AMERICAN ELECTRIC POWER

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Chairman Asim Z. Haque
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215-3979

Ohio Power Siting Board
Docketing Division
180 East Broad Street
Columbus, Ohio 43215-3979

January 20, 2017

Re: PUCO Case No. 16-1557-EL-BTX
West Bellaire-Glencoe 138 kV Transmission Line Rebuild Project Application for a Certificate of Environmental Compatibility and Public Need by AEP Ohio Transmission Company, Inc.

Dear Chairman Haque,

Attached please find a copy of the Application for a Certificate of Environmental Compatibility and Public Need ("Application") for the West Bellaire-Glencoe 138 kV Transmission Line Rebuild Project ("Project") by AEP Ohio Transmission Company, Inc. ("AEP Ohio Transco" or "Company"). This filing is in accordance with O.A.C. 4906-5-01 et seq., and 4906-2-01 et seq.

Filing of this application is effected electronically in accordance with O.A.C. 4906-2-02 (A) and (D). Five printed copies and ten additional electronic copies (CDs) of this filing will also be submitted to the Staff of the Ohio Power Siting Board ("OPSB") for their use.

The following information is included pursuant to O.A.C. 4906-2-04(A)(3):

(a) Applicant:
AEP Ohio Transmission Company, Inc.
c/o American Electric Power
Energy Transmission
700 Morrison Road
Gahanna, Ohio 43230

(b) Facilities to be Certified:
West Bellaire-Glencoe 138 kV Transmission Line Rebuild Project

(c) Applicant's authorized representative with respect to this application is:

Crystal Wood-Hython
Project Manager
700 Morrison Road
Gahanna, Ohio 43230

Sincerely,

AEP Ohio Transmission Company, Inc.

Scott N. Smith
Senior Vice President-Transmission Field Services & Contracts
American Electric Power Service Corporation,
as agent for AEP Ohio Transmission Company, Inc.
an Ohio corporation ("Owner")

Now comes Scott N. Smith and says that the information and material contained in the attached Application is true to the best of his knowledge and belief.

Scott N. Smith

Sworn to and subscribed before me this 20th day of JANUARY, 2017.

LINDA D. CRAIG NOTARY PUBLIC · STATE OF OHIO MY COMMISSION EXPIRES DECEMBER 19, 2021 RECORDED IN FRANKLIN COUNTY

Notary

APPLICATION TO THE OHIO POWER SITING BOARD FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

OPSB CASE NO.
16-1557-EL-BTX

West Bellaire - Glencoe 138 kV Transmission Line Rebuild Project

January 2017

Prepared by:
AECOM

Prepared for:
American Electric Power –
Ohio Transmission Company

Chapter 4906-15

Instructions for the Preparation of Certificate Applications for Electric Power, Gas and Natural Gas Transmission Facilities

4906-15-01 Project summary and facility overview

(A) An applicant for a certificate to site a major electric power, gas, or natural gas transmission facility shall provide a project summary and overview of the proposed project. In general, the summary should be suitable as a reference for state and local governments and for the public. The summary and overview shall include the following:

(1) A statement explaining the general purpose of the facility.

(2) A description of the proposed facility.

(3) A description of the site or route selection process, including descriptions of the major alternatives considered.

(4) A discussion of the principal environmental and socioeconomic considerations of the preferred and alternate routes or sites.

(5) An explanation of the project schedule (a bar chart is acceptable).

(B) Information filed by the applicant in response to the requirements of this section shall not be deemed responses to any other section of the application requirements.

(C) If the applicant 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, shall be provided to the board staff on computer disk concurrent with submission of the application.

Effective: 1/25/09
119.032 review dates: 11/30/13
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Prior Effective Dates: 12/27/76, 10/10/78, 7/7/80, 7/7/88, 8/28/98, 12/15/03

4906-15-02 Review of need for proposed project

(A) The applicant shall provide a statement explaining the need for the proposed facility, including a listing of the factors upon which it relied to reach that conclusion and references to the most recent long-term forecast report (if applicable). The statement shall also include but not be limited to, the following:

(1) A statement of the purpose of the proposed facility.

(2) Specific projections of system conditions, local requirements or any other pertinent factors that impacted the applicant's opinion on the need for the proposed facility.

(3) Relevant load flow studies and contingency analyses, if appropriate, identifying the need for system improvement.

(4) For electric power transmission facilities, load flow data shall be presented in the form of transcription diagrams depicting system performance with and without the proposed facility.

(5) For gas or natural gas transmission projects, one copy in electronic format of the relevant base case system data on diskette, in a format acceptable to the board staff, with a description of the analysis program and the data format.

(B) Expansion plans.

(1) For the electric power transmission lines and associated facilities, the applicant shall provide a brief statement of how the proposed facility and site/route alternatives fit into the applicant's most recent long-term electric forecast report and the regional plans for expansion, including, but not limited to, the following:

(a) Reference to any description of the proposed facility and site/route alternatives in the most recent long-term electric forecast report of the applicant.

(b) If no description was contained in the most recent long-term electric forecast report, an explanation as to why none was filed in the most recent long-term electric forecast report.

(c) Reference to regional expansion plans, including East Central Area Reliability Coordination Agreement bulk power plans, when applicable (if the transmission project will not affect regional plans, the applicant shall so state).

(2) For gas transmission lines and associated facilities, the applicant shall provide a brief statement of how the proposed facility and site/route alternatives fit into the applicant's most recent long-term gas forecast report, including the following:

(a) Reference to any description of the proposed facility and site/route alternatives in the most recent long-term gas forecast report of the applicant.

(b) If no description was contained in the most recent long-term gas forecast report, an explanation as to why none was filed in the most recent long-term gas forecast report.

(C) For electric power transmission facilities, the applicant shall provide an analysis of the impact of the proposed facility on the electric power system economy and reliability. The impact of the proposed facility on all interconnected utility systems shall be evaluated, and all conclusions shall be supported by relevant load flow studies.

(D) For electric power transmission lines, the applicant shall provide an analysis and evaluation of the options considered which would eliminate the need for construction of an electric power transmission line, including electric power generation options and options involving changes to existing and planned electric power transmission substations.

(E) The applicant shall describe why the proposed facility was selected to meet the projected need.

(F) Facility schedule.

(1) Schedule. The applicant shall provide a proposed schedule in bar chart format covering all applicable major activities and milestones, including:

(a) Preparation of the application.

(b) Submittal of the application for certificate.

(c) Issuance of the certificate.

(d) Acquisition of rights-of-way and land rights for the certified facility.

(e) Preparation of the final design.

(f) Construction of the facility.

(g) Placement of the facility in service.

(2) Delays. The applicant shall describe the impact of critical delays on the eventual in-service date.

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Replaces: part of 4906-15-04
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4906-15-03 Site and route alternatives analyses

(A) The applicant shall conduct a site and route selection study prior to submitting an application for an electric power transmission line, electric power transmission substation, gas or natural gas transmission line, or a gas compressor station. The study shall be designed to evaluate all practicable sites, routes, and route segments for the proposed facility identified within the project area.

(1) The applicant shall provide the following:

(a) A description of the study area or geographic boundaries selected, including the rationale for the selection.

(b) A map of suitable scale which includes the study area and which depicts the general routes, route segments, and sites which were evaluated.

(c) A comprehensive list and description of all qualitative and quantitative siting criteria, factors, or constraints utilized by the applicant, including any evaluation criteria or weighting values assigned to each.

(d) A description of the process by which the applicant utilized the siting criteria to determine the preferred and alternate routes and sites.

(e) A description of the routes and sites selected for evaluation, their final ranking, and the factors and rationale used by the applicant for selecting the preferred and alternate routes and sites.

(2) The applicant shall provide one copy of any constraint map utilized for the study directly to the board staff for review.

(B) The applicant shall provide a summary table comparing the routes, route segments, and sites, utilizing the technical, financial, environmental, socioeconomic, and other factors identified in the study. Design

and equipment alternatives shall be included where the use of such alternatives influenced the siting decision.

(C) The applicant may provide a copy of any route and site selection study produced by or for the applicant for the proposed project as an attachment to the application. The study may be submitted in response to paragraphs (A) and (B) of this rule, provided that the information contained therein is responsive to the requirements of paragraphs (A) and (B) of this rule.

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4906-15-04 Technical data

(A) Site/route alternatives. Information on the location, major features, and the topographic, geologic, and hydrologic suitability of site/route alternatives shall be submitted by the applicant . If this information is derived from reference materials, it shall be derived from the best available and current reference materials.

(1) Geography and topography. The applicant shall providemap(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of a transmission line alignment, and the area within the immediate vicinity of a substation site or compressor station site, which shall include the following features:

(a) The proposed transmission line alignments, including proposed turning points.

(b) The proposed substation or compressor station site locations.

(c) Major highway and railroad routes.

(d) Identifiable air transportation facilities, existing or proposed.

(e) Utility corridors.

(f) Proposed permanent access roads.

(g) Lakes, ponds, reservoirs, streams, canals, rivers, and swamps.

(h) Topographic contours.

(i) Soil associations or series.

(j) Population centers and legal boundaries of cities, villages, townships, and counties.

(2) Slope and soil mechanics. The applicant shall:

(a) Provide a brief, but specific description of the soils in the areas depicted on the above map(s) where slopes exceed twelve per cent. This information may be extracted from published sources.

(b) Discuss the rationales as to suitability of the soils for foundation construction.

(B) Layout and construction. The applicant shall provide information on the poposed layout and preparation of route/site alternatives, and the description of the proposed major structures and their installation as detailed below.

(1) Site activities. The applicant shall describe the proposed site clearing, construction methods and reclamation operations, including:

(a) Surveying and soil testing.

(b) Grading and excavation.

(c) Construction of temporary and permanent access roads and trenches.

(d) Stringing of cable and/or laying of pipe.

(e) Post-construction reclamation.

(2) Layout for associated facilities. The applicant shall:

(a) Provide a map of 1:2,400 scale of the site of major transmission line associated facilities such as substations, compressor stations and other stations, showing the following proposed features:

(i) Final grades after construction, including the site and access roads.

(ii) Proposed location of major structures and buildings.

(iii) Fenced-in or secured areas.

(iv) Estimated overall dimensions.

(b) Describe reasons for the proposed layout and any unusual features.

(c) Describe plans for any future modifications in the proposed layout, including the nature and approximate timing of contemplated changes.

(C) Transmission equipment. The applicant shall provide a description of the proposed transmission lines, as well as switching, capacity, metering, safety and other equipment pertinent to the operation of the proposed electric power and gas transmission lines and associated facilities. Include any provisions for future expansion.

(1) Provide the following data for electric power transmission lines:

(a) Design voltage.

(b) Tower designs, pole structures, conductor size and number per phase, and insulator arrangement.

(c) Base and foundation design.

(d) Cable type and size, where underground.

(e) Other major equipment or special structures.

(2) Provide a description for electric power transmission substations that includes a single-line diagram and a description of the proposed major equipment, such as:

(a) Breakers.

(b) Switchgear.

(c) Bus arrangement and structures.

(d) Transformers.

(e) Control buildings.

(f) Other major equipment.

(3) Provide the following data for gas transmission lines:

(a) Maximum allowable operating pressure.

(b) Pipe material.

(c) Pipe dimensions and specifications.

(d) Other major equipment.

(4) Provide a description of gas transmission facilities such as:

(a) Control buildings.

(b) Heaters, odorizers, and above-ground facilities.

(c) Any other major equipment.

(D) Environmental and aviation compliance information. The applicant shall provide:

(1) A list and brief discussion of all permits that will be required for construction of the facility.

(2) A description, quantification and characterization of debris that will result from construction of the facility, and the plans for disposal of the debris.

(3) A discussion of the process that will be used to control storm water and minimize erosion during construction and restoration of soils, wetlands, and streams disturbed as a result of construction of the facility.

(4) A discussion of plans for disposition of contaminated soil and hazardous materials generated or encountered during construction.

(5) The height of tallest anticipated above ground structures. For construction activities within the vicinity of airports or landing strips, provide the maximum possible height of construction equipment as well as all installed above ground structures.

(6) A description of the plans for construction during excessively dusty or excessively muddy soil conditions.

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4906-15-05 Financial data.

(A) Ownership. The applicant shall state the current and proposed ownership status of the proposed facility, including sites, rights-of-way, structures, and equipment. The information shall cover sole and combined ownerships, any leases, options to purchase, or franchises, and shall specify the extent, terms, and conditions of ownership, or other contracts or agreements.

(B) Electric capital costs. The applicant shall submit estimates of applicable capital and intangible costs for the various components of electric power transmission facility alternatives. The data submitted shall be classified according to the federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for the utility companies, unless the applicant is not an electric light company, a gas company or a natural gas company as defined in Chapter 4905. of the Revised Code (in which case, the applicant shall file the capital costs classified in the accounting format ordinarily used by the applicant in its normal course of business). The estimates shall include:

(1) Land and land rights.

(2) Structures and improvements.

(3) Substation equipment.

(4) Poles and fixtures.

(5) Towers and fixtures.

(6) Overhead conductors.

(7) Underground conductors and insulation.

(8) Underground-to-overhead conversion equipment.

(9) Right-of-way clearing and roads, trails, or other access.

(C) Gas capital cost. The applicant shall submit estimates of applicable capital and intangible costs for the various components of gas transmission facility alternatives. The data submitted shall be classified according to the federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for utility companies, unless the applicant is not an electric light company, a gas company or a natural gas company as defined in Chapter 4905. of the Revised Code (in which case, the applicant shall file the capital costs classified in the accounting format ordinarily used by the applicant in its normal course of business. The estimates shall include:

(1) Land and land rights.

(2) Structures and improvements.

(3) Pipes.

(4) Valves, meters, boosters, regulators, tanks, and other equipment.
(5) Roads, trails, or other access.

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4906-15-06 Socioeconomic and land use impact analysis

(A) The applicant shall conduct a literature search and map review for the area within one thousand feet on each side of each proposed transmission line centerline and within one thousand feet of the perimeter of each substation or compressor station designed to identify specific land use areas as required in paragraph (B)(3) of this rule. On-site investigations shall be conducted within one hundred feet of each side of each proposed transmission line centerline and within one hundred feet of the perimeter of each substation or compressor station to characterize the potential effects of construction, operation, and maintenance of the proposed facility.

(B) The applicant shall provide, for each of the site/route alternatives and adjacent areas, map(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of a transmission alignment, and the area within the immediate vicinity of a substation site, which map(s) shall include the following features:

(1) Proposed approximate centerline for each transmission line alternative being proposed.

(2) Proposed substation or compressor station locations.

(3) General land use, depicted as areas on the maps, including, but not limited to:

(a) Residential use.

(b) Commercial use.

(c) Industrial use.

(d) Cultural use (as identified in paragraph (F) of this rule).

(e) Agricultural use.

(f) Recreational use.

(g) Institutional use (e.g., schools, hospitals, churches, government facilities, etc.).

(4) Transportation corridors.

(5) Existing utility corridors.

(6) Noise-sensitive areas.

(7) Agricultural land (including agricultural district land) existing at least sixty days prior to submission of the application located within each transmission line right-of-way or within each site boundary.

(C) The applicant shall provide for each of the site/route alternatives, a description of the impact of the proposed facility on each land use identified in paragraph (B)(3) of this rule. As it relates to agricultural land, the description shall include the acreage impacted and the applicant's evaluation of impacts to cultivated land, permanent pasture land, managed wood lots, orchards, nurseries, and agricultural-related structures.

(1) Provide the number of residential structures within one thousand feet of the proposed facility, and identify all residential structures for which the nearest edge of the structure is within one hundred feet of the proposed facility.

(2) Construction: The applicant shall estimate the probable impact of the proposed facility on each land use (including: (a) buildings that will be destroyed, acquired, or removed as the result of the planned facility and criteria for owner compensation; and (b) field operations [such as plowing, planting, cultivating, spraying, and harvesting], irrigation, and field drainage systems).

(3) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility on each land use.

(4) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during the construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize impact to land use, such as effects on subsurface field drainage systems.

(D) The applicant shall provide the following public interaction information for each of the site/route alternatives:

(1) A list of counties, townships, villages, and cities within one thousand feet on each side of the centerline or facility perimeter.

(2) A list of the public officials contacted regarding the application, their office addresses, and office telephone numbers.

(3) A description of the program or company/public interaction planned for the siting, construction, and operation of the proposed facility, i.e. public information programs.

(4) A description of any insurance or other corporate program, if any, for providing liability compensation for damages, if such should occur, to the public resulting from construction or operation of the proposed facility.

(5) A description of how the facility will serve the public interest, convenience, and necessity.

(6) An estimate of the increase in tax revenues as a result of facility placement.

(7) A description of the impact of the facility on regional development, referring to pertinent formally adopted regional development plans.

(E) The applicant shall provide the following health, safety, and aesthetic information for each site/route alternative:

(1) The applicant shall provide a description of how the facility will be constructed, operated, and maintained to comply with the requirements of applicable state and federal statutes and regulations, including the 2002 edition of the "National Electrical Safety Code", applicable occupational safety and health administration regulations, U.S. department of transportation gas pipeline safety standards, and Chapter 4901:1-16 of the Administrative Code.

(2) For electric power transmission facilities, the applicant shall discuss the production of electric and magnetic fields during operation of the preferred and alternate site/route. If more than one conductor configuration is to be used on the proposed facility, information shall be provided for each configuration that constitutes more than ten per cent of the total line length, or more than one mile of the total line length being certificated. Where an alternate structure design is submitted, information shall also be provided on the alternate structure. The discussion shall include:

(a) Calculated electric and magnetic field strength levels at one meter above ground, under the conductors and at the edge of the right-of-way for:

(i) Winter normal conductor rating.

(ii) Emergency line loading.

(iii) Normal maximum loading.

Provide corresponding current flows, conductor ground clearance for normal maximum loading and distance from the centerline to the edge of the right-of-way. Estimates shall be made for minimum conductor height. The applicant shall also provide typical cross-section profiles of the calculated electric and magnetic field strength levels at the normal maximum loading conditions.

(b) References to the current state of knowledge concerning possible health effects of exposure to electric and magnetic field strength levels.

(c) Description of the company's consideration of electric and magnetic field strength levels, both as a general company policy and specifically in the design and siting of the transmission line project including: alternate conductor configurations and phasing, tower height, corridor location and right-of-way width.

(d) Description of the company's current procedures for addressing public inquiries regarding electric and magnetic field strength levels, including copies of informational materials and company procedures for customer electric and magnetic field strength level readings.

(3) The applicant shall discuss the aesthetic impact of the proposed facility with reference to plans and sketches, including the following:

(a) The views of the proposed facility from such sensitive vantage points as residential areas, lookout points, scenic highways, and waterways.

(b) Structure design features, as appropriate.

(c) How the proposed facility will likely affect the aesthetic quality of the site and surrounding area.

(d) Measures that will be taken to minimize any visual impacts created by the proposed facility.

(4) For electric power transmission facilities, the applicant shall provide an estimate of the level of radio and television interference from operation of the proposed facility, identify the most severely impacted areas, if any, and discuss methods of mitigation.

