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CASE NUMBER 12-1636-EL-BTX

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DESCRIPTION OF DOCUMENT Application

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APPLICATION FOR

A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

FOR THE

HAYES-WEST FREMONT 138 kV TRANSMISSION LINE PROJECT

SUBMITTED TO THE

OHIO POWER SITING BOARD

AFFIDAVIT

Case No. 12-1636-EL-BTX

STATE OF OHIO)
SS.
SUMMIT COUNTY)

On November 25, 2013, before me, a Notary Public in and for the State and County Aforesaid, personally appeared Rhonda S. Ferguson, who after being duly sworn according to law, deposed and said that she is the Vice President of AMERICAN TRANSMISSION SYSTEMS, INCORPORATED, an Ohio Corporation, that in such capacity she is authorized to make this Affidavit; and that the within information of AMERICAN TRANSMISSION SYSTEMS, INCORPORATED, to the Ohio Power Siting Board is true and correct to the best of her knowledge, information, and belief.

Rhonda S. Ferguson

Sworn to and subscribed before
me this 25th day of November 2013.

Notary

Kathleen Anne Grant
Resident Summit County
Notary Public, State of Ohio
My Commission Expires: 11/08/2014

BEFORE THE OHIO POWER SITING BOARD

Certificate Applications for Electric Power, Gas and Natural Gas Transmission Facilities

Hayes-West Fremont 138 kV Transmission Line Project

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4906-15-01 PROJECT SUMMARY AND FACILITY OVERVIEW

(A) PROJECT SUMMARY AND FACILITY OVERVIEW

This Application seeks a Certificate of Environmental Compatibility and Public Need ("Certificate") from the Ohio Power Siting Board ("Board") for the Hayes-West Fremont 138 kV Transmission Line Project ("Project"). The Certificate for the Project is being sought by American Transmission Systems, Incorporated ("ATSI" or the "Applicant"), a FirstEnergy Company. The proposed Project involves the construction of an overhead 138 kilovolt (kV) electrical transmission line with provisions for the future installation of a second 138 kV transmission line on the same structures. As proposed and described in this Application, the Project extends between the existing West Fremont Substation in Sandusky County, Ohio, and the Hayes Substation in Erie County, Ohio. The Hayes Substation was approved by the Board under case number 11-4711-EL-BTX and is currently under construction. The Project is depicted on Figures 04-1A through 04-1F.

Construction of the proposed Project involves the installation of a single circuit 138 kV overhead transmission line approximately 30 miles in length with provisions to install a future Hayes-West Fremont 138 kV Transmission Line on the same structures. When both the Project and the Groton Substation are in service, the transmission line circuits will designated as the Groton-Hayes 138 kV Transmission Line and the Groton-West Fremont 138 kV Transmission Line, but are described in this Application as the Hayes-West Fremont 138 kV Transmission Line. The future circuit, if constructed, is preliminary identified as the Hayes-West Fremont #2 138 kV Transmission Line.

The Project will originate at the existing West Fremont Substation located approximately one mile northwest of the City of Fremont in Sandusky County, Ohio. From the West Fremont Substation, the Project will extend approximately 22 miles to the east and slightly south, to a point where a loop will extend south to the planned site of the new Groton Distribution Substation, which will be located approximately three miles north of the city of Bellevue, Ohio. Beyond the point of the loop, the proposed Project will travel approximately eight miles northeast, ending at the Hayes Substation, which is located four miles south of the city of Sandusky in Erie County, Ohio.

The Board has jurisdiction over major transmission line installations located wholly within the state of Ohio. As such, ATSI is required to file this Application with the Board for a Certificate for the proposed Project. This Application contains the specific Project details regarding environmental, socioeconomic, technical, ecological, justification of need, and financial matters that are required by Admin. Code Chapter 4906-15. The Application, for ease of review and presentation, is organized to present the required information in the same order as in that Administrative Code Chapter.

(1) General Purpose of the Facility

Installation of the proposed Project described in this Application, and the associated line configurations to establish the substation line exits to and from the new Groton Distribution Substation are needed to reinforce ATSI's Bulk Electric System ("BES") in the Project Study Area in order to provide safe and reliable electric service.

ATSI's 345 kV and 138 kV transmission systems in the northern Ohio region between Toledo and Cleveland (the "Project Area Transmission System" and "Project Study Area," respectively), are part of the ATSI BES. Currently the ATSI BES in this area faces significant operating limitations including capacity shortage, thermal ratings constraints, and potential low voltages on the electric transmission system. These operating limitations have been exacerbated by the retirement of, and will be further exacerbated by the planned future retirement of additional, coal-fired generation around Lake Erie, which started in 2012 and is expected to continue through 2015. This Project, in conjunction with others identified and directed by PJM Interconnection, Inc., ("PJM"), the Regional Transmission Organization ("RTO"), is designed to correct these operating limitations and ensure reliable energy delivery in the Project Study Area.

The Project Area Transmission System has been evaluated using the PJM 2013 and 2015 Load Forecasts from the forecast report dated January 26, 2012. These evaluations are discussed in detail in Section 2 of this Application. These evaluations demonstrate that the Project Area Transmission System will experience, among other significant operating limitations, significant potential circuit thermal overloads under various planning scenarios – when all the generation units that have been scheduled for deactivation are deactivated. This Project is part of needed improvements to the BES necessary to address the impact on the Project Area Transmission System from the planned generation retirement and to provide safe and reliable electric service to the Project Study Area and the entire ATSI service area. Iit is important to note that this Project is being proposed in conjunction with multiple other projects that are needed to address various planning violations on the BES that result from the planned retirement of generation in the ATSI service area. These other projects address many other BES operation limitations that result from the generation deactivations.

In addition to generally reinforcing the Project Area Transmission System, this proposed Project specifically addresses severe thermal overloads on two transmission line segments that follow contingency events on the BES after generation retirement. Under BES contingency events, the Lakeview-Ottawa 138 kV and the Greenfield-Lakeview 138 kV transmission lines that are in series and connect ATSI's Ottawa, Lakeview, and Greenfield Substations in the Toledo Edison and Ohio Edison service areas, may experience severe thermal overloads. Without the Project, these conditions could lead to forced load shed by the PJM via a Post-Contingency Local Load Relief Warning (PCLLRW) directive, in order to restore the remaining transmission system loading to within acceptable levels and prevent equipment damage. The outage combination of greatest concern is a NERC Category C5 common-tower outage, which involves losing multiple transmission line circuits sharing common supporting structures: the event of concern is a double-circuit tower line outage of the Beaver-Davis Besse and the Davis Besse-Hayes 345 kV transmission lines. This contingency results in an extreme thermal overload of the Lakeview-Ottawa 138 kV Transmission Line and Greenfield-Lakeview 138 kV Transmission Line. Under this contingency, to reduce the transmission line loading to below acceptable values, customer loads would have to be dropped in northern Ohio between Port Clinton, Sandusky, and Lorain.

In addition to addressing the significant operation limitations associated with generation retirement on the Project Area Transmission System, the installation of the Project and the Groton Distribution Substation will provide ATSI with the ability to reliably serve existing electrical loads, as well as facilitate future economic expansion in the region.

The Project installs a new 138 kV transmission line path between West Fremont and Hayes Substations providing a west-to-east path for power flows which generally are parallel to power flows on the Lakeview-Ottawa 138 kV Transmission Line and in series with the Greenfield-Lakeview 138 kV Transmission Line. The new parallel path will reduce loading of the Lakeview-Ottawa 138 kV and Greenfield-Lakeview 138 kV Transmission Lines to acceptable levels during modeled contingency events and removes the risk of having to shed customer loads during certain BES contingencies.

In summary, the Project is needed to ensure continued provision of safe and reliable electric service in the Project Area.

(2) Summary Description

The proposed Project will install a new single circuit 138 kV overhead electric transmission line with provisions to install a second circuit on the same structures in the future. A Route Selection Study was conducted for the proposed new transmission line.

This Application provides information on two routes for the proposed Project, a preferred and an alternate route, as required by Ohio Administrative Code Rule 4906-5-04(A). The routes will be described in this Application as the "Preferred Route" and the "Alternate Route." Further, the Application provides information on an alternate routing of an approximately 1.44-mile segment of the Preferred Route. This alternate Preferred Route segment will be described in this Application as "Preferred Route Option B."

The Project will originate at the existing West Fremont Substation located approximately one mile northwest of the city of Fremont in Sandusky County, Ohio. From the West Fremont Substation, the Project will extend approximately 22 miles to the east and slightly south, to a point where a loop will be extended into the planned site of the new Groton Distribution Substation, which will be located approximately three miles north of the city of Bellevue. Beyond the point of the loop, the proposed Project will travel approximately eight miles northeast, ending at the Hayes Substation, which is located four miles south of the City of Sandusky in Erie County, Ohio.

ATSI and CH2M HILL, a contractor employed by ATSI, conducted a Route Selection Study to identify and evaluate potential corridors, and to ultimately identify the Preferred Route and Alternate Route for the Project. The Route Selection Study is provided in Appendix 03-1. The Route Selection Study was designed to evaluate economic and technical feasibility of potential routes while minimizing the overall effects of a potential route on ecology, sensitive land uses, socioeconomic, and cultural resources. Potential routes were evaluated, compared, and ranked to aid in the selection of the Preferred Route and the Alternate Route. ATSI and CH2M HILL also incorporated public input and information collected during field surveys of route alternatives to further distinguish between route alternatives and to ultimately identify a Preferred and Alternate Routes that represent the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations.

(3) Route Selection Process

A Route Selection Study was conducted to identify and evaluate potential routes for the Project. The location of the Project is shown in Figures 04-1A through 04-1F.

The Route Selection Study is presented in Appendix 03-1. Potential routes for the Project were identified, analyzed, scored and ranked to facilitate the selection of two alternative routes, the Preferred Route and the Alternate Route. The objective of the Route Selection Study was to identify routes that minimize the overall impacts to the community and the environment, while taking into account the engineering and construction needs of the Project.

(4) Principal Environmental and Socioeconomic Considerations

A socioeconomic survey of the project area was performed that included preparation of a land use map, current population estimates and projections for the area, consideration of compatibility of the Project with local and regional development plans, and a qualitative assessment of the impact of the proposed transmission line on the surrounding community.

(a) Land Use Impacts:

The proposed Project is generally located in a rural setting consisting of agricultural fields with several residential land use areas, few woodlots, and minimal commercial/industrial and recreational land uses along the proposed Preferred and Alternate Routes. A comparison of the various land use characteristics is included as Tables 6-4 through 6-5 of this Application.

Preferred Route

The Preferred Route is approximately 28.95 miles long with 182 residences located within 1,000 feet of the centerline but none within 100 feet. Numerous residences are located just west of the Sandusky River and south of the Preferred Route. Residential areas are also located on the north bank of the Sandusky River, just west of Shannon Road. A residential area is located along State Route 101 where it intersects with the Preferred Route. Pockets of residential land use areas are also located near the proposed Groton Distribution Substation. No significant impacts to residential areas are anticipated due to construction of the proposed Preferred Route. Any minor impacts are likely to be short-term and will quickly recover following completion of construction. Impacts due to operating and maintaining the line are anticipated to be minor and include removal of incompatible vegetation that may grow within the ROW.

Six commercial/industrial areas are located within 1,000 feet of the Preferred Route. One commercial/industrial area is located at the westernmost end of the proposed Project; this area encompasses the existing West Fremont Substation and the nearby Fremont Energy Center, a 707 MW (fired) natural gas combined cycle facility owned by American Municipal Power, Inc. A commercial/industrial area is located just south of the Ohio Turnpike and west of State Route 53; this area includes two hotels, a gas station, and an eating establishment. A Department of Transportation salt storage facility is located just southeast of the intersection of the Ohio Turnpike and Shannon Road. This commercial/industrial facility is located approximately 5.3 miles from the western end of the Preferred Route. An additional commercial/industrial facility is located on both sides of the Ohio Turnpike and the Preferred Route, adjacent to the intersection of the Norfolk and Western Railroad. This commercial/industrial land use area a landfill and a retention pond. A mulch and compost facility is located approximately 0.3 mile southwest of the Pickle Street and State Route 101 intersection. Lastly, a quarry is located within 1,000 feet of the Preferred Route. The quarry is located south of the Ohio Turnpike and between Billings Road and State Route 4, approximately 2.2 miles east of the proposed Groton Distribution Substation. The route passes through the north end of the quarry. No adverse impacts to commercial/industrial land uses are anticipated as a result of the construction or operation and maintenance of the proposed Preferred Route.

The majority of the Preferred Route, 21.7 miles (or 75 percent of the route), crosses agricultural land. Adverse effects on farming are typically minor, with potential impacts to agricultural land uses from the construction of the proposed Project including damage to existing crops, disruption of plow patterns, and compaction of soils. These impacts are anticipated to be localized and restricted to the pole locations and construction access routes. Although there are numerous areas where the Preferred Route does not follow field edges, to the extent practical, the Preferred Route is located along field edges to minimize disruption of plowing patterns.

Impacts to agricultural land uses due to operation and maintenance are anticipated to be minimal. As agricultural land uses are generally compatible with transmission lines, only limited vegetation clearing may be necessary to keep the right-of-way ("ROW") free from incompatible species of vegetation. These types of maintenance activities have minimal, if any, impacts on agricultural land uses.

Three recreational land use areas are located within 1,000 feet of the Preferred Route. These areas include the North Coast Inland Trail, Wildlife Habitat Restoration Program land and the Green Hills Golf Course. The North Coast Inland Trail, located just west of the existing West Fremont Substation, is part of a 28 mile paved rail-to-trail path. This area is in an industrial/commercial land use area. The Wildlife Habitat Restoration Program land is located north of the Ohio Turnpike and west of County Road 198 and is owned by the Ohio Department of Natural Resources. The Green Hills Golf Course is located approximately 0.8 mile south of the proposed Hayes Substation, northwest of the

Mason Road West and Patten Tract Road intersection. Impacts to the Wildlife Habitat Restoration Program property are anticipated to be limited to vegetation clearly and aesthetic changes and are expected to be temporary and minimal.

One institutional land use area was identified within 1,000 feet of the Preferred Route. The church, Master's Hand Church of God, is located on the northeast corner of Portland Road and Magill Road. No adverse impacts to institutional land uses are anticipated due to the construction or operation and maintenance of the proposed Preferred Route.

Preferred Route Option B

Preferred Route Option B was identified and is included in this Application as an alternative to a small section of the Preferred Route that includes a crossing of Ohio Department of Natural Resource Wildlife Habitat Restoration Program property. This Ohio Department of Natural Resource property is located on the north side of the Ohio Turnpike and west of Township Line Road (County Road 189), and the proposed Preferred Route crosses the south side of the property immediately adjacent to the Ohio Turnpike. If the Ohio Department of Natural Resources determines that installing a transmission line on this property is not appropriate, then this small section of the Preferred Route is unlikely to receive necessary clearance to move forward with construction. Preferred Route Option B is being presented in this Application as an alternative to avoid crossing the Ohio Department of Natural Resource property, in the event the Ohio Department of Natural Resources declines to grant permission to construct the Preferred Route. The Preferred Route Option B is a 1.44 mile alternate segment between the Sandusky River and Township Line Road. The length of the entire Preferred Route, with Preferred Route Option B, is 28.93 miles.

Twenty residences are located within 1,000 feet of Preferred Route Option B as compared to 15 residences within 1,000 feet of the corresponding 1.45 mile segment of the Preferred Route, and no residences are located within 100 feet of either. An Ohio Department of Transportation salt storage facility is the only commercial/industrial area within 1,000 feet of Preferred Route Option B and the corresponding segment of the Preferred Route. The Ohio Department of Natural Resources Wildlife Habitat

Restoration Program property is the only recreational land use area located within 1,000 feet of Preferred Route Option B which is directly crossed by the Project. Impacts to land use associated with Preferred Route Option B will be mostly temporary during construction and limited to noise, additional local traffic, soil compaction, and minimal aesthetic changes.

Alternate Route

The Alternate Route is approximately 30.47 miles long. There are 319 residences located within 1,000 feet and one residential structure is located within 100 feet of the centerline of the route. Although residential density is relatively low over the majority of the Alternate Route, some of the denser residential areas along the Alternate Route are located along Port Clinton Road, State Route 510, Pickle Street, Bardshar Road, and Skadden Road. The closest structure to the Alternate Route is located along Port Clinton Road. Impacts to residential land use areas due to construction of the proposed Alternate Route are anticipated to be short-term. Impacts due to operating and maintaining the proposed Alternate Route are anticipated to include removal of vegetation that may grow within the ROW.

Four commercial/industrial land use areas are located within 1,000 feet of the Alternate Route. The West Fremont Substation and the nearby Fremont Energy Center, a 707 MW (fired) natural gas combined cycle facility owned by American Municipal Power, Inc. is located at the westernmost end of the proposed transmission line. Another commercial/industrial area is located on the west side of the proposed centerline where the Alternate Route parallels the Norfolk and Western Railroad, approximately four miles from the western end of the Alternate Route. This area is located within 100 feet of the proposed Alternate Route centerline and includes numerous commercial and industrial facilities, such as Wal-Mart, Graham Packing Company, Staples, Comfort Inn and Suites, and other facilities. A third commercial/industrial land use area is located east of North Karbler Road. This commercial/industrial area is also located within 1,000 feet of the Preferred Route and includes a landfill and a retention pond. Lastly, a mulch and compost facility is located approximately 0.3 mile southwest of the Pickle Street and State Route

101 intersection. No adverse impacts to commercial/industrial land uses are anticipated as a result of the construction or operation and maintenance of the proposed Alternate Route.

The majority of the Alternate Route, 22.41 miles (or 73 percent of the route), crosses agricultural land. Adverse effects on farming are typically minor, potential impacts to agricultural land uses from the construction of the proposed Project include damage to existing crops, disruption of plow patterns, and compaction of soils. These impacts are anticipated to be localized and restricted to the pole locations and construction access routes. Although there are numerous areas where the Alternate Route does not follow field edges, to the extent practical, the Alternate Route is located along field edges to minimize disruption of plowing patterns.

Impacts to agricultural land uses due to operation and maintenance are anticipated to be minimal. As agricultural land uses are generally compatible with transmission lines, only limited vegetation clearing may be necessary to keep the ROW free from incompatible species of vegetation. These types of maintenance activities have minimal, if any, impacts on agricultural land uses.

Two recreational areas are located within 1,000 feet of the Alternate Route. These areas include the North Coast Inland Trail and Sleepy Hollow Golf Course. The North Coast Inland Trail, located just west of the existing Fremont Substation, is part of a 28 mile paved rail-to-trail path. This area is in an already industrial/commercial land use area. Sleepy Hollow Golf Course is located near State Route 101 and Wales Corner Road, approximately 3.2 miles west of the proposed Groton Distribution Substation.

Based on comments received from the public, the proposed Alternate Route crosses an area of interest to the local community identified as Peninsular Farms. Many of the comments have objected to installing a transmission line on Peninsular Farms. Peninsular Farms is a privately owned area of approximately 470 acres located on the west side of the Sandusky River north of Fremont, Ohio. The proposed Alternate Route crosses the western and southern portions of Peninsular Farms in areas that are currently being used primarily as agricultural fields. Many of the public comments have described

Peninsular Farms as being located on the Whittaker Reserve and as the largest remaining acreage of the original 1,289 acres that comprised the first European settlement in Ohio. This area is also described as the final resting place of James and Elizabeth Whittaker, the original settlers of the property. In addition to a few farming structures, Peninsular Farms contains a couple of residences and associated structures, and unlike the substantial nearby development of the City of Fremont, has largely remained undeveloped. In addition to the farm land and structures, Peninsular Farms includes areas of diverse habitats of woods, meadows, wetlands, and riverside land. If the transmission line is constructed along the Alternate Route, limited impacts to the Peninsular Farms property are anticipated due to the construction, operation and maintenance of the Project.

One institutional land use area was identified within 1,000 feet of the Alternate Route. The Fremont Dialysis Center is located on State Route 53, just west of where the Alternate Route parallels the Norfolk and Western Railroad. No adverse impacts to institutional land uses are anticipated due to the construction or operation and maintenance of the proposed Alternate Route.

Throughout the Project, public roads will be utilized for construction access to the extent possible, and temporary access routes will be utilized for sections of the routes located between public roads. Permanent access routes are not planned, but may be considered outside of agricultural fields and residential areas if they provide a significant opportunity to minimize surface disturbance for initial construction and future operation and maintenance activities. The access routes along the Preferred and Alternate Routes will minimize impacts to agricultural fields, wetlands and streams to the extent practical.

(b) Economic Impacts: The proposed Project is necessary to ensure adequate and reliable electric service to area customers. It is anticipated that manufacturers and developers are more likely to invest in new manufacturing facilities or expand existing facilities in locations where adequate and reliable electric service is available. As Sandusky and Erie Counties have many positive factors, such as skilled labor, that encourage regional development, by ensuring adequate and reliable electric service to the area, the Project is anticipated to have a positive impact on regional development. The construction process of the Project is anticipated to have a small, but positive, impact on the local economy. A portion of the labor for the construction and materials of the facility is likely to be drawn from local sources.

(c) ***Ecological Impacts:*** An ecological study of the Preferred and Alternate Routes of the proposed Project was performed. The study included analysis of published literature and maps to assess the presence of endangered plant and animal species, streams, and wetlands. The entire length of the Preferred and Alternate Routes were field surveyed for vegetation, endangered plants and animals, streams, and wetlands. The results of this survey are discussed in detail in Section 7 of this Application. Delineated wetlands and stream locations are shown on Figures 7-2 through 7-3.

Information regarding endemic vegetation and wildlife was obtained from the Ohio Department of Natural Resources-Division of Wildlife (ODNR-DOW) Ohio Biodiversity Database. Records obtained from ODNR-DOW in November 2013 included a study area 1-mile beyond the current Preferred and Alternate Routes to ensure completeness. At the time of the correspondence, species located within 1,000 feet of the study area include Rayed Bean (*Villosa fabalis*), Indiana bat (*Myotis sodalist*), Northern long-eared bat (*Myotis septentrionalis*), Red Knot (*Calidris canutus rufa*), Kirtland's warbler (*Setophaga kirtlandii*), Piping plover (Charadrius melodus), Lakeside daisy (*Tetraneuris herbacea*), Easter massasauga (*Sistrurus catenatus*), Eastern prairie fringed orchid (*Platanthera leucophaea*), Eastern foxsnake (*Pantherophis gloydi*), Bushy horseweed (*Conyza ramosissima*), Greater redhorse (*Moxostoma valenciennesi*), Blanding's turtle (*Emydoidea blandingii*), and Bald eagle (*Haliaeetus leucocephalus*). Details regarding each species can be found in Section 7.

Construction impacts to streams and wetlands along the Preferred and Alternate Routes of the proposed Project will be minimal, as the transmission line will span most of these sensitive areas. Construction access routes will be selected to minimize impacts to wetlands and streams to the extent practical. Temporary access routes to any portion of the Project will be installed outside of wetland and ecologically sensitive areas. Applicant does not expect at this time to have to install any structures in any wetlands or ecologically sensitive areas. Storm water best management practices will be employed where necessary to mitigate potential erosion and degradation during construction.

(c) ***Cultural Impacts:*** An assessment for cultural resources was conducted for the Preferred and Alternate Routes of the proposed Project. Data was collected from the Ohio Historic Preservation Office's (OHPO) online mapping system in an effort to locate inventoried cultural resources. The data gathered during this analysis included National Register of Historic Places (NRHP), historic districts, previously recorded archaeology sites, historic structures, and previously surveyed archaeological areas.

Preferred Route

No historic structures were identified within 1,000 feet of the Preferred Route or Preferred Route Option B. No previously recorded archaeology sites were identified within 100 feet of the Preferred Route or Preferred Route Option B. No NRHP or historic districts were identified within 1,000 feet of the Preferred Route or Preferred Route Option B.

Alternate Route

No historic structures were identified within 1,000 feet of the Alternate Route of the proposed Project. Two previously recorded archaeology sites were identified within 100 feet of the Alternate Route of the proposed Project. No NRHP or historic districts were identified within 1,000 feet of the Alternate Route of the proposed Project.

Based on the literature review conducted for the Project, adverse impacts to previously identified cultural resources are not expected. ATSI will further coordinate with OHPO on the potential requirement for further Phase 1 studies. Peninsular Farms is locally known as a historically important property and some comments received from the public indicate a concern that the construction of the proposed Project along the Alternate Route might have an adverse effect on the aesthetics of the property. Although the proposed Alternate Route crosses Peninsular Farms, it minimize these potential impacts to the extent possible.

(d) Other Environmental Impacts: No other potential environmental impacts beyond those discussed above are expected as a result of this Project.

(5) Project Schedule Summary

Construction of the proposed Project is proposed to begin in May 2017 and expected to be completed and placed in service to meet the expected load requirements in September 2018. ATSI would likely proceed with construction and place the facility in service earlier if all permitting, detailed engineering, and right-of-way acquisition are completed prior to May 2017.

(B) INFORMATION FILED IN RESPONSE TO REQUIREMENTS

The information filed in response to the requirements of Administrative Code Rule 4906-15-01 as found in this Section of the Application is in addition to information contained in other sections of the Application.

Ohio Power Siting Board Process

The Board has jurisdiction over major transmission line installations located wholly within the state of Ohio. As such, ATSI is required to file this Application with the Board for a Certificate. This Application contains specific project details regarding environmental, socioeconomic, technical, ecological, justification of need, and financial matters.

The Board process is initiated with pre-application public information meetings to be held by the Applicant within the general project area. These meetings are intended to provide general project information to the local residents and to detail upcoming Board activities. Three meetings were held October 17th and 18th, 2012 and May 15, 2013 for this Project. Following the public information meetings, this Application was filed with the Board. The Board has 60 days to either certify the Application as complete, or identify why the Application is not complete, notifying the Applicant by mail of the specific grounds. If the Application is found to be complete, the Board will order the Applicant to serve a copy of the complete Application on the chief executive officer of each municipal corporation and county, and the head of each public agency charged with the duty of protecting the environment or of planning land use in the area in which any portion of the project is to be located.

After complete applications have been served in the general project area, the Board schedules public hearings. The Applicant is required to provide two separate public notices of the project and upcoming hearings in newspapers of general circulation within the project area. The first public notice is to be published within 7 days of the complete Application service date, and the second public notice is to be published at least seven but not more than 21 days prior to the public hearing. In addition, the Applicant is required to send a letter describing the facility to each property owner within the planned site or ROW of the proposed facility and to each property owner who may be approached by the applicant for any additional easement necessary for the construction, operation, or maintenance of the facility. The Board Staff is to conduct an investigation of the complete application and submit a written report not less than fifteen days prior to the beginning of public hearings.

One session of the Public Hearings for the project is usually held at a location within the general project area, with the other session(s), which is evidentiary in nature, held at the principal office of the Board. An Administrative Law Judge appointed by the Chairman of the Board presides over all hearings. The Administrative Law Judge will regulate the proceedings and provide members of the public opportunity during a portion of the hearing to offer testimony. Within a reasonable time after conclusion of the hearings, the Board shall issue a final decision based on the record of the proceedings.

(C) PREPARATION OF HARD COPY MAPS

Digital, geographically-referenced data used in the preparation of maps for this Application will be provided under separate cover to the Board concurrent with submission of this Application.

4906-15-02 NEED FOR THE PROPOSED PROJECT

(A) SECTION SUMMARY

This section of the Application provides an explanation of:

- Why it is necessary to construct the proposed Hayes-West Fremont 138 kV Transmission Line (or "Project");
- Why installation of the Groton Substation is associated with the Project and necessary;
- How the Project fits into the Applicants' recent long-term forecast and regional plans for the electric system;
- How the Project serves the interest of the system economy and reliability; provides a schedule of the Project; and
- Why it is appropriate to construct the proposed Project with provisions to install a future 138 kV transmission line on the same structures.

Installation of the proposed Hayes-West Fremont 138 kV Transmission Line described in this Application, and the associated line configurations to establish the substation line exits to and from the new Groton Substation are needed to reinforce ATSI's Bulk Electric System ("BES") in the Project Study Area in order to provide safe and reliable electric service. When both the Project and the Groton Substation are in service, the transmission line circuits will designated as the Groton-Hayes 138 kV Transmission Line and the Groton-West Fremont 138 kV Transmission Line, but are described in this Application as the Hayes-West Fremont 138 kV Transmission Line.

ATSI's 345 kV and 138 kV transmission systems in the northern Ohio region between Toledo and Cleveland (the "Project Area Transmission System" and "Project Study Area," respectively), which are part of ATSI's BES, currently face significant operating limitations, including capacity shortage, thermal ratings constraints[1], and potential low voltages on the electric transmission system. These operating limitations were

[1] Exceeding thermal ratings results in wires overheating to the point that the electric system is damaged.

exacerbated by the retirement of, and planned future retirement of additional, coal-fired generation around Lake Erie, which started in 2012 and is expected to continue through 2015. This Project, in conjunction with others identified and directed by PJM Interconnection, Inc. ("PJM"), the Regional Transmission Organization ("RTO"), is designed to correct these operating limitations and ensure reliable energy delivery in the Project Study Area.

The Project Area Transmission System has been evaluated using the PJM 2013 and 2015 Load Forecasts from the forecast report dated January 26, 2012. These evaluations are discussed in detail later in this Section. The evaluations demonstrate that the Project Area Transmission System will experience potential circuit thermal overloads under various planning scenarios when all the generation units that have been scheduled for deactivation are deactivated. This Project addresses certain of these operating limitations and other projects address many of the other BES operation limitations that result from the generation deactivations.

In particular, this Project addresses severe thermal overloads on two transmission line segments following contingency events on the BES. Under BES contingency events, the Lakeview-Ottawa 138 kV and the Greenfield-Lakeview 138 kV transmission lines that connect ATSI's Ottawa, Lakeview, and Greenfield Substations in the Toledo Edison and Ohio Edison service areas, may experience severe thermal overloads following contingency events. Without the Project, these conditions would lead to forced load shed by the PJM via a Post-Contingency Local Load Relief Warning (PCLLRW) directive, in order to restore the remaining transmission system loading to within acceptable levels and prevent equipment damage. The outage combination of greatest concern is a North American Electric Reliability Corporation ("NERC") Category C5 common-tower outage, which involves losing both circuits sharing a 345 kV tower line: the event of concern is a double-circuit tower line outage of the Beaver-Davis Besse and the Davis Besse-Hayes 345 kV transmission lines. This contingency results in an extreme thermal overload of the Lakeview-Ottawa 138 kV Transmission Line and the Greenfield-Lakeview 138 kV Transmission Line. Under this contingency, to reduce the transmission line loading to below acceptable values, customer loads would have to be dropped in northern Ohio between Port Clinton, Sandusky, and Lorain. These results will be discussed in more detail later in this Section under "Load Flow Studies".

Installation of the Hayes-West Fremont 138 kV Transmission Line Project and the Groton Substation will provide ATSI with the ability to reliably serve existing electrical loads, as well as facilitate future economic expansion in the region. The Project installs a new 138 kV transmission line path between West Fremont and Hayes Substations providing a west-to-east path for power flows which generally are parallel to power flows on the Lakeview-Ottawa 138 kV Transmission Line and the Greenfield-Lakeview 138 kV Transmission Line. The new parallel path will reduce loading of the Lakeview-Ottawa 138 kV and the Greenfield-Lakeview 138 kV transmission lines to acceptable levels during modeled contingency events and removes the risk of having to shed customer loads during certain BES contingencies.

When compared to other alternatives, the proposed Project is the best option to resolve capacity limitations, thermal overloads and low voltage violations. In addition, overall transmission system efficiency is improved because the Project reduces power losses on the high-voltage transmission system by providing a more direct route for bulk power flows across the system.

Based on current BES conditions, current PJM forecasting modeling, and the schedule of planned generation retirement, the Project was needed by June 1, 2013 to meet all applicable planning criteria for contingency conditions. However, due to the length of the Project development process, including siting, right-of-way acquisition, engineering, permitting and construction activities, it is estimated that a realistic projected in-service date for planning purposes is June 1, 2018. To the extent practical, the Project will be implemented to achieve an earlier in-service date. In the interim period before the Project can be completed, the FE System Control Center will use operating procedures, in conjunction with PJM, to prevent the 138 kV transmission line overloads. However, this procedure involves sectionalizing the 138 kV networked system, which adds additional risk to the system if contingency conditions occur, and is unacceptable as a long-term operating condition for the BES.

Construction of this Project will provide a new, high-voltage transmission pathway for the Project Area and thereby correct for the existing circuit loading limitations in the area. PJM has considered this Project as part of its continuing review of the transmission system within the ATSI footprint and has assigned the project Baseline RTEP #b1959. The Project was identified as a baseline RTEP project in the Transmission Expansion Advisory Committee ("TEAC") Recommendations to the PJM Board as summarized in the PJM Staff Whitepaper, dated May 2012, which can be found on the PJM website at http://www.pjm.com/committees-and-groups/committees/teac.aspx, (attachment X). The whitepaper contains additional information regarding the drivers and need for this Project and other projects within the ATSI footprint, as directed by PJM. Moreover, the additional capacity provided to the Project Area from this project when considered in conjunction with the other PJM identified projects, will support forecasted load growth and interconnection of potential new loads.

The Project is also needed to support the installation of the proposed Oregon Clean Energy Center. Oregon Clean Energy, LLC submitted an application to the Board on January 17, 2013 in Docket Number 12-2959-EL-BGN proposing to construct the Oregon Clean Energy Center, a new natural gas-fired combined-cycle generating facility located in Lucas County, Ohio. The Oregon Clean Energy Center is planned to be a 799 MW energy facility and will utilize advanced gas turbine/steam turbine, combined-cycle technology to generate electricity. The proposed location for the facility is located within Lucas County, Ohio on North Lallendorf Road in the city of Oregon. The Board approved the Oregon Clean Energy Center project on May 1, 2013.

(A)(1) PURPOSE OF THE FACILITY

ATSI's 345 kV and 138 kV transmission system in the northern Ohio between the Toledo and Cleveland metro regions (the "Project Area Transmission System"), is part of the regional transmission grid and – through various substations – provides electric supply to customers within the Toledo Edison, Ohio Edison, and the Cleveland Electric Illuminating Company ("CEI") service territories, and to various Municipal & Rural Electric Cooperative ("REC") entities located therein. In the area of the Project, the existing Project Area Transmission System serves customers in the Ohio counties of Ottawa, Sandusky, Erie and Lorain, and provides system transfers on the ATSI transmission system between the Toledo Edison, Ohio Edison, and CEI territories. This area of the FirstEnergy service territory is referenced in this Application as the Project Study Area.

Starting in 2012, numerous generation units in and near the ATSI service area were scheduled for retirement. The retirement of the generation units supplying the Project Area Transmission System required the evaluation of the operation of transmission system after the retirement of this generation by ATSI and PJM. Based on this analysis, the transmission system is constrained by thermal limitations on the transmission lines after the retirement of certain generation facilities along Lake Erie. For example, the reduced real power output (Watts) of FirstEnergy's Eastlake, Lakeshore, and Ashtabula power plants in north-east Ohio results in increased power flow on the 345 kV and 138 kV network between the Toledo, Sandusky, and Cleveland regions, and for certain 345 kV contingencies, the 138 kV network becomes greatly overloaded. Specifically, a double-circuit tower line outage of the Beaver-Davis Besse and the Davis Besse-Hayes 345 kV Transmission Lines results in an extreme thermal overload of both the Lakeview-Ottawa 138 kV and Greenfield-Lakeview 138 kV Transmission Lines. New transmission infrastructure is needed to keep electrical circuit loading within prescribed limits and avoid the need for load shedding during contingency operation.

Under its normal operating configuration, the Project Area Transmission System supplies distribution and retail transmission customer substations. The substations in Toledo Edison, Ohio Edison and CEI serve more than two million customers in Ohio, including a large number of industrial customers with heavy electrical needs for their manufacturing equipment. The Project Area Transmission System, when it was originally installed, was developed to meet area needs as they existed at that time (primarily residential and some industrial customers) and relied heavily on generating units located in close proximity to the load center (e.g., the former Edgewater power plant in Lorain Ohio, among others). The 345 kV and 138 kV Project Area Transmission System was expanded over time to both accommodate growth in the Project Area, and to better integrate the Applicant's electric system into the larger interconnected transmission grid system. However, the Project Area Transmission System relies on generating units located inside and outside the load center to both meet local electrical demand and provide voltage stability through dynamic reactive power response. The amount of dynamic reactive power available in any area is defined as the difference between the actual reactive output of dynamic reactive devices (i.e. generating units, Synchronous Condensers, Static Var Compensators ("SVC"), etc.) and the maximum capability of the dynamic reactive devices, which is commonly referred to as dynamic reactive reserve. When dynamic reactive reserve is exhausted, the Project Area Transmission Systems becomes at risk for low voltage and voltage collapse. These retirements increase the power flowing from the west to the east through the Project Area Transmission System, and there is less dynamic voltage support to the Project Area.

The retirement of generating units means that the Project Area Transmission System must import more power from outside the local load center, and rely on various reactive devices and transformation from higher voltage systems (e.g., 345 kV to 138 kV) to maintain a level of acceptable voltage stability. Much of the power being imported into the Project Area Transmission System moves over the ATSI transmission system which ultimately connects to neighboring utilities. These transmission facilities have import capacity limitations, and attempting to import power in excess of the capacity limits will result in thermal overloads on these transmission facilities as well as certain facilities within the Project Study Area being served. Additionally, with increased loading on the transmission lines that move power into the Project Study Area, there are increased power losses due to the inherent resistance and heating of the electric conductors. These power losses also contribute to a reduction in dynamic reactive reserves in the Project Study Area, as reactive power is consumed by the transmission system. Conversely, the installation of the Project will result in less power loss because of impedance.

The Hayes-West Fremont 138 kV Transmission Line and Groton 138-69 kV Substation are needed to support increases in electric load in the Project Study Area and maintain satisfactory thermal loading of the existing transmission lines. Additionally, there are other projects identified by PJM and FirstEnergy in the northern Ohio region that are needed to ensure compliance with NERC reliability standards for the 345 kV and 138 kV transmission systems, PJM planning criteria[2], and the FirstEnergy transmission planning criteria. Ultimately, all of the identified projects are needed to ensure continued provision of safe and reliable electric service in the Project Study Area.

The proposed Hayes-West Fremont 138 kV Transmission Line Project adds a new 138 kV pathway for energy flows within the Project Study Area and the associated Gorton Substation will add a new 139-69 kV transformation source. The Project installs a new 138 kV Transmission Line from the Hayes Substation to the new Groton Substation, and then from the new Groton Substation to the West Fremont Substation; overall, the Project will consist of approximately 28 miles of 138 kV transmission line construction. The Groton Substation will provide a new 138 kV to 69 kV source that will strengthen electrical service in the area between Sandusky and Bellevue and provide capacity for additional load growth. Installation of the Groton Substation also reduces the loading on the heavily loaded Ottawa-Lakeview-Greenfield 138 kV transmission line. Overall, the Project will provide the following benefits to the Project Area Transmission System:

[2] PJM's planning criteria utilizes the most stringent of the applicable NERC, PJM or local (transmission owner) criteria. PJM Manual 14-B at page 20.

1. Addresses severe thermal overloads on the Lakeview-Ottawa 138 kV and the Greenfield-Lakeview 138 kV transmission lines under BES contingency events.

2. Decrease flows on existing infrastructure, which relieves thermal overload violations. PJM has identified numerous contingencies that cause extreme overloads on the existing 138 kV infrastructure (Lakeview-Ottawa and Greenfield-Lakeview 138 kV transmission line pathway). The Project will remove the risk of forced load shed during high system loading periods.

3. Improve reliability of the Project Area Transmission System under contingency conditions by adding voltage support from the 138 kV to the 69 kV system. The area around Bellevue, Ohio is vulnerable to low voltages for certain system contingencies which the new Groton Substation north of Bellevue will reduce by providing a strong 69 kV source to mitigate the low voltage risk.

4. Reduce reactive power losses on transmission lines moving power into the Project Study Area, and in turn improve system voltages. The new Hayes-West Fremont 138 kV Transmission Line will reduce the load on the Lakeview-Ottawa and Greenfield-Lakeview 138 kV transmission line pathway, which experiences heavy loading during the summer. This will reduce real and reactive power losses on the existing transmission lines, and provide a more efficient pathway for system power flows. The new 138 kV transmission line will provide a direct link from the large amount of generation at the West Fremont Substation (Fremont Energy Center) to the major transmission substation at Hayes. The existing system topology consists of a long 138 kV route between West Fremont, Ottawa, Lakeview, Greenfield, and Hayes Substations, which results in higher line losses. A direct 138 kV path between the West Fremont and Hayes Substations will permit a more efficient bulk transfer of energy, which will result in less power loss.

5. Strengthen the Project Area Transmission System to allow for integration of new generation into the BES and to support future growth in load demand in the Project Study Area. Of immediate and critical need is the ability to integrate the Oregon Clean Energy

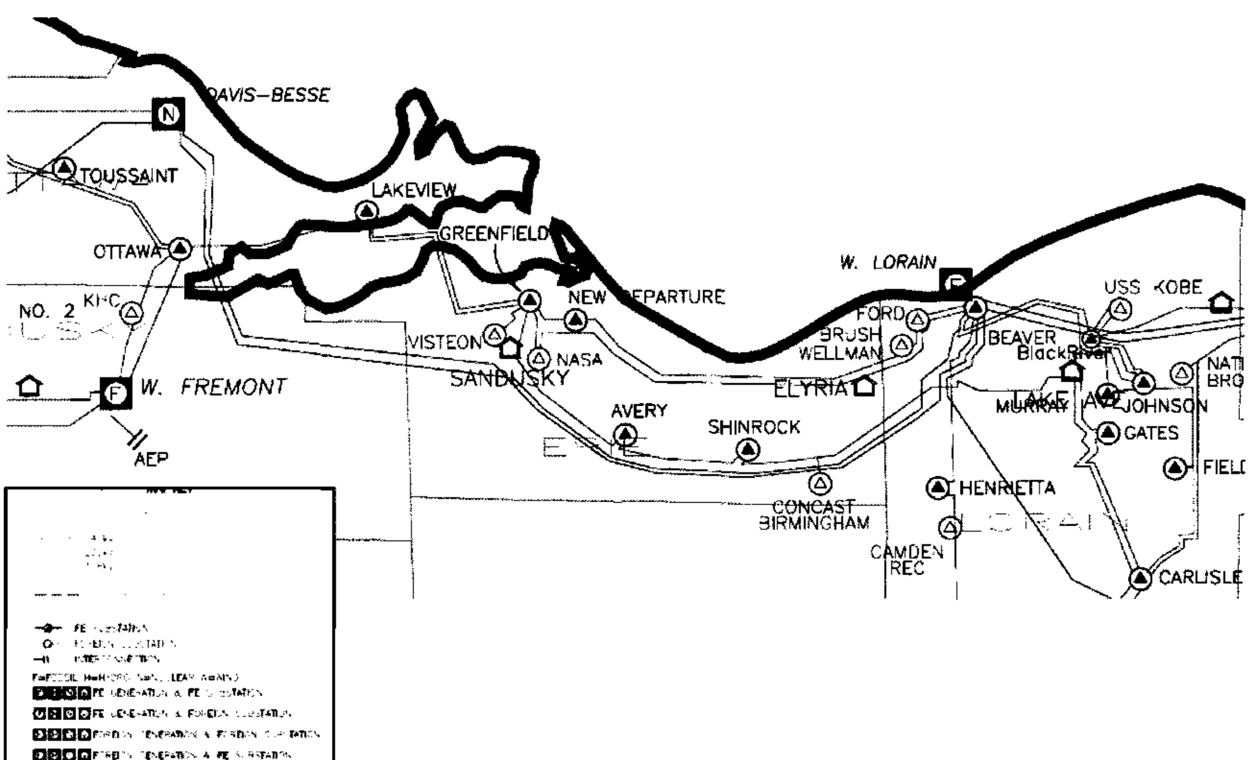
Center into the BES which will provide additional system reinforcement and needed system capacity.

PROJECT STUDY AREA

This Section describes the electrical facilities and equipment that comprise ATSI's transmission system in the Project Study Area and the existing violations of contingency planning and power flow criteria in the Project Study Area. Finally this section describes the expected conditions on the Project Area Transmission System after the Project is placed in-service.

The Project Area Transmission System, in the Northern Ohio area between the Toledo and Cleveland metro regions, is a part of the transmission grid and - through various substations - provides electric supply to parts of the Toledo Edison, Ohio Edison, and CEI's service territories. The area served by the Project Area Transmission System is referenced here as the Project Study Area as shown in **Figure 2-1**.

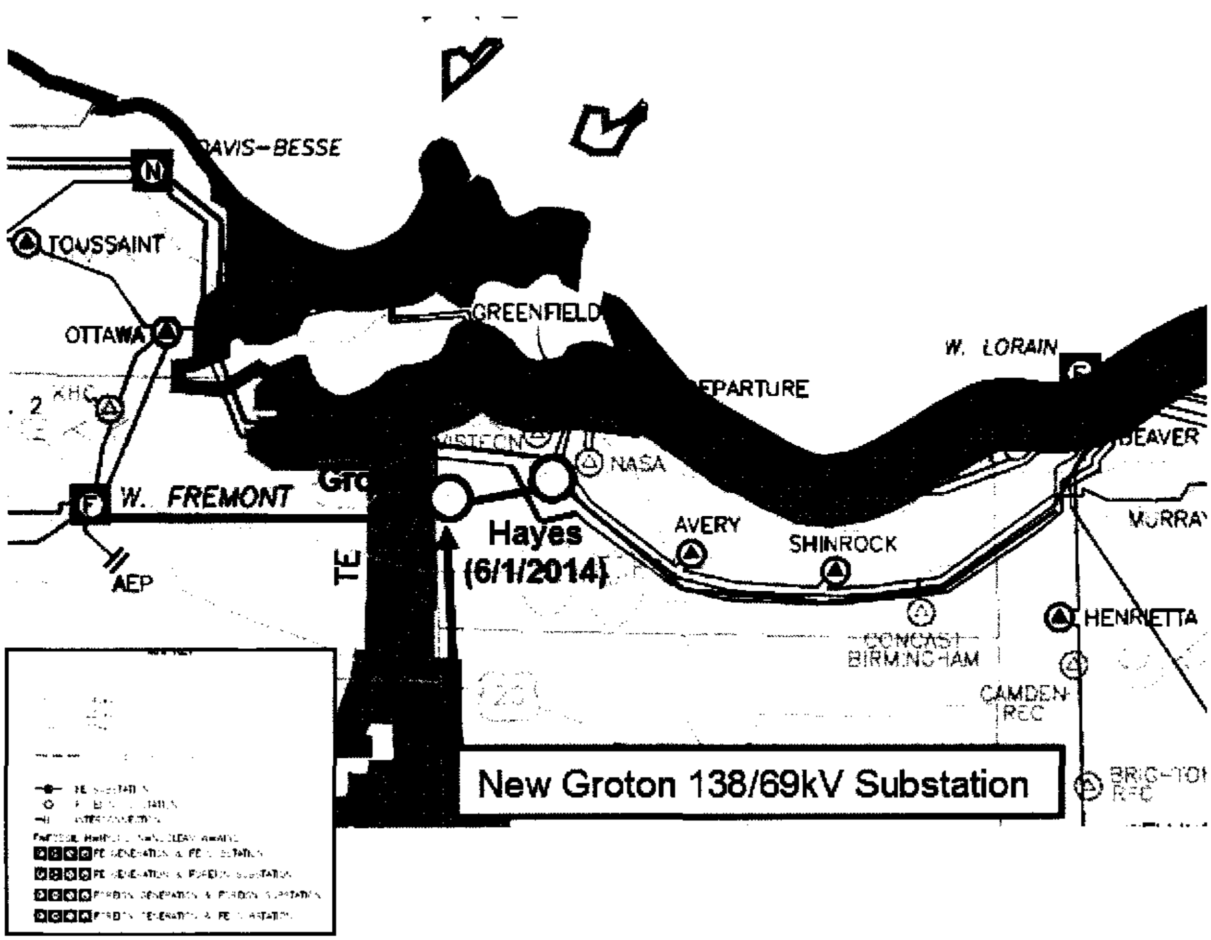
Figure 2-1: Project Area Transmission System Overview (*system as of June 2013*)



The Project will connect the existing West Fremont Substation to the new Groton Substation and the Hayes Substation, as shown in **Figure 2-2**. The Hayes 345-138 kV substation is under construction and has a planned in-service date of June 2014. (Installation of the Hayes Substation was approved by the Board in Docket Number 11-711-EL-BSB). The 138 kV route for the Project is approximately 28 miles in length, stretching from the northwest side of the city of Fremont to a rural area south of Sandusky (Perkins Township). The local system being reinforced by the Project serves the communities of Port Clinton, Sandusky, Bellevue, and Norwalk, among others.

Figure 2-2: Project Overview

The West Fremont – Hayes 138 kV Transmission Line and Groton Substation



There will be, in June 2014, two 345 kV pathways passing through the Project Study Area: Davis Besse-Beaver 345 kV, and Davis Besse-Hayes-Beaver 345 kV pathways. (The second pathway involves installation of the Hayes Substation, as well as the ongoing installation of the Beaver to Brownhelm Junction 345 kV Transmission Line Project approved by the Board in Docket Number 11-4248-EL-BTX, the Davis Besse-Hayes 345 kV Transmission Line Construction Project approved by the Board in Docket Number 12-2666-EL-BLN, and the Beaver-Davis Besse #2 345 kV Transmission Line Extension to Hayes Substation approved by the Board in Docket Number 12-3158-EL-BLN.) The route between Davis Besse and Beaver substations is approximately 60 miles in length. The Davis Besse-Beaver 345 kV, and Davis Besse-Hayes-Beaver 345 kV circuits are supported on the same structures (i.e. existing steel lattice towers and steel poles) which is typically described as the lines share a common tower line. In addition, there are various 138 kV transmission lines in the Project Study Area connecting Ottawa to Lakeview to Greenfield Substations, and other transmission lines continuing on out of the Greenfield Substation. The single 138 kV pathway between Ottawa-Lakeview-Greenfield Substations becomes overloaded during an outage of the Davis Besse-Beaver 345 kV and Davis Besse-Hayes-Beaver 345 kV circuits. Both 345 kV transmission lines could experience an outage either by a common tower failure (N-2 event); or when taking one of the 345 kV transmission lines out for routine maintenance and then a fault occurring on the other 345 kV transmission line (an N-1-1 event).

The existing 345 kV transmission lines in the Project Study Area are:

- Davis Besse-Hayes 345 kV Transmission Line(ISD 2014)
- Hayes-Beaver 345 kV Transmission Line (ISD 2014)
- Beaver-Davis Besse 345 kV Transmission Line

The existing 138 kV transmission lines in the Project Study Area are:

- West Fremont-Ottawa #1 & #2 138 kV Transmission Lines
- Ottawa-Lakeview 138 kV Transmission Line
- Lakeview-Greenfield 138 kV Transmission Line
- Avery-Hayes 138 kV (ISD 2014) Transmission Line

- Greenfield-Hayes #1 & #2 138 kV (ISD 2014) Transmission Lines
- Beaver-New Departure-Greenfield 138 kV Transmission Line
- Beaver-NASA-Greenfield 138 kV Transmission Line
- Avery-Shinrock 138 kV Transmission Line
- Johnson-Shinrock 138 kV Transmission Line

138 to 69 kV transformation is provided at:

- West Fremont Substation
- Greenfield Substation
- Avery Substation
- Shinrock Substation

There is a fairly extensive 69 kV sub-transmission network between the areas of Fremont, Bellevue, and Norwalk. The Bellevue area and associated substation loads are distant from the 138-69 kV source substations, necessitating the need for the proposed Groton 138-69 kV Substation north of Bellevue (Groton Township). A new source at Groton would offload the 138-69 kV transformation at the Greenfield Substation, which in turn reduces the Lakeview-Greenfield 138 kV Transmission Line loading.

(A)(2) SYSTEM CONDITIONS

A. CHANGES IN THE ATSI SYSTEM

FirstEnergy Generation and neighboring generation owners have submitted plans to PJM to retire generation units in the ATSI footprint, and specifically along Lake Erie at the Bayshore, Lakeshore, Eastlake, and Ashtabula generation facilities. This affects transmission system performance in the Toledo Edison, Ohio Edison, and CEI service territories. The PJM - FirstEnergy Deactivation Report containing the entire list of deactivations can be found at http://pjm.com/planning/generation-retirements/~/media/planning/gen-retire/20120425-fe-jan-2012-generator-deactivation-request-study-results-required-upgrades.ashx (attachment X).

The retirement of the generating units has created identified reliability issues for the Project Study Area that will materialize over the next several years as the generation units are retired. The reduced real power output in north-east Ohio will require higher west-to-east system transfer on ATSI's 345 kV and 138 kV facilities to meet the supply needs in the Project Study Area. Under certain critical contingencies, once the generation units are retired, the 138 kV transmission lines may become overloaded which will significantly impact system reliability in the Project Study Area.

Continued load growth will exacerbate capacity, voltage and thermal limitations in the ATSI footprint, including the Project Study Area. Per the PJM 50/50 forecast, over a 10 year period, overall electric load growth is expected to increase by one percent (1%) per year[3]. Load growth in the ATSI footprint, including the Project Study Area, per the PJM forecast, is projected to be approximately one and one half percent (1.5%) per year over the next 3 years, under current economic conditions. This expected load growth is already starting to materialize in the Lorain Ohio area in particular with several recent announcements of high-profile load additions at steel-making facilities. The Project is needed to ensure that not only will the Project Area Transmission System remain capable of delivering reliable service to existing load, but that the Project Area Transmission System will be capable of supporting expect growth in Project Study Area load.

Load served in the Project Study Area is closely tied to the observed voltages and transmission line loading on the Project Area Transmission System. The relationship between load and voltage is analyzed using planning tools which simulates the response of system voltage to increases in system load under contingency conditions. Typically, voltage levels at monitored locations will decrease as system load is increased. Increases in load being served and subsequent increases in reactive power losses on transmission lines moving power into the Project Study Area results in depletion of dynamic reactive reserves. The decrease in voltage due to increases in load and losses is gradual until dynamic reactive reserves are exhausted, at which point voltage decay accelerates and eventually collapses. Planning analysis performed on the Project Study Area establish

[3] http://www.pjm.com/planning/resource-adequacy-planning/load-forecast-dev-process.aspx

that low voltages and thermal overloads on the 138 kV transmission system under contingency conditions are expected at PJM forecasted 2013 peak load levels, if no transmission system reinforcements are implemented. The portfolio of reinforcement projects identified and directed by PJM in the TEAC Recommendations to the PJM Board, PJM Staff Whitepaper (attachment X), which includes this Project, ensure system voltage stability for forecasted system load levels.

B. SYSTEM CONDITIONS IN THE PROJECT AREA

ATSI's bulk transmission system in the Project Study Area consists of two west-to-east 345 kV transmission lines and a group of underlying 138 kV transmission lines. The lines that comprise the 345 kV and 138 kV Project Area Transmission System are the "backbone" for electric delivery to and through the Project Study Area. These transmission lines permit electricity to flow to the loads in the local project area, as well as permit bulk power transfers across Ohio. Under normal operating conditions prior to the announced generation retirements, these 345 kV and 138 kV transmission lines, as well as the generation units situated outside the area, were the source of power for the Project Study Area. With the retirement of the generation units around Lake Erie, there is less capability to provide voltage support and dynamic stability to the Project Study Area. It is now necessary to build this Project to relieve thermal overloads and provide voltage support.

C. SYSTEM LOAD CONDITIONS IN THE PROJECT AREA

The proposed Project will add a new 138 kV transmission line and a 138 kV to 69 kV substation to relieve thermal overload conditions under certain system contingency situations and strengthen the sub transmission system that provides service to residential, commercial, and industrial loads. In general, the new West Fremont-Hayes 138 kV Transmission Line and Groton Substation will provide thermal relief to the thermally overloaded Ottawa-Lakeview 138 kV Transmission Line and the Lakeview-Greenfield 138 kV Transmission Line in the event of the loss of the Davis Besse-Hayes 345 kV and Davis Besse-Beaver 345 kV Transmission Lines. There is a significant amount of load in the Project Study Area, including the cities of Sandusky, Bellevue, and Norwalk, plus various energy-intensive industrial customers in the area such as automotive suppliers (Visteon, KBI Bearings) and theme parks (Cedar Point, Kalahari) that cannot be adequately served in the event of this contingency without the addition of the Project.

2. PLANNING PROCESS

The following explanation of various contingency planning criteria is provided as context for the discussion of contingency planning criteria violations that will occur in the Project Study Area without the addition of the Project.

The transmission system, or Bulk Electric System ("BES"), is defined as all lines operated at voltages of 100 kV or higher, plus transformers with high-side and low-side winding voltages both greater than 100 kV. The ATSI transmission system must meet all applicable NERC, PJM, and FirstEnergy transmission planning criteria that apply to the BES. PJM is the registered Transmission Planner ("TP") for the ATSI system, and utilized the PJM Planning process to test for, and meet, all applicable BES criteria.

A. PJM PLANNING PROCESS

PJM's Regional Transmission Expansion Plan ("RTEP") identifies transmission system upgrades and enhancements that are needed for the operational, economic and reliability requirements of PJM customers. PJM's region-wide RTEP approach integrates transmission with generation and load response projects to meet load-serving obligations. PJM currently applies planning and reliability criteria to identify transmission constraints and other reliability concerns. Transmission upgrades to mitigate identified reliability criteria violations are then examined for their feasibility, impact and costs, culminating in one plan for the entire PJM footprint.

The requirements and procedures for the RTEP process are set forth in Schedule 6 of the PJM Operating Agreement. In accordance with those requirements, PJM prepares a plan for the enhancement and expansion of transmission facilities in the PJM region.

Additionally, the PJM manuals describe the details of the RTEP process. In particular, PJM Manuals address PJM's regional planning process. PJM's RTEP Process preserves the reliability of PJM's interstate transmission system to ensure that power continues to flow reliably to customers and to ensure robust, competitive power markets.

(1) PJM RELIABILITY ASSESSMENT IN THE RTEP PROCESS

The following overview is based on publicly available information, including information from PJM and PJM documents and data. To the extent that there is a difference between this overview and the processes and procedures described the PJM Tariff or other PJM documents and data, then the PJM Tariff or other PJM documents or data control.

The PJM Reliability Assessment Process consists of several tests to ensure all generation capacity is deliverable to load in PJM without violating any system thermal or voltage limits. If violations are found, mitigation projects are put in place to resolve the issue(s). Limits used in the analysis are consistent with the requirements of NERC standards FAC-010 and FAC-014. The methodology used to determine system operating limits is included in PJM Manual M-14B.

PJM conducts this detailed review annually for the near-term, which consists of a detailed reliability analysis review of the current year plus 5 years out. The study years prior to the 5-years out reliability assessment are considered the "in-close" years and have already had analyses conducted in previous years' study cycles. In addition, for each of these "in-close" years, PJM updates and issues addenda to address changes as necessary throughout the year. For example, planned generation modifications or changes in transmission topology can trigger restudy and the issuance of a baseline addendum. This is referred to as a "retool study" (e.g., generators which drop from the interconnection queue cause restudy and an addendum to be issued for affected baseline analyses).

