

Exhibit D – Alternatives and Siting Analysis: Table of Contents

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1.0 INTRODUCTION

This Exhibit describes the methodology utilized in defining the alternative routes and in selecting the proposed transmission line route. The siting study identified major constraints and used a quantitative and qualitative evaluation process to compare alternative transmission routes for the project. The methodology used for the siting study, as described herein, provided a framework from which to select the routes most suited for an overhead electric transmission line while satisfying the regulatory filing requirements for such a project. The ultimate goal of the study was to select a route that avoids or minimizes adverse impacts to the natural, cultural, and social environments to the maximum extent practical, while still maintaining the economic viability and technical feasibility of the project.

1.1 Background Research

Prior to initiation of the detailed siting study used to identify alternative routes, background research was conducted regarding the overall environmental setting within the Area of Study (**Figure C-1**). This information is provided within **Exhibit C** (Environmental Setting).

1.2 Quantitative and Qualitative Siting Methodology

Following the background research, a quantitative siting study method was used to initially score and rank alternative routes according to certain selected criteria. Subsequently, a qualitative evaluation that incorporated both public input and professional judgment was conducted in order to reach a final decision point regarding the selected route. It is important to note that not all criteria can be counted and scored, making the qualitative evaluation an essential step in the selection process. The results of the qualitative evaluation are discussed later in this report.

The data used in this analysis fall into three broad categories, – ecological, land use/cultural, and technical/engineering. These are in general accordance with National Environmental Policy Act (NEPA) criteria and have been used on many successful siting studies. Data were drawn from a wide variety of sources including state and local Geographic Information System (GIS) databases, field reconnaissance surveys,

information supplied by public agencies, published documents, and publicly available electronic information.

The siting methodology used for determining the selected transmission line route for the new Appenzell #1 & #2 138 kV Taps is a combination of a raster suitability surface method followed by a vector analysis when the data precision increases. The raster method is adapted from a protocol developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC).¹ The EPRI method incorporates GIS technology, statistical evaluation, and stakeholder collaboration into the decision-making process. The methodology formalizes many of the methods and principles used in the industry and by consultants over the last few years. It was developed over the course of a number of years with collaboration and feedback from utility companies, federal, state and local government agencies, and other key stakeholders, such as private landowners. The process was tested and calibrated against existing transmission line siting projects that had been successfully completed.

These siting phases as used for this specific project are discussed in **Section 3.0**. A review of the methodology is included in **Section 2.0** below, and a full discussion of the EPRI-GTC Siting Methodology can be found in the EPRI-GTC Overhead Electric Transmission Line Siting Methodology (2006) report.

¹ EPRI-GTC Overhead Electric Transmission Line Siting Methodology (2006)

2.0 SITING METHODOLOGY

2.1 Summary of Siting Methodology Approach

As noted in **Section 1.0**, the siting methodology used for determining the selected transmission route is adapted from a protocol developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC). URS and other consultants have been using similar opportunity and constraint review methods for many years in transmission and other siting studies. Based on URS' professional review and comparisons with its own siting methods, the EPRI process offers an excellent framework for siting analysis **when used with appropriate modifications for project specific criteria**. The siting methodology used for this project includes both quantitative and qualitative evaluation techniques. The quantitative evaluation was used to initially develop, score, and rank alternative routes according to certain selected criteria. Subsequently, a qualitative evaluation that incorporated both public input and professional judgment was conducted in order to reach a final decision regarding the selected route.

The siting method consists of three fundamental phases:

- Generate Macro Corridors. These Macro Corridors are used to define the outer edges of the Project Study Area.
- Generate Alternative Corridors. Alternative corridors most suitable for transmission line development are generated within the Project Study Area from three primary perspectives: a) protection of the Natural Environment, b) protection of the Built Environment, and c) Engineering Considerations.
- Identify Alternative Routes within the Alternative Corridors and Determine Selected Route.

2.2 Phase I – Macro Corridor Generation/Project Study Area Determination

Macro Corridor analysis begins after the start and end points of the new transmission line has been established. The first step in the Macro Corridor development process is to develop a landuse/landcover GIS database for the area of study that identifies some of the

key opportunity and constraint areas that are traditionally reviewed as part of a siting study. Typical opportunity areas include paralleling or rebuilding existing utility corridors, paralleling primary or secondary roads, or crossing open and undeveloped areas. Constraint areas are represented by densely populated area, wetlands, or other less suitable land types.

A series of potential broad corridor areas are then developed for the following three scenarios:

- Opportunities for rebuilding or paralleling existing transmission lines.
- Opportunities to parallel existing road right-of-ways or other linear features.
- Opportunities to cross undeveloped land (cross country).

After the most suitable scenario-specific Macro Corridor is identified, these three scenario corridors are merged together into a final combined Macro Corridor area. The outer boundary of this combined Macro Corridor area effectively defines the **Project Study Area**.

2.3 Phase II – Alternative Corridor Generation

In Phase II, Alternative Corridors are generated from within the combined Macro Corridor area based on three distinct perspectives and utilize additional detailed data. The three perspectives are defined as follows:

- *Built Environment* - protecting human and cultural resource areas, by reducing potential conflicts with existing residential neighborhoods and other community-valued buildings or historic sites.
- *Natural Environment* - protecting plants, animals and aquatic resources, by minimizing the impact to ecological resources and natural habitat.
- *Engineering Considerations* – maximizing co-location and minimizing cost and schedule challenges, by seeking the shortest path or utilizing existing right-of-ways, while avoiding areas that pose significant construction obstacles, such as steep slopes or unique agricultural practices.

The three primary perspectives (Built Environment, Natural Environment, and Engineering Considerations) utilize the same datasets to establish perspective-specific Alternative Corridors, but apply a higher weighting to data aligned with their unique perspective. The Built Environment assessment, for example, applies a higher weighting to features related to building proximity and building density; whereas the Natural Environment evaluation applies a higher weighting to floodplain and wildlife habitat features. Similarly, the Engineering Considerations perspective is based on linear infrastructure and slope features. This approach provides the ability to compare the environmental, social, and financial costs and benefits of the different corridors.

2.4 Phase III – Alternative and Selected Route Development

The next step in the process, determining the Alternative Routes within the Alternative Corridor, is accomplished by identifying a preferred path or alignment within the Alternative Corridors. These alternative transmission line route developments utilize similar data as noted previously, but this time focus on a single alignment rather than a broader corridor area.

To assess the advantages and disadvantages of the various Alternative Routes, feature metrics, or specific parameters measured for a particular feature, such as the number of residences or number of stream crossings per route, are considered for each route. These quantitative feature metrics are normalized, assigned relative weights, and organized within the three perspectives (Built Environment, Natural Environment, and Engineering Considerations). The rationale for normalization is to provide a means to compare the data. Using a normalized 0-100 scale allows the different data values to be mathematically combined and compared without being distorted by differences in measurement scale. With the establishment of these quantitative values, an overall score for each Alternative Route can be calculated. Lower scores are preferred as they indicate potentially less impact along that route. The numerical score provides an objective reference for comparing each of the Alternative Routes.

The next step in the evaluation process applies expert judgment to rank the top Alternative Routes. Siting team members qualitatively rank the most preferred routes (lowest overall scores) based on several important considerations such as, visual

concerns, community concerns, schedule delay risk, special permit issues and construction and maintenance accessibility; additional considerations can be added if considered relevant to a given project. This process is designed to encourage thorough discussion in evaluating and selecting a final route in an objective, consistent, and comprehensive manner. The goal of the qualitative expert judgment process is to determine two or three Selected Routes through the Project Study Area.

A final phase for this project incorporates public comment regarding the Alternative Routes. Feedback obtained from landowners and the surrounding community is incorporated into route locations and into the re-calculation of route scores. A Selected Route can then be determined after all these factors have been incorporated into the considerations.

3.0 ALTERNATIVE ROUTE DETERMINATION

The goal of this siting analysis was to determine the most suitable transmission line route to connect the proposed Appenzell 138-12 kV substation, to be located southwest of the Route 715 and Miller Road intersection near the Village of Appenzell, to the most appropriate tap location along a defined 7.5-mile stretch of the Siegfried-Jackson 138 kV transmission line. The following sections describe how the methodology was used to select the appropriate tap location and the proposed Transmission Line Route. The substation location and required transmission tap were determined as part of the need analysis as described in **Exhibit B**.