(F) The applicant shall provide, for each of the site/route alternatives, a description of the impact of the proposed facility on cultural resources. This description shall include potential and identified recreational areas and those districts, sites, buildings, structures, and objects which are recognized by, registered with, or identified as eligible for registration by the Ohio historical society or the Ohio department of natural resources. It shall include but not be limited to the following:

(1) Location studies: The applicant shall describe studies used to determine the location of cultural resources within the study corridor. Correspondence with the Ohio historical preservation office shall be included.

(2) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on cultural resources.

(3) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility on cultural resources.

(4) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during the operation and maintenance of the proposed facility to minimize impact to cultural resources.

(G) The applicant shall submit data and related information on noise emissions generated by the proposed transmission line and associated facilities. Construction noise information shall be submitted for only those portions of transmission line routes requiring more than four months of actual construction time to complete in residential, commercial, and other noise-sensitive areas.

(1) Construction: To assure noise control during construction, the applicant shall estimate the nature of any intermittent, recurring, or particularly annoying sounds from the following sources:

(a) Dynamiting or blasting activities.

(b) Operation of earth moving and excavating equipment.

(c) Driving of piles.

(d) Erection of structures.

(e) Truck traffic.

(f) Installation of equipment.

(2) Operation and maintenance: The applicant shall estimate the effect of noise generation due to the operation or maintenance of the transmission line and associated facilities.

(3) Mitigation procedures: The applicant shall describe any equipment and procedures designed to mitigate noise emissions during both the site clearing and construction phase, and during the operation and maintenance of the facility to minimize noise impact.

(H) The applicant shall provide site-specific information that may be required in a particular case to adequately describe other significant issues of concern that were not addressed above. The applicant shall describe measures that were taken and/or will be taken to avoid or minimize adverse impact. The applicant shall describe public safety-related equipment and procedures that were and/or will be taken.

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4906-15-07 Ecological impact analysis.

(A) The applicant shall provide a summary of any studies that have been made by or for the applicant on the natural environment in which the proposed facility will be located. The applicant shall conduct and report the results of a literature search, including map review, for the area within one thousand feet on each side of a transmission line alignment and the area within the immediate vicinity of a substation or compressor station site. On-site investigations shall be conducted within one hundred feet on each side of a transmission line centerline or within one hundred feet of a substation or compressor station site to characterize the potential effects of construction, operation, or maintenance of the proposed facility.

(B) The applicant shall provide for each of the site/route alternatives a map(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of the transmission line alignment and the area within the immediate vicinity of a substation site or compressor station site. The map(s) shall include the following:

(1) Proposed transmission line alignments.

(2) Proposed substation or compressor station locations.

(3) All areas currently not developed for agricultural, residential, commercial, industrial, institutional, or cultural purposes including:

(a) Streams and drainage channels.

(b) Lakes, ponds, and reservoirs.

(c) Marshes, swamps, and other wetlands.

(d) Woody and herbaceous vegetation land.

(e) Locations of threatened or endangered species.

(4) Soil associations in the corridor.

(C) The applicant shall provide for each of the site/route alternatives a description of each stream or body of water (and associated characteristics including floodplain) that is present and may be affected by the proposed facility, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on streams and bodies of water. This shall include the impacts from route clearing.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on streams and bodies of water. This shall include the permanent impacts from route clearing.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on streams and bodies of water.

(D) The applicant shall provide for each of the site/route alternatives a description of each wetland that is present and may be affected by the proposed facility. The applicant shall describe the probable impact on these wetlands, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on wetlands and wildlife habitat.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on wetlands and wildlife habitat. This would include the permanent impacts from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on wetlands and wildlife habitat.

(E) The applicant shall provide for each of the site/route alternatives a description of the naturally occurring vegetation that is present and may be affected by the proposed facility. The applicant shall describe the

probable impact to the environment from the clearing and disposal of this vegetation, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on the vegetation. This would include the impacts from route clearing, types of vegetation waste generated, and the method of disposal or dispersal.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on species described above. This would include the permanent impact from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on species described above.

(F) The applicant shall provide for each of the site/route alternatives a description of each major species of commercial or recreational value and species designated as endangered or threatened, in accordance with U.S. and Ohio species lists, that is present and may be affected. The applicant shall describe the probable impact to the habitat of the species described above, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on commercial, recreational, threatened, or endangered species. This would include the impacts from route clearing and any impact to natural nesting areas.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on species described above. This would include the permanent impact from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on species described above.

(G) The applicant shall provide for each of the site/route alternatives a description of the areas with slopes and/or highly erodible soils (according to the natural resource conservation service and county soil surveys) that are present and may be affected by the proposed facility. The applicant shall describe the probable impact to these areas, including but not limited to the following:

(1) Construction: The applicant shall provide a description of the measures that will be taken to avoid or minimize erosion and sedimentation during the site clearing, access road construction, facility construction process, and any other temporary grading. If a storm water pollution prevention plan is required for the proposed facility, the applicant shall include the schedule for the preparation of this plan.

(2) Operation and maintenance: The applicant shall describe and estimate the probable impact of the operation and maintenance of the proposed facility after construction on the environment. This would include permanent impacts from sites where grading has taken place.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during operation and maintenance of the proposed facility to minimize the impact on the environment due to erosion from storm water run-off.

(H) The applicant shall provide site-specific information that may be required in this particular case to adequately describe other significant issues of concern that were not addressed above. The applicant shall describe measures that were taken and/or will be taken to avoid or minimize adverse impacts. The applicant shall describe public safety-related equipment and procedures that were and/or will be taken.

Effective: 12/15/2003
119.032 review dates: 9/30/13
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Prior Effective Dates: 10/10/78, 3/20/87, 8/28/98

BEFORE THE OHIO POWER SITING BOARD
Certificate Application for Electric Transmission Facilities
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4906-5-02 Project Summary and Applicant Information

4906-5-02 PROJECT SUMMARY AND APPLICANT INFORMATION

(A) PROJECT SUMMARY AND FACILITY OVERVIEW

AEP Ohio Transmission Company, Inc. ("AEP Ohio Transco") proposes to rebuild the existing six-mile Glencoe-West Bellaire 69 kV electric transmission line in Belmont County, Ohio ("Project") as a double-circuit 138kV line, with one side operated at 69 kV. Due to increased customer load growth in the area stemming from the Utica shale gas play and numerous mining facilities, several 69 kV circuits and one 138-69 kV transformer were identified and forecasted to be overloaded in the future under certain contingency conditions. These violations were confirmed with the PJM RTO as part of the 2019 RTEP Study, and approved as Baseline RTEP upgrades in January 2015 (b2593). In addition, the existing line has been in service since the 1930s and has deteriorated to a level that no longer adheres to AEP's Transmission Line Engineering Standards ("TLES"). Rebuilding the line will eliminate the risks for overloading and enhance reliability for area customers. Rebuilding the line will also resolve issues associated with the deterioration of the line and bring the line up to current design standards. The proposed Project will improve local service for customers, decrease power interruptions, improve resiliency of the system, and speed recovery of local service when outages do occur. In addition, the Project will facilitate the interconnection of new industrial customers to the AEP Ohio transmission system and support future economic development in the area.

(1) General Purpose of the Facility

The existing West Bellaire-Glencoe line provides 69 kV transmission service to the area, and serves AEP Ohio distribution load at Neffs Station. West Bellaire Station serves as a critical 345-138-69 kV transmission source to the region, while Glencoe Station is an important 69 kV switching station for the local area, with five 69 kV circuit connections. The 69 kV line was originally constructed in the 1930s using a combination of single pole and H frame wood construction.

The rebuilt double-circuit line will continue to serve the area with 69 kV transmission service, but will be built to 138 kV design standards to enable future voltage conversion to support future load growth in the area. The West Bellaire-Glencoe 138kV circuit will facilitate the installation of a 138-69 kV transformer source at Glencoe Station in 2019. This new transformer will be a major reliability improvement for the area by off-loading several 69 kV circuits and 138-69 kV transformers, which were forecasted to be overloaded in the coming years. In addition, the upgraded 69 kV side will serve Neffs Station.

(2) General Location, Size, and Operating Characteristics

The proposed Project will be located in Pultney, Richland, and Smith Townships of Belmont County. It will extend from the existing West Bellaire Station to the existing Glencoe Station for a total length of approximately six miles. The Project will consist of supporting structures and conductors for a double-circuit 138 kV transmission line, with one side energized at 69 kV and the

other side energized at 138 kV. The 69 kV side will serve AEP Ohio's Neffs distribution substation. A combination of steel structures is proposed for the Rebuild. Structure type will vary based on topography. All proposed structures are anticipated to average 100 feet in height with a proposed average span of 500 feet. A project overview is provided in **Figure 02-1**.

(3) Suitability of the Preferred and Alternate Routes

AEP Ohio Transco identified a Preferred and an Alternate Route, along with shared Rebuild Sections within existing right-of-way ("ROW") for this Project, after conducting a Route Selection Study ("RSS") (Figure 02-1 and detailed in Appendix 04-1). The study documented the selection process of the routes, which is discussed in further detail in Section 4905-6-04 of this Application.

The goal of the RSS was to identify reasonable routes while avoiding or minimizing effects on sensitive land uses, ecological, and cultural features within the Project area. The Preferred and Alternate Routes, including the shared Rebuild Sections, are both constructible and were selected by AEP Ohio Transco for consideration by the Ohio Power Siting Board ("OPSB") in this Application.

As described above, the purpose of the Project is to rebuild the existing West Bellaire-Glencoe line and in the process upgrade it to 138/69 kV operation. To meet current 138 kV standards, the new line will require a wider 100 foot ROW, which may result in impacts to some areas due to adjacent development. AEP Ohio Transco's consultant sought to identify potential routing solutions that would have the least overall impacts to local land use and environmental and cultural resources, while avoiding non-standard design and construction requirements.

As a rebuild project, utilizing the existing 69 kV ROW where possible is the most advantageous solution for the Project. Since the existing 69 kV line cannot be taken out of service during construction without major service disruptions, rebuilding on the existing centerline is not possible. Rather, the Project will be constructed primarily within the existing ROW offset by approximately 35 feet to allow for construction while the existing line remains in service. Crossovers of the existing 69 kV centerline are proposed to allow construction on the most advantageous and least impactful offset side of the existing infrastructure. The Rebuild Segments of the Preferred and Alternate Routes account for approximately 4.7 miles of the 5.8 to 6.1 miles of total lengths. The Rebuild Sections include an approximately 0.5 mile offset from an existing 138 kV line exiting West Bellaire Station and 3.8 miles of offset from the existing West Bellaire-Glencoe 69 kV line. There are two crossovers of the existing 69 kV line by the Rebuild Sections to avoid two existing residences[1].

Due to engineering requirements and potential impacts, Preferred and Alternate Route deviations from the existing ROW were necessary around the Village of Neffs and at a crossing of four

[1] Note, because the Rebuild Segments of the Preferred and Alternate Routes are within the existing transmission ROW for the majority of the length of the Project, the only portions of the Preferred Route considered for purposes of the 20% alternative threshold described in Ohio Administrative Code Section 4906-3-05 are those portions of the Preferred Route and the Alternate Route that are outside of the existing ROW. These portions include new potential corridors around the Village of Neffs and the crossing of four American Transmission System, Inc. (ATSI) lines where existing structures obstruct the ability to directly offset the existing 69 kV line being rebuilt.

FirstEnergy 138 kV lines. The Preferred Route deviation around the Village of Neffs provides a shorter route and is better aligned with existing infrastructure than the Alternate Route that extends farther to the north. The Preferred Route deviation at the crossing of the four FirstEnergy lines was selected based on engineering constraints.

The Preferred and Alternate Routes are equally suitable for the need of the Project. More land use features are located within 1,000 feet of the Preferred Route because it is closer to the Village of Neffs. However, features within closer proximity (i.e. within 100 feet) remain similar. In fact, the closest residence to the Alternate Route is approximately 90 feet away, while the closest residence to the Preferred Route is approximately 110 feet away. Overall, the Preferred Route offers the best balance of meeting engineering requirements, impact minimization, and cost effectiveness. The Preferred Route also avoids potential schedule and engineering difficulties associated with coordination with American Transmission System, Inc. to raise their lines to allow for the new West Bellaire–Glencoe 138/69 kV line to pass under them, or risk the possibility of multiple lines having a service interruption by an event that knocks down the single new line.

(i) Preferred Route

The Preferred Route around the Village of Neffs is approximately 0.8 mile long. It diverges from the existing Glencoe-West Bellaire 69kV and other 138 kV lines ROW approximately 0.3 mile east of Dixon Hill Road. It crosses wooded rolling hills heading west for approximately 0.6 mile before turning southwest for 0.1 mile to rejoin the existing Glencoe-West Bellaire 69kV ROW. In the area of the four ATSI 138 kV lines, the Preferred Route deviates from the existing ROW for approximately 0.7 mile to the north. It exits the existing ROW to the northwest for 0.4 mile. It then turns south and southwest for 0.25 mile to re-enter the ROW. The Preferred Route utilizes existing topographic changes and a valley to cross under the existing ATSI lines.

(ii) Alternate Route

The Alternate Route around the Village of Neffs is approximately 1.1 miles long. It parallels the West Bellaire-Tiltonsville 138kV ROW for 0.2 mile. The segment then heads west for 0.4 mile, crossing over McCurdy Road and Dixon Hill Road. It then turns southwest for 0.4 mile and heads to Neffs Substation, rejoining the existing ROW. In the area of the four ATSI 138 kV lines, the Alternate Route deviates to the south of the existing ROW. It exits the existing ROW to the southwest for 820 feet, and then turns northwest for 280 feet, and then it turns west following a portion of the existing ROW for 0.4 mile. The total length is approximately 0.6 mile. Without additional work by ATSI to raise their 138 kV lines, the new line along the Alternate Route would need to go over the existing lines due to topography and necessary clearance distances.

(4) Project Schedule Summary

AEP Ohio Transco plans to start construction of the transmission line in late 2017 or early 2018, with an estimated in-service date in the summer of 2019. **Figure 03-1** provides additional details regarding the proposed Project schedule.

(B) APPLICANT INFORMATION

(1) Company History

American Electric Power ("AEP") was originally incorporated in 1906 as the American Gas and Electric Company. The company's earliest utility properties provided electric, gas and other services in communities in New Jersey, New York, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois. The company became AEP in 1958 and merged with Central and Southwest Corporation in 2000.

(2) Current Operations and Affiliate Relationships

AEP Ohio Transco is a transmission-only company approved as a public utility in Ohio in 2010 in case 10-245-El-UNC. Since that time, AEP Ohio Transco has worked to develop and strengthen the transmission network in Ohio.

AEP is one of the largest electric utilities in the United States, delivering electricity to nearly 5.4 million customers through 223,000 miles of distribution lines in 11 states. AEP owns the nation's largest electricity transmission system, which is a network comprised of more than 40,000 miles and includes more 765-kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP also ranks among the nation's largest generators of electricity, owning approximately 32,000 megawatts of generating capacity in the U.S. AEP's utility units operate as AEP Ohio, AEP Texas, Appalachian Power (in Virginia and West Virginia), Wheeling Power (West Virginia), AEP Appalachian Power (in Tennessee), Indiana Michigan Power Company, Kentucky Power, Public Service Company of Oklahoma, and Southwestern Electric Power Company (in Arkansas, Louisiana, and east Texas). AEP's headquarters are in Columbus, Ohio. News releases and other information about AEP can be found at www.AEP.com.

J:\Project\ENV\60518004_AEP_WBelGl\900-CAD-GIS\920-GIS or Graphics\Glencoe_WestBellaire_OPSB_Fig 02-1_Overview.mxd

Neffs Station

West Bellaire Station

Glencoe Station

LEGEND:

- Preferred Route
- Alternate Route
- Rebuild Section
- Existing Station
- Existing Electric Line

0 2,000 4,000

Feet

Base Map Source:
ArcGIS Online, Bing Map Hybrid

N

Belmont County

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe
138 kV Line Rebuild Project

FIGURE 02-1
PROJECT OVERVIEW

JOB NO. 60518004

AECOM

4906-5-03 Review of Need and Schedule

4906-5-03 REVIEW OF NEED AND SCHEDULE

(A) NEED FOR PROPOSED FACILITY

The proposed Project will be built to 138 kV design standards to enable future voltage conversion to support future load growth in the area. The West Bellaire-Glencoe 138kV circuit will facilitate the installation of a 138-69 kV transformer source at Glencoe. This new transformer will be a major reliability improvement for the area by off-loading several 69 kV circuits and 138-69 kV transformers, which were forecasted to be overloaded in the coming years.

(1) Purpose of the Proposed Facility

AEP Ohio Transco proposes to build the Project in order to improve local service for customers, decrease power interruptions, improve resiliency of the system, and speed recovery of local service when outages do occur. Furthermore, the Project will facilitate the interconnection of new industrial customers to the AEP Ohio transmission system and support future economic development in the area. The rebuilt double-circuit line will continue to serve the vicinity with 69kV transmission service, but will be built to 138kV design standards to enable future voltage conversion to support future load growth in the area. The West Bellaire-Glencoe 138kV circuit will facilitate the installation of a 138-69kV transformer source at Glencoe. This new transformer will be a major reliability improvement for the area, and off-load several 69kV circuits and 138-69kV transformers which were forecasted to be overloaded in the coming years. In addition, the upgraded 69kV side will serve AEP Ohio's Neffs distribution station.

(2) System Conditions, Local Requirements and Other Pertinent Factors

The Project area of Belmont County and the surrounding counties have exhibited above-average load growth in recent years. This is primarily due to the shale gas industry, including energy-intensive operations such as midstream processing facilities and pipeline compressor stations. There has also been a high level of coal mining activity, which is expected to continue. These energy-intensive industries have severely taxed the limits of the current 69 kV system, which was built many decades ago. Per AEP's Transmission Planning Criteria, the 69 kV system must stay within prescribed voltage and thermal loading limits under base case and various contingency scenarios. AEP Ohio Transco and PJM agreed in 2014-15 that the facilities in **Table 03-1** would be overloaded in future years, necessitating the proposed Project. The subject Project resolves the 69 kV issues by inserting a strong 138-69 kV transformer source at Glencoe, which considerably reduces area 69 kV loading issues.

(3) Load Flow Studies and Contingency Analyses

Power flow analysis was performed using the Siemens PTI PSS/E power flow software. Load flow analysis identified contingency conditions resulting in 138-69kV thermal overloads, which are violations of AEP Ohio Transco & PJM planning criteria. **Table 03-1** below summarizes the results of the load flow analysis depicting the summer 2019 peak load conditions. The table

shows the circuit & transformer loading percentages, before and after the West Bellaire-Glencoe project is in place. As shown, all overload violations are resolved.

