Karst Features
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- Structures with Turn Angles 20-30 degrees
- Structures with Turn Angles >30 degrees

Terrain - Slope Map
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

NOTES
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2. *Data source: NEET, ERM, USGS, REXTAG*

N

0 0.25 0.5 0.75 1
Miles

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Appendix E-13
Alternative Routes
Engineering and Infrastructure
Page 31 of 31
MidAtlantic Resiliency Link

ERM

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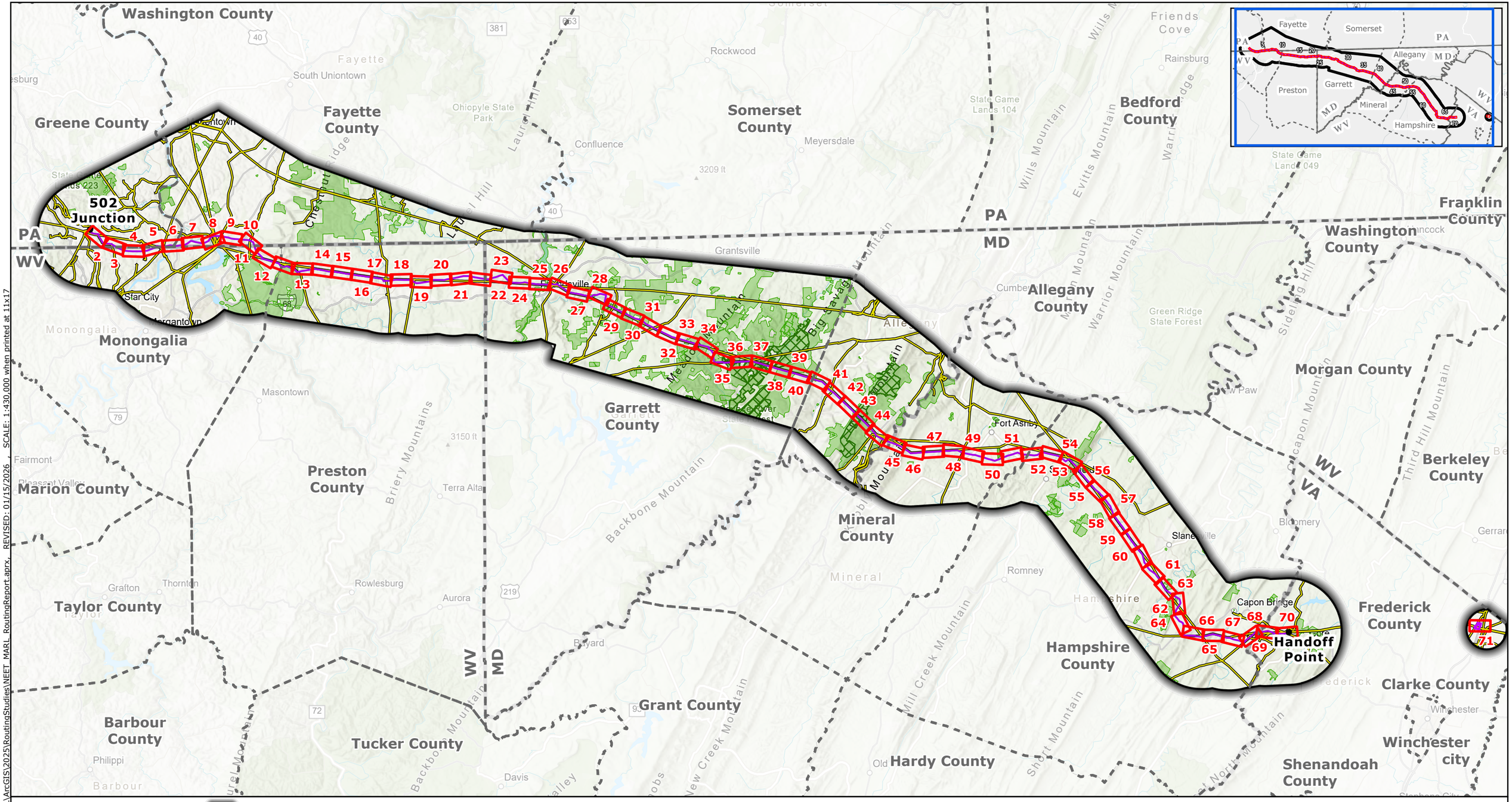
Coordinate System: NAD 1983 UTM Zone 17N

APPENDIX E-14 THE PROPOSED ROUTE MAPBOOK



Project Components
- Project Endpoints
- Proposed Route Centerline
- Proposed Substation Boundary
- Project Study Area

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border
- Map Index Page

Protected Areas
- Protected Lands*
- Maryland Wildlands

NOTES
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N

0 3.5 7 10.5 14
Miles

Scale: 1:430,000
1 inch equals 35,833 ft (when printed at 11x17)

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Proposed Route
Page 1 of 71
MidAtlantic Resiliency Link

ERM

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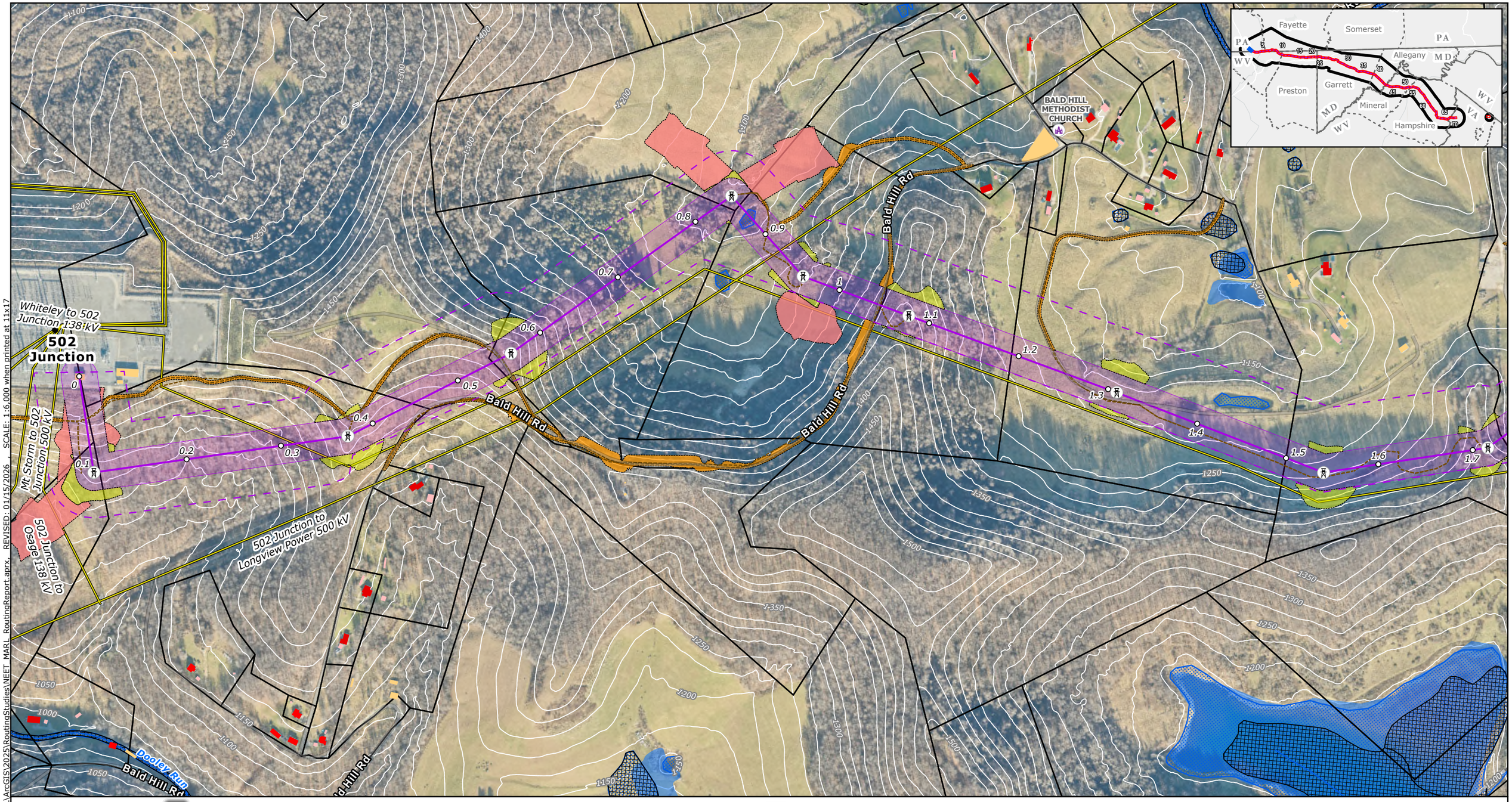

Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
- Siting Corridor
- Proposed Substation Boundary
- Project Study Area

Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

LiDAR Elevation Contours
- 25-foot contours

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- Protected Lands*
- Maryland Wildlands

Community Resources
- Hiking/Walking Trails
- Potomac Heritage Trail
- Scenic Byways
- Place of Worship
- Childcare Center
- School

Water Resources
- Stream/River - Intermittent(NHD)
- Stream/River - Perennial (NHD)
- Trout Streams and Coldwater Fisheries (all states)
- Riparian Habitat Exclusion Zone
- NWI Wetlands (All Types)
- Modeled High Probability Wetlands
- NHD Waterbody

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Parcels

Buildings Footprints
- Residential Dwelling
- Residential Outbuilding (Shed,Garage,Other)
- Non-residential buildings

NOTES
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N

0 0.05 0.1 0.15 0.2
Miles

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

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Proposed Route
Page 2 of 71
MidAtlantic Resiliency Link

ERM

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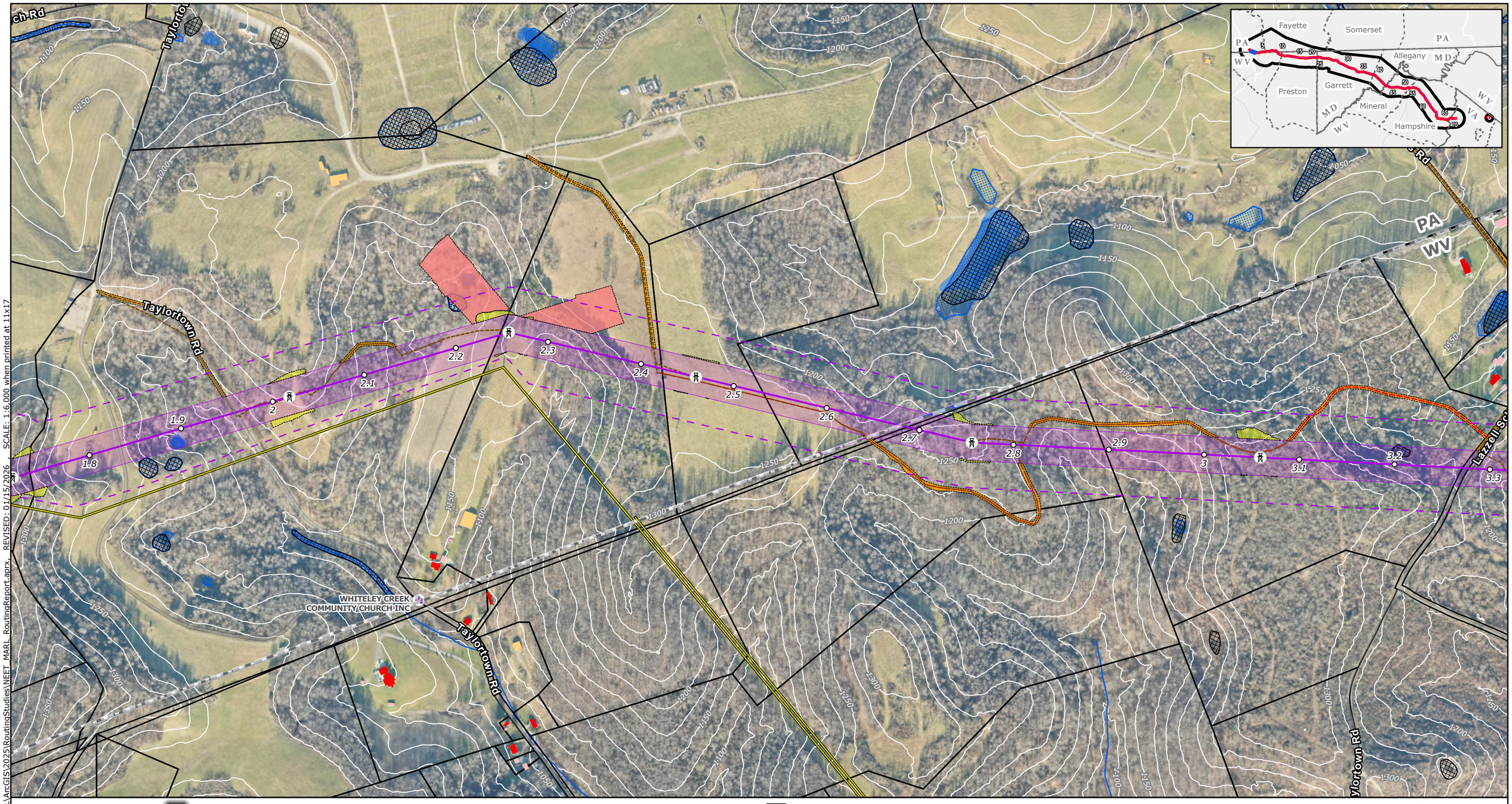

Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
- Siting Corridor
- Proposed Substation Boundary

- Project Study Area

Ancillary Facilities
- Permanent Access Road
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LiDAR Elevation Contours
- 25-foot contours

Base Data
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Protected Areas
- Protected Lands*
- Maryland Wildlands

Community Resources
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FEMA Flood Hazard
- Regulatory Floodway
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- 0.2% Annual Chance Flood Hazard

- Parcels

Buildings Footprints
- Residential Dwelling
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- Non-residential buildings

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N

0 0.05 0.1 0.15 0.2
Miles

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Appendix E-14
Proposed Route
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MidAtlantic Resiliency Link

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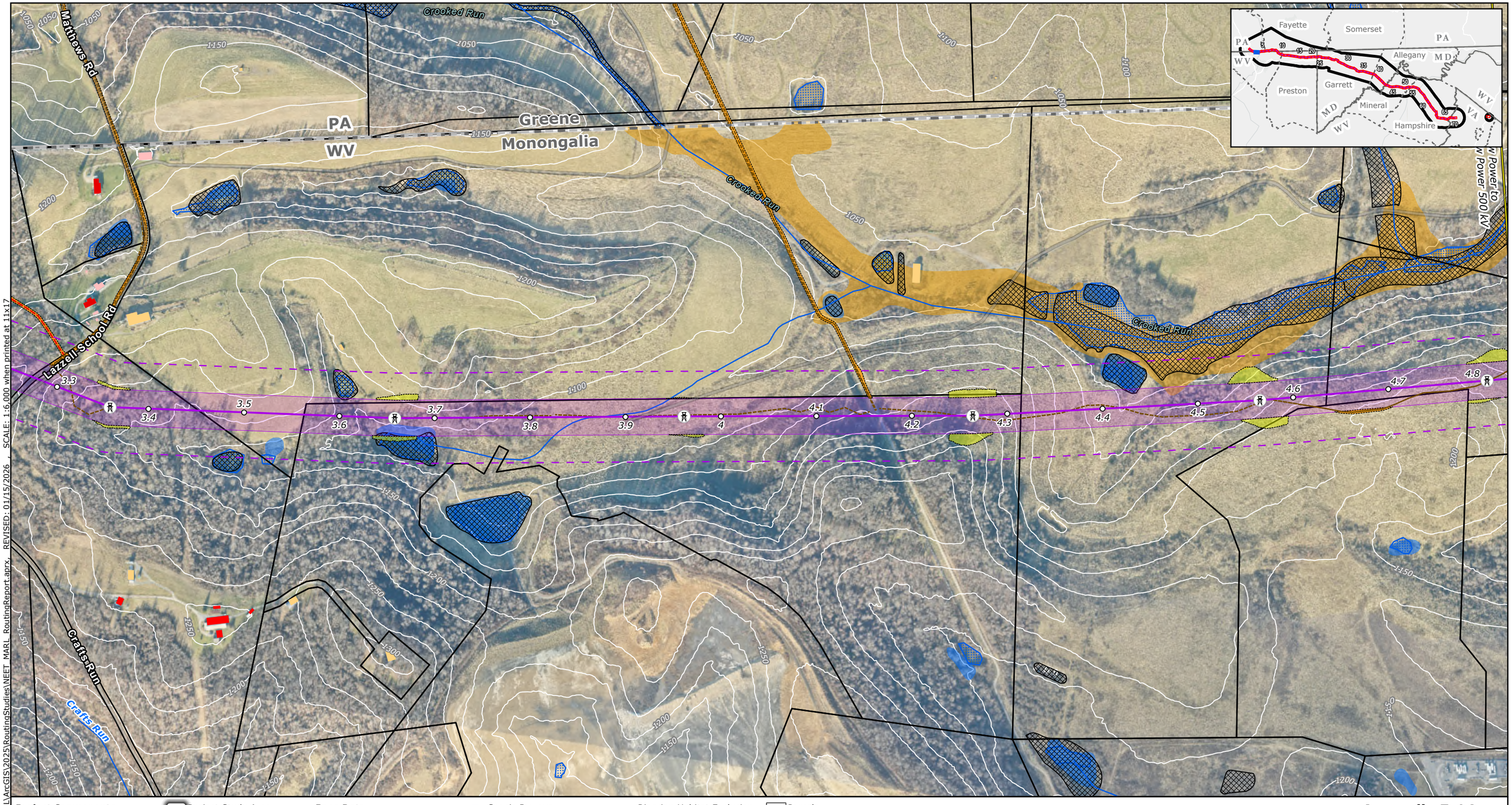

Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
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Ancillary Facilities
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- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

LiDAR Elevation Contours
- 25-foot contours

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- Protected Lands*
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N

0 0.05 0.1 0.15 0.2
Miles

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Proposed Route
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MidAtlantic Resiliency Link

ERM

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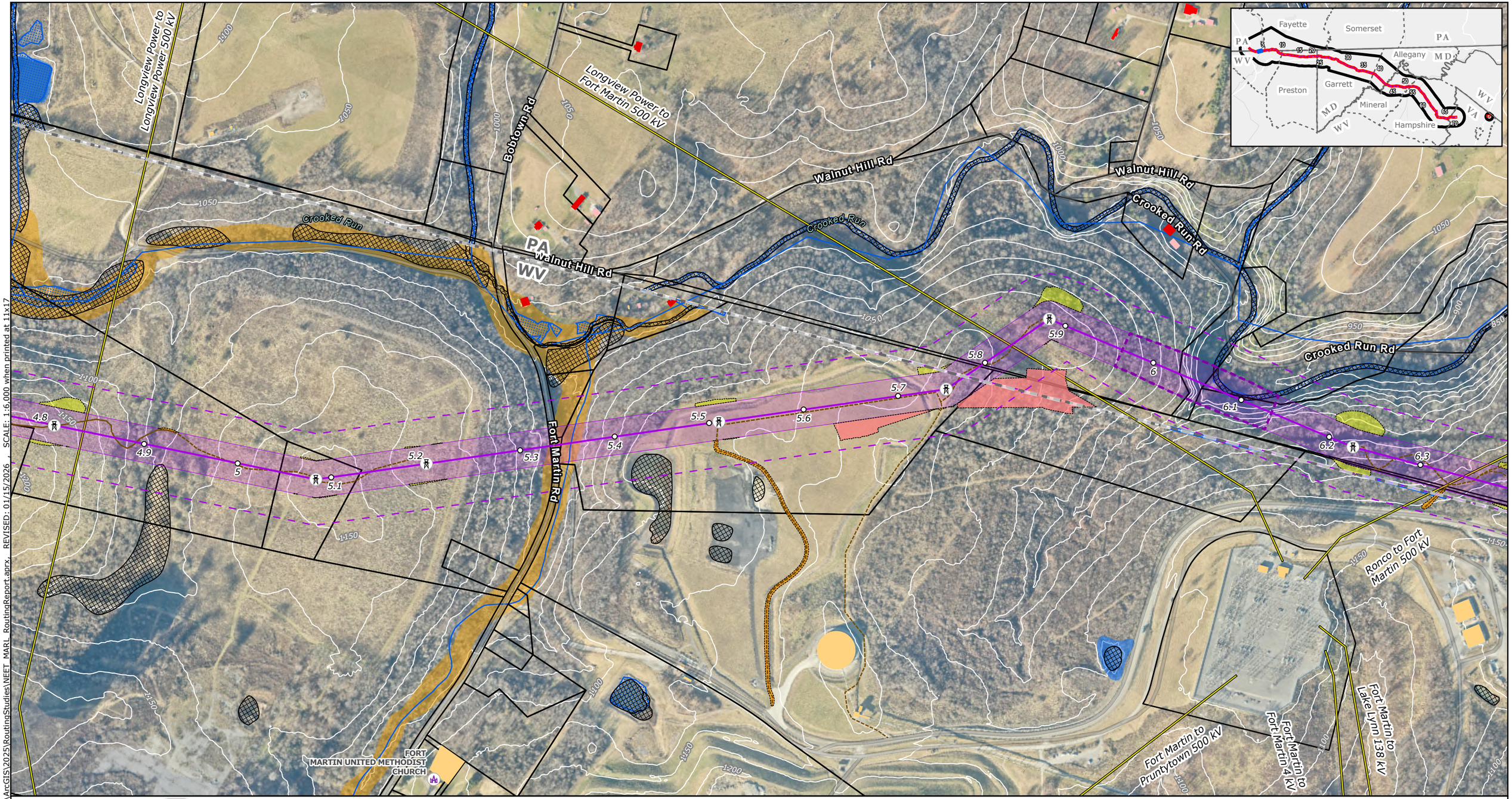

Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
- Siting Corridor
- Proposed Substation Boundary

- Project Study Area

Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

LiDAR Elevation Contours
- 25-foot contours

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- Protected Lands*
- Maryland Wildlands

Community Resources
- Hiking/Walking Trails
- Potomac Heritage Trail
- Scenic Byways
- Place of Worship
- Childcare Center
- School

Water Resources
- Stream/River - Intermittent(NHD)
- Stream/River - Perennial (NHD)
- Trout Streams and Coldwater Fisheries (all states)
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N

0 0.05 0.1 0.15 0.2
Miles

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Proposed Route
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MidAtlantic Resiliency Link

ERM

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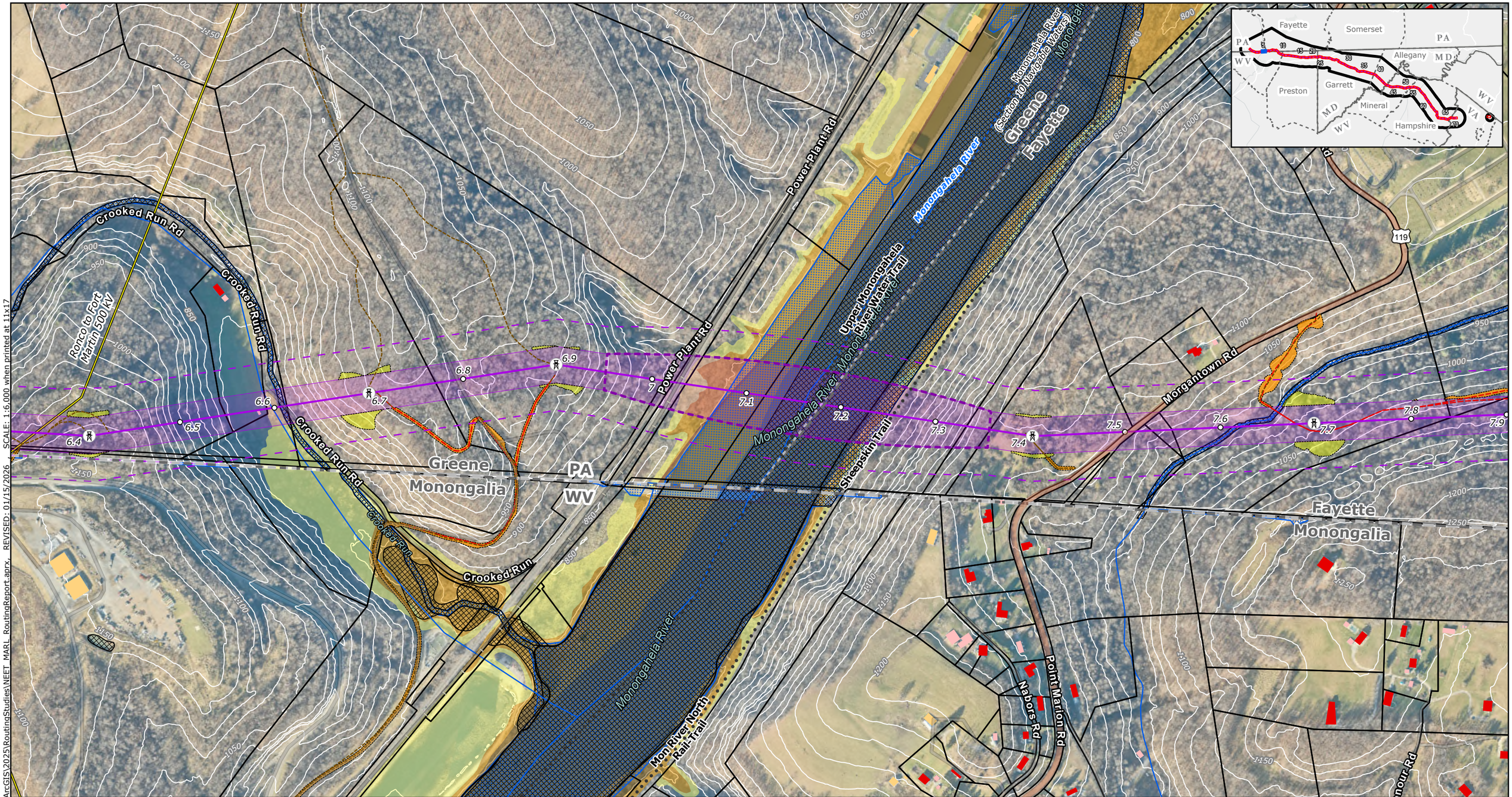

Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
- Siting Corridor
- Proposed Substation Boundary
- Project Study Area

Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

LiDAR Elevation Contours
- 25-foot contours

Base Data
- Existing High-Voltage Transmission Lines
- County Boundary
- State Border

Protected Areas
- Protected Lands*
- Maryland Wildlands

Community Resources
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- Potomac Heritage Trail
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- Childcare Center
- School

Water Resources
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- Trout Streams and Coldwater Fisheries (all states)
- Riparian Habitat Exclusion Zone
- NWI Wetlands (All Types)
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FEMA Flood Hazard
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N

0 0.05 0.1 0.15 0.2
Miles

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Appendix E-14
Proposed Route
Page 6 of 71
MidAtlantic Resiliency Link

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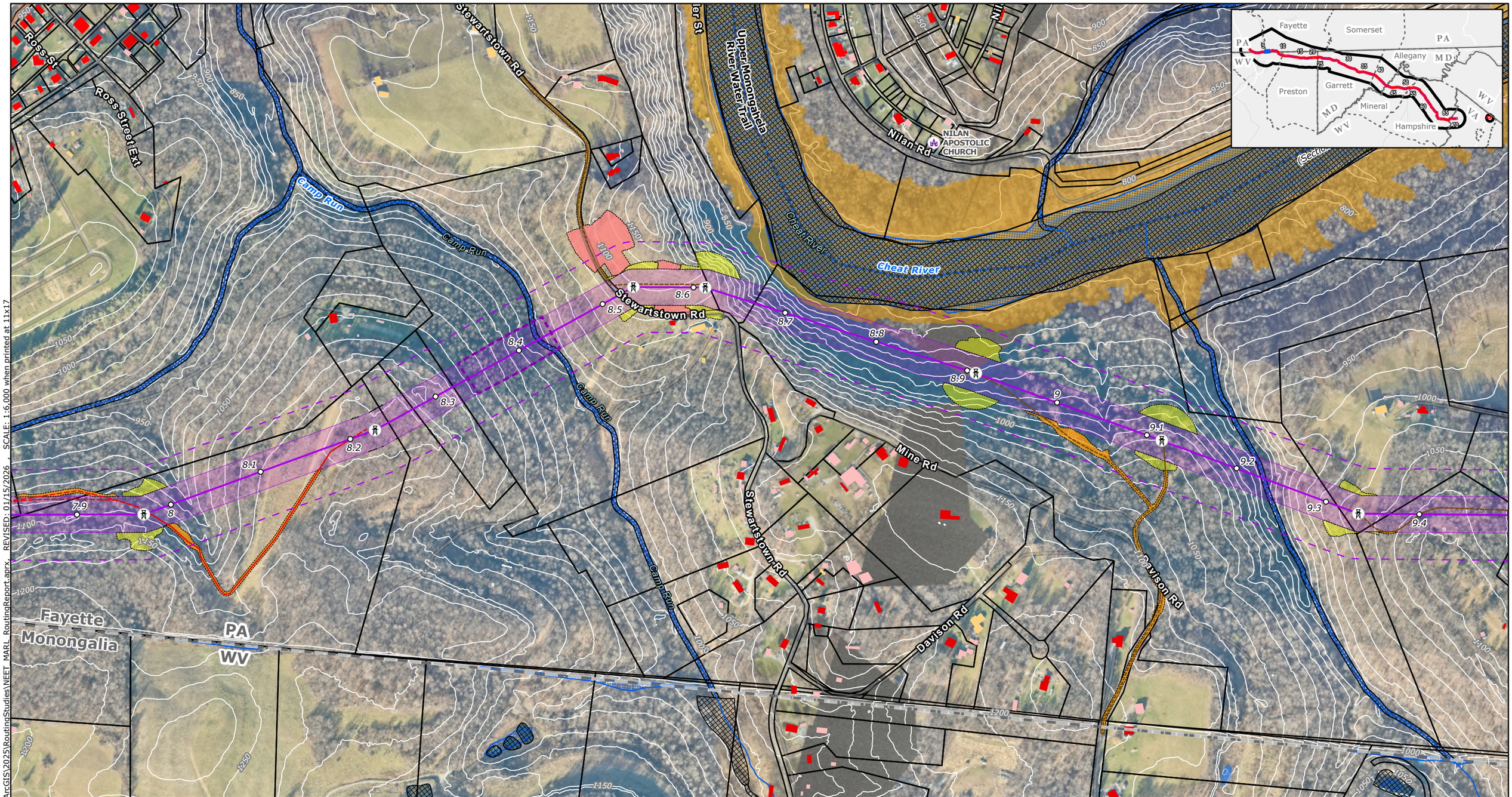

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Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
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- Siting Corridor
- Proposed Substation Boundary
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N

0 0.05 0.1 0.15 0.2

Miles

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Proposed Route
Page 7 of 71
MidAtlantic Resiliency Link

ERM

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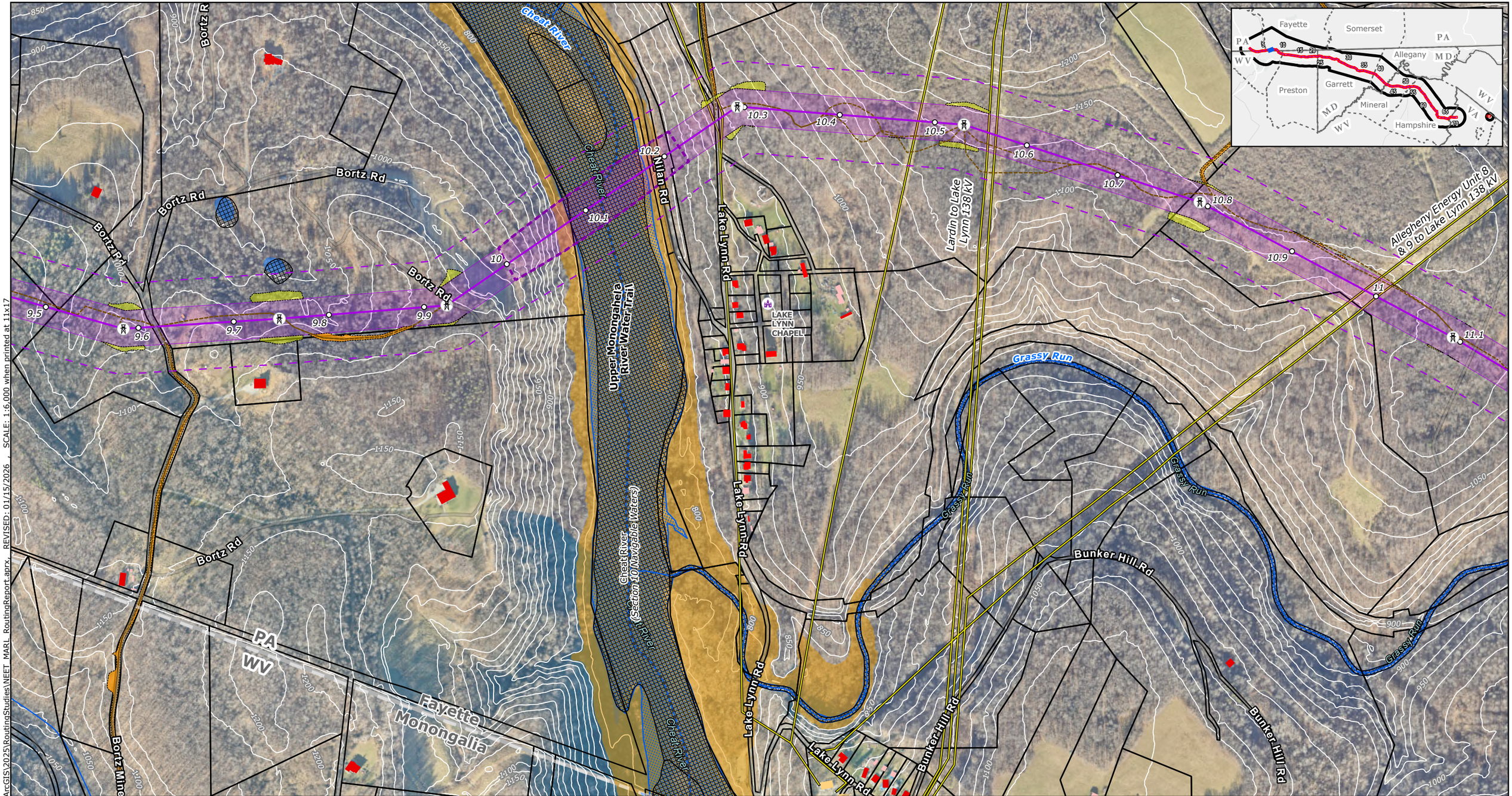

Project Components
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- Proposed Route ROW Corridor
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- Siting Corridor
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Ancillary Facilities
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- Temporary Access Road
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- Wire Work Area LoD
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N

0 0.05 0.1 0.15 0.2
Miles

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Proposed Route
Page 8 of 71
MidAtlantic Resiliency Link

ERM

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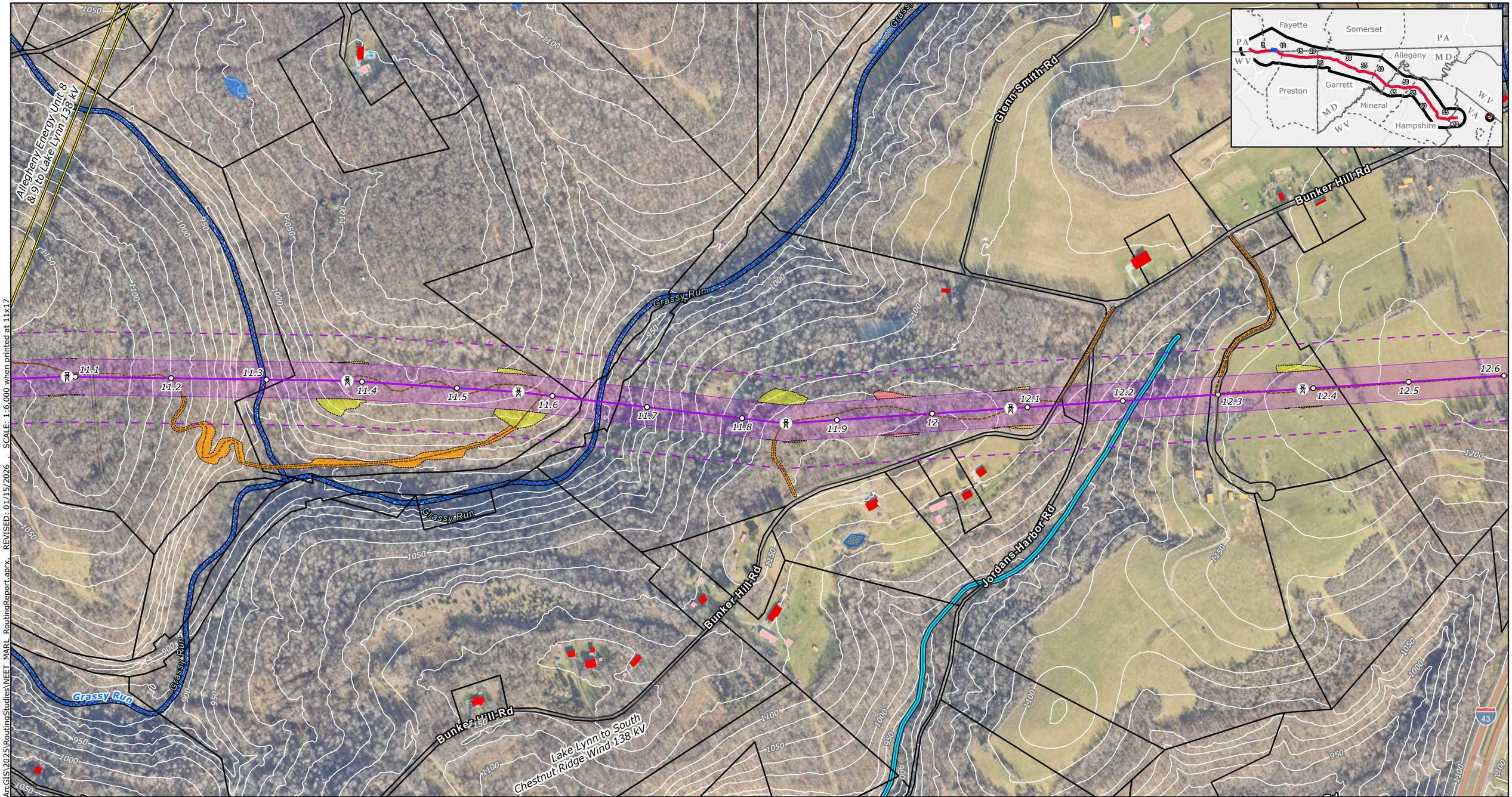

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Project Components
- Project Endpoints
- Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Areas
- Siting Corridor
- Proposed Substation Boundary
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N

0 0.05 0.1 0.15 0.2
Miles

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Appendix E-14
Proposed Route
Page 9 of 71
MidAtlantic Resiliency Link

ERM

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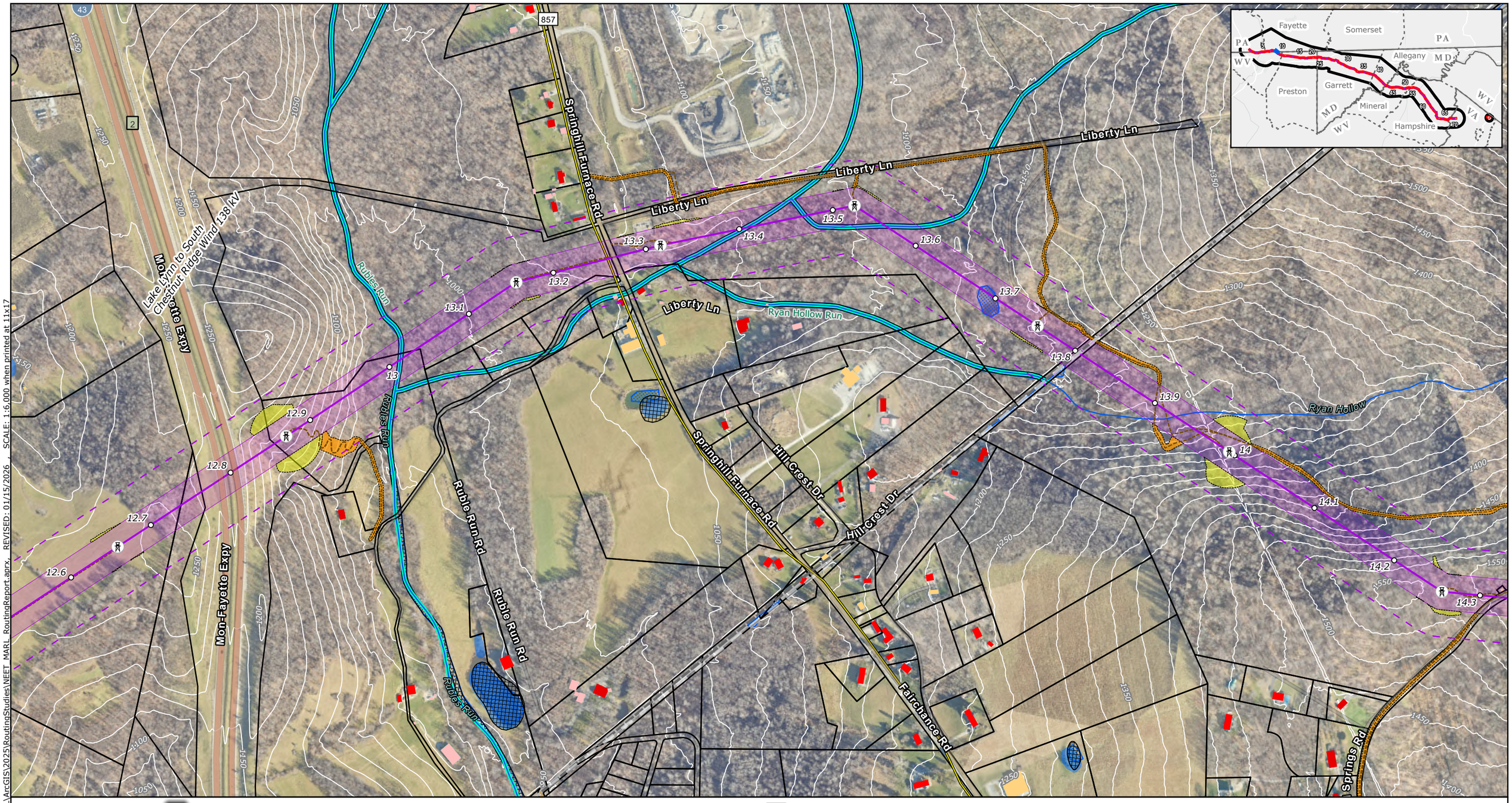

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N

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Miles

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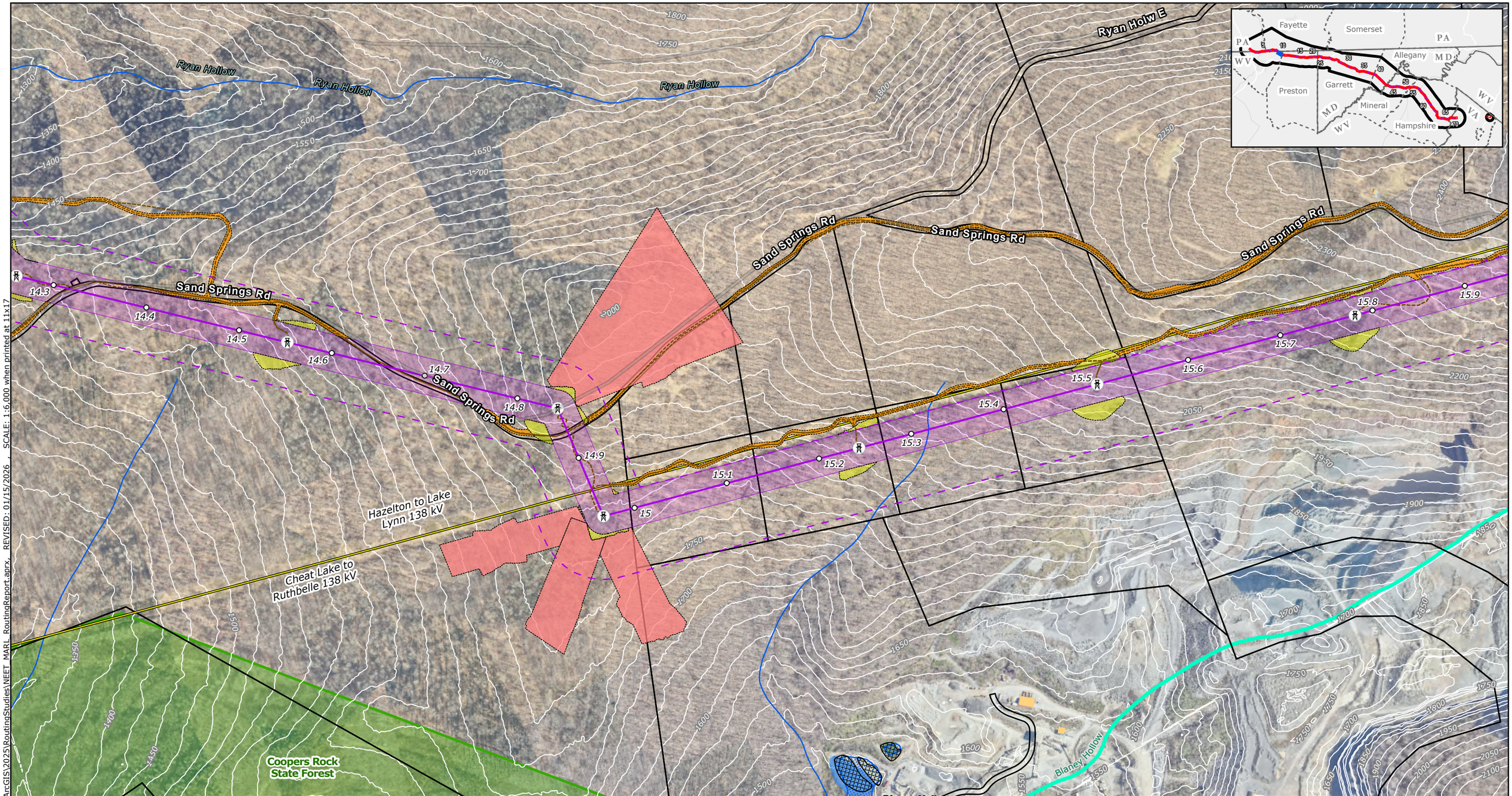
Appendix E-14
Proposed Route

MidAtlantic Resiliency Link

ERM



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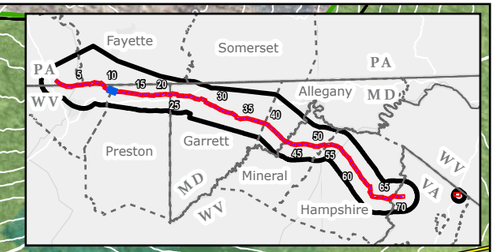

Hazelton to Lake Lynn 138 kV

Sand Springs Rd

Cheat Lake to Ruthbelle 138 kV

Coopers Rock State Forest

Blaney Hollow

Little Laurel Creek

16 16.1 16.2 16.3 16.4 16.5 16.6 16.7 16.8 16.9 17 17.1 17.2 17.3 17.4 17.5

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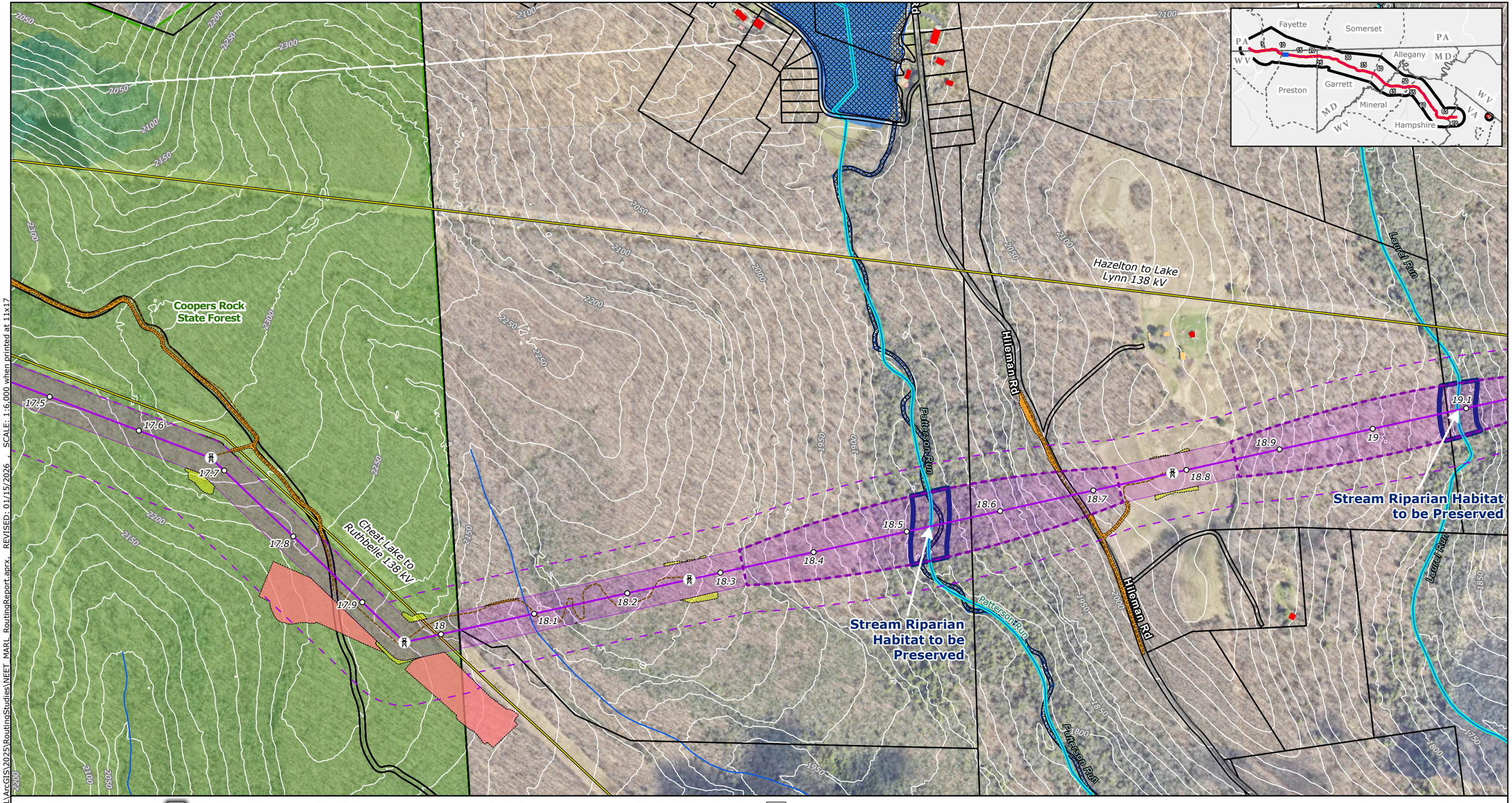

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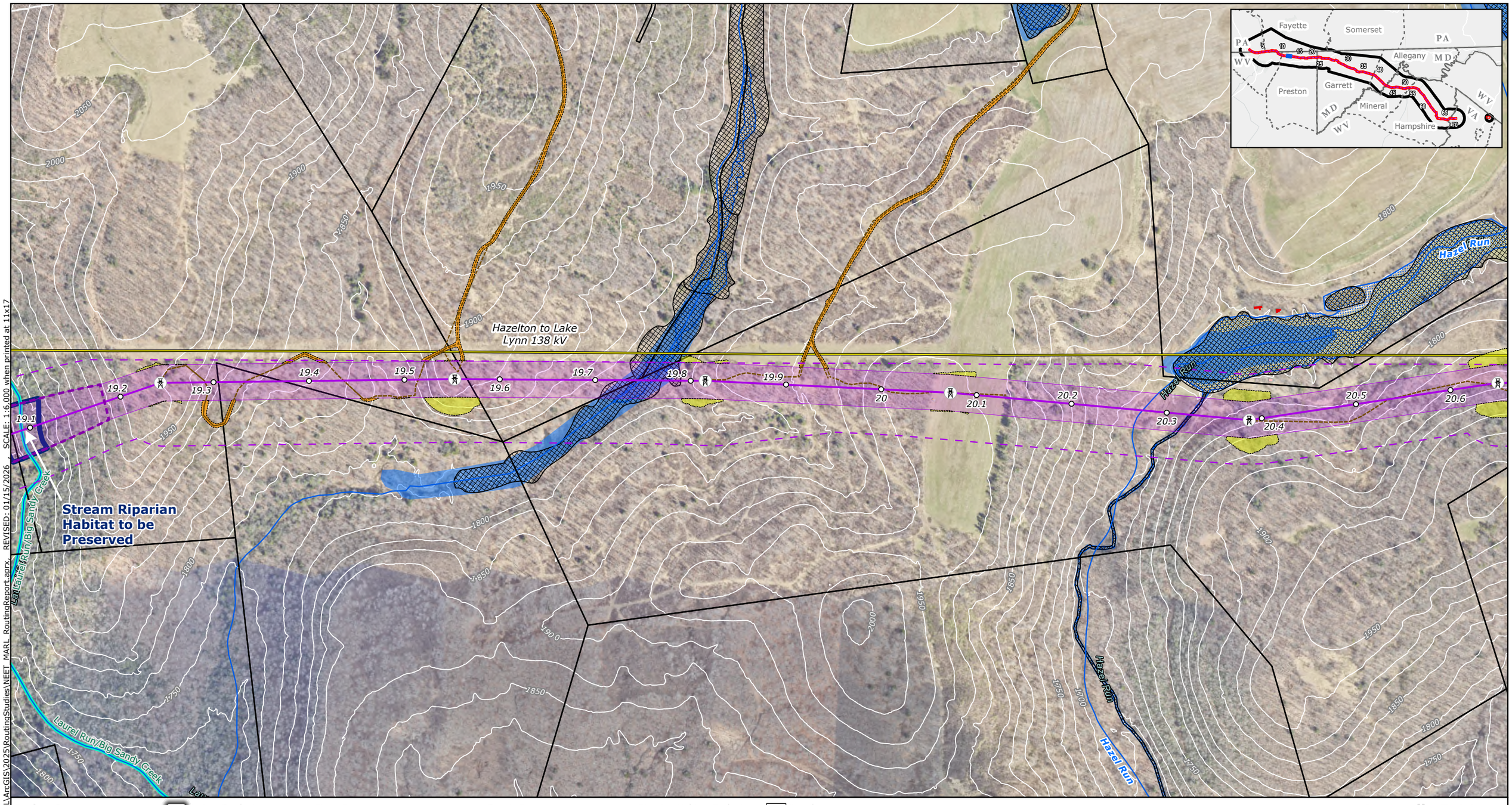

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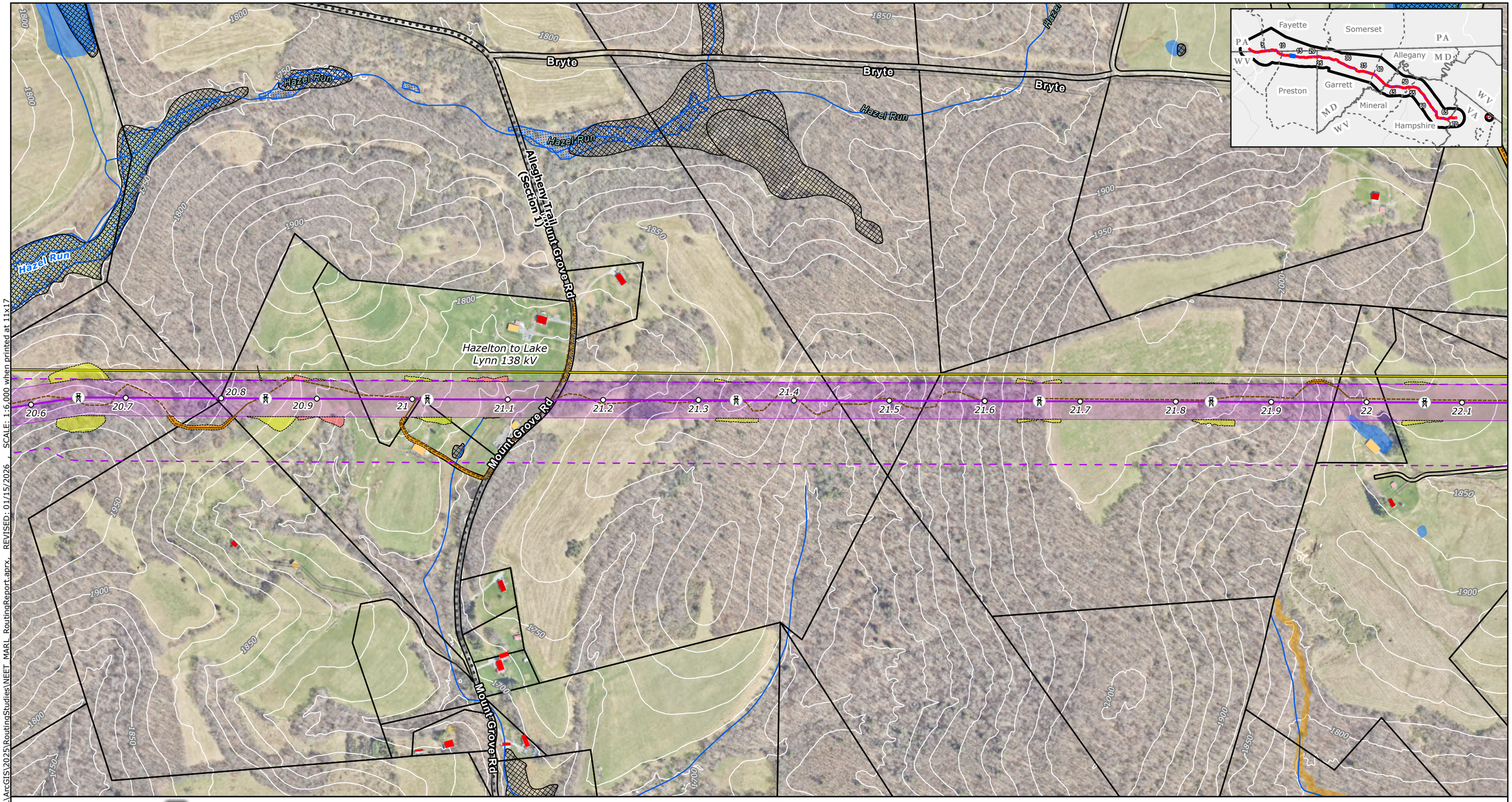

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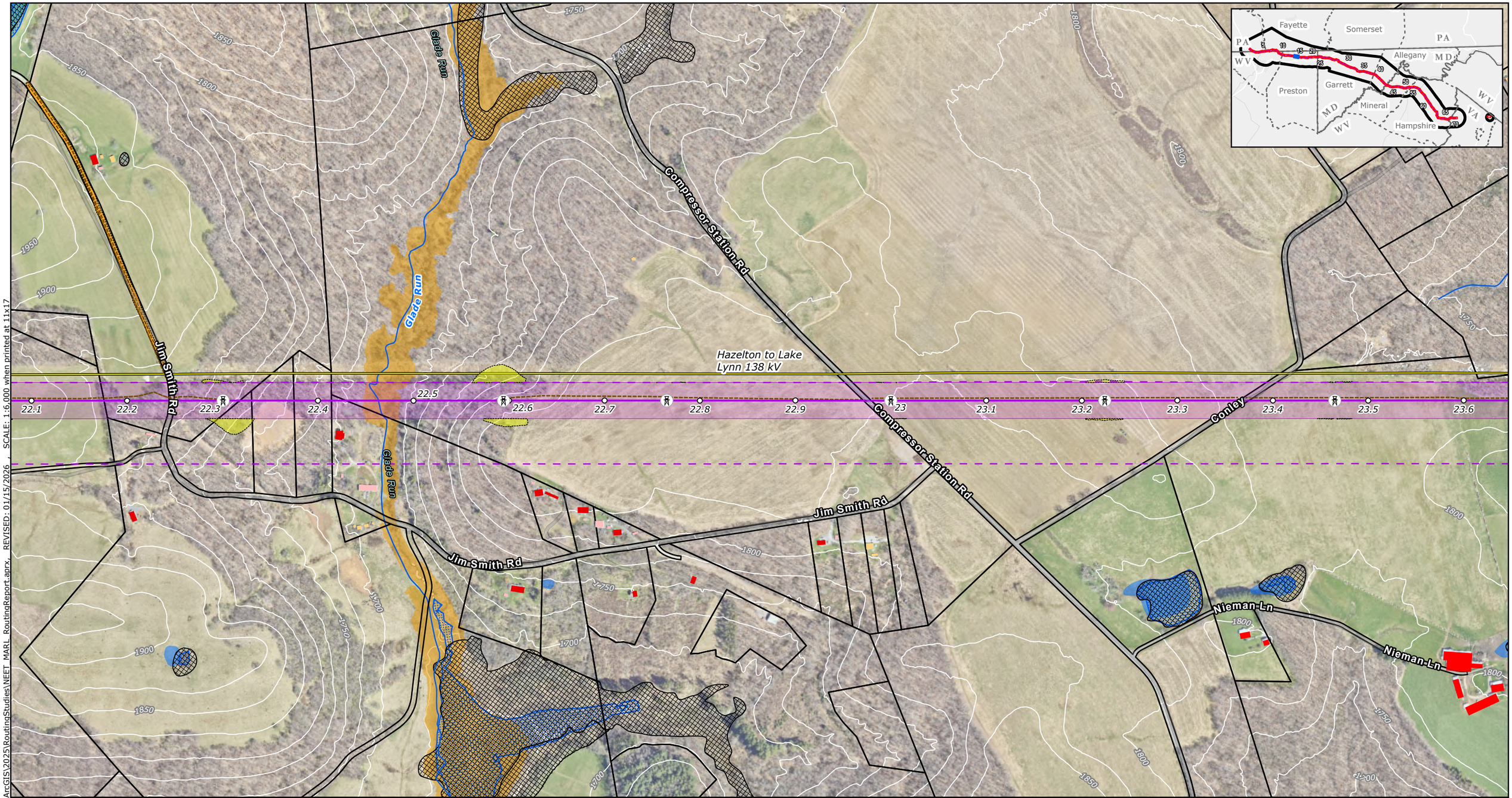

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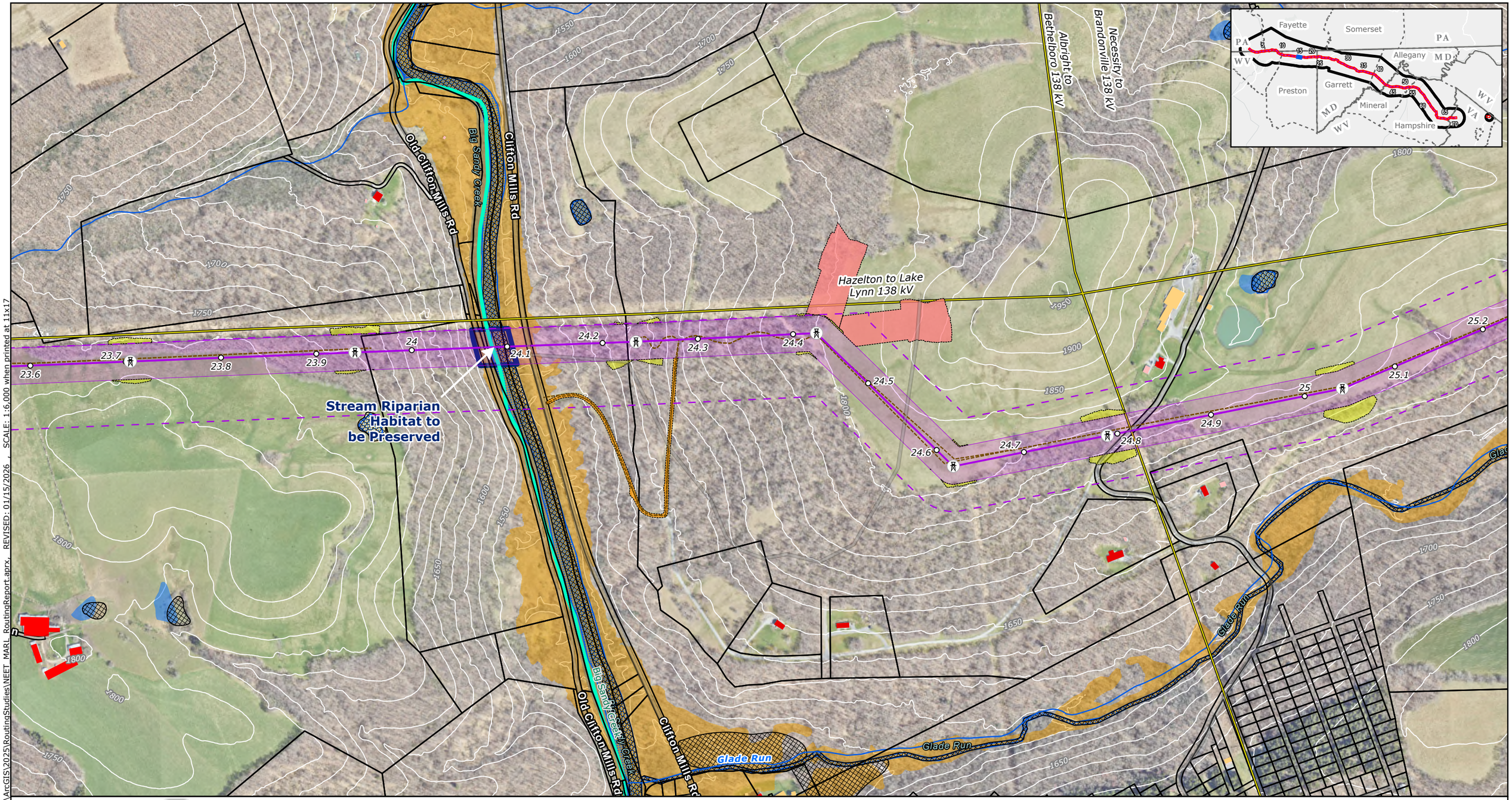

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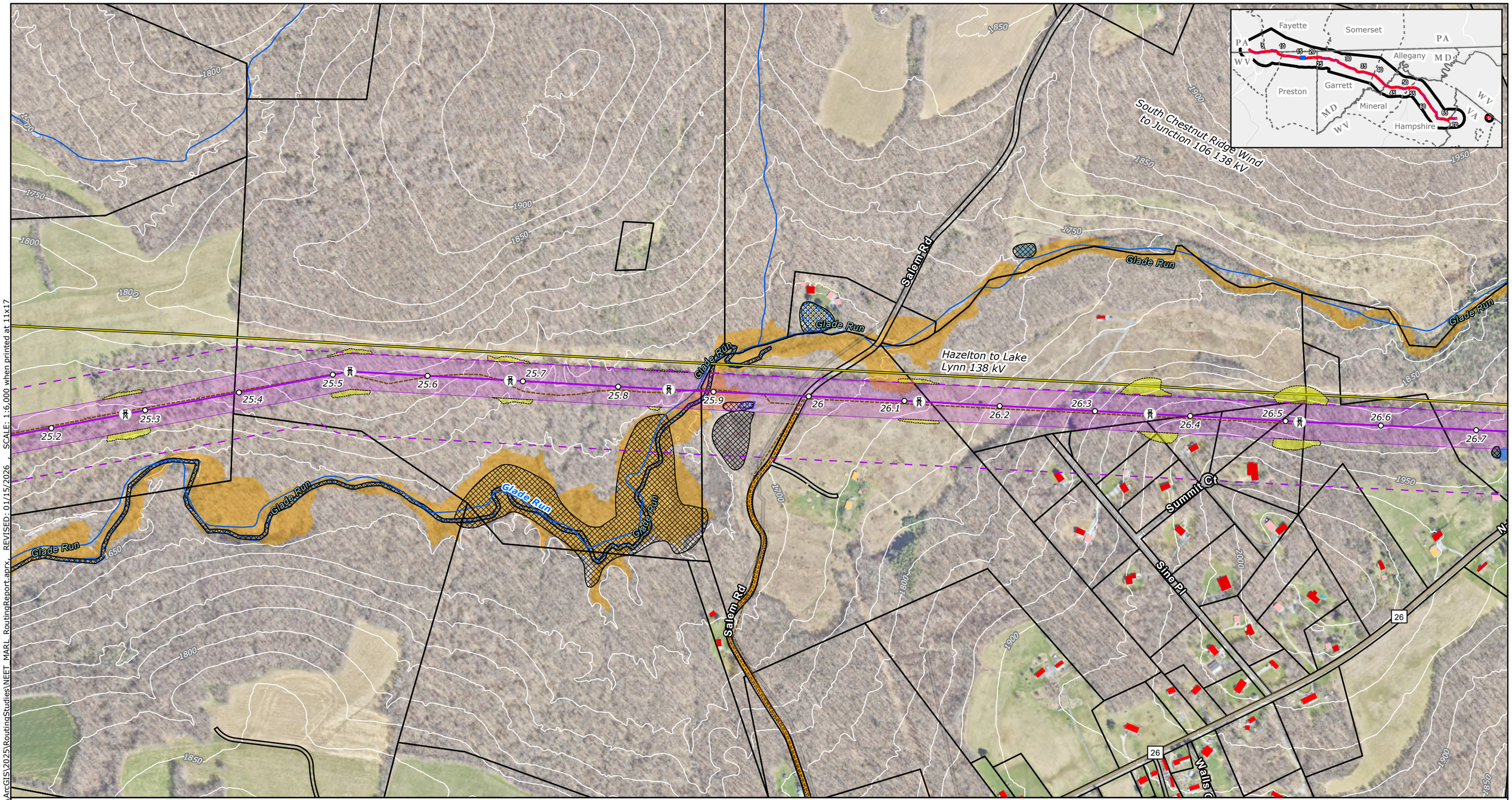

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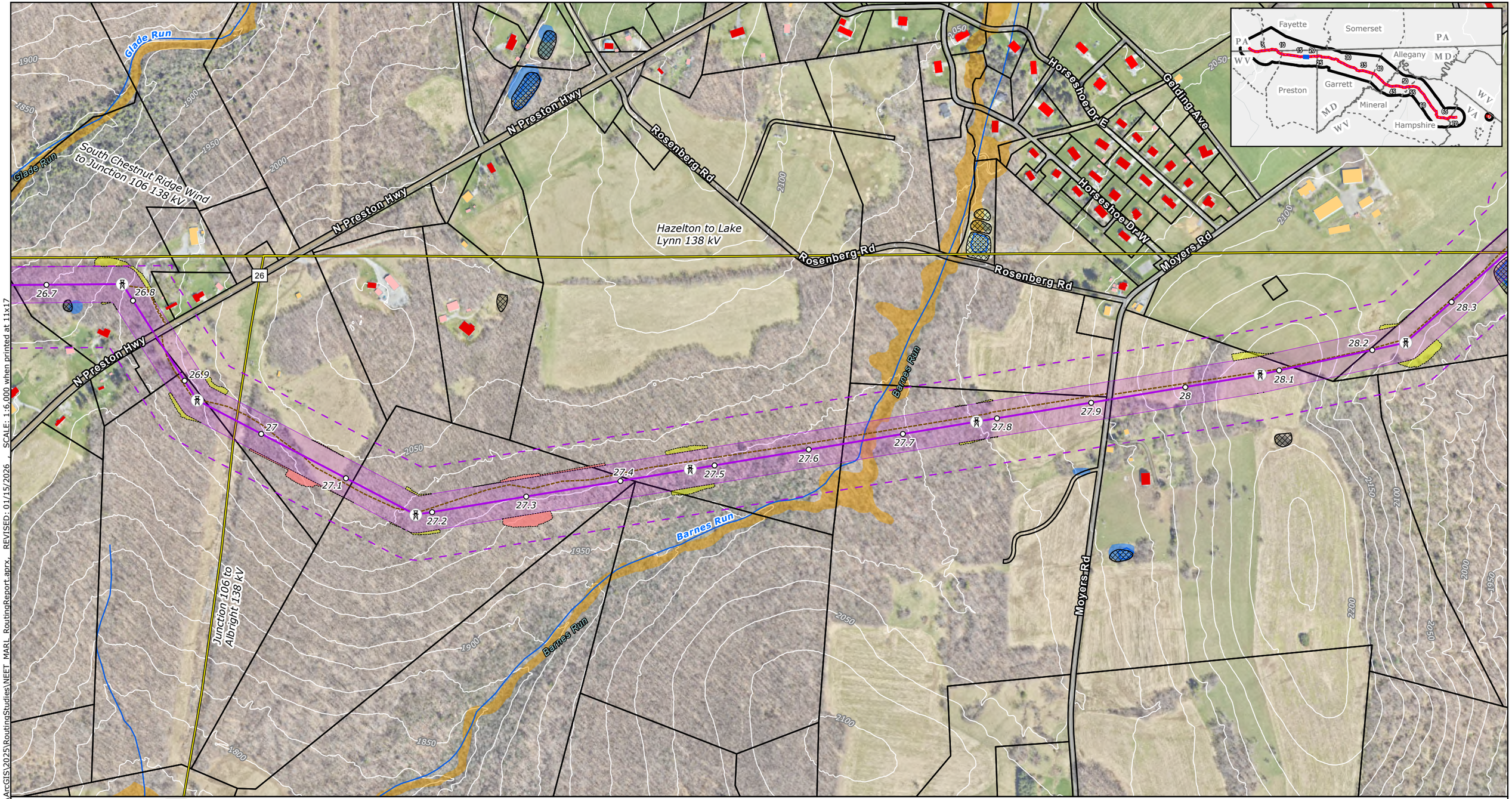

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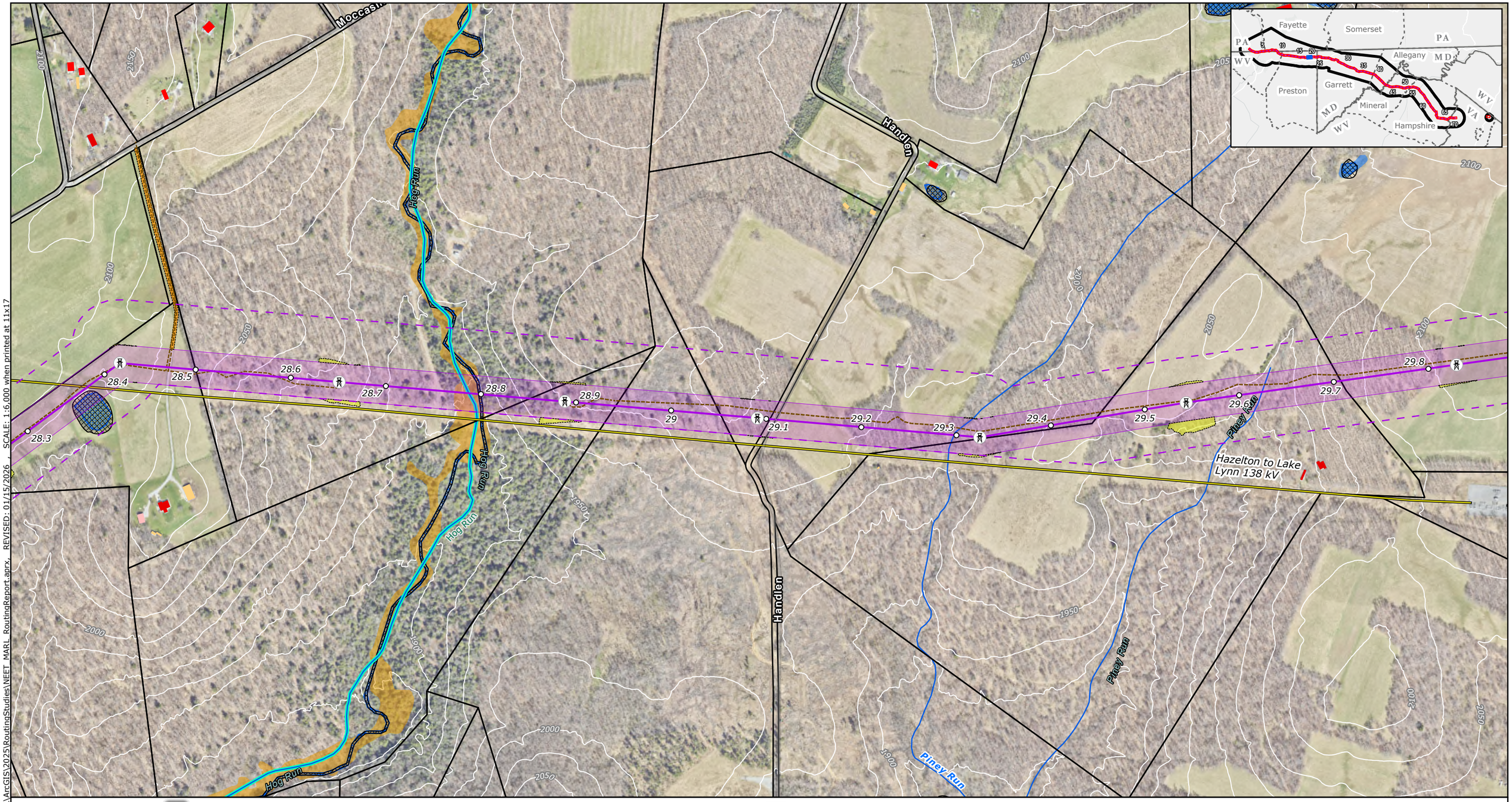

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N

0 0.05 0.1 0.15 0.2

Miles

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Proposed Route
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MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\RoutingStudies\NEET_MARL_RoutingReport.aprx, REVISED: 01/15/2026 , SCALE: 1:6,000 when printed at 11x17

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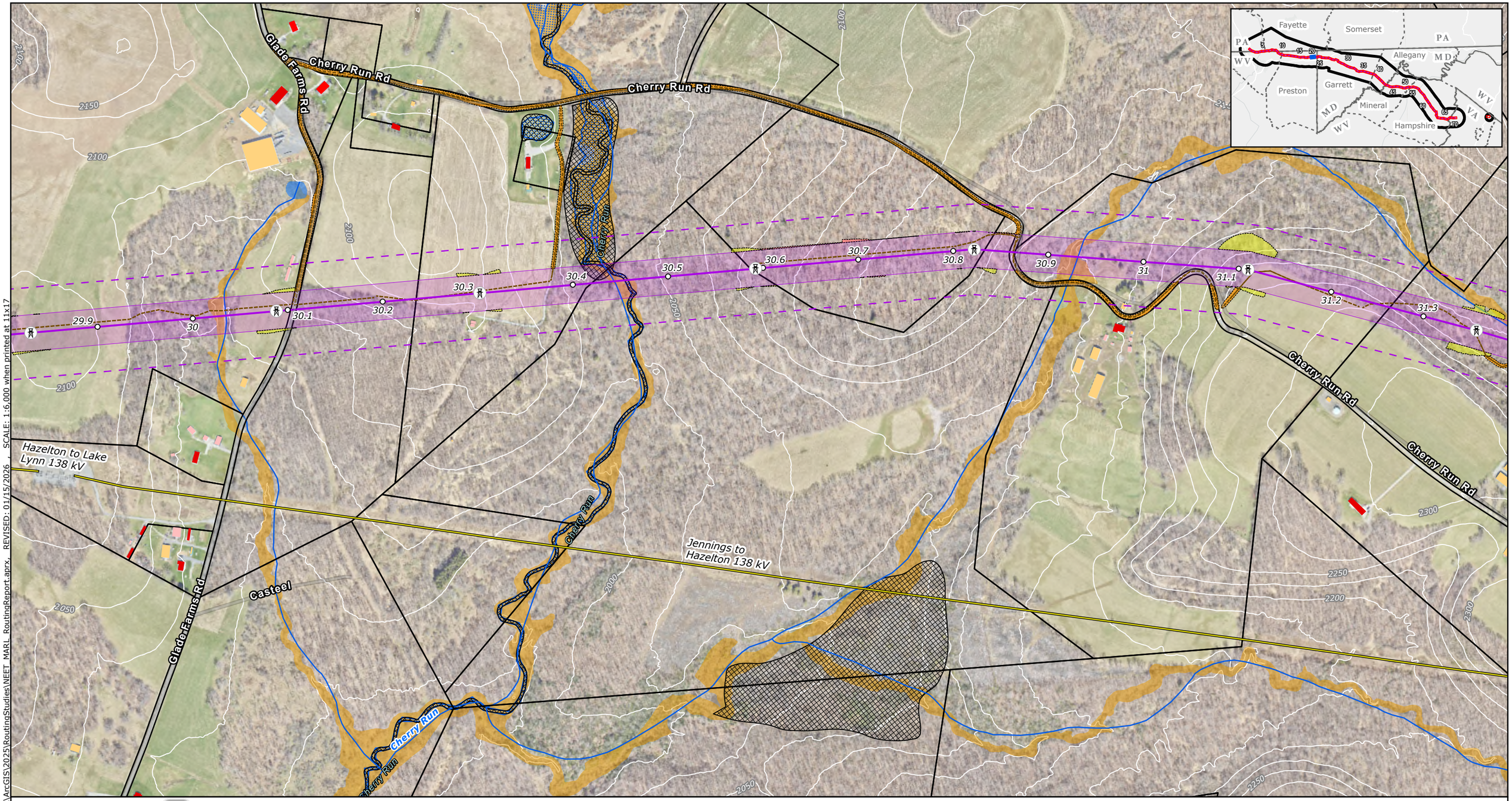

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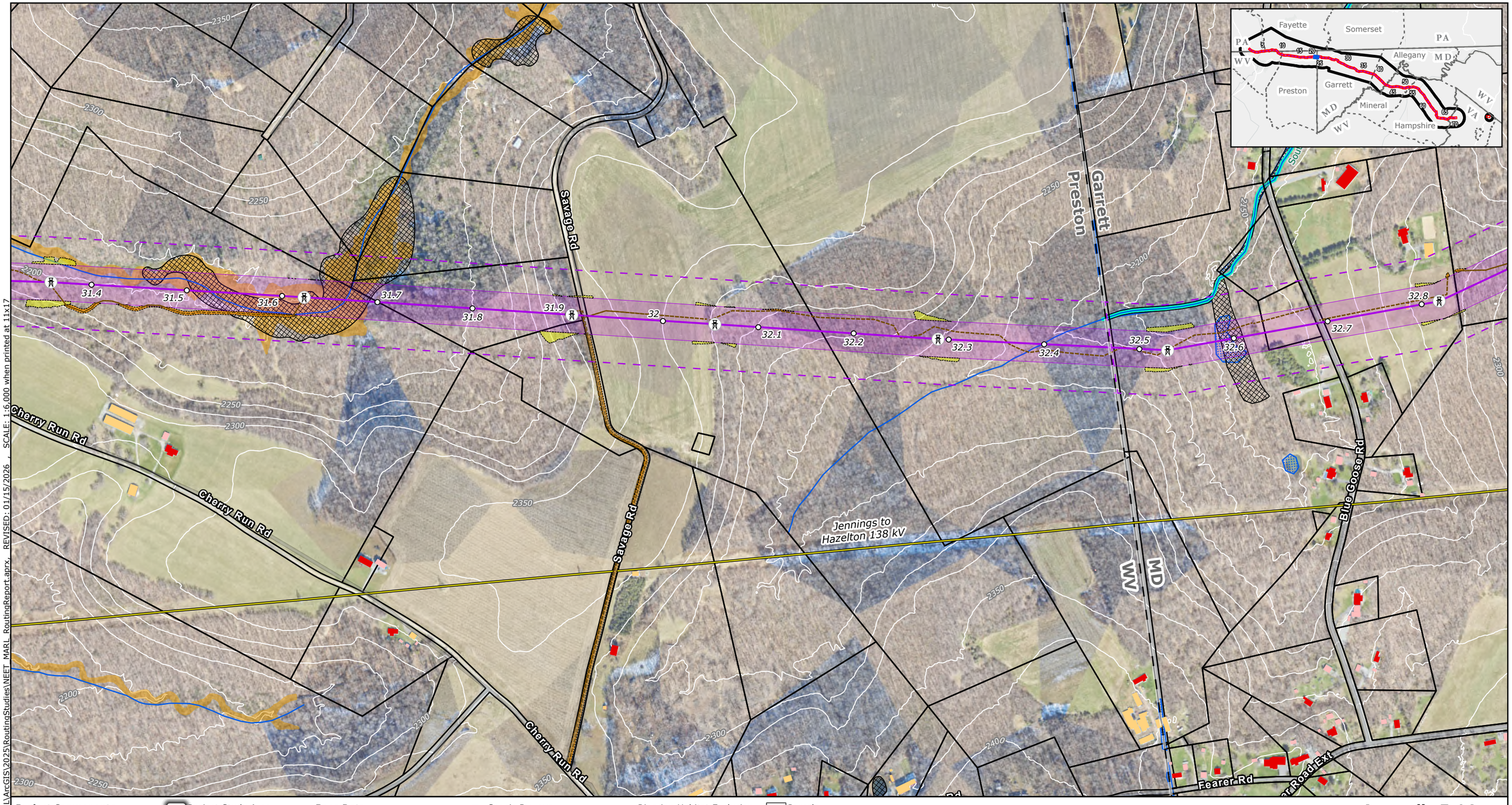

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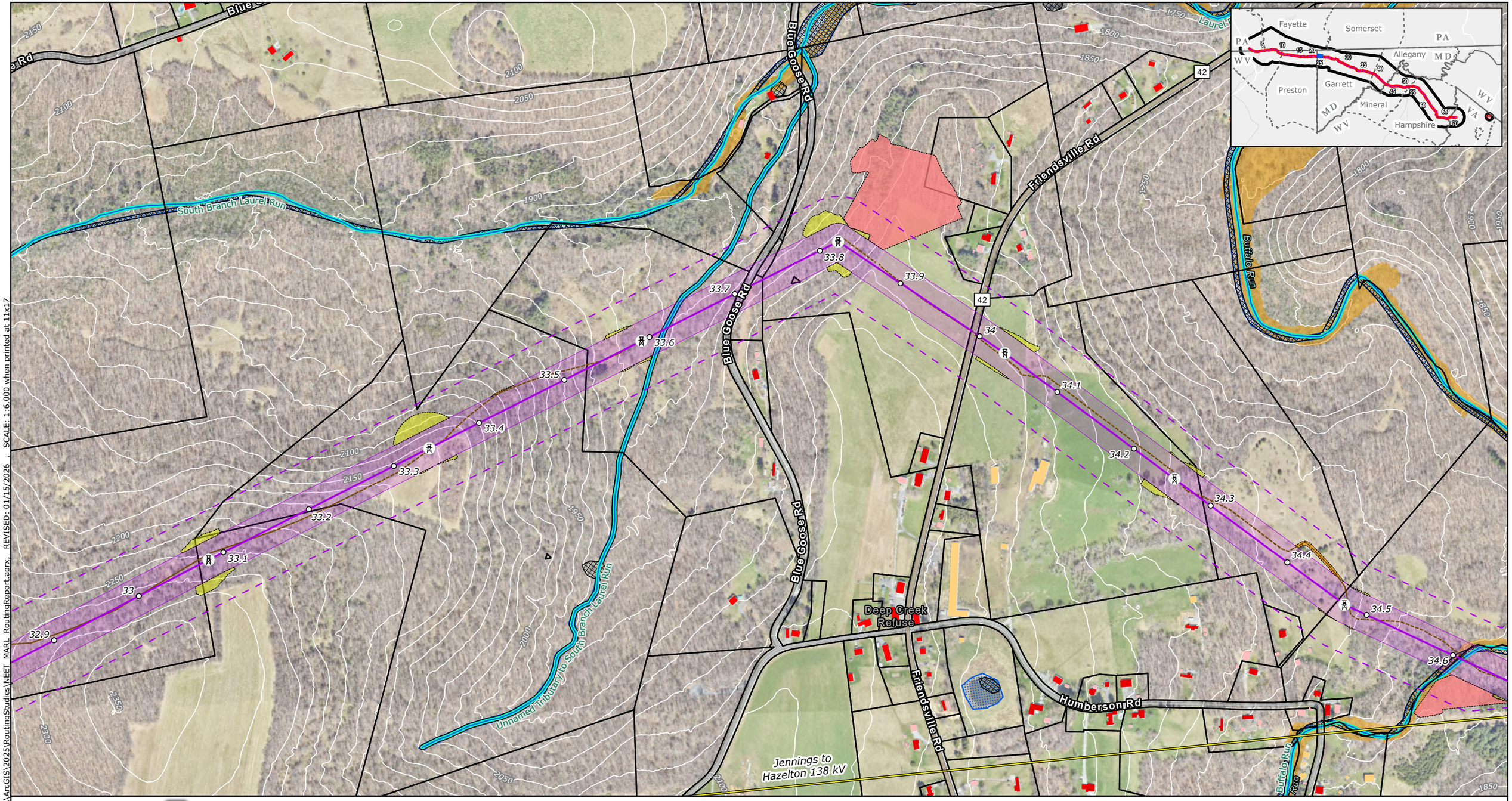

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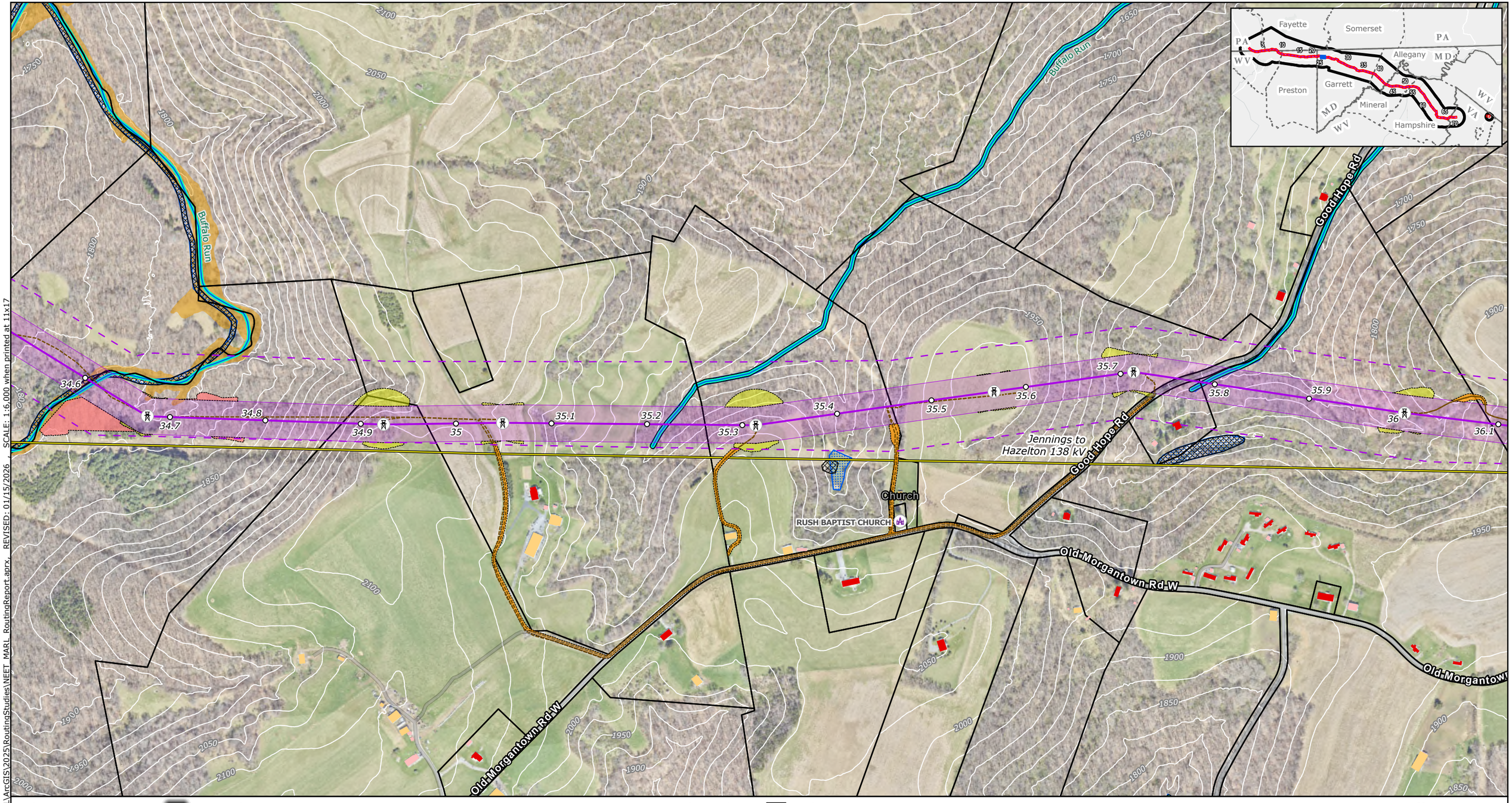