Each year, the establishment of the assumptions for the new annual baseline analysis, updated assumptions of load, transmission topology and installed generation are assessed for the "in-close" range of years to validate the continued applicability of each of the "in-close" baseline analyses and resulting upgrades (including any addenda). Adjustments to the "in-close" analyses are performed as deemed necessary by PJM. Consequently, PJM annually verifies the continued need for, and prior modification of, previously recommended upgrades through its retool studies, reassessment of current conditions and any needed adjustments to analyses. All criteria thermal and voltage violations resulting from the near term analyses are identified using power flow analysis.

(2) PJM RELIABILITY ASSESSMENT REVIEW STEPS

The seven steps in an annual near-term reliability assessment review are as follows:

Develop a Reference System Power Flow Case

I. **Baseline Thermal**
II. **Baseline Voltage**
III. **Load Deliverability - Thermal**
IV. **Load Deliverability - Voltage**
V. **Generation Deliverability - Thermal**
VI. **Baseline Stability Analysis**

These reliability assessment related steps are followed by an analysis of various scenarios that ensures the robustness of the plan by looking at impacts of variations in key parameters selected by PJM. Each of these steps in the PJM Regional Transmission Expansion Planning ("RTEP") process, including the reliability assessment, are described in more detail in PJM Manual M-14B Generation and Transmission Interconnection Planning (http://www.pjm.com/planning/rtep-development/expansion-plan-process.aspx

Developing the Reference System Power Flow Case

The reference power flow case and the analysis techniques comprise the full set of analytic assumptions and parameters for reliability analysis. Each case is developed from the most recent set of Eastern Reliability Assessment Group ("ERAG") system models. PJM revises this model as needed to incorporate all of the current system parameters and assumptions, including current loads, installed generating capacity, transmission and generation maintenance, system topology, and firm transmission transactions.

The results of capacity market auction(s) are used to help determine the amount and location of generation or demand side resources to be included in the reliability modeling.

Generation or demand side resources that are cleared in the capacity market auction are included in the reliability modeling. Generation or demand side resources that either do not bid or do not clear in any capacity market auction are not included in the reliability modeling. All such modeling comports with the capacity construct provisions approved by the FERC.

Subsequent to sub regional stakeholder modeling reviews facilitated by PJM, PJM develops the final set of reliability assumptions presented to the PJM Transmission Expansion Advisory Committee ("TEAC") for review and comment, after which PJM finalizes the reliability review reference power flow case.

Baseline Thermal Analysis

The baseline thermal analysis is a thorough analysis of the reference power flow to ensure thermal adequacy based on normal (applicable to system normal conditions prior to contingencies) and emergency (applicable after the occurrence of a contingency) thermal ratings specific to the TO facilities being examined. It encompasses an exhaustive analysis of all NERC category A, B, and C events and the most critical common mode outages. Final results are supported with AC power flow solutions. The PJM Load Forecast uses a 50/50 distribution from the latest available PJM Load Forecast Report (50% probability that the actual load is higher or lower than the projected load) minus energy efficiency programs. Demand response programs are not considered in the Load Forecast.

For normal conditions (NERC category A), all facilities are loaded within their normal thermal ratings. For each single contingency (NERC Category B), all facilities are loaded within their emergency thermal ratings. After each single contingency and allowing phase shifter, re-dispatch and topology changes to be made, post-contingency loadings of all facilities are within their applicable normal thermal ratings.

For the more severe contingencies (NERC category C), with only transformer tap and switched shunt adjustments enabled, post-contingency loadings of all facilities are within their applicable emergency thermal ratings as required by the PJM or the TO's planning criteria.

NERC Category C3 "N-1-1" analysis is also conducted as part of the annual RTEP process to determine if all monitored facilities can be operated:

1) Within normal thermal and voltage limits after N-1 (single) contingency assuming re-dispatch and system adjustments.

2) Within the applicable emergency thermal ratings and voltage limits after an additional single contingency ("N-1-1") condition.

The "N-1-1" study is conducted on a 50/50 non-diversified summer peak case. All BES single contingencies as defined in NERC category C3 as well as lower voltage facilities that are monitored by PJM Operations are included in the assessment. Non-BES contingencies, defined by TOs, are included to check for greater than 300 MW load loss. Non-BES facilities that are included in the assessment will also have corresponding contingencies defined.

Areas of the system that become radial post-contingency will be excluded from monitoring, with the following exceptions:

1) If the radial system contains greater than 300 MW of load, or

2) Specific local TO planning criteria require that it be monitored.

The PJM NERC Category C3 (or "N-1-1") thermal analysis will test numerous combinations of single contingency (N-1 condition) for thermal violations. All violations of the applicable thermal ratings are recorded and reported and solutions are developed.

Baseline Voltage Analysis

The baseline voltage analysis parallels the thermal analysis. It uses the same power flow and examines voltage criteria for the same NERC category A, B, and C events. Also, voltage criteria are examined for compliance. PJM examines system performance for both a voltage drop criteria (where applicable) and an absolute voltage criteria. The voltage drop is calculated as the decrease in bus voltage from the initial steady state power flow to the post-contingency power flow. The post-contingency power flow is solved with generators holding a local generator bus voltage to a pre-contingency level consistent with specific TO specifications. In most instances, this is the pre-contingency generator bus voltage. Additionally, all phase shifters, transformer taps, switched shunts, and DC lines are locked for the post-contingency solution. Static var compensators ("SVCs") are allowed to regulate and fast switched capacitors are enabled.

The absolute voltage criteria is examined for the same contingency set by allowing transformer taps, switched shunts, and SVCs to regulate, locking phase shifters and allowing generators to hold steady state voltage criteria (generally an agreed upon voltage on the high voltage bus at the generator location.)

The NERC Category C3 "N-1-1" contingency voltage magnitude test procedure follows a similar method as the thermal test method, except all monitored facilities are monitored for the emergency low limit after the second contingency ("N-1-1") conditions. Voltage collapse is considered to be a severe reliability violation and, consequently, each "N-1-1" condition that exhibits voltage collapse is investigated, validated, and resolved with remedial actions, or network upgrades.

Load Deliverability Analysis - Thermal

The load deliverability tests are a unique set of analyses designed to ensure that the transmission system provides a comparable transmission function throughout the system. These tests ensure that the transmission system is adequate to deliver each load area's requirements from the aggregate of system generation. The tests develop an expected value of loading after testing an extensive array of probabilistic dispatches to determine thermal limits. A deterministic dispatch method is used to create imports for the voltage criteria test. The transmission system reliability criterion used is 1 event of failure in 25 years. This is intended to design transmission so that it is not more limiting than the generation system which is planned to a reliability criterion of 1 failure event in 10 years.

Each load areas' deliverability target transfer level to achieve the transmission reliability criterion is separately developed using a probabilistic modeling of the load and generation system. The load deliverability tests measure the design transfer level supported by the transmission system for comparison to the target transfer level. Transmission upgrades are specified by PJM to achieve the target transfer level as necessary. Details of the load deliverability procedure can be found in PJM Manual M-14B.

The thermal test examines each load deliverability area where the deliverability area is under the stressed conditions of a 90/10 summer load forecast (i.e., a forecast that only has a 10% chance of being exceeded) and demand response is implemented (energy efficiency is removed from all areas). The areas not under the test are at the conditions of a 90/10 summer load forecast. The transfer limit to the load is determined for system normal and all single contingencies (NERC category A and B criteria) under ten thousand (10,000) load study area dispatches with calculated probabilities of occurrence. The dispatches are developed randomly based on the availability data for each generating unit. This results in an expected value of system transfer capability that is compared to the target level to determine system adequacy. As with all thermal transmission tests conducted by PJM the applicable TO's normal and emergency ratings are applied. The steady state and single contingency power flows are solved consistent with the similar solutions described for the baseline thermal analyses.

Load Deliverability Analysis – Voltage

This testing procedure is similar to the thermal load deliverability test except that voltage criteria are evaluated and a deterministic dispatch procedure is used to increase study area imports. The voltage tests and criteria are the same as those performed for the baseline voltage analyses.

Generation Deliverability Analysis – Thermal

The generator deliverability test for the reliability analysis ensures that, consistent with the load deliverability single contingency testing procedure, the transmission system is capable of delivering the aggregate system generating capacity at peak load (50/50 load level in all areas) with all firm transmission service modeled. Energy efficiency is removed from all areas and demand response is not exercised. The procedure ensures sufficient transmission capability in all areas of the system to export an amount of generation capacity at least equal to the amount of certified capacity resources in each area. Areas, as referred to in the generation deliverability test, are unique to each study and depend on the electrical system characteristics that may limit transfer of capacity resources. For generator deliverability, areas are defined with respect to each transmission element that may limit transfer of the aggregate of certified installed generating capacity. The cluster of generators with significant impacts on the potentially limiting element is the area for that element. The starting point power flow is the same power flow case set up for the baseline analysis. Thus the same baseline load and ratings criteria apply. The same contingencies used for load deliverability apply and the same single contingency power flow solution techniques also apply. Details of the generation deliverability procedure can be found in PJM Manual M-14B.

One additional step is applied after generation deliverability is ensured consistent with the load deliverability tests. The additional step is required by system reliability criteria that call for adequate and secure transmission during certain NERC category C common mode outages. The procedure mirrors the generator deliverability procedure with somewhat lower deliverability requirements consistent with the increased severity of the contingencies.

The details of the generator deliverability procedure including methods of creating the study dispatch can be found in PJM Manual M-14B.

Baseline Stability Analysis

PJM ensures generator and system stability during its interconnection studies for each new generator. In addition, analysis is performed on the RTEP baseline stability cases. These analyses ensure the system is transiently stable and that all system oscillations display positive damping. Generator stability studies are performed for critical system conditions, which include light load and peak load for three phase faults with normal clearing, plus single line to ground faults with delayed clearing. Also, specific TO designated faults are examined for plants on their respective systems. Finally, PJM also initiates special stability studies on an as needed basis. The triggers for such special studies commonly include, but is not limited to, conditions arising from operational performance reviews or major equipment outages or deactivations.

FIRSTENERGY PLANNING PROCESS

Voltage Stability

The FirstEnergy transmission system is developed such that it can be operated at the expected peak and at lower load levels such that the system will maintain voltage stability with the most severe combination of a generating unit and a transmission line removed from service.

Power Voltage ("PV") analysis was used as the method of testing voltage stability. This analysis is performed using a system model with an initial load equal to the 50/50 load forecast, incrementing system load (incremental load is to be added at 0.85 power factor, simulating the contingency and then recording voltages at transmission buses. The process of incrementing load, simulating the contingency and recording voltages is repeated until the power flow will no longer converge. The 50/50 summer peak case represents a forecasted load level for ATSI in which there is a 50% chance that the actual summer peak load will be higher than the forecasted load, and a 50% chance the actual peak will be lower.

In order for the system to be considered stable, the system load must be able to be incremented to the 90/10 forecasted peak prior to any voltage instability. The 90/10 summer peak case represents a forecasted load level for ATSI in which there is a 90% chance that the actual summer peak will be less than the forecasted load and only a 10% chance it will be higher.

Power Flow Criteria

FirstEnergy has developed power flow criteria for the elements of its transmission system that define the maximum normal and emergency rating for major pieces of equipment. The criteria for the major equipment elements of the system are summarized below:

Transmission Lines

Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. The ultimate transmission circuit capacity may be limited by either the line conductor itself or by other elements such as breakers, switches, or relays.

Bulk Power Transformers

Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. Bulk power transformers on ATSI's system typically have 345 kV "high side" and 138 kV "low side" nominal voltages. Normal load ratings for each specific bulk power transformer are developed based on seasonal conditions considering loss of life (i.e. shortens the useful life of the component) and thermal stresses and should not be exceeded during normal conditions. Transformers loaded above their rating are likely to become overheated which results in an acceleration of the breakdown of insulating materials in the transformer, which shortens the transformer operating life.

Emergency load ratings specific to each bulk power transformer are also based on seasonal assessments and should not be exceeded during contingency conditions. The emergency ratings are predicated on the peak permissible loading during the period when the emergency condition may occur and would result in increased transformer loading. Emergency condition time frames considered in this analysis may extend for several months to account for situations where the emergency condition is caused by the failure of another bulk transformer or other critical piece of equipment that would require a lengthy time period to repair or replace. Operating measures may be necessary in order to maintain transformer loadings within emergency ratings and might include interruptions to specific customers.

Area Transmission Transformers:

Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. Area transmission transformers on ATSI's system typically have 138 kV "high side" and 69 kV or less "low side" nominal voltages. Ratings specific to each area transmission transformer are based on seasonal conditions considering loss of life and thermal stresses and should not be exceeded during normal conditions. Emergency ratings specific to each area transmission transformer are also based on seasonal conditions and should not be exceeded during contingency conditions. The emergency rating is tolerated up to 24 hours, assuming a mobile or spare transformer is available and can be installed while awaiting a permanent transformer repair or replacement. Otherwise the emergency rating applied corresponds to the period (months) utilized for bulk transformers. Operating measures may be necessary in order to maintain transformer loadings within emergency ratings and might include certain customer interruptions.

Bus Voltage Criteria

Normal substation bus voltages can range from 0.95 per unit to 1.05 per unit of nominal during on-peak and off-peak conditions. The minimum contingency voltage is 0.92 per unit for all 345 kV, 0.92 per unit for networked 138 kV, and 0.90 per unit for all remaining transmission voltages. The maximum pre-to-post contingency voltage change is 0.08 per unit for 345 kV transmission substations, and 0.10 per unit for the remaining transmission substations.

(A)(3) LOAD FLOW ANALYSIS

ATSI and PJM conducted studies of the Project Area Transmission System for the PJM 2013 and 2015 Forecast summer peak load conditions, with varying amounts of generation available and with and without the proposed Project. These studies included evaluation of the effects of various contingency conditions such as an outage of a transmission line(s), transformer(s), and multiple elements (N-2 Contingency). More detail is provided below in regard to the system conditions and outages evaluated when performing the analysis.

Table 2-2 below lists the applicable system load levels evaluated in the load flow analysis.

Table 2-2: PJM Load Forecast

Year	Load Level	Applicable System
2013	13,435 MW	ATSI
2015	13,875 MW	ATSI

The process of identifying PJM required reinforcements to accommodate the announced generation retirements was a collaborative effort between the ATSI and PJM Planning organizations. The Project is part of the group of FirstEnergy projects required to meet all applicable FirstEnergy, PJM, and NERC criteria. The West Fremont-Hayes 138 kV Transmission Line Project and the Groton Substation Project were in particular, needed to address both "single" (NERC TPL-002-0b Category B) contingency events in 2013 and "common-mode" contingency events (NERC TPL-003-0a Category C) in 2015, which resulted in 138 kV transmission thermal overloads that exceeded criteria in PJM and FE's generation retirement load flow studies.

PJM, through various generator retirement studies, has determined that several system reinforcements are required to meet the applicable PJM and NERC criteria for the BES. The Transmission Expansion Advisory Committee ("TEAC") Recommendations to the PJM Board, PJM Staff Whitepaper, dated May 2012 (http://www.pjm.com/committees-and-groups/committees/teac.aspx) contains a complete list of the transmission projects required to meet applicable planning criteria. The most recent status of all PJM RTEP projects can be found using the following website, http://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx

Contingency Violations

Table 2-3 provides a summary of the 2013 and 2015 Generation Deliverability evaluation and contingency violations before and after installation of the proposed Project. The Ottawa-Lakeview 138 kV Transmission Line and the Lakeview-Greenfield 138 kV Transmission Line have summer emergency rating of 375 and 316 MVA respectively. The 2013 Generation Deliverability analysis shows that without the proposed Project, during an outage of the Beaver-Davis Besse 345 kV Transmission Line, a N-1 outage scenario, under modeled system loading, the Ottawa-Lakeview 138 kV Transmission Line and the Lakeview-Greenfield 138 kV Transmission Line exceed their summer emergency rating by 129.6 and 129.2 percent respectively. The 2015 Generation Deliverability analysis shows that without the proposed Project during an outage of both the Beaver-Davis Besse 345 kV Transmission Line and the Davie Besse-Hayes 345 kV Transmission Line, a NERC Category C5 common-tower outage and a N-1-1 or N-2 outage scenario, under modeled system loading, the Ottawa-Lakeview 138 kV Transmission Line and the Lakeview-Greenfield 138 kV Transmission Line exceed their summer emergency rating by 111.6 and 103.8 percent respectively. The 2015 Generation Deliverability analysis also shows that with the proposed Project during an outage of both the Beaver-Davis Besse 345 kV Transmission Line and the Davie Besse-Hayes 345 kV Transmission Line, a NERC Category C5 common-tower outage and a N-1-1 or N-2 outage scenario, under modeled system loading, the Ottawa-Lakeview 138 kV Transmission Line and the Lakeview-Greenfield 138 kV Transmission Line are within their summer emergency rating by 73.3 and 58.5 percent respectively.

Table 2-3: 2013 and 2015 Generation Deliverability Results

Facility	Rating MVA (Summer Emergency)	2013 Generation Deliverability	2015 Generation Deliverability (see Note 1)	
		Loss of Beaver-Davis Besse 345 kV Transmission Line (N-1) Without Proposed Hayes-West Fremont #1 138 kV Transmission Line:	Loss of Beaver-Davis Besse 345 kV Transmission Line and Davis Besse-Hayes 345 kV Transmission Line (N-1-1 or N-2) **Without** Proposed Hayes-West Fremont 138 kV Transmission Line	Loss of Beaver-Davis Besse 345 kV Transmission Line and Davis Besse-Hayes 345 kV Transmission Line (N-1-1 or N-2) **With** Proposed Hayes-West Fremont 138 kV Transmission Line
		% Loading on Identified Facilities	% Loading on Identified Facilities	% Loading on Identified Facilities
Ottawa-Lakeview 138 kV Transmission Line	375	129.6	111.6	73.3
Lakeview-Greenfield 138 kV Transmission Line	316	129.2	103.8	58.5

Note 1: The 2015 Generation Deliverability model includes the Davis Besse-Hayes 345 kV Transmission Line which is currently under construction with a planned June 2014 in service date.

Table 2-3: 2013 and 2015 Generation Deliverability Results

[redacted]		2013 Generation Deliverability*	2015 Generation Deliverability	
			w/ Hayes 345/138 kV Sub and Davis Besse - Beaver 345 kV	Previous case with addition of W.Fremont - Groton - Hayes 138 kV
Facility	Rating MVA (Summer Emergency)	Loss of Beaver - Davis Besse 345 kV (N-1) % Loading	Loss of Beaver - Davis Besse & Davis Besse - Hayes 345 kV (N-2) % Loading	o/l/o Beaver - Davis Besse & Davis Besse - Hayes % Loading
Ottawa - Lakeview	375	129.6	111.6	73.3
Lakeview - Greenfield	316	129.2	103.8	58.5

*Does not include Hayes 345/138 kV substation or second Davis Besse - Beaver 345 kV Lines

(A)(4) LOAD FLOW DATA

An electronic copy of the Applicant's load flow data, in the form of a load flow case with the proposed facility, can be provided upon request and under seal to the OPSB Staff as it contains confidential trade secret and critical energy infrastructure information ("CEII").

(A)(5) Natural Gas Transmission Line Base Case Data

The Applicant does not propose to construct, own or operate any natural gas transmission lines or facilities as part of or in conjunction with the Project. Consequently, Administrative Code Rule 4906-15-02(A) (5) does not apply to this Application and, accordingly, no base-case data for any natural gas transmission line(s) are filed in this docket.

(B) EXPANSION PLANS

(B)(1) REGIONAL PLANS

The FirstEnergy Generation retirement announcements were made on January 26, 2012, while neighboring generation owners announced retirement of additional generation in February and March of 2012. PJM formally presented the proposed portfolio of projects to mitigate the identified transmission system issues resulting from the announced retirements at a PJM TEAC meeting on April 27, 2012. Formal PJM Board of Directors approval was received on May 17, 2012.

PJM, as the entity with responsibility under federal law for conducting independent regional planning for the electric transmission system at 100 kV and above, conducts an annual study of "needs" that exist or that may come into existence on the regional electric transmission system in order to maintain a robust electric transmission system. Where a need is identified, PJM stakeholders analyze the need and work to develop a project to improve the performance of the transmission system that, if constructed, will address and resolve the identified need. The process for performing these studies is described in the PJM tariffs as the "Regional Transmission Expansion Plan" or RTEP. Each year PJM issues a report (the "RTEP report") that described all projects that have been identified through the RTEP process as necessary to resolve issues on the regional electric transmission system. This Project is currently a baseline RTEP project in PJM and is identified as RTEP Project Number b1959.

The Project will be constructed and operated in compliance with all applicable mandatory reliability standards or other standards that are promulgated by NERC.

(B)(1)(a) Long Term Forecast Report

In addition to being approved as an RTEP project, the West Fremont-Hayes 138 kV Transmission Line and Groton 138-69 kV substation was included in FirstEnergy's 2013 Ohio LTFR (Long-Term Forecast Report) submitted to the The Public Utilities Commission of Ohio ("PUCO") in April 2013; Case No. 13-925-EL-FOR. The Project was listed in the Planned Electric Transmission Lines and Summary of Proposed Substations lists. The Project was proposed as a measure needed to reliably serve the FirstEnergy system, maintain compliance with NERC reliability standards, and make up for the loss of generation in Ohio.

(B)(2) Long Term Forecasting – Gas Transmission

The Applicant does not propose to construct, own or operate any natural gas transmission lines or facilities as part of or in conjunction with the Project. Consequently, Administrative Code Rule 4906-15-02(B)(2) does not apply to this Application and, accordingly, no long-term forecasts for construction or operation or natural gas transmission line(s) or associated facilities are filed in this docket.

(C) PROJECT IMPACT ON ELECTRIC SYSTEM

Completion of the Project will resolve planning criteria violations on the Project Area Transmission System for the years studied thus far by PJM. ATSI has determined that bringing the Project on-line will not adversely impact any of ATSI's other existing transmission facilities, or the transmission facilities and equipment of neighboring utilities. Overall performance on the Project Area Transmission System will be improved significantly as a result of the construction of the Project and other proposed improvements in Ohio.

Thermal overloads will be corrected and the Project Area Transmission System will be more interconnected by this Project, allowing ATSI greater operational flexibility to continue to provide safe, efficient and reliable electricity to its customers. The Project will add a 138 kV to 69 kV source to the area, strengthening the 69 kV system that provides local service to residential, commercial, and industrial customers. In addition, transmission system maintenance and switching procedures will be easier to facilitate with these new transmission lines put in place. Substation equipment and transmission overhead lines are placed on routine inspection and maintenance schedules, to ensure proper reliability and reduce the chances of system outages.

By completing this Project, the existing contingency overloads on ATSI's Ottawa-Lakeview and Lakeview-Greenfield 138 kV Transmission Lines also will be eliminated which will greatly reduce or eliminate the risk of forced load shed by PJM, ensuring a reliable source of power for area customers during all times of the year.

(D) PROJECT ALTERNATIVES ANALYSIS

In 2012, ATSI and PJM determined that circuit loading in the Project Area Transmission System would exceed system limits due, in part, to the retirement of certain generating units within the ATSI footprint. In order to address this issue, ATSI and PJM initiated work on options for serving existing and projected load in the Project Area. This work included analysis of transmission and non-transmission alternatives. The results of this analysis are described in the following paragraphs.

Analysis of Transmission Alternatives

ATSI and PJM surveyed a range of options and performed extensive analysis on those options that were both short-term fixes and long-term fixes for the identified transmission systems issues. Initial analysis established that completion of multiple projects was needed in order to resolve all of the capacity and circuit loading violations on the ATSI 345 kV and 138 kV Systems resulting from the planned retirement of generation. Moreover, there was not one transmission or non-transmission alternative which resolved these issues completely; rather it required a combination of several projects in order to meet the necessary results. Further, some of the options considered were not cost effective and others did not mitigate all of the load flow violations. The 28-mile long 138 kV transmission line between West Fremont, Groton, and Hayes Substations was deemed to be the optimal solution to resolve specific issues affecting the Project Area Transmission System, and is needed in conjunction with the other identified projects to address the announced generation retirements.

<u>Alternatives studied for this Project included:</u>

1. Rebuild and reconductor the entire Ottawa-Lakeview-Greenfield 138 kV transmission pathway as double-circuit, utilizing larger wire sizes to allow for additional capacity and loading of the lines.

a. This option would be prohibitively expensive due to the terrain that these circuits traverse around Lake Erie and across the Sandusky Bay. Approximately 25 miles of existing 138 kV facilities would have to be torn down and re-built as double-circuit 138 kV. Very large conductor would have to be used, and would still not provide a very large planning margin for future load growth and system transfers. Construction of this option would therefore only delay the need for a project such as Hayes-West Fremont 138 kV Transmission Line, not eliminate the need for it.

b. Construction would be difficult due to the environmentally sensitive lands near Lake Erie as well as the crossing of Sandusky Bay.

c. Re-building this circuit entirely would remove it from service for an extended period, making the Project Area very vulnerable to voltage and thermal limitations and potential shedding of load during this time. Building the new Hayes-West Fremont 138 kV Transmission Line instead would allow the Ottawa-Lakeview-Greenfield 138 kV pathway to stay in-service during construction.

d. This alternative also would not provide any additional support to the local 69 kV network between Sandusky and Bellevue, as the proposed Groton Substation would. As such, this option was rejected.

2. Construct a new 345 kV transmission line between the Toledo Edison and Ohio Edison service territories.

a. This entirely new 345 kV transmission line on new right-of-way would likely be over 50 miles in length, possibly up to 100 miles, depending on the terminal facilities chosen. Additionally, the 60 mile pathway between the Davis Besse and Beaver Substations is already fully utilized with the two transmission lines running between the Beaver and Hayes substations (in-service June 2014). Consequently, the corridor would need to significantly widened to construct a third 345 kV transmission line along this pathway.

The 138 kV system fed from the West Fremont substation would still be vulnerable to contingency overloads, even with a new east-to-west 345 kV transmission line. The system impedance would be prohibitively high for power to flow on the 138 kV system, up to the 345 kV system and across, and then back down to the 138 kV system again, to serve the load centers.

b. Again, as in Alternative-1, this 345 kV option would not strengthen the Bellevue area 69 kV system, as the proposed Groton Substation would. As such, this option was rejected.

Analysis of Non-Transmission Alternatives

Two different types of non-transmission alternatives were considered: (i) energy efficiency alternatives and (ii) demand-side management alternatives. As explained in the following paragraphs, although certain features of each non-transmission alternative were attractive, no single non-transmission alternative resolved all of the capacity, thermal and voltage violations on the ATSI 138 kV System. Accordingly, the non-transmission alternatives were rejected.

Energy Efficiency

Conservation and energy efficiency programs involve actions taken on the customer side of the meter that reduce the customers' overall energy requirements (collectively referred to as "Energy Efficiency" actions). Energy Efficiency actions focus on using energy more efficiently without sacrificing customer comfort or convenience. These actions usually involve installing more efficient equipment or changing processes to conserve energy. Energy Efficiency and conservation programs usually provide financial incentives for customers to purchase and install energy efficient equipment and/or educate consumers on the efficient use of energy. Energy Efficiency also requires customer cooperation – a utility cannot force customers to participate in Energy Efficiency programs. The reduction in peak load would be less than what is necessary to relieve the thermal overload problems on the 138 kV System. Further, Energy Efficiency programs will not provide the transmission infrastructure that is needed throughout the northern Ohio area. New transmission lines and a substation, similar to the proposed Project, along with other projects identified by PJM in their analysis, would remain needed to solve the system transfer constraint. Accordingly, this option is not sufficient and, as such, was rejected

Demand Side Management

Demand-Side Management ("DSM") programs generally involve actions taken on the customer side of the meter that have the intention and effect of reducing the customers' requirements during peak times. DSM programs typically involve utility incentives that are provided to consumers in exchange for reduction or curtailment of customer load at specific times (usually system peak times, but also can be used to address peak times at specific locations). Load management and demand response incentives are most often provided and renewed on an annual basis. Further, DSM also requires customer cooperation – a utility cannot force customers to participate in DSM programs. DSM will not provide the required transmission infrastructure needed in the northern Ohio area. This would leave the Project Area without a means of maintaining proper system voltages. New transmission lines and a substation, similar to the proposed Project, along with other projects identified by PJM in their analysis, would remain needed to solve the capacity constraint.

Given the circumstances that prevail on ATSI's 345 kV and 138 kV Systems, DSM would be effective only if it achieved a negative growth scenario. This represents an extremely ambitious objective when compared to other utilities' experiences. Although arguably possible for ATSI to develop and launch a large DSM program, the time frame to address current need, as well as the scale of the program required for success, is not consistent with the experience of those of utilities and others who have managed successful programs. It is clear that DSM can make only a small contribution—far less than what is necessary—to relieving the capacity problems on the 345 kV and 138 kV System. Accordingly this option is not sufficient and, as such, was rejected

Inclusion of Energy Efficiency and Demand Side Management in PJM Forecasting

It is also important to note that PJM incorporates Energy Efficiency ("EE") and Demand Response ("DR") into their forecast and analysis, and any effort to address the need for this Project or the overall transmission system issues associated with generation retirement would need to be in addition to the EE and DR resources included in PJM forecasts.

PJM forecasts include DR and EE resources that clear through the RPM process and are assumed to be available for their committed planning year(s). Beyond the commitment period (3 years), DR and EE amounts are held constant. Forecasted DR and EE is summarized in the tables in the PJM Load Forecast Report, and forecast load levels across PJM are reduced by the amount of EE that cleared in Reliability Pricing Model ("RPM") for both load and generation deliverability tests. For DR and Price Responsive

Demand (PRD), there is no impact on generation deliverability test (not an emergency condition). For the Capacity Emergency Transfer Limit (CETL) calculation, the forecasted 90/10 load level in the area under test is reduced by the amount of DR and PRD that cleared in RPM, except in situations where 90/10 load minus DR and PRD would be less than 50/50 load. In those instances, 50/50 load levels will be used in the area under test.

Since PJM forecasts include EE and DR that clear in the RPM, these resources were already included in the modeling and forecasting done by PJM and ATSI following the announced retirement of area generation. Consequently, the ability to address the need for the Project through additional EE or DSM projects is limited by the fact that existing EE and DR recourses are already included in the forecasts that demonstrate the need for the Project.

New Generation

ATSI does not build or own generation and can only plan for transmission. In 2001, the State of Ohio made a policy decision to deregulate electric utilities. Through this deregulation process, the State of Ohio mandated that transmission and generation must remain in legally separate and independent companies. As such, ATSI does not build or own generation and can only plan for transmission.

PJM, is the entity authorized by the federal government to manage the reliability of the electric transmission system and the operation of the wholesale electricity market in a defined control area. PJM's Regional Transmission Expansion Planning process determines what changes and additions to the grid are needed to maintain reliability in the future. The process systematically evaluates proposed transmission and generation projects to ensure that compliance with reliability criteria is maintained. The process also includes a mechanism to mandate necessary grid improvements. Under PJM agreements, transmission owners are obligated to build transmission projects that are needed to maintain reliability standards and that are approved by the board. Accordingly, the option for ATSI to construct generation is not appropriate.

To ensure the future availability of the generating capacity and other resources that will be needed to keep the regional power grid operating reliably for consumers, PJM developed and implemented the RPM. The PJM process does not include a mechanism to mandate new generation be constructed. The RPM system continues to follow a market approach to obtaining the capacity needed to ensure reliability, but includes incentives that are designed to stimulate investment both in maintaining existing generation and in encouraging the development of new sources of capacity – resources that include not just generating plants, but demand response and energy-efficiency programs. Investors need sufficient long-term price signals to encourage the maintenance and development of generation and other resources. The RPM plan, based on making capacity commitments three years ahead, creates long-term price signals to attract needed investments in reliability in the PJM region. Proposals to construct generation within the PJM market are submitted and reviewed by PJM as part of the Transmission Expansion Planning process defined in M-14 series of PJM manuals.

(E) PROJECT SELECTION

The Project which installs a single 138 kV transmission line circuit between the Hayes, Groton and West Fremont substations was selected because it is the most efficient option to resolve the thermal overload problems that exist on the ATSI 138 kV System in the Project Study Area. As noted herein, all of the other transmission and non-transmission alternatives either would not resolve all of the capacity and voltage problems or, if all such problems would be resolved, the alternatives would: (i) cost more money; (ii) have greater environmental and social impacts; or (iii) both cost more money and have greater environmental and social impacts.

Construction of the Project will provide operating flexibility to eliminate contingency violations and chances of load shed through the PJM Planning process which incorporates NERC, PJM and the Applicants' planning criteria. Moreover, construction of the Project adds another pathway for power flow to and through the Project Study Area, affording greater flexibility for future load growth and system maintenance. Finally, the addition of the Project provides the additional operational benefits that accrue by adding another 138-69 kV power source north of Bellevue, ensuring that the businesses, homes and communities in the area region will have ready access to safe and reliability energy for many years to come. The proposed West Fremont - Hayes 138 kV Transmission Line and Groton Substation creates a more robust electrical grid in the northern Ohio area along Lake Erie.

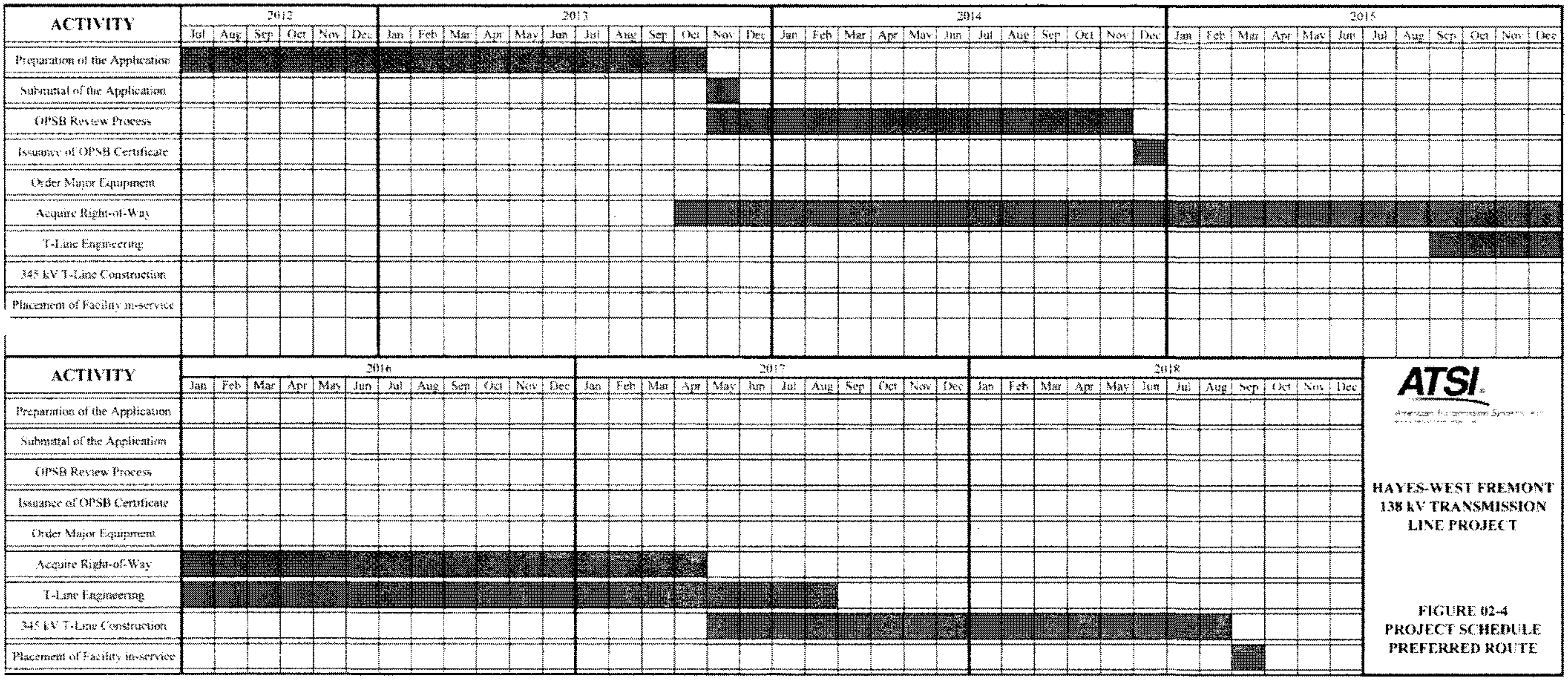
The proposed Project includes provisions to install a second Hayes-West Fremont 138 kV transmission line in the future on the installed structures. ATSI's needed right-of-way width and development is largely the same for a single or double circuit 138 kV transmission line and the only significant distinction is that the supporting structures will be designed to support two transmission lines. As the proposed Project will largely be installed on wood poles (a few steel poles will be installed), this will generally require larger diameter wood poles for tangent sections of the Project and two poles structures at turns in the route of the transmission line. Including provisions to install the future transmission line is beneficial as it provides the flexibility to establish the future line by installing hardware, insulators and conductors when needed with only minor and temporary impacts from the construction with little if any additional right-of-way, structures, and ecological and social impacts. In the event that there is a benefit to install the future transmission line at the same time as the proposed Project, installation of both transmission lines will occur at the same time and an applicable submittal to the Board will be made prior to commencing that construction process. In the event that the Hayes-West Fremont 138 kV Transmission Line is installed separately, it is anticipated that a Letter of Notification submittal would be made to the Board prior to commencing its installation.

(F) PROJECT SCHEDULE

The Applicants propose to complete construction and bring the Project on-line by no later than June 1, 2018. The Project is presently needed, as of June 1, 2013, but it is estimated it cannot be completed until the 2018 date. This five year gap is due to the lengthy process of project siting, commission approval, obtaining right-of-way, permitting, engineering, and construction of the proposed Project and new Groton substation. If the various tasks leading to construction can be completed earlier, it is likely that construction will also take place earlier and that the Project will be placed in service at an earlier date. Until the Project is placed in service, operating procedures are in place at the FirstEnergy System Control Center to sectionalize the ATSI 138 kV system as needed during high system loading days, so as to prevent the extreme overloads on the Ottawa-Lakeview and Lakeview-Greenfield 138 kV Transmission Lines. This operating procedure is a needed step to prevent circuit overloads, but does place risk on the system by breaking it up and leaving it less interconnected. Once the Hayes-West Fremont 138 kV Transmission Line Project is completed, the operating procedures can be eliminated, removing the risk to electric customers in the Project Area.

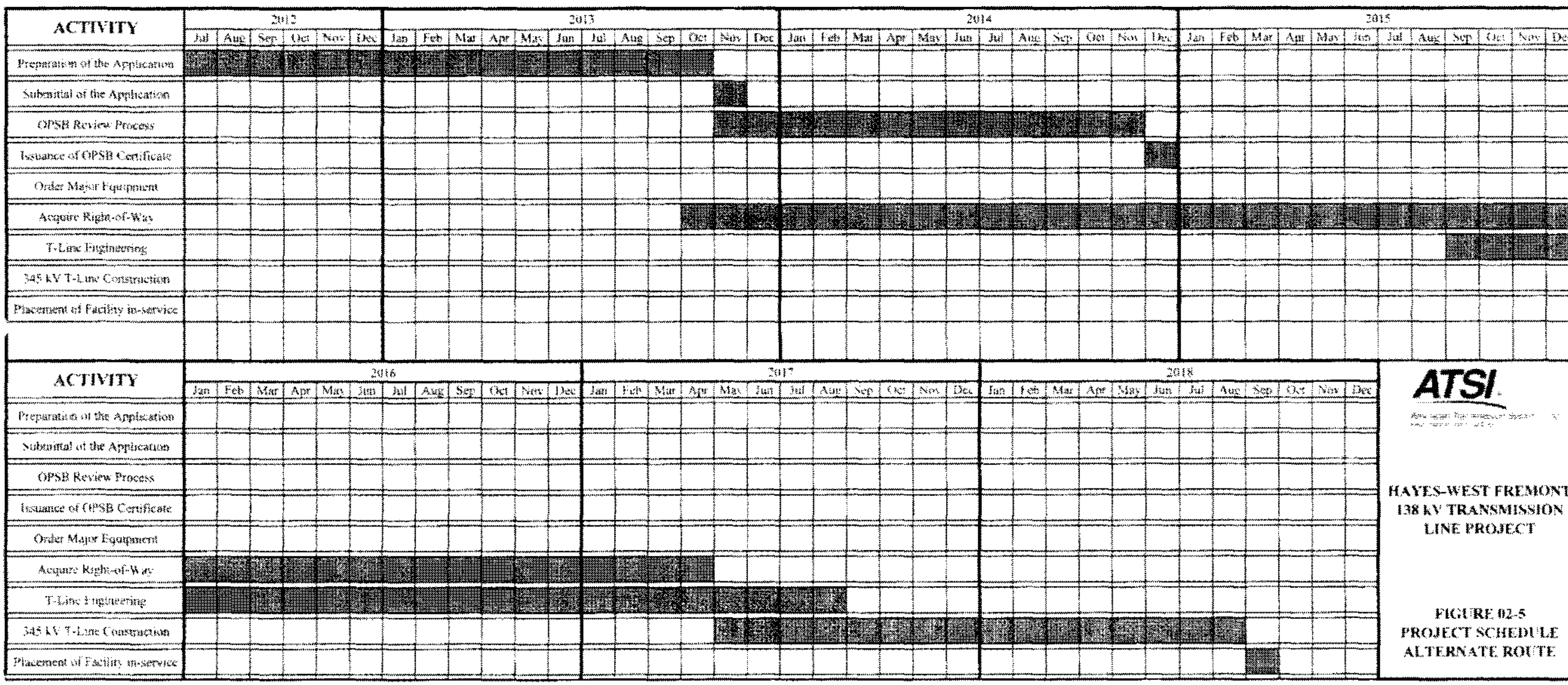
Critical delays in construction or other processes necessary to bring the Project on-line may impact the Applicant's electric customers in the Sandusky, Bellevue and Norwalk areas (among others) by exposing them to ongoing reliability issues until such time as the Project is brought on-line. This may include lower than desired service voltages and emergency forced load shed, as directed by PJM. PJM has already issued PCLLRW warnings regarding the high system loading on the ATSI 138 kV network during periods of hot weather.

The Project is needed to ensure the ATSI BES system meets or exceeds all applicable NERC Transmission Planning Limits ("TPL"), PJM and FE planning criteria as applied through the PJM Planning process. Specifically, this Project is intended to reinforce the interconnected transmission system following the announced retirement of several coal-fired power plants in the ATSI territory, which is located in both Ohio and Pennsylvania.



HAYES-WEST FREMONT
138 kV TRANSMISSION
LINE PROJECT

FIGURE 02-4
PROJECT SCHEDULE
PREFERRED ROUTE



ACTIVITY
2012
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2014
2015
Preparation of the Application
Submittal of the Application
OPSB Review Process
Issuance of OPSB Certificate
Order Major Equipment
Acquire Right-of-Way
T-Line Engineering
345 kV T-Line Construction
Placement of Facility in-service
ACTIVITY
2016
2017
2018
Preparation of the Application
Submittal of the Application
OPSB Review Process
Issuance of OPSB Certificate
Order Major Equipment
Acquire Right-of-Way
T-Line Engineering
345 kV T-Line Construction
Placement of Facility in-service
ATSI
HAYES-WEST FREMONT
138 kV TRANSMISSION
LINE PROJECT
FIGURE 02-5
PROJECT SCHEDULE
ALTERNATE ROUTE

4906-15-03 SITE AND ROUTE ALTERNATIVES ANALYSES

This section of the Application summarizes the Route Selection Study ("RSS") for the Hayes-West Fremont 138 kV Transmission Line Project ("Project"). The Route Selection Study includes a description of the study area with related maps, identification of evaluated routes, siting criteria and factors, evaluation process, and rationale for selecting the Preferred and Alternate routes, as required by Ohio Administrative Code Rule 4906-5-04(A)

The proposed Project will connect the existing West Fremont Substation in Sandusky County to the Hayes Substation which is currently under construction in Erie County with a new 138 kV transmission line. The Project also requires the transmission line to connect to or pass through the site of the Groton Substation, a new distribution substation located northwest of the intersection of Strecker Road and State Route 269 in Erie County. Depending on the route selected, the Project length ranges from approximately 25 to 31 miles.

The Applicant's consultant, CH2M HILL, conducted the transmission line Route Selection Study for the proposed Project. The goal of the Route Selection Study was to identify viable routes based on the siting criteria that avoid or limit impacts to sensitive land uses, ecological resources, and cultural features, while taking into consideration engineering and construction needs of the Project. Potential routes were evaluated, compared and ranked to aid the selection of both a Preferred and an Alternate. The detailed Route Selection Study, which is attached as Appendix 03-1 of this Application, is provided in accordance with the Administrative Code Rule 4906-15-03(C) and to satisfy the requirements of Administrative Code Rules 4906-15-03(A) and (B).

CH2M HILL evaluated the study areas defined by the existing West Fremont and Hayes Substations. This initial evaluation was used to identify potential route corridors. These corridor segments were combined into potential routes and compared based on quantitative and qualitative factors for the respective route segments.

In 2012, 27 routes were evaluated and two of the more favorable routes, based on both a quantitative scoring and ranking and qualitative criteria, were presented at two public information meetings held in October, 2012. Public comments provided during and after these meetings were reviewed, and the route alternatives were revised where practical based on public input, and specific requests that were made by property owners that did not materially change the viability of the route. Applicant received a considerable and consistent level of public input that the historic and ecologic value of the area identified as Peninsula Farms was of considerable value to the local community. Additionally, in general, owners of agricultural lands strongly preferred routes that followed property lines and edges of agricultural fields rather than crossing agricultural fields. Finally, the public comments showed a strong preference for route alternatives that paralleled the Ohio Turnpike.

A second round of data collection and route scoring was conducted following the 2012 public information meetings to analyze the input received during those meeting which increased the number of potential routes from 27 to 102 alternatives. These routes were all scored and ranked, and routes with lower, or better scores were considered more preferable. Scores ranged from the most favorable of 12.2 (Route 82) to the least favorable score of 85.8 where the minimum possible score is 0 and a maximum possible score is 100. Of the 102 route evaluated, the best (lowest) scoring candidate was Route 82 which received a total score of 12.2 out of 100 and is approximately 28.42 miles long.

A third public information meeting was held in May 2013 to present the better scoring candidate routes and solicit additional public input. The public input received continued the strong level of local concern for the historic and ecologic value of the area identified as Peninsula Farms. It was also notable that there were significantly fewer comments on the potential crossing of agricultural fields as a result of the route adjustments made to follow property lines, edges of fields and the Ohio Turnpike to the extent practical. Additional public input supported routing options that minimized impacts associated with crossing the Sandusky River by paralleling the Ohio Turnpike and existing utility crossings.

The most favorably scoring route that meets the objectives expressed in public comments to avoid a crossing of Peninsular Farms and to parallel the Ohio Turnpike, is Route 79. Route 79 scored 14.6 and ranked 7th in the overall scoring. Route 87, with a score of 15.2 and an overall rank of 9th, is similar to Route 79. West of Groton Substation, Routes 79 and 87 are identical, while east of Groton Substation Route 87 varies from Route 79 to follow more property lines and therefore reduces agricultural impacts. As the scores of Routes 79 and 87 are nearly the same and as Route 87 is an option that reduces agricultural impacts, Route 87 was selected as the route with the fewer overall impacts. As Route 87 is one of the best scoring routes and is believed to be the most acceptable route to the community, it represents the route that minimizes overall project impacts to the extent practical and was selected as the Preferred Route. Route 16, ranked 32nd with a score of 19.5, was selected as the Alternate Route, as it is a top scoring route with less than 20% in common with the Preferred Route (Route 87).

After the selection of the Preferred and Alternate Routes was made, additional information was received through discussions with property owners and during field surveys. This information was used to continue to evaluate and optimize the Preferred and Alternate Routes to further minimize or avoid impacts to ecological, land use, cultural, or technical criteria. Three areas along the Preferred Route and one area along the Alternate Route were identified to further optimize the Routes. These areas are described in detail in section 4.7 of Appendix 3-1, the Route Selection Study.

Appendix 3-1
Route Selection Study

Route Selection Study

Hayes-West Fremont 138-kV Transmission Line Project

Prepared for:

FirstEnergy Service Company

December 2013

Prepared by:

CH2MHILL.

Contents

SECTION 1
Introduction and Project Overview

1.1 Introduction

FirstEnergy Service Company. on behalf of American Transmission Systems, Incorporated ("ATSI"), a FirstEnergy Company, is proposing to construct a new 138-kilovolt (kV) electric transmission line from the Hayes Substation in Erie County, Ohio, to the West Fremont Substation in Sandusky County, Ohio. ATSI also requires the project to either loop into or pass through the site of a new, proposed distribution substation located northwest of the intersection of Strecker Road and State Route 269 in Erie County, identified as the Groton Substation. The Project will be referred to as the Hayes-West Fremont 138 kV Transmission Line Project (Figure 1-1). Depending on the route selected, the Project length would range from approximately 25 miles to 31 miles. The Hayes-West Fremont 138 kV Transmission Line Project is proposed to be a single-circuit line, with provisions for a future additional circuit, supported primarily on wood poles, and requires a new 60-foot-wide right-of-way ("ROW"). The Project falls under the jurisdiction of the Ohio Power Siting Board.

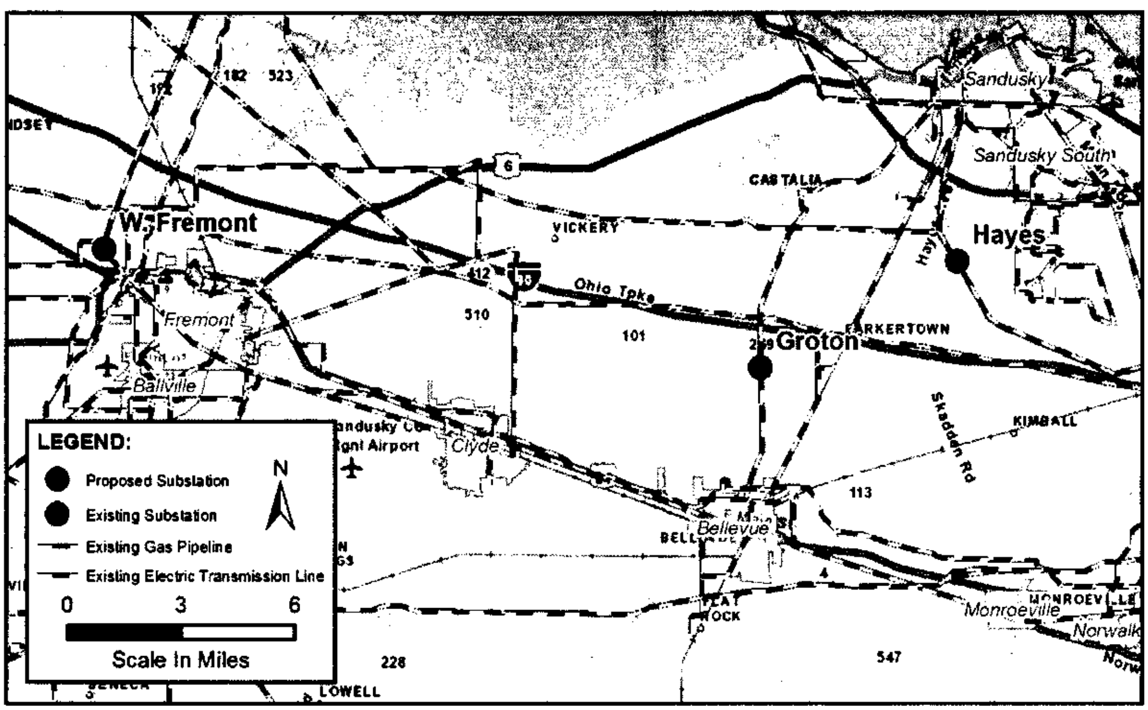


FIGURE 1-1
Project Overview Map

SECTION 2
Purpose and Objectives

2.1 Purpose and Objectives

ATSI intends to submit an Application to the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need, pursuant to Admin. Code Chapter 4906-15. This Route Selection Study ("RSS") is intended to supplement the information provided in Section 03 of the Application and contains a description of the process used by ATSI to identify the Preferred and Alternate Routes ultimately presented in the Application, as well as the data and other information relied on by the Applicant in making those selections.

CH2M HILL, the principle consultant employed by ATSI to prepare this RSS, has developed a process to site transmission facilities that satisfies the regulatory requirements for siting major transmission projects but also remains flexible enough to address local concerns, remain sensitive to local input and draws upon the lessons learned by both ATSI's siting staff and the staff of CH2M Hill in prior siting matters.

A variety of methods have been used over the years as technology, regulations, and public awareness have evolved to identify the lowest impact transmission line routes. Although core siting principles have generally remained the same, there are unique elements to each project related to geography and setting, the type of project, the political and regulatory climate, and schedule that are critical to developing transmission line route alternatives that have the fewest overall impacts. These unique elements influence the siting criteria to be used and the relative weighting (or emphasis) applied to each of them. The Hayes-West Fremont 138 kV Transmission Line Project is no different and, as detailed in this RSS, this Project must contend with a suite of competing commercial, technical, environmental, and land use criteria that necessitated a comprehensive, iterative, and effective siting study design. As a result of these efforts, the RSS design used for the Project relied on appropriate data at the appropriate scale to focus on those areas and corridors with the greatest potential for success.

SECTION 3
Route Selection Process

The first step in a RSS process design is the identification of a general project area. A general project area must be defined in order to begin the route selection process by identifying the boundaries within which practical routing options can be identified.

The general project area is generally limited to a reasonable distance between the predetermined end points, in this case, the Hayes and West Fremont Substations. Other key factors in determining the general project area are other significant constraints in and around the project area, such as, major water bodies, urban areas, existing transportation corridors and existing utility corridors. In the case of this Project, constraints identified near the project area include Lake Erie, which is located north of the Hayes and West Fremont Substations, and the cities of Fremont, Clyde and Bellevue, which are located south of the Hayes and West Fremont Substation. Also, numerous transportation corridors were identified, namely Interstate 80, US Highway 6, and US Highway 20.

Based on these large scale constraints, the general project area for this Project was limited by Lake Erie to the north, the West Fremont Substation to the west, the Hayes Substation to the east, and, although there are no "hard" boundaries to the south, extending the general project area past the City of Bellevue would add unnecessary length to any proposed route alternative given the eastern and western termini of the Project at the Hayes and West Fremont Substations.

Despite the fact that the general project area is located in a largely rural area, several east-west trending linear rights-of-way and transportation corridors were identified and considered in the siting process. These include pipelines, existing electric transmission lines, and highways. These linear rights-of-way presented potential opportunities for siting the Project. Conversely, there are small streams and rivers to cross, and it is likely that wetlands and other waters will present siting constraints as efforts are made to minimize ecological impacts. The evaluation of multiple existing corridors, along with the modeling the potential for large wetlands and other ecologically sensitive areas impacts to site selection, were handled through a RSS process that drew on several of the processes and consideration described in the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation's (GTC) raster-based siting process, along with customized constraints, scoring techniques, and weighting values developed by CH2M Hill's siting team. This process relies on public information and other freely available data in the initial stages to filter out those areas that are clearly unsuitable and detailed field investigations at later stages to refine the selection process.

3.1 Macro-corridor Analysis

Once the general project area was identified, the first step in the RSS was to develop a focused study area based on relatively coarse (broad scale) and readily available data. This step involved the creation and evaluation of three broad or macro corridors that identify the most preferable corridor(s) within three general siting corridor types:

1. That parallel existing transmission lines;
2. That parallel existing transportation corridors; or
3. That will create a new corridor, generally referred to as a cross-country corridor.

These three general siting corridor types represent the likely routing scenarios in the general project area for a transmission line and provide a rational and initial method for limiting a defined "study area" to the area most likely to contain practical routes. This process is referred to as macro-corridor generation and is based on the techniques reported by the EPRI and GTC, but which has been modified by CM2H Hill to incorporate its expertise in siting transmission projects and to facilitate a more comprehensive assessment of Project specific factors. This step uses the following readily available data:

- 2006 National Land Cover Dataset ("NLCD") (U.S. Geological Survey [USGS])
- Existing transmission lines (varied sources)
- Gas pipelines (varied sources)
- Major roads (Environmental Systems Research Institute)
- Railroads (Environmental Systems Research Institute)
- Slope (10–meter [m] digital elevation model, USGS)
- Superfund sites (avoidance area, U.S. Environmental Protection Agency)
- Airports (avoidance area, Environmental Systems Research Institute)
- National Register of Historic Places (Avoidance Area, National Park Service)
- Federal and state parks (avoidance area, Environmental Systems Research Institute)

These data layers for the general project area are transformed into mapping grids that store values for each cell that represents its relative suitability to host a transmission line (for example, a steep slope is unsuitable, whereas a flat slope is highly suitable) and a common numeric index, or score, is used to reflect relatively suitability within each characteristic. Land cover, roads, railroads, transmission lines, gas pipelines, and slope are assigned a suitability value for each macro-corridor being considered. The suitability values range between 1 and 9, where 1 is the most suitable and 9 is the least suitable. Table 3-1, below, shows the data layers and the relative suitability scores assessed for each macro corridor. "Avoidance areas" consist of features that are known to be critical siting characteristics and can be described as "fatal flaws" in any route that contains those features. In the maco-corridor analysis, these areas are assigned "No Data" values that prohibit any analysis to occur within that cell, which precludes that cell from being considered further in the siting process. After generating the suitability surfaces, a "cost/distance" algorithm is applied to develop the macro-corridor(s) for each scenario, and approximately the top 3 to 6 percent of the areas identified in this modeling are considered. The point at which the areas are identified for further analysis is based on the first natural break in the frequency distribution of the cumulative cost/distance model and is used to establish each macro-corridor.

Data Layers	**Cross Country Scenario**	**Transmission Scenario**	**Transportation Scenario**
NLCD			
Forests	2	3	3
Developed	9	9	9
Scrub Shrub	1	3	3
Grasslands	1	3	3
Agriculture	1	3	3
Water	7	7	7
Barren Land / Quarries	9	9	9
Wetlands	9	9	9
Slope > 30 Degrees	9	9	9
Transmission Lines	5	1	5
Railroads	5	8	1
Major Roads	9	9	1
Avoidance Areas			
Airports	*Avoidance*	*Avoidance*	*Avoidance*
Superfund Sites	*Avoidance*	*Avoidance*	*Avoidance*
NHRP Historic Sites	*Avoidance*	*Avoidance*	*Avoidance*

TABLE 3-1
Macro-Corridor Suitability Values

3.1.1 Transmission Corridor

The transmission corridors from Hayes Substation, to Groton Substation, to West Fremont Substation have large sections of overlap. One of the larger transmission corridors from the Hayes Substation to the West Fremont Substation parallels the existing Beaver-Davis Besse 345 kV Transmission Line and then continues west of US Highway 6 to parallel an existing FirstEnergy distribution line. This corridor expands slightly north of the City of Fremont to support paralleling an existing natural gas line and an existing ATSI 138 kV transmission line. The other large transmission corridor is located near Interstate

80, which parallels an existing Dominion East Ohio natural gas pipeline. A smaller transmission corridor was identified, which parallels several distribution lines, and would skirt around the northern portion of the City of Fremont. Also, numerous north-south corridors were identified, which parallel existing distribution lines, connect the two major corridors described above, and provide a connection to the Groton Substation (Figure 3-1-1).

