

Application to the Ohio Power Siting Board For a Certificate of Environmental Compatibility and Public Need

The Dayton Power and Light Company

West Milton-Eldean 138 kV Transmission Line Project

OPSB Case No. 14-0469-EL-BTX

March 2015



BEFORE THE OHIO POWER SITING BOARD
Certificate Application for Electric Transmission Facilities
The Dayton Power and Light Company
West Milton-Eldean 138 kV Transmission Line Project

TABLE OF CONTENTS

SECTION	PAGE
4906-15-01 PROJECT SUMMARY AND FACILITY OVERVIEW	01-1
(A) PROJECT SUMMARY AND FACILITY OVERVIEW.....	01-1
(1) Statement Explaining General Purpose.....	01-1
(2) Description of Proposed Facility	01-2
(3) Description of Site Selection Process.....	01-2
(4) Principal Environmental and Socioeconomic Considerations of the Sites or Routes	01-3
(a) Land Use Impacts.....	01-3
(b) Economic Impacts	01-3
(c) Ecological Impacts.....	01-4
(d) Cultural Impacts.....	01-5
(5) Project Schedule	01-5
(B) GENERAL OVERVIEW	01-6
(C) ELECTRONIC COPY OF DATA.....	01-6
4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT	02-1
(A) STATEMENT OF NEED.....	02-1
(1) Purpose of Proposed Facility	02-2
(2) Specific Projections of System Conditions	02-2
(3) Relevant Load Flow Studies.....	02-2
(4) Transcription Diagrams Depicting System Performance with and without Proposed Project.....	02-2
(5) Base Case Data for Natural Gas Transmission Line	02-2
(B) EXPANSION PLANS	02-2
(1) Electric Transmission Lines and Associated Facilities.....	02-2
(a) Long Term Forecast Report	02-2
(b) Regional Expansion Plans	02-2
(2) Gas Transmission Lines.....	02-3
(C) IMPACT OF THE FACILITY ON ELECTRIC POWER SYSTEM ECONOMY AND RELIABILITY	02-3
(D) OPTIONS CONSIDERED TO ELIMINATE NEED FOR CONSTRUCTION OF A TRANSMISSION LINE	02-3
(E) REASON FACILITY WAS SELECTED FOR PROJECT NEED.....	02-3
(F) FACILITY SCHEDULE.....	02-3
(1) Proposed Schedule (bar chart format).....	02-3
(2) Delays.....	02-3

TABLE OF CONTENTS (CONTINUED)

SECTION	PAGE
4906-15-03 ROUTE ALTERNATIVES ANALYSIS	03-1
(A) ROUTE SELECTION STUDY	03-1
4906-15-04 TECHNICAL DATA.....	04-1
(A) ROUTE ALTERNATIVES DATA	04-1
(1) Geography and Topography	04-1
(a) Transmission Line Alignments, Including Proposed Turning Points	04-1
(b) Proposed Substation Site Locations	04-2
(c) Major Highway and Railroad Routes	04-2
(d) Air Transportation Facilities	04-2
(e) Utility Corridors	04-2
(f) Proposed Permanent Access Roads	04-3
(g) Lake, Ponds, Reservoirs, etc.....	04-3
(h) Topographic Contours.....	04-3
(i) Soil Associations or Series	04-3
(j) Population Centers and Legal Boundaries of Cities, Villages, Township, Counties	04-4
(2) Slope and Soil Mechanics	04-4
(a) Slopes	04-4
(b) Soil Suitability	04-5
(B) LAYOUT AND CONSTRUCTION.....	04-6
(1) Site Activities	04-6
(a) Surveying and Soil Testing	04-6
(b) Grading and Excavation	04-6
(c) Access Road Construction	04-7
(d) Stringing of Cable.....	04-7
(e) Post Construction Reclamation.....	04-7
(2) Layout for Associated Facilities	04-7
(a) Site Map (1:2,400 Scale)	04-7
(b) Reasons for Proposed Layout and Unusual Features	04-8
(c) Future Modifications Plans.....	04-8
(C) TRANSMISSION EQUIPMENT	04-8
(1) Transmission Line Design Data	04-8
(a) Design Voltage	04-8
(b) Transmission Pole Structures, Conductor Data, and Insulator Configuration	04-8
(c) Base and Foundation Design	04-10
(d) Underground Cable Design.....	04-10
(e) Other Major Equipment or Special Structures	04-10
(2) Electrical Substation Design Data.....	04-10
(3) Not Applicable (Gas Transmission Lines)	04-10

TABLE OF CONTENTS (CONTINUED)

SECTION	PAGE
(D) ENVIRONMENTAL AND AVIATION COMPLIANCE INFORMATION	04-10
(1) List and Discussion of Permits Required	04-10
(2) Descriptions, Quantification, and Disposal of Construction Debris	04-11
(3) Storm Water and Erosion Control	04-11
(4) Contaminated Soil and Hazardous Materials	04-13
(5) Height of Tallest Anticipated Above Ground Structures	04-14
(6) Construction Plans in Poor Soil Conditions	04-14
4906-15-05 FINANCIAL DATA	05-1
(A) OWNERSHIP.....	05-1
(B) ELECTRIC CAPITAL COSTS	05-1
(C) GAS CAPITAL COSTS.....	05-2
4906-15-06 SOCIOECONOMIC AND LAND USE IMPACT ANALYSIS.....	06-1
(A) SOCIOECONOMIC CHARACTERISTICS	06-1
(B) TRANSMISSION ROUTES, SUBSTATION SITES, AND LAND USE.....	06-2
(1) Transmission Line Alignments	06-2
(2) Substation Sites	06-2
(3) General Land Use.....	06-3
(a) Residential	06-3
(b) Commercial.....	06-3
(c) Industrial.....	06-3
(d) Cultural	06-3
(e) Agricultural	06-3
(f) Recreational.....	06-3
(g) Institutional	06-4
(4) Transportation Corridors	06-4
(5) Existing Utility Corridors.....	06-4
(6) Noise Sensitive Areas.....	06-5
(7) Agricultural and Agricultural District Land	06-5
(C) LAND USE IMPACTS	06-5
(1) Number of Residential Structures.....	06-6
(2) Construction Impacts.....	06-7
(a) Residential Use.....	06-8
(b) Commercial Use	06-8
(c) Industrial Use.....	06-8
(d) Cultural Sites & Structures.....	06-8
(e) Agricultural Use.....	06-9
(f) Recreational Use	06-9
(g) Institutional Use	06-9
(3) Operation and Maintenance Impacts.....	06-10
(a) Residential Use.....	06-10

TABLE OF CONTENTS (CONTINUED)

SECTION	PAGE
(b) Commercial Use	06-10
(c) Industrial Use.....	06-10
(d) Cultural Use	06-10
(e) Agricultural Use.....	06-10
(f) Recreational Use	06-10
(g) Institutional Use	06-10
(4) Mitigation	06-10
(a) Residential Use.....	06-11
(b) Commercial Use	06-11
(c) Industrial Use.....	06-11
(d) Cultural Use	06-11
(e) Agricultural Use.....	06-11
(f) Recreational Use	06-11
(g) Institutional Use	06-11
(D) PUBLIC INTERACTION INFORMATION	06-11
(1) Counties, Townships, Villages, and Cities	06-11
(2) Public Officials Contacted	06-12
(3) Public Information Program.....	06-12
(4) Liability Compensation.....	06-12
(5) Public Interest, Convenience, and Necessity	06-12
(6) Tax Revenues	06-13
(7) Impact on Regional Development	06-13
(E) HEALTH, SAFETY AND AESTHETIC INFORMATION	06-13
(1) Compliance with Safety Regulations.....	06-13
(2) Electric and Magnetic Fields	06-14
(a) Electric Field Strength Results.....	06-16
(b) Magnetic Field Strength Results	06-18
(c) Current State of EMF Knowledge	06-20
(d) Company's Line Design Considerations	06-21
(e) Procedures for Addressing Public Inquiries Regarding EMF	06-22
(3) Aesthetic Impacts.....	06-22
(a) Views of the Proposed Facility	06-23
(b) Structure Design Features	06-23
(c) Facility Effect of the Site and Surrounding Area.....	06-23
(d) Visual Impact Minimization	06-24
(4) Estimate of Radio and Television Interference	06-24
(F) IMPACTS ON CULTURAL RESOURCES.....	06-24
(1) Cultural Resources Studies and Agency Correspondence.....	06-24
(2) Construction Impacts.....	06-26
(3) Operation and Maintenance Impacts.....	06-26
(4) Mitigation Procedures	06-26
(G) NOISE EMISSIONS.....	06-27
(1) Construction	06-27
(a) Dynamiting or Blasting Activities	06-27
(b) Operation of Earth Moving & Excavating Equipment.	06-27

TABLE OF CONTENTS (CONTINUED)

SECTION	PAGE
(c) Driving Piles	06-29
(d) Erection of Structures	06-29
(e) Truck Traffic	06-29
(f) Installation of Equipment	06-29
(2) Operation and Maintenance	06-29
(3) Mitigation Procedures	06-29
(H) OTHER SIGNIFICANT ISSUES	06-30
(I) REFERENCES	06-30

4906-15-07 ECOLOGICAL IMPACT ANALYSIS 07-1

(A) SUMMARY OF ECOLOGICAL IMPACT STUDIES	07-1
(B) ECOLOGICAL FEATURES	07-2
(1) Transmission Line Alignments	07-2
(2) Substation Locations	07-2
(3) All Areas Currently Not Developed for Agricultural, Residential, Commercial, Industrial, Institutional, or Cultural Purposes	07-2
(a) Streams and Drainage Channels	07-2
(b) Lakes, Ponds, and Reservoirs	07-4
(c) Marshes, Swamps, and Other Wetlands.....	07-5
(d) Woody and Herbaceous Vegetation Land.....	07-6
(e) Locations of Threatened and Endangered Species	07-6
(4) Soil Associations.....	07-8
(C) STREAMS AND BODIES OF WATER	07-8
(1) Construction Impact	07-8
(2) Operation and Maintenance Impact	07-9
(3) Mitigation Procedures	07-9
(D) WETLAND IMPACTS	07-9
(1) Construction Impacts.....	07-9
(2) Operation and Maintenance Impact	07-10
(3) Mitigation Procedures	07-10
(E) VEGETATION IMPACT	07-10
(1) Construction Impacts.....	07-10
(2) Operation and Maintenance Impact	07-11
(3) Mitigation Procedures	07-12
(F) COMMERCIAL, RECREATIONAL, AND THREATENED/ENDANGERED SPECIES IMPACT.....	07-12
(1) Construction Impacts.....	07-12
(a) Commercial Species.....	07-12
(b) Recreational Species	07-14
(c) Protected Species	07-15
(2) Operation and Maintenance Impacts.....	07-16
(3) Mitigation Procedures	07-16