3.1 Generating Macro Corridors - Defining the Project Study Area

The Project Study Area is defined by a progressive process that uses various mapped datasets to generate broad Macro Corridors. The map is composed of data that represent opportunity areas (e.g., existing transmission line right-of-ways and cross country areas) and constraint areas (e.g., residential neighborhoods and wetlands). These opportunity and constraint areas are integrated together and then a final process step removes defined avoidance areas, such as historic districts, public parks, and wilderness areas, which are avoided where practical.

Specific avoidance areas included county-identified historic districts around the Villages of Appenzell and McMichael, State Game Lands #38, Big Pocono State Park, non-spannable water bodies (i.e., Akiba Lake, Trout Lake, and Mountain Spring Lake), EPA Superfund Sites, and several church or cemetery parcels. Other potential avoidance area categories, such as airports, military facilities, state-listed historic structures or districts, wildlife refuges, and wild scenic rivers are not present within the area of study.

Three types of suitability surfaces, as discussed in **Section 2.0**, were calculated for three potential scenarios:

- Rebuilding or paralleling existing transmission lines
- Paralleling existing road right-of-ways
- Crossing undeveloped land (cross country)

When these individual Macro Corridors are then combined, as illustrated in the Combined Map image in **Figure D-1**, the outer extent of the combined corridors establishes the outer extent of the **Project Study Area**. This process is used to create a more quantifiable method for determining the study area. This Project Study Area, shown in **Figure D-2**, forms the basis for the collection and analysis of more detailed datasets that are used in the Alternative Corridor analysis.

3.2 Generating Alternative Corridors

Alternative Corridors are generated utilizing the same GIS analysis methods as the Macro Corridors, but uses more detailed datasets only from within the defined project study area. Three types of Alternative Corridors are generated within the Project Study Area. These corridors are identified as being the most suitable for transmission line development from three distinct perspectives - Built Environment, Natural Environment, and Engineering Considerations.

3.2.1 Datasets Used for Alternative Corridors

Figures D-3 through D-8 illustrate some of the core datasets that were used to develop Alternative Corridors for the three perspectives. **Figure D-3** consists of Existing Land Use categories, which were refined and updated for this analysis and based on field review. **Figure D-4** illustrates the different Agricultural Preservation areas within the Study Area. **Figure D-5** indicates the location of Cultural and Historic resources identified within the Study Area. **Figure D-6** shows the different Zoning areas based on review of the Chestnuthill and Jackson Township ordinances. **Figure D-7** provides information on the streams, wetlands, floodplain, and other natural areas. **Figure D-8** identifies areas of Steep Slopes ranging from moderate (15-25%) to extremely steep (>25%).

These datasets, as well as the diverse forms of information reviewed in **Exhibit C**, were also utilized in the analysis of the selected route in an effort to locate and identify airports or potential archeologic, geologic, historic, scenic, or wilderness areas within two miles of the selected route right-of-way. More details of these efforts are discussed in Section 4.6 of **Exhibit D**.

3.2.2 Additional Engineering Considerations

Along with the typical engineering considerations such as slope and number of angle points reviewed to site a new transmission line, additional project area specific considerations were incorporated. Engineering options may be restricted based on the agricultural crops grown and farming methods utilized by landowners, such as fruit orchards and the center pivot irrigation technique. In the Project Study Area, evergreen (Christmas) tree farms are a common agricultural crop. Evergreen tree farms were added to the Engineering Considerations Perspective as a means of addressing these potentially sensitive agricultural areas.

3.2.3 Additional Environmental Considerations

As with the Engineering considerations refinements for the environmental elements within the project study area were made involving classifying streams and wetlands, defining protective buffers, and adding important birding areas. These refinements are described in further detail below.

Streams were classified in accordance with the protected water uses designated by PADEP in 25 Pa. Code Chapter 93. Special Protection Waters are classified as High Quality (HQ) or Exceptional Value (EV). Protective buffers for HQ and EV streams were set at 150 feet and 200 feet, respectively. Streams classified as protective of cold-water fisheries (CWF), warm-water fisheries (WWF), or trout stocked fisheries (TSF) were given protective buffers of 100 feet. The minimal buffer width (100 feet) was based on local stormwater ordinances developed by the Monroe County Conservation District and endorsed by Jackson and Chestnuthill Townships to provide protection to streams. Based on professional judgment, buffer widths for the HQ and EV streams were broadened to increase protection of these Special Protection Waters. All of these various stream classifications were added to the Streams/Wetlands section under the Environmental Perspective. CWF/WWF/TSF streams were issued a value of six, whereas HQ/EV streams were issued a value of eight.

Similarly, wetlands were classified in accordance with US Fish and Wildlife Service’s Cowardin system². The vegetated Cowardin wetland types in the Study Area are palustrine emergent (PEM), palustrine shrub-scrub (PSS), and palustrine forested (PFO). These wetland types are identified in the NWI dataset on the basis of aerial photography. The 100-foot protective buffer assigned to NWI wetlands was also based on local stormwater ordinances. These wetland classifications were added to the Streams/Wetlands section under the Environmental Perspective. PFO wetlands were issued a value of six, whereas PEM/PSS wetlands were issued a value of seven. Although PFO wetlands are of great ecological importance, within the Project Study Area, PEM/PSS wetlands were deemed more ecologically sensitive due to the need to evaluate these habitats for possible use by the bog turtle (*Glyptemys muhlenbergii*), a federally Threatened and Pennsylvania Endangered species.

For the Public Lands section, “Other Conservation Areas” and “State-owned lands” were more specifically defined as to the type of public land affected. For example, conservation areas within the Project Study Area include lands protected by conservation easements (i.e., Pohoqualine Fishing Club) and farmland areas protected by agricultural conservation easements. These easements preserve the land in its existing condition (upland forest, riparian forest, active agriculture) by purchasing the development rights of the land with public funds from state, county, and township sources. Other farmland preservation techniques, such as Agricultural Security Areas and Act 319 “Clean and Green” were identified, but not considered for similar protection, because the development rights of the land are still applicable and public funds were not used.

The primary State-owned lands used for constraint analysis are Wildlife Management Areas (WMA). However, Pennsylvania also owns State Parks, State Game Lands, and State Forests. State Parks are already protected under the Avoidance Area category, but the other land types are not similarly protected. For this analysis, State Forests and State Game Lands (SGL) were added to the State-owned category. No State Forests are located in the Project Study Area; however, the 5,477-acre SGL #38 is located in the Project Study Area. This SGL is situated in the northeastern corner of Chestnuthill

² Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)

Township and the northwestern corner of Jackson Township. State Game Lands are managed by the Pennsylvania Game Commission and are utilized for wildlife management, hunting, hiking, and other outdoor opportunities.

Important Bird Areas, or IBAs, were added to the Wildlife Habitat section of the Environmental Perspective. IBAs are sites that provide essential habitat for one or more species of bird, including locations for breeding, wintering, and/or migrating birds. The 15,000-acre Long Pond Preserve (Important Bird Area #64) is located along the northern edge of the Project Study Area. IBA #64, whose conservation efforts are headed by The Nature Conservancy, contains specific important bird habitat, such as till barrens, northern hardwood and boreal conifer forests, wetlands, and agricultural fields.

3.2.4 Review of Alternative Corridors

After the datasets were added to the review, Alternative Corridors (**Figure D-9**) were created for each of the three perspectives. These corridors then form the optimal areas for development of alternative route alignments for consideration.

3.3 Alternative Route Generation and Analysis

3.3.1 Alternative Route and Initial Analysis

In this stage of the analysis a single preferred path for each of the different perspectives is determined using the standard GIS analysis tools. To complete this task, more sophisticated data were developed and existing data modified. For example, to generate the Alternative Routes, a 328-foot (100-meters) protective buffer was created encompassing the residential units. This buffer width is based on the definition of a house's curtilage, which includes the land or buildings within 100 meters of a house that are used for domestic purposes. The 100 meters limit, however, does not extend beyond the homeowner's property line.

Based on the three perspectives (Built Environment, Natural Environment, and Engineering Considerations), three Alternative Routes were identified that connected the proposed Appenzell substation to the Siegfried-Jackson 138 kV transmission line (**Figure D-10**). These Alternative Route lines tapped to the Siegfried-Jackson transmission line northeast or southwest of the Village of McMichael and proceeded east in either a

“northern” or “southern” course, relative to their position when compared to the Village of McMichael, toward the proposed substation site. Initial review noted similarity in the Built and Engineering Alternative Route alignments (northern routes). Due to this similarity, these two Alternative Routes were assessed through the rest of the siting process as one route by combining them into a single route alignment. By combining the two northern routes into a single alignment the process provided two alternative routes: north route (Built/Engineering Alternatives) and south route (Natural Alternative).