AEP's Transmission Planning Criteria for the PJM RTO (***FERC Form 715 filing***) are posed online at: https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/. This document discusses thermal loading limits, voltage limts, and other topics. In summary, in order to meet AEP's planning criteria under applicable tests, transmission facilities must:

- Not reach a loading level that exceeds normal thermal limits under normal conditions
- Not reach a loading level that exceeds emergency thermal limits under contingency conditions
- Maintain voltage between 95% and 105% of nominal voltage under normal conditions
- Maintain voltage between 92% and 105% of nominal voltage under contingency conditions
- Not experience voltage deviations of more than 8% per contingency

TABLE 03-1
West Bellaire-Glencoe Area Transmission System Performance
Summer Peak 2019 Conditions with Transmission System Before Improvements in Comparison with the Proposed West Bellaire-Glencoe Project in Place

Issue	Contingency Outage Scenario	Affected Facility	2019 Base Case Before Improvements	2019 Case After Improvements	Diagram #
Thermal Overloads	Kammer-West Bellaire 138kV fault (also outages West Bellaire 138-69 XFMR)	Somerton 138-69kV XFMR	**111%**	**78%**	2 & 4
		Speidel-West Bethesda-Belmont 69kV	**106%**	**42%**	2 & 4
		DTE Coal-Robyville 69kV	**104%**	**32%**	2 & 4

(4) System Performance Transcription Diagrams

Transcription diagrams are provided in **Appendix 03-1**, which depict the thermal overload violations listed in **Table 03-1**. The order of diagrams in Appendix 03-1 is as follows:

- Prior to Project:
    - 1- Base Case (no contingencies)
    - 2- With Critical Contingency (overloaded facilities shown by red bar chart)
- After West Bellaire-Glencoe Project:
    - 3- Base Case (no contingencies)
    - 4- With Critical Contingency (no overloads shown)

(B) REGIONAL EXPANSION PLANS

(1) Proposed Facility in Long-Term Forecast

The proposed Project is listed in the 2016 "AEP Ohio Transmission Company Long Term Forecast Report to the Public Utilities Commission of Ohio," Form FE-T9, on page 15.

The West Bellaire-Glencoe project was submitted to the PJM RTO in Fall 2014 and approved as a baseline RTEP reliability upgrade (identifier b2593) in January 2015, in order to resolve the thermal overloads on the local AEP Transmission system, and provide the capacity for future customer load growth. Once a project is approved by PJM as a baseline upgrade, it is included in all future regional transmission studies.

The West Bellaire-Glencoe 138kV line rebuild will not have a significant effect on neighboring electric transmission utilities in Ohio or elsewhere.

(C) SYSTEM ECONOMY AND RELIABILITY

The proposed Project will reinforce the AEP Ohio Transco 69 kV transmission system in the eastern Ohio area by increasing the 69 kV system load-serving capacity and providing for future conversion to 138kV when needed. In addition, reliability risks due to aged and deteriorated facilities will be reduced as well. The new 138 kV line between the West Bellaire Station and the Glencoe Station will facilitate installing a new 138-69kV transformer source at the Glencoe Station, which offloads area 69 kV transmission facilities of concern.

With the Project in place, 2019 summer peak system losses will be reduced by approximately 1.3 MW in the AEP service area. This is due to the new circuit having a larger wire size (less resistive losses), plus the efficient placement of a power transformer at Glencoe Station. The new 138-69 kV transformer at Glencoe Station means less power has to travel from afar, via the 69 kV transmission grid.

Table 03-1 above compares the performance of the AEP Ohio Transco transmission system with and without the proposed Project. **Table 03-1** illustrates that the forecasted thermal overload violations are eliminated with the subject Project in place.

(D) OPTIONS TO ELIMINATE THE NEED FOR THE PROPOSED PROJECT

Several options were explored in addition to the proposed Project. The Project resolves three overloads shown in **Table 03-1**. As an alternative, these three facilities could have been upgraded. This would have resulted in the following set of projects: replace the Somerton 138-69kV transformer (50 MVA) with a larger unit (e.g., 90 MVA); rebuild the Speidel-West Bethesda and West Bethesda-Belmont 69kV circuits with larger conductor; rebuild the Robyville-DTE Coal 69kV circuit with larger conductor. This suite of projects would have been more expensive, required more system outage time for construction (three facilities to be upgraded instead of one), and the Project area 69 kV system would still be vulnerable to thermal overload and/or low voltages, due to the lack of 138-69 kV sources nearby. Ultimately, the West Bellaire-Glencoe project was preferred, and selected by PJM, as a means for fixing today's reliability issues and providing margin for future load growth. Due to the Baseline RTEP project status, the Project is required in order for AEP to maintain compliance with NERC TPL standards.

Another option explored by AEP Ohio Transco would have been to curtail the maximum loading permitted for area industrial customers. However, this is not a realistic option, as it would have a negative economic impact on companies and employers in the area and it would have limited the attractiveness of economic expansion in Belmont County. One of the primary goals of the Project is to ensure a robust and reliable source of electricity to the region for decades to come.

(E) FACILITY SELECTION RATIONALE

AEP Ohio Transco's rationale to construct the future West Bellaire-Glencoe 138kV line was due to the fact that it resolved the area's transmission overloads, which is illustrated in **Table 03-1**. This Project was the optimal choice, as it will facilitate a new 138-69 kV power source at Glencoe Station. Other 69 kV line rebuilds or transformer replacements would have patched the system for a short period, but not provided the same long-term system margin and flexibility as this Project.

The decision to construct to double-circuit 138kV voltage specifications was two-fold: ***1)*** it permitted a new 138 kV source at Glencoe Station; ***2)*** it allowed the Neffs 69 kV distribution Station to continue to be served from the 69kV transmission grid, until such plans are made to convert to 138 kV. PJM selected the proposed Project based on cost, reliability improvement, and construction feasibility.

(F) FACILITY SCHEDULE

(1) Schedule Gantt Chart

The major scheduled activities associated with the Preferred and Alternate Sites are shown in bar chart form on **Figure 03-1.**

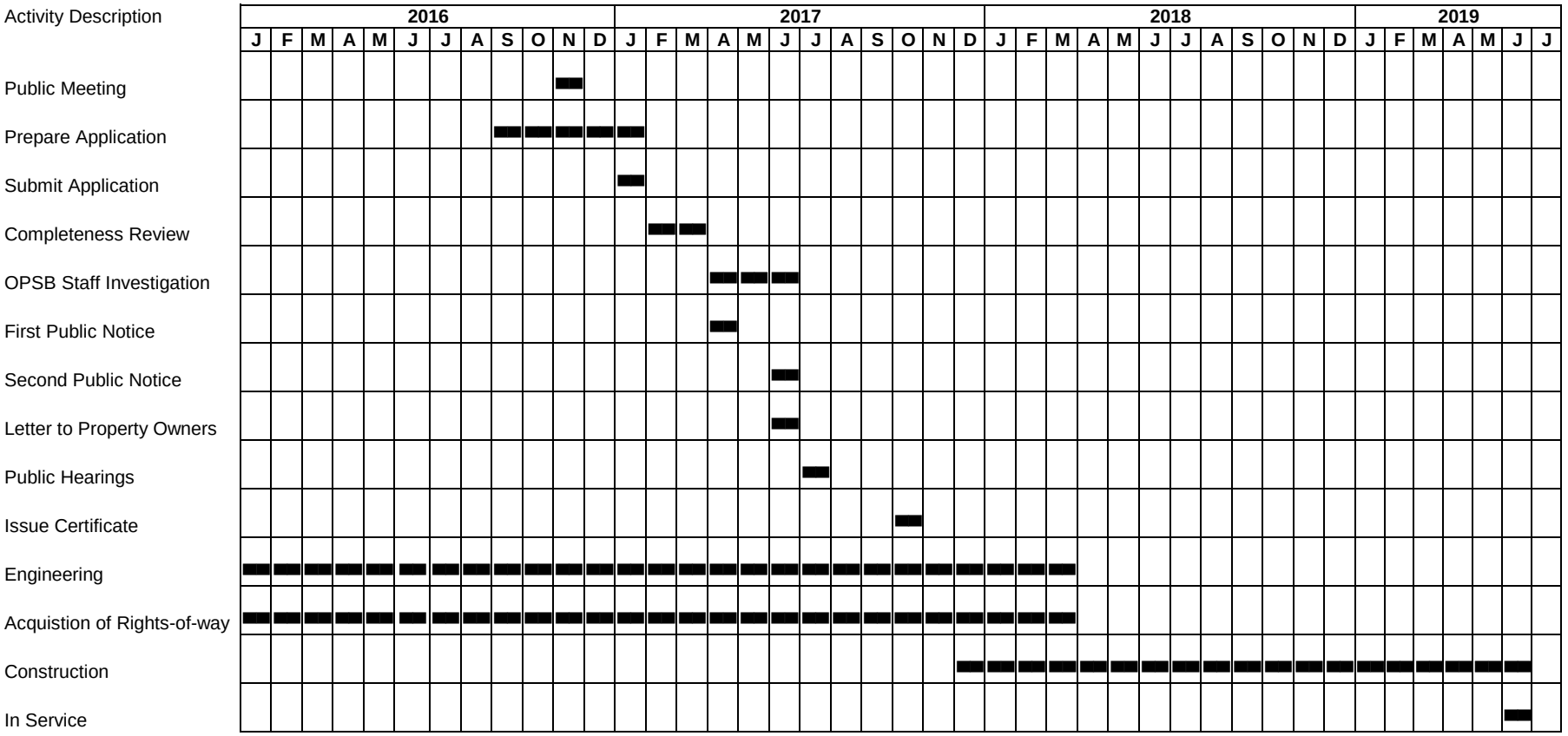
(2) Impact of Critical Delays

Critical delays to the Project will postpone the system reliability and reinforcement efforts the Project proposes to rectify. Without the Project upgrades in place, the facilities listed in Table 03-1 are vulnerable to thermal overload, which would affect the local and regional benefits associated with the Project.