TABLE OF CONTENTS (CONTINUED)

SECTION	PAGE
(G) SLOPE AND ERODIBLE SOILS	07-16
(1) Construction Impact	07-16
(2) Operation and Maintenance Impact	07-16
(3) Mitigation Procedures	07-16
(H) SITE SPECIFIC INFORMATION	07-17

LIST OF TABLES

Tables:

- 2-1 Load Flow Analysis Results with and Without the Proposed Facility
- 5-1 Estimates of Applicable Intangible and Capital Costs for the Preferred and Alternate Routes
- 6-1 Study Area Demographics of the Preferred and Alternate Route
- 6-2 Land Use within the Preferred and Alternate Route Study Areas (within 1,000 feet)
- 6-3 Residential Structures within 100 feet of the Preferred and Alternate Routes
- 6-4 Conductor Position Coordinates for Each Modeled Cross-Section (Relative to Centerline and Ground Level)
- 6-5 Electric And Magnetic Field Results Summary Listing of the Calculated rms Field Magnitudes; Electric Fields in Kv/M and Magnetic Fields in Units of milligauss (mG) at Both Sides EROW and Maximum Beneath the Line.
- 6-6 Circuit Power Ratings for Three Load Scenarios Used for Magnetic Field Calculations
- 6-7 Typical Construction Noise Sources
- 7-1 Delineated Streams within 100 Feet of the Preferred Route
- 7-2 Delineated Wetlands within 100 Feet of the Preferred Route
- 7-3 ODNR and USFWS Listed Species with the Project Area

LIST OF FIGURES

Figure:

- 1-1 Preferred And Alternate Routes
- 2-1 Project Schedule
- 4-1 Land Use and Constraint Map
- 6A Two Transmission Lines Cross-Section Models used to Calculate Electric and Magnetic Fields
- 6B Calculated rms Electric Field Magnitudes for the Three Representative Cross-Section at One Meter Height
- 6C Calculated Magnetic Fields from Three Cross-Sections under the Summer Normal Load Scenario.
- 6D Calculated Magnetic Fields from Three Cross-Sections under Short-Term Emergency Load Scenario
- 6E Calculated Magnetic Fields from Three Cross-Sections under the Winter Normal Load Scenario
- 7-1 Wetland Delineation and Stream Assessment Map

APPENDICES

- 3-1 Route Selection Study
- 6-1 Public Officials Contacted
- 6-2 Public Meeting Information
- 7-1 Photographs Of Aquatic Resources
- 7-2 Ohio EPA Headwater Habitat Evaluation Index Forms and Qualitative Habitat Evaluation Index Stream Assessment Forms
- 7-3 Wetland Data Forms - U.S. Army Corps of Engineers Forms and Ohio Rapid Assessment Method Forms
- 7-4 Regulatory Agency Correspondence – U.S. Fish and Wildlife Service and Ohio Department of Natural Resources

(CULTURAL RESOURCES LITERATURE REVIEW REPORT – to be provided to OPSB under separate cover)

4906-15-01 PROJECT SUMMARY AND FACILITY OVERVIEW

(A) PROJECT SUMMARY AND FACILITY OVERVIEW

This Application seeks a Certificate of Environmental Compatibility and Public Need from the Ohio Power Siting Board ("Board") for the proposed West Milton-Eldean 138 kV Transmission Line Project ("Project"). This Project is being proposed by The Dayton Power and Light Company ("Dayton Power & Light" or "DP&L"), a wholly owned subsidiary of AES Corporation. The scope of the proposed Project involves the construction of the proposed single circuit 138 kV transmission line within Miami County, Ohio. DP&L would construct, maintain, operate and own the transmission line. The proposed Preferred and Alternate Routes for the Project, both of which are 16.6 miles in length, are described in this Application.

The Board has jurisdiction over major electric transmission installations located wholly within the state of Ohio. As such, DP&L is required to file this application for a Certificate of Environmental Compatibility and Public Need for the proposed Project with the Board. This application contains specific project details regarding environmental, socioeconomic, technical, ecological, justification of need, and financial matters.

(1) Statement Explaining General Purpose

The proposed, West Milton-Eldean 138 kV circuit will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation (NERC) reliability standards. It was through the PJM Regional Transmission Organization's planning process that the need for the proposed project was identified. Specifically, the Regional Transmission Expansion Planning (RTEP) contingency analysis showed that under the multiple contingency of DP&L's Shelby – Sidney 138 kV Circuit and DP&L's Miami – Eldean 138 kV Circuit, voltages would be below the minimum acceptable level per NERC reliability criteria at eight transmission buses. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and ensure compliance with the mandatory NERC reliability standards.

(2) Description of Proposed Facility

The proposed, West Milton-Eldean transmission line will consist of the construction and operation of a single 138 kV circuit line for improved reliability of electric service for DP&L's northwest area of their service territory. Some portions of the transmission line will be underbuilt with a 12.5 kV electric distribution line where the proposed route is co-located with an existing overhead electric distribution line (primarily along public road right-of-way). The Project will originate at the existing West Milton Substation located just south of the village of West Milton in Miami County, Ohio (Union Township). The transmission line Project would extend along the west side of West Milton (outside of the village's limits) to a point south of the town of Ludlow Falls, then head east adjacent to State Route 55, north a short distance adjacent to Harter Road (in Union Township), north adjacent to Forest Hill Road and then across agricultural land toward the northwest (Concord Township) until the route reaches the Eldean Substation located on Experiment Farm Road. Both the Preferred and Alternate Route are 16.6 miles in length.

(3) Description of Site Selection Process

GAI Consultants, Inc. (GAI) was contracted by DP&L to conduct the Route Selection Study to identify generally broad route corridors, specify route alternatives within the general corridors, define and quantify the physical attributes (land use, ecological, cultural, and engineering), systematically score and rank the route alternatives, and select a Preferred and Alternate route. The Route Selection Study is included as Appendix 3-1. The objective of the Route Selection Study was to identify and evaluate potential route alternatives between the two existing substations and ultimately select the alternative having the least impact on the overall human environment and sensitive ecological resources while being cost effective and technically feasible to construct and operate. DP&L and GAI incorporated public input received during and after two public informational meetings which further optimized the Routes. The location of the Preferred and Alternate Route is shown in Figure 1-1 (following this section), Figure 4-1 of Section 4 (sheets 1 through 5, topographic base map) as well as Figure 7-1 of Section 7 (sheets 1 through 5) with an aerial image base map.

(4) Principal Environmental and Socioeconomic Considerations of the Sites or Routes

A general socioeconomic survey of the study area was performed as part of this Application. This included a field review, review of land use maps, review of current population estimates and projections for the area, consideration of compatibility of the Project with local and regional development plans, and an assessment of the impact of the Project on the surrounding community.

(a) Land Use Impacts: The Project is located predominantly in a rural, agricultural setting but portions of the transmission line routes occur along road right-of-way where there are intermittent residences located in this rural setting. Approximately 80% and 76% of the corridor review area (200 feet wide) for the Preferred and Alternate Routes, respectively, are comprised of agricultural land. Much of the remainder of the land for both routes consists of open land, residential lots, pasture land and forests. Impacts to agricultural land uses due to operation and maintenance are expected to be relatively minor in light of the overall percent of crop land that may be removed from cultivation due to new transmission structures. No recreational land or activities are anticipated to be impacted by the Project. No adverse impacts to commercial or industrial operations and businesses are anticipated to result from the Project.

Furthermore, the Preferred and Alternate Routes are co-located with either road right-of-way or existing transmission line right-of-way (DP&L-owned) that accounts for 9.7 miles and 10.4 miles, respectively, of the total 16.6-mile lengths. One primary area of industrial land use consists of a rock quarry within an approximate 550-foot section of the Preferred Route. A small summer camp facility consisting of sleeping cabins is located adjacent to the Preferred Route approximately 0.3-mile west of the West Milton Substation.

The number of residences within 1,000 feet of the Preferred Route is 160. Twenty (20) of the residences are within 100 feet of the route. There are 250 residences within 1,000 feet of the Alternate Route, 13 of which are within 100 feet.

(b) Economic Impacts: The Project could have a positive impact on regional development in Miami County due to the benefits of improved reliability of electric power. The Project would also produce additional tax revenue for local schools and the community. DP&L projects that the new transmission line will contribute between approximately \$588,247 and \$593,638 in total property taxes to Miami County, Union Township, and Concord Township over the first year

after the Project is completed. No negative impacts on regional development are foreseen for this Project.

(c) *Ecological Impacts:* An ecological survey was conducted for the majority of the Preferred Route and portions of the Alternate Route within a 200-foot-wide corridor along the proposed routes to assess the presence and quality of streams and wetlands as well as suitable habitat for threatened and endangered species that may exist in the Project area. As noted in Section 4906-15-07 of this Application, some properties were inaccessible at the time of the field review as landowner approvals had not yet been granted. Published literature and maps containing relevant information were also researched prior to field reconnaissance reviews.

Four small streams (three of which are ephemeral type) and the Stillwater River (a State-designated scenic river) were observed along the Preferred Route and documented for physical habitat quality. Stream impacts during construction will be minimal as any equipment crossings will be controlled through methods outlined in the Project stormwater control plan. The Stillwater River would not be impacted by construction as the transmission line will only span the river. An overhead distribution line exists within the same alignment, and would be consolidated with the new transmission line structures. Only two small wetlands (less than 0.11-acre in the survey corridor) of the palustrine emergent type were observed and can be avoided by construction equipment as they do not fully encompass the construction corridor.

Through correspondence with the U.S. Fish and Wildlife Service (USFWS), only the federally-endangered Indiana bat and two mussel species were identified as potentially being present in the project vicinity. The mussel species, if present, would be limited to the Stillwater River and this river will not be disturbed during construction. Some forest areas, estimated at approximately 2.7 acres, may need to be partially or completely cleared for construction of either the Preferred or Alternate Route which could result in the removal of Indiana bat habitat. DP&L would clear any trees during the winter season to avoid impacts to the Indiana bat. The Ohio Department of Natural Resources (ODNR) also provided correspondence stating that the same two mussel species as noted by the USFWS, plus one mussel listed as a state species of concern and one threatened plant may occur in the vicinity of the Project. Impacts to all of these species are expected to be avoidable. The threatened plant species was identified several years ago well outside of the Project corridor, the only known occurrence in the area.

(d) *Cultural Impacts:* The following is a brief summary of cultural resources near the Project based on literature research:

Preferred Route: One historic structure, no National Register of Historic Places (NRHP) sites, and no historic districts were identified within 1,000 feet of this Route. Eight archaeological sites were recorded within 1,000 feet of the Preferred Route; three archaeological sites were recorded within 100 feet located within or near the right-of-way of State Route 55, approximately 0.4-mile east of the Stillwater River. These three small sites would be avoided for pole structure placement during engineering design. One cemetery is located within 1,000 feet of the Preferred Route near the West Milton Substation.