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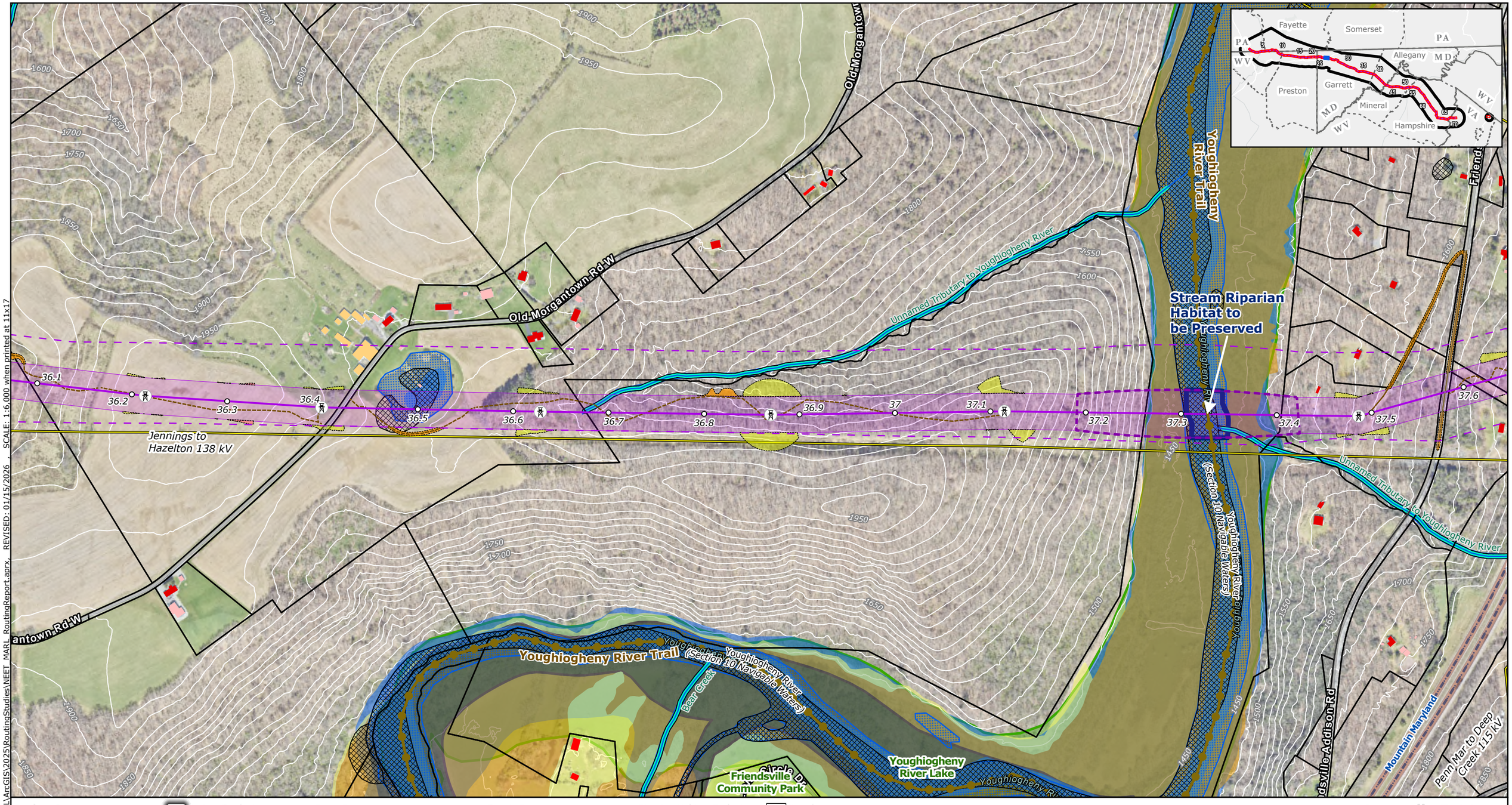

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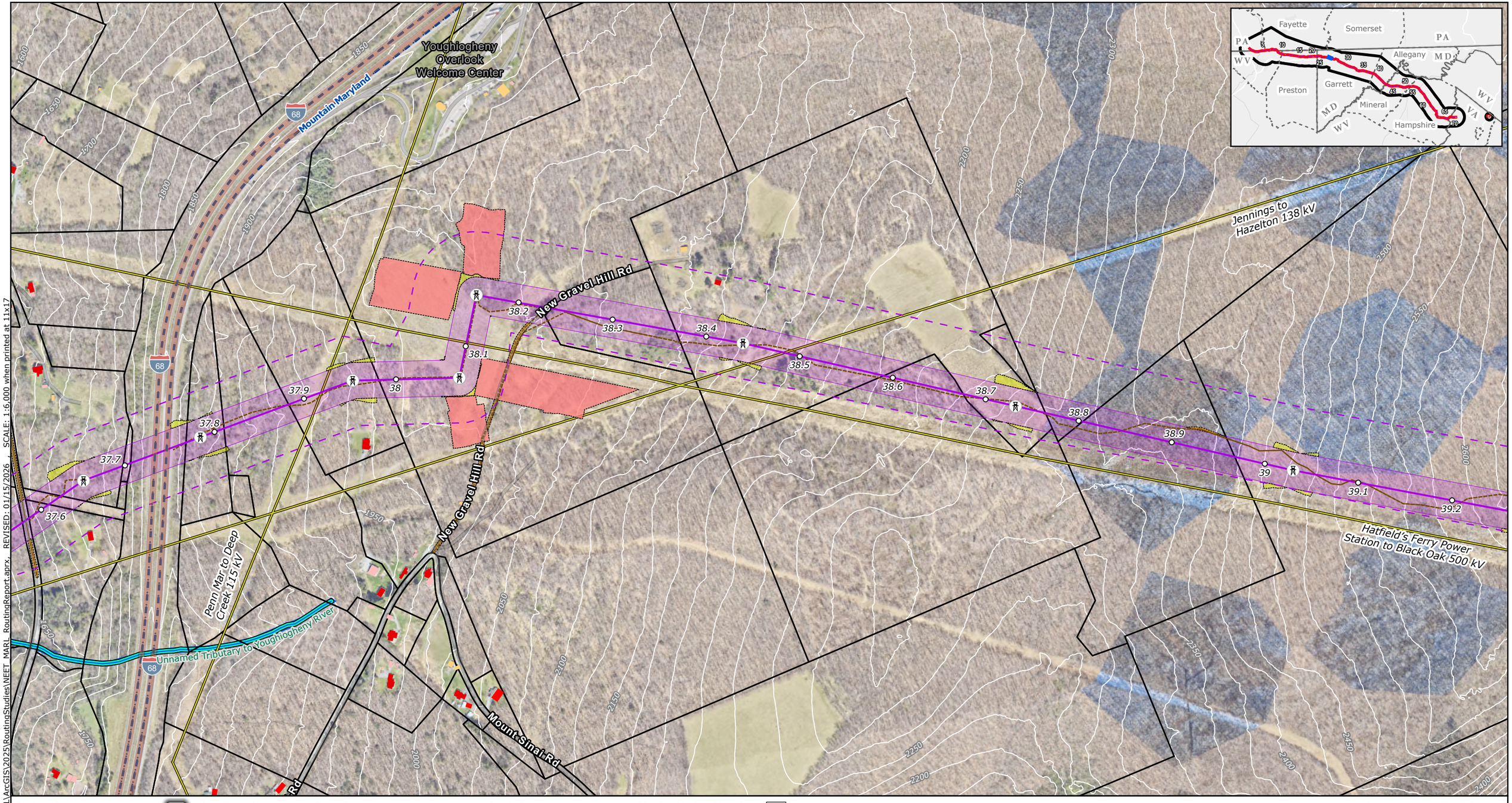

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MidAtlantic Resiliency Link

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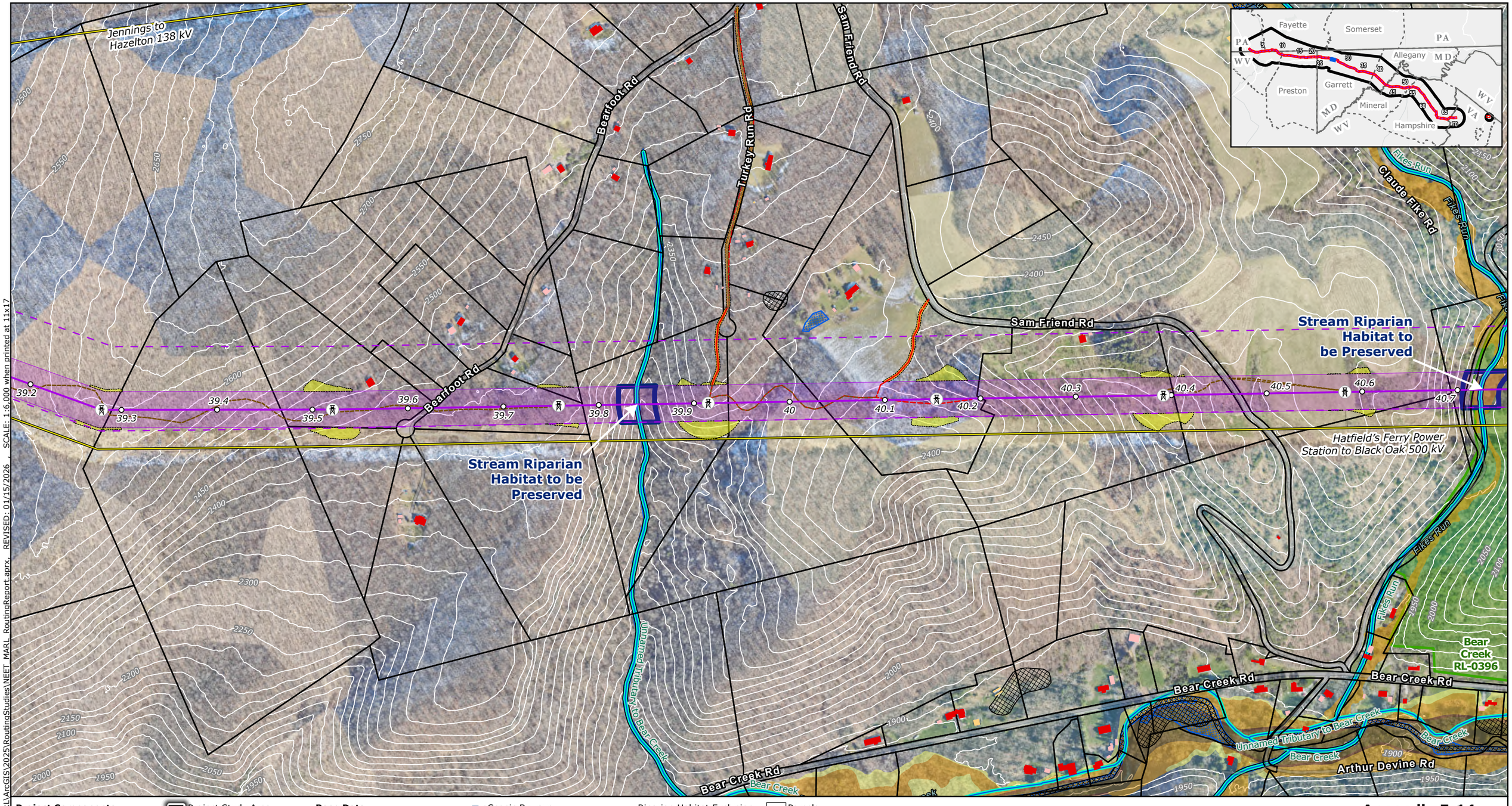

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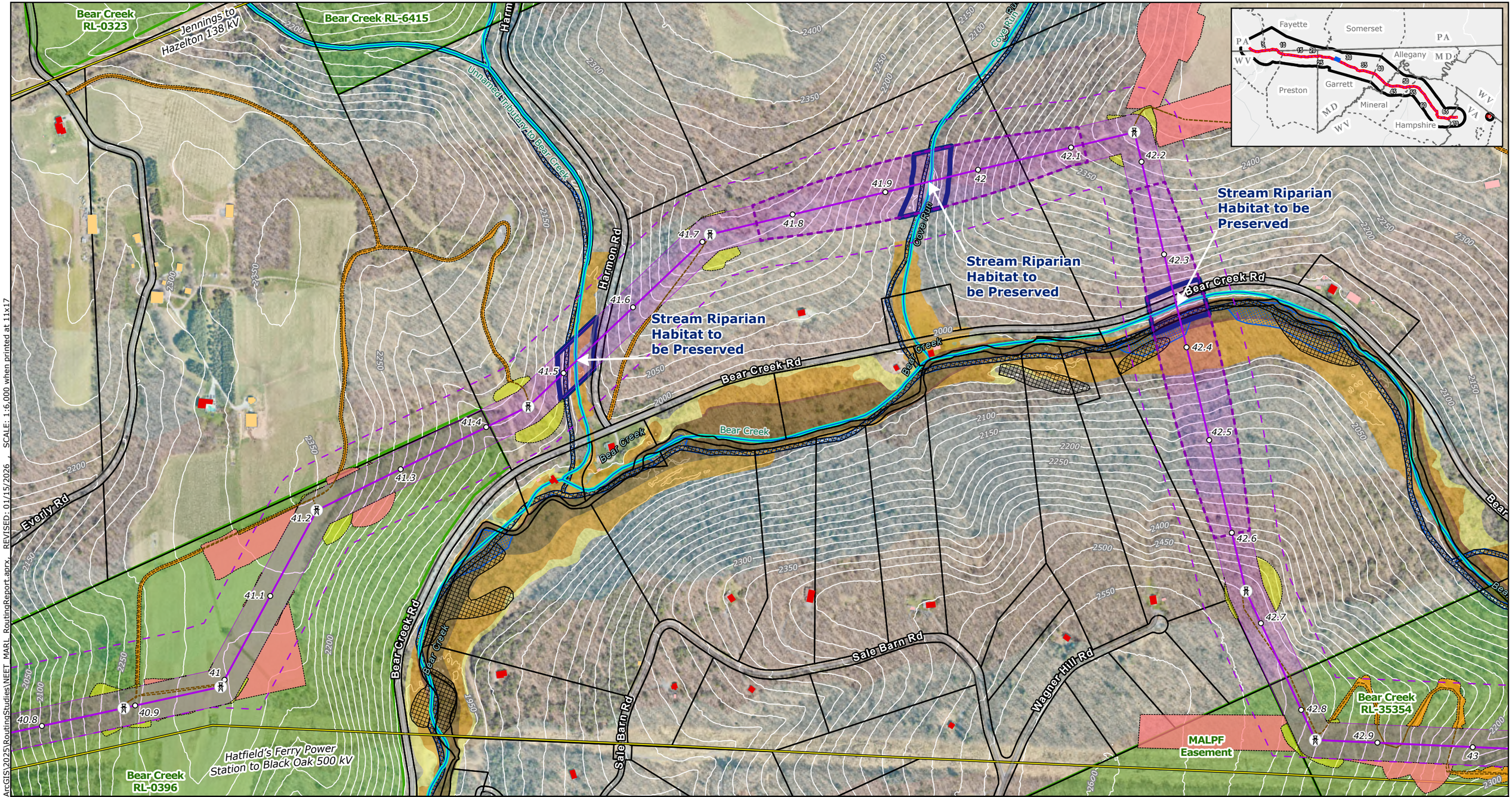

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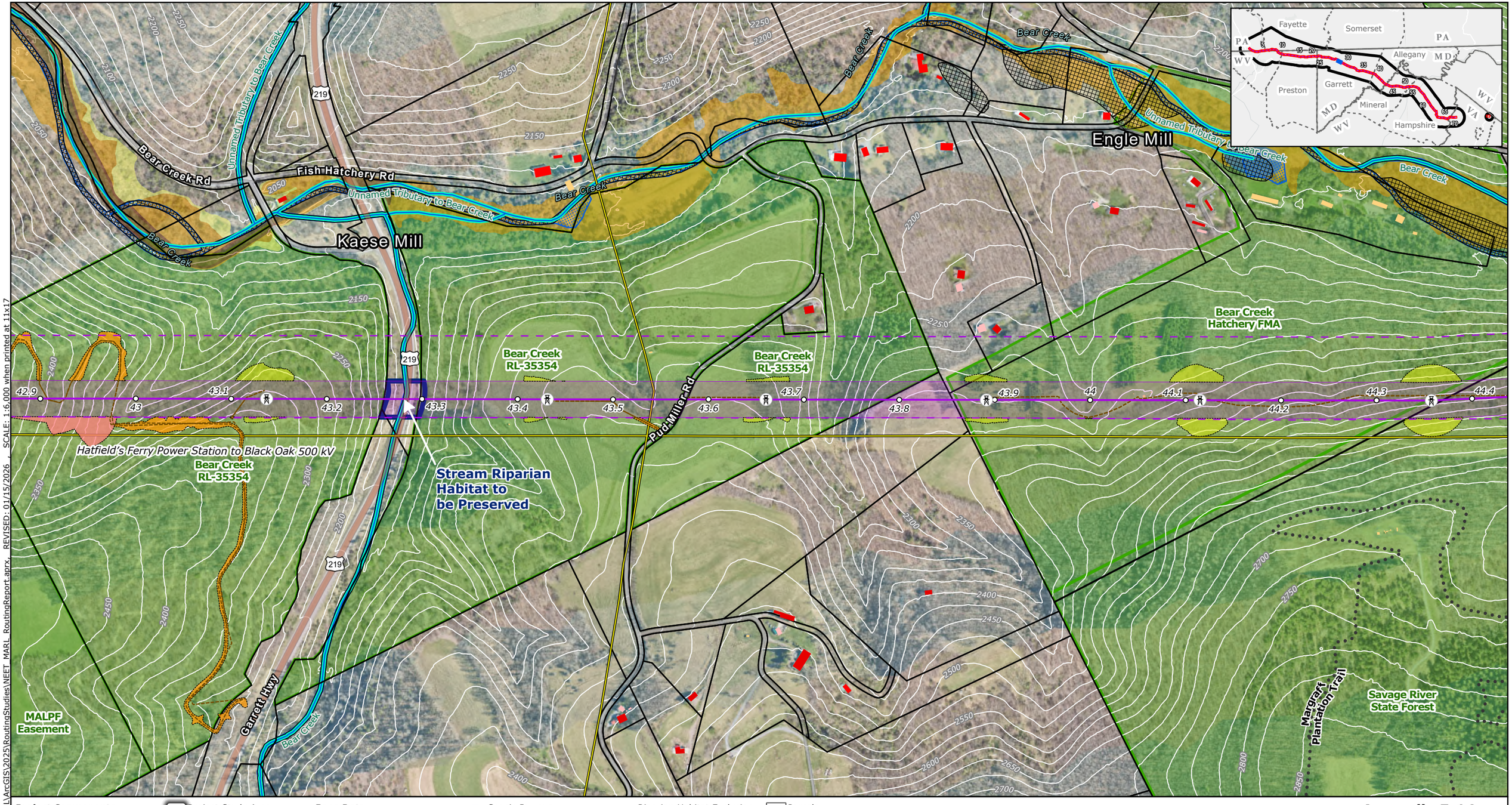

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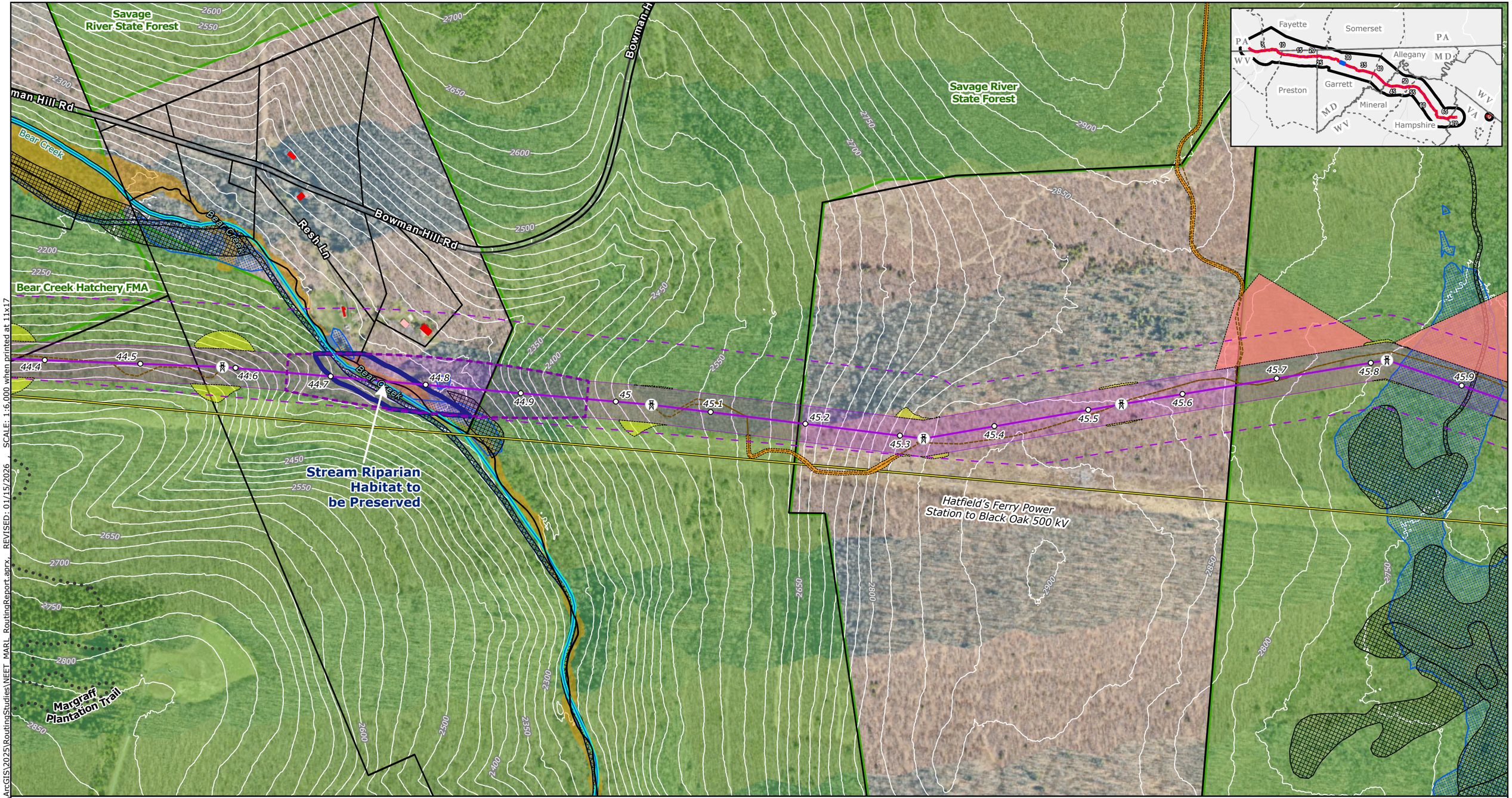

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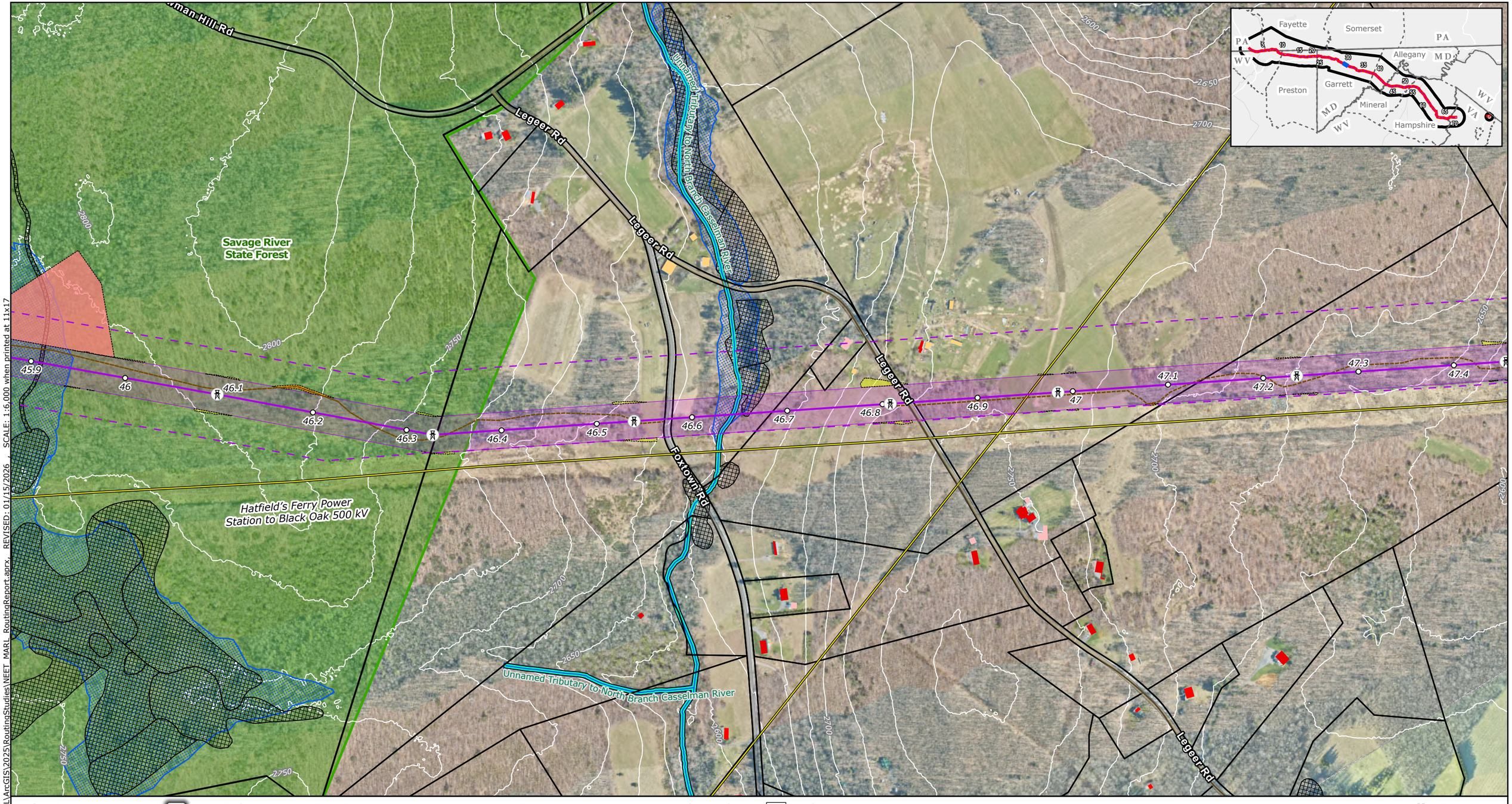

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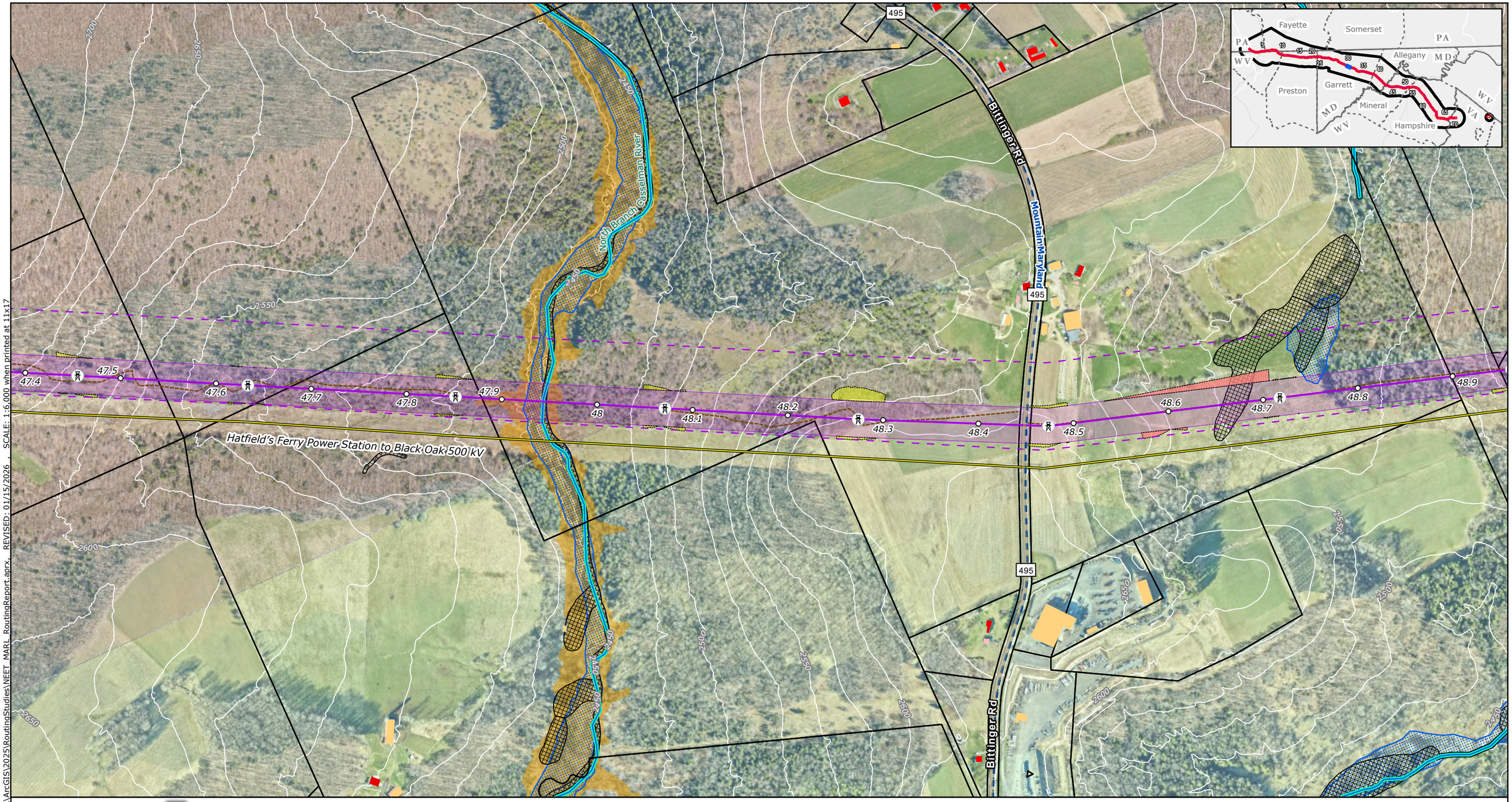

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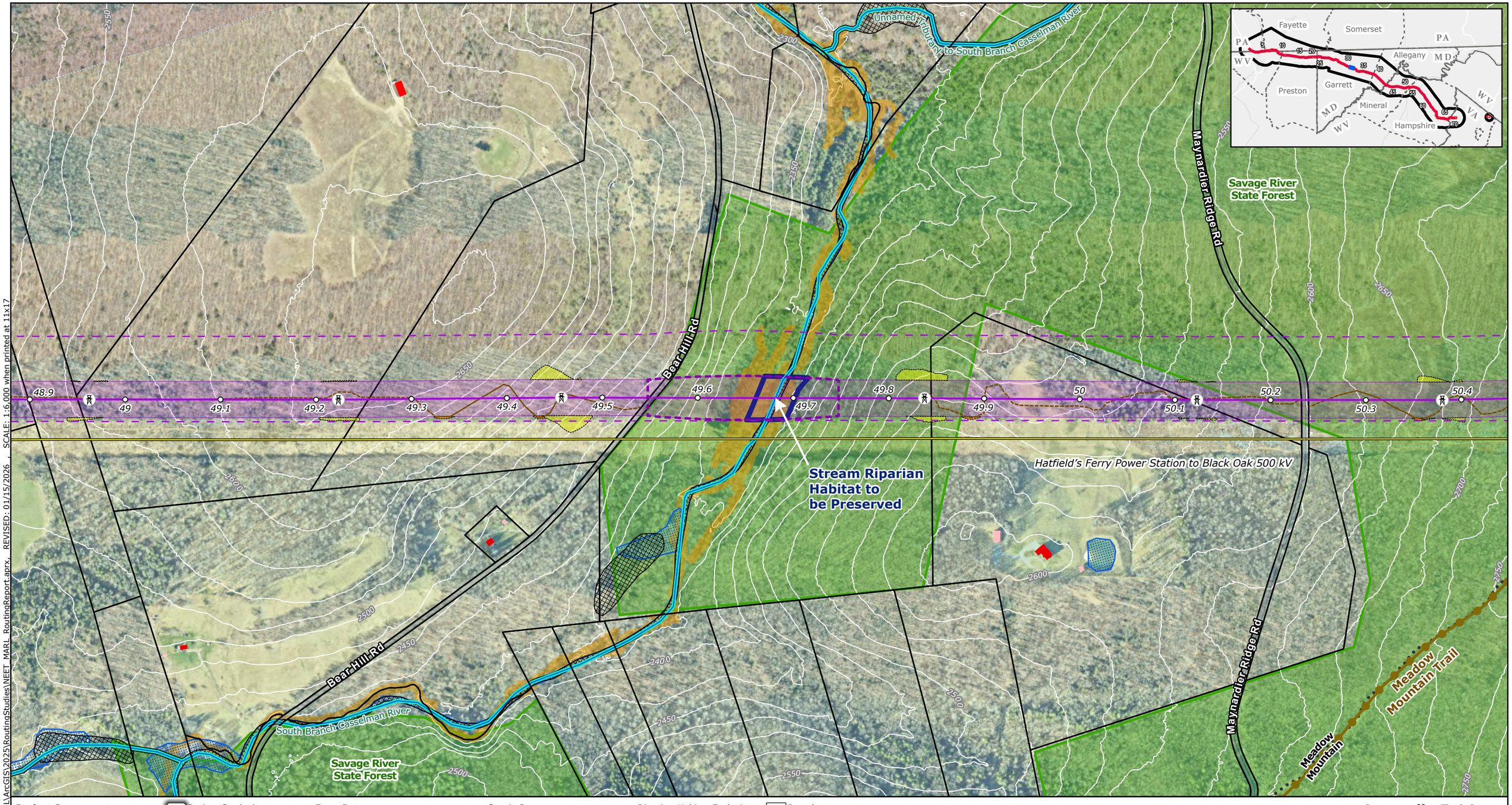

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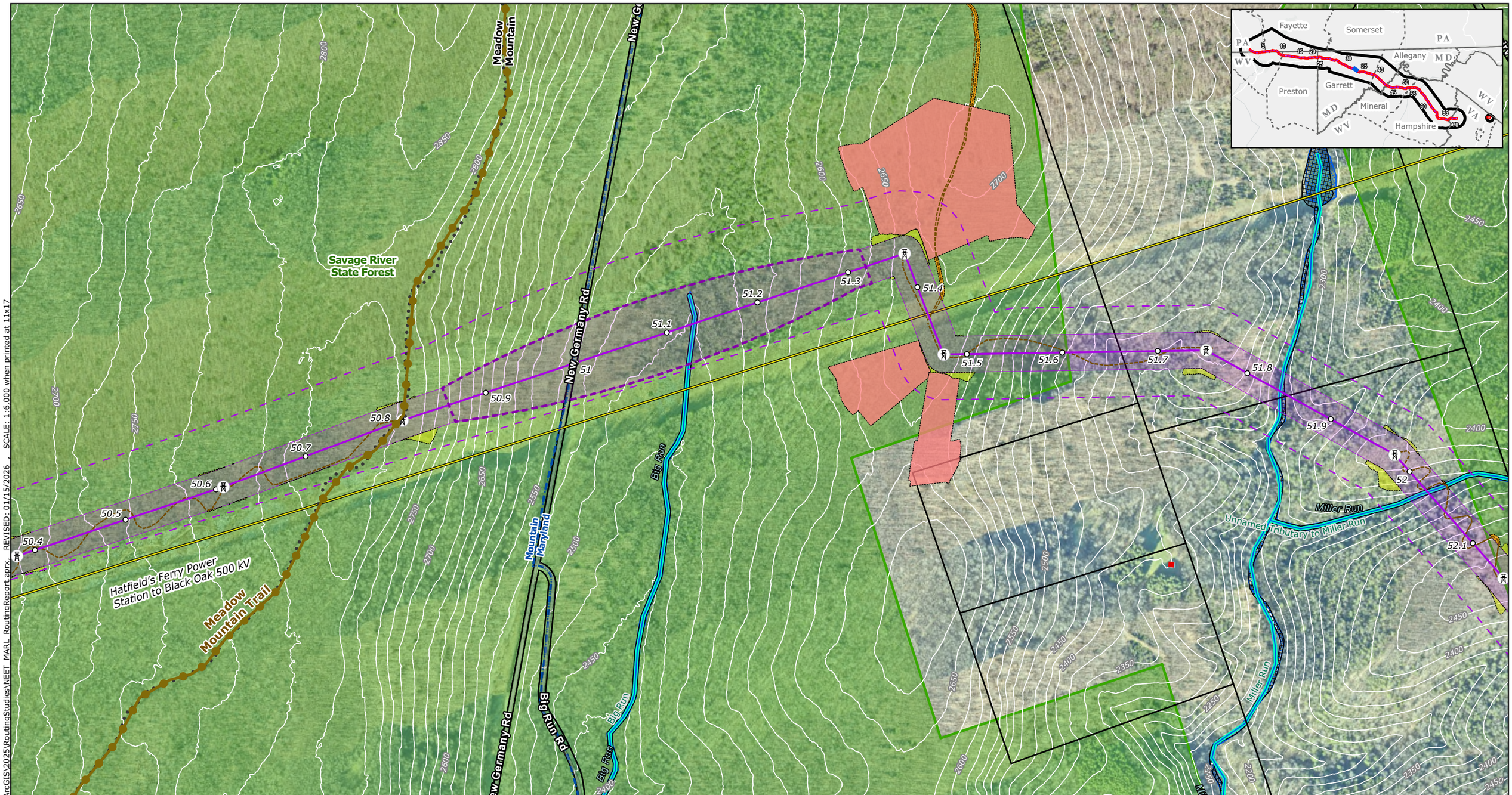

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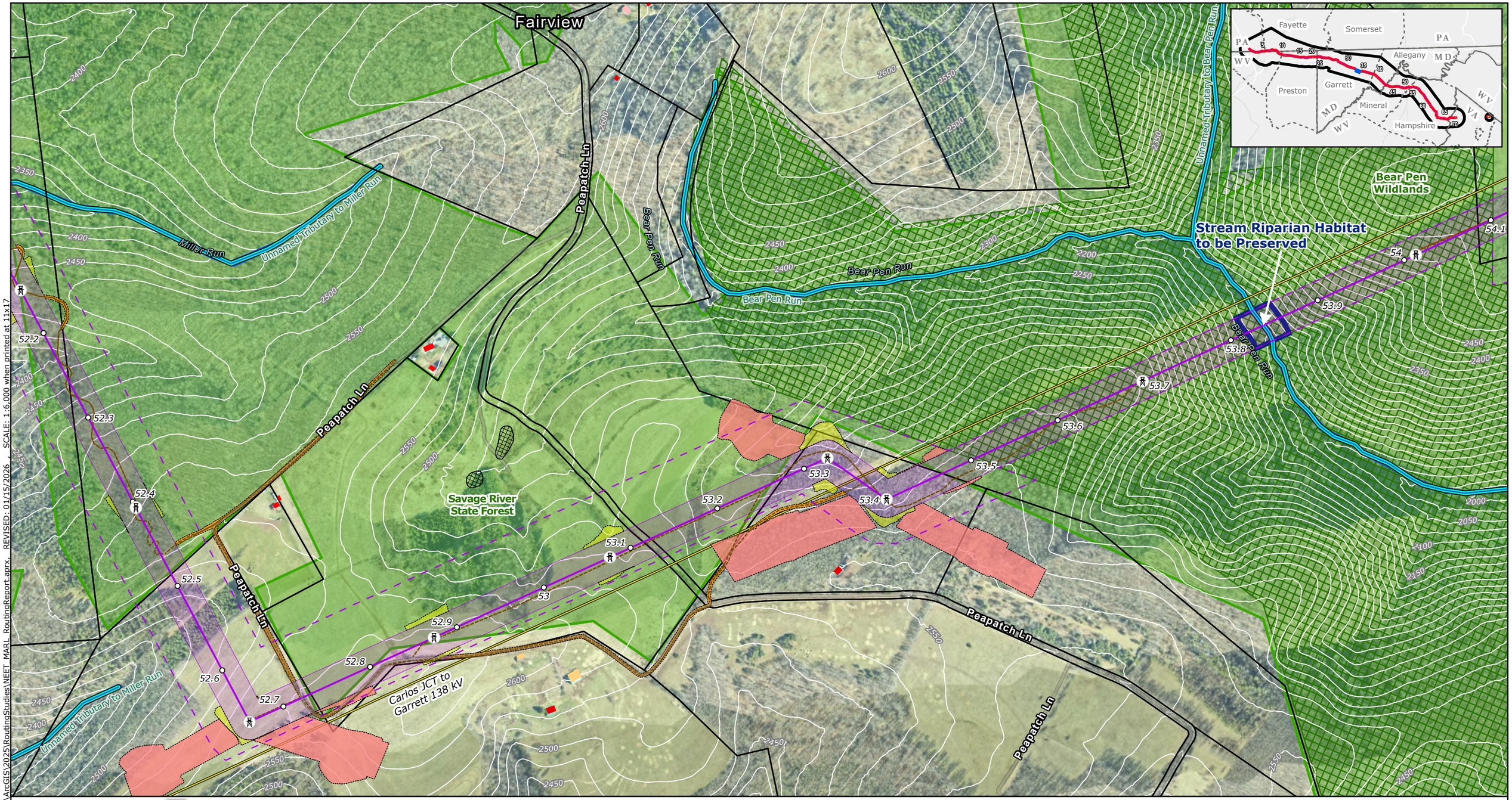

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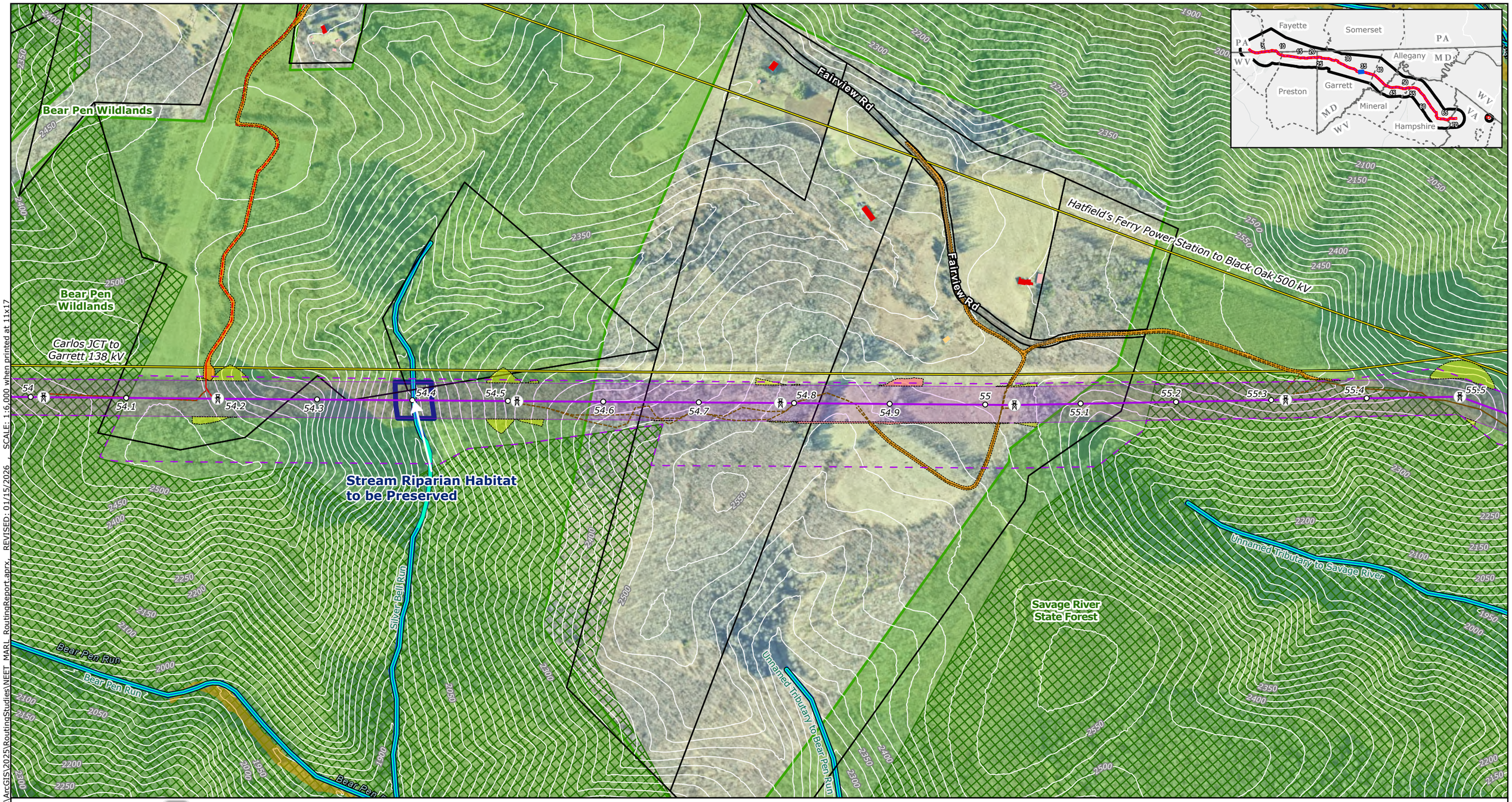

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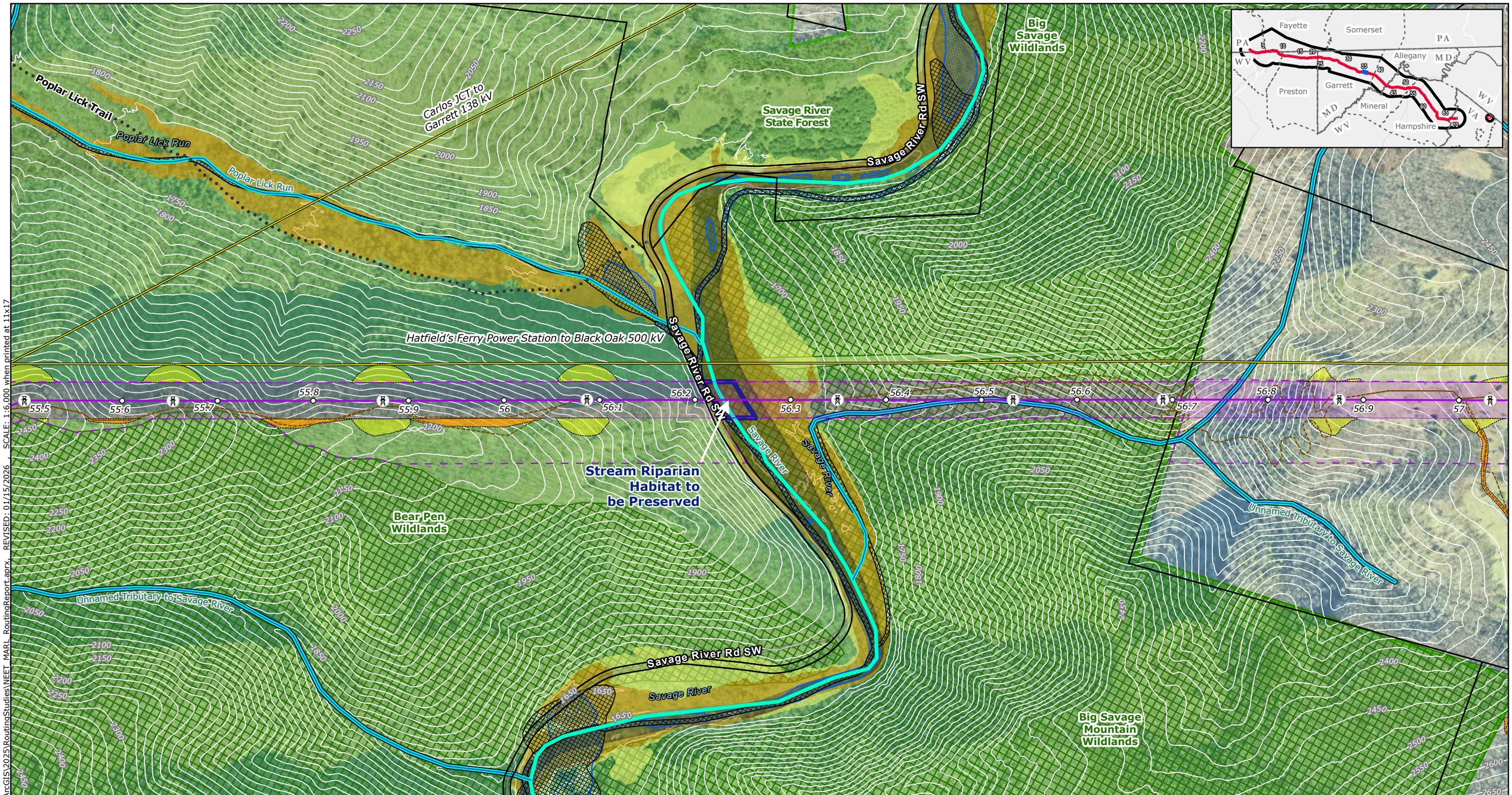

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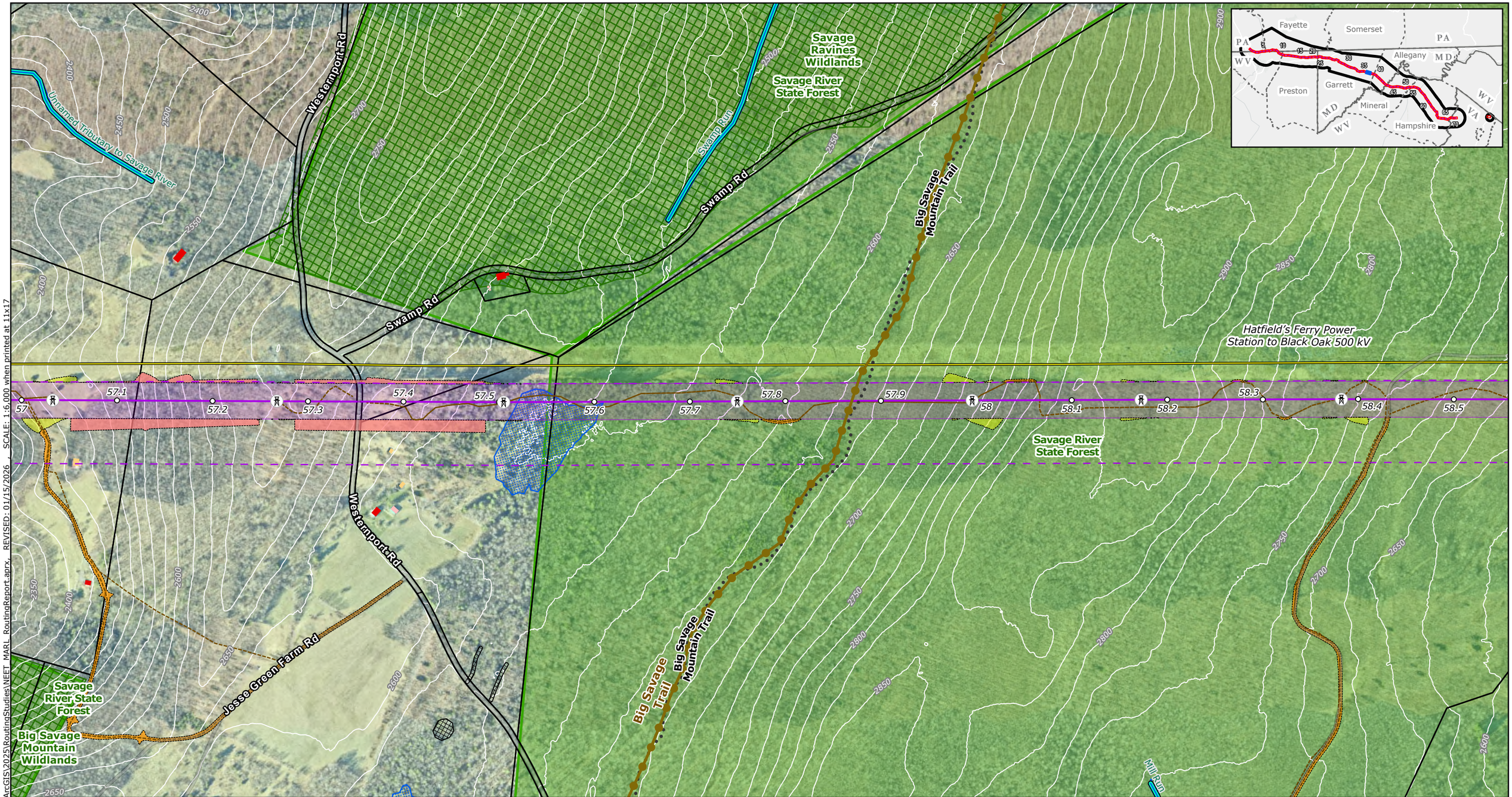

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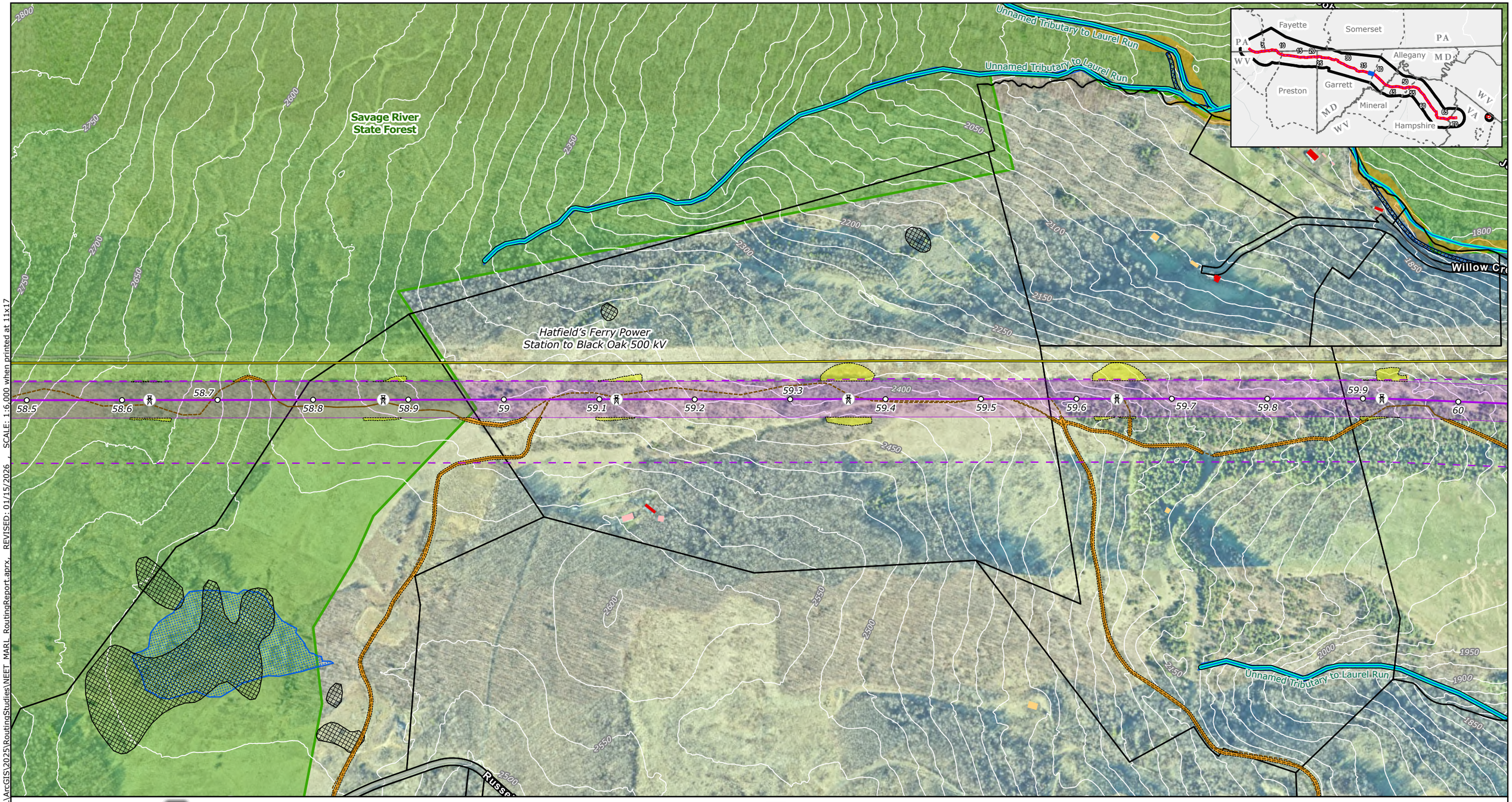

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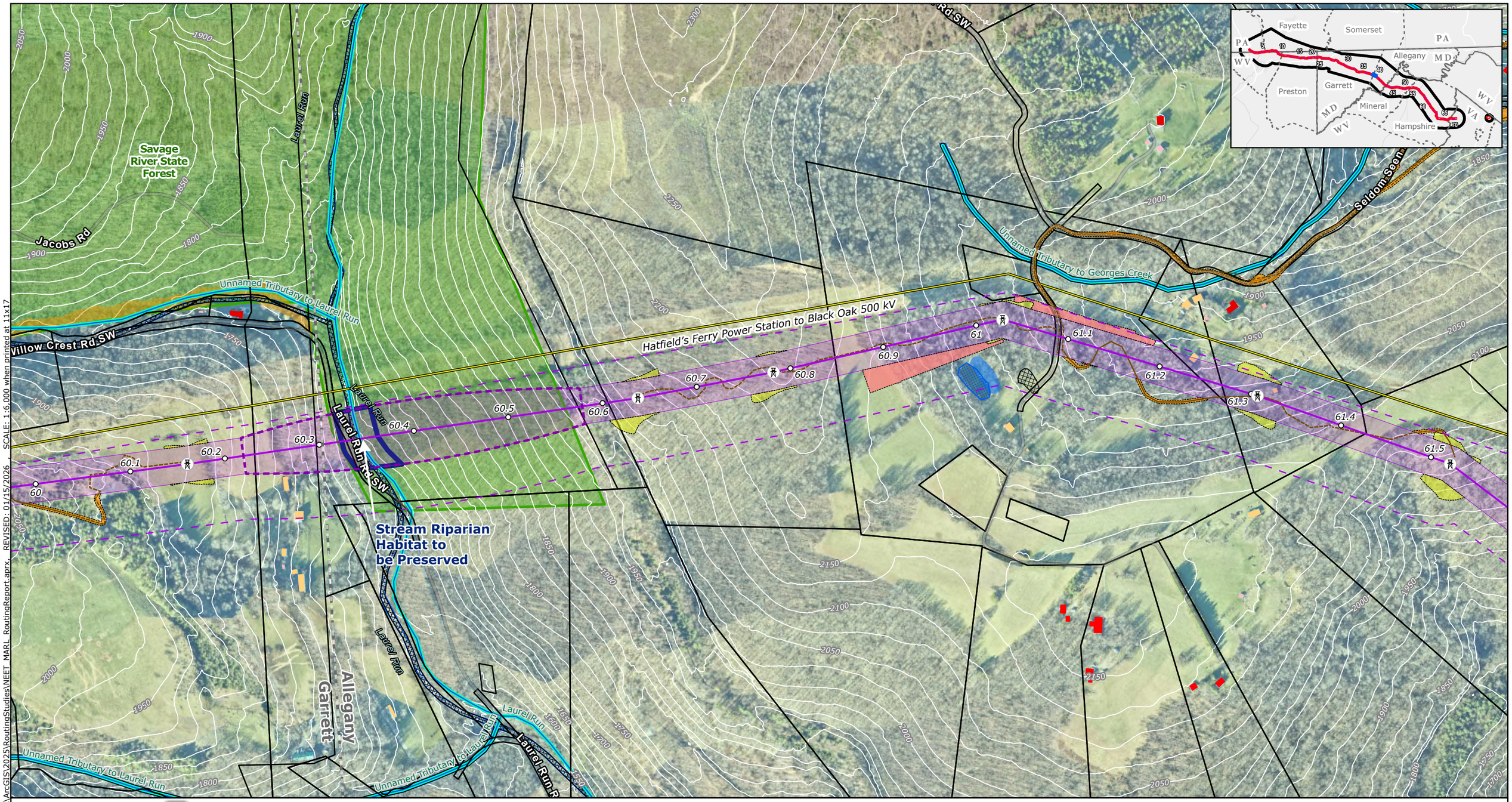

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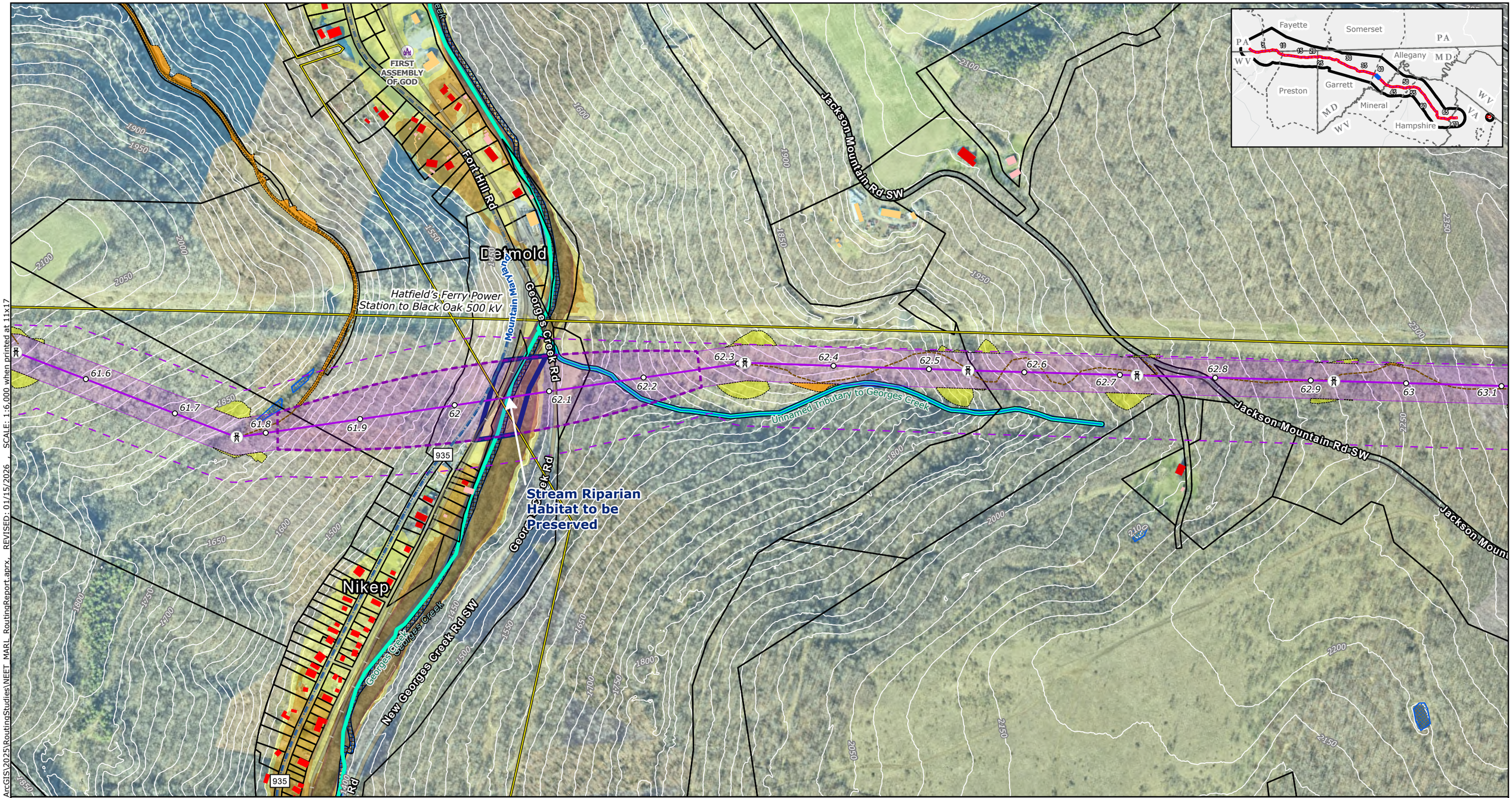

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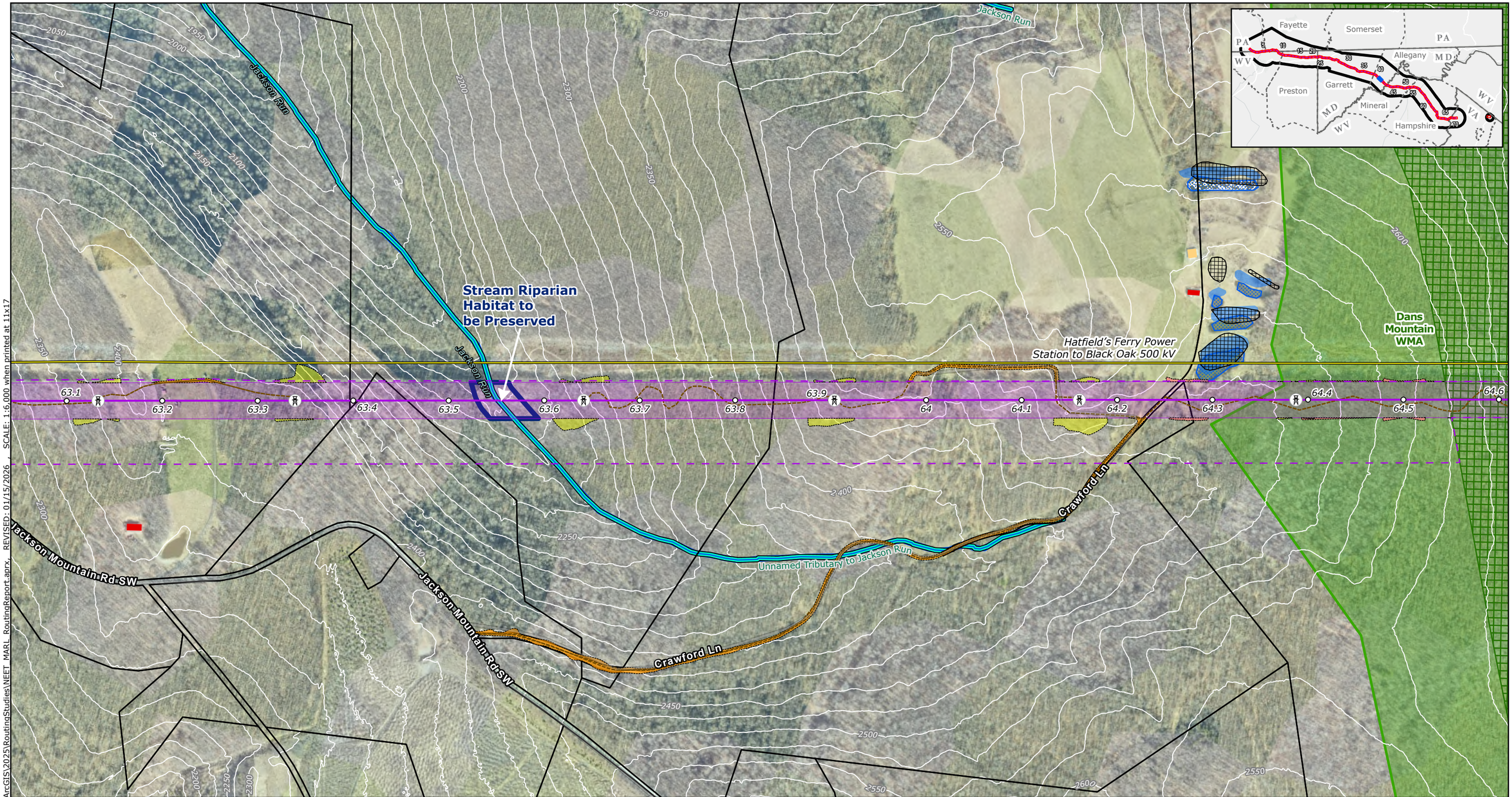

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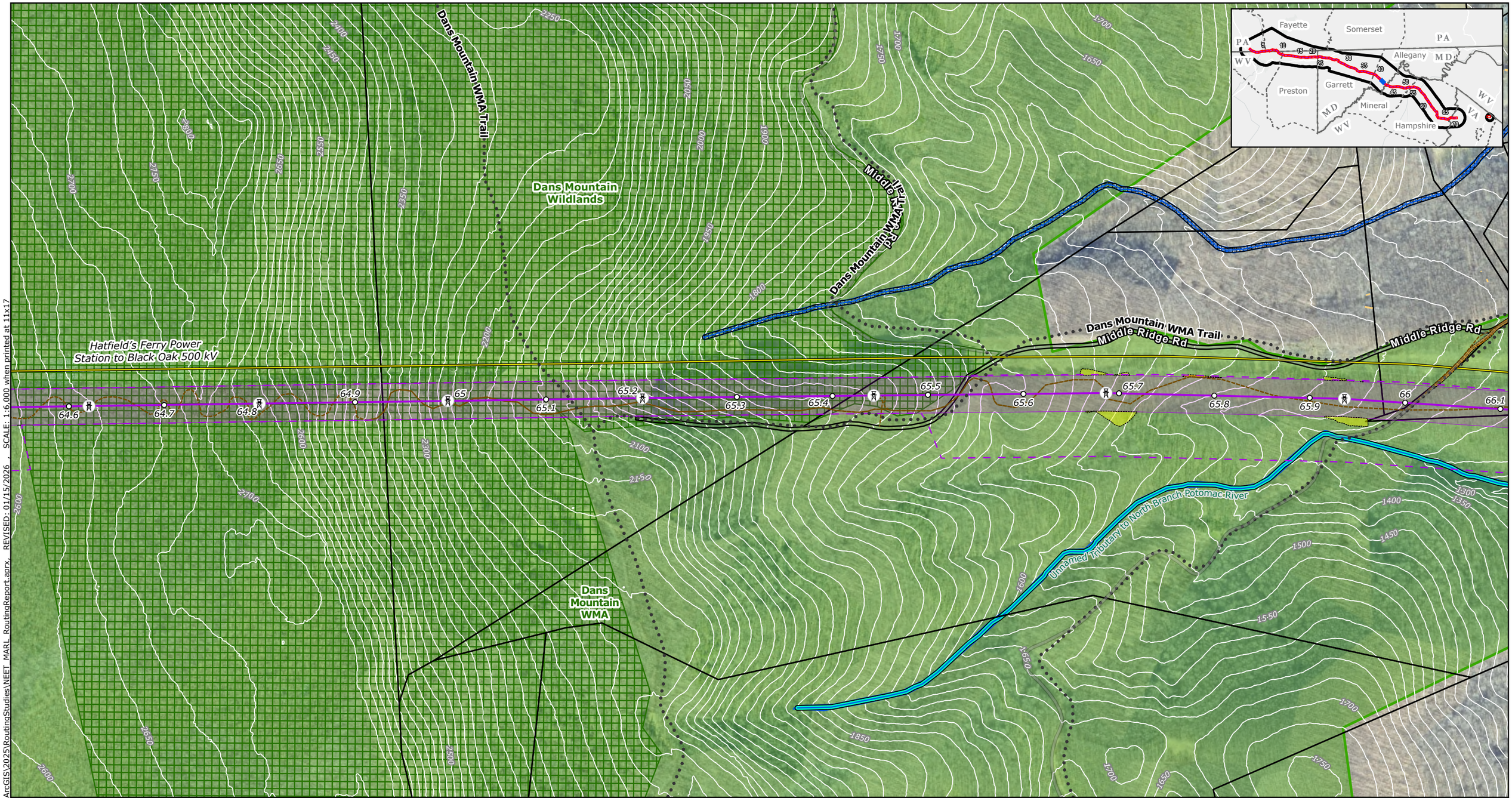

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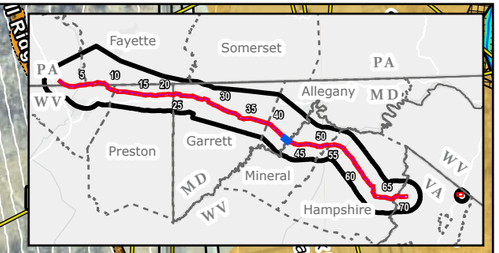

Danville
Middle Ridge Rd
Dans Mountain WMA Trail
DANVILLE COMMUNITY BAPTIST CHURCH
Hatfield's Ferry Power Station to Black Oak 500 kV
Dans Mountain WMA
Unnamed Tributary to North Branch Potomac River
Steeles Hill Rd
McMullen Hwy SW
Carman Dr
Baltimore and Ohio Railroad
220

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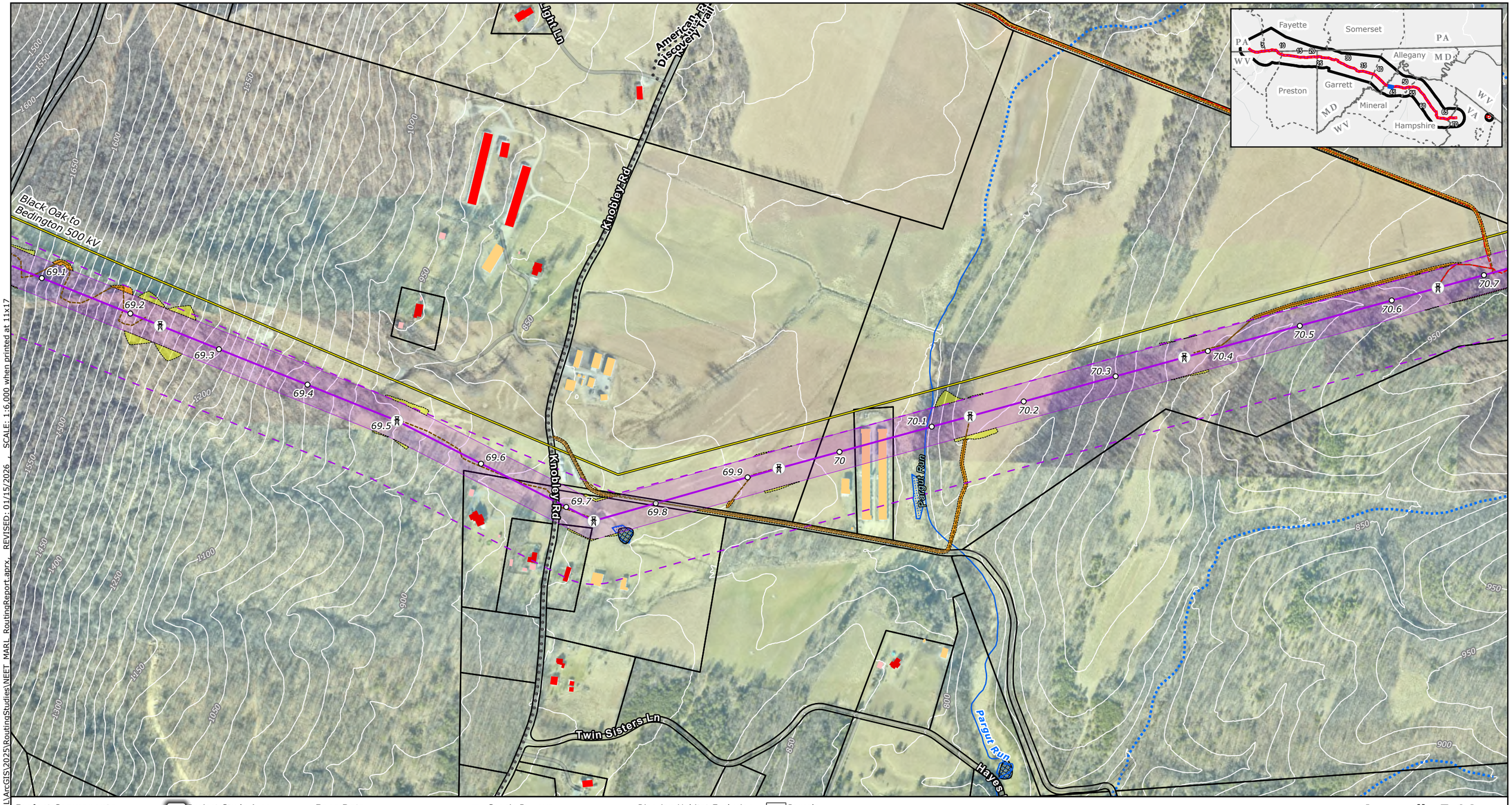

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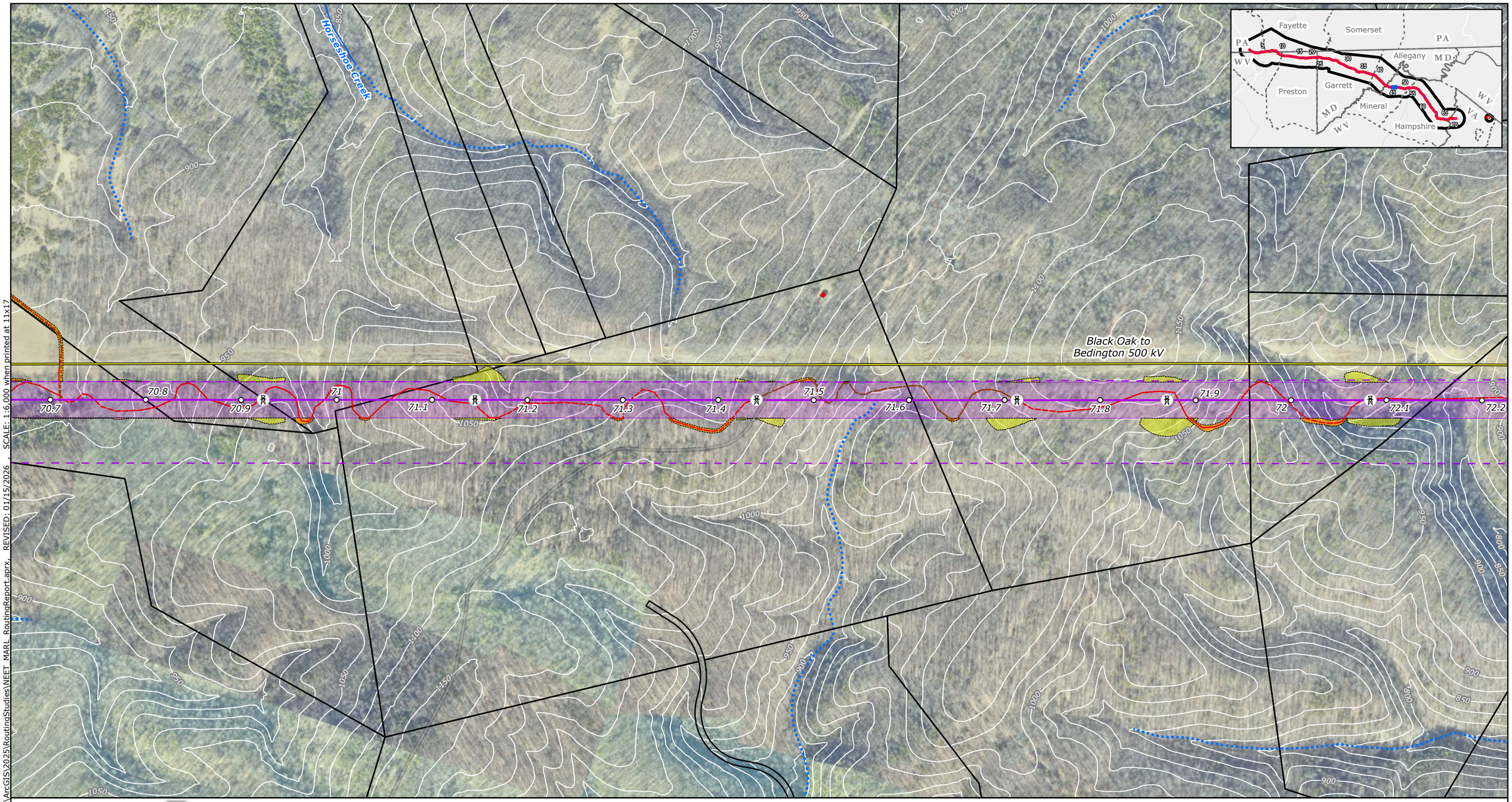

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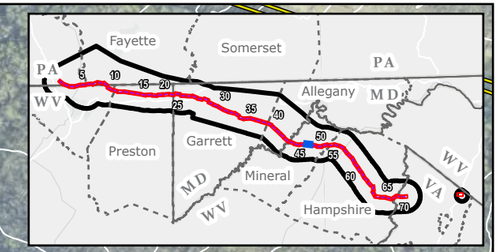

Black Oak to Bedington 500 kV

Ponderosa

Patterson Creek

Lost Hollow Dr

Horseshoe Rd

Black Oak to Junction 138 kV

Patterson Creek Water Trail

72.2 72.3 72.4 72.5 72.6 72.7 72.8 72.9 73 73.1 73.2 73.3 73.4 73.5 73.6 73.7

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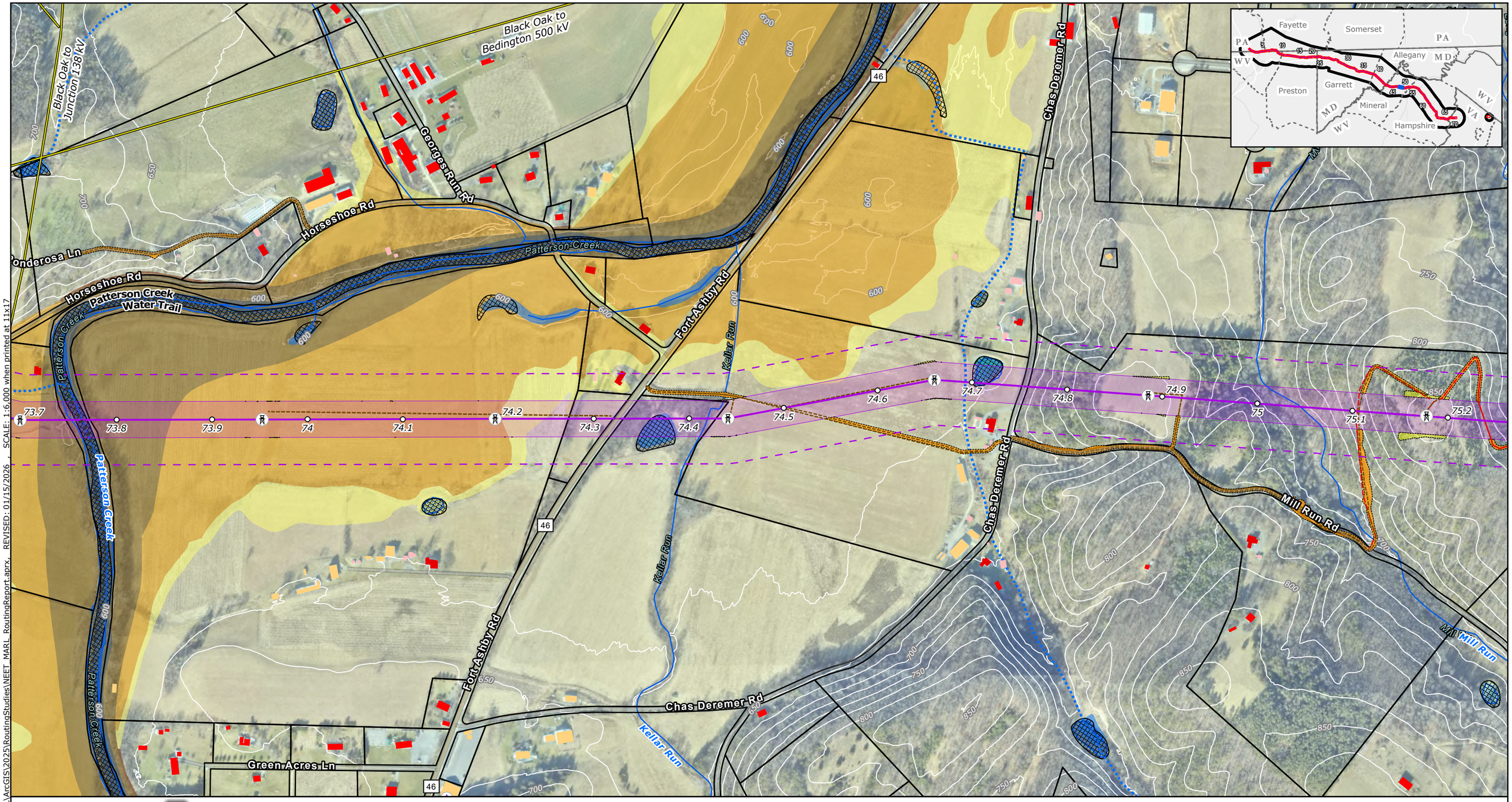

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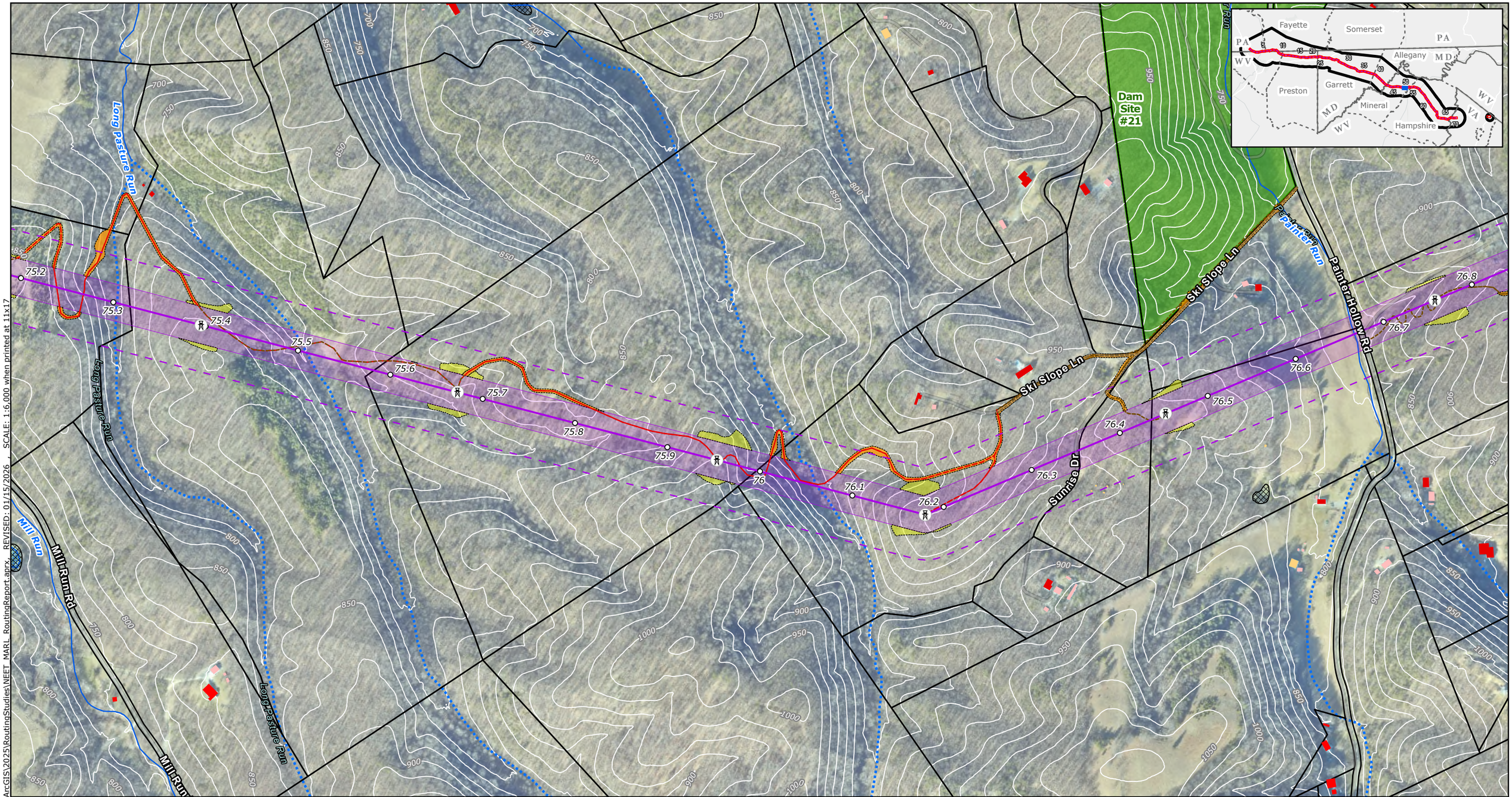

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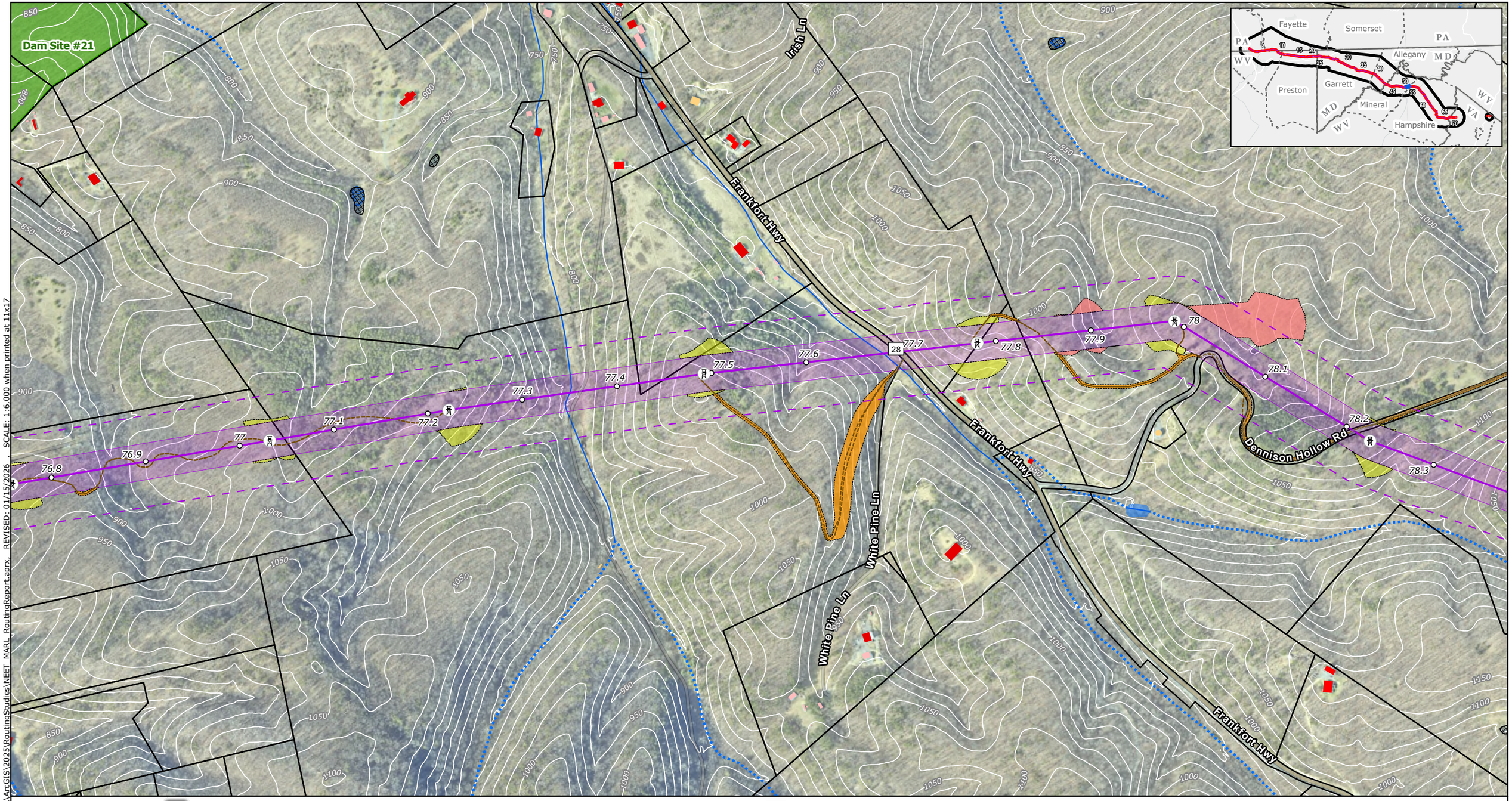