3.3.2 Engineering Adjustments to Alternative Route Alignments

Based on the field observations and assessment of aerial maps, the initial Alternative Routes were modified to reflect a more practical alignment. Changes included:

- Straightening the proposed alignments in areas where the generated alignment was irregular (zigzagging through open fields).
- Setting possible pole sites to minimize potential impact to environmental and sensitive land use features. A 1,000 foot distance was used as the longest possible distance for a span between transmission line poles.
- Setting possible pole sites in positions to effectively span some features (crop fields) or to make turns that avoid other features (residential areas). Many of these modifications were implemented to decrease potential impact to farming processes.
- Placing proposed alignments along the edge of open fields or along farm roads. These modifications were also implemented to decrease potential impact to farming processes.
- Placing proposed alignments set distances, typically 100 feet, from specific property lines to decrease potential conflicts with neighboring landowners.
- Placing proposed alignments that lie within forest areas set distances, typically 100 feet, from the edge of fields. This modification was used to decrease visibility of the alignment.

The resulting alignments are described below and illustrated in **Figure D-11**.

3.4 Description of Alternative Routes

The following is a verbal description of each of the alternative routes that were identified via the analysis previously described.

3.4.1 Route A – Northern Route

Alternative Route A is 2.26 miles in length. This alternative ties into the Siegfried-Jackson 138 kV Transmission Line north of Route 715, 1.5 miles northeast of the Village of McMichael, in Chestnuthill Township. The tap location and line route would be located entirely within Jackson Township. The following narrative describes this proposed route. Note that all linear distances (feet) are approximate:

- This alternative would tap into the existing Siegfried-Jackson 138 kV Transmission Line in a forested area adjacent to the north side of Jackson Road.
- The line would then proceed 1,950 feet to the southeast, passing through two open agricultural fields and crossing over Fall Creek, an Exceptional Value (EV) classified stream. The terrain around Fall Creek is moderately steep and the 100-year floodplain is 100 feet wide.
- The line would then turn to the south for 1,900 feet. This segment would cross Price Drive and Mountain Road, span over another agricultural field, and parallel the edge of a dairy farm. To minimize impacts to these and all other crop fields, the line was adjusted to utilize farm roads and forested edges where possible
- After turning to the southeast, the line would then proceed for 3,700 feet to Frailey Road, east of its intersection with Mountain Road. In this segment, the line would proceed through 2,400 feet of forest and span an identified NWI palustrine forested (PFO) wetland area. The remaining 1,300 feet would parallel the edge of dairy or agricultural fields.
- At Frailey Road, the line would turn to the southwest and proceed for 900 feet, crossing Frailey Road and Mountain Road, before proceeding up a slope and over an agricultural field.

- At the western edge of the agricultural field, the line would turn to the south and proceed for 1,800 feet. The line would parallel the edge of the agricultural field and then cross to the south side of Route 715, west of its intersection with Mountain Road.
- After crossing Route 715, the line would turn to the east, and proceed for 1,700 feet, generally paralleling Route 715 to the south. Along this section, the line would cross over a tributary to Sand Spring Run, as well as Sand Spring Run, both of which are tributaries to Appenzell Creek, a High Quality (HQ) classified stream. The terrain around Sand Spring Run is relatively flat and the 100-year floodplain is 100 feet wide. The line will also span an identified NWI palustrine emergent (PEM) wetland area that borders the tributary to Sand Spring Run.
- The transmission line would end at the proposed substation that will be constructed at least 500 feet upslope from Sand Spring Run in an open meadow owned by Lake Akiba. The substation would be located 500 feet south of Route 715 and west of its intersection with Miller Road, about 0.5-mile from the Village of Appenzell.

3.4.2 Route B – Southern Route

Alternative Route B is 2.51 miles in length. This alternative ties into the Siegfried-Jackson 138 kV Transmission Line on the west side of Route 715, 1.0 mile southwest of the Village of McMichael, in Chestnuthill Township. The tap location would be within Chestnuthill Township and the line route would cross into Jackson Township to reach the substation. The following narrative describes this proposed route:

- This alternative would tap into the existing Siegfried-Jackson 138 kV Transmission Line in a forested area adjacent to the west side of White Church Road and 500 feet south of the existing McMichael Substation.
- The line would then proceed 2,600 feet to the east, traversing through 1,700 feet of forested areas, crossing over White Church Road, and paralleling the edge of an agricultural field.

- At this point, the line would turn to the northeast for 750 feet and across an open field.
- After turning east again, the line would proceed for 1,900 feet, passing by a vacant property that would need to be purchased, crossing over Route 715, and spanning over two parallel sections of McMichael Creek, an Exceptional Value (EV) classified stream. The terrain around McMichael Creek is relatively steep and the 100-year floodplain is 800 feet wide due to McMichael Creek being divided into two distinct stream features. An identified NWI palustrine forested (PFO) wetland area, located within the floodplain, would also be spanned. The line would then cross several small agricultural fields lying to the east of McMichael Creek.
- At this point, the line would turn to the northeast and continue for 1,400 feet, crossing through more agricultural fields and along the edge of a forested area. In these fields, the line would enter into Jackson Township.
- The line then turns north and proceeds for 750 feet across an agricultural field.
- After turning east, the line continues for 4,100 feet, paralleling the edge of two agricultural fields, crossing Sterling Road, and traversing 1,700 feet of forest. Initial portions of this segment would lie directly adjacent to the Mountain View Meadows residential development.
- The line would then turn to the northeast and proceed for 1,800 feet toward the proposed substation. In this section, the line would pass primarily through forested areas and cross over Sand Spring Run, a tributary to Appenzell Creek, which is a High Quality (HQ) classified stream. The terrain around this section of Sand Spring Run is moderately steep and the 100-year floodplain is 100 feet wide. An identified NWI palustrine forested (PFO) wetland area, located along Sand Spring Run, would also be spanned. Sand Spring Run flows into Lake Akiba just south of this segment.
- The transmission line would end at the proposed substation that will be constructed at least 500 feet upslope from Sand Spring Run in an open meadow

owned by Lake Akiba. The substation would be located 200 feet south of Route 715 and west of its intersection with Miller Road, about 0.5-mile from the Village of Appenzell.

3.5 Additional Modification of the Alternative Routes

Upon completion of the initial round of alternative route generation and subsequent modifications, additional modifications were made to Route A and Route B based on feedback from the public outreach events. These additional modifications, ultimately resulting in Route A1 and Route B1, and the justifications for them, are discussed below.

3.5.1 Overview of Public Outreach

PPL Electric conducted an extensive public outreach program for this project aimed at disseminating information to the public and gathering input from the public to incorporate into the decision-making process. This public outreach included meetings with, phone calls with and mailings to owners of property within 1,000-feet of the two alternative transmission line routes, posting on April 8, 2009 of advertisements in the Stroudsburg Pocono Record and the Lehighon Times News, distribution of a news release to local media outlets and establishment and updating of a project website (www.monroepowerproject.com).

Throughout the public outreach process, PPL Electric has responded to 39 questions and concerns from property owners, residents, and other interested persons through Open Houses, in-person meetings, personal phone calls, emails, and project update letters.

3.5.2 First Open House – Alternative Routes

An Open House was held by PPL Electric on April 20, 2009 at the Reeders United Methodist Church located near the intersection of Route 715 and Church Road in Reeders, Pa. Owners of land within 1,000 feet of Alternative Route A and Alternative Route B, including the owners of land in the required 100 foot wide right-of-way, were invited by letter to attend the Open House. The public was invited through advertisements in local newspapers. Information on the need for the new transmission line and descriptions of the proposed routes was provided with the mailed invitations.