Alternate Route: Due to the Alternate Route being common with the Preferred Route along State Route 55, the same results apply to the Alternate Route for the specific State Route 55 section near the Stillwater River. For the entire Alternate Route, three historic structures, no NRHP sites, and no historic districts were identified within 1,000 feet of this Route. Twelve archaeological sites were recorded within 1,000 feet of the Preferred Route; three archaeological sites were recorded within 100 feet located within or near the right-of-way of State Route 55. One cemetery is located within 1,000 feet of the Alternate Route near the West Milton Substation.

Further research and possible field investigations will potentially be undertaken in specific areas along the Preferred Route (pending consultation with the Ohio Historic Preservation Office). Formerly discovered archaeological sites and new sites can typically be avoided through strategic transmission structure placement and planned access road placement or mitigation measures. Certain areas may also be excluded for construction equipment in order to prevent soil surface disturbance if warranted.

(5) Project Schedule

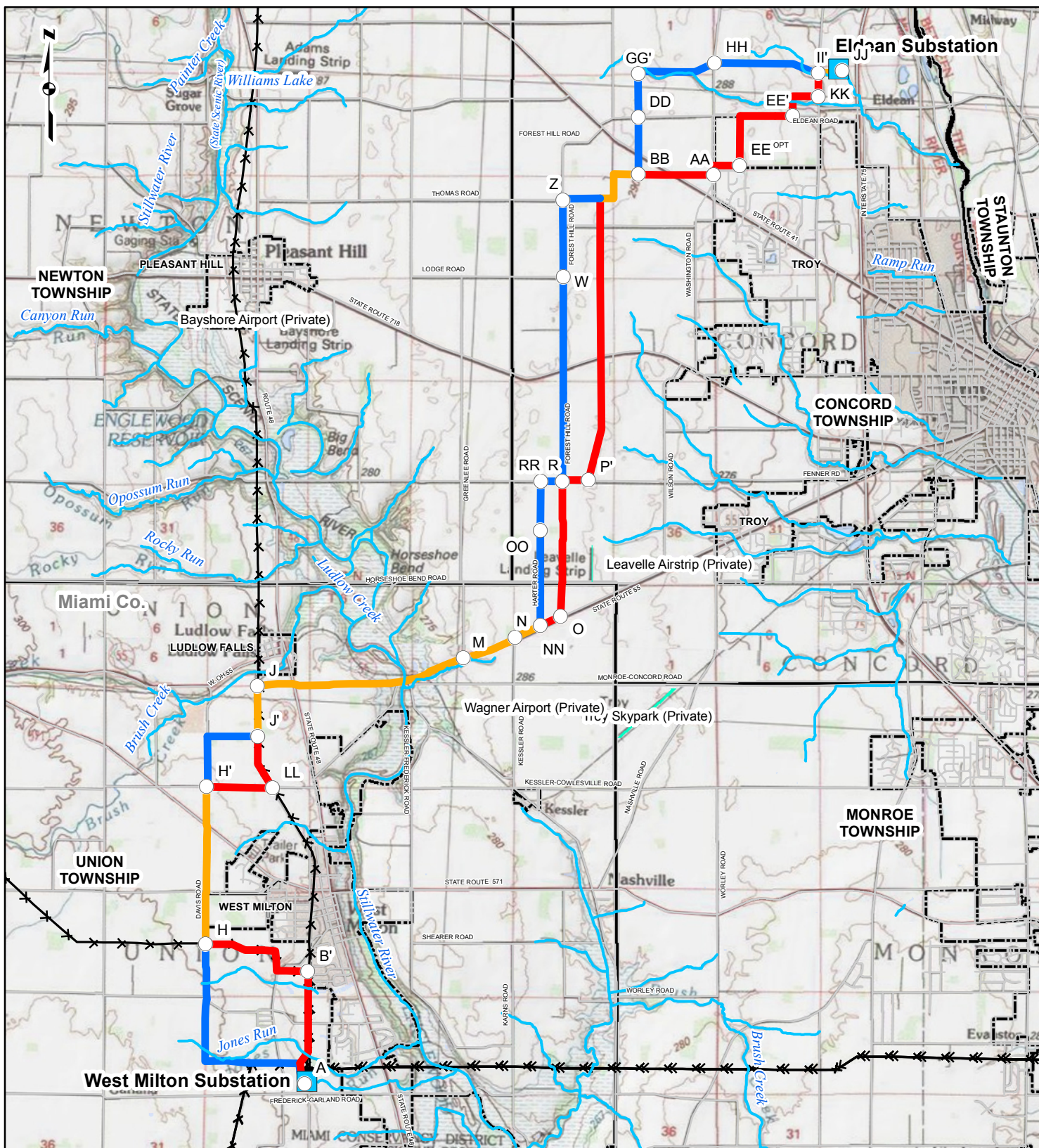
DP&L plans to commence construction of the transmission line in spring 2017 with an estimated in-service date by mid-2018. In the meantime, this Application will be under review by the Board, engineering design will be completed, and right-of-way acquisition from property owners will be conducted. Figure 2-1 in Section 2 provides additional details regarding the proposed Project schedule.

(B) GENERAL OVERVIEW

Information filed by the Applicant in response to the requirements of this section is not deemed responses to any other section of the application requirements.

(C) ELECTRONIC COPY OF DATA

The Applicant, DP&L, has prepared the required hard copy maps using digital, geographically referenced data. An electronic copy of all such data, excluding data obtained by the Applicant under a licensing agreement which prohibits distribution, has been provided to the Board staff concurrent with submission of the application.



PROJECT LOCATION



MIAMI COUNTY, OHIO

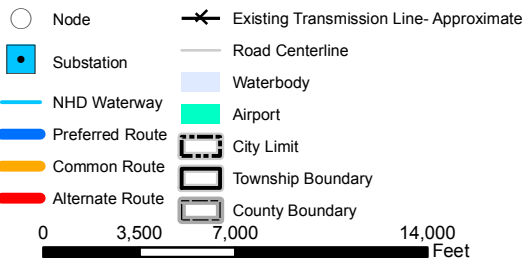


FIGURE 1-1
PREFERRED AND ALTERNATE ROUTES

WEST MILTON TO ELDEAN 138kV	
DAYTON POWER & LIGHT	
DRAWN BY: TDB	DATE: 1/21/2015
CHECKED: MAF	APPROVED: MAF

REFERENCE: USGS 30' x 60' TOPOGRAPHIC QUADRANGLES: PIQUA (1986,) DAYTON, OHIO. OBTAINED VIA ESRI USA TOPO, NATIONAL GEOGRAPHIC TOPO, AND USGS, ACCESSED 01/2015.

4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT

(A) STATEMENT OF NEED**(1) Purpose of the Proposed Facility**

The proposed West Milton-Eldean 138 kV Transmission Project will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation ("NERC") reliability standards. The State of Ohio is located in the Reliability First Corporation ("RFC"), one of eight regions comprising the NERC, and DP&L is a member of RFC. The NERC and RFC are empowered by the Federal Energy Regulatory Commission ("FERC") to enforce utility industry compliance with the mandatory reliability standards to ensure the integrity of the bulk electric system.

DP&L is also a member of the Pennsylvania, New Jersey, Maryland ("PJM") Interconnection, a regional transmission organization, which coordinates the movement of wholesale power in all or parts of 13 states, including Ohio, and the District of Columbia. PJM conducts a Regional Transmission Expansion Planning ("RTEP") process annually to ensure its transmission footprint, including the DP&L system, is in compliance with the mandatory NERC reliability standards. Both PJM and the member companies collaboratively conduct studies to identify potential violations of the mandatory NERC reliability standards and evaluate projects to resolve the violations. Ultimately, the PJM Board is responsible for approval of the proposed projects. The projects are then filed with FERC to obtain its approval.

It was through the PJM RTEP process that the need for the proposed project was identified. Specifically, RTEP contingency analysis showed that under the multiple contingency of DP&L's Shelby – Sidney 138 kV Circuit and DP&L's Miami – Eldean 138 kV Circuit, voltages would be below the minimum acceptable level per PJM reliability criteria, at the following eight transmission buses: Halterman 138 kV, Springcreek 138 kV, Eldean 138 kV, Eldean 69 kV, Sidney 138 kV, Sidney 69 kV, Amsterdam 138 kV and Amsterdam 69 kV. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and

ensure compliance with the mandatory NERC reliability standards. The project has been approved by both the PJM Board and FERC.

(2) Specific Projections of System Conditions

The PJM RTEP process is based on a five-year projection of transmission system conditions. The proposed project was identified during the 2010 RTEP process based on projected conditions for 2015, including the 2010 PJM Load Forecast for 2015. All projects identified through prior years' RTEP processes were reflected in the analyses for 2015.

(3) Relevant Load Flow Studies

Table 2-1 provides a summary of the load flow evaluation results and contingency violations with and without the proposed transmission line facility.

Table 2-1 – Load Flow Analysis Results With and Without the Proposed Facility

Issue	Contingency	Limiting Facility	kV	Without Proposed Project (% voltage)	With Proposed Project (% voltage)
Voltage	Shelby-Sidney 138 + Miami-Eldean 138	Amsterdam	138	diverged	98.3
		Eldean	138	diverged	100.2
		Halterman	138	diverged	98.5
		Sidney	138	diverged	97.4
		Springcreek	138	diverged	98.4

(4) Transcription Diagrams Depicting System Performance with and without proposed project

An electronic copy of DP&L's load flow data, developed as a load flow case with and without the proposed facility, can be provided upon request of the OPSB staff.

(B) EXPANSION PLANS

(1) Electric Transmission Lines and Associated Facilities

(a) *Long-Term Forecast Report:* The proposed project is referenced on page 81 of Section 4901:5-5-04 of DP&L's 2014 Long-Term Forecast Report.

(b) *Regional Expansion Plans:* As referenced above, the proposed project is a result of the PJM RTEP process, which ensures regional coordination and compliance with the mandatory NERC reliability standards.

(2) Gas Transmission Lines

The proposed facility is not a Gas Transmission Line; therefore, this section does not apply.

(C) IMPACT OF THE FACILITY ON ELECTRIC POWER SYSTEM ECONOMY AND RELIABILITY

The proposed project will ensure that the northwest area of DP&L's transmission system complies with the mandatory NERC reliability standards. The proposed project is the least-cost means to ensure compliance.

(D) OPTIONS CONSIDERED TO ELIMINATE NEED FOR CONSTRUCTION OF A TRANSMISSION LINE

The addition of capacitor banks was considered as an option; however, this option is not feasible due to space and other constraints, and it would not provide an effective means to address the voltage issues noted above.