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N

0 0.05 0.1 0.15 0.2

Miles

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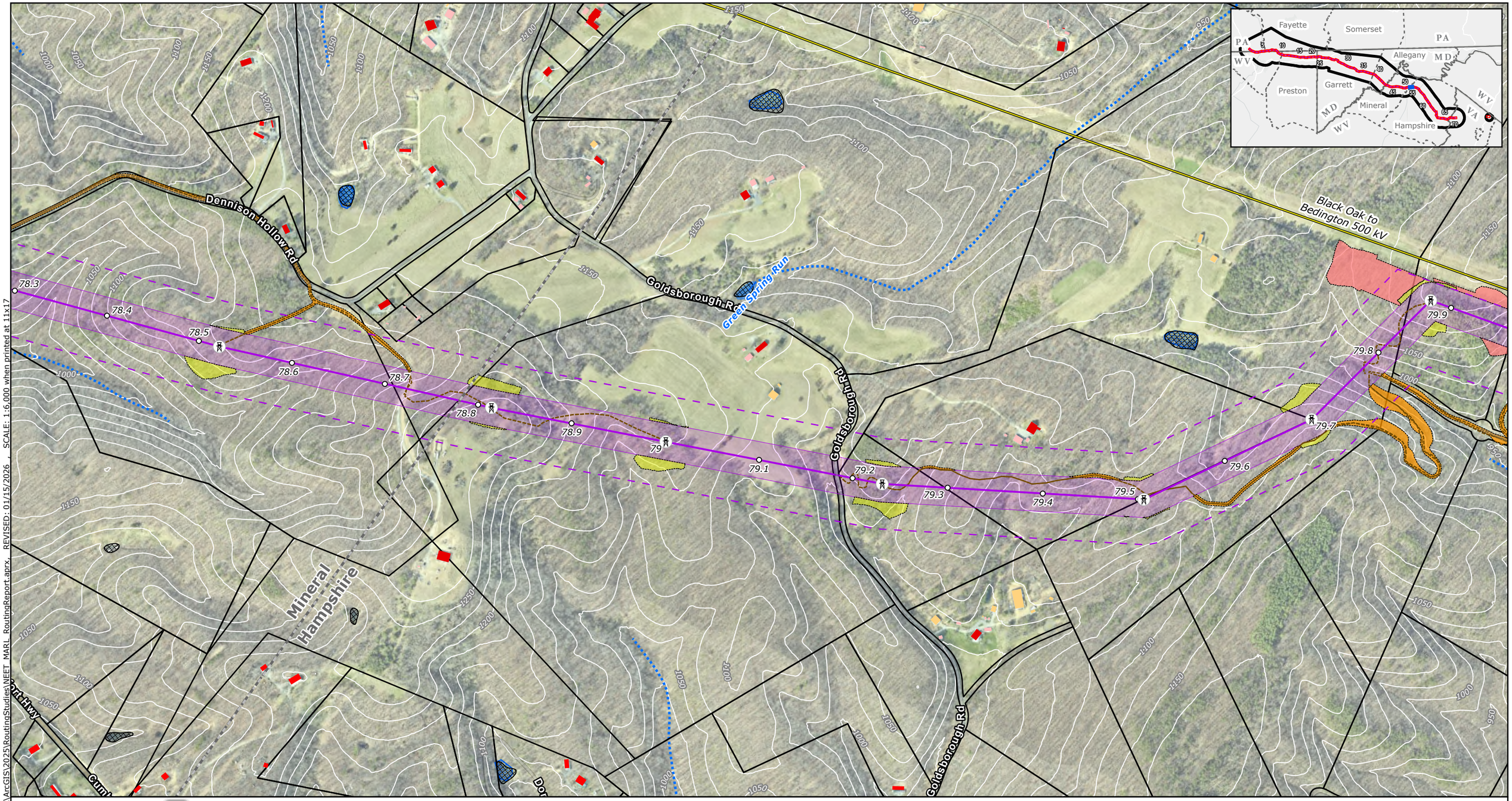

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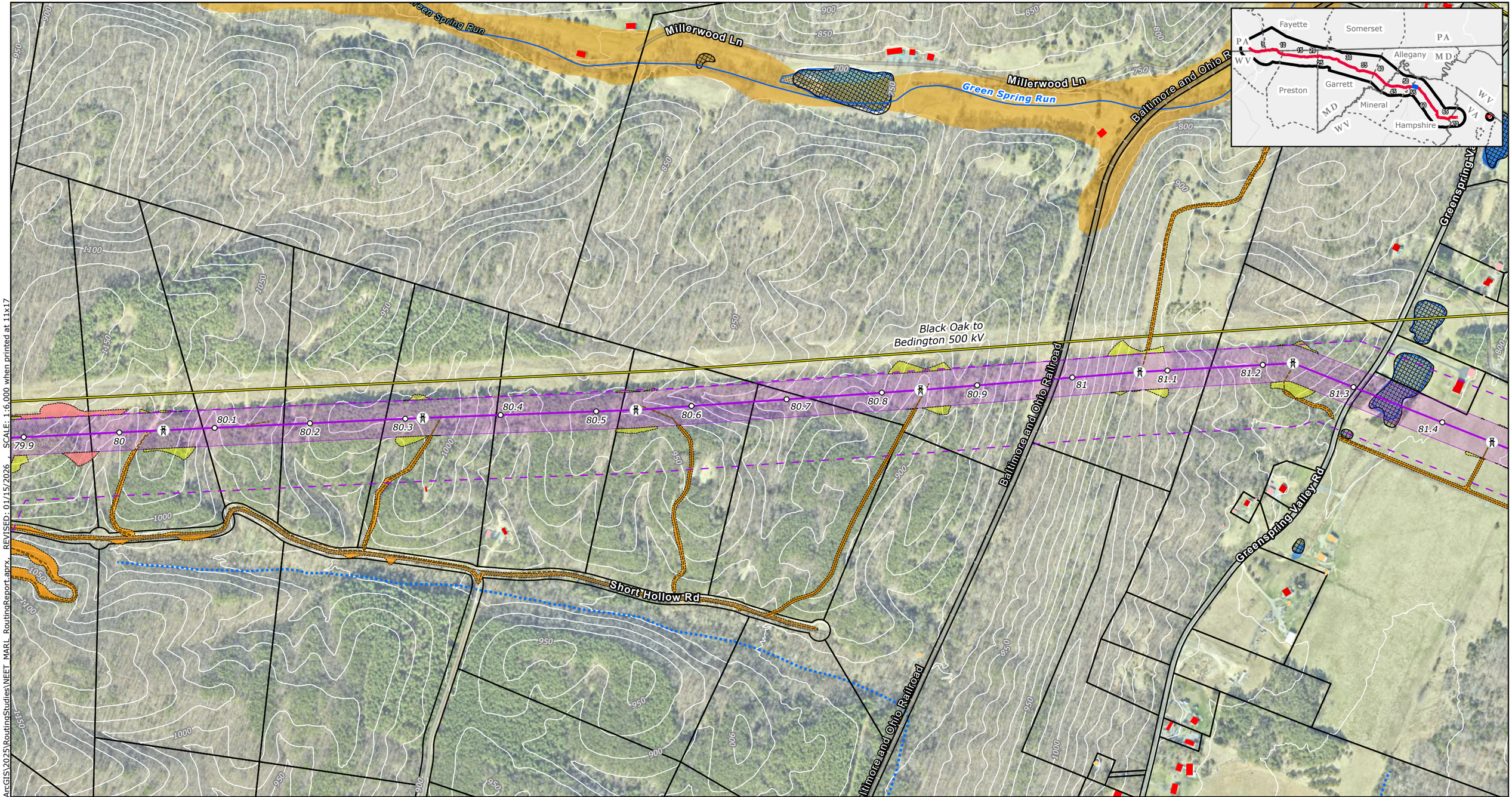

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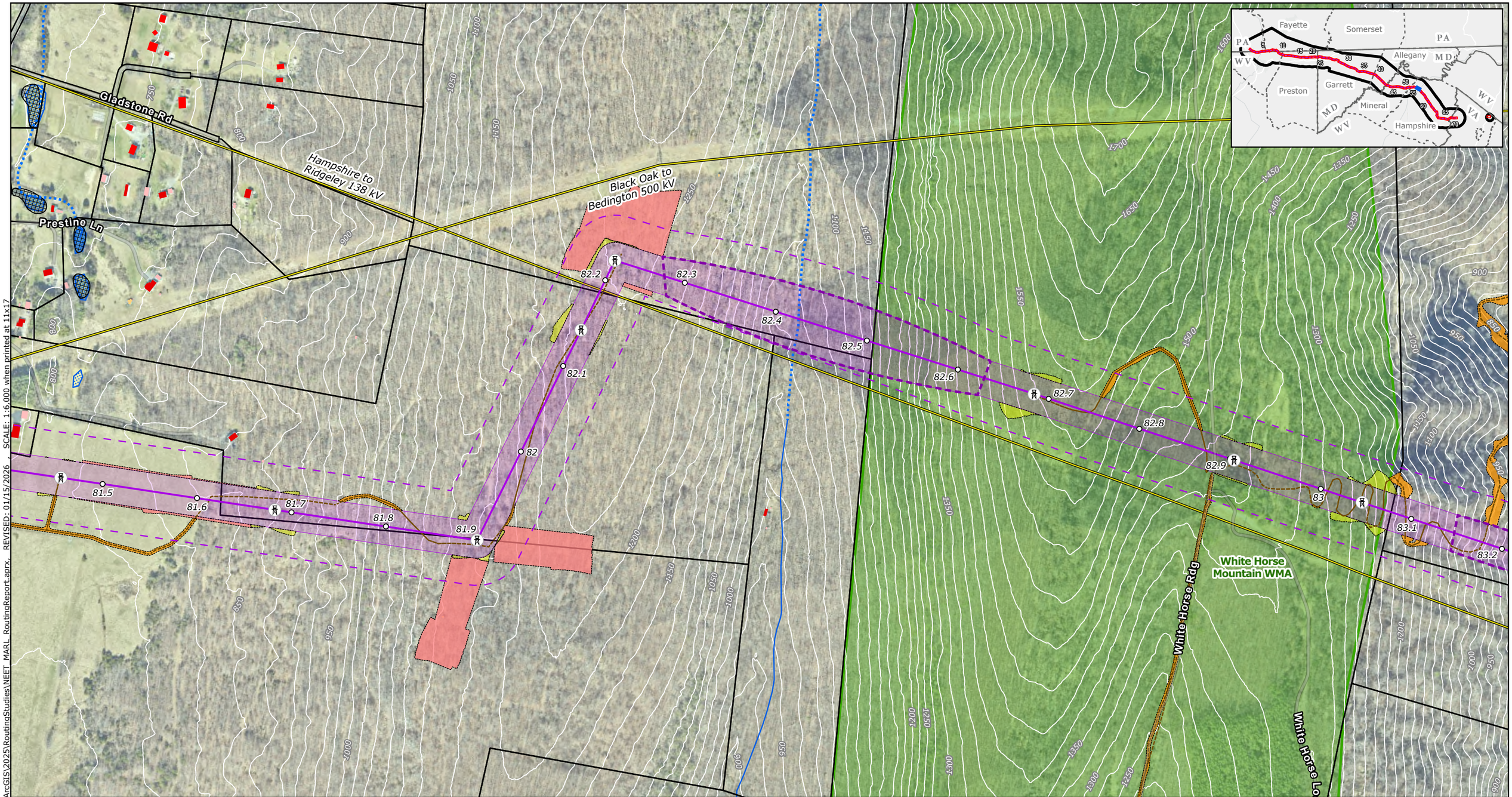

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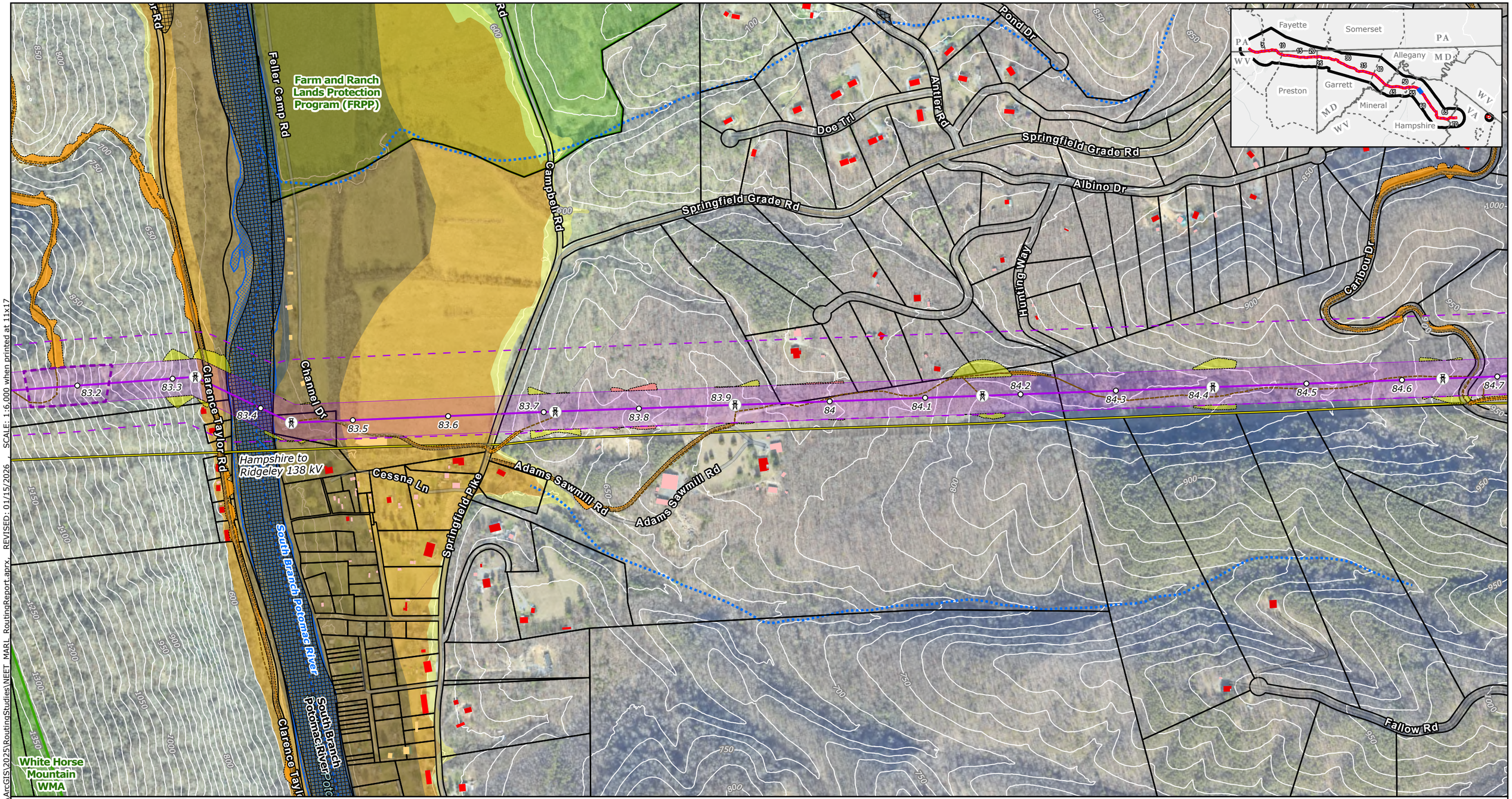

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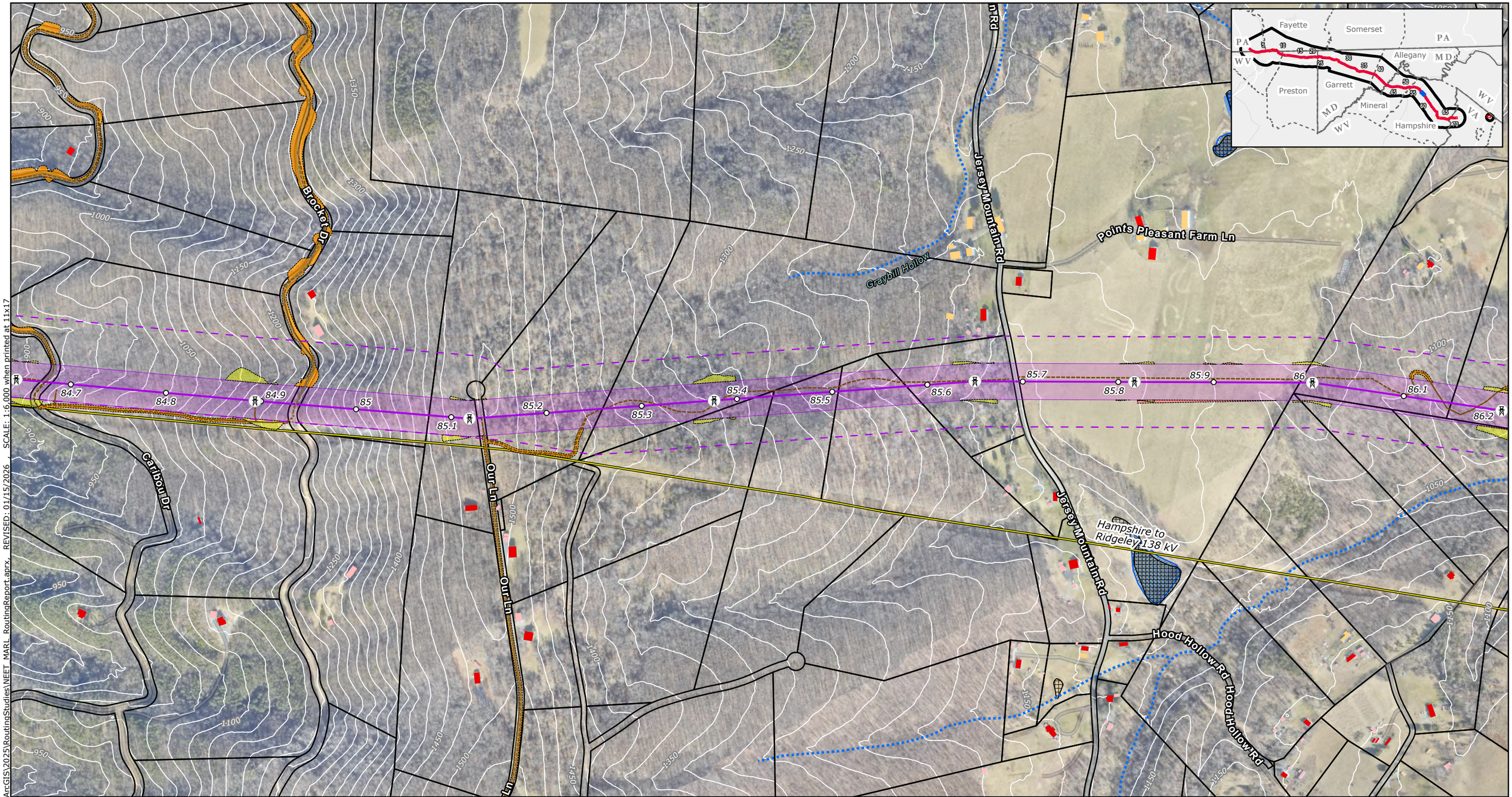

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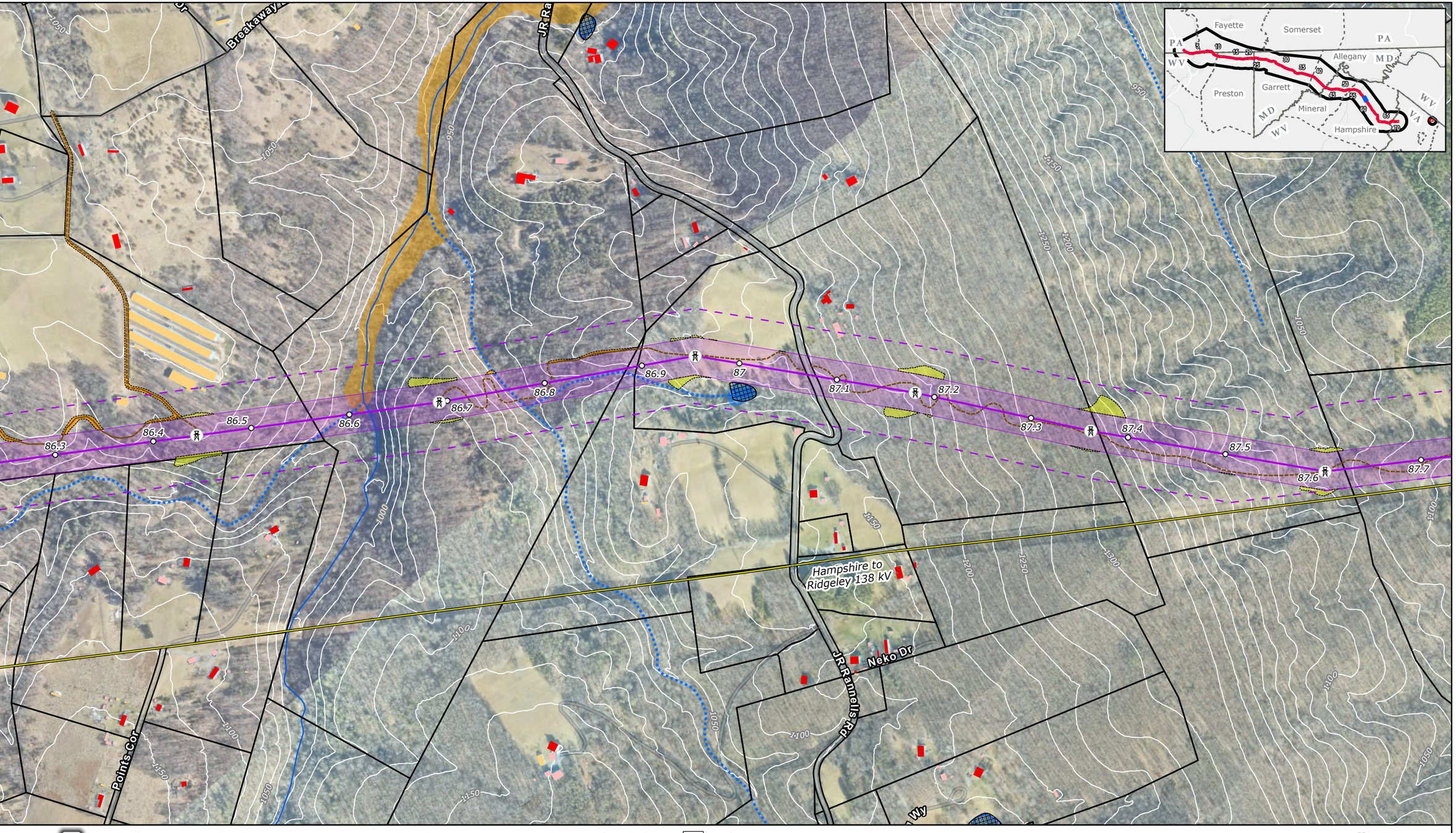

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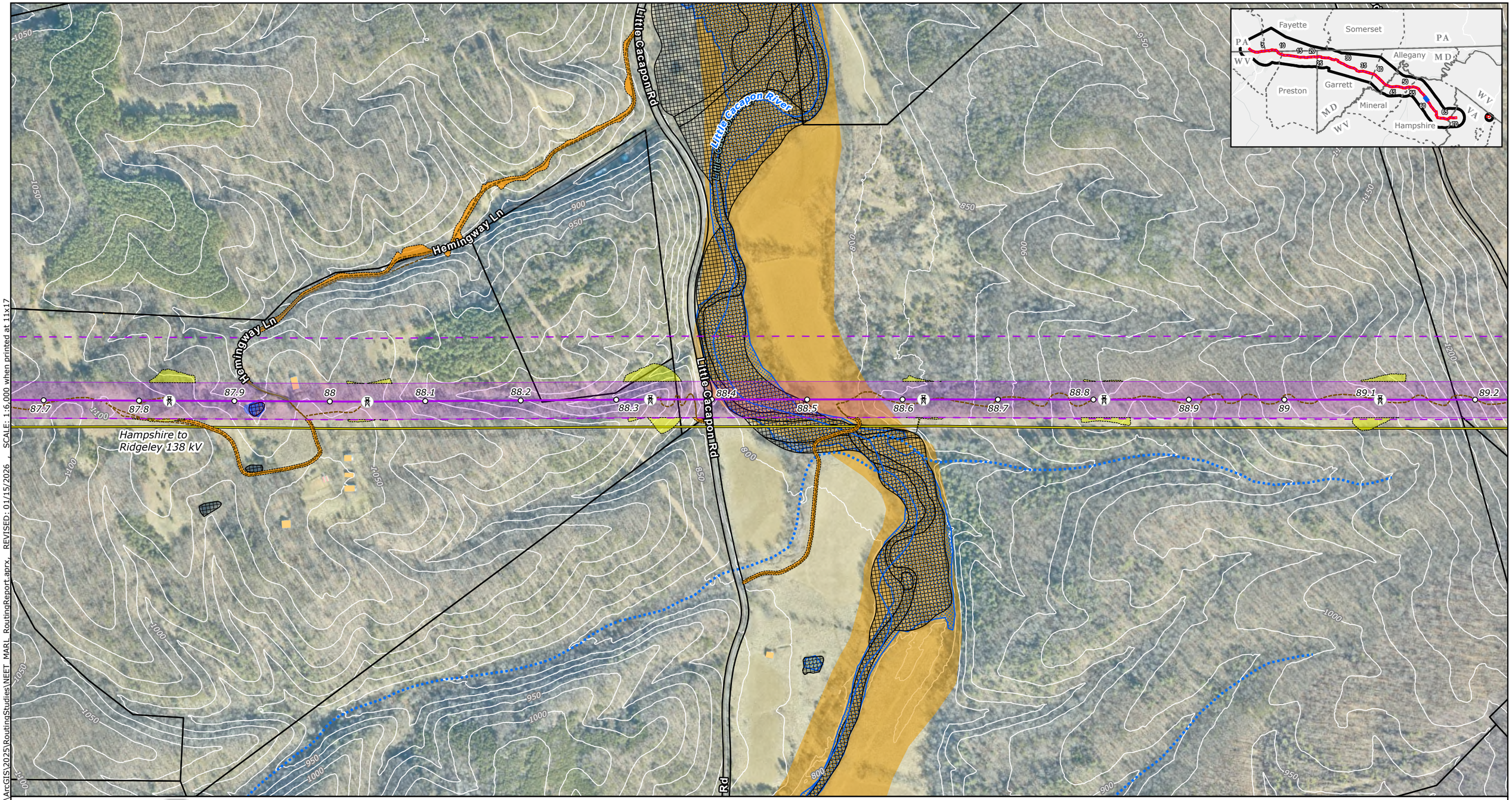

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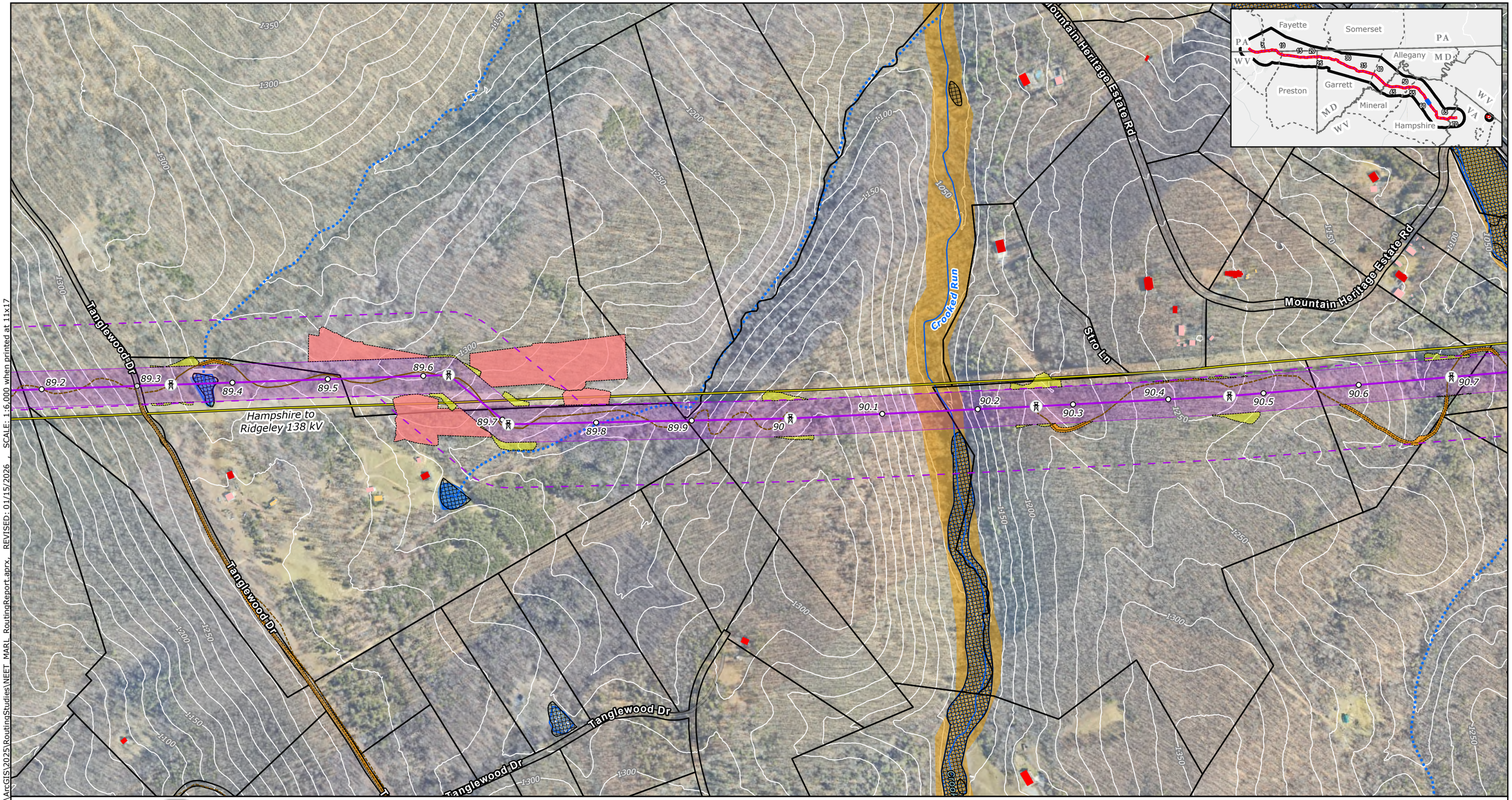

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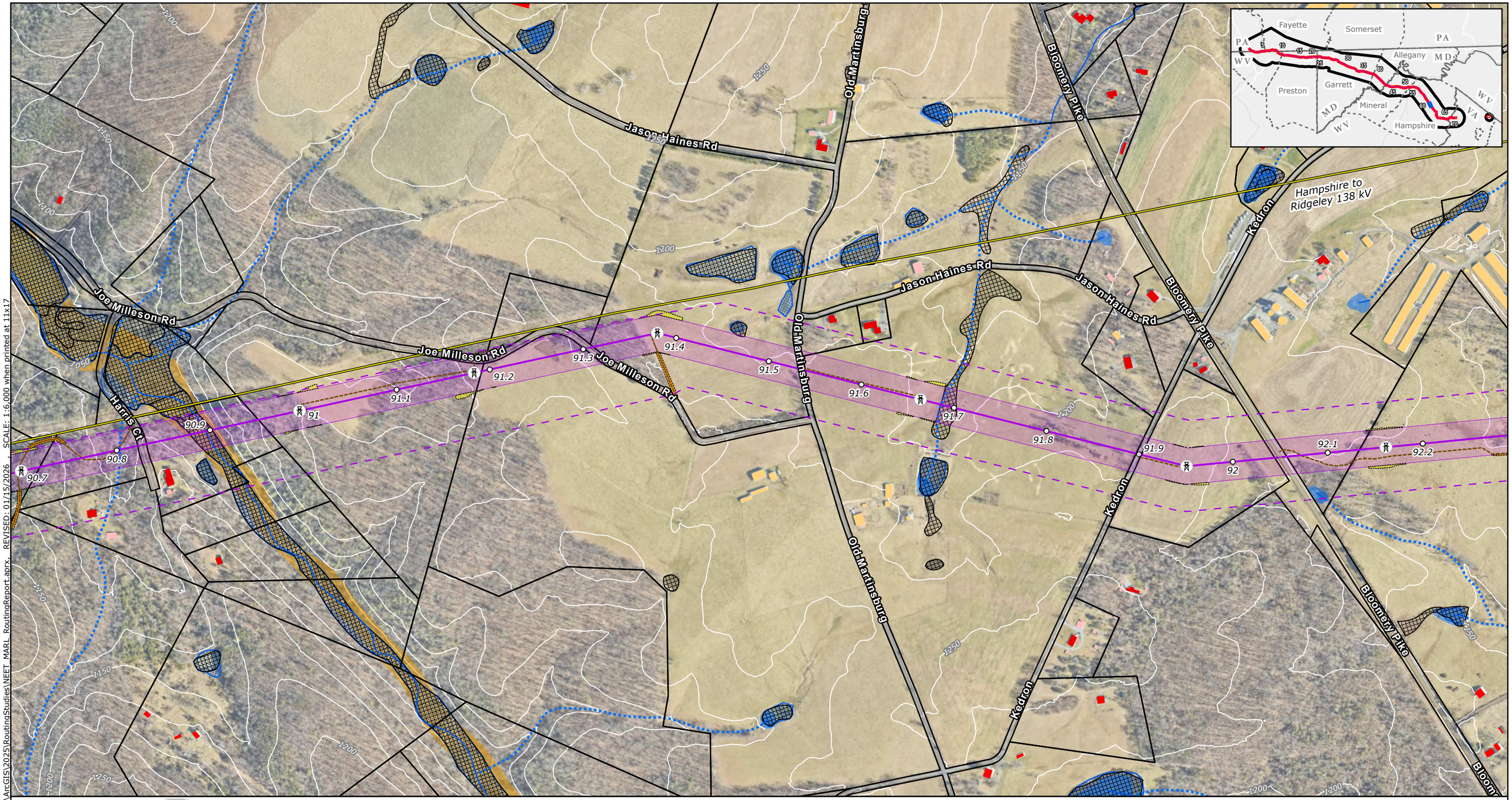

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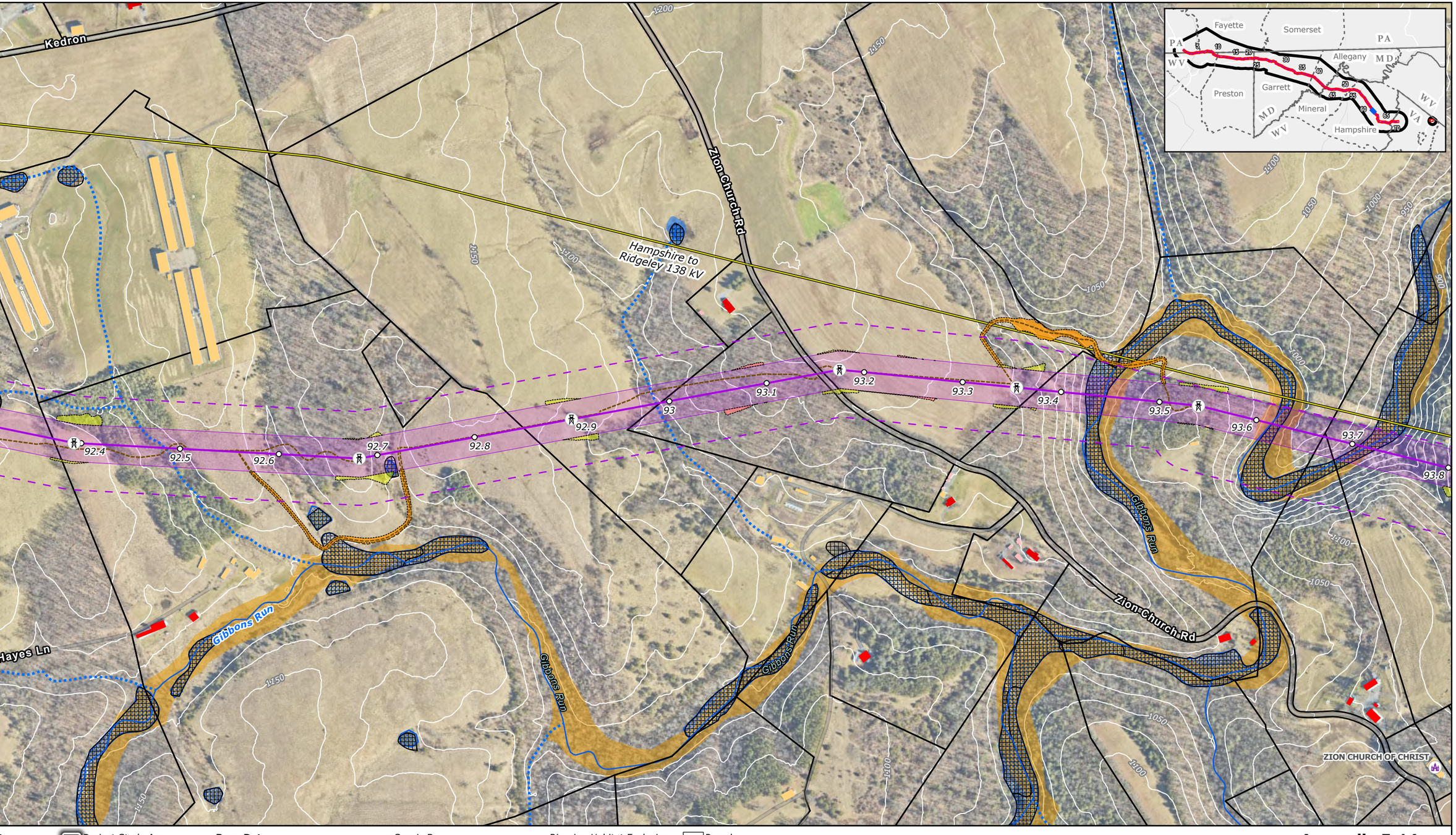

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N

0 0.05 0.1 0.15 0.2
Miles

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ERM

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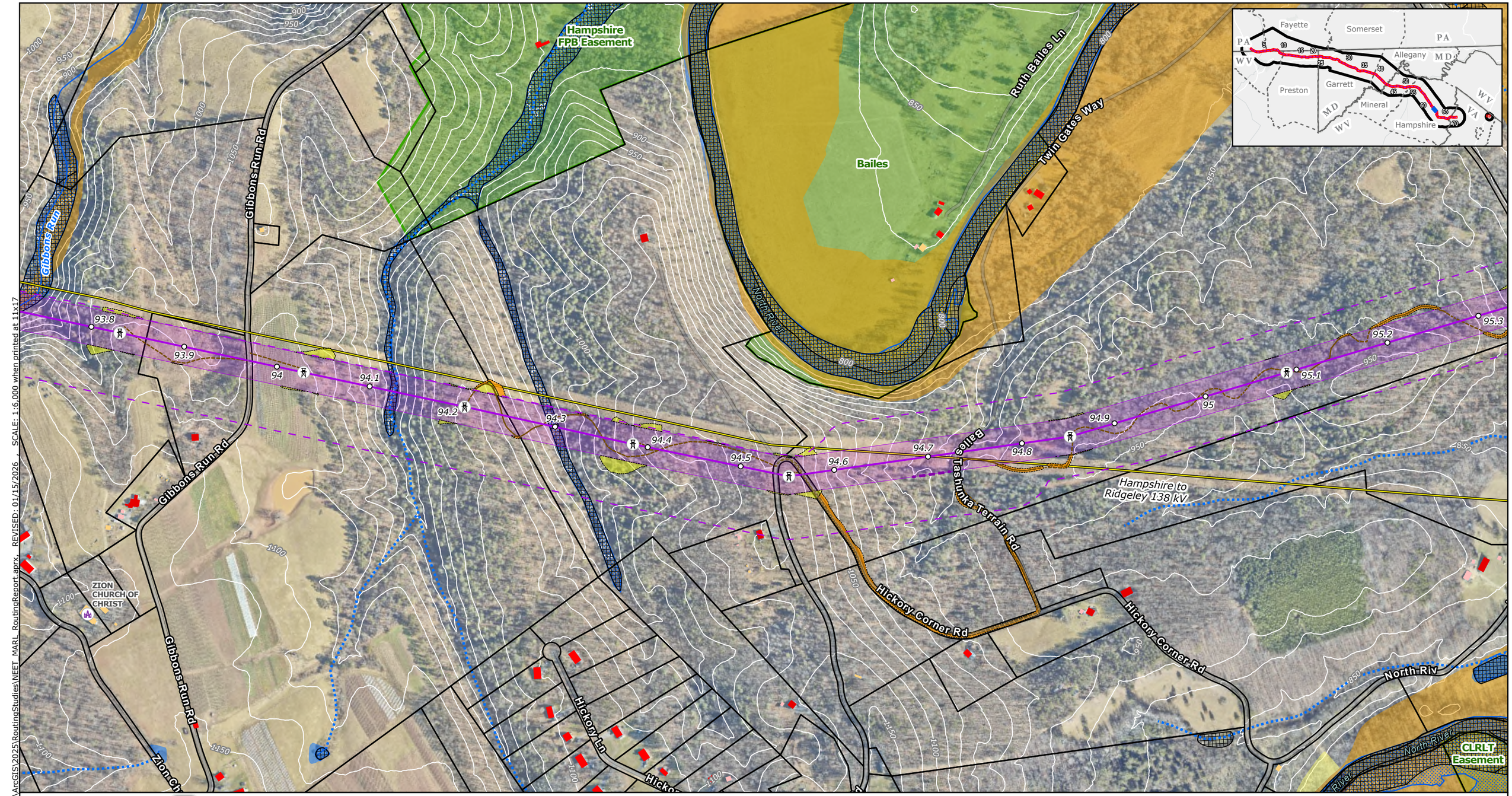

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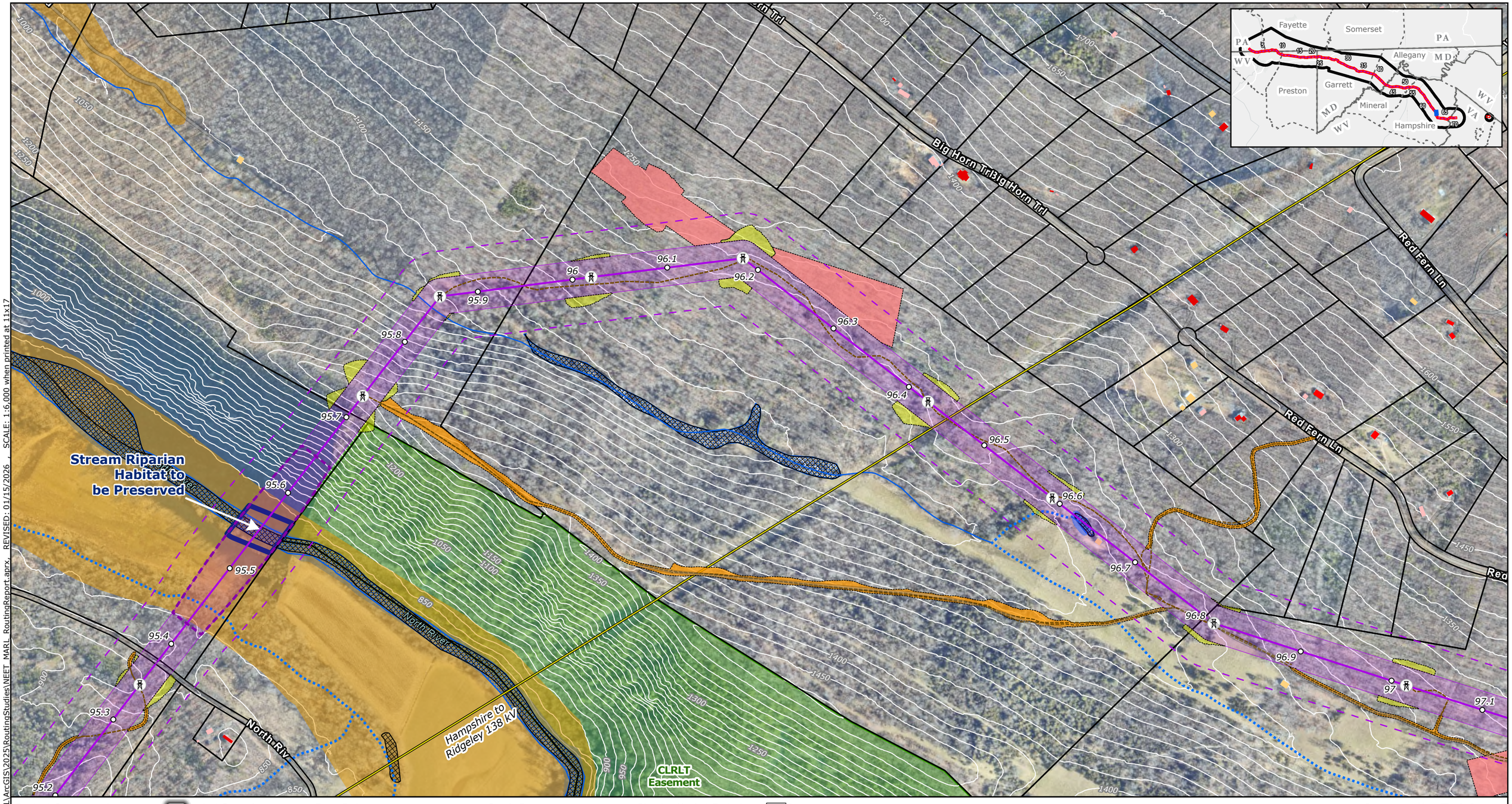

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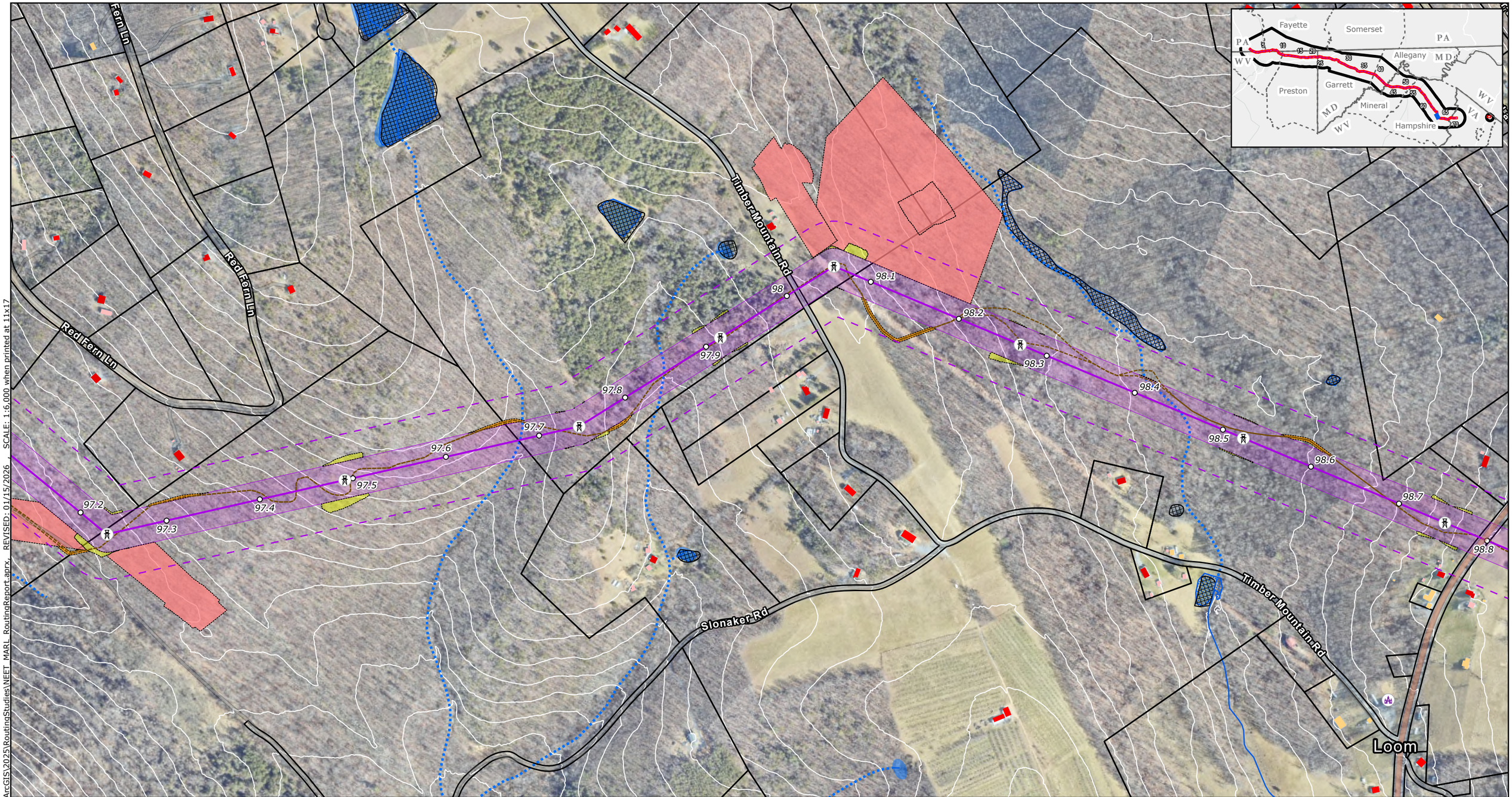

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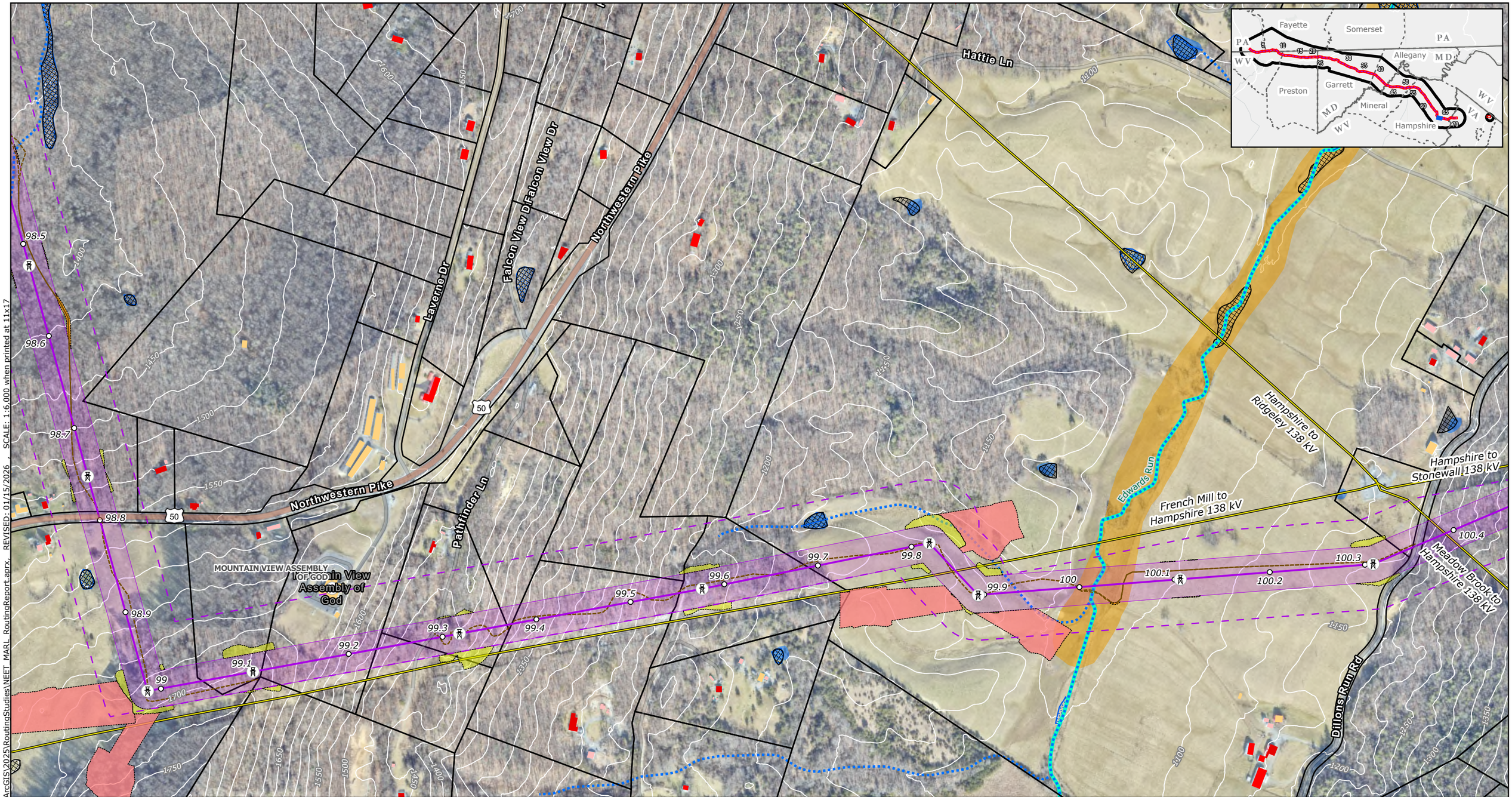

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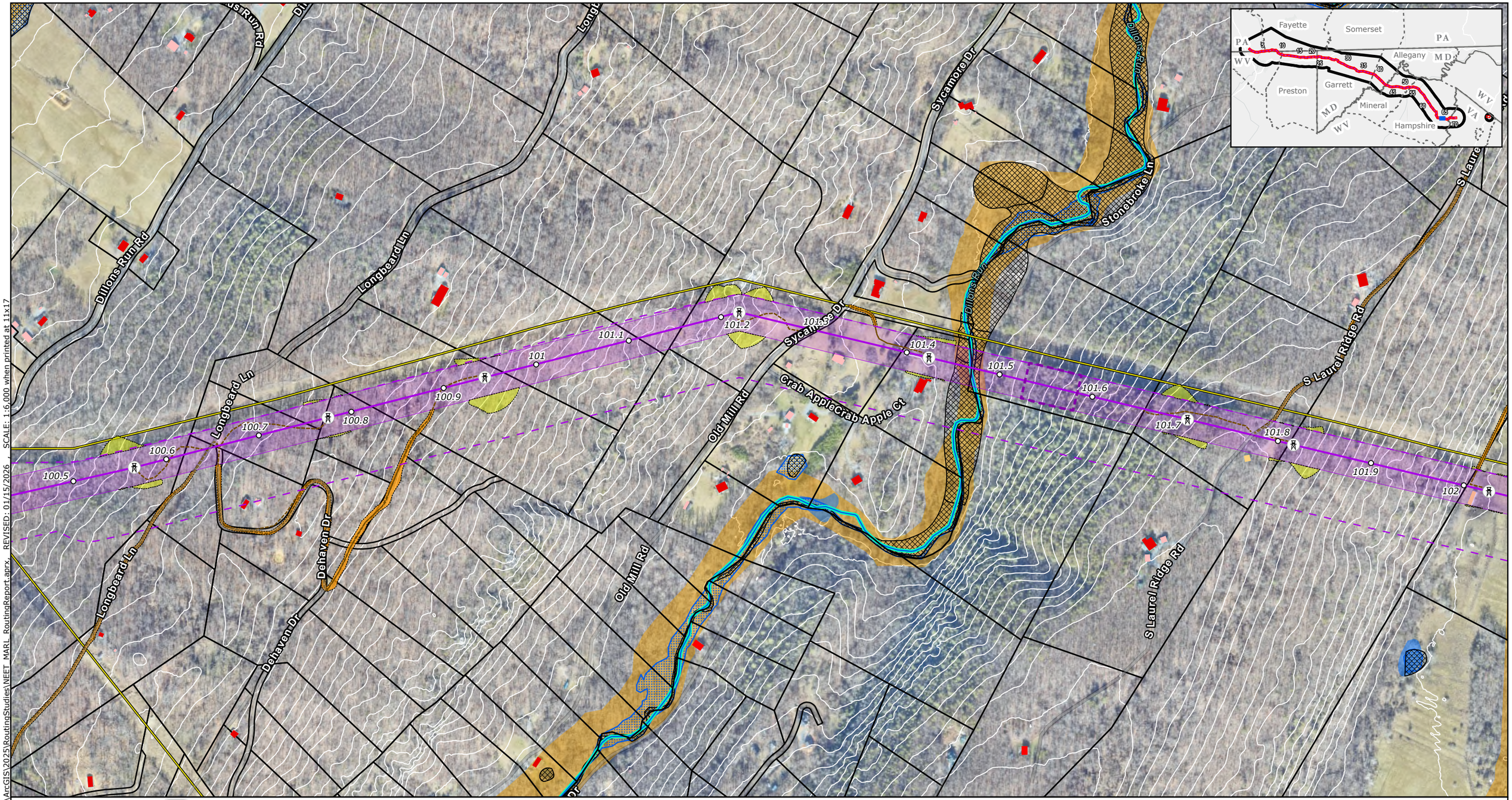

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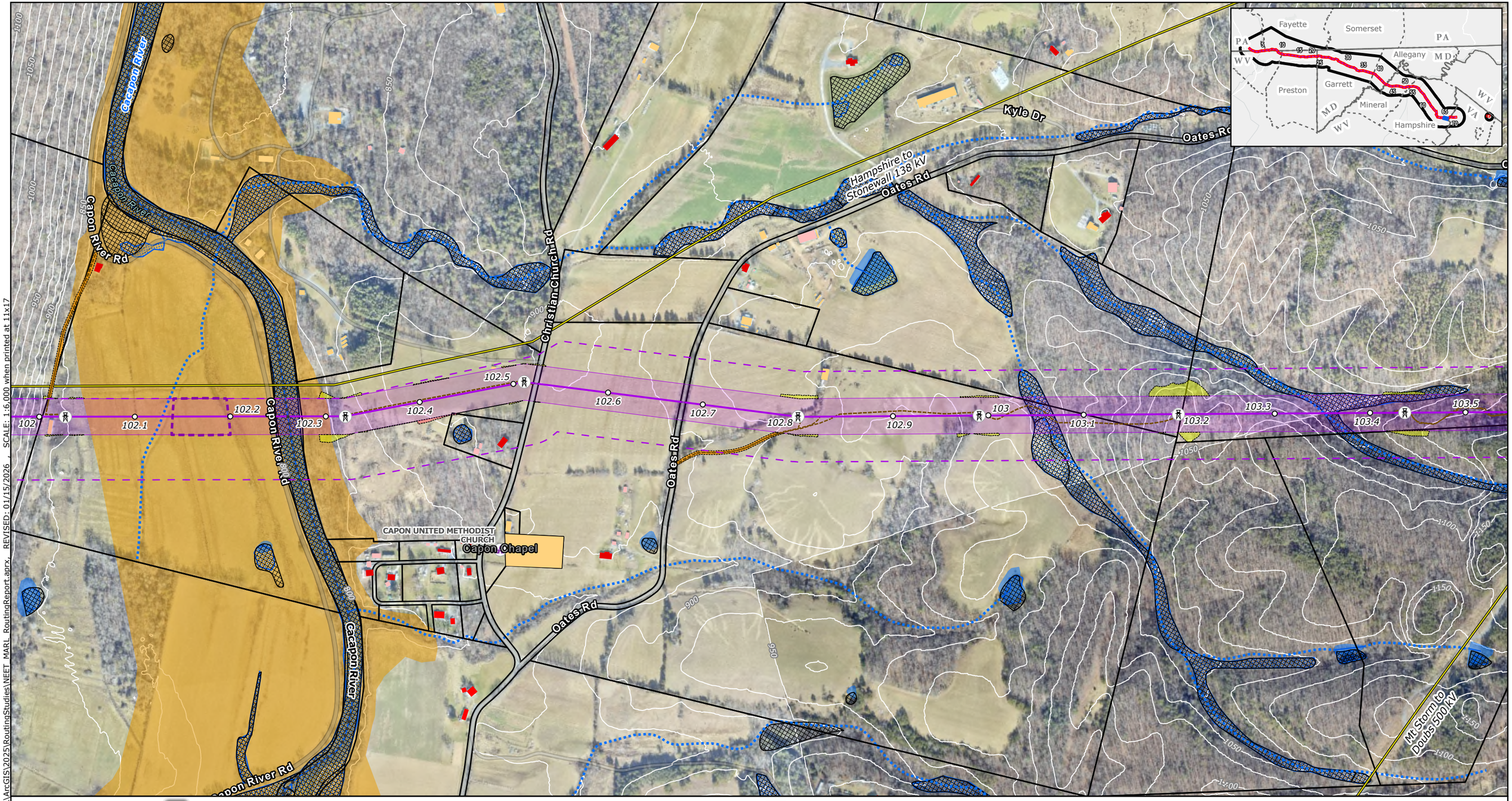

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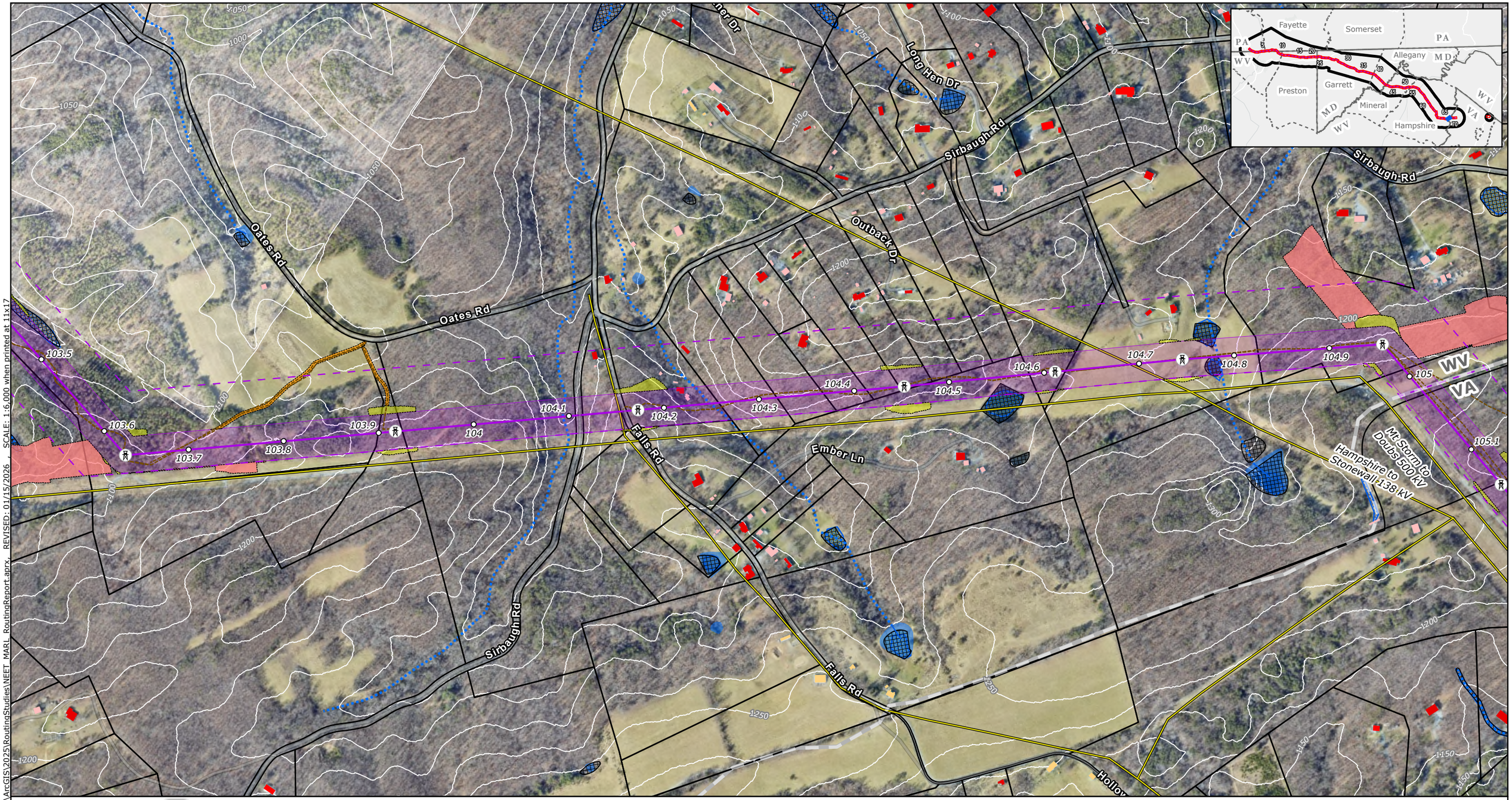

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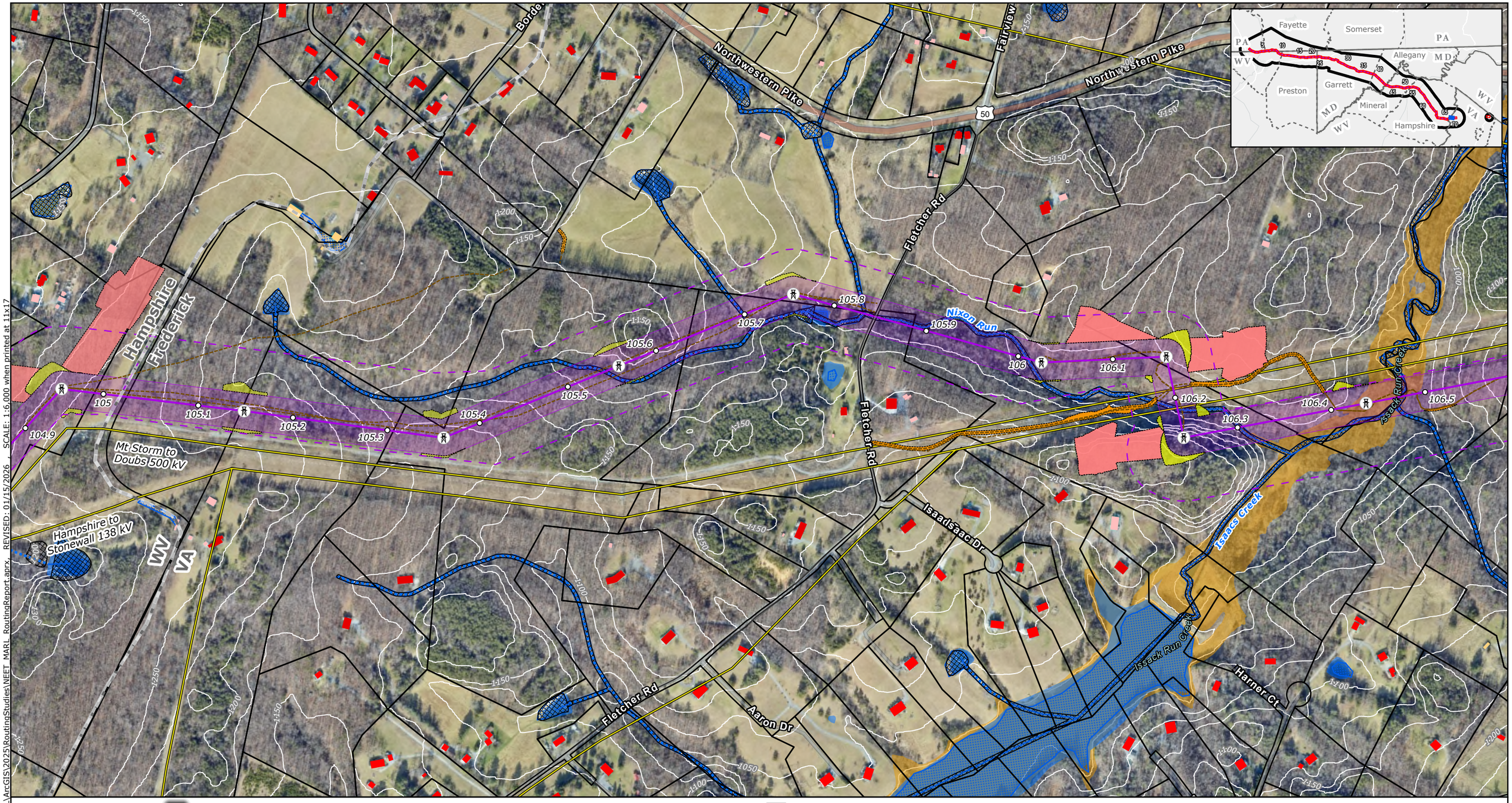

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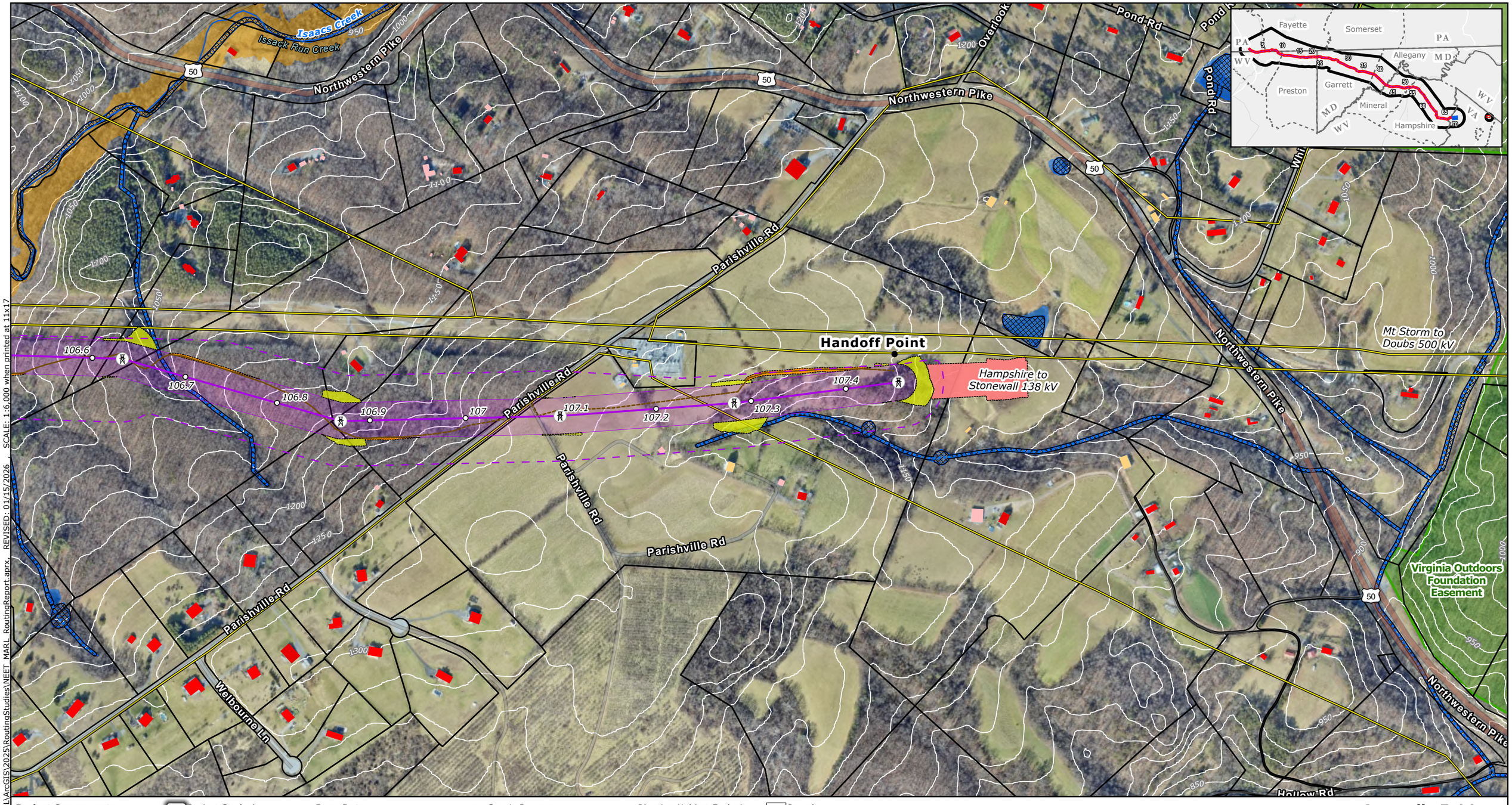

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- NHD Waterbody

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

- Parcels

Buildings Footprints
- Residential Dwelling
- Residential Outbuilding (Shed,Garage,Other)
- Non-residential buildings

NOTES
1. *Proposed tower locations are preliminary and subject to change*
2. *Data source: NEET, ERM, HIFLD, USGS, PAD-US, REXTAG, PAD-US, NCED, MDNR, MDiMAP, PASDA, WVDEP, VADCR*

**Protected Areas includes local, county, state and federal parks, conservation easements, agricultural easements, state forests, and wildlife management areas.*

N

0 0.05 0.1 0.15 0.2

Miles

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Coordinate System: NAD 1983 UTM Zone 17N

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Proposed Route
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MidAtlantic Resiliency Link

ERM

APPENDIX F VEGETATION MANAGEMENT PLAN

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Transmission Vegetation Management Operations Manual

01/21/2025

"This document contains nonpublic transmission information and must be treated in accordance with the FERC Standards of Conduct."

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0 Glossary of Defined Terms

Term	Definition
Clearance 1	Minimum approach distances to energized conductors for persons other than qualified line-clearance arborists and trainees as defined in Table 2 of ANSI Z133.1, 2017; Refer to Appendix 1.
Clearance to Wire (CTW)	A radial distance measurement between vegetation and transmission lines. CTW measurement should be taken on vegetation placed into the annual work plan.
Corridor	A single line circuit or multiple line circuits running in parallel and organized in such a manner that can be managed together as one unit.
Diameter at Breast Height (D.B.H.)	The standard position for diameter measurements at standing trees is at breast height, defined at the height of 4.5 feet from ground level.
Inspector	Individual assigned with the responsibility of evaluating the condition of the ROW and clearances between vegetation and applicable transmission lines.
Minimum Vegetation Clearance Distance (MVCD)	The minimum distance to prevent flashover as specifically identified in FAC-003-5, Table 2; Refer to Appendix 3.
NERC applicable line	These include lines operated at 200kV or higher, or lines identified as an element of an IROL, or lines that are an element of a Major WECC Transfer Path, or lines that are operated at 200kV or higher and extend greater than 1 mile beyond the fenced area of the generating station switchyard to the point of interconnection, or lines that are operated at 200kV or higher and do not have a clear line of sight from the generating station switchyard fence to the point of interconnection.
Right-of-Way (ROW)	Type of legal right by ownership, easement, permit, grant, or reservation over land for the operation of electrical transmission lines. The maintained width of the ROW is as established at the time of construction or what has been maintained prior to FAC-003-1.
Transmission Vegetation Management System (TVMS)	Geographical Information System (GIS) based work management software that serves as the system of record for Transmission Vegetation Management Inspections, Work Planning, Work Execution and Compliance.
Tree Risk Assessment	Line inspection shall include assessing the risk associated with the failure of a tree or tree part, its potential for impacting the facilities and the consequences (ANSI A300 Part 9). A prescription shall be placed in TVMS to mitigate risks. Mitigation measures should include, but not limited to the following future monitoring, removal, topping to make safe and crown reduction.

Trigger Distance	Minimum approach distance from energized conductors for qualified line-clearance arborists and trainees as defined in Table 3 of ANSI Z133.1, 2017; refer to appendix 2. Vegetation conditions at or inside the Trigger Distance are classified as an emergent vegetation condition prescription (EVC) which starts the Emergent Vegetation Process.
Vegetation Action Threshold (VAT)	Vegetation program objective for NERC and Non-NERC lines to keep vegetation clear of power lines by VAT distance; Refer to Appendix 4 and Appendix 5.
Work Batch(s)	Work prescription(s) are prioritized and organized into groups which become the annual work plan.
Work Prescription(s)	Defines and quantifies the work activity to meet the objectives of the plan and identifies when the work should be completed.

1 Introduction

This manual applies to all of NextEra Energy Inc. and its registered entities listed in Appendix 9.1 with designated overhead transmission lines identified as NERC FAC-003-5 applicable lines operated at 200kV or higher and lines operated below 200kV identified by the Planning Coordinator or Transmission Planner that can result in uncontrolled operation that adversely impacts the reliability of the Bulk Electric System. The objectives outlined in this program manual includes all non-applicable overhead transmission and distribution lines.

2 Objective

To define a vegetation management program that ensures reliability of the bulk electric system (BES). The following is a list of program objectives:

- Managing vegetation, prior to encroachment, into Vegetation Action Threshold (VAT) for NERC applicable and Non-NERC lines
- Mitigating potential fire hazards by managing fuel levels to acceptable limits
- Compliance with governmental vegetation related regulations and restrictions

3 System Structure/Work Prescriptions

3.1 Geographical Structure

The transmission system is organized by Subsidiary, Area, Sub Area, Corridors, Sites and NERC Regions.

3.2 Practices and Work Prescriptions

The vegetation management control methods are to use an integrated vegetation management approach to achieve program objectives through:

- Identification of compatible and incompatible vegetation through inspection
- Implementation of appropriate control methods to discourage incompatible vegetation.
- Promotion of compatible vegetation

Control methods are based on environmental impact and anticipated effectiveness, along with site characteristics, security, economics, current land use and other factors. These methods include, but are not limited to pruning, removal, herbicide application and mowing.

Work identified through the inspection process requires creation of a work prescriptions and is outlined as follows:

- Aerial Spray: Plant specific application of an approved herbicide broadcast across the entire right-of-way using helicopters or fixed wing aircraft. Unit is number of acres.
- Aerial - RT (Dead): A dead tree identified from an aerial inspection that will be removed. Unit is number of trees.
- Aerial - RT (Leaner): A structurally deteriorated tree identified from an aerial inspection that will be removed. Unit is number of trees.
- Aerial - TTS: A tree identified from an aerial inspection pruned to industry standards. Unit is number of trees.
- Broadcast Spray: Plant specific application of an approved herbicide to the entire right- of-way to achieve a species shift in the right-of-way diversity (necessary when one or two incompatible species dominate the right-of-way). Contractor shall achieve a 90% effectiveness after three months of those target species. The process of broadcast spray recognizes that the entire right-of-way will “brown-out.” Unit is number of acres.
- Clear and Treat Brush: Woody species removed, and herbicide applied to stumps or stems within the right-of-way as directed. Unit is number of acres.

- Clear Area: Trees removed, and stumps treated with appropriate herbicide in a specified area. Unit is number of trees.
- Critical Trim: A tree or group of trees approaching trigger distance pruned to industry standards. Unit is number of trees.
- Critical Removal: A tree approaching trigger distance identified for removal. Unit is number of trees.
- Emergent Vegetation Condition (EVC): Pruning of vegetation that is at or inside the minimum approach distance or identified as a safety concern. Reference in Emergent Vegetation Process. Unit is number of trees.
- Ground Check: Location identified during an aerial inspection that requires ground follow-up.
- Lidar Critical Trim: A tree or group of trees detected by remote sensing technologies to be approaching trigger distance to be pruned to industry standards. Unit is number of trees.
- Lidar Trim Area: A tree or group of trees detected by remote sensing technologies pruned to industry standards. Unit is number of trees.
- Linear Trim: Specifically identified spans of high-density trees pruned where it is not practical to obtain a tree count in advance of the work. Occasionally , there will be trees that require removal during this process. It is not necessary to document the count of these removals because linear trimming is based on length of work (not tree counts). Unit is linear foot for each side of right-of-way.
- Mechanical Trim: Specifically identified spans of trees pruned with a mechanical tree trimmer, such as a Jarraffe. Unit is linear foot for each side of right-of-way.
- Mow - Normal: Grass and brush in right-of-way mowed or cut to a height of less than six (6) inches. Brush DBH in right-of-way is less than two (2) inches. Unit is number of acres.
- Mow - Heavy: Grass and brush in right-of-way mowed or cut to a height of less than six (6) inches. Brush DBH in right-of-way is greater than two (2) inches. Unit is number of acres.
- Mow Roads & Pads: Grass and brush mowed or cut thirteen (13) feet on each side of the center line of the road or structure to a height of less than six (6) inches. Unit is number of acres.
- Mow - Specialized: Grass and brush in right-of-way mowed or cut to a height of less than six (6) inches. Vegetation cleared using unique methods with specialized equipment or the average soil in right-of-way is sufficiently wet to require low ground pressure equipment. Unit is number of acres.
- Pole Clearing: Clearing or application of plant specific approved herbicide on the structure pad to the target species for a minimum distance of ten (10) feet around the structure and one and one-half feet (1.5) around down guys. Unit is number of poles.
- Remove Trees: Trees or shrubs cut (4"or greater at DBH, 5" caliper or greater stump) at ground level and the stumps treated with the appropriate herbicide where necessary to prevent re-sprouting. Unit is number of trees.
- Remove Vines: The severing of vines at or above ground level and application of a plant specific approved herbicide. (Under no circumstances are vines removed from the pole if they are closer in elevation than ten (10) feet below energized facilities). Unit is number of poles.
- Restricted Work: Vegetation work with restrictions placed on the site or job by a governmental agency.
- Roll ROW: Vegetation in right-of-way rolled down using the tracks and a chopper (under wet conditions). Unit is number of acres
- Short Cycle Trim: A tree pruned to industry standards on a cycle less than 12 months. Unit is number of trees.
- Special: Unique vegetation work not defined in the current work prescription list.
- Spot Treat - Heavy: Plant specific application of an approved herbicide to the target species. The application shall achieve a 90% control after three months of all target species. Target species

density is greater than two thousand (2000) stems per acre or greater than sixty percent (60%) of the area of the span. Unit is number of acres.

- Spot Treat - Light: Plant specific application of an approved herbicide to the target species. The application shall achieve a 90% control after three months of all target species. Target species density is less than one thousand (1000) stems per acre or less than thirty percent (30%) of the area of the span. Unit is number of acres.
- Spot Treat - Medium: Plant specific application of an approved herbicide to the target species. The application shall achieve a 90% control after three months of all target species. Target species density is greater than one thousand (1000) stems per acre and less than two thousand (2000) stems per acre or greater than thirty percent (30%) and less than sixty percent (60%) of the area of the span. Unit is number of acres.
- Tree Mitigation: Tree identified that has initiated the Vegetation Mitigation Process.
- TGR (Tree Growth Regulator): Specific application of approved TGR to a tree to slow its growth. Results should be evident within six (6) months and last for two to three years. Unit is number of trees.
- Trim Area: Trees pruned to industry standards in a specified area. Unit is number of trees.
- Trim Tree(s) to Standard: Branches pruned from a tree to industry standards. Unit is number of trees.
- Widen ROW Edge: Clear vegetation encroaching into the right-of-way to maintained right-of-way edge. Unit is number of acres.

4 Vegetation Management Program (NERC Standard FAC-003-5, Requirement R1 and R3)

4.1 Program Description

The Vegetation Management Program is designed to mitigate the risk of vegetation from encroaching into VAT. The key elements of the program are to inspect the applicable ROWs, document vegetation, prescribe a work plan, and execute the work plan prior to the vegetation encroaching into the VAT for NERC and Non-NERC lines.

Based on the inspections, work prescriptions are defined and inventoried in TVMS, including the work types (i.e., maintenance strategies and vegetation control methods) based on vegetation growth rates and environmental conditions. The identified work prescriptions are then prioritized and organized into groups of work which become the annual work plan, which is managed in TVMS, per Section 8.

4.2 Layers of Protection

The Vegetation Management Program has established layers of protection to prevent encroachment into MVCD:

- Growth and bend-in potential of the vegetation are gauged through the course of patrol/inspection.
- Quality Assurance and Control; Refer to Section 8.3.3
- Clearance to Wire measurements; Refer to Section 0

4.3 Quarterly Reporting to the Regional Entity (RE)

The Vegetation Management and Compliance groups shall report, at least quarterly to the RE, qualifying sustained transmission line outages determined to have been caused by vegetation. If interruptions have occurred that meet the NERC requirements for reporting, Vegetation Management will review outage with the Compliance Organization prior to submission.

5 Communicating the existence of a vegetation condition that is inside the Trigger Distance (NERC Standard FAC-003-5, Requirement R4)

The Inspector shall communicate to the appropriate control center, without intentional delay, vegetation conditions that are inside the Trigger Distance as defined in Appendix 2. Reference the Emergent Vegetation Process.

6 Mitigation Measures (NERC Standard FAC-003-5, Requirement R5)

Restrictions on scheduled work may include refusals by property owners to access or perform work batches to stop work by local authorities, or restrictions by federal and/or state agencies. These restrictions should be brought to leadership for action. While negotiations or legal action with governmental entities or landowners is underway, the Inspectors shall manage the restriction to prevent encroachment into MVCD.
If Vegetation Maintenance is constrained from being performed, the following actions should be taken and documented to prevent vegetation from encroaching MVCD on NERC applicable lines:

Refer to Vegetation Mitigation Process that requires:

- Short cycle prescription created for identified work.
- Increased condition assessment frequency to monitor the vegetation as warranted.

7 ROW Inspection Schedule (NERC Standard FAC-003-5, Requirement R6)

Generally, scheduled work will be determined by the inspection process. Routine inspections will occur via ground patrols, aerial patrols, lidar and/or imagery analysis. NERC applicable lines, and Non-NERC lines designated as critical to the reliability of the electrical system in the region shall be inspected 100%, at a minimum, annually with no more than 18 months between inspections. The inspection schedule is documented in TVMS.

An independent patroller will perform a peer patrol on NERC applicable lines designated by the Vegetation Management Operations Leader to ensure vegetation management practices are aligned with vegetation management program expectations. The independent review of classified LiDAR data or imagery can be the independent patrol.

The timing and number of inspections may be adjusted to respond to changing conditions such as fuel loading, heavy rain falls, high winds, landowner intervention, and tree mortality.

7.1 Inspection Purpose

- To inventory vegetation conditions that may impact the safe and reliable operation of the bulk electrical system. Tree Risk Assessment shall be performed during all inspections.
- To prioritize work appropriate to species and/or site-specific conditions.
- To adjust schedule for changes in vegetation growth to prevent encroachment into VAT.

7.2 Inspection Records

Each inspection shall be documented in TVMS with the date of completion and the name of the Inspector. Data records and/or evidence will be maintained for at least three calendar years to show compliance with FAC-003-5.

8 Annual Work Plan (NERC Standard FAC-003-5, Requirement R7)

8.1 Annual Work Plan

Annually, the Transmission Vegetation Management Team shall review work prescriptions and work batches that comprise the Annual Work Plan to ensure the plan meets program objectives and prevent risk

of encroachment into MVCD.

Prior to the end of the calendar year of the plan, Transmission Vegetation Management Team shall review the Annual Work Plan to ensure completion and Vegetation Management Leadership shall review that NERC applicable lines are compliant with the NERC Standard FAC-003-4 as required by each Reliability Entity.

The Annual Work Plan is created, maintained, and modified in TVMS. Periodically, the plan is reviewed to ensure it continues to meet program objectives and does not allow any encroachment into MVCD. The Annual Work Plan is dynamic and will allow for adjustments to the work plan based on inspections, changes to right-of-way conditions and other environmental factors. These modifications shall be documented at the work prescription level.

Reasons for modifications to existing work prescriptions in TVMS that impact the Annual Work Plan may include, but are not limited to:

- Change in expected growth rate/environmental factors.
- Circumstances that are beyond control of the Transmission Vegetation Management, such as natural disasters
- Rescheduling work
- Crew or contractor availability.
- Identified unanticipated high priority work.
- Weather conditions/Accessibility
- Permitting delays
- Customer changes/issues

Modifications to the vegetation Annual Work Plan in response to changing conditions as described above may occur. In the event a modification is needed that does not put the transmission system at risk of an encroachment, then the percent completed calculation will be based on the number of units completed divided by the number of units in the final revised plan. For example:

- No revisions: If 1,000 work prescriptions are planned for the year and 1,000 work prescriptions were completed by year-end, the calculation for percent completion of the work plan would be work prescriptions completed divided by work prescriptions planned for year (1,000 work prescriptions / 1,000 work prescriptions = 100% completion of Annual Work Plan).
- Additional work: If 1,000 work prescriptions are planned at the beginning of the year, but during an inspection 50 existing work prescriptions were identified and added to the Annual Work Plan. The % completion of revised annual work plan of 1,050 work prescriptions would be calculated by the number completed year-end divided by the number of work prescriptions in the revised work plan (1,050 work prescriptions / 1,050 work prescriptions = 100% completion of the Annual Work Plan).
- Deferred work: If 1,000 work prescriptions are planned at the beginning of the year, but during an inspection 50 existing work prescriptions are removed from the Annual Work Plan due to the reasons for modifications listed above. The % completion of the revised work plan of 950 work prescriptions would be calculated by the number completed year-end divided by the number of work prescriptions in the revised work plan (950 work prescriptions / 950 work prescriptions = 100% completion of the Annual Work Plan).

Documentation for modification of the annual plan (any of the scenarios described above) is MANDATORY. In all circumstances associated with the annual work plan, whether additions or deferments of work prescriptions, the program will maintain adherence to the objectives outlined in Section 2.

8.2 Work Specifications

The methods utilized for vegetation management are further described in contract specifications. Specifications will be developed for work that is bid or assigned and shall maintain compliance with the standards set forth in this document.

All work specifications shall comply with the following industry standards:

- ANSI Z133.1-2017 Safety Requirements for Arboricultural Operations.
- OSHA 1910.269 Electric Power Generation, Transmission and Distribution.
- ANSI A300 (Part 1)-2017 Pruning
- ANSI A300 (Part 7)-2018 Integrated Vegetation Management
- ANSI A300 (Part 9)-2017 Tree Risk Assessment a. Tree Failure
- ISA BMP's that are components to ANSI parts 1, 7 and 9

8.3 Implementation (NERC Standard FAC-003-5, Requirement R7)

8.3.1 Tracking

Periodically, the Transmission Vegetation Management will review the progress of scheduled and completed work. The Annual Work Plan will consist of all planned work prescriptions with a due date in the annual work plan year. Changes to annual work plan during the calendar year will be documented within TVMS with a change modification reason. The Annual Work Plan is due at the end of the calendar year. Work plan completion percentage be determined by dividing the number completed work prescriptions by the work prescriptions total in the finalized Annual Work Plan.

8.3.2 Documentation

The annual work plan is maintained in TVMS. Reports are monitored to ensure work plan is complete and plan modifications are documented.

8.3.3 Quality Assurance, Quality Control, and Independent Inspection

The Quality Assurance and Quality Control program reviews completed work to ensure that the annual work plan is effectively executed and within the specifications of the transmission vegetation program. Refer to Transmission Vegetation Management Quality Assurance and Control process.

9 Appendixes

9.1 NextEra Energy, Inc. Registered Entities

Florida Power & Light (FPL)

NextEra Energy Resources (NEER):

Canadian Assets
USA Assets

NextEra Energy Transmission (NEET):

GridLiance Holdco (GDLH)
Horizon West Transmission (HWT)
Lone Star Transmission (LST)
New Hampshire Transmission (NHT)
NextEra Energy Transmission MidAtlantic (NMA)
NextEra Energy Transmission New York (NNY)
Trans Bay Cable (TBC)
Upper Canada Transmission (UCT)
NextEra Energy Transmission Southwest (NEET SW)

9.2 Appendix 1 – ANSI Z133.1 Table 2 (Clearance 1)

Table 2. Minimum approach distances to energized conductors for persons other than qualified line-clearance arborists and qualified line-clearance arborist trainees.

Nominal voltage in kilovolts (kV) phase-to-phase*	Distance	
	feet-inches	meters
0.0 to 1.0	10-00	3.05
1.1 to 15.0	10-00	3.05
15.1 to 36.0	10-00	3.05
36.1 to 50.0	10-00	3.05
50.1 to 72.5	10-09	3.28
72.6 to 121.0	12-04	3.76
138.0 to 145.0	13-02	4.00
161.0 to 169.0	14-00	4.24
230.0 to 242.0	16-05	4.97
345.0 to 362.0	20-05	6.17
500.0 to 550.0	26-08	8.05
785.0 to 800.0	35-00	10.55

* Exceeds phase to ground. Per 29 CFR 1910.333

9.3 Appendix 2 – ANSI 133.1 Table 3 (Trigger Distance)

Table 3. Minimum approach distances (MAD) from energized conductors for qualified line-clearance arborists and qualified line-clearance arborist trainees.