Figure 03-1

Project Schedule

West Bellaire-Glencoe 138 kV Transmission Line Rebuild Project



APPENDIX 03-1

TRANSCRIPTION DIAGRAMS

Figure 1: 2019 System Prior to Project, No Contingencies

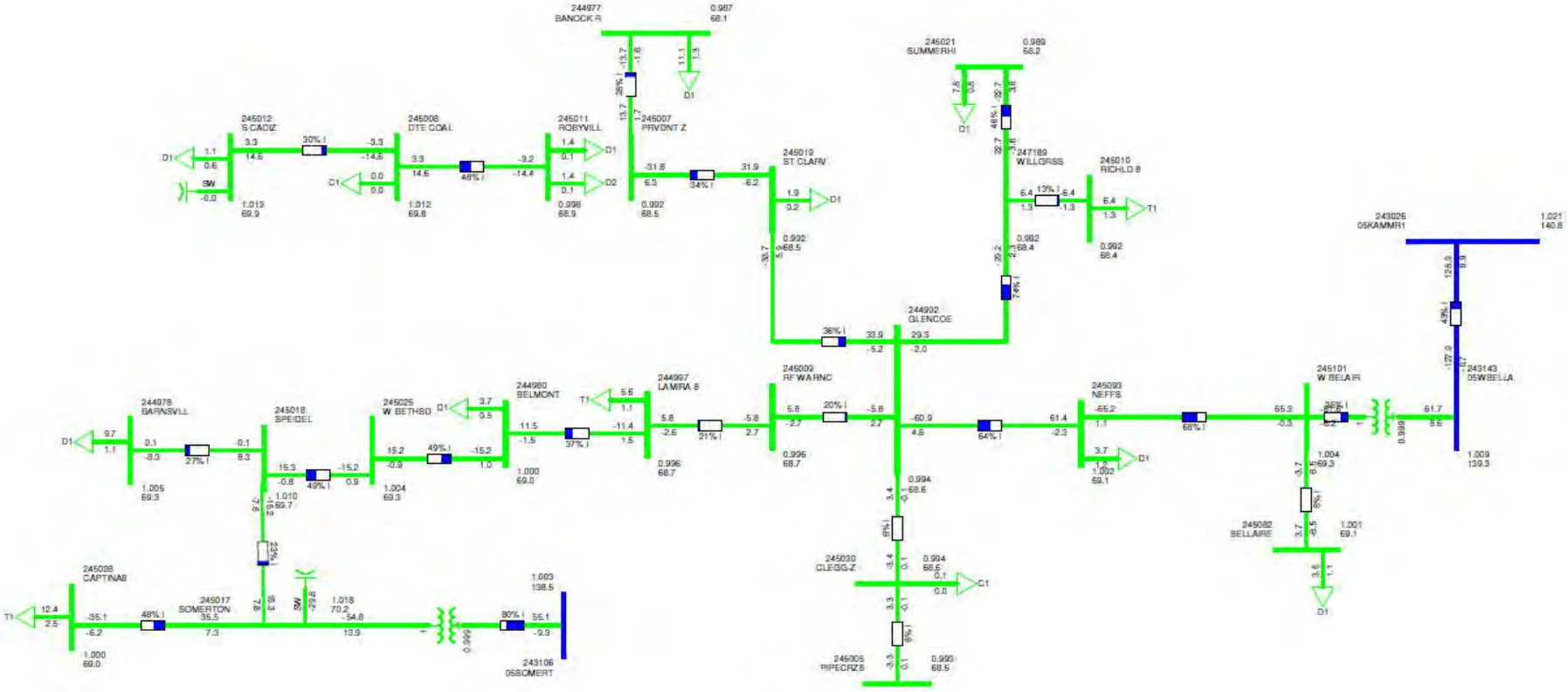


Figure 2: 2019 System Prior to Project, Kammer-West Bellaire 138kV contingency

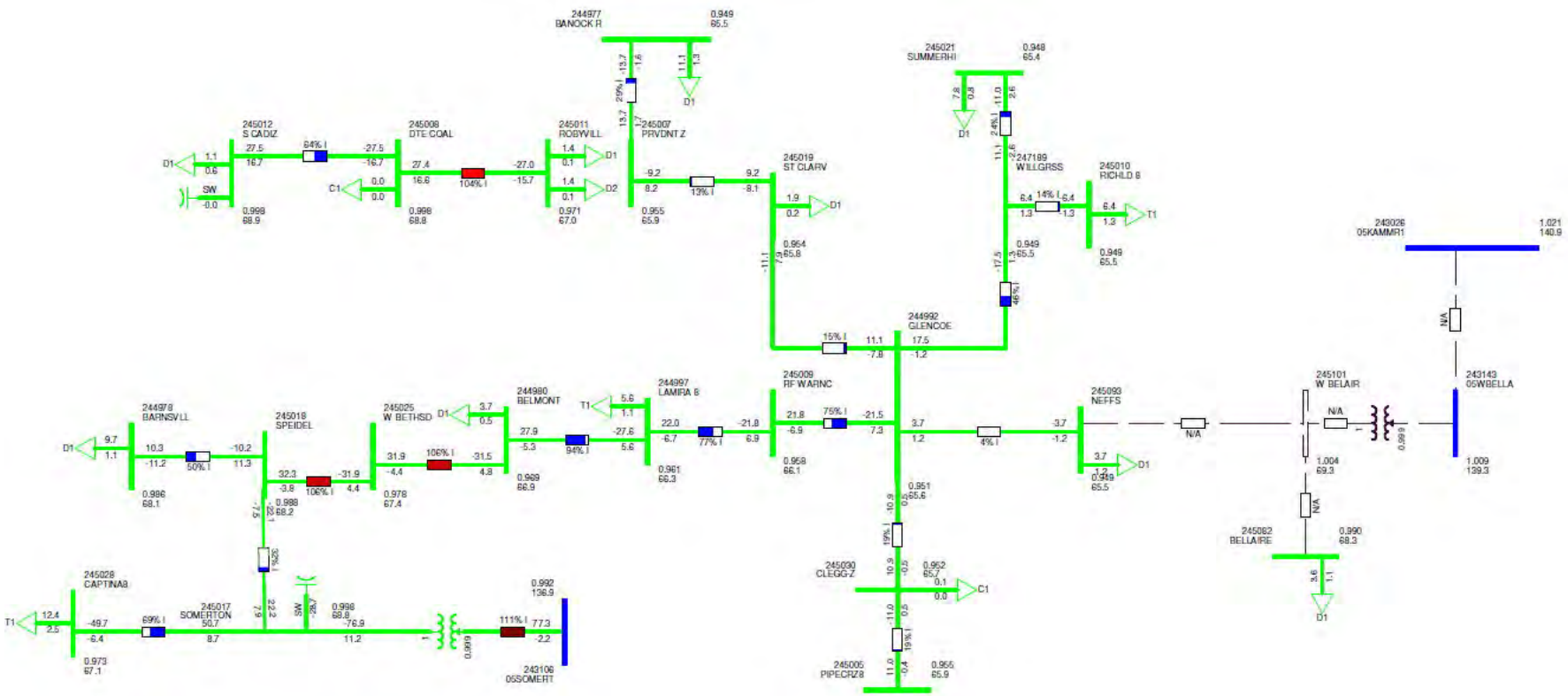


Figure 3: 2019 System After Project in Place, No Contingencies

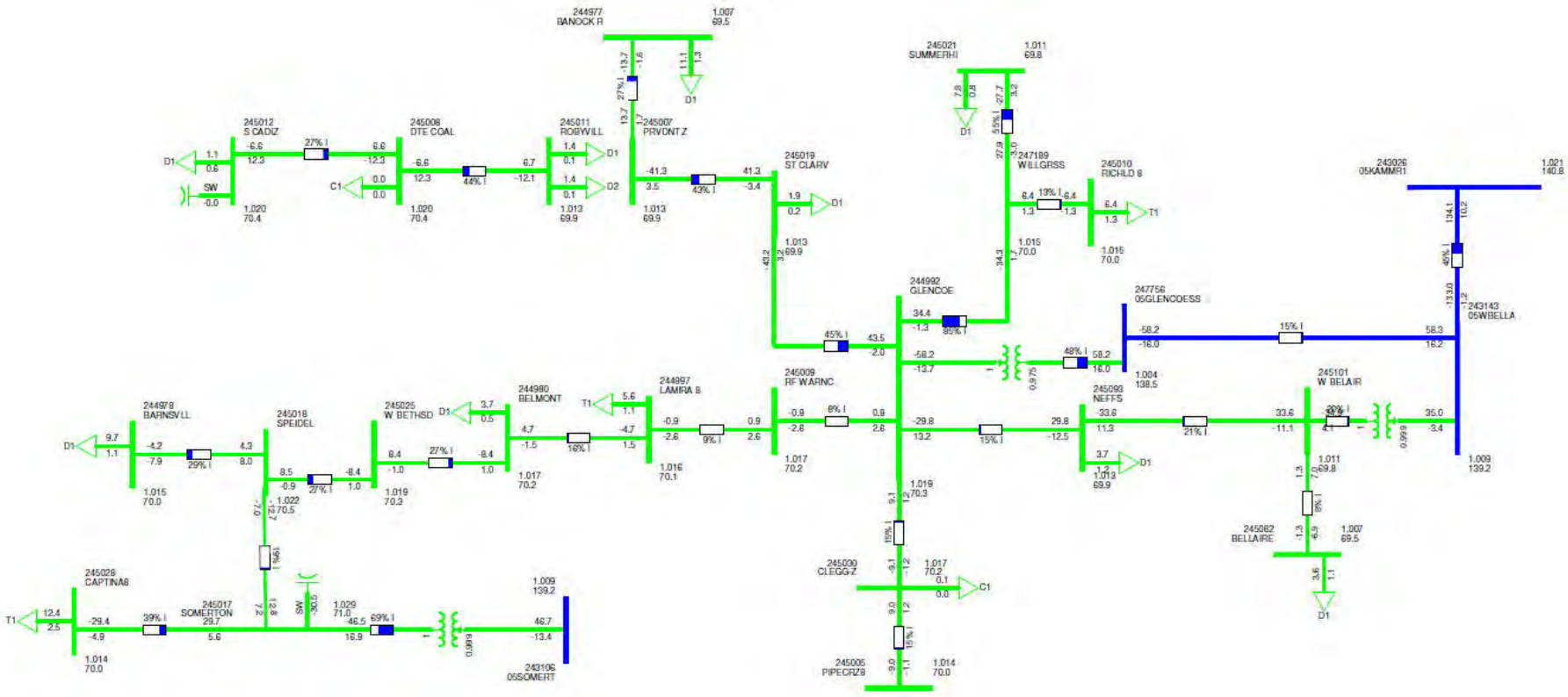
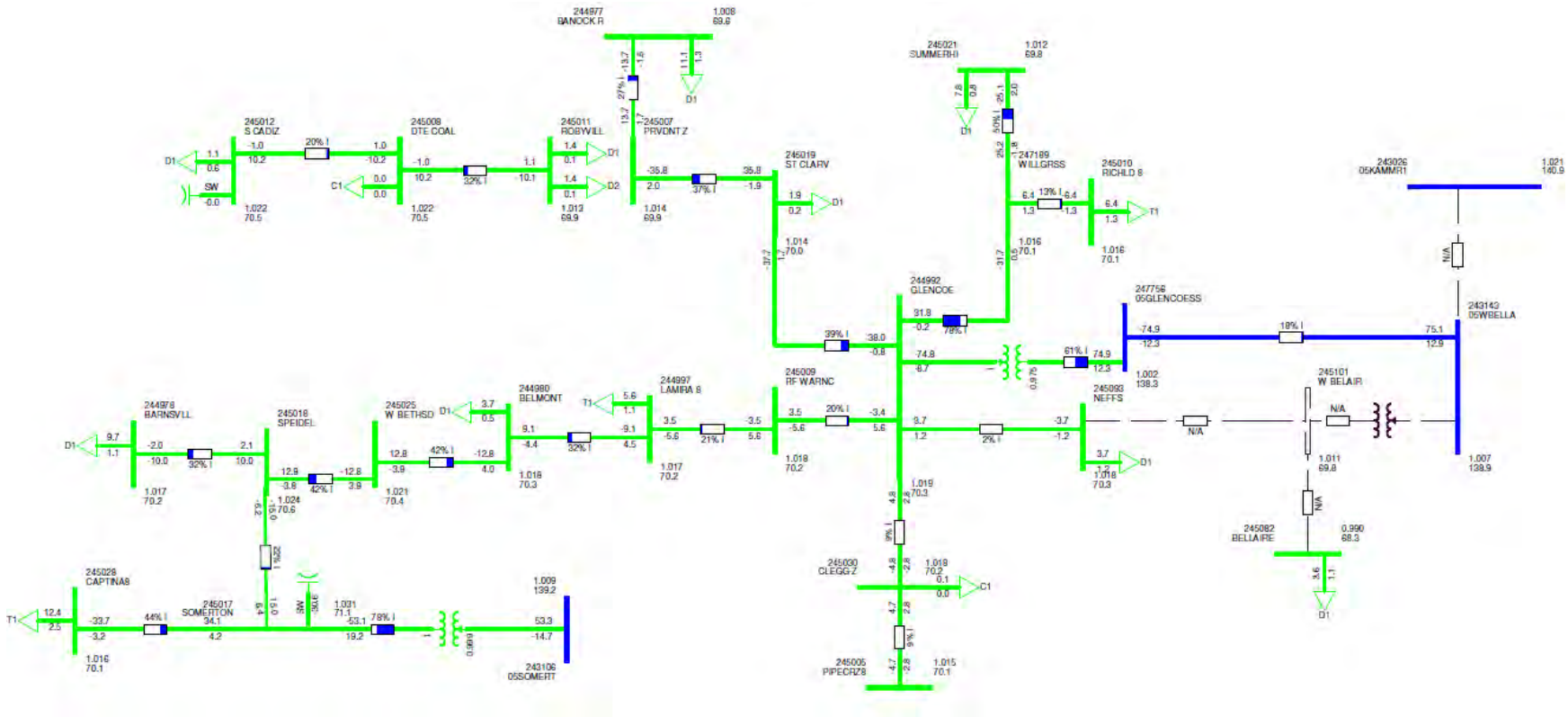


Figure 4: 2019 System After Project in Place, Kammer-West Bellaire 138kV contingency



4906-5-04 Route Alternatives Analysis

4906-5-04 ROUTE ALTERNATIVES ANALYSIS

(A) ROUTE SELECTION STUDY

(1) Study Area Description and Rationale

The proposed Project is located in Belmont County, Ohio and is a proposed rebuild project. Therefore, the study area for the Project was focused on the existing ROW. AEP Ohio Transco's consultant conducted the transmission line RSS for the Project in the Village of Neffs (Appendix 4-1). AEP Ohio Transco prefers to offset the existing centerline because it is safer, more reliable, and less costly than rebuilding on existing centerline. Therefore, the study area was limited to the existing ROW and immediate areas unless a major constraint prevented direct offset of the existing centerline. Major constraints preventing direct offset included the Village of Neffs and an area requiring crossing four FirstEnergy lines.

(2) Study Area and Constraint Map

Figure 1 of **Appendix 04-1** provides a study area map. **Figures 3A through 3E** of **Appendix 04-1** provide constraints maps for the candidate routes considered for the Project. **Figures 04-1A** and **04-1B** provide maps of the siting constraints specific to the Preferred and Alternate Routes.

(3) Evaluated Routes Map

Figure 2 of **Appendix 04-1** provides an overview of the evaluated routes.

(4) Qualitative and Quantitative Siting Criteria

Qualitative and quantitative siting criteria included water resources, habitat and sensitive species, developed land uses, cultural resources, and engineering constraints, and are provided in **Appendix 04-1**.

(5) Process of Determining Preferred and Alternate Routes

Qualitative and quantitative siting criteria were established based on the nature of the study area and Project needs. Since the Project involves rebuild of an existing 69 kV line for 138/69 kV operation, offset of the existing line within existing ROW is preferred, where possible. AEP Ohio Transco's engineers identified areas where direct offset was not possible due to major constraints, which provided focus areas for the RSS. AEP Ohio Transco's siting consultant identified preliminary routes within the focus areas based on review of aerial photography, topographic maps, and identified constraints and opportunities. The siting criteria were then used to compare the route candidates and select preliminary routes to be presented at a public open house and to affected property owners. The routes were then tweaked based on public and property owner input, as well as detailed engineering. Ultimately, the Preferred and Alternate Routes were selected because they best balance the needs of the Project while limiting impacts.

(6) Evaluated Routes and Selection Rationale

AEP Ohio Transco's consultant evaluated offsets and deviations as described in the RSS provided in **Appendix 04-1**.

(B) Comparison Summary Table

Comparison tables of the siting constraints considered for the candidate routes are provided in the RSS as **Appendix 04-1.** A comparison summary table of the selected Preferred and Alternate Routes is provided as **Table 07-6**.

(C) Public Involvement

AEP Ohio Transco conducted an information program to raise awareness, communicate Project details, and seek feedback from residents, the media, and local elected officials. Part of the program involved conducting a public information open house in the area to seek feedback from the community on the Project and the routes presented. Prior to the public information meeting, AEP Ohio Transco mailed invitation letters to residents, tenants, and officials, and issued a newspaper public notice and news release. A Project website was also created with Project mapping and a summary description. At the public information open houses, AEP Ohio Transco representatives were available to answer questions, listen, and receive feedback from the public to incorporate in the siting process.

(D) Public Information Open House

AEP Ohio Transco conducted the public informational open house on November 1, 2016 at Bellaire High School in Bellaire, Ohio. Five people attended the public informational meeting.

AEP Ohio Transco encouraged those attendees with specific objections to suggest alternatives. Three comment cards were received during the meeting. One of the comment cards included a completed opinion rating of routing considerations. No other comments or ratings were included on the comment cards. After the public informational open house, one subsequent comment was received from a landowner adjacent to the Alternate Route. The landowner expressed concerns associated with the proposed location of the Alternate Route.

APPENDIX 04-1

ROUTE SELECTION STUDY

WEST BELLAIRE-GLENCOE 138/69 KV ELECTRIC TRANSMISSION LINE PROJECT

ROUTE SELECTION STUDY REPORT

Prepared for:

American Electric Power Ohio Transmission Company
700 Morrison Road
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Prepared by:

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Cincinnati, Ohio 45202

Project #: 60518004

January 2017

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1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

This document presents the Route Selection Study conducted by AECOM Technical Services, Inc. (AECOM) for American Electric Power Ohio Transmission Company's (AEP Ohio Transco) proposed West Bellaire-Glencoe 138/69 kV electric transmission line in Belmont County, Ohio. AEP is proposing to rebuild their existing West Bellaire-Glencoe 69 kV transmission line as a double circuit line with one circuit operating at 138 kV and the second circuit will remain in operation at 69 kV. The line will originate at the existing West Bellaire Substation, pass adjacent to Neffs Substation located approximately 0.8 mile to the northwest, and extend to the existing Glencoe Substation located approximately five miles to the southwest. This Route Selection Study details the available options and evaluates them relative to one another by both quantitative and qualitative criteria.

The Route Selection Study involved collection and evaluation of engineering, environmental, cultural, and land use data in order to identify potential routes for the transmission line. The Route Selection Study identifies major constraints and uses an evaluation process to compare alternatives that avoid or minimize adverse effects to the extent practical. AEP Ohio Transco retained AECOM to assist with the evaluations of environmental, land use, cultural, and engineering/construction issues during the study.

Timeline of Activities

AEP Ohio Transco contracted AECOM in July 2016, to conduct a siting study and identify Preferred and Alternate Routes for the Project. Beginning in August 2016, AECOM met with staff from AEP Ohio Transco in Gahanna, Ohio and began the process of gathering relevant information on area land uses, the existing transmission system, and potential sensitive resources in the area between the West Bellaire, Neffs, and Glencoe Substations.

Beginning in August 2016 and continuing through October 2016, representatives of AECOM and AEP Ohio Transco gathered resource data and other information through federal and state regulatory agency requests, coordination with local officials, field investigations, and readily available geographic information sources. This data and information were transferred into a geographic information system (GIS) database for analysis. Using this information, the project team identified a range of potential route segments for the new 138/69 kV transmission line. The route segments included portions of the line that would be rebuilt within the existing right-of-way (ROW) and portions that would require construction in new ROW. The project team continued to revise the route segments as they conducted field reconnaissance efforts, met with local officials and property owners, and accumulated information on the area resources.

On November 1, 2016, AEP Ohio Transco held an open house to present the rebuild to the public and gather input from local residents about the rebuild in general and specifically regarding comments on the routes under consideration for areas where realignment would be required. Following the open house, the project team made additional revisions and modifications based on public input, discussion with landowners, and continued coordination with regulatory agencies, local officials, and other stakeholders.

Once revisions to the route segments were complete in November 2016, the project team compared the revised route segments in each of the areas along the route where deviations from the existing ROW were required. Based on this comparison, the project team ranked the route segments in each of the areas to identify a Preferred Route for the Project. An Alternate Route was also identified.

This study documents the process, data used, and rationale for the selection of the route segments and the ultimate identification of the Preferred and Alternate Routes.

1.2 PROJECT DESCRIPTION

1.2.1 Location

The project is located in a rural area of Belmont County. The project will connect the existing West Bellaire Substation to Glencoe Substation. The West Bellaire Substation is located north of State Route 149, locally referred to as Neffs Bellaire Road, in the Village of Neffs off of St. Joe Road. The Glencoe Substation is located south of State Route 149, locally referred to as Warnock Glencoe Road, northwest of Glencoe. Wooded areas and rolling topography are predominant between the two endpoints of the proposed transmission line, with scattered residences along local roads and some agricultural fields also present. Heavier residential development is located at the northeast end of the Project in the Village of Neffs.

1.2.2 Transmission Line Structure Requirements

The Rebuild will consist of supporting structures and conductors for the 138/69 kV transmission line. A combination of steel structures is proposed for the Rebuild. Structure type will vary based on topography. All proposed structures are anticipated to average 100 feet in height with a typical span of 500 feet.

1.2.3 Right-of-Way (ROW) Requirements

The transmission line will be built within a 100-foot-wide ROW. AEP will acquire the majority of the ROW in new portions of the Project as easements across private land. AEP will work with affected property owners to negotiate any additional easement needs. Landowners along with the approved route will be notified and land access will be requested.

In forested areas, the ROW will be cleared of all tall growing, woody stemmed vegetation. Certain trees or other vegetation outside of the ROW that may pose a threat to the transmission line may also be removed as deemed necessary for the safe and reliable construction and operation of the line. In agricultural areas, normal farming operations will resume after the construction of the transmission line, with loss of farmland use only immediately under the structure footprint.

2.0 OVERVIEW OF THE ROUTING PROCESS

2.1 PURPOSE OF THE ROUTE SELECTION STUDY

The purpose of this Route Selection Study is to assist in identifying routes best suited for the transmission line and to support the required regulatory filings for the project. AEP intends to prepare and submit an Ohio Power Siting Board (OPSB) Application for the project. The Route Selection Study will assist in the preparation of OPSB Application and has been developed in accordance with the provisions of Ohio Administrative Code (OAC) 4906-11-01(B)4 for electricity transmission facilities.

The Route Selection Study is designed to identify and compare suitable routes that minimize the overall effects on ecology, sensitive land uses, and cultural features to the greatest extent practical while maintaining economic and technical feasibility. The result of this process is identification of the preferred route use for field studies and detailed engineering of the transmission line route.

2.2 STEPS OF THE ROUTE SELECTION STUDY

This route selection study involved three main steps:

- Step 1: Identification of focus areas along the existing alignment where new routes would be required to accommodate the proposed double circuit line.
- Step 2: Identification of routes within the focus areas considering ecological, cultural, land use, and engineering factors.
- Step 3: Compare the routes within each focus area
- Step 4: Select a preferred study segment in each focus area and compile a proposed route for the project.

2.3 STUDY AREA DEFINITION AND DESCRIPTION

The boundaries of the Study Area were determined by the geographic area encompassing the project end points: the West Bellaire Substation and the Glencoe Substation. The Study Area was intended to encompass routes between these connection points, but focused on the existing alignment. The Study Area is shown in **Figure 1**, and is currently is characterized by woodlots, rolling topography, and scattered residences.

2.4 DATA COLLECTION

2.4.1 Data Sources and Criteria

The purpose of the Route Selection Study was to identify viable routes based on the physical locations where structures could be located, while avoiding or limiting impacts to sensitive land uses, ecological, and cultural features in the project vicinity. It is desirable to maximize certain criteria along a given route,

(e.g., paralleling existing corridors). These criteria are known as opportunities. Undesirable criteria, such as wetlands, historic properties, etc. are termed constraints and the study seeks to avoid/minimize their occurrence. Therefore, the goal of routing is to maximize attributes while minimizing constraints. Some of the quantitative factors considered in the Route Selection Study are listed in **Table 2-1**.

TABLE 2-1: QUANTITATIVE SITING CRITERIA

Criteria	Data Source
Ecological	
Area of Woodlots within 100-foot Right-of-way (acres)	Woodlots as digitized from aerial photography
Area of National Wetland Inventory (NWI) Wetlands within 100-foot Right-of-way (acres)	NWI wetland areas as identified by United States Fish and Wildlife Service (USFWS)
Number of Streams Crossed	United States Geological Survey (USGS) Topographic Maps, USGS National Hydrography Dataset
Threatened and Endangered Species Listings within 1,000 feet	Ohio Department of Natural Resources (ODNR) Natural Heritage Database
Cultural	
National Register of Historic Places (NRHP) and Districts within 1,000 feet	Ohio Historic Preservation Office (OHPO) online database
Ohio Historic Inventory (OHI) Structures within 1,000 feet	OHPO online database
Known Archaeology Sites within 1,000 feet	OHPO online database
Cemeteries within 100 feet	OHPO online database
Land Use	
Residences within 100 feet	Aerial photography and County Auditor Parcel Data
Residences within 1,000 feet	Aerial photography and County Auditor Parcel Data
Institutional Land Uses within 1,000 feet	Schools and places of worship-USGS maps, Environmental Systems Research Institute (ESRI) geographical information systems (GIS) data layer
Other Sensitive Land Uses within 1,000 feet	Includes airports, air strips, parks, preserves, park district property, designated managed areas, conservation and observatory sites, and golf courses; sources: USGS, ESRI GIS data
Properties Crossed	Belmont County Auditor GIS data
Mining Operations	ODNR Mineral Resources Management
Engineering	
Road Crossings	ESRI GIS data
Railroad Crossings	ESRI GIS data
Percent Closely Paralleling Existing Linear Features -Includes roads, railroads, electric lines, pipelines;	Aerial photography, and USGS maps; Lengths calculated by GIS software
Length of Route (miles)	Calculated by GIS software

In addition to quantitative factors, a range of qualitative factors are also considered in the route development and analysis process. These include, but are not limited to: construction challenges, maintenance concerns, the need for non-standard design requirements, etc.).

2.4.2 Field Inspections

Prior to field inspections, GIS data sources were compiled and mapped. Features such as residences, churches, schools, cemeteries, commercial, and industrial areas were mapped in GIS. Field inspections were conducted using this mapping. The team members performed windshield surveys from public roads and other points of public access. GIS data sources, USGS topographic maps, aerial photography, and road maps were correlated with observed features from the windshield survey. Features were field verified and added or removed from the GIS database.

2.4.3 Regulatory Agency Coordination and Local Contacts

The Routing Team contacted various federal, state, and local agencies to inform them of the Project and request data for the planning process. These agencies are listed below.

Federal Agencies

- USFWS

State Agencies

- ODNR

Local Agencies

- Belmont County Auditor

AEP Ohio Transco representatives also met privately with several interested landowners.

2.5 PUBLIC INVOLVEMENT

The public outreach effort educated the public on the need for the Project and about substantial issues related to the planning, siting, construction, and operation of the proposed 138/69 kV transmission line. These efforts were primarily directed at residents and local officials or stakeholders in the Study Area (Belmont County); however, AEP Ohio Transco also established and maintained opportunities for stakeholders outside of the region to comment via the Project website, phone, or US mail.

2.5.1 Public Open House

One public open house meeting was held at Bellaire High School in Bellaire, OH on November 1, 2016. The project team set up stations at the meeting and provided information related to project need,

engineering and design of the structures, siting and environment issues, ROW issues, vegetation management, and route selection and the OPSB process. The community was notified about the time and location of the meeting through a public notice in local newspapers and letters to property owners crossed and adjacent to the candidate routes.