(E) REASON PROPOSED FACILITY WAS SELECTED TO MEET PROJECT NEED

The proposed project was selected because it is the best option to resolve the potential voltage issues noted above from both transmission system performance and cost perspectives.

(F) FACILITY SCHEDULE

(1) Proposed Schedule (bar chart format)


Figure 2-1 presents the schedule for the Application preparation and submittal to the Board, the planning and engineering design, acquisition of rights-of-way, construction and in-service dates in bar chart format.

(2) Delays

Any critical delays in the major activities outlined for the Project would further delay compliance with the NERC regulations and the in-service date of the transmission line.

FIGURE 2-1: Project Schedule - West Milton-Eldean 138 kV Transmission Line Project

ACTIVITY	2014												2015												2016											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Preparation of Application																																				
Submittal of the application for certificate																																				
OPSB Application Review																																				
Issuance of the certificate																																				
Acquistion of rights-of-way and land rights for the certified facility																																				
Preparation of the final design																																				
Construction of the facility																																				
Placement of the faciilty in service																																				

ACTIVITY	2017												2018																							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec												
Preparation of Application																																				
Submittal of the application for certificate																																				
OPSB Application Review																																				
Issuance of the certificate																																				
Acquistion of rights-of-way and land rights for the certified facility																																				
Preparation of the final design																																				
Construction of the facility																																				
Placement of the facility in service																																				

4906-15-03 ROUTE ALTERNATIVES ANALYSIS

(A) ROUTE SELECTION STUDY

This section presents a summary of the Route Selection Study (“RSS” or “Study”) for the West Milton-Eldean 138 kV Transmission Line Project (“Project”). As required by Ohio Administrative Code 4906-15-03(A) and (B), the Study defines the geographic boundaries of the area studied for potential route alternatives, identifies the potential transmission line route alternatives on maps, defines and reports on the attribute data for each route alternative evaluated, and describes the siting criteria and methods employed to rank the routes and determine the most feasible routes including the Preferred and Alternate Routes.

The objective of the Study was to identify and evaluate potential route alternatives to connect the existing West Milton Substation located (south of West Milton, Ohio) to the existing Eldean Substation located northwest of Troy, Ohio, and ultimately select the transmission route that has the least, or among the least, impact on the human environment and sensitive ecological resources while also achieving project requirements of technical feasibility and cost effectiveness in terms of construction and long-term operation. Dayton Power & Light, Incorporated (“DP&L”) and their consultant, GAI Consultants, Inc. (“GAI”), utilized the results of the Study, as well as input received from public informational meetings, to establish the Preferred and Alternate Routes. The RSS involved defining the study area, the collection, evaluation and analysis of various environmental, socioeconomic, and engineering data to identify many unique transmission line route alternatives that were subsequently scored to determine the ranking of each route. GAI’s Route Selection Study is included as Appendix 3-1. The RSS fulfills the rules within the Ohio Administrative Code 4906-15-03(A) and (B) in terms of the report content and the protocols for route siting and selection.

The RSS involved the identification of 105 route alternatives for quantification of the various attributes, scoring of each route on a relative basis, and then ranking the routes by score. A public informational meeting was held March 25, 2014 to present two of the most viable routes, based on quantitative scores and the consideration of qualitative factors. The vast majority of comments received by DP&L during the meeting, and the comments received afterwards by DP&L and the Ohio Power Siting Board (“Board”), were opposed to the route that utilized the Greenlee Road corridor (blue/orange in Figure 2 of the RSS in Appendix 3-1). Residents cited

the adverse effect of views of the landscape horizon where no overhead lines currently exist (but rather are underground), including the view toward, and from, the 150-acre Brukner Nature Center (privately owned) west of Greenlee Road, and the adverse effect on a historic "Bicentennial Farm" (as designated by the Ohio Department of Agriculture) immediately adjacent to the route alternative. The Brukner Nature Center is located 2,600 feet west of the Greenlee Road route alternative and the nature center property extends for a length of 1.0 mile along this route alternative (separated by flat agricultural fields). The nature center land contains six miles of hiking trails. Other residents (other than Greenlee Road residents) opposed sections of the two route alternatives crossing agricultural land which bisects parcels – instead they preferred that the routes follow existing property lines more closely if properties having such land use must be part of the routes.

The siting team fully considered the public's comments from the March 2014 meeting, from the majority opinion on the Greenlee Road route to individual landowner requests for minor route adjustments, and devised several new route alternatives that utilized the Forest Hill Road corridor (where existing overhead distribution lines parallel the majority of the roadway), as well as routes that utilize the immediately surrounding agricultural lands and property lines. Five new routes were developed, as well as minor adjustments to selected previous routes as landowners suggested, bringing the total number of routes to undergo a second round of quantitative scoring and ranking to 110 route alternatives. The lower numeric scores again indicated the more viable or favorable route alternatives. The scores ranged from a high of 4,587 (least viable or favorable) to 2,114 (most viable) based on quantitative scoring of the attribute values. Based on the quantitative score coupled with DP&L's consideration of a limited amount of qualitative route selection criteria, Route #135 (score of 2,237) which was ranked third overall, was selected as the most viable route to be presented during the second public meeting in order to seek comments. In addition to Route #135, two variations of this route and another largely unique route (Route #128) that utilized property lines in agricultural fields (in the midsection of the project area, or in the Forest Hill Road vicinity), were selected for the public's review. Route #128 has a reasonably low percentage of its route in common (34%) with Route #135.

The second public information meeting was held on July 9, 2014 to present the newly selected route alternatives that are among the more favorable scores (Route #135), including the additional route options or variations as mentioned above that utilize property lines across

agricultural land (including Route #128), in order to solicit the public's input. The vast majority of the members of the public in attendance submitted written and verbal comments in favor of Route #135 (blue/orange route depicted in Figure 4 of the RSS in Appendix 3-1) over the blue route segment options (or variations) and Route #128 (the red/orange route).

The highest ranking, most viable route alternative that results in the overall least impacts on the human and ecological environment, combined with the route alternative being most acceptable to the community based on solicited comments, was determined to be Route #135 which is ranked third in overall quantitative scoring. Route #128, ranked 31st by overall quantitative scoring, was determined to be the most viable Alternate Route having the least amount of route in common (34%) with the Preferred Route. DP&L was granted a variance by an Administrative Law Judge from the requirement that the alternate route have not more than 20% in common with the preferred route [Ohio Administrative Code 4906-05-04(A)].

Subsequent to the public meetings, three requests were made of DP&L by landowners to consider adjustments to the alignment of the Preferred Route (in two cases) and the Alternate Route (in one case) specifically on their properties to, in their view, optimize the route alignments for their planned uses of the land. All three of these route adjustments are further discussed in Section 3.6, and shown in Figures 5 through 7 of the RSS included as Appendix 3-1. In one case for the Preferred Route, for the area located just south of route node BB, the alignment was moved to the property boundary line instead of an approximate 1,800-foot diagonal orientation across the land parcel (agricultural land) as was originally planned. In the second case for the Preferred Route, located between nodes GG' and HH, the landowner similarly requested that the alignment follow their property boundary versus being aligned through the mid-section of the agricultural crop field which spanned approximately 0.77 feet.

For the Alternate Route, one landowner in the area of nodes AA and EE (shown as EE^{OPT} on map figures) requested that the route be relocated to their rear property boundary (consisting of agricultural crop land) versus being adjacent to their residence and along road right-of-way (Washington Road and Eldean Road). This route optimization resulted in reducing the length of Alternate Route's alignment along road right-of-way by approximately 0.74-mile and instead increasing the length of agricultural land crossed.

Route Selection Study

The Dayton Power and Light Company
West Milton to Eldean
138 kV Transmission Line Project
Miami County, Ohio

GAI Project Number: G121196.00

February 2015

Prepared for: The Dayton Power and Light Company
1900 Dryden Road
Dayton, Ohio 45439

Prepared By: GAI Consultants, Inc.
Cincinnati Office
1830 Airport Exchange Boulevard, Suite 220
Erlanger, Kentucky 41018



Table of Contents

1.0	Introduction and Purpose.....	1
2.0	Route Selection Methodology	2
2.1	Defining the Study Area	3
2.2	Siting Attributes and Constraints	3
2.3	Selection of Candidate Route Alternatives.....	5
2.4	Route Scoring Process.....	6
3.0	Route Evaluation and Ranking Results	6
3.1	Initial Route Scoring Results and Rankings	6
3.2	Public Input and Supplemental Route Development	8
3.3	Supplemental Route Alternatives Analysis and Ranking	10
3.4	Second Public Meeting Input on Revised Route Alternatives	11
3.5	Selection of Preferred and Alternate Routes.....	12
3.6	Route Adjustments for Optimizing Alignments	14

TABLES:

Table 3-1 Quantitative Route Scoring Criteria

Table 3-2 Initial Route Alternative Scoring Results

Table 3-3 Supplemental and Updated Route Alternatives Scoring Results

FIGURES (embedded with narrative text):

Figure 1 Project Overview Map and Study Area

Figure 2 Route Alternatives for Public Input – March 2014 Meeting

Figure 3 Revised Route Alternatives Based on Public Input (March 2014)

Figure 4 Revised Route Alternatives for Public Review – July 2014 Meeting

Figure 5 Preferred and Alternate Routes

Figure 6 Preferred Route – West of Washington Road Route Adjustment

Figure 7 Alternate Route – Eldean Road / Washington Road Intersection Route Adjustment

FIGURES (following text):

Figure 3.1 Project Location Map

Figure 3.2 Project Study Area Map

Figure 3.3 Route Alternatives

Figure 3.4 Preferred and Alternate Routes

Figure 3.5 Route Alternatives Maps (1 inch = 1,000 feet scale)

1.0 Introduction and Purpose

The Dayton Power and Light Company ("DP&L") is planning to construct a new 138 kV transmission line to improve the reliability of electric power in the northwest area of the DP&L transmission system. The West Milton to Eldean 138 kV Transmission Line Project (Project) area is located in the vicinity of West Milton, Ohio, west of the city of Troy in Miami County (Townships of Union and Concord), as illustrated in Figure 1 below. The new transmission line will be constructed to connect the West Milton Substation and the Eldean Substation which are 11 miles apart based on a straight linear path.