Voltage Range (Phase-to-Phase)	Altitude Correction Factor Sea Level to 5,000 ft (0–1,524 m)* Phase-to-Ground		Altitude Correction Factor 5,000 to 10,000 ft (1,524–3,048 m)* Phase-to-Ground		Altitude Correction Factor 10,000 to 14,000 ft (3,048–4,267 m)* Phase-to-Ground	
kV	ft-in	m	ft-in	m	ft-in	m
0.050 to 0.300	*Avoid contact*		*Avoid contact*		*Avoid contact*	
0.301 to 0.750	1-02	0.356	1-04	0.407	1-06	0.458
0.751 to 5.0	2-03	0.686	2-06	0.762	2-09	0.839
5.1 to 15.0	2-03	0.686	2-07	0.788	2-10	0.864
15.1 to 36.0	2-08	0.813	3-01	0.940	3-04	1.016
36.1 to 46.0	2-11	0.889	3-04	1.016	3-08	1.118
46.1 to 72.5	3-06	1.067	4-00	1.220	4-04	1.321
72.6 to 121.0	3-11	1.194	4-06	1.372	4-10	1.474
121.1 to 145.0	4-06	1.372	5-02	1.575	5-07	1.702
145.1 to 169.0	5-01	1.550	5-09	1.753	6-03	1.905
169.1 to 242.0	7-00	2.134	7-11	2.413	8-07	2.617
242.1 to 362.0	11-09	3.582	13-06	4.115	14-07	4.445
362.1 to 420.0	14-08	4.471	16-09	5.106	18-02	5.538
420.1 to 550.0	17-06	5.334	20-00	6.096	21-08	6.604
550.1 to 800.0	23-09	7.239	27-02	8.281	29-05	8.967

*From 29 CFR 1910.269 Tables R-6 & R-7 altitude corrected (R-5) for 1,500 m, 3,000 m, & 4,200 m.

9.4 Appendix 3 – FAC 003 Table 2 (Minimum Vegetation Clearance Distance)

FAC-003 — TABLE 2 — Minimum Vegetation Clearance Distances (MVCD)[12]

For **Alternating Current** Voltages (feet)

(AC) Nominal System Voltage (KV)*	(AC) Maximum System Voltage (kV)[13]	MVCD (feet) Over sea level up to 500 ft	MVCD feet Over 500 ft up to 1000 ft	MVCD feet Over 1000 ft up to 2000 ft	MVCD feet Over 2000 ft up to 3000 ft	MVCD feet Over 3000 ft up to 4000 ft	MVCD feet Over 4000 ft up to 5000 ft	MVCD feet Over 5000 ft up to 6000 ft	MVCD feet Over 6000 ft up to 7000 ft	MVCD feet Over 7000 ft up to 8000 ft	MVCD feet Over 8000 ft up to 9000 ft	MVCD feet Over 9000 ft up to 10000 ft	MVCD feet Over 10000 ft up to 11000 ft	MVCD feet Over 11000 ft up to 12000 ft	MVCD feet Over 12000 ft up to 13000 ft	MVCD feet Over 13000 ft up to 14000 ft	MVCD feet Over 14000 ft up to 15000 ft
765	800	11.6ft	11.7ft	11.9ft	12.1ft	12.2ft	12.4ft	12.6ft	12.8ft	13.0ft	13.1ft	13.3ft	13.5ft	13.7ft	13.9ft	14.1ft	14.3ft
500	550	7.0ft	7.1ft	7.2ft	7.4ft	7.5ft	7.6ft	7.8ft	7.9ft	8.1ft	8.2ft	8.3ft	8.5ft	8.6ft	8.8ft	8.9ft	9.1ft
345	362[14]	4.3ft	4.3ft	4.4ft	4.5ft	4.6ft	4.7ft	4.8ft	4.9ft	5.0ft	5.1ft	5.2ft	5.3ft	5.4ft	5.5ft	5.6ft	5.7ft
287	302	5.2ft	5.3ft	5.4ft	5.5ft	5.6ft	5.7ft	5.8ft	5.9ft	6.1ft	6.2ft	6.3ft	6.4ft	6.5ft	6.6ft	6.8ft	6.9ft
230	242	4.0ft	4.1ft	4.2ft	4.3ft	4.3ft	4.4ft	4.5ft	4.6ft	4.7ft	4.8ft	4.9ft	5.0ft	5.1ft	5.2ft	5.3ft	5.4ft
161	169	2.7ft	2.7ft	2.8ft	2.9ft	2.9ft	3.0ft	3.0ft	3.1ft	3.2ft	3.3ft	3.3ft	3.4ft	3.5ft	3.6ft	3.7ft	3.8ft
138	145	2.3ft	2.3ft	2.4ft	2.4ft	2.5ft	2.5ft	2.6ft	2.7ft	2.7ft	2.8ft	2.8ft	2.9ft	3.0ft	3.0ft	3.1ft	3.2ft
115	121	1.9ft	1.9ft	1.9ft	2.0ft	2.0ft	2.1ft	2.1ft	2.2ft	2.2ft	2.3ft	2.3ft	2.4ft	2.5ft	2.5ft	2.6ft	2.7ft
88	100	1.5ft	1.5ft	1.6ft	1.6ft	1.7ft	1.7ft	1.8ft	1.8ft	1.8ft	1.9ft	1.9ft	2.0ft	2.0ft	2.1ft	2.2ft	2.2ft
69	72	1.1ft	1.1ft	1.1ft	1.2ft	1.2ft	1.2ft	1.2ft	1.3ft	1.3ft	1.3ft	1.4ft	1.4ft	1.4ft	1.5ft	1.6ft	1.6ft

** Table 2 – Table of MVCD values at a 1.0 gap factor (in U.S. customary units), which is located in the EPRI report filed with FERC on August 12, 2015. (The 14000-15000 foot values were subsequently provided by EPRI in an updated Table 2 on December 1, 2015, filed with the FAC-003-4 Petition at FERC)*

[12] The distances in this Table are the minimums required to prevent Flash-over; however prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance.

[13] Where applicable lines are operated at nominal voltages other than those listed, the applicable Transmission Owner or applicable Generator Owner should use the maximum system voltage to determine the appropriate clearance for that line.

[14] The change in transient overvoltage factors in the calculations are the driver in the decrease in MVCDs for voltages of 345 kV and above. Refer to pp.29-31 in the Supplemental Materials for additional information.

TABLE 2 (CONT) — Minimum Vegetation Clearance Distances (MVCD)[15]

For **Alternating Current** Voltages (meters)

(AC) Nominal System Voltage (KV)*	(AC) Maximum System Voltage (kV)[16]	MVCD meters Over sea level up to 153 m	MVCD meters Over 153m up to 305m	MVCD meters Over 305m up to 610m	MVCD meters Over 610m up to 915m	MVCD meters Over 915m up to 1220m	MVCD meters Over 1220m up to 1524m	MVCD meters Over 1524m up to 1829m	MVCD meters Over 1829m up to 2134m	MVCD meters Over 2134m up to 2439m	MVCD meters Over 2439m up to 2744m	MVCD meters Over 2744m up to 3048m	MVCD meters Over 3048m up to 3353m	MVCD meters Over 3353m up to 3657m	MVCD meters Over 3657m up to 3962m	MVCD meters Over 3962 m up to 4268 m	MVCD meters Over 4268 m up to 4572 m
765	800	3.6m	3.6m	3.6m	3.7m	3.7m	3.8m	3.8m	3.9m	4.0m	4.0m	4.1m	4.1m	4.2m	4.2m	4.3m	4.4m
500	550	2.1m	2.2m	2.2m	2.3m	2.3m	2.3m	2.4m	2.4m	2.5m	2..5m	2.5m	2.6m	2.6m	2.7m	2.7m	2.7m
345	362[17]	1.3m	1.3m	1.3m	1.4m	1.4m	1.4m	1.5m	1.5m	1.5m	1.6m	1.6m	1.6m	1.6m	1.7m	1.7m	1.8m
287	302	1.6m	1.6m	1.7m	1.7m	1.7m	1.7m	1.8m	1.8m	1.9m	1.9m	1.9m	2.0m	2.0m	2.0m	2.1m	2.1m
230	242	1.2m	1.3m	1.3m	1.3m	1.3m	1.3m	1.4m	1.4m	1.4m	1.5m	1.5m	1.5m	1.6m	1.6m	1.6m	1.6m
161	169	0.8m	0.8m	0.9m	0.9m	0.9m	0.9m	0.9m	1.0m	1.0m	1.0m	1.0m	1.0m	1.1m	1.1m	1.1m	1.1m
138	145	0.7m	0.7m	0.7m	0.7m	0.7m	0.7m	0.8m	0.8m	0.8m	0.9m	0.9m	0.9m	0.9m	0.9m	1.0m	1.0m
115	121	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.7m	0.7m	0.7m	0.7m	0.7m	0.8m	0.8m	0.8m	0.8m
88	100	0.4m	0.4m	0.5m	0.5m	0.5m	0.5m	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.6m	0.7m	0.7m
69	72	0.3m	0.3m	0.3m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.4m	0.5m	0.5m	0.5m

** Table 2 – Table of MVCD values at a 1.0 gap factor (in U.S. customary units), which is located in the EPRI report filed with FERC on August 12, 2015. (The 14000-15000 foot values were subsequently provided by EPRI in an updated Table 2 on December 1, 2015, filed with the FAC-003-4 Petition at FERC)*

[15] The distances in this Table are the minimums required to prevent Flash-over; however prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance.

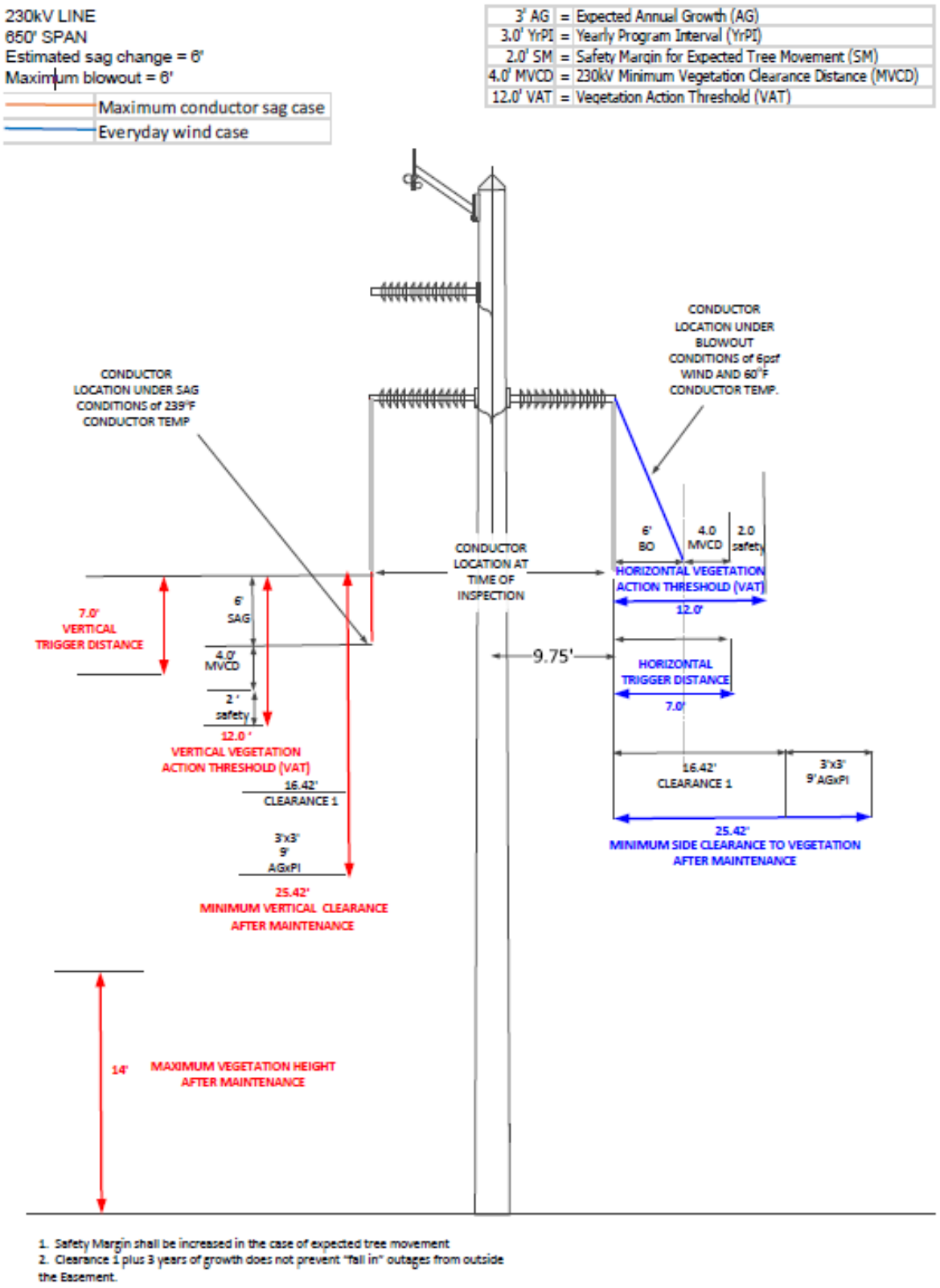
[16] Where applicable lines are operated at nominal voltages other than those listed, the applicable Transmission Owner or applicable Generator Owner should use the maximum system voltage to determine the appropriate clearance for that line.

[17] The change in transient overvoltage factors in the calculations are the driver in the decrease in MVCDs for voltages of 345 kV and above. Refer to pp.29-31 in the supplemental materials for additional information.

9.5 Appendix 4 – Vegetation Action Threshold

Voltage	Span Length(s)	Vegetation Action Threshold (VAT)
69kV or less	All	**5.5'**
115kV	All	**5.9'**
138kV	All	**6.5'**
161kV	All	**7.1'**
230kV	350' (sag & blowout)	**9'**
230kV	650' (sag and blowout)	**12'**
230kV	1320' (sag)	**15'**
230kV	1320' (blowout)	**24'**
345kV	350' and 650' (sag & blowout)	**15.17'**
345kV	1320' (sag)	**15.3'**
345kV	1320' (blowout)	**24.3'**
500kV	350' and 650' (sag & blowout)	**21'**
500kV	1320' (sag)	**21'**
500kV	1320' (blowout)	**27'**
Vegetation Action Threshold for NERC lines consist of MVCD + Sag/Sway @ 6 PSF; 239 Degrees plus a 2' buffer.		
Vegetation Action Threshold for Non-NERC lines consist of Minimum Approach Distance plus a 2' buffer.		

9.6 Appendix 5 – Diagram of Vegetation Action Threshold



1. Safety Margin shall be increased in the case of expected tree movement
2. Clearance 1 plus 3 years of growth does not prevent "fall in" outages from outside the Easement.

10 Revision History

Revision	Date	Author(s)	Description
1	06/18/2014	Steve Jolly	Finalized Structure/Content
2	08/18/2014	Steve Jolly	Added references to appendices and NERC requirements
3	11/27/2014	Steve Jolly	Added GO list validation
4	02/10/2015	Steve Jolly	Added Definition of Applicable line, replaced FPL with NEE
5	10/29/2015	Jose Medina	Added section "Quality Assurance, Quality Control, and Independent Patrol;" updated Appendix #3 VEL table in which distances were expanded in anticipation of NERC FAC-003-3 GAP factor adjustment; Minor grammatical edits.
6	05/23/2017	Dan Marsh	General update throughout
7	06/27/2017	Dan Marsh	Additional updates and clarification
8	01/16/2019	Dan Marsh	Gulf Power added
9	06/03/2019	Dan Marsh	Updated appendix 2, 4 and 5, due to ANSI table updates; updated/added definitions; general updates throughout
10	11/01/2019	Aaron Neville	Updated name for Vegetation Mitigation Process to Emergent Vegetation Process
11	06/01/2022	Dan Marsh, Aaron Neville	Adjusted verbiage to include all NEE assets; refined definitions and work tasks; added A300 part 9 and BMPs; added safety buffer to VAT for Non-NERC lines.
11.1	01/31/2024	Aaron Neville	Revision and updates for greater clarity to the annual work plan process as a recommendation from SERC's 2023 O&P Audit of FPL and updated overall formatting.
12	04/01/2024	Aaron Neville	Update references to FAC-003-5 Standard (Dated effective date of new standard).
13	12/17/2024	Rochelle Brown, Aaron Neville	Updated Section 9.1 to include NextEra Energy Transmission Southwest (NEET SW).
13.1	01/10/2025	Aaron Neville, George Keys, Andrew Gonzalez	Updated references to sections that were incorrect. Minor edits for spelling, and grammar.
13.2	01/21/2025	Rochelle Brown, Aaron Neville	Updated section 1 to reflect Appendix 9.1, updated Clearance to Wire definition to reference current FAC standard

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APPENDIX G DATA SOURCES

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Source / Author	Date*	Name	Subcategory	Category
Conservation & Habitat				
U.S. Fish and Wildlife Service (USFWS)	8/22/2025	Critical Habitat Final/Proposed	Critical Habitat Final/Proposed	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	8/1/2025	The Wildlife and Heritage Service Natural Heritage Program	State Listed Species	Conservation & Habitat
Pennsylvania Department of Conservation and Natural Resources (DCNR) and Pennsylvania Fish and Boat Commission (PFBC)	8/6/2025	The Pennsylvania Natural Heritage Program (PNHP)	State Listed Species	Conservation & Habitat
The Virginia Department of Wildlife Resources (DWR)	1/29/2024	Wildlife Environmental Review Map Service (WERMS)	State Listed Species	Conservation & Habitat
West Virginia Department of Natural Resources (WVDNR)	10/16/2024	The West Virginia Natural Heritage Program (WVNHP)	State Listed Species	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	11/14/2024	The Wildlife and Heritage Service Natural Heritage Program	Bat Hibernacula	Conservation & Habitat
Pennsylvania Department of Conservation and Natural Resources (DCNR) and Pennsylvania Fish and Boat Commission (PFBC)	4/4/2024	The Pennsylvania Natural Heritage Program (PNHP)	Bat Hibernacula	Conservation & Habitat
The Virginia Department of Wildlife Resources (DWR)	1/29/2024	Wildlife Environmental Review Map Service (WERMS)	Bat Hibernacula	Conservation & Habitat
West Virginia Department of Natural Resources (WVDNR)	10/16/2024	The West Virginia Natural Heritage Program (WVNHP)	Bat Hibernacula	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	11/14/2024	The Wildlife and Heritage Service Natural Heritage Program	Bat Known Occupied Summer Habitat	Conservation & Habitat
Pennsylvania Department of Conservation and Natural Resources (DCNR) and Pennsylvania Fish and Boat Commission (PFBC)	4/4/2024	The Pennsylvania Natural Heritage Program (PNHP)	Bat Known Occupied Summer Habitat	Conservation & Habitat
The Virginia Department of Wildlife Resources (DWR)	1/29/2024	Wildlife Environmental Review Map Service (WERMS)	Bat Known Occupied Summer Habitat	Conservation & Habitat
West Virginia Department of Natural Resources (WVDNR)	10/16/2024	Bat Known Occupied Summer Habitat	Bat Known Occupied Summer Habitat	Conservation & Habitat
U.S. Fish and Wildlife Service (USFWS)	6/11/2025	Northern Long-Eared Bat (NLEBs)	Northern Long-Eared Bat Area of Interest	Conservation & Habitat
U.S. Fish and Wildlife Service (USFWS)	6/11/2025	Tricolored Bat (TCBs)	Tricolored Bat Area of Interest	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Irreplaceable Natural Areas (INAs)	Irreplaceable Natural Areas (INAs)	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Forests of Recognized Importance (FORIs)	Forests of Recognized Importance (FORIs)	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Ecological Significant Area (ESAs)	Ecological Significant Area	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Targeted Ecological Areas (TEAs)	Targeted Ecological Areas	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/5/2025	Forest Interior Dwelling Species (FIDs)	Forest Interior Dwelling Species Confirmed/Probable	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Natural Heritage Areas (NHAs)	Natural Heritage Areas	Conservation & Habitat
Pennsylvania Department of Conservation and Natural Resources (DCNR) and Pennsylvania Fish and	11/6/2025	Natural Heritage Areas (NHAs)	Natural Heritage Areas	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	8/1/2025	The Wildlife and Heritage Service Natural Heritage Program	Rare, Threatened, and Endangered Species	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Sensitive Species Areas (SSAs)	Sensitive Species Areas	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Biodiversity Conservation Network (BioNet)	Biodiversity Conservation Network	Conservation & Habitat
Virginia Department of Conservation and Recreation (DCR)	8/9/2023	The Virginia Natural Heritage Program (VNHP)	Ecological Cores	Conservation & Habitat
Virginia Department of Forestry (VDOF)	6/28/2021	Forest Conservation Value (FCV)	Forest Conservation Value	Conservation & Habitat
Virginia Department of Conservation and Recreation (DCR)	6/9/2025	Area of Conservation Interest (AOCI)*	Area of Conservation Interest	Conservation & Habitat
The Virginia Department of Wildlife Resources (DWR)	1/29/2024	VA Department of Wildlife Resources (WERMS)	Species Observations	Conservation & Habitat
Maryland Department of Natural Resources (MDNR)	5/12/2025	Habitat Connectivity Network (HCN)	Habitat Connectivity Network	Conservation & Habitat
Environmental Protection Agency (EPA)	6/18/2025	Ecoregions	Ecoregions	Conservation & Habitat
Cultural				
Maryland Historical Trust (MHT)	9/22/2025	Maryland's Cultural Resource Information System (MEDUSA)	Architecture Resources	Cultural
Pennsylvania State Historic Preservation Office (SHPO)	10/22/2025	Pennsylvania's State Historical and Museum Commission (PA-SHARE)	Architecture Resources	Cultural
Virginia Department of Historic Resources (VDHR)	11/7/2025	Virginia Cultural Resources Information System (VCRIS)	Architecture Resources	Cultural
West Virginia State Historic Preservation Office (SHPO)	9/22/2025	Architecture Resources	Architecture Resources	Cultural
Maryland Historical Trust (MHT)	9/19/2025	Maryland's Cultural Resource Information System (MEDUSA)	Archaeology Resources and Surveys	Cultural
Pennsylvania State Historic Preservation Office (SHPO)	10/22/2025	Pennsylvania's State Historical and Museum Commission (PA-SHARE)	Archaeology Resources and Surveys	Cultural
Virginia Department of Historic Resources (VDHR)	11/7/2025	Virginia Cultural Resources Information System (VCRIS)	Archaeology Resources and Surveys	Cultural
West Virginia State Historic Preservation Office (SHPO)	9/22/2025	Archaeology Resources and Surveys	Archaeology Resources and Surveys	Cultural
Maryland Historical Trust (MHT)	9/22/2025	Maryland's Cultural Resource Information System (MEDUSA)	Cemeteries	Cultural
Pennsylvania State Historic Preservation Office (SHPO)	10/22/2025	Pennsylvania's State Historical and Museum Commission (PA-SHARE)	Cemeteries	Cultural
Virginia Department of Historic Resources (VDHR)	11/7/2025	Virginia Cultural Resources Information System (VCRIS)	Cemeteries	Cultural
West Virginia State Historic Preservation Office (SHPO)	9/22/2025	Cemeteries	Cemeteries	Cultural
Maryland Historical Trust (MHT)	9/22/2025	Maryland's Cultural Resource Information System (MEDUSA)	Historic Districts	Cultural
Pennsylvania State Historic Preservation Office (SHPO)	10/22/2025	Pennsylvania's State Historical and Museum Commission (PA-SHARE)	Historic Districts	Cultural
Virginia Department of Historic Resources (VDHR)	11/7/2025	Virginia Cultural Resources Information System (VCRIS)	Historic Districts	Cultural
West Virginia State Historic Preservation Office (SHPO)	9/22/2025	Historic Districts	Historic Districts	Cultural
National Park Service (NPS)	7/1/2025	National Register of Historic Places (NRHP)	National Register of Historic Places	Cultural

Source / Author	Date*	Name	Subcategory	Category
Virginia Department of Historic Resources (VDHR)	7/14/2025	Virginia Cultural Resources Information System (VCRIS)	Preservation Easements	Cultural
Preservation Virginia (APVA)	9/12/2024	Most Endangered Historic Places	Most Endangered Historic Places	Cultural
Maryland Historical Trust (MHT)	3/14/2023	Maryland's Cultural Resource Information System (MEDUSA)	Battlefields	Cultural
Pennsylvania State Historic Preservation Office (SHPO)	3/14/2023	Pennsylvania's State Historical and Museum Commission (PA-SHARE)	Battlefields	Cultural
Virginia Department of Historic Resources (VDHR)	3/14/2023	Virginia Cultural Resources Information System (VCRIS)	Battlefields	Cultural
West Virginia State Historic Preservation Office (SHPO)	3/14/2023	Battlefields	Battlefields	Cultural
Maryland Historical Trust (MHT)	5/12/2025	Maryland's Cultural Resource Information System (MEDUSA)	Heritage Areas	Cultural
Geologic and Soil				
Environmental Protection Agency (EPA)	3/24/2021	Hazardous Waste Sites	Hazardous Waste Sites	Geologic and Soil
Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA)	4/11/2025	Soil Survey Geographic Database (SSURGO)	Farmland (prime, state and local importance)	Geologic and Soil
Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA)	4/11/2025	Soil Survey Geographic Database (SSURGO)	Soils	Geologic and Soil
Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA)	4/11/2025	Soil Survey Geographic Database (SSURGO)	Soil Hydric Class	Geologic and Soil
U.S. Geological Survey (USGS)	12/1/2023	Karst Topography	Karst Topography	Geologic and Soil
U.S. Geological Survey (USGS)	8/1/2017	Geologic Formations	Geologic Formations	Geologic and Soil
Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR)	10/1/2025	Abandoned Mines	Abandoned Mines	Geologic and Soil
West Virginia Department of Environmental Protection (WVDEP)	4/26/2022	Office of Abandoned Mine Lands and Reclamation (AML&R)	Abandoned Mines	Geologic and Soil
U.S. Geological Survey (USGS)	7/31/2025	Earthquakes	Earthquakes	Geologic and Soil
U.S. Geological Survey (USGS)	6/5/2025	Physiographic Sections	Physiographic Sections	Geologic and Soil
Human Environment				
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Child Care Centers	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Colleges and Universities	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Event Centers	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Fire Stations	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Hospitals	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Nursing Homes	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Places of Worship	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Police Stations	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Prisons	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Private Schools	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Public Schools	Human Environment
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Town Halls	Human Environment
Maryland Department of Planning (MDP)	11/12/2024	Agriculture Preservation Areas	Agriculture Preservation Areas	Human Environment
WeConservePA	11/1/2025	Agriculture Preservation Areas	Agriculture Preservation Areas	Human Environment
Environmental Protection Agency (EPA)	5/20/2024	Environmental Justice Areas	Environmental Justice Areas	Human Environment
ESRI	11/1/2023	Demographic Data	Demographic Data	Human Environment
U.S. Department of Transportation (USDOT) and 'Federal Highway Administration (FHWA)	1/19/2021	Federal Highway Administration (FHWA)	National Scenic Byways	Human Environment
Maryland Department of Transportation (MDOT)	8/13/2025	State Highway Administration (SHA)	State Scenic Byways	Human Environment
Pennsylvania Department of Transportation (PennDOT)	8/22/2024	State Scenic Byways	State Scenic Byways	Human Environment
Virginia Department of Transportation (VDOT)	1/14/2025	State Scenic Byways	State Scenic Byways	Human Environment
West Virginia Department of Transportation (WVDOT)	6/15/2023	State Scenic Byways	State Scenic Byways	Human Environment
U.S. Department of Agriculture (USDA) and U.S. Forest Service (USFS)	9/1/2025	National Wild and Scenic Rivers	National Wild and Scenic Rivers	Human Environment
U.S. Geological Survey (USGS)	2/28/2024	Trails	Trails	Human Environment
West Virginia Department of Transportation (WVDOT)	8/25/2021	Trails	Trails	Human Environment
WeConservePA	1/1/2023	Trails	Trails	Human Environment
Maryland Department of Transportation (MDOT)	12/17/2022	Trails	Trails	Human Environment
National Park Service (NPS)	12/29/2022	Potomac Heritage Trail	Potomac Heritage Trail	Human Environment
ERM - Digitized from High-Resolution Imagery	9/26/2025	Residential Dwellings	Residential Dwellings	Human Environment
ERM - Digitized from High-Resolution Imagery	9/26/2025	Residential Outbuildings	Residential Outbuildings	Human Environment
ERM - Digitized from High-Resolution Imagery	9/26/2025	Non-residential Buildings	Non-residential Buildings	Human Environment
ReportAll	1/16/2024	Parcels and Landowners	Parcels and Landowners	Human Environment
U.S. Census Bureau	8/8/2024	States	States	Human Environment
U.S. Census Bureau	8/8/2024	Counties	Counties	Human Environment
U.S. Census Bureau	8/8/2024	Census Designated Place	Census Designated Place	Human Environment
U.S. Census Bureau	8/8/2024	Census Tract	Census Tract	Human Environment
U.S. Census Bureau	8/8/2024	Census Block Group	Census Block Group	Human Environment
U.S. Census Bureau	8/8/2024	Census Block	Census Block	Human Environment
Maryland Department of Housing and Community Development (MDCD)	4/20/2018	Census Designated Opportunity Zones	Census Designated Opportunity Zones	Human Environment

Source / Author	Date*	Name	Subcategory	Category
Pennsylvania Department of Community and Economic Development (DCED)	6/14/2018	Census Designated Opportunity Zones	Census Designated Opportunity Zones	Human Environment
Virginia Department of Housing and Community Development (DHCD)	5/24/2018	Census Designated Opportunity Zones	Census Designated Opportunity Zones	Human Environment
West Virginia Department of Commerce	2/28/2018	Census Designated Opportunity Zones	Census Designated Opportunity Zones	Human Environment
Allegany County, Maryland	1/18/2024	The Geographic Information Systems (GIS) Office and Department of Planning and Zoning	Zoning	Human Environment
Garrett County Government Department of Community Development, Maryland	1/22/2024	The Planning and Land Management Division	Zoning	Human Environment
Greene County, Pennsylvania	4/8/2025	The Department of Planning and Community Development	Zoning	Human Environment
Fayette County, Pennsylvania	4/12/2022	The Fayette County Planning and Zoning Office	Zoning	Human Environment
Hampshire County, West Virginia	2/26/2025	Hampshire County Planning Office	Zoning	Human Environment
Mineral County, West Virginia	2/26/2025	The Office of the Planning Commission	Zoning	Human Environment
Monongalia County, West Virginia	2/26/2025	The Monongalia County Planning Office and Monongalia County Planning Commission	Zoning	Human Environment
Preston County, West Virginia	2/28/2025	Zoning	Zoning	Human Environment
Frederick County, Virginia	6/5/2025	The Frederick County Department of Planning and Development and GIS Division of Information Technologies	Zoning	Human Environment
Infrastructure				
U.S. Census Bureau	9/25/2024	Roads	Roads	Infrastructure
U.S. Department of Transportation (USDOT)	9/30/2025	Railroads	Railroads	Infrastructure
U.S. Department of Transportation (USDOT)	10/14/2025	Federal Aviation Administration (FAA)	Airports	Infrastructure
Pennsylvania Department of Environmental Protection (PA DEP)	11/19/2024	Oil and Gas Wells	Oil and Gas Wells	Infrastructure
West Virginia Department of Environmental Protection (WVDEP)	11/19/2024	Oil and Gas Wells	Oil and Gas Wells	Infrastructure
Maryland Department of the Environment (MDE)	7/28/2017	Maryland Oil and Gas Viewer	Oil and Gas Wells	Infrastructure
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Oil and Gas Wells	Infrastructure
REXTAG	2/15/2025	Power & Renewables Dataset	Wind Turbines	Infrastructure
REXTAG	2/15/2025	Power & Renewables Dataset	Powerplants	Infrastructure
U.S. Energy Information Administration (EIA)	11/3/2025	Coal Mines	Coal Mines	Infrastructure
Environmental Protection Agency (EPA)	4/18/2023	Underground Storage Tanks	Underground Storage Tanks	Infrastructure
REXTAG	2/15/2025	Power & Renewables Dataset	Landfills	Infrastructure
U.S. Department of Transportation (USDOT) and Federal Highway Administration (FHWA)	6/20/2025	National Bridge Inventory (NBI)	Bridges	Infrastructure
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Communication Towers	Infrastructure
U.S. Department of Homeland Security (DHS)	11/2/2022	Homeland Infrastructure Foundation-Level Data (HIFLD)	Cellular Towers	Infrastructure
REXTAG	2/15/2025	Power & Renewables Dataset	Transmission Lines	Infrastructure
REXTAG	2/15/2025	Natural Gas Dataset	Natural Gas Pipelines	Infrastructure
Federal Energy Regulatory Commission (FERC)	10/24/2024	FERC Regulated Boundaries	FERC Regulated Boundaries	Infrastructure
Imagery and Elevation				
U.S. Department of Agriculture (USDA)	2022 and 2023	National Agriculture Imagery Program (NAIP)	Satellite Imagery	Imagery and Elevation
NEET Contracted SAM	12/1/2023 - 2/1/2024	High Resolution Aerial Imagery (3-inch)	High Resolution Aerial Imagery (3-inch)	Imagery and Elevation
NEET Contracted SAM	12/1/2023 - 2/1/2025	LiDAR Digital Elevation Model	LiDAR Digital Elevation Model	Imagery and Elevation
ERM developed from LiDAR DTM	12/1/2023 - 2/1/2025	LiDAR Elevation Contours	LiDAR Elevation Contours	Imagery and Elevation
Land Cover/Land Use				
U.S. Geological Survey (USGS)	10/24/2024	Annual NLCD Collection 1 Science Products	National Land Cover Dataset 2024	Land Cover/Land Use
U.S. Department of Agriculture (USDA)	2/27/2025	National Agricultural Statistics Service (NASS)	Cropland, Pasture/Rangeland, Tree Farms/Orchards	Land Cover/Land Use
ERM	6/17/2025	Visual Landscape Units	Visual Landscape Units	Land Cover/Land Use
Chesapeake Conservancy, University of Vermont Spatial Analysis Lab (UVM SAL), U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (EPA), and the Chesapeake Bay Program	3/15/2023	Land Use Land Cover	Land Use Land Cover	Land Cover/Land Use
Maryland Department of Planning (MDP)	2/4/2025	Land Use	Land Use	Land Cover/Land Use
Allegany County, Maryland	5/21/2014	The Department of Planning and Zoning, Comprehensive Plan	Future Land Use	Land Cover/Land Use
Garrett County Government Department of Community Development, Maryland	11/22/2022	Garrett County Planning Commission	Future Land Use	Land Cover/Land Use
Fayette County, Pennsylvania	9/1/2019	Planning Commission	Future Land Use	Land Cover/Land Use
Greene County, Pennsylvania	7/18/2019	Greene County Board of Commissioners, Comprehensive Plan	Future Land Use	Land Cover/Land Use
Hampshire County, West Virginia	6/1/2019	Hampshire County Planning Commission	Future Land Use	Land Cover/Land Use
Mineral County, West Virginia	12/1/2010	The Office of the Planning Commission	Future Land Use	Land Cover/Land Use
Monongalia County, West Virginia	2/1/2023	The Monongalia County Planning Office and Monongalia County Planning Commission	Future Land Use	Land Cover/Land Use
Preston County Economic Development Authority (PCEDA)	2023	Future Land Use	Future Land Use	Land Cover/Land Use
Frederick County, Viginia	11/10/2021	Frederick County Planning Commission	Future Land Use	Land Cover/Land Use
Protected Areas				
U.S. Geological Survey (USGS)	4/26/2023	Protected Areas Database (PAD-US)	State Forests	Protected Areas
U.S. Geological Survey (USGS)	4/26/2023	Protected Areas Database (PAD-US)	State Parks	Protected Areas
U.S. Geological Survey (USGS)	4/26/2023	Protected Areas Database (PAD-US)	Wildlife Management Areas	Protected Areas
National Conservation Easement Database (NCED), Hampshire and Mineral County Farmland Protection Bureaus	10/8/2024	Agricultural Easements	Agricultural Easements	Protected Areas

Source / Author	Date*	Name	Subcategory	Category
National Conservation Easement Database (NCED)	10/8/2024	Historical Easements	Historical Easements	Protected Areas
National Conservation Easement Database (NCED), Cacapon & Lost Rivers Land Trust (CLRLT), The Nature Conservancy	10/8/2024	Conservation Easements	Conservation Easements	Protected Areas
U.S. Geological Survey (USGS)	4/26/2023	Protected Areas Database (PAD-US)	Local Parks	Protected Areas
U.S. Army Corps of Engineers (USACE)	4/26/2023	Recreation Management Areas	Recreation Management Areas	Protected Areas
Pennsylvania Department of Conservation and Natural Resources (DCNR)	2/1/2024	State Wilderness Areas	State Wilderness Areas	Protected Areas
Pennsylvania Game Commission (PGC)	1/1/2023	State Game Land	State Game Land	Protected Areas
Maryland Department of Natural Resources (MDNR)	12/15/2017	State Wildlands	State Wildlands	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	DNR Owned Lands and Conservation Easements	DNR Owned Lands and Conservation Easements	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Rural Legacy Properties	Rural Legacy Properties	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Environmental Trust Easements	Environmental Trust Easements	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Forest Conservation Act Easements	Forest Conservation Act Easements	Protected Areas
Maryland Department of Agriculture (MDA) and The Maryland Agricultural Land Preservation Foundation (MALPF)	5/12/2025	Agricultural Land Preservation Foundation Easements	Agricultural Land Preservation Foundation Easements	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Local Protected Lands	Local Protected Lands	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Private Conservation Lands	Private Conservation Lands	Protected Areas
Maryland Department of Natural Resources (MDNR)	5/12/2025	Transfer Development Rights and Purchase Development Rights	Transfer Development Rights and Purchase Development Rights	Protected Areas
Maryland Historical Trust (MHT) and Maryland Department of Planning (MDP)	5/12/2025	Historical Trust Preservation Easements	Historical Trust Preservation Easements	Protected Areas
WeConservePA	10/1/2023	Agricultural Security Areas (ASAs)	Agricultural Security Areas	Protected Areas
WeConservePA	11/1/2025	Conservation Easements	Conservation Easements	Protected Areas
WeConservePA	11/1/2025	Farmland Preservation Easements	Farmland Preservation Easements	Protected Areas
WeConservePA	11/1/2025	Local Conserved Land	Local Conserved Land	Protected Areas
WeConservePA	11/1/2025	Privately Owned Conserved Land	Privately Owned Conserved Land	Protected Areas
Virginia Department of Conservation and Recreation (DCR)	7/14/2025	Conservation Lands Database	Conservation Lands and Easements	Protected Areas
West Virginia Department of Natural Resources (WVDNR)	1/1/2024	DNR Managed Land	DNR Managed Land	Protected Areas
The Nature Conservancy (TNC)	1/1/2013	TNC Preserves and Easements	TNC Preserves and Easements	Protected Areas
West Virginia Department of Natural Resources (WVDNR)	1/1/2020	County and City Parks	County and City Parks	Protected Areas
		Water Resources		
U.S. Geological Survey (USGS)	9/17/2025	National Hydrography Dataset (NHD)	Perennial Streams	Water Resources
U.S. Geological Survey (USGS)	9/17/2025	National Hydrography Dataset (NHD)	Intermittent Streams	Water Resources
U.S. Army Corps of Engineers (USACE)	10/9/2025	Section 10 Navigable Waters	Section 10 Navigable Waters	Water Resources
Pennsylvania Fish and Boat Commission (PFBC)	7/1/2025	Class A Wild Trout Streams	Class A Wild Trout Streams	Water Resources
Pennsylvania Fish and Boat Commission (PFBC)	5/1/2025	Natural Reproduction Trout Streams	Natural Reproduction Trout Streams	Water Resources
Pennsylvania Fish and Boat Commission (PFBC)	10/1/2022	Wilderness Trout Streams	Wilderness Trout Streams	Water Resources
Virginia Department of Wildlife Resources (WERMS)	1/29/2024	Trout Streams	Trout Streams	Water Resources
West Virginia Department of Environmental Protection (WVDEP)	1/18/2024	Trout Streams	Trout Streams	Water Resources
Maryland Department of Natural Resources (MDNR)	8/25/2025	Trout Watersheds	Trout Watersheds	Water Resources
Virginia Department of Wildlife Resources (DWR)	1/29/2024	Threatened/Endangered Species Waters	Threatened/Endangered Species Waters	Water Resources
West Virginia Department of Environmental Protection (WVDEP)	1/18/2024	Tier 3 Waterways	Tier 3 Waterways	Water Resources
West Virginia Department of Natural Resources (WVDNR)	10/16/2024	Mussel Streams	Mussel Streams	Water Resources
Maryland Department of the Environment (MDE)	5/29/2025	Designated Use Streams	Designated Use Streams	Water Resources
Pennsylvania Department of Environmental Protection (PA DEP)	5/8/2025	Designated Use Streams	Designated Use Streams	Water Resources
Maryland Department of the Environment (MDE)	1/5/2023	Tier II Streams and Catchments	Tier II Streams and Catchments	Water Resources
Maryland Department of the Environment (MDE)	8/25/2025	Stocked Trout Streams	Stocked Trout Streams	Water Resources
Pennsylvania Fish and Boat Commission (PFBC)	11/1/2024	Stocked Trout Streams	Stocked Trout Streams	Water Resources
West Virginia Department of Natural Resources (WVDNR)	10/16/2024	Stocked Trout Streams	Stocked Trout Streams	Water Resources
Virginia Department of Wildlife Resources (DWR)	8/16/2024	Stocked Trout Streams	Stocked Trout Streams	Water Resources
Pennsylvania Department of Environmental Protection (PA DEP)	5/8/2025	Attaining and Non Attaining Streams and Lakes	Attaining and Non Attaining Streams and Lakes	Water Resources
U.S. Fish and Wildlife (USFWS)	5/7/2025	National Wetland Inventory (NWI)	Wetlands/Wetlands of Special State Concern	Water Resources
Maryland Department of Natural Resources (MDNR)	5/12/2025	MD iMAP Data Catalog (DoIT)	Wetlands/Wetlands of Special State Concern	Water Resources
Maryland Department of the Environment (MDE)	5/12/2025	Wetlands/Wetlands of Special State Concern	Wetlands/Wetlands of Special State Concern	Water Resources
West Virginia Department of Environmental Protection (WVDEP)	1/31/2020	Wetlands/Wetlands of Special State Concern	Wetlands/Wetlands of Special State Concern	Water Resources
Virginia Department of Conservation and Recreation (DCR)	2/23/2015	Wetlands/Wetlands of Special State Concern	Wetlands/Wetlands of Special State Concern	Water Resources
ERM	9/19/2025	Modeled Wetlands	Modeled Wetlands	Water Resources
Federal Emergency Management Agency (FEMA)	9/4/2025	National Flood Hazard Layer (NFHL)	Flood Plains	Water Resources

Source / Author	Date*	Name	Subcategory	Category
U.S. Geological Survey (USGS)	5/30/2025	Watersheds	Watersheds	Water Resources
Notes:				
*acquisition date was used when publication date was unavailable				

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APPENDIX H WETLAND IDENTIFICATION MODEL REPORT

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Wetland Identification Model Report

MidAtlantic Resiliency Link Project

PREPARED FOR
NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc.

DATE
January 2026

REFERENCE
0718854



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SIGNATURE PAGE

Wetland and Waterbody Desktop Modeling Report

MidAtlantic Resiliency Link Project

0718854



Heather Heater
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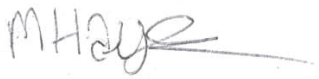

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
CNN	convolutional neural network
DEM	digital elevation model
DTW	Depth-to-Water Index
EVI	Enhanced Vegetation Index
HUC	Hydrologic Unit Code
MARL Project	MidAtlantic Resiliency Link Project
MDNR	Maryland Department of Natural Resources
MHPW	modeled high probability wetlands
NAIP	National Agriculture Imagery Program
NDVI	Normalized Difference Vegetation Index
NDWI	Normalized Difference Water Index
NIR	Near-Infrared
NLCD	National Land Cover Database
nm	nanometer

Acronym	Description
NWI	National Wetlands Inventory
ROW	right-of-way
TWI	Topographic Wetness Index
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WIM	Wetland Identification Model

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1. INTRODUCTION

As a supplement to the desktop review of publicly available wetlands data from the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and state-specific wetland mapping datasets, a deep learning-based Wetland Identification Model (WIM) was created to further evaluate wetland resources within the MidAtlantic Resiliency Link (MARL) Project Study Area and help better understand existing wetland resources and potential impacts.

The NWI was established by the USFWS to conduct nationwide inventories of wetlands, providing important geospatial information on wetland extents, types, and change. NWI data is primarily created and updated by manually identifying and classifying high-resolution aerial imagery, which is sometimes supplemented by field work and collateral data. To maintain temporal and spatial accuracy, the USFWS works with federal, state, and local agencies, as well as tribal governments, nonprofit organizations, and universities to update the NWI. While NWI maps are important general purpose tools for wetland management and preliminary project assessments, they are not intended to define wetland boundaries for regulatory purposes. Additionally, the age of NWI maps varies widely, with underlying data decades old in many areas (Gage et al. 2020).

The USFWS NWI data for Maryland, Pennsylvania, and Virginia was produced with imagery from the 1980s. West Virginia NWI data was produced with imagery from 2018. In Maryland, wetlands were further mapped by the Maryland Department of Natural Resources (MDNR) using imagery collected from 1988 to 1995. West Virginia wetland data (WVDEP 2020) is similar to USFWS NWI, and Pennsylvania and Virginia do not have comparable state-produced data. Both the USFWS NWI and MDNR characterize wetlands based on the Cowardin Classification System, which classifies wetlands into five major systems. Palustrine, lacustrine, and riverine wetlands are present in the MARL Project Study Area, and this area does not cross marine or estuarine wetlands. Table 1-1 summarizes the extent of NWI- and MDNR-mapped wetlands within the MARL Project Study Area. Generally, NWI maps provide a preliminary basis for identifying these wetlands, with field surveys required to confirm resource location, extent, and classification.

TABLE 1-1 NATIONAL WETLANDS INVENTORY AND MARYLAND DEPARTMENT OF NATURAL RESOURCES WETLANDS SUMMARY WITHIN THE MARL PROJECT STUDY AREA

Classification	Maryland (acres)	Pennsylvania (acres)	Virginia (acres)	West Virginia (acres)	Study Area Total (acres)
NWI					
Palustrine	2,305.5	843.9	77.0	3,260.2	6,486.6
Riverine	1,794.2	2,182.8	244.9	1,829.1	6,051.0
Lacustrine	753.7	155.5	306.2	1,628.5	2,843.9
NWI Total [a]	**4,853.4**	**3,182.2**	**628.1**	**6,717.8**	**15,381.5**
MDNR					
Palustrine	1,706.5	-	-	-	1,706.5
Riverine	454.0	-	-	-	454.0
Lacustrine	679.9	-	-	-	679.9
MDNR Total [a]	**2,840.4**	**-**	**-**	**-**	**2,840.4**

Source: USFWS n.d.; MDNR n.d.

MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory
[a] Totals may not match the sum of addends due to rounding.

2. METHODOLOGY

2.1 MODEL BACKGROUND AND ARCHITECTURE

Using the methodology from WIM research at the University of Virginia and the Chesapeake Conservancy (Mainali et al. 2023; ESRI n.d.-a; ESRI 2024), a deep learning classifier was created to predict wetlands within the MARL Project Study Area. The WIM toolbox for ArcGIS Pro is based on a random trees algorithm. Random trees is a pixel-based machine learning classifier based on ensemble learning. It builds many different decision trees using random samples of training data, with each tree trained on a different subset of data. Each tree makes a prediction based on the subset of data it was given, and the most frequent tree output is used as the overall classification. Using random trees algorithms to identify wetlands is a well-documented approach that can be done using the out-of-the-box WIM toolbox, making it a user-friendly option. However, this algorithm is significantly limited in the quantity of training data it can incorporate because it ingests data as NumPy arrays (data structure withing the Python coding language designed for numerical computation), only able to train on one 12-digit Hydrologic Unit Code (HUC-12; representing subwatersheds) extent at a time. Additionally, random trees algorithms do not consider the spatial context of predictor variables. Since wetlands are a cohesive geomorphologic object, neighboring feature information is important for accurate classification. Without meaningful contextual information from the surrounding area, these pixel-based classifiers often create landcover maps with a high-level of local-scale heterogeneity where a pixel in the middle of a wetland could easily be misclassified (Mainali et al. 2023).

Deep learning models have proven to be accurate and efficient for detecting complex patterns, interactions, and non-linearities in remote sensing data, outperforming traditional machine learning with at least 20 percent greater accuracy in land cover and wetland classification (Rezaee et al. 2018; Liu et al. 2018). Previous studies have indicated the ability of deep learning architectures to serve as the kind of generalizable and repeatable method necessary for wetland monitoring and a proxy for potential impact assessment (Mahdianpari et al. 2018; DeLancey et al. 2019; Du et al. 2020). The model used for this analysis is based on U-Net (Ronneberger et al. 2015), a deep learning classifier that leverages the power of convolutional neural networks (CNNs). CNNs incorporate convolutional layers that extract contextual information from images at multiple scales with a series of learned filters. These filters let CNNs focus on important features within the image without needing to process each pixel individually. This allows for more efficient handling of larger images and the incorporation of spatial context, which is missed in traditional machine learning.

U-Net is a well-known image segmentation algorithm designed like an auto-encoder. It has an encoding path (“contracting”) paired with a decoding path (“expanding”), predicting pixelwise segmentation of the input image. This model was implemented in the ArcGIS API for Python (ESRI n.d.-b). Like traditional image classification, U-Net requires a raster image with several bands (predictor variables) and a label image that contains the label for each pixel (wetland or non-wetland) to train and predict wetlands.

The U-Net model is especially effective for analyzing large areas and identifying wetlands because it can quickly process high-resolution satellite and aerial images (such as LiDAR imagery), finding

subtle patterns that traditional methods often miss. Unlike older machine learning approaches, U-Net uses deep learning to look at both the details and the broader context in each image, which helps it accurately distinguish wetlands from other land types—even when the landscape is complex. Its design allows it to handle big datasets efficiently and consistently, making it a reliable tool for mapping wetlands across extensive regions.

2.2 MODEL AREAS

The MDNR wetland data was used to facilitate model training and testing because this dataset is more recent and has greater accuracy than NWI data due to using newer and higher resolution aerial imagery and integrating modern technology such as LiDAR and digital elevation models (DEMs). This dataset also covers a substantial portion of the MARL Project Study Area. For model training purposes, this wetland data is referred to as "wetland training labels."

The training area is used to train the wetland model on real-world examples. The training area selected for the model included 12 watersheds in Garrett and Allegany Counties (Table 2-1) and was selected because it covers a geographically diverse area representative of the larger MARL Project Study Area. The MDNR wetland data work well across the larger MARL Project Study Area because the areas across the four states are within similar physiographic regions and within the same U.S. Army Corps of Engineers (USACE) Regional Supplement (Eastern Mountains and Piedmont Region). The USACE Regional Supplements consider the same regional characteristics of wetlands across the three USACE wetland criteria (hydrology, hydrophytic vegetation, and hydric soils).

The testing area is a geographic region that the model never sees during training and is used only to evaluate how well the model can identify wetlands in new, unseen places. The testing area is essential for proving that the model accurately predicts wetlands. The model testing area was selected as the remainder of Maryland within the MARL Project Study Area, encompassing six watersheds in Garrett County (Table 2-1). As the model used MDNR wetland data, the training and testing areas needed to be entirely in Maryland. Training and testing areas are shown on Figure 2-1.

After visual review, it was determined that while the MDNR wetland polygons are more accurate than NWI data, they are missing many riverine wetlands; therefore, riverine wetlands from the NWI dataset were merged with the MDNR data. The polygons were dissolved to remove overlaps and Cowardin classifications, resulting in 936 wetlands (5,540 acres) to be used for training and testing data (Figure 2-2) that do not differentiate between different wetland classifications. After training and testing, the model was run on the entire MARL Project Study Area.

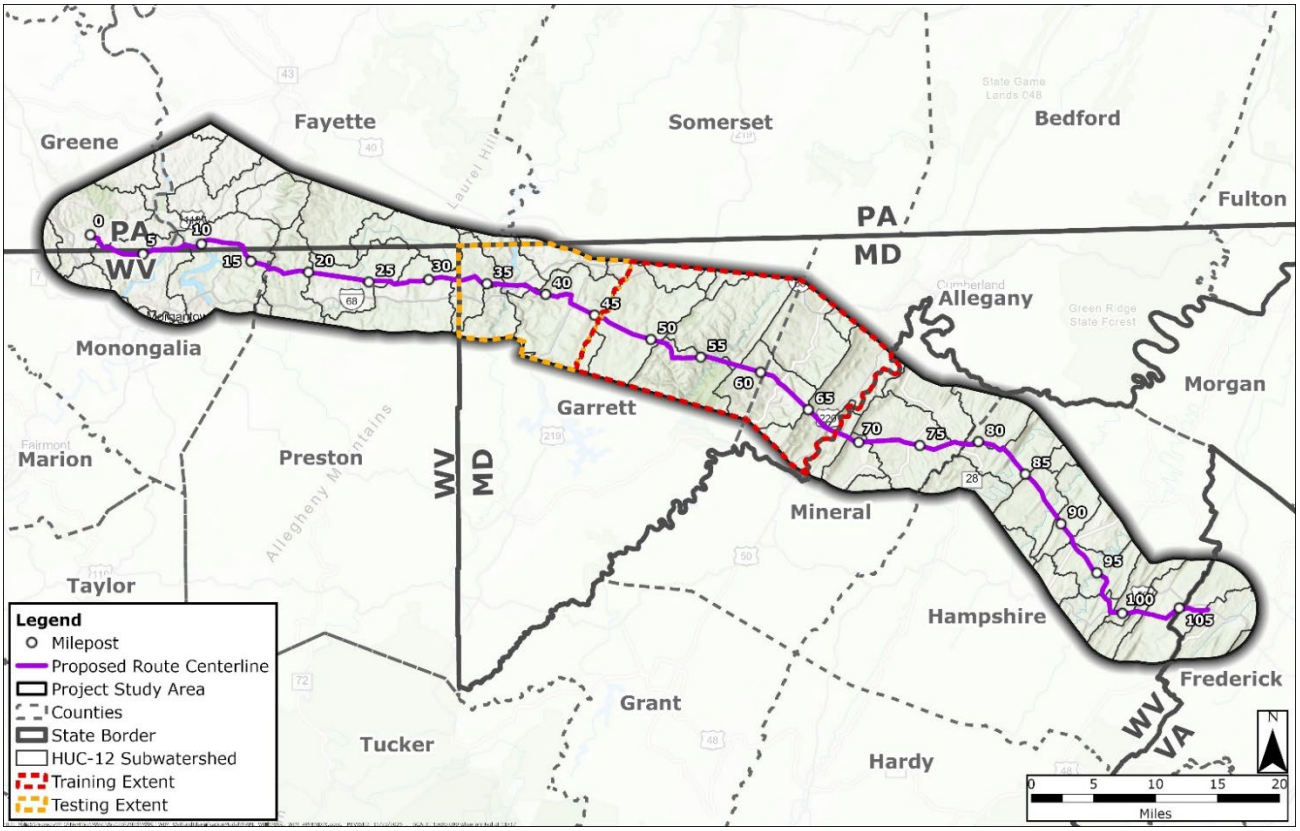
TABLE 2-1 WATERSHEDS WITHIN THE TRAINING AND TESTING AREAS

Area	Watershed Name	County	State
Training Area	Braddock Run—Wills Creek	Allegany	Maryland
	Flag Run—Casselman River	Garrett	Maryland
	Headwaters Casselman River	Garrett	Maryland
	Limestone Run—North Branch Potomac River	Allegany	Maryland
	Lower Deep Creek Lake	Garrett	Maryland
	Lower Georges Creek	Allegany	Maryland

Area	Watershed Name	County	State
	Lower Savage River	Garrett	Maryland
	Mill Run—North Branch Potomac River	Allegany	Maryland
	Red Run—Piney Creek	Garrett	Maryland
	Tub Mill Run—Casselman River	Garrett	Maryland
	Upper Georges Creek	Allegany	Maryland
	Upper Savage River	Garrett	Maryland
Testing Area	Bear Creek	Garrett	Maryland
	Buffalo Run	Garrett	Maryland
	Mill Run	Garrett	Maryland
	Salt Block Run—Youghiogheny River	Garrett	Maryland
	Whites Creek	Garrett	Maryland
	Youghiogheny River Lake—Youghiogheny River	Garrett	Maryland

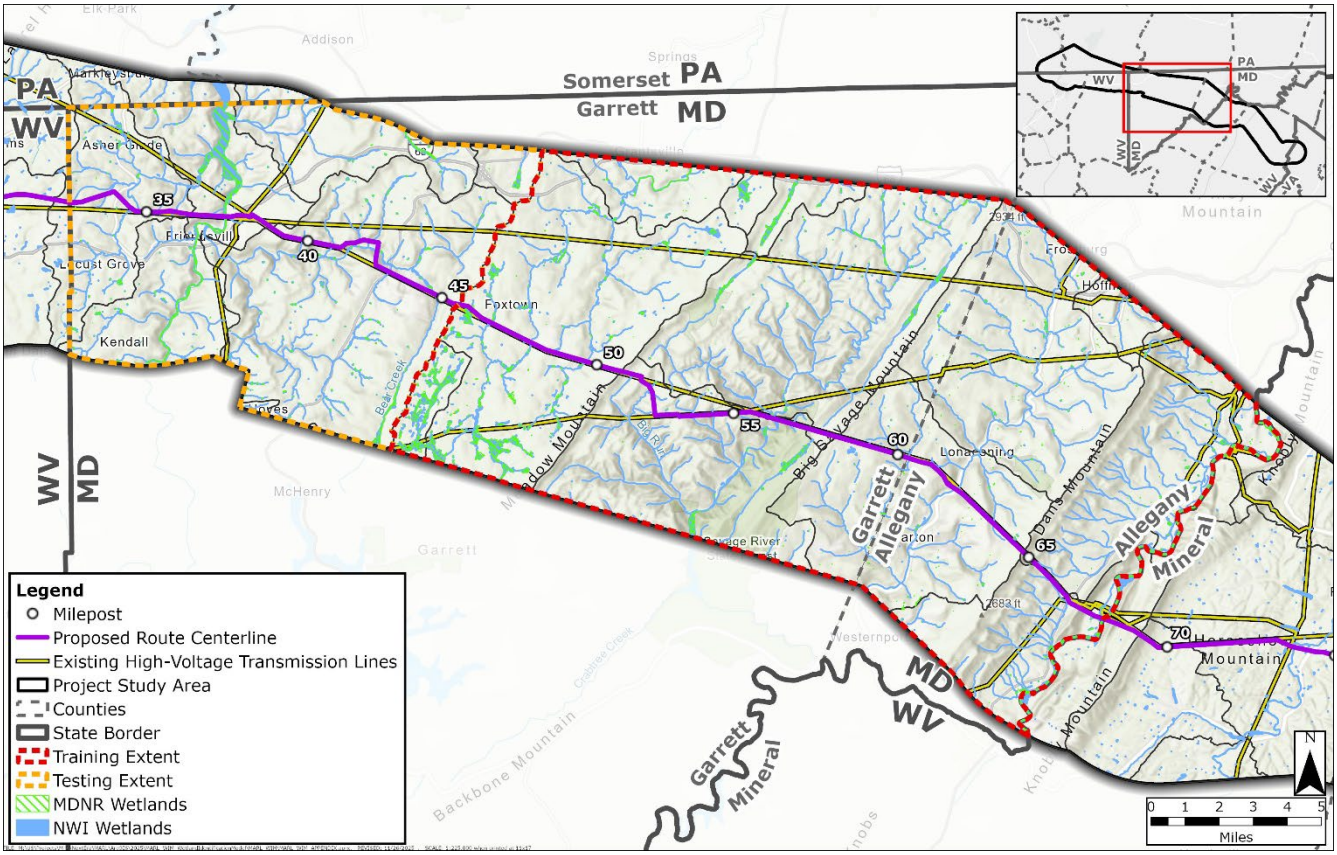
Source: USGS 2025

FIGURE 2-1 MARL PROJECT STUDY AREA WITH TRAINING AND TESTING EXTENT



HUC = Hydrologic Unit Code; MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

FIGURE 2-2 MARYLAND PROJECT STUDY AREA WITH MERGED MARYLAND DEPARTMENT OF NATURAL RESOURCES AND NATIONAL WETLANDS INVENTORY WETLANDS



MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.3 PREDICTOR VARIABLES

Using methodology from the University of Virginia (O'Neil et al. 2018, 2019, 2020) and the Chesapeake Conservancy (Mainali et al. 2023), eight predictor variables were created to identify potential wetland areas. The predictor variables were created from the following data sources:

- High-resolution LiDAR-based DEM: A 3-meter DEM was created from LiDAR flight data from 2024. As recommended by the WIM documentation, the high-resolution DEM was smoothed using the Perona Malik algorithm to remove changes in elevation that are too small to indicate features of interest (Sangireddy et al. 2016).
- U.S. Department of Agriculture National Agriculture Imagery Program (NAIP) multispectral imagery and derivative products: Multispectral NAIP imagery was collected during leaf-on season in 2023 for Maryland and Virginia and during 2022 for Pennsylvania and West Virginia at 1-meter resolution (USDA 2023).
- U.S. Geological Survey National Hydrography Data (USGS 2025).
- High-resolution land cover data (1-meter) from the Chesapeake Conservancy (Chesapeake Conservancy 2018), supplemented by 30-meter resolution National Land Cover Database (NLCD) land cover data (USGS 2024).

These predictors, along with wetland training labels, train the model to identify potential wetlands by recognizing the complex patterns that correspond to wetland characteristics, including hydrology, topography, and geomorphology. Wetland training labels are desktop classifications indicating which areas are wetlands and which are not. The eight predictor variables are discussed below.

2.3.1 DEPTH-TO-WATER INDEX

The Depth-to-Water Index (DTW) is a soil moisture index based on a simple idea: areas that are closer—both in distance and elevation—to streams, ponds, or other surface waters tend to have wetter soils (Murphy et al. 2007). In other words, DTW helps estimate how far water would have to travel downhill to reach each point on the landscape. Lower DTW values suggest areas that stay wet longer, which often makes them good indicators of potential wetlands.

DTW was created using the WIM toolbox for ArcGIS Pro (ESRI 2024). The workflow starts by smoothing the 3-meter DEM, which is then used to calculate a DTW-specific slope raster that acts as the "cost surface"—essentially, a representation of how difficult it is for water to flow across each cell. Surface water features are defined using data from the National Hydrography Data and converted into a 3-meter raster.

The DTW raster was created using the following equation:

$$DTW = \left[\Sigma \left(\frac{dz_i}{dx_i}\right) a\right] * x_c \quad (1)$$

DTW adds up how steep the terrain is along the easiest path water would take to reach the nearest stream or pond. Each part of the formula represents something about that path (Murphy et al. 2007):

- Dz_i/dx_i: the change in elevation from one cell to the next divided by the horizontal distance the water travels across that cell in the data. Together this defines the slope of each step along the path. Steeper slopes mean water can travel there more easily whereas flatter slopes "cost" more for water to move;
- *a*: a small adjustment that accounts for whether water is moving straight (parallel) across a cell or diagonally across the corner; and
- X_c: the cell size (3 meters in this model).

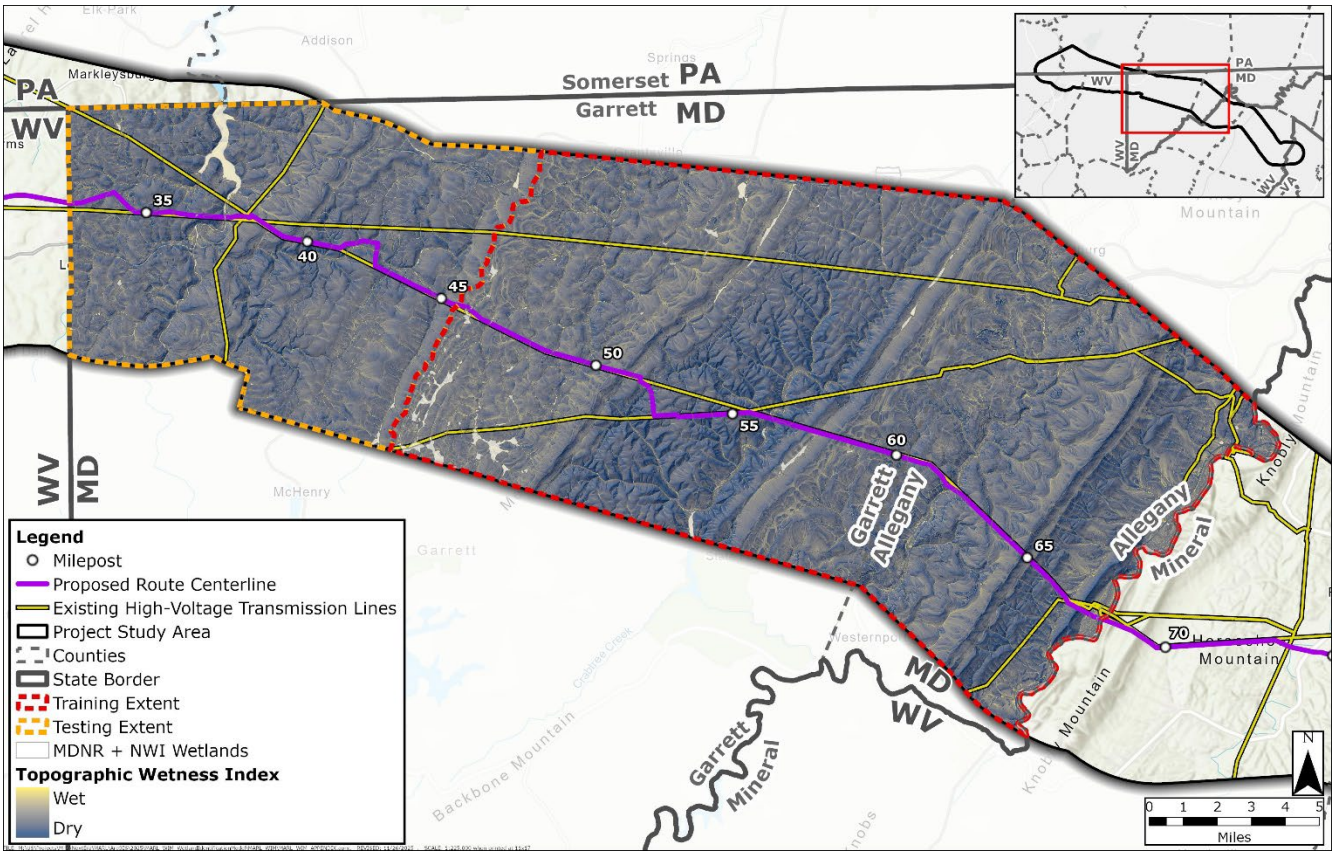
2.3.2 TOPOGRAPHIC WETNESS INDEX

The Topographic Wetness Index (TWI) indicates how wet or saturated a location is likely to be based on terrain, relating the tendency of an area to receive water to its tendency to drain water. TWI was created using the WIM toolbox for ArcGIS Pro (ESRI 2024). The smoothed 3-meter DEM is used to calculate a TWI-specific slope raster and specific catchment area before creating the TWI raster using the following equation:

$$TWI = ln(\frac{\alpha}{tan\,\beta}) \quad (2)$$

Where *a* is the specific catchment area (contributing area per unit contour length), tan(β) is the local slope (Beven and Kirkby 2009). The TWI predictor variable is seen on Figure 2-3.

FIGURE 2-3 TOPOGRAPHIC WETNESS INDEX PREDICTOR VARIABLE



MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

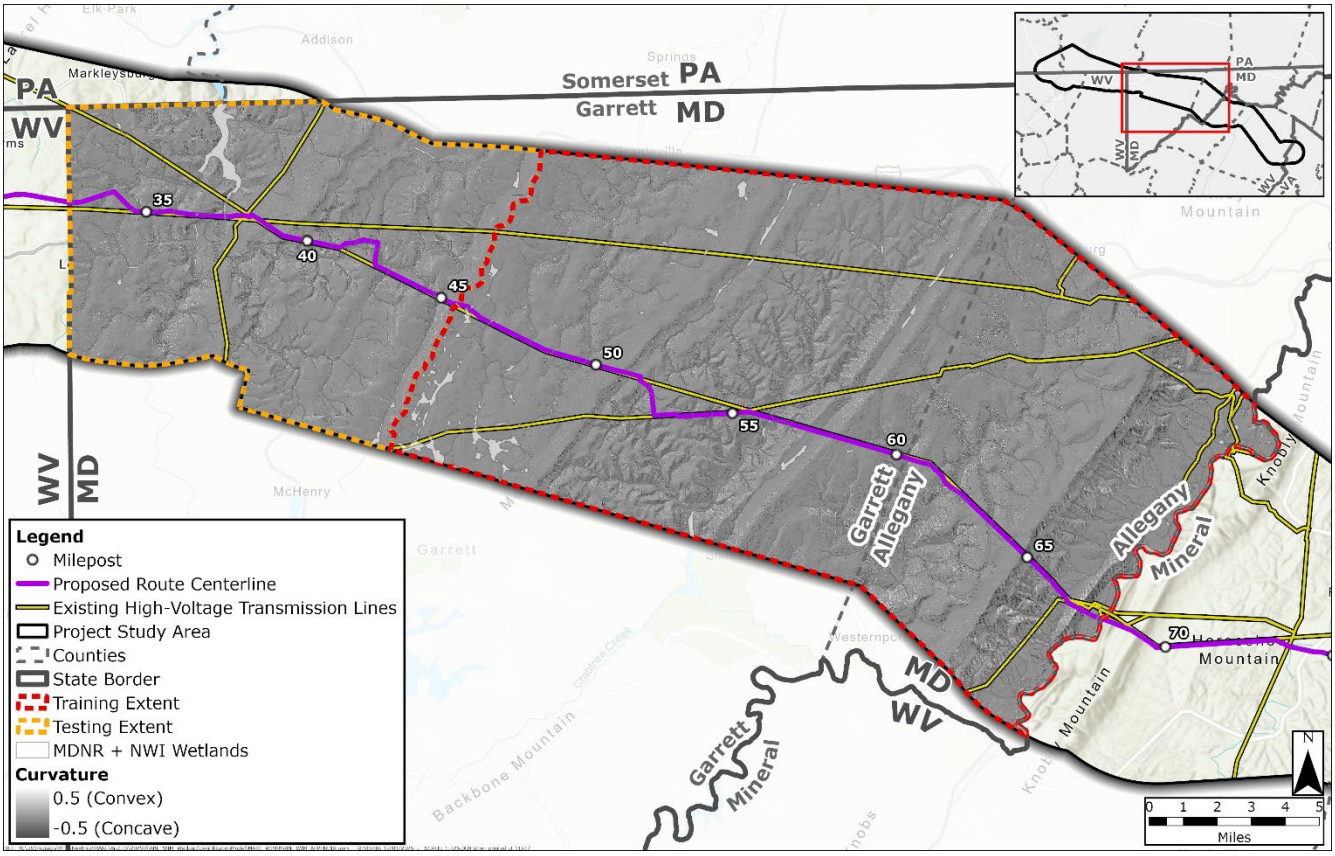
2.3.3 CURVATURE

Curvature indicates how a landform bends, which influences how water accumulates. Curvature was created using the WIM toolbox for ArcGIS Pro (ESRI 2024). The smoothed 3-meter DEM is used to calculate mean curvature, the average of the minimum and maximum curvature. The output raster describes the intrinsic convexity or concavity of the surface, independent of direction or gravity influence. High positive values indicate areas of maximum denudation and high negative values indicate areas of maximum accumulation (Minár et al. 2020), calculated using the following equation:

$$Curvature = \frac{(1+Z_x^2)Z_{yy}-2Z_xZ_yZ_{xy}+(1+Z_y^2)Z_{xx}}{2(1+Z_x^2+Z_y^2)^{3/2}} \quad (3)$$

Where Z_x and Z_y are the first partial derivatives, and Z_{xx}, Z_{yy}, and Z_{xy} are the second partial derivatives. The curvature predictor variable is seen on Figure 2-4.

FIGURE 2-4 CURVATURE PREDICTOR VARIABLE



MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.3.4 NATIONAL AGRICULTURE IMAGERY PROGRAM IMAGERY AND DERIVATIVE PRODUCTS

Multispectral NAIP imagery was collected during leaf-on season in 2023 for Maryland and Virginia and during 2022 for Pennsylvania and West Virginia at 1-meter resolution (USDA 2023). NAIP imagery includes four bands.

- Band 1: Red (600 to 700 nanometer [nm]);
- Band 2: Green (500 to 600 nm);
- Band 3: Blue (400 to 500 nm); and
- Band 4: Near-Infrared (NIR) (800 to 900 nm).

The imagery was resampled to 3-meter resolution to match the DEM and decrease processing burden. Studies have shown that adding "engineered features" values derived from raw remote sensing data increases accuracy of wetland models (Lang et al. 2020). These derived quantities include spectral indices, which are simple calculations that can represent vegetation or wetness by combining two or more spectral reflectance bands. Three spectral indices were derived from the NAIP imagery.

- Normalized Difference Vegetation Index (NDVI) (Figure 2-5);
- Normalized Difference Water Index (NDWI) (Figure 2-6); and
- Enhanced Vegetation Index (EVI) (Figure 2-7).

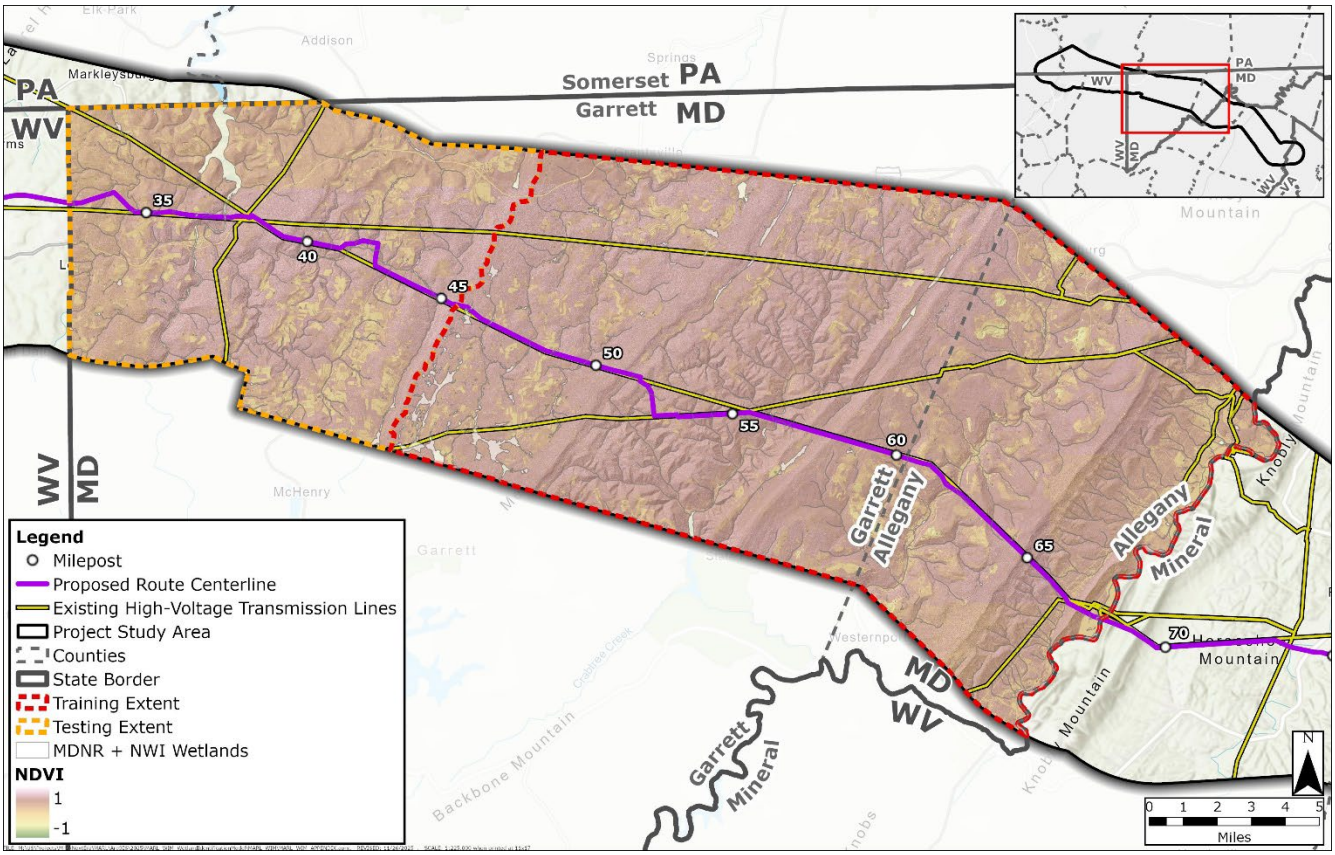
NDWI is used to monitor changes related to water content in water bodies. NDVI is used to quantify vegetation greenness and density. EVI is an optimized vegetation index that accounts for atmospheric influences and vegetation background signal. EVI is similar to NDVI but is less sensitive to noise, allowing for better differentiation of vegetation density than NDVI in areas with very dense green vegetation.

$$NDVI = (NIR - Red)/(NIR + Red) \quad (4)$$

$$NDWI = (Green - NIR)/(Green + NIR) \quad (5)$$

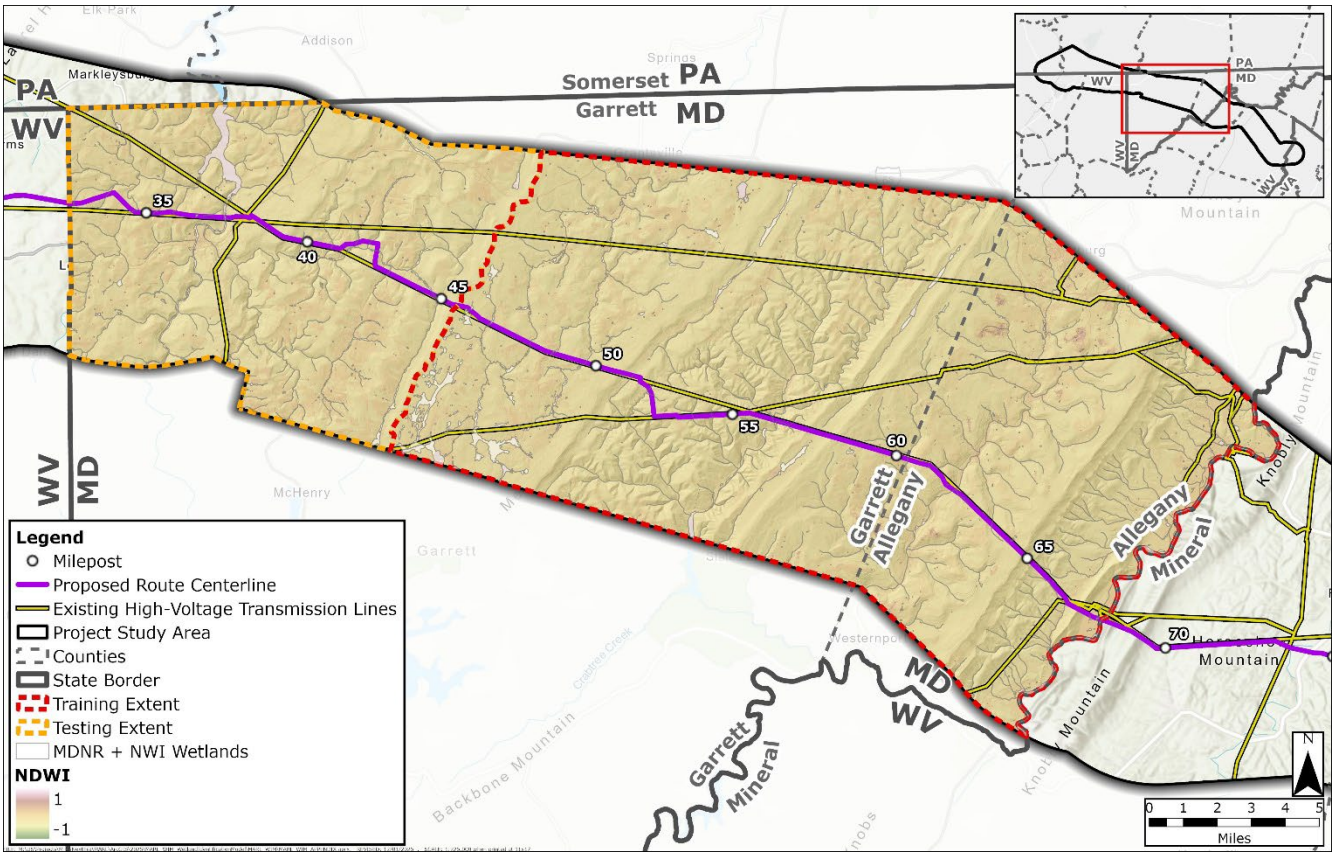
$$EVI = 2.5 * [(NIR - Red)/(NIR + (6 * Red) - (7.5 * Blue) + 1.0)] \quad (6)$$

FIGURE 2-5 NORMALIZED DIFFERENCE VEGETATION INDEX PREDICTOR VARIABLE



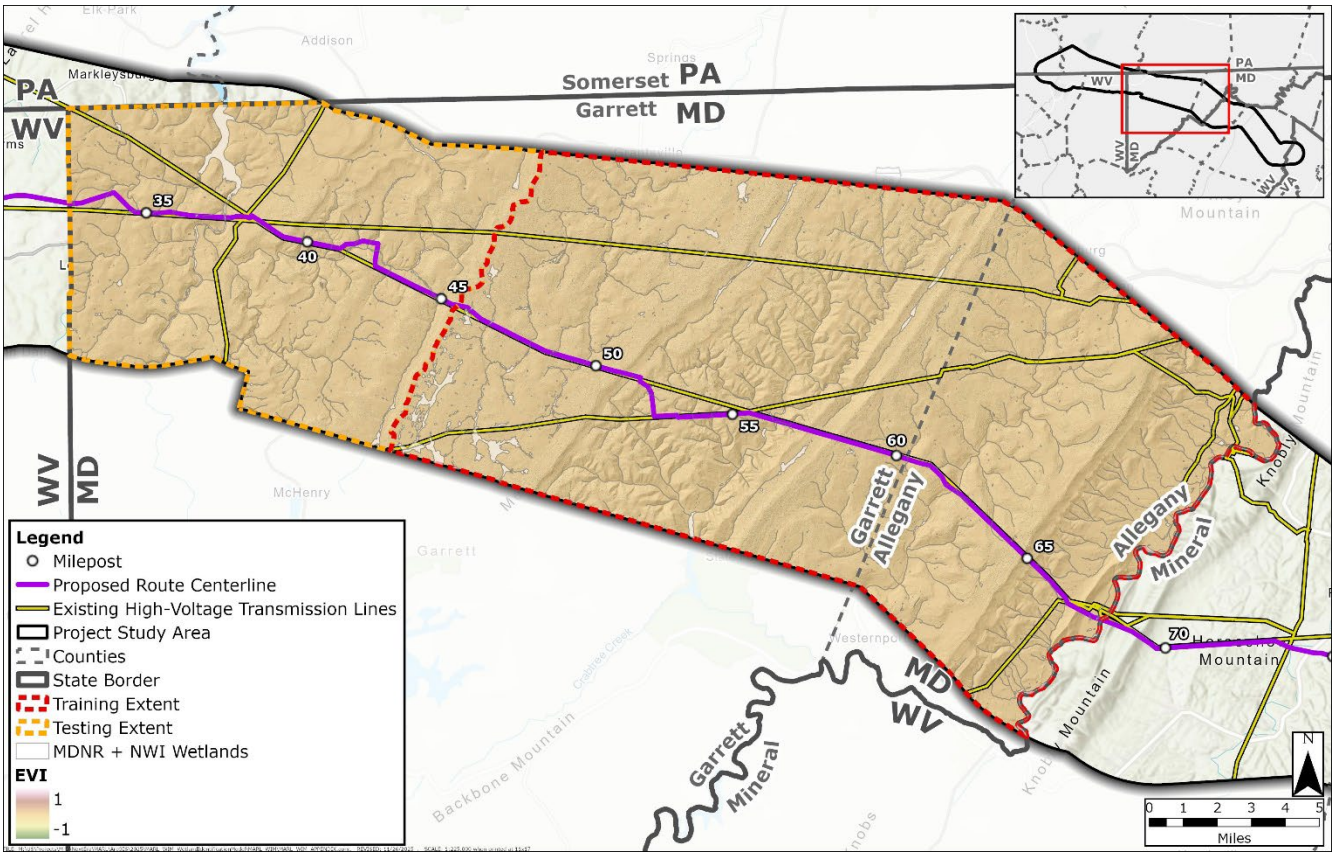
MD = Maryland; MDNR = Maryland Department of Natural Resources; NDVI = Normalized Difference Vegetation Index; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

FIGURE 2-6 NORMALIZED DIFFERENCE WATER INDEX PREDICTOR VARIABLE



MD = Maryland; MDNR = Maryland Department of Natural Resources; NDWI = Normalized Difference Water Index; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

FIGURE 2-7 ENHANCED VEGETATION INDEX PREDICTOR VARIABLE

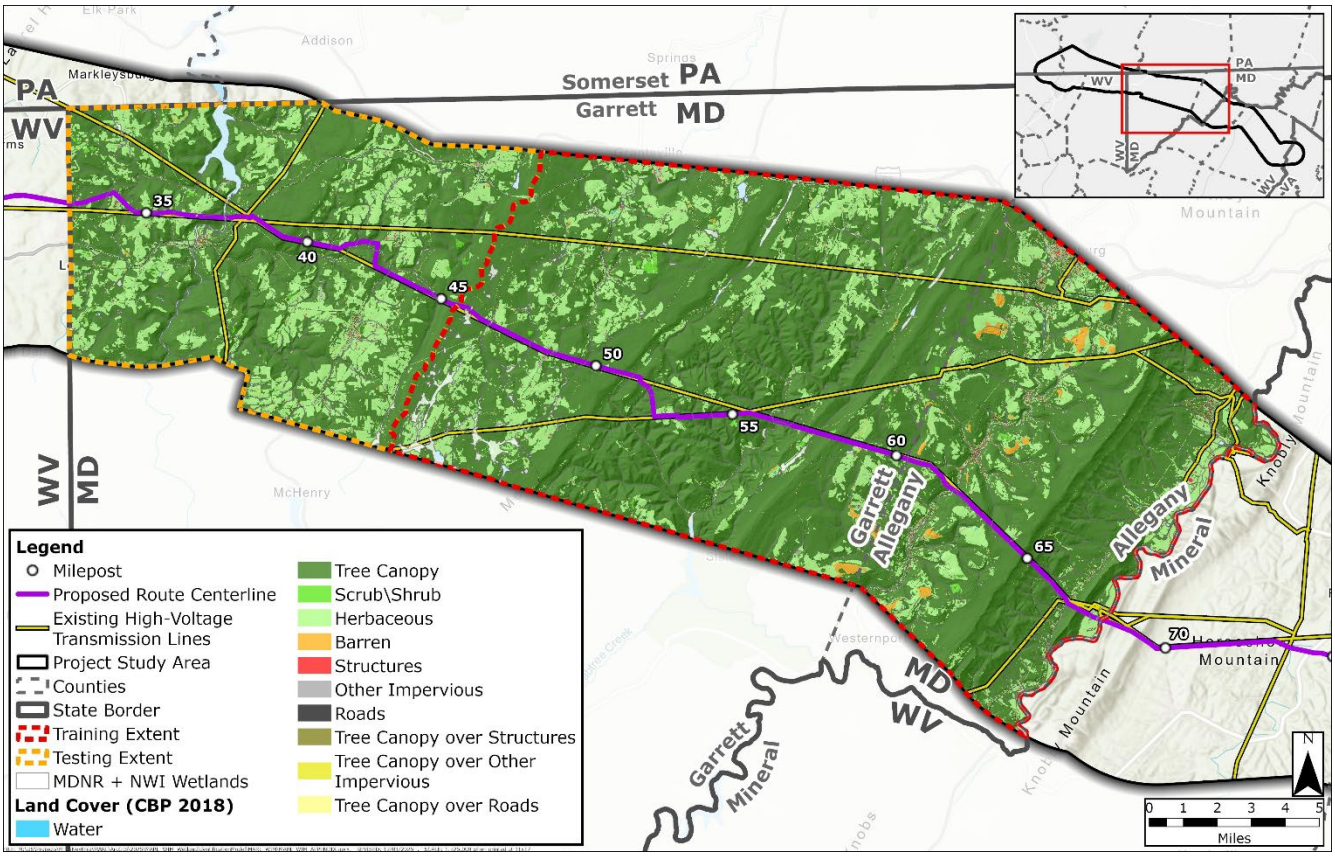


EVI = Enhanced Vegetation Index; MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.3.5 LAND COVER

High-resolution land cover data (1-meter) from the Chesapeake Conservancy (Chesapeake Conservancy 2018) was resampled to a 3-meter resolution to be used as a predictor variable. Using categorical data in addition to continuous data for predictor variables is recommended by the WIM toolbox for ArcGIS Pro guidance (ESRI 2024). The Chesapeake Conservancy land cover dataset from 2017/2018 uses 11 different land cover classes and provides valuable information on impervious surfaces, tree canopy, and water resources in the area (Figure 2-8). The Chesapeake Conservancy land cover dataset covers Maryland, Virginia, and the eastern portion of West Virginia. In Pennsylvania and western West Virginia, the NLCD dataset was used (USGS 2024). The NLCD uses 12 land cover classes that are different than the Chesapeake Conservancy dataset; therefore, the NLCD classes were remapped to match the Chesapeake Conservancy land cover classes.

FIGURE 2-8 LAND COVER PREDICTOR VARIABLE

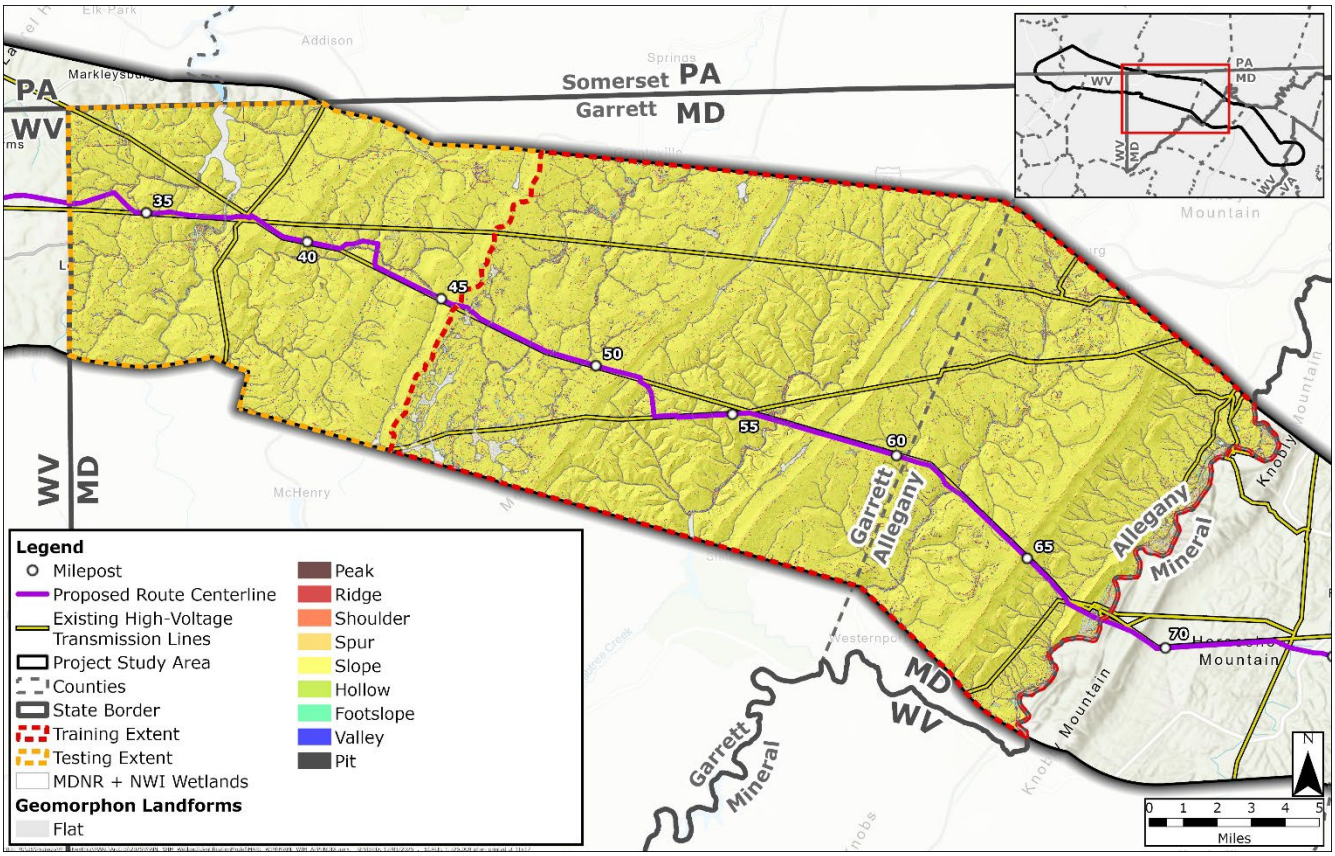


MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.3.6 GEOMORPHONS

Geomorphons, a novel landform classification, were created following the guidance of the Chesapeake Conservancy (Mainali et al. 2023). This study found a unique spatial pattern in geomorphons that corresponded to wetland areas. Geomorphon landforms were calculated in ArcGIS Pro using the smoothed DEM. The tool calculates the local ternary patterns of higher, lower, and equal elevation determined by line-of-sight at each cell, then classifies the unique patterns into 10 common landform types: flat, peak, ridge, shoulder, spur, slope, hollow, footslope, valley, and pit (Jasiewicz and Stepinski 2013). Wetlands are represented by highly repeating series of small, irregular ridges, valleys, pits, flats, and footslopes along otherwise flat or non-slopping areas (Mainali et al. 2023). If there is standing water in a wetland, the DEM may exhibit patterns of interpolation as LiDAR pulses are absorbed by water, resulting in distinct patterns of geomorphons. Geomorphons are seen on Figure 2-9.