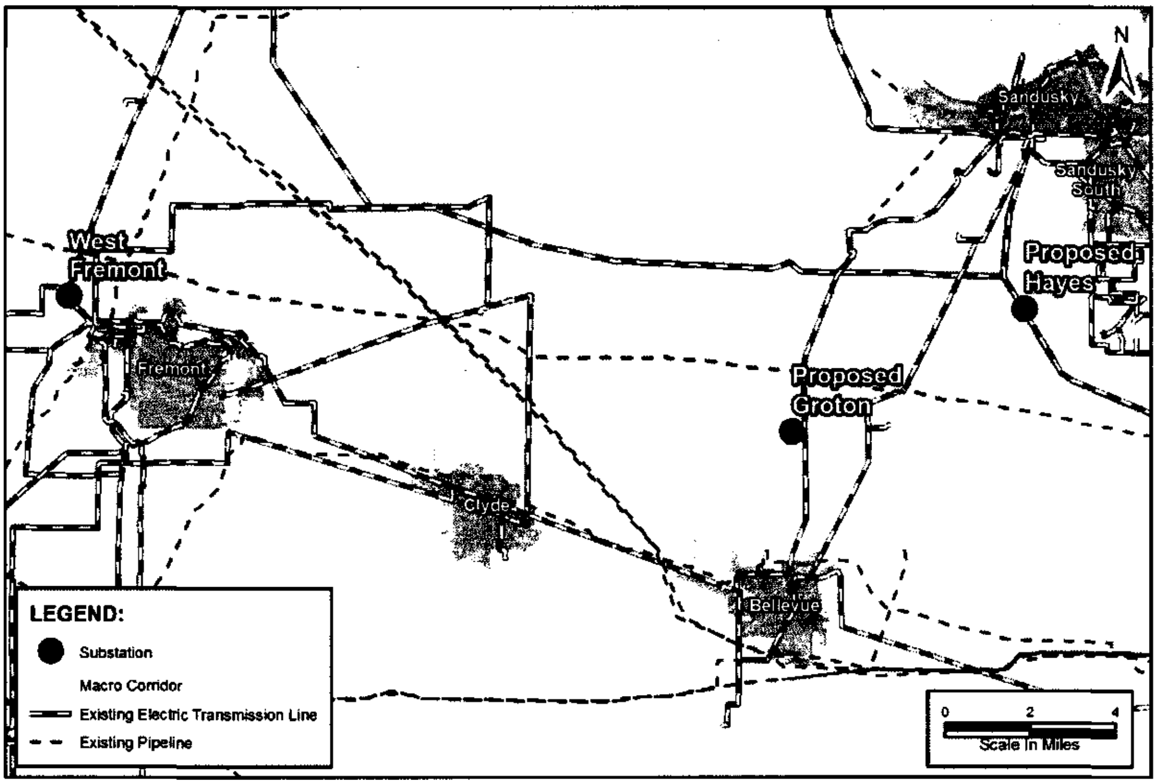


FIGURE 3-1-1
Transmission Macro Corridor Map

3.1.2 Transportation Corridor

The transportation corridor from the Hayes Substation to the Groton Substation is a corridor, approximately 4.5 miles wide, that travels southwest and only diverges around an active quarry. Several corridors from the Hayes Substation to the West Fremont Substation and from the Groton Substation to the West Fremont Substation coincide, most notable were corridors paralleling Interstate 80, State Route 412, US Highway 6, and State Route 301. Unlike the transmission and cross country corridors, the transportation corridors travel through the City of Fremont, primarily south of US Highway 6 (US Highway 20), and enter the West Fremont Substation from the south (Figure 3-1-2).

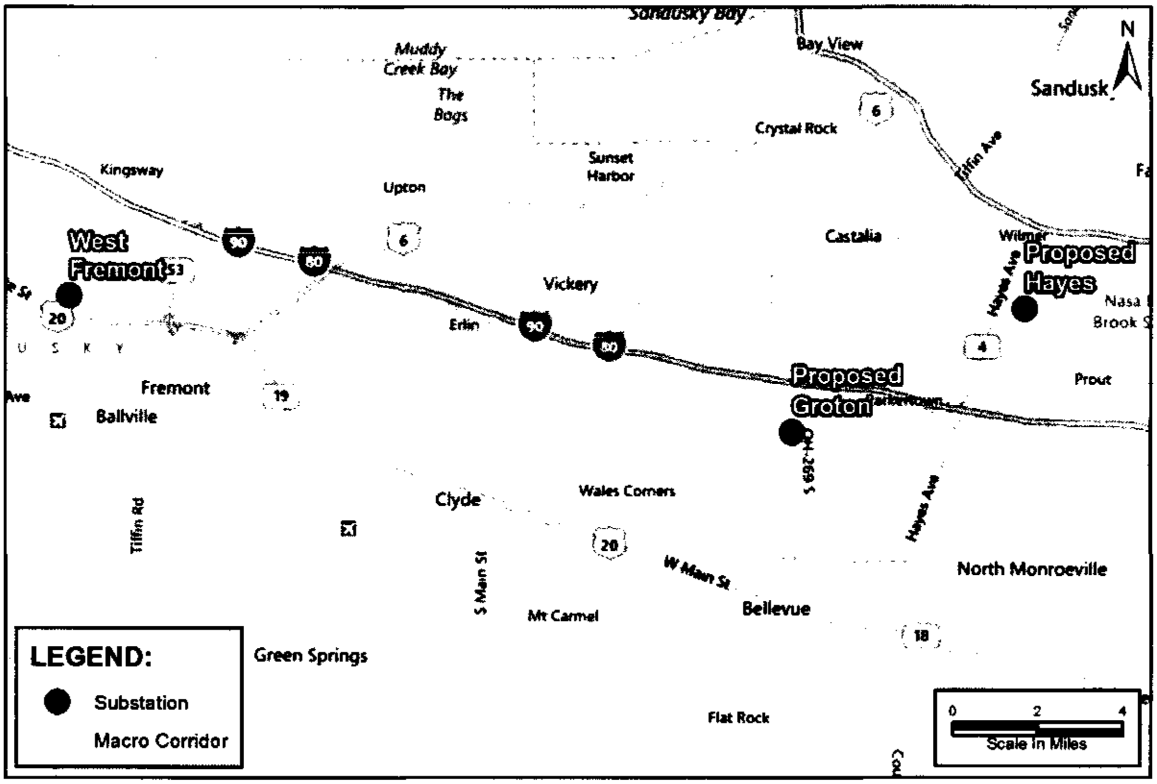


FIGURE 3-1-2
Transportation Macro Corridor Map

3.1.3 Cross Country Corridor

Due to the rural nature of the general project area, the cross country corridor encompasses a very broad swath across the entire study area. From the Hayes Substation, the cross country corridor heads due west, until reaching the outskirts of the City of Fremont, at which point, the cross country corridor arcs up and around the northern portion of the City of Fremont and into the West Fremont Substation. The cross county corridor from the Hayes Substation to the West Fremont Substation is approximately 2.5 miles wide. The cross country corridor from the Hayes Substation to the Groton Substation is an even wider corridor, approximately 3.5 miles wide, heading directly southwest. The corridor diverges east of the Groton Substation to minimize disruption to an active quarry. The cross county corridor heads west from the Groton Substation to the West Fremont Substation and expands as it heads towards US Highway 6. A pinch point occurs in the cross country corridor as it heads around the northern portion of the City of Fremont and across the Sandusky River. The cross country corridor expands again as it heads southwest into the West Fremont Substation (Figure 3-1-3).

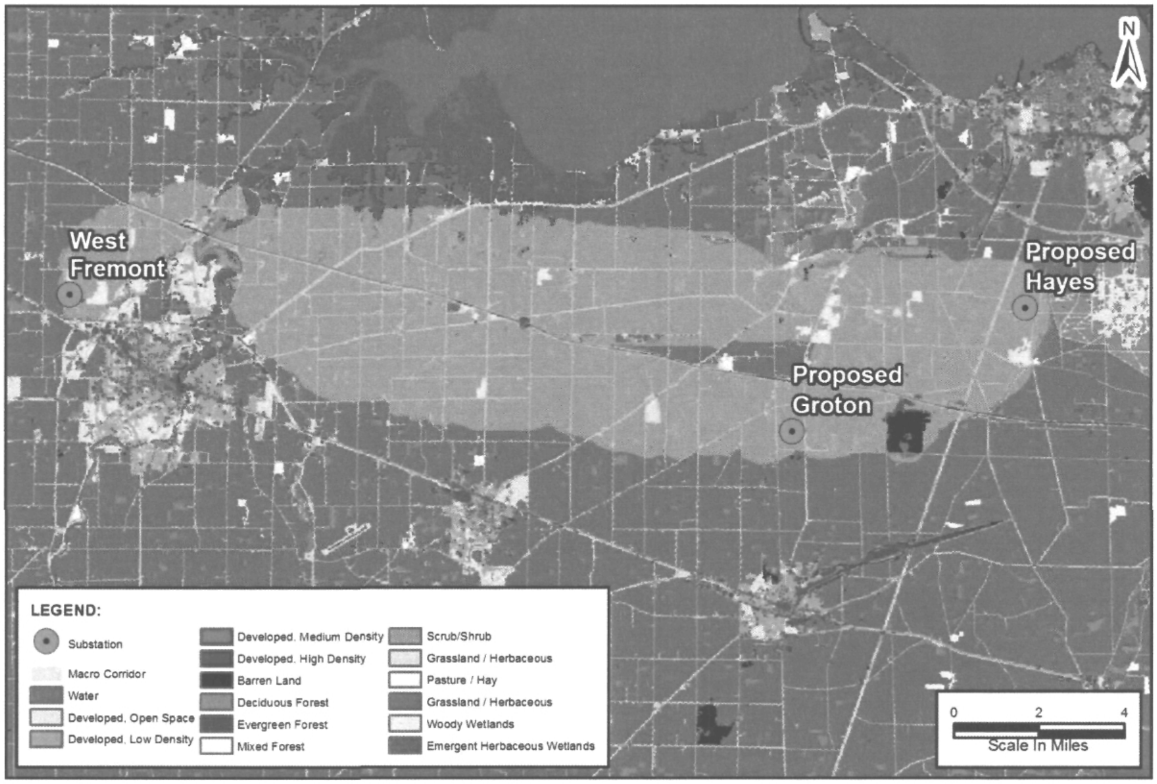


FIGURE 3-1-3A
Cross Country Macro Corridor Map

Once the three macro-corridors are identified, they are combined to create a composite macro-corridor map. The outer boundary of the composite macro-corridors is used to define the focused study area for the project. The focused study area includes the best overall transmission, transportation, and cross-country corridor(s). By combining all three macro-corridors, a focused study is defined that helps focus detailed data collection and analysis to the area with the greatest reasonable chance supporting the route options with the fewest overall impacts. (Figure 3-1-4).

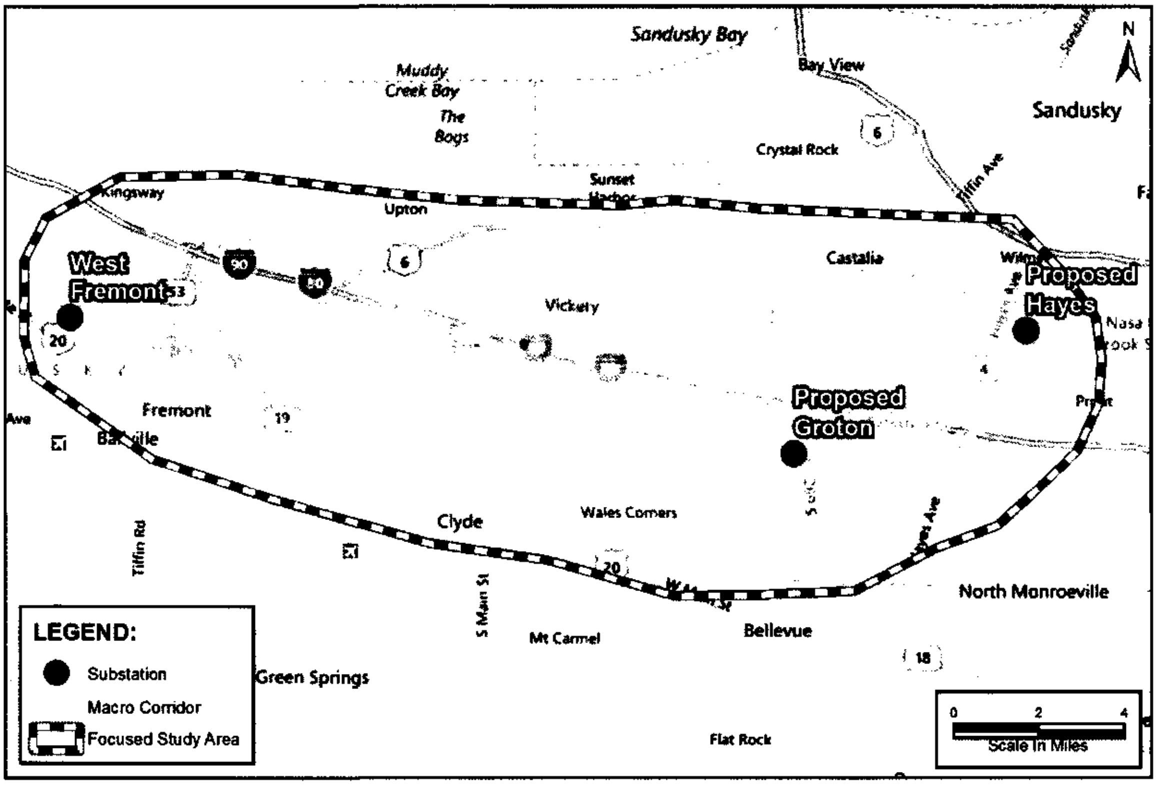


FIGURE 3-1-3B
Composite Macro Corridor Map

3.2 Potential Corridor Analysis

After the focused study area was defined, the next step in the RSS was to conduct a detailed study incorporating field data and observations.

Three tiers of suitability surfaces were created, first with individual criteria or layers (Tier 1); second, with combined categorical groups for engineering, ecological, and land use/cultural (Tier 2); and third, with combined suitability surfaces having multiple, different weighting scenarios to capture preferential corridors for each category (Tier 3). This step in the RSS identifies four combined suitability surfaces that are used to generate potential route corridors (see Table 3-2 following the text). Like the macro-corridor analysis, a cost/distance algorithm was applied and the top 3 to 6 percent of the areas identified (based on the first naturally occurring break in normal distribution) and were used to establish potential route corridor(s) for each scenario. The potential route corridors were identified using the following suitability surfaces:

1. Ecological Preference - A cost distance scenario that emphasizes avoidance and minimization of ecological constraints,

2. Technical Preference - A cost distance scenario that emphasizes technical attributes and minimizes technical constraints,

3. Land Use and Cultural Preference - A cost distance scenario that emphasizes avoidance and minimization of land use and cultural constraints, and

4. Equal Preference - A cost distance scenario that balances the ecological, technical, and land use/cultural criteria.

In all scenarios, the results favored corridors that paralleled existing linear rights of way, including electric transmission and distribution lines, railroads, and natural gas pipelines. Below is a description of the results for each potential route corridor scenario.

3.2.1 Ecological Preference

From the Hayes Substation, the ecological preference route corridors parallel the existing Beaver-Davis Besse 345 kV Transmission Line to the north and also heads to the southwest towards the proposed Groton Substation through a combination of paralleling existing electric distribution lines and new cross-country corridors. West of the Groton Substation the corridor primarily parallels a Dominion East Ohio Gas Company natural gas pipeline. The two corridors merge approximately halfway and continue to parallel the gas pipeline until the northeast portion of the City of Fremont where they follow an electric distribution line to the West Fremont Substation (Figure 3-2-1).

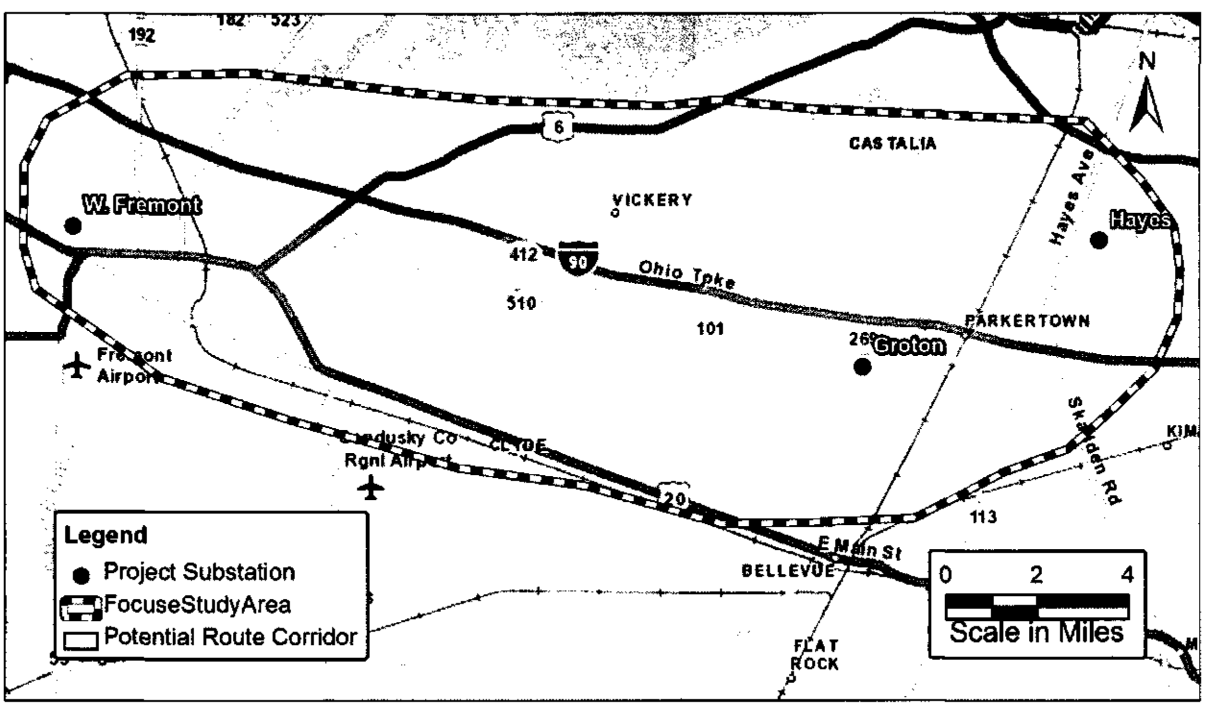


FIGURE 3-2-1
Ecological Preference Corridor Map

3.2.2 Technical Preference

The technical preference route primarily parallels overhead electric transmission and distribution lines. From the Hayes Substation, the corridors parallel the Beaver-Davis Besse 345 kV Transmission line. A couple of distribution lines are paralleled to the south and southwest towards the proposed Groton Substation, and one corridor continues towards the City of Bellevue and then northwest towards Fremont along US Highway 20. The northern corridor turns southwest and parallels a railroad and distribution towards the City of Fremont where it reconnects with the southern corridor and on to the West Fremont Substation (Figure 3-2-2).

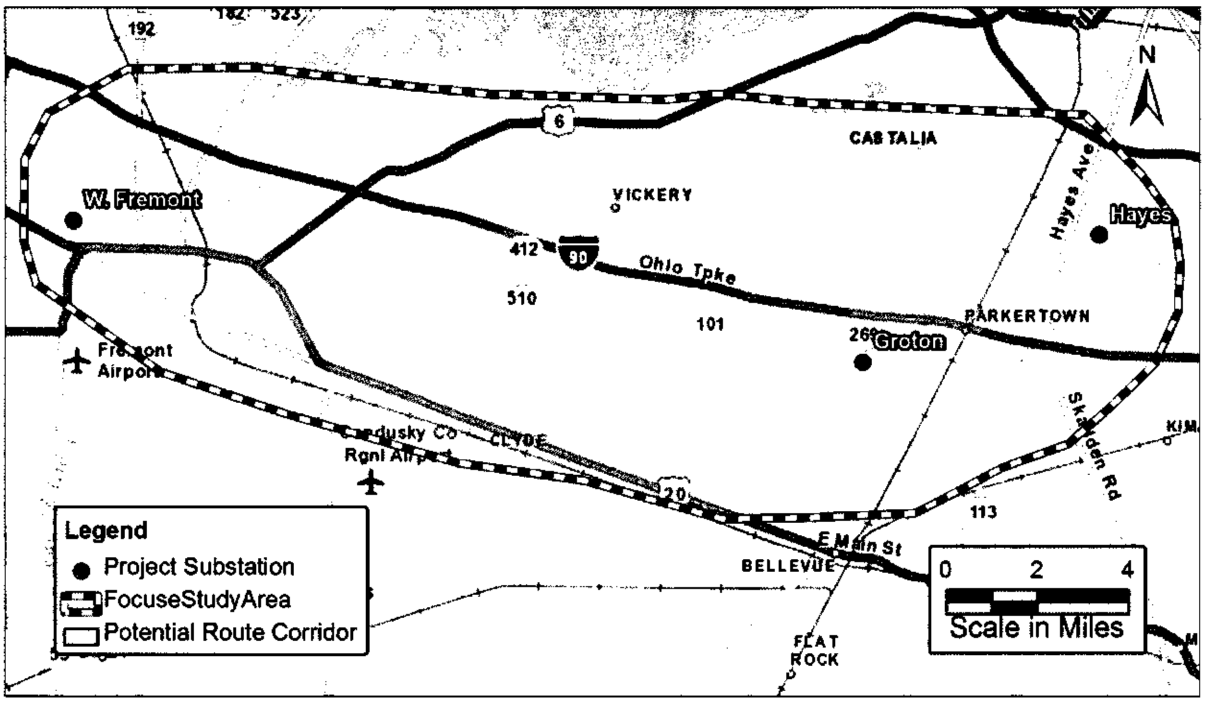


FIGURE 3-2-2
Technical Preference Corridor Map

3.2.3 Land Use and Cultural Preference

The land use and cultural potential route corridors primarily parallel the existing Beaver-Davis Besse 345 kV transmission line to the north and the Dominion East Ohio Gas Company's natural gas pipeline in the central portion of the focused study area. The northern corridor connects to electric distribution lines north of Fremont and parallels them to the West Fremont Substation and the southern corridor also parallels electric distribution lines along the north side of the City of Fremont (Figure 3-2-3).

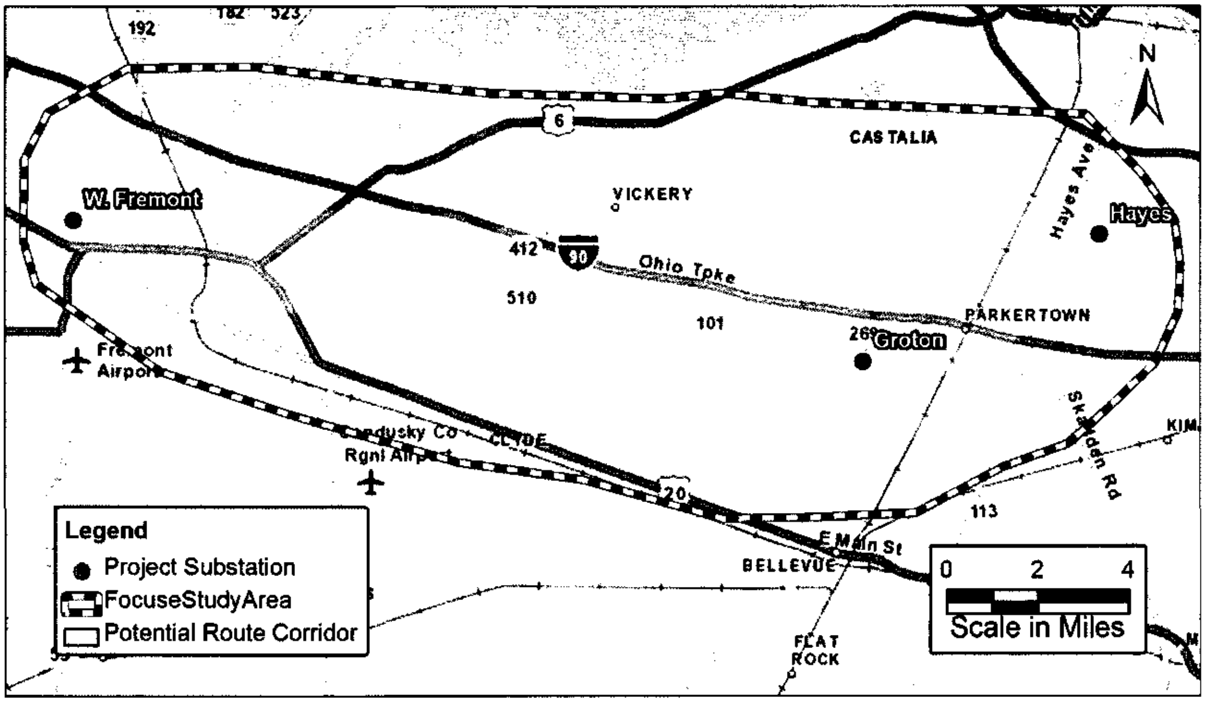


FIGURE 3-2-3
Land Use and Cultural Preference Corridor Map

3.2.4 Equal Preference

The equal preference potential route corridors are similar to the ecological preference corridors except that they parallel the distributions lines to the northeast of Fremont exclusively instead of with a wider corridor that includes the natural gas pipeline further to the north (Figure 3-2-4).

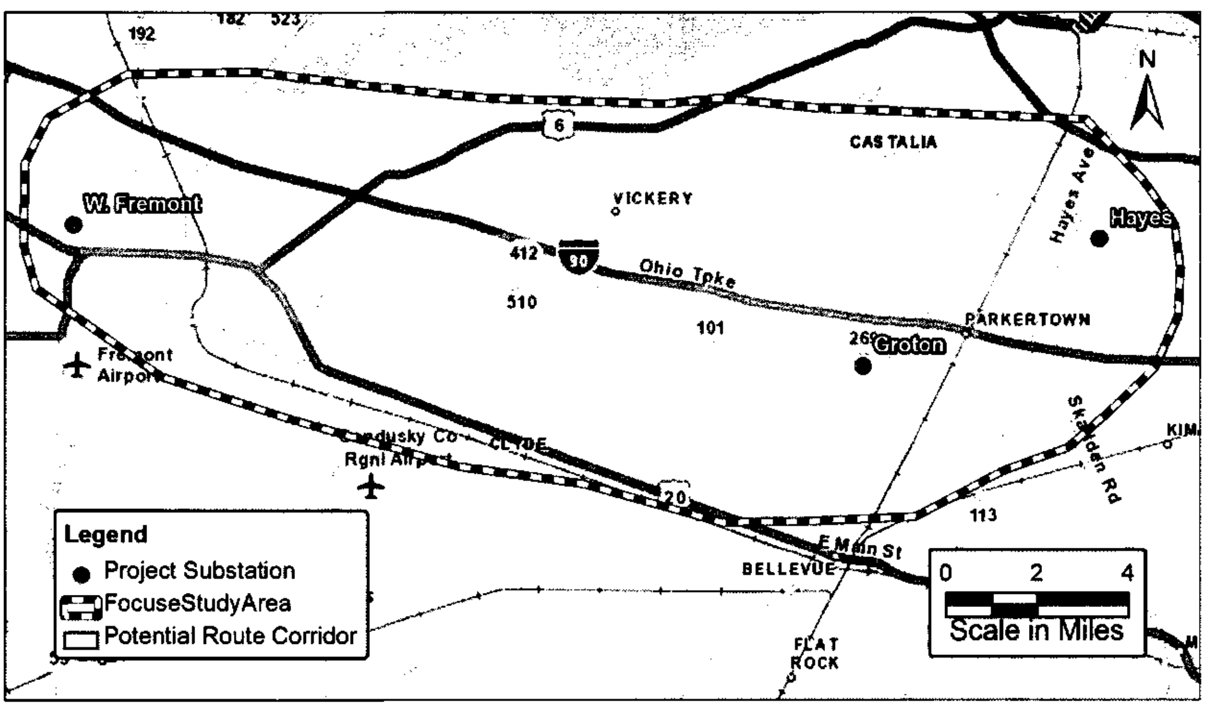


FIGURE 3-2-4
Equal Preference Corridor Map

3.3 Corridor Favorability Ranking

The scenarios described in the potential route corridor analysis identified the likely corridors in which route centerlines could be placed, and identified the routes within those corridors that would score better than routes located outside of those corridors. However, the potential route corridor analysis lacks the ability to compare relative scores for the various route corridors. In order to compensate for this limitation, the corridor favorability ranking was developed to act as a visual guidance. The corridor favorability ranking filters out the least favorable of the corridors and allows for a more focused study of the most favorable corridors. If this process does not net sufficient options, more corridors can be added for further consideration.

For the corridor favorability ranking, the tier 2 suitability surfaces were combined to create a separate tier 3 suitability surface, which mimics the weighting employed in the route scoring and ranking step of the route selection study. The weighting strategy for the route selection study gives 40% weighting to ecological criteria, 40% for land use criteria, 10% for cultural criteria, and 10% for technical criteria (refer to Section 3.4 for a more detailed description of the route selection process). However, because the land use and cultural components of the potential route corridor are grouped into one category in the siting process, the weighting used in the corridor favorability ranking consisted of 40% for ecology, 50% for land use and cultural, and 10% for technical. The results for this suitability surface are shown in Figure 3-3A for routes from the Hayes Substation to the West Fremont Substation and Figure 3-3B for route from the Groton Substation to the West Fremont Substation. In figures 3-3A and 3-3B, blue areas indicate the highest suitability while white areas indicate areas of lowest suitability.

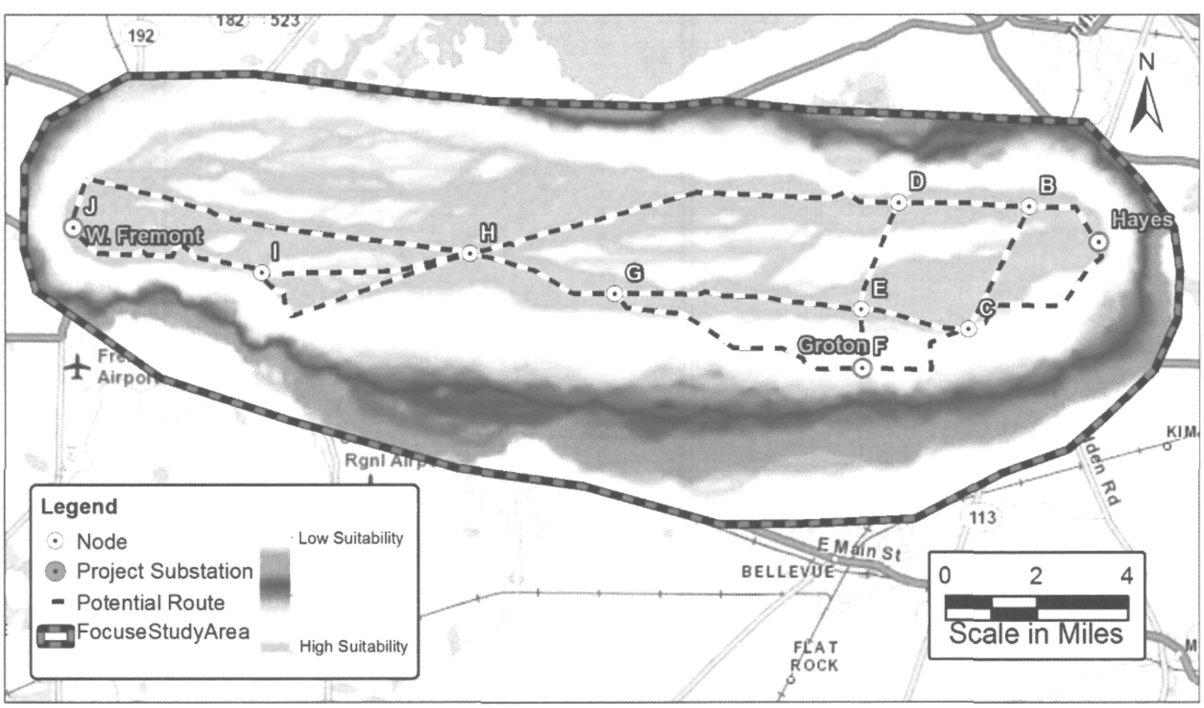


FIGURE 3-3A
Hayes-West Fremont Corridor Favorability Map

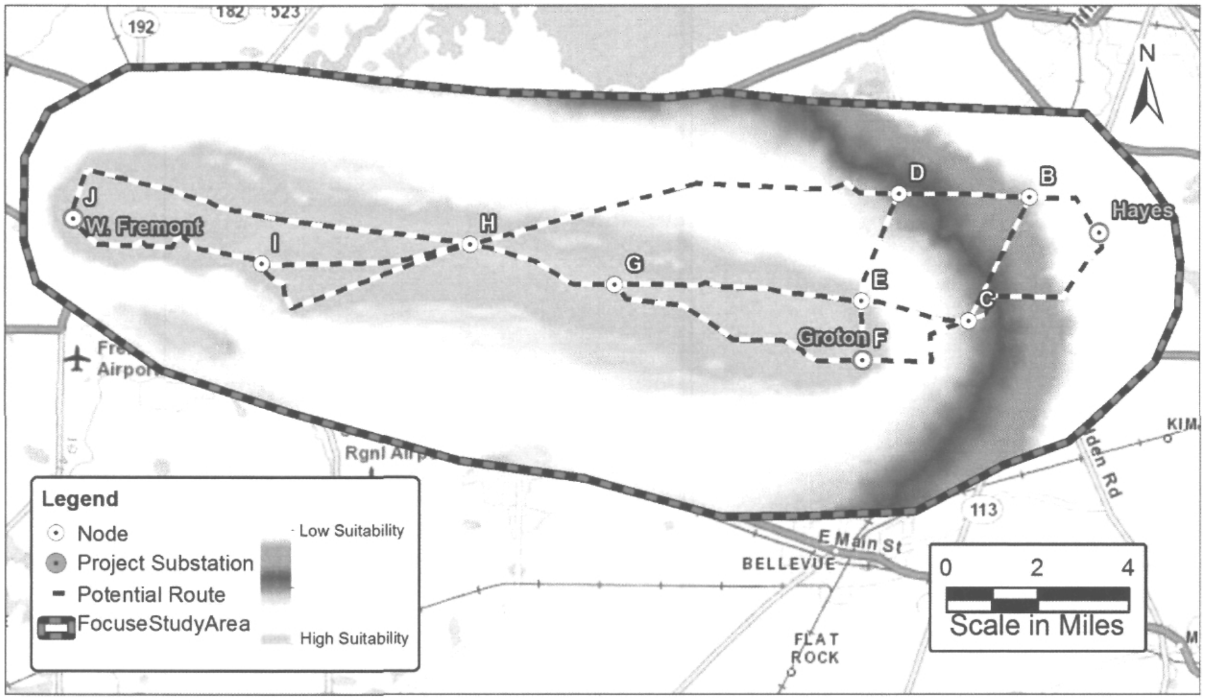


FIGURE 3-3B
Groton-West Fremont Corridor Favorability Map

Each of the potential route corridors identified above were then reviewed to assess where each corridor falls within this favorability assessment. Two corridors were immediately identified that appeared to be less favorable than the other potential route corridors and were not further evaluated. These corridors were the western half of the northern corridor identified in the equal preference scenario and the southern corridor identified in the technical scenario. The northern corridor in the equal preference scenario appears to be primarily influenced negatively by ecological criteria including National Wetland Inventory, ODNR managed areas, and threatened and endangered species habitat and/or reported presence. The southern corridor in the technical scenario appears to be influenced negatively by land use criteria of buildings and residences.

Therefore, the corridors identified in the corridor favorability ranking (those areas identified in blue and green) were used to help guide the placement of candidate routes primarily by eliminating certain high impact corridors from further consideration.

3.4 Route Identification, Evaluation, and Ranking

After limiting the potential route corridors and developing the evaluation criteria, additional data was collected within those areas identified as likely supporting the best routing options. The evaluation criteria included both attribute and constraint data. Attribute data represents possible features that would promote the development of an electric transmission lines (i.e. paralleling existing utility infrastructure), whereas, constraint data corresponds to areas that would limit the development of an electric transmission line (i.e. residential areas). Using the evaluation criteria, potential route centerlines were identified within the corridors established in the corridor favorability ranking.

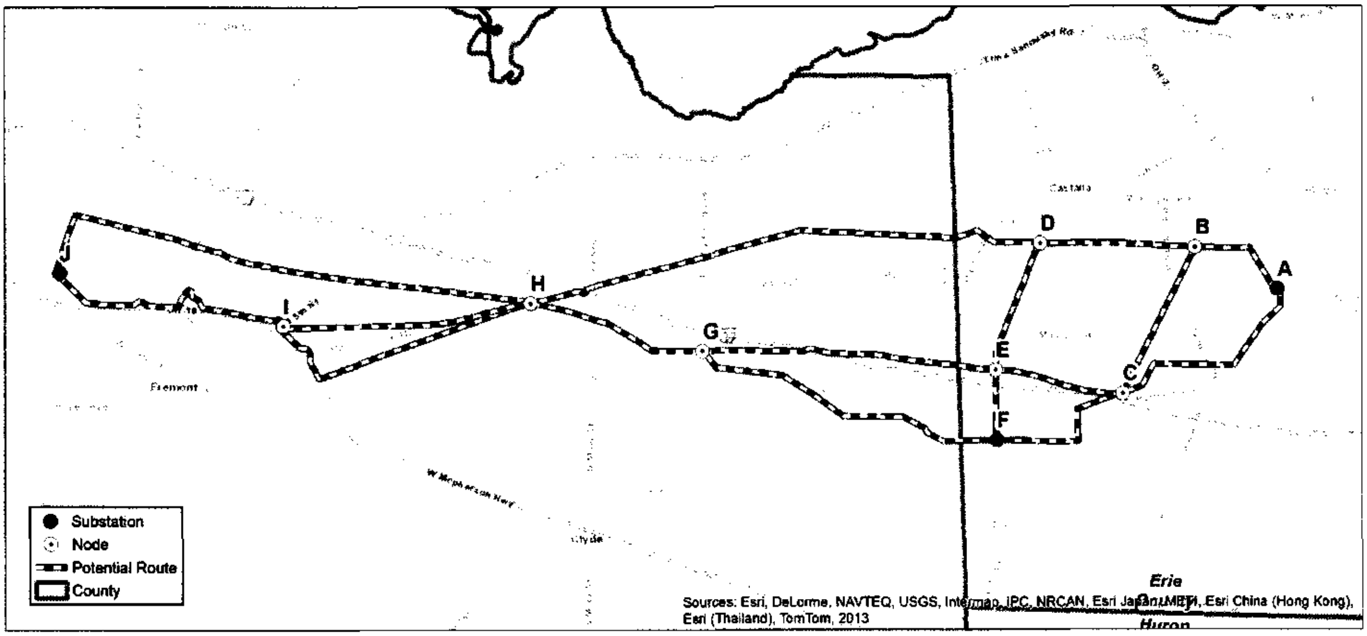


FIGURE 3-4
Route Alternatives

Below is a detailed description of each of the proposed route segments identified at this stage of the RSS:

Node A: Node A is the proposed Hayes Substation, which is located in an agricultural field. The proposed Hayes Substation will be located in Erie County along Fox Road, between Patten Tract Road and Hayes Avenue.

A-B: Segment A-B travels northwest out of the Hayes Substation for 0.9 mile. The segment then turns sharply west for an additional 1 mile. Segment A-B parallels existing transmission line for its entire 1.9 mile length and crosses only agricultural land. This segment also crosses two roads and an existing railroad track.

A-C: Segment A-C heads south out of the proposed Hayes Substation, crossing over 2 sets of existing transmission line. The segment then turns southwest for 1.4 miles, turns west for 1.5 miles, and then travels generally southwest for an additional 0.8 mile. Segment A-C travels over mainly agricultural land, crosses 6 roads, and an existing railroad track.

B-C: Segment B-C is approximately 3 miles long and parallels an existing transmission line, railroad track, and Old Railroad Road for its entire length. This segment crosses mainly over agricultural land.

B-D: Segment B-D travels west for 2.9 miles. This segment mainly crosses agricultural land and parallels the southern side of an existing transmission line.

C-E: Segment C-E travels mainly west, crossing over agricultural land. This segment is 2.4 miles long, and parallels the southern side of an existing natural gas pipeline.

C-F: Segment C-F begins by traveling southwest for 0.9 mile. During which the segment crosses over a natural gas pipeline and Interstate 80. The segment then turns sharply south for 0.6 mile, crossing over Portland Road and agricultural fields. For the first 1.5 miles, this segment parallels an existing transmission line. Next, the segment turns sharply again and heads west for 1.5 miles, crossing over agricultural fields.

D-E: Segment D-E heads generally south for 2.5 miles. The segment parallels an existing distribution line and State Route 269.

D-H: Segment D-H is 9.8 miles long. The segment begins by heading west for 4.5 miles, paralleling the south side of an existing transmission line, crossing over agricultural land and woodlots. Next, the segment travels southwest for 5.2 miles, paralleling the south side of an old railroad corridor for the entire 5.2 miles. This portion of the segment also parallels an existing distribution line for approximately 2.3 miles.

E-F: Segment E-F heads south for 1.3 miles, paralleling the west side of State Highway 269 and a distribution line.

E-G: Segment E-G is 5.4 miles, which heads west, and parallels the south side of an existing natural gas pipeline. This segment mainly crosses agricultural land and woodlots. Segment E-G also crosses over Interstate 80.

Node F: Node F is the proposed Groton Substation. The proposed Groton Substation is located on agricultural land, just north of Strecker Road, between State Route 269 and County Road 312.

F-G: Segment F-G generally heads northwest for approximately 6 miles and crosses over agricultural land. This segment crosses over 6 roads, 2 of which are moderately residential where the proposed segments would cross over the roads (State Route 101 and County Road 175).

G-H: Segment G-H heads west for 1.0 mile and then turns and heads generally northwest for 2.4 miles. The entire 3.4 miles parallels the south side of a natural gas pipeline and crosses over agricultural land.

H-I (north): Segment H-I (north) heads southwest for 1.8 miles, crossing over and then paralleling the northern side of an old railroad corridor. The segment turns slightly and heads due west for an additional

2.7 miles, continuing to parallel the northern side of an old railroad corridor. Segment H-I (north) crosses over agricultural fields and through the small town of Erlin.

H-I (south): Segment H-I (south) travels 4.1 miles in a southwestern direction. The route parallels the south side of an existing distribution line, crossing over agricultural land, woodlots, and the small town of Erlin. The route then turns and heads northwest for 1.3 miles, paralleling a distribution line and US Highway 20.

H-J: Segment H-J is a long 9.8 mile segment. This segment starts out by heading northwest for 8.6 miles paralleling the north side of an existing natural gas pipeline. The segment crosses over agricultural land, the Sandusky River, and several small woodlots. The route then turns and heads generally south for 1.2 miles, paralleling an existing transmission line, into the west side of the West Fremont Substation.

I-J: Segment I-J is approximately 5 miles long and parallels an existing distribution line for its entire length. The segment begins by heading generally west for 4.2 miles, paralleling the north side of a distribution line and US Highway 6. This portion of the segment crosses over commercial, residential, and agricultural land. Next the segment heads northwest for 0.8 mile, paralleling the east side of a distribution line and an existing railroad track, and crossing over agricultural land. Segment I-J enters the south side of the West Fremont Substation.

Node J: Node J is the West Fremont Substation. It is located west of County Road 138.

The segments described above were then used to create feasible route candidates, 27 routes were identified (see below). Routes which would require considerable backtracking were removed from further consideration. These routes begin at the Hayes Substation, connect to the Groton Substation, and end at the West Fremont Substation.

1. A-B-D-E-F--D-H-J
2. A-B-D-E-F--D-H-I(north)-J
3. A-B-D-E-F--D-H-I(south)-J
4. A-B-D-E-F--E-G-H-J
5. A-B-D-E-F--E-G-H-I(north)-J
6. A-B-D-E-F--E-G-H-I(south)-J
7. A-B-D-E-F-G-H-J
8. A-B-D-E-F-G-H-I(north)-J
9. A-B-D-E-F-G-H-I(south)-J
10. A-B-C-E-F--E-G-H-J
11. A-B-C-E-F--E-G-H-I(north)-J
12. A-B-C-E-F--E-G-H-I(south)-J
13. A-B-C-F-G-H-J
14. A-B-C-F-G-H-I(north)-J
15. A-B-C-F-G-H-I(south)-J
16. A-C-E-F--E-G-H-J
17. A-C-E-F--E-G-H-I(north)-J
18. A-C-E-F--E-G-H-I(south)-J
19. A-C-F-G-H-J
20. A-C-F-G-H-I(north)-J
21. A-C-F-G-H-I(south)-J
22. A-C-E-F-G-H-J
23. A-C-E-F-G-H-I(north)-J
24. A-C-E-F-G-H-I-J(south)-J
25. A-B-C-E-F-G-H-J
26. A-B-C-E-F-G-H-I(north)-J
27. A-B-C-E-F-G-H-I(south)-J

The next step after identifying the route alternatives was to score and rank the routes relative to one another. A quantitative ranking methodology, which involves sorting and converting raw route data to dimensionless scores and weighting the environmental, cultural, socioeconomic, and technical/engineering constraints, was utilized. These scores were tabulated and ranked. The score generated uses raw data counts, which are then normalized to a dimensionless parameter (a "score").

Normalizing the data is vital to ensure that all of constraints are compared according to the same scale and are directly comparable to one another. It also allows the data to be weighted later as desired. The following formula was used to normalize the raw data:

Normalized Score = ((Xij – Min Valuej) / Range) *100

Where: i = xth value in constraint and j = constraint

This normalizing method uses the range of collected data in a particular category for all route options such that there is no "bunching" of the data and avoids one constraint category being unintentionally influential.

The next step in this process is to weight the criteria. In its simplest form, weighting recognizes that under certain circumstances, one evaluation criteria is more relevant to determining an outcome than another. For example, a route located primarily in a residential/suburban area is a land use-dominated route and the selection of a route should avoid residences as much as practical. Conversely, a route through a nationally recognized ecological preserve should be designed to have the fewest ecological impacts, rather than the most practical from an engineering perspective. The weighing of the criteria, therefore, allows the RSS to take into consider general land-use patterns in the focus study area to emphasis the criteria that are most likely to be critical to the siting process in that particular focus study area. Weighing of these criteria, therefore, is project dependent and must be evaluated on a case-by-case basis. The weighting for the project is based on characteristics of the project area, supplemented and informed by the previous experience by ATSI and CH2M HILL, siting similar facilities. The following criteria weighting factors were used for the Project:

- Ecological Criteria weighted at 40%
- Cultural Criteria weighted at 10%
- Land Use Criteria weighted at 40%
- Technical Criteria weighted at 10%

Table 3-4 provides a detailed description of the criteria used to score the route alternatives, along with the data sources used to collect the criteria.

Category	Subcategory	Criteria	Weighting	Data Source
Ecological		Area of Woodlots within 60-ft ROW (in acres)	40%	Aerial Photograph (2011)
		Area of NWI within 60-ft ROW (in acres)		US Fish and Wildlife Services
		NHD Stream Crossing		US Geological Survey (The National Map)
	Threatened, Endangered, or Protected Species	Federal or State Endangered or Threatened Species Areas within 60-ft ROW		Ohio Department of Natural Resources Division of Wildlife (Ohio Natural Heritage Program)
		Federal or State Endangered or Threatened Species Areas between ROW and 1,000-ft		
		Federal or State Protected Species Areas within 60-ft ROW		
		Federal or State Protected Species Areas between ROW and 1,000-ft		
Cultural		National Register of Historic Places within 1,000-ft	10%	Ohio Historical Preservation Office
		Known Archaeology Sites within 100-ft		Ohio Historical Preservation Office
		Ohio Historical Inventory Historic Structures within 1,000-ft		Ohio Historical Preservation Office
		Cemeteries within 100-ft		Ohio Historical Preservation Office
Land Use	Residences	Residences within 30-ft	40%	Aerial Photograph (2011)
		Residences between 30 and 100-ft		
		Residences between 100 and 1,000-ft		
		Properties Crossed by Centerline		Sandusky and Erie County Auditors
	Institutional Land Uses	Linear Feet of Institutional Land Uses Crossed		Environmental Systems Research Institute (ESRI)
		Institutional Land Uses within 1,000-ft		
	Other Sensitive Land Uses	Linear Feet of Other Sensitive Land Uses Crossed		Protected Areas Database of the US (PADUS), Environmental Systems Research Institute (ESRI), and Ohio Department of Natural Resources Division of Wildlife
		Other Sensitive Land Uses within 1,000-ft		
Technical		Centerline Road Crossings	10%	Environmental Systems Research Institute (ESRI)
		Centerline Railroad Crossings		Environmental Systems Research Institute (ESRI)
	Turn Angles	Turn Angles Greater than 0 and Less than 20 Degrees		
		Turn Angles Greater than 20 Degrees		
	Paralleling Linear Features	Length of Segment Paralleling Existing Transmission ROW		PowerMap and Environmental Systems Research Institute (ESRI)
		Length of Segment Paralleling Existing Gas Line ROW		
		Length of Segment Paralleling Railroad Corridor		
		Length of Route		

TABLE 3-4
Route Selection Criteria

After the routes have been quantitatively scored and ranked they are then evaluated for qualitative factors that cannot be easily measured or quantified. These criteria include such things as aesthetics, construction access, community concerns, and other un-scored engineering considerations. Then, a combination of the quantitative scoring and ranking and the qualitative considerations are considered to make a final selection of Preferred and Alternate Routes. The results of this RSS are discussed in Section 4 of this RSS.

SECTION 4
Results

4.1 Initial Score and Rank Results

A score and rank was determined for each of 27 route alternatives, broken down by category (ecology, cultural, land use, and technical). Also, using the weighting scheme described in Section 3.4, an overall score and rank was given to each route alternative. These scores and ranks can be found in Table 4-1, following the text. Scores could range from a minimum (better) score of 0 to a maximum score of 100 (worse). However, scores for the 27 route alternatives ranged from a low score of 12.0 (more suitable route) to a high score of 77.1 (less suitable route).

Breaking down the route alternatives allows for the results of the route selections study to be clearly depicted. Since all of the route alternatives cross through Node H, the routes can be split into an eastern and western portion. There are nine eastern options and three western options to compare (refer to Figures 4A for eastern options and Figure 4B for western options).

Eastern Options

- A-B-D-E-F—D-H
- A-B-D-E-F—E-G-H
- A-B-D-E-F-G-H
- A-B-C-E-F—E-G-H
- A-B-C-F-G-H
- A-C-E-F—E-G-H
- A-C- F-G-H
- A-C-E-F-G-H
- A-B-C-E-F-G-H

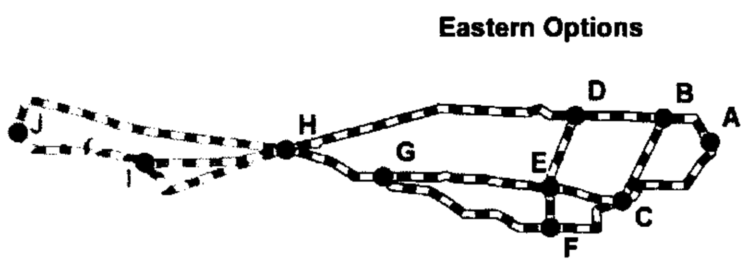


FIGURE 4-1A
Eastern Segment Options

Western Options

- H-J
- H-I(north)-J
- H-I(south)-J

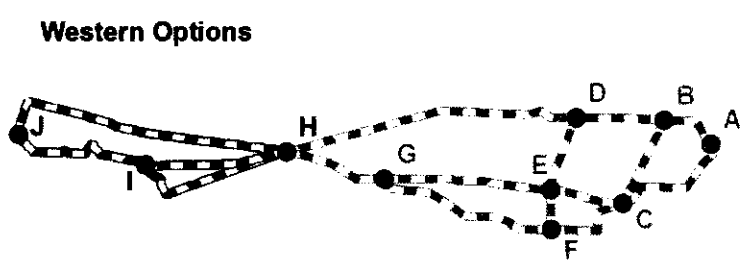


FIGURE 4-1B
Western Segment Options

The most favorable scoring eastern option was A-C-F-G-H. This option scored well because there were no residences within 100 feet, no institutional or sensitive land uses within 1,000 feet, no threatened, endangered, or protected species within 1,000 feet and no cultural criteria within the specified distances. The next most favorable scoring eastern option was A-C-E-F-G-H, however, this option has a significant portion of overlap with option A-C-F-G-H. An eastern option with minimal overlap with A-C-F-G-H was A-B-C-E-F—E-G-H. This option was the 7th best eastern option.

For the western portion, the most favorable scoring option was H-J. This option scored well because it had the least amount of stream crossings, no institutional land uses within 1,000 feet, the least amount of residences within 1,000 feet, and parallels a large amount of existing utility infrastructure. Option H-I (south)-J was the second most favorable western option, while H-I (north)-J was the third most favorable western option.

The most favorable eastern and western portions combined to create Route 19. Route 19 is the most favorable scoring route alternative, with a score of 12.0. This route has the second most favorable ecological score, the most favorable land use score, tied for the 10th most favorable cultural score, and the third most favorable technical score.

The next best scoring route is Route 22 (A-C-E-F-G-H-J). Route 22 had an overall score of 14.0. This route had the most favorable ecological score, the second most favorable land use score, tied for the 10th most favorable cultural score, and had the 12th most favorable technical score. However, Route 22 has approximately 76% in common with Route 19 and could not be considered as an alternative to Route 19 because the route selection study must conform to the OPSB process, and Admin Code Rule 4906-05-04(A) which states:

> *"Two routes shall be considered as alternatives if not more than twenty per cent of the routes are in common. The percentage in common shall be calculated based on the shorter of the two routes."*

Consequently, in order to be considered an appropriate alternative route to Route 19, the route would need to have less than 20% in common with Route 19. Route 12 (A-B-C-E-F—E-G-H-I(south)-J) is the next best scoring route alternative with less than 20 percent in common with Route 19. However, in further evaluating the alternatives to Route 19, FirstEnergy identified an inactive railroad corridor that would provide enough width for the potential right-of-way that was located on Route 11 [A-B-C-E-F—E-G-H-

I(north)-J]. AS a result, Route 11 was selected as a more suitable alternative. Route 11 has a score of 43.1 and ranks 22nd. Route 11 has the 24th most favorable ecological score, the 17th most favorable land use score, ties for the 13th most favorable cultural score, and has the 9th most favorable technical score. Based on these initial results, ATSI determined that it would seek public input on Route 19 and Route 11 and evaluate these route options further in the field.

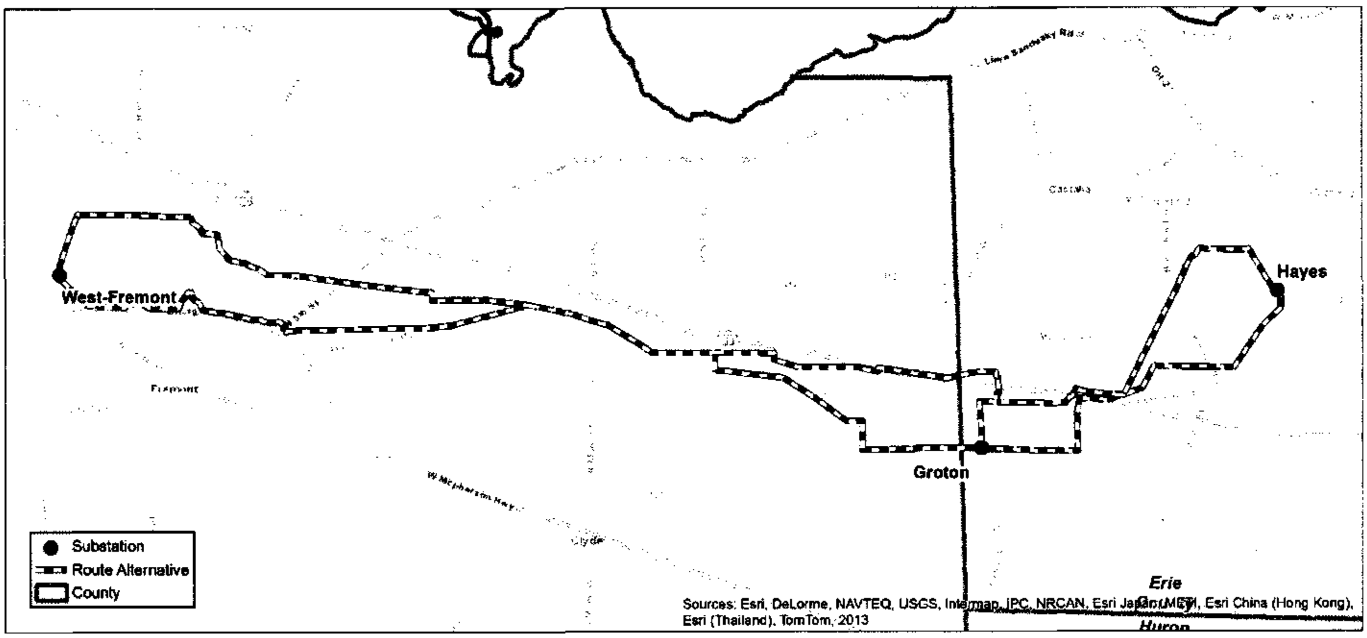


FIGURE 4-2
Public Information Meeting Route Alternatives October, 2012

4.2 Public Input

Route 19 and 11 were presented at two public information meetings on October 17th and 18th, 2012 in Fremont and Bellevue, OH respectively. These meetings are required as part of the Ohio Power Siting Board process and are designed to inform the public of the siting process, the route selection process and to solicit input from the public on the Project. Public input was received during and after the public information meetings and through communications to ATSI.

Two primary concerns were brought up by multiple parties regarding the public input portion of this Project. First, there was concern about potential impacts of the project to Peninsular Farms, a self-designated private conservation area located on the west side of the Sandusky River just outside of the City of Fremont. One of the alternatives presented at the public information meetings was co-located along an existing gas pipeline corridor and crossed through the middle of Peninsular Farms. Second, throughout the central and eastern portions of the project area, there were concerns raised by property owners regarding the crossing through the middle of agricultural fields, again where the proposed alternatives were paralleling a gas pipeline corridor. Multiple parties also suggested that they thought that a good alternative for the Project would be along the Ohio Turnpike.

4.3 Additional Route Identification, Evaluation, and Ranking

After the public input that was received and reviewed, the route alternatives were revisited and it was determined that revisions and additional alternatives would be evaluated. The route alternatives previously evaluated were revised to take into consideration the preference of multiple property owners to aligning the routes along the edge of their farmed fields and parcels to minimize impacts to agricultural activities. Additional route alternatives were also added to the study based upon public input and a review of additional potential route corridors was conducted in a manner similar to the process described in section 3.2. These route alternatives included an alternative along the Turnpike, co-locating along existing distribution and transmission lines further to the north, and additional alternatives segments in the central project area near the proposed Groton substation to connect the new route alternatives. As a result of this process a revised set of route segments was created, scored and ranked using the same method and criteria identified in section 3.4.