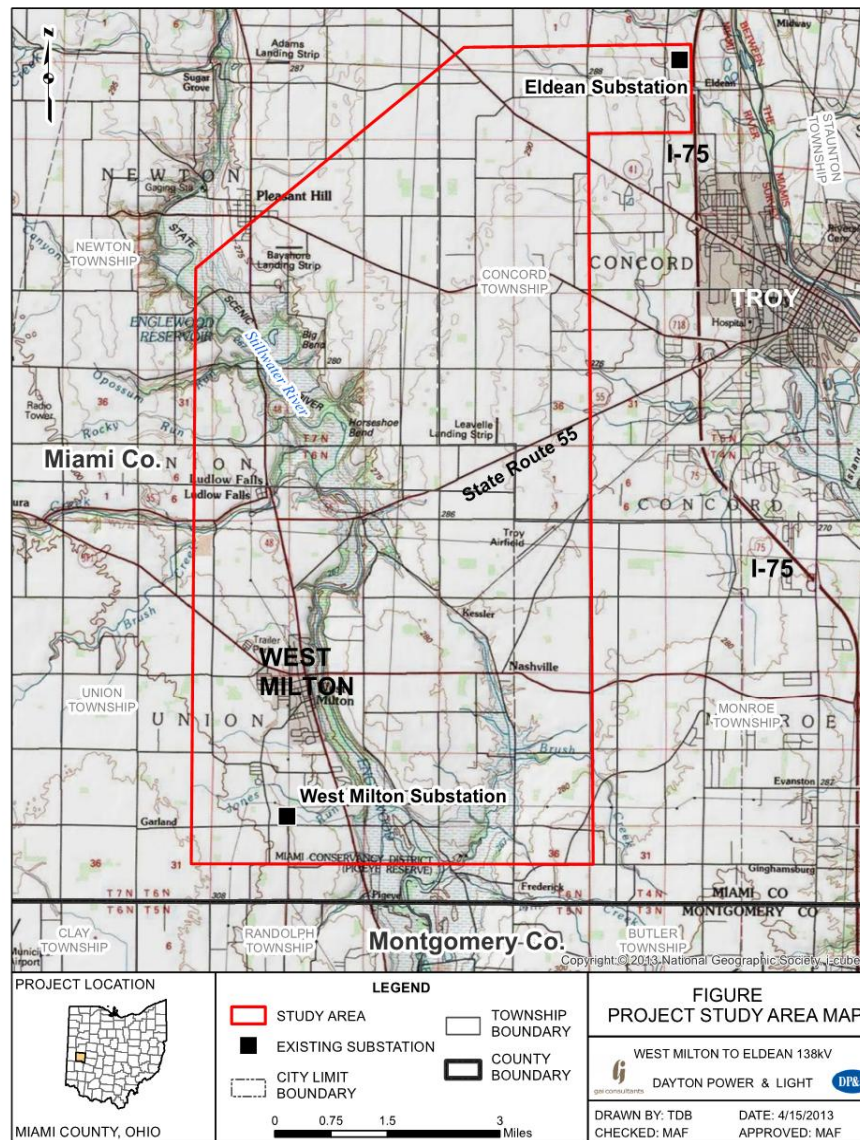


Figure 1
Project Overview Map and Study Area

The proposed new 138 kV circuit will ensure that adequate transmission system voltages are maintained in the northwest area of the DP&L transmission system under various outage conditions, as required to comply with the mandatory North American Electric Reliability Corporation (NERC) reliability standards. A recent contingency analysis conducted by Regional Transmission Expansion Planning indicated that, under a multiple contingency condition for two DP&L circuits in the area, voltages would be below the minimum acceptable level at eight transmission buses according to PJM Interconnection (PJM) reliability criteria. This multiple contingency would effectively leave the northwest area of the DP&L transmission system without a 138 kV source. The proposed new 138 kV circuit will mitigate this situation and ensure compliance with the mandatory NERC reliability standards.

This purpose and overall objective of this Route Selection Study is to assist in determining the best transmission line route alternatives that avoid or minimize adverse environmental and social impacts to the extent practical, considering technical and economic feasibility. The Route Selection Study involved the acquisition and evaluation of environmental, land use, cultural and engineering data to develop several route segments that could be combined to create various route alternatives for comparative analysis and ultimate ranking to meet the above objective. The study will result in the selection of preferred and alternate routes to advance into application development. The siting criteria employed for establishing route segments and complete route alternatives were as follows:

- avoidance or minimization with existing and proposed future land uses (e.g., by utilizing existing transmission line or road corridors where possible);
- avoidance or minimization of effects on human, natural, visual, and cultural resources;
- avoid or minimize visibility from densely populated areas;
- minimize impacts to construction and maintenance costs by selecting shorter, more direct routes;
- locate routes through terrain where economical construction and mitigation techniques can be employed; and
- consistency with DP&L's transmission needs, schedule, regulatory agency directives, and environmental regulations.

Construction of a 138 kV transmission line of this length requires that DP&L prepare and submit and Application for a Certificate of Environmental Compatibility and Public Need to the Ohio Power Siting Board (OPSB). To that end, this route selection study serves as the first component to fulfill the application development process, and ultimately gaining regulatory approval to construct the line.

2.0 Route Selection Methodology

GAI Consultants, Inc. (GAI) and DP&L assembled a team of environmental scientists, design engineers, geographic information specialists, and a cultural resource specialist to conduct this route selection study. The methodology of the study is designed to identify transmission line route alternatives that minimize the overall effects on ecology, sensitive land uses, and cultural resources to the greatest extent practical while maintaining economic and engineering or technical feasibility. GAI utilized techniques adapted from the methods reported by Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) (2009). The study process relies on detailed land use, ecological and cultural resource data from many public sources and other providers which is confirmed to the extent possible and supplemented through field observations. This process results in a comprehensive assessment of the study area and the candidate route alternatives that is presented in this report. The data and analysis process presented herein also allows comparison of additional route alternatives or modifications in response to public input or regulatory agency reviews.

2.1 Defining the Study Area

The first step in the siting process involved the identification of a study area encompassing the Milton and Eldean Substations and intervening areas. The 53-square mile study area, measuring 10.7 miles (north-south) by 7.3 miles (east-west) based on the longest sides of the study area, generally encompasses the town of West Milton, a portion of the Stillwater River watershed area, sparsely populated communities to the south, and largely rural land to the north. The study area is situated west of the city of Troy, Ohio, outside of the city boundaries and is shown in Figure 3.1, Project Location Map and Figure 3.2, Project Study Area, both of which follow the text of this report.

The boundaries of the study area were determined based on a review of United States Geological Survey (USGS) maps and aerial photography. Significant siting features such as urban or densely populated areas, water bodies, large forested and riparian areas, utility corridors, and transportation routes, and the fixed terminus points of the proposed transmission line were principally used to define the boundaries for the study. The eastern study boundary was generally positioned to avoid the western developed suburban areas of Troy, Ohio while capturing the rural lands for possible route corridors. The western study area limit was established just west of the DP&L's 69 kV transmission line (oriented north-south) in order to evaluate co-location or paralleling of this transmission corridor.

The selected study area offers the flexibility to consider a wide range of route corridors and route segments while maintaining reasonable distances of route alternatives to connect the Milton and Eldean Substations. Furthermore, the east to west breadth of the study area allows for route options that would cross the Stillwater River at a variety points north to south.

2.2 Siting Attributes and Constraints

The key objective of the Route Selection Study is to systematically determine the most viable routes for construction of the transmission line while avoiding or minimizing effects on ecological features, sensitive lands, densely populated areas, and cultural sites while maximizing the economical feasibility and the construction practicability. GAI and DP&L defined a variety of siting attributes and siting constraints. Attributes are generally features or factors that are favorable or desirable (e.g., shorter route lengths, paralleling utility corridors, minimizing turn angles, etc.) for construction and operation of a transmission line. Siting constraints are generally those features or factors that are undesirable, to be minimized or avoided to the extent practical, in proximity to a transmission line. The attributes and constraints utilized for the study area are summarized in Table 3-1.

**Table 3-1
Quantitative Route Scoring Criteria**

Siting Attributes and Constraints ¹	Score Weighting
Ecology	
Number of Perennial Streams Crossed	30%
Wetlands Crossed, acres in ROW (National Wetland Inventory data)	
Forests Lands Crossed, acres to be cleared	
Threatened and Endangered Species Sitings/Listings, within 1,000 feet	
Land Use	
Residences, # within 100 feet of centerline (accounts for 70% within subcategory "Residences")	30%
Residences, # within 100 to 1000 feet (accounts for 30% within subcategory "Residences")	
Number of Properties Crossed	
Institutional Uses, number within 1,000 feet (schools, hospitals, churches)	
State Scenic River Area, feet crossed in undeveloped zones ("area" includes 1000 feet adjacent to river) ²	
Other Sensitive Areas Crossed (parks, preserves, trails, agency-managed areas, golf courses, public-use airports or airstrips), linear feet (70% within "sensitive areas" category)	
Number of Other Sensitive Areas within 1,000 feet (parks, preserves, trails, agency-managed areas, golf courses, public-use airports or airstrips) (30% within "sensitive areas" category)	
Cultural	
National Register of Historic Places listed sites or structures, within 1,000 feet	10%
Ohio Historic Structure/Sites Inventory, # within 1,000 feet	
Known Archaeological Sites, # within 100 feet	
Cemeteries, # within 100 feet	
Engineering	
Route Length, feet	30%
Paralleling Existing ROW (utility or road), linear feet	
Number of Highway, Road, or Railroad Crossings	
Length of Route with Slope >20%, feet	
Number of Turn Angles >10 degrees	

Notes:

- Where applicable, right-of-way (ROW) required to be cleared or disturbed is assumed to be 75 feet, or 37.5 feet if parallel to road ROW or existing transmission line ROW.
- "Undeveloped zones" are defined as areas without residences or other structures, or where agricultural land is in use.

Following establishment of the study area, GAI utilized aerial photography from the Ohio State Imagery Program (Miami County, 2011), USGS topographic mapping, and published data to compile an attributes and constraints map based on geographic information system (GIS) software programs. This mapping was primarily utilized to identify major siting features, avoidance areas, and socioeconomic attributes and constraints.

2.3 Selection of Candidate Route Alternatives

After defining the limits of the study area, various geographical data and aerial imagery (2012) were assembled and organized using a GIS program to produce maps consisting of readily available data sources (locations of rivers and streams, National Wetland Inventory data, floodplains, forests, scenic or public preservation areas, regulatory-protected species, residences, airports, churches, cemeteries, cultural resource and historic sites, public-use areas such as golf courses, etc.). The geographical area between the two substations can generally be described as three subareas, 1) the vicinity of West Milton, its suburbs, and the Stillwater River corridor, 2) middle area consisting of hamlets of Kessler and Nashville south of State Route 55 and sparse groupings of residences and agricultural fields, and 3) the northern subarea that is largely used for agricultural crops with sparse farm residences, small groupings of residences, and the western residential developments of Troy.