Large scale maps were presented for review by participants. Members of the project team greeted meeting attendees, answered questions about the project, and aided attendees in locating their property or other features of concern on aerial maps showing the array of route segments under consideration. Participants were encouraged to document the location of their houses, places of business, property of concern, or other sensitive resources on the printed maps.

Comment sheets were made available for all meeting attendees. Attendees were asked to fill out the sheet completely, including contact information. The project team read all comment sheets, and scanned and stored them in the project database as a record of meeting attendance and public comments. Five people were documented as attending the meeting and three submitted written comments at the meeting. One additional comment was received via email after the meeting.

A Project website (http://www.aeptransmission.com/ohio/WestBellaire-Glencoe/) was created to provide the public with Project information, updates, and another means to comment.

2.5.2 Summary of Public Comment

There were three comment cards submitted on the Project at the public open house held in November. A fourth comment was received via email after the meeting. All comments were catalogued and categorized based on the relevancy and topic. Categories of concern from the public include aesthetics, structure placement, ROW clearing, property values, and health. The emailed comment indicated a preference to avoid a residence located along Alternative Segment 5 (Route Alternatives 1 and 3).

The Routing Team staff reviewed all comments from the public, and, where applicable, incorporated information derived from the public open house and public comments when reviewing, revising, and comparing route segments (defined below in Section 2.6, Route Development Guidelines and Process).

2.6 ROUTE DEVELOPMENT GUILDLINES AND PROCESS

2.6.1 Routing Guidelines

Based on the identified needs and technical requirements of the project, the Study Area was evaluated to identify candidate routes. A constraint map of the Study Area was developed using ArcMap GIS software. Georeferenced data layers for the identified constraints, obtained from published County, State, and Federal materials and local planning documents, were superimposed on 2013 aerial photography obtained from the United States Farm Service Agency's National Agricultural Imagery Program.

Preferred routing options for the electric transmission line included the following:

- Routes that avoided, to the extent possible, the identified constraints or minimized potential impact where it could not be avoided
- Routes utilizing or closely paralleling established linear rights-of-way such as other electric utility lines, pipelines, railroads, or roads
- Routes that avoided developed areas to the extent practical
- Routes with minimal impact on woodland, wetland areas, and riparian corridors.

2.6.2 Technical Guidelines

Technical guidelines are driven by the physical characteristics and engineering limitations of the structures and lines themselves, and the design criteria necessary to meet AEP Ohio Transco standards, North American Electric Reliability Corporation (NERC) reliability standards, National Electric Safety Code (NESC), and industry best practices for construction. The technical guidelines were compiled from (1) the technical expertise of engineers and other industry professionals responsible for the reliable, safe and economical construction, operation, and maintenance of electric system facilities, (2) NERC reliability standards as implemented by PJM, the regional transmission authority, and (3) industry best practices.

The Routing Team considered the following technical guidelines during the development, evaluation, and comparison of routes.

- Maintain a minimum of 35 feet centerline-to-centerline separation when paralleling existing 69 kV transmission lines.

- Minimize angles greater than 65 degrees and steep slopes (more than 20 degree slopes for angle structures, and more than 30 degrees for tangent structures); and

2.6.3 Routing Constraints and Opportunities

Route alternatives were mapped with routing constraints and opportunities within the Study Area.

Routing Constraints

Constraints are specific areas that should be avoided to the extent reasonably practical during the route development and selection process. Nevertheless, complete avoidance is not always reasonably practical; for example, paralleling an existing cleared ROW across a constraint could be preferable to a new ROW that affects a high number of homes. Another example related to the project concerns the location of the associated substations, which can be located within town or corporate boundaries or adjacent to park areas. Constraints are generally divided into two groups based on the size of the geographic area encompassed by the constraint: large area constraints and small area constraints. The first group (large area constraints) includes constraints that cover large areas of land in the Study Area.

Typical large area constraints identified in the Study Area include:

- Urban areas, including towns, cities, and other high concentrations of commercial and industrial development areas
- Large streams, wetlands, flood zones or unique natural resource features

Small area constraints encompass other feature types found within smaller geographic areas, or site-specific locations. Through the iterative process of route development described above, the routes are adjusted, to the extent reasonably practicable, to avoid small area constraints, including:

- Individual residences (houses, mobile homes, and multi-family buildings)
- Commercial and industrial buildings
- Outbuildings and barns
- Cemeteries
- Churches
- Schools
- Hospitals
- Recorded locations of designated historic buildings and sites
- Small wetlands

Route alternatives and all areas of the required ROW attempted to avoid small area constraints. However, in some instances it was not reasonably practical to avoid all small area constraints because of the large number of these constraints in some areas of the Project or other compounding constraints. Specific constraints are described under each resource area in Section 3.

Routing Opportunities

Routing opportunities, such as locations where the proposed transmission line might be located while reasonably minimizing adverse impacts, were identified. These opportunities typically include other linear infrastructure and utility corridors, such as the existing electric and gas transmission network, rail lines, and roads, but may also include reclaimed mine lands, or unused portions of industrial or commercial areas. Routing opportunities identified within the Study Area include the existing Glencoe-West Bellaire 69 kV line and other existing 138 kV lines exiting West Bellaire Substation. These lines are presented on the Candidate Routes Map (**Figure 2**).

2.6.4 Routing Process Steps and Terminology

The process of route development includes frequent modification throughout the study as a result of the identification of new constraints and opportunities. The first step in the process is to develop an array of preliminary route segments for the project.

Evaluation of new data can require modification of segments as necessary. Route options are assembled from the segments that best meet the routing guidelines and analysis. The Preferred and Alternate Routes are identified for submittal to the OPSB.

2.7 STUDY SEGMENT DEVELOPMENT

The majority of the project can be constructed within the existing Glencoe-West Bellaire 69 kV ROW. These portions of the line are referred to as the Rebuild Segments. However, new alignments are necessary in in the eastern portion of the Project around the Village of Neffs (East Focus Area) and the western portion of the Project in the vicinity of four 138 kV lines owned by American Transmission System, Inc. (West Focus Area). New alignments in the East Focus Area were developed to accommodate the need to locate the wider right-of-way of the 138 kV line through a dense urban area where there is minimal space to locate a 138 kV transmission line. New alignments were developed leaving the West Bellaire Substation to the north and south to route around the dense urban area. New alignments were also developed in the West Focus Area primarily to provide a suitable crossing of the existing line. All study segment concepts considered are shown on Figure 2.

2.7.1 Study Segments

Study Segment Concept – East Focus Area

In the East Focus Area, route segments were developed in consideration of the developed character of the area. Key challenges in this area include impacts to residences in Neffs, McMahon Creek, and impacts on development and area aesthetics along the State Route 149 corridor. The existing 69 kV ROW of Glencoe-West Bellaire is located in the front yards of several residences along Harrison Street in the Village of Neffs. Several study segments were developed to re-route the portion of the West Bellaire-Glencoe 138/69 kV transmission line around the Village of Neffs in a manner that minimized impacts to home owners. Alignments to the north and south of the existing ROW were developed and taken into consideration. Key opportunities in this area include paralleling the existing portion of the West Bellaire – Tiltonsville 138 kV Transmission Line.

Study Segment Concepts – West Focus Area

The key challenge for the West Focus Area is the need to avoid physical obstructions of existing 138 kV transmission lattice towers along four American Transmission System, Inc. lines. The existing structures are in close proximity to the West Bellaire-Glencoe 69 kV line and prevent direct offset within the existing ROW. Identification of constructible routes that allow NERC and NESC standards to be met at the crossing locations is the key to alternatives in the West Focus Area.

Segments in Rebuild Areas

The portions of the line outside the East and West Focus Areas that are constructed within the existing Glencoe-West Bellaire 69 kV ROW are the Rebuild Segments. Offsetting the existing 69 kV line is necessary to avoid taking it out of service for long periods of time. In these areas, most of the existing ROW can accommodate the new line at 138 kV standards with only minor revisions to account for topography and other site-specific considerations. Given that the existing ROW could accommodate the new line and the impacts associated with a transmission line ROW, detailed assessment and consideration of new alignments outside of the existing ROW for these segments was not necessary.

2.8 ALTERNATIVE SEGMENTS

The network of Alternative Segments was revised, refined and reduced as additional information through coordination with regulatory agencies, field reviews, geographic information reviews, and landowner contacts was acquired. Only the most viable segments remained for formal analysis and comparison.

The following section provides a detailed description of each Alternative Segment. The route identification and review process included continual review, modification, and elimination of study segments based on new field analysis and stakeholder input. Stakeholder input was very important throughout the route development process. The final product is a compilation of study segments for analysis and comparison. These Alternative Segments are described in the following sections and are shown in more detail on Figure 2.

2.8.1 East Focus Area

Eight Alternative Segments were identified within the Neffs Focus Area. Alternative Segment 1 departs from the existing 69 kV corridor approximately 350 feet east of Dixon Hill Road, where it turns north to avoid the densely urban area along Harrison Street. Alternative Segment 2 departs from the West Bellaire substation heading northeast. The alternative segments rejoin the existing 69 kV ROW at Neffs Substation. Alternative Segment 3 follows the existing West Bellaire-Tiltonsville 138 kV Corridor to the north, leaving the West Bellaire Substation. Alternative Segment 4 heads south out of the West Bellaire Substation to route around Neffs. Alternative Segment 5 heads north out of the West Bellaire Substation following the existing West Bellaire-Tiltonsville 138 kV transmission line. The utilization of the existing Glencoe-West Bellaire 69 kV ROW through Neffs would direct the line along Harrison Street through several small single family properties.

Alternative Segment 1

Alternative Segment 1 is approximately 1.0 mile long. The segment heads out of the West Bellaire Substation to the northeast making use of the existing ROW of an existing 138 kV transmission line for 0.5 mile. The segment crosses over the existing ROW and heads to the north-northwest. The segment then heads northwest for 0.5 mile.

Alternative Segment 2

Alternative Segment 2 is approximately 0.5 mile long. It leaves the West Bellaire Substation heading north to utilize the West Bellaire-Tiltonsville 138 kV transmission line ROW rather than the existing Glencoe-West Bellaire 69 kV corridor due to the confined nature of the station and existing lines relative to the desired station bay location. It is approximately 300 feet east of the existing Glencoe-West Bellaire 69 kV line.

Alternative Segment 3

Alternative Segment 3 follows the West Bellaire-Tiltonsville 138 kV ROW north for 0.2 mile.

Alternative Segment 4

Alternative Segment 4 diverges from the existing West Bellaire-Tiltonsville 138 kV line ROW. It crosses wooded rolling hills heading west for approximately 0.6 mile. It is approximately 0.1 mile north of the existing Glencoe-West Bellaire 69 kV line through the Village of Neffs.

Alternative Segment 5

Alternative Segment 5 heads west from the West Bellaire-Tiltonsville 138 kV line for 0.5 mile, crossing over McCurdy Road and Dixon Hill Road. It then turns southwest for 0.2 mile and heads toward Neffs Substation.

Alternative Segment 6

Alternative Segment 6 is approximately 2.1 miles long. The segment utilizes the West Bellaire-Tiltonsville138 kV ROW, following it north for nearly 0.7 mile before turning west and exiting the ROW. The segment then continues 0.25 mile over Dixon Hill Road before turning southwest for 1.1 miles and re-entering the existing Glencoe-West Bellaire 69 kV ROW.

Alternative Segment 7

Alternative Segment 7 heads southwest for 0.1 mile rejoining the existing Glencoe-West Bellaire 69 kV ROW to Neffs Substation.

Alternative Segment 8

Alternative Segment 8 is approximately 1.2 miles long. The segment heads out of the West Bellaire Substation to the west for 0.1 mile before turning southwest to cross over Neffs Bellaire Road and McMahon Creek. The segment then turns northwest for 0.2 mile and then directly north for 0.2 mile to once again cross over McMahon Creek. The segment then heads northeast through urban development and crosses Neffs Bellaire Road again to reach Neffs Substation, where it rejoins the existing Glencoe-West Bellaire 69 kV ROW.

Alternative Segment Combinations to form East Routes

East Focus Area Alternative Segments were combined to form routes as follows:

- Route Alternative 1 – Alternative Segments 1, 5, and 7
- Route Alternative 2 – Alternative Segments 2, 4, and 7
- Route Alternative 3 – Alternative Segments 2, 3, 5, and 7
- Route Alternative 4 – Alternative Segments 2, 3, and 6
- Route Alternative 5 – Alternative Segment 8

Alternative Segment 6 and the resulting Route Alternative 4 were not carried into quantitative review due to the significant length and difficult terrain. It did not offer any advantages over the other East Focus Area Alternatives.

Alternative Segment 8/Route Alternative 5 was not carried into quantitative review due to the significant engineering constraints associated with crossing McMahon Creek and routing through urban development. The use of this route would require demolishing several buildings.

Existing Glencoe-West Bellaire 69 kV ROW

The existing Glencoe- West Bellaire 69 kV ROW within the Village of Neffs is approximately 0.4 mile long. The segment utilizes the front yards of the north street side residences along Harrison Street. This segment is eliminated as a possibility due to necessary outage and there is not enough space necessary to construct and operate a 138 kV transmission line.

2.8.2 West Focus Area

Two Alternative Segments were considered. Alternative Segment 9 (Route Alternative 6) crosses over the existing Glencoe-West Bellaire 69 kV corridor and deviates to avoid structures of the crossing of multiple 138 kV transmission lines within a corridor owned by American Transmission System, Inc. to the north of the existing corridor. Alternative Segment 10 (Route Alternative 7) serves the same purpose but crosses to the south of the existing corridor.

Alternative Segment 9 Route Alternative 6

Alternative Segment 9/Route Alternative 6 is approximately 0.7 mile long and is north of the offset rebuild section and Alternative Segmen10/Route Alternative 7. The purpose of the route is to avoid existing lattice tower structures of a 138 kV multi-transmission line ROW owned by American Transmission System, Inc. that prevent a direct 35-foot offset both north and south of the existing Glencoe-West Bellaire 69 kV line. The segment exits the existing ROW of the Glencoe-West Bellaire 69 kV

transmission line to the northwest for 0.4 mile. It then turns south and southwest for 0.25 mile to re-enter the ROW. Alternative Segment 9/Route Alternative 6 utilizes existing topographic changes and a valley to cross under the existing American Transmission System, Inc. lines. From an engineering standpoint, crossing under the American Transmission System, Inc. lines is preferred rather than crossing over them, because it reduces the possibility of multiple lines being knocked out of service by a single event.

Alternative Segment 10/Route Alternative 7

Alternative Segment 10/Route Alternative 7 is approximately 0.6 mile long and is south of the Rebuild Section and Alternative Segment 9/Route Alternative 6. The deviation is to avoid existing structures of a 138 kV multi-transmission line ROW owned by American Transmission System, Inc. The segment exits the existing ROW of the Glencoe-West Bellaire 69 kV transmission line to the southwest for 820 feet, and then turns northwest for 280 feet, and then it turns west following a portion of the Rebuild Section for 0.4 mile. Without additional work by American Transmission System, Inc. to raise their 138 kV lines, the rebuilt West Bellaire-Glencoe 138 kV line would need to go over the existing lines due to topography and necessary clearance distances. Extending the new line over four existing 138 kV lines is a significant concern because it increases the possibility of multiple lines being knocked out of service by a single event.

2.8.3 Rebuild Segments

The Rebuild Segments are located in between the focus areas and will follow the centerline of the existing Glencoe-West Bellaire 69 kV transmission line. Combined, the length of the Rebuild Segments to be built within the existing ROW is approximately 3.8 miles.

3.0 PROJECT AREA RESOURCES AND ENVIRONMENTAL IMPACTS

This section provides a description of key resources in the Study Area and a comparative analysis of the potential impacts of each Route Alternative on these resources. An assessment of the potential impacts of the 3.8-mile Rebuild Segment is also presented. The assessment relies on a combination of information collected in the field, GIS data sources, supporting documents, stakeholder input, and the knowledge and experience of the Routing Team. All calculations are based on an optimal centerline and ROW for each of the Route Alternatives.

The location of the optimal centerline is the optimal location from an engineering and routing standpoint for the centerline of a 100-foot ROW for each of the Route Alternatives, based on data currently available, such as the field reconnaissance, USGS topographic maps, GIS constraints mapping, and aerial photographs. It is necessary to define an optimal centerline for each Route Alternative in order to compile relevant data to permit a fair analysis and comparison of the respective environmental impacts of each of the routes. The respective locations of the optimal centerlines for the Preferred Route identified in this report are shown on the GIS Constraints Map (Figure 3). The final location of the 100-foot ROW for

any route ultimately approved is subject to change based on final engineering, ground surveys, minimization of impacts on resources, and landowner preference.

Table 3-1 provides a summary of Route Alternative and Rebuild Segment lengths, the amount of rebuild and/or parallel opportunities, and ROW requirements.

Table 3-1. Alternative, Deviation, and Rebuild Segment Length and ROW Requirements						
	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Length (miles)	1.8	1.2	1.6	0.7	0.6	3.8
Acres of ROW (100')	22.4	15.4	19.7	8.4	7.3	46.6
Parallel Alignments						
Transmission Line (miles)	0.5	0.5	0.7	0	0.4	3.8
Percentage Transmission/Distribution Line Parallel	27.8%	41.7%	43.8%	0.0%	66.7%	100%
Road (miles)	0	0	0	0	0	0
Total Parallel (miles)	0.5	0.5	0.7	0	0.4	3.8
Total Percentage Parallel	27.8%	41.7%	43.8%	0.0%	66.7%	100%

3.1 WATER RESOURCES

Table 3-2 summarizes water resources within the ROW for each Route Alternative and the Rebuild Segments. The wetland and stream calculations presented are based on the desktop wetland analysis.

Table 3-2. Water Resources						
	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Desktop Delineated Wetlands						
Streams Crossed (count)	2	2	1	0	2	8
Wetlands Crossed (count)	0	0	0	0	0	2
Acres of NWI wetlands	0.00	0.00	0.00	0.00	0.00	0.30

Table 3-2. Water Resources						
	East Focus Area			West Focus Area		
Route Alternatives	1	2	3	6	7	Rebuild Segments
FEMA Floodplain						
100-yr Floodplain crossed by optimal centerline (miles)	0.00	0.00	0.00	0.00	0.00	0.04
Acres of 100-yr Floodplain within the 100' ROW	0.00	0.00	0.00	0.00	0.00	0.67
Topography						
Steep Slopes > 20% (miles)	1.21	0.94	1.17	0.32	0.29	2.15

3.1.1 Resource Characteristics

In general, the Study Area topography consists of a series of ridges separated by valleys and streams. Elevations within the Study Area range from approximately 750 to 1,150 feet above mean sea level (msl).

There are multiple streams located in the Study Area. The main streams in the area are the McMahon Creek, Little McMahon Creek, Williams Creek, and Welsh Run. There are several unnamed tributaries to the creeks as well.