An exhibition-styled format was employed at the workshop using a variety of displays to explain various aspects of the project. Displays were staffed by representatives of PPL Electric and other experts who explained the project to attendees, received feedback and other input from attendees, and answered questions and/or recorded questions for subsequent follow-up. The information stations at the event covered various subjects, such as the need for the line, engineering and construction requirements, right-of-way acquisition procedures, and route-selection procedures. The following six information stations were used to help provide information to the attendees:

- Station 1 – Welcome and Sign-In. Attendees were asked to sign in and were given directions to the stations and general information about the format of the meeting.
- Station 2 – Why This Project is Needed in This Area. Representatives explained that the project is needed to improve the electric delivery system in this area.
- Station 3 – Substation and Transmission Siting. Representatives described the alternative routes where the power line could be sited, as well as reasons for choosing those routes. In addition, the proposed heights of towers, as well as the proposed substation planned for the area, were discussed.
- Station 4 – Engineering. Representatives at this station explained and provided attendees with photographs of what the substation and transmission line will look like when constructed.
- Station 5 – Timeline for This Project. This station detailed the timeline that PPL Electric will follow to complete this project, including filing with the Pennsylvania Public Utility Commission for approval of the project.
- Station 6 – How You Can Stay Informed. The project team identified how to submit comments (including submitting comment cards taken during the Open House), ask further questions and receive additional information and updates regarding the project.

Results

Approximately 40 individuals attended the event. Feedback from attendees ranged from curiosity to concern.

After the Open House, residents who attended the event were mailed thank you letters. Additionally, people residing within the 1,000 feet of the proposed alternative line routes who did not attend the event were mailed a letter which updated them about the Open House and provided contact information for them to express comments, questions or concerns about the project to PPL Electric.

Specific feedback on possible modifications to the two original Alternative Routes was obtained and is illustrated as two new Alternative Routes (A1 and B1) in **Figure D-12**. Landowner requests regarding line adjustments on their property included the following:

Route A changes – Route A1

- Two landowners requested that the tap location and transmission line be moved to a different portion of their property on the south side of Jackson Road. This change would have the alignment proceed for 3,100 feet in a southeasterly direction before crossing Mountain Road, just south of its intersection with Jackson Road, and meet with the original alignment at the southern end of a dairy farm. This realignment would reduce the line length in this area by 750 feet. The new route would parallel the edge of two agricultural fields and cross Fall Creek, an Exceptional Value (EV) classified stream. The terrain around this section of Fall Creek is relatively flat and the floodplain is 500 feet wide. An identified NWI palustrine forested (PFO) wetland area is located within the floodplain and a second PFO area is located immediately to the southeast. Every attempt will be made to span this wetland with just an overhead line crossing with no impacts to the wetland. The last 700 feet of this realignment would parallel a property line. This landowner, who also owns the dairy farm and agricultural field near the Mountain Road and Jackson Road intersection, recommended the realignment and noted he would prefer the line passing along the back of his property rather than through the open expanse in his front yard.

- Three landowners near the Mountain Road and Frailey Road intersection provided feedback that would make the aerial crossing of these roads less complicated. The first landowner, who lives on the north side of the Mountain Road and Frailey Road intersection, requested that the alignment be moved 50 feet west into the tree line rather than along the edge of his agricultural fields. This change resulted in a new angle that was directed toward a landowner on the west side of Mountain Road, who indicated that he would agree to have the line cross over the southern portion of their property to allow for a straighter alignment and to possibly eliminate the need for an additional pole in the agricultural field to the southwest. The landowner of the agricultural field recommended this change in the proposed alignment as it reduces potential impacts on active farm operations.
- On the south side of Route 715, the landowner suggested that the line be moved further south before turning east toward the proposed substation. Although this alignment reduces the visibility of the line from Route 715, it does extend the overall length by 200 feet. Soil information also indicates that much of the land adjacent to Sand Spring Run may be a wetland that can easily be spanned.

The changes noted above were implemented and the result was Alternative Route A1, which was added to the list of alternative routes to be further evaluated in the Selected Route process. Alternative Route A1 is approximately 2.13 miles in length, which is relatively shorter than the original Route A.

Route B changes – Route B1

- The property at the proposed tap location is owned by PPL Electric. A site review of the property indicated the presence of headwater streams and wetland areas. The new alignment would proceed further south before crossing White Church Road and turning to the east.
- On the east side of McMichael Creek, adjacent landowners requested that the alignment be streamlined across their agricultural fields to reduce the number of poles and the potential impact on farming operations. This alignment, which would travel just north of the original alignment, would reduce the overall length by 200 feet.

- Landowners of a large farm near the intersection of Sterling Road and Akiba Road requested that the alignment be moved to the front of their property, which is used for grazing cows, rather than along the back, which is used for growing crops. This alignment would parallel a wooded area on the west side of the property, turn sharply south toward Akiba Road, turn sharply east at the road, parallel the road for 1,500 feet, cross Sterling Road, and proceed in a northeasterly direction toward the eastern edge of the property. These changes would bring the line within 200 feet of the farmstead, as well as increase the overall length of the line by 600 feet.
- Several landowners to the east of Sterling Road suggested that the alignment be moved to the southern edge of their wooded lots to reduce forest fragmentation. These modifications would reduce the forest impact by 1,000 feet, but move the alignment further to the south, where it would be closer and possibly more visible from Akiba Lake, an organized recreational retreat. The suggested alignment would also cross a PFO wetland area on a slanted angle that may increase the overall wetland impact.

The changes noted above were implemented and the result was Alternative Route B1, which was added to the list of alternative routes to be further evaluated in the Selected Route process. Alternative Route B1 is approximately 2.63 miles long, which is longer than the original Route B. All four Alternative Routes are illustrated in **Figure D-12**.

4.0 ROUTE SELECTION PROCESS

4.1 Evaluation Metrics

The decision process of identifying the Selected Route involves quantitatively evaluating the advantages and disadvantages of the various Alternative Routes (see **Figure D-12**), and then qualitatively assessing the various routes based on less tangible criteria using team based expert judgment. Initial steps in this process require calculating the evaluation metrics of the various routes and summarizing these data in a tabular form organized within the three perspectives (Built Environment, Natural Environment, and Engineering Considerations). The metrics used for this evaluation process are defined in **Table D-1**.

Evaluation metrics provide detailed information on relative lengths, acres of easement, and particular circumstances. Specific evaluation metrics answer questions regarding the length of the alternative route, acres of wetland crossing, and number of road crossings.

Constraint data (e.g. linear feet of wetland's crossed, houses within 300 feet, etc) are recorded on a variety of scales/units, including aerial, linear, and point. It is common for one route, for example, to cross 100 linear feet of wetland, while another might cross 10 feet of wetland and be in close proximity to 100 houses; which then, is the "better" route? Data normalization is required at this point to allow for the meaningful comparison of the routes using these measurement values, e.g., miles of line and acres of wetlands. Normalizing the data allows the underlying characteristic of the data sets to be compared by removing the units (feet, acres, etc) associated with the various measurements.

This is achieved by first comparing a single constraint value for a given route against the other same constraint value of the alternative routes. To use an example from this study we first determine which routes have the "lowest" and "highest" potential wetland impacts by comparing the range of values between the routes. This range lies between 3.14-acres for Route B to 7.46-acres for Route A1. A normalization calculation is used that assigns each route a value, based in this case, on a scale of 0 – 100. 0 for this study is assigned to the lowest potential impact route and 100 to the highest potential impact route; the other routes are assigned a value in between the 0 – 100 based on their relative

potential impact when compared between the lowest and highest scoring routes. This same process is then used to assign a value on the 0 – 100 scale for all the metrics being evaluated, e.g., acres of natural forests impacted, number of road crossings, and number of residences with 300-feet of the line.

The Tabular Summary of the Alternative Routes (**Table D-2**) illustrates the raw metric and corresponding normalized values for the four Alternative Routes.