DP&L's guidelines in commissioning this study included evaluating both road or existing transmission line ROW corridors and "cross-country" corridors (largely agricultural fields), where land use may be suitable, for potential siting of a transmission line in terms of construction, operation and maintenance. For possible "cross-country" routes, following property lines was preferred over diagonal crossing when practical. GAI and DP&L selected some avoidance areas based on land use, relatively dense residential areas, and preserved natural areas (mainly the Stillwater River vicinity) to be considered for avoidance or minimization while identifying possible route corridors. Route alternative corridors crossing the Stillwater River, a State Scenic River, were chosen to coincide with bridges or existing aerial electric line (distribution or transmission lines) crossing points. A windshield survey was conducted on several occasions from February 2012 to May 2014 to view the general study area for potential corridors as well as constraints or avoidance areas as defined above that may not be apparent based solely on GIS data and mapping sources. GAI also consulted with the Ohio Department of Natural Resources to obtain location data for protected species for consideration in siting the route corridors.

All of the route segments utilized to form the various route alternatives that were devised for analysis and scoring are depicted in Figure 3.3 which is located at the end of the report text. There were four potential route corridors selected in the immediate vicinity of the West Milton Substation, which begin with connection to the substation itself. Three of the four corridors follow existing DP&L-owned transmission lines including various voltages (69 kV, 138 kV, and 345 kV). The fourth corridor follows a road ROW (Frederick Garland Road) toward the east. In general, four largely unique route corridors were identified which span from the southern study area limit to the north section of the study area. These corridors were selected to provide a full range of options for analysis, including paralleling of road ROW, and crossing through agricultural lands aligning with property boundaries to the extent practical. In addition, one corridor was established from south to north on the west side of West Milton, due to the presence of schools and existing area development. This corridor diverges toward the north (north of Ludlow Falls community) to offer two additional route candidate corridors to cross the Stillwater River.

In the north and northwest portion of the study area approaching Eldean Substation, several route candidates (approximately five general corridors with additional segments for optional routing between the five primary corridors) were developed and analyzed. These route alternatives offered a combination of agricultural land and road ROW for comparative analysis. All route segments were assigned a node for each end of the segment (letter A through JJ during the first study phase) as a system to track and identify route segments.

2.4 Route Scoring Process

After all potential route segments were created, segment combinations were then assembled to create individual route alternatives to span between the two substations. All possible segment combinations were assigned a route identification number. Segment combinations that would require backtracking, thus increasing distance and potential effects, were not considered. During the initial scoring process, a total of 105 route alternatives were analyzed and scored through a comparative analysis process. As described below the number of route alternatives evaluated and scored was increased to 110 for the supplemental (second) scoring process following several route adjustments and newly identified route segments.

Relative Scaling of Attribute Data: In order to compare attribute measurements on a relative scale and to obtain a score that could be compared across the different alternatives, each summed data result for each attribute for a particular route alternative was normalized, or mathematically proportioned, to a scale of one to 100. The normalized values for each attribute/constraint, the total normalized score for each route alternative, and the overall rank of the route alternatives after applying weighting factors was then calculated. In this procedure the alternative with the highest value (less favorable result) for individual attributes receives a relative score of 100; that with the lowest value (more favorable result) receives a relative score of 0. (Note: If all alternatives have an impact value of zero for a specific attribute criterion, then the weighted value is set to zero). Note that the value system for the attribute of paralleling existing ROW (distance) is converse of that described above. Thus, the attribute values are transformed to a relative scale from one to 100 to obtain relative scores for each attribute criterion that was considered in the analysis and scoring. Using the relative score position, or rank, of the alternative in comparison to the values for all alternatives provided an indication of how a particular alternative compares overall. The normalized attribute scores within each category (ecological, land use, engineering, cultural resources) were then averaged for each route alternative, then all category scores were summed to determine the overall route score. The formula used for normalizing the data to achieve a relative scale is as follows, as based on a methodology suggested by EPRI/GTC (2009) and Gaige, et al. (1991):

$$\text{Normalized score value} = (x - \text{minimum value}) / \text{range}] * 100, \text{ where } x = \text{actual attribute value}$$

Weighting of Attributes and Constraints: The weighting factors applied to individual attributes for route selection study were based on the Project planning team's (DP&L and GAI staff) professional judgment based on Project objectives and previous route study experience on similar projects. Certain attributes and constraints have more impact on the ecological features, humans and their activities, socioeconomic features, the engineering design specifications and construction implementation processes relative to other attributes. Based on these premises, the Project planning team developed the following weighting values for each attribute category: Ecological (30%), Land Use (30%), Cultural Resources (10%), and Engineering/Construction (30%).

3.0 Route Evaluation and Ranking Results

3.1 Initial Route Scoring Results and Rankings

Table 3-2 summarizes the criteria category scores, with weighting values applied, and the overall relative ranking of all route alternatives for the initial route scoring process for 105 route alternatives. The total route scores ranged from 1,838 to 4,425 out of a possible range from zero to 10,000. The weighting values were applied by multiplying the normalized score by the actual percent weighting value (rather than dividing the percent value by 100) in order to arrive at overall route scores expressed in the "thousands" for ease of comparison (versus decimal values). Based on the route scoring system and process, a lower overall score indicates a more favorable route alternative and conversely a higher score indicates a more inferior route alternative given the variety of attributes that were measured.

The results of the initial scoring process indicated that the 12 highest ranked routes (Routes 103, 132, 131, 104, 133, 113, 107, 115, 106, 105, 114, and 119) all utilize the same western route segments from the West Milton Substation (with the exception of the H'-LL-J' segment), and follow the same route to roughly reach halfway toward the Eldean Substation in the vicinity of nodes M, N, and O on State Route 55. This western route (segments A-H-H') consists of both cross-country and road ROW route portions and crosses the Stillwater River along the State Route 55 bridge and ROW where an overhead distribution line exists. The A-H-H'-J'-J-M combination is favored, based on the overall scores and the fact that it is common to 12 of the top 15 route scores, in comparison to other route alternatives exiting the West Milton Substation to the north and east.

From the vicinity of nodes M, N, and O, the top 15 route alternatives diverge on five different route paths to reach the northern section of the study area. Four of the top nine route alternatives utilize the N-O-P-BB route segment combination, including the top three scoring routes, for traversing the central portion of the study area which mostly consists of agricultural land. Five of the top 15 scoring routes include paralleling portions of Forest Hill Road (segments N-O-R and N-O-R-W). Four of the top 15 routes parallel Greenlee Road (segments M-S-V-X) to reach the north section of the study area.

For the northern portion of the study area, 11 of the top 15 ranked route alternatives utilize the GG-HH-II-JJ segments to reach the Eldean Substation terminus. However, other route segment combinations in the Eldean Road vicinity (e.g., segment DD-EE-EE') scored high as well. These various segments consist of both road ROW and cross-country (agricultural land) routes.

New route segments were added on Markley Road starting at node H' and extending to new node LL, then turning north alongside DP&L's existing 69 kV circuit and ROW. The additional route offers a second alternative for reaching node J', and attempts to achieve a route alternative having less in common with the other route to node J'.

Initially, the segments A-B-C-G-N and A-D-G-N (refer to Figure 3.5) were devised as a route corridor option existing the West Milton Substation toward the east across the Stillwater River then heading north for a more direct access to the center of the study area to the north. Although this route corridor would pass by the privately owned Wagner air/landing strip (a single grass turf runway), the corridor was evaluated early in the Route Selection Study (RSS) to determine if the routes in this corridor would score relatively high. The routes were evaluated due to the air strip's unknown status (active or no longer operational) and potential availability for purchase. While some routes in this corridor scored moderately high, DP&L decided to remove this corridor from further consideration due to the logistical issues of the route proximity to the private Wagner air strip. For the same reasons (although all routes would run parallel with the air strip), the route segment (P-BB) near the Leavelle air strip (private, turf single runway) was abandoned due to the potential logistics and unknown status as to its current operational status.

Based on the initial scoring results, DP&L staff reviewed several of the top ranked routes for qualitative aspects that were not necessarily fully considered in the route analysis and scoring process. The section of State Route 55 used for the majority of the top ranked routes (segments J-M-N-O) is heavily traveled and presents challenges for transmission line construction due to the heavier traffic, shared ROW with highway maintenance operations, and other overhead utilities adjacent to the highway. Most notably, the existing communication cables near State Route 55 presents a potential set back issue (further from road edge) as transfer of such cables to DP&L's proposed future pole structures is not guaranteed. Additionally, it was DP&L's preference to minimize the number of residential parcels crossed by or adjacent to the proposed route. DP&L concluded that Route 120 and 128 as the most viable and feasible two routes to be presented to the public for soliciting input.

Route 120 (A-H-H'-J'-J-M-S-V-X-W-Z-CC-BB-DD-GG-HH-II-JJ) was ranked 14 overall. Route 128 was selected as one of the highest ranked route alternatives having the lowest percentage of route in common with Route 120 at 28%. The commonality of this route with the Preferred Route exceeds the

OPSB rule, Administrative Rule 4906-05-04(A), that states: "Two routes shall be considered as alternatives if not more than 20% of the routes are in common". However, it is within the acceptable range for a variance request from the OPSB given the study area (which was ultimately granted). Route 128 consists of the following segments: A-H-H'-LL-J'-J-M-N-O-R-P'-BB-AA-EE-EE'-KK-II-JJ. Although this route presents the logistical challenges noted above for segments J-M-N-O, it was considered a viable route that is constructible and capable of meeting transmission operational needs. The two routes are depicted below in Figure 2.

3.2 Public Input and Supplemental Route Development

DP&L held the first public meeting on March 25, 2014 to present Route 120 (displayed as the blue/orange route in Figure 2) and Route 128 (red/orange route) to residents and stakeholders interested in the Project. The public meetings, which are required by OPSB rules, are intended to inform the public of DP&L's route alternatives being considered for an application to the OPSB and to allow the public to make inquiries about the route selection process and to make comments and suggestions on the two route alternatives. Public input was received during the meeting, including both verbal and written comments, as well as residents' comments received subsequent to the meeting through direct communication to DP&L staff and filing letters with the OPSB.