FIGURE 2-9 GEOMORPHON LANDFORMS PREDICTOR VARIABLE



MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

2.4 MODEL TRAINING, DEPLOYMENT, AND EVALUATION

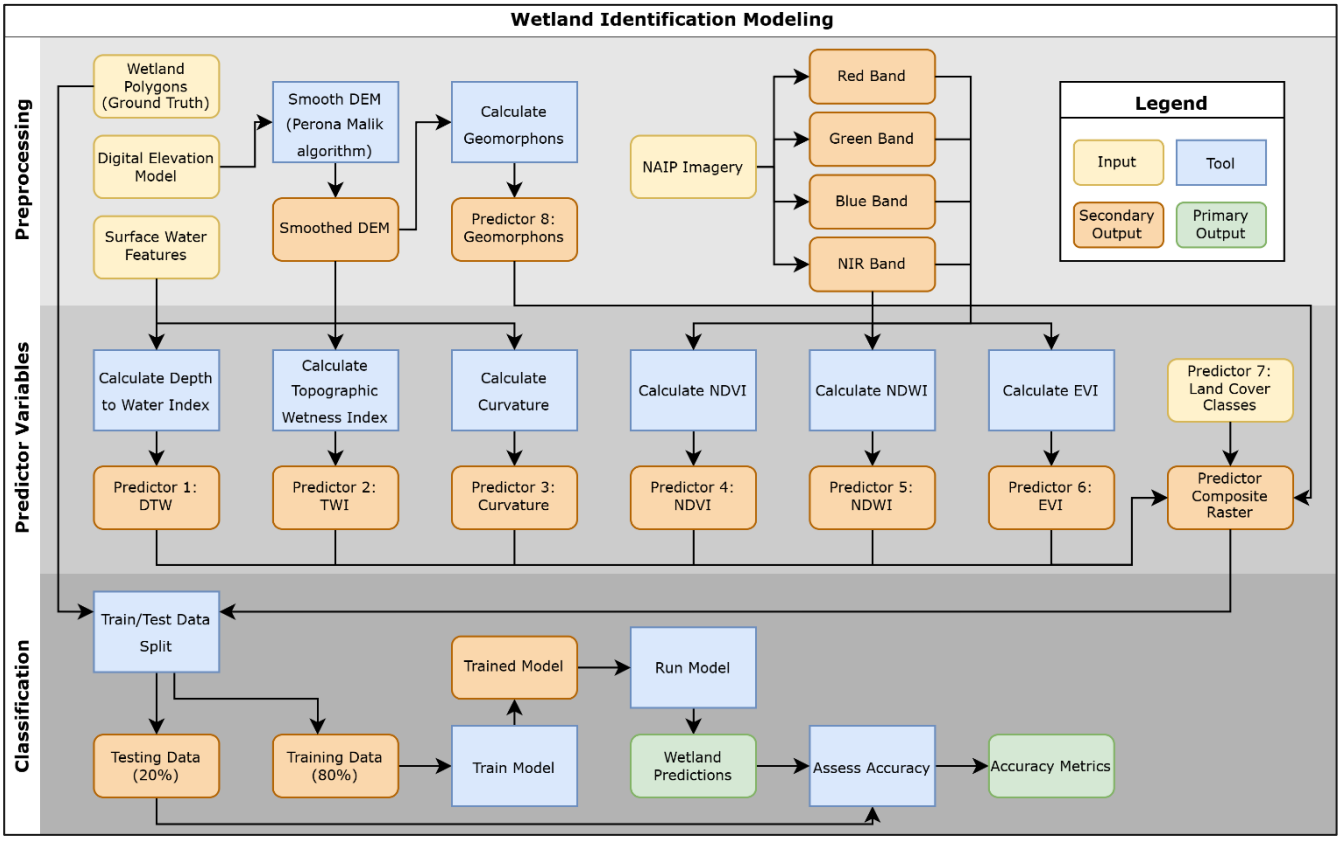
During model evaluation it was determined that DTW was highly variable across the training area and skewing wetland predictions. DTW historically overpredicts wetlands based on nearby surface water (Kekkonen et al. 2025). Wetland water depth fluctuates greatly across time and space and is difficult to capture in a static predictor variable such as DTW, especially for a large study area. Due to this high variability, DTW was excluded from the first composite model. The remaining predictor variables were mosaiced together to create one 7-band composite raster representing the training area. The 7-band based model is referred to as "high probability" wetland predictions. DTW was set aside to create an 8-band based model, which is referred to as "low probability" wetland predictions. The 8-band raster is considered "low probability" based on the assumption that the DTW variable will overpredict wetlands across the MARL Project Study Area. The low probability wetland model is included here for entirety, but the model was significantly inaccurate and is not included in the results. These limitations and future model improvement suggestions are explored further in Section 4, Discussion.

Training data for the predictor variable composite was generated using the Export Training Data for Deep Learning tool in ArcGIS Pro (ESRI n.d.-c.). This tool takes the input raster and training sample data in vector form and creates smaller image chips for model training. The input raster was the predictor variable composite, and the input training sample data was the combined MDNR

wetland polygons. The output image chips are 256 by 256 pixels, with 50 percent overlap containing the predictor variable composite as the base. For each image chip, every pixel is labeled as a wetland or non-wetland based on the combined wetland data. This resulted in 5,776 total image chips with wetland and/or non-wetland labels. These chips were split 80/10/10, with 80 precent (4,622) used for training, 10 precent (577) for validation during model training, and 10 precent (577) kept separate for final model testing. Training data is used to train the deep learning model, while the validation data is used to fine-tune the model and determine the stopping point of training. Validation data is considered part of the training of the model. The testing dataset of previously unseen data is used to determine the final accuracy of the model.

The U-Net model was trained with ResNet34 as the backbone, a dynamic learning rate from 0.00001 to 0.001, a batch size of 16, and 30 epochs. Wetland predictions were then created for the previously unseen testing area and overall MARL Project Study Area using the Classify Pixels Using Deep Learning tool in ArcGIS Pro (ESRI n.d.-d.). The overall process diagram is seen on Figure 2-10.

FIGURE 2-10 PROCESS DIAGRAM



DEM = digital elevation model; DTW = Depth-to-Water Index; EVI = Enhanced Vegetation Index; NAIP = National Agriculture Imagery Program; NDVI = Normalized Difference Vegetation Index; NDWI = Normalized Difference Water Index; TWI = Topographic Wetness Index

2.4.1 MODEL EVALUATION

Using the combined MDNR and NWI riverine wetland dataset as ground truth data, the predicted wetlands from the deep learning model were assessed for accuracy following the WIM toolbox for ArcGIS Pro guidance (ESRI 2024). Predicted wetlands were compared against the combined MDNR and NWI testing data, referred to as "ground truth labels." The calculated accuracy metrics were precision, recall, and F1 score. A value closer to 1 indicates greater accuracy of the model. These metrics are calculated using true positives, false positives, and false negatives. True positive means the pixel was classified correctly as a class of interest (wetland), false positive means the pixel of a background class (non-wetland) was incorrectly assigned to the class of interest (wetland), and false negative means the pixel of a known class (wetland) was incorrectly assigned to the background class (non-wetland).

Precision is the accuracy of positive predictions, accounting for the overprediction of positive classes (wetlands) without being biased by disproportionately large populations of the negative class (non-wetlands). Precision is the percentage of wetland predictions made that were correct, checking how many positive predictions matched ground truth labels and is calculated as follows:

$$Precision = \frac{True\ Positive}{True\ Positive + False\ Positive} \quad (7)$$

Recall is the probability of a ground truth label being corrected classified. It measures the proportion of actual positive pixels (ground truth labels) that were correctly identified by the model, giving the percentage of true wetlands that were correctly identified and is calculated as follows:

$$Recall = \frac{True\ Positive}{True\ Positive + False\ Negative} \quad (8)$$

The F1 score is the weighted average of precision and recall, often used to measure the overall performance of a model. The F1 score is preferred over traditional accuracy metrics, as it offers a more balanced view in datasets with high class imbalance, like wetland/non-wetland classes. F1 is calculated as follows:

$$F1 = \frac{2*(Precision*Recall)}{(Precision+Recall)} \quad (9)$$

3. RESULTS

Predicted wetlands were compared against the combined MDNR and NWI testing data, which was kept independent and not seen by the model during training (Figure 3-1). The F1 score for the high probability model (seven predictor variables) testing area was 0.900 (Table 3-1), which is considerably high for a low number of training samples and minimal model fine-tuning.

TABLE 3-1 ACCURACY METRICS FOR THE HIGH PROBABILITY WETLAND MODEL TESTING AREA

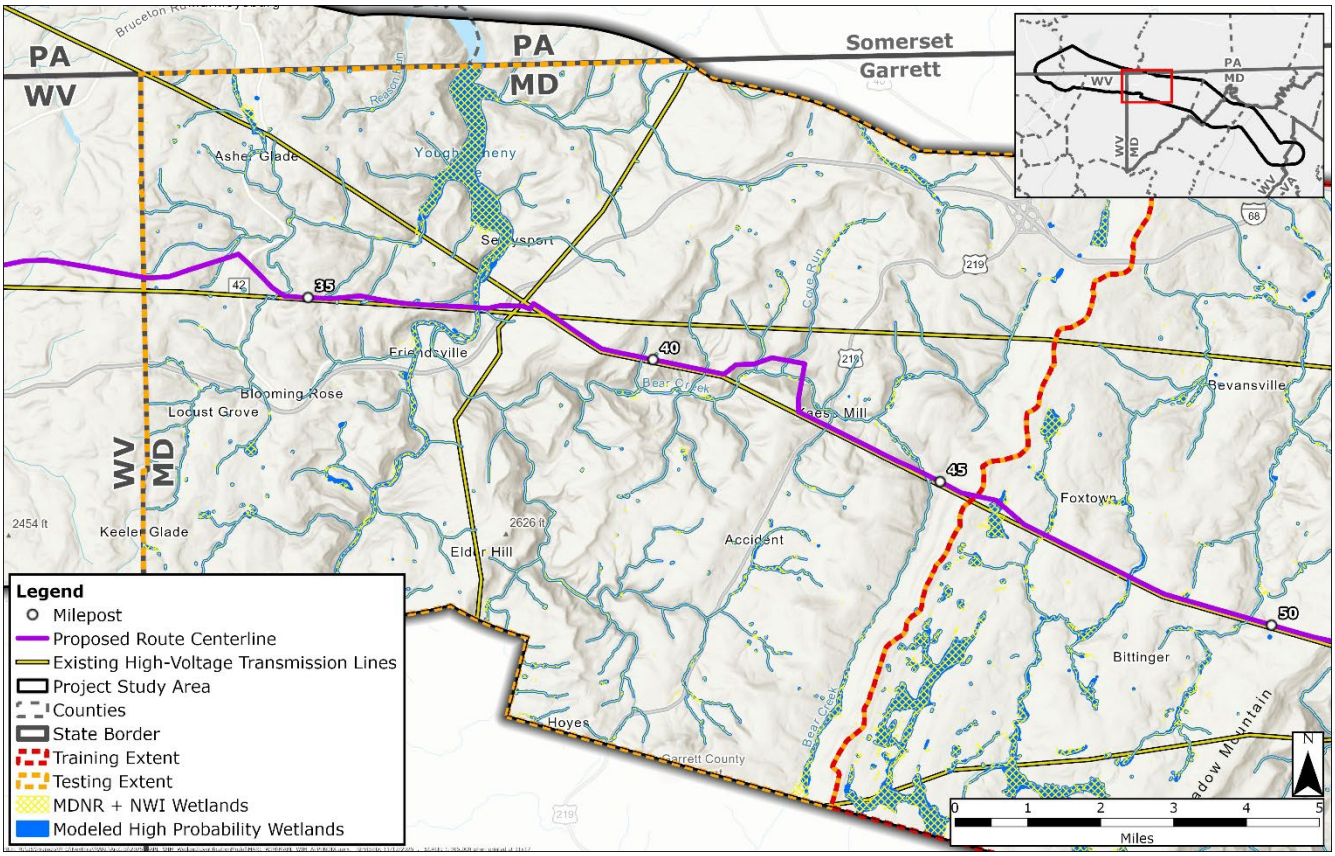
	Wetlands	Non-Wetlands
Precision	0.850	0.998
Recall	0.956	0.996
F1 Score	0.900	0.999

Final wetland predictions were made for the entirety of the MARL Project Study Area, including all proposed project components, with the exception of the Woodside Substation site. More than 23 percent of the MARL Project Study Area was used to train the model, so any accuracy metrics calculated for the larger area are slightly skewed because the model has already seen those ground truth labels. Accuracy metrics for the entire MARL Project Study Area are presented in Table 3-2 regardless of this limitation. The area of modeled high probability wetlands (MHPW) within the MARL Project Study Area is 15,403.5 acres (Table 3-3). The modeled wetland results for the Siting Corridor and ROW Corridor are provided in Table 3-4 and Table 3-5.

TABLE 3-2 ACCURACY METRICS FOR THE HIGH PROBABILITY WETLAND MODEL WITHIN THE MARL PROJECT STUDY AREA

	Wetlands	Non-Wetlands
Precision	0.889	0.996
Recall	0.854	0.997
F1 Score	0.871	0.997

FIGURE 3-1 HIGH PROBABILITY WETLAND MODEL RESULTS WITHIN THE TESTING AREA



MD = Maryland; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; PA = Pennsylvania; VA = Virginia; WV = West Virginia

TABLE 3-3 SUMMARY OF NATIONAL WETLANDS INVENTORY, MARYLAND DEPARTMENT OF NATURAL RESOURCES, AND MODELED HIGH PROBABILITY WETLANDS WITHIN THE MARL PROJECT STUDY AREA

Classification	Maryland (acres)	Pennsylvania (acres)	Virginia (acres)	West Virginia (acres)	Study Area Total (acres)
NWI Total [a]	4,853.4	3,182.2	628.1	6,717.8	15,381.5
MDNR Total [a]	2,840.4	NA	NA	NA	2,804.4
MHPW Total [a]	5,247.5	3,678.9	699.1	5,778.0	15,403.5

Source: USFWS n.d.; MDNR n.d.

MDNR = Maryland Department of Natural Resources; MHPW = modeled high probability wetlands; NA = not applicable; NWI = National Wetlands Inventory

[a] Totals may not match the sum of addends due to rounding.

TABLE 3-4 SUMMARY OF NATIONAL WETLANDS INVENTORY, MARYLAND DEPARTMENT OF NATURAL RESOURCES, AND MODELED HIGH PROBABILITY WETLANDS WITHIN THE SITING CORRIDOR

Classification	Maryland (acres)	Pennsylvania (acres)	Virginia (acres)	West Virginia (acres)	Siting Corridor Total (acres)
NWI Total [a]	28.4	22.1	5.1	46.3	102.0
MDNR Total [a]	12.8	NA	NA	NA	12.8
MHPW Total [a]	37.1	27.9	5.1	29.3	99.4

Source: USFWS n.d.; MDNR n.d.

MDNR = Maryland Department of Natural Resources; MHPW = modeled high probability wetlands; NA = not applicable; NWI = National Wetlands Inventory
[a] Totals may not match the sum of addends due to rounding.

TABLE 3-5 SUMMARY OF NATIONAL WETLANDS INVENTORY, MARYLAND DEPARTMENT OF NATURAL RESOURCES, AND MODELED HIGH PROBABILITY WETLANDS WITHIN THE ROW CORRIDOR

Classification	Maryland (acres)	Pennsylvania (acres)	Virginia (acres)	West Virginia (acres)	ROW Corridor Total (acres)
NWI Total [a]	12.1	9.9	2.1	18.5	42.6
MDNR Total [a]	5.7	NA	NA	NA	5.7
MHPW Total [a]	15.1	13.1	2.1	12.3	42.6

Source: USFWS n.d.; MDNR n.d.

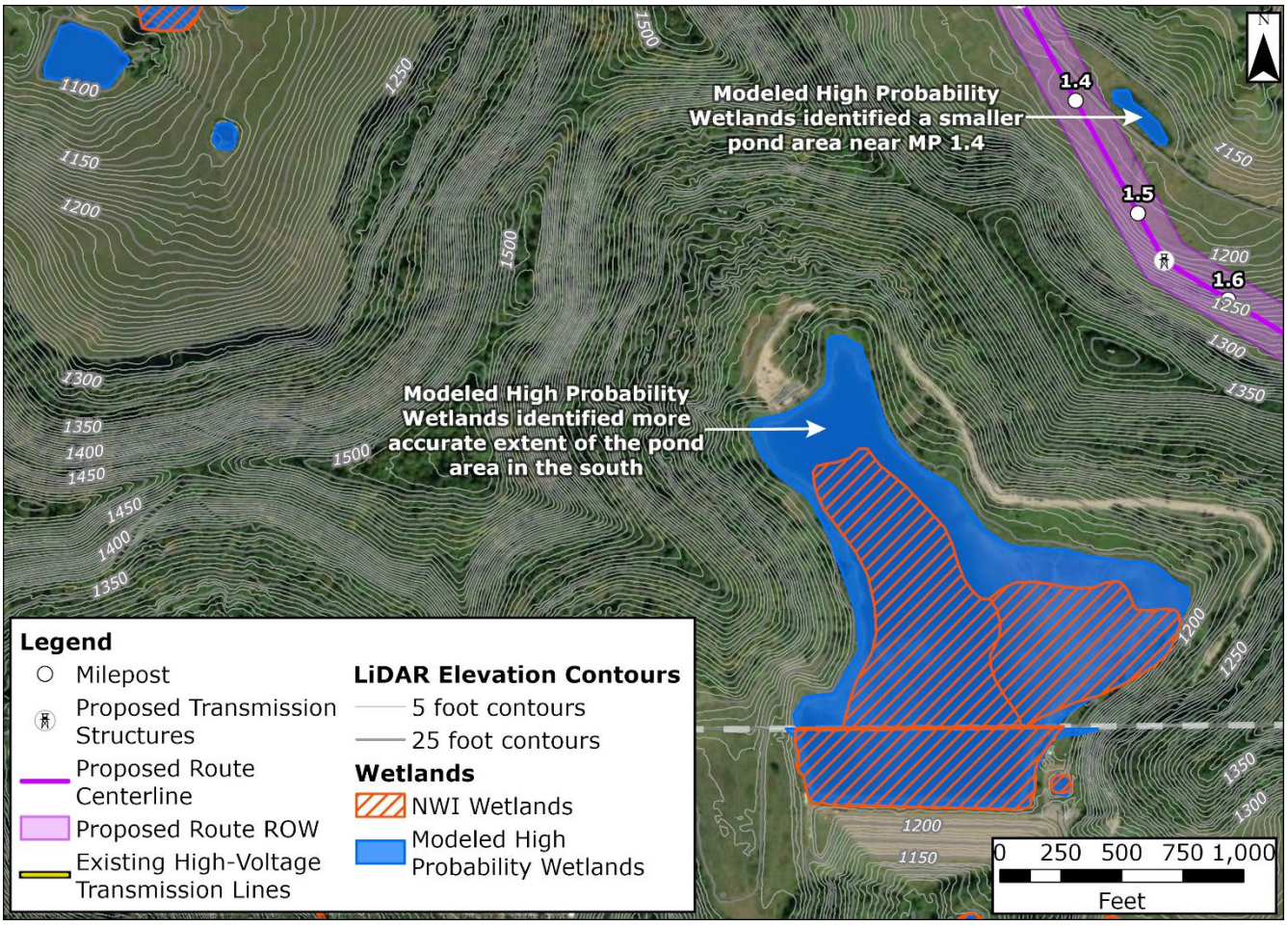
MDNR = Maryland Department of Natural Resources; MHPW = modeled high probability wetlands; NA = not applicable; NWI = National Wetlands Inventory; ROW = right-of-way
[a] Totals may not match the sum of addends due to rounding.

The model predicted more wetlands within the total MARL Project Study Area (15,403.5 acres) compared to NWI mapping (15,381.5 acres) but predicted 2.6 acres less than NWI mapping in the Siting Corridor. The model predicted the same acreage as NWI mapping in the ROW Corridor (42.6 acres) although with different geometries. However, in areas of NWI riverine wetlands concentrated in steeper topographic settings, the modeled wetlands closely matched the NWI wetland geometries potentially due to the use of geomorphons as a predictor variable. Although the USFWS did not use geomorphon-based terrain analysis to delineate NWI riverine wetlands, the strong spatial agreement between modeled geomorphon landforms and NWI riverine wetlands suggests that geomorphology is a primary control on riverine wetland occurrence and supports the validity of the model's predictor variables. Additionally, of the 42.6 acres of NWI wetlands within the ROW Corridor, 54.4 percent are riverine wetlands (23.2 acres). For all three analysis types by state (MARL Project Study Area, Siting Corridor, ROW Corridor), the model predicted more, or the same acreages of wetlands compared to NWI data, with the exception of West Virginia. These sections of West Virginia may be highly different than Maryland in terms of topography, which would result in model mismatch and confusion between the training area in Maryland and unseen areas in West Virginia. Additionally, West Virginia had the largest area for

wetland predictions, which introduces higher potential for errors and misalignment. For more details on acres of MHPW within the MARL Project Study Area, Siting Corridors, or ROW Corridors of the Proposed Route and Alternative Routes, see Attachment 1, Modeled Wetlands Summary Tables.

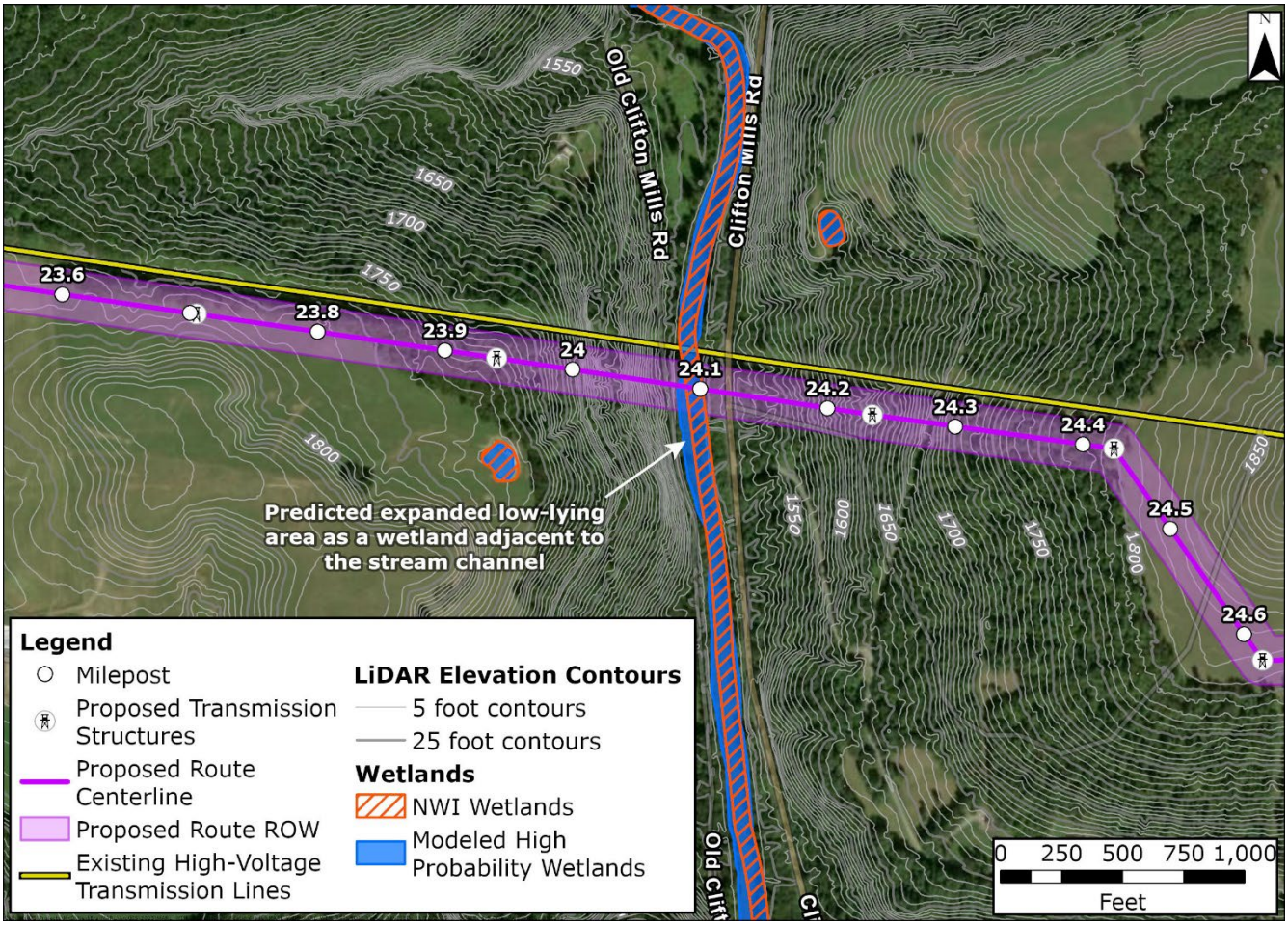
Based on visual review and to provide example differences, Figure 3-2 through Figure 3-7 show discrete examples of model outputs compared to existing wetland data. In some areas the MHPW aligns more closely with topographic features or identify previously unidentified potential wetland areas. Whereas in other places the MHPW matches the NWI or MDNR wetlands. To see additional details, refer to Attachment 2, Modeled Wetlands Mapbook.

FIGURE 3-2 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN GREENE COUNTY, PENNSYLVANIA, IDENTIFYING MORE ACCURATE BOUNDARY OF PONDED AREA AND UNIDENTIFIED PONDED AREA



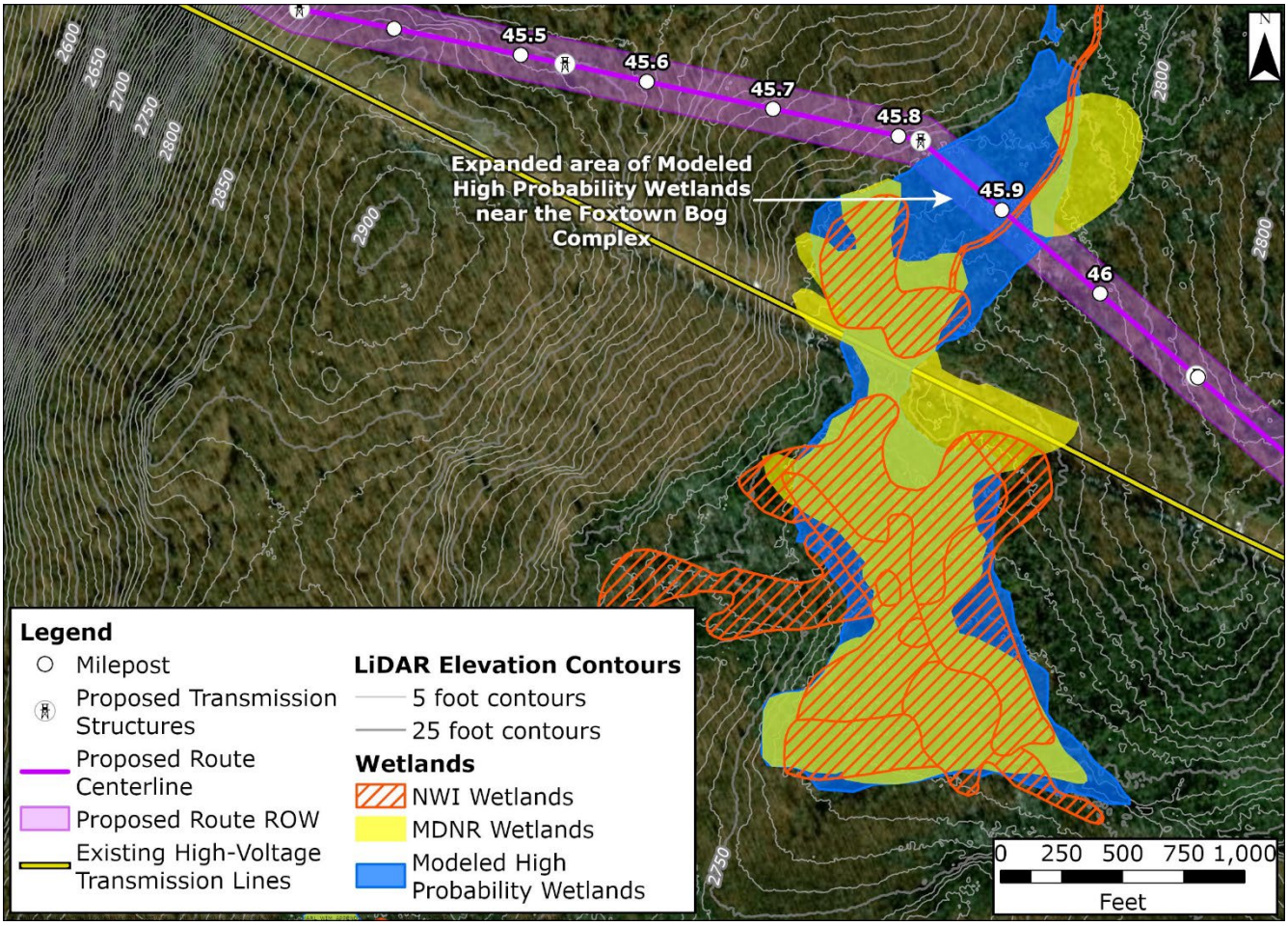
LiDAR = Light Detection and Ranging; MP = milepost; NWI = National Wetlands Inventory; ROW = right-of-way

FIGURE 3-3 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN PRESTON COUNTY, WEST VIRGINIA, SHOWING MODELED HIGH PROBABILITY WETLANDS EXPANDED IN LOW-LYING AREAS BIG SANDY CREEK



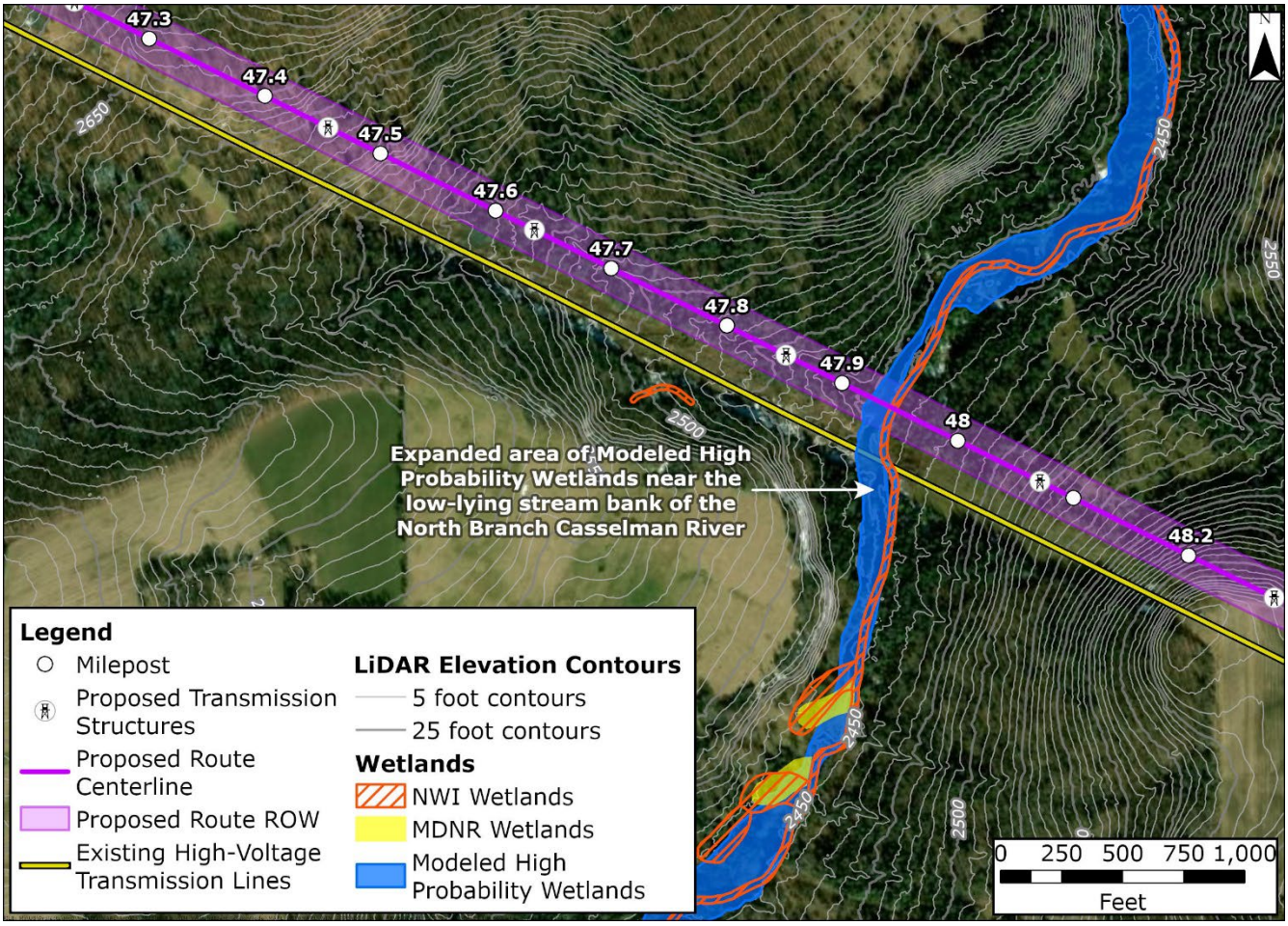
LiDAR = Light Detection and Ranging; NWI = National Wetlands Inventory; ROW = right-of-way

FIGURE 3-4 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN GARRETT COUNTY, MARYLAND, PREDICTING EXPANDED WETLAND AREA NEAR FOXTOWN BOG COMPLEX



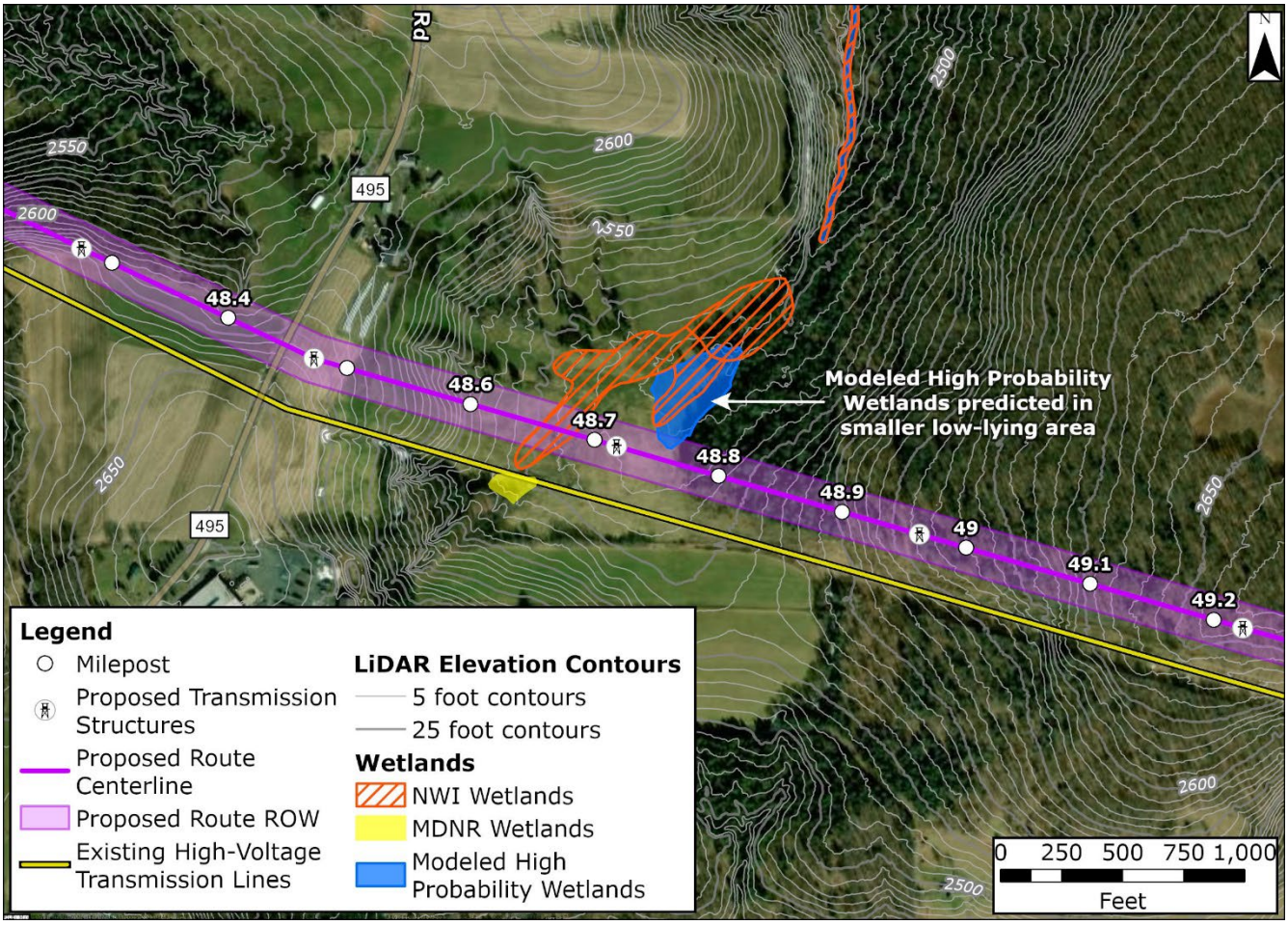
LiDAR = Light Detection and Ranging; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; ROW = right-of-way

FIGURE 3-5 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN GARRETT COUNTY, MARYLAND, PREDICTING LARGER WETLAND AREA ON THE STREAM BANKS OF THE NORTH BRANCH CASSELMAN RIVER



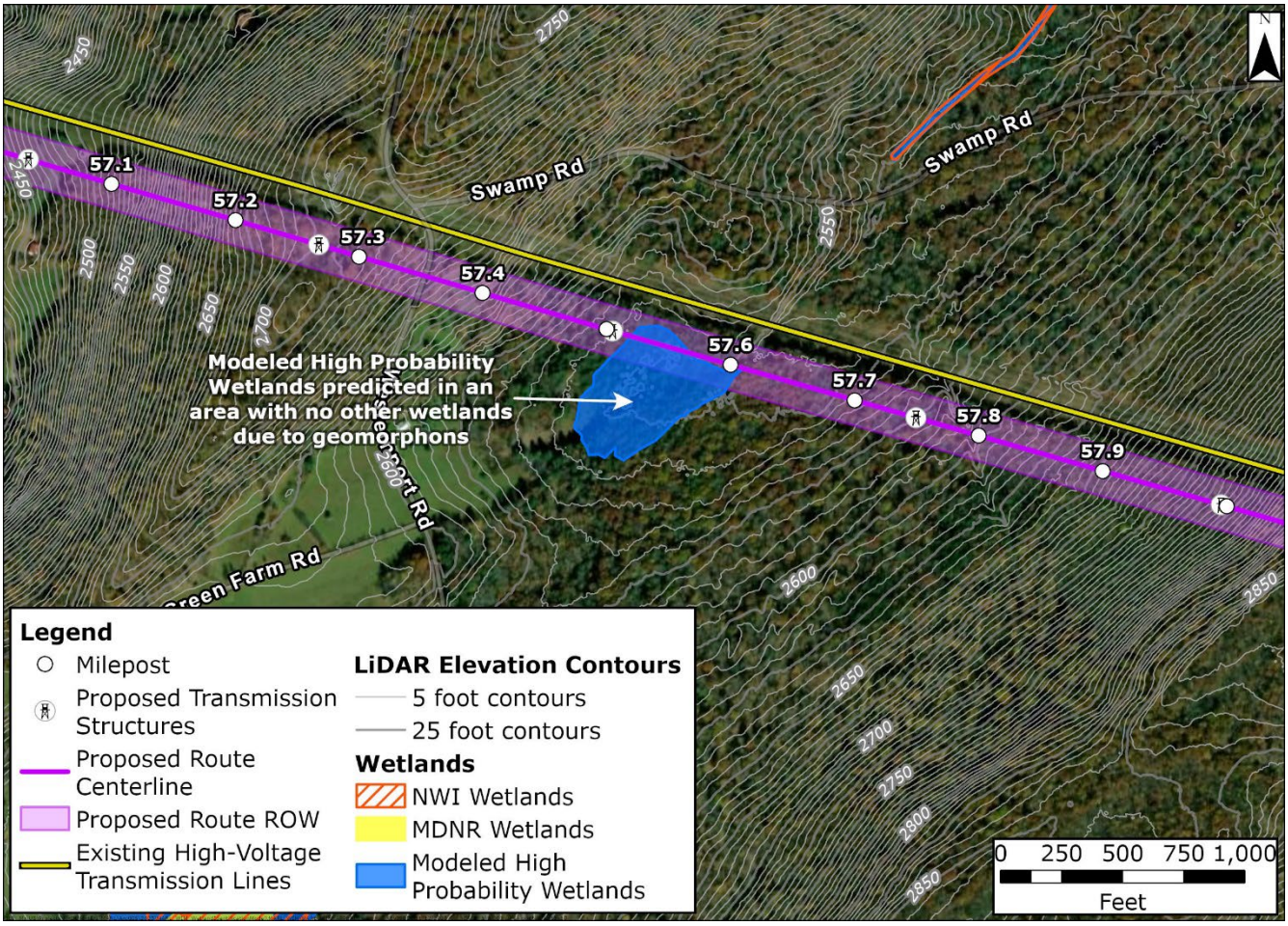
LiDAR = Light Detection and Ranging; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; ROW = right-of-way

FIGURE 3-6 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN GARRETT COUNTY, MARYLAND, SHOWING SMALLER POTENTIAL WETLAND FOOTPRINT COMPARED TO THE NATIONAL WETLANDS INVENTORY DATA THAT MORE CLOSELY ALIGNS WITH TOPOGRAPHY



LiDAR = Light Detection and Ranging; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; ROW = right-of-way

FIGURE 3-7 MODELED HIGH PROBABILITY WETLANDS EXAMPLE IN GARRETT COUNTY, MARYLAND, SHOWING A POTENTIAL WETLAND AREA NOT PREVIOUSLY IDENTIFIED



LiDAR = Light Detection and Ranging; MDNR = Maryland Department of Natural Resources; NWI = National Wetlands Inventory; ROW = right-of-way

4. DISCUSSION

There are fundamental challenges in training and evaluating a wetland prediction model using non-field delineated, regional datasets that are outdated or inaccurate, such as the MDNR and NWI data. Inaccurate wetland labels, along with temporal and categorical mismatches between these labels and the model outputs (which represent current conditions), introduce uncertainty into the testing data used to assess model performance. A deep learning model does not know what a wetland is because it simply learns the patterns from the predictor variables that exist on the labeled wetlands; therefore, if your labeled wetlands are incorrect, outdated, or misaligned, the model will absorb those mistakes and learn incorrect patterns. Consequently, the accuracy metrics primarily reflect how well the model reproduces MDNR and NWI data. However, the accuracy of the model can be leveraged to extrapolate real-world data from a smaller, representative area to the larger project area. Using field delineated wetlands to fine-tune the current model would produce more reliable and generalizable results, especially by focusing on a small—yet representative—area containing highly accurate ground truth data, which could be useful for early impact assessments and preliminary project planning.

While the model successfully predicted wetlands in the MARL Project Study Area, there are notable limitations with this method. The model is unable to distinguish between different types of wetland classifications (palustrine, riverine, and lacustrine), and the acreage provided in the final predictions is a combination of these classes. To differentiate wetland types within the predictions, it will require new models to be trained using specific Cowardin classes. While this may be possible, it will be considerably inaccurate due to the class imbalance and low sample size per class of the training data. Additionally, the model cannot distinguish MHPW from low probability wetlands. This is partially a limitation of the model type (U-Net) and may require using a different deep learning architecture altogether to achieve this goal. To overcome this challenge, an attempt was made to use the DTW as the eighth variable to create a “low probability” model, as this variable historically overpredicts wetlands based on nearby surface water (Kekkonen et al. 2025). However, DTW is highly variable across the MARL Project Study Area, particularly in Maryland due to the steep topography. Because Maryland was used as the training area, the high variability in DTW significantly skewed results and greatly overpredicted wetlands.

The goal of this model was to detect previously unknown wetlands and refine known wetlands in the MARL Project Study Area to help understand potential impacts and field requirements; therefore, the recall and precision should be lower than expected for other types of deep learning predictions, as these metrics are calculated by comparing to the ground truth features.

Future improvements to the model could include both model training and evaluation. To create a more accurate low probability wetland model, the DTW variable will need to be updated or modified. This could be done with more accurate stream network mapping, through field delineation or additional datasets, or the use of a Soil Wetness Index to quantify moisture at various depths in the nearby soil (Murphy et al. 2007). Additionally, using field delineated wetlands to train and evaluate the model will improve the accuracy of the model and the reliability of accuracy metrics. While the current accuracy metrics show temporal robustness in the model trained with predictor variables and wetland labels collected decades apart, any improvement to ground truth data will significantly improve the model.

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ATTACHMENT 1 MODELED WETLANDS SUMMARY TABLES

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TABLE 1 MODELED HIGH PROBABILITY WETLANDS BY STATE WITHIN THE SITING CORRIDOR

Environmental Features	State	Calculation Type	Measure	Unit	End to End A	End to End B	End to End C	End to End D	End to End E	End to End F
MHPW	Maryland	Siting Corridor	Area	Acres	37.1	32.1	42.2	38.7	37.1	43.8
MHPW	Pennsylvania	Siting Corridor	Area	Acres	27.9	25.6	60.9	27.9	27.9	60.9
MHPW	West Virginia	Siting Corridor	Area	Acres	29.3	35.6	24.9	29.3	32.8	29.7
MHPW	Virginia	Siting Corridor	Area	Acres	5.1	4.5	5.1	5.1	5.1	4.5
Siting Corridor Total [a]					**99.4**	**97.8**	**133.0**	**101.00**	**103.0**	**138.9**

MPHW = Modeled High Probability Wetlands

[a] Totals may not match the sum of addends due to rounding.

TABLE 2 MODELED HIGH PROBABILITY WETLANDS BY STATE WITHIN THE ROW CORRIDORS

Environmental Features	State	Calculation Type	Measure	Unit	End to End A	End to End B	End to End C	End to End D	End to End E	End to End F
MHPW	Maryland	Proposed ROW	Area	Acres	15.1	13.2	18.5	15.8	15.1	19.2
MHPW	Pennsylvania	Proposed ROW	Area	Acres	13.1	12.0	28.4	13.1	13.1	28.4
MHPW	West Virginia	Proposed ROW	Area	Acres	12.3	16.0	10.6	12.3	14.4	13.5
MHPW	Virginia	Proposed ROW	Area	Acres	2.1	1.9	2.1	2.1	2.1	1.9
ROW Total [a]					**42.6**	**43.1**	**59.6**	**43.3**	**44.8**	**63.0**

MPHW = Modeled High Probability Wetlands; ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

TABLE 3 MODELED HIGH PROBABILITY WETLANDS BY COUNTY WITHIN THE SITING CORRIDOR

Environmental Features	County	State	Calculation Type	Measure	Unit	End to End A	End to End B	End to End C	End to End D	End to End E	End to End F
MHPW	Garrett	Maryland	Siting Corridor	Area	Acres	30.9	25.9	36.0	29.3	30.9	34.4
MHPW	Allegany	Maryland	Siting Corridor	Area	Acres	6.2	6.2	6.2	9.4	6.2	9.5
MHPW	Greene	Pennsylvania	Siting Corridor	Area	Acres	10.0	10.0	8.2	10.0	10.0	8.2
MHPW	Fayette	Pennsylvania	Siting Corridor	Area	Acres	18.0	15.6	52.8	18.0	18.0	52.8
MHPW	Monongalia	West Virginia	Siting Corridor	Area	Acres	1.4	4.3	1.2	1.4	1.4	1.2
MHPW	Preston	West Virginia	Siting Corridor	Area	Acres	4.3	7.6	< 0.1	4.3	4.3	< 0.1
MHPW	Mineral	West Virginia	Siting Corridor	Area	Acres	2.1	2.1	2.1	2.1	2.1	2.1
MHPW	Hampshire	West Virginia	Siting Corridor	Area	Acres	21.5	21.5	21.5	21.5	25.0	26.3
MHPW	Frederick	Virginia	Siting Corridor	Area	Acres	5.1	4.5	5.1	5.1	5.1	4.5
Survey Total [a]						**99.3**	**97.7**	**133.0**	**101.0**	**102.8**	**138.9**

MPHW = Modeled High Probability Wetlands

[a] Totals may not match the sum of addends due to rounding.

TABLE 4 MODELED HIGH PROBABILITY WETLANDS BY COUNTY WITHIN THE ROW CORRIDOR

Environmental Features	County	State	Calculation Type	Measure	Unit	End to End A	End to End B	End to End C	End to End D	End to End E	End to End F
MPHW	Garrett	Maryland	Proposed ROW	Area	Acres	13.2	11.3	16.6	12.5	13.2	15.9
MPHW	Allegany	Maryland	Proposed ROW	Area	Acres	1.9	1.9	1.9	3.3	1.9	3.3
MPHW	Greene	Pennsylvania	Proposed ROW	Area	Acres	5.1	5.1	3.9	5.1	5.1	3.9
MPHW	Fayette	Pennsylvania	Proposed ROW	Area	Acres	8.0	6.9	24.4	8.0	8.0	24.4
MPHW	Monongalia	West Virginia	Proposed ROW	Area	Acres	< 0.1	1.6	< 0.1	< 0.1	< 0.1	< 0.1
MPHW	Preston	West Virginia	Proposed ROW	Area	Acres	1.7	3.8	< 0.1	1.7	1.7	< 0.1
MPHW	Mineral	West Virginia	Proposed ROW	Area	Acres	1.0	1.0	1.0	1.0	1.0	1.0
MPHW	Hampshire	West Virginia	Proposed ROW	Area	Acres	9.6	9.6	9.6	9.6	11.7	12.5
MPHW	Frederick	Virginia	Proposed ROW	Area	Acres	2.1	1.9	2.1	2.1	2.1	1.9
ROW Total [a]						**42.6**	**43.0**	**59.6**	**43.3**	**44.8**	**63.0**

MPHW = Modeled High Probability Wetlands; ROW = right-of-way

[a] Totals may not match the sum of addends due to rounding.

TABLE 5 MODELED HIGH PROBABILITY WETLANDS BY STATE WITHIN THE MARL PROJECT STUDY AREA

Environmental Features	State	Calculation Type	Measure	Unit	Study Area
MPHW	Maryland	Study Area	Area	Acres	5,247.5
MPHW	Pennsylvania	Study Area	Area	Acres	3,678.9
MPHW	West Virginia	Study Area	Area	Acres	5,778.0
MPHW	Virginia	Study Area	Area	Acres	699.1
Total [a]					**15,403.6**

MPHW = Modeled High Probability Wetlands

[a] Totals may not match the sum of addends due to rounding.

TABLE 6 MODELED HIGH PROBABILITY WETLANDS BY COUNTY WITHIN THE MARL PROJECT STUDY AREA

Environmental Features	County	State	Calculation Type	Measure	Unit	Study Area
MPHW	Garrett	Maryland	Study Area	Area	Acres	4,189.2
MPHW	Allegany	Maryland	Study Area	Area	Acres	1,058.3
MPHW	Greene	Pennsylvania	Study Area	Area	Acres	1,326.2
MPHW	Fayette	Pennsylvania	Study Area	Area	Acres	2,352.7
MPHW	Monongalia	West Virginia	Study Area	Area	Acres	2,071.9
MPHW	Preston	West Virginia	Study Area	Area	Acres	730.5
MPHW	Mineral	West Virginia	Study Area	Area	Acres	428.2
MPHW	Hampshire	West Virginia	Study Area	Area	Acres	2,547.4
MPHW	Frederick	Virginia	Study Area	Area	Acres	699.1
Total [a]						**15,403.6**

MPHW = Modeled High Probability Wetlands

[a] Totals may not match the sum of addends due to rounding.

ATTACHMENT 2 MODELED WETLANDS MAPBOOK

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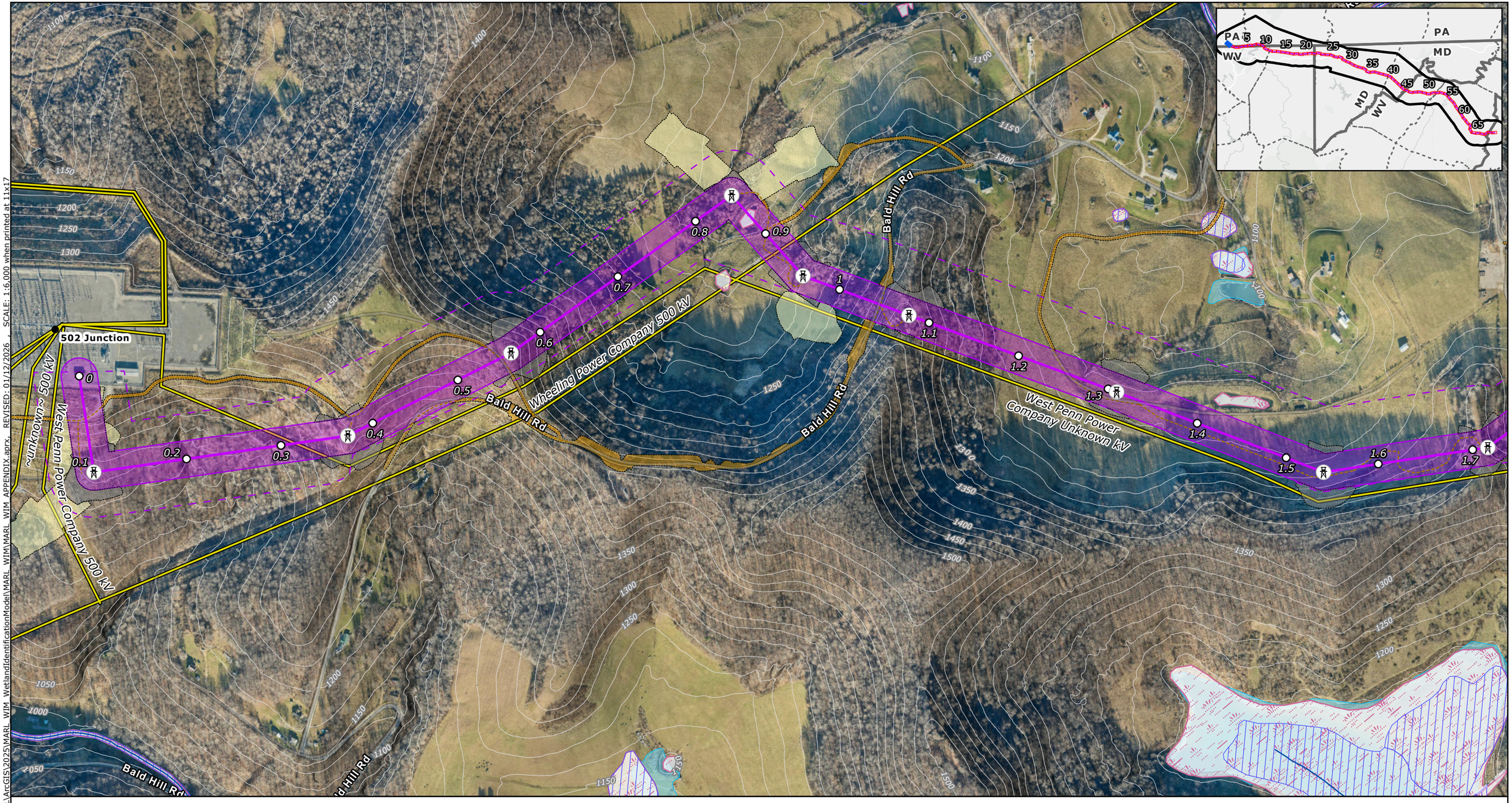

Proposed Project Components
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- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Area
- Proposed Route Siting Corridor

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
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- NHD Waterbody
- MDNR Wetlands
- NWI Wetlands
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NOTES
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4. *Data source: NextEra, ERM, MD DNR, MDE, USGS NHD, USFWS NWI, MD iMAP Portal*

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US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 2
Modeled Wetlands Mapbook

MidAtlantic Resiliency Link

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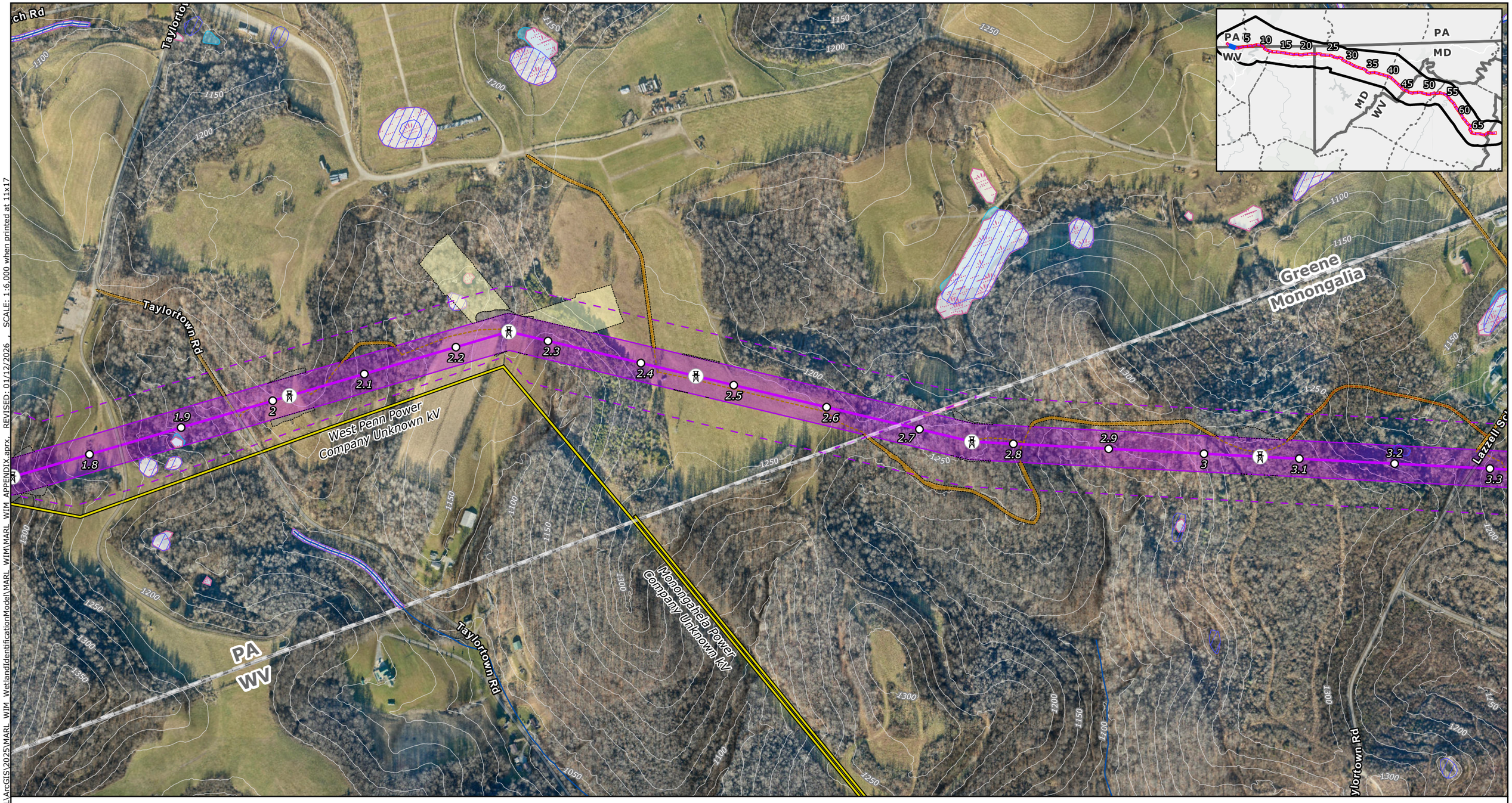

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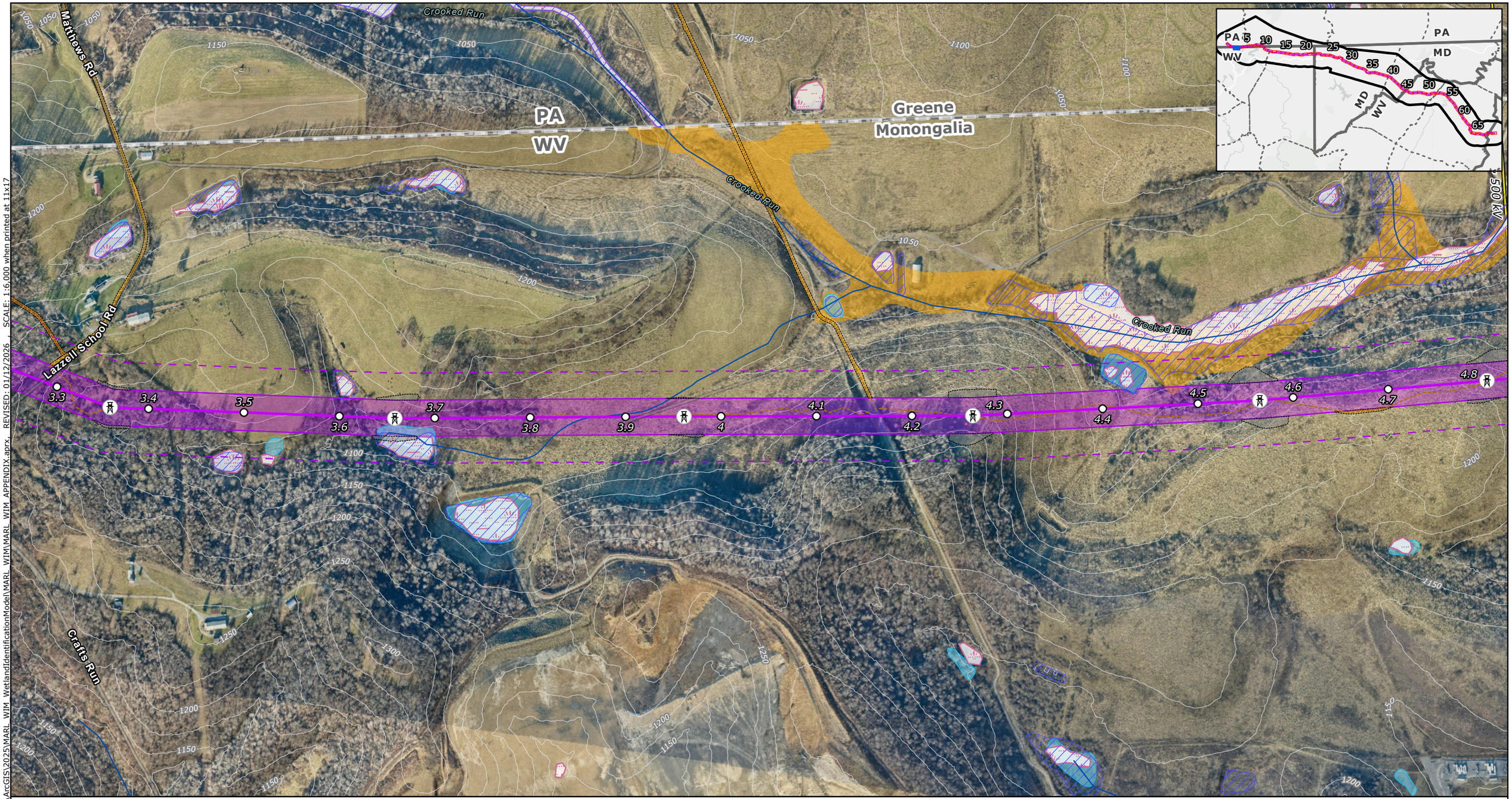

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Attachment 2
Modeled Wetlands Mapbook
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ERM

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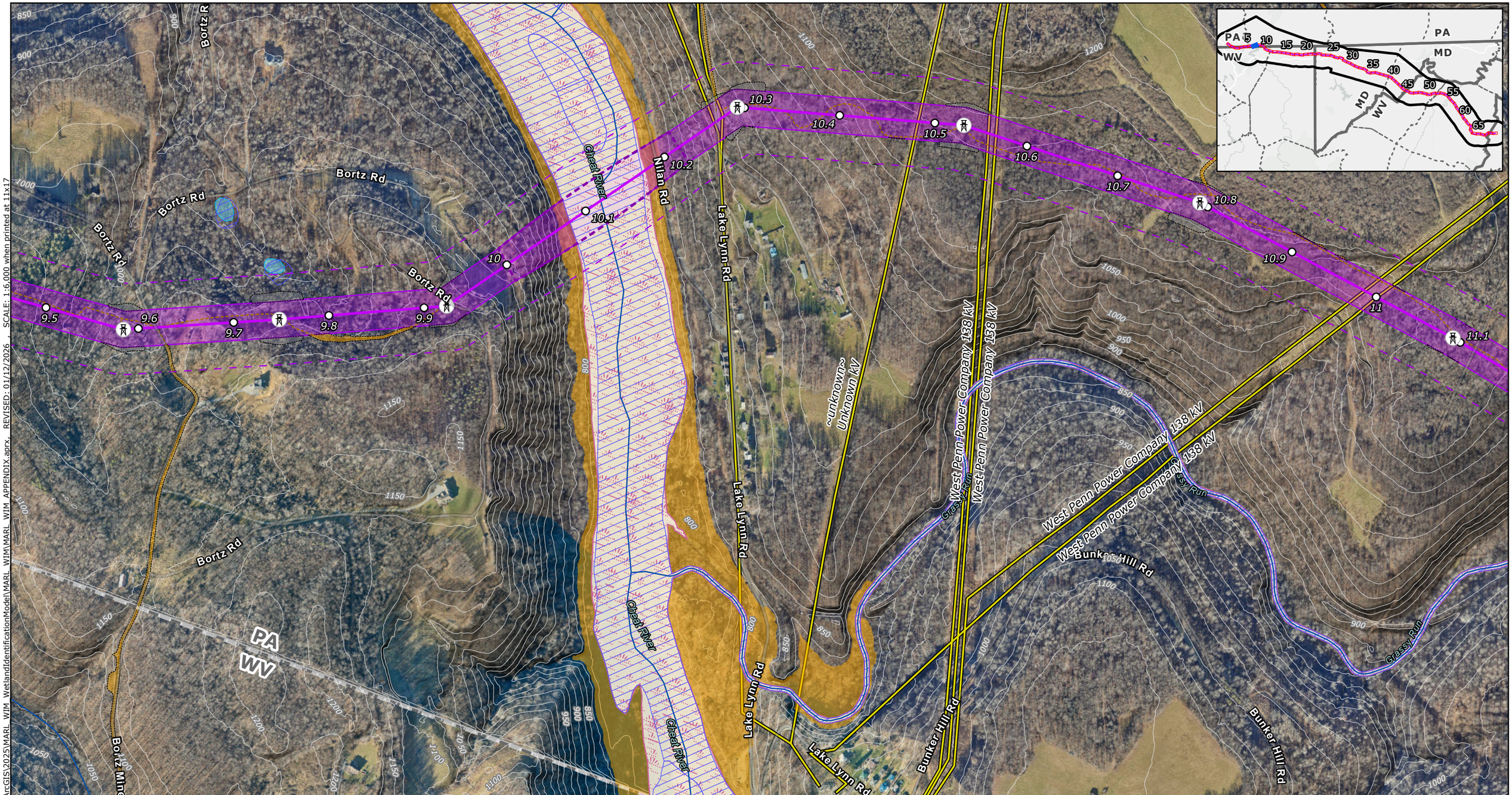

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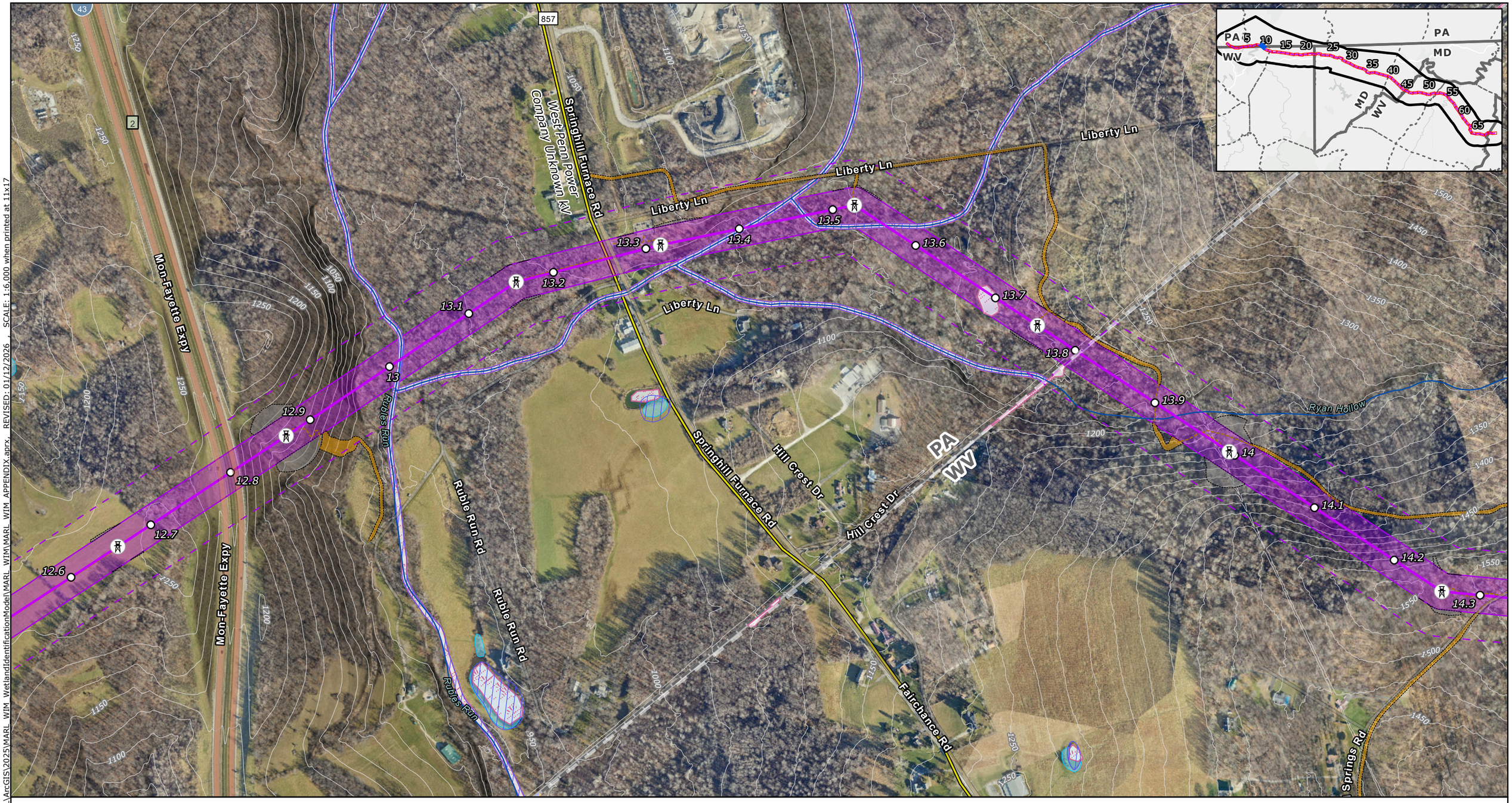

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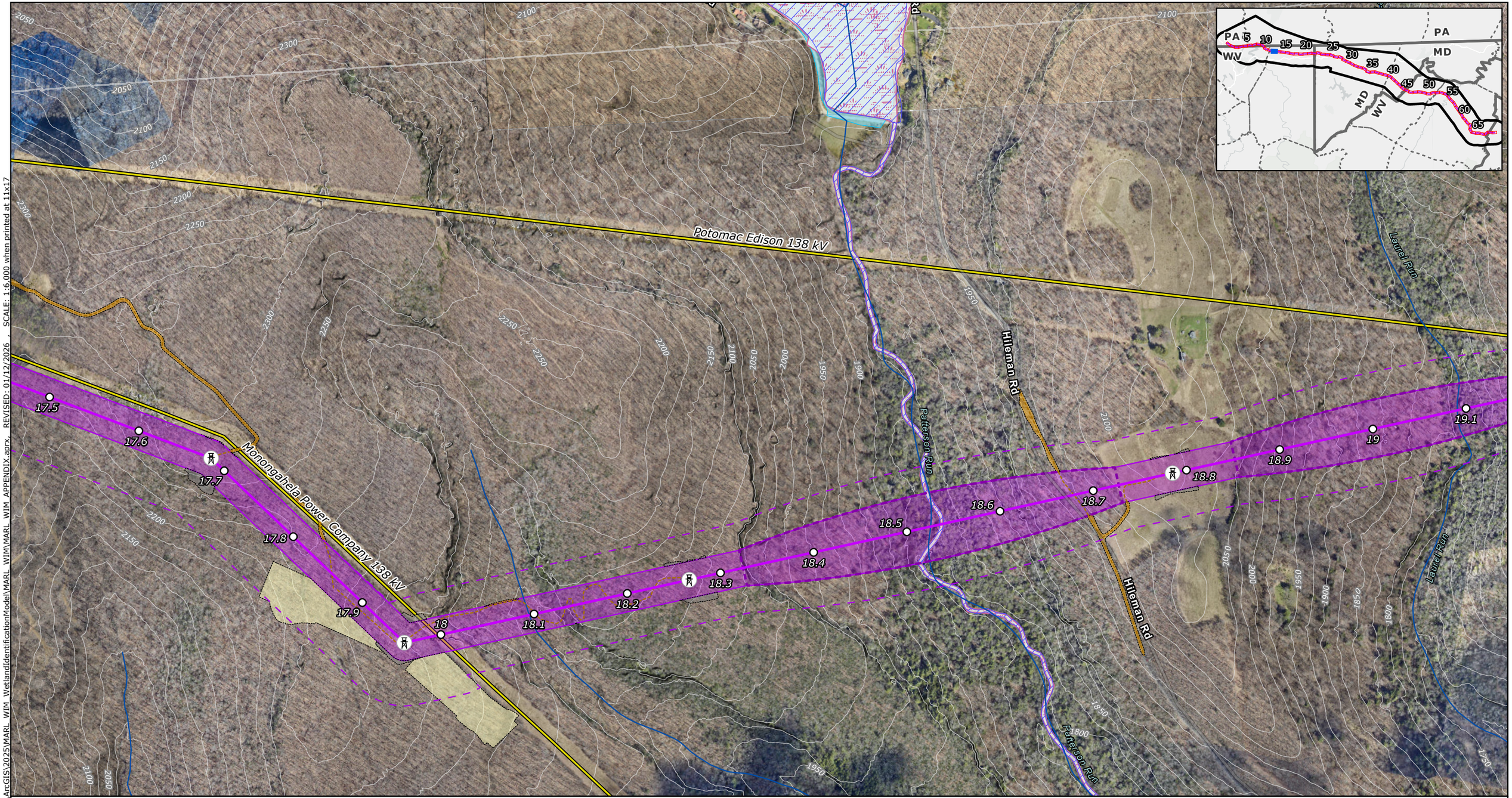

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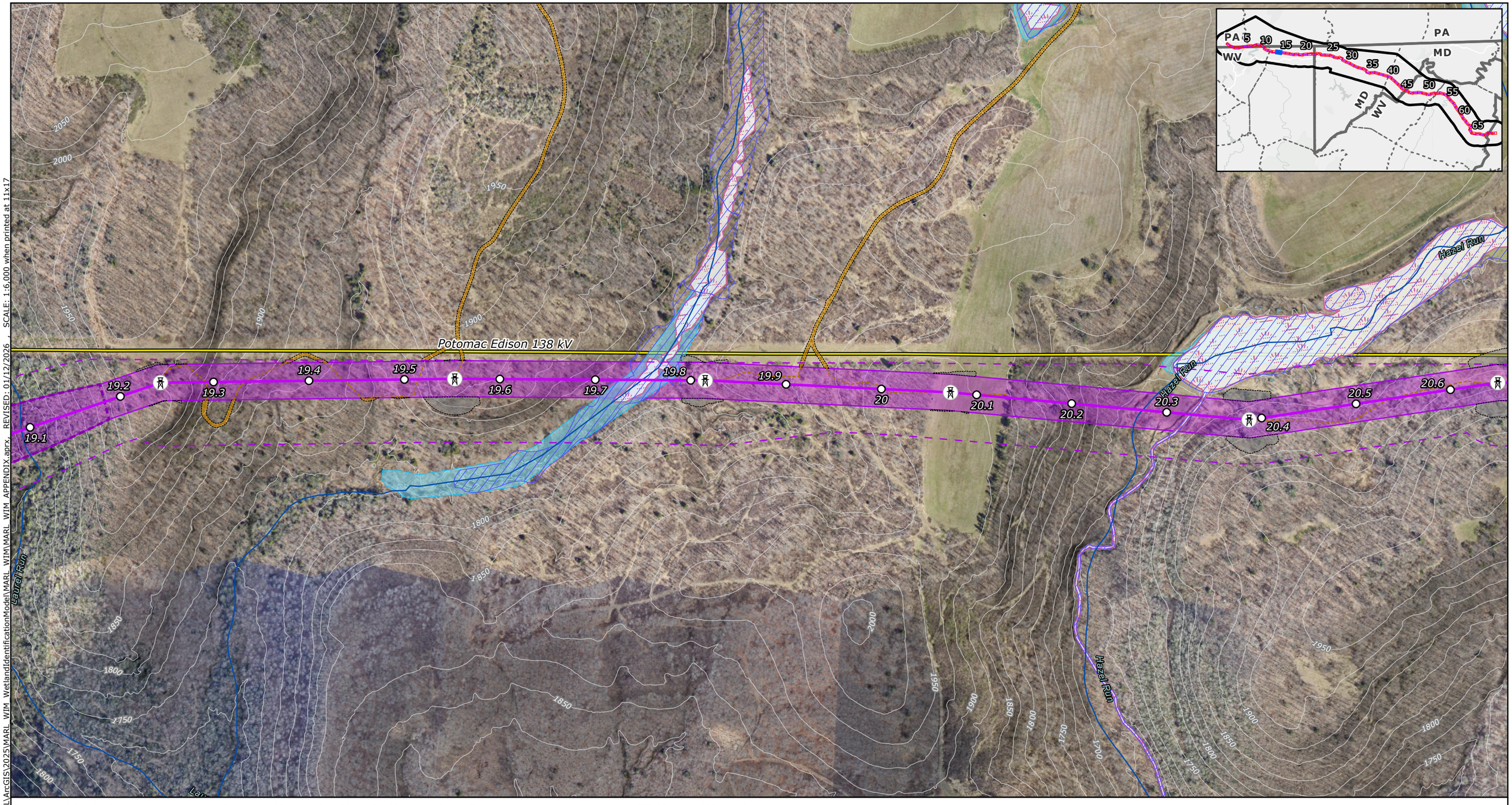

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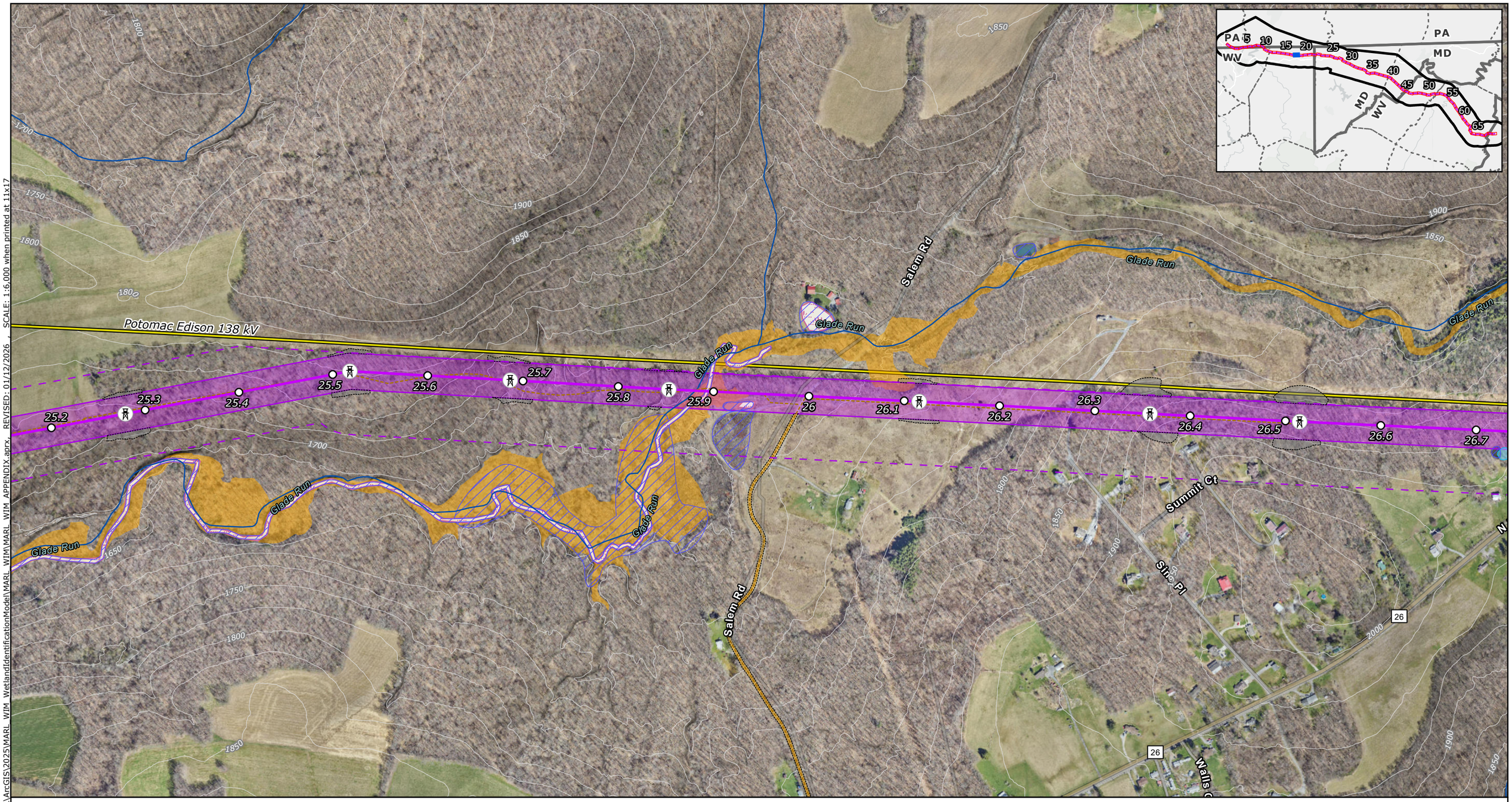

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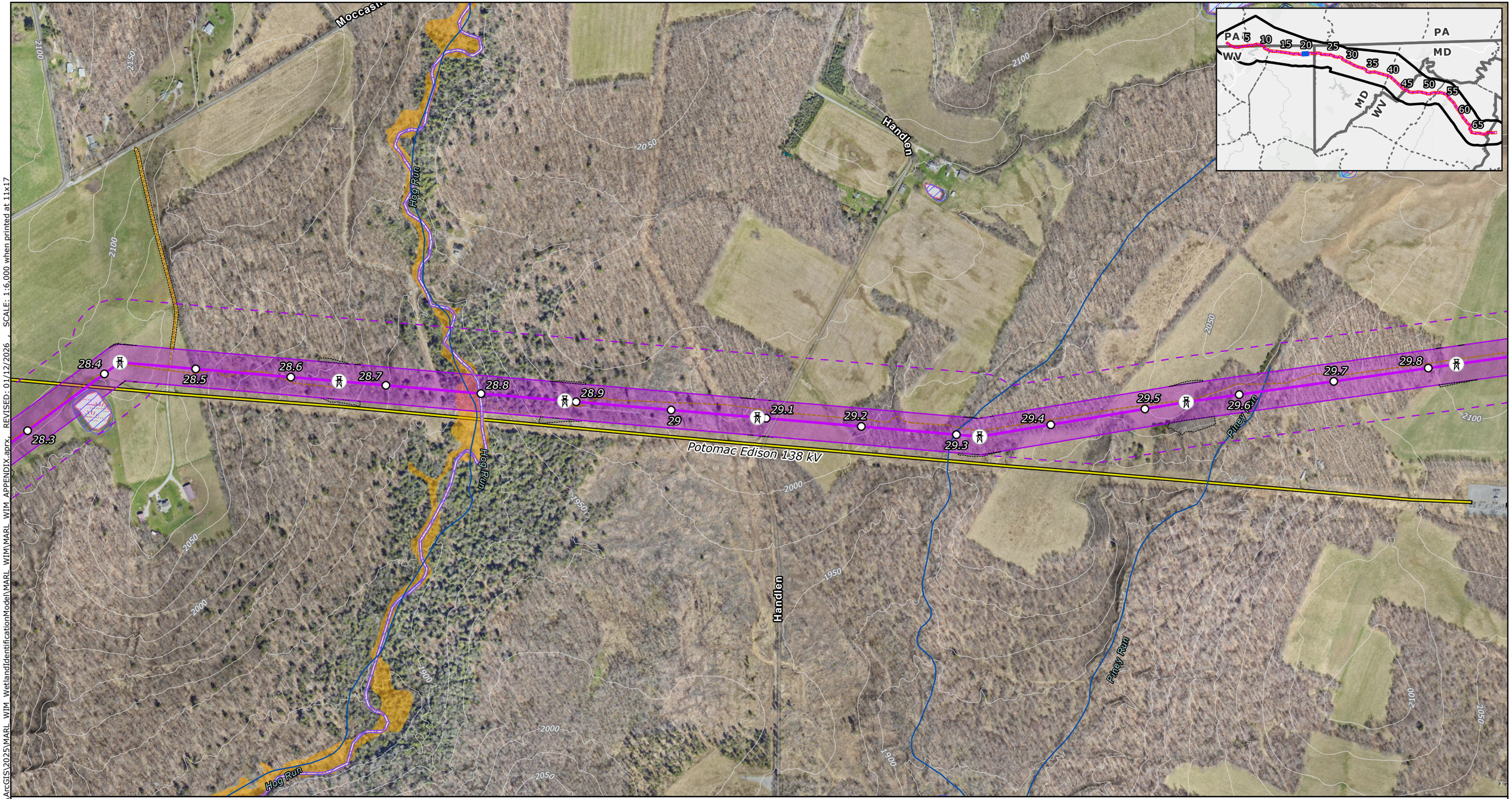

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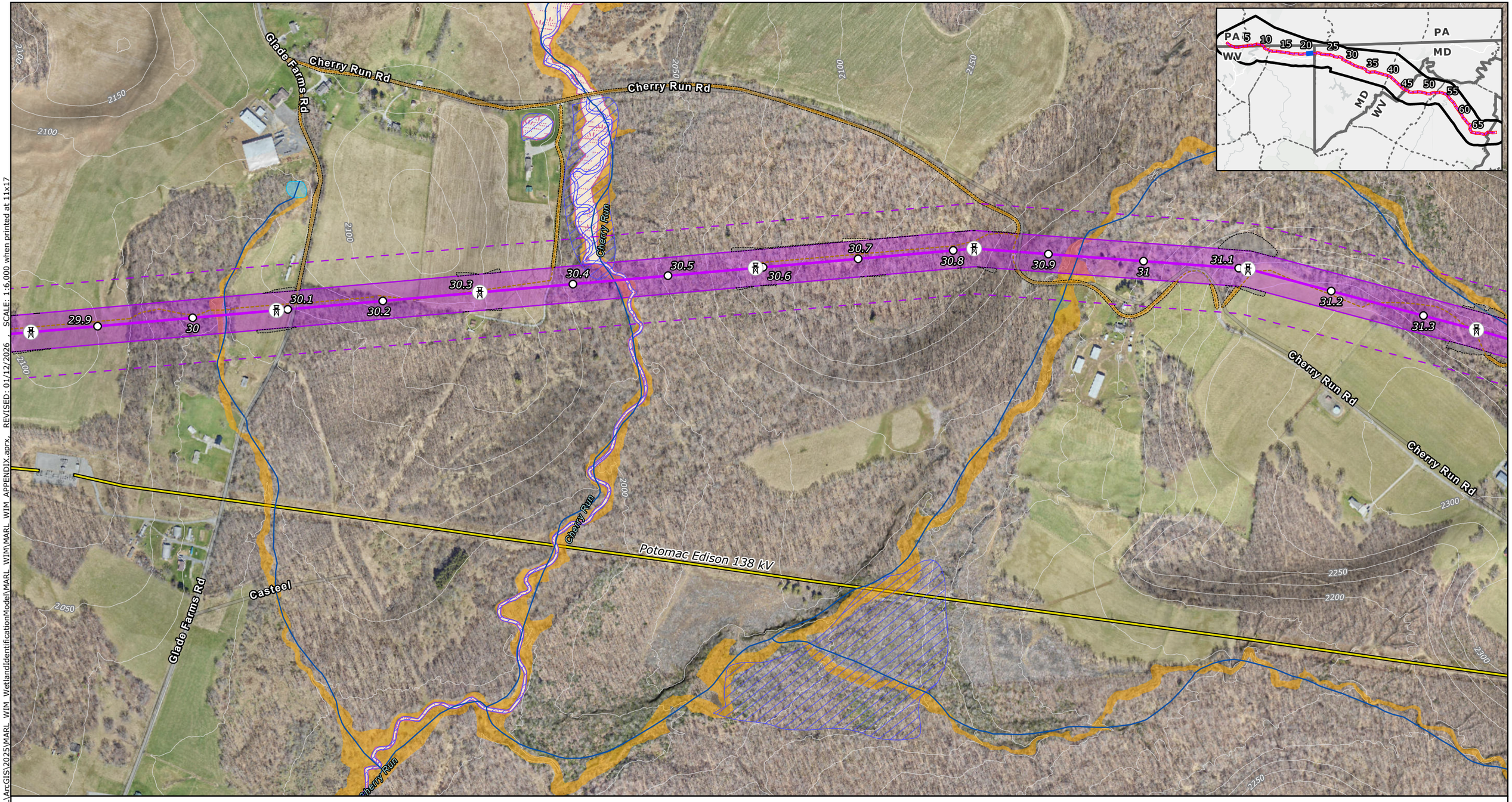