Wetlands within the Study Area were preliminarily assessed through a detailed desktop delineation. A desktop delineation allows probable wetland locations to be identified based on a spatial review of existing data sets (e.g., the National Wetland Inventory [NWI] maps and National Hydrography Data [NHD]) and visual inspection of aerial imagery. NWI wetlands are mapped using the Cowardin et al. (1979) wetland classification system. Results of the desktop analysis indicate that two types of wetlands are likely present within the Study Area: Freshwater Pond and Riverine.

General Impacts

Transmission construction activities such as vegetation clearing, access road construction, grading, and foundation construction can impact soils by disturbing the native structure of the soil and thereby creating areas of higher erosion potential, compaction, and lower soil permeability/fertility. The severity of soil impacts depends on several variables including vegetation cover, the slope of the land, soil particle size, thickness of the soil profile, depth to a restrictive layer, and soil moisture content. During construction of the ROW and access roads, farmland may be removed temporarily from productivity; permanent structures such as transmission towers would remove only a small portion of the ROW for the transmission tower footprint from further productivity. Based on landowner preference, access roads may remain, or will be removed and restored following project construction. To the extent the roads are

removed and restored following project construction, cropping and grazing in these areas can resume once construction is complete. Furthermore, once transmission structure construction is completed, normal agricultural uses will continue to be permitted within the ROW to the extent consistent with applicable safety requirements.

Unvegetated soil surfaces are more susceptible to erosion and loss of soil productivity. Removing stumps during tree clearing increases the potential for soil erosion, and leaving topsoil exposed increases the potential of loss by wind and water. Best management practices (BMPs) to minimize erosion impacts may include leaving stumps in the ground, covering exposed soil with mulch, and reseeding after construction. AEP will obtain necessary permits and employ specified BMPs to minimize soil erosion during construction activities. In agricultural areas, farming activities will continue to occur within the ROW following construction. In forested areas, the ROW will be re-vegetated with compatible species and maintained.

Direct impacts on hydrologic features are often minimized or avoided by spanning wetlands, rivers, or drainages, when feasible. In the absence of other constraints, engineers typically seek to place structures at high points in topography, inherently resulting in the avoidance of structure placement that impacts water or wetland features in low-lying areas. However, in a few rare instances, such as at crossings of large wetland areas or complexes, a structure may need to be placed within a wetland. In these instances, the area of wetland loss is limited to the area of the footprint of the structure foundation. Other impacts may include conversion of a forested wetland to a scrub/shrub or herbaceous wetland.

To reduce the potential for these effects, routes were placed to intercept streams at perpendicular angles whenever possible to limit stream clearing and avoid the potential for access road construction along stream courses. AEP will attempt to avoid sensitive habitats by routing the access roads around the regulated area or by terminating access roads on either side of the stream or wetland. Access road construction may temporarily affect the natural hydrology by intercepting, concentrating, and diverting surface flow from its natural flow pattern. Permanent roads may expand the channel network via road ditches and reduce infiltration rates of precipitation, generating larger amounts of surface runoff. Many herbaceous plant species and compatible woody plant species will remain in designated areas, limiting wetland disturbance. AEP will further minimize construction impacts on wetlands by leaving stumps in the ground to minimize soil erosion and sediment delivery, and will not place brush and log piles in floodplains or within 25 feet of stream or riverbanks to avoid the potential for scouring during high flows.

Field wetland delineations will be conducted for the approved route and engineered access roads to determine the exact location of any wetlands or waterways. It is anticipated that project engineering can minimize wetland and stream impacts through spanning and avoidance; however, if impacts are unavoidable, AEP will coordinate with USACE to meet any requirements derived from the Section 404/401 permitting process. To reduce the potential for the impacts described above, AEP will obtain all necessary permits and employ specified BMPs during the construction, operation, and maintenance phases of the transmission line project.

3.1.2 Segment Comparison

East Route Alternatives 1, 2, and 3 all cross relatively steep slopes (**Table 3-2**). Approximately 1.2 miles (78 percent) of East Route Alternative 2 contains slopes with a gradient of greater than 20 percent. The amount East Route Alternative 1 crossing steep slopes is more, but with a smaller overall percentage (1.8 miles, or 67 percent). East Route Alternative 3 crosses 1.6 miles of steep slope greater than 20 percent (27 percent). Steeper terrain results in both additional environmental and engineering considerations. All segments have the potential for increased soil erosion associated with construction and operation of a new transmission line as a result of vegetation clearing and additional grading necessary through steep areas. In all cases, erosion and sediment control measures would be employed to minimize and mitigate potential soil erosion.

East Route Alternatives 1 and 2 cross two streams. Both routes would cross unnamed tributaries to McMahon Creek. East Route Alternative 3 crosses only one stream, an unnamed tributary to McMahon Creek. None of the East Focus Area Routes cross NWI wetlands. The East Focus Area Routes also do not cross mapped 100-yr floodplain areas.

Based on the above assessment, the East Focus Area Routes would result in similar impacts to soil and water resources. However, East Route Alternative 1 has the potential to result in slightly greater impacts to soils due to the length of the segment.

West Focus Area Route Alternatives 6 and 7 contain less than 0.8 mile of relatively steep slopes (**Table 3-2**). Approximately 46 percent (0.3 mile) of the 0.7-mile West Route Alternative 6 has slopes greater than 20 percent and approximately 48 percent (0.3 mile) of the 0.6-mile West Route Alternative 7 has slopes greater than 20 percent. As mentioned above, steeper terrain results in both additional environmental and engineering considerations, and in all cases, erosion and sediment control measures would be employed to minimize and mitigate potential soil erosion.

Based on the desktop delineation, West Route Alternative 6 does not cross any streams or wetlands. West Route Alternative 7 crosses two streams.

The Rebuild Segments cross 2.2 miles of relatively steep slopes (**Table 3-2**). Approximately 57 percent of the routes have slopes of greater than 20 percent. Steep terrain results in both additional environmental and engineering considerations and, in all cases, erosion and sediment control measures would be employed to minimize and mitigate potential soil erosion.

Based on the desktop delineation, the Rebuild Segments cross 8 streams. These include Welsh Run, Little McMahon Creek, Williams Creek and several unnamed tributaries to those streams. These crossings also include 0.04 mile of mapped 100-yr floodplain area around Little McMahon Creek and an unnamed tributary to McMahon Creek. There are 2 NWI areas crossed by the Rebuild Segments (0.3 acre within the 100-foot ROW).

3.2 WILDLIFE HABITAT AND SENSITIVE SPECIES

Table 3-3 identifies the anticipated tree clearing required for each Route Alternative and Rebuild Segments. None of the Route Alternatives or the Rebuild Segments crossed any known private conservation land, regional/locally-owned conservation lands, or state-owned lands.

Table 3-3. Tree Clearing						
	East Focus Area			West Focus Area		
Alternative Segments	1	2	5	6	7	Rebuild Segments
Digitized Forest Cover						
Acres within 100' ROW	16.6	9.6	9	4.5	2.9	19.9
Percent of 100' ROW forested	74.1%	62.3%	45.7%	53.6%	39.7%	43.3%

3.2.1 Resource Characteristics

Habitat within the Study Area primarily consists of pastureland and upland forest with limited residential or commercial development and limited row-cropping. Several streams and wetland areas are also located within the Study Area. There are several federal and state sensitive species within the Study Area that are described below.

Sensitive Federal Species

To address the Project's potential to impact federally protected species, AECOM conducted a web based literature review of the USFWS Ohio County Distribution List of ***Federally Listed Species by Ohio Counties, November 2015***, to identify what species potentially occur in Belmont County, Ohio. **Table 3-4** lists the two species identified during the USFWS literature review.

Table 3-4. Federally-Listed Species that Could Inhabit Belmont County, Ohio			
Common Name	Species Name	Federal Status	General Notes
Mammals			
Indiana bat	Myotis sodalis	Endangered	Seasonal clearing restrictions
Northern long-eared bat	Myotis septentrionalis	Threatened	Seasonal clearing restrictions

Federally Listed Species by Ohio Counties, October, 2016.

Accessed November 8, 2016:
https://www.fws.gov/Midwest/endangered/lists/pdf/OhioSppListOct2016.pdf

AECOM submitted a coordination letter to the USFWS on September 12, 2016, soliciting comments on the Project. AECOM received a response regarding the Project from USFWS on October 18, 2016. The USFWS comments do not identify additional species other that those listed above and do not anticipate any adverse effects to any federally endangered, threatened, proposed, or candidate species. No federal wilderness areas, wildlife refuges, or designated critical habitats are located within the Study Area.

Indiana Bat: The federal government lists the Indiana bat as endangered in Ohio. Winter Indiana bat hibernacula include caves and mines, while summer habitat typically includes tree species exhibiting exfoliating bark or cavities that can be used for roosting. The 8- to 10-inch diameter size classes of several species of hickory (***Carya*** spp.), oak (***Quercus*** spp.), ash (***Fraxinus*** spp.), birch (***Betula*** spp.), and elm (***Ulmus*** spp.) have been found to be utilized by the Indiana bat. These tree species and many others may be used when dead, if there are adequately sized patches of loosely-adhering bark or open cavities. The structural configuration of forest stands favored for roosting includes a mixture of loose-barked trees with 60 to 80 percent canopy closure and a low density sub-canopy (less than 30 percent between about 6 feet high and the base canopy). The suitability of roosting habitat for foraging or the proximity to suitable foraging habitat is critical to the evaluation of a particular tree stand. An open subcanopy zone, under a moderately dense canopy, is important to allow maneuvering while catching insect prey. Proximity to water is critical, because insect prey density is greater over or near open water.

Northern Long-Eared Bat: The federal government lists this species as Threatened in Ohio. As with the Indiana bat, winter northern long-eared bat hibernacula include caves and mines, while summer habitat typically includes tree species exhibiting exfoliating bark or cavities that can be used for roosting. Northern long-eared bat has also been found, albeit rarely, roosting in structures like barns and sheds. Similar to the Indiana bat, characteristics within the Project area suggest it is not likely to inhabit the proposed work areas.

Sensitive State Species

ODNR provided a corresponding letter response to a request for Ohio Natural Heritage Database GIS records dated October 20, 2016. No GIS records of rare or endangered species are reported within a one mile radius of the Project. A copy of the letter indicating no Ohio Natural Heritage Database GIS records is included in Attachment A.

AECOM submitted a coordination letter to the ODNR on September 7, 2016, soliciting comments on the Project. AECOM received a response regarding the Project from the ODNR on September 12, 2016. ODNR is unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks, forests, wildlife refuges, or other protected natural areas within the Project area.

To address the Project's potential to impact state protected species, AECOM conducted a web based literature review of the ODNR State Listed Wildlife Species List***, November 2016***, to identify what species potentially occur in Belmont County, Ohio. **Table 3-5** lists the species identified during the ODNR literature review.

Table 3-5. State-Listed Species that Could Inhabit Belmont County, Ohio			
Common Name	**Species Name**	**Federal Status**	**General Notes**
Mammals			
Indiana bat	Myotis sodalis	Endangered	Seasonal clearing restrictions
Black Bear	Urus americanus	Endangered	No impacts likely
Amphibians-Salamander			
Eastern Hellbender	Cryptobranchus alleganiensis alleganiensis	Endangered	No in-stream work planned
Fish			
Western Banded Killfish	Fundulus diaphanus menona	Endangered	No in-stream work planned
Tippecanoe Darter	Etheostoma Tippecanoe	Threatened	No in-stream work planned
Channel Darter	Percina copelandi	Threatened	No in-stream work planned
River Darter	Percina shumardi	Threatened	No in-stream work planned
Paddlefish	Polyodon spathula	Threatened	No in-stream work planned
Insects			
River Jewelwing	Calopteryx aequabilis	Endangered	No in-stream work planned
Bivalves			
Butterfly	Ellipsaria lineolata	Endangered	No in-stream work planned
Black Sandshell	Ligumia recta	Threatened	No in-stream work planned
Threehorn Wartyback	Obliquaria reflexa	Threatened	No in-stream work planned

Ohio's State Listed Species By County, Belmont County, June 2016.
Accessed November 8, 2016:
http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/species%20and%20habitats/state-listed%20species/belmont.pdf

Indiana bat comments: The Indiana bat, a federally and state endangered species, is a potential inhabitant of Belmont County. Suitable habitat of bats includes dead or dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. ODNR recommends that suitable habitat trees remain conserved, however, if trees must be cleared, ODNR recommends that tree clearing occur between October 1 and March 31 to avoid disturbing potential bat roost sites during the breeding and brood-rearing months.

Eastern hellbender comments: The eastern hellbender (***Cryptobranchus alleganiensis alleganiensis)***, a state endangered species and a federally listed species of concern, is a potential inhabitant of Belmont County. This aquatic salamander inhabits perennial streams with large flat rocks. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

Fish comments: The western banded killfish (***Fundulus diaphanus menona)***, Tippecanoe darter (***Etheostoma Tippecanoe)***, channel darter (***Percina copelandi***, river darter (***Percina shumardi)***, and

paddlefish (***Polyodon spathula)*** are state listed species and potential inhabitants of Belmont County. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

Mussel comments: The butterfly (***Ellipsaria lineolate***), black sandshell (***Ligumia recta***), and threehorn wartyback (***Obliquaria reflexa***) are state listed species and potential inhabitants of Belmont County. Due to the location and that no in-water work is proposed, this Project is not likely to impact this species.

General Impacts

Construction and operation of the Rebuild could affect wildlife through habitat loss, alteration, or fragmentation; disturbance and/or displacement from noise and construction activities; or mortality from collisions with construction equipment, transmission structures, lines, conductors and guy and shield wires. Construction noise, disturbance, and human presence may temporarily displace the more mobile species from the ROW and construction areas to similar habitats nearby, some individuals may leave the area or otherwise alter their patterns. Any displaced wildlife is expected to return to the area shortly after construction is completed and human presence decreases. Piling logs and brush along the ROW edges will create cover and nesting habitat for upland birds, mammals, and reptiles. In areas where the ROW will go through relatively undisturbed tracts of forest, the ROW clearing will fragment the forest and create edge habitat. Although edge habitat provides habitat for a wide diversity and abundance of species, such as deer, songbirds, red-tailed hawks, and red fox; species that require forest interior habitat will lose habitat and be forced to relocate into other interior forest areas.

The East Focus Area Route Alternatives result in additional tree clearing relative to the existing corridor. East Route Alternative 3 results in approximately 9.0 acres of additional tree clearing. East Route Alternative 2 results in approximately 9.6 acres of additional clearing. East Route Alternative 1 would result in over 16 acres of additional clearing.

West Route Alternative 6 results in approximately 4.5 acres of additional tree clearing compared to approximately 2.9 acres for West Route Alternative 7.

No in-water work is currently proposed for the project. However, in the event that impacts to aquatic habitats cannot be avoided, they will be minimized by use of construction BMPs for sedimentation and erosion control. AEP Ohio Transco will use temporary bridges/timber matting, where practical, to cross stream locations. Any culverts installed during the construction of the line will be sized and placed to allow for passage of fish and other aquatic species.

Once the transmission line is built, limited vegetation disturbance (periodic mowing, trimming, application of herbicide or removal of hazard trees, etc.) will occur during scheduled ROW maintenance. These activities may cause short-term disturbance of wildlife in the immediate vicinity of the activity. Animals that inhabit shrubs and small trees that have grown within the ROW will be displaced to adjacent habitats when this vegetation is trimmed or removed from the ROW.

General Impacts on Special-Status Species

Federally Listed Species

Indiana Bat—Indiana bats hibernate in limestone caves, or occasionally in abandoned mines (USFWS, 2007). In spring, reproductive females migrate and form maternity colonies where they bear and raise their young in wooded areas under the exfoliating bark of dead trees greater than three (3) inches diameter at breast height that retain large, thick slabs of peeling bark. Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain, wooded wetlands, and upland communities.

Males and non-reproductive females typically do not roost in colonies and may stay close to their hibernaculum or migrate to summer habitat. Summer roosts are typically located behind exfoliating bark of large, often dead, trees or snags that are within canopy gaps in forests, in fence lines, or along wooded edges. Indiana bats forage in or along the edges of forested and riparian areas, eating a variety of flying insects found along rivers or lakes and in uplands. Both males and females return to hibernacula in late summer or early fall to mate and enter hibernation.

Threats to the Indiana bat vary during the annual cycle. During hibernation, threats include modifications or disturbance to caves and mines and human disturbance. During summer months, possible threats relate to the loss and degradation of forested habitat. Migration pathways and swarming sites may also be affected by habitat loss and degradation. However, little is known about the migratory habits and habitats of the Indiana bat.

AEP Ohio Transco proposes to comply with USFWS and ODNR comments and limit tree clearing to the period between October 1 and March 31 to avoid disturbing potential bat roost sites during the breeding and brood-rearing months.

Northern Long-Eared Bat—Northern long-eared bats roost and forage in deciduous upland and riparian forests and using snag or den trees that are 9 to 36 inches diameter at breast height and that have loose bark during the spring and summer. In autumn, northern long-eared bats swarm in wooded areas surrounding caves and mines where they hibernate. The primary threat to the northern long-eared bat is white-nose syndrome, a disease that has killed an estimated 5.5 million cave hibernating bats in the United States and Canada. Other threats include destruction, modification, or curtailment of its habitat or range and human- made factors affecting the northern long-eared bat's continued existence. These threats combined with white-nose syndrome heighten the level of risk.

The northern long-eared bat utilizes habitat similar to the Indiana bat; therefore, potential Project impacts to the bat would be similar to those discussed for the Indiana bat. Forested habitat would need to be cleared for the ROW and access roads, which could potentially impact northern long-eared bat summer roosting habitat.

State-Listed Species

Based on no planned in-water work and mobility of species, AEP Ohio Transco's consultation with ODNR resulted in identification of no potential impacts to state-listed species beyond the Indiana bat, which will be avoided through adherence to seasonal tree clearing restrictions.

3.2.2 Segment Comparison

The removal of forested habitat for new ROW and access road clearing could affect potential Indiana and northern long-eared bat summer roosting habitat. East Route Alternatives 2 and 3 appear to be the best candidates in terms of wildlife habitat and sensitive species because the result in the less tree clearing than East Route Alternative 1. Similarly, West Route Alternative 7 results in slightly less tree clearing than West Route Alternative 6. Other differences in habitat and sensitive species between the alternatives appear to be negligible.

3.3 DEVELOPED LAND USE

Table 3-6 identifies developed land uses located in the vicinity of the Route Alternatives and Rebuild Segments. Additionally, see detailed Candidate Route Constraint Mapping (Figures 3A through 3E).

Table 3-6. Developed Land Uses

	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Residences within 100' ROW	0	0	0	0	0	0
Residences within 1000' of centerline	145	325	148	14	12	225
Cemeteries within 100' ROW	0	0	0	0	0	0
Cemeteries within 1000' of centerline	0	1	0	0	0	0
Churches within 100' ROW	0	0	0	0	0	0
Churches within 1000' of centerline	0	2	1	0	0	2
Schools within 100' ROW	0	0	0	0	0	0
Schools within 1000' of centerline	0	2	1	0	0	0
Commercial buildings within 100' ROW	0	0	0	0	0	0
Commercial buildings within 1000' of centerline	4	6	4	0	0	7

Table 3-6. Developed Land Uses						
	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Outbuildings within 100' ROW	0	0	0	0	0	0
Outbuildings within 1000' of centerline	53	89	47	7	7	134
Number of Parcels within 100' ROW	18	11	17	8	9	41
Number of Parcels within 1000' of centerline	196	348	185	37	36	441
Number of Parcel Owners within 100' ROW	13	9	13	5	5	25
Number of Parcel Owners within 1000' of centerline	100	175	97	17	17	171

3.3.1 Resource Characteristics

Land use throughout the Study Area is predominately forestland and grassland/pasture, with interspersed areas of suburban and rural development and some areas of cultivated crops.