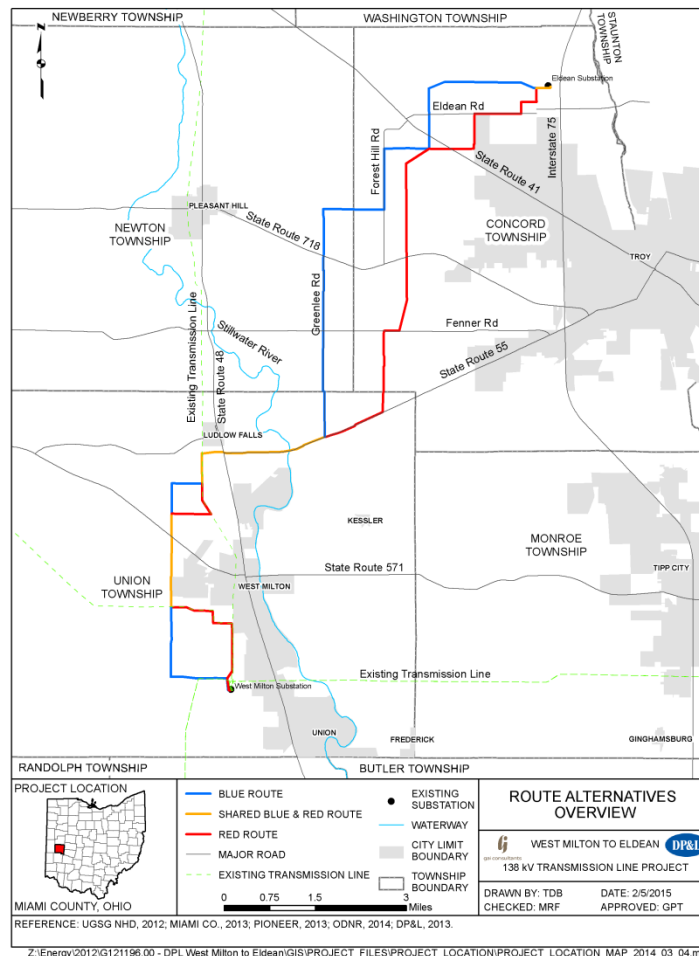


Figure 2
Route Alternatives for Public Input – March 2014 Meeting

The vast majority of comments (87%) generated from the public meeting were offered by residents of Greenlee Road which is the primary north-south road corridor that comprises 3.8 miles of Route 120 (blue/orange route). Additionally, Greenlee Road residents submitted several comment letters to the OPSB including a signed petition in opposition to the Greenlee Road portion of Route 120. The comments primarily concerned 1) the effect on landscape aesthetics, in particular where no overhead utility lines currently exist, and the viewshed toward and from land owned by the Brukner Nature Center, 2) the potential and/or perceived adverse effect on a farm on Greenlee Road considered to be of historical significance (a "Bicentennial Farm" as designated by the Ohio Department of Agriculture), and 3) lower property values as a result of a transmission line along road frontage, among other documented concerns. A few comments were also received from residents or landowners crossed by Route 128 (red/orange route) expressing concerns and opposition to this route due to various effects on their property including its impacts to crop cultivation.

Following DP&L's consideration and review of all public comments received during and after the March 25, 2014 public meeting, several new route segment alternatives were developed for evaluation in the vicinity of the southern Forest Hill Road vicinity, in lieu of the Greenlee Road option.

To avoid new route segments that would parallel Forest Hill Road along a number of residential lots, routes were devised to cross agricultural fields and align with property boundaries where feasible. Refer to Figure 3, Revised Route Alternatives Based on Public Input (March 2014). Starting at a new node NN on State Route 55, one new route segment heads north along Harter Road then continues for one mile through agricultural fields until Fenner Road is reached, then turns to the east to re-join the existing route segment on Forest Hill Road where residential lots are relatively sparse.

Additionally, new route segments were added at node OO to provide options for more length through agricultural fields, further to the north, following the Concord and Newton Township boundary (north-south). Several complete route alternatives (from substation to substation) were assembled using the supplemental route segments in the southern Forest Hill Road vicinity. The new routes were then analyzed, scored, and ranked against all previous route alternatives as describe in the next section.

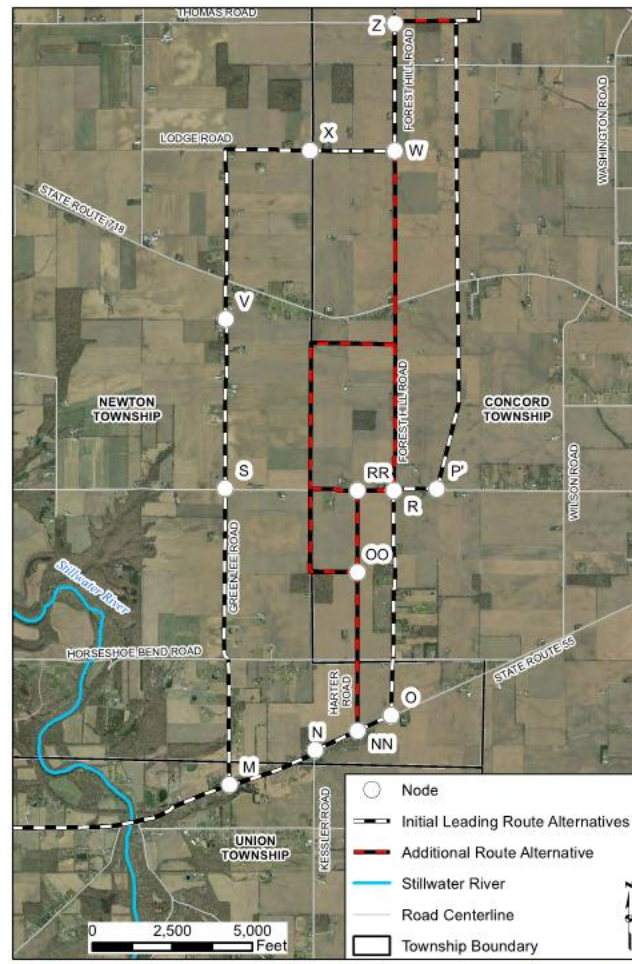


Figure 3
Revised Route Alternatives Based on Public Input (March 2014)

3.3 Supplemental Route Alternatives Analysis and Ranking

As a result of developing the above-mentioned supplemental route segments, after considering input received from the March 25th public meeting, the analysis and route scoring process described in Section 2.4 was performed. The purpose was to produce a relative comparison of all of the route alternatives including the new supplemental route segments used to form several new route alternatives. A total of 110 route alternatives were analyzed and processed with resulting scores ranging from 2,114 (best scoring alternative) to 4,587.

Table 3-3 summarizes the scoring results of the 110 route alternatives including the attribute category rankings for each route. The top 10 route alternatives consisted of three unique route segments in the central portion of the RSS study area, which indicates that the three different route segments are comparatively close in scoring. The central part of the study area is generally the south end of the Forest Hill Road, State Route 55, and vicinity, which is where supplemental route options were added. Three of the top 10 routes consisted of the agricultural field option from State Route 55 to Fenner Road (NN-OO-RR), three routes consisted of the Forest Hill Road alignment (O-R), and four routes included the Greenlee Road alignment (M-S-V or M-S-R).

The top ranked route segments in the northern section of the Project entering the Eldean Substation were DD-GG'-HH-II'-JJ (all of which crosses agricultural fields) and DD-EE-EE'-KK-II' (utilizing Eldean

Road, a short segment of agricultural land, and Experiment Farm Road). The DD-GG'-HH-II'-JJ segment combination ranks slightly better for ecological, land use and cultural resources criteria categories than the alternate leading segment entering the substation.

The alternative route segments exiting the West Milton Substation include the A-B'-H segment which heads north and the A-H segment that heads westward from the substation then north. The A-H segment is ranked higher for the ecological category (due to likely fewer wetland crossings), but A-H is ranked lower for the land use (primarily due to a summer camp located adjacent to the alignment), cultural resources, and engineering (due to less co-location with existing transmission corridor) categories.

The scoring process resulted in the highest ranked route being Route 138 which utilizes the new supplemental segment NN-OO-RR crossing agricultural fields, then crossing over Forest Hill Road toward the east, then turning north through agricultural fields (P'-BB) then entering the Eldean Substation utilizing the northern-most segment combination (DD-GG'-HH-II). Route 138, considered a "cross-country" route, would span and bisect several agricultural field parcels in the P'-BB segment, which is less desired than routes that follow agricultural field property boundaries or road ROW to the extent practical. The second highest ranked route, Route 139, utilizes Greenlee Road (from State Route 55) and then the northernmost route segments to enter the Eldean Substation. For the reasons discussed above concerning Greenlee Road, this is not a viable route based on public input.

The #3 ranked route, Route 135, was ultimately selected by DP&L as one of two routes to advance for presentation at a second public informational meeting. Refer to Figure 4 below for a map of this route (shown as the blue/orange route). Besides the route being one of the highest scoring, Route 135 offers the advantage of a combination of routing along rural roads (e.g., Forest Hill Road) and crossing agricultural fields aligning with property boundaries where practical.

The second selected route alternative for presentation to the public should ideally have <20% in common with the other route alternative being considered for possible selection as the Preferred Route. Early in the RSS, DP&L and GAI recognized that the <20% in common requirement would be difficult to achieve for the Project and requested a waiver of the rule, and suggested approximately 30% or less in common, from the OPSB. The OPSB granted this waiver of the rule to DP&L. The next highest favorably ranked route that approaches 30% or less in common was Route 128. Route 128, having 34% in common with the alternative selected Route 135, was ranked 31st overall out of 110 route alternatives. It utilizes segments that diverge from Route 135 in several locations including exiting the West Milton Substation from the north and utilizing the Markley Road option to utilize more existing DP&L transmission ROW. Route 125 runs roughly parallel with Route 135 north of State Route 55 but spans much more agricultural fields and a shorter and different section of Forest Hill Road to the south. The route is depicted on the Figure 4 map below as the red/orange route.

3.4 Second Public Meeting Input on Revised Route Alternatives

Following the development of supplemental route segments resulting from the first public meeting, and the identification, evaluation and scoring of supplemental route alternatives, a second public informational meeting was held on July 9, 2014. Similar to the first meeting, the purpose of the meeting was to seek public input and comments on the two revised route alternatives (blue/orange Route 135 and red/orange Route 128 as shown in Figure 4) being considered for an application to the OPSB.

Public comments were received during the meeting as well as two comments submitted to the OPSB several weeks subsequent to the meeting. The majority of comments were supportive of the blue/orange route, which consisted of the longest section paralleling Forest Hill Road (Route 135). Few public comments supported the red/orange route alternative (Route 128) which consists of a larger percentage of agricultural fields in the central portion of the study area.