TABLE D-1: Metric Definitions

Built Environment
NRHP Listed/Eligible Structures/Districts: Identifies the number of historic structures or districts that would be located adjacent to the transmission line. No NRHP features were noted within the core project study area or within 2-miles of the selected route.
Residences within 300': Residences that may be visually impacted by the proposed transmission line.
Proposed Housing Developments: Areas that have physical indications of new residential development or that were obtained from review of township records.
Commercial Buildings within 300': Structures would include retail stores, restaurants, and service garages. Project specific commercial structures also included certain barns that were used in commercial activities.
Industrial Buildings within 300': Structures would include steel mills, power plants, or quarries.
School, Day Care, Church, Cemetery, or Park Parcels: Identifies the number of areas where the transmission line would border any of these sensitive land uses.
Non-condemnable Properties: Properties that contain residences that lie within 100-meters of or have their curtilage crossed by the proposed transmission line.
Natural Environment
Natural Forests: Acres of forest potentially impacted by the proposed transmission line.
Stream/River Crossing: Number of streams that will be crossed by the proposed transmission line. Values based upon use of GIS stream data. Smaller tributaries are often not identified in the GIS database, thus the number of crossings may be higher.
NWI Wetlands and Hydric Soils: Acres of potential wetlands that will be crossed by the proposed transmission line. NWI (National Wetland Inventory) features were mapped over 20 years ago and are not highly accurate. Hydric soils indicate areas with high potential for wetland features. Soils with hydric inclusions, which also have a high wetland potential, were not used in the assessment, thus the area of potential wetlands may be higher.
Floodplain Areas: Acres of floodplains that will be crossed by the proposed transmission line. Values based on State generated GIS FEMA floodplains, where available, or use of the PADEP accepted 50-foot default floodway limit rule on either side of a known stream (approximately 100 feet wide).
Engineering Variables
Length: Length of transmission line as calculated by GIS analysis
Miles parallel with Roads: Length of proposed transmission line adjacent to (within 100') of roadway. These areas have easier access for construction and maintenance. Conversely, length of line distant from roadways will have higher engineering constraints.
Number of Road Crossings: Number of times the proposed transmission line crosses a public road. These areas have engineering constraints due to height requirements.
Areas of Steep Slopes (>25%): Acres of steep slopes crossed by the proposed transmission line. These areas have engineering constraints based on access road development, pole placement, and long-term maintenance.
Number of Parcels: Identifies the number of different landowners associated with the proposed transmission line.
Estimated Total Project Costs: Value to be estimated based on total length

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TABLE D-2: Tabular Summary of Alternative Routes

METRIC		APPENZELL - ROUTE A	APPENZELL - ROUTE B	APPENZELL - ROUTE A1	APPENZELL - ROUTE B1
BUILT ENVIRONMENT	NHRP Listed/ Eligible Structures/ Districts	0	0	0	0
	<i>Normalized</i>				
	Residences (w/in 300ft of transmission center line)	13	14	14	8
	<i>Normalized</i>	83	100	100	0
	Proposed Housing Developments	0	0	0	0
	<i>Normalized</i>				
	Commercial Buildings (w/i 300ft of transmission center line)	0	1	0	1
	<i>Normalized</i>	0	100	0	100
	Industrial Buildings (w/in 300ft of transmission center line)	0	0	0	0
	<i>Normalized</i>				
	School, Day Care, Church, Cemetery, Park Parcels	0	0	0	0
	<i>Normalized</i>				
	Non-condemnable Properties	0	1	0	1
	<i>Normalized</i>	0	100	0	100
NATURAL ENVIRONMENT	Natural Forests (acres)	10.04	13.48	14.54	15.15
	<i>Normalized</i>	0	67	88	100
	Stream/River Crossings (#)	3	3	4	3
	<i>Normalized</i>	0	0	100	0
	NWI Wetlands & Hydric Soil Areas (acres)	6.62	3.14	7.46	3.86
	<i>Normalized</i>	81	0	100	17
	Floodplain Areas (acres)	0	1.66	0	1.65
<i>Normalized</i>	0	100	0	99	
ENGINEERING VARIABLES	Length (miles)	2.26	2.51	2.13	2.63
	<i>Normalized</i>	26	76	0	100
	Miles of Rebuild w Existing T/L	0	0	0	0
	<i>Normalized</i>				
	Miles of Co-location w Existing T/L	0	0	0	0
	<i>Normalized</i>				
	Miles parallel w/ Roads	0.15	0	0	0.28
	<i>Normalized</i>	46	100	100	0
	Number of Road Crossings	5	3	3	3
	<i>Normalized</i>	100	0	0	0
	Areas of Steep Slopes (> 25%)	0	0	0	0
	<i>Normalized</i>				
	Number of Landowners	7	12	8	12
	<i>Normalized</i>	0	100	20	100
Total Project Costs	2285175	2526434	2153727	2647220	
<i>Normalized</i>	27	76	0	100	



4.2 Weighting Procedures and Modifications

The normalized metric values derived from **Table D-2** were further adjusted through a weighting process shown in Weighted Metrics and Weighted Totals (**Table D-3**). As noted in **Section 2.0**, in its simplest form, weighting is a recognition that under certain circumstances, one evaluation criteria is more important or relevant in determining an outcome than another. For example, locating a transmission line close to a residential neighborhood is seen as less preferable if compared to locating close to an industrial development area. As another example, a route through an urban, paved setting is essentially an engineering problem (i.e. the route is severely limited by where the line physically can go). Conversely, a route through a nationally recognized ecological preserve with the addition of known sensitive archaeological resources will be decided by the least ecologically and culturally sensitive routes, rather than the most practical for an engineering perspective. Therefore, it is clear that weights can, and indeed should, be evaluated on a case by case basis. As with the route alignment generation the URS and PPL Electric siting team reviewed the weight criteria and assigned weights based on expert judgment.

In the first procedure noted in **Table D-3**, the metric values are assessed based on a relative weight assigned to each specific metric, e.g., Proximity to Residences is assigned a weight of 16.3%, while Proximity to Industrial Buildings is assigned a weight of only 1.8%. This weighting ensures that the features requiring the most “protection” are assigned a higher relative influence in the final ranking. Relative weights for all the metrics within each perspective (Built Environment, Natural Environment, and Engineering Considerations) must add up to 100%. The total of the weighted metrics within each perspective is summarized and illustrated on the line titled “Total” at the bottom of the perspective (e.g., Route B has a Total of 21 for the Built Environment.)

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TABLE D-3: Weighted Metrics and Weighted Totals

PERSPECTIVE / METRICS	Perspective Weight / Metric Weight	APPENZELL - ROUTE A	APPENZELL - ROUTE B	APPENZELL - ROUTE A1	APPENZELL - ROUTE B1
BUILT	33.0%				
NHRP Listed/ Eligible Structures/Districts (1500ft from edge of R/W)	15.5%				
<i>Weighted</i>					
Residences (w/in 300ft of transmission center line)	16.3%	83	100	100	0
<i>Weighted</i>		14	16	16	0
Proposed Housing Developments	5.4%				
<i>Weighted</i>					
Commercial Buildings (w/in 300ft of transmission center line)	3.6%	0	100	0	100
<i>Weighted</i>		0	4	0	4
Industrial Buildings (w/in 300ft of transmission center line)	1.8%				
<i>Weighted</i>					
School, Day Care, Church, Cemetery, Park Parcels (#)	13.1%				
<i>Weighted</i>					
Non-condemnable Properties	44.3%	0	100	0	100
<i>Weighted</i>		0	44	0	44
TOTAL	100.0%	14	64	16	48
WEIGHTED TOTAL		4	21	5	16
NATURAL	33.0%				
Natural Forests (acres)	15.0%	0	67	88	100
<i>Weighted</i>		0	10	13	15
Stream/River Crossings (#)	32.3%	0	0	100	0
<i>Weighted</i>		0	0	32	0
NWI Wetlands & Hydric Soil Areas (acres)	40.3%	81	0	100	17
<i>Weighted</i>		32	0	40	7
Floodplain Areas (acres)	12.4%	0	100	0	99
<i>Weighted</i>		0	12	0	12
TOTAL	100.0%	32	22	85	34
WEIGHTED TOTAL		11	7	28	11
ENGINEERING	33.0%				
Length (miles)	40.0%	26	76	0	100
<i>Weighted</i>		10	30	0	40
Miles of Rebuild w Existing T/L	0.0%				
<i>Weighted</i>					
Miles of Co-location w Existing T/L	0.0%				
<i>Weighted</i>					
Miles parallel w/ Roads	0.0%	46	100	100	0
<i>Weighted</i>		0	0	0	0
Number of Road Crossings	10.0%	100	0	0	0
<i>Weighted</i>		10	0	0	0
Areas of Steep Slopes (> 25%)	25.0%				
<i>Weighted</i>					
Number of Landowners	15.0%	0	100	20	100
<i>Weighted</i>		0	15	3	15
Total Project Costs	10.0%	27	76	0	100
<i>Weighted</i>		3	8	0	10
TOTAL	100.0%	23	53	3	65
WEIGHTED TOTAL		8	17	1	21
SUM OF WEIGHTED TOTAL		23	45	34	48



In the second weighting process noted in **Table D-3**, the Weighted Total for each route, within the three perspectives, is further assessed based on the relative weight assigned to the different perspectives (i.e., the 33% noted at the top of the Perspective Weight/Metric Weight). The three perspectives (Built Environment, Natural Environment, and Engineering Considerations) were reviewed by the siting team to determine if there were any exceptional conditions relevant for this project that would validate an additional higher relative weighting of one perspective over another. To reference our earlier example, a route through a nationally recognized ecological preserve might indicate that an additional emphasis be placed on the natural environment perspective. Since no exceptional conditions were determined by the siting team each perspective was assigned an equal weight (33%). The result of these perspective weights on the weighted metric total is illustrated on the line titled “Weighted Total”, also located at the bottom of each perspective. The Weighted Total values for the entire process are summed at the bottom of the table on the line titled “Sum of Weighted Total”. This Sum of Weighted Total result effectively shows which of the routes has the lowest cumulative impact (i.e., a low number is preferred) to the built and natural environment while being technically feasible to construct from an engineering perspective.