Urban and Developed Lands

Developed areas within the Study Area are primarily concentrated in and around the Village of Neffs. While complete avoidance of all residential, commercial, and industrial areas is not possible, the Routing Team worked to minimize impacts on existing residences, commercial facilities, and other non-residential structures.

County Planning and Zoning

Belmont County currently does not have a comprehensive plan. Each entity (such as the Village of Neffs) is given the ability to adopt their own zoning and permitting regulations. No regulations were found for the Village of Neffs.

Mineral and Subsurface Resources

There are four surface coal mine operations present in the Study Area that cross the project. These operations are owned by the Marietta Coal Company. The Study Area USGS Topographic Map also shows several areas of previous strip mining.

General Impacts on Land Use

In general, the construction of a transmission line will have minimal impacts on agricultural uses of the land. Impacts to agricultural land would primarily be confined to the construction phase of the Rebuild. Construction may temporarily interrupt grazing and crop production, but the presence of a transmission line itself has minimal long-term impacts on pastureland for livestock. There will be a permanent loss of grazing and crop production at each of the structure footprints, however, grazing and crop production would continue within the ROW.

All woody stemmed vegetation will be removed within the 100-foot ROW and along permanent access roads. Regular maintenance operations will prevent the regrowth of trees and tall growing vegetation in the cleared areas and access roads. Thus, lands within any new cleared ROW and access road (if permanent) would be removed from future timber production for the life of the transmission line.

Routes were developed to avoid impacts on residences, commercial operations, and other developed land features. Major urban and developed areas were avoided to the extent feasible during the routing process.

Table 3-6 compares the proximity of the Route Alternatives to nearby residences, outbuildings, churches and schools. No residences are located within the 100-foot wide ROW for any of the East or West Route Alternatives or the Rebuild Segments. Alternatives were developed in areas with limited housing and other development. As a result, churches, cemeteries and schools were avoided, none of which occur within the 100-foot ROW of the centerline for the Route Alternatives.

3.3.2 Segment Comparison

East Focus Area Alternative Routes 1, 2, and 3 are each approximately 1.8 mile, 1.2 miles, and 1.6 miles long, respectively. East Route Alternative 1 will have 27.8% of the route in an existing transmission corridor. East Route Alternatives 2 and 3 have greater percentages of their lengths within existing ROW with 41.7% and 43.8%, respectively.

The East Focus Area Route Alternatives 1, 2, and 3 avoid residences, commercial buildings, outbuildings, schools, churches, and cemeteries within the 100-foot ROW. East Route Alternative 1 crosses within 1,000 feet of approximately 145 residences, four commercial buildings, 53 outbuildings, no churches, and no schools. East Route Alternative 2 crosses within 1,000 feet of 325 residences, six commercial buildings, 89 outbuildings, two churches, and two schools. East Route Alternative 3 crosses within 1,000 feet of 148 residences, four commercial buildings, 47 outbuildings, one church, and one schools. One cemetery (Alexander Cemetery) is within 1,000 feet of East Route Alternative 2. East Alternative Routes 1 and 3 have fewer residences and other sensitive land uses within 1,000 feet. The differences between the Rout Alternatives in terms of potential land use impacts within 1,000 feet are correlated to distance from the Village of Neffs. However, East Route Alternative 2 crosses fewer parcels with fewer owners than the other two candidates.

West Route Alternatives 6 and 7 are 0.7 mile and 0.6 mile long, respectively. They cross over the existing Glencoe-West Bellaire 69 kV corridor and leave the existing ROW to avoid structures associated with multiple 138 kV transmissions within a corridor owned by American Transmission System, Inc. West Alternative Route 7 returns to the existing ROW sooner with 66.7% of its length within existing ROW. However, the crossing location would require additional work by American Transmission System, Inc., which could result in delays in the desired in-service date of the Project.

No residences, commercial buildings, outbuildings, schools, churches, or cemeteries are located within the new 100-foot wide ROW for the West Route Alternatives. West Route Alternative 6 is within 1,000 feet of 14 residences and seven outbuildings. West Route Alternative 7 is within 1,000 feet of 12 residences and seven outbuildings. No commercial buildings, schools, churches, or cemeteries are within 1,000 feet of either candidate.

The Rebuild Segments are located in between the focus areas and will follow the centerline of the existing Glencoe-West Bellaire 69 kV transmission line. Combined, the length of the Preferred Route to be built within the existing ROW is approximately 3.8 miles.

No residences, commercial buildings, outbuildings schools, churches, or cemeteries, are located within the new 100-foot-wide ROW for the Rebuild Segments. Within 1,000 feet of the Rebuild Segments there are 225 residences, seven commercial buildings, and 134 outbuildings. Two churches are within 1,000 feet of the Rebuild Segments. The churches are Coalbrook Presbyterian Church and Clarksburg United Methodist Church. No schools or cemeteries are within 1,000 feet of the Rebuild Segments.

3.4 CULTURAL RESOURCES

Table 3-7 identifies any cultural resources located in the vicinity of the Route Alternatives and Rebuild Segments.

Table 3-7. Cultural Resources

	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Architectural Resources within 100-foot ROW	0	0	0	0	0	0
Architectural Resources within 1,000 Feet	0	1	0	0	0	2
Archaeological Resources within 100-foot ROW	0	0	0	0	0	2
Archaeological Resources within 1,000 Feet	0	0	0	0	0	2

3.4.1 Resource Characteristics

As a part of the study, a review of the cultural resource from OHPO was completed. Spatial information was collected on all previously identified architectural and archaeological resources for each route.

Architectural Historic Properties

A review of the architectural resources from OHPO identified two sites within the Study Area. The first is the current First National Bank (formerly the Neffs Post Office) on Pike Street in the Village of Neffs (Site BEL0061708). The second is the Hudson Property on State Route 149 in the Village of Neffs (Site BEL0132408). Neither site is listed in the National Register of Historic Places.

Archaeological Resources

A review of the archaeological resources from OHPO identified two sites within the Study Area. The sites overlap and include a prehistoric and a historic site (33BL0245 and 33BL0246). The sites are not listed in the National Register of Historic Places.

General Impacts

Impacts on architectural historic properties will be visual, created by the rebuilding of the existing line and construction of new towers where none exists, by the addition of a second transmission line next to an existing transmission line corridor, and by the clearing of forested land. Impacts will vary based on local relief, height of existing vegetation, and any intervening recent development. Any physical impacts on architectural historic properties will be avoided, where possible, by strategically locating access roads, staging areas, and towers in areas away from the architecturally historic resource.

Impacts on archaeological sites typically occur during the ground-disturbing activities associated with construction of a transmission line, e.g., construction of new access roads, clearing and grubbing of the ROW, establishing equipment staging areas, tower construction, and driving of tired or tracked vehicles. Whenever possible, these impacts on identified sites will be avoided by strategically locating access roads, towers, and staging areas away from known sites. If the site cannot be avoided then additional consultation will be carried out with OHPO. AEP will conduct a Phase I cultural resources study, as required by OHPO.

3.4.2 Segment Comparison

Based on the results of background research and the information available at this time, East Alternative Routes 1, 2, and 3 would have no impacts to known cultural resources within the 100-foot ROW. East Route 2 does have one architectural site (BEL0061708) within 1,000 feet. This Site is not listed in the National Register.

Based on the results of background research and the information available at this time, the West Alternative Routes would have no impacts to known cultural resources.

The Rebuild Segments have two archaeological sites within the 100-foot ROW and two architectural sites within 1,000 feet. These sites are not listed in the National Register.

3.5 ENGINEERING CONSTRAINTS

Table 3-8 identifies engineering considerations for each Route Alternative and the Rebuild Segments including the total segment length, length of rebuild, length of infrastructure parallel and ROW crossings.

Table 3-8. Engineering Considerations

	East Focus Area			West Focus Area		
Route Alternatives	**1**	**2**	**3**	**6**	**7**	**Rebuild Segments**
Length (miles)	1.8	1.2	1.6	0.7	0.6	3.8
Acres of ROW (100')	22.4	15.4	19.7	8.4	7.3	46.0
Parallel Alignments						
Transmission Line (miles)	0.5	0.5	0.7	0	0.4	3.8
Percentage Transmission/Distribution Line Parallel	27.8%	41.7%	43.8%	0.0%	66.7%	100%
Road (miles)	0	0	0	0	0	0
Total Parallel (miles)	0.5	0.5	0.7	0	0.4	3.8
Total Percentage Parallel	27.8	41.7%	43.8%	0.0%	66.7%	100%
Right-Of-Ways Crossed						
138 kV	2	1	1	4	4	0
Gas Lines Crossed	1	0	1	1	1	0
Interstates Crossed	0	0	0	0	0	0
US Highways Crossed	0	0	0	0	0	0
State and County Highways Crossed	1	1	1	0	0	2
Local Roads Crossed	1	0	3	0	0	8
Topography						
Steep Slopes > 20% (miles)	1.21	0.94	1.17	0.32	0.29	2.15
Digitized Forest Cover						
Acres within 100' ROW	16.6	0.9	1.2	4.5	2.9	19.9
Percent of 100' ROW forested	74.1%	62.3%	45.7%	53.6%	39.7%	43.3%
Desktop Mapped Streams and Wetlands						
Streams Crossed (count)	2	2	1	0	2	8
Wetlands Crossed (count)	0	0	0	0	0	2

Table 3-8. Engineering Considerations						
	East Focus Area			West Focus Area		
Route Alternatives	1	2	3	6	7	Rebuild Segments
Acres of NWI wetlands	0.00	0	0	0.00	0.00	0.30
FEMA Floodplain						
100-yr Floodplain crossed by optimal centerline (miles)	0.00	0	0	0.00	0.00	0.04
Acres of 100-yr Floodplain within the 100' ROW	0.00	0	0	0.00	0.00	0.67
Parcels and Property Owners						
Number of Parcels within 100' ROW	18	11	20	8	9	41
Number of Parcels within 1000' of optimal centerline	196	348	254	37	36	441
Number of Parcel Owners within 100' ROW	13	9	254	5	5	25
Number of Parcel Owners within 1000' of optimal centerline	100	9	14	17	17	171

3.5.1 Design Considerations and Constructability

Constructability is a term used to discuss the feasibility of a proposed transmission line, as it relates to engineering and construction concerns. Constructability evaluates the use of existing transmission corridors, engineering challenges, and accessibility issues.

Major factors that affect constructability include, but are not limited to, steep topography, condensed ROWs, high angles, proximity to major highways, accessibility, and cost. Additional issues to consider when evaluating constructability are: ease of moving equipment, materials, and workers to the construction sites; relative ease of ensuring public and worker safety; logistical difficulties associated with obtaining the required easements for the transmission line; and the actual amount of time and materials needed for construction, which can correlate to the total length of the corridor (i.e., longer lines require more materials and, often, a longer construction period).

Transmission Right-of-Way

AEP attempted to minimize route length and ROW acquisition. Where possible, AEP considers using existing transmission ROW, paralleling existing transmission lines, or paralleling other infrastructure (i.e., roadways, railways or gas lines). AEP has a 100-foot wide ROW for the existing 69 kV line. Therefore, the majority of the Rebuild will be constructed within the existing ROW, with three exceptions. Alternative Segment 2, which is part of East Route Alternatives 2 and 3 leaves the West

Bellaire Substation heading north to utilize the West Bellaire–Tiltonsville 138 kV transmission line ROW rather than the existing Glencoe–West Bellaire 69 kV corridor because it offers better alignment with the appropriate station bay. Within the East Focus Area, AEP would abandon a portion of its existing 69 kV line ROW as it crosses a densely populated area of the Village of Neffs. West Focus Area Route Alternatives 6 and 7 avoid existing structures of a 138 kV multi-transmission line ROW owned by American Transmission System, Inc.

In areas where a new portion of the transmission line will be built, a new 100-foot ROW will be needed. When determining the best location for new ROW, factors such as the total width required and the use or expansion of existing infrastructure corridors (transmission line, gas pipeline and roadway) were considered. The transmission ROW will need to be maintained free of tall-growing vegetation in order to safely operate the transmission line.

Engineering and Construction Considerations

Potential engineering and construction challenges are important to consider when routing a transmission line. Sharp angles, steep topography, nearby towers, antennas, and airfields along with narrow ROW alignments are all elements that could ultimately require extensive or non-standard engineering and lead to increases in impacts and overall cost. Each turn, or angle, in a transmission line requires a different, and often more expensive and generally larger, type of structure. Avoiding circuitous routes can reduce later challenges in the engineering and environmental permitting phases of the Rebuild. The proximity to existing roadway, transmission and gas pipeline infrastructure could also pose potential engineering and construction challenges. As with paralleling existing infrastructure, crossing over transmission lines and gas pipelines may require specialized construction techniques or outages. AEP attempted to minimize engineering challenges during the conceptual design phase.

The Rebuild ascends and descends numerous hills. The Routing Team considered the challenges associated with steep topography, especially through areas that would require new ROW. In addition to requiring more extensive grading within the ROW, areas with steep topography are typically more challenging to access, which results in longer access roads that also require significant grading. Where the route uses existing ROW or parallels existing infrastructure, there are opportunities to use existing access roads.

Project Cost

AEP evaluated the East and West Focus Area Route Alternatives from a high-level cost perspective to identify significant cost differences. Due to the short length of the Route Alternatives and relatively similar number of angled structures, there were no significant differences in the cost.

3.5.2 Segment Comparison

East Route Alternatives 1, 2, and 3 will require new construction. East Route Alternative 1 is approximately 1.8 miles long and will require 22.4 acres of ROW, with approximately 27.8% within existing ROW. East Route Alternative 2 is approximately 1.2 miles long and will require 15.4 acres of ROW, with 41.7% within existing ROW. East Route Alternative 3 is 1.6 miles long and will require 19.7 acres of ROW, with 43.8% within existing ROW. Forest clearing would be necessary for all Route Alternatives, with 16.6 acres for East Route Alternative 1 and 9.6 and 9 acres, respectively, for East Route Alternatives 2 and 3.

The East Route Alternatives are expected to result in similar constructability impacts from wetlands, stream crossings, and 100-year floodplain areas. East Route 2 would impact fewer property owners, crosses fewer areas of slopes over 20%, and crosses fewer combined existing infrastructure such as electric transmission lines, pipelines, and roads. From an engineering standpoint, East Route Alternative 2 is slightly preferred because it crosses fewer areas of steep slopes.

West Route Alternatives 6 and 7 each have constructability difficulties. West Route 6 crosses under the four American Transmission System, Inc. 138 kV lines utilizing a valley. The valley crossing results in a slightly longer overall length, greater length of crossing of slopes greater than 20%, and more tree clearing. West Route 7 utilizes more existing ROW, but would require American Transmission System, Inc. to raise their existing 138 lines before a crossing could occur. This could create schedule impacts resulting in a delayed in-service date.

The Rebuild Segments total 3.8 miles, a total of 46.6 acres within the existing ROW of the Glencoe-West Bellaire 69 kV Transmission Line. No existing transmission lines are crossed. Two county highways and eight local roads are crossed by the Rebuild Segments. Fifty-seven percent of the Rebuild Segments cross steep slopes (2.2 miles). Eight streams and two wetlands are affected by the Rebuild Segments along with 0.6 acre of 100-yr Floodplain. A total of 25 property owners are within the 100-foot ROW for Rebuild Segments (40 parcels total).

4.0 IDENTIFICATION OF THE PREFERRED AND ALTERNATE ROUTES

As stated in the introductory chapters, the goal in selecting a suitable route for the Rebuild is to minimize impacts on the natural, cultural, and human environment while avoiding circuitous routes, extreme costs, and non-standard design requirements. However, in practice, it is not usually possible to optimally minimize all potential impacts at all times. There are often inherent tradeoffs in potential impacts to every routing decision. For example, in heavily forested Study Areas, the route that avoids the most developed areas will likely have the greatest amount of forest clearing, while the route that has the least impact on vegetation and wildlife habitats often impacts more residences or farm lands. Thus, an underlying goal of a routing study is to reach a reasonable balance between minimizing potential impacts on one resource versus increasing the potential impacts on another.

The following section presents the rationale for selection of the Preferred and Alternate Routes, and thus, the routes that are considered to best minimize the impacts overall. The rationale is derived from the accumulation of the routing decisions made throughout the process, comments from the public and regulatory agencies, and the comparative analysis of potential impacts presented in Section 3. Because approximately 80 percent of the Rebuild would be located within existing AEP-owned and maintained ROW, the Rebuild was evaluated with the use of Route Alternatives in East and West Focus Area where it is necessary to leave the existing ROW.

4.1 SUMMARY OF ALTERNATIVE SEGMENT COMPARISONS

The East and West Focus Areas are the only areas that require comparison. East Route Alternatives 1, 2, and 3 were compared against each other using advantages and disadvantages of each to determine the best option for the Preferred Route. Similarly, West Route Alternatives 6 and 7 were compared.

4.1.1 East Route Alternative 1

Advantages:

- Fewer properties within 1,000-feet of the centerline.

Disadvantages:

- Longest length.
- Requires the largest amount of forest clearing within the ROW.
- Crosses the greatest amount of steep slopes.

4.1.2 East Route Alternative 2

Advantages:

- Shorter length.
- Smaller area of tree clearing.
- Crosses a smaller amount of steep slope.
- Crosses less existing infrastructure ROW.
- Fewest number of property owners

Disadvantages:

- Closer to the Village of Neffs and corresponding sensitive land uses.

4.1.3 East Route Alternative 3

Advantages:

- Parallels more of existing 138 kV transmission line (West Bellaire-Tiltonsville 138 kV).
- Least amount of tree clearing

Disadvantages:

- Longer length of rebuild than East Route Alternative 2.
- Crosses a greater amount of steep slopes than East Route Alternative 2.

4.1.4 West Route Alternative 6

Advantages:

- Crosses under multiple American Transmission System, Inc. lines without need for their reconfiguration.

Disadvantages:

- More tree clearing.
- More steep slopes.

4.1.5 West Route Alternative 7

Advantages:

- Less tree clearing.
- Utilizes greater length of existing ROW,

Disadvantages:

- American Transmission System, Inc. lines need to be raised to prevent likely reliability/outage concerns.