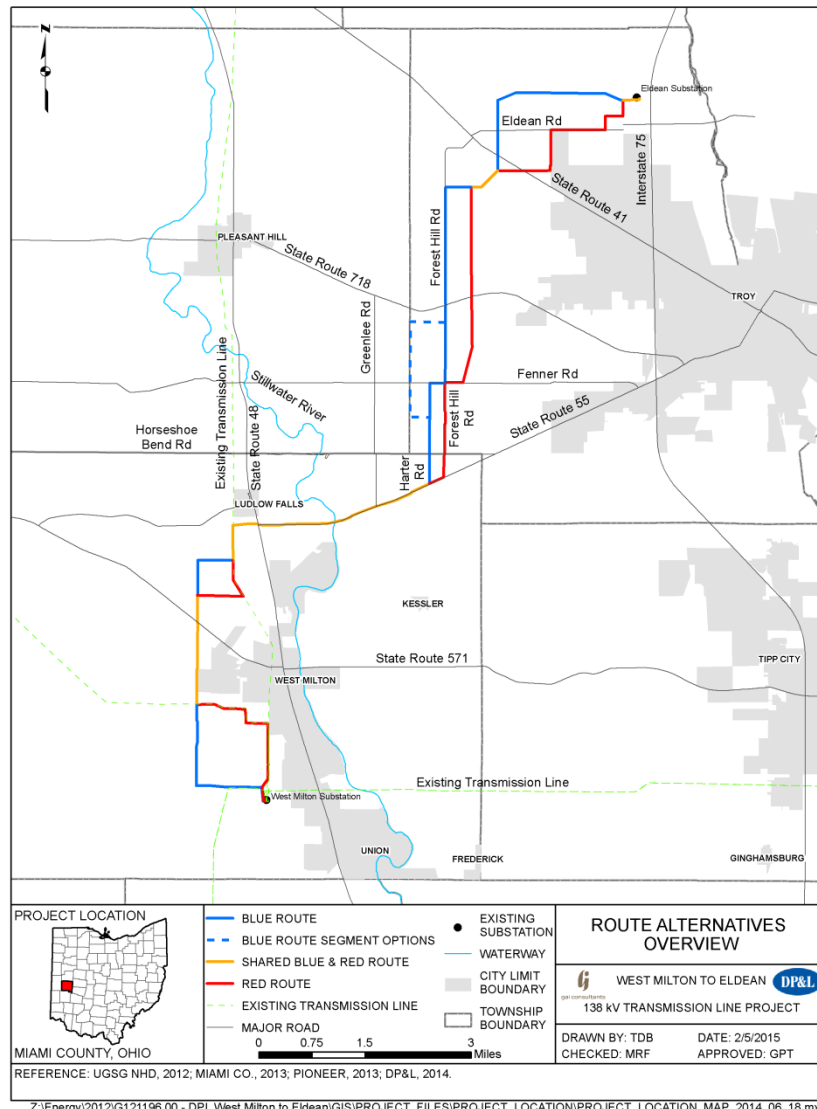


Figure 4
Revised Route Alternatives for Public Review – July 2014 Meeting

3.5 Selection of Preferred and Alternate Routes

Based on the results of the public meeting and a qualitative review of the route alternatives (depicted in Figure 4), the Preferred and Alternate Routes were selected by the DP&L siting team. The primary qualitative factors considered in the final selection were the minimization of route lengths that bisect land parcels (mainly agricultural fields) to the extent practical, minimization of routes proximal to residences along road ROW, and the feasibility of construction and maintenance of the transmission line.

3.5.1 Preferred Route

The Preferred Route was determined to be Route 135 (blue/orange route in Figure 5). The route is the 3rd highest scoring route overall and received comments of support based on the

second public meeting. The ranking of individual attribute categories for Route 135 are as follows (in terms of higher rank being more favorable): 12th for ecological rank, 17th for land use rank, 5th for cultural resources rank, and 39th for engineering rank.

3.5.2 Alternate Route

The Alternate Route was determined to be Route 128 (red/orange route in Figure 5). The route is the 31st highest scoring route overall and has 34% in common with Route 128. The ranking of individual attribute categories for the Alternate Route are: ecological rank of 27th, land use rank of 15th, cultural resources rank of 90th, and engineering rank of 93rd. This is the highest overall ranked route that approaches the 30% range for in-common percentage with the Preferred Route – all other higher ranked routes that could be considered for the alternate have more than 34% in common with the Preferred Route.

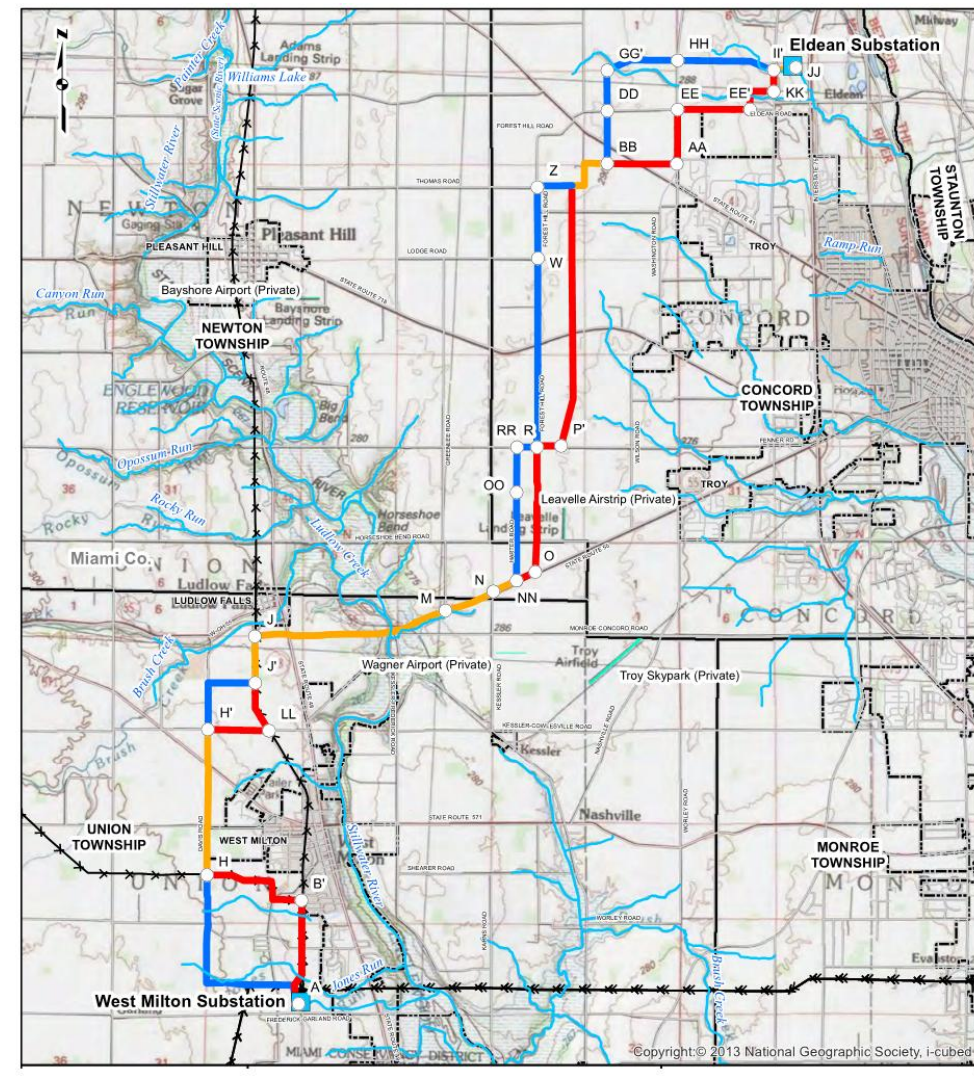


Figure 5
Preferred (Blue/Orange) and Alternate (Red/Orange) Routes

3.6 Route Adjustments for Optimizing Alignments

Following the selection of the Preferred and Alternate Routes, DP&L responded to a few landowners' request for meetings to discuss the proposed transmission alignment on their properties. These requests for changing the alignment, exclusively within an individual landowner's property, were evaluated on a case-by-case basis to determine the impact on ecological features, land use, socioeconomics, and engineering design and constructability. One area on the Preferred Route, one area on the Alternate Route, and one area on the common route were determined to be reasonable requests to optimize the alignment of these route segments, which are described below.

3.6.1 Common Route – South of State Route 41

A route adjustment relocated the proposed centerline from a diagonal orientation (1,750 feet length) over an agricultural field to the landowner's nearby property line requiring the addition of a right angle turn in the transmission line (the common route south of node BB). The optimized route segment is now 2,470 feet in length and will have less impact on agricultural crop operations. One residence is located 540 feet from this optimized route segment.

3.6.2 Preferred Route – West of Washington Road North

A request was made of DP&L to adjust the Preferred Route from the previous alignment through the middle of an agricultural crop land parcel (a 0.77-mile segment of the route) to a parallel alignment that would be situated along the landowner's property boundary in the same crop land parcel. The landowner requesting this optimization of the route has the property registered as an Ohio Agricultural District land parcel and the shift in alignment will result in a lesser impact to agricultural crop operations. The adjusted route is shown in Figure 6 below. The new alignment will also shift the line from the middle of the agricultural field of the adjacent landowner's parcel (to the west) to the property boundary (near node GG'). The overall length of the optimized route is 0.79 miles compared to 0.77 miles for the former route segment. The route will be positioned closer to an un-named ephemeral or intermittent tributary, which drains crop land and is partially parallel with the property boundary; however, the stream would be outside of the ROW with the exception of one crossing of the route. One residence is located 180 feet, and nine residences are located from 230 feet to 1,000 feet, from the optimized route. This is reasonably comparable to the previous Preferred Route where eight residences were located within 1,000 feet of the route segment.



Figure 6
Preferred Route – West of Washington Road Route Adjustment

3.6.3 Alternate Route – Area of Eldean Road / Washington Road Intersection

Similar to the previously described route adjustments for the Preferred Route, a request was received from the owner of the agricultural land, including their residence (<100 feet from the Alternate Route), located southeast of the intersection of Eldean Road and Washington Road on the Alternate Route. The adjusted route is shown in Figure 7 below between nodes AA-EE^{OPT}-EE'. The landowner, having crop land registered as Ohio Agricultural District land, requested that the route be shifted from the 0.74-mile road frontage route to the opposite side of their land and property boundary line. The optimized route segment is 0.74 miles in length through crop land, essentially the same as the previous Alternate Route (also 0.74 miles along road ROW and the edge of the crop land). Approximately a 1,300-foot portion the route

adjustment (segment AA-EE^{OPT}) is situated parallel with the rear property boundary of 15 residences (located on Parkwood Drive) but the route's centerline is more than 100 feet distance to any of these residences. The previous Alternate Route alignment was within 1,000 feet of 59 residences compared to 65 residences within 1,000 feet of the new route adjustment. There is no difference in ecological impacts – no streams, wetlands, or forested areas exist within the planned ROW of the optimized route.



Figure 7
Alternate Route – Eldean Road / Washington Road Intersection Route Adjustment

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

3/11/2015 4:47:36 PM

in

Case No(s). 14-0469-EL-BTX

Summary: Application regarding West Milton - Eldean 138kV Transmission Line Project (Part 2 of 9) electronically filed by Mr. Michael A Hassay on behalf of Shamash, Hertzels Mr.