Review of these cumulative values indicates that both of the southern routes, Route B (48) and Route B1 (45), would produce significantly more costs and impacts relative to both of the northern routes, Route A (23) and Route A1 (34). Specifically, inspection of the Built Environment and Engineering Consideration Perspectives notes considerable variation between the southern and northern routes. Weighted Total metrics for the Built Environment, for example, note higher values for Routes B (21) and B1 (16) relative to the values noted for Routes A (4) and A1 (5). The higher metrics for the southern routes result from presence of a property that would need to be purchased along the proposed routes. Similarly, Engineering Restriction metrics note higher values for Routes B (17) and B1 (21) relative to the values noted for Routes A (8) and A1 (1). These higher metrics for the southern routes result from the increased number of landowners involved along the proposed alignments and a greater total length.

The final summed and weighted metric value for both of the northern routes are also notably different. These differences are primarily evident in regards to the Natural

Environment Perspectives. Weighted Total metrics for the Natural Environment Perspective note higher values for Route A1 (28) relative to Route A (11). These higher metric values for Route A1 reflect the increased number of stream and wetland crossings along this route.

4.3 Expert Judgment Process and Discussions

The last step in identifying the Selected Route involved the qualitative assessment of the Alternative Routes using team based expert judgment. Team members assessed the different routes based on the following qualitative criteria: Visual Concerns, Community Concerns, Schedule Delay Risk, Special Permit Issues, and Construction/Maintenance/Accessibility. These criteria were determined by the siting team to be most relevant to this study. As illustrated on the Expert Judgment Form (**Table D-4**), each of these variables was assigned a weight based on its significance within the scope of the project. Each of the variables on the Expert Judgment Form was ranked by the team members on a one-to-three (1-3) scale, with one (1) indicating a low impact and three (3) indicating a high impact.

TABLE D-4: Expert Judgment Form

Criteria	Weights	Appenzell - Route A	Appenzell - Route B	Appenzell - Route A1	Appenzell - Route B1
VISUAL ISSUES	10%	2	2	1	2
<i>Weighted</i>		0.2	0.2	0.1	0.2
COMMUNITY ISSUES	30%	2	3	2	2
<i>Weighted</i>		0.6	0.9	0.6	0.6
SCHEDULE DELAY RISK	20%	1	3	1	3
<i>Weighted</i>		0.2	0.6	0.2	0.6
SPECIAL PERMIT ISSUES	30%	3	2	3	2
<i>Weighted</i>		0.9	0.6	0.9	0.6
CONSTRUCTION/MAINTENANCE / ACCESSIBILITY	10%	2	1	1	1
<i>Weighted</i>		0.2	0.1	0.1	0.1
TOTALS	100%	2.1	2.4	1.9	2.1

*Expert Judgment Form ranked on a scale of 1-3 with 1 indicating a low impact and 3 a high impact

The weights assigned to the variables were reviewed by the siting team to determine appropriate values relative to the initial EPRI values. Considerations included:

- **Community concerns** were ranked higher (from 25% to 30%) due to the response from the surrounding community concerning the potential for health issues, specifically in regards to EMF.
- **Visual concerns** related to the development of a new transmission line right-of-way through a relatively undeveloped portion of Monroe County were considered a significant change to the landscape. The weight for this category was adjusted higher (from 5% to 10%) to account for this change.
- **Schedule delay risks** were ranked lower (from 30% to 20%) due to the proactive public outreach and open house program that had created constructive opportunities to discuss right-of-way acquisition from the pertinent landowners, which improved the prospect of alignment modifications that further reduced the schedule delay.

4.3.1 Comprehensive Plans and Zoning Review

In preparation for the Expert Judgment process, the siting team reviewed relevant county and local documents regarding planned growth and preservation of open space, including the Monroe County Comprehensive Plan (1999), Monroe County Open Space Plan (2001), West End Open Space Plan (Chestnuthill Township) (2003), HJP Open Space and Recreation Plan (includes Jackson Township) (2003), and a Regional Joint Comprehensive Plan (includes Chestnuthill and Jackson Townships) (2006). The siting team also reviewed current zoning and land development ordinances for Chestnuthill and Jackson Townships to determine if possible adjustments to the line routes, pole heights, or pole locations, needed to be made to adhere to these ordinances. Information from the county comprehensive plan indicated the region has a strong potential for growth for all utilities. The county open space plan further acknowledges that the high voltage transmission lines have a multiple use potential as recreation and greenway corridors.

Conversely, the local comprehensive and open space plans do not address transmission lines or their right-of-ways. In regards to local ordinances, Chestnuthill Township defers

to the Pennsylvania Public Utility Commission (PUC) to decide that the utility in question is reasonably necessary for the convenience or welfare of the public. Jackson Township ordinances note that public utility uses are permitted in any zoning district with a special exception permit, which is issued after the Zoning Hearing Board determines that specific location and design criteria have been met. Chestnuthill Township ordinances related to height restrictions specifically notes that electric transmission lines are exempt. Jackson Township has a similar height ordinance that specifically notes the exemption of public utility structures.

All of these items were considered during the Expert Judgment process and were incorporated into the decision-making process where practical.

4.3.2 Visual Concerns

Initial Team discussions focused on visibility concerns. As noted in **Exhibit E** (Design and Engineering), the transmission line network would utilize single pole structures that would be between 95 to 105 feet in height and have a average line span length of 500 to 600 feet, which is similar to the existing Siegfried-Jackson 138 kV line that is located within the project study area. Team members revisited the field assessment that they conducted to assess the visibility of the existing Siegfried-Jackson 138 kV line, which occurred in mid-winter and early-spring when leaf cover was low and the ability to evaluate the landscape high. Reviewing the surrounding and similar land use and land cover of the new route alignments to this existing route offered an excellent comparison frame of reference for potential visual impacts.

During those field visits, it was observed that the existing Siegfried-Jackson 138 kV alignment (poles and line) was most visible while crossing over steep slope areas and in the open agricultural and tree farm areas, but that visibility decreased significantly in the mature forested areas, which have an average height of approximately 75 to 85 feet. In these forested areas, the tops of the transmission poles extended minimally above the treetops and were indiscernible from a distance. From the perspective of the various residential developments through which it passed, the visibility of the Siegfried-Jackson 138 kV alignment was notably evident in the unforested residential communities, but usually imperceptible within the forested residential areas. Due to the dense tree growth,

the alignment was generally hidden by the forest and could not be distinguished at a distance of 100 feet within the forested areas. It should be noted that many of these residential developments, which have housing units within 100 feet of the existing alignment, were developed after the construction of the Siegfried-Jackson 138 kV transmission line. Also observed during the field visit was that the undulating topography actually decreased the visibility of the alignment relative to adjacent residential communities and potential view points located along the local roadways.