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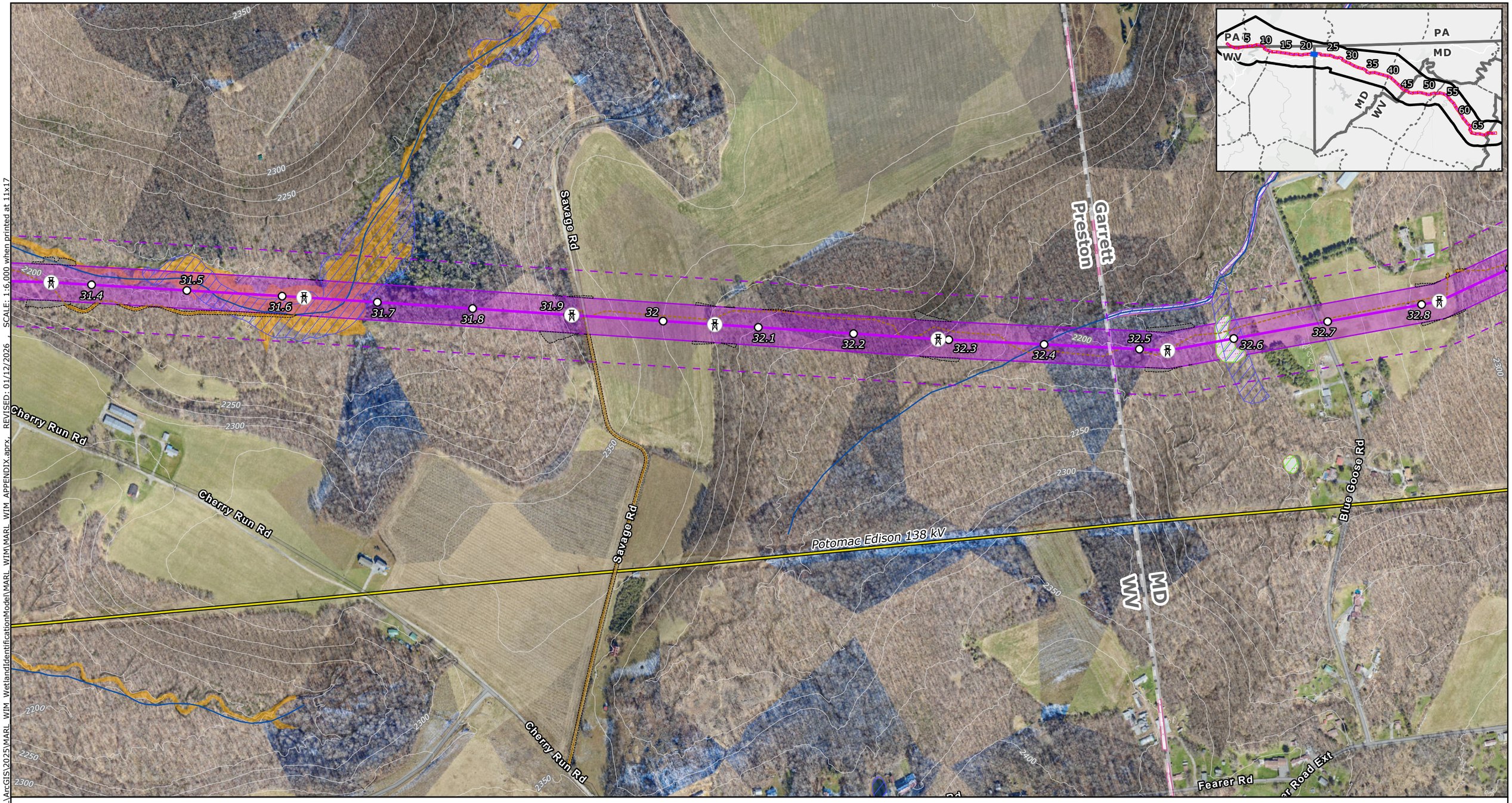

Proposed Project Components
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- Aerial Easement Blowout Area
- Proposed Route Siting Corridor

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N

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US Feet

Scale: 1:6,000
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Attachment 2
Modeled Wetlands Mapbook
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ERM

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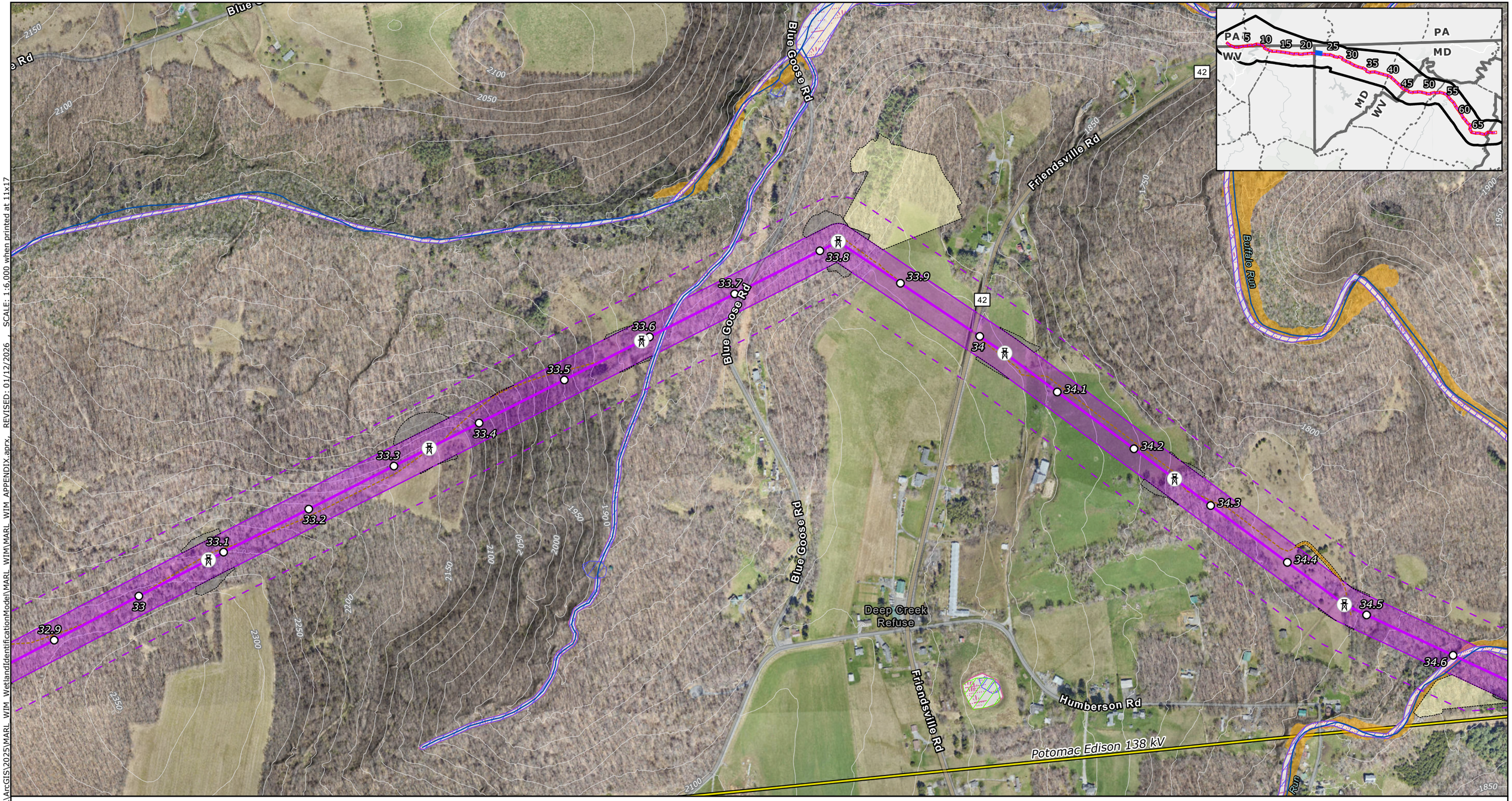

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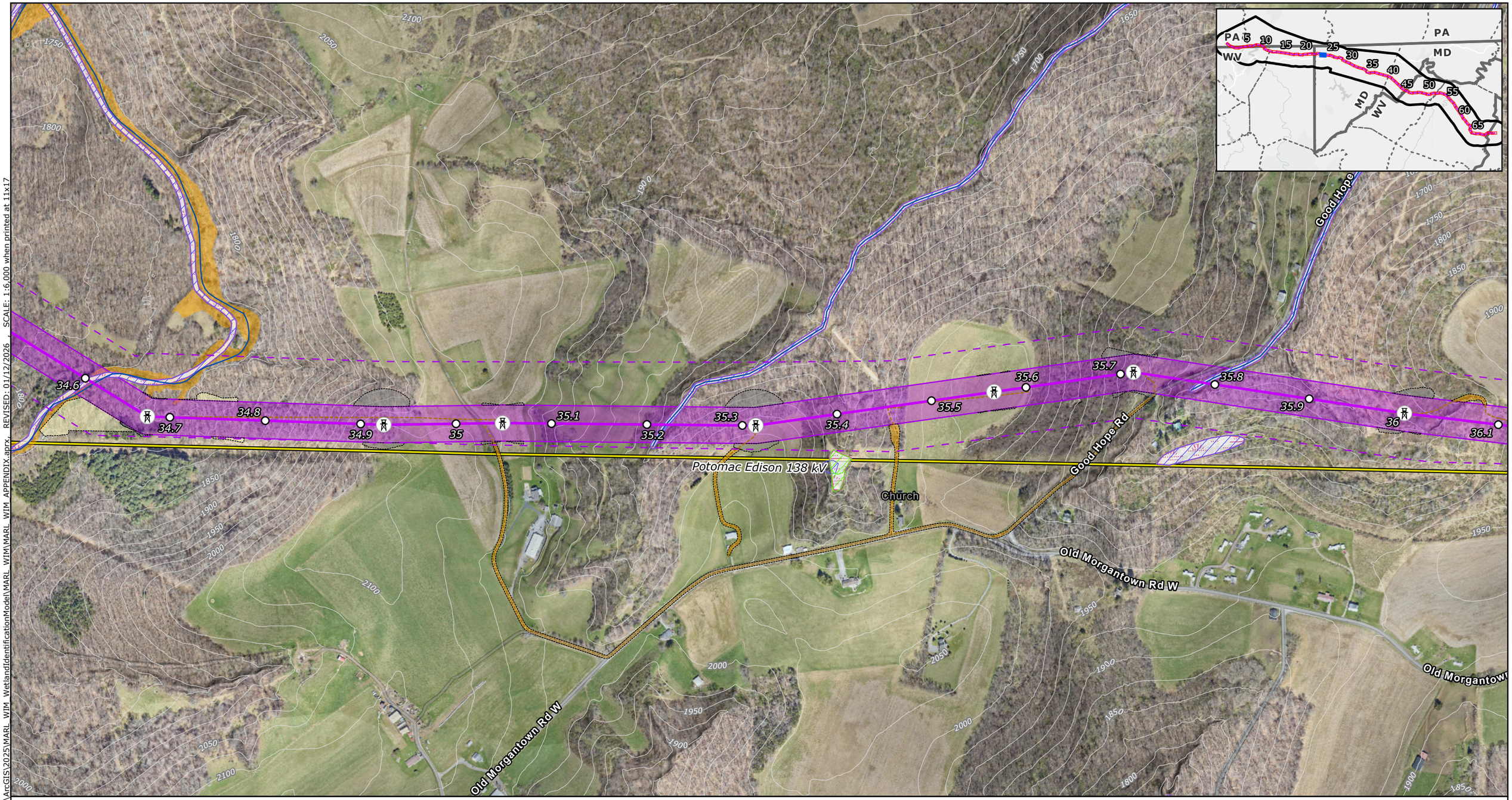

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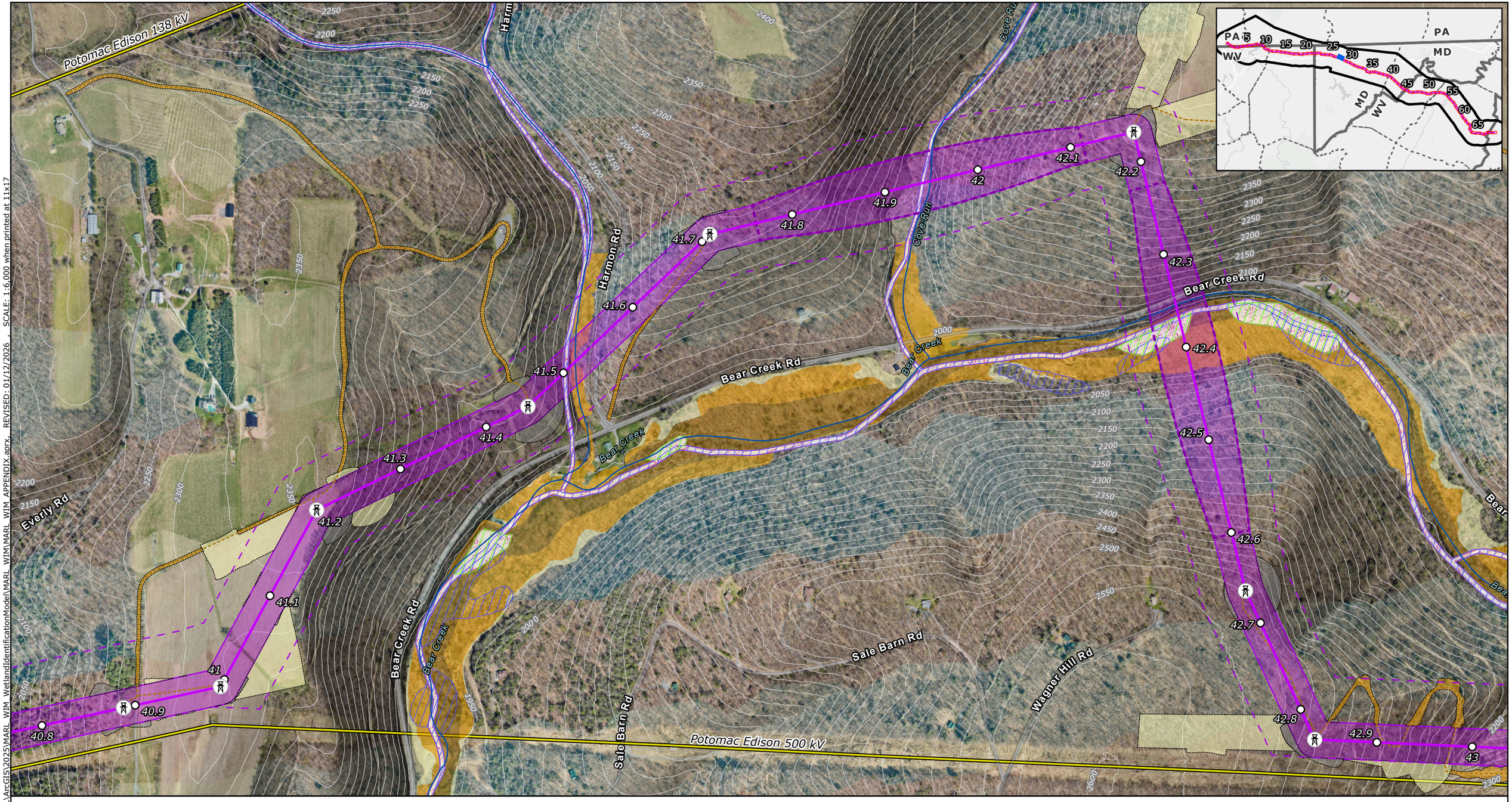

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ERM

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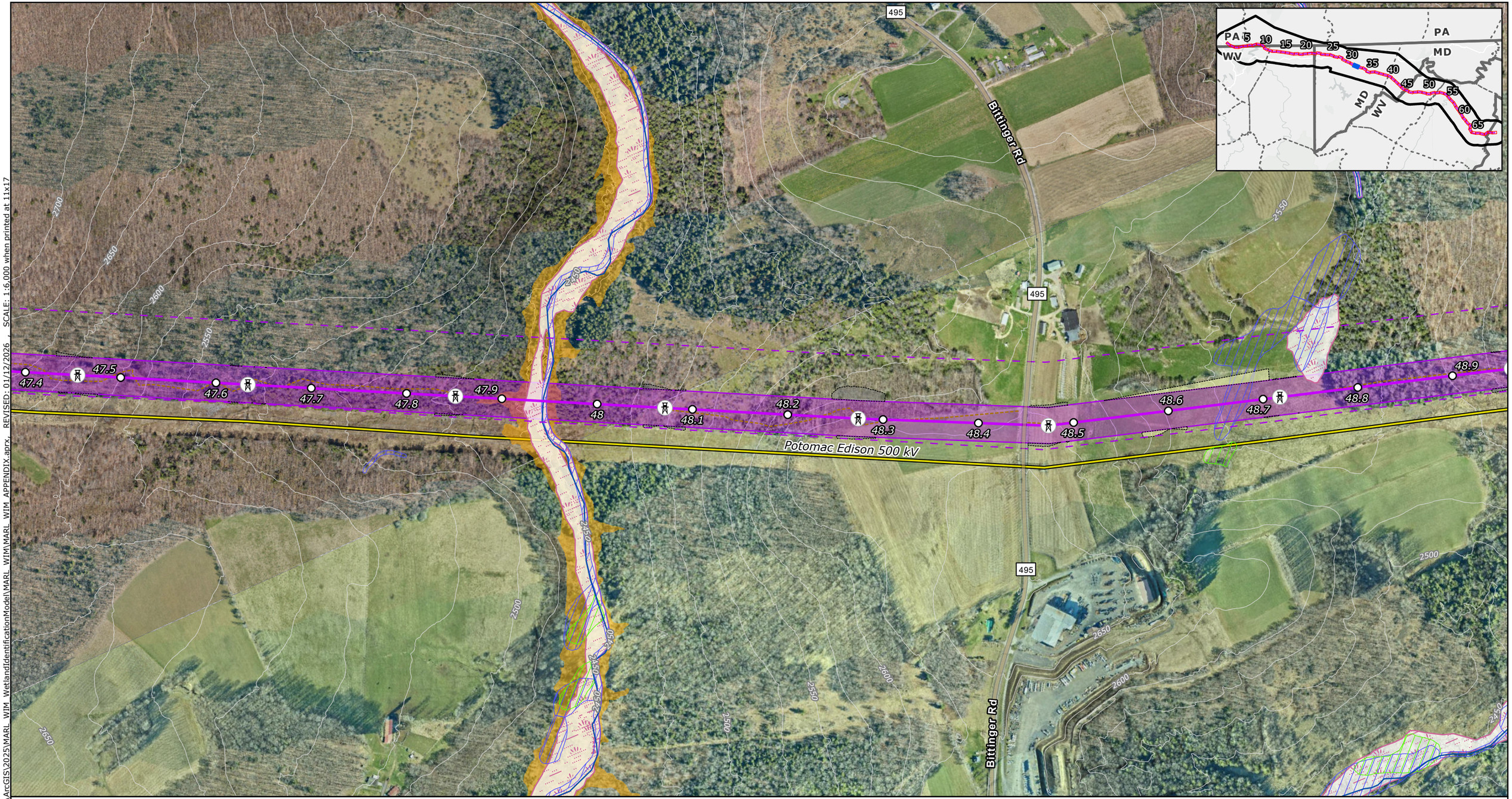

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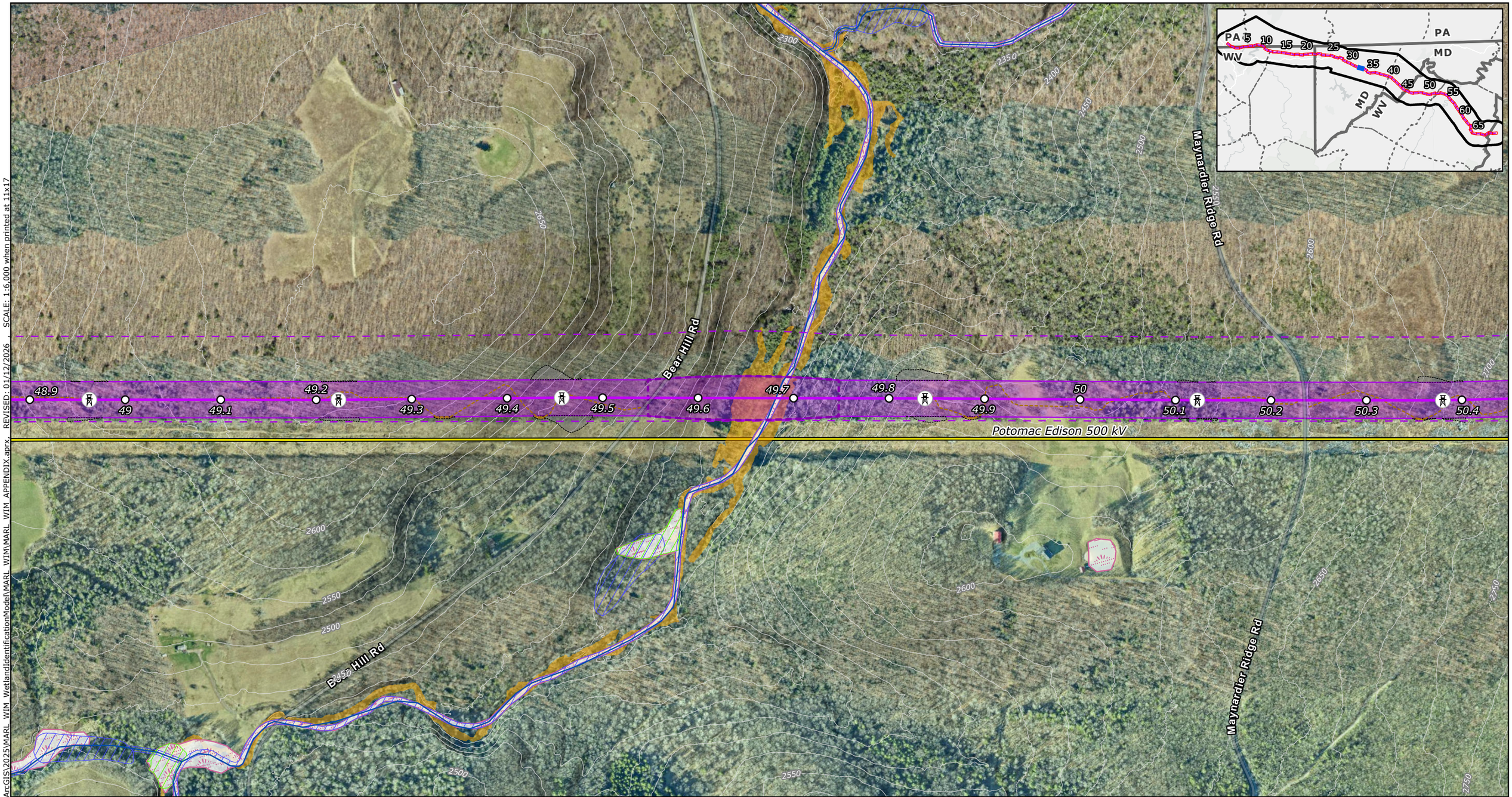

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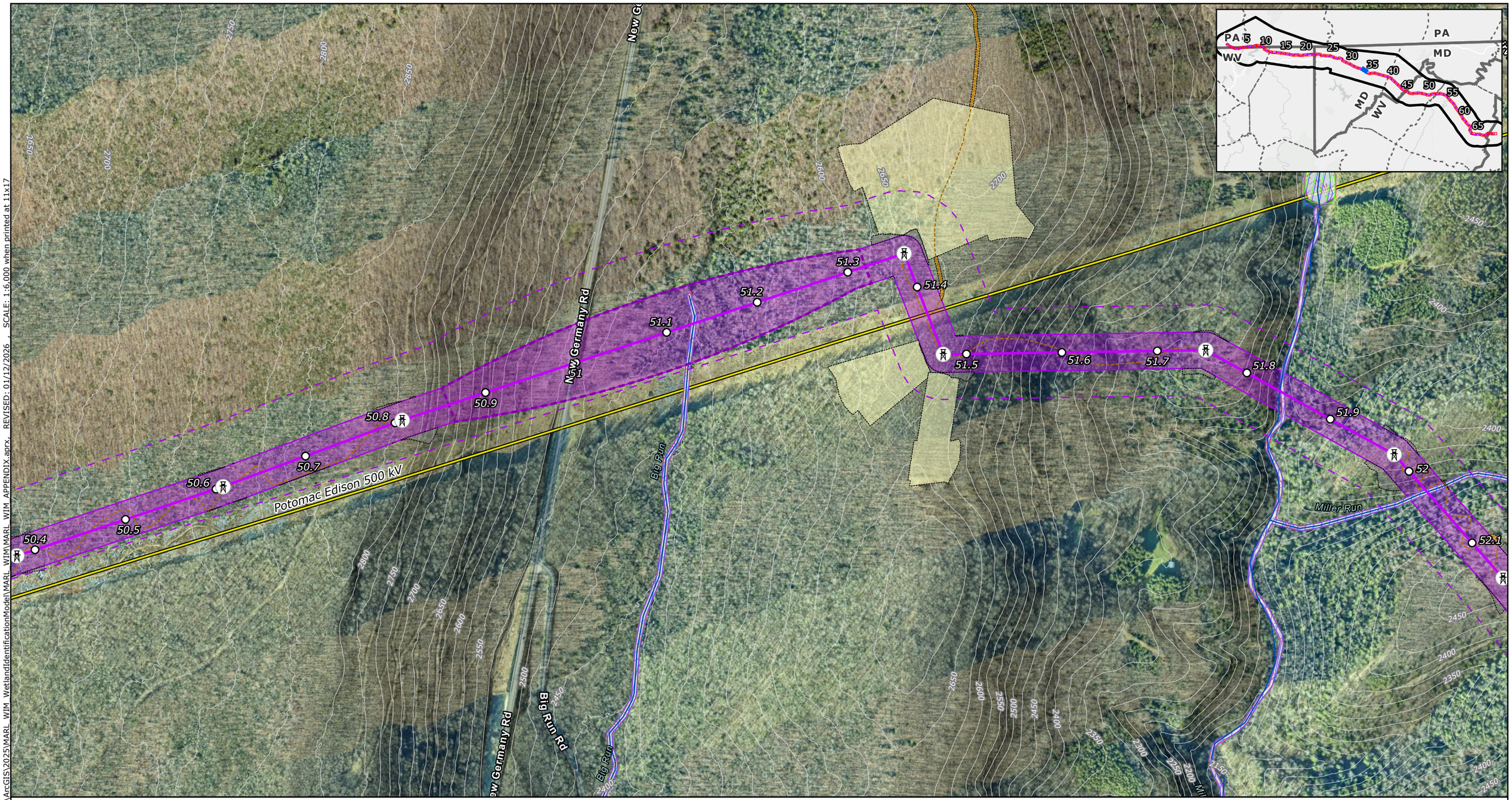

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N

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US Feet

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ERM

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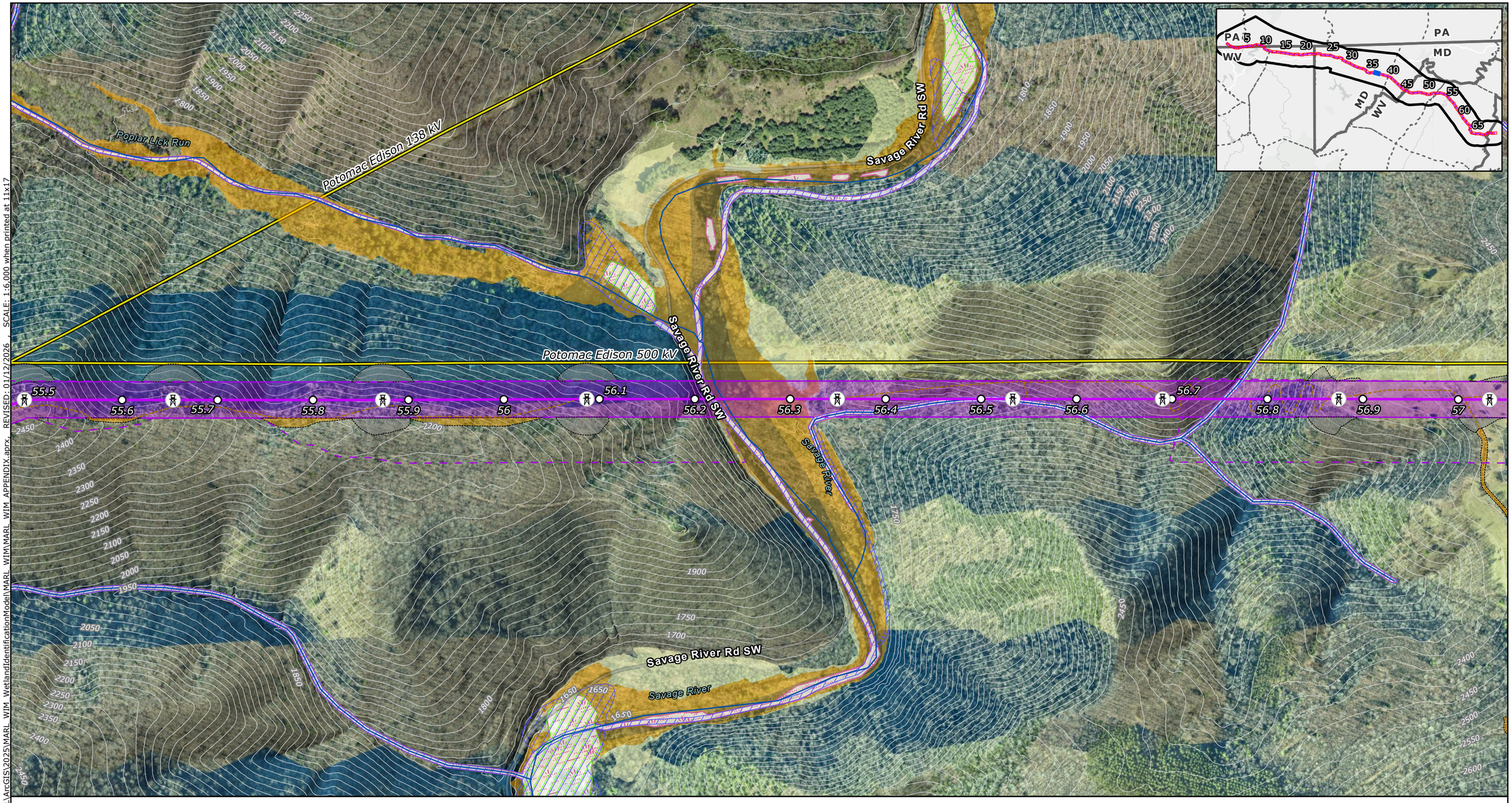

Proposed Project Components
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Proposed Route Ancillary Facilities
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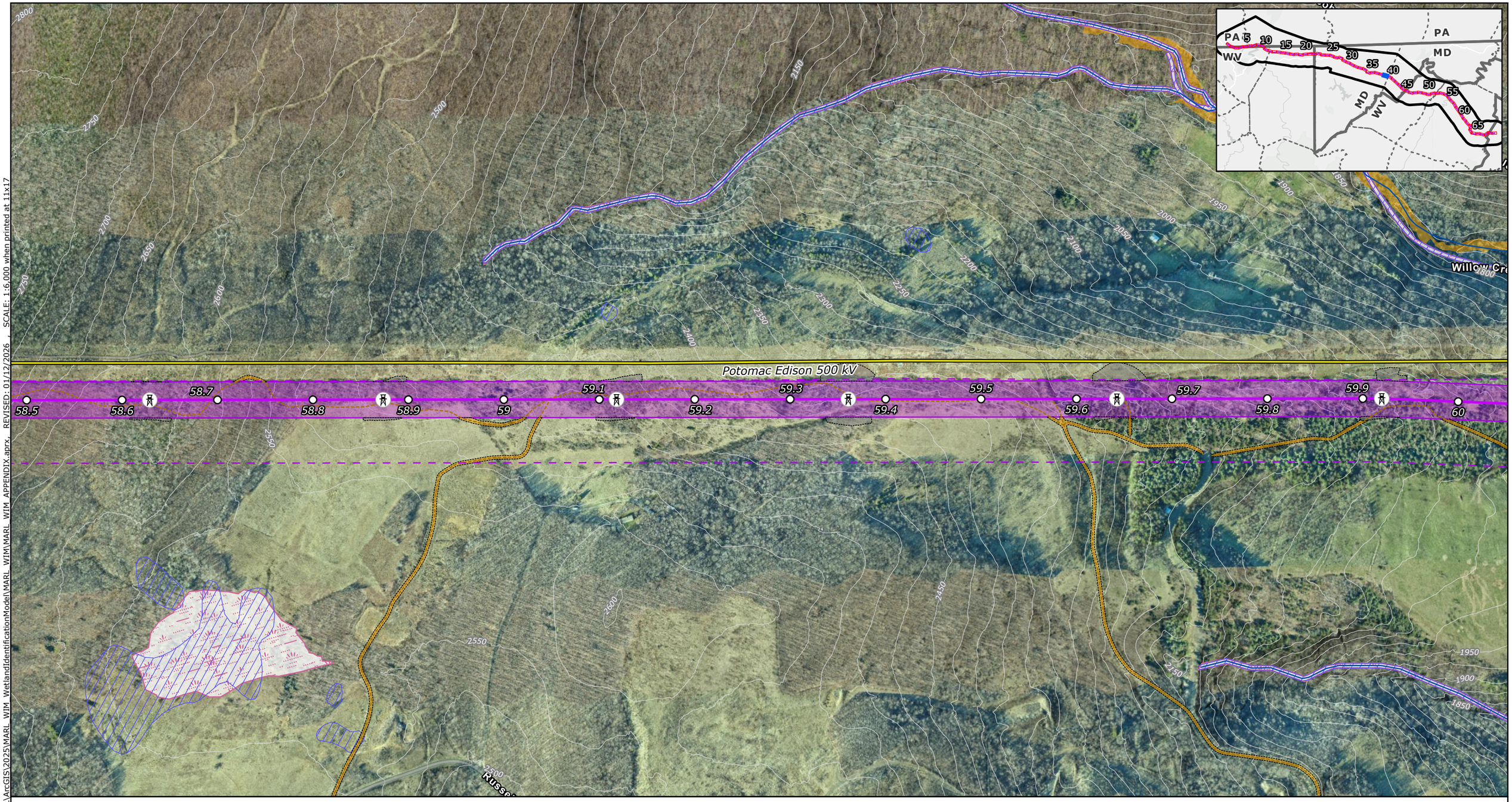

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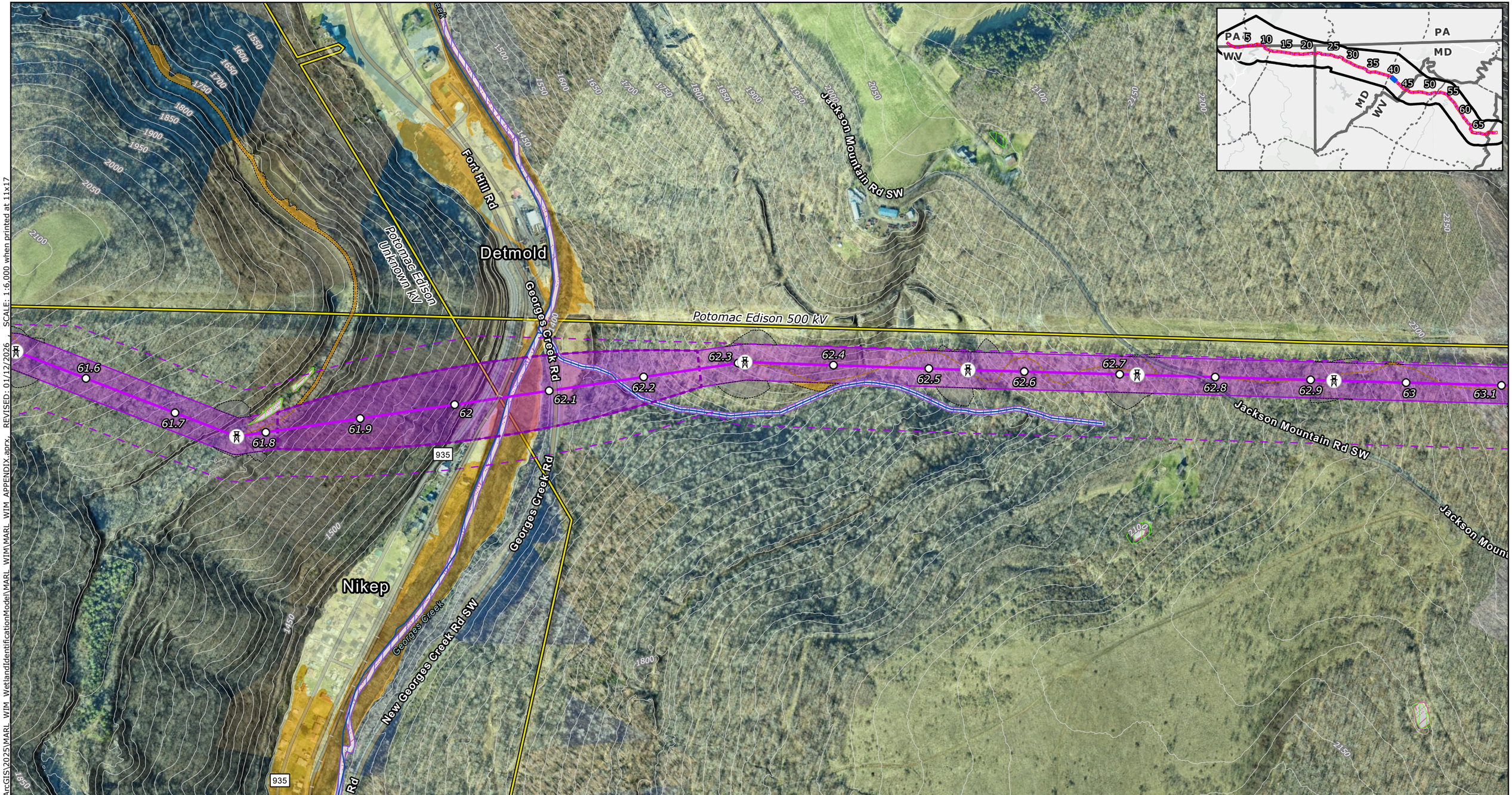

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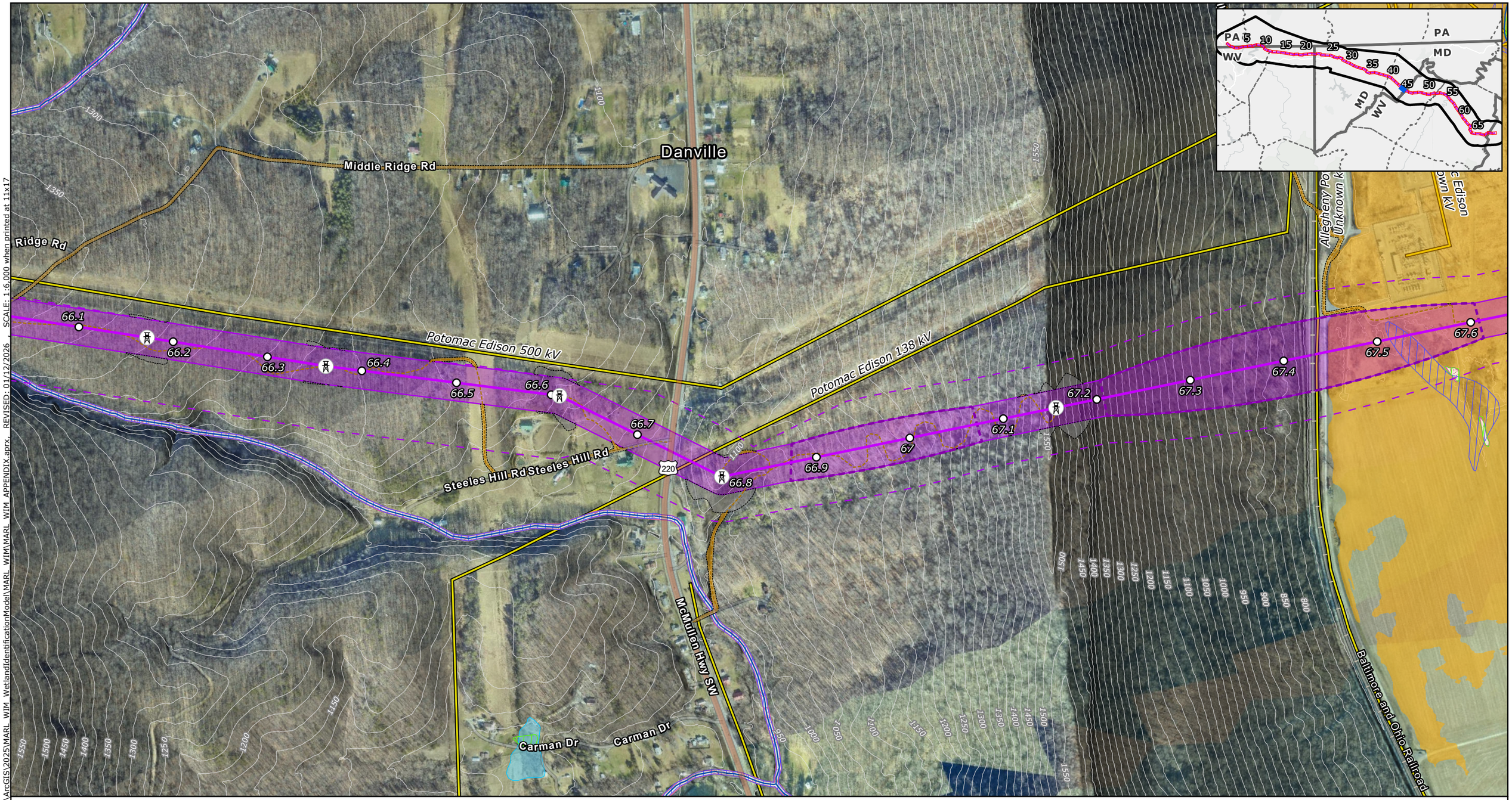

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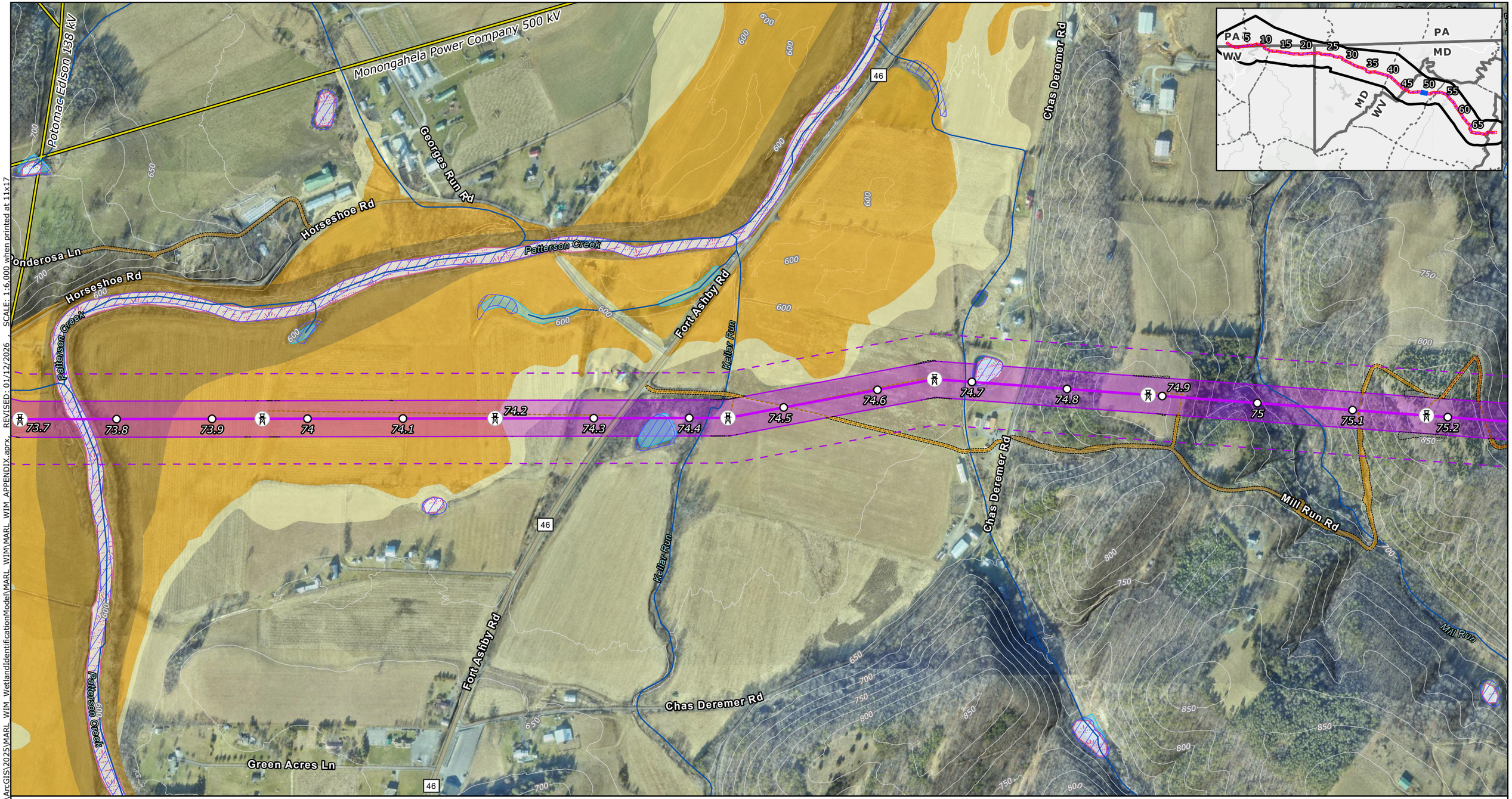

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N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 2
Modeled Wetlands Mapbook

MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\MARL_WIM_APPENDIX.aprx, REVISED: 01/12/2026 , SCALE: 1:6,000 when printed at 11x17
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Coordinate system: NAD 1983 UTM Zone 17N

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Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
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- Proposed Route Siting Corridor

Proposed Route Ancillary Facilities
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- Wire Work Area LoD
- Structure Pad LoD

Base Data
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Attachment 2
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MidAtlantic Resiliency Link

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Page 53 of 69
MidAtlantic Resiliency Link

ERM

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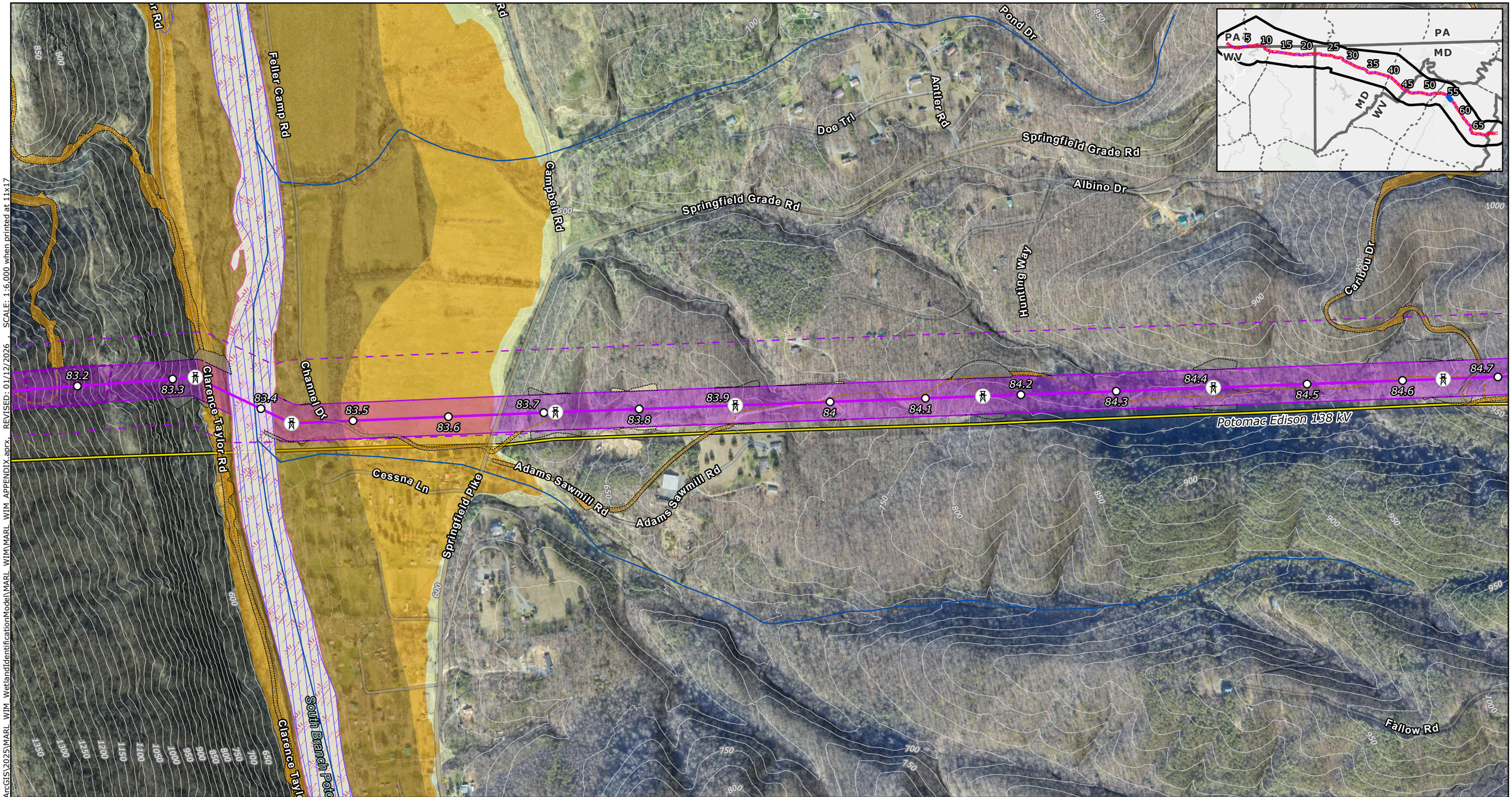

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Attachment 2
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ERM

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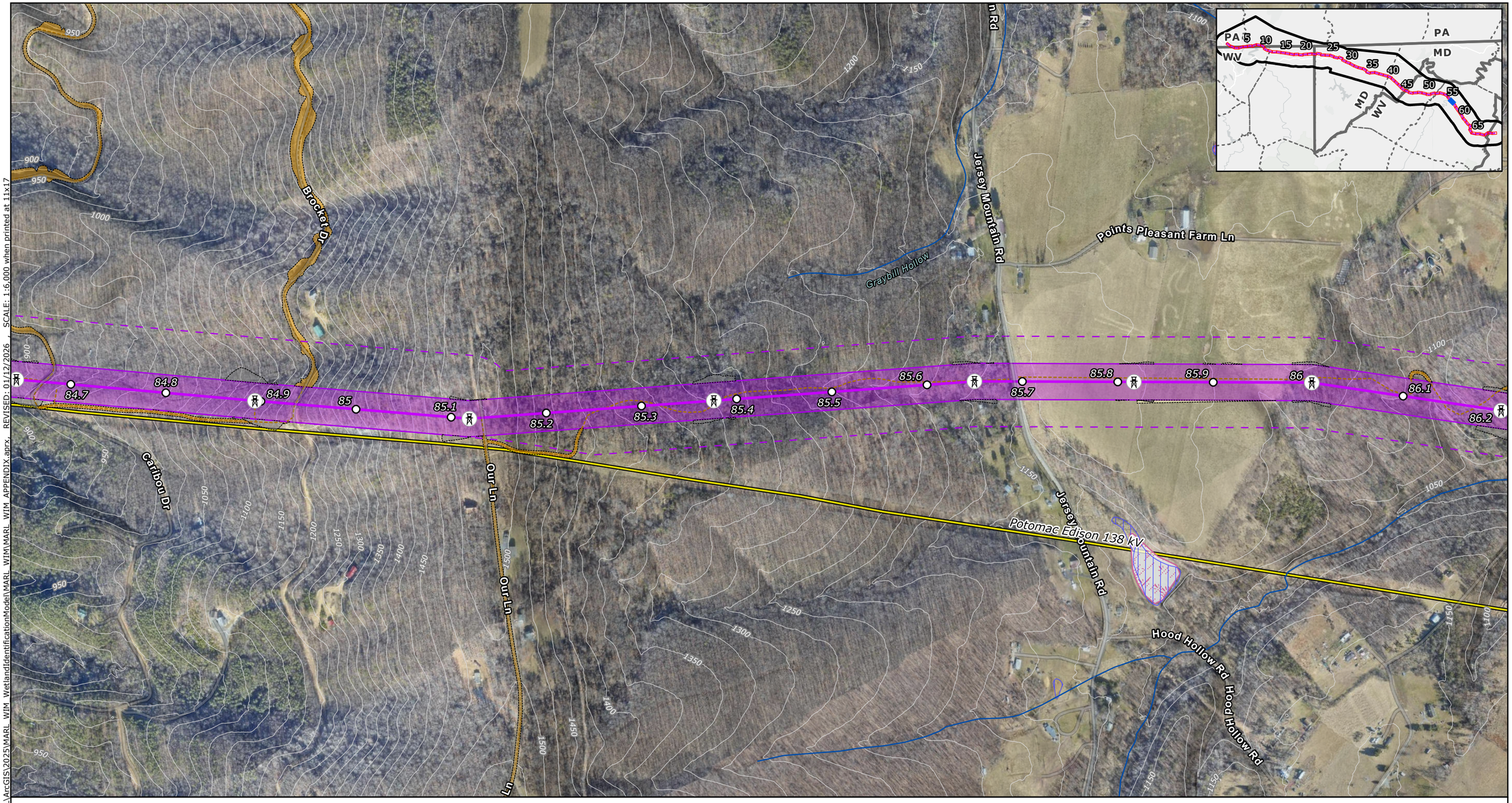

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MidAtlantic Resiliency Link

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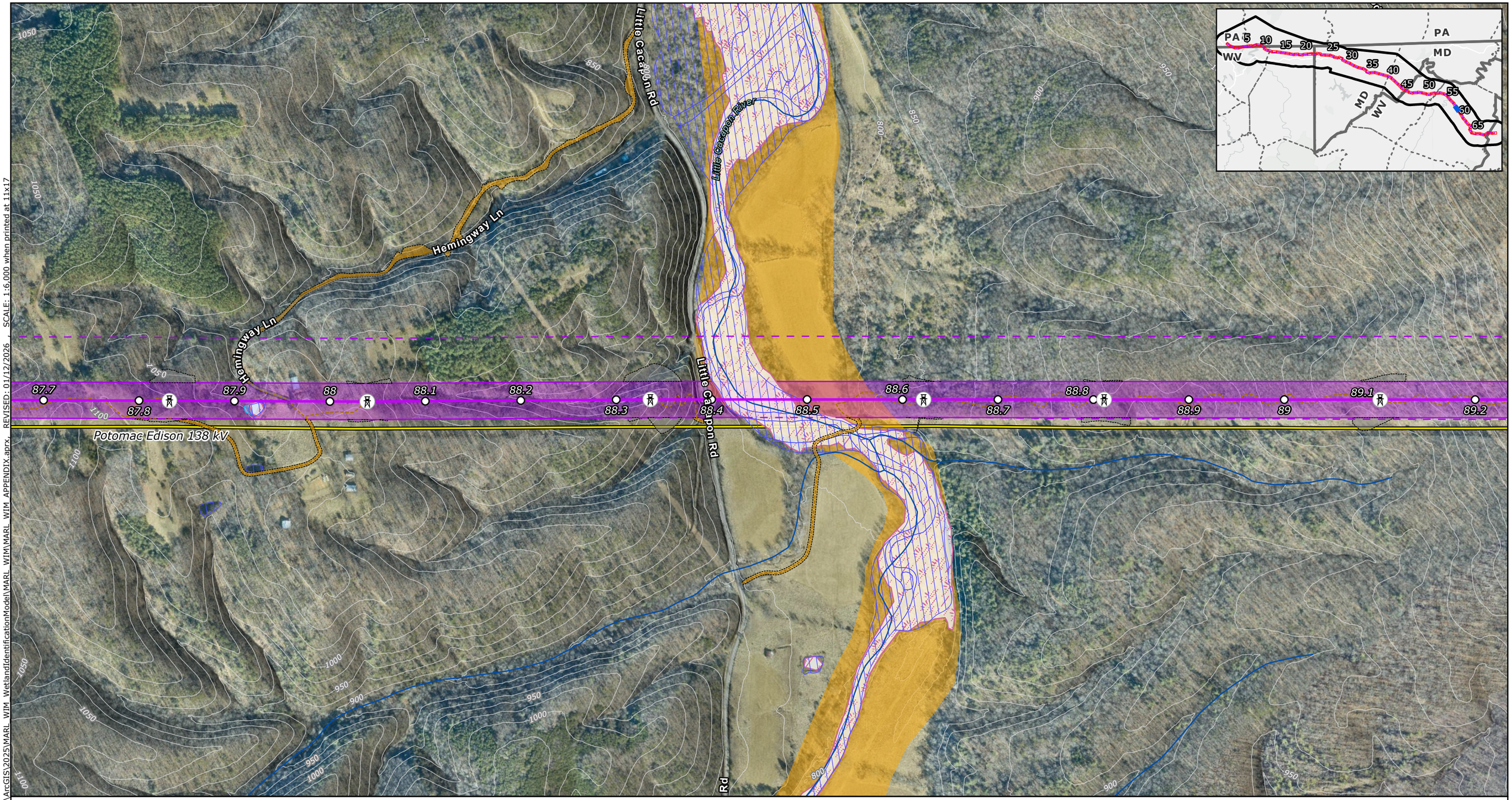

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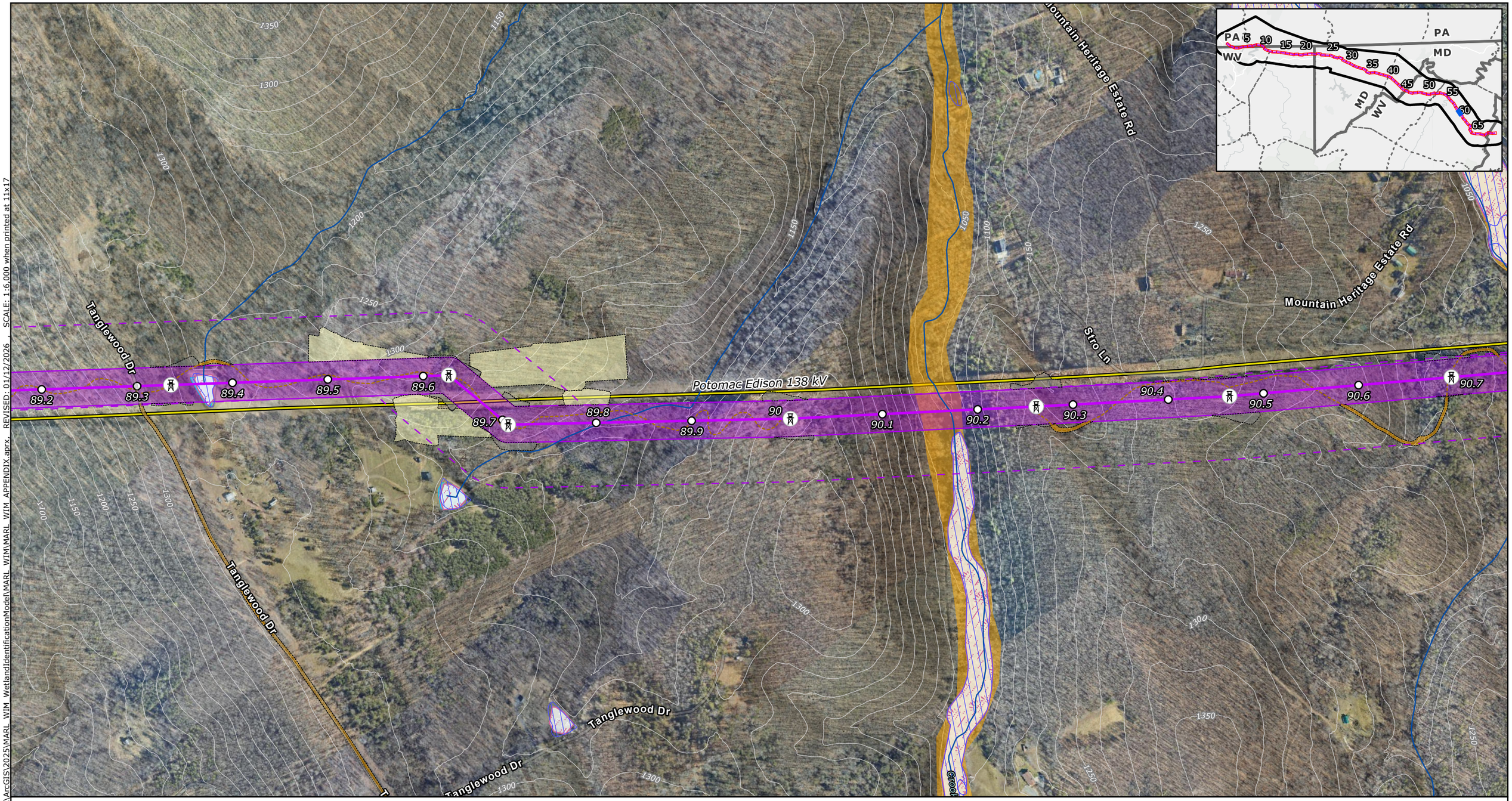

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MidAtlantic Resiliency Link

ERM

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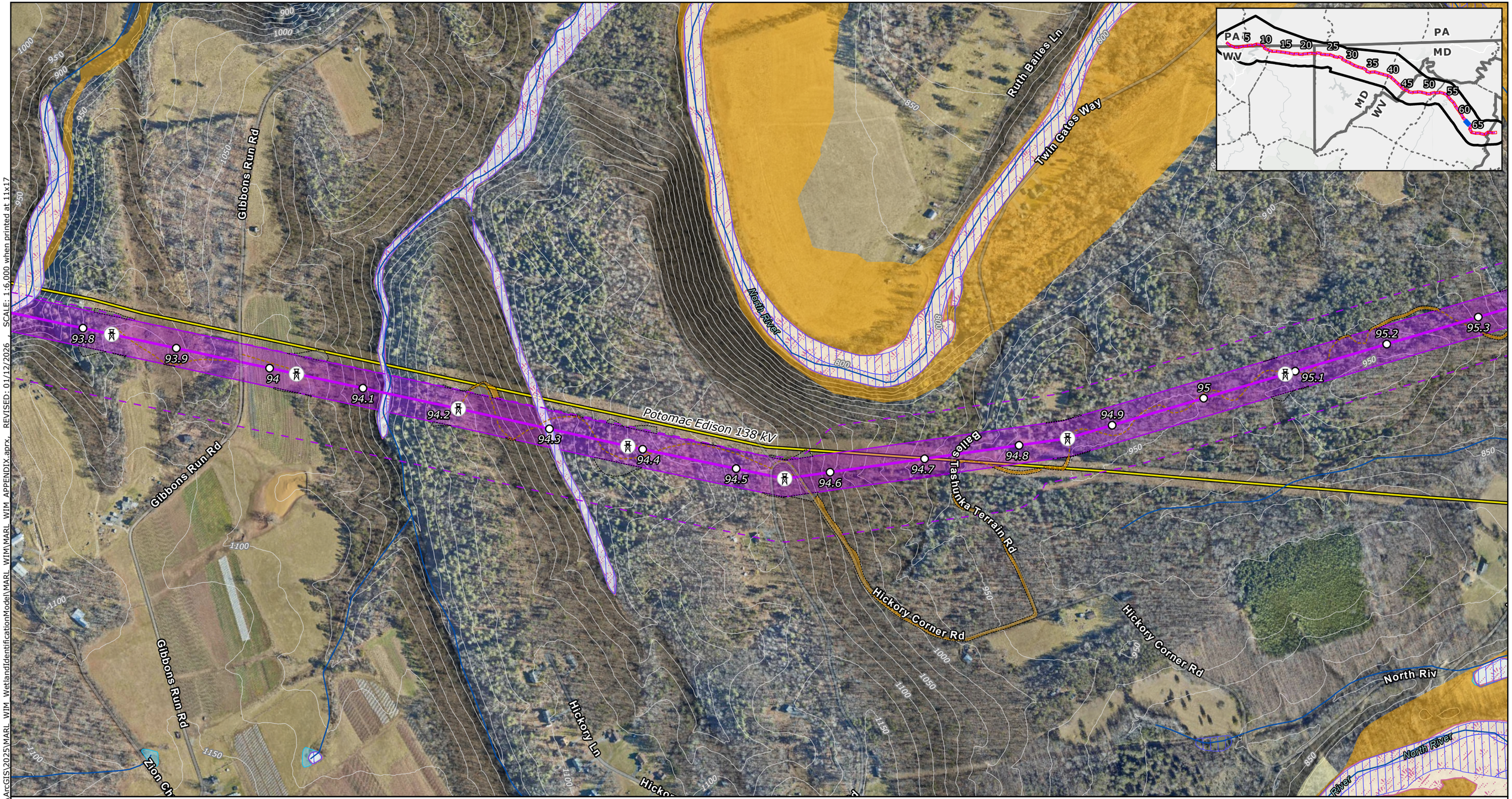

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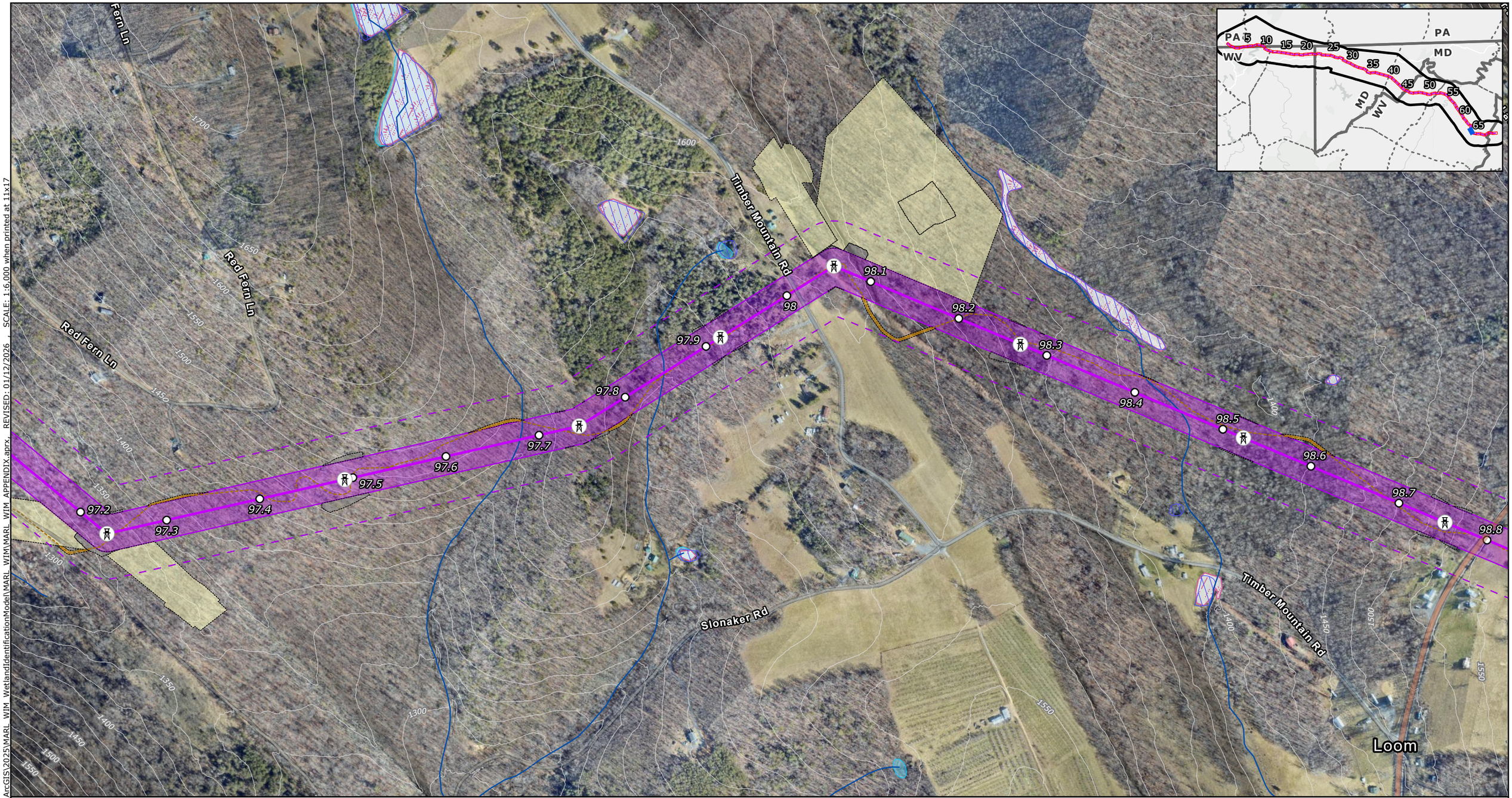

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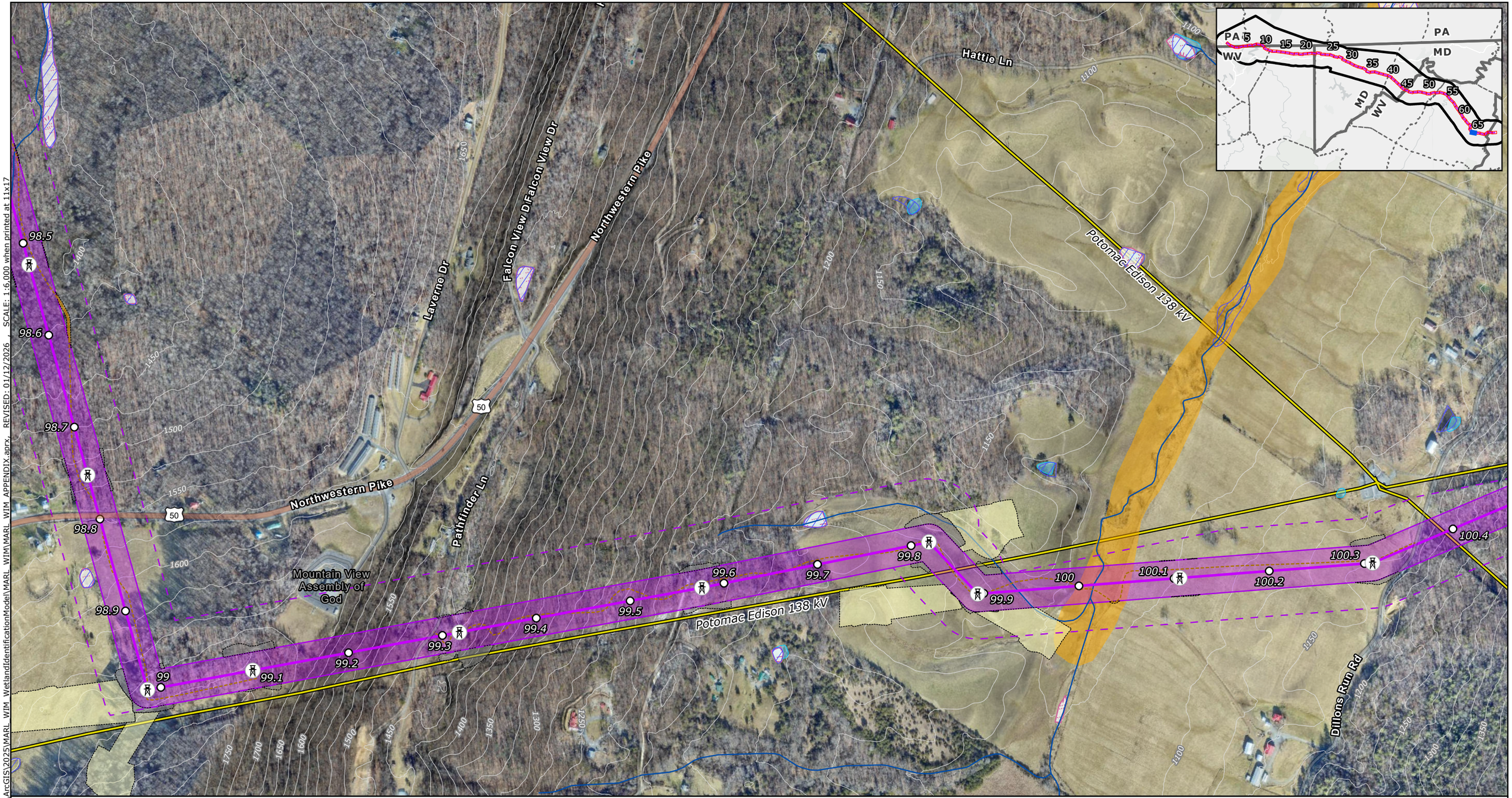

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MidAtlantic Resiliency Link

ERM

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Coordinate system: NAD 1983 UTM Zone 17N

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Proposed Project Components
- Project Endpoints
- Proposed Route Towers
- Milepost
- Proposed Route Centerline
- Proposed Route ROW Corridor
- Aerial Easement Blowout Area
- Proposed Route Siting Corridor

Proposed Route Ancillary Facilities
- Permanent Access Road
- Temporary Access Road
- Access Road LoD
- Wire Work Area LoD
- Structure Pad LoD

Base Data
- Existing High-Voltage Transmission Lines (>69kV)
- State Border
- County Boundary

Water Resources
- NHD Flowline
- NHD Waterbody
- MDNR Wetlands
- NWI Wetlands
- Modeled High Probability Wetlands

FEMA Flood Hazard
- Regulatory Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard

NOTES
1. Proposed tower locations are preliminary and subject to change
2. Ancillary facilities were only designed for the proposed route
3. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
4. Data source: NextEra, ERM, MD DNR, MDE, USGS NHD, USFWS NWI, MD iMAP Portal

N

0 250 500 750 1,000

US Feet

Scale: 1:6,000
1 inch equals 500 ft (when printed at 11x17)

Attachment 2
Modeled Wetlands Mapbook
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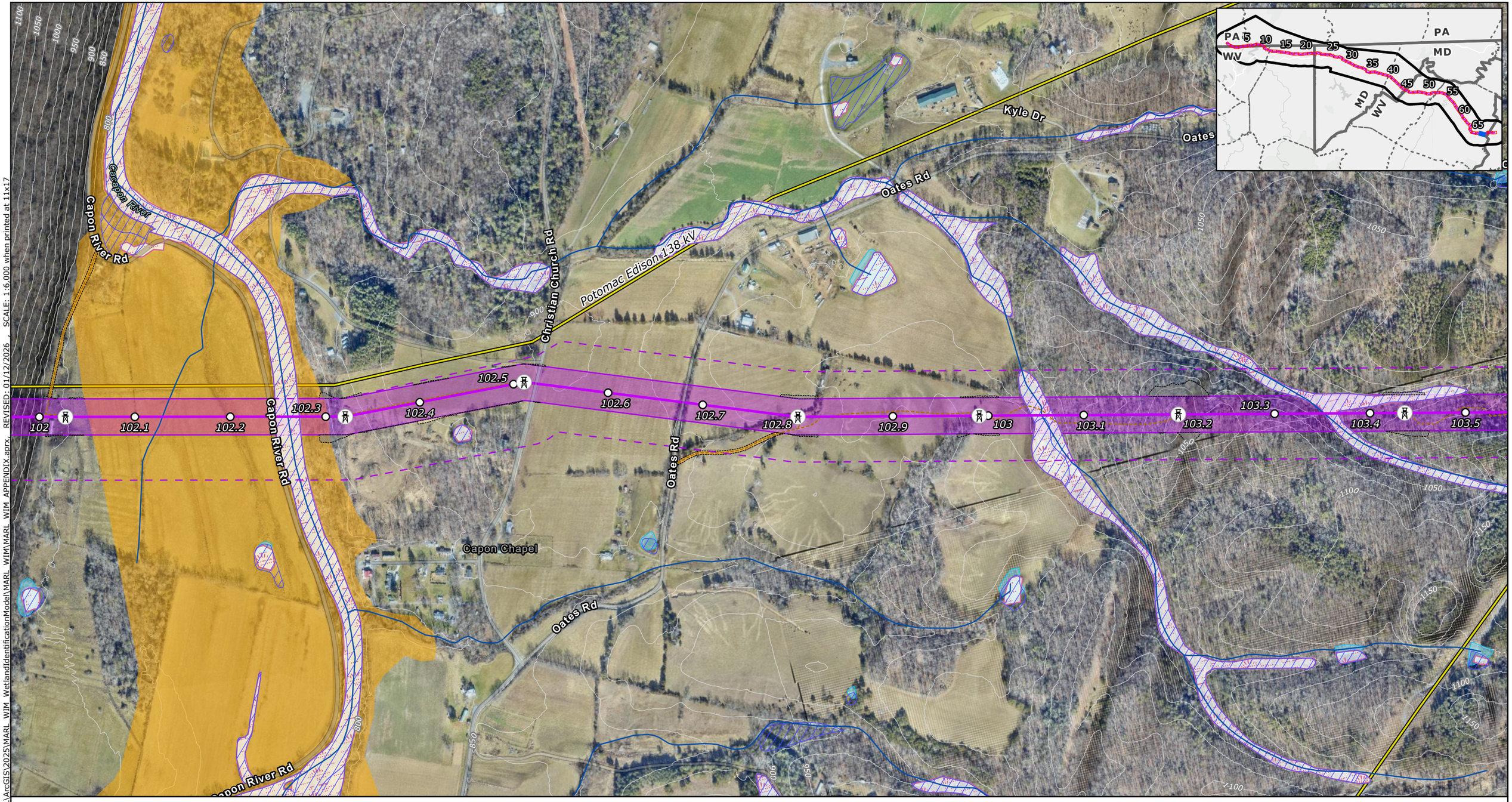

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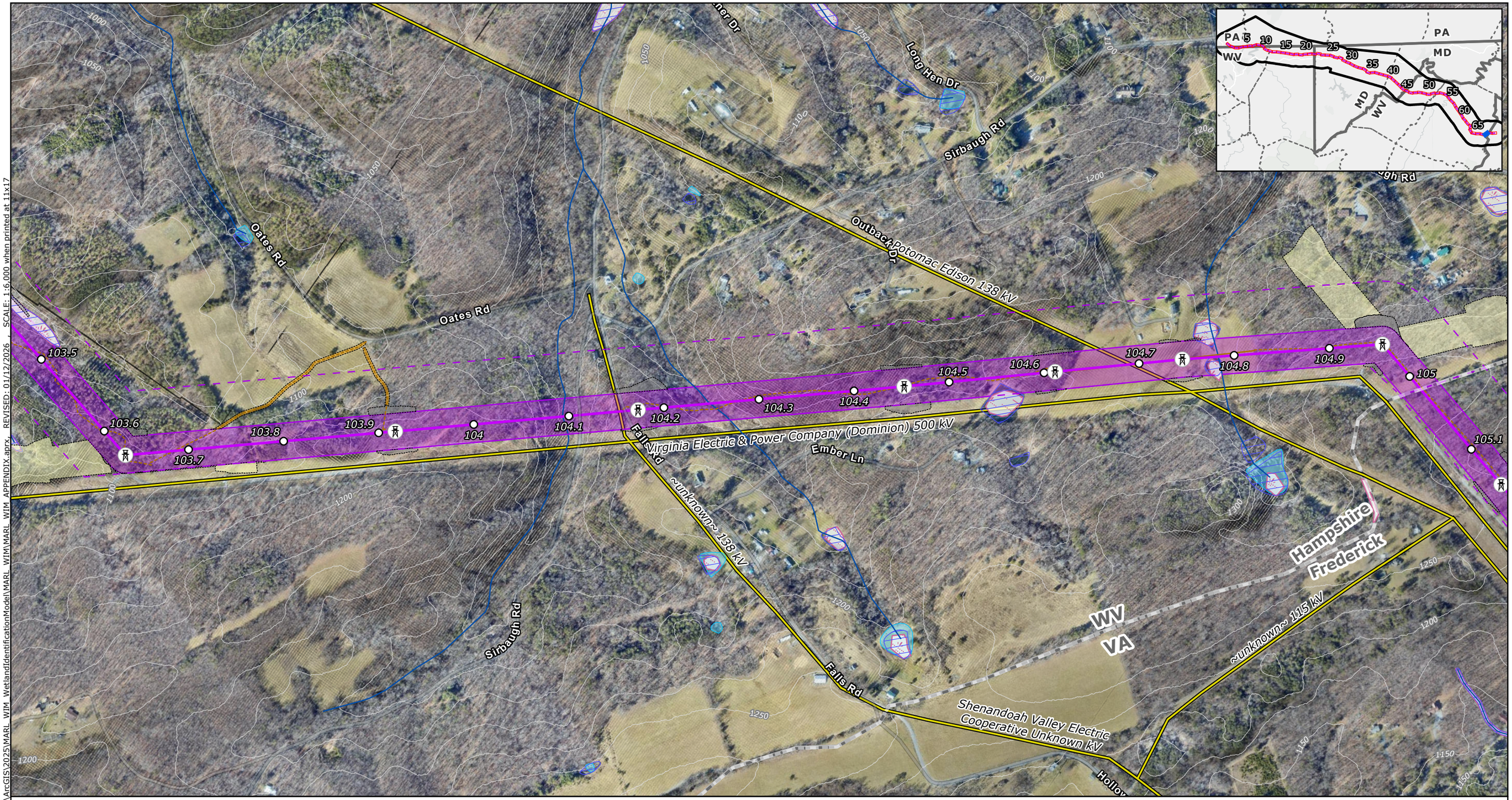

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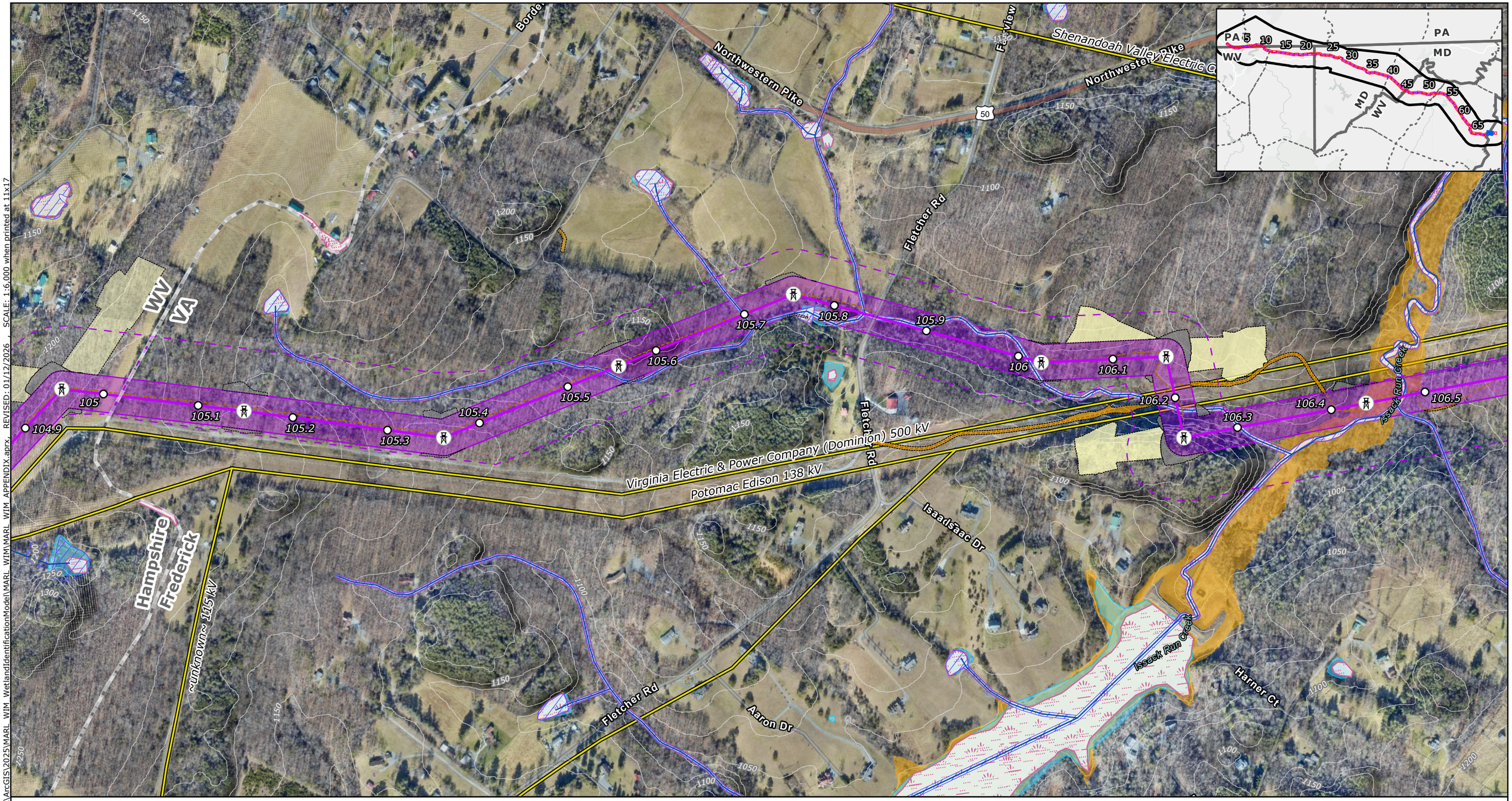

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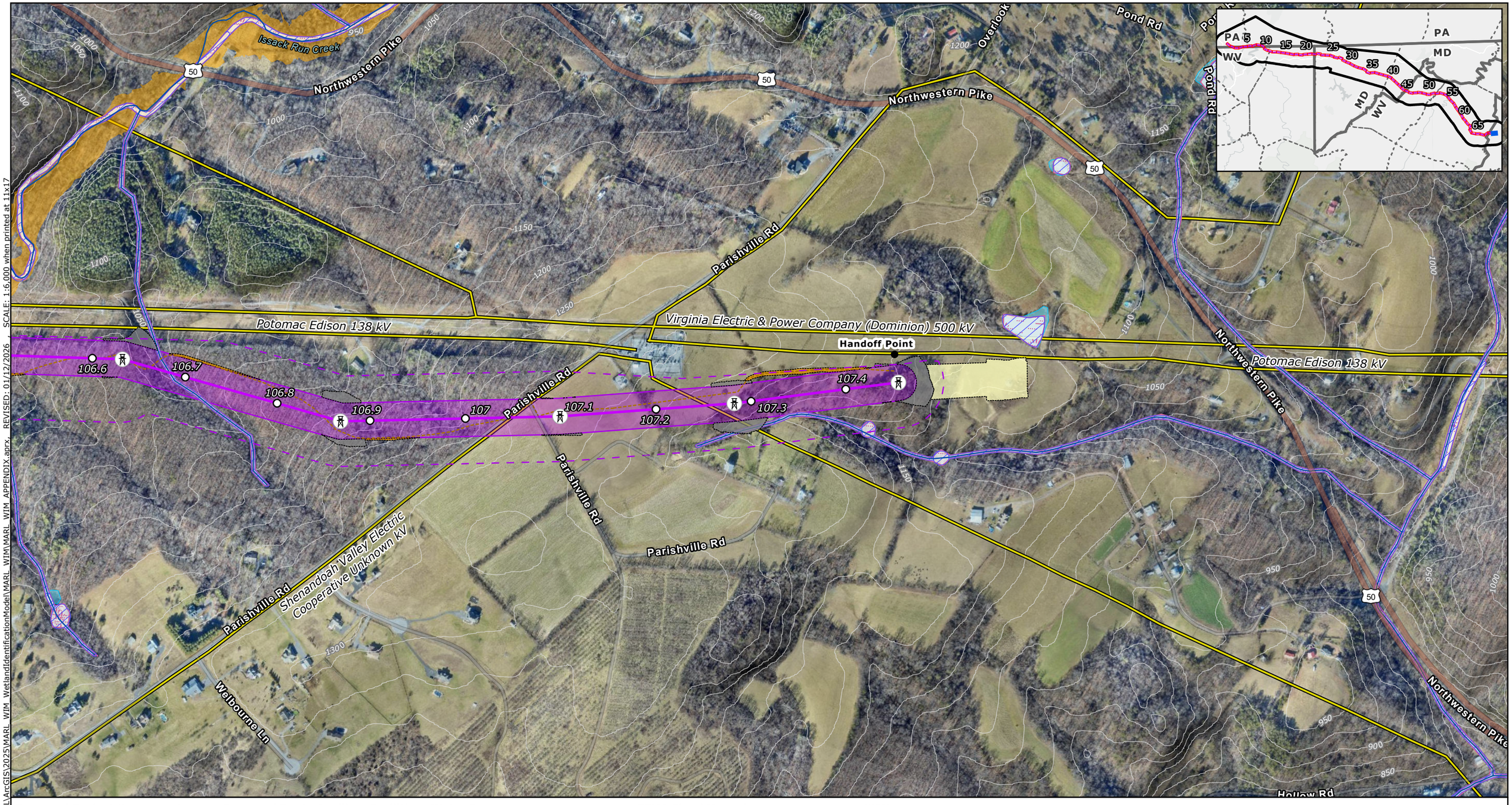

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N

0 250 500 750 1,000

US Feet

Scale: 1:6,000

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Attachment 2
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MidAtlantic Resiliency Link

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APPENDIX I PUBLIC OPEN HOUSE CONTENT

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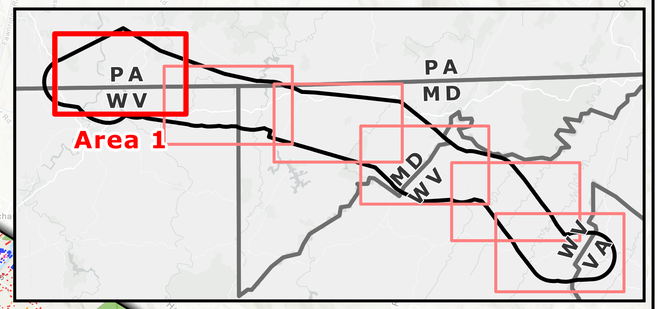


State Game Land 138

Forbes State Forest

Friendship Hill National Historic Site

State Game Land 223

Fayette County

Greene County

End Point

Point Marion Lock and Dam

Lake Lynn Dam

PA
WV

Greene County
Monongalia County

Fayette County
Preston County

River Trail

Cheat Lake

Monongahela River

Lake O' Woods

Coopers Rock State Forest

Quebec Run Wild Area

Agricul Easem

Legend

- End Points
- Project Study Area
- Counties
- Preliminary Proposed Route Options
- Existing High-Voltage Transmission Lines

High-Level Constraints

- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways
- Stream/River (NHD)
- Maryland Wildlands
- Protected Areas