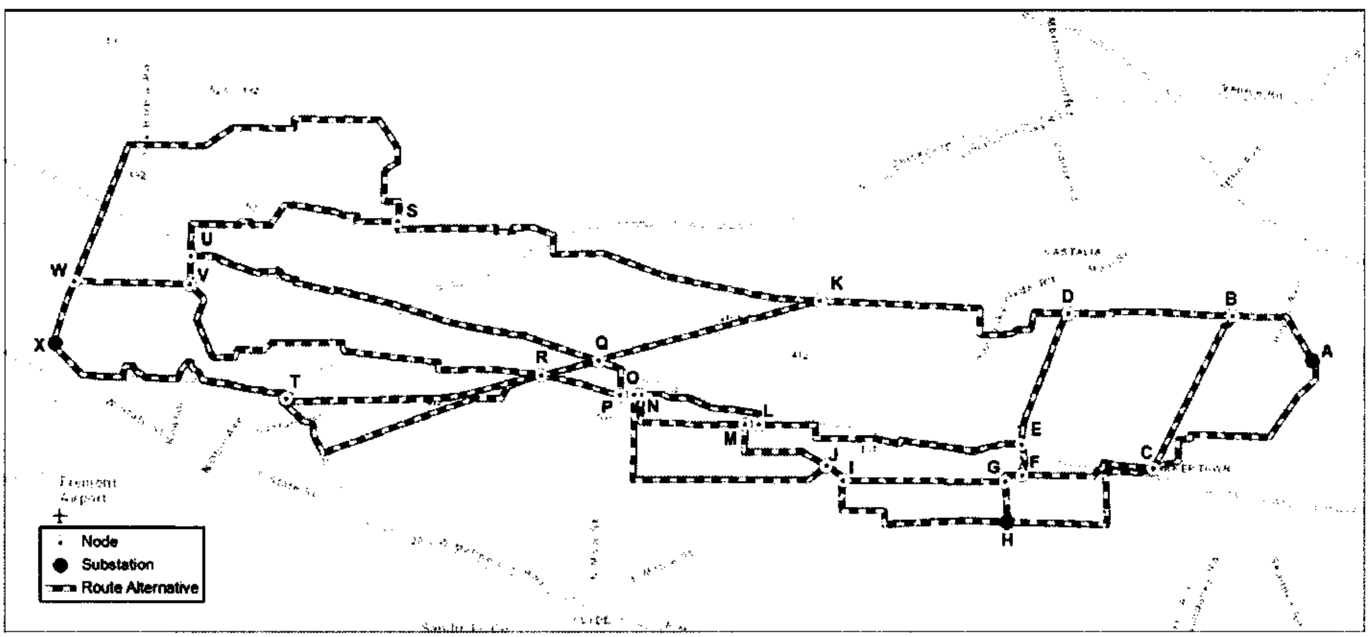


FIGURE 4-3
Revised Route Alternatives

Figures showing the evaluation criteria, along with the proposed route centerlines, are provided as Figures 4-4A to 4-4Z. Below is a detailed description of each of the proposed route segments:

Node A: Node A is the proposed Hayes Substation, which is located in an agricultural field. The proposed Hayes Substation will be located in Erie County along Fox Road, between Patten Tract Road and Hayes Avenue.

A-B: Segment A-B travels northwest out of the Hayes Substation for 0.9 mile. The segment then turns sharply west for an additional 1 mile. Segment A-B parallels existing transmission line for its entire 1.9 mile length and crosses only agricultural land. This segment also crosses two roads and an existing railroad track.

A-C: Segment A-C heads south out of the proposed Hayes Substation, crossing over 2 sets of existing transmission line. The segment then turns southwest for 1.4 miles, turns west for 1.5 miles, and then travels generally southwest for an additional 0.8 mile. Segment A-C travels over mainly agricultural land, crosses 6 roads, and an existing railroad track.

B-C: Segment B-C is approximately 3 miles long and parallels an existing transmission line, railroad track, and Old Railroad Road for its entire length. This segment crosses mainly over agricultural land.

B-D: Segment B-D travels west for 2.9 miles. This segment mainly crosses agricultural land and parallels the southern side of an existing transmission line.

C-F: Segment C-F travels west for 2.5 miles. This segment parallels an existing gas pipeline for approximately 1 mile and then turns south briefly to cross the Turnpike before turn west again and crossing agricultural land.

C-H: Segment C-H begins by traveling southwest for 0.9 mile. During which the segment crosses over a natural gas pipeline and Interstate 80. The segment then turns sharply south for 0.6 mile, crossing over Portland Road and agricultural fields. For the first 1.5 miles, this segment mostly parallels an existing distribution line. Next, the segment turns sharply again and heads west for 1.5 miles, crossing over agricultural fields.

D-E: Segment D-E heads generally south for 2.5 miles. The segment parallels an existing distribution line and State Route 269.

D-K: Segment D-K heads west paralleling an existing 345 kV transmission line corridor for approximately 0.5 miles before turning south around the Castalia Quarry Reserve. The segment then heads west for approximately a mile through agricultural land and a woodlot before turning north for 0.5 mile. Then it turns west again, paralleling the 345 kV transmission line corridor for another 3 miles.

E-F: Segment E-F runs north to south for 0.6 miles. The segment parallels County Road 269 and a distribution line.

E-L: Segment E-L heads west paralleling a gas pipeline for approximately 0.3 miles before turning southwest until the Turnpike. Then the segment parallels the north side of the Turnpike for approximately 1 mile before crossing over to the south side and paralleling again for another 0.4 miles. The segment turns due west across agricultural fields for 1 mile until it turns north for 0.2 miles where it rejoins the gas pipeline. From here, it turns due west again and parallels the gas pipeline for another mile across agricultural land.

F-G: Segment F-G heads west for 0.3 miles and then turns south for 0.1 miles across agricultural land.

G-H: Segment G-H runs north to south for 0.7 miles across agricultural land.

G-I: Segment G-I runs straight and due west for 2.9 miles across agricultural land and across one woodlot. This segment mostly parallels property lines.

Node H: Node H is the proposed Groton Substation. The proposed Groton Substation is located on agricultural land, just north of Strecker Road, between State Route 269 and County Road 312.

H-I: Segment H-I heads due west for 2 miles across agricultural land and crosses County Road 175. Then the segment turns north for 0.2 miles

I-J: Segment I-J runs northwest for 0.4 miles crossing State Route 101. This segment crosses agricultural land.

J-M: Segment J-M travels northwest for 0.5 miles away from State Route 101. Then the segment turns west for 1 mile before turning due north for 0.5 miles. This segment is 2.0 miles in length and crosses primarily through agricultural land and next to a few woodlots.

J-O: Segment J-O travels southwest for 0.3 miles before heading turning west and traveling another 3.4 miles crossing County Roads 268 and 260. The segment then turns due north and travels another 2.5 miles crossing County Roads 231 and 233. Most of the segment crosses agricultural lands but some woodlots are paralleled and crossed.

K-Q: Segment K-Q travels southwest for 4.1 miles following an abandoned railroad corridor and crossing three county roads. Most of this segment is agricultural land but for 1 mile it does cross woodlots and parallel an existing distribution line.

K-S: Segment K-S travels 8.3 miles primarily west and northwest paralleling an existing 345 kV transmission line for most of the way. For approximately 1 mile, the segment does leave the transmission line corridor and head due west for 0.6 miles before turning due north for 0.4 miles before continuing to following the transmission line corridor. Most of this segment crosses agricultural land but near the western end of the segment the Pickerel Creek Wildlife Area is also crossed for 0.3 miles.

L-M: Segment L-M travels 0.2 miles west across agricultural land.

L-N: Segment L-N travels 0.1 miles due north to the Turnpike and then heads northwest paralleling the Turnpike for 1.5 miles. The segment then turns west for another 0.8 across agricultural land.

M-N: Segment M-N travels 1.9 miles west paralleling a gas pipeline for the first 1.5 miles and then turns north for another 0.5 miles. Most of the segment crosses agricultural land but a woodlot is paralleled for 0.2 miles.

N-O: Segment N-O travels west for 0.1 miles and crosses a woodlot and agricultural land.

O-P: Segment O-P travels west for 0.3 miles and crosses agricultural land.

P-Q: Segment P-Q travels north for 0.4 miles crossing agricultural land and the Turnpike. After crossing the Turnpike the route turns to the northwest and parallels the Turnpike for 0.5 miles and crosses agricultural land and a woodlot.

P-R: Segment P-R travels northwest for 1.5 miles paralleling an existing gas pipeline. The segment crosses agricultural land, State Routes 510 and 412, and the corner of an industrial hazardous waste facility.

Q-R: Segment Q-R travels southwest for 1.1 miles following an abandoned railroad corridor and an existing distribution line. The segment does cross an industrial hazardous waste facility and the Turnpike.

Q-U: Segment Q-U travels northwest for 4.8 miles along the north side of the Turnpike. Then the segment crosses to the south side of the Turnpike just east of County Road 198 and parallels the south side of the Turnpike for 0.8 miles and then crosses back to the north side of the Turnpike. The segment then follows the edge of the edge of the Turnpike property boundary for 0.7 miles. Before crossing the Sandusky River the segment crosses back to the south side of the Turnpike and parallels the Turnpike to the northwest for 1 miles before turning west for another 0.5 miles.

R-T (north): Segment R-T (north) heads southwest for 1.8 miles, crossing over and then paralleling the northern side of an old railroad corridor. The segment turns slightly and heads due west for an additional 2.7 miles, continuing to parallel the northern side of an old railroad corridor. Segment R-T (north) crosses over agricultural fields and through the small town of Erlin.

R-T (south): Segment R-T (south) travels 4.1 miles in a southwestern direction. The route parallels the south side of an existing distribution line, crossing over agricultural land, woodlots, and the small town of Erlin. The route then turns and heads northwest for 1.3 miles, paralleling a distribution line and US Highway 20.

R-V: Segment R-V is approximately 7.8 miles long and begins by heading west/northwest paralleling an existing gas pipeline corridor. The segment alternates between paralleling the gas pipeline and following property lines for approximately 5.0, crossing agricultural land until it reaches County Road 176. Here the route turns slightly southwest for 0.5 miles until it crosses the Sandusky River. Once across the Sandusky River the segment continues west for approximately 1.0 miles until it turns north/northwest to follow an existing railroad corridor for 0.5 miles. The segment then turns north paralleling State Route 53 for 0.4 miles until it turns northwest, crosses State Route 53 and Muskelunge Creek for another 0.4 miles.

S-U: Segment S-U is approximately 4.7 miles long and begins by traveling west for 0.8 miles paralleling an existing distribution line. The segment then turns north for 0.2 miles and then turns west/northwest for 1.2 miles to the Sandusky River. After crossing the Sandusky River the route turns to the southwest for 0.4 miles across agricultural land. The segment then turns west and then primarily parallels the existing distribution line for 1.6 miles and

S-W: Segment S-W is approximately 9.6 miles long and parallels existing transmission lines for a majority of its length. It begins by heading north for 1.8 miles traveling around the Pickeral Creek Wildlife Area. Then the segment turns northwest while paralleling the existing Beaver-Davis Besse 345 kV Transmission Lines across the Sandusky River for 0.4 miles. Across the river the segment turns west crossing agricultural land and following property lines to the extent practical for 4.8 miles. Then the route turns southwest paralleling an existing 138 kV Transmission line for 2.6 across agricultural land.

T-X: Segment T-X is approximately 5 miles long and parallels an existing distribution line for its entire length. The segment begins by heading generally west for 4.2 miles, paralleling the north side of a distribution line and US Highway 6. This portion of the segment crosses over commercial, residential, and agricultural land. Next the segment heads northwest for 0.8 mile, paralleling the east side of a distribution line and an existing railroad track, and crossing over agricultural land. Segment T-X enters the south side of the West Fremont Substation.

U-V: Segment U-V travels south for 0.5 miles across agricultural and residential land. The segment crosses East County Road 89 and parallels and existing distribution line.

V-W: Segment V-W travels west for 2.1 miles across agricultural land. The segment parallels an existing distribution line for the first 1.7 miles and crosses Fangboner and Oak Harbor Roads.

W-X: Segment W-X travels southwest for 1.2 miles paralleling an existing 138 kV transmission line. The segment crosses agricultural land and W. County Road 73.

Node X: Node X is the West Fremont Substation. It is located west of County Road 138.

The segments described above were then used to create another set of feasible route candidates and 102 routes were identified (see below). These routes begin at the Hayes Substation, connect to the Groton Substation, and end at the West Fremont Substation.

1) A-B-C-F-G-H--F-E-L-M-N-O-P-Q-U-V-W-X
2) A-B-C-F-G-H--F-E-L-M-N-O-P-R-T (north)-X
3) A-B-C-F-G-H--F-E-L-M-N-O-P-R-T (south)-X
4) A-B-C-F-G-H--F-E-L-M-N-O-P-R-V-W-X
5) A-B-C-F-G-H--F-E-L-N-O-P-Q-U-V-W-X
6) A-B-C-F-G-H--F-E-L-N-O-P-R-T (north)-X
7) A-B-C-F-G-H--F-E-L-N-O-P-R-T (south)-X
8) A-B-C-F-G-H--F-E-L-N-O-P-R-V-W-X
9) A-B-C-F-G-H-I-J-M-N-O-P-Q-U-V-W-X
10) A-B-C-F-G-H-I-J-M-N-O-P-R-T (north)-X
11) A-B-C-F-G-H-I-J-M-N-O-P-R-T (south)-X
12) A-B-C-F-G-H-I-J-M-N-O-P-R-V-W-X
13) A-B-C-F-G-H-I-J-O-P-Q-U-V-W-X
14) A-B-C-F-G-H-I-J-O-P-R-T (north)-X
15) A-B-C-F-G-H-I-J-O-P-R-T (south)-X
16) A-B-C-F-G-H-I-J-O-P-R-V-W-X
17) A-B-C-H-G-I-J-M-N-O-P-Q-U-V-W-X
18) A-B-C-H-G-I-J-M-N-O-P-R-T (north)-X
19) A-B-C-H-G-I-J-M-N-O-P-R-T (south)-X
20) A-B-C-H-G-I-J-M-N-O-P-R-V-W-X
21) A-B-C-H-G-I-J-O-P-Q-U-V-W-X
22) A-B-C-H-G-I-J-O-P-R-T (north)-X
23) A-B-C-H-G-I-J-O-P-R-T (south)-X
24) A-B-C-H-G-I-J-O-P-R-V-W-X
25) A-B-C-H-I-J-M-N-O-P-Q-U-V-W-X
26) A-B-C-H-I-J-M-N-O-P-R-T (north)-X
27) A-B-C-H-I-J-M-N-O-P-R-T (south)-X
28) A-B-C-H-I-J-M-N-O-P-R-V-W-X
29) A-B-C-H-I-J-O-P-Q-U-V-W-X
30) A-B-C-H-I-J-O-P-R-T (north)-X
31) A-B-C-H-I-J-O-P-R-T (south)-X
32) A-B-C-H-I-J-O-P-R-V-W-X
33) A-B-D-E-F-G-H-I-J-M-N-O-P-Q-U-V-W-X
34) A-B-D-E-F-G-H-I-J-M-N-O-P-R-T (north)-X
35) A-B-D-E-F-G-H-I-J-M-N-O-P-R-T (south)-X
36) A-B-D-E-F-G-H-I-J-M-N-O-P-R-V-W-X
37) A-B-D-E-F-G-H-I-J-O-P-Q-U-V-W-X
38) A-B-D-E-F-G-H-I-J-O-P-R-T (north)-X
39) A-B-D-E-F-G-H-I-J-O-P-R-T (south)-X
40) A-B-D-E-F-G-H-I-J-O-P-R-V-W-X
41) A-B-D-E-F-G-H--G-I-J-M-N-O-P-Q-U-V-W-X
42) A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-T (north)-X
43) A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-T (south)-X
52) A-B-D-E-F-G-H--E-L-M-N-O-P-R-V-W-X
53) A-B-D-E-F-G-H--E-L-N-O-P-Q-U-V-W-X
54) A-B-D-E-F-G-H--E-L-N-O-P-R-T (north)-X
55) A-B-D-E-F-G-H--E-L-N-O-P-R-T (south)-X
56) A-B-D-E-F-G-H--E-L-N-O-P-R-V-W-X
57) A-B-D-E-F-G-H--D-K-Q-R-T (north)-X
58) A-B-D-E-F-G-H--D-K-Q-R-T (south)-X
59) A-B-D-E-F-G-H--D-K-Q-R-V-W-X
60) A-B-D-E-F-G-H--D-K-Q-U-V-W-X
61) A-B-D-E-F-G-H--D-K-S-U-V-W-X
62) A-B-D-E-F-G-H--D-K-S-W-X
63) A-C-F-G-H--F-E-L-M-N-O-P-Q-U-V-W-X
64) A-C-F-G-H--F-E-L-M-N-O-P-R-T (north)-X
65) A-C-F-G-H--F-E-L-M-N-O-P-R-T (south)-X
66) A-C-F-G-H--F-E-L-M-N-O-P-R-V-W-X
67) A-C-F-G-H--F-E-L-N-O-P-Q-U-V-W-X
68) A-C-F-G-H--F-E-L-N-O-P-R-T (north)-X
69) A-C-F-G-H--F-E-L-N-O-P-R-T (south)-X
70) A-C-F-G-H--F-E-L-N-O-P-R-V-W-X
71) A-C-F-G-H-I-J-M-N-O-P-Q-U-V-W-X
72) A-C-F-G-H-I-J-M-N-O-P-R-T (north)-X
73) A-C-F-G-H-I-J-M-N-O-P-R-T (south)-X
74) A-C-F-G-H-I-J-M-N-O-P-R-V-W-X
75) A-C-F-G-H-I-J-O-P-Q-U-V-W-X
76) A-C-F-G-H-I-J-O-P-R-T (north)-X
77) A-C-F-G-H-I-J-O-P-R-T (south)-X
78) A-C-F-G-H-I-J-O-P-R-V-W-X
79) A-C-F-G-H--G-I-J-M-N-O-P-Q-U-V-W-X
80) A-C-F-G-H--G-I-J-M-N-O-P-R-T (north)-X
81) A-C-F-G-H--G-I-J-M-N-O-P-R-T (south)-X
82) A-C-F-G-H--G-I-J-M-N-O-P-R-V-W-X
83) A-C-F-G-H--G-I-J-O-P-Q-U-V-W-X
84) A-C-F-G-H--G-I-J-O-P-R-T (north)-X
85) A-C-F-G-H--G-I-J-O-P-R-T (south)-X
86) A-C-F-G-H--G-I-J-O-P-R-V-W-X
87) A-C-H-G-I-J-M-N-O-P-Q-U-V-W-X
88) A-C-H-G-I-J-M-N-O-P-R-T (north)-X
89) A-C-H-G-I-J-M-N-O-P-R-T (south)-X
90) A-C-H-G-I-J-M-N-O-P-R-V-W-X
91) A-C-H-G-I-J-O-P-Q-U-V-W-X
92) A-C-H-G-I-J-O-P-R-T (north)-X
93) A-C-H-G-I-J-O-P-R-T (south)-X
94) A-C-H-G-I-J-O-P-R-V-W-X

44) A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-V-W-X
45) A-B-D-E-F-G-H--G-I-J-O-P-Q-U-V-W-X
46) A-B-D-E-F-G-H--G-I-J-O-P-R-T (north)-X
47) A-B-D-E-F-G-H--G-I-J-O-P-R-T (south)-X
48) A-B-D-E-F-G-H--G-I-J-O-P-R-V-W-X
49) A-B-D-E-F-G-H--E-L-M-N-O-P-Q-U-V-W-X
50) A-B-D-E-F-G-H--E-L-M-N-O-P-R-T (north)-X
51) A-B-D-E-F-G-H--E-L-M-N-O-P-R-T (south)-X
95) A-C-H-I-J-M-N-O-P-Q-U-V-W-X
96) A-C-H-I-J-M-N-O-P-R-T (north)-X
97) A-C-H-I-J-M-N-O-P-R-T (south)-X
98) A-C-H-I-J-M-N-O-P-R-V-W-X
99) A-C-H-I-J-O-P-Q-U-V-W-X
100) A-C-H-I-J-O-P-R-T (north)-X
101) A-C-H-I-J-O-P-R-T (south)-X
102) A-C-H-I-J-O-P-R-V-W-X

4.4 Updated Score and Rank Results

Similar to the analysis described in Section 4.1 of this RSS, score and rank was determined for each of the 102 revised route alternatives, broken down by category (ecology, cultural, land use, and technical). The same weighting scheme described in Section 3.4 and utilized in section 4.1 was also applied to these results. These scores and ranks can be found in Table 4-2, following the text. Scores for the 102 revised route alternatives ranged from a low score of 12.2 (more suitable route) to a high score of 85.8 (less suitable route). The six route alternatives that utilized segment D-K were the highest scoring and therefore least suitable routes evaluated. The other 96 route alternatives scored between 12.2 and 40.5.

The most favorable scoring route was route 82 (A-C-F-G-H—G-I-J-M-N-O-P-R-V-W-X) with a total score of 12.2. This route held the 2nd most favorable land use score, the 4th most favorable ecological score, the 17th most favorable technical score, and the 47th most favorable cultural score. The eastern half of this route is primarily cross-country and then it intermittently parallels an existing gas pipeline until it crosses the Sandusky River and Peninsular Farms. Then the route parallels a combination of railroad, road, distribution, and transmission lines towards the West Fremont Substation. The top seven scoring routes all utilize segment R-V which crosses Peninsular Farms.

The most favorable route that has less than 20% in common with route 82 is route 29 (A-B-C-H-I-J-O-P-Q-U-V-W-X) with a score of 21.8 and ranks 41st out of 102 alternatives. This route has the 11th most favorable cultural score, the 39th most favorable land use score, the 54th most favorable technical score, and the 62 most favorable ecological score.

Given the public concern for crossing Peninsular Farms and a preference for paralleling the Ohio Turnpike, the best scoring route that meets these criteria was also identified. Route 79 (A-C-F-G-H---G-I-J-M-N-O-P-Q-U-V-W-X) has a score of 14.6 and ranks 7th of the 102 routes. This route has the most favorable cultural score, the 7th most favorable land use score, the 43rd most favorable ecological score, and the 52nd most favorable technical score. The eastern half of this route is identical to route 82, primarily cross-country up until node P. This route then turns north and parallels the Ohio Turnpike for 8 miles across the Sandusky River.

The most favorable route that has less than 20% in common with route 79 is route 24 (A-B-C-H-G-I-J-O-P-R-V-W-X) with a score of 19.0 and ranks 28th. This route has the 13th most favorable technical score, the 16th most favorable ecological score, the 31st most favorable land use score, and the 71st most favorable score.

These routes and segments in addition to segments also presented at the previous public information meetings (Segments E-F, E-L, L-M, L-O, R-T (north), T-X) were then retained and presented to the public at an additional public information meeting as provided in Figure 4-5.

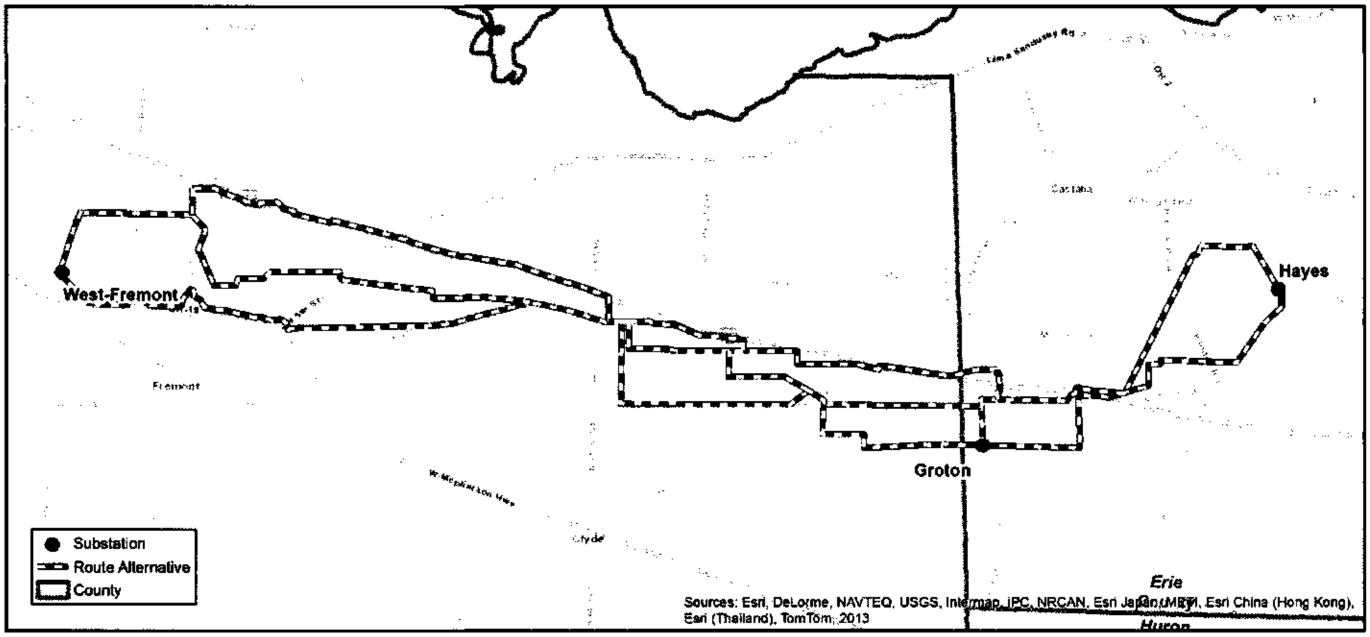


FIGURE 4-5
Public Information Meeting Route Alternatives May, 2013

4.5 Additional Public Input

After identifying these routing options, another public information meeting was held on May 15th, 2013 in Fremont, OH. This meeting was held to help to solicit input to the revised route alternatives and it was not required as part of the Ohio Power Siting Board process. Similar to the meetings in 2012, public input was received during and after the public information through the FirstEnergy communications address, email address, and phone number given out during the public information meetings.

There were multiple comments that the revised route across the southern portion of Peninsular Farms was more preferable than the route through the middle that paralleled the existing gas pipeline corridor, although there was still a strong preference expressed by many commenters that the Project should avoid Peninsular Farms altogether. Multiple comments were received that expressed support and a preference for the adjusted routes that more closely followed the edge of agricultural fields and property lines.

Additionally, multiple parties voiced a preference to following the Ohio Turnpike across the Sandusky River to minimize agricultural impacts and impacts to bald eagles nesting areas known to exist in the area.

4.6 Qualitative Route Review and Selection of Preferred and Alternate Routes

After receiving additional public input and conducting field surveys in the focus study area, qualitative factors were reviewed and considered for the route alternatives. Three qualitative factors were identified that were specific to this Project and considered in the final selection of the Preferred and Alternate Route. These include impacts to Peninsular Farms and agricultural land, and crossing the Sandusky River.

The public input received for this Project multiple parties highlighted a general public concern for potential impacts to Peninsular Farms. Many property owners and farmers in the project area expressed an interested in minimizing, where possible, impacts to agricultural land. There was also a preference expressed to minimize aesthetic impacts and impacts to bald eagles by crossing the Sandusky River at a location where there is existing infrastructure such as the Ohio Turnpike.

With these qualitative considerations, the route alternative that avoided crossing Peninsular Farms, paralleled the Ohio Turnpike across the Sandusky River, and minimized agricultural impacts was selected for the Preferred Route. Route 79 is the route with the most favorable score (14.6) and rank (7th) that does not cross Peninsular Farms and parallels the Ohio Turnpike across the Sandusky River, but after further review, Route 87 (A-C-H-G-I-J-M-N-O-P-Q-U-V-W-X) with a score of 15.2 and an overall rank of further reduces agricultural impacts east of the proposed Groton Substation by following more property lines. Therefore, Route 87 was selected as the Preferred Route. One of the best scoring routes with less than 20% in common with Route 87 is Route 16 (A-B-C-F-G-H-I-J-O-P-R-V-W-X) with a score of 19.5 and an overall rank of 32, which was selected as the Alternate Route.

4.6.1 Preferred Route

Route 87, ranked 9th with a score of 15.2 was selected as the Preferred Route which is the 2nd highest scoring route that parallels the Ohio Turnpike across the Sandusky River and avoids crossing Peninsular Farms. Route 87 received the most favorable cultural score, the 10th most favorable land use score, the most 43rd most favorable ecological score, and 63rd most favorable technical score.

4.6.2 Alternate Route

Route 16, ranked 32nd with a score of 19.5 was selected as the Alternate Route and which has less than 20% in common with Route 87. Route 16 received the 15th most favorable ecological score, the 20th most favorable technical score, the 32nd most favorable land use score, and the 71st most favorable cultural score.

4.7 Route Optimization

After the selection of the Preferred and Alternate Routes was made, additional information was received through discussions with property owners and during field surveys. This information was used to further evaluate and optimize the Preferred and Alternate Routes to minimize or avoid impacts to ecological, land use, cultural, or technical criteria. Three areas along the Preferred Route and one area along the Alternate Route were identified to further optimize the Routes. These refinements are described below.

4.7.1 Preferred Route - ODNR Property along Ohio Turnpike

ATSI and CH2M HILL met with the Ohio Department of Natural Resources on October 18th, 2013 to discuss a route alternative across the Wildlife Habitat Restoration Program property on the north side of the Ohio Turnpike. Segment Q-U avoided this property but after further detailed review, adjusting the route across the ODNR property would reduce the number of required transmission line crossing over the Ohio Turnpike, reduce the number of properties crossed by two, and reduce the overall length of the Project. This adjustment can be seen in Figure 4-6 below.

FIGURE 4-6
ODNR Property Preferred Route Adjustment

4.7.2 Preferred Route –Hanson Aggregates Quarry

Following discussions with multiple properties owners and the owners of the Hanson Aggregates Quarry on Portland Road in Erie County a route optimization that placed the Preferred Route on a portion of the quarry property was considered acceptable. Typically an active quarry and a transmission line are incompatible land uses but after discussion with the representatives of the quarry, there is enough area on the properties for the construction of a transmission line that would not conflict with the operation or current expansion plans for the quarry. This route adjustment reduces the length of the route that crosses agricultural land by 1.5 miles, reduces the number of properties crossed by 6, reduces the turn angles by 2, and reduces the stream crossings by 2. This adjustment can be seen in Figure 4-7.

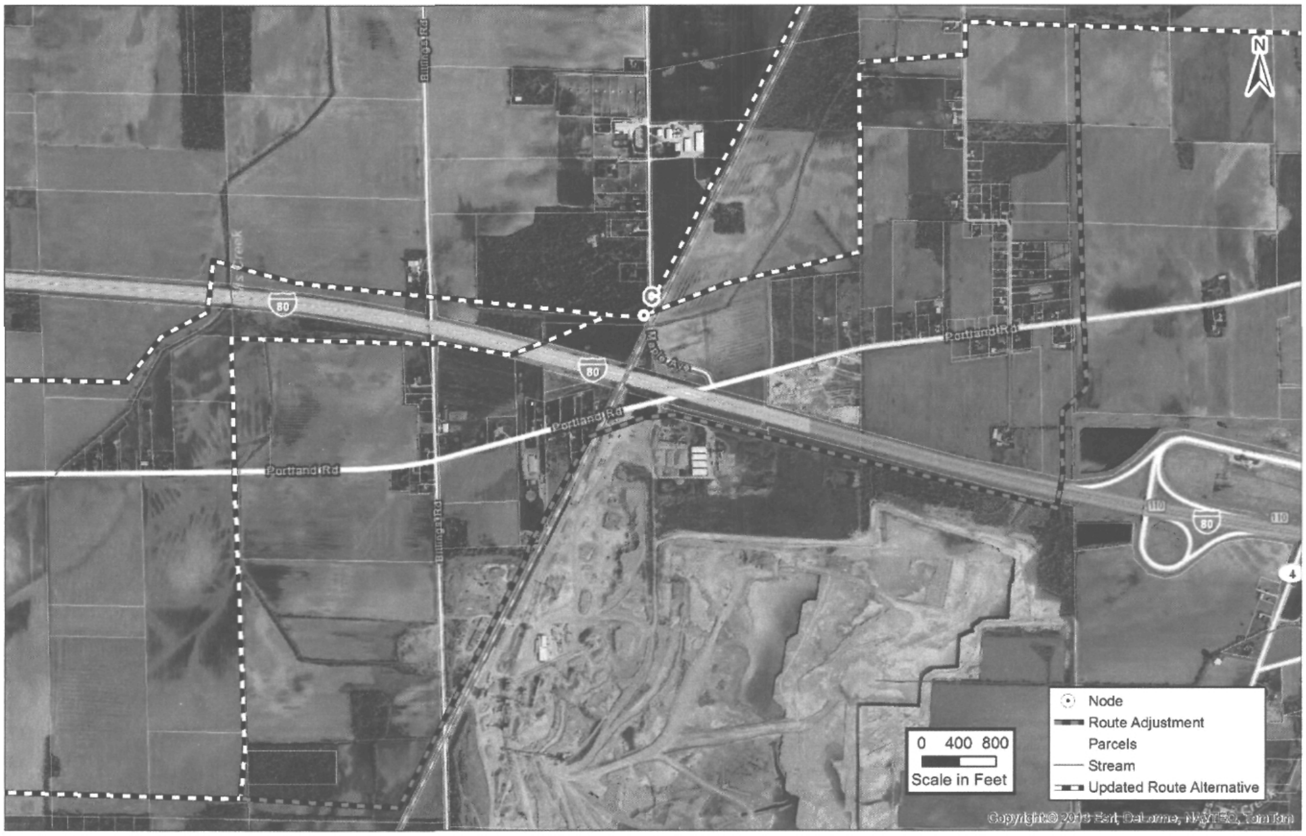


FIGURE 4-7
Hanson Aggregates Quarry Preferred Route Adjustment

4.7.3 Preferred Route – West of State Route 53

During field surveys, a category 3 wetland was identified along this route alternative. After a review of the wetland location and quality, the route was adjusted to the east to avoid impacting the wetland. This route adjustment can be seen on Figure 4-8 below and it avoids impacting the category 3 wetland and increases the distance between the proposed route and the residences along East County Road 89.

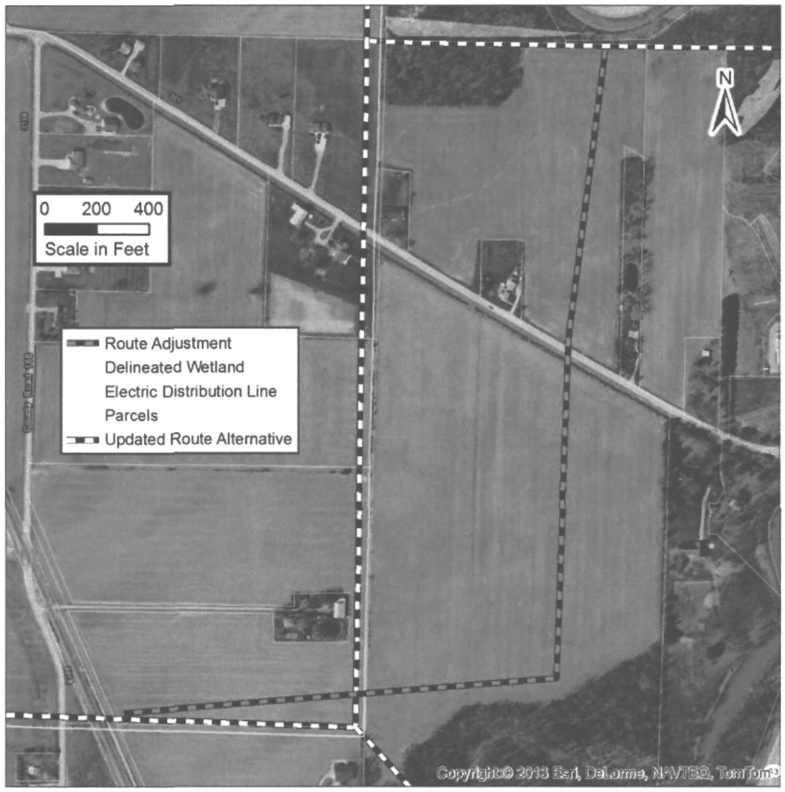


FIGURE 4-8
West of State Route 53 Preferred Route Adjustment

4.7.4 Alternate Route – State Route 510

Comments were received at the public information meeting that requested the adjustment of the Alternate route further west, out of agricultural fields to follow state route 510. Field surveys also identified multiple forested wetlands throughout the woodlots along this corridor. This route adjustment as shown on Figure 4-9 avoids forested wetland impacts, minimizes woodlot clearing, and reduces agricultural impacts. The number of residences within 100 feet increases with this route adjustment, but the route was adjusted to cross State Route 510 so that the transmission line is across the street from any residence.

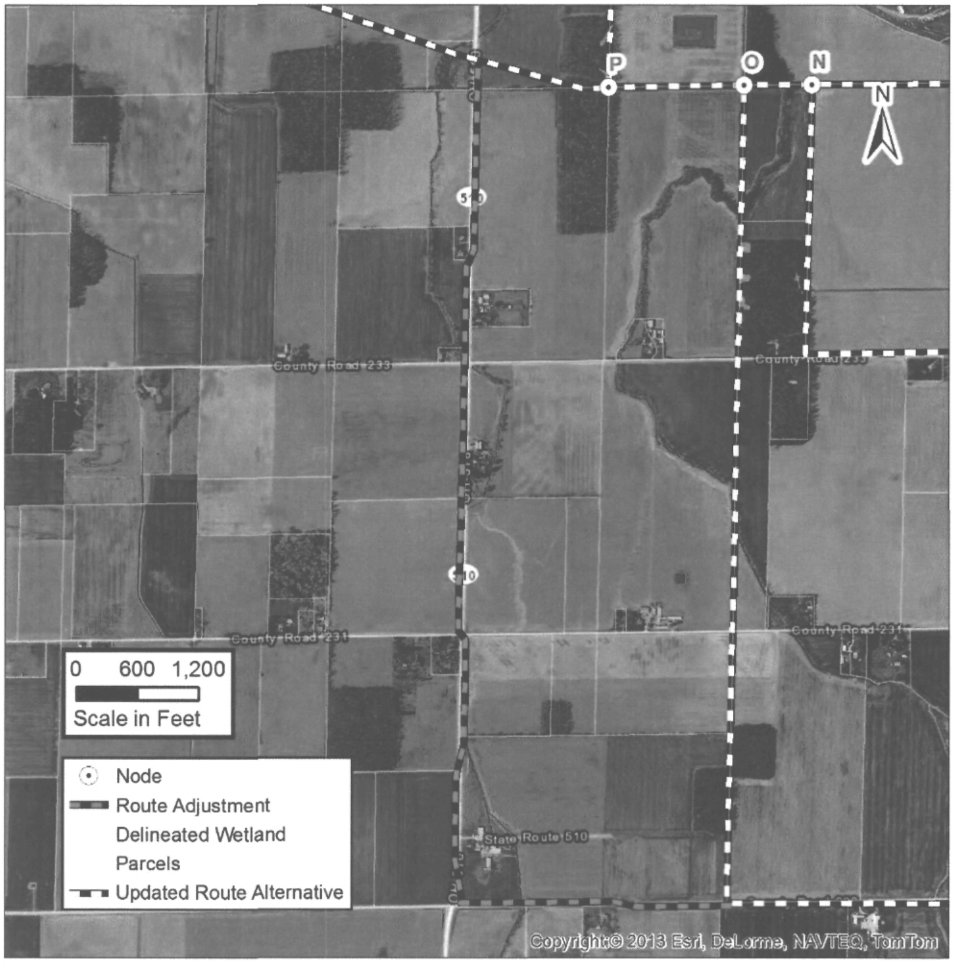


FIGURE 4-9
West of State Route 53 Preferred Route Adjustment

SECTION 5
Conclusion

The Preferred and Alternate Routes selected for the Project are shown in Figure 5-1. The Preferred Route is 28.95 miles and the Alternate Route is 30.47 miles long. Since the Preferred Route crosses an Ohio Department of Natural Resource property, an alternate segment was presented to provide an alternative that avoids this property in the event that the Ohio Department of Natural Resources does not allow the transmission line to cross this property. This segment is 1.44 miles long and parallels the south side of the Ohio Turnpike and is referred to as Preferred Route Option B.

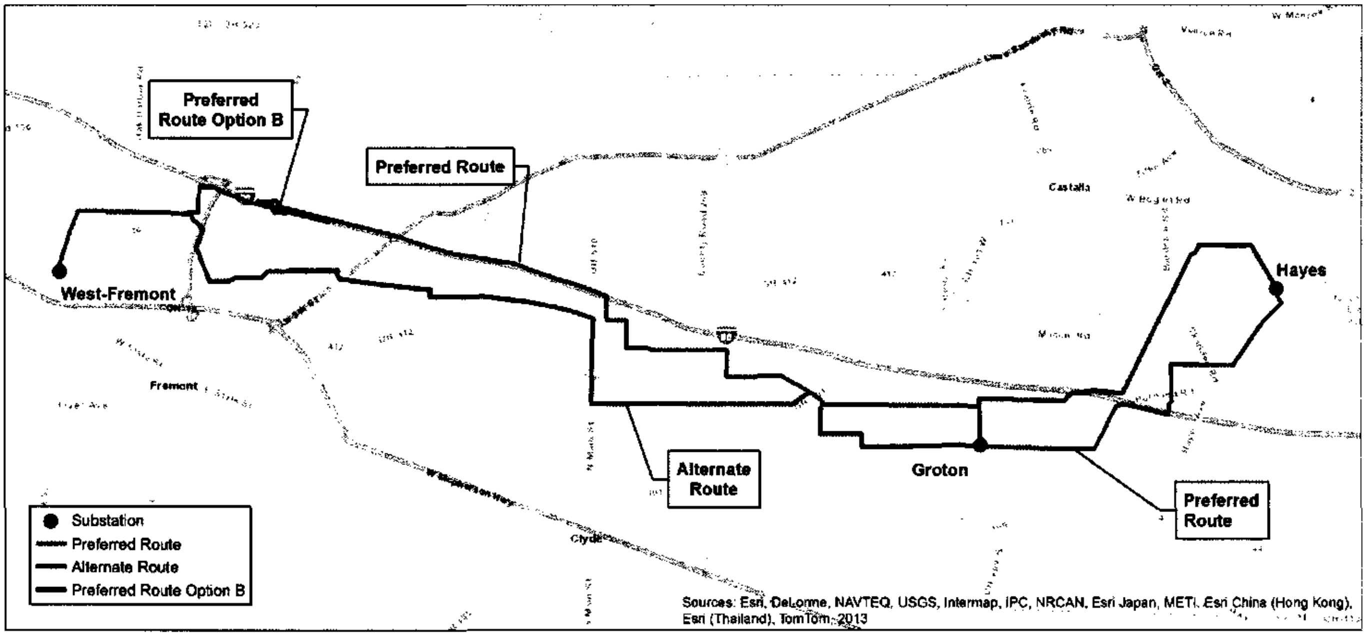


FIGURE 5-1
Preferred and Alternate Routes

Table 3-2
Potential Corridor Siting Criteria Suitability

Tier 2 Criteria		Tier 1 Criteria	Suitability	Suitability Value	Suggested Weight	Data Source
Ecology		Floodplain	Floodplain	9	5	Ohio Department of Natural Resources
			Background	1		
		Streams	Large Streams (perennial)	9	25	National Hydrography Dataset
			Small Streams (intermittent)	8		
			Large Streams 100 ft.	7		
			Small Streams 100 ft.	6		
			Background	1		
		Wetlands	PFO	9	25	National Wetland Inventory
			PSS/PEM	8		
			0-50 ft.	7		
			50-100 ft.	6		
			100-200 ft.	5		
			200-300 ft.	4		
			300-400 ft.	3		
			400-500 ft.	2		
			Greater than 500 ft.	1		
		Land Cover	Forests / Wood Wetlands	9	20	National Landcover Dataset-United States Geological Survey
			Developed Land / Open Water	6		
			Row Crops and Agriculture	2		
			Open Land, Pasture	1		
		T&E Species	T&E Species	9	25	Ohio Department of Natural Resources
			Special Concern Species	8		
			ODNR Managed Area	7		
			T&E Species within 100 ft.	6		
			Special Concern Species within 0-100 ft.	5		
			ODNR Managed Area within 0-100 ft.	4		
			T&E Species 100-1,000 ft.	3		
			Special Conern Species 100-1,000 ft.	2		
			Background	1		
Land Use / Cultural	Land Use	Proximity to Building	Building	9	25	Sandusky and Erie County Auditor and 2011 Ohio Statewide Imagery Program Aerial Photography
			0-30 ft.	8		
			30-100 ft.	7		
			100-200 ft.	6		
			200-350 ft.	5		
			350-500 ft.	4		
			500-750 ft.	3		
			750-1,000 ft.	2		
			> 1,000 ft.	1		
		Building Density	Most Dense / 2-3 buildings per acres	9	30	Sandusky and Erie County Auditor and 2011 Ohio Statewide Imagery Program Aerial Photography
			1.5-2	8		
			1-1.5	7		
			0.5-1	6		
			0.25-0.5	5		
			0.15-0.25	4		
			0.1-0.15	3		
			0.05-0.1	2		
			Least Dense / 0.025 - 0.05 buildings per acre	1		
		Land Use	Residential	9	25	National Landcover Dataset-United States Geological Survey
			Parks	6		
			Nonresidential	3		
			Agriculture	1		
	Cultural	Proximity to NRHP	NRHP	9	20	Ohio Historic Preservation Office
			0-100 ft.	8		
			100-250 ft.	7		
			250-400 ft.	6		
			400-550 ft.	5		
			550-700 ft.	4		
			700-850 ft.	3		
			850-1,000 ft.	2		
			> 1,000 ft.	1		
Technical		Linear Utility Infrastructure	Parallel Existing Transmission Line 100 ft.	1	50	Platts PowerMap
			Parallel Existing Transsmission TX 100-1,000 ft	2		
			Parallel Gas Pipeline 100 ft.	3		
			Parallel Gas Pipeline 100 ft. - 1,000 ft.	4		
			Background	9		
		Linear Transportation Infrastructure	Parallel Road ROW	1	30	Environmental Systems Research Institute StreetMap
			Parallel Railway ROW	3		
			Parallel Limited Access Highway ROW	5		
			Background	9		
		Slope	0-15%	1	20	United States Geological Survey
			15-30%	6		
			> 30%	9		

Exclusion	National Register of Historic Places	NA	NA	Ohio Historic Preservation Office
	Superfund Sites	NA	NA	Ohio Environmental Progection Agency
	Schools	NA	NA	Environmental Systems Research Institute
	Chruches	NA	NA	Environmental Systems Research Institute
	Cemeteries	NA	NA	Environmental Systems Research Institute

TABLE 4-1 - ROUTE SCORES AND RANKINGS

Route	Total Score	Total Rank	Ecological Score	Rank	Land Use Score	Rank	Cultural Score	Rank	Technical Score	Rank
19.) A-C-F-G-H-J	12.0	1	10.0	2	0.8	1	36.7	10	40.1	3
22.) A-C-E-F-G-H-J	14.0	2	9.1	1	4.9	2	36.7	10	47.6	12
21.) A-C-F-G-H-I(south)-J	19.9	3	14.6	6	18.1	5	16.7	1	51.2	16
20.) A-C-F-G-H-I(north)-J	20.9	4	20.0	12	14.8	4	33.3	4	36.0	1
24.) A-C-E-F-G-H-I-J(south)-J	21.9	5	13.7	4	22.3	9	16.7	1	58.7	20
16.) A-C-E-F--E-G-H-J	22.2	6	27.8	16	7.1	3	36.7	10	45.9	10
23.) A-C-E-F-G-H-I(north)-J	22.9	7	19.1	10	18.9	6	33.3	4	43.5	5
13.) A-B-C-F-G-H-J	24.0	8	15.0	7	20.7	7	53.3	18	43.9	6
25.) A-B-C-E-F-G-H-J	27.7	9	14.1	5	29.0	12	53.3	18	51.4	17
7.) A-B-D-E-F-G-H-J	29.2	10	13.6	3	29.4	13	70.0	24	49.7	14
18.) A-C-E-F--E-G-H-I(south)-J	30.1	11	32.4	18	24.4	10	16.7	1	57.0	19
17.) A-C-E-F--E-G-H-I(north)-J	31.1	12	37.8	22	21.1	8	33.3	4	41.8	4
15.) A-B-C-F-G-H-I(south)-J	31.9	13	19.6	11	38.1	16	33.3	4	55.0	18
14.) A-B-C-F-G-H-I(north)-J	32.9	14	25.0	15	34.7	15	50.0	13	39.8	2
10.) A-B-C-E-F--E-G-H-J	34.2	15	32.8	19	27.0	11	53.3	18	49.8	15
27.) A-B-C-E-F-G-H-I(south)-J	35.6	16	18.7	9	46.4	22	33.3	4	62.5	25
26.) A-B-C-E-F-G-H-I(north)-J	36.6	17	24.1	14	43.0	18	50.0	13	47.3	11
9.) A-B-D-E-F-G-H-I(south)-J	37.1	18	18.2	8	46.8	23	50.0	13	60.8	22
4.) A-B-D-E-F--E-G-H-J	37.3	19	32.3	17	31.5	14	70.0	24	48.0	13
8.) A-B-D-E-F-G-H-I(north)-J	38.0	20	23.6	13	43.4	19	66.7	22	45.6	8
12.) A-B-C-E-F--E-G-H-I(south)-J	42.1	21	37.4	21	44.4	20	33.3	4	60.9	23
11.) A-B-C-E-F--E-G-H-I(north)-J	43.1	22	42.8	24	41.0	17	50.0	13	45.7	9
6.) A-B-D-E-F--E-G-H-I(south)-J	45.2	23	36.9	20	48.9	24	50.0	13	59.1	21
5.) A-B-D-E-F--E-G-H-I(north)-J	46.2	24	42.3	23	45.5	21	66.7	22	43.9	7
1.) A-B-D-E-F--D-H-J	68.3	25	64.7	25	68.6	25	83.3	27	65.9	26
3.) A-B-D-E-F--D-H-I(south)-J	76.2	26	69.3	26	85.9	27	63.3	21	77.0	27
2.) A-B-D-E-F--D-H-I(north)-J	77.1	27	74.8	27	82.6	26	80.0	26	61.8	24

TABLE 4-2 REVISED ROUTE SCORES AND RANKINGS

Route		Total Score	Total Rank	Ecological Score	Ecological Rank	Land Use Score	Land Use Rank	Cultural Score	Cultural Rank	Technical Score	Technical Rank
82	A-C-F-G-H--G-I-J-M-N-O-P-R-V-W-X	12.2	1	6.0	4	7.4	2	27.8	47	41.2	17
90	A-C-H-G-I-J-M-N-O-P-R-V-W-X	12.8	2	5.7	3	8.6	4	27.8	47	43.2	23
66	A-C-F-G-H--F-E-L-M-N-O-P-R-V-W-X	13.0	3	7.3	10	6.8	1	27.8	47	45.5	37
98	A-C-H-I-J-M-N-O-P-R-V-W-X	13.3	4	5.1	1	10.1	8	27.8	47	44.7	30
74	A-C-F-G-H-I-J-M-N-O-P-R-V-W-X	13.3	5	5.4	2	9.5	6	27.8	47	45.7	39
70	A-C-F-G-H--F-E-L-N-O-P-R-V-W-X	13.6	6	7.2	9	8.0	3	27.8	47	47.2	45
79	A-C-F-G-H--G-I-J-M-N-O-P-Q-U-V-W-X	14.6	7	14.6	45	9.7	7	0.0	1	48.7	52
86	A-C-F-G-H--G-I-J-O-P-R-V-W-X	14.8	8	6.9	8	11.8	11	27.8	47	45.3	34
87	A-C-H-G-I-J-M-N-O-P-Q-U-V-W-X	15.2	9	14.3	43	11.0	10	0.0	1	50.7	63
94	A-C-H-G-I-J-O-P-R-V-W-X	15.3	10	6.5	7	13.1	16	27.8	47	47.2	44
63	A-C-F-G-H--F-E-L-M-N-O-P-Q-U-V-W-X	15.3	11	15.9	54	9.2	5	0.0	1	53.0	73
95	A-C-H-I-J-M-N-O-P-Q-U-V-W-X	15.7	12	13.7	40	12.4	14	0.0	1	52.2	70
71	A-C-F-G-H-I-J-M-N-O-P-Q-U-V-W-X	15.7	13	14.0	42	11.9	12	0.0	1	53.2	74
102	A-C-H-I-J-O-P-R-V-W-X	15.8	14	6.0	5	14.5	21	27.8	47	48.8	53
78	A-C-F-G-H-I-J-O-P-R-V-W-X	15.9	15	6.3	6	14.0	18	27.8	47	49.8	58
67	A-C-F-G-H--F-E-L-N-O-P-Q-U-V-W-X	15.9	16	15.8	53	10.3	9	0.0	1	54.7	81
20	A-B-C-H-G-I-J-M-N-O-P-R-V-W-X	16.5	17	8.2	13	14.3	20	38.9	71	35.9	3
4	A-B-C-F-G-H--F-E-L-M-N-O-P-R-V-W-X	16.6	18	9.8	18	12.5	15	38.9	71	38.2	9
28	A-B-C-H-I-J-M-N-O-P-R-V-W-X	17.0	19	7.6	11	15.7	24	38.9	71	37.5	6
12	A-B-C-F-G-H-I-J-M-N-O-P-R-V-W-X	17.0	20	7.9	12	15.2	22	38.9	71	38.5	10
83	A-C-F-G-H--G-I-J-O-P-Q-U-V-W-X	17.1	21	15.5	51	14.2	19	0.0	1	52.7	71
8	A-B-C-F-G-H--F-E-L-N-O-P-R-V-W-X	17.2	22	9.7	17	13.6	17	38.9	71	40.0	14
91	A-C-H-G-I-J-O-P-Q-U-V-W-X	17.7	23	15.1	50	15.4	23	0.0	1	54.7	80
99	A-C-H-I-J-O-P-Q-U-V-W-X	18.2	24	14.6	46	16.8	28	0.0	1	56.2	87
75	A-C-F-G-H-I-J-O-P-Q-U-V-W-X	18.2	25	14.9	48	16.3	26	0.0	1	57.3	89
1	A-B-C-F-G-H--F-E-L-M-N-O-P-Q-U-V-W-X	18.5	26	18.4	66	12.1	13	11.1	11	51.8	68
17	A-B-C-H-G-I-J-M-N-O-P-Q-U-V-W-X	18.8	27	16.8	61	16.6	27	11.1	11	43.4	26
24	A-B-C-H-G-I-J-O-P-R-V-W-X	19.0	28	9.0	16	18.7	31	38.9	71	40.0	13
25	A-B-C-H-I-J-M-N-O-P-Q-U-V-W-X	19.3	29	16.2	56	18.1	30	11.1	11	44.9	31
9	A-B-C-F-G-H-I-J-M-N-O-P-Q-U-V-W-X	19.3	30	16.5	58	17.5	29	11.1	11	46.0	40
32	A-B-C-H-I-J-O-P-R-V-W-X	19.5	31	8.5	14	20.1	33	38.9	71	41.5	18

TABLE 4-2 REVISED ROUTE SCORES AND RANKINGS

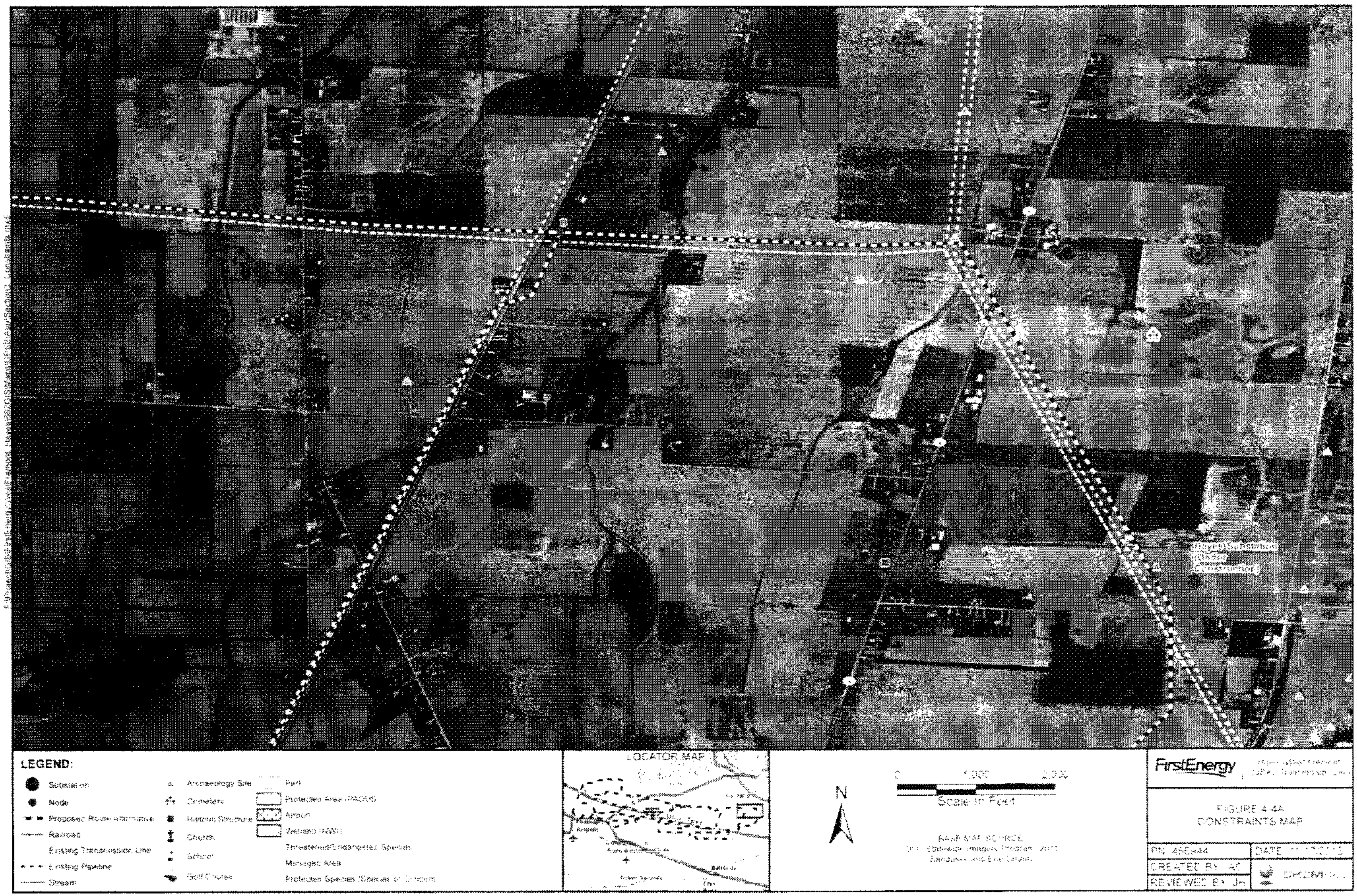
Route		Total Score	Total Rank	Ecological Score	Ecological Rank	Land Use Score	Land Use Rank	Cultural Score	Cultural Rank	Technical Score	Technical Rank
16	A-B-C-F-G-H-I-J-O-P-R-V-W-X	19.5	32	8.8	15	19.6	32	38.9	71	42.5	20
81	A-C-F-G-H--G-I-J-M-N-O-P-R-T (south)-X	19.5	33	10.8	23	21.6	36	16.7	29	49.3	55
5	A-B-C-F-G-H--F-E-L-N-O-P-Q-U-V-W-X	19.6	34	18.3	65	16.0	25	11.1	11	47.5	47
89	A-C-H-G-I-J-M-N-O-P-R-T (south)-X	20.1	35	10.5	22	22.8	40	16.7	29	51.3	65
65	A-C-F-G-H--F-E-L-M-N-O-P-R-T (south)-X	20.3	36	12.1	34	21.0	34	16.7	29	53.6	77
97	A-C-H-I-J-M-N-O-P-R-T (south)-X	20.6	37	9.9	19	24.2	43	16.7	29	52.8	72
73	A-C-F-G-H-I-J-M-N-O-P-R-T (south)-X	20.6	38	10.2	20	23.7	41	16.7	29	53.9	78
69	A-C-F-G-H--F-E-L-N-O-P-R-T (south)-X	20.9	39	12.0	33	22.2	38	16.7	29	55.3	84
21	A-B-C-H-G-I-J-O-P-Q-U-V-W-X	21.3	40	17.6	64	21.1	35	11.1	11	47.5	46
29	A-B-C-H-I-J-O-P-Q-U-V-W-X	21.8	41	17.1	62	22.5	39	11.1	11	49.0	54
13	A-B-C-F-G-H-I-J-O-P-Q-U-V-W-X	21.9	42	17.4	63	22.0	37	11.1	11	50.0	60
85	A-C-F-G-H--G-I-J-O-P-R-T (south)-X	22.1	43	11.7	29	26.0	47	16.7	29	53.4	75
93	A-C-H-G-I-J-O-P-R-T (south)-X	22.6	44	11.3	28	27.3	53	16.7	29	55.3	83
80	A-C-F-G-H--G-I-J-M-N-O-P-R-T (north)-X	22.9	45	20.1	74	24.5	44	11.1	11	39.1	11
101	A-C-H-I-J-O-P-R-T (south)-X	23.1	46	10.8	24	28.7	59	16.7	29	56.9	88
77	A-C-F-G-H-I-J-O-P-R-T (south)-X	23.2	47	11.1	26	28.2	56	16.7	29	57.9	90
88	A-C-H-G-I-J-M-N-O-P-R-T (north)-X	23.4	48	19.8	73	25.8	46	11.1	11	41.1	16
64	A-C-F-G-H--F-E-L-M-N-O-P-R-T (north)-X	23.6	49	21.4	82	24.0	42	11.1	11	43.4	25
19	A-B-C-H-G-I-J-M-N-O-P-R-T (south)-X	23.7	50	12.9	37	28.5	58	27.8	47	44.1	29
3	A-B-C-F-G-H--F-E-L-M-N-O-P-R-T (south)-X	23.9	51	14.6	47	26.7	49	27.8	47	46.4	41
96	A-C-H-I-J-M-N-O-P-R-T (north)-X	23.9	52	19.2	68	27.2	52	11.1	11	42.6	21
72	A-C-F-G-H-I-J-M-N-O-P-R-T (north)-X	24.0	53	19.6	70	26.7	50	11.1	11	43.6	27
68	A-C-F-G-H--F-E-L-N-O-P-R-T (north)-X	24.2	54	21.3	81	25.1	45	11.1	11	45.1	33
27	A-B-C-H-I-J-M-N-O-P-R-T (south)-X	24.3	55	12.4	35	29.9	64	27.8	47	45.6	38
11	A-B-C-F-G-H-I-J-M-N-O-P-R-T (south)-X	24.3	56	12.7	36	29.4	62	27.8	47	46.6	42
7	A-B-C-F-G-H--F-E-L-N-O-P-R-T (south)-X	24.5	57	14.5	44	27.8	54	27.8	47	48.1	51
52	A-B-D-E-F-G-H--E-L-M-N-O-P-R-V-W-X	25.1	58	12.0	32	26.0	48	55.6	92	43.7	28
84	A-C-F-G-H--G-I-J-O-P-R-T (north)-X	25.4	59	21.0	80	29.0	61	11.1	11	43.1	22
56	A-B-D-E-F-G-H--E-L-N-O-P-R-V-W-X	25.7	60	11.8	31	27.1	51	55.6	92	45.4	35
92	A-C-H-G-I-J-O-P-R-T (north)-X	26.0	61	20.7	79	30.2	65	11.1	11	45.1	32
44	A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-V-W-X	26.2	62	10.8	25	28.9	60	55.6	92	47.6	48