Based on this information, team discussions concluded the following:

- Poles will need to be placed adjacent to all road crossings to maintain a required distance above the local distribution and communication network that parallels the road; poles at these locations would have the highest visibility
- Span length between poles could extend up to 1,000 feet in highly desirable areas, such as along or over steep slopes, or over stream and wetland crossings
- Visibility of the poles may not be reduced in areas of steep slopes due to the need to construct sturdier pole arrangements required to support the added span length
- However, because increasing span length would result in fewer poles, increasing span length may reduce visual impact
- Through the use of selective pole placement, the visibility of the alignment could be reduced by utilizing lower topographic spots or bypassing around, rather than over, higher topographic spots
- Visibility of the poles within agricultural areas could be reduced by paralleling the alignment with adjacent tree lines that typically border the productive fields

In regards to the different Alternative Routes, the Expert Judgment Team concluded that visibility concerns were deemed more problematic for Alternative Routes A, B, and B1. This conclusion was based on the observation that, in its northern section, Route A would concurrently cross several open agricultural fields and two roads (Mountain Road, Price Road), of which Mountain Road is a significant connector road in the area, and, in its southern section, would parallel a densely populated segment of Route 715, a major thoroughway in the area. In the central section of Route B, the alignment would traverse

along the edge of an agricultural field that is paralleled to the north by an unforested residential development, with a narrow strip of deciduous trees separating the two land uses. Similarly, in the central section of Route B1, the alignment would cross several open fields, proceed over a secondary road (Sterling Road), and then parallel a segment of Akiba Road, another significant connector road in the area.

Comparatively, Route A1 crosses many of the same roads as Route A, but the alignment is set back further from the roads and crosses these features at more indiscernible locations. As such, the Expert Judgment Team concluded that Route A1 would have the least visibility concerns.

4.3.3 Community Concerns

Community concerns raised in response to the proposed transmission line range from potential personal affects (Electric and Magnetic Fields (EMF), visual) to potential community-wide affects (decrease in property values, impacts to environment). To proactively address some of these concerns, PPL Electric has communicated the alignment rationale and route options via newspaper announcements and residential mailings, conducted two Open Houses, maintained an e-mail and phone system to document and address specific concerns, and met individually with numerous landowners. These measures have significantly improved the alignment analysis by presenting landowners opportunities to provide guidance on potential route alignments across their properties. Neighboring landowners have also benefited by being presented information on the nature and limits of potential EMF from the proposed alignment, as well as the limited impact of the alignment on property values.

Despite these measures, some concerned citizens have voiced their concern regarding the potential impact of EMF on the health and welfare of the surrounding population. Although many of these individuals did attend the Open Houses, they stated that they were not satisfied by the answers that were provided and have obtained some rebuttal information that supports their concerns. The concerns of these individuals, all of whom live on or near the various proposed alignments, are being proactively addressed by PPL through on-going communications.

Since the primary community concern has been common to the different Alternative Routes, the Expert Judgment Team concluded that the concerns were present for all four potential routes. Route B, however, which borders a residential development, was deemed to have the most concentrated community concern.

4.3.4 Schedule Delay

Risk of schedule delay is directly related to the other variables discussed under the Expert Judgment section. For example, negative community reaction, complicated right-of-way acquisition, additional field studies for environmental permit clearance, and construction complexity can result in delayed schedules. As is discussed in these different sections, many of the potential reasons for schedule delays along each of the Alternative Routes are being proactively addressed.

In regards to the different Alternative Routes, the Expert Judgment Team concluded that schedule delay concerns were deemed more problematic for the southern routes (Route B and Route B1). This conclusion was based on the existence of a non-condemnable property that is common to both alignments.

Assessment of Alternative Route A compared to A1 concluded that both routes would have similar schedule delay issues. Route A has a relatively higher construction complexity due to the number of road crossings and alignment turns, whereas Route A1 would span more intricate wetland and stream networks, which may require additional environmental studies.

4.3.5 Special Permit Requirements

There are various types of permits that may be required for the development of a new transmission alignment. Depending on the degree of stream or wetland impact, the U.S. Army Corps of Engineers (USACE) may require that a Section 404 encroachment permit be obtained for work conducted in these areas. A similar permit (Section 105) from the Pennsylvania Department of Environmental Protection (PADEP) would also be required for these activities. For specific low-impact activities, such as aerial stream crossings, minor road crossings, and temporary stream crossings, PADEP may require General Permits to be obtained. PADEP, in conjunction with the county conservation district,

may also require permits for stormwater discharge activities. The special permit requirements for stormwater discharge increase depending on the water quality of the receiving stream, thus HQ and EV streams having more stringent protection. Other permits, such as for highway occupancy or aviation safety, may be required from other specific state or federal agencies.

Often, to acquire these permits, other forms of studies and clearances need to be conducted and obtained. For example, to obtain the USACE Section 404 permit, the wetland and stream boundaries need to be confirmed through a jurisdiction determination conducted by the USACE. Furthermore, specific studies related to threatened and endangered species or historic and cultural features also need to be conducted, and documented compliance with the appropriate government agency obtained, prior to receiving the Section 404 permit. The complexity of the permits and their associated requirements depend upon the environmental and cultural context of the proposed activities.

Team discussions focused on the cultural and environmental information acquired for the project study area through literature review and field visits. Based on these sources, potential studies for cultural/historic features and threatened/endangered species are equally relevant for all of the alternatives. Differences between the various routes were more evident in regards to wetland/stream impacts. From the Alternative Route assessment, it was concluded that all of the routes would cross several HQ or EV streams, as well as pass through NWI wetlands and adjacent areas with hydric soils. For example, from the field visits, it was observed that the wetland and stream complex associated with Sand Spring Run, located south of Route 715, would be a very difficult area to construct transmission poles and span transmission lines without impacting the permitted features. The proposed work would be further complicated by the additional stormwater requirements that would need to be addressed to protect the stream network, which is designated as HQ.

In regards to the different Alternative Routes, the Expert Judgment Team concluded that permit requirement concerns were deemed substantial for all four potential routes. The northern routes (Route A and Route A1), however, were considered to have the most

potential special permit issues. This conclusion was based on permit requirements anticipated for crossing a relatively higher wetland area compared to the southern routes (Routes B and B1). Compared to each other, Route A would require more roadway crossing permits relative to A1, but A1 would require more environmental permits for crossing Fall Creek, a designated EV stream that is divided into two paralleling segments along this route.

Compared to each other, an assessment of Route B to Route B1 concluded that the difference in the potential special permits associated with these two routes would not be significant. Each of these routes traverses similar landscapes and cross the same wetlands and stream valleys in generally the same locations.

4.3.6 Construction/Maintenance/Accessibility

Discussions for this section took into consideration the variables involved in constructing a transmission line network, conducting mandatory routine maintenance of the facilities, and providing appropriate access to all the required areas. Initial construction phases require the use of various types of heavy machinery (i.e., bulldozers, cranes, cement mixers) that need to traverse the landscape to the proposed pole positions. These vehicles aid in leveling out the access roads and footer/pad areas, digging the footer or creating the concrete foundations, and erecting the pole structures. Typically, wire installation is conducted by hand, with construction personnel carrying lighter leader lines between poles and using small power equipment to pull the line taught and haul the heavier line into place. This process often allows the lines to be strung over wetlands or stream valleys, thereby decreasing potential impacts to protected features and avoiding steep slopes. Due to the ability to bypass certain complex areas between the poles, the access road system does not necessarily need to extend for the entire length of the proposed alignment. This decrease in access road length also reduces the potential for various permits. The access road system would only need to assure admission to the pole locations for routine inspections and maintenance requirements.

Based on this information, team discussions concluded the following:

- Construction and maintenance access over agricultural areas would utilize existing farm roads wherever possible, thereby eliminating access road construction at these locations
- Span length between poles could extend up to 1,000 feet in highly desirable areas, such as along or over steep slopes, and over stream or wetland crossings

In regards to the different Alternative Routes, the Expert Judgment Team concluded that constructability and maintenance concerns were relatively unproblematic for all four of the routes. This conclusion is based on the observation that a majority of these alignments cross or parallel the edge of open agricultural fields and none are impeded by areas of steep slopes. Identified constraints, such as the relatively higher prevalence of wetland areas along the northern routes (Route A and Route A1) and the relatively higher prevalence of forested areas noted along the southern routes (Route B and Route B1), may add to the construction or maintenance difficulty, but these forms of barriers can be readily addressed through practical engineering and proactive right-of-way management. Of the various routes, the Team concluded that the construction of Route A would present more complex issues based on the increased number of proposed alignment turns located along that route.

4.4 Expert Judgment Conclusion of Selected Route

The following summarizes the variables reviewed and conclusions determined by the Expert Judgment Team:

- Visibility concerns were deemed least problematic for Alternative Route A1 when compared to other three routes (Routes A, B, and B1). This conclusion was based on the observations that Route A1 is set back further from local roads and crosses these features at more indiscernible locations. The other alignments either parallel closely along sections of primary roads or along the edge of residential developments, making these routes more visible to the surrounding community.
- Community concerns, which have been centered on the health and safety issues associated with EMF, were present for all four potential routes. Route B,

however, which borders a residential development, was deemed to have the most concentrated community concern.