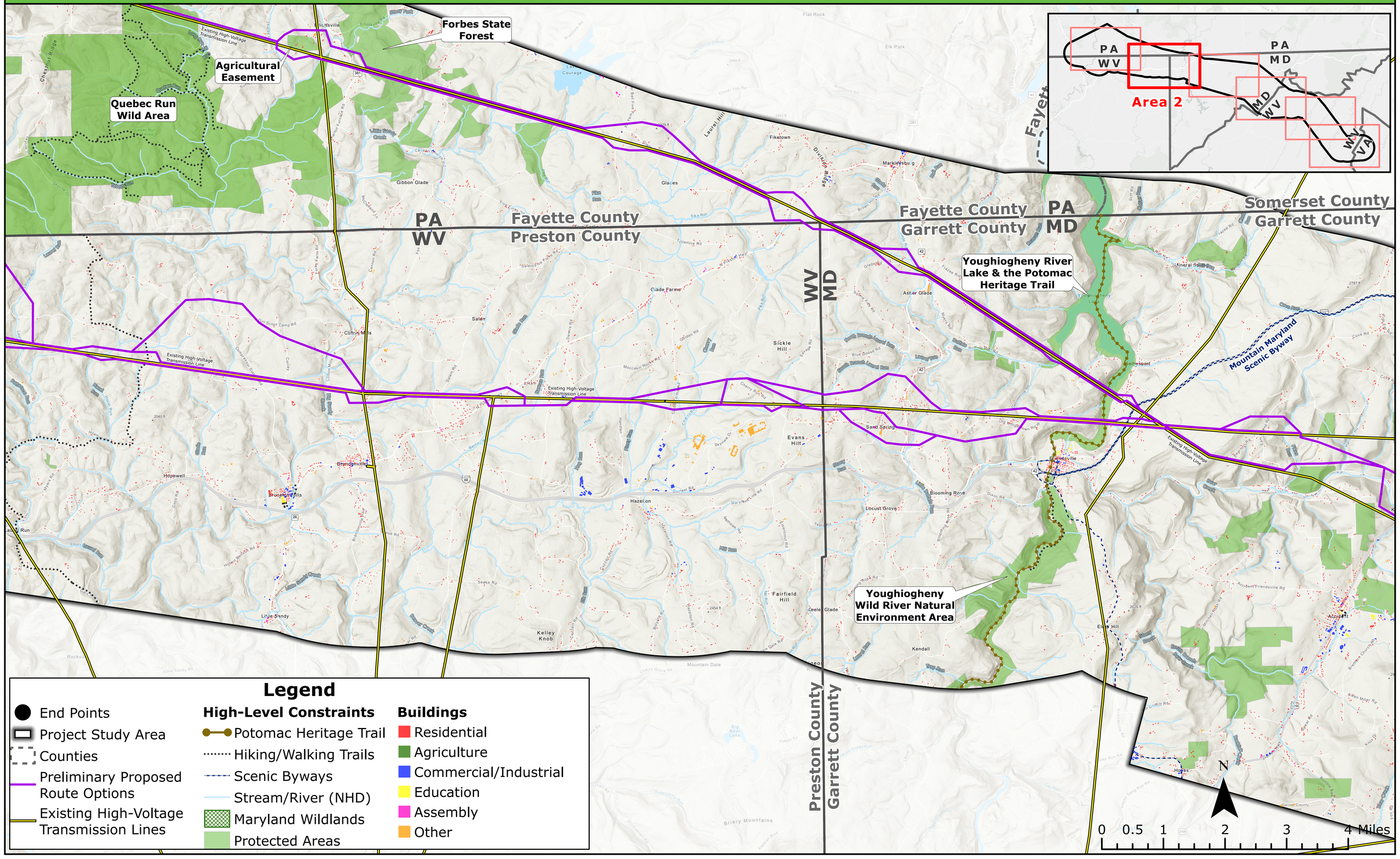
Buildings

- Residential
- Agriculture
- Commercial/Industrial
- Education
- Assembly
- Other

N

0 0.5 1 2 3 4 Miles

Preliminary Draft Route Options: Area 2



Legend

- End Points
- Project Study Area
- Counties
- Preliminary Proposed Route Options
- Existing High-Voltage Transmission Lines

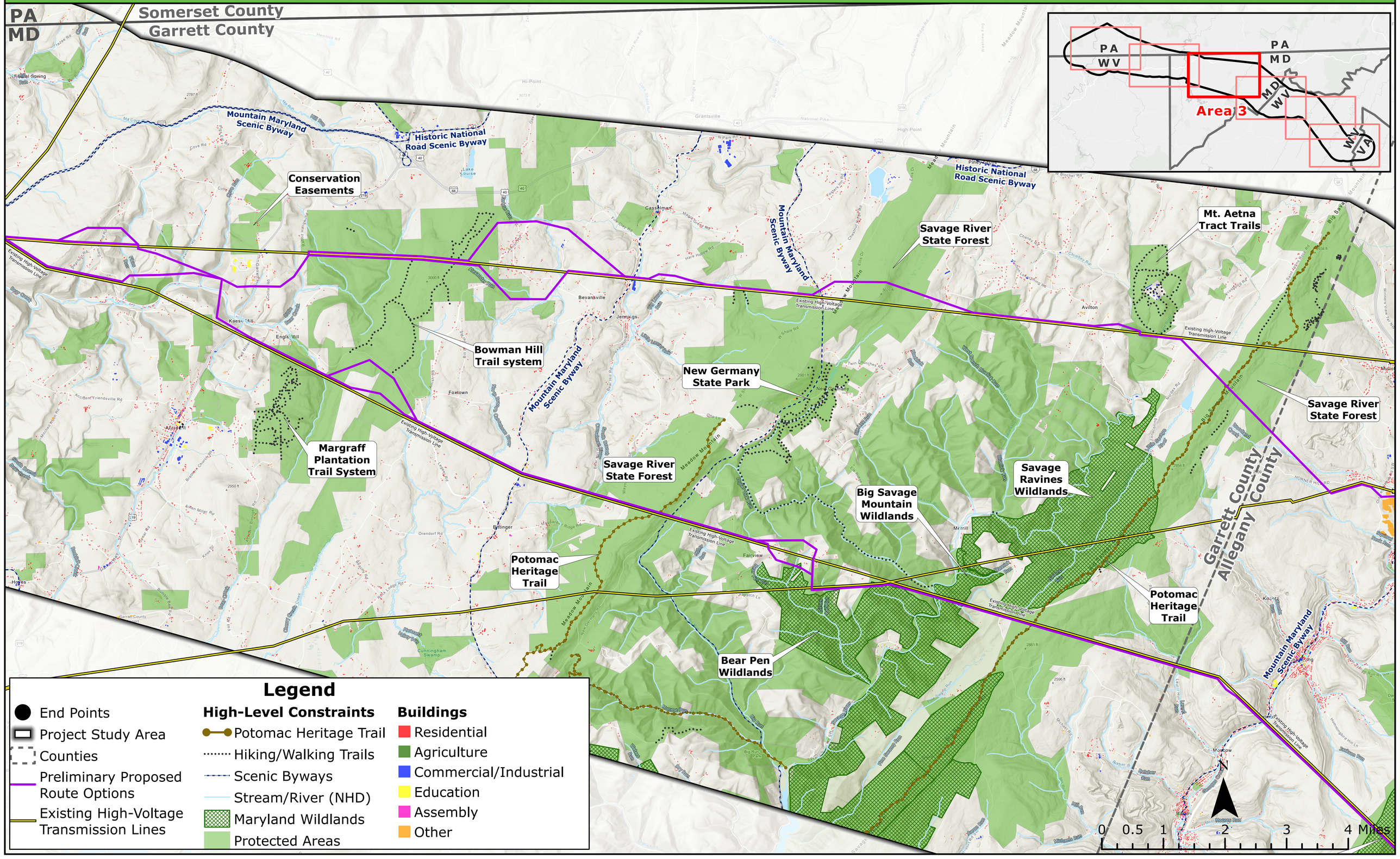
High-Level Constraints

- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways
- Stream/River (NHD)
- Maryland Wildlands
- Protected Areas

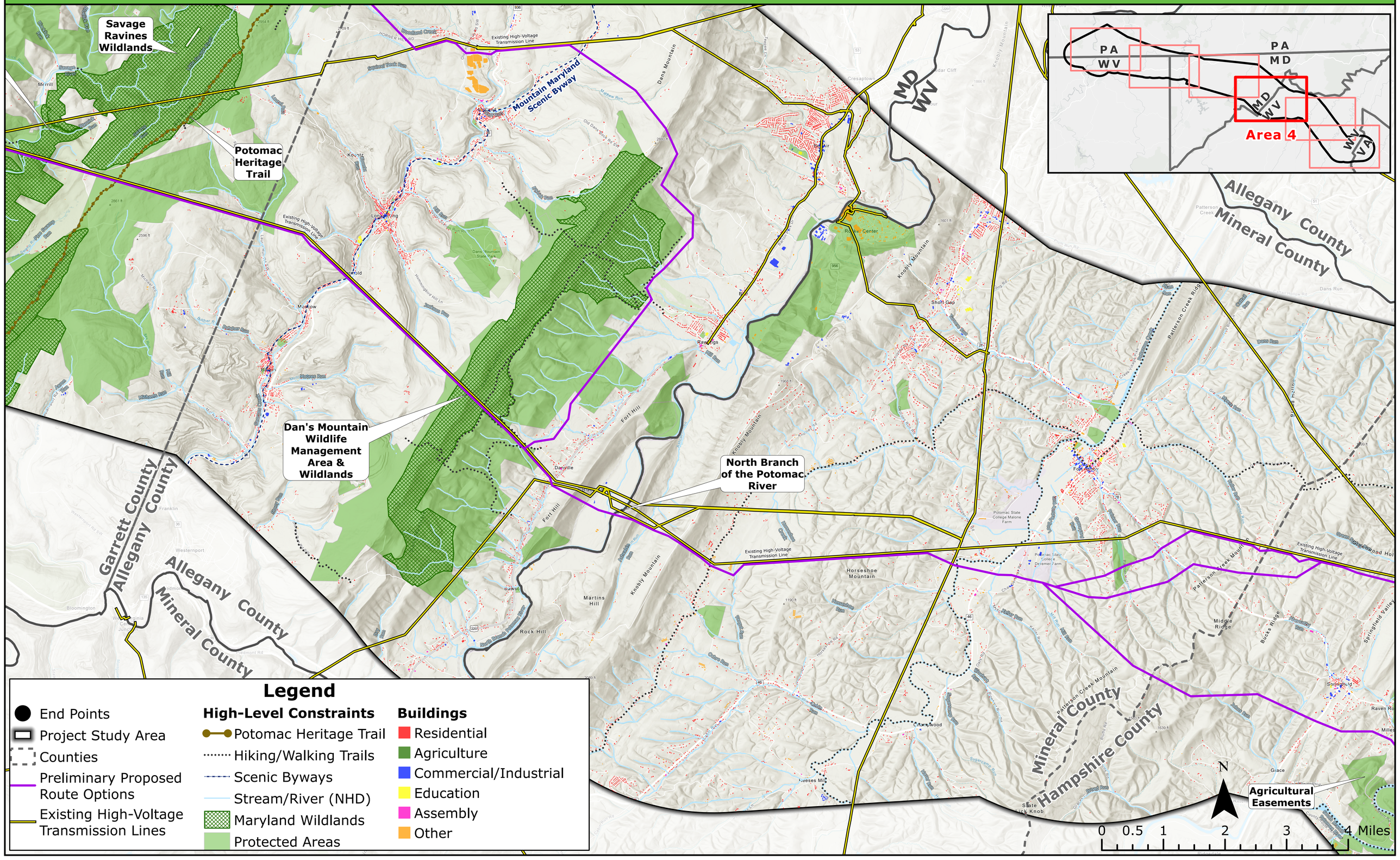
Buildings

- Residential
- Agriculture
- Commercial/Industrial
- Education
- Assembly
- Other

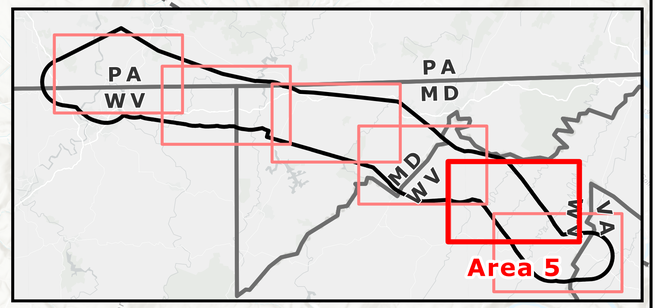
Preliminary Draft Route Options: Area 3



Preliminary Draft Route Options: Area 4



Preliminary Draft Route Options: Area 5



White Horse Mountain Wildlife Management Area

South Branch of the Potomac River

Agricultural Easements

Agricultural Easements

Cacapon & Lost Rivers Land Trust

Mineral County
Hampshire County

Legend

- End Points
- Project Study Area
- Counties
- Preliminary Proposed Route Options
- Existing High-Voltage Transmission Lines

High-Level Constraints

- Potomac Heritage Trail
- Hiking/Walking Trails
- Scenic Byways
- Stream/River (NHD)
- Maryland Wildlands
- Protected Areas

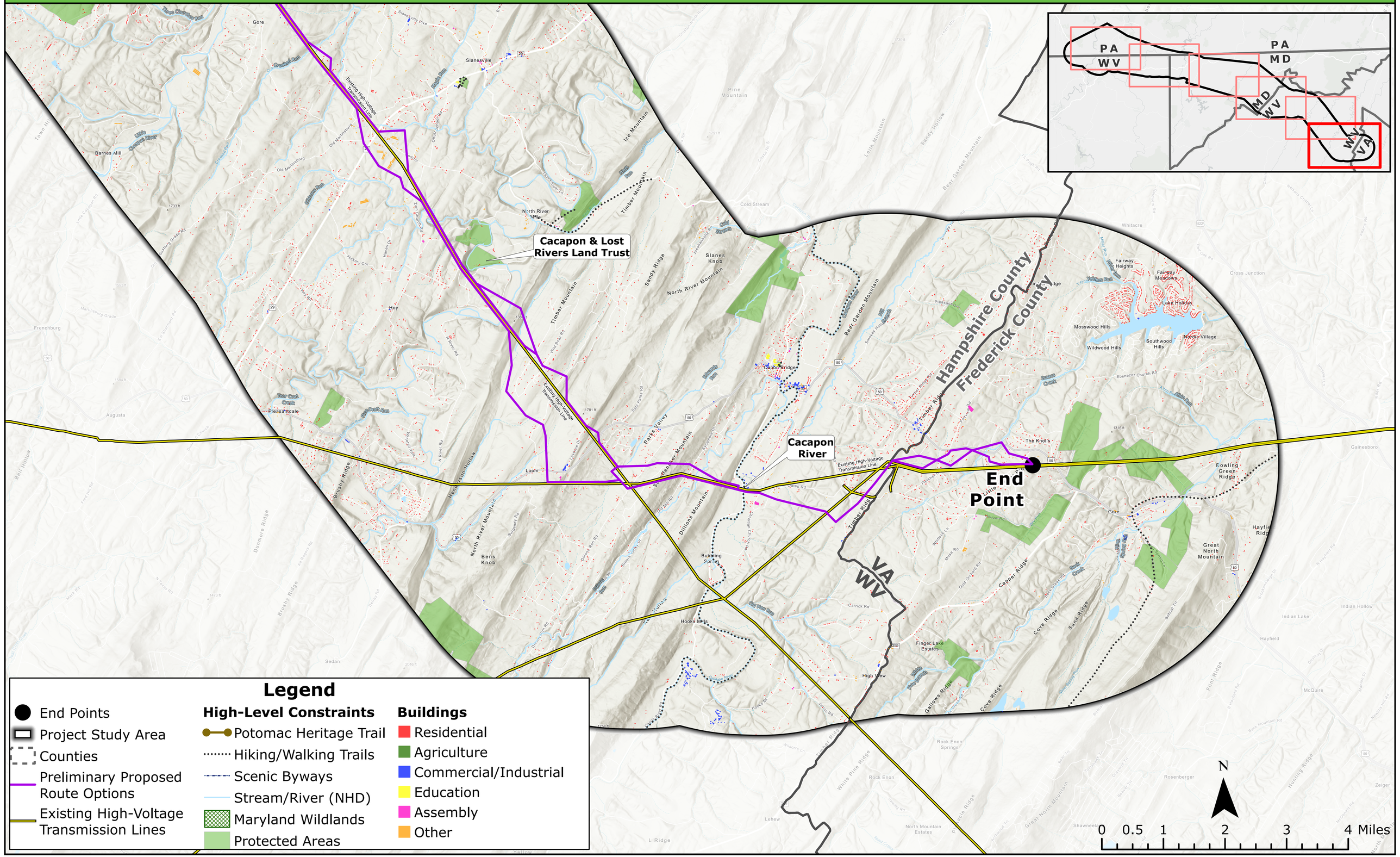
Buildings

- Residential
- Agriculture
- Commercial/Industrial
- Education
- Assembly
- Other

N

0 0.5 1 2 3 4 Miles

Preliminary Draft Route Options: Area 6



APPENDIX J VISUAL IMPACT ASSESSMENT

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Visual Impact Assessment

MidAtlantic Resiliency Link Project

PREPARED FOR
NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc.

DATE
January 2026

REFERENCE
0718854



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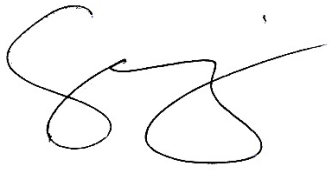
SIGNATURE PAGE

Visual Impact Assessment

MidAtlantic Resiliency Link Project

0718854



Sergio Capozzi
Technical Consulting Director



Ben Sussman
Associate Technical Partner



Eric Johnson
Data Analytics and Visualization Specialist



Jeremy Mastroianni
Data Analytics and Visualization Specialist

Environmental Resources Management, Inc.

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AV	aerial view
DEM	Digital Elevation Model
ERM	Environmental Resources Management, Inc.
GIS	geographic information system
KOP	key observation point
kV	kilovolt
MARL Project	MidAtlantic Resiliency Project
NEET MA	NextEra Energy Transmission MidAtlantic, Inc.
NEET VA	NextEra Energy Transmission Virginia, Inc.
ROW	right-of-way
SALDO	subdivision and land development ordinance
SCORP	Statewide Comprehensive Outdoor Recreation Plan
VDCR	Virginia Department of Conservation and Recreation
VSR	visually sensitive resource

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1. INTRODUCTION

Visual resources capture the combination of natural landforms, vegetation, water features, and human modifications (including cultural/historic features) that characterize and contribute to a landscape's visual quality. Impacts on visual resources occur when the existing visual character of the landscape (environment) is substantially modified or altered by a project.

NextEra Energy Transmission MidAtlantic, Inc. (NEET MA) and NextEra Energy Transmission Virginia, Inc. (NEET VA) are proposing to build the MidAtlantic Resiliency Project (MARL Project), a new 107.5-mile, 500 kilovolt (kV) transmission line that will traverse portions of Pennsylvania, West Virginia, Maryland, and Virginia, and include the new 500/138 kV Woodside Substation to be located in Frederick County, Virginia.[1] The purpose of this Visual Impact Assessment is to:

1. Define the existing visual resource character of the MARL Project Right-of-Way (ROW) Corridor and vicinity, including landscape units, visually sensitive resources (VSRs), and viewer groups.
2. Evaluate potential visibility of and changes to existing visual resource conditions from the MARL Project.

While the focus of the Visual Impact Assessment is on the Proposed Route, visual resource information for the Alternative Routes is provided for context, where applicable.

[1] NEET MA is responsible for constructing the portions of the MARL Project in Pennsylvania, West Virginia, and Maryland. NEET VA is responsible for constructing the portions of the MARL Project in Virginia, as well as a new 500/138 kV Woodside Substation in Frederick County, Virginia. The permitting of the substation is subject to the siting authority of Frederick County, and information in this Visual Impact Assessment related to the Woodside Substation is provided for overall context of the full MARL Project.

2. METHODOLOGY

This assessment uses a structured approach to visual resources that relies on established techniques for describing existing landscape characteristics and identifying the potential changes or contrasts resulting from proposed surface-disturbing activities. These established techniques include (but are not limited to) the Federal Highway Administration's *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA 2015), Bureau of Land Management's Visual resource management system (BLM 1984), and U.S. Forest Service's scenery management system (USFS 1995). This section outlines the specific methods used to define existing conditions and evaluate changes from the MARL Project, including the Woodside Substation, on existing visual resource conditions.

2.1 DETERMINE THE REGULATORY CONTEXT

Environmental Resources Management, Inc. (ERM) conducted a comprehensive review of federal, state, regional, and local plans and policies to identify relevant guidance related to scenic resources. These documents (e.g., comprehensive plans and other types of management plans and policies) often outline goals and objectives, protective measures, and/or highlight sensitive scenic resources that are crucial for understanding the existing visual resource context of a project. Additionally, they tend to reflect the visual preferences of a community, making them vital in assessing the perspectives of viewers and their sensitivity to changes in existing visual resource conditions. Ordinances, such as zoning and other adopted regulations, may provide enforceable regulations related to visual resources. Section 3.1, Regulatory Setting for Visual Resources, provides a more detailed discussion of the regulatory setting for the MARL Project.

2.2 IDENTIFY EXISTING VISUAL CHARACTERISTICS (LANDSCAPE UNITS)

ERM visual resource specialists systematically categorized the MARL Project Study Area into distinct landscape units. Each landscape unit is characterized by similar types of land cover, along with other corresponding visual traits. The units were delineated through a combination of geographic information system (GIS) layers (e.g., physiographic provinces, land use / land cover, slope/topography, logical boundaries such as roads and rivers, known VSRs) and a review of photographs from the MARL Project Study Area. Landscape units are intended to capture representative visual characteristics across an entire landscape area, providing a macro-scale framework to assess existing conditions and identify potential changes in visual conditions from a proposed project. Landscape characteristics are a set of attributes, qualities, or traits that make the landscape unit identifiable or unique. Landscape characteristics are described based on the specific combination of visual features in a landscape unit, including:

- Landforms—the topography/terrain features of the landscape, including any waterbodies or rivers;
- Vegetation—the variety of vegetation/vegetative communities present on the landscape; and
- Built environment—the existing structures, facilities, or other built modifications on the landscape.

For each identified landscape unit, these visual features are described in terms of their primary visual elements, including forms, lines, colors, and textures. ERM reviewed GIS data layers and aerial photography, as well as photography from representative key observation points (KOPs) and aerial views (AVs) throughout the MARL Project Study Area to identify the primary visual features and their corresponding visual elements. A KOP is a location that represents an important or sensitive viewpoint within a landscape unit, while an AV offers an elevated perspective that provides a broader view of a landscape, including transition areas between landscape units.

Each KOP and AV provides a representative view of existing landscape characteristics within a landscape unit and offers a location from which to evaluate visual resource changes from a project. KOPs are typically established at publicly available, high-use viewing areas such as highways and other travel corridors, trails and recreation sites, communities, or designated scenic facilities (e.g., scenic byways, overlooks). Conversely, AVs may also be located in areas with high visual potential, albeit with limited public access for ground-level photography due to safety concerns or challenging access (e.g., hazardous highway locations, water-based sites). AVs are designed to provide elevated, unobstructed perspectives not available to most observers that illustrate the spatial relationship between landscape features, particularly in areas where ground level perspectives may be limited by private ownership, complex terrain, and/or vegetation patterns.-

2.3 DEFINE TYPICAL VIEWER GROUPS IN THE MARL PROJECT STUDY AREA

Understanding how different viewer groups perceive visual resources is essential for evaluating a project's visual impacts. Generally, individuals with a strong attachment to a landscape or an expectation of scenic quality exhibit greater sensitivity to changes than those for whom scenic resources are incidental or irrelevant to their activities. The typical viewer groups in the MARL Project Study Area are listed below:

- Area residents: These viewers live near the MARL Project and are likely to be highly sensitive to potential changes in landscape characteristics. They value the scenic integrity of the landscape (the degree to which a landscape retains its natural or cultural visual character) around their homes and often have frequent and prolonged views from their homes. Additionally, area residents are typically more familiar with the local landscape, making them more sensitive to changes over time.
- Motorists, commuters, and other travelers: These viewers travel along the primary road corridors in the area and have multiple opportunities to view the landscape. Their exposure to views of the MARL Project varies based on speed, direction of travel, and trip length, as well as viewing angles and screening, among other factors. Consequently, these viewers, particularly those on high-speed roadways, tend to be less sensitive to changes in scenic conditions.
- Recreationists and tourists: These viewers choose parks, recreation areas, and other tourist attractions, in part, based on the scenic setting and quality of these areas; therefore, they also tend to be more sensitive to changes in the landscape.

Sensitivity and perception of visual resource changes (impacts) tend to vary by setting and viewer group. Therefore, anticipating viewer sensitivity is crucial for the comprehensive evaluation of potential impacts from a proposed project on visual resources. Several factors influence viewer sensitivity and the perception of impacts. Generally, users with static, direct, frequent, or prolonged views (area residents) and those engaged in setting-dependent activities (e.g., some types of recreation, tourism), tend to have higher levels of sensitivity to change compared to others.

2.4 VIEWSHED ANALYSIS AND POTENTIAL VISIBILITY

The objective of a GIS-based viewshed model is to provide a generalized understanding of areas from which a proposed project may be visible. A viewshed model uses terrain data, the heights of the proposed infrastructure, and various obstructions (e.g., terrain, vegetation, buildings) to identify areas where a project may be visible by calculating line-of-sight visibility. The MARL Project viewshed modeling relied on the datasets described below to determine visibility.[2]

- Digital Elevation Model (DEM): ERM obtained multiple 1-meter resolution DEMs from the U.S. Geological Survey National Elevation Dataset. These DEMs were derived from LiDAR flights that took place between 2018 and 2022 across the MARL Project Study Area. The DEMs represent a "bare earth" terrain dataset that does not include the heights of buildings or trees. For purposes of the viewshed analysis, ERM merged this data into a single, 10-meter resolution dataset that covers the entire MARL Project Study Area.
- Vegetation Model: To account for the screening impacts of vegetation on visibility, ERM developed a MARL Project-specific vegetation model using land cover data from the European Space Agency. This model defines the extent of vegetation and incorporates tree height data from the U.S. Department of Agriculture / U.S. Department of Interior LandFire data layer. By combining this vegetation data with the bare earth DEM, ERM created an approximate Digital Surface Model, which provides a more accurate representation of on-the-ground conditions by including forest and vegetation heights.
- Proposed infrastructure: ERM used preliminary tower placements and heights provided by NEET MA and NEET VA and a cleared ROW Corridor that ranges in width from 200 feet to 426 feet.

Using the Geodesic Viewshed tool in ArcGIS Pro, ERM identified areas within the foreground (less than 0.5 mile from the Proposed Route centerline) and middle ground (0.5 to 2 miles from the Proposed Route centerline) that may have potential visibility of the proposed structures. The analysis was limited to the foreground and middle ground, as these viewing distances represent the areas from which proposed changes in visual resource conditions would likely be most pronounced and discernible. The output model estimates the approximate number of towers visible at any given location, assuming an observer height (average eye level) of 1.5 meters tall. The output model includes vegetation screening impacts, indicating that proposed infrastructure would not be visible to a viewer standing within a forest due to the obstruction caused by the vegetation. However, the model does not differentiate between varying degrees of visibility, such as whether only the top of the structure or the entire structure is visible.

[2] The viewshed model was only developed for the transmission route, not the Woodside Substation.

The intent of the viewshed assessment is to identify the locations with the highest potential for unobstructed views of the MARL Project. While there may be additional viewing opportunities at greater distances (more than 2 miles from the Proposed Route), the MARL Project would likely begin to blend into the landscape and not act as a focal point for casual viewers at these distances. This does not mean that viewers would not perceive the new transmission line; rather, the prominence of the transmission line infrastructure would generally diminish with increasing distance. Additionally, the GIS model's accuracy in capturing visibility tends to decrease as distance increases because of intervening vegetation and built structures, as well as atmospheric conditions and other factors that influence more distant views. Therefore, the emphasis on potential foreground and middle ground views aims to identify those locations with the greatest potential to affect a viewer group.

In addition to the viewshed analysis, visibility from area roads and VSRs was also assessed based on proximity to the Proposed Route. For this assessment, VSRs included residences within 500 feet of the Proposed Route centerline and publicly accessible, designated recreational resources (e.g., parks, trails, forests, wildlife management areas) crossed by the Proposed Route. While cultural/historic properties and sites are also typically considered VSRs, these sites are evaluated (including potential visibility) and addressed separately in the cultural resource sections of each state-specific Environmental Review Document. While proximity does not guarantee visibility, there is a higher likelihood for unobstructed views from area roads and VSRs near the Proposed Route, along with greater sensitivity to visual change from viewer groups compared to more distant roads and VSRs because of intervening terrain, vegetation, and other screening factors.

2.5 VISUAL SIMULATIONS AND IMPACT EVALUATION

As noted previously, a KOP serves as a specific location for documenting existing conditions and creating photographic simulations of future scenarios involving a proposed project. While each KOP depicts a specific location, most are also chosen to represent the broader types of views or viewing opportunities available across a landscape. For the MARL Project, KOPs were established in publicly accessible areas (e.g., roads, parks, trails) that are representative of the predominant landscape units within the MARL Project Study Area. These points provide both individual and collective context for cataloging existing visual conditions across various landscape units affected by the MARL Project, as well as for assessing potential visual resource changes resulting from the MARL Project.

For baseline photographs at KOPs, field photographers used a Nikon Z6ii professional specification digital single-lens reflex camera outfitted with a Nikkor AF 50mm f/1.8 prime lens. The camera was mounted on a panoramic head of a tripod, positioned in portrait orientation with the lens height typically set at 5.5 feet. The photographers ensured the tripod head and camera were level while aiming the viewfinder at the centerline of the MARL Project. They then recorded the exposure and focus settings and fixed those settings manually so they could not be inadvertently altered. Photographers then captured a series of 36 frames, rotating the panoramic head approximately 10 degrees after every frame, resulting in approximately a 50 percent overlap of the previous frame (rotating approximately 10 degrees between frames) until the full 360-degree sequence was captured. After the photos were complete, visualization specialists compiled a

single panorama from all 36 photos at each KOP using PTGui Pro version 12.11, a professional photographic stitching software. Each panorama documents existing conditions and serves as the basis for the photographic simulations of the MARL Project.

To evaluate future changes in visual resource conditions from the MARL Project, visualization specialists developed photographic simulations of the MARL Project from each KOP based on the panoramas and digital engineering drawings provided by NEET MA and NEET VA. This process began with plotting each KOP camera location in Global Mapper version 23.1, followed by creating digital models of the MARL Project in Autodesk 3DS Max 2023. The structures of the MARL Project were then rendered in Vray version 6 from each KOP camera location. The renderings employed a simulated physical camera along with a sun and sky simulation lighting model, ensuring consistency with the conditions depicted in the original KOP photography. The resulting 3D imagery was subsequently exported for overlay on the panoramas for each KOP.

The visualization specialists produced the photographic simulations by overlaying the rendered images on the existing photograph for each KOP using known control points. They adjusted the brightness and contrast of the rendered images to match the existing photograph and made other minor changes to the images (e.g., adding or removing vegetation to reflect future conditions) where necessary using Adobe Photoshop. Finally, the visualization specialists cropped the final images to the proper proportions and exported the images to a PDF format.

Using the photographic simulations, visual resource specialists conducted a visual assessment focused on describing existing conditions and the changes anticipated at full buildout of the MARL Project. This assessment involved comparing the existing visual conditions (panoramic images and field notes) against the photographic simulations of the MARL Project at each representative KOP. The analysis identified changes in visual conditions (form, line, color, and texture) resulting from the MARL Project. The magnitude of change, as well as viewer sensitivity and visibility, served as indicators of the impact on visual resources.

3. EXISTING CONDITIONS

The description of existing conditions in the MARL Project Study Area focuses primarily on the landscapes and scenic resources crossed by or in the vicinity of the Proposed Route. This includes—where applicable—similarities and differences between existing conditions along the Proposed Route and the Alternative Routes. The descriptions of existing conditions are presented geographically from the western to eastern ends of the MARL Project.

3.1 REGULATORY SETTING FOR VISUAL RESOURCES

The MARL Project crosses portions of Pennsylvania, West Virginia, Maryland, and Virginia. The remainder of this section describes state and local laws, ordinances, regulations, and statutes that may be applicable to visual resources. County and municipal comprehensive plans in Pennsylvania, West Virginia, and Virginia are advisory documents, whereas subdivision and land development ordinances are legally enforceable. In Maryland, zoning must be consistent with the adopted comprehensive plan of the corresponding jurisdiction (MDP n.d.).

3.1.1 PENNSYLVANIA REGULATORY SETTING

The Pennsylvania State Constitution affirms that "the people [of Pennsylvania] have the right clean air, pure water, and to the preservation of the natural, scenic, historic and [a]esthetic values of the environment" (Article I, § 27). Pennsylvania's Statewide Comprehensive Outdoor Recreation Plan (SCORP) addresses these values and others (e.g., clean air and water, natural and cultural resources, outdoor recreation) by providing statewide goals, objectives, and guidance to protect and preserve natural and cultural resources (PADCNR 2025). While the Pennsylvania SCORP does not include a specific section on aesthetic or scenic resources, it acknowledges the importance of scenic values and identifies "important" scenic resources throughout the state (e.g., trails, overlooks). In Greene and Fayette Counties, the Proposed Route and Alternative Routes do not cross any important scenic resources identified in the Pennsylvania SCORP; however, other trails and outdoor recreation sites crossed by the Proposed and/or Alternative Routes in Pennsylvania do have scenic value. These trails, sites, and use areas are identified in Section 4.2, Viewshed Analysis and Visibility.

Similar to the SCORP, the comprehensive plans for both Greene County and Fayette County do not include a dedicated section on scenic or visual resources (Greene County 2019; Fayette County 2019). Both plans acknowledge the scenic settings and availability of scenic vistas in their respective county, although they do not specify particular scenic vistas. Comprehensive plans for the individual municipalities in Pennsylvania crossed by the MARL Project are not readily available online.

In Pennsylvania, public utilities (e.g., transmission lines) are generally exempt from subdivision and land development ordinances (SALDOs), which may contain provisions such as zoning and subdivision requirements. Substations may be subject to regulations related to visual buffers around the substation site. The Fayette County zoning ordinance and Greene County SALDO do not specifically mention visual resources related to transmission infrastructure.

3.1.2 WEST VIRGINIA REGULATORY SETTING

The West Virginia SCORP (similar in intent and content to the Pennsylvania document of the same name) acknowledges the substantial contributions that scenic resources make to the state's natural and cultural heritage, as well as to protected areas (WVDED 2021). It highlights designated scenic byways, trails, water trails, and overlooks, alongside various other state and federal outdoor recreation sites and use areas that play a crucial role in conservation and tourism. The scenic quality of these areas is a factor in the overall visitor experience. Although the West Virginia SCORP does not explicitly outline goals and objectives for visual resources, it emphasizes the important benefits that scenic resources provide to residents and visitors statewide.

The Monongalia, Mineral, and Hampshire County comprehensive plans lack a detailed section on scenic or visual resources (Monongalia County Planning Commission 2023; Mineral County Planning Commission 2010; Hampshire County Planning Commission 2019); however, these plans acknowledge the scenic setting and/or quality in their respective counties. The *Hampshire County Comprehensive Plan*, includes several goals and objectives focused on protecting and preserving scenic resources and scenic quality related to housing, transportation infrastructure, and parks and recreation. Preston County has a strategic plan instead of a comprehensive plan (Preston County Economic Development Authority 2023). This plan notes scenic views as one of the strengths of the county. While all four counties recognize the scenic quality of their respective settings, none of the planning documents specify particular scenic resources or vistas that have visual protections. Additionally, they do not establish clear visual or scenic quality objectives aimed at preserving existing visual characteristics or delineating acceptable levels of change.

In West Virginia, transmission lines are generally exempt from land development ordinances such as zoning and subdivision requirements. Substations may be subject to regulations related to visual buffers around the substation site.

The Magnolia County and Hampshire County land development ordinances do not specifically mention visual resources related to transmission infrastructure. In Mineral County, the subdivision ordinance exempts utility parcels from ordinance requirements. Preston County does not appear to have a SALDO.

3.1.3 MARYLAND REGULATORY SETTING

Maryland’s *Land Preservation and Recreation Plan 2019–2023* serves as a framework for managing the state’s natural and cultural resources, including their scenic values (MDNR 2019). The plan identifies both state and federal protected areas and sites, as well as specific programs intended to protect and conserve cultural and natural resources; however, it lacks defined goals, objectives, or guidance specifically focused on the protection and preservation of scenic values at these resources. Scenic use areas and sites identified in the plan and crossed by the Proposed Route are listed in Section 4.2.

In Maryland, the MARL Project crosses Garrett and Allegany Counties. Neither the Garrett County Comprehensive Plan nor the Allegany County Comprehensive Plan have a dedicated section or goals and objectives for scenic or visual resources (Garrett County 2022; Allegany County 2014). Several scenic areas are referenced in both, and the Allegany County plan highlights the

importance of scenic vistas and uninterrupted scenic viewsheds. As noted above, local municipal zoning must be consistent with the adopted comprehensive plan of the corresponding jurisdiction.

In Maryland, transmission lines are generally exempt from zoning and subdivision requirements. Substations may be subject to regulations related to visual buffers around the substation site. The Allegany County zoning and subdivision ordinances do not specifically mention visual resources related to transmission infrastructure. Garrett County does not administer zoning or subdivision requirements within unincorporated areas outside of the Deep Creek Lake watershed (which the MARL Project would not cross); therefore, visual resources related to transmission infrastructure are not regulated.

3.1.4 VIRGINIA REGULATORY SETTING

The Virginia Outdoors Plan previously featured a dedicated chapter and guidance on scenic resources in the state (VDCR 2018). According to this guidance, the Virginia Department of Conservation and Recreation (VDCR) defers to local governments for the protection and management of scenic resources. VDCR also collaborates with local governments and other stakeholders to address scenic resources with statewide importance through the Virginia Scenic Rivers Program and Virginia's Byways. Although the most recent Virginia Outdoors Plan does not specifically address scenic resources (VDCR 2024), both the scenic river and byways programs help preserve the scenic and other important resource values associated with designated rivers and byways. The Proposed Route and the Woodside Substation site do not intersect any designated Virginia Scenic Rivers or Scenic Byways.

The Frederick County comprehensive plan does not have a scenic or visual resource section or objectives associated with scenic or visual resources (Frederick County 2021). The plan recognizes the county's scenic setting and visual quality and emphasizes the contribution of scenic resources and quality to both residents and visitors. It also recognizes the county's natural and historic/ cultural resources, which also offer opportunities to experience the landscape and scenic resources.

In Virginia, transmission lines are generally exempt from zoning requirements. Substations may be subject to regulations related to visual buffers around the substation site. The Frederick County zoning and subdivision ordinances do not specifically mention visual resources related to transmission infrastructure.

3.2 PHYSIOGRAPHIC PROVINCES

Physiographic provinces are large land areas that are characterized by a cohesive pattern of landforms, geologic formations, elevations, and vegetation, all of which directly influence the visual resource identity of a landscape. As a result, physiographic provinces provide a framework for understanding the natural landscape character across a broad geographic area. The Proposed Route crosses the Appalachian Plateau and the Valley and Ridge physiographic provinces, as shown on Figure 3.2-1 and described below (NPS 2017).

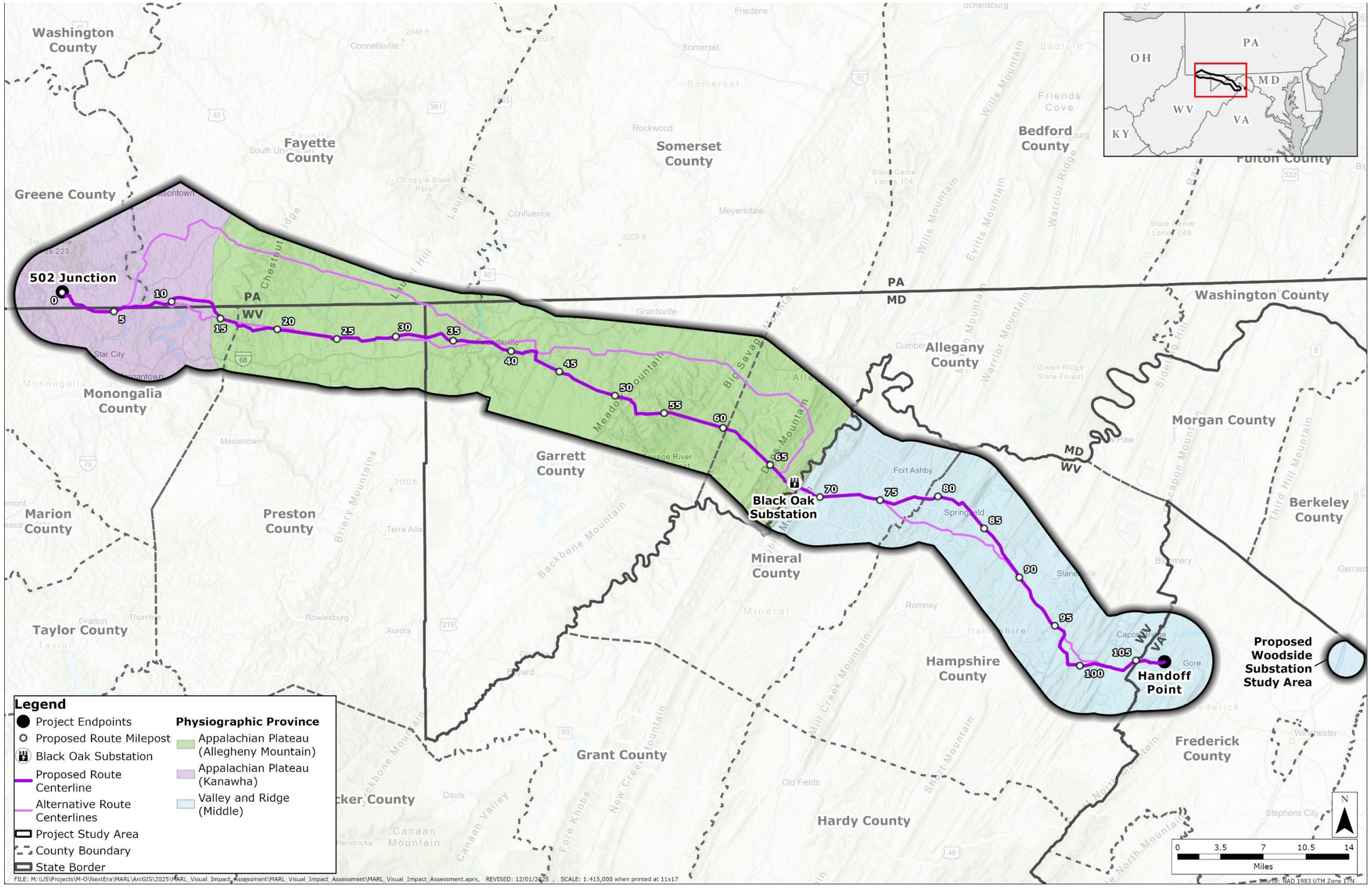
The Appalachian Plateau province[3] is characterized by mountainous terrain incised by rivers and streams that contribute to the rolling, gently undulating terrain and curvilinear forms. The vegetation is a mix of large, contiguous forested areas interspersed with open agricultural fields. The forests contribute vertical features, textural complexity, and seasonal color dynamics to the landscape. The forest canopy often obscures but mimics the underlying landforms and creates a sense of visual enclosure in many areas. Human development is generally low-density and rural in character with residential, agricultural, and commercial/industrial structures primarily located along transportation corridors, which generally follow river and stream valleys. These structures add geometric forms and straight lines to the landscape. Additionally, linear infrastructure (e.g., highways, roads, transmission and distribution lines) throughout the area introduces strong linear and geometric forms with their visual prominence dependent on the scale of the structures (mass and height), topography, and vegetative screening.

The Valley and Ridge province is characterized by long, narrow mountain ridges (generally running northeast to southwest) with intervening valleys. The mountain ridges form strong diagonal and horizontal lines that appear as repeating, undulating bands across the landscape. The valleys between these ridges tend to have gently rolling to flat terrain. Rivers and streams occur frequently in the valleys and add sinuous, curvilinear forms and lines to the landscape. The vegetation patterns generally follow the landform patterns, with the ridges covered in dense forests and a patchwork of agricultural fields, riparian areas, and maintained lawns dotting the valley floors. The forested areas add vertical features that reinforce the elevation differences present on the landscape and help enclose views. Variations in vegetation types and patterns also create textural complexity and seasonal color dynamics that contribute to the aesthetic character of the area. Human development is primarily concentrated in the valleys, where small communities and clusters of agricultural structures follow the natural alignment of the terrain. The built environment typically consists of low geometric structures (single- and two-story buildings) that are often subordinate to the dominant natural features. Major roads, utility corridors, and other linear infrastructure generally follow valley bottoms and occasionally cross ridges through gaps or engineered cuts. In certain areas (e.g., elevated vantage points), this type of infrastructure is highly visible and contrasts with the landscape's natural forms and patterns.

The MARL Project crosses landscape units (Section 3.3, Existing Visual Characteristics) that incorporate the broad visual characteristics of these physiographic provinces, as well as other area-specific land use and other visually oriented factors (e.g., topography, degree of development).

[3] There are two sections to the Appalachian Plateau province: the Allegheny Mountain and Kanawha sections. These sections are distinguished by their underlying geologic characteristics; however, these sections share similar visual characteristics.

FIGURE 3.2-1 PHYSIOGRAPHIC PROVINCES



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

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3.3 EXISTING VISUAL CHARACTERISTICS

The MARL Project Study Area was divided into landscape units, which are geographic areas that share similar land use / land cover and corresponding visual characteristics. Figure 3.3-1 shows the delineated landscape units in the MARL Project Study Area, as well as the Proposed Route and Alternative Routes. The MARL Project is most likely to directly affect landscapes crossed by the new transmission infrastructure; therefore, Section 3.3.1, Proposed Route Landscape Units, focuses only those landscape units crossed by the Proposed Route, while Section 3.3.2, Alternative Route Landscape Units, identifies the units crossed by the Alternative Routes. In addition to landscape characteristics, the common types of viewer groups are also identified for each landscape unit.

3.3.1 PROPOSED ROUTE LANDSCAPE UNITS

As shown on Figure 3.3-1, the Proposed Route crosses the Rural Agricultural, Forested Mountains, Developed, River Valley, Rural Developed, and Forested Ridges Landscape Units. The remainder of this section describes those landscape units.

3.3.1.1 RURAL AGRICULTURAL LANDSCAPE UNIT

Rural Agricultural Landscape Units primarily feature expansive agricultural fields and natural grass and shrublands, interspersed with patches of dense forest. These units commonly extend through the valleys between areas of forested mountain ranges. Small towns and other areas of low-density development are often found along roadways in these valleys. Figure 3.3-2, Figure 3.3-3, and Figure 3.3-4 show representative views in Rural Agricultural Landscape Units. As shown on these figures, Rural Agricultural Landscape Units share the following visual characteristics:

- Landform/Water—broad, gentle slopes, horizontal profile bounded by taller, rounded mountains; long, flat to rolling lines delineating transition between ground and sky; colors and textures in underlying terrain obscured by vegetation and built features.
- Vegetation—fields appear as low, geometric forms with clusters of taller, forested vegetation forming vertical, amorphous, strips; mix of fields and forested areas create open, wide, low, regular (along the ground) to irregular (along the canopies of forested areas) horizontal lines with simple, repetitive vertical lines; fields create continuous areas of green, yellow, and tan colors, while forested areas dominated by tan, green, brown, and other natural hues and subject to seasonal variation; fine, uniform, continuous textures of the fields broken by medium, patchy, contrasting textures of adjacent clusters of forest.
- Built Environment—roads appear as linear, smooth, flat, gray strips; residences, farm structures, and other buildings add definite, solid, geometric forms; transmission and distribution lines create distinct, repetitive, vertical forms; straight to curvilinear horizontal lines (roads); short, vertical, and horizontal lines (structures and buildings); long, thin, slightly undulating horizontal lines; roads, buildings, and energy infrastructure add multiple colors (e.g., white, gray, tan, yellow) and smooth, directional, ordered, stippled, sparse textures.

The primary viewer groups in Rural Agricultural Landscape Units include area residents and motorists.

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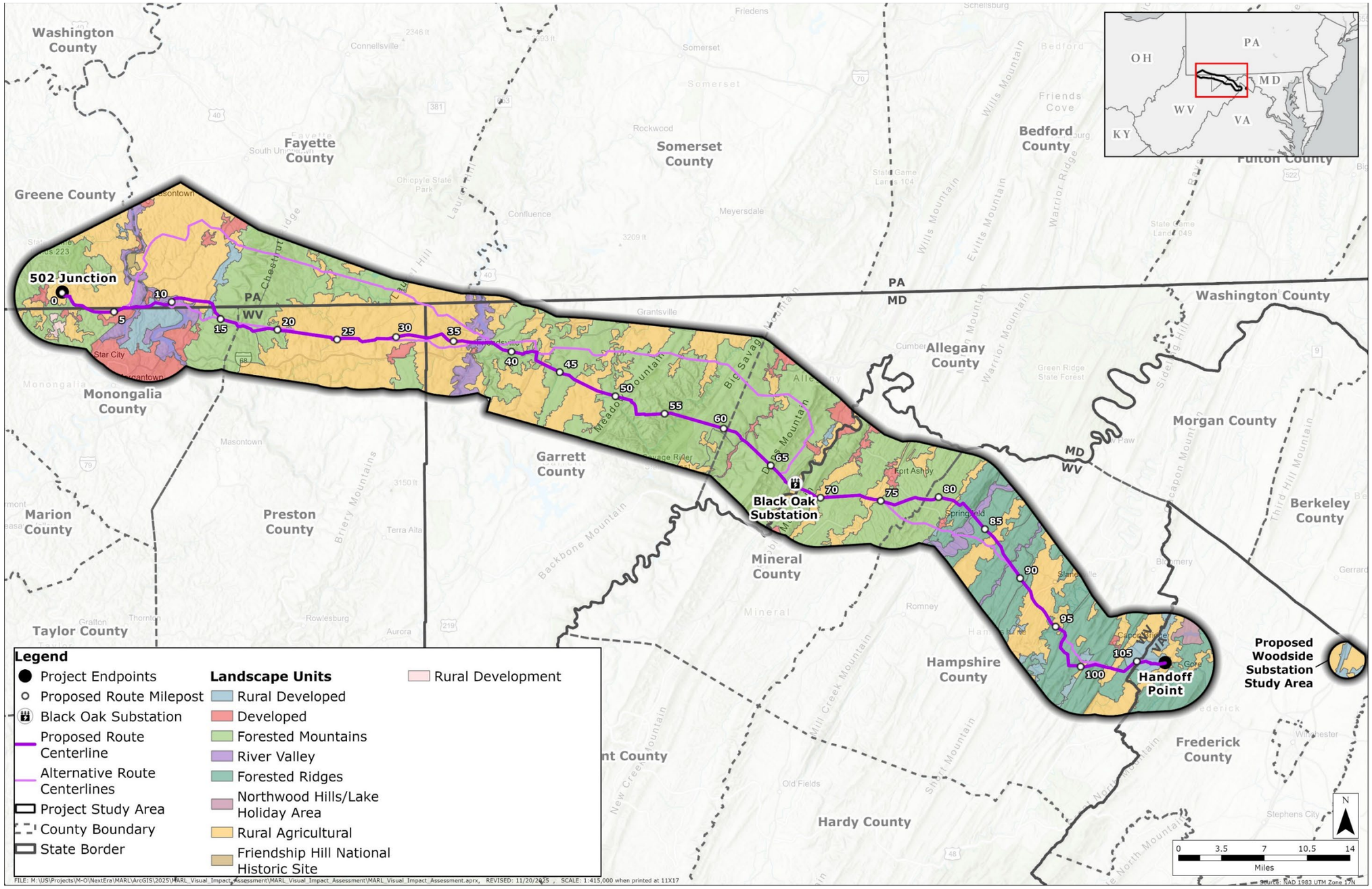
FIGURE 3.3-1 LANDSCAPE UNITS



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

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FIGURE 3.3-2 RURAL AGRICULTURAL LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Bald Hill Church Road, Greene County, Pennsylvania

FIGURE 3.3-3 RURAL AGRICULTURAL LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: Compressor Station Road, Preston County, West Virginia

FIGURE 3.3-4 RURAL AGRICULTURAL LANDSCAPE UNIT (REPRESENTATIVE VIEW 3)



Image location: Near intersection of Bloomery Pike and Kedron Road, Hampshire County, West Virginia

3.3.1.2 FORESTED MOUNTAINS LANDSCAPE UNIT

Forested Mountains Landscape Units are characterized by mountainous terrain that is dominated by native forest cover and other vegetation with periodic clusters of low-density development and linear infrastructure. Figure 3.3-5, Figure 3.3-6, and Figure 3.3-7 show representative views of Forested Mountains Landscape Units.

FIGURE 3.3-5 FORESTED MOUNTAINS LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Garrett Highway near Kaese Mill, Garrett County, Maryland

FIGURE 3.3-6 FORESTED MOUNTAINS LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: Fairview Road, Garrett County, Maryland

FIGURE 3.3-7 FORESTED MOUNTAINS LANDSCAPE UNIT (REPRESENTATIVE VIEW 3)



Image location: Waxler Road (Knobly Mountain), Mineral County, West Virginia

As shown on these figures, Forested Mountains Landscape Units share the following visual characteristics:

- Landform/Water—generally obscured by vegetation and built environment but underlying landform is characterized by prominent rolling to steep, rounded, wide, nondirectional, and trapezoidal forms with dominant horizontal lines that generally follow ridgelines.
- Vegetation—dominated by deciduous mixed forest with vertical layering, tall and amorphous forms and short, rounded forms; repeating vertical lines, irregular horizontal line across the canopy; a mix of green hues with assorted browns and grays with seasonal variability; medium to coarse textures.
- Built Environment—roads, residences and other buildings, and energy infrastructure add low, flat, geometric, tall, vertical forms; curvilinear, straight vertical and horizontal lines; various colors including white, gray, brown, blue, yellow, metallic, and others; fine, smooth, patchy, discontinuous, scattered, and stippled textures.

The primary viewer groups in Forested Mountains Landscape Units include area residents, motorists, and recreationists.

3.3.1.3 DEVELOPED LANDSCAPE UNITS

Developed Landscape Units are dominated by cleared lands with a high level of development, including residential, commercial, and/or industrial buildings and structures; aboveground infrastructure; and maintained lawns/planting areas and remnant native vegetation. Figure 3.3-8 and Figure 3.3-9 show representative views of Developed Landscape Units.

FIGURE 3.3-8 DEVELOPED LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Hanekamp Street West, Lonaconing, Allegany County, Maryland

FIGURE 3.3-9 DEVELOPED LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: Springfield Pike, Springfield, Hampshire County, West Virginia

As shown on these figures, Developed Landscape Units share the following visual characteristics:

- Landform/Water—terrain creates broad benches, flat to rolling areas with rounded ridgetops and steep drainage cuts; long horizontal and diagonal lines; colors and textures generally obscured by aboveground buildings and structures, as well as vegetation.
- Vegetation—lawns and grasslands add low, smooth, simple, geometric to irregular forms with clusters of forest contributing medium to high, repetitive forms that add vertical context; regular horizontal and vertical, simple lines; vibrant to matte greens, tans, browns with pops of brilliant colors and subject to seasonal variation; smooth to coarse textures.
- Built Environment—residential, commercial, and industrial development adds rectilinear, geometric, definite, solid, multi-height, linear forms; bold, angular, horizontal, vertical, simple, hard lines; subtle to vivid, multiple hues (gray, white, blue, green, yellow, etc.); coarse to fine, patchy, ordered, discontinuous, and granular textures.

The primary viewer groups in Developed Landscape Units include area residents and motorists.

3.3.1.4 RIVER VALLEY LANDSCAPE UNITS

River Valley Landscape Units are similar to Rural Agriculture Landscape Units but have serpentine rivers (including in-stream lakes and other impoundments) as a focal feature of the valley. Figure 3.3-10, Figure 3.3-11, and Figure 3.3-12 show representative views of River Valley Landscape Units.

FIGURE 3.3-10 RIVER VALLEY LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Sheepskin Trail / Monongahela River Trail North, West Virginia / Pennsylvania border

FIGURE 3.3-11 RIVER VALLEY LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: Cheat Lake Trail south of Lake Lynn Power Station, West Virginia

FIGURE 3.3-12 RIVER VALLEY LANDSCAPE UNIT (REPRESENTATIVE VIEW 3)



Image location: Springfield Pike, Hampshire County, West Virginia

As shown on these figures, River Valley Landscape Units share the following visual characteristics:

- Landform/Water—broad, north-to-south oriented valleys; horizontal profile, flat to gentle slopes bordered by steeper inclines that define the valley; sinuous, meandering forms (rivers and lakes); horizontal lines across skyline with curvilinear lines delineating the transition from water to riparian vegetation; blue, gray, reflective colors (water); smooth textures; except for the river, most underlying terrain colors and textures obscured by vegetation and built features.
- Vegetation—forested areas appear as vertical, strips, and amorphous forms; broken and contiguous tall, rounded forms along rivers (riparian vegetation); open, wide, low, regular (grasslands and other scrub-shrubs areas) to irregular (forest canopies) horizontal lines; dominated by tan, green, brown, and other natural hues and subject to seasonal variation; fine to medium continuous patches of uniform textures.
- Built Environment—buildings/structures, roads, and energy infrastructure create definite, solid, geometric, hard, flat, repeating tall, vertical forms with straight to curvilinear horizontal and vertical lines; multiple colors (e.g., white, gray, tan, yellow, red, blue) and ordered, smooth, stippled, and sparse textures.

The primary viewer groups in River Valley Landscape Units may include area residents, recreationists, and motorists.

3.3.1.5 RURAL DEVELOPED LANDSCAPE UNITS

Rural Developed Landscape Units are similar to Developed Landscape Units but are smaller, less dense, and primarily aligned along a travel corridor interspersed with forested areas and/or agricultural fields. Figure 3.3-14, Figure 3.3-15, and Figure 3.3-15 show representative views of Rural Developed Landscape Units.

FIGURE 3.3-13 RURAL DEVELOPED LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Stewartstown Road, Monongalia County, West Virginia

FIGURE 3.3-14 RURAL DEVELOPED LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: West Virginia Route 26, Brandonville, West Virginia

FIGURE 3.3-15 RURAL DEVELOPED LANDSCAPE UNIT (REPRESENTATIVE VIEW 3)



Image location: Cedar Hill Road, Frederick County, Virginia

As shown on these figures, Rural Developed Landscape Units share the following visual characteristics:

- Landform/Water—terrain appears as rolling to flat, gentle to moderate slopes, narrow, and irregular forms with varied elevations and shapes (low hills, graded areas); long, soft horizontal and diagonal lines; colors and textures obscured by aboveground vegetation and structures.
- Vegetation—lawns, fields, remnant grasslands, individual trees, and patches of forest vegetation add low, flat, geometric bounded by tall, irregular, vertical, amorphous forms; regular, simple, soft, branching and repeating vertical lines with smooth to broken horizontal lines; mix of natural green hues with splashes of bright hues (e.g., red, pink, orange) and subject to seasonal variation; smooth to medium, patchy, discontinuous textures.
- Built Environment—dominated by buildings and structures that appear as low, geometric, smooth, regular forms; bold, straight, simple, vertical, and horizontal lines; multiple colors (e.g., white, gray, black, blue, yellow); smooth to medium, patchy, scattered textures.

The primary viewer groups in Rural Developed Landscape Units include area residents and motorists.

3.3.1.6 FORESTED RIDGES LANDSCAPE UNITS

Forested Ridges Landscape Units are similar to Forested Mountains Landscape Units, with different underlying landforms. Forested Ridges Landscape Units generally include long, narrow mountain ridges that are mostly oriented northeast to southwest, with native forest cover and occasional clusters of low-density development and linear infrastructure. Figure 3.3-16, Figure 3.3-16, and Figure 3.3-18 show representative views of Forested Ridges Landscape Units.

FIGURE 3.3-16 FORESTED RIDGES LANDSCAPE UNIT (REPRESENTATIVE VIEW 1)



Image location: Red Fern Lane, Hampshire County, West Virginia

FIGURE 3.3-17 FORESTED RIDGES LANDSCAPE UNIT (REPRESENTATIVE VIEW 2)



Image location: Northwestern Pike, Hampshire County, West Virginia

FIGURE 3.3-18 FORESTED RIDGES LANDSCAPE UNIT (REPRESENTATIVE VIEW 3)



Image location: Northwestern Pike, Hampshire County, West Virginia

As shown on these figures, Forested Ridges Landscape Units share the following visual characteristics:

- Landform/Water—underlying landform is low, long, narrow, linear, rounded; ridgelines form continuous, regular, horizontal lines across skyline; colors and textures obscured by vegetation in most areas.
- Vegetation—dominated by deciduous mixed forest with interspersed evergreen species; contiguous forested areas appear as rounded to amorphous forms on the landscape; individual trees and shrubs add multi-height amorphous, round, and conical forms; soft, feathered horizontal lines, and repeating vertical lines; mix of green hues with assorted browns and grays, medium to coarse textures, and seasonal variability.
- Built Environment—occasional buildings, roads, and other types of infrastructure add low, flat, smooth, tall, vertical linear and geometric forms; straight, vertical and horizontal, thin, slightly undulating horizontal lines; various colors; fine, smooth, directional (roads) and discontinuous (other sporadic structures), and stippled textures.

The primary viewer groups in Forested Ridges Landscape Units include area residents, motorists, and recreationists.

3.3.2 ALTERNATIVE ROUTE LANDSCAPE UNITS

The Alternative Routes generally cross the same types of landscape units as the Proposed Route (Figure 3.3-1). Table 3.3-1 lists the mileage of each landscape unit crossed by the Proposed Route and each Alternative Route.

TABLE 3.3-1 LANDSCAPE UNITS CROSSED BY THE PROPOSED ROUTE AND ALTERNATIVE ROUTES

Landscape Unit Type	Proposed Route		Alternative Route B		Alternative Route C		Alternative Route D		Alternative Route E		Alternative Route F	
	Count [a]	Miles [b]	Count [a]	Miles [b]	Count [a]	Miles [b]	Count [a]	Miles [b]	Count [a]	Miles [b]	Count [a]	Miles [b]
Rural Agricultural	33	35.6	33	33.7	31	40.2	43	39.1	33	35.3	39	43.4
Forested Mountains	22	45.8	25	45.6	18	50.0	31	50.1	22	44.8	28	53.3
Developed	2	0.2	2	0.2	4	0.7	1	0.2	2	0.2	3	0.7
River Valley	9	4.2	9	5.6	4	3.1	9	4.2	9	4.5	4	3.4
Rural Developed	10	4.1	12	5.0	6	2.2	10	4.1	11	4.3	10	2.9
Forested Ridges	18	17.4	19	17.1	18	17.4	17	17.4	15	17.1	16	15.4

[a] The count column indicates the number of landscape units crossed by each route.
[b] The miles column indicates the cumulative mileage of route within each type of landscape unit.

4. IMPACT ASSESSMENT

This section addresses the anticipated changes in visual resource conditions from the MARL Project. The changes are primarily focused on the Proposed Route, but similarities and differences with the Alternative Routes are also noted where applicable.

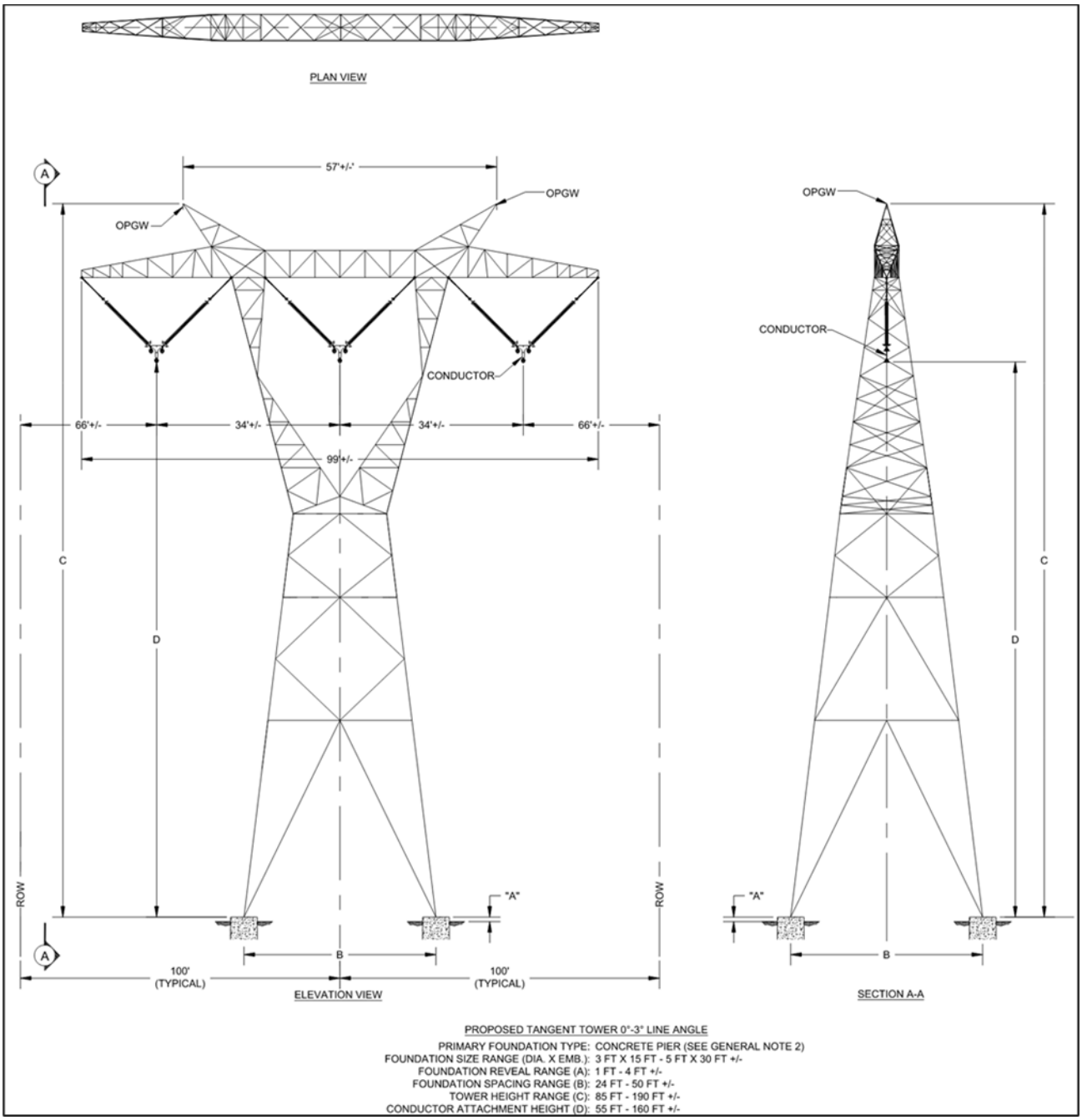
4.1 MARL PROJECT FEATURES

The MARL Project (Proposed Route) will include 452 new structures that will be primarily lattice steel structures ranging in height from 85 feet to 190 feet with an average structure height of 145 feet above ground level (final structure heights are subject to change based on final engineering design and exclude foundation reveal). Figure 4.1-1 displays a typical MARL Project lattice transmission line structure. The average distance between towers (span) will be 1,258 feet for the MARL Project, with the span between transmission structures depending on the type of structure used, as well as topography, ground elevation, and nearby constraints. The width of the ROW Corridor varies and ranges from 200 feet to 426 feet (average width of 289 feet) based on several factors including paralleling opportunities, greenfield areas, and aerial easement needs. The number of structures, average structure height, and average span length for the Alternative Routes vary but are generally similar to the Proposed Route (see Table 1.4-1 of the Routing Study).

Construction of the MARL Project would result in increased visibility of construction equipment and construction activity, particularly at road crossings and from open areas directly adjacent to the ROW Corridor. Clearing of trees in the ROW Corridor will also occur during the construction period. Construction impacts would be short-term and temporary and last only for the duration of construction, anticipated to be 24 months for the entire MARL Project, although construction at any single location along the Proposed Route will occur over multiple shorter periods of time during the overall construction period.

Once constructed, the new transmission line infrastructure would introduce tall, geometric structures and long, linear conductors to the landscape. Where visible, the transmission structures would create a series of repetitive, dominant vertical features that rise above the existing tree canopies and add new focal points that shift the vertical structure of the landscape. The conductors would appear as multiple undulating, overhead horizontal lines spanning the areas between transmission poles. The thin conductors would be most apparent in foreground views (less than 0.5 mile), in particular where they span open fields and roads with few to no screening features. In forested areas, the conductors would be better absorbed into the landscape and, at greater distances (into the middle ground and background), would be harder to discern against background features and the sky. The ROW Corridor would be most apparent in forested landscapes and areas, where the cleared ROW would modify the existing forms and lines in the vegetation and expose new areas to view.

FIGURE 4.1-1 TYPICAL MARL PROJECT LATTICE TRANSMISSION LINE STRUCTURE



OPGW = Optical Ground Wire; ROW = right-of-way

The Proposed Route and corresponding ROW Corridor were designed, in part, to maximize paralleling opportunities with existing high-voltage transmission lines where feasible. Aligning the MARL Project ROW Corridor with these existing transmission line corridors helps minimize visual impacts by repeating landscape elements that are already present (i.e., existing transmission structures and conductors), better absorbing these elements into the existing landscape. This approach also helps maintain existing vegetative screening, particularly in forested areas. Table 4.1-1 includes the total miles of paralleling opportunities for the Proposed Route and Alternative Routes, as well as the total length of each route.

TABLE 4.1-1 MILES OF PARALLELING OPPORTUNITIES BY ROUTE

State	Proposed Route	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Pennsylvania	2.3	2.3	16.9	2.3	2.3	16.9
West Virginia	27.7	31.7	18.5	27.7	22.1	10.9
Maryland	25.5	25.0	28.0	12.1	25.5	14.7
Virginia	1.0	0.7	1.0	1.0	1.0	0.7
Total Paralleling Miles [a]	**56.5**	**59.7**	**64.4**	**43.1**	**50.9**	**43.2**
Total Route Miles [b]	**107.5**	**107.3**	**113.6**	**115.2**	**106.3**	**119.1**

[a] Totals may not match the sum of addends due to rounding.
[b] This includes the centerline length for the Proposed Route and each Alternative Route (see Table 1.4-1 of the Routing Study).

Where the MARL Project will be located adjacent to an existing transmission line, the MARL Project ROW Corridor will generally abut the existing corridor. The additional clearing for the MARL Project ROW Corridor would primarily change vegetation features in these areas but may also expose additional areas of the underlying terrain to view. These changes would be most pronounced in forested landscapes and patches of dense forest cover in other types of landscape where tall trees and shrubs would be removed, thereby modifying the existing combination of forms, lines, and textures in the vegetation and terrain.

In addition, many of the existing high-voltage transmission lines that the MARL Project will parallel and abut lattice structures that are similar in design to the MARL Project's proposed towers (Figure 4.1-1). While the MARL Project towers may be taller (depending on final engineering design) and potentially more prominent on the landscape, they add similar forms, lines, colors, and textures to existing visual conditions. Some of the existing high-voltage transmission lines have short, paired H-frame wooden towers that are visually distinct from the MARL Project infrastructure. In these areas, the MARL Project would add new forms, lines, and colors to the existing landscape.

4.2 VIEWSHED ANALYSIS AND VISIBILITY

The GIS-based viewshed analysis (Section 2.4, Viewshed Analysis and Potential Visibility) identified the locations from which the Proposed Route may be visible. The viewshed mapping and corresponding figures are provided in Attachment 1, Viewshed Analysis Figures. The results indicate that approximately 11 percent of the viewshed area, inclusive of both foreground and middle ground regions, may potentially have views of one or more structures along the Proposed Route. The limited extent of potential visibility is largely due to the area's topography and forest cover, which provide effective screening.

The Proposed Route would be potentially visible across slightly more than 18 percent of the foreground (up to 0.5 mile from the Proposed Route centerline) and slightly less than 9 percent of the middle ground (0.5 to 2 miles from the Proposed Route centerline). In both the foreground and middle ground areas with potential visibility, most views are expected to reveal fewer than 12 structures.

Across the different landscape unit types (Section 3.3.1), potential foreground and middle ground visibility would be greatest in Rural Agricultural and Developed Landscape Units, while visibility would be most limited in the Forested Mountains and Forested Ridges Landscape Units. The different extents of screening vegetation and topography in landscape unit types account for these differences (i.e., there are fewer screening features in Rural Agricultural and Developed Landscape Units compared to Forested Mountains and Forested Ridges Landscape Units). Table 4.2-1 lists the extent of visibility (acres of potential visibility) in each landscape unit, while Table 4.2-2 shows the portion of each landscape unit where structures may be visible, by number of structures.

As indicated by the GIS-based viewshed model (Attachment 1 and Table 4.2-1), potential visibility of the Proposed Route would be greatest in the foreground. In foreground areas, the new transmission line infrastructure acts as focal points that draw the attention of viewers. At longer viewing distances (middle ground to background), the Proposed Route may be apparent but would be one of multiple potential focal points. Since potential visibility is greatest in the foreground, this area was also assessed to determine the number of locations with potential visibility and greatest sensitivity to changes in visual resource characteristics. For purposes of this assessment, these locations included road crossings, residences, parks, recreation sites, and other protected areas.

In general, visibility of the Proposed Route would be most pronounced at shorter distances (generally less than 0.5 mile). Views of the Proposed Route and changes to existing visual conditions would be greatest from within the cleared ROW Corridor, at road crossings, across open fields or other clearings, and from elevated areas with broad, panoramic views. Some segments of the Proposed Route and Alternative Routes would cross through forested areas (e.g., Forested Mountains and Forested Ridges Landscape Units) that generally provide a substantial amount of screening that would limit views. While the new transmission line may also be visible at greater distances (generally more than 0.5 mile), including from higher elevation areas that provide panoramic views of the regional landscape, its presence on the landscape would diminish at longer distances.

Ultimately, actual visibility of the MARL Project will be influenced by the existing terrain, vegetation, and the built environment in each landscape unit. For example, in Forested Mountains and Forested Ridges Landscape Units, dense vegetation and rugged terrain will help screen views of the transmission line (tall lattice towers and long, thin overhead conductors), limiting visibility primarily to road crossings and other foreground locations. In contrast, Rural Agricultural and Rural Developed Landscape Units offer broader sightlines, making the MARL Project structures more visually prominent and apparent from area roads, farm buildings, and residences sporadically located throughout the area.

TABLE 4.2-1 PROPOSED ROUTE POTENTIAL VISIBILITY BY LANDSCAPE UNIT TYPE AND VIEWING DISTANCE

Landscape Unit	Viewing Distances								
	Foreground			Middle Ground			Foreground and Middle Ground, Total [c]		
	Total Acres	Acres Visible [a]	Percent [b]	Total Acres	Acres Visible [a]	Percent [b]	Total Acres	Acres Visible [a]	Percent [b]
Rural Agriculture	22,716.2	8,314.3	36.6%	73,332.2	13,078.5	17.8%	96,048.4	21,392.8	17.8%
Forested Mountains	29,085.4	2,484.7	8.5%	83,499.1	1,747.4	2.1%	112,584.5	4,232.1	2.1%
Developed	695.2	219.9	31.6%	4,471.3	795.4	17.8%	5,166.5	1,015.3	17.8%
River Valley	2,584.1	438.1	17.0%	8,525.1	1,383.5	16.2%	11,109.2	1,821.6	16.2%
Rural Developed	3,147.8	587.2	18.7%	8,115.9	582.6	7.2%	11,263.7	1,169.7	7.2%
Forested Ridges	10,555.7	665.6	6.3%	30,651.7	308.3	1.0%	41,207.4	973.9	1.0%

[a] Acres within each distance zone for each landscape unit where the MARL Project (one or more structures) is potentially visible.
[b] Indicates the percentage of the viewing distance within each landscape unit where the proposed MARL Project would potentially be visible.
[c] Totals may not match the sum of addends due to rounding.

TABLE 4.2-2 STRUCTURES POTENTIALLY VISIBLE BY LANDSCAPE UNIT AND DISTANCE

Number of Structures Visible	Rural Agricultural (%)	Forested Mountains (%)	Developed (%)	River Valley (%)	Rural Developed (%)	Forested Ridges (%)
Foreground (Up to 0.5 mile from viewer)						
0 structures (no visibility)	63.4%	91.5%	68.4%	83.0%	81.3%	93.7%
1 to 11 structures	33.0%	7.4%	27.0%	16.7%	16.5%	6.0%
12 or more structures	3.6%	1.2%	4.6%	0.2%	2.1%	0.3%
Middle ground (0.5 to 2 miles from viewer)						
0 structures (no visibility)	82.2%	97.9%	82.2%	83.8%	92.8%	99.0%
1 to 11 structures	16.4%	1.8%	16.2%	16.2%	6.8%	1.0%
12 or more structures	1.5%	0.3%	1.6%	0.1%	0.3%	0.0%

Road crossings are a specific type of opportunity for foreground views of the MARL Project. Table 4.2-3 lists the number of road crossings for the Proposed Route, while Table 4.2-4 lists the total number of road crossings for the Proposed Route and Alternative Routes. At these crossings, the MARL Project would be visible and result in changes to vegetation forms and lines within the cleared ROW Corridor. The tall, geometric transmission structures and overhead undulating horizontal lines would also be highly perceptible at these crossings. The duration of these views (structure visibility) would depend on the speed and direction of travel for motorists on these roads.

TABLE 4.2-3 PROPOSED ROUTE ROAD CROSSINGS BY STATE

Road Category [a]	Number of Road Crossings				
	Pennsylvania	West Virginia	Maryland	Virginia	Total
Primary	1	0	1	0	2
Secondary	3	5	6	0	14
Tertiary	12	78	47	3	140
Total [a]	**16**	**83**	**54**	**3**	**156**

[a] Roads are categorized by function, as follows:
Primary Roads (arterials): Major, high-speed routes that connect larger towns and cities
Secondary Roads (collectors): Smaller, intermediate speed roads that connect towns/cities and arterials
Tertiary Roads (local): Small, low speed roads that provide access within towns/cities and properties and that connect to collectors.

TABLE 4.2-4 PROPOSED ROUTE AND ALTERNATIVE ROUTE ROAD CROSSINGS

Road Category [a]	Number of Road Crossings					
	Proposed Route	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Primary	2	2	2	2	2	2
Secondary	14	13	16	14	14	16
Tertiary	140	139	148	144	133	150
Total	**156**	**154**	**166**	**160**	**149**	**168**

[a] Roads are categorized by function, as follows:
Primary Roads (arterials): Major, high-speed routes that connect larger towns and cities
Secondary Roads (collectors): Smaller, intermediate speed roads that connect towns/cities and arterials
Tertiary Roads (local): Small, low speed roads that provide access within towns/cities and to properties and connect to collectors. In addition to road crossings, a number of parks, trails, protected areas, and other recreation sites and use areas are in the vicinity of the Proposed Route. Viewer groups in these areas may be more sensitive to changes in scenic conditions because there is an expectation of scenic quality (i.e., visitors expect a higher level of visual quality at these areas). Table 4.2-5 lists the parks, trails, and other protected areas that the Proposed Route ROW Corridor will cross. Other parks, trails, and protected areas in the vicinity of the Proposed Route may also have potential viewing opportunities of the Proposed Route. However, the distance and intervening topography, vegetation, and built environment would likely screen many of these viewing opportunities.

While private residences are not considered public use areas (i.e., areas from which the general public would have views of a project), area residents are typically a viewer group with higher levels of sensitivity to changes in visual resources. The MARL Project siting process treated private residences as a routing constraint to minimize potential impacts, including changes in visual resource conditions. Nonetheless, 151 private residences are within 500 feet of the Proposed Route, while 142 to 192 private residences are within 500 feet of the Alternative Routes, as shown in Table 4.2-6.

TABLE 4.2-5 PARKS, TRAILS, AND PROTECTED AREAS CROSSED BY THE PROPOSED ROUTE ROW CORRIDOR

State	Parks, Trails, and Protected Areas
Pennsylvania	• Upper Monongahela River Water Trail • Sheepskin Trail
West Virgina	• Cooper's Rock State Forest • White Horse Mountain WMA • Allegheny Trail • Patterson Creek Water Trail • American Discovery Trail • South Branch Potomac River • Cacapon River Water Trail
Maryland	• Youghiogheny River Lake • Dan's Mountain WMA • Savage River State Forest • Big Savage Mountain Trail • Dan's Mountain WMA Trail • Meadow Mountain Trail • Mountain Maryland Scenic Byway • Potomac Heritage National Scenic Trail
Virginia	• None

WMA = Wildlife Management Area

This proximity does not mean that these residents will have unobstructed views of the ROW Corridor and Proposed Route, but it increases the likelihood that changes in landscape conditions may be visible from these residences. There are additional individual and clusters of residential development in the vicinity of the Proposed Route. The Proposed Route would also potentially be visible from other clusters of residential development in the vicinity of the Proposed Route (beyond 500 feet); however, distance would help minimize potential viewing opportunities.

TABLE 4.2-6 PRIVATE RESIDENCES WITHIN 500 FEET OF THE ROUTE CENTERLINES

State	Number of Private Residences					
	Proposed Route	Alternative Route B	Alternative Route C	Alternative Route D	Alternative Route E	Alternative Route F
Pennsylvania	16	10	47	16	16	47
West Virginia	91	128	73	91	82	77
Maryland	40	50	37	59	40	56
Virginia	4	4	4	4	4	4
Total	**151**	**192**	**161**	**170**	**142**	**184**

4.3 SIMULATIONS AND CHANGES IN LANDSCAPE CHARACTERISTICS

To evaluate anticipated visual change, photographic simulations of the MARL Project were compared to photographs of existing conditions at 14 KOPs and AVs representing the landscape units along the Proposed Route. KOPs and AVs are intended to be a sample of common, representative views along the length of the MARL Project. The degree to which overhead transmission lines influence and are visible on a landscape depends on a number of factors, including (but not limited to) structure height, design, and color; existing landscape features (e.g., topography, vegetation, human-made development); duration of the view; the extent of transmission infrastructure visible; and distances from the viewer. The specific combination of these factors changes from location to location, contributing to a range of potential influences and impacts across the MARL Project Study Area. For example, a transmission line that is partially obscured by vegetation and topography and visible at a substantial distance would have less visual impact than an unobstructed transmission line viewed at close distance.

4.3.1 KEY OBSERVATION POINTS AND AERIAL VIEWS

KOPs present a view that casual observers could have from publicly accessible locations. AVs were used instead of KOPs in some areas because of the lack of public access in proximity to the Proposed Route (e.g., river corridors). While public access is limited in these areas, they represent sensitive VSRs and viewer groups (e.g., residents, recreationists). The 14 KOPs and AVs are displayed on Figure 4.3-1. The remainder of this section describes existing conditions and the visual impacts of the Proposed Route by KOP and AV, including small-scale versions of the panoramic existing conditions photographs and simulation images. Larger format panoramic photographs and simulations are provided in Attachment 2, Existing Conditions and Simulation Photographs.

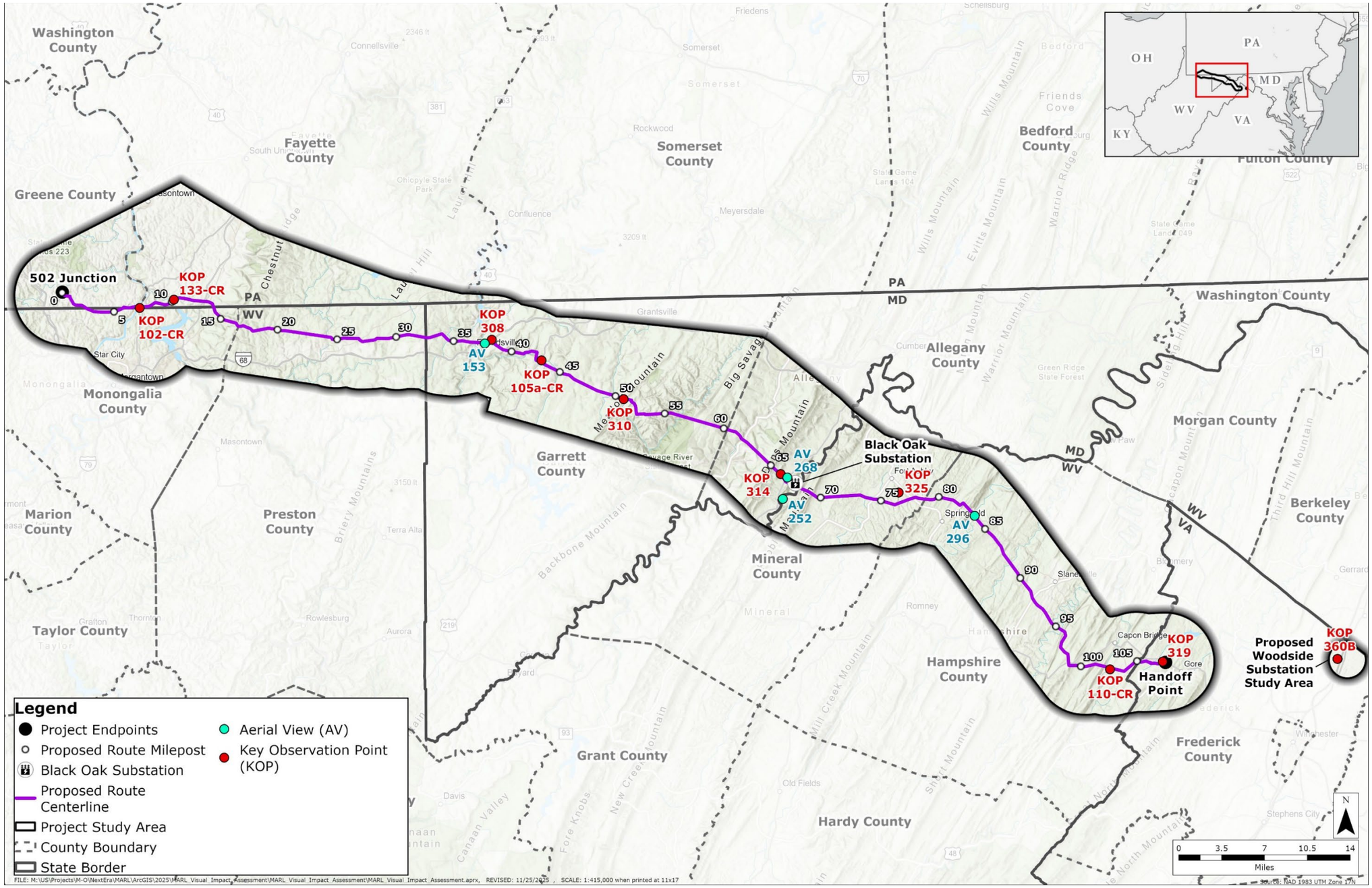
4.3.1.1 KOP 102-CR

KOP 102-CR is on the Monongahela River Trail / Sheepskin Trail and is less than 0.1 mile south of the Proposed Route (Alternative Routes B, D, and E share the same alignment as the Proposed Route in this area). The view is oriented to the north where the Monongahela River is visible through forest vegetation (Figure 4.3-2). The KOP is within and representative of a River Valley Landscape Unit.

From KOP 102-CR, the Proposed Route would be visible as it crosses the Monongahela River (Figure 4.3-3). Two transmission structures would be partially visible on the far side of the river (circled in red on Figure 4.3-3), and several conductors would be visible where they cross the river (circled in yellow on Figure 4.3-3). The existing trees in this location would obscure these features and make them difficult to discern at this distance.

Table 4.3-1 summarizes the existing visual characteristics of the landscape visible from KOP 102-CR, along with changes to these characteristics due to the Proposed Route.

FIGURE 4.3-1 KEY OBSERVATION POINTS AND AERIAL VIEWS



MD = Maryland; PA = Pennsylvania; VA = Virginia; WV = West Virginia

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FIGURE 4.3-2 KOP 102-CR EXISTING CONDITIONS



FIGURE 4.3-3 KOP 102-CR SIMULATED CONDITIONS WITH THE PROPOSED ROUTE

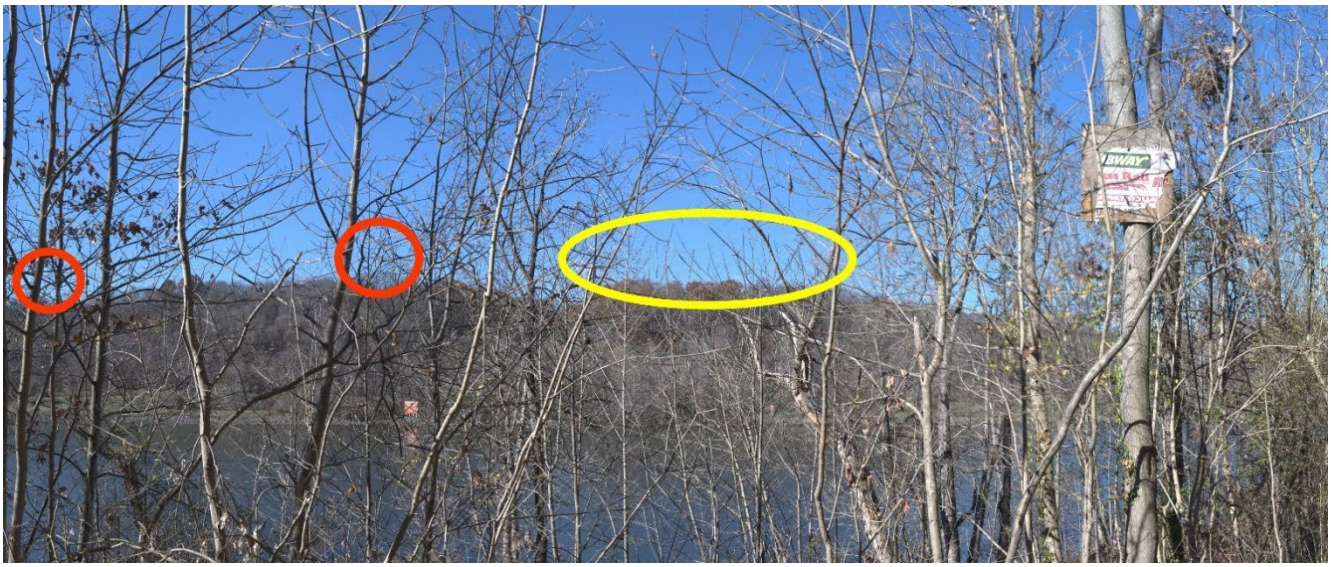

TABLE 4.3-1 KOP 102-CR LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Low, flat, rectangular forms; weak horizontal lines; blue-gray colors (Monongahela River); uniform, smooth textures	No change
Vegetation	Rounded, contiguous, strip forms (forested areas); simple horizontal and irregular vertical lines; brown, gray, tan, green colors (subject to seasonal variation); fine to medium, stippled textures	No change
Built Environment	Simple, geometric forms; straight lines; red, white, green colors (signage); fine, random textures	Tall, angular, geometric, linear forms; vertical, diagonal, parallel, horizontal lines; dull metallic, gray hues; fine, smooth texture

4.3.1.2 KOP 133-CR

KOP 133-CR is on Lake Lynn Road and is less than 0.1 mile to the south of the Proposed Route (Alternative Routes D and E share the same alignment as the Proposed Route in this area). The view is oriented to the north/northwest and includes forested areas on both sides of a paved, two-lane road that is bordered and crossed by two existing distribution lines (Figure 4.3-4). The KOP is within and representative of a River Valley Landscape Unit. While not in view, the Cheat River is to the west (left) of Lake Lynn Road.

FIGURE 4.3-4 KOP 133-CR EXISTING CONDITIONS



The Proposed Route would be visible from KOP 133-CR as it crosses Lake Lynn Road (Figure 4.3-5). A single transmission structure would be visible on the east (right) side of the road and multiple new overhead conductors would span the road. These new features would generally increase the level of visual clutter at this location. The Proposed Route would also require removal of trees on both sides of the road, opening direct views of the Cheat River and more distant areas to the left of the road.

FIGURE 4.3-5 KOP 133-CR SIMULATION CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-2 summarizes the existing visual characteristics of the landscape visible from KOP 133-CR, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-2 KOP 133-CR LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Simple, flat to angular forms (hills); weak diagonal lines; colors and textures obscured by vegetation and built features	Curving, rounded forms; simple, slightly curved, horizontal lines; subtle blue hue; fine, smooth, textures
Vegetation	Strip, amorphous, irregular, rounded forms (clusters of trees); vertical, branching, irregular horizontal lines; brown, tan, multiple green hues; fine to medium, continuous, stippled textures	New individual amorphous, patchy forms and changes to weak, branching lines; additional area of fine texture
Built Environment	Flat, strip, simple, linear, repeating forms (road and distribution lines); diagonal, straight to slightly curving, multiple, diagonal and vertical lines; light gray, brown, black colors; smooth, continuous, stippled textures	New tall, angular, geometric forms; additional parallel, diagonal lines; dull metallic, gray hues; fine, smooth texture

4.3.1.3 AV 153

AV 153 is taken from above Friendsville Addison Road and is less than 0.1 mile south of the Proposed Route (Alternative Routes D and E share the same alignment as the Proposed Route in this area; Alternative Route B also has a similar alignment as the Proposed Route but deviates as it approaches from the west in this area). The view is oriented to the west along an existing 138 kV transmission line and captures the Youghiogheny River as it flows between forested hills (Figure 4.3-6). While the view is not from the Youghiogheny River (e.g., boater or angler perspective from the river), it is intended to help characterize views from the river. The AV is within and representative of a River Valley Landscape Unit.