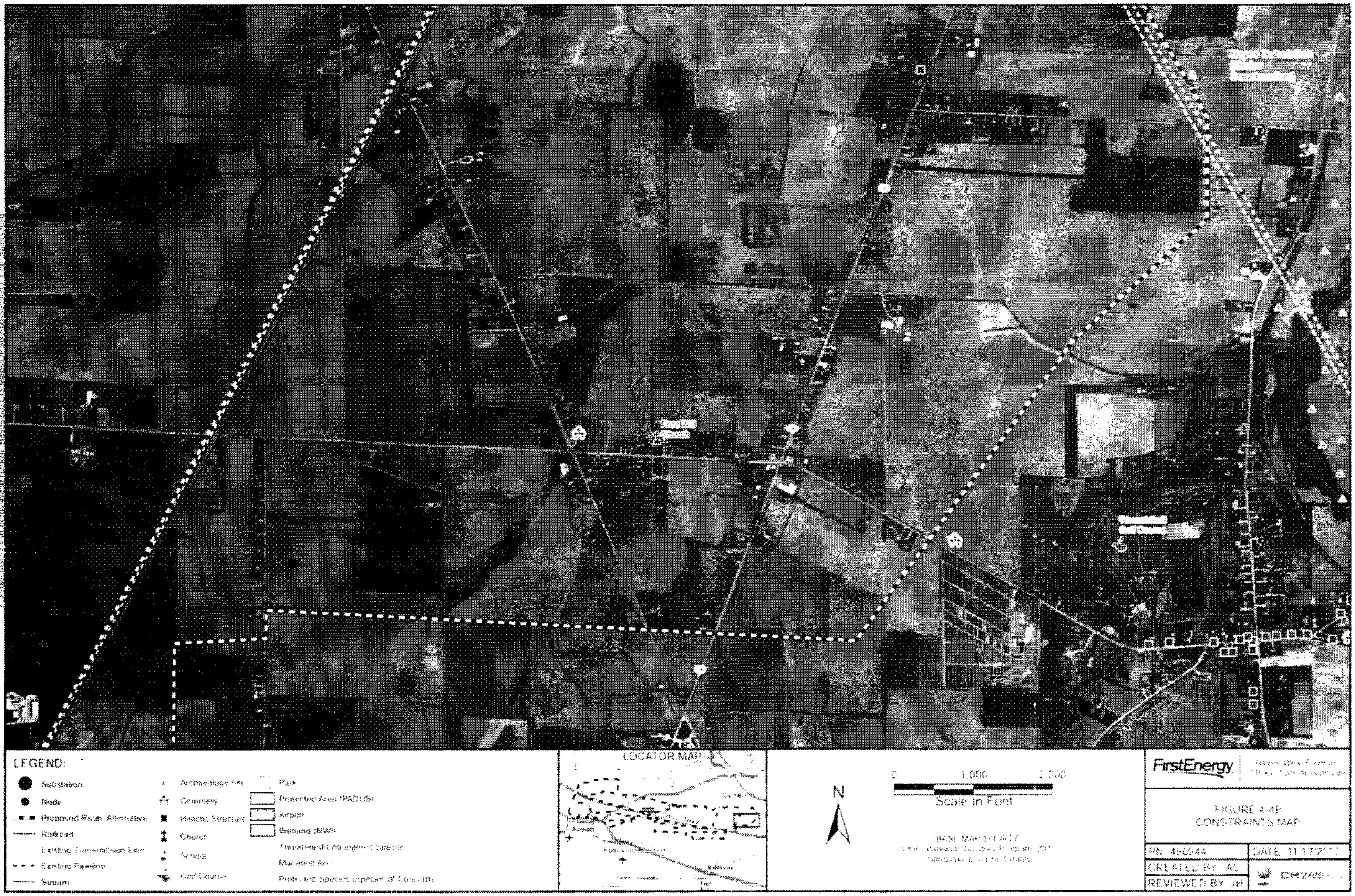
TABLE 4-2 REVISED ROUTE SCORES AND RANKINGS

Route		Total Score	Total Rank	Ecological Score	Ecological Rank	Land Use Score	Land Use Rank	Cultural Score	Cultural Rank	Technical Score	Technical Rank
23	A-B-C-H-G-I-J-O-P-R-T (south)-X	26.3	63	13.8	41	32.9	74	27.8	47	48.1	50
100	A-C-H-I-J-O-P-R-T (north)-X	26.5	64	20.1	75	31.7	71	11.1	11	46.6	43
76	A-C-F-G-H-I-J-O-P-R-T (north)-X	26.5	65	20.4	77	31.1	68	11.1	11	47.7	49
31	A-B-C-H-I-J-O-P-R-T (south)-X	26.8	66	13.3	38	34.3	78	27.8	47	49.6	57
15	A-B-C-F-G-H-I-J-O-P-R-T (south)-X	26.8	67	13.6	39	33.8	77	27.8	47	50.7	62
53	A-B-D-E-F-G-H--E-L-N-O-P-Q-U-V-W-X	26.9	68	19.6	71	28.1	55	27.8	47	50.1	61
18	A-B-C-H-G-I-J-M-N-O-P-R-T (north)-X	27.1	69	22.3	85	31.4	70	22.2	39	33.8	1
2	A-B-C-F-G-H--F-E-L-M-N-O-P-R-T (north)-X	27.3	70	23.9	90	29.7	63	22.2	39	36.1	4
36	A-B-D-E-F-G-H-I-J-M-N-O-P-R-V-W-X	27.3	71	10.3	21	31.0	67	55.6	92	52.1	69
49	A-B-D-E-F-G-H--E-L-M-N-O-P-Q-U-V-W-X	27.5	72	20.5	78	28.4	57	27.8	47	51.2	64
26	A-B-C-H-I-J-M-N-O-P-R-T (north)-X	27.6	73	21.7	83	32.9	73	22.2	39	35.3	2
10	A-B-C-F-G-H-I-J-M-N-O-P-R-T (north)-X	27.6	74	22.1	84	32.4	72	22.2	39	36.4	5
6	A-B-C-F-G-H--F-E-L-N-O-P-R-T (north)-X	27.8	75	23.8	89	30.8	66	22.2	39	37.9	8
41	A-B-D-E-F-G-H--G-I-J-M-N-O-P-Q-U-V-W-X	28.5	76	19.4	69	31.2	69	27.8	47	55.1	82
48	A-B-D-E-F-G-H--G-I-J-O-P-R-V-W-X	28.7	77	11.7	30	33.3	75	55.6	92	51.7	66
22	A-B-C-H-G-I-J-O-P-R-T (north)-X	29.6	78	23.2	88	35.9	81	22.2	39	37.9	7
33	A-B-D-E-F-G-H-I-J-M-N-O-P-Q-U-V-W-X	29.6	79	18.9	67	33.4	76	27.8	47	59.6	92
40	A-B-D-E-F-G-H-I-J-O-P-R-V-W-X	29.8	80	11.1	27	35.5	79	55.6	92	56.2	86
30	A-B-C-H-I-J-O-P-R-T (north)-X	30.1	81	22.6	86	37.3	83	22.2	39	39.4	12
14	A-B-C-F-G-H-I-J-O-P-R-T (north)-X	30.2	82	22.9	87	36.8	82	22.2	39	40.4	15
45	A-B-D-E-F-G-H--G-I-J-O-P-Q-U-V-W-X	31.1	83	20.3	76	35.7	80	27.8	47	59.1	91
37	A-B-D-E-F-G-H-I-J-O-P-Q-U-V-W-X	32.2	84	19.7	72	37.8	84	27.8	47	63.7	98
51	A-B-D-E-F-G-H--E-L-M-N-O-P-R-T (south)-X	32.4	85	16.7	60	40.2	85	44.4	85	51.8	67
55	A-B-D-E-F-G-H--E-L-N-O-P-R-T (south)-X	33.0	86	16.6	59	41.3	86	44.4	85	53.5	76
43	A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-T (south)-X	33.5	87	15.6	52	43.1	87	44.4	85	55.7	85
35	A-B-D-E-F-G-H-I-J-M-N-O-P-R-T (south)-X	34.6	88	15.0	49	45.2	90	44.4	85	60.3	94
50	A-B-D-E-F-G-H--E-L-M-N-O-P-R-T (north)-X	35.7	89	26.1	96	43.2	88	38.9	71	41.6	19
47	A-B-D-E-F-G-H--G-I-J-O-P-R-T (south)-X	36.0	90	16.5	57	47.5	92	44.4	85	59.8	93
54	A-B-D-E-F-G-H--E-L-N-O-P-R-T (north)-X	36.3	91	25.9	95	44.3	89	38.9	71	43.3	24
42	A-B-D-E-F-G-H--G-I-J-M-N-O-P-R-T (north)-X	36.8	92	24.9	92	46.0	91	38.9	71	45.5	36
39	A-B-D-E-F-G-H-I-J-O-P-R-T (south)-X	37.1	93	15.9	55	49.7	94	44.4	85	64.3	99

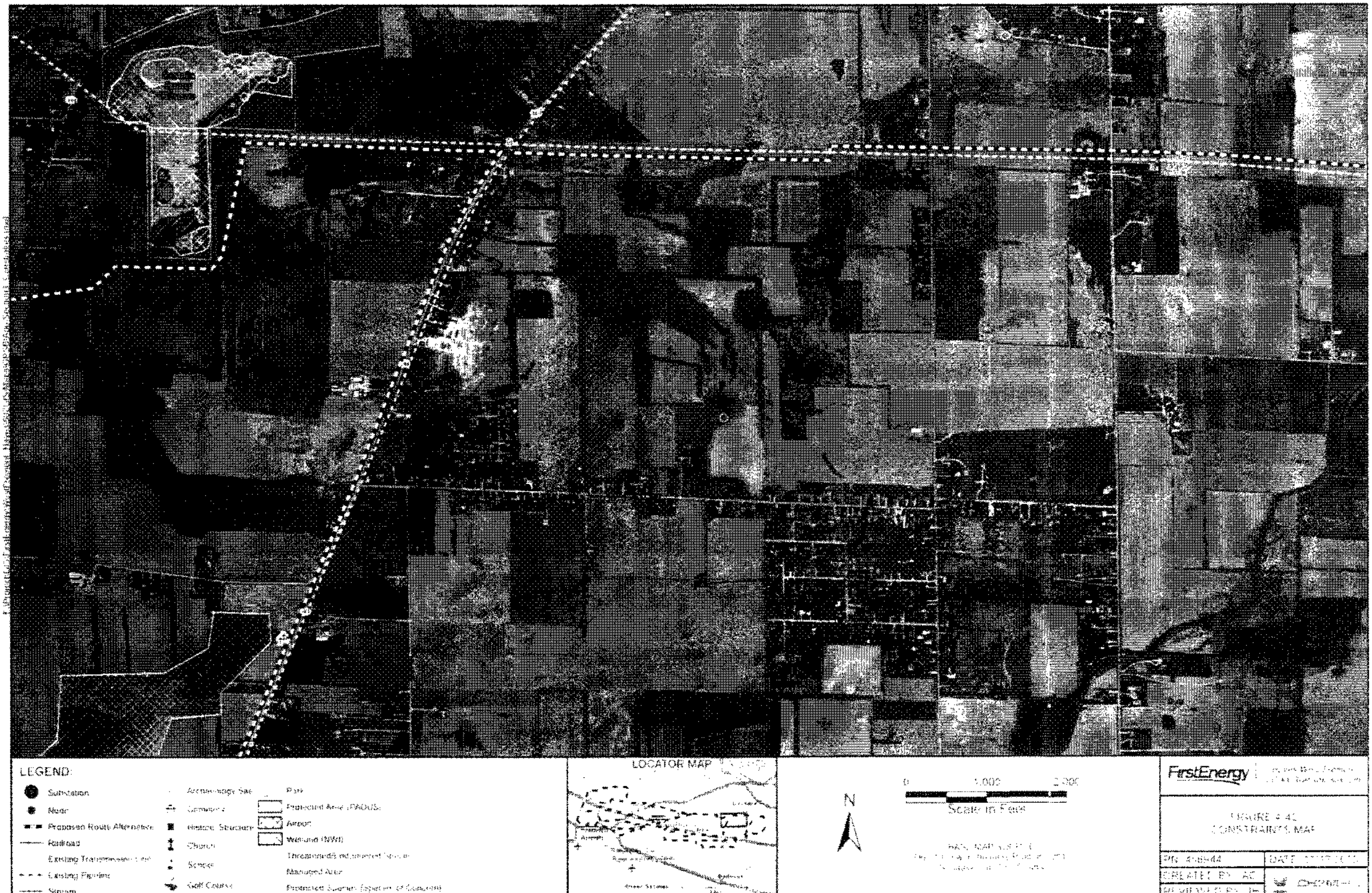
TABLE 4-2 REVISED ROUTE SCORES AND RANKINGS

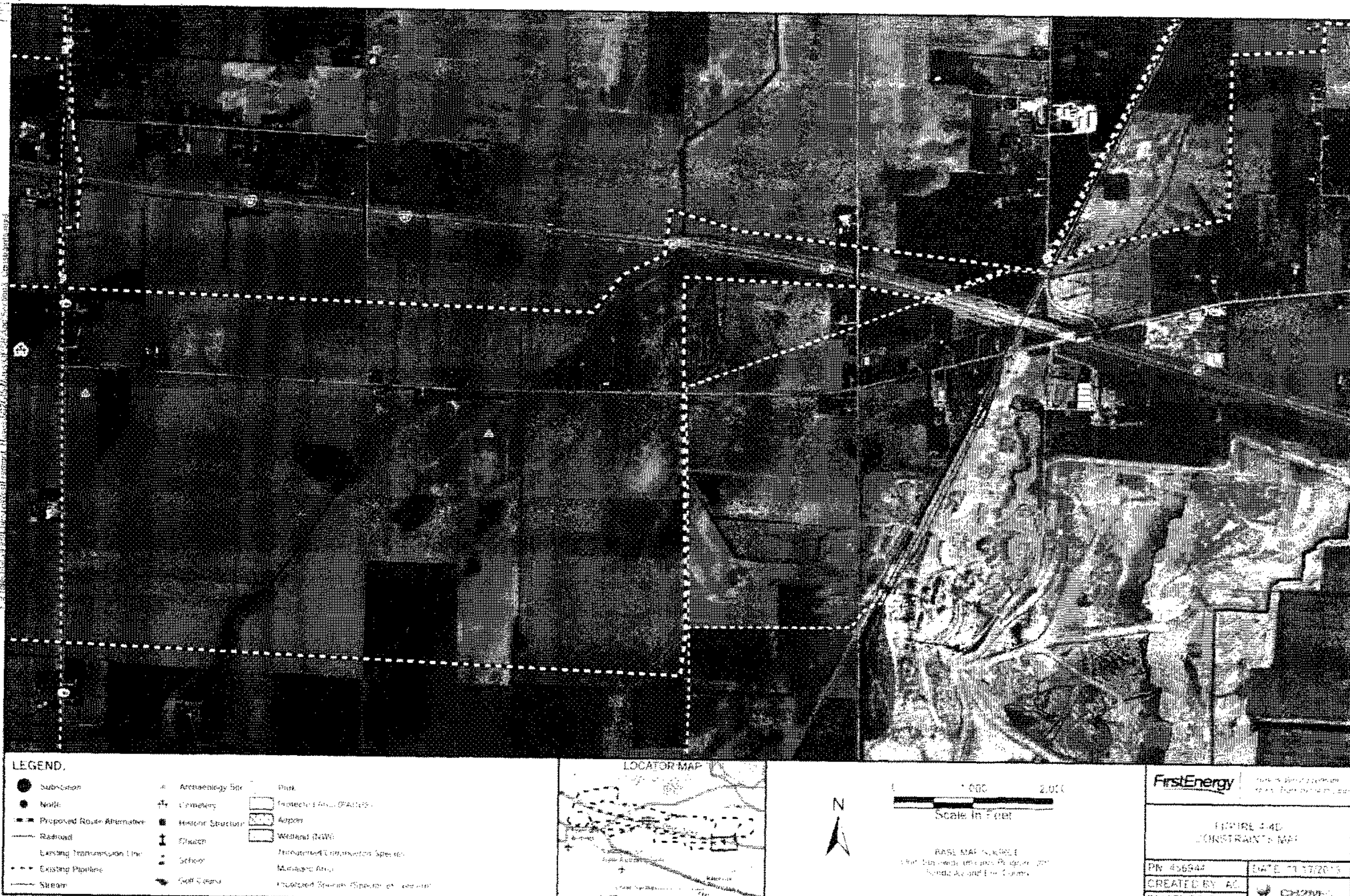
Route		Total Score	Total Rank	Ecological Score	Ecological Rank	Land Use Score	Land Use Rank	Cultural Score	Cultural Rank	Technical Score	Technical Rank
34	A-B-D-E-F-G-H-I-J-M-N-O-P-R-T (north)-X	37.9	94	24.4	91	48.2	93	38.9	71	50.0	59
46	A-B-D-E-F-G-H--G-I-J-O-P-R-T (north)-X	39.3	95	25.8	94	50.5	95	38.9	71	49.5	56
38	A-B-D-E-F-G-H-I-J-O-P-R-T (north)-X	40.5	96	25.3	93	52.6	97	38.9	71	54.1	79
59	A-B-D-E-F-G-H--D-K-Q-R-V-W-X	53.9	97	44.3	97	52.3	96	88.9	102	63.5	97
60	A-B-D-E-F-G-H--D-K-Q-U-V-W-X	54.5	98	52.6	99	53.0	98	61.1	98	61.5	96
58	A-B-D-E-F-G-H--D-K-Q-R-T (south)-X	61.2	99	49.1	98	66.5	99	77.8	101	71.6	100
57	A-B-D-E-F-G-H--D-K-Q-R-T (north)-X	64.5	100	58.4	100	69.5	100	72.2	100	61.3	95
61	A-B-D-E-F-G-H--D-K-S-U-V-W-X	70.5	101	61.3	101	84.5	101	44.4	85	77.4	102
62	A-B-D-E-F-G-H--D-K-S-W-X	85.8	102	76.6	102	102.4	102	66.7	99	75.4	101

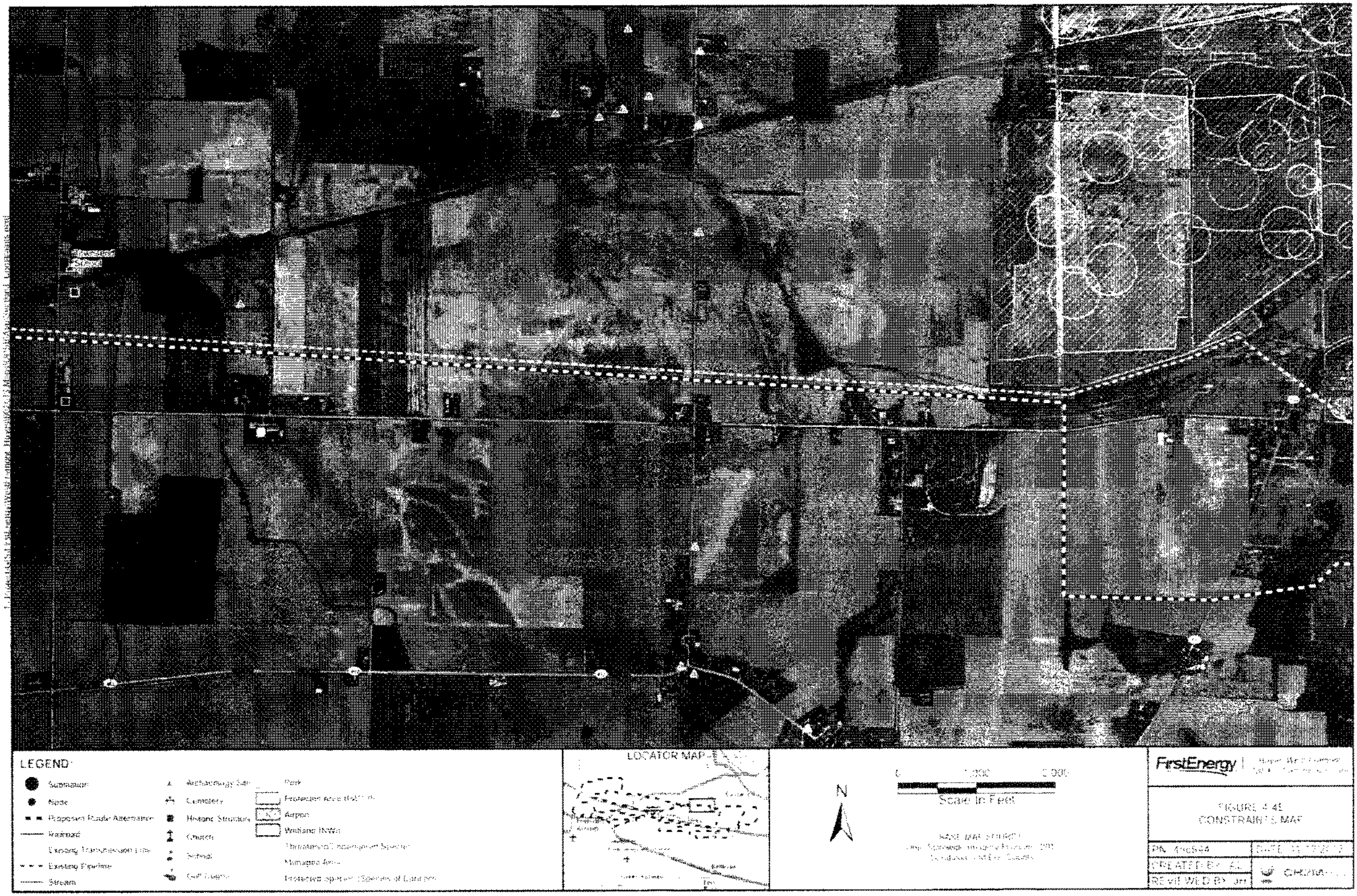

LEGEND:
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Park
Protected Area (PADUS)
Airport
Wetland (NWI)
Threatened/Endangered Species
Managed Area
Protected Species (Species of Concern)
LOCATOR MAP
N
Scale in Feet
0
1,000
2,000
BASE MAP SOURCE
FirstEnergy
FIGURE 4-4A
CONSTRAINTS MAP
PN: 456644
CREATED BY: AC
REVIEWED BY: JH
DATE

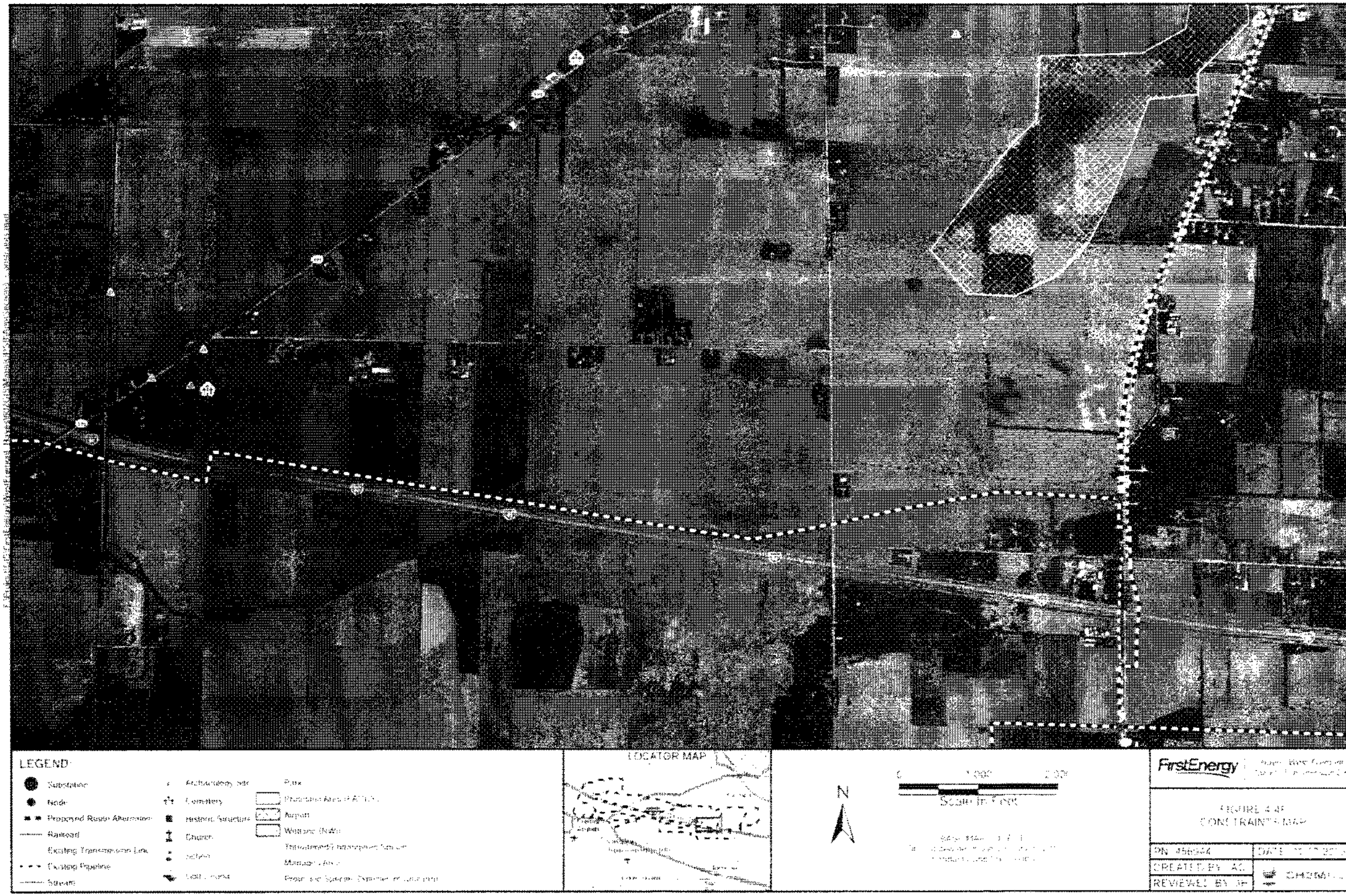


LEGEND:
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Park
Protected Area (PADUS)
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
0
1,000
2,000
Scale in Feet
BASE MAP SOURCE
FirstEnergy
FIGURE 4-4B
CONSTRAINTS MAP
PN: 456944
DATE: 11/17/2011
CREATED BY: AL
REVIEWED BY: JH
CH2MHILL

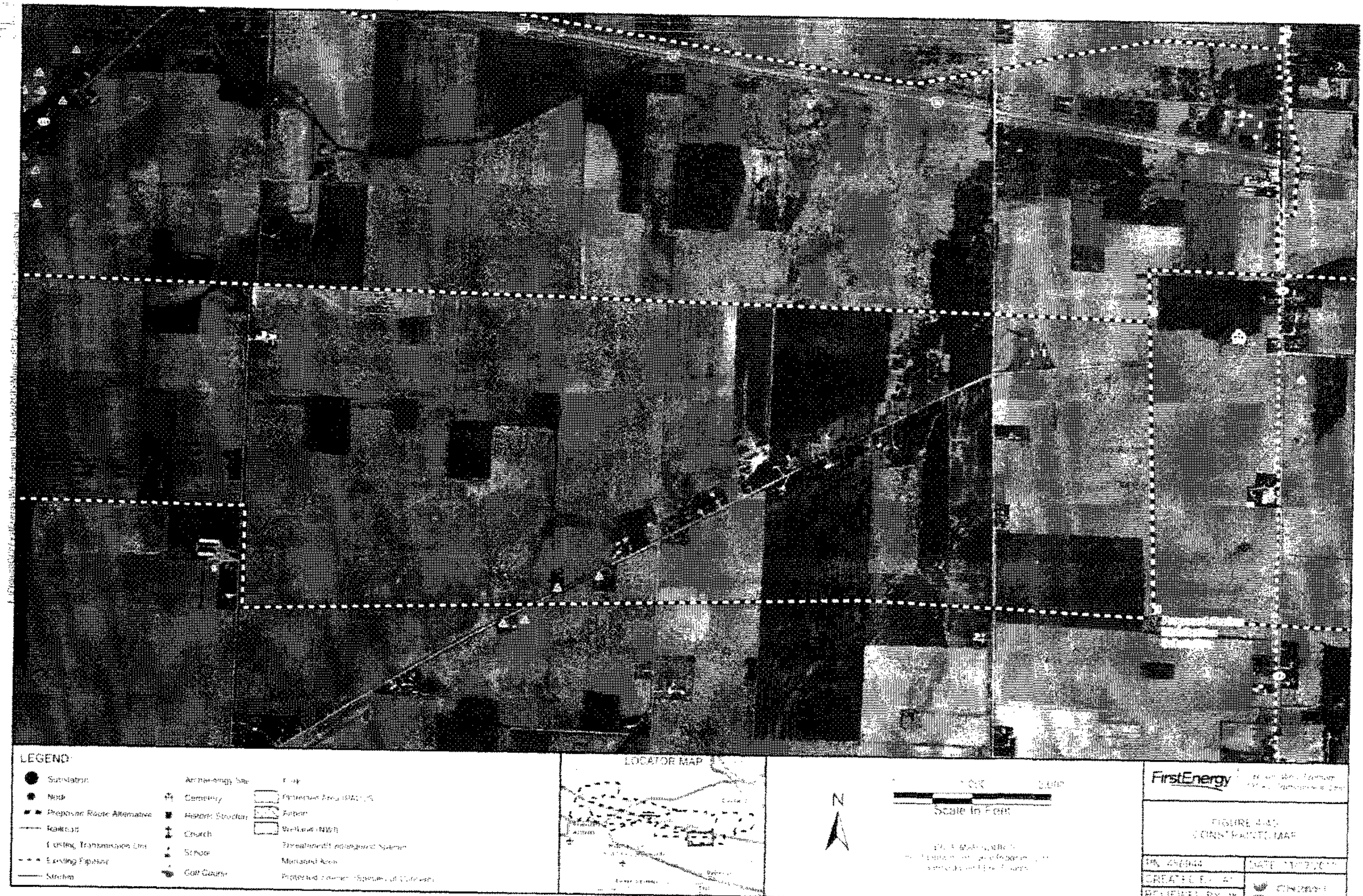

LEGEND:
Substation
Node
Proposed Route Alternative
Railroad
Existing Pipeline
Stream
Church
Golf Course
Airport
Managed Area
LOCATOR MAP
N
0
1,000
2,000
Scale in Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY: AC


LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Historic Structure
Church
School
Golf Course
Airport
LOCATOR MAP
N
0
1,000
2,000
Scale In Feet
BASE MAP SOURCE
FirstEnergy
FIGURE 4-4D
CONSTRAINTS MAP
PN 456944
CREATED BY AC
REVIEWED BY JH

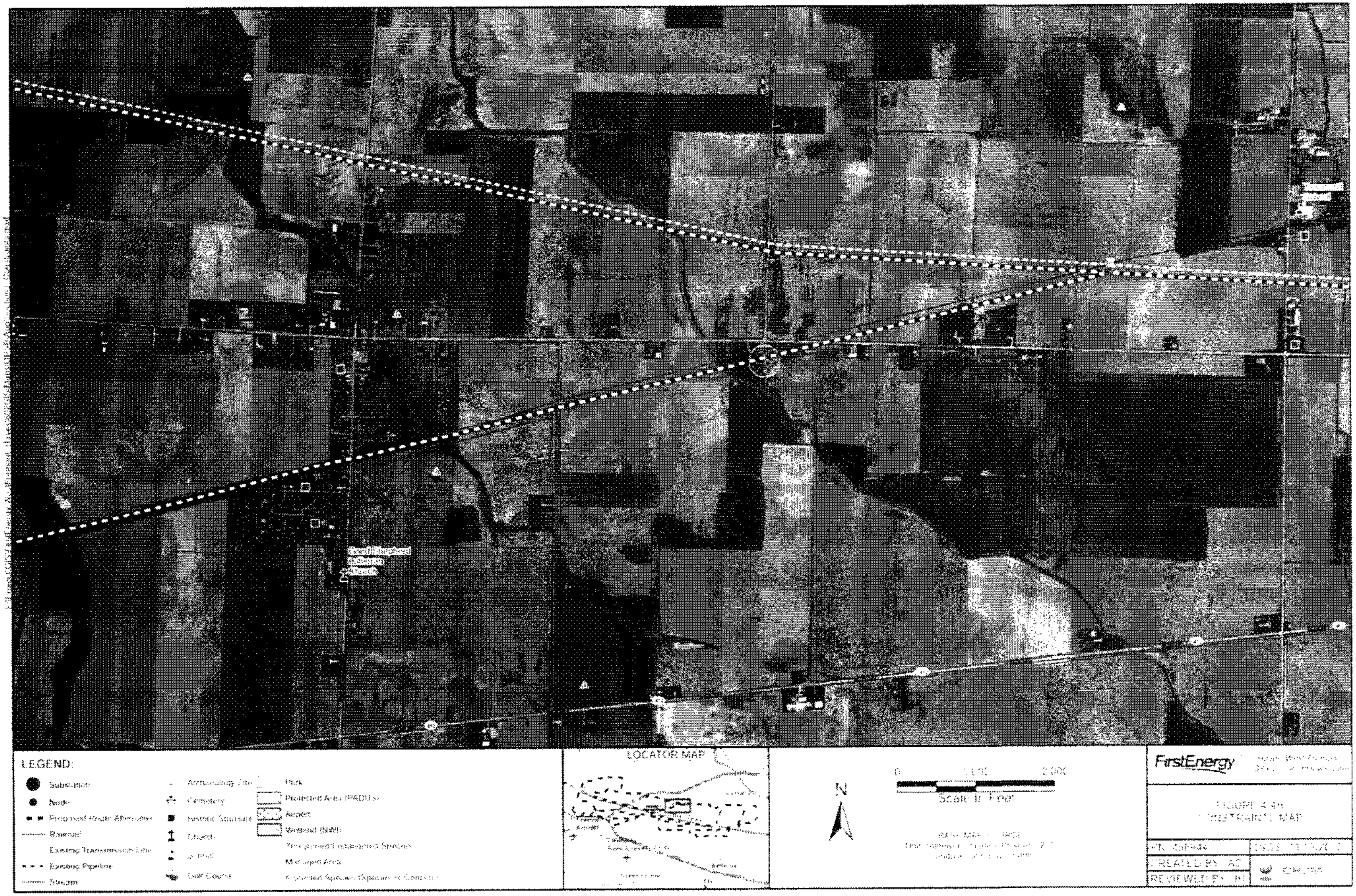

LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Park
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
Scale in Feet
FirstEnergy
FIGURE 4-4E
CONSTRAINTS MAP
CREATED BY
REVIEWED BY

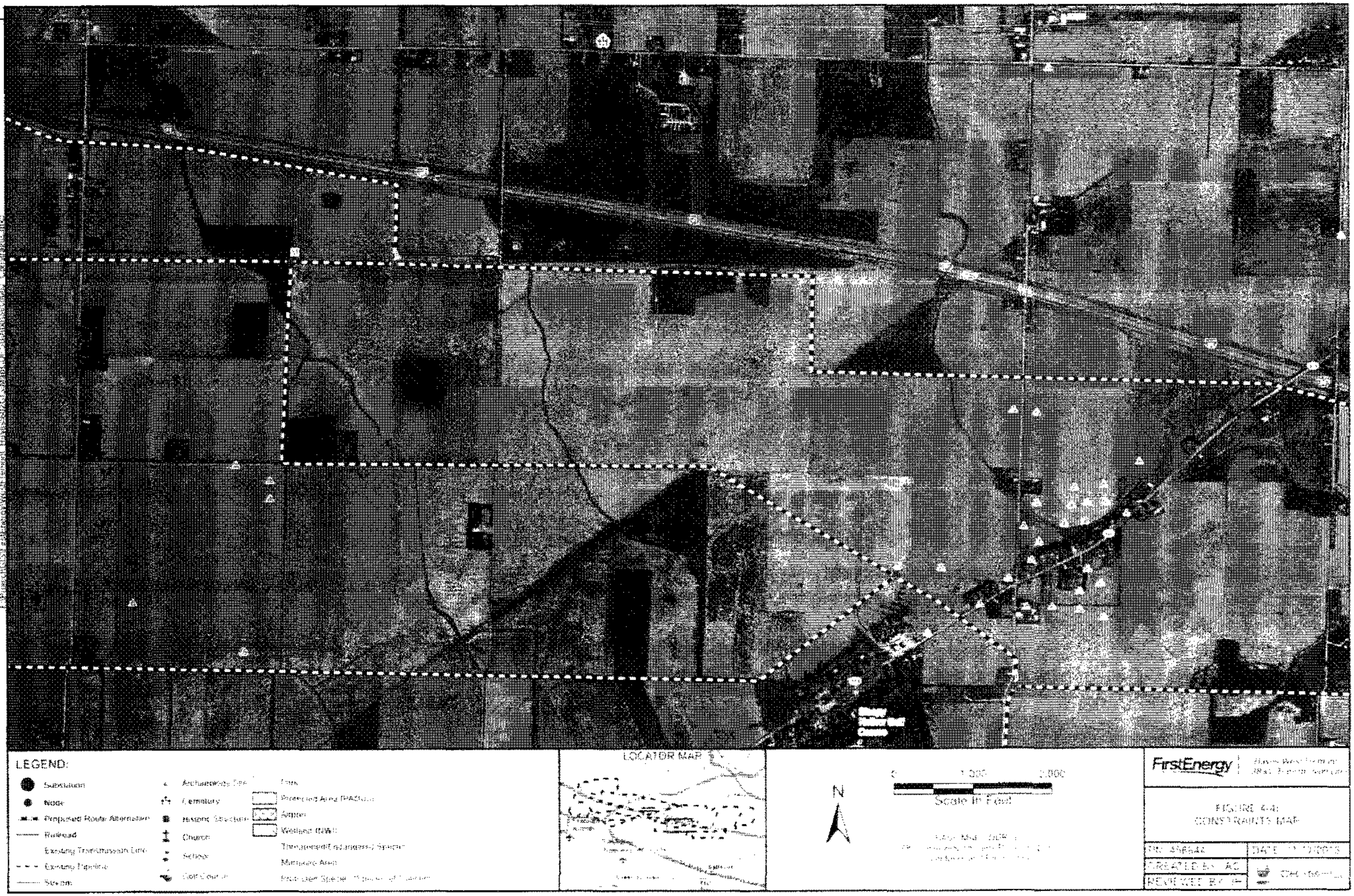


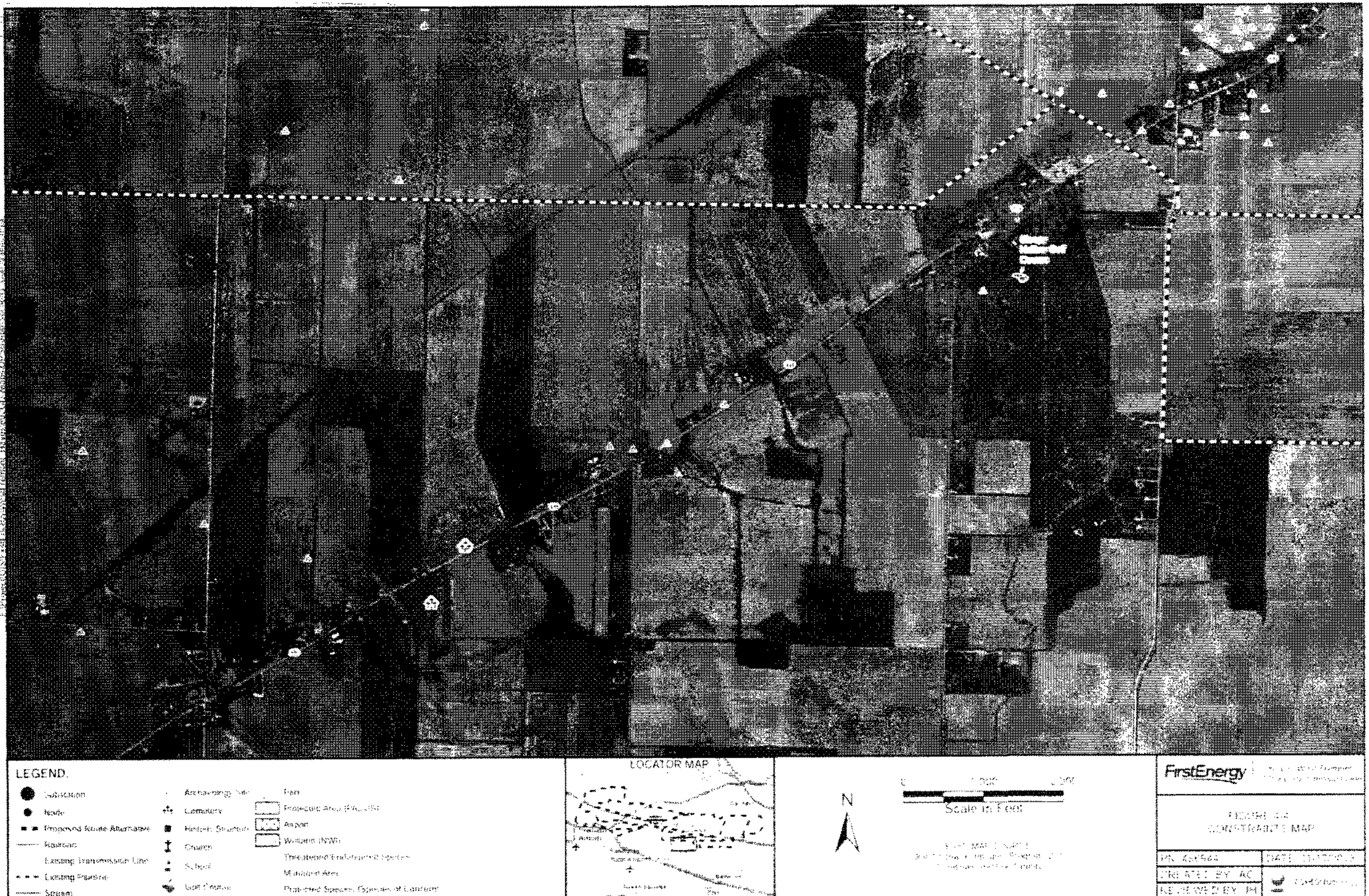
LEGEND
Substation
Node
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
Park
Airport
LOCATOR MAP
N
Scale In Feet
FirstEnergy
FIGURE 4-4F
CONSTRAINTS MAP
CREATED BY: AC
REVIEWED BY: JH

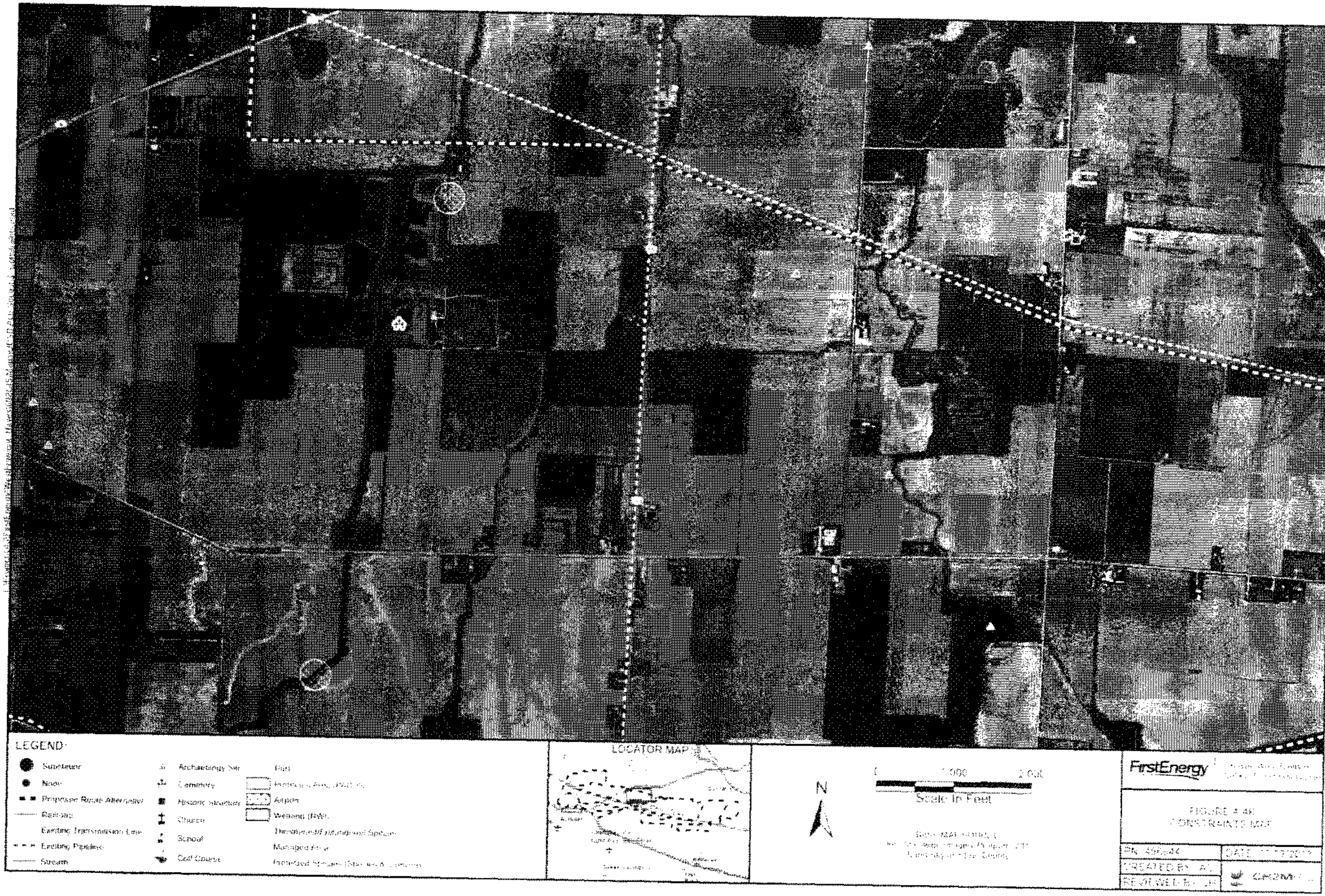


LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Historic Structure
Church
School
Golf Course
Airport
Wetland (NWI)
Threatened/Endangered Species
Protected Species
LOCATOR MAP
N
Scale In Feet
FirstEnergy
FIGURE 4-45
CONSTRAINTS MAP
DATE
CREATED BY
REVIEWED BY


LEGEND:
Substation
Node
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Historic Structure
Church
Golf Course
Park
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
Scale in Feet
FirstEnergy
CREATED BY: AC
REVIEWED BY


LEGEND:
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Historic Structure
Church
School
Airport
Wetland (NWI)
LOCATOR MAP
0
1,000
2,000
Scale in Feet
N
FirstEnergy
FIGURE 4-4:
CONSTRAINTS MAP
CREATED BY: AC