4.2 PREFERRED AND ALTERNATE ROUTES

Based on a qualitative and quantitative review of information obtained from GIS data, existing easements, field reconnaissance, agency consultation and public outreach as well as engineering and financial estimates for the Rebuild, an alignment combining East Route Alternative 2, West Route Alternative 6,

and the Rebuild Segments is the Preferred Route as shown in Figure 4. More land use features are located within 1,000 feet of East Route Alternative 2 than the other fully evaluated East Focus Area Route Alternatives because it is closer to the Village of Neffs. However, features within closer proximity (i.e. within 100 feet) remain similar. Overall, this alignment offers the best balance of meeting engineering requirements, impact minimization, and cost effectiveness. The decision to utilize West Route Alternative 6 as part of the Preferred Route was dictated by potential schedule and engineering difficulties associated with coordination with American Transmission System, Inc. to raise their lines to allow for the new West Bellaire–Glencoe 138/69 kV line to pass under them.

The combination of East Route Alternative 3 and West Route Alternative 7 were evaluated as the next best option, and were selected as the Alternate Route.

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RICHLAND TOWNSHIP

Belmont County

SMITH TOWNSHIP

PULTNEY TOWNSHIP

Glencoe

Neffs

West Bellaire

Stewartsville

McClainsville

Methodist Ridge Rd

Bull Run Rd

White Hill Rd

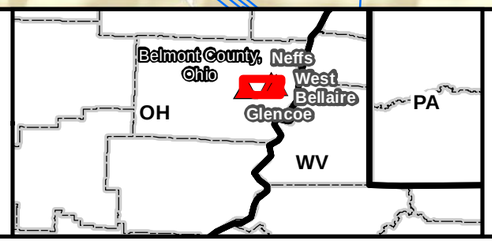
Williams Creek

McMahon Creek

Trough Run

Legend

- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Line
- Township Boundary



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BASE MAP SOURCE:ArcGIS Online, World Street Map

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 1
STUDY AREA

JOB NO. 60518004

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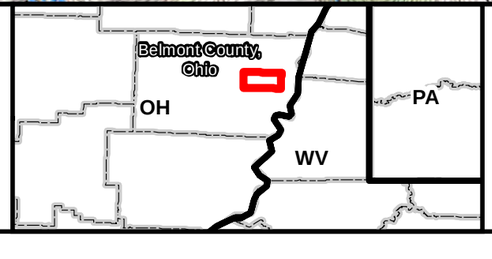
Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Township Boundary



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BASE MAP SOURCE:ArcGIS Online, USA Topo Maps

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 2
CANDIDATE ROUTES

AECOM

JOB NO. 60518004

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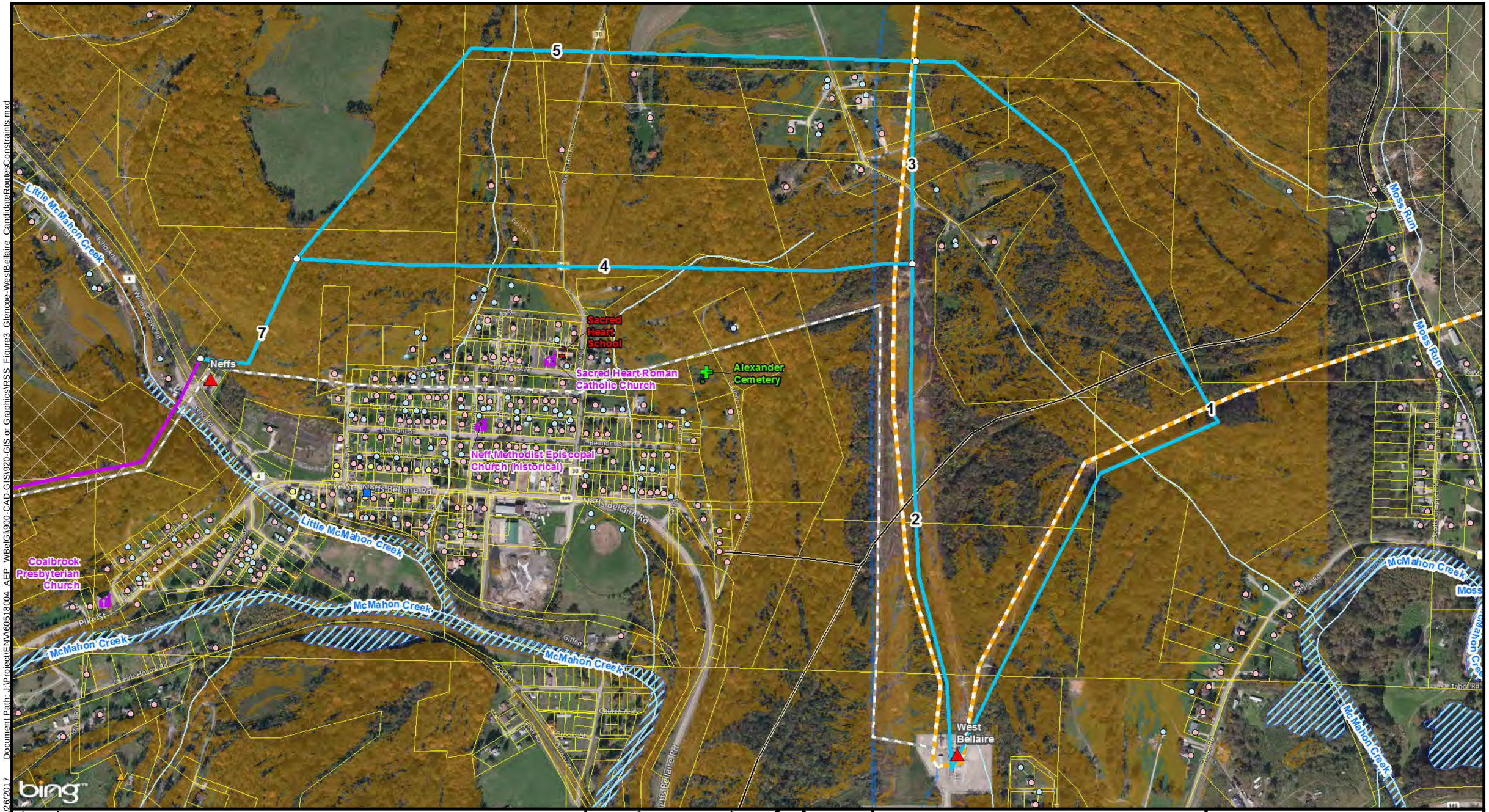

Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Archaeological Site
- Historic Structure
- Church
- Cemetery
- Commercial Building
- Outbuilding
- Residence
- School
- Existing Gap Pipeline
- Stream (National Hydrography Dataset)
- Greater than 20% Slope
- Coal Survey Mine Operation
- National Wetland Inventory
- Parcel Boundary

0 500 1,000 Feet

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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 3A
CANDIDATE ROUTES CONSTRAINTS MAP

AECOM

JOB NO. 60518004

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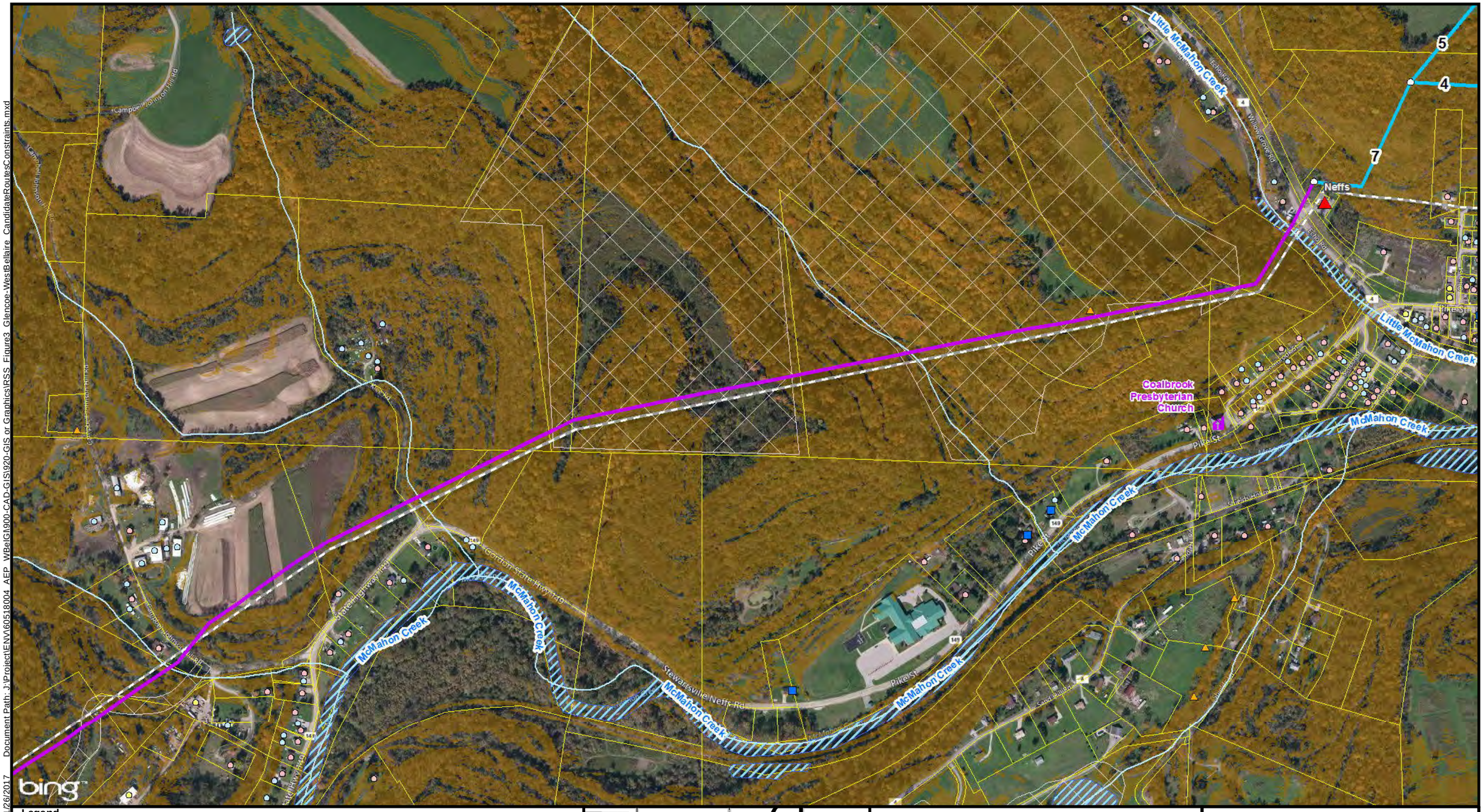
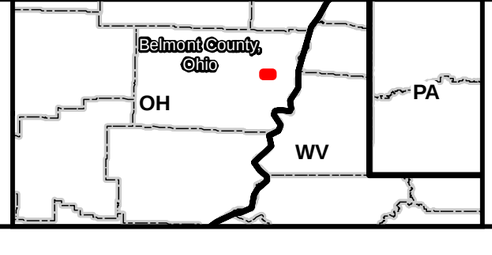


Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Archaeological Site
- Historic Structure
- Church
- Cemetery
- Commercial Building
- Outbuilding
- Residence
- School
- Existing Gap Pipeline
- Stream (National Hydrography Dataset)
- Greater than 20% Slope
- Coal Survey Mine Operation
- National Wetland Inventory
- Parcel Boundary



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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 3B
CANDIDATE ROUTES
CONSTRAINTS MAP

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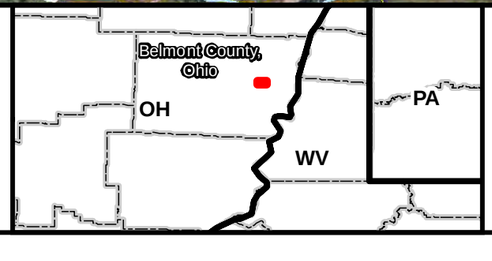
Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Archaeological Site
- Historic Structure
- Church
- Cemetery
- Commercial Building
- Outbuilding
- Residence
- School
- Existing Gap Pipeline
- Stream (National Hydrography Dataset)
- Greater than 20% Slope
- Coal Survey Mine Operation
- National Wetland Inventory
- Parcel Boundary



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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 3C
CANDIDATE ROUTES CONSTRAINTS MAP

AECOM

JOB NO. 60518004

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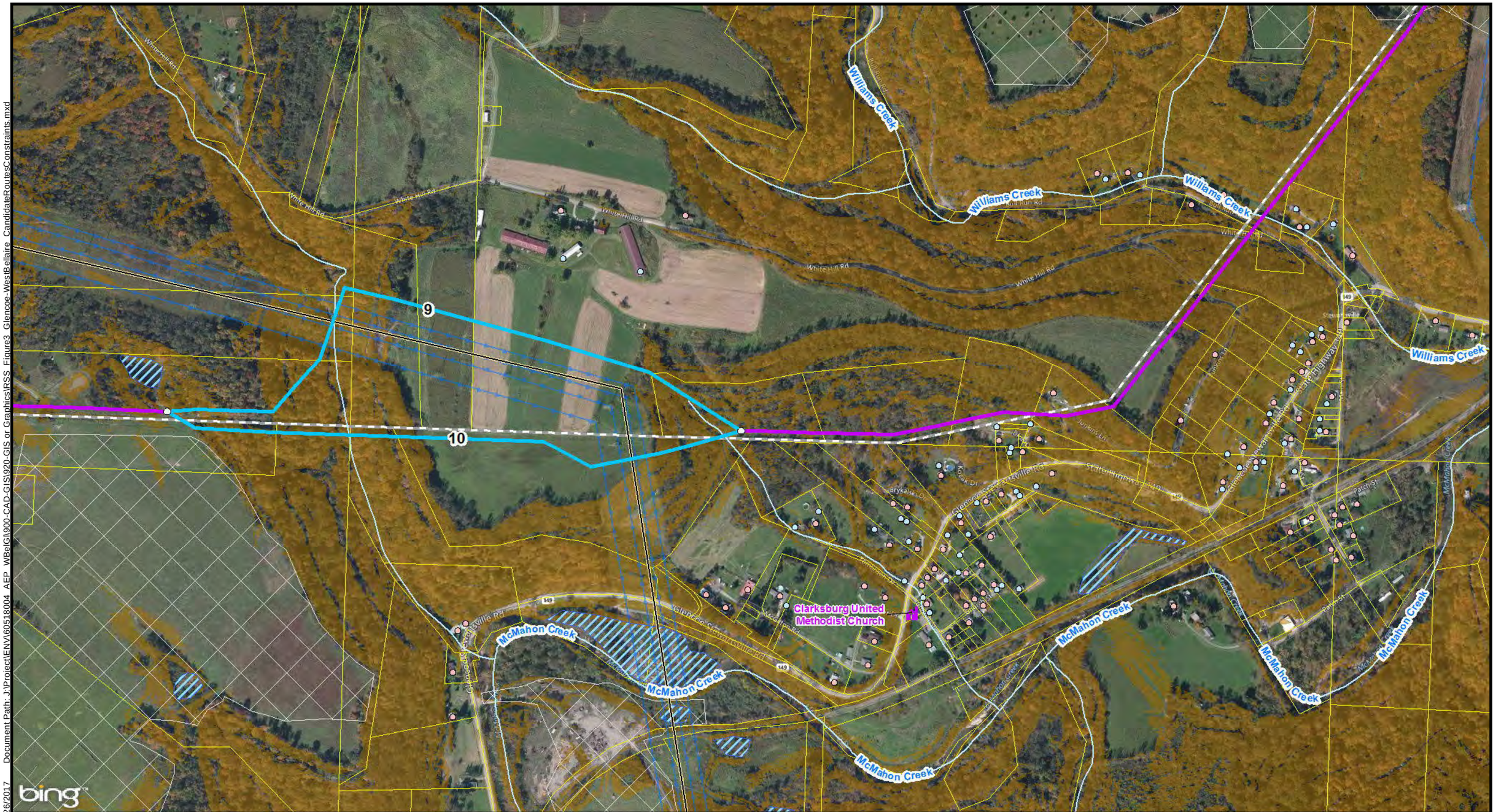
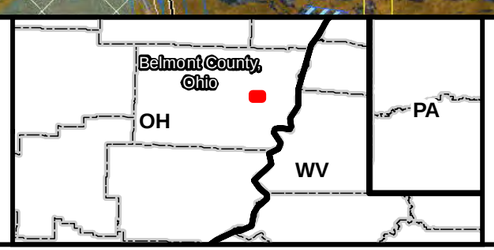


Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Archaeological Site
- Historic Structure
- Church
- Cemetery
- Commercial Building
- Outbuilding
- Residence
- School
- Existing Gap Pipeline
- Stream (National Hydrography Dataset)
- Greater than 20% Slope
- Coal Survey Mine Operation
- National Wetland Inventory
- Parcel Boundary



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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 3D
CANDIDATE ROUTES
CONSTRAINTS MAP

AECOM

JOB NO. 60518004

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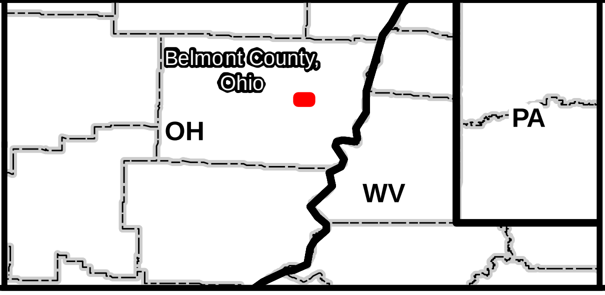
Legend

- Alternative Segment
- Rebuild Section
- Existing Substation
- Existing Glencoe - West Bellaire 69kV Transmission Line
- Existing AEP 138kV Transmission Line
- Other Existing Transmission Lines
- Archaeological Site
- Historic Structure
- Church
- Cemetery
- Commercial Building
- Outbuilding
- Residence
- School
- Existing Gap Pipeline
- Stream (National Hydrography Dataset)
- Greater than 20% Slope
- Coal Survey Mine Operation
- National Wetland Inventory
- Parcel Boundary



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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 3E
CANDIDATE ROUTES
CONSTRAINTS MAP

JOB NO. 60518004

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Document Path: J:\Project\ENV\60518004_AEP_WBel\GIS\900-CAD-GIS\920-GIS or Graphics\RSS_Figure4_Glencoe-WestBellaire_PreferredRoute.mxd

Date Saved: 1/26/2017

Glencoe

Neffs

West Bellaire

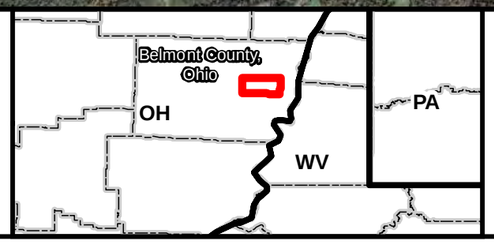
Glencoe

Neffs

bing

Legend

- Existing Substation
- Preferred Route
- Alternate Route
- Rebuild Section



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BASE MAP SOURCE:ArcGIS Online, Bing Maps Hybrid

AEP OHIO TRANSMISSION COMPANY

West Bellaire-Glencoe 138 kV TransmissionLine

FIGURE 4
PREFERRED AND
ALTERNATE ROUTES

AECOM

JOB NO. 60518004

Summary: Application electronically filed by Mrs. Erin C Miller on behalf of AEP Ohio Transmission Company