- Schedule delay concerns were deemed more problematic for the southern routes (Route B and Route B1). This conclusion was based on the existence of a property that would need to be purchased that is common to both alignments.
- Permit requirement concerns were deemed more problematic for the northern routes (Route A and Route A1) compared to the southern routes (Route B and Route B1). This conclusion was based on permit requirements anticipated for Route A, which has a relatively higher construction complexity due to the number of road crossings and alignment turns, and Route A1, which would span more intricate wetland and stream networks and may require additional environmental studies.
- Constructability concerns were deemed relatively unproblematic for all four of the routes. Of the various routes, construction of Route A was deemed to be relatively more complex based on the increased number of proposed alignment turns located along that route.

Expert Judgment Team values illustrated in **Table D-4** indicate that Route A1 scored the best and Route B scored the worse out of the four routes. This was due primarily to the community concerns and schedule delay risks associated with the Route B alignment. The lower (better) scoring routes, Routes A, A1, and B1, reflect more desirable circumstances, but Route A1 scored better due to less visibility issues, schedule delay risks, and constructability concerns. Therefore, based on the quantitative assessment of the Alternative Routes, in conjunction with the qualitative Expert Judgment process, **Route A1** was chosen as the Selected Route, which is illustrated on **Figure D-13**.

4.5 Second Open House – Selected Route

PPL Electric held a second Open House at the Reeders United Methodist Church on June 16, 2009 to announce its plans to construct the transmission line along a modified version of proposed Alternative Route A1. The Selected Route, as presented at the Second Public Open House meeting, is shown in **Figure D-13**. Owners of land within 1,000 feet

of the proposed Alternative Route A1 were invited to this Open House through a letter and all residents of the area were invited through advertisements that appeared on June 9, 2009 in the Stroudsburg Pocono Record and the Lehigh Times News. At the same time as the selection of Route A1 was announced, property owners residing along alternative Route B and B1, and identified areas along Route A, were mailed letters stating that these routes had not been selected for the project. Approximately 28 property owners and other interested persons attended the second event. Most of the property owners who attended the Open House listed mailing addresses in Stroudsburg, Pa.

Results

Some residents who attended this Open House expressed concerns with placing the line along proposed Alternative Route A1:

- Several attendees perceived that there would be a loss in property value due to proximity of the selected route to their homes.
- Two attendees expressed concerns about health issues related to the project.
- One resident discussed at length his concerns with Electric and Magnetic Fields (EMF) related to the transmission line.

After the second Open House, property owners and other interested persons who attended the event were mailed thank you letters and residents along the 1,000 foot corridor of Alternative Route A1 who did not attend were mailed an Open House update letter.

Specific modifications to the Selected Route were provided by the landowners during the Second Open House some of which PPL Electric decided to implement. These changes are reviewed below and illustrated in **Figure D-14** (Selected Route).

- A landowner on west side of Mountain Road and Jackson Road intersection requested that alignment proceed around northern side of house, across Mountain Road, and into dairy field east of house. This alignment remains within 100 feet of the house, but conflicts less with neighboring landowner bordering the back of the property.

- A landowner on the northeast corner of Frailey Road and Mountain Road intersection requested that the alignment be moved back to the eastern edge of the agricultural field rather than through the wooded section on western edge. This alignment places a potential pole location close to the floodplain of Sand Spring Run (estimated to be 100 feet wide) and increases the overall length by 350 feet. The request was made to move the line further away from a house located in the western woods.
- A landowner on the south side of Route 715 requested that the alignment be moved to the north so that it would parallel the southern edge of Route 715. This adjustment would increase the visibility of the alignment, as well as possibly increase the complexity involved in crossing the wetlands and floodplain area associated with Sand Spring Run. The request was made to improve development options for the property.
- The length of the Selected Route is 2.18 miles.

4.5.1 Summary of Additional Communications

Since this project was announced in April 2009, PPL Electric has received two letters from nearby property owners expressing concerns with the project. The first letter spoke in opposition of the company potentially selecting Alternative Route B as the project route. PPL Electric responded to this letter stating that a modified version of Route A was selected. The second letter was from a resident who expressed concerns about EMF related to transmission lines. PPL Electric issued a response letter to this customer to address these concerns.

In addition to comments made to PPL Electric at both Open Houses and the above mentioned letters, since the project was announced, the project team has also worked to respond to 7 other inquiries received by email and phone. A majority of these inquiries received through the project website have dealt with concern about the lines' proximity to homes and environmental concerns about placing the line through undeveloped, natural areas. PPL Electric has responded to each of these inquiries expressing a willingness to listen to the concerns of interested persons and work to complete this project in a way that minimizes its impact.

4.6 Description of Selected Route

The Selected Route, described below and illustrated in **Figure D-14** and the **Map-D Pocket**, was primarily developed through aerial analysis of the environmental, cultural, and social characteristics of the study area, as well as limited field assessment of the proposed alignment. Through this process, all airports and potential archeologic, geologic, historic, scenic, or wilderness areas within two miles of the selected route right-of-way have been located and identified. Further studies into these valued items, primarily archeologic, are still in process. As such, minor changes to this alignment are anticipated as more in-depth information becomes available.

The Selected Route is 2.18 miles in length. The route will tie into the Siegfried-Jackson 138 kV Transmission Line in Jackson Township, north of Route 715 and 1.5-mile northeast of the Village of McMichaels. The following narrative describes the alignment of this route:

- This alternative would tap into the existing Siegfried-Jackson 138 kV Transmission Line at the edge of an agricultural field south of Jackson Road.
- This alignment would then proceed for 3,100 feet in a southeasterly direction before crossing Mountain Road, just south of its intersection with Jackson Road. The route would parallel the edge of two agricultural fields and cross Fall Creek, an Exceptional Value (EV) classified stream, which has split into two segments along this route. The terrain around this section of Fall Creek is relatively flat and the floodplain is 500 feet wide due to the stream being spilt into two parallel segments. Two NWI palustrine forested (PFO) wetland areas are located within and adjacent to this section of the alignment.
- Prior to crossing Mountain Road, the alignment would angle around the northern side of a residential home and proceed into a dairy field east of Mountain Road. The alignment will pass within 100 feet of the residential home, but the landowner, who owns the dairy farm and agricultural field near the Mountain Road and Jackson Road intersection, has concurred with the alignment.

- After crossing Mountain Road, the alignment would turn to the southeast and proceed for 3,700 feet to Frailey Road, east of its intersection with Mountain Road. In this segment, the line would proceed through 2,400 feet of forest and span an identified NWI palustrine forested (PFO) wetland area. The remaining 1,300 feet would parallel the edge of the dairy farm or cross over an agricultural field near Frailey Road. The alignment over this field would cross from the western edge to the eastern edge, placing the alignment within close proximity to Sand Spring Run, which has moderately steep slopes leading down to its 100 foot wide floodplain. Sand Spring Run is a primary tributary to Appenzell Creek, which is a High Quality (HQ) classified stream.
- At Frailey Road, the line would turn to the southwest and proceed for 900 feet, crossing at the Frailey Road and Mountain Road intersection, before proceeding up a slope and over an agricultural field.
- At the western edge of the agricultural field, the line would turn to the south and proceed for 1,800 feet. The line would parallel the edge of the agricultural field and then cross to the south side of Route 715, west of its intersection with Mountain Road.
- After crossing Route 715, the line would turn to the sharply to the east, and proceed for 1,700 feet, generally paralleling Route 715 to the south. Along this section, the line would cross over a tributary to Sand Spring Run, as well as Sand Spring Run, both of which are tributaries to Appenzell Creek, a High Quality (HQ) classified stream. The terrain around this section of Sand Spring Run is relatively flat and the 100-year floodplain is 100 feet wide. The line will also span an identified NWI palustrine emergent (PEM) wetland area that borders the tributary to Sand Spring Run and a potential forested wetland located along the eastern side of Sand Spring Run.

- The transmission line would end at the proposed substation that will be constructed at least 500 feet upslope from Sand Spring Run in an open meadow owned by Lake Akiba. The substation would be located 500 feet south of Route 715 and west of its intersection with Miller Road, about 0.5-mile from the Village of Appenzell.