LEGEND.
Proposed Route Alternative
Existing Transmission Line
Church
School
Airport
LOCATOR MAP
N
Scale in Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY: AC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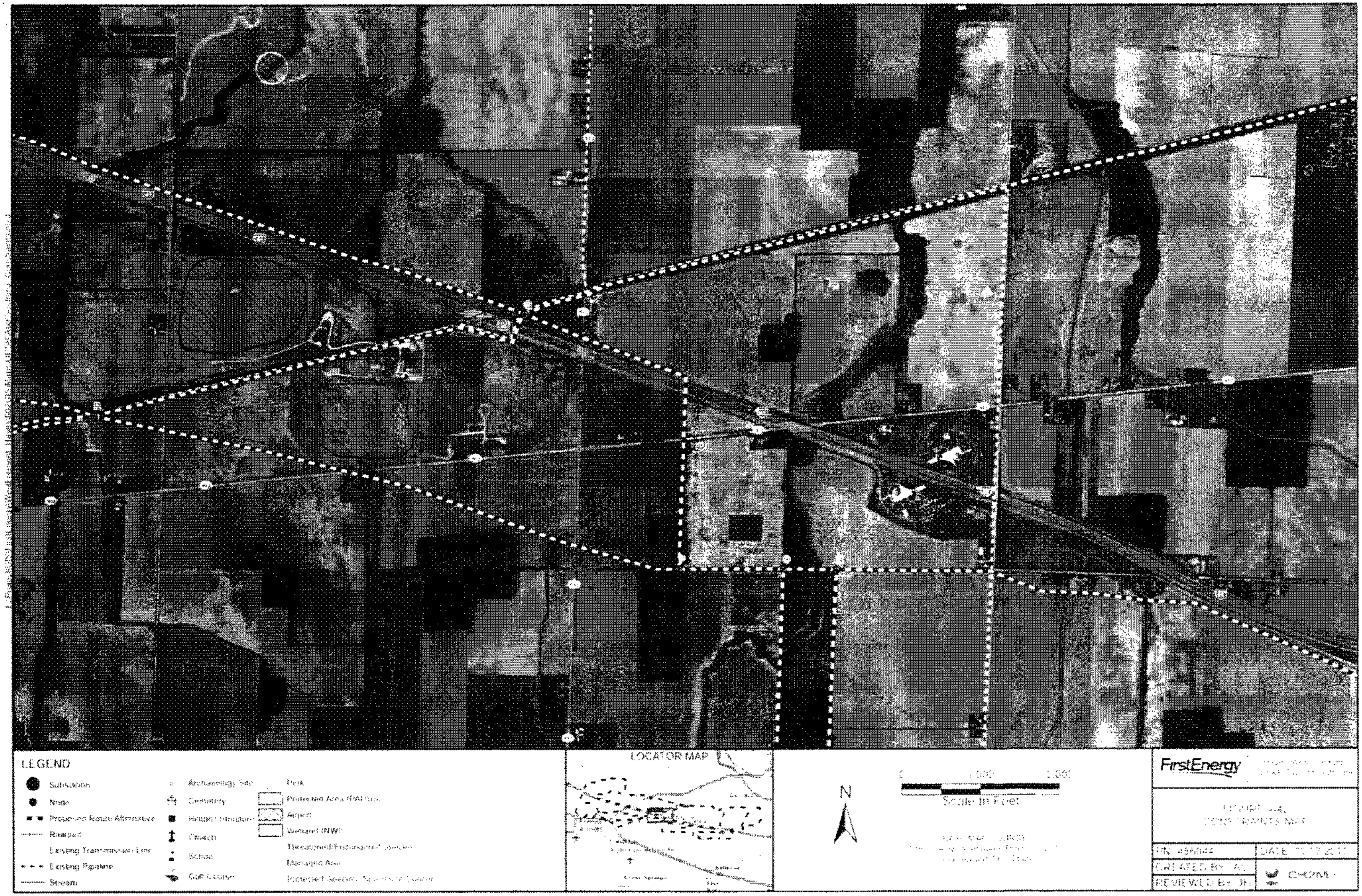
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
1,000
Scale In Feet
FirstEnergy
CREATED BY: AL
REVIEWED BY: JH
CH2MHILL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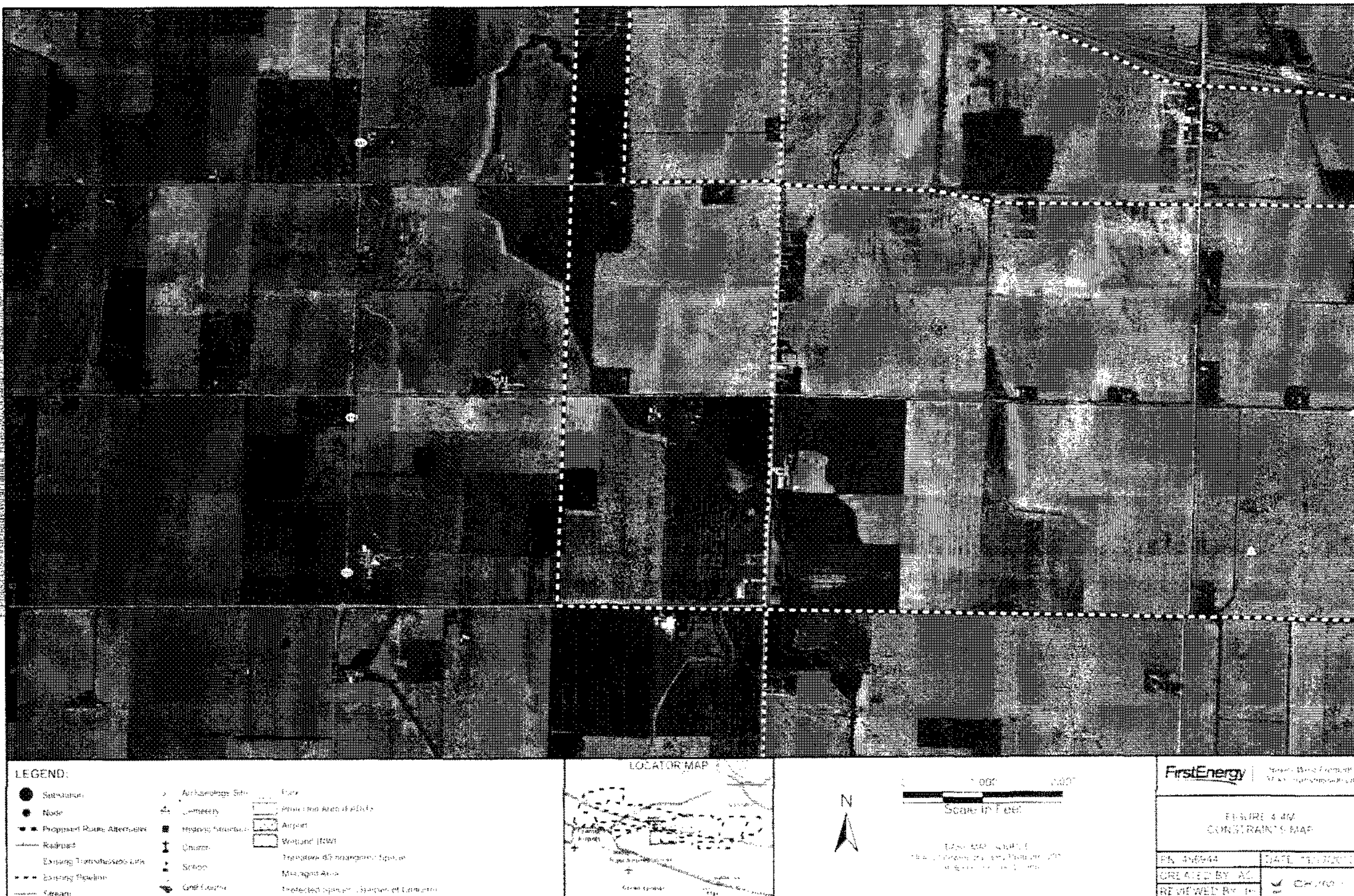
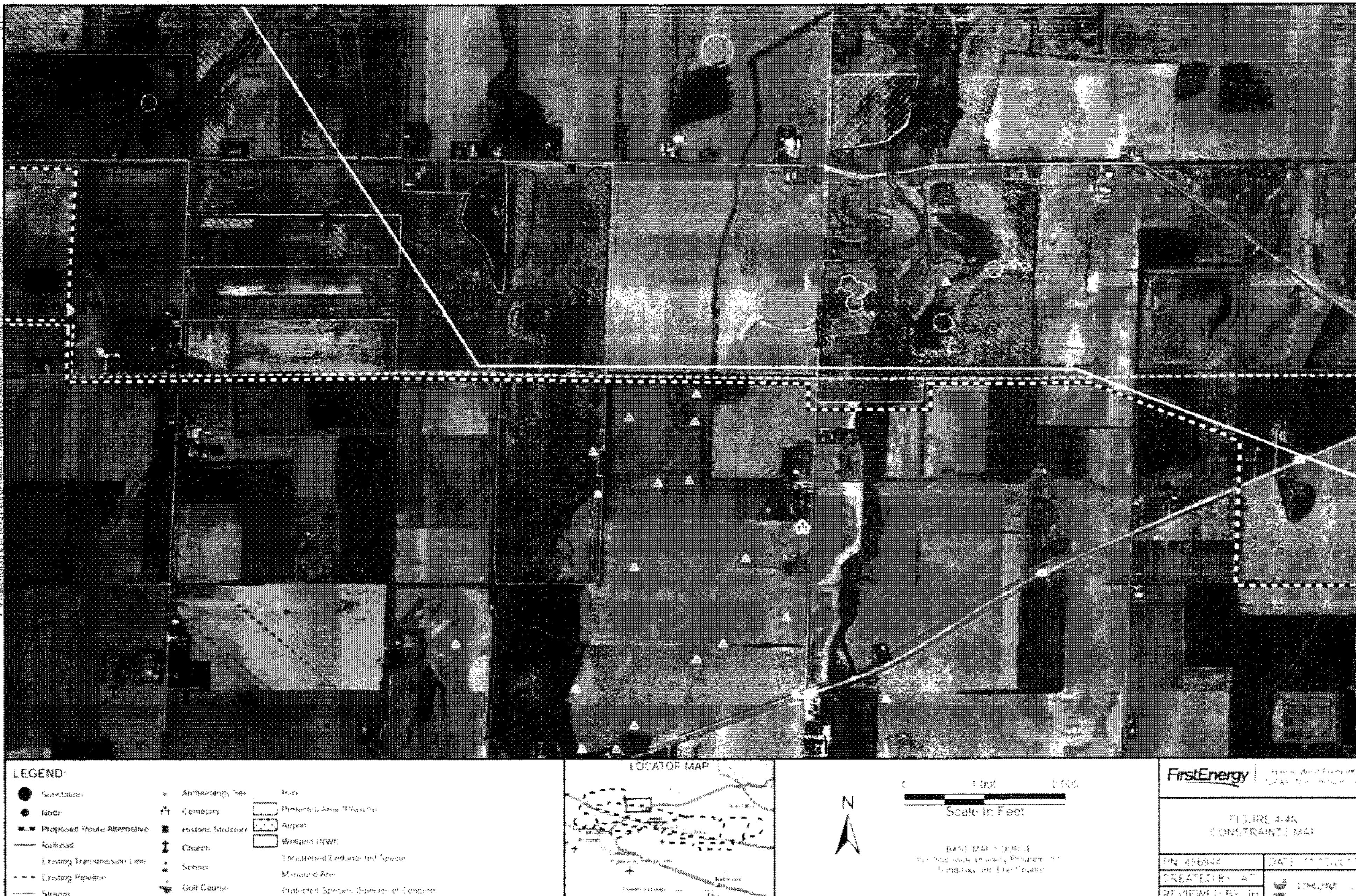
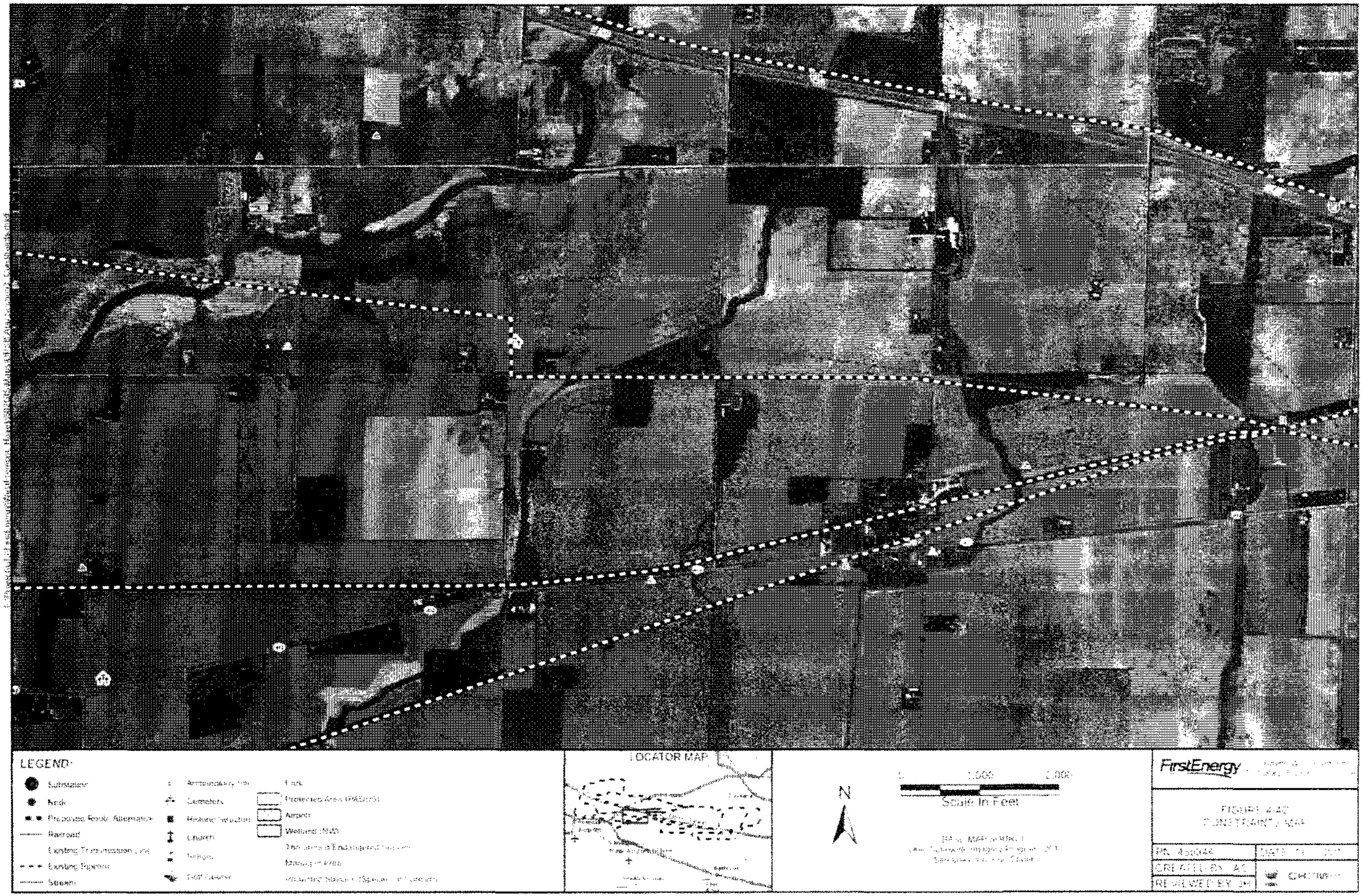
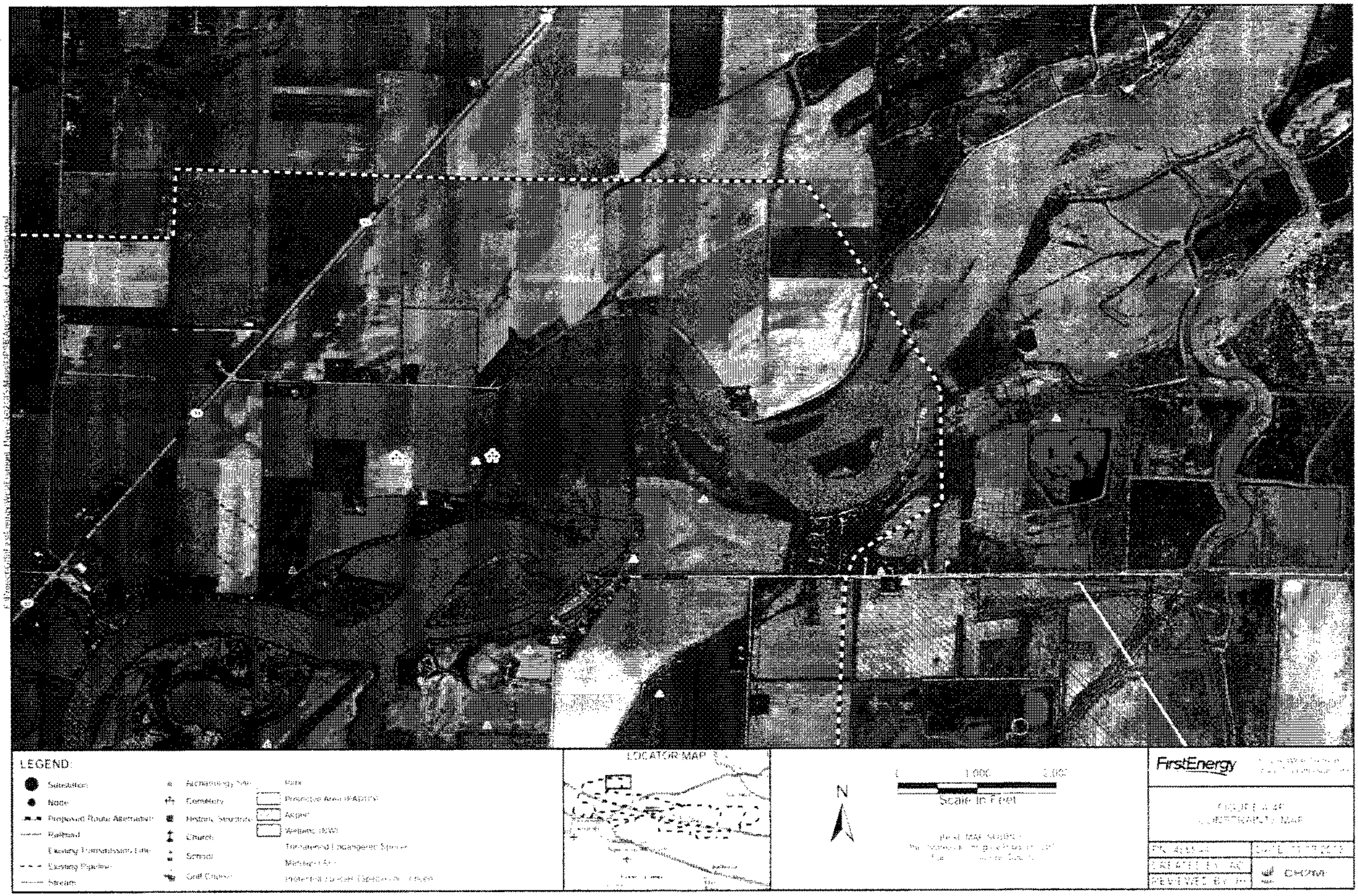
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Church
School
Park
Airport
Threatened/Endangered Species
Managed Area
LOCATOR MAP
N
Scale In Feet
FirstEnergy
CREATED BY
REVIEWED BY


LEGEND:
Substation
Node
Railroad
Stream
Church
School
Airport
LOCATOR MAP
N
Scale in Feet
1,000
FirstEnergy
CONSTRAINTS MAP
CREATED BY
REVIEWED BY
DATE


LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Church
School
Golf Course
Wetland (NWI)
LOCATOR MAP
N
Scale in Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY
REVIEWED BY



LEGEND:
Substation
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Church
Protected Area (PADUS)
Airport
Wetland (NWI)
LOCATOR MAP
N
Scale In Feet
FirstEnergy
CREATED BY: AC
REVIEWED BY: JM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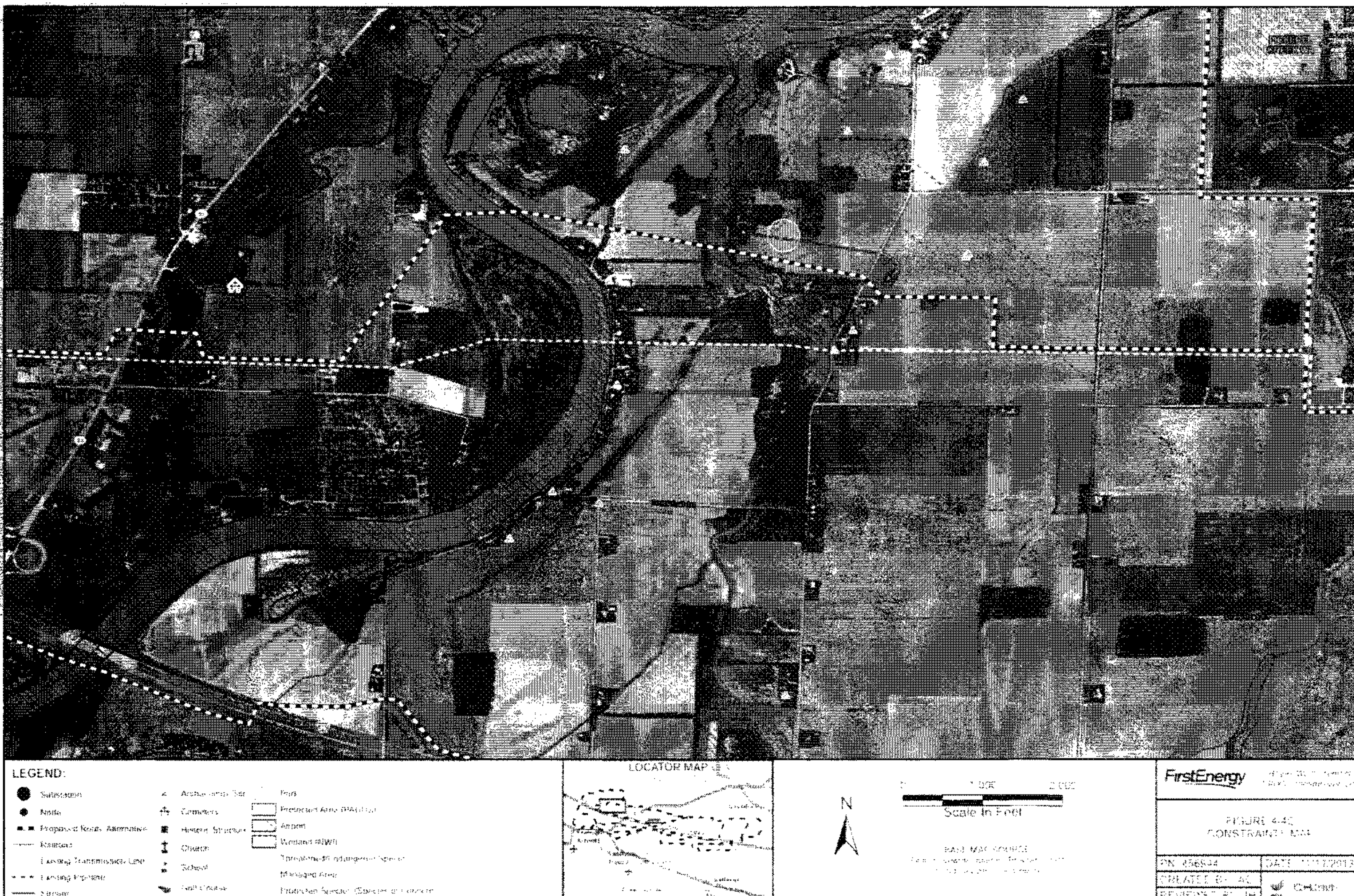
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Park
Protective Area (PAD)
Wetland (NWI)
Threatened Endangered Species
LOCATOR MAP
N
Scale in Feet
0
1,000
2,000
FirstEnergy
CH2MHILL


LEGEND:
LOCATOR MAP
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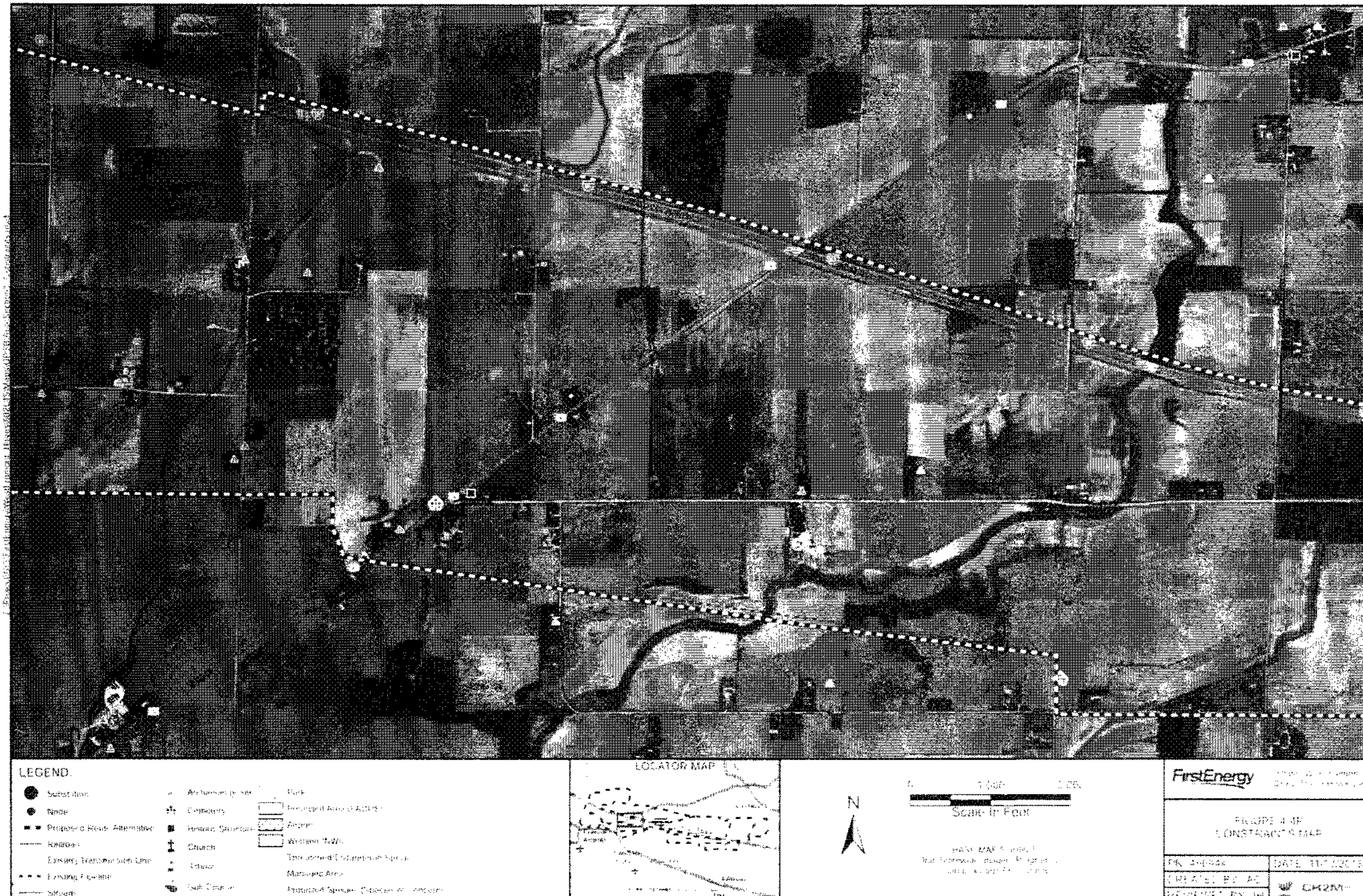
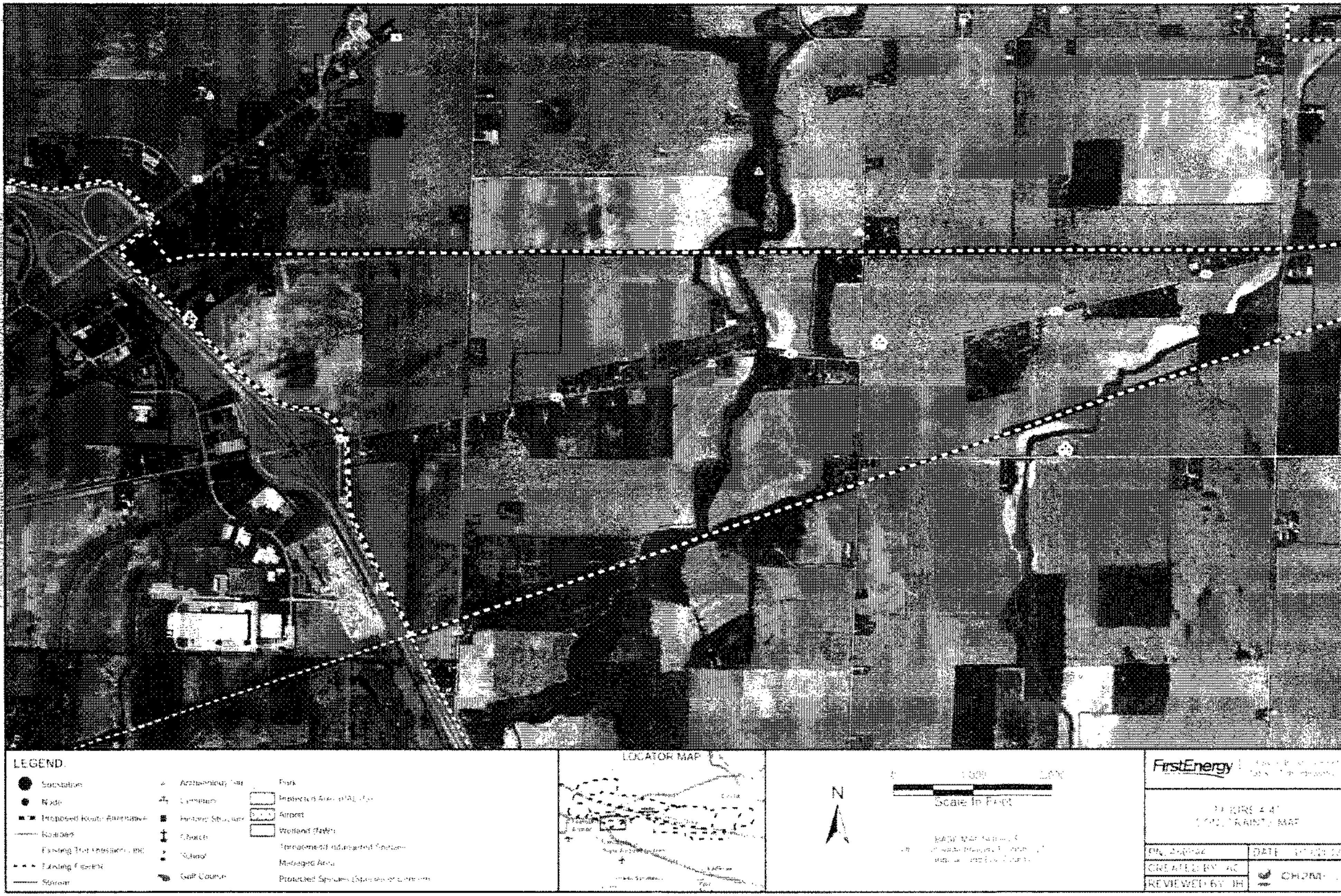
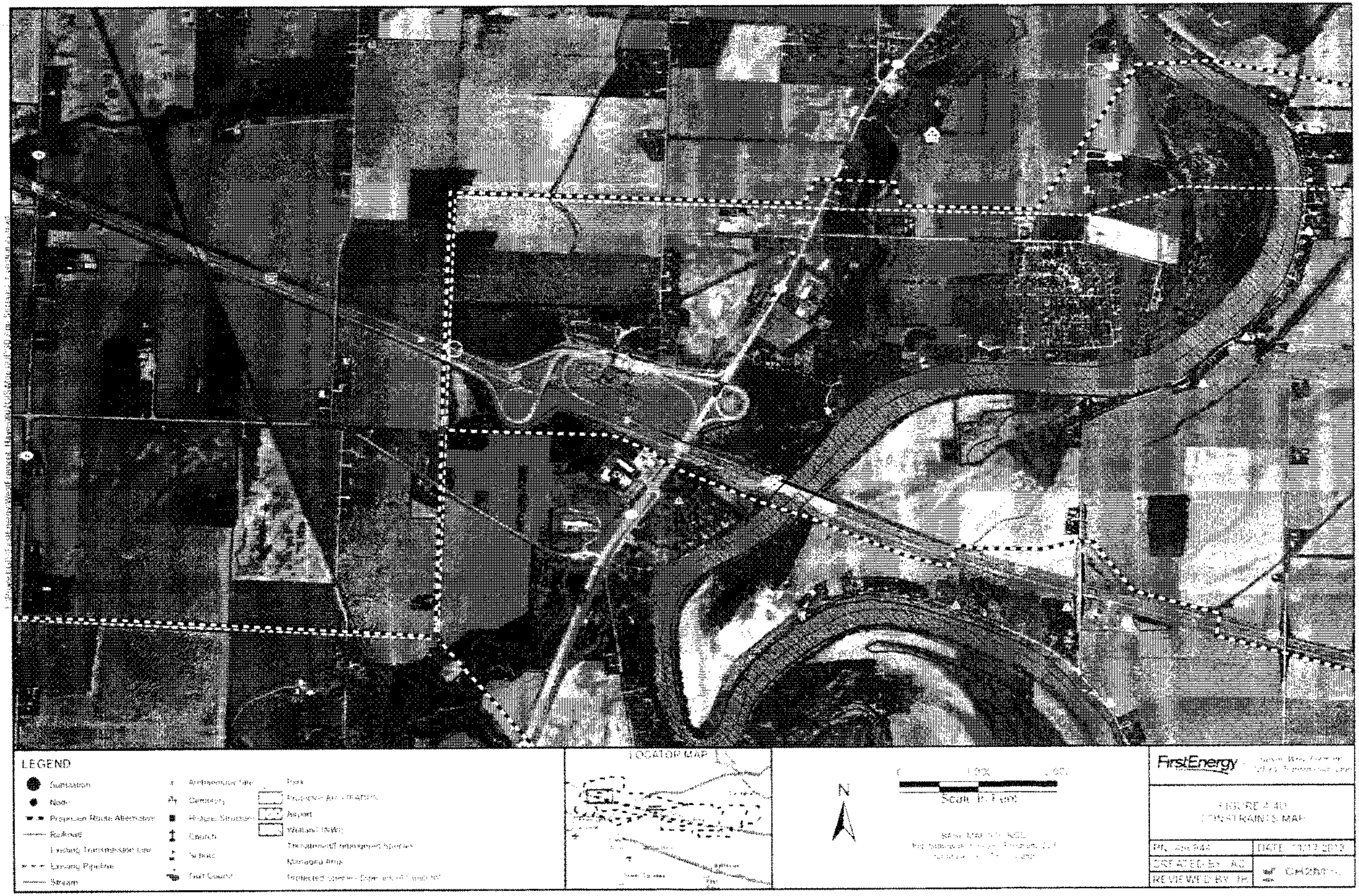
Scale In Feet
FirstEnergy
FIGURE 4-4C

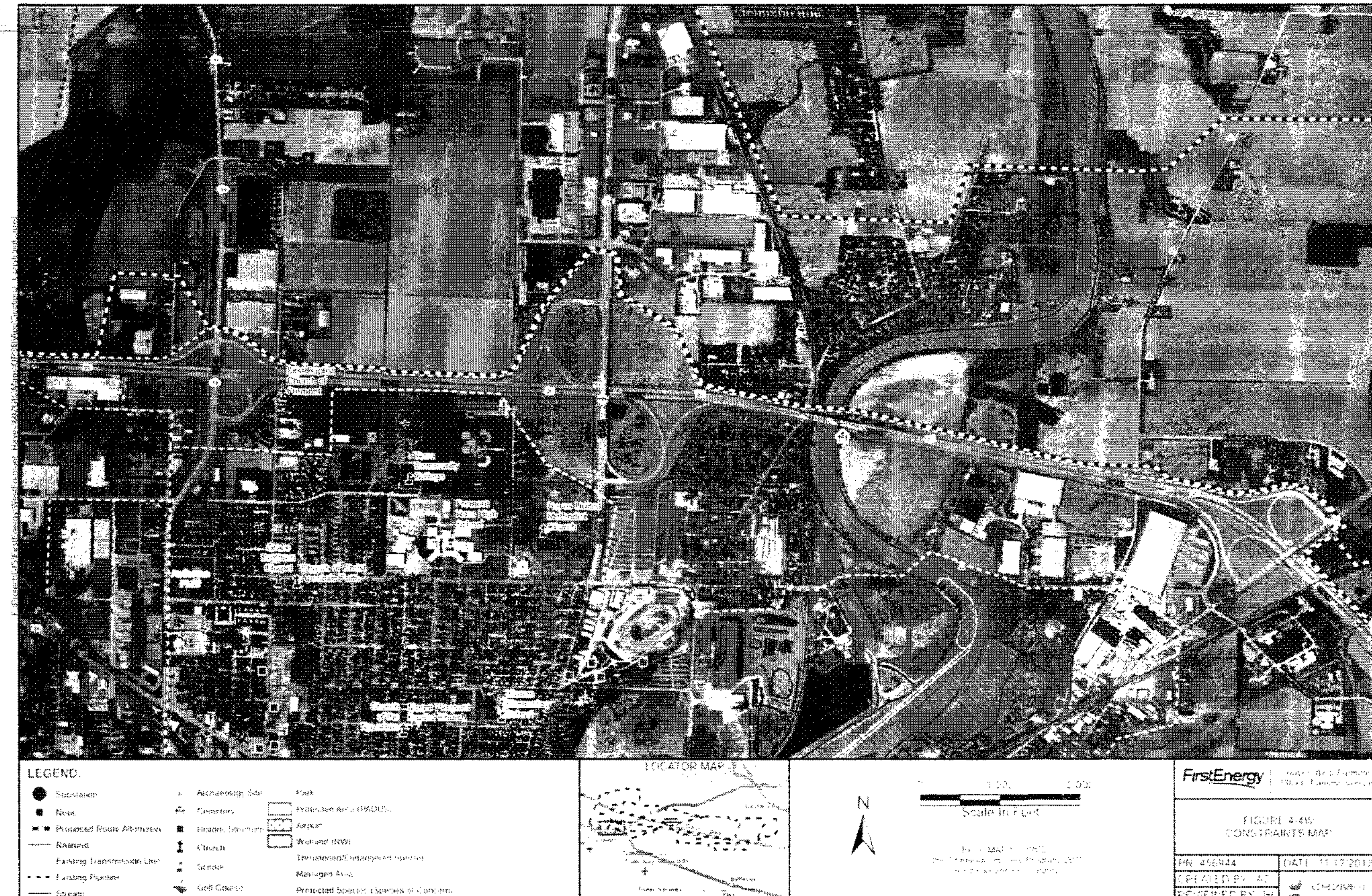

LEGEND
Substation
Node
Railroad
Church
LOCATOR MAP
N
Scale In Feet
FirstEnergy
CONSTRAINTS MAP
CH2M

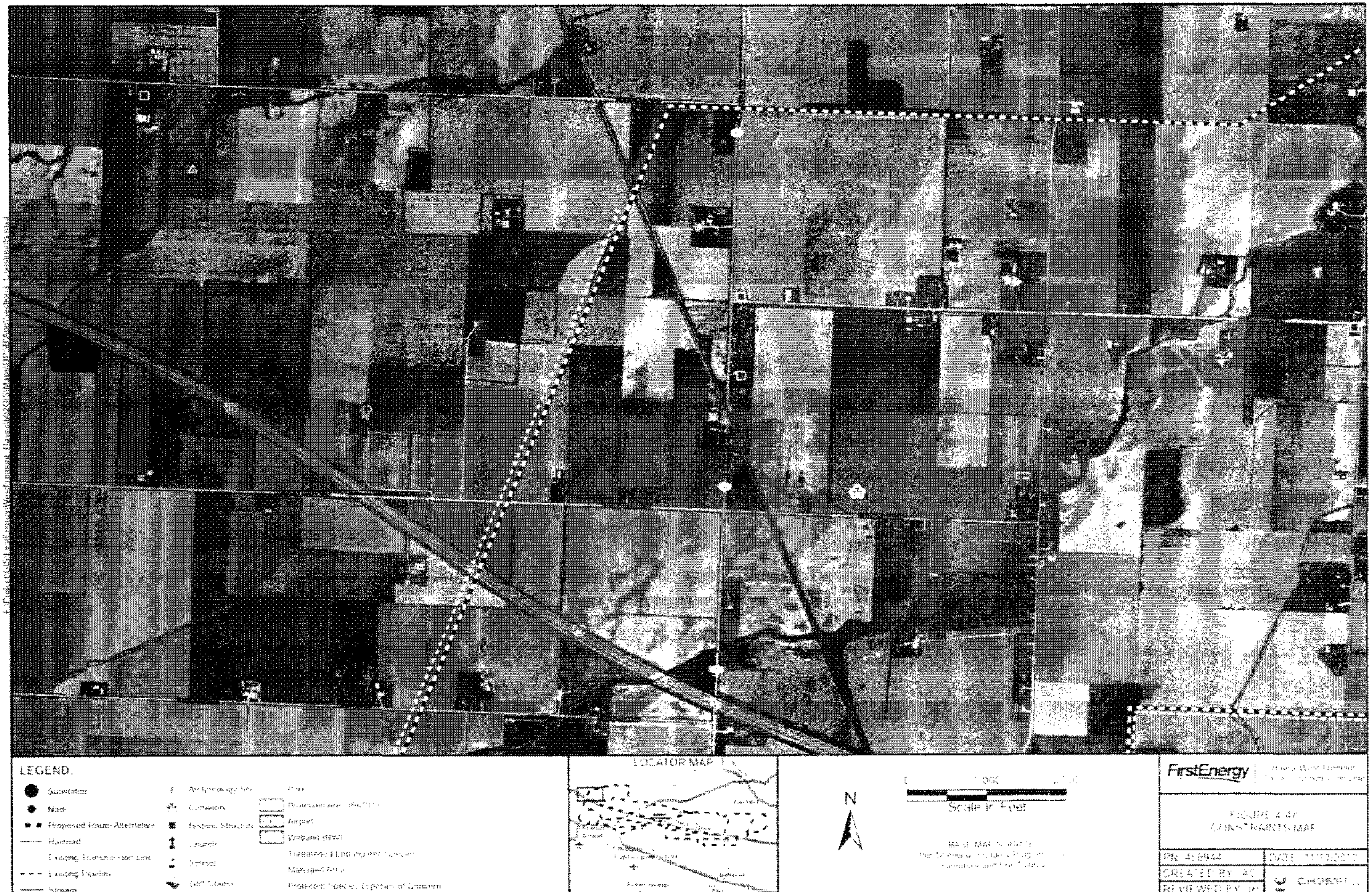

LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Archaeology Site
Cemetery
Historic Structure
Church
School
Golf Course
Park
Airport
Wetland (NWI)
Threatened/Endangered Species
Managed Area
Protected Species (Sensitive Elements)
LOCATOR MAP
N
Scale In Feet
FirstEnergy
CREATED BY: AC
REVIEWED BY: JH
DATE
CH2M

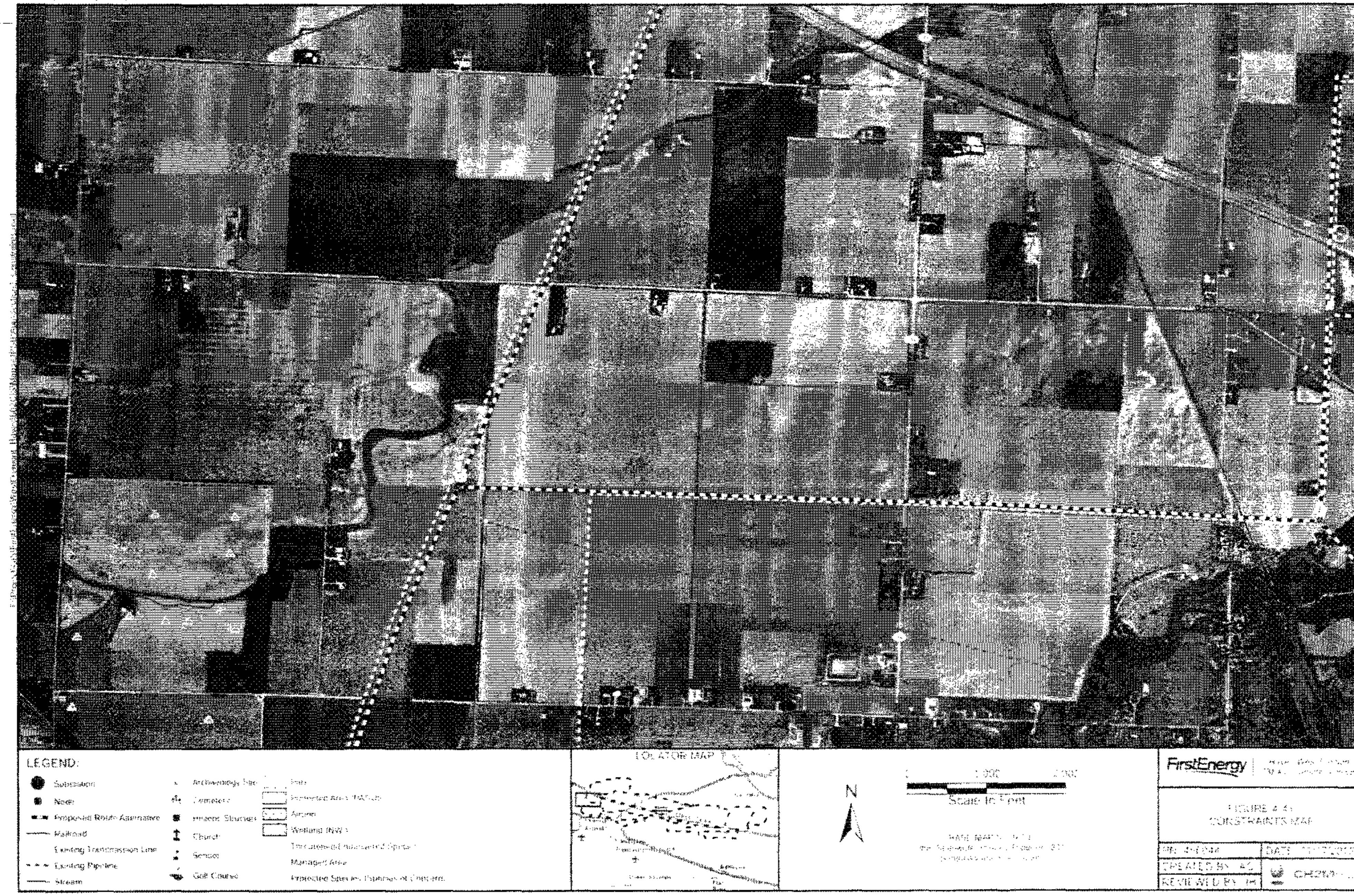

LEGEND.
Proposed Route Alternative
LOCATOR MAP
N
Scale in Feet
FirstEnergy

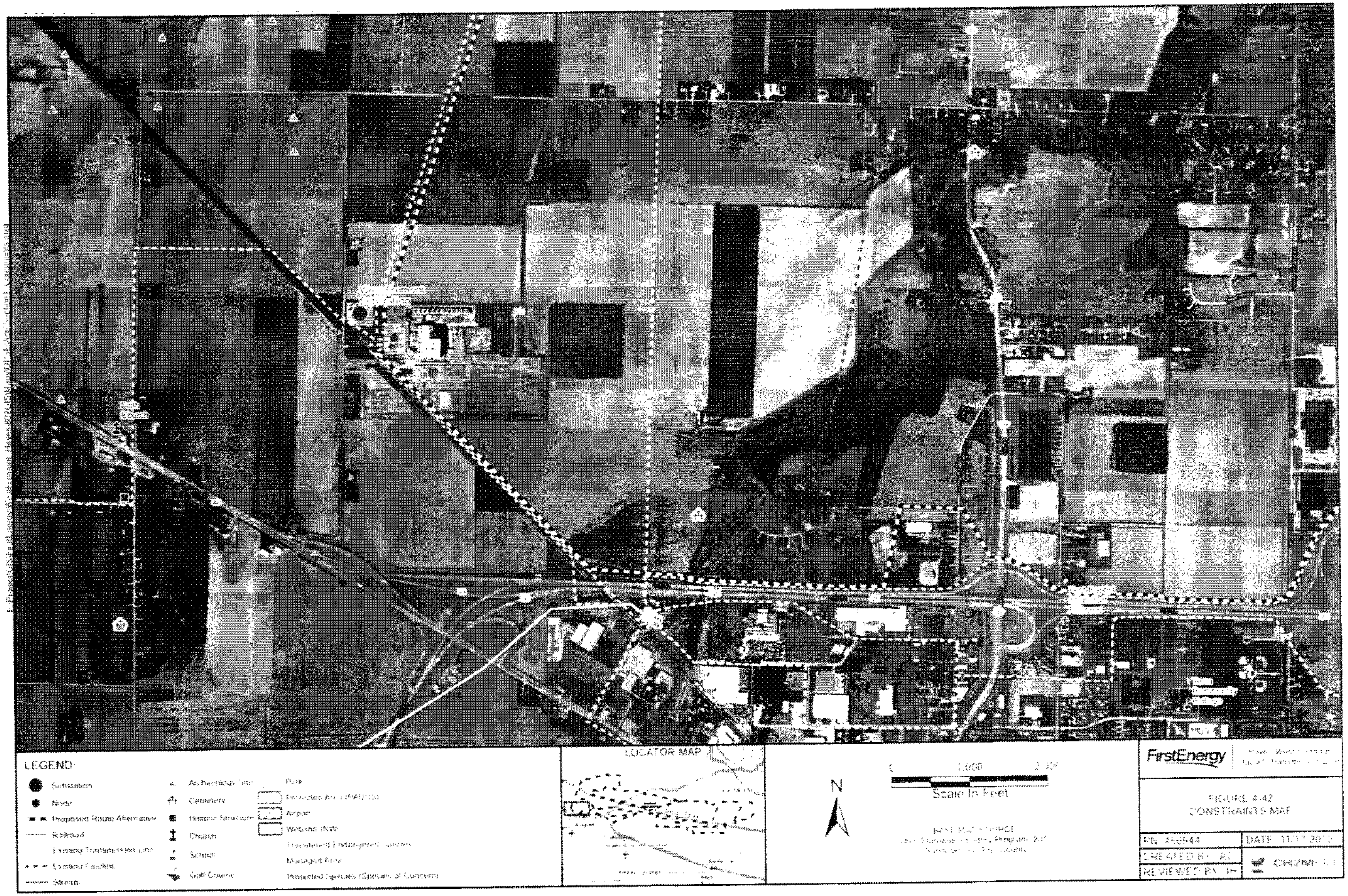

LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Church
School
Golf Course
Park
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
Scale in Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY: AC
REVIEWED BY: JH
CH2MHILL


LEGEND
Substation
Railroad
Existing Pipeline
Church
School
LOCATOR MAP
N
Scale In Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY
REVIEWED BY


LEGEND.
Substation
Node
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Cemetery
Church
School
Golf Course
Park
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
Scale in Feet
FirstEnergy
FIGURE 4-4W
CONSTRAINTS MAP
CREATED BY: AC
REVIEWED BY: JH


LEGEND.
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Airport
Wetland
Managed Area
Protected Species, Species of Concern
LOCATOR MAP
N
Scale in Feet
FirstEnergy
CONSTRAINTS MAP
CREATED BY: AC


LEGEND:
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Pipeline
Stream
Church
School
Golf Course
Airport
Wetland (NWI)
Managed Area
LOCATOR MAP
N
Scale In Feet
FirstEnergy
FIGURE 4-4
CONSTRAINTS MAP
DATE
CREATED BY
REVIEWED BY



LEGEND
Substation
Node
Proposed Route Alternative
Railroad
Existing Transmission Line
Existing Facilities
Stream
Cemetery
Historic Structure
Church
School
Golf Course
Park
Airport
Wetland (NWI)
Managed Area
Protected Species (Species of Concern)
LOCATOR MAP
N
1,000
Scale In Feet
FirstEnergy
FIGURE 4-42
CONSTRAINTS MAP
DATE
CREATED BY: AC

4906-15-04 TECHNICAL DATA

(A) SITE/ROUTE ALTERNATIVES

This section of the Application provides the required technical data for the proposed Hayes-West Fremont 138 kV Transmission Line Project ("Project"). The data provided includes location, major features, and the topographic, geologic, and hydrologic suitability of the route alternatives. This section also provides data on the layout and construction of the proposed transmission line alternatives and provides information on the proposed transmission line equipment.

(1) Geography and Topography

A map series at 1:24,000 scale showing the proposed Preferred and Alternate Route alignments for the Project and the adjacent areas within 1,000 feet on either side of the proposed alignments are presented in Figures 4-1A through 4-1F. The figures were developed from the following United States Geological Society ("USGS") 7.5 minute topographic maps: Lindsey (published 1971); Wightman Grove (published 1980); Vickery (published 1960); Castalia (published 1971); Sandusky (published 1979); Fremont East (published 1980); Clyde (published 1971); Bellevue (published 1980); and Kimball (published 1971).

The information on the figures was updated through review of aerial photography, property parcel data from Sandusky and Erie County auditors, and field surveys conducted in October 2012, November 2012, May 2013, June 2013, August 2013, September 2013, October 2013, and November, 2013.

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

As noted throughout this Application, the Project proposes a Preferred Route, an alternate 1.44-mile section of this preferred alignment ("Preferred Route Option B"), and an Alternate Route. The proposed alignments for the Project, including the proposed turning points, are shown on Figures 4-1A through 4-1F and described, from west to east, in the following sections.

Preferred Route

The Preferred Route begins approximately three miles northwest of Fremont at the existing West Fremont Substation. The route extends approximately one mile northeast paralleling an existing overhead transmission line and continues east for approximately two miles paralleling an overhead distribution line before tracking north for approximately 0.5 mile, just south of the Ohio Turnpike (Route 90 and Route 80). Just east of the Sandusky River crossing, the Preferred Route crosses the Ohio Turnpike, then parallels it for approximately eight miles before looping through the proposed Groton Distribution Substation and terminating at the Hayes Substation. The Preferred Route is 28.95 miles long and traverses mostly agricultural land, and some forested, commercial/industrial, residential, and recreational lands. The Preferred Route parallels and crosses two sets of railroad tracks and numerous utility right-of-ways (ROWs). The Preferred Route is located in Sandusky, Riley, Townsend, York Townships, in Sandusky County and Groton, Oxford, and Perkins Townships, in Erie County.

Preferred Route Option B

Preferred Route Option B is an alternate 1.44-mile section of the Preferred Route between the Sandusky River and Township Line Road. Preferred Route Option B begins just east of the Sandusky River, where it separates from the Preferred Route alignment, continuing along the south side of the Ohio Turnpike until it crosses the turnpike at Township Line Road, where it rejoins the Preferred Route alignment. The combined length of the Preferred Route if Preferred Route Option B is selected is 28.93 miles. Preferred Route Option B is located in Riley and Sandusky Townships in Sandusky County.

Alternate Route

The Alternate Route is identical to the Preferred Route for approximately the first four miles, until the route crosses the Norfolk and Western Railroad. From this point, the Alternate Route generally runs east, looping through the proposed Groton Distribution Substation and terminating at the Hayes Substation. The Alternate Route is 30.47 miles and traverses agricultural, forested, commercial/industrial, residential, and recreation land; it parallels and crosses two sets of railroad tracks and numerous utility ROWs. The Alternate Route is located in Sandusky, Riley, Green Creek, Townsend, and York Townships, Sandusky County and Groton, Margaretta, and Perkins Townships, Erie County.

The proposed Preferred Route, Preferred Route Option B, and Alternate Route for the Project, including the proposed turning points, are shown in Figures 4-1A through 4-1F. Detailed written descriptions of the routes are also provided in Section 4906-15-06(B)(1) of this Application.

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

To meet Project need, the Project must either loop into or pass through the proposed Groton Distribution Substation. Figure 4-1D shows the proposed location of this distribution substation in Groton Township, Erie County, approximately four miles north of Bellevue, Ohio, for both the Preferred and Alternate Routes. Both routes are proposed to terminate at the Hayes Substation currently under construction, located in Perkins Township, Erie County. The Hayes Substation, shown on Figure 4-1F, is located at the end of the proposed Project, approximately four miles south of Sandusky, Ohio.

(c) Major highway and railroad routes.

The single alignment shared by the Preferred and Alternate Routes crosses one state road (State Route 19) and the Norfolk and Western Railroad before diverging and continuing along separate alignments.

After separating from the shared alignment, the Preferred Route crosses State Route 53 before paralleling the Ohio Turnpike for approximately eight miles, twice crossing the Turnpike and crossing Highway 6 and State Route 510. The Preferred Route then turns south, crossing State Route 412 before turning generally east and crossing State Route 101 just west of the proposed Groton Distribution Substation. The route then crosses State Route 269 before paralleling the Norfolk and Western Railroad for approximately 0.7 miles, just west of the quarry. The route then crosses the railroad and the north portion of the quarry before traveling northeast, crossing the Ohio Turnpike and State Route 4 and terminating at the proposed Hayes Substation.

After separating from the Preferred Route, Preferred Route Option B roughly parallels the Ohio Turnpike, before crossing it once at Township Line Road. At this point, Preferred Route Option B rejoins the Preferred Route.

The Alternate Route crosses State Route 53 before paralleling the Norfolk and Western Railroad ROW for approximately 0.7 miles. The route next crosses Highway 6 and State Route 412 before crossing State Route 510, paralleling the road for approximately 1.6 miles and crossing it a total of five times. As the route trends east, it crosses State Route 101 west of the proposed Groton Distribution Substation, crossing State Route 269. The Alternate Route then crosses the Ohio Turnpike just before crossing and paralleling the Norfolk and Western Railroad for approximately 2.8 miles, travelling northeast. The Alternate Route crosses State Route 4 before terminating at the proposed Hayes Substation.

The Project will cross the Norfolk and Western Railroad in two locations along both the Preferred and Alternate routes. The single alignment shared by the Preferred and Alternate Routes crosses the Norfolk and Western Railroad in Sandusky Township, Sandusky County, just before the routes separate and continue along different proposed ROWs. The Preferred Route crosses the railroad again near the quarry, between the proposed Groton Distribution Substation and Hayes Substation, in Groton Township, Erie County. The Alternate Route crosses the same railroad, but in Margaretta Township, Erie County.

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

Based on data from the Federal Aviation Administration's Office of Aeronautical Information Services, nine airports and three heliports are located in Sandusky County and eight airports and six heliports are located in Erie County. A former airport site is located within the 1,000 foot buffer of the Alternate Route. This airport, Zimmerman Airport, was a privately owned facility located east of North River Road and south of Kelly Road. Based on data from the Ohio Department of Aviation, this airport has been closed since December 2007. Two additional airports are located in proximity, but not within the Alternate Route or its 1,000 foot buffer. Mather Field, a privately owned facility, is located just outside of the proposed Alternate Route, between Bardshar Road and Old Railroad Road. Galloway Airport, a privately owned facility, is located east of Patten Tract Road approximately one mile from both the proposed Preferred and Alternate Routes.

(e) Utility corridors.

The proposed Preferred Route for the Project is 28.95 miles long or 28.93 miles long if Preferred Route Option B is selected.. The proposed Alternate Route for the Project is 30.47 miles long. All proposed routes are in Sandusky and Erie counties. The Project crosses numerous transmission and pipeline ROWs. The Preferred Route crosses and parallels existing electric transmission lines in four locations and existing pipeline ROWs in eight locations. Preferred Route Option B does not parallel any existing ROW. The Alternate Route crosses and parallels existing electric transmission lines in six locations and existing pipeline ROWs in 13 locations. Table 04-1 summarizes the existing electric transmission or distribution lines paralleled by the Project. The alignment of the existing electric transmission lines and existing pipelines are shown on Figures 4-1A through 4-1F.

[illegible]

	Routes	
	Preferred	Alternate
Number of Parallel Sections	4	6
Name of Existing Transmission Line and Mileage of Parallel Section(s)	West Fremont to Ottawa #1 and #2 138 kV Transmission Line (1.1 miles) 12.47 kV Distribution Line (1.11 miles, parallels 0.74 miles, and overbuild 0.37 miles) Existing 69 kV Transmission Line (1.58 miles) Beaver-Davis Beese 345 kV Transmission Line (0.11 miles)	West Fremont to Ottawa #1 and #2 138 kV Transmission Line (1.1 miles) 69 kV Distribution Line (1.75 miles) AEP Fremont to TAP 69 kV Distribution Line (0.17 miles) 69 kV Distribution Line (2.91 miles) Beaver-Davis Beese 345 kV Transmission Line (0.96 miles)

		Greenfield-Avery 138 kV Transmission Line (0.92 miles)
Total Parallel Mileage	3.90 miles	7.81 miles

(f) Proposed permanent access roads.

No permanent access roads are proposed for the Preferred Route, Preferred Route Option B, or the Alternate Route. Please see Section 4906-15-04(B)(1)(c) of this Application for a description of the Applicant's approach for access roads for construction and future maintenance of the transmission line along the proposed routes.

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

A full description of the lakes, ponds, reservoirs, streams, canals, rivers, and swamps (wetlands) located within 1,000 feet of the Preferred Route, Preferred Route Option B, and the Alternate Route is provided in Section 4906-15-07(B)(3) of this Application. A map at 1:24,000 scale showing water bodies in the Project area are included as Figures 4-1A through 4-1F. Larger scale maps of streams, ponds, and wetlands that were field delineated within 200 feet of the centerline are included as Figures 7-2A through 7-2FF for the Preferred Route and Preferred Route Option B and as Figures 7-3A through 7-3HH for the Alternate Route.

(h) Topographic contours.

The topographic contours of the Project area are shown at five foot intervals on Figures 4-1A through 4-1F. The Project area is generally flat with gentle hills, based on these topographic contours. A steeper portion of the Project area is located near the proposed Groton Distribution Station. The highest elevation for the Project is located near the proposed Groton Distribution Station. The elevation along the Preferred Route, Preferred Route Option B, and the Alternate Route ranges from approximately 575 to 800 feet above mean sea level.

(i) Soil associations or series.

Eight soil associations will be crossed by the Preferred Route, Preferred Route Option B, and the Alternate Route for the Project and are shown on Figures 4-1A through 4-1F. These soil associations include Lenawee-Del Rey, Toledo, Kibbie-Colwood, Nappanee-Hoytville, Spinks-Kibbie-Belmore, Milton-Millsdale-Castalia, Tuscola-Kibbie, and Pewamo-Bennington. No soil conditions were identified that could potentially limit the construction feasibility of the Project.

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

Population centers and the legal boundaries of Cities, Villages and Townships in the vicinity of the Preferred Route, Preferred Route Option B, and the Alternate Route are shown on Figures 4-1A through 4-1F.

No portion of the Preferred Route or Preferred Route Option B, including the 1,000 foot buffer, is located within, or immediately adjacent to a municipal boundary. The Preferred Route and its 1,000 foot buffer, which is mostly in an agricultural land use, is located within Sandusky, Riley, Townsend, York Townships, in Sandusky County and Groton, Oxford, and Perkins Townships, in Erie County.

A section of the Alternate Route is located 200 feet outside of the City of Fremont (Figure 4A); the 1,000 foot buffer is located within a commercial/industrial section of the city. The Alternate Route and its 1,000 foot buffer, which is also mostly in an agricultural land use, is located within Sandusky, Riley, Green Creek, Townsend, and York Townships, in Sandusky County and Groton, Margaretta, and Perkins Townships, in Erie County.

(2) Slope and Soil Mechanics

(a) Slopes

Very few areas along the Preferred Route, Preferred Route Option B, and the Alternate Route contain soil that has a slope greater than or equal to 12 percent. The Preferred Route contains the following soil series greater than or equal to 12% slopes: Ritchey loam (RhC), 6 to 12% slopes; Saylesville silty clay loam (SbC2), 6 to 12% slopes; Spinks loamy fine sand (SpD), 12 to 18% slopes; Zurich silt loam (ZuC2), 6 to 12% slopes; and Zurich silt loam (ZuD2), 12 to 18% slopes.

Preferred Route Option B contains Saylesville silty clay loam (SbC2), 6 to 12% slopes. The Alternate Route contains the following soil series greater than 12% slopes: Mentor silt loam (MeF), 25 to 50% slopes; Ritchey loam (RhC), 6 to 12% slopes; Spinks loamy fine sand (SpD), 12 to 18% slopes; Zurich silt loam (ZuC2), 6 to 12% slopes; and Zurich silt loam (ZuD2), 12 to 18% slopes. The majority of these soils are located on the eastern portion of both the Preferred and Alternate Routes. A description of these soil types are found below:

(i) Mentor silt loam, 25 to 50% slopes (MeF)

This soil consists of very deep, well drained soils that are located on terraces, lake plains, and outwash plains. Areas with this soil and a slope greater than 18% are in woodland or permanent pasture. Original vegetation is deciduous forest consisting of oak, maple, beech, hickory, and ash trees. Permeability of this soil is moderate and the depth to an intermittent apparent water table is 3.5 to 6 feet between February and March in most years.

(ii) Ritchey loam, 6 to 12% slopes (RhC)

This soil consists of shallow, well drained soils that are located on till plains. Some areas are cultivated and the remainder is used as pasture or woodland. Native vegetation is deciduous hardwoods, mainly oak and hickory. This soil has moderate permeability and the potential for surface runoff ranges from negligible to high.

(iii) Saylesville silty clay loam, 6 to 12% slopes (SbC2)

This very deep, well-drained soil formed mostly on glacial lake basins, stream terraces, and slackwater areas. Most areas are used for cropland. Common crops are corn, small grain, and hay. Some areas are used for pastureland or woodland. Native vegetation is mixed hardwoods. Permeability is moderately slow.

(iv) Spinks loamy fine sand, 12 to 18% slopes (SpD)

This soil consists of very deep, well drained soils located on dunes, moraines, till plains, outwash plains, beach ridges, and lake plains. This soil is used mostly for hay production or pasture. Some areas are cropped to corn, wheat, oats, and soybeans. Steeper areas are in forest or permanent pasture. Native vegetation is hardwoods, dominantly of oak and hickory. The potential for surface runoff is negligible to medium depending on slope gradient. Permeability is moderately rapid.

(v) Zurich silt loam, 6 to 12% slopes (ZuC2) and Zurich silt loam, 12 to 18% slopes (ZuD2)

This soil consists of very deep, moderately well drained soils that occur on outwash plains. Most areas containing this soil are cropped or urbanized. Crops commonly grown are corn, soybeans, and small grain. Natural hardwood forest was oak, hickory, and maple. An intermittent apparent seasonal high water table is from 2 to 3.5 feet below the surface from December to April in most years. The potential for surface runoff is medium to high. This soil has moderate permeability.

(b) Soil Suitability

No slope or soil conditions were found that could potentially limit construction feasibility of the proposed Project. Many segments of the Preferred and Alternate Route follow existing pipeline ROW and transmission ROWs, roads, and railroads. It is not anticipated that the steeper slopes would impact the Project. New poles would typically be placed on more gently sloped locations to ease placement and reduce the potential for erosion.

(B) LAYOUT AND CONSTRUCTION

The following paragraphs provide data on the layout, engineering design process, and construction of the proposed Project. Additionally, Section 4906-15-07(E) of the Application provides data relating to vegetation removal during construction of the proposed transmission line.

(1) Site Activities

(a) Surveying and soil testing.

The transmission line will be surveyed to establish the centerline location. The surveying will be completed using conventional and/or aerial methods. The location of significant topographic features and man-made structures along or near the centerline of the transmission line that may affect the design of the transmission line will be identified during the survey. Some minimal clearing of small trees and brush may be required if the surveyor's line of sight is obstructed. Offsets will be used to survey around large trees and other large obstructions. Profile measurements will also be obtained by conventional or aerial methods. Structure locations will be staked prior to construction.