FIGURE 4.3-6 AV 153 EXISTING CONDITIONS



As shown on Figure 4.3-7, the Proposed Route would be visible in the expanded cleared ROW on both sides of the Youghiogheny River from AV 153. The wider ROW would further modify the forest cover in this area and increase the visibility of the underlying terrain. The transmission structures and overhead conductors would be visible within the expanded ROW Corridor. While the Proposed Route structures would be similar to the existing transmission line structures in the ROW, they would be larger (increased mass) and taller, resulting in increased prominence on the landscape. From the river (recreationist perspective), the new transmission line crossing would be similar to views at a road crossing; that is, the overhead conductors would be clearly visible above the river and the structures would be visible within the cleared ROW.

FIGURE 4.3-7 AV 153 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-3 summarizes the existing visual characteristics of the landscape visible from AV 153, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-3 AV 153 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Rolling, moderate, trapezoidal, strip, low forms (valley bounded by hills/mountains); regular, curvilinear, smooth, diagonal and horizontal lines; colors and textures generally obscured by vegetation and built features	No change
Vegetation	Simple, contiguous, transparent, amorphous, patch forms; weak diagonal, vertical, straight to irregular lines; brown, various green hues; fine to medium, directional, continuous, contrasting textures	Additional lines and change in contrasting textures
Built Environment	Low, angular to curving, geometric, linear forms; straight, diagonal, parallel, simple lines; gray, brown, white colors; fine, patchy, ordered, sparse, scattered textures	New tall, angular, geometric, forms; additional parallel lines; dull metallic, gray hues; fine, smooth texture

4.3.1.4 KOP 308

KOP 308 is from the Youghiogheny Overlook Welcome Center on Interstate 68. It is 0.2 mile north of the Proposed Route (Alternative Routes B, D, and E share the same alignment as the Proposed Route in this area; Alternative Routes C and F also cross through this area along a separate alignment). The view is oriented to the southwest and includes a portion of the access road and parking area at the overlook, a walking path, signs, a forested hillside, and an existing 115 kV transmission line and cleared ROW (Figure 4.3-8). The KOP is within and representative of a Forested Mountains Landscape Unit.

FIGURE 4.3-8 KOP 308 EXISTING CONDITIONS



The Proposed Route would not be visible from KOP 308, due to distance, intervening topography, and the presence of tall, mature trees that limit more extensive southwestern views of the landscape from this location. Table 4.3-4 summarizes the existing visual characteristics of the landscape visible from KOP 308.

TABLE 4.3-4 KOP 308 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Domed, simple, sloped forms (mountains); weak, curving lines; colors and textures obscured by vegetation and built environment	No change
Vegetation	Amorphous, tall, irregular, strip, patch forms (dense forested areas); horizontal and vertical, branching, curving lines; green, brown, red, yellow colors; smooth, fine to medium, discontinuous, clumped textures	No change
Built Environment	Definite, flat, solid, geometric, linear, directional forms (parking area, road, pathway); bold, regular, straight and curving, diagonal, vertical, simple lines; gray, tan, dull metallic, white, yellow, red, blue colors; fine, smooth, stippled textures	No change

4.3.1.5 KOP 105A-CR

KOP 105a-CR is on U.S. Route (US) 219 (Garrett Highway) and is 0.2 mile north of the Proposed Route (Alternative Routes B, C, and E share the same alignment as the Proposed Route in this area). The view is oriented to the south/southwest along the road corridor, which marks the transition between a Forested Mountains Landscape Unit to the west and a Rural Agricultural Landscape Unit to the east (Figure 4.3-9). An existing set of overhead conductors is visible across the highway.

FIGURE 4.3-9 KOP 105A-CR EXISTING CONDITIONS



From KOP 105a-CR, the Proposed Route would be visible as it crosses Garrett Highway (Figure 4.3-10). The cleared ROW Corridor would also be visible on the east (left) side of the highway. A single transmission structure would be partially visible through the trees along the ridge on the left side of the highway (circled in red on Figure 4.3-10). Several parallel overhead conductors would also be visible above the highway corridor and over adjacent trees.

FIGURE 4.3-10 KOP 105A-CR SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-5 summarizes the existing visual characteristics of the landscape visible from KOP 105a-CR, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-5 KOP 105A-CR LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Gentle, rolling, sloped forms (hills); horizontal and diagonal lines; colors and textures obscured by vegetation and built features	No change
Vegetation	Dense, rounded, conical, and amorphous forms (forest); weak vertical, branching, irregular horizontal lines; brown, tan, multiple green hues; fine to medium, continuous, stippled textures	New low, flat form; diagonal lines; light green color; directional, smooth texture
Built Environment	Prominent, flat, simple, linear, geometric to curving forms (road); regular, continuous, straight, and curving lines; gray, brown, white, yellow colors; smooth, directional, ordered textures	New tall, angular, geometric forms; additional parallel, horizontal lines; dull metallic, gray hues; fine, smooth texture

4.3.1.6 KOP 310

KOP 310 is on the Potomac Heritage National Scenic Trail and is less than 0.1 mile south of the Proposed Route (Alternative Routes B, C, and E share the same alignment as the Proposed Route in this area). The view is oriented to the northwest along an existing ROW. The cleared ROW creates an open area in the densely forested landscape within which an existing 500 kV transmission line is prominent (Figure 4.3-11). The elevation and topography at this existing ROW crossing provide trail users a broad, long-distance view of the landscape from KOP 310. The KOP is within and representative of a Forested Mountains Landscape Unit.

FIGURE 4.3-11 KOP 310 EXISTING CONDITIONS



The Proposed Route would be visible within the expanded ROW to the right of the existing transmission line at KOP 310 (Figure 4.3-12). Multiple transmission structures and overhead conductors would be visible and would contribute additional visual elements that are similar to the existing transmission line in this area. The expanded ROW would expose new areas of the underlying terrain and open broader views of the regional landscape. These changes would be most pronounced for trail users from within the expanded ROW and would likely be minimal from within the adjacent forested areas where dense tree cover would help screen the new transmission line.

FIGURE 4.3-12 KOP 310 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-6 summarizes the existing visual characteristics of the landscape visible from KOP 310, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-6 KOP 310 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Indistinct, rolling, low, simple forms (mountains); weak horizontal and diagonal lines; gray colors; fine to medium, patchy textures (most colors and textures obscured by vegetation)	No change
Vegetation	Strip, patch, continuous, amorphous, short to tall forms (forest and cleared ROW); weak horizontal, short vertical, branching lines; green, brown, tan, white colors; fine to medium, stippled textures	Additional short, flat forms and subtle changes to lines and textures
Built Environment	Tall, angular, geometric, linear, flat forms (transmission line); regular, straight, undulating, parallel, diagonal, horizontal lines; gray, dull metallic colors; fine, smooth, stippled textures	Additional tall, angular, geometric, linear forms; additional parallel, horizontal lines; additional dull metallic, gray hues; additional fine, smooth textures

ROW = right-of-way

4.3.1.7 KOP 314

KOP 314 is on Middle Ridge Road at the edge of the existing cleared ROW that descends Dan's Mountain from the northwest and continues to the southeast. The Proposed Route is less than 0.1 mile east of KOP 314 (the five Alternative Routes share the same alignment as the Proposed Route in this area; Alternative Routes D and F approach this area from the north but then follow the same northwest to southeast alignment as the other routes in this area). The view is oriented to the northwest and includes an existing cleared ROW, high-voltage transmission line, and dense forested areas (Figure 4.3-13). Attachment 2 provides a second view to the southeast at this KOP. The KOP is within and representative of a Forested Mountains Landscape Unit.

FIGURE 4.3-13 KOP 314 EXISTING CONDITIONS



From KOP 314, the Proposed Route would be visible within the expanded ROW to the left of the existing transmission line (Figure 4.3-14). Multiple transmission structures and overhead conductors would be visible and would contribute additional visual elements that are similar to the existing transmission line in this area. The expanded ROW would expose new areas of the underlying terrain and open views to a broader area. These changes would be most pronounced from within the expanded ROW and would likely be minimal from within the adjacent forested areas where dense tree cover would help screen the new transmission line.

FIGURE 4.3-14 KOP 314 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-7 summarizes the existing visual characteristics of the landscape visible from KOP 314, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-7 KOP 314 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Rolling, domed, simple forms (mountains); weak horizontal and diagonal lines; gray, tan colors; fine to medium, patchy textures (most colors and textures obscured by vegetation)	No change
Vegetation	Strip, block, continuous, amorphous, short to tall forms (forest and cleared ROW); irregular horizontal, repetitive vertical, branching lines; green, brown, tan, red colors; fine to medium, stippled textures	Additional short, flat forms and subtle changes to lines and textures
Built Environment	Tall, angular, geometric, linear, flat forms (transmission line); regular, straight, undulating, parallel, diagonal, horizontal lines; gray, dull metallic colors; fine, smooth, stippled textures	Additional tall, angular, geometric, forms; additional parallel, undulating, horizontal lines; additional dull metallic, gray colors; additional fine, smooth textures

ROW = right-of-way

4.3.1.8 AV 268

AV 268 is taken from above US 220 (McMullen Highway) and is nearly 0.4 mile east of the Proposed Route (the five Alternative Routes share the same alignment as the Proposed Route in this area; Alternative Routes D and F approach this area from the north but then follow the same northwest to southeast alignment as the other routes). This AV shows an existing transmission line and cleared ROW as it descends the forested slope of Dan's Mountain from the west/ northwest and continues to the east/southeast (Figure 4.3-15). Another utility ROW runs left-to-right across the view, crossing the existing transmission line perpendicularly. The view is intended to help characterize visual resource conditions within a densely forested, mountainous area. KOP 314 is nearby and provides a land-based perspective in this type of landscape (Section 4.3.1.7, KOP 314). AV 268 is within and representative of a Forested Mountains Landscape Unit.

FIGURE 4.3-15 AV 268 EXISTING CONDITIONS



From AV 268, the Proposed Route would be clearly visible within the expanded ROW through the forested eastern slope of Dan's Mountain (Figure 4.3-16). The MARL Project would add a second set of transmission structures and long, undulating overhead conductors to the expanded ROW in this area. As noted in KOP 314 (Section 4.3.1.7), from within the cleared ROW, the additional transmission line structures would be prominent on the landscape; however, views of any changes in visual resource conditions due to the Proposed Route would be minimal from other nearby locations within the adjacent forest, because of the dense tree cover and area topography.

FIGURE 4.3-16 AV 268 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-8 summarizes the existing visual characteristics of the landscape visible from AV 268, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-8 AV 268 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with MARL Project
Topography	Prominent, rolling, domed, steep, tall, solid forms (mountains); regular, curving, horizontal, diagonal, continuous lines; light gray, white colors (largely obscured by vegetation and built environment); fine, smooth, dotted textures	No change
Vegetation	Weak, contiguous, amorphous to geometric forms (forest, cleared ROW, and lawns); curving, simple, straight lines; brown, tan, gray, green colors; smooth, medium, continuous textures	Additional low, flat forms and similar lines, colors, and textures
Built Environment	Short to tall, bold, angular, regular, geometric, linear, simple forms (transmission line and homes); bold, straight, diagonal, thin, simple, parallel lines; gray, dull metallic, brown, black, white, green colors; scattered, fine to medium, stippled, smooth textures	Additional tall, angular, geometric, linear forms; additional parallel, horizontal lines; similar dull metallic, gray hues; additional fine, smooth, stippled textures

ROW = right-of-way

4.3.1.9 AV 252

AV 252 is taken from above Gerstell Road and is 1.5 miles southwest of the Proposed Route (all five Alternative Routes share the same alignment as the Proposed Route in this area). The view is oriented to the northeast within a wide agricultural valley bordered by forested mountains (Figure 4.3-17). The North Branch of the Potomac River flows across the valley before turning to the north along the eastern (right) side of the valley. A series of existing high-voltage transmission lines connected to the existing Black Oak Substation cross the valley from west (left) to east (right). The view is intended to help characterize the view from the North Branch of the Potomac River, as well as for residents within the valley. The AV is within and representative of a Rural Agricultural Landscape Unit that is bordered by Forested Mountains Landscape Units.

FIGURE 4.3-17 AV 252 EXISTING CONDITIONS



The Proposed Route would be clearly visible as it spans the open agricultural valley and forested mountains visible from AV 252 (Figure 4.3-18). The additional transmission structures and long, undulating overhead conductors would repeat the visual elements created by the existing high-voltage transmission lines already present on the landscape in this area. Clusters of trees may help screen the Proposed Route from the North Branch of the Potomac River and other land-based locations within the agricultural valley. The new transmission line infrastructure would nonetheless be prominent on the landscape, due to the open nature of the valley and contrasting slopes of the adjacent mountains.

FIGURE 4.3-18 AV 252 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-9 summarizes the existing visual characteristics of the landscape visible from AV 252, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-9 AV 252 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Bold, flat, triangular, trapezoidal, contrasting, concave, directional forms (valley bordered by mountains); straight, diagonal, curvilinear, angular, continuous lines; deep/dark blue; fine, smooth textures (most colors and textures obscured by vegetation and built features	No change
Vegetation	Strip, patch, contiguous, amorphous, contrasting forms (fields, riparian vegetation, forests); weak, curvilinear, vertical, irregular horizontal, continuous lines; tan, brown, green, white colors; fine to medium, patchy, ordered, contrasting textures	Subtle changes in patchy forms and irregular horizontal lines
Built Environment	Tall, angular, geometric, linear, directional forms (transmission lines, substation, road); regular, straight to curving, angular, simple, parallel, undulating, continuous lines; light gray, green, dull metallic, white colors; smooth, stippled, sparse textures	Additional tall, angular, geometric, linear forms; additional parallel, undulating, horizontal lines; additional dull metallic, gray hues; additional fine, smooth textures

4.3.1.10 KOP 325

KOP 325 is located on Painter Hollow Road adjacent to Painter Run/Fort Ashby Dam. It is slightly more than 0.8 mile north of the Proposed Route (Alternative Routes B, C, and D share the same alignment as the Proposed Route in this area). The view is oriented to the south and shows Painter Hollow Road as it heads to the south behind a small hill, a portion of the gravel parking area/fishing access at Fort Ashby Dam, and forested hillsides. Painter Run is partially visible through the trees bordering the reservoir (right side of Figure 4.3-19). The KOP is within and representative of a Forested Mountains Landscape Unit.

FIGURE 4.3-19 KOP 325 EXISTING CONDITIONS



From KOP 325, the Proposed Route would be partially visible. Two transmission structures would be mostly obscured but perceptible behind trees on both sides of Painter Hollow Road (circled in red on Figure 4.3-20). A portion of the new overhead conductors would also be visible above the trees where Painter Hollow Road curves to the right (circled in yellow on Figure 4.3-20).

FIGURE 4.3-20 KOP 325 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-10 summarizes the existing visual characteristics of the landscape visible from KOP 325, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-10 KOP 325 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Steep, domed, flat forms (hills and lake); diagonal, smooth, straight, horizontal lines; brown, tan, black, dark green colors; fine, smooth textures	No change
Vegetation	Strip, conical, amorphous, diverse forms (trees and other ground vegetation); irregular, horizontal, vertical, branching lines; green, brown, tan colors; fine to medium, patchy, discontinuous, stippled textures	No change
Built Environment	Definite, flat, solid, low, curving forms (road and parking area); curvilinear, continuous, directional lines; gray, yellow colors; smooth, continuous textures	New angular, geometric forms; new thin, horizontal lines; new dull metallic, gray hues; new fine, smooth textures

4.3.1.11 AV 296

AV 296 is taken from above Springfield Pike and is less than 0.1 mile east of the Proposed Route (Alternative Routes B, C, and D share the same alignment as the Proposed Route in this area). The view is oriented to the northwest along an existing 138 kV transmission line and captures the South Branch Potomac River as it flows between forested ridges (Figure 4.3-21). An existing 500 kV ROW is also visible on the right (north) side of the image. While the view is not from the South Branch Potomac River (e.g., boater, angler, private camp perspectives), it is intended to help characterize views from and along the river. The AV is within and representative of a River Valley Landscape Unit, as well as adjacent Forested Ridge Landscape Units that border the river valley.

The Proposed Route would be clearly visible from AV 296 as it descends in a new cleared ROW through the forested eastern/southeastern slope of the White Horse Mountain Wildlife Management Area and then crosses the South Branch Potomac River (Figure 4.3-22). It would add another cleared ROW and set of transmission structures and long, undulating overhead conductors to the landscape in this area. The new transmission infrastructure would be similar in appearance to the existing 500 kV route and would be larger and more prominent than the existing 138 kV route to the south (left). From the river (recreationist perspective), the new transmission line crossing would be similar to the other nearby transmission line crossings; that is, the overhead conductors would be clearly visible above the river, and the structures would be visible within the cleared ROW.

Table 4.3-11 summarizes the existing visual characteristics of the landscape visible from AV 296, along with changes to these characteristics due to the Proposed Route.

FIGURE 4.3-21 AV 296 EXISTING CONDITIONS



FIGURE 4.3-22 AV 296 SIMULATION CONDITIONS WITH THE PROPOSED ROUTE



TABLE 4.3-11 AV 296 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Rolling, rounded, flat, tall, directional forms (river valley bordered by mountains); horizontal, curving, simple lines; dark green/blue, gray colors; fine, smooth, sparse granular textures	No change
Vegetation	Solid, linear, strip, amorphous forms (fields and forest); bold, straight, irregular, continuous lines; green, brown, light gray, tan colors; fine to medium, continuous, contrasting textures	Additional low, flat forms and similar lines, colors, and textures
Built Environment	Angular, geometric, linear, low, directional forms (transmission lines, buildings); short to long, straight and curving, simple, continuous lines; gray, dull metallic, white, blue, green colors; scattered, fine to medium, stippled, smooth textures	Additional tall, angular, geometric, linear forms; additional parallel, horizontal lines; additional dull metallic, gray hues; additional fine, smooth textures

4.3.1.12 KOP 110-CR

KOP 110-CR is on Christian Church Road and is less than 0.2 mile south of the Proposed Route (all five Alternative Routes share the same alignment as the Proposed Route in this area). The view is oriented to the northwest and includes a narrow two-lane road, agricultural fields, clusters of trees, residential and farm structures, and a distribution line (Figure 4.3-23). The KOP is within and representative of a Rural Agricultural Landscape Unit.

FIGURE 4.3-23 KOP 110-CR EXISTING CONDITIONS



From KOP 110-CR, the Proposed Route would be visible as it crosses from west (left) to east (right) across Christian Church Road and the adjacent open fields (Figure 4.3-24). Some of the new transmission structures would be mostly screened by existing trees (left side of Christian Church Road), while the tops of other structures would be visible above the existing tree canopy (circled in red on Figure 4.3-24). The long, thin overhead conductors would be visible as they cross the open areas between clusters of forest vegetation. The cleared ROW would create several new gaps in the clusters of forest vegetation on the right side of the view that would be visible from this location.

FIGURE 4.3-24 KOP 110-CR SIMULATED CONDITIONS WITH THE PROPOSED ROUTE



Table 4.3-12 summarizes the existing visual characteristics of the landscape visible from KOP 110-CR, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-12 KOP 110-CR LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with MARL Project
Topography	Gentle, rounded forms (hills); weak horizontal lines; colors and textures obscured by vegetation and built features	No change
Vegetation	Wide, rolling, low forms with tall, irregular, patches(fields and clusters of trees); weak, slightly curving and weak, irregular vertical lines; green, tan, and brown colors; fine to medium, discontinuous textures	Subtle changes to patchy forms
Built Environment	Flat, strip, simple, geometric and linear forms (road and distribution line); diagonal, slightly rounded, vertical lines; gray, white, light tan, black colors; smooth, continuous textures	Additional tall, angular, linear forms; additional parallel, horizontal lines; dull metallic, gray hues; fine, smooth textures

4.3.1.13 KOP 319

KOP 319 is on Parishville Road and is slightly more than 0.1 mile north of the Proposed Route (all five Alternative Routes share the same alignment as the Proposed Route in this area). The view from this location is oriented to the southwest and includes a two-lane road, the Gore Substation, a cell phone tower, several transmission and distribution lines, and a grassy hillside with clusters of forest vegetation (Figure 4.3-25). The KOP is within and representative of a Rural Agricultural Landscape Unit.

FIGURE 4.3-25 KOP 319 EXISTING CONDITIONS



The Proposed Route would be visible as it crosses Parishville Road and continues past the substation to the south (left) of the road (Figure 4.3-26). A single new transmission structure (circled in red on Figure 4.3-26) would be partially visible behind several distribution poles and substation structures. The MARL Project's overhead conductors would be visible crossing Parishville Road and then continuing to the east (left) with other existing overhead conductors (circled in yellow on Figure 4.3-26). The MARL Project's new transmission structure and conductors would be similar in appearance to the existing transmission, substation, and distribution infrastructure on the landscape at this KOP.

FIGURE 4.3-26 KOP 319 SIMULATED CONDITIONS WITH THE PROPOSED ROUTE

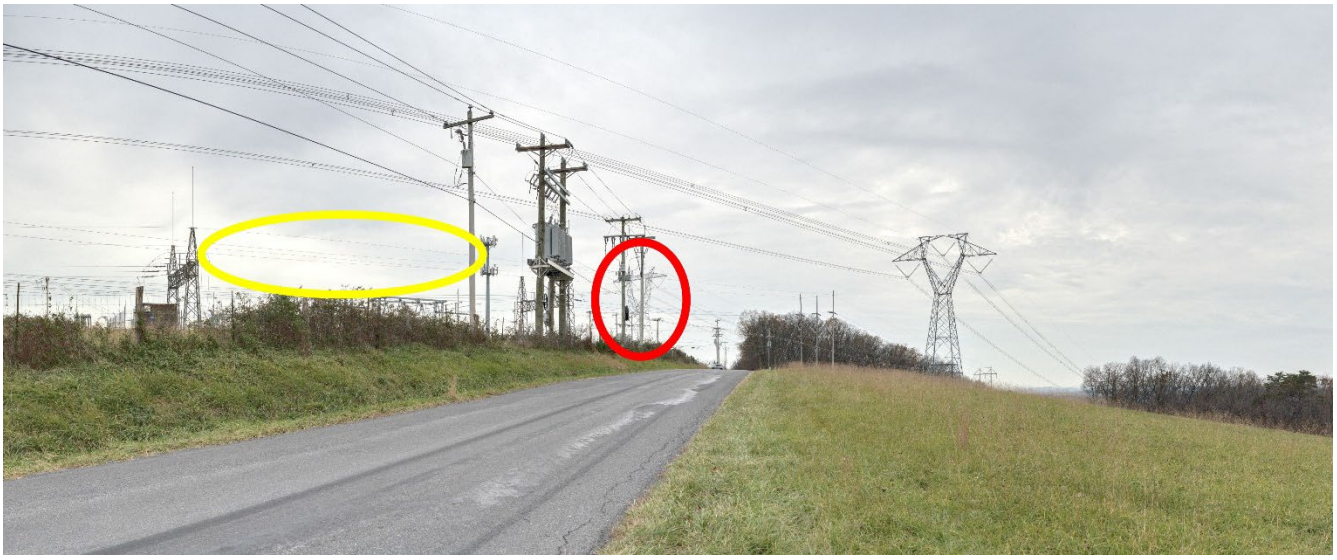

Table 4.3-13 summarizes the existing visual characteristics of the landscape visible from KOP 319, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-13 KOP 319 LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Proposed Route
Topography	Rolling, domed, simple, regular forms (hills); horizontal, diagonal lines; colors and textures obscured by vegetation and built environment	No change
Vegetation	Low, simple, patch, block, amorphous forms (fields and clusters of trees); weak, vertical, branching, discontinuous, irregular lines; green, tan, brown colors; fine to medium, patchy textures	No change
Built Environment	Tall, repeating, angular, geometric, linear, cylindrical forms (transmission line, substation, and road); straight, parallel, vertical, diagonal, continuous lines; gray, light brown, dull metallic colors; smooth to rough, ordered, stippled textures	Additional tall, angular, geometric, linear forms; additional parallel, horizontal lines; additional dull metallic, gray colors; additional smooth, stippled textures

4.3.1.14 KOP 360B

KOP 360B is on Thistle Lane, which runs along the southern side of the proposed Woodside Substation property. The view from this KOP is oriented to the northeast across an open field that is crossed by two existing transmission lines. The KOP is within and representative of a Rural Agricultural Landscape Unit.

FIGURE 4.3-27 KOP 360B EXISTING CONDITIONS



The Woodside Substation would be prominent in the view from KOP 360B (Figure 4.3-28). Multiple substation structures and facilities, as well as a retention pond and a support building outside of the walled footprint of the substation would be visible. While the existing transmission lines have similar visual elements as MARL Project elements, the new substation would add multiple new elements and would substantially increase the extent of energy infrastructure on the landscape in this area.

FIGURE 4.3-28 KOP 360B SIMULATED CONDITIONS WITH THE WOODSIDE SUBSTATION



Table 4.3-14 summarizes the existing visual characteristics of the landscape visible from KOP 360B, along with changes to these characteristics due to the Proposed Route.

TABLE 4.3-14 KOP 360B LANDSCAPE CHARACTERISTICS

Landscape Feature	Existing Conditions	Conditions with Woodside Substation
Topography	Flat, low forms (terrain); weak horizontal lines; colors and textures obscured by vegetation and built environment	Similar low, flat forms; strong horizontal lines; colors and textures remain obscured by vegetation and the built environment
Vegetation	Rounded, amorphous, clump, low, strip forms (field and clumps of trees); irregular, horizontal, curving lines; brown, tan, multiple green hues; soft, fine, continuous, clumped textures	Low, flat, small clusters, strip, simple, forms; weak diagonal, irregular horizontal; tan, green colors; smooth, fine, clumped, subtle textures
Built Environment	Tall, angular, geometric, linear, parallel, undulating, vertical, horizontal lines (transmission lines and gravel road); light to dark gray, dull metallic colors; fine, smooth, ordered, stippled textures	Solid, definitive, tall, linear, geometric, tall, angular, geometric, repetitive forms; additional horizontal, vertical, diagonal lines; multiple gray and dull metallic hues; fine, smooth, ordered textures

4.3.2 IMPACT ASSESSMENT BY LANDSCAPE UNIT

Based on the visual characteristics of the Proposed Route infrastructure (Section 4.1, MARL Project Features) and the anticipated changes in visual resource conditions (Section 4.3.1, Key Observation Points and Aerial Views), this section describes the permanent changes that are anticipated from the Proposed Route in each landscape unit type. These descriptions are centered on typical landscape characteristic changes resulting from the Proposed Route. While the descriptions are not intended to represent a view from a specific location, they are representative of the visual changes that may be expected at locations with Proposed Route visibility throughout each landscape unit. The descriptions are focused on the Proposed Route, but similar visual resource changes would also be expected from the Alternative Routes in each landscape unit.

4.3.2.1 RURAL AGRICULTURAL LANDSCAPE UNITS

Because the Rural Agricultural Landscape Unit type is characterized by flat, open areas between low mountains, the addition of the MARL Project would introduce new, large-scale, visually prominent features to the landscape unit. The changes in visual characteristics of Rural Agricultural Landscape Units due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—existing vegetation patterns would be disrupted by vegetation clearing within the ROW Corridor, introducing new linear gaps with altered colors and textures, particularly in areas with clusters of trees and other taller vegetation; low, agricultural vegetation would remain unchanged.
- Built Environment—addition of tall, metallic towers with dominant vertical and geometric forms, spaced at regular intervals, and extending linearly across the landscape; introduction of thin, undulating horizontal lines.

These changes would generally decrease the scenic integrity of the landscape and would be most pronounced in areas without existing transmission line infrastructure.

4.3.2.2 FORESTED MOUNTAINS LANDSCAPE UNITS

Forested Mountains Landscape Units benefit from varied terrain and dense forest cover, both of which tend to screen and help limit the visibility of changes in visual resource characteristics from the Proposed Route. The changes in visual characteristics of Forested Mountains Landscape Units due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—new, wide, linear gaps with distinct edges that break up the continuity of dense forest vegetation; modifications to the forms, lines, and textures of the vegetation in the ROW Corridor.
- Built Environment—introduction of tall, metallic towers with dominant vertical and geometric forms extending linearly across the landscape would contrast with the organic forms of adjacent forest areas; addition of thin, undulating, horizontal overhead lines.

The ROW Corridor and repetitive structures would decrease the scenic integrity of the landscape by creating new visual intrusions into the forested landscape. Changes to visual characteristics would be most prominent within or near the cleared ROW Corridor, as well as from nearby elevated locations that provide a broader view of the landscape. Forest vegetation would limit views of the ROW Corridor (and thus of changes to visual characteristics) from other areas. These changes would be less apparent in areas with existing transmission line infrastructure.

4.3.2.3 DEVELOPED LANDSCAPE UNITS

Because Developed Landscape Units are dominated by cleared lands with high levels of development, the introduction of new and/or additional transmission line infrastructure would be more compatible with the existing landscape characteristics than in more natural-appearing landscape units such as Forested Mountains. The changes in the characteristics of these more visually complex landscapes due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—new gaps in taller vegetation, such as ornamental trees and pockets of remnant forests; changes to forms, lines, and textures in the cleared ROW Corridor.
- Built Environment—addition of tall, highly visible metallic towers with vertical and geometric forms that may conform to or be somewhat consistent with existing structures and development patterns; addition of thin, undulating, horizontal overhead lines above existing buildings; in more densely developed areas, the addition of new transmission line structures and conductors may be partially absorbed into the complex built environment, but in more suburban areas or locations at the edge of development, the transmission infrastructure may be more visually prominent and reduce the visual cohesion of the landscape.

In general, the cleared ROW Corridor and new transmission infrastructure would be more compatible with the scenic integrity of the landscape in Developed Landscape Units than in other landscape units. The new infrastructure would be similar to some existing landscape elements but may be more prominent because of its mass and height.

4.3.2.4 RIVER VALLEY LANDSCAPE UNITS

River Valley Landscape Units are similar to Rural Agricultural Landscape Units. The introduction of transmission infrastructure in these areas would add prominent linear and vertical elements that contrast with the landscape's horizontal orientation and visual character. The Proposed Route often crosses this landscape unit perpendicular to the general direction of each valley (including the river and road features that define each valley), making MARL Project components more prominent in these areas. The changes in visual characteristics of River Valley Landscape Units due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—existing vegetation patterns would be disrupted by vegetation clearing within the ROW Corridor, introducing new linear gaps with altered colors and textures, particularly in areas with clusters of trees and other taller vegetation, including riparian areas.

- Built Environment—addition of tall, metallic towers with dominant vertical and geometric forms spaced at regular intervals and extending linearly across the landscape; introduction of thin, undulating horizontal lines; in visually open areas, including river crossings, the transmission infrastructure would be a dominant visual feature that introduces forms, lines, and colors that contrast with the surrounding natural environment.

These changes would generally decrease the scenic integrity of the landscape and would be most pronounced in areas without existing transmission line infrastructure. Except in riparian habitat exclusion zones in Maryland and West Virginia, the trimming and removal of trees and other taller riparian vegetation would be visible and would potentially affect the recreational experience of river users by reducing the sense of natural enclosure within the river corridor.

4.3.2.5 RURAL DEVELOPED LANDSCAPE UNITS

Rural Developed Landscape Units have a blend of human-altered and natural landscape features, with varied landscape elements and visual complexity. The addition of new transmission line infrastructure would introduce new vertical and linear built elements that may contrast with the form and scale of the existing landscape. The changes in the visual characteristics of Rural Developed Landscape Units due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—existing vegetation patterns would be disrupted by vegetation clearing within the ROW Corridor, introducing new linear gaps with altered colors and textures, particularly in areas with clusters of trees and taller shrubs; any new breaks in taller vegetation would reduce screening, modify vegetative patterns, and increase the visibility on the landscape.
- Built Environment—addition of tall, metallic towers with dominant vertical and geometric forms spaced at regular intervals and extending linearly across the landscape; introduction of thin, undulating horizontal lines; a higher degree of compatibility in more developed areas with similar landscape elements, but scale and height of new infrastructure would make it a prominent feature across the landscape unit.

The anticipated changes from the Proposed Route would generally decrease the scenic integrity of Rural Developed Landscape Units, in particular in areas with less development.

4.3.2.6 FORESTED RIDGES LANDSCAPE UNITS

Forested Ridges Landscape Units are similar to Forested Mountains Landscape Units. The changes in the visual characteristics of Forested Ridges Landscape Units due to the Proposed Route are summarized below:

- Landform/Water—largely unchanged from existing conditions; structure-specific grading may change landforms in specific locations but would not result in landscape level changes.
- Vegetation—new wide, linear gaps with distinct edges that break up the continuity of dense forest vegetation; modifications to the forms, lines, and textures of the vegetation in the ROW Corridor.

- Built Environment—introduction of tall, metallic towers with dominant vertical and geometric forms that contrast with the organic forms of adjacent forest areas; addition of thin, undulating, horizontal overhead lines.

In Forested Ridges Landscape Units, the new ROW Corridor and repetitive structures would decrease the scenic integrity of the landscape by creating new visual intrusions into the forested landscape. Changes to visual characteristics would be most prominent within or near the cleared ROW, as well as from nearby elevated locations that provide a broader view of the landscape. Forest vegetation would limit views of the ROW Corridor (and thus of changes to visual characteristics) from other areas. Similar to other types of landscape units, the changes would also be less apparent in areas with existing transmission line infrastructure.

5. CONCLUSIONS

The MARL Project involves the construction and operation of a new 500 kV transmission line and associated ROW Corridor that will cross portions of Pennsylvania, West Virginia, Maryland, and Virginia. As noted previously, the degree to which overhead transmission lines influence and are visible on a landscape depends on a number of factors, including, but not limited to, structure height and color, existing landscape features (e.g., topography, vegetation, built environment), duration of the view, and distances from the viewer. The specific combination of these factors changes by location, contributing to a range of potential influences and changes to existing visual resource characteristics.

As noted previously, construction of the MARL Project would result in increased visibility of construction equipment and construction activity including clearing of trees and other vegetation from the ROW Corridor. These changes would be short-term, temporary impacts that would last only for the duration of construction, anticipated to be 24 months for the entire MARL Project, although construction at any single location along the Proposed Route will occur over multiple shorter periods of time during the overall construction period. Upon completion of construction, vehicles, equipment, and personnel will depart, and disturbed portions of the ROW Corridor and any ancillary facilities workspaces will be restored. Stable, early succession plant communities will be re-established in disturbed areas following construction through implementation of a prescribed vegetation management plan.

During operation, the new transmission line will add tall, geometric structures and long, gently curving lines to the landscape that will be most apparent in foreground areas. The transmission structures will create a series of repetitive, dominant, vertical features that will extend above existing trees canopies and add new focal points that shift the vertical structure of the landscape. The conductors will appear as multiple undulating, overhead horizontal lines spanning the areas between transmission poles. These changes will be most perceptible in landscape unit types with fewer screening features (e.g., Rural Agricultural Landscape Units) and least perceptible in areas with more screening features (e.g., Forested Mountains Landscape Units).

Overall, the Proposed Route was selected because it offers a balanced approach to potential resource impacts, including visual, environmental, and socioeconomic resources, as well as engineering feasibility. Changes to visual resources are not completely avoidable from large-scale transmission line projects; however, where possible, the Proposed Route centers these unavoidable changes in areas with lower levels of viewer sensitivity and on landscapes that are better able to absorb visual resource changes. Along the Proposed Route alignment, the greatest visual resource impacts would be expected where the following conditions are met:

- Where unobstructed views with few to no screening opportunities are common;
- At road crossings and near residences and other VSRs where viewer sensitivity is high; and
- In areas with no existing transmission line infrastructure or other large-scale development.

In these areas, changes to existing visual characteristics would be most pronounced, and viewer exposure and sensitivity to these changes would be greatest. This combination would result in impacts on visual resources. Areas with this combination of factors generally represent a small percentage of the area within the foreground and middle ground of the Proposed Route.

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ATTACHMENT 1 VIEWSHED ANALYSIS FIGURES

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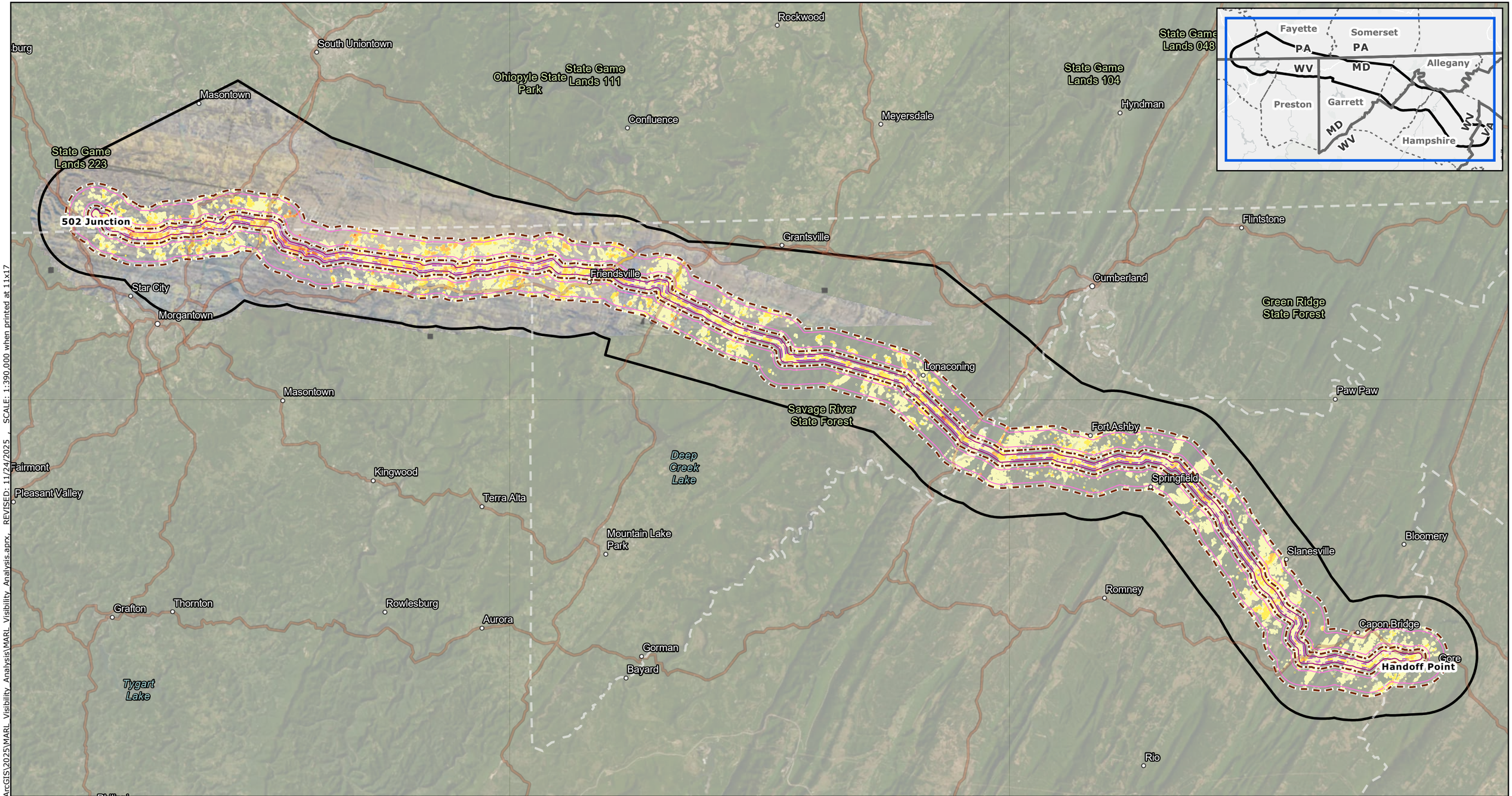

Proposed Route Towers
Proposed Route (A) Centerline
Proposed Route ROW

Visibility Range

Foreground - Centerline to 0.5 Miles
Middle Ground - 0.5 to 2 Miles

Structures Visible

More than 67 Structures Visible
46 - 67 Structures Visble
23 - 45 Structures Visible
12 - 22 Structures Visible
Fewer than 12 Structures Visible

NOTES

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3. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
4. Data source: NEET, ERM, USFWS, PA NHI, PAD-US

N

0 16,000 32,000 48,000 64,000

US Feet

Scale: 1:390,000
1 inch equals 32,500 ft (when printed at 11x17)

Viewshed Analysis

Page 1 of 14

MidAtlantic Resiliency Link

ERM

Coordinate System: NAD 1983 UTM Zone 17N

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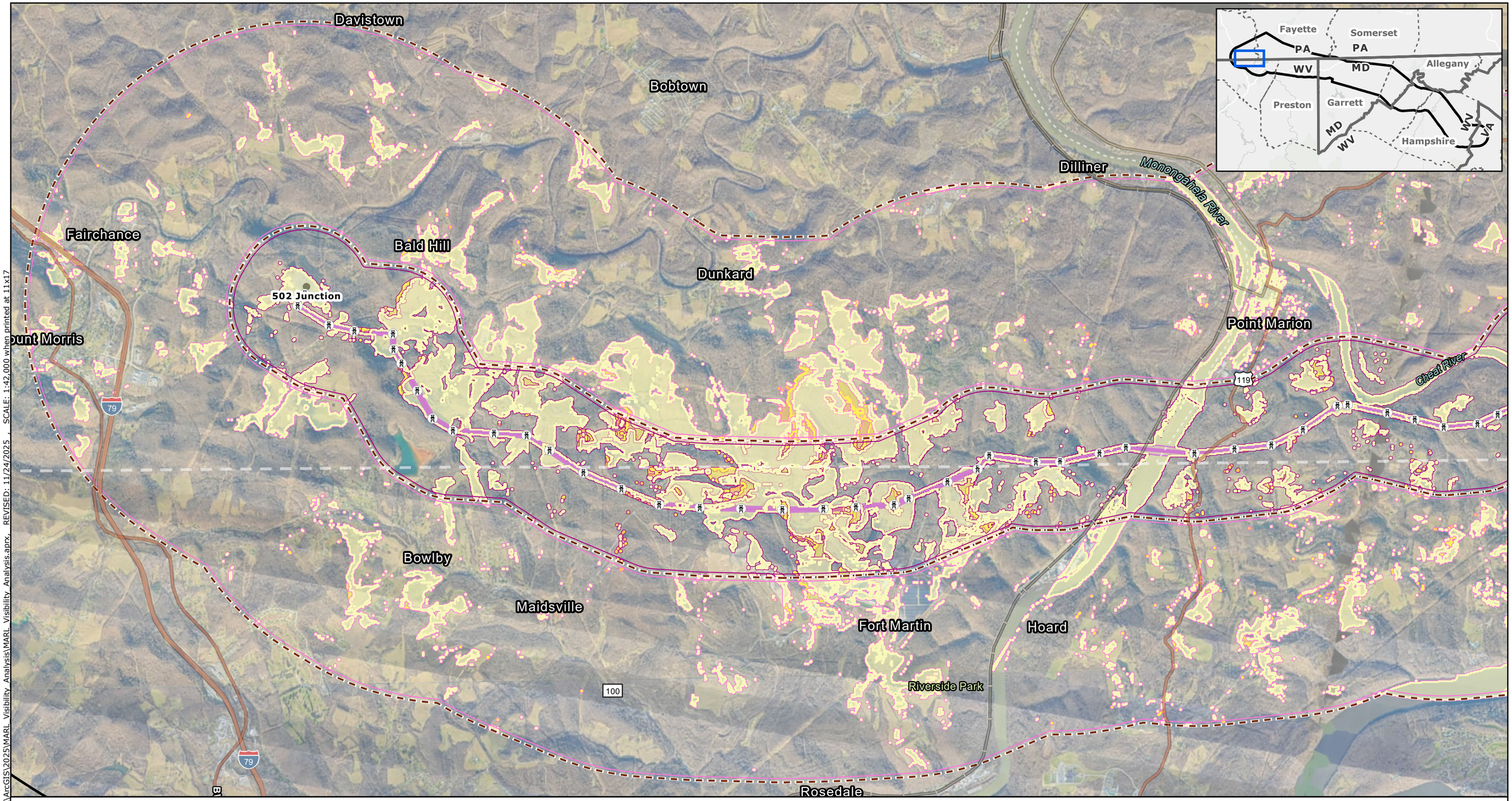

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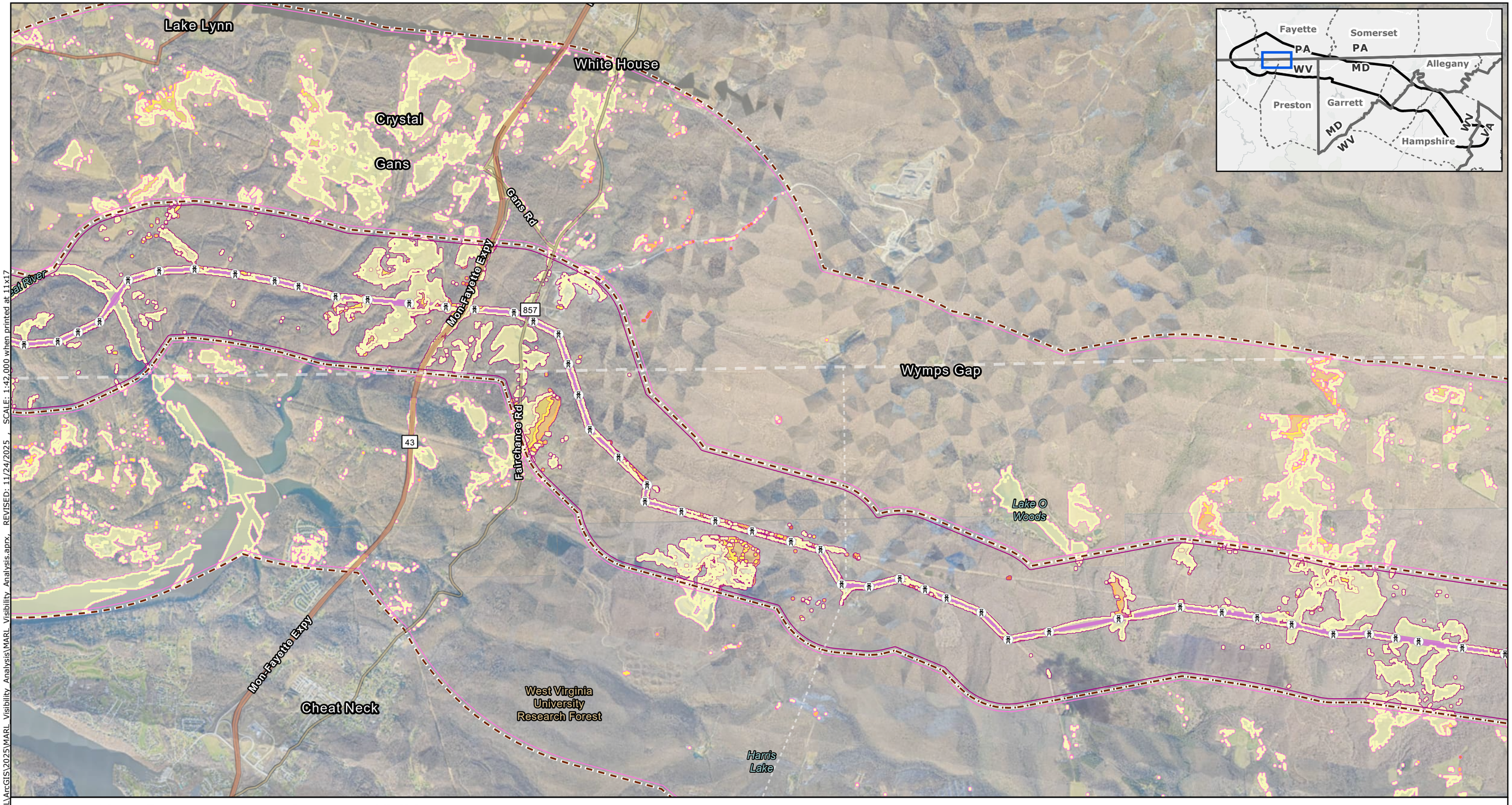

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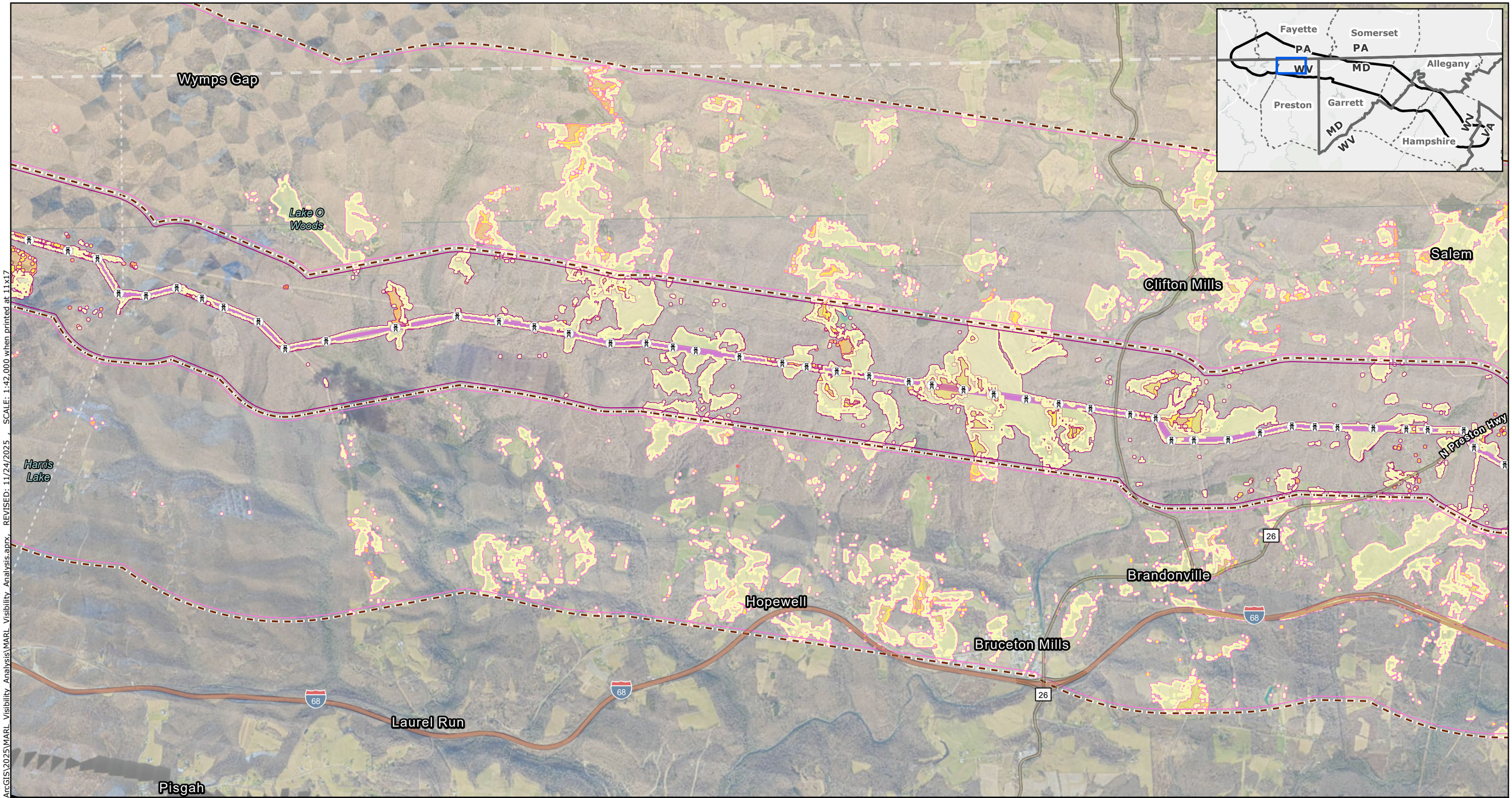

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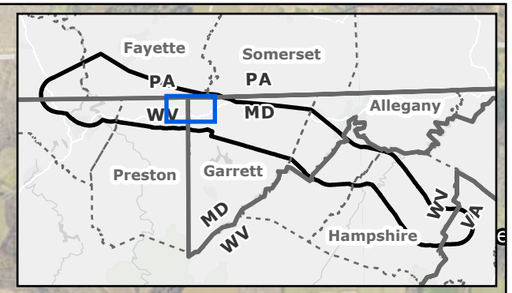

Five Forks
N Preston Hwy
Glade Farms
Friendsville Rd
Asher Glade
Youghiogheny Lake
Selbysport
26
42
Sand Spring
68
Friendsville
Blooming Rose
Hazelton
Locust Grove
42

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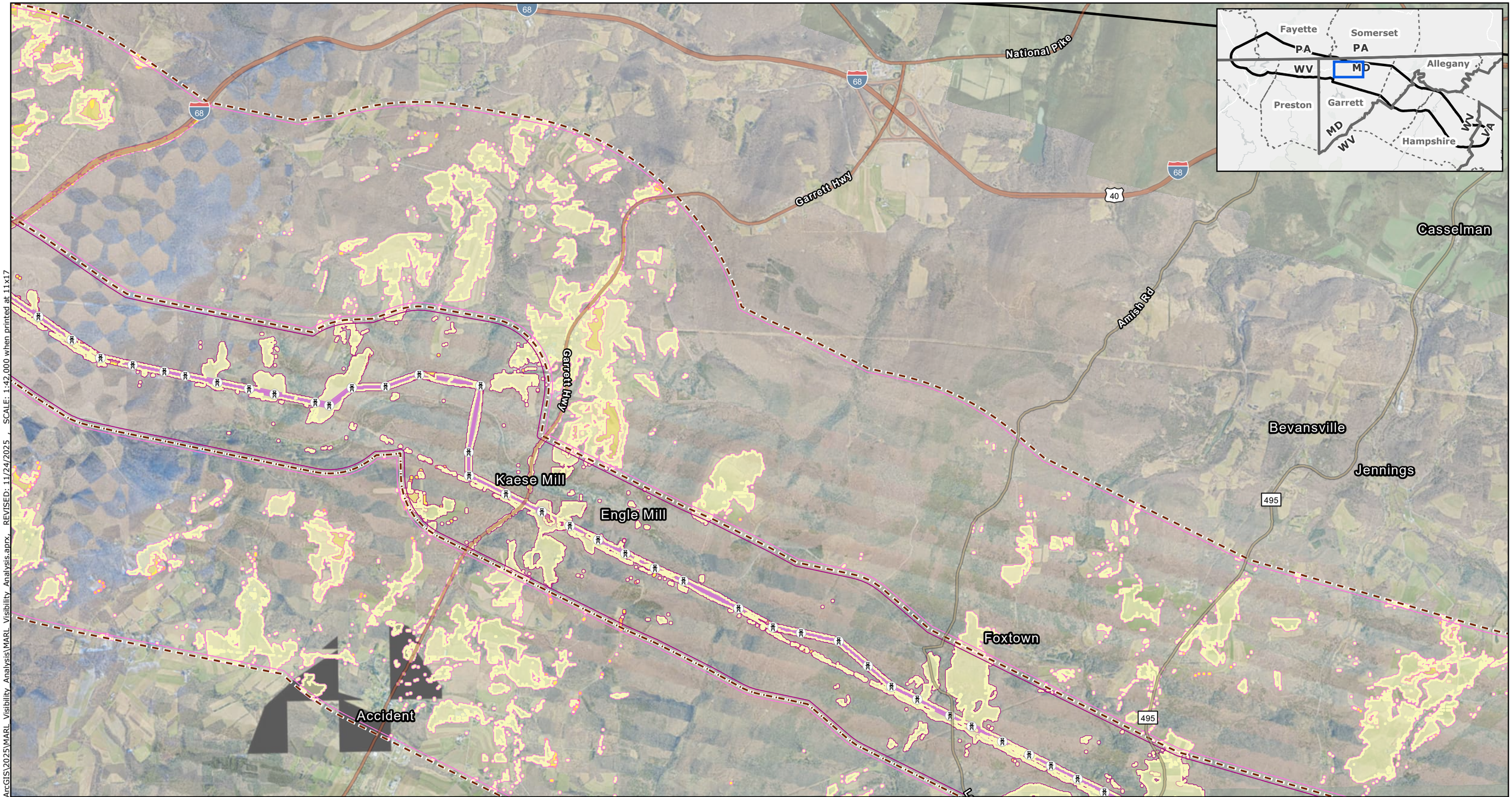

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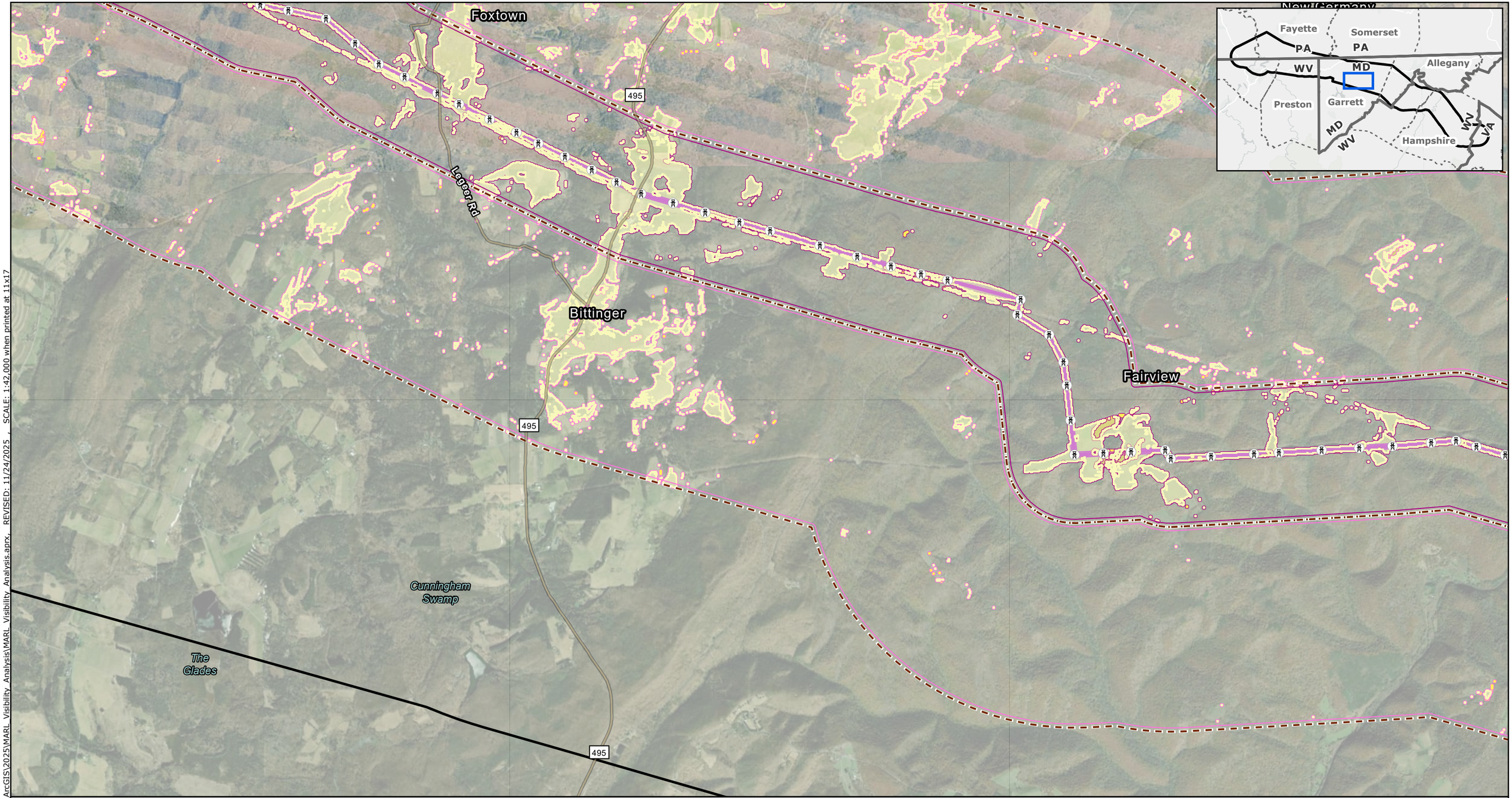

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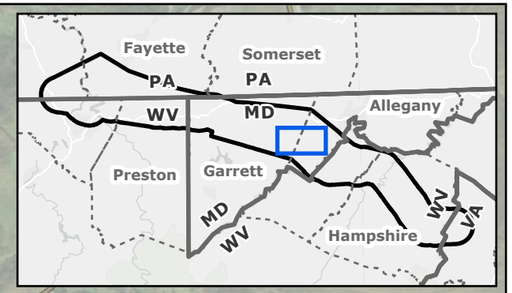

Merrill

Koontz

Midland

36

Lonaconing

Fort Hill Rd

Dan's Mountain Campground

Detmold

Moscow

Barton

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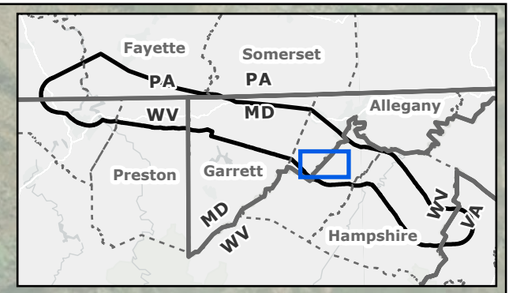

Danville

Black Oak

McMullen Hwy SW

Dawson

McMullen Hwy SW

Piedmont Rd

Fort Ashby Rd

220

220

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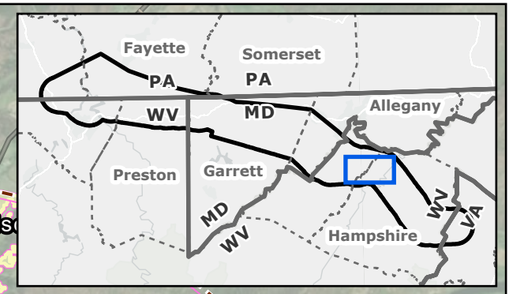

Fort Ashby
Frankfort Hwy
S Green St
Potomac State College Malone Farm
Fort Ashby Rd
Potomac State College Deremer Farm
Frankfort Hwy
Cumberland Rd
Milleson
Springfield
Raven Rocks
Millesons Mill
Grace
wood

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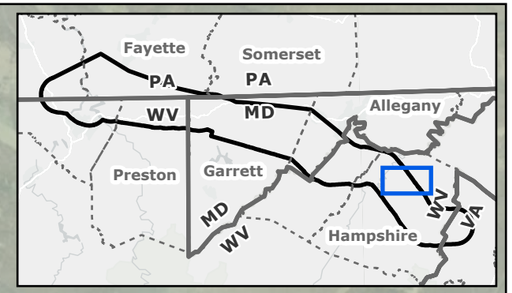

Points

Creekvale

Higginsville

Three Churches

29

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3. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
4. Data source: NEET, ERM, USFWS, PA NHI, PAD-US

N

0 1,750 3,500 5,250 7,000

US Feet

Scale: 1:42,000
1 inch equals 3,500 ft (when printed at 11x17)

Viewshed Analysis
Page 11 of 14
MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\MARL_Visibility_Analysis\MARL_Visibility_Analysis.aprx, REVISED: 11/24/2025 , SCALE: 1:42,000 when printed at 11x17

Coordinate System: NAD 1983 UTM Zone 17N

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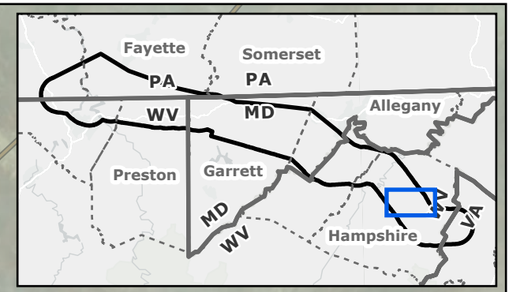

Gore

Slanesville Pike

Slanesville

Bloomery Pike

Barnes Mill

Bloomery Pike

North River Mills

Cold

Hoy

- Proposed Route Towers
- Proposed Route (A) Centerline
- Proposed Route ROW

Visibility Range

- Foreground - Centerline to 0.5 Miles
- Middle Ground - 0.5 to 2 Miles

Structures Visible

- More than 67 Structures Visible
- 46 - 67 Structures Visble
- 23 - 45 Structures Visible
- 12 - 22 Structures Visible
- Fewer than 12 Structures Visible

NOTES

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3. LoD is the limit of disturbance of the ancillary facilities outside of the ROW Corridor
4. Data source: NEET, ERM, USFWS, PA NHI, PAD-US

N

0 1,750 3,500 5,250 7,000

US Feet

Scale: 1:42,000
1 inch equals 3,500 ft (when printed at 11x17)

Viewshed Analysis
Page 12 of 14
MidAtlantic Resiliency Link

ERM

FILE: M:\US\Projects\M-O\NextEra\MARL\ArcGIS\2025\MARL_Visibility_Analysis\MARL_Visibility_Analysis.aprx, REVISED: 11/24/2025, SCALE: 1:42,000 when printed at 11x17

Coordinate System: NAD 1983 UTM Zone 17N

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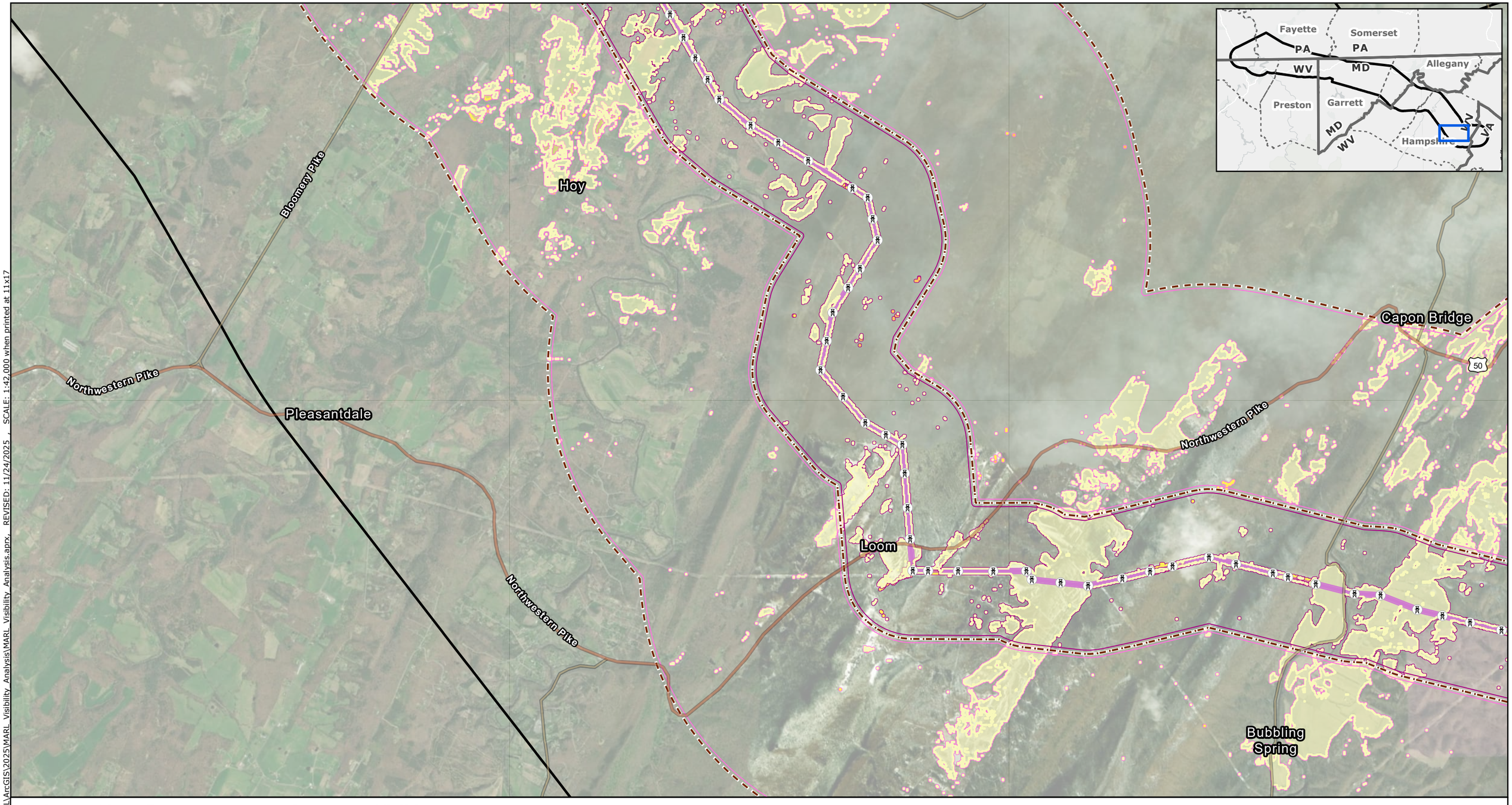

- Proposed Route Towers
- Proposed Route (A) Centerline
- Proposed Route ROW

Visibility Range

- Foreground - Centerline to 0.5 Miles
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4. *Data source: NEET, ERM, USFWS, PA NHI, PAD-US*

N

0 1,750 3,500 5,250 7,000

US Feet

Scale: 1:42,000

1 inch equals 3,500 ft (when printed at 11x17)

Viewshed Analysis

Page 13 of 14

MidAtlantic Resiliency Link

ERM

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Coordinate System: NAD 1983 UTM Zone 17N

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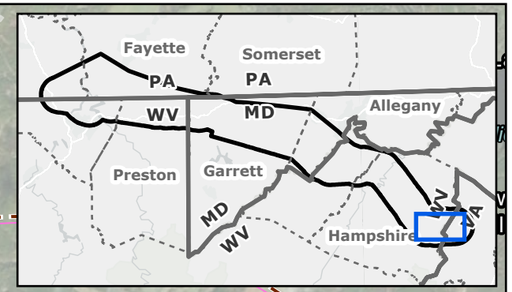

Capon Bridge
50
Northwestern Pike
Northwestern Pike
The Knolls
Loom
Handoff Point
Gore
Bubbling Spring
Carpers Pike
Hooks Mills
Finger Lake

- Proposed Route Towers
- Proposed Route (A) Centerline
- Proposed Route ROW

Visibility Range

- Foreground - Centerline to 0.5 Miles
- Middle Ground - 0.5 to 2 Miles

Structures Visible

- More than 67 Structures Visible
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- 23 - 45 Structures Visible
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NOTES

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N

0 1,750 3,500 5,250 7,000

US Feet

Scale: 1:42,000
1 inch equals 3,500 ft (when printed at 11x17)

Viewshed Analysis
Page 14 of 14
MidAtlantic Resiliency Link

ERM

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Coordinate System: NAD 1983 UTM Zone 17N

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ATTACHMENT 2 EXISTING CONDITIONS AND SIMULATION PHOTOGRAPHS

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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

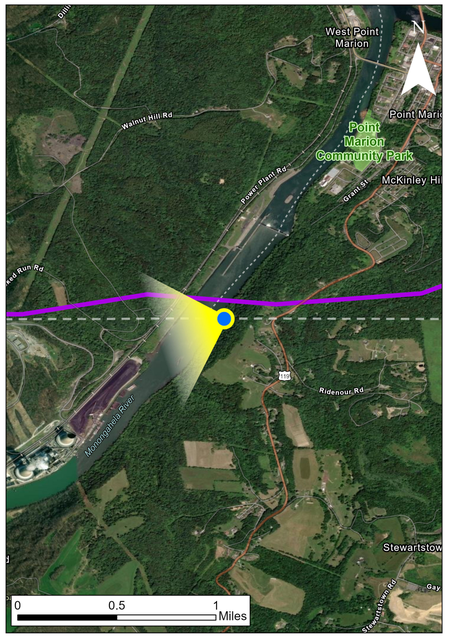
NextEra Energy Transmission subsidiaries[1]

KOP 102-CR

Sheepskin Trail

Proposed Route

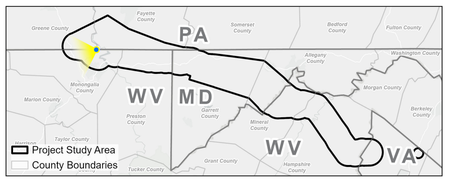
Date: 11/12/2024
Time: 1:02 pm
Viewing Direction: Southwest
Landscape Unit: River Valley



Viewpoint Direction

Protected Lands

Preliminary Draft Route Options



[1] NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc. are subsidiaries of NextEra Energy Transmission, LLC.

EXISTING CONDITIONS

PROPOSED CONDITIONS

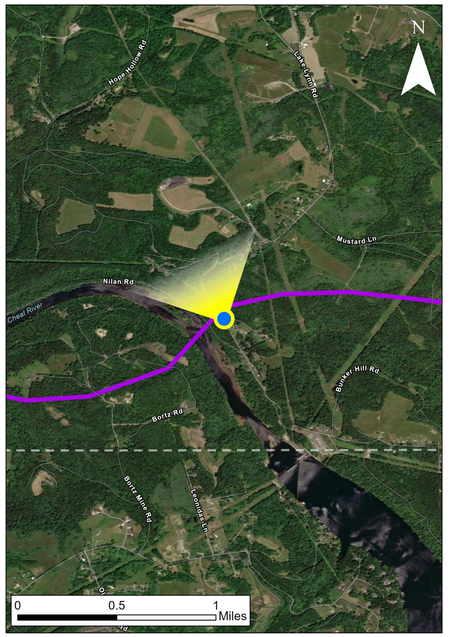
MidAtlantic Resiliency Link
500 kV Electric Transmission Project
NextEra Energy Transmission subsidiaries[1]

KOP 133-CR

Lake Lynn Historic District

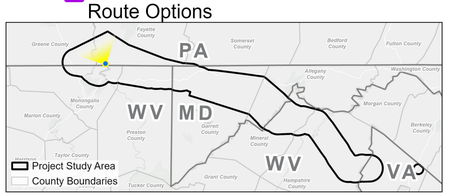
Proposed Route

Date: 11/12/2024
Time: 4:56 pm
Viewing Direction: Northeast
Landscape Unit: River Valley



Viewpoint Direction

Preliminary Draft Route Options



[1] NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc. are subsidiaries of NextEra Energy Transmission, LLC.





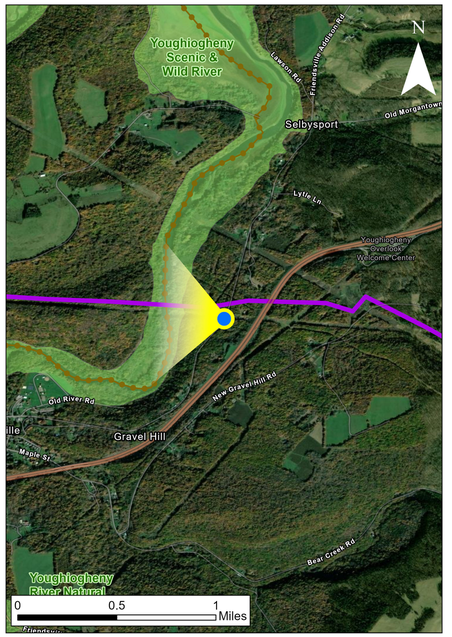
MidAtlantic Resiliency Link
500 kV Electric Transmission Project
NextEra Energy Transmission subsidiaries[1]

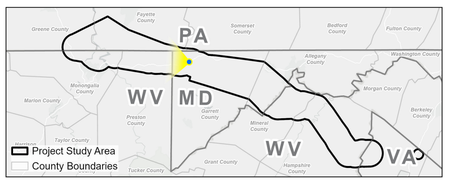
Aerial View 153

Youghiogheny River

Proposed Route

Date: 12/08/2024
Time: 1:16 pm
Viewing Direction: West
Landscape Unit: Rural Development





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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

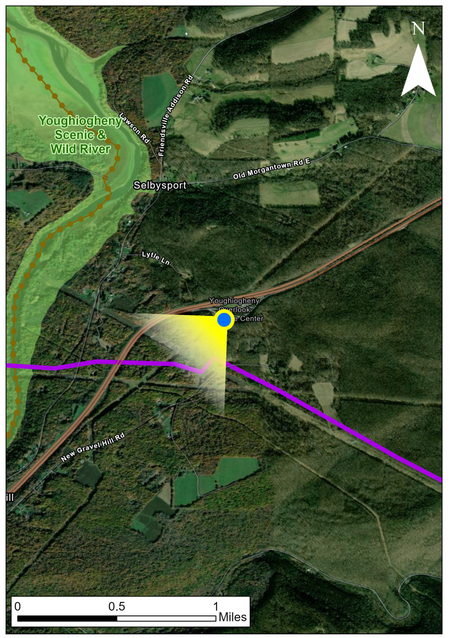
NextEra Energy Transmission subsidiaries[1]

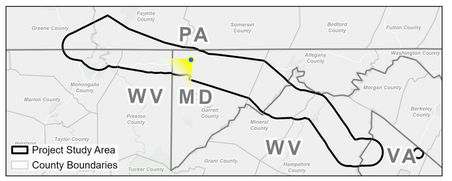
KOP 308

Youghiogheny Overlook Welcome Center

Proposed Route

Date: 11/13/2024
Time: 1:17 pm
Viewing Direction: Southwest
Landscape Unit: Forested Mountains





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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

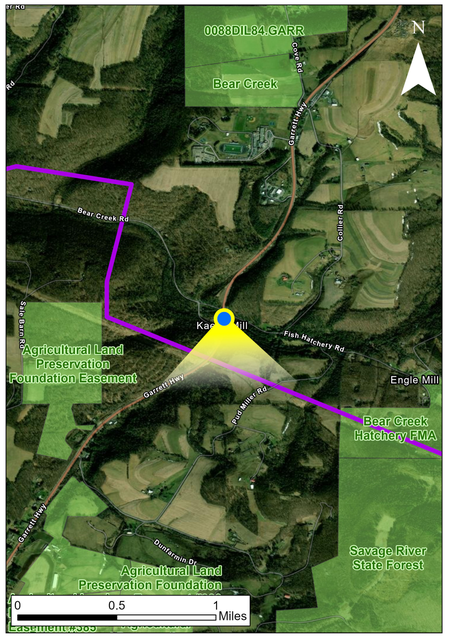
NextEra Energy Transmission subsidiaries[1]

KOP 105a-CR

Garrett Highway/Kaese Mill

Proposed Route

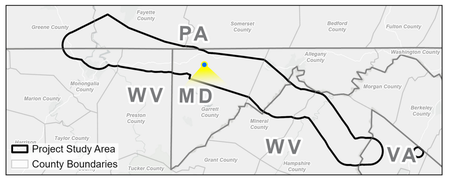
Date: 11/19/2024
Time: 2:44 pm
Viewing Direction: South
Landscape Unit: Forested Mountains



Viewpoint Direction

Protected Lands

Preliminary Draft Route Options



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MidAtlantic Resiliency Link

500 kV Electric Transmission Project

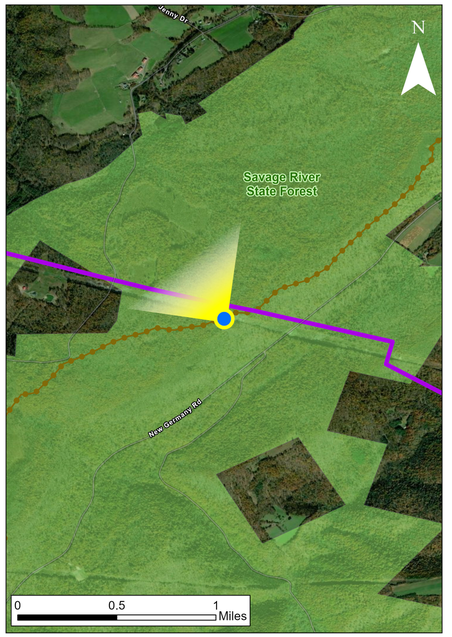
NextEra Energy Transmission subsidiaries[1]

KOP 310

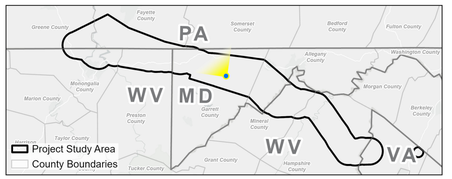
Potomac Heritage National Scenic Trail

Proposed Route

Date: 11/18/2024
Time: 12:5 pm
Viewing Direction: Northwest
Landscape Unit: Forested Mountains



Viewpoint Direction
Preliminary Draft Route Options
Potomac Heritage Trail
Protected Lands



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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

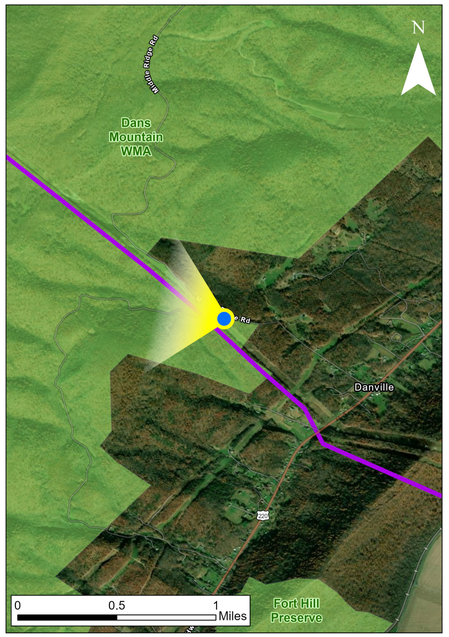
NextEra Energy Transmission subsidiaries[1]

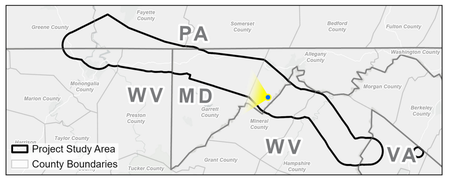
KOP 314

Dan's Mountain Wildlife Management Area

Proposed Route

Date: 11/14/2024
Time: 10:23 am
Viewing Direction: Northeast
Landscape Unit: Forested Mountains





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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

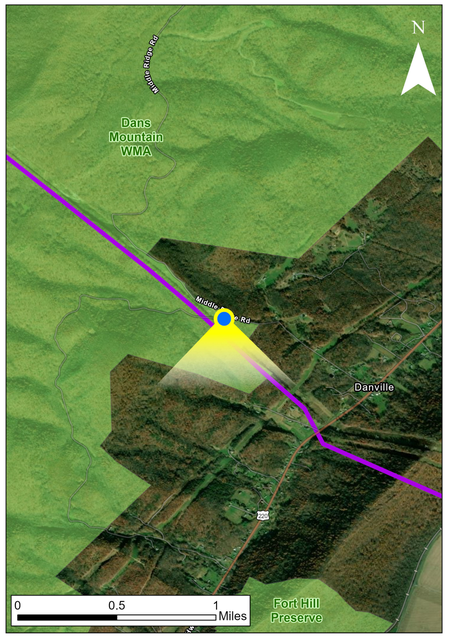
NextEra Energy Transmission subsidiaries[1]

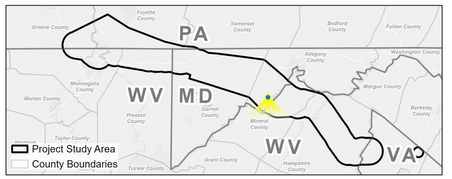
KOP 314

Dan's Mountain Wildlife Management Area

Proposed Route

Date: 11/14/2024
Time: 10:23 am
Viewing Direction: South
Landscape Unit: Forested Mountains





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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

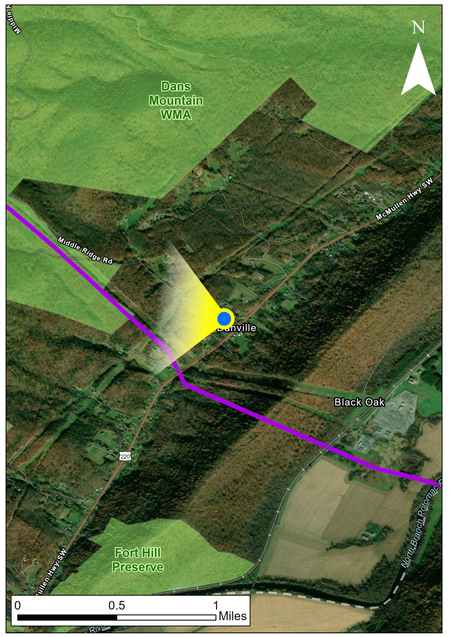
NextEra Energy Transmission subsidiaries[1]

Aerial View 268

Dan's Mountain Wildlife Management Area

Proposed Route

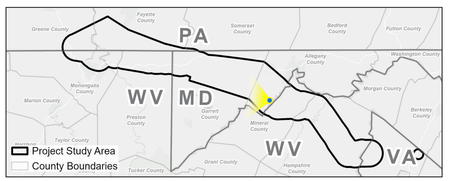
Date: 12/09/2024
Time: 12:21 pm
Viewing Direction: West
Landscape Unit: Forested Mountains



Viewpoint Direction

Protected Lands

Preliminary Draft Route Options



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MidAtlantic Resiliency Link
500 kV Electric Transmission Project
NextEra Energy Transmission subsidiaries[1]

Aerial View 252

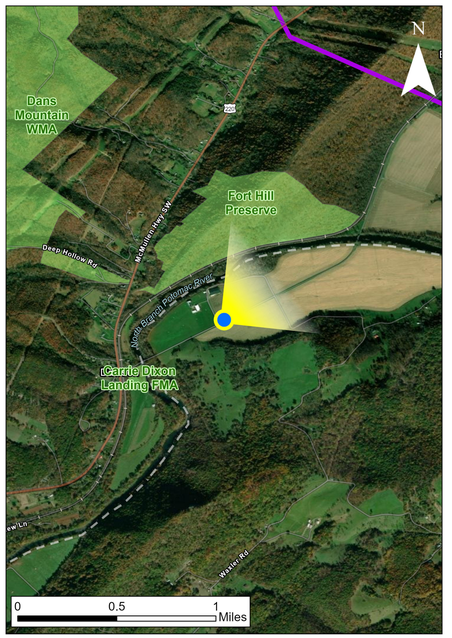
North Branch of the Potomac River

Proposed Route

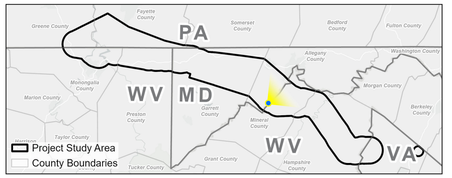
Date: 12/08/2024
Time: 3:21 pm
Viewing Direction: Northeast
Landscape Unit: Rural Agricultural

EXISTING CONDITIONS

PROPOSED CONDITIONS



Viewpoint Direction
Protected Lands
Preliminary Draft Route Options



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MidAtlantic Resiliency Link

500 kV Electric Transmission Project

NextEra Energy Transmission subsidiaries[1]

KOP 325

Painter Hollow Rd

Proposed Route

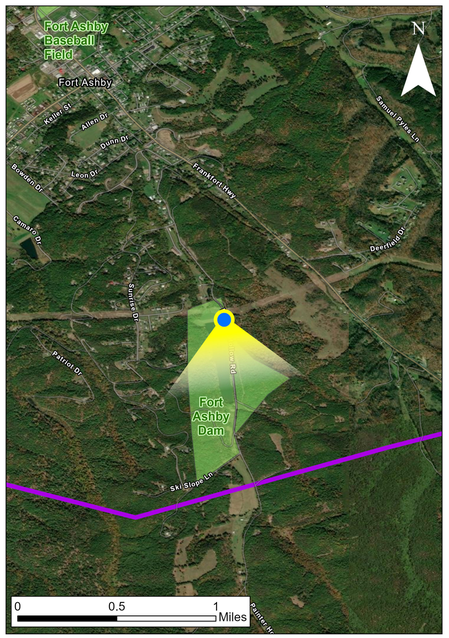
Date: 11/15/2024
Time: 2:53 pm
Viewing Direction: South
Landscape Unit: Forested Mountains

EXISTING CONDITIONS



PROPOSED CONDITIONS

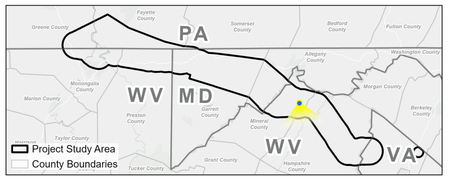




Viewpoint Direction

Protected Lands

Preliminary Draft Route Options



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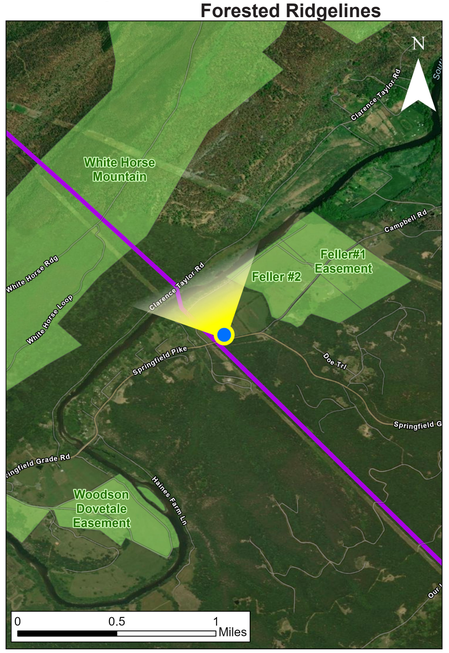
MidAtlantic Resiliency Link
500 kV Electric Transmission Project
NextEra Energy Transmission subsidiaries[1]

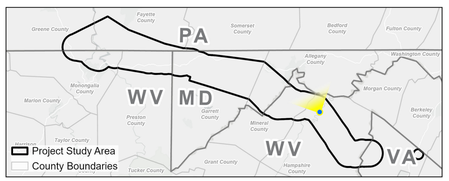
Aerial View 296

South Branch Potomac River

Proposed Route

Date: 12/09/2024
Time: 1:43 pm
Viewing Direction: Northwest
Landscape Unit: River Valley
Forested Ridgelines





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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

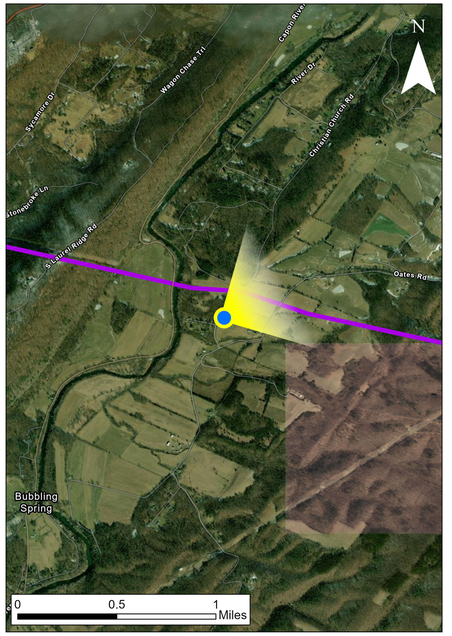
NextEra Energy Transmission subsidiaries[1]

KOP 110-CR

Capon Chapel

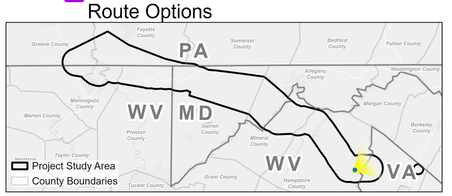
Proposed Route

Date: 11/19/2024
Time: 1:29 pm
Viewing Direction: Northeast
Landscape Unit: Rural Agricultural



Viewpoint Direction

Preliminary Draft Route Options



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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

NextEra Energy Transmission subsidiaries[1]

KOP 319

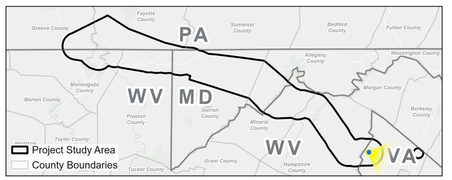
Parishville Rd

Proposed Route

Date: 11/19/2024
Time: 11:32 am
Viewing Direction: Southeast
Landscape Unit: Rural Agricultural



Viewpoint Direction
End Points
Preliminary Draft Route Options
Protected Lands



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EXISTING CONDITIONS

PROPOSED CONDITIONS

MidAtlantic Resiliency Link

500 kV Electric Transmission Project

NextEra Energy Transmission subsidiaries[1]

KOP 360B

Thistle Lane

Woodside Substation

Date: 09/08/2025
Time: 12:26 pm
Viewing Direction: Northeast
Landscape Unit: Rural Agricultural
Forested Ridgelines



Viewpoint Direction

Project Study Area



[1] NextEra Energy Transmission MidAtlantic, Inc. and NextEra Energy Transmission Virginia, Inc. are subsidiaries of NextEra Energy Transmission, LLC.