Soil tests will not be performed for most of the transmission line, as foundations for the new wood poles are not necessary. Since a small number of steel structures on concrete foundations will be necessary, soil tests will be performed using a drop hammer to drive a sampler tube. Soil bearing capacity is tested by the number of blows required to drive the tube 12 inches into the ground. Soil samples taken with a split-spoon at five-foot intervals will be used to determine soil type. Typically, the testing will be performed to a depth of between 20 to 40 feet. If rock is encountered, a carbide-tipped bit will be used to drill an exploratory boring 5 to 10 feet into the rock.

(b) Grading and excavation.

No significant grading is anticipated to construct the transmission line on either route. The existing terrain within the Preferred and Alternate routes ROW generally provides a suitable surface for construction vehicle operations.

Each wood pole installation requires a machine-drilled hole for placement of the structure. The excavation for these poles will average three feet in diameter and nine to twelve feet deep. A portion of the excavated soil will be used for backfill. The excess material will be placed around the structure or hauled off-site.

The installation of steel poles on reinforced concrete foundations may be needed at certain points of the transmission line where a larger than usual span is necessary. These structures will require a machine-drilled hole for placement of the pole foundation. A portion of the excavated soil will be used for backfill around the foundation, and the excess soil material will be placed around the pole or hauled offsite.

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

No permanent access roads or trenches are anticipated. Temporary access to the construction areas of the Preferred and Alternate routes will occur from existing township, county or state roads adjacent to or crossed by the transmission line ROW. Existing access routes along the existing ROW used by crews during routine maintenance of adjacent existing transmission or distribution lines will be utilized, where possible, to construct the proposed line along the Preferred or Alternate routes.

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

Conductor installation for the proposed line will be accomplished using the tension stringing method. Lightweight guy cables or ropes will be fed through the stringing sheaves of the sections of line that require stringing. Conductors will then be pulled through under sufficient tension to keep the conductor "in the air." This protects the conductor from surface damage.

Temporary guard or clearance poles will be used as a safety precaution at locations where the conductors could create a hazard to either crew members or the general public. The locations and heights of clearance poles will be such that the conductors are held clear of power and communication circuits, vehicular traffic, and other structures. The stringing operation will be under the observation of crew members at all times. The observers will be in radio and/or visual contact with the operator of the stringing equipment.

(e) Post-Construction Reclamation

After construction, drainage, fencing and erosion control aspects of the transmission line right-of-way will be de-commissioned and the property restored to conditions as good as or better than those that existed prior to construction. This includes the restoration of drainage ditches, repair or replacement of any pre-existing or damaged fencing or field drainage tiles (or damage thereto), the seeding and mulching of disturbed non-cultivated areas; and the removal of temporary soil erosion and sedimentation control measures after vegetative cover has been established. Disturbed areas adjacent to streams and wetlands will be revegetated using methods to minimize soil erosion and degradation.

(2) Layout for Associated Facilities

(a) Site Map

Figure 4-1A shows the proposed transmission line relative to the existing West Fremont Substation. Figure 4-1D shows the proposed transmission line relative to the proposed Groton Distribution Substation. Figure 4-1F shows the proposed transmission line relative to the Hayes Substation.

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

Construction will not alter the existing grades at the existing West Fremont or Hayes Substation. Some minor modifications may be made at the proposed Groton Distribution Substation.

(ii) Proposed location of major structures and buildings.

No new buildings are being planned as part of this Project. However, a new control building may be planned for the proposed Groton Distribution Substation.

(iii) Fenced-in or secured areas.

There will be no fenced or secured areas for the proposed transmission line. Fenced and secured areas will likely be included in the proposed Groton Distribution Substation. The existing West Fremont Substation will be expanded to accommodate the proposed transmission line exit, and details of this will be proposed in a separate filing to the Board.

(iv) Estimated overall dimensions.

The dimensions of the Hayes Substation will remain unchanged, once its construction is complete. The dimensions of the existing West Fremont Substation will be expanded as described in a separate filing to the Board.

(b) Reason for Proposed Layout

There are no unusual features associated with construction of this Project.

(c) Future Modification Plans

On behalf of ATSI, FirstEnergy's planning engineers generally forecast future transmission projects in a five-year planning window. The Project includes the installation of one 138 kV transmission line with provisions for a future 138 kV transmission line on the same structures. Current plans do not include installing additional lines or equipment within that the current 5 year planning window.

(C) TRANSMISSION EQUIPMENT

(1) Electric Power Transmission Lines

The majority of the Project will be installed on wood pole construction. A few free standing steel pole structures may be required in order to construct the Project. The exact number and location of these structures along the centerline of the proposed routes will be determined further along during detailed engineering design.

(a) Design voltage.

The transmission line will be designed and constructed to operate at 138 kV.

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

The proposed new transmission line will be supported on the multiple structure types. The general features of these structures are described in the following sections. Where new structures are installed, they will be designed to support two 138 kV transmission lines with only one transmission line initially installed. Where the Preferred and Alternate routes of the transmission line are located along road rights-of-way, the transmission line poles may be designed to support distribution circuits, either on cross arms or on horizontal post insulators, depending on the voltage of the distribution circuit. In the area where the Preferred Route crosses the Sandusky River and the Ohio Turnpike, the transmission line poles will be designed to support the distribution circuit that currently exists at this location.

1. For tangent configurations on the Preferred and Alternate routes, single wood pole tangent structures, shown conceptually in Figure 04-2, will be utilized for both the Preferred and Alternate route. These typical tangent structures will consist of a single wood pole with three horizontal post insulators to support the transmission conductors on each side of the pole.

2. For structures with a light angle configuration on the Preferred and Alternate routes, shown conceptually in Figure 04-3, a two pole structure, with three post insulators, on each pole, installed in a pull-off configuration, will be utilized. Both poles will be guyed separately.

3. For structures with a major angle configuration on the Preferred and Alternate routes, shown conceptually in Figure 04-4, a two pole structure, with three post insulators, on each pole, installed in a pull-off configuration, will be utilized. Both poles will be guyed separately.

4. Figure 04-5 shows the typical structure details for locations where a self-supported steel structure with concrete foundations are needed.

Although it is not anticipated, the design or ROW conditions may dictate that other types of structures need to be utilized. If these unanticipated conditions arise, they will be addressed on a case-by-case basis.

The conductor used for both the Preferred and Alternate routes will be designed and constructed for 138 kV operation and will be 954 kcmil ACSR per phase. This conductor has a maximum strength of approximately 28,500 pounds. The ground wire to be installed on both the Preferred and Alternate routes will be 3#6 Alumoweld. The phase conductors and overhead ground wires will be installed in accordance with the latest version of the National Electrical Safety Code (NESC). The conductors will be supported by aluminum clamps attached to the polymer horizontal post insulators. Aluminum clamps will support the overhead ground wire. At dead-ends, bolted-type dead-end clamps will be used on the conductor and on the ground wire.

(c) Base and foundation design.

Each wood pole will be set in an approximately 3-foot diameter hole, nine to 12 feet deep. Excavated soil backfill will be tamped around the pole in layers. Crushed rock backfill may be required where normal soil conditions are not suitable for excavated soil backfill. Steel poles, if installed will be supported on reinforced concrete foundations designed for the specific loading conditions of the structure.

(d) Cable type and size, where underground.

There are no underground cables associated with the proposed transmission line. Therefore this section does not apply.

(e) Other major equipment or special structures.

No other major equipment or special structures are anticipated. Any potential variances will be assessed on a case-by-case basis, and discussed with the Board Staff prior to construction.

(2) Electric Power Transmission Substations

This section is not applicable as this Application does not propose to install an electric transmission substation.

(3) Gas Transmission Lines

This section is not applicable as the proposed Project does not install gas transmission facilities.

(4) Gas Transmission Facilities

This section is not applicable as the proposed Project does not install gas transmission facilities.

(D) ENVIRONMENTAL AND AVIATION COMPLIANCE INFORMATION

(1) Permits

The Applicant anticipates submitting a Notice of Intent ("NOI") for coverage under the General Permit Authorization for Stormwater Discharges Associated with Construction Activities Under the National Pollution Discharge Elimination System (GP OHC000004) ("Stormwater General Permit"). Coverage is also expected to be obtained under the U.S. Army Corps of Engineers (USACE) Nationwide Permit 12 for wetland impacts associated with Utility Line Activities. Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act coverage will be obtained from the USACE. Consultation with the Ohio Department of Natural Resources will be conducted for state listed rare plant species. Appropriate Certification under Section 401 of the Clean Water Act will be obtained from the State of Ohio as well.

Construction Debris

As construction work proceeds, the ROW will be kept clean of all rubbish and debris. Debris associated with construction of the proposed transmission line is expected to consist of conductor scrap, construction material packaging including cartons, insulator crates, conductor reels and wrapping, and used stormwater erosion control materials. Clearance poles, conductor reels and other materials with salvage value will be removed from the construction area for reuse or salvage. It is estimated that approximately 400 cubic yards of construction debris could be generated from the Project. Construction debris will be disposed of in accordance with state and federal requirements in an Ohio Environmental Protection Agency approved landfill or other appropriately licensed and operated facility.

Where trees must be cleared from the ROW, the resulting brush will be chipped or wind-rowed along the edge of the ROW, and marketable timber will generally be cut into appropriate lengths for sale or disposition by the landowner. Generally, stumps will be left in place.

(2) Stormwater and Erosion Control

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared and incorporated into the Construction Plans and Specifications, and shall be made available on site during construction of the Project. The SWPPP will include the following General Conditions, at a minimum per the Stormwater General Permit:

(a) Erosion and Sediment Controls: Implementation of erosion and sediment control practices shall conform to the Ohio Department of Natural Resources Rainwater and Land Development Manual (2006); the Ohio EPA NPDES Permit Program for the discharge of storm water from construction sites, and any erosion and sediment control practices and standards required by the Erie and Sandusky Counties.

Wetlands, streams and other environmentally sensitive areas shall be clearly flagged before commencement of clearing or construction. Construction and access in these areas will be minimized to the extent practical. Light weight forestry clearing equipment will be allowed to work in these areas when necessary to complete clearing activities so long as significant ground disturbance does not occur – if ground disturbances occurs, or if heavy weight forestry clearing equipment is used in these areas, the equipment will operate on construction matting to the extent possible. Line construction equipment and related activities will occur in these areas only when clearly identified in the Construction Plans.

Streams are not expected to be impacted. Streams, including beds and banks, if unexpectedly disturbed during construction, shall be re-stabilized immediately after in-channel work is completed.

Grubbing activities are not expected to be required. Sediment basins, traps and perimeter sediment controls shall be implemented within seven days of any grubbing activities and shall continue to function until disturbed areas are permanently stabilized.

Silt Fencing/Filter Sock

Silt fencing, filter sock and/or other appropriate best management practices for erosion control shall be constructed before upslope land disturbance begins.

All silt fences and/or filter sock shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions which may carry concentrated flows to the silt fence are dissipated along its length.

Silt fence shall be placed so that eight inches of cloth are below the ground surface. Excess material shall lie at the bottom of the six-inch deep trench and the trench shall be backfilled and compacted.

Silt fence and/or filter sock shall allow runoff to pass only as diffuse flow through the geotextile fabric. If runoff overtops the silt fence or filter sock, flows under or around the ends, one of the following shall be performed, as appropriate: 1) the layout of the silt fence or filter sock shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

Fence posts shall be a minimum of 32 inches in height made by 2 inch by 2 inch hardwood of sound quality.

Silt fence fabric shall be ODOT Type C geotextile fabric or equivalent.

Soil Stabilization

Disturbed areas, outside of active agricultural fields, that are expected to remain unworked for more than 21 days shall be stabilized with seed and mulch no later than 7 days after the last construction in that area.

Maintenance / Inspection

All erosion and sediment control practices shall be inspected at least once every seven days and within 24 hours after any storm event greater than one-half inch of rain per 24-hour period.

All erosion and sediment control measures shall be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours of report. Silt fencing will be inspected for depth of sediment, for tears, for assurance that the fabric is securely attached to the fence posts, and to assure that the fence posts are firmly in the ground. Seeded areas will be inspected for evidence of bare spots or washouts. Permanent records of the maintenance and inspection must be maintained throughout the construction period. Records shall include, at a minimum, the name of the Inspector, major observations, date of inspection, certification of compliance, and corrective measures taken.

(b) Materials Management: All materials stored on-site shall be kept in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

Products shall be kept in their original containers with the original manufacturer's label.

Manufacturer's recommendations for proper use and disposal will be followed.

Material Safety Data Sheets (MSDS) will be retained and available on-site at all times.

(3) Contaminated and Hazardous Materials

The following General Conditions will also be included in the SWPPP to address disposition of contaminated soil and hazardous materials generated or encountered during construction:

Spill Prevention

All on-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled.

Secondary containment shall be provided for all on-site fuel storage tanks.

All sanitary waste will be collected in portable units and emptied regularly by a licensed sanitary waste management contractor, as required by local regulations.

All spills will be cleaned up immediately after discovery. Manufacturer's recommended methods for spill cleanup will be followed. Materials and equipment necessary for spill cleanup will be kept in a designated storage area on-site.

Spills will be reported to the appropriate government agency as required.

Any suspected hazardous materials encountered during construction shall be reported to the FirstEnergy Environmental Department.

(4) Height of Tallest Anticipated Above Ground Structures

The height of the tallest anticipated above ground structure and construction equipment is approximately 120 feet. According to the Federal Aviation Administration's Office of Aeronautical Information Services, nine airports and three heliports are located in Sandusky County; eight airports and six heliports are located in Erie County.

Although the exact pole locations have not been determined, points at 5-mile intervals and major turning points where poles would likely be required along the proposed routes were entered into the FAA's Notice Criteria Tool

(https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm) website. Based on the coordinates, elevations, and heights of these locations, all locations exceeded the notice criteria. Based on this preliminary information, additional coordination with the FAA and the ODOT Office of Aviation may be required.

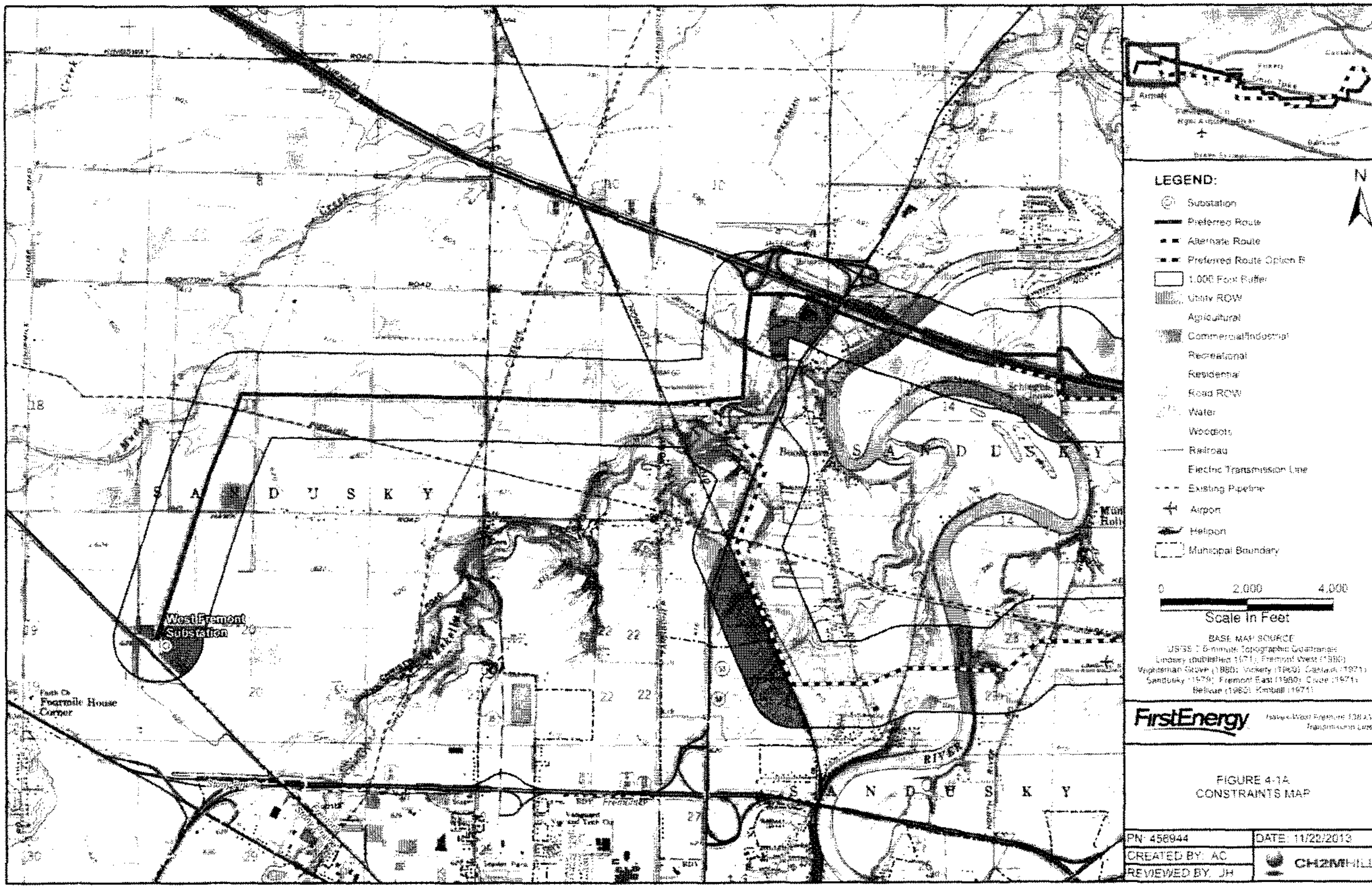
(5) Construction Plans in Poor Soil Conditions

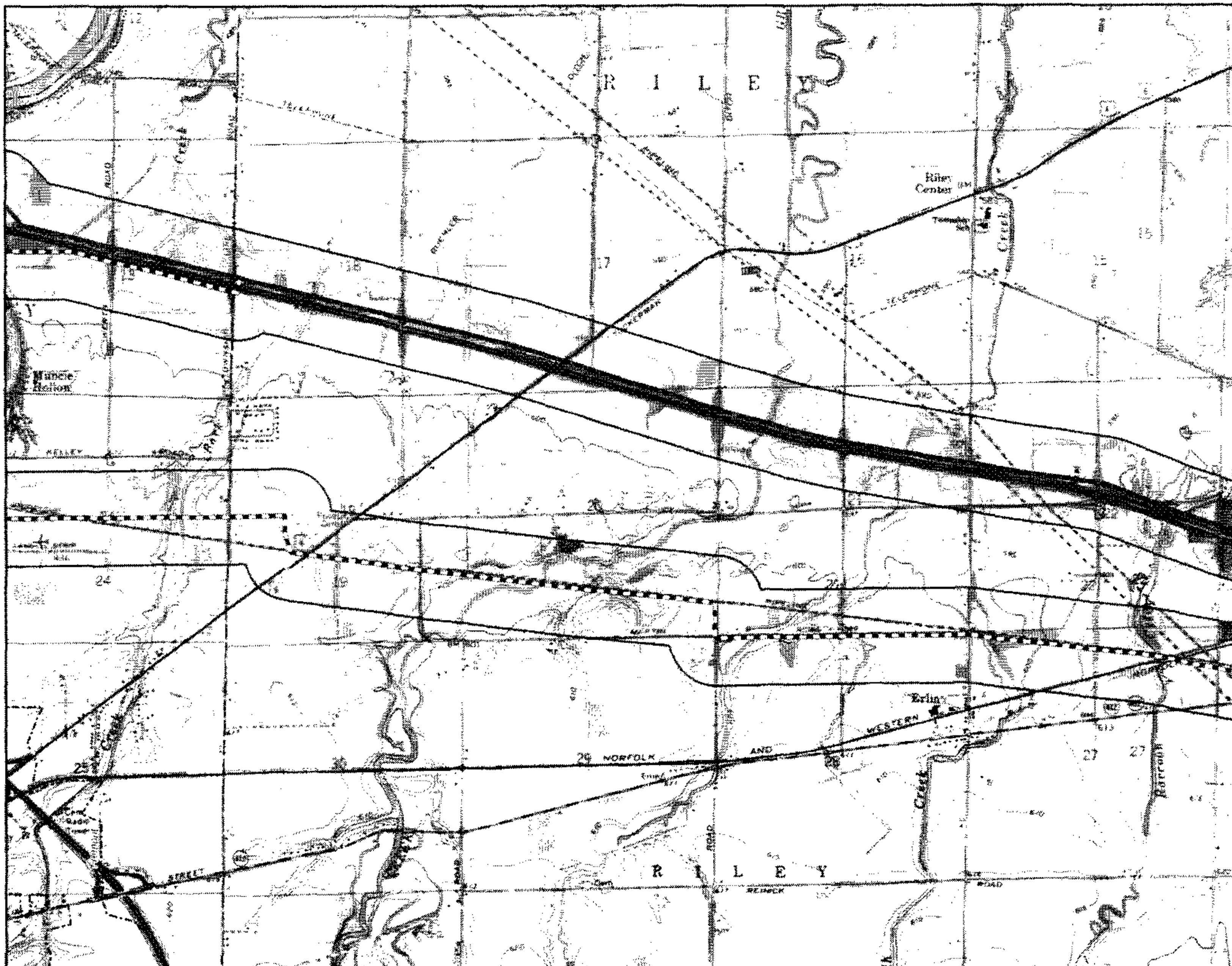
Dust Control

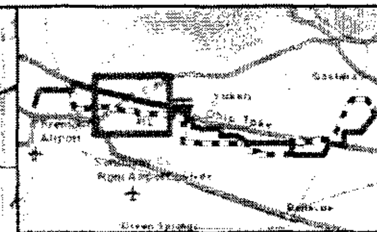
The Site and surrounding areas shall be kept free from fugitive dust resulting from Site activities. During excessively dry periods of active construction, dust suppression shall be implemented where necessary through irrigation, mulching, or application of tackifier resins.

Excessive Muddy Soil Conditions

Construction entrances shall be established and maintained to prevent tracking or flowing of sediment onto public right of ways. All sediment spilled, dropped, washed, or tracked onto public right of ways shall be removed immediately.


West Fremont Substation
Fourmile House Corner
SANDUSKY
RIVER
LEGEND:
Substation
Preferred Route
Alternate Route
Preferred Route Option B
1,000 Foot Buffer
Utility ROW
Agricultural
Commercial/Industrial
Recreational
Residential
Road ROW
Water
Woodlots
Railroad
Electric Transmission Line
Existing Pipeline
Airport
Heliport
Municipal Boundary
N
0
2,000
4,000
Scale In Feet
BASE MAP SOURCE
FirstEnergy
FIGURE 4-1A
CONSTRAINTS MAP
PN: 458944
DATE: 11/22/2013
CREATED BY: AC
REVIEWED BY: JH
CH2MHILL





LEGEND:

- Substation
- Preferred Route
- Alternate Route
- Preferred Route Option B
- 1,000 Foot Buffer
- Utility ROW
- Agricultural
- Commercial/Industrial
- Recreational
- Residential
- Road ROW
- Water
- Woodlots
- Railroad
- Electric Transmission Line
- Existing Pipeline
- Airport
- Heliport
- Municipal Boundary

N

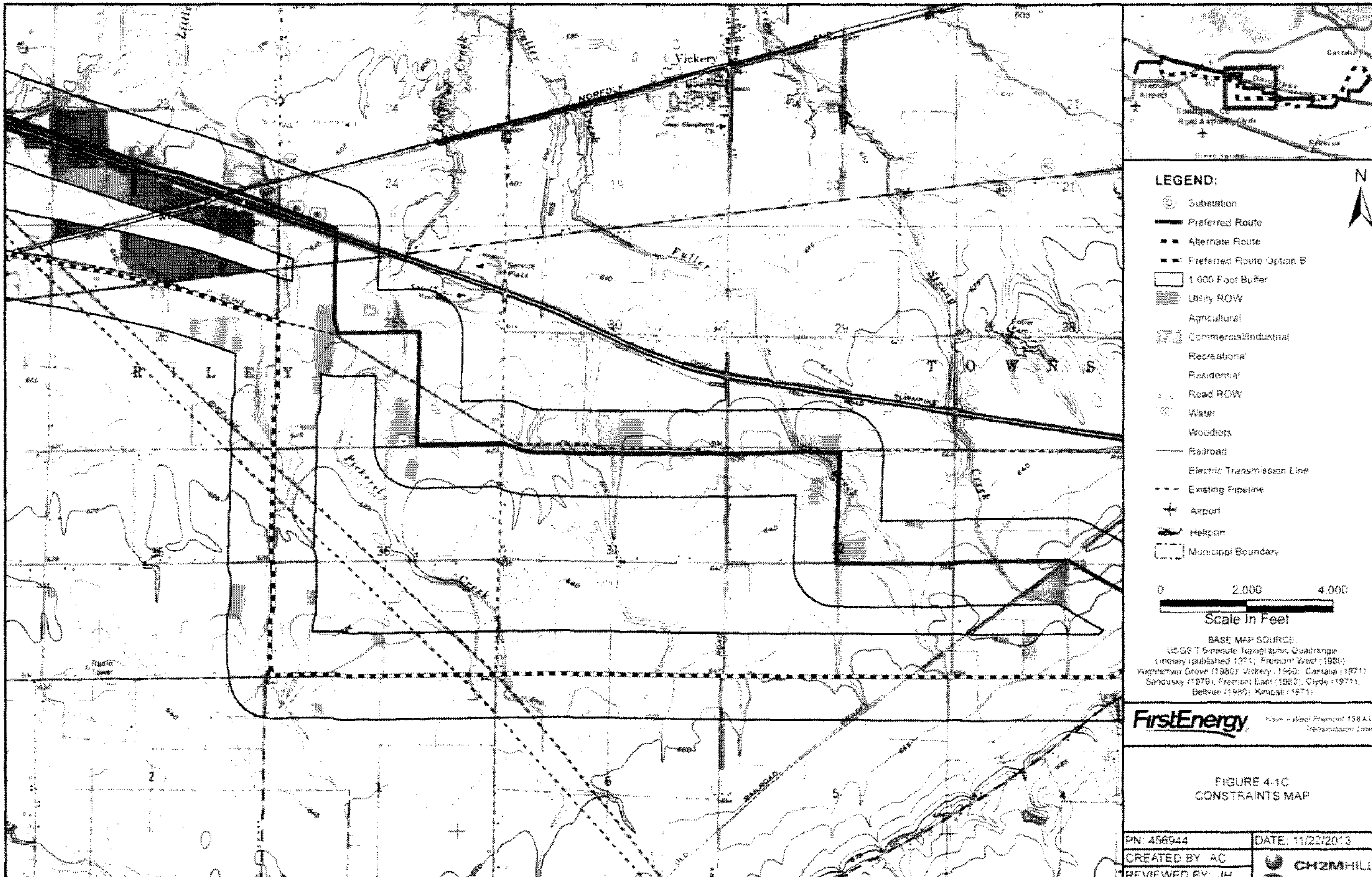
0 2,000 4,000
Scale In Feet

BASE MAP SOURCE:
USGS 7.5-minute Topographic Quadrangle
Lindsey (published 1971); Fremont West (1960);
Wightsman Grove (1960); Vickery (1960); Castalia (1971);
Sandusky (1979); Fremont East (1960); Clyde (1971);
Bellvue (1960); Kimball (1971)

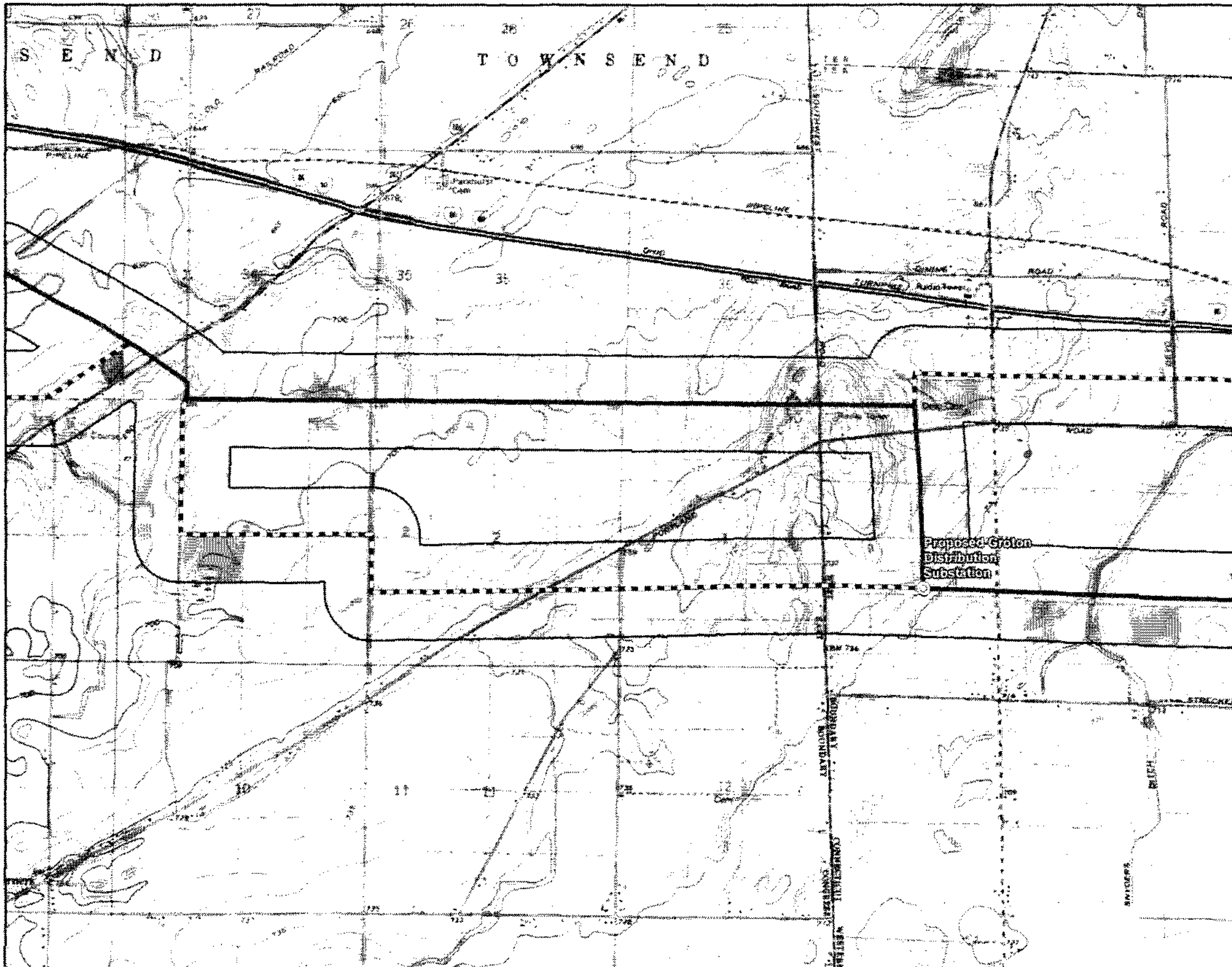
FirstEnergy

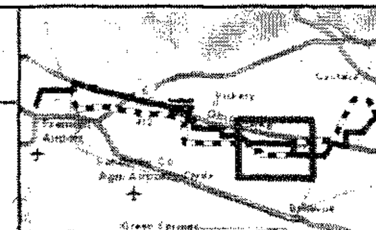
FIGURE 4-1B
CONSTRAINTS MAP

PN: 456944	DATE: 11/22/2013
CREATED BY: AC	CH2MHILL
REVIEWED BY: JH	



Vickery
NORFOLK
Fuller
Creek
R I L E Y
T O W N S
LEGEND:
N
Substation
Preferred Route
Alternate Route
Preferred Route Option B
1,000 Foot Buffer
Utility ROW
Agricultural
Commercial/Industrial
Recreational
Residential
Road ROW
Water
Woodlots
Railroad
Electric Transmission Line
Existing Pipeline
Airport
Heliport
Municipal Boundary
0
2,000
4,000
Scale In Feet
BASE MAP SOURCE:
USGS 7.5-minute Topographic Quadrangle
Lindsey (published 1971), Fremont West (1980), Wightmans Grove (1960), Vickery (1960), Castalia (1971), Sandusky (1979), Fremont East (1980), Clyde (1971), Bellvue (1980), Kimball (1971)
FirstEnergy
FIGURE 4-1C
CONSTRAINTS MAP
PN: 456944
DATE: 11/22/2013
CREATED BY: AC
REVIEWED BY: JH
CH2MHILL





LEGEND:

- Substation
- Preferred Route
- Alternate Route
- Preferred Route Option B
- 1,000 Foot Buffer
- Utility ROW
- Agricultural
- Commercial/Industrial
- Recreational
- Residential
- Road ROW
- Water
- Woodlots
- Railroad
- Electric Transmission Line
- Existing Pipeline
- Airport
- Heliport
- Municipal Boundary

N

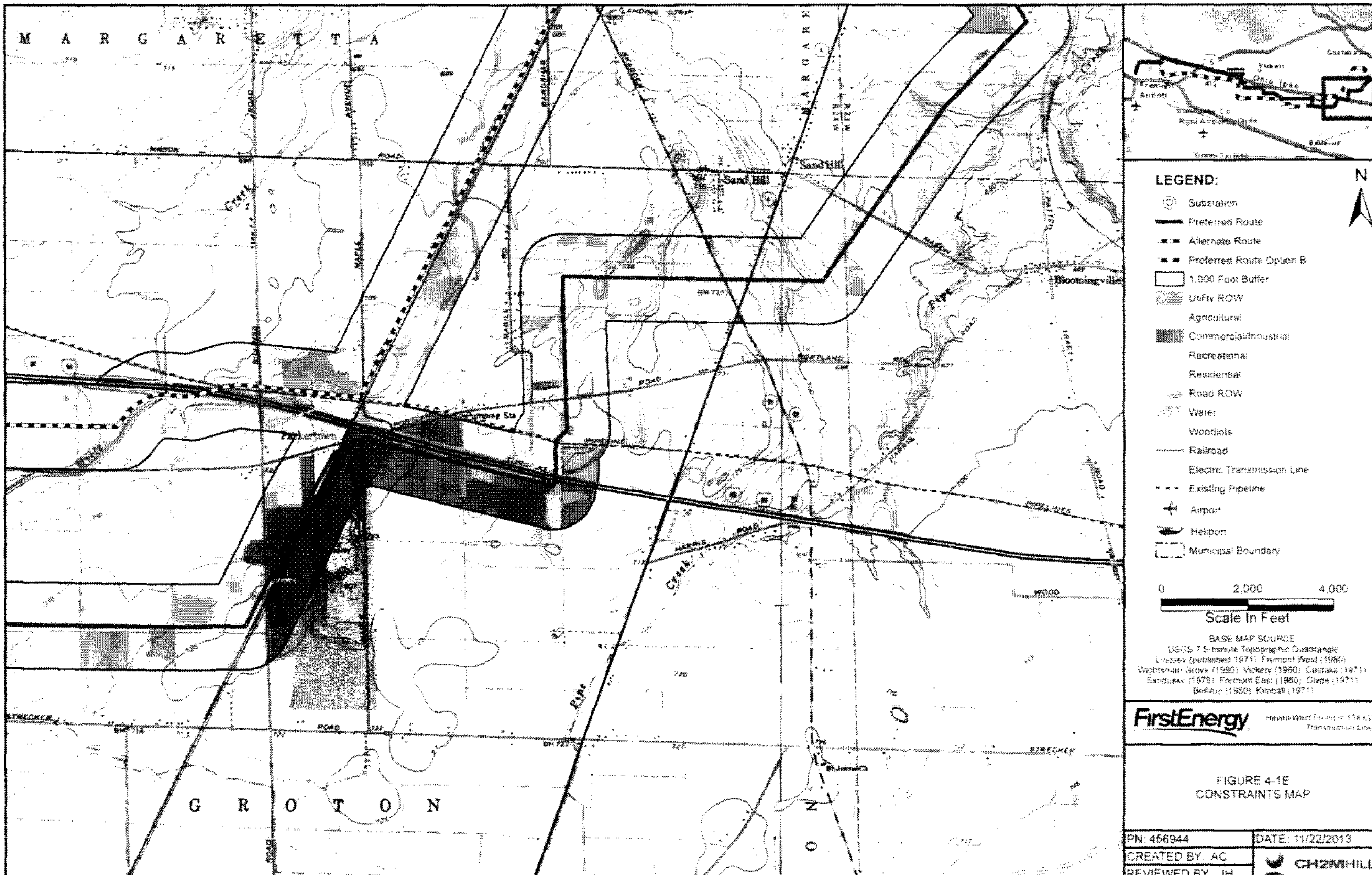
0 2,000 4,000
Scale In Feet

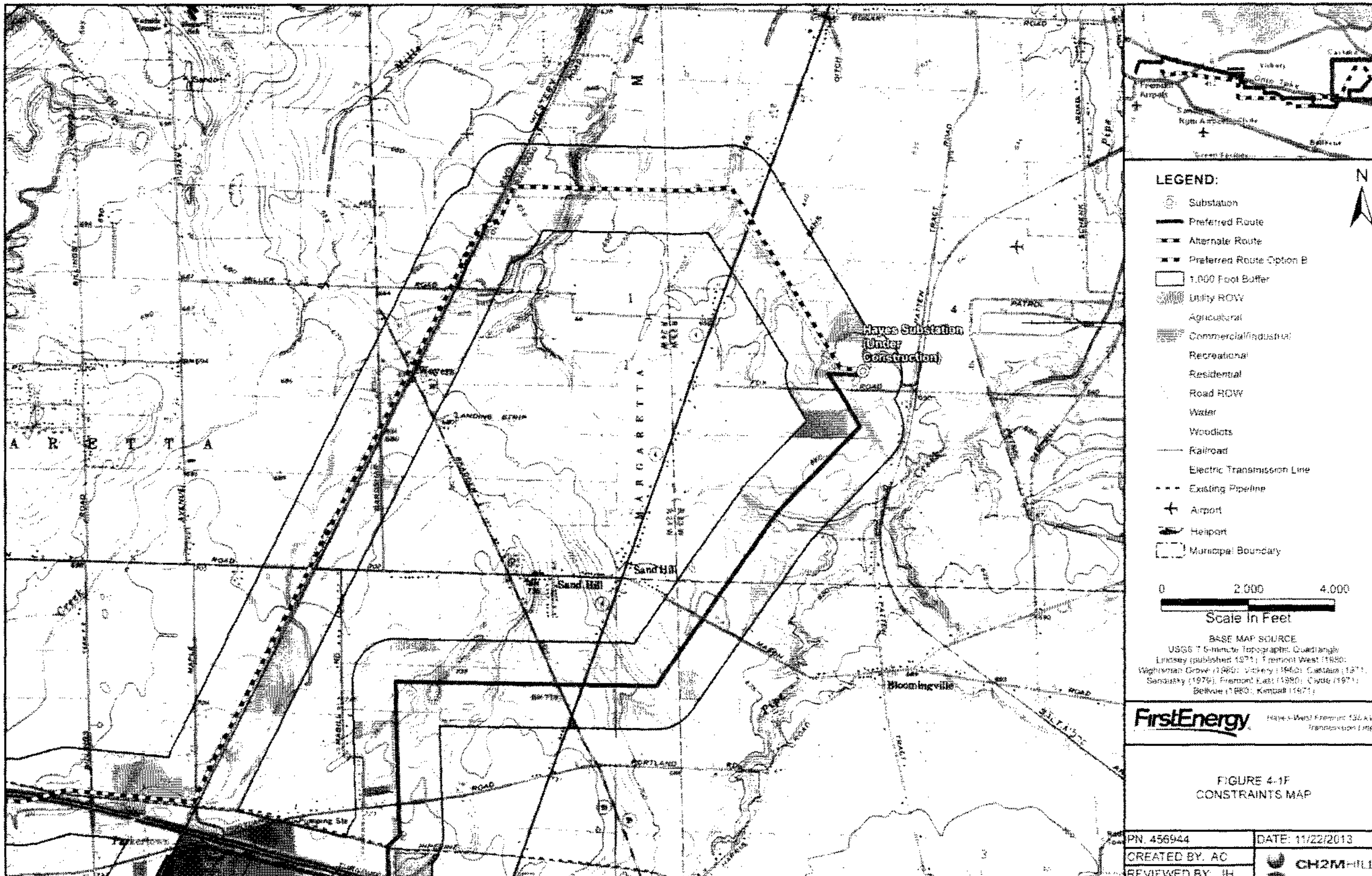
BASE MAP SOURCE
USGS 7.5-minute Topographic Quadrangle
Lindsey (published 1971); Fremont West (1960)
Wightsman Grove (1960); Vickery (1960); Castalia (1971)
Sandusky (1978); Fremont East (1960); Clyde (1971)
Bellvue (1960); Kimball (1971)

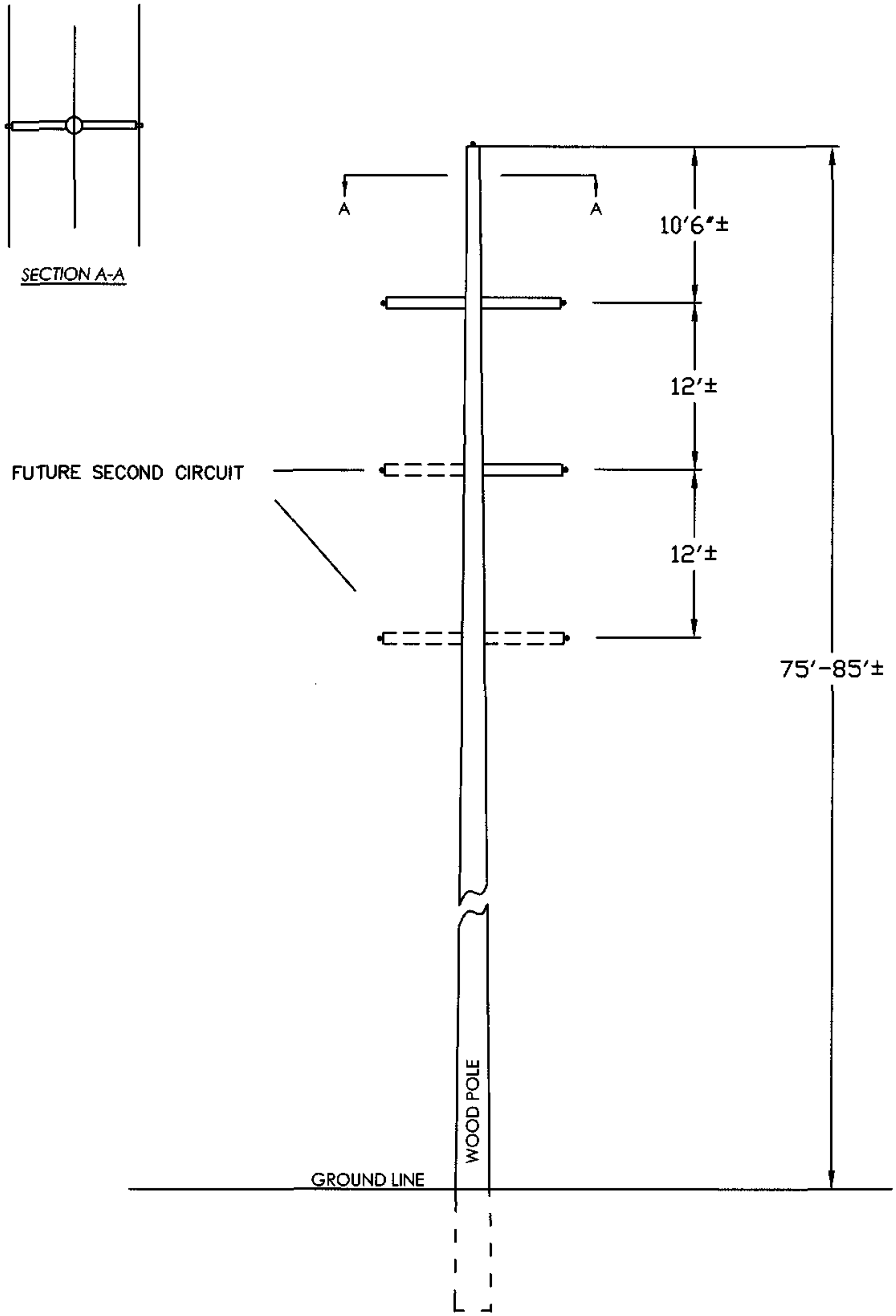
FirstEnergy

FIGURE 4-1D
CONSTRAINTS MAP

PN 456944	DATE: 11/22/2013
CREATED BY: AC	CH2MHILL
REVIEWED BY: JH	


M A R G A R E T T A
G R O T O N
Sand Hill
Bloomingville
LEGEND:
Substation
Preferred Route
Alternate Route
Preferred Route Option B
1,000 Foot Buffer
Utility ROW
Agricultural
Commercial/Industrial
Recreational
Residential
Road ROW
Water
Woodlots
Railroad
Electric Transmission Line
Existing Pipeline
Airport
Heliport
Municipal Boundary
N
0 2,000 4,000
Scale In Feet
BASE MAP SOURCE
USGS 7.5-minute Topographic Quadrangle
FirstEnergy
FIGURE 4-1E
CONSTRAINTS MAP
PN: 456944
DATE: 11/22/2013
CREATED BY: AC
REVIEWED BY: JH
CH2MHILL


LEGEND:
Substation
Preferred Route
Alternate Route
Preferred Route Option B
1,000 Foot Buffer
Utility ROW
Agricultural
Commercial/Industrial
Recreational
Residential
Road ROW
Water
Woodlots
Railroad
Electric Transmission Line
Existing Pipeline
Airport
Heliport
Municipal Boundary
N
0
2,000
4,000
Scale In Feet
Hayes Substation (Under Construction)
MARGARETTA
Sand Hill
Bloomingville
Parkertown
FirstEnergy
FIGURE 4-1F
CONSTRAINTS MAP
PN. 456944
DATE: 11/22/2013
CREATED BY. AC
REVIEWED BY: JH
CH2MHILL



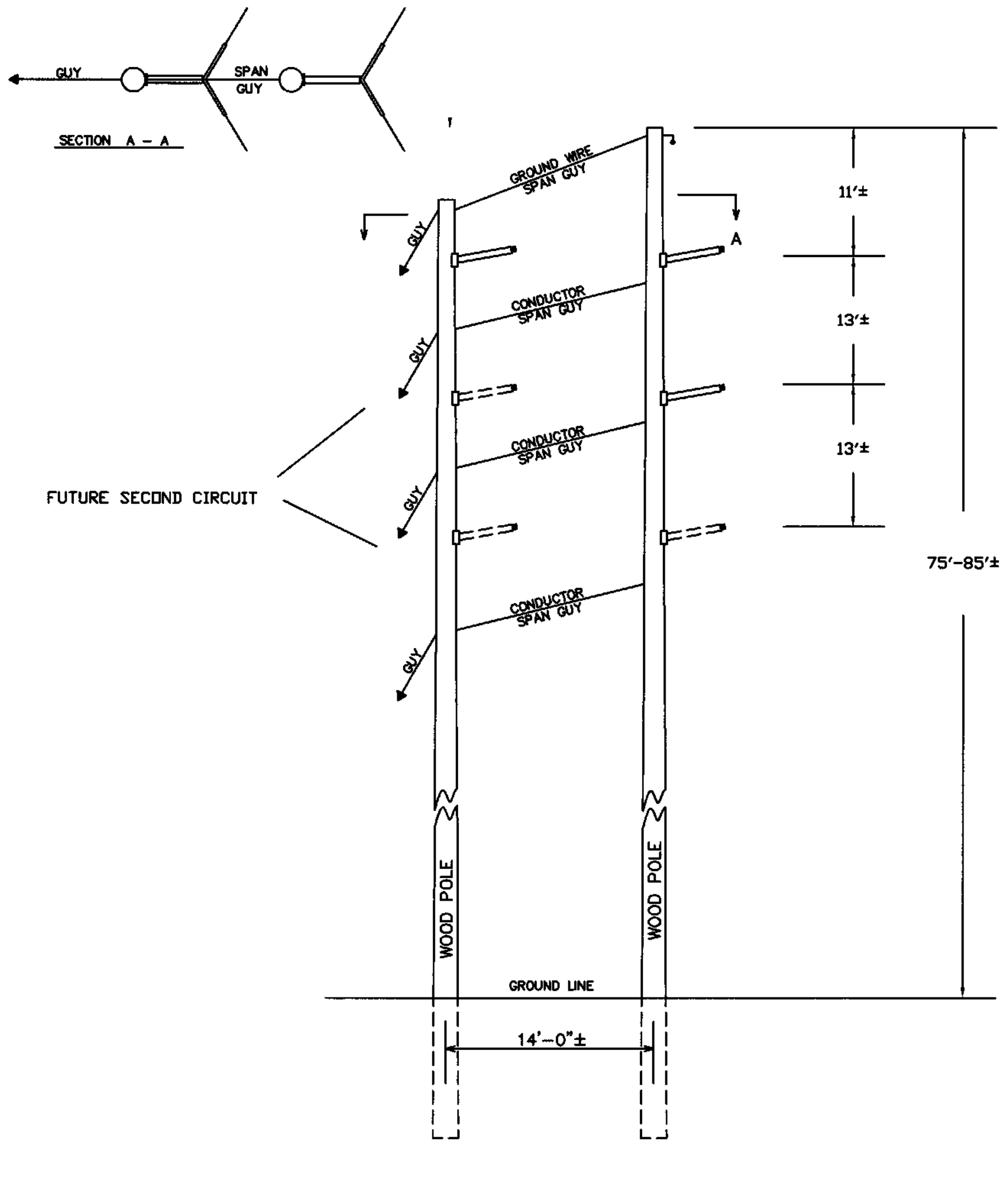
NOTE:
DISTRIBUTION UNDERBUILD AND GUYING AS NEEDED

ATSI
American Transmission Systems, Inc
a subsidiary of FirstEnergy Corp.

HAYES-WEST FREMONT 138 kV
TRANSMISSION LINE PROJECT

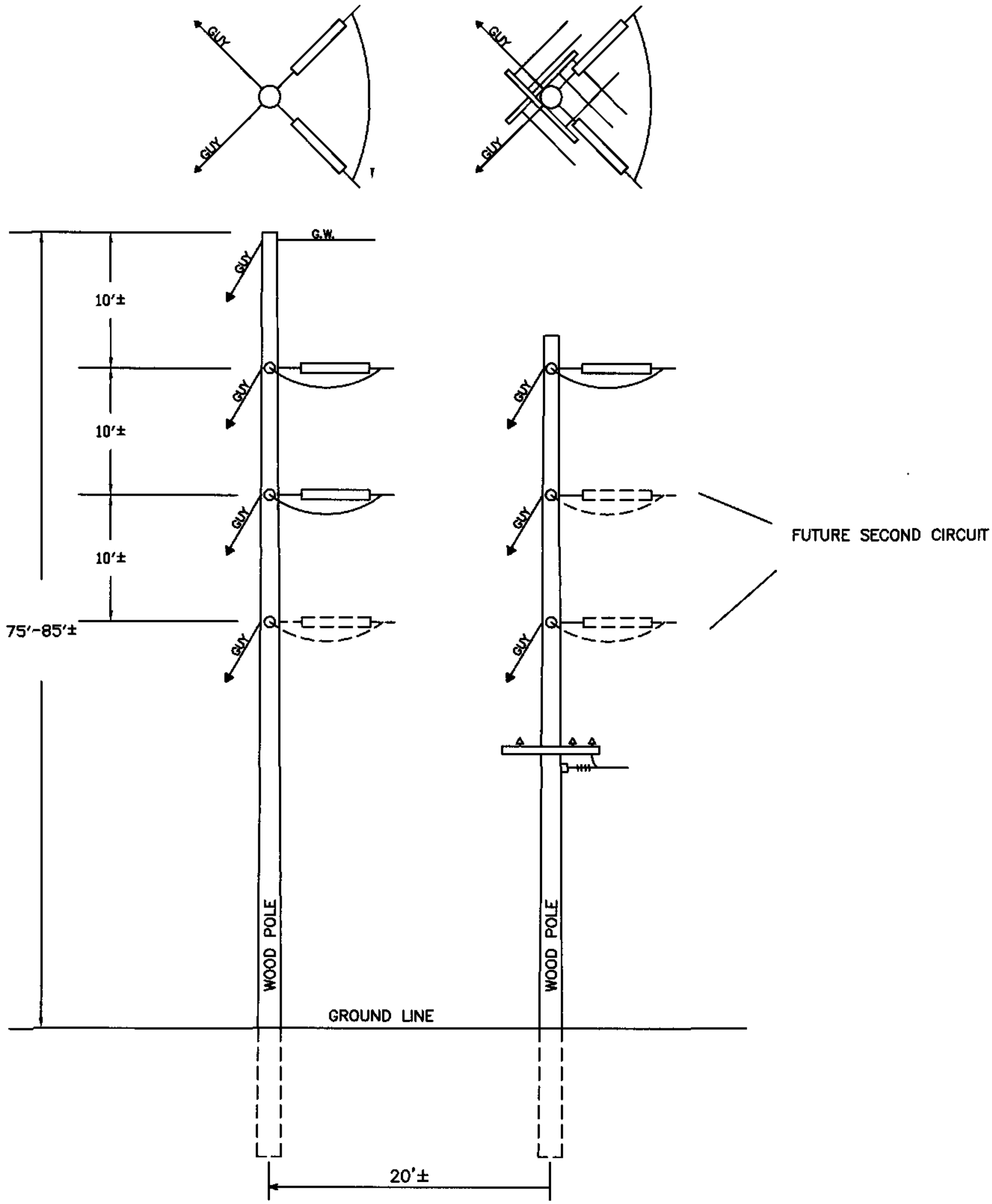
138 kV TANGENT STRUCTURE

FIGURE 04-2



NOTE:
DISTRIBUTION UNDERBUILD AND GUYING AS NEEDED

ATSI. American Transmission Systems, Inc. a subsidiary of FirstEnergy Corp.	HAYES-WEST FREMONT 138 kV TRANSMISSION LINE PROJECT
138 kV LIGHT ANGLE 2 POLE STRUCTURE	
FIGURE 04-3	



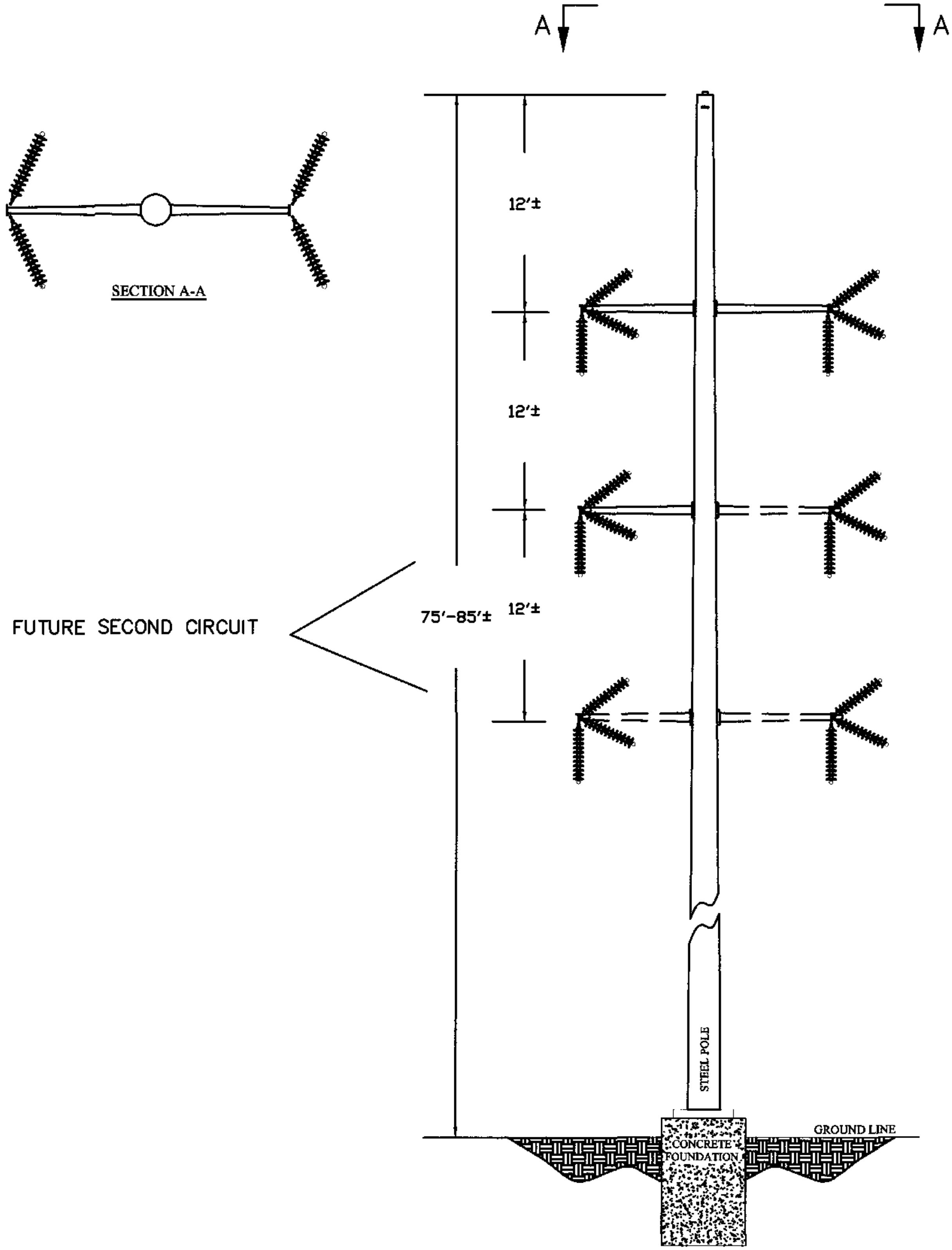
NOTE:
DISTRIBUTION UNDERBUILD AND GUYING AS NEEDED

ATSI. American Transmission Systems, Inc. a subsidiary of FirstEnergy Corp.

HAYES-WEST FREMONT 138 kV TRANSMISSION LINE PROJECT

138 kV CORNER DEAD END 2 POLE STRUCTURE

FIGURE 04-4



ATSI
American Transmission Systems, Inc
a subsidiary of FirstEnergy Corp.

HAYES-WEST FREMONT 138 kV TRANSMISSION LINE PROJECT

138 kV SELF SUPPORTED STEEL POLE

FIGURE 04-5

4906-15-05 FINANCIAL DATA

(A) OWNERSHIP

The Applicant will construct, own, operate, and maintain the proposed West Fremont-Hayes 138 kV Transmission Line Project ("Project").

The Preferred and Alternate Routes for the Project are approximately 28-mile and 30-mile long routes, respectively, that extend from the existing West Fremont Substation to the new Hayes Substation, which is currently under construction. Both the Preferred and Alternate Routes will consist of new construction located primarily in new rights-of-way or easements to be acquired for the Project. For purposes of this section, the construction of Preferred Route Option B will not have a material impact on the cost of construction of the Preferred Route. Applicant will negotiate for easements for the necessary right-of-way for the Project, although acquiring property rights by fee purchase of land or other types of agreements may occur.

In instances where the Project may follow local roads or existing electrical distribution infrastructure, ATSI will negotiate for easements for the necessary right-of-way to relocate existing and install future distribution circuits on the transmission line poles.

Some property owners along both the Preferred and Alternate Routes have indicated their strong opposition to the Project, and it is possible that some property owners may not negotiate terms of an easement or other transactions. Where the necessary right-of-way for the transmission line along the route approved by the OPSB cannot be obtained through negotiations, appropriation of the necessary right-of-way will be pursued.

(B) ELECTRIC CAPITAL COST

Estimates of applicable intangible and capital costs for both the Preferred and Alternate Route are identified in Table 05-1.

TABLE 05-1

ESTIMATES OF APPLICABLE INTANGIBLE AND CAPITAL COSTS

FOR BOTH THE PREFERRED AND ALTERNATE ROUTES

FERC Account Number	Description	Preferred Route ($)	Alternate Route ($)
350	Land and Land Rights, Engineering, Construction, etc.	21,524,000	21,524,000
352	Structures & Improvement	0	0
353	Station Equipment	0	0
354	Towers & Fixtures	0	0
355	Pole & Fixtures	841,000	930,000
356	Overhead Conductors & Devices	454,000	502,000
	TOTAL	$22,820,000	$23,000,000

(C) GAS CAPITAL COST

The Applicant does not propose to construct, own or operate any natural gas transmission lines or facilities as part of or in conjunction with the proposed Project. As such, the OPSB's regulations, Section 4906-15-05(C) of the Ohio Administrative Code, do not apply to this Application and accordingly, no estimates of capital costs for construction or operation of natural gas transmission lines or associated facilities are included in the Application.

4906-15-06 SOCIOECONOMIC AND LAND USE IMPACT ANALYSIS

(A) SECTION SUMMARY

This section of the Application provides data on anticipated land use impacts along the proposed route alternatives for the Hayes-West Fremont 138 kV Transmission Line Project ("Project"). This section includes data collected from literature searches and on-site surveys and investigations. It also provides descriptions of anticipated construction activities, public outreach, health, safety, and aesthetic information, and noise emission data associated with the construction, operation, and maintenance of the Project.

(B) SOCIOECONOMIC AND LAND USE CHARACTERISTICS

A study of the general socioeconomic characteristics for the Project area was conducted as part of this Application. The results of the study are provided below. The study was based on review of available United States Census Bureau data and other available materials from state and local governmental agencies.

The socioeconomic characteristics of the counties and municipalities crossed by and within 1,000 feet of the Preferred and Alternate transmission line routes are summarized in Tables 6-1 through 6-3. This information includes population data, population change between 2000 and 2010, average household size, and median household income.

A Preferred and Alternate transmission line route(s) are required by Ohio Administrative Code Rule 4906-5-04(A) for applications to the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need for electric transmission facilities. A description of the Preferred and Alternate Routes, from west to east, is provided below and can be seen on Figures 4-1A through 4-1F.

Description of Preferred Route

The preferred Project alignment ("Preferred Route") begins approximately three miles northwest of Fremont at the existing West Fremont Substation. The route extends approximately one mile northeast paralleling an existing transmission line and continues east for approximately two miles paralleling a distribution line before tracking north for approximately 0.5 mile, just south of the Ohio Turnpike (Route 90 and Route 80). Just east of the Sandusky River crossing, the Preferred Route crosses the Ohio Turnpike, then roughly parallels it for approximately eight miles before extending to the proposed Groton Distribution Substation and terminating at the Hayes Substation. The Preferred Route is 28.95 miles and traverses mostly agricultural land, as well as forested, commercial/industrial, residential, and recreational lands. The Preferred Route parallels and crosses two sets of railroad tracks and numerous utility right-of-ways (ROWs). The Preferred Route traverses Sandusky, Riley, Townsend, York Townships in Sandusky County and Groton, Oxford, and Perkins Townships in Erie County.

Description of Preferred Route Option B

Preferred Route Option B is a proposed 1.44-mile alternate segment of the Preferred Route between the Sandusky River and Township Line Road (County Road 198). Preferred Route Option B begins just east of the Sandusky River, where it separates from the Preferred Route alignment. It continues along the south side of the Ohio Turnpike until it crosses the turnpike at Township Line Road and rejoins the Preferred Route alignment. The length of the entire Preferred Route, with Preferred Route Option B implemented, is 28.93 miles. The corresponding segment of the Preferred Route replaced by Preferred Route Option B is 1.45 miles long. Preferred Route Option B and the corresponding segment of the Preferred Route traverses Sandusky and Riley Townships in Sandusky County.

Description of Alternate Route

The alternate Project alignment ("Alternate Route") is identical to the Preferred Route for approximately the first four miles, until the route crosses the Norfolk and Western Railroad. From this point, the Alternate Route generally runs east, looping through the proposed Groton Distribution Substation and terminating at the Hayes Substation. The Alternate Route is 30.47 miles long and traverses agricultural, forested, commercial/industrial, residential, and recreation land; it parallels and crosses two sets of railroad tracks and numerous utility ROWs. The

Alternate Route passes through Sandusky, Riley, Green Creek, Townsend, and York Townships in Sandusky County and Groton, Margaretta, and Perkins Townships in Erie County.

Study Area Demographics – Preferred Route

The Preferred Route and area within 1,000 feet on each side of the route are located within Sandusky, Riley, Townsend, York Townships in Sandusky County and Groton, Oxford, and Perkins Townships in Erie County. The route and its corridor pass through dominantly agricultural land; with a few, scattered low-density residential areas.

Table 6-1 Study Area Demographics of the Preferred Route

Municipality	2010 Population	2000 Population	Percent Change (%)	Average Household Size	Median Household Income
Sandusky County	**60,944**	**61,792**	**-1.4**	**2.48**	**$47,277**
Sandusky Township	3,619	4,087	-11.5	2.53	$48,333
Riley Township	1,226	1,302	-5.8	2.27	$56,205
Townsend Township	1,620	1,617	0.2	2.70	$57,957
York Township	2,532	2,512	0.8	2.61	$48,528
Erie County	**77,079**	**79,551**	**-3.1**	**2.37**	**$47,466**
Groton Township	1,427	1,384	3.1	2.82	$76,824
Oxford Township	1,201	1,096	9.6	2.84	$59,554
Perkins Township	12,202	12,578	-3.0	2.54	$58,021

Source: U.S. Census Bureau

Study Area Demographics – Preferred Route Option B

The Preferred Route Option B and area within 1,000 feet on each side of the route is located within Sandusky and Riley Townships in Sandusky County. Like the balance of the Preferred Route, this route option also passes through agricultural land with only scattered low-density residential areas.

Table 6-2 Study Area Demographics of Preferred Route Option B

Municipality	2010 Population	2000 Population	Percent Change (%)	Average Household Size	Median Household Income
Sandusky County	**60,944**	**61,792**	**-1.4**	**2.48**	**$47,277**
Sandusky Township	3,619	4,087	-11.5	2.53	$48,333

Riley Township	1,226	1,302	-5.8	2.27	$56,205

Source: U.S. Census Bureau

Study Area Demographics – Alternate Route

The Alternate Route and area within 1,000 feet on each side of the route centerline are located within the city of Fremont and Sandusky, Riley, Green Creek, Townsend, York Townships in Sandusky County and Groton, Margaretta, and Perkins Townships in Erie County. The characteristics of the Alternate Route are similar to that of the Preferred Route, mostly agricultural with scattered low-density residential areas.

Table 6-3 Study Area Demographics of the Alternate Route

Municipality	2010 Population	2000 Population	Percent Change (%)	Average Household Size	Median Household Income
Sandusky County	**60,944**	**61,792**	**98.6**	**2.48**	**$47,277**
Sandusky Township	3,619	4,087	-11.5	2.53	$48,333
Riley Township	1,226	1,302	-5.8	2.27	$56,205
Green Creek Township	3,646	9,527	-61.7	2.53	$58,077
Townsend Township	1,620	1,617	0.2	2.70	$57,957
York Township	2,532	2,512	0.8	2.61	$48,528
City of Fremont*	16,734	17,375	-3.7	2.43	$38,907
Erie County	**77,079**	**79,551**	**-3.1**	**2.37**	**$47,466**
Groton Township	1,427	1,384	3.1	2.82	$76,824
Margaretta Township	5,981	6,289	-4.9	2.51	$51,549
Perkins Township	12,202	12,578	-3.0	2.54	$58,021

Source: U.S. Census Bureau
*Portions of the City of Fremont are within the Alternate Route 1,000 foot corridor.

(1) Proposed Routing Alignments and Turning Points

A map of the Preferred Route, Preferred Route Option B, Alternate Route, and their respective 2,000 foot-wide corridors is provided at 1:24,000 scale as Figures 4-1A through 4-1F.

(a) Preferred Route

The Preferred Route is 28.95 miles long. The route begins approximately three miles northwest of Fremont at the existing West Fremont Substation. The route extends approximately one mile northeast where it closely parallels the existing West Fremont-Ottawa 138 kV Transmission Line, then turns easterly and continues east for approximately two miles paralleling a distribution line before tracking north for approximately 0.5 mile, just south of the Ohio Turnpike (Route 90 and Route 80). Just east of the Sandusky River crossing, the Preferred Route crosses the Ohio Turnpike, then roughly parallels the Ohio Turnpike for approximately eight miles. Just east of State Route 510, it turns south and crosses the Ohio Turnpike again. The route then travels generally southeast for approximately 1.3 miles before heading east for approximately 1.8 miles. After approximately two miles of generally tracking east and crossing State Route 101, the route travels east for almost three miles, crossing agricultural lands. Heading south, the route passes through the proposed Groton Distribution Substation, then turns east, and travels approximately 2.1 miles. It turns northeast just west of a quarry where it parallels the existing Norfolk and Western Railroad before turning east and crossing the railroad and the northern portion of the quarry. The route travels approximately 1.1 miles before turning generally north crossing the Ohio Turnpike just west of the State Route 4 interchange. The route travels north for one mile before turning east where it continues for an additional mile, and turning generally northeast for approximately 1.5 miles. The route lastly cuts northwest for 0.3 miles, then east and terminating at the Hayes Substation which is currently under construction.

(b) Preferred Route Option B

With Preferred Route Option B implemented, the length of the Preferred Route is 28.93 miles. Preferred Route Option B begins just east of the Sandusky River crossing, where it separates from the Preferred Route alignment, continuing along the south side of the Ohio Turnpike until it crosses the turnpike at Township Line Road, where it rejoins the Preferred Route alignment. Preferred Route Option B is 1.44 miles long. The corresponding segment of the Preferred Route replaced by Preferred Route Option B is 1.45 miles long.

(c) Alternate Route

The Alternate Route is 30.47 miles long. The Alternate Route is identical to the Preferred Route for approximately the first four miles, until the route crosses the Norfolk and Western Railroad. From this point, the Route continues southeast and traverses through woodlots and an agricultural field before crossing State Route 53. The route shifts southwest for 0.4 mile, passing through a residential area before shifting southeast, where it parallels the Norfolk and Western Railroad for approximately 0.7 mile. Here, the 1,000-foot buffer overlaps with the City of Fremont, with the route centerline being 95 feet outside the city limits at its closest distance. The Route shifts generally east, with small shifts northeast and south/southeast for approximately 8.1 miles. During this stretch, the proposed Route passes through residential areas before crossing the Sandusky River. The majority of this Route passes through agricultural land use with few residential areas. The Route crosses Interstate Route 6, the Norfolk and Western Railroad, and State Route 412. After the 8.1-mile stretch east, the route turns south paralleling and crossing State Route 510 five times for approximately 1.6 miles. Turning east, the route continues for approximately 8.2 miles, crossing State Route 101 and traversing through mainly agricultural fields with few residential and woodlots. At the end of this 8.2-mile stretch, the proposed route passes through the proposed Groton Distribution Substation. After passing through the substation, the route turns north and continues through agricultural land for approximately 0.9 mile before turning east. From here, the Alternate Route travels approximately 2.7 miles generally east, crossing State Route 269 and the Ohio Turnpike through mainly agricultural land with few woodlots and residential areas before shifting northeast and paralleling the Norfolk and Western Railroad for approximately 3.1 miles. The Route then shifts east for almost one mile passing through mainly agricultural land before shifting southeast paralleling an existing electric transmission line for approximately 0.9 mile, crossing State Route 4 and terminating at the Hayes Substation which is currently under construction.

(2) Proposed Substation Locations

The proposed Project will connect to the existing West Fremont Substation, extend to the proposed Groton Distribution Substation, and terminate at the existing Hayes Substation. The layout of the existing West Fremont Substation will be expanded by approximately 11 percent for the proposed Project. The additional area needed for the West Fremont Substation will be filed with the Board under a separate filing.

(3) General Land Use

The Project is located in a rural setting consisting of numerous agricultural fields with scattered residential areas, few woodlots, and minimal commercial/industrial, and recreational land uses along the proposed ROWs. A comparison of the various land use characteristics of the Preferred Route, Preferred Route Option B, and Alternate Route is in Table 6-4 below. Table 6-5 presents a comparison of land use characteristics of the 1.44-mile Preferred Route Option B and the corresponding 1.45-mile segment of the Preferred Route it replaces.

(a) Residential

Preferred Route: There are 182 residences located within 1,000 feet of the Preferred Route in a few areas. No residences are located within 100 feet of the Preferred Route. Numerous residents are located just west of the Sandusky River and south of the proposed Preferred Route. A residential land use area is located along State Route 101 where it intersects with the Preferred Route. Pockets of residences are also located near the proposed Groton Distribution Substation.

Preferred Route Option B: Twenty residences are located within 1,000 feet of the 1.44-mile Preferred Route Option B, or five more residences than the corresponding 1.45-mile segment of the Preferred Route. No residences are located within 100 feet of the centerline of Preferred Route Option B or the corresponding segment of the Preferred Route. Numerous residents are located immediately south of Preferred Route Option B, on the north bank of the Sandusky River, just west of Shannon Road.

Alternate Route: There are 319 residences located within 1,000 feet of the Alternate Route and one residential structure is located within 100 feet of the Alternate Route. Although residential density is relatively low in the wider area, some of the denser residential pockets along the Alternate Route are located along Port Clinton Road, State Route 510, Pickle Street, Bardshar Road, and Skadden Road. The closest residential structure to the Alternate Route is located along Port Clinton Road.

(b) Commercial/Industrial

Preferred Route: Six commercial/industrial areas are located within 1,000 feet of the Preferred Route. One commercial/industrial area is located at the westernmost end of the proposed transmission line; this area encompasses the existing West Fremont Substation and the nearby Fremont Energy Center, a 707 MW (fired) natural gas combined cycle facility owned by American Municipal Power, Inc. A commercial/industrial area is located just south of the Ohio Turnpike and west of State Route 53; this area includes two hotels, a gas station, and a restaurant. A Department of Transportation salt storage facility is located just southeast of the intersection of the Ohio Turnpike and Shannon Road (also located along Preferred Route Option B). This commercial/industrial facility is located approximately 5.3 miles from the western end of the Preferred Route. An additional commercial/industrial facility is located on both sides of the Ohio Turnpike and the Preferred Route, adjacent to the intersection of the Norfolk and Western Railroad. This commercial/industrial land use area includes a landfill and a retention pond. A mulch and compost facility is located approximately 0.3 mile southwest of the Pickle Street and State Route 101 intersection. Finally, a quarry is located within 1,000 feet of the Preferred Route. The quarry is located south of the Ohio Turnpike and between Billings Road and State Route 4, approximately 2.2 miles east of the proposed Groton Distribution Substation. The route passes through the north end of the quarry property.

Preferred Route Option B: One commercial/industrial area is located within 1,000 feet of Preferred Route Option B. A Department of Transportation salt storage facility is located just southeast of the intersection of the Ohio Turnpike and Shannon Road (also located in the Preferred Route). This commercial/industrial facility is located approximately 5.3 miles from the western end of the Preferred Route.

Alternate Route: Four commercial/industrial land use areas are located within 1,000 feet of the Alternate Route. The West Fremont Substation is located at the westernmost end of the proposed transmission line. Another commercial/industrial area is located on the west side of the proposed centerline where the Alternate Route parallels the Norfolk and Western Railroad, approximately four miles from the western end of the Alternate Route. This area is located within 100 feet of the proposed Alternate Route centerline and includes numerous commercial and industrial facilities, such as Wal-Mart, Graham Packing Company, Staples, Comfort Inn and Suites, and other facilities. A third commercial/industrial land use area is located east of North Karbler Road. This commercial/industrial area is also located within 1,000 feet of the Preferred Route and includes oil sumps and a retention pond. Finally, a mulch and compost facility is located approximately 0.3 mile southwest of the Pickle Street and State Route 101 intersection.

(c) Cultural

Preferred Route: No historic structures, National Register of Historic Places (NRHP) sites, or historic districts were identified within 1,000 feet of the Preferred Route. Fourteen known archaeology sites were identified within 1,000 feet of the Preferred Route; no previously recorded archaeology sites were identified within 100 feet of the Preferred Route.

Preferred Route Option B: No historic structures, National Register of Historic Places (NRHP) sites, or historic districts were identified within 1,000 feet of Preferred Route Option B or the corresponding 1.45-mile segment of the Preferred Route. Two previously recorded archaeology sites were identified within 1,000 feet of Preferred Route Option B; three previously recorded archaeology sites were identified within 1,000 of the corresponding 1.45-mile segment of the Preferred Route. No previously recorded archaeology sites were identified within 100 feet of Preferred Route Option B or the corresponding 1.45-mile segment of the Preferred Route.

Alternate Route: No historic structures, National Register of Historic Places (NRHP) sites, or historic districts were identified within 1,000 feet of the Alternate Route. Twenty-four previously recorded archaeology sites were identified within 1,000 feet of the Alternate Route; two previously recorded archaeology sites were identified within 100 feet of the Alternate Route.

(d) Agricultural

Preferred Route: The majority of the Preferred Route, 21.14 miles (or 73 percent of the route), crosses agricultural land.

Preferred Route Option B: The majority of Preferred Route Option B, 1.00 mile (or 69 percent of the segment), crosses agricultural land. Less than half of the corresponding segment of the Preferred Route, 0.63 mile (or 43 percent of the segment), crosses agricultural land.

Alternate Route: The majority of the Alternate Route, 22.41 miles (or 74 percent of the route), crosses agricultural land.

(e) Recreational

Preferred Route: Three recreational land use areas are located within 1,000 feet of the Preferred Route. These areas are the North Coast Inland Trail, Wildlife Habitat Restoration Program land, and the Green Hills Golf Course. The North Coast Inland Trail, located just west of the existing West Fremont Substation, is part of a 28 mile paved rail-to-trail path. This area is in an already industrial/commercial land use area. The Wildlife Habitat Restoration Program land is located north of the Ohio Turnpike and west of Township Line Road and is owned by the Ohio Department of Natural Resources. The Green Hills Golf Course is located approximately 0.8 mile south of the proposed Hayes Substation, northwest of the Mason Road West and Patten Tract Road intersection.

Preferred Route Option B: One recreational land use area is located within 1,000 feet of Preferred Route Option B, the Wildlife Habitat Restoration Program land owned by the Ohio Department of Natural Resources. Wildlife Habitat Restoration Program land is located north of the Ohio Turnpike and west of Township Line Road.

Alternate Route: Two recreational areas are located within 1,000 feet of the Alternate Route. These areas are the North Coast Inland Trail and, the Sleepy Hollow Golf Course. Sleepy Hollow Golf Course is located near State Route 101 and Wales Corner Road, approximately 3.2 miles west of the proposed Groton Distribution Substation.

(f) Institutional

Preferred Route: The only institutional land use identified within 1,000 feet of the Preferred Route was the Master's Hand Church of God. This church is located on the northeast corner of Portland Road and Magill Road.

Preferred Route Option B: No institutional land use were identified within 1,000 feet of Preferred Route Option B or the corresponding segment of the Preferred Route.

Alternate Route: The Fremont Dialysis Center located on State Route 53, just west of where the Alternate Route parallels the Norfolk and Western Railroad was the only institutional land use identified along the Alternate Route.

Table 6-4 Summary of Land Use Factors of the Route Alternatives		
	Route Alternatives	
	Preferred	Alternate
Length (in miles)	28.95	30.47
Features within 100 feet of Route Alternatives		
Threatened and Endangered Species	1	1
Historic Structures (OHI)	0	0
Archaeological Sites	0	2
NWI Wetlands	13	5
Residences	0	1
Other Sensitive Land Uses*	1	1
Features within 1,000 feet of Route Alternatives		
Threatened and Endangered Species	1	1
Historic Structures (OHI)	0	0
Archaeological Sites	14	24
NWI Wetlands	49	24
Residences	182	319
Other Sensitive Land Uses*	2	4

*Other sensitive land uses include airports, parks, state forests, schools, hospitals, churches, and cemeteries

Table 6-5 Summary of Land Use Factors of Preferred Route Option B and Corresponding Segment of Preferred Route		
	Preferred Route Alternatives	
	Preferred Route Option B	Corresponding Segment of Preferred Route
Length (in miles)	1.44	1.45
Features within 100 feet of Route Alternatives		
Threatened and Endangered Species	1	1
Historic Structures (OHI)	0	0
Archaeological Sites	0	0
NWI Wetlands	1	0

Table 6-5 Summary of Land Use Factors of Preferred Route Option B and Corresponding Segment of Preferred Route		
	Preferred Route Alternatives	
	Preferred Route Option B	Corresponding Segment of Preferred Route
Residences	0	0
Other Sensitive Land Uses*	0	1
Features within 1,000 feet of Route Alternatives		
Threatened and Endangered Species	1	1
Historic Structures (OHI)	0	0
Archaeological Sites	3	2
NWI Wetlands	2	3
Residences	20	15
Other Sensitive Land Uses*	1	1

*Other sensitive land uses include airports, parks, state forests, schools, hospitals, churches, and cemeteries

(4) Transportation Corridors

Preferred Route: A total of seven State Routes, one Interstate highway, the Ohio Turnpike and one railroad are crossed by the Preferred Route. These crossing include State Route 19, the Norfolk and Western Railroad, State Route 53, Ohio Turnpike (three crossings), US Highway 6, State Route 510, State Route 412, State Route 101, State Route 269, and State Route 4.

Preferred Route Option B: Preferred Route Option B mostly parallels and crosses the Ohio Turnpike once west of Township Line Road. The corresponding segment of the Preferred Route mostly parallels and crosses the Ohio Turnpike once just north of the northern bank of the Sandusky River.

Alternate Route: The Alternate Route crosses one railroad, seven State Routes, one Interstate Highway and the Ohio Turnpike. These crossings include: State Route 19, and the Norfolk and Western Railroad, State Route 3, US Highway 6, State Route 412, State Route 510 (five crossings), State Route 101, State Route 269, the Ohio Turnpike, and State Route 4.

(5) Existing Utility Corridors

The Preferred Route, including Preferred Route Option B, crosses or parallels four exiting transmission lines. The Alternate Route crosses six existing transmission lines. Existing transmission lines parallel 12 percent of the Preferred Route and 25 percent of the Alternate Route. Table 4-1 identifies the number of sections of each proposed route that parallels an existing transmission line, the name of the existing line that the Project parallels, and the mileage for each parallel section.

(6) Noise-Sensitive Areas

Noise-sensitive areas in the predominantly rural Project area are limited to the residences, recreational areas, and the institutional land uses located near the proposed Preferred Route, Preferred Route Option B, and the Alternate Route. An assessment of noise impact during construction and operation of the transmission line is provided in Section 4906-15-06(G).

Preferred Route: There are 182 residences within 1,000 feet of the Preferred Route. No residences are located within 100 feet of the centerline. In addition to the residences, the North Coast Inland Trail, the Sleepy Hollow Golf Course, Master's Hand Church of God, and the Ohio Department of Natural Resources Wildlife Habitat Restoration Program property were identified as other noise sensitive areas.

Preferred Route Option B: There are 20 residences within 1,000 feet of the 1.44-mile Preferred Route Option B, or five more residences than the corresponding 1.45-mile segment of the Preferred Route. The Ohio Department of Natural Resources Wildlife Habitat Restoration Program property was the only noise sensitive area identified within 1,000 feet of Preferred Route Option B.

Alternate Route: There are 319 residences within 1,000 feet of the Alternate Route. One residence is located within 100 feet of the centerline. The Fremont Dialysis Center, the North Coast Inland Trail, and the Sleepy Hollow Golf Course are other noise sensitive areas identified within 1,000 feet of the Alternate Route.

(7) Agricultural Land (including Agricultural District Land)

Data from the Eire and Sandusky County Auditors was received on October 18, 2013, which is within 60 days prior to submission of the Application, as required by the OAC 4906-15-06(B)(7). Several agricultural district lands are located within the proposed ROW of the Preferred Route, Preferred Route Option B, and the Alternate Route. The Preferred Route centerline traverses 8.91 miles of agricultural district land and the Alternate Route centerline traverses 13.22 miles of agricultural district land. The Preferred Route Option B centerline traverses 0.25 miles of agricultural district land while the corresponding Preferred Route segment traverses 0.52 miles of agricultural district land.

(C) LAND USE IMPACTS OF THE PROPOSED PROJECT

(1) Number of Residential Structures

Based on review of Sandusky and Erie County auditor parcel data, aerial photography, and field surveys, one residence was identified within 100 feet of the route alternatives. Table 6-6 has the address, parcel number, and route information for this residential structure.

Preferred Route: No residential structures are located within 100 feet of the Preferred Route.

Preferred Route Option B: No residential structures are located with 100 feet of Preferred Route Option B or the corresponding segment of the Preferred Route.

Alternate Route: One residential structure is located within 100 feet of the Alternate Route.

Table 6-6: Residential Structures within 100 Feet of the Route Alternatives

Parcel Number	Property Address	Route
3301714002	5402 Skadden Rd, Castalia, Ohio 44824	Alternate Route

(2) Impact of Construction

(a) Residential: Numerous residences are within 1,000 feet of the proposed Project route alternatives. One residence is located within 100 feet of the Alternate Route. No removal of residential structures is anticipated due to construction of the proposed Project. Trees within residential yards may be removed where they are located within the ROW or are identified as danger trees. An increase in noise, dust, and traffic is also anticipated with construction of the proposed Project. Existing background noise, such as local traffic and railroads, will help mitigate direct impacts due to construction on residential areas. In addition, it is unlikely construction that construction work will be done outside of normal daylight hours, which will minimize impacts. Also, normal noise suppression devices will be fitted on the heavy equipment. A temporary increase in dust and vehicle emissions will occur during construction, but this will be a shot term impact and will be minimized through the use of best management practices (BMP), including dust suppression by watering or covering exposed soils. Impacts to residences due to construction of the Project are expected to be short-term and minimal.

Due to maintenance and reliability requirements and the clearance requirements of the National Electric Safety Code (NESC), FirstEnergy's generally prohibits structures from being located within the ROW of transmission lines.

Because of maintenance and reliability requirements, the North American Electric Reliability Corporation's (NERC) Reliability Standards, and the clearance requirements of the NESC, FirstEnergy will remove all incompatible plant species that pose a risk to the construction, operation and maintenance of the transmission line prior to operating the transmission line. This includes all trees and plant species located within the proposed ROW that have the potential to disrupt safe operation of the transmission line. Additionally, trees and other vegetation outside of the ROW, generally described as danger trees or priority trees that are dead, dying, diseased, leaning, significantly encroaching, or prone to failure and could potentially fall into the line, are typically removed.

(b) Commercial/Industrial: No adverse impacts to commercial/industrial land uses are anticipated as a result of the construction of the proposed Project.

(c) Cultural: No adverse impacts to cultural land uses are anticipated as a result of the construction of the proposed Project. Comments received from the public have described Peninsular Farms as a locally known historically important property and have expressed concern that construction of the proposed project along the Alternate Route might have an adverse effect on the aesthetics of the property. Additional details on Peninsular Farms and these comments are provided in Part H below. FirstEnergy developed the routing of the Alternate Route to minimize these potential impacts.

(d) Agricultural: Potential impacts to agricultural land uses from the construction of the proposed Project include damage to existing crops, disruption of plow patterns, and potential compaction of soils. These impacts are anticipated to be localized and restricted to the pole locations. Adverse effects on farming are expect to be minor.

Comments from and discussions with some agricultural landowners have indicated a strong preference for the line to be place along property boundaries or the field edges to accommodate equipment widths. The proposed Preferred and Alternate Routes have been aligned to incorporate this concept to the extent practical, however, as property lines and field edges are often not aligned to follow a continuous paths across agricultural areas, it is not possible do this in every case. Some alteration in farming patterns in localized areas is possible.

(e) Recreational: The Preferred Route crosses the Wildlife Habitat Restoration Program property. Impacts to this property are expected to be temporary and minimal, and limited to vegetation clearing and minor aesthetic changes.

(f) Institutional: No adverse impacts to institutional land uses are anticipated as a result of the construction of the proposed Project.

(3) Impact of Operation and Maintenance

(a) Residential: The impacts of operating and maintaining the proposed Project on residential land use are limited to a prohibition of installing new structures within the ROW and periodic removal of incompatible vegetation. In order to meet NERC's Reliability Standards and the clearance requirements of the NESC, it is FirstEnergy's practice to prohibit new structures from being located within the ROW of transmission lines. In order to meet NERC's Reliability Standards and the clearance requirements of the NESC, vegetative maintenance, consisting of the removal of incompatible plant species that pose a risk to the operation and maintenance of the transmission line is expected to occur generally on a five-year cycle.

(b) Commercial/Industrial: No adverse impacts to commercial/industrial land uses are anticipated due to operation and maintenance of the proposed Project.

(c) Cultural: No adverse impacts to cultural land uses are anticipated due to operation and maintenance of the proposed Project.

(d) Agricultural: Impacts to agricultural land uses due to operation and maintenance are anticipated to be minimal and limited to vegetation clearing that may occur to keep the ROW free from incompatible species.

(e) Recreational: Impacts to the Wildlife Habitat Restoration Program property (Preferred Route), although minimal, are anticipated due to operation and maintenance of the proposed Project if constructed. Impacts to the property may include the removal of incompatible plant species along and adjacent to the ROW.

No adverse impacts are anticipated to recreational land use areas due to operation and maintenance if the Preferred Route, if Preferred Route Option B, is chosen.

(f) Institutional: No adverse impacts to institutional land uses are anticipated due to operation and maintenance of the proposed Project.

(4) Mitigation Procedures

A Stormwater Pollution Prevention Plan (SWPPP) for the proposed Project will be developed to mitigate the potential for erosion and sedimentation. Best management practices (BMP's) for erosion and sedimentation control techniques will be implemented as required. Disturbed surface areas will be revegetated after construction and final grading is completed. Damage resulting from Project construction will be repaired to preconstruction conditions when necessary.

(a) Residential: Compensation and/or mitigation for the prohibition of the future installation of structures within the ROW and vegetation clearing and maintenance activities for the transmission line will be determined as part of the acquisition of the ROW for the Project, as part of any negotiated agreement between FirstEnergy and property owners or as determined in appropriation proceedings.

In the event that an existing septic system located in the ROW of the transmission line is impacted by the construction, operation or maintenance of the proposed Project, the septic system will be repaired or replaced by FirstEnergy in accordance with the Ohio Sanitary Code, as necessary to meet the appropriate installation requirements.

(b) Commercial/Industrial: No mitigation is proposed for commercial/industrial properties, as no commercial or industrial use areas will be impacted.

(c) Cultural: No mitigation measures are anticipated for cultural impacts beyond the routing to minimize aesthetic impacts and avoidance of known resources.

(d) Agricultural: Mitigation for damage to current crops and compaction of soils and resulting reduction of productivity from construction, operation and maintenance activities is typically provided as a payment to the property owner as specified in the easement for the ROW. The specific terms of the easement regarding crop damage are determined as part of FirstEnergy's acquisition of the ROW for the Project, as provided as part of the negotiated agreement between FirstEnergy and the property owner or as determined in appropriation proceedings.

FirstEnergy will provide mitigation for damage to underground field drainage systems from construction, operation, and maintenance activities by repairing or replacing damaged sections of the drainage systems as necessary.

Disruption of plow patterns will be minimized on the Project primarily by placing poles beyond or at the edges of agricultural fields to the extent practical and by installing single tangent poles to support the transmission line, where possible. However, the basic mitigation for this limited impact will be provided through compensation to the property owner for the ROW.

(e) Recreational: Impacts on recreational land use areas associated with construction of the proposed Project are anticipated to be minimal. The specific terms of the easement regarding vegetative clearing and maintenance activities for the transmission line, in areas where FirstEnergy does not own the ROW, will be determined as part of the acquisition of the ROW for this Project, as provided as part of the negotiated settlement between FirstEnergy and the property owner or as determined by the appropriation proceedings.

(f) Institutional: No institutional land use areas are anticipated to be impacted by the Project; therefore, no mitigation is proposed for institutional properties.

(D) PUBLIC INTERACTION INFORMATION

(1) Counties, Townships, Cities, and Villages within 1,000 Feet of the Route Alternatives

The Preferred Route centerline traverses Sandusky, Riley, Townsend, York Townships in Sandusky County and Groton, Oxford, and Perkins Townships in Erie County.

The Preferred Route Option B centerline traverses Sandusky and Riley Townships in Sandusky County.

The Alternate Route centerline traverses Sandusky, Riley, Townsend, Green Creek, York Townships in Sandusky County and Groton, Perkins, and Margaretta Townships in Erie County.

(2) Public Officials Contacted

The ATSI area managers have contacted numerous local officials to discuss the proposed Project. Appendix 06-1 provides a list of the contacted local public officials, including their office address and office telephone numbers.

(3) Public Interaction Plan

To keep the public informed of the Hayes-West Fremont 138 kV Transmission Line Project, ATSI created a public information program that included the following:

In October and November of 2012, ATSI issued public notices regarding the Project. The public notices were distributed to residences that were located within the Project area of either route.

Three public information meetings were held for the Project. These meetings occurred in October 2012 (two meetings) and May 2013. The meetings in October occurred in Fremont and Bellevue, Ohio, and were attended by 13 people for both meetings combined. The last public information meeting occurred at the Fremont Middle School in Fremont, Ohio and approximately 100 people attended. The public was presented with several route alternatives, reviewed display boards, and discussed the Project with several ATSI and CH2M HILL representatives. Copies of the handout material can be found in Appendix 06-2 and include a project map, a brief statement of need, and the siting process.

(4) Liability Insurance

FirstEnergy Corp, as the parent company of ATSI currently self-insures against Commercial general liability and property damage exposure, as well as Commercial liability exposure in connection with its automobile operations. ATSI purchases excess Commercial General Liability insurance covering indemnity to at least $35,000,000 in excess of $10,000,000. This insurance is on a per occurrence basis and is arranged under a broad form that includes automobile and contractual liability. Present coverage is arranged with AEGIS renewable on a year-to-year basis.

(5) Public Interest, Convenience, and Necessity

This Project will serve the public interest by providing anticipated future electrical demands in the future at a fair market value to consumers. Section 4906-02 of this Application provides a more detailed discussion of the necessity for this Project.

(6) Tax Revenues

The Project is located within Sandusky and Erie Counties. FirstEnergy will pay property taxes on utility facilities in each jurisdiction crossed by the transmission line. The approximate annual property taxes associated with the Preferred and Alternate Routes over the first year after the Project is complete are $ 1,025,307 and $ 1,027,408, respectively.

Based on the 2013 tax rates, the following is an estimated distribution of taxes by township, city and county :

Preferred Route

Erie County		$ 407,356
Sandusky County		$ 617,951
	TOTAL	$ 1,025,307

Riley Township		$ 220,498
Sandusky Township		$ 196,576
Townsend Township		$ 200,877
Groton Township		$ 328,877
Oxford Township		$ 18,504
Perkins Township		$ 59,975
	TOTAL	$ 1,025,307

Alternate Route

Erie County		$ 391,865
Sandusky County		$ 635,543
	TOTAL	$ 1,027,408

Groton Township		$ 222,070
Margaretta Township		$ 114,344
Perkins Township		$ 55,451
Riley Township		$ 231,591
Sandusky Township		$ 202,428
York Township		$ 98,144
Townsend Township		$ 103,380
	TOTAL	$ 1,027,408

(7) Regional Development Impacts

The proposed Project will have a positive impact on regional development, as it is part of improvements to the BES that will help to ensure a reliable electric system. A more detailed discussion of how this Project will affect regional development is included in Section 4906-02 of this Application.

(E) HEALTH, SAFETY, AND AESTHETICS

(1) Compliance with State and Federal Regulations

The construction, operation, and maintenance of the Project will comply with the requirements of applicable state and federal statutes and regulations, including requirements specified in the NERC Mandatory Reliability Standards, the National Electrical Safety Code, the Public Utilities Commission of Ohio, and will meet applicable safety standards established by the Occupational Health and Safety Administration (OSHA).

(2) Electric and Magnetic Field Production

The following calculations provide an approximation of the magnetic and electric fields strengths of the new 138 kV transmission line. The calculations provide an approximation of the electric and magnetic field levels based on specific assumptions utilizing the Electric Power Research Institute (EPRI) EMF Workstation 2009 program software.

Factors that affect the level of magnetic and electric fields include variance in the ROW widths, daily and projected long-term transmission line loading, operating voltage, contingency operations, phase configuration, direction of current flows, conductor sag, ground elevation, unbalance conditions, and other nearby magnetic field sources or conductors of neutral current including water mains, metallic fences, and railroad tracks. Electric field computations assume that shrubs, trees, buildings, and other objects are not in close proximity to the facilities, as they produce significant shielding effects.

Other transmission or distribution facilities near the line will also affect the calculated fields. For example, a double-circuit loop configuration, with current flows in opposite directions, results in a partial reduction (cancellation) of the magnetic field levels. The model and calculations include a number of assumptions including the following:

- Current flows are assumed in the direction expected under normal system operating conditions;

- The location of transmission line poles, attached conductors and static wire, and line phasing are based on preliminary engineering layouts;
- The calculated field levels assume a reference point approximately 3 feet (1 meter) aboveground.

Three loading conditions were modeled for the proposed transmission line. The three loading conditions are: 1) normal maximum loading, 2) emergency line loading, and 3) the winter normal conductor rating. The normal maximum loading represents the routine maximum loading that the transmission line would be operated. Daily current load levels would fluctuate below this level. The emergency maximum loading represents the maximum current flow in the transmission line under unusual circumstances and only for a short period of times. The winter normal conductor rating represents the maximum current flow that the conductor used on the Project can withstand during winter conditions. It is not anticipated that the transmission line would be operated at the winter normal conductor rating level of current flow.

The transmission line loadings used in the calculations are presented in Table 6-8. As the line loads are similar for the Preferred and Alternate Routes, the modeled field strengths are approximately the same for both the Preferred and Alternate Routes and are based on a detailed model of the Preferred Route.

TABLE 06-8:
TRANSMISSION LINE LOADINGS

Line Name	Normal Loading (Amps)	Emergency Loading (Amps)	Winter Conductor Rating (Amps)
Groton – West Fremont 138 kV Transmission Line	417	574	1479
Hayes – Groton 138 kV Transmission Line	179	317	1479

(a) Electric and Magnetic Field Strength Levels

The calculated electric and magnetic fields for the Groton – West Fremont 138 kV Transmission Line are shown in Table 6-9. The calculated electric and magnetic fields for the Hayes – Groton 138 kV Transmission Line are shown in Table 6-10. Typical cross section profiles of the normal calculated electric fields and magnetic fields at normal loading, emergency loading and winter conductor rating are shown in Figures 06-1 through 06-8.

TABLE 06-9:

EMF CALCULATIONS Groton – West Fremont 138 kV Transmission Line

Line EMF Calculations		Electric Field (kV/meter)	Magnetic Field (mGauss)
Normal Loading	Under Lowest Conductors	0.64	19.14
	At Right-of-Way Edge	0.44/0.24	14.6/12.3
Emergency Loading	Under Lowest Conductors	0.64	26.35
	At Right-of-Way Edge	0.44/0.24	20.1/16.9
Winter Rating	Under Lowest Conductors	0.64	67.89
	At Right-of-Way Edge	0.44/0.24	51.8/43.7

TABLE 06-10:

EMF CALCULATIONS Hayes – Groton 138 kV Transmission Line

Line EMF Calculations		Electric Field (kV/meter)	Magnetic Field (mGauss)
Normal Loading	Under Lowest Conductors	0.64	8.22
	At Right-of-Way Edge	0.44/0.24	6.2/5.3
Emergency Loading	Under Lowest Conductors	0.64	14.55
	At Right-of-Way Edge	0.44/0.24	11.1/9.4
Winter Rating	Under Lowest Conductors	0.64	67.89
	At Right-of-Way Edge	0.44/0.24	51.8/43.7

(b) Current State of EMF Knowledge

Electric and magnetic fields are naturally occurring in the environment and can be found in the Earth's interior and in the human body. They are generated essentially anywhere where there is a flow of electricity, including electrical appliances and power equipment. Electric fields are associated with the voltage of the source; magnetic fields are associated with the flow of current in a wire. The strength of these fields decreases rapidly with distance from the source. EMFs associated with electricity use are not disruptive to cells like x-rays or ultraviolet rays from the sun. EMF fields are thought to be too weak to break molecules or chemical bonds in cells. Scientists have conducted extensive research over the past two decades to determine whether EMFs are associated with adverse health effects, at this time there is no firm basis to conclude that EMFs from transmission lines cause adverse health effects. A number of independent scientific panels have reviewed the research and have stated that there is no basis to conclude that EMFs cause adverse health effects nor has it been shown that levels in everyday life are harmful.

Developments

As part of the National Energy Policy Act of 1992, the Electric and Magnetic Fields Research and Public Information Dissemination (EMF RAPID) program was initiated within the five-year effort under the National EMF Research Program. The culmination of this five-year effort resulted in a final RAPID Working Group report, which was released for public review in August 1998. The Director of the National Institutes of Environmental Health Sciences (NIEHS) then prepared a final report to Congress after receiving public comments. The NIEHS' Director's final report, released to Congress on May 4, 1999, concluded that extremely low frequency electric and magnetic fields (ELF-EMF) exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The Director further stated that the conclusion of this report is insufficient to warrant aggressive regulatory concern.

Sources for Additional Information

The following websites sponsored by federal agencies or other organizations provide additional information on EMF:

- Centers for Disease Control/National Institute for Occupational Safety and Health: http://www.cdc.gov/niosh/topics/emf/
- National Institute of Environmental Health Sciences (NIEHS): http://www.niehs.nih.gov/health/topics/agents/emf/

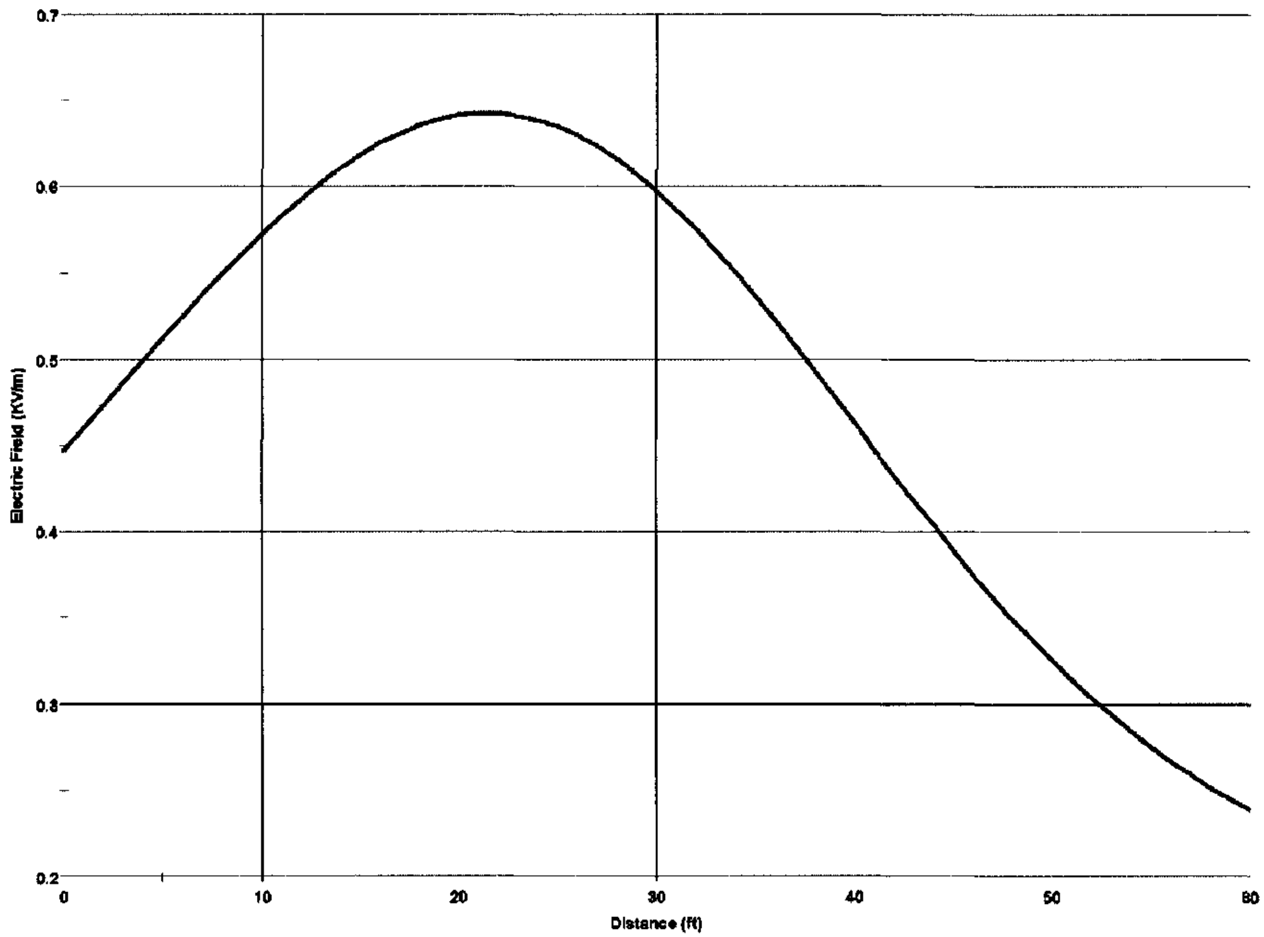
(c) Company's Considerations

The strength of EMFs can potentially be reduced by installing the transmission line conductors in a compact configuration and, for multiple circuit transmission lines, by selecting conductor phasing that reduces the field strengths. ATSI designs its facilities according to the requirements of the NESC. The pole heights and configuration were chosen based on NESC specifications, engineering parameters, and cost. ATSI's typical practice, as proposed in this the new construction portions of this Project, is to install 138 kV transmission lines primarily on wood tangent structures supported on horizontal post insulators – this is a compact design that reduces EMF field strengths in comparison to other installations. Given that this proposed facility is a single circuit line, reverse phasing is not an option, except in the locations where another circuit has been identified as being rebuilt as a double circuit. However, conductor spacing, distance, and loading will affect the degree to which this will occur.

(d) Procedures for Public Relations Regarding Electric and Magnetic Fields

Information on EMF was available at the Public Information Meetings held for the Project in October 2012 and May 2013. This information included a discussion of basic information on electric magnetic field theory, scientific research activities and EMF levels in everyday life. Appendix 06-3 contains copies of this information. Similar materials will be available upon request to persons along the Project routes.

Electric Field, Mid Span - Normal Load(EF)



Resultant
Min = 0.239 kV/m Max = 0.643 kV/m

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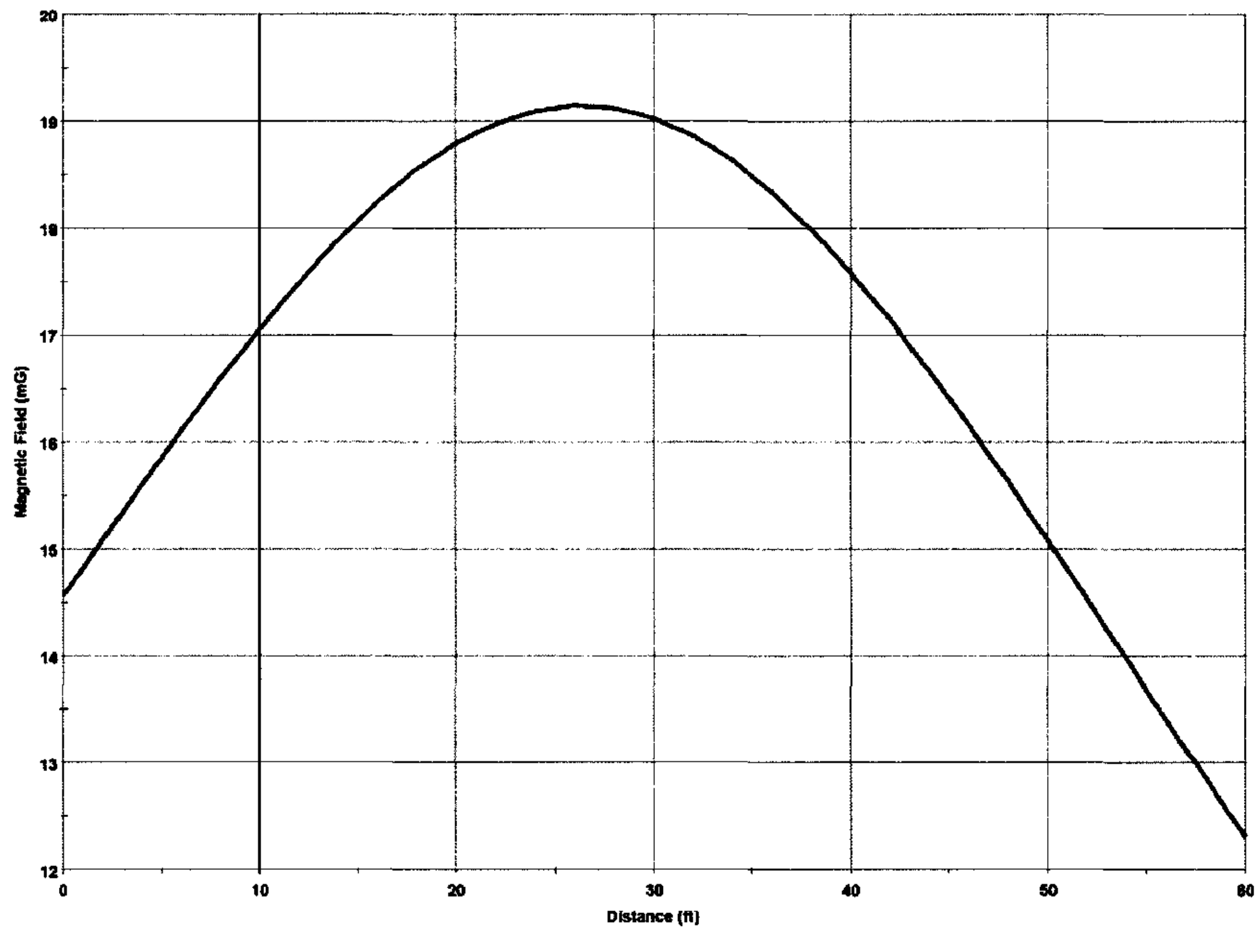
Hayes–West Fremont 138 kV Transmission Line Project

ELECTRIC FIELD
Groton–West Fremont 138 kV Transmission Line

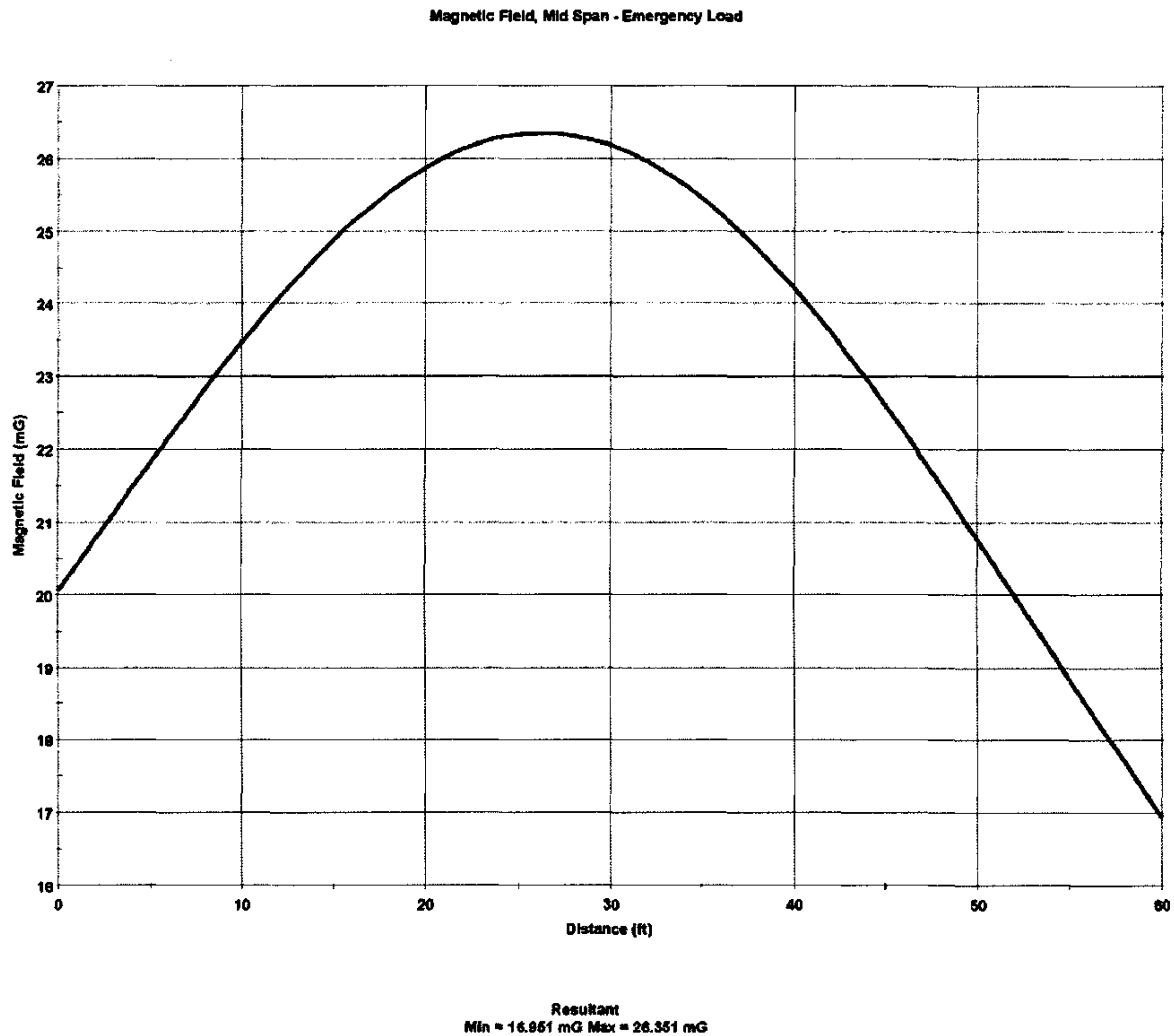
EXHIBIT 06–1

Magnetic Field, Mid Span - Normal Load



Resultant
Min = 12.315 mG Max = 19.143 mG

ATSI® American Transmission Systems, Inc. a subsidiary of FirstEnergy Corp.	Hayes–West Fremont 138 kV Transmission Line Project
MAGNETIC FIELD NORMAL LOAD Groton–West Fremont 138 kV Transmission Line	
EXHIBIT 06–2	



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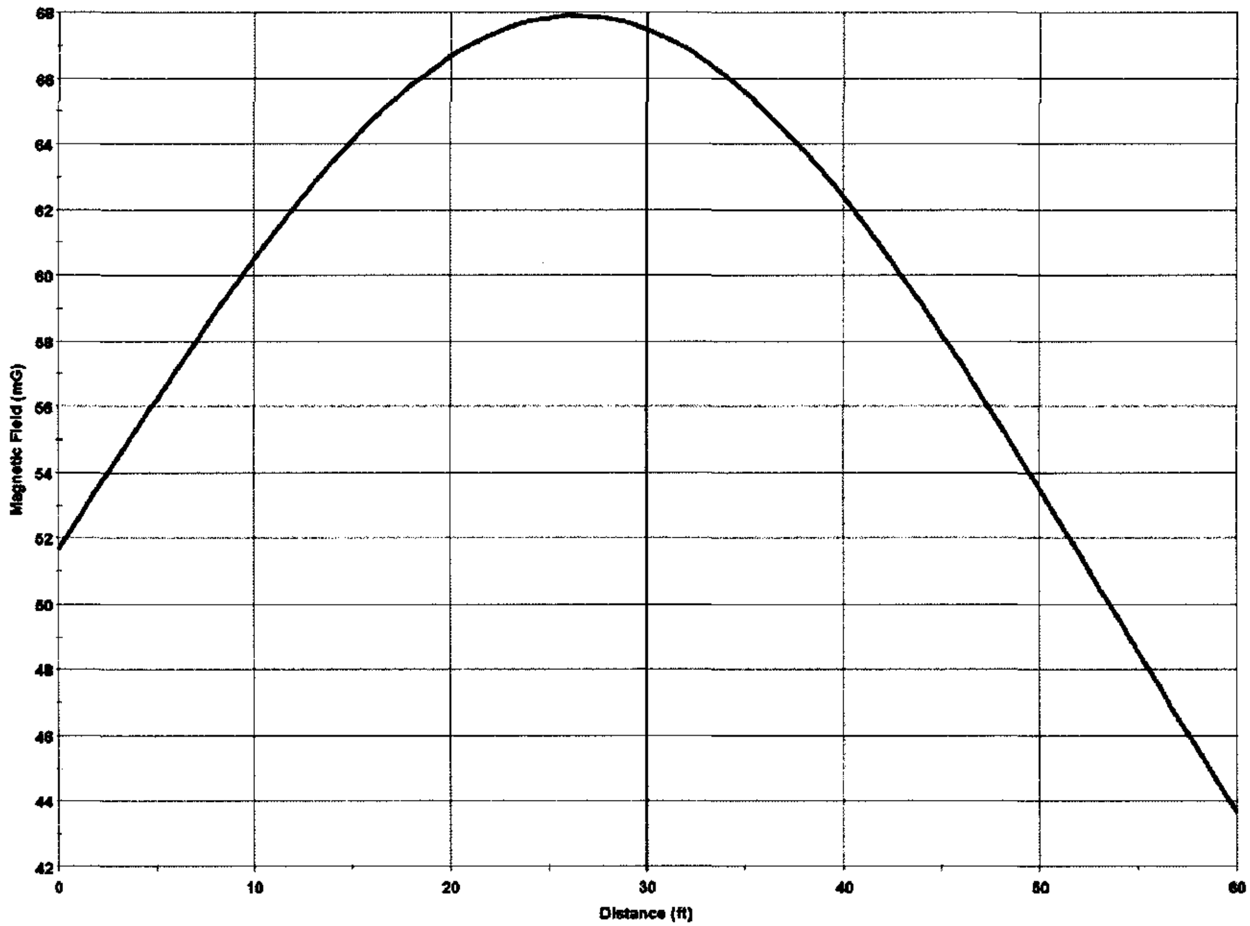
Hayes–West Fremont 138 kV Transmission Line Project

MAGNETIC FIELD EMERGENCY LOAD
Groton–West Fremont 138 kV Transmission Line

EXHIBIT 06–3

Magnetic Field, Mid Span - Winter Rating



Resultant
Min = 43.679 mG Max = 67.896 mG

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Hayes–West Fremont 138 kV
Transmission Line Project

MAGNETIC FIELD WINTER RATING
Groton–West Fremont 138 kV Transmission Line

EXHIBIT 06–4