LARGE FILING SEPARATOR SHEET

CASE NUMBER 12-1727-EL-BSB

FILE DATE 11/9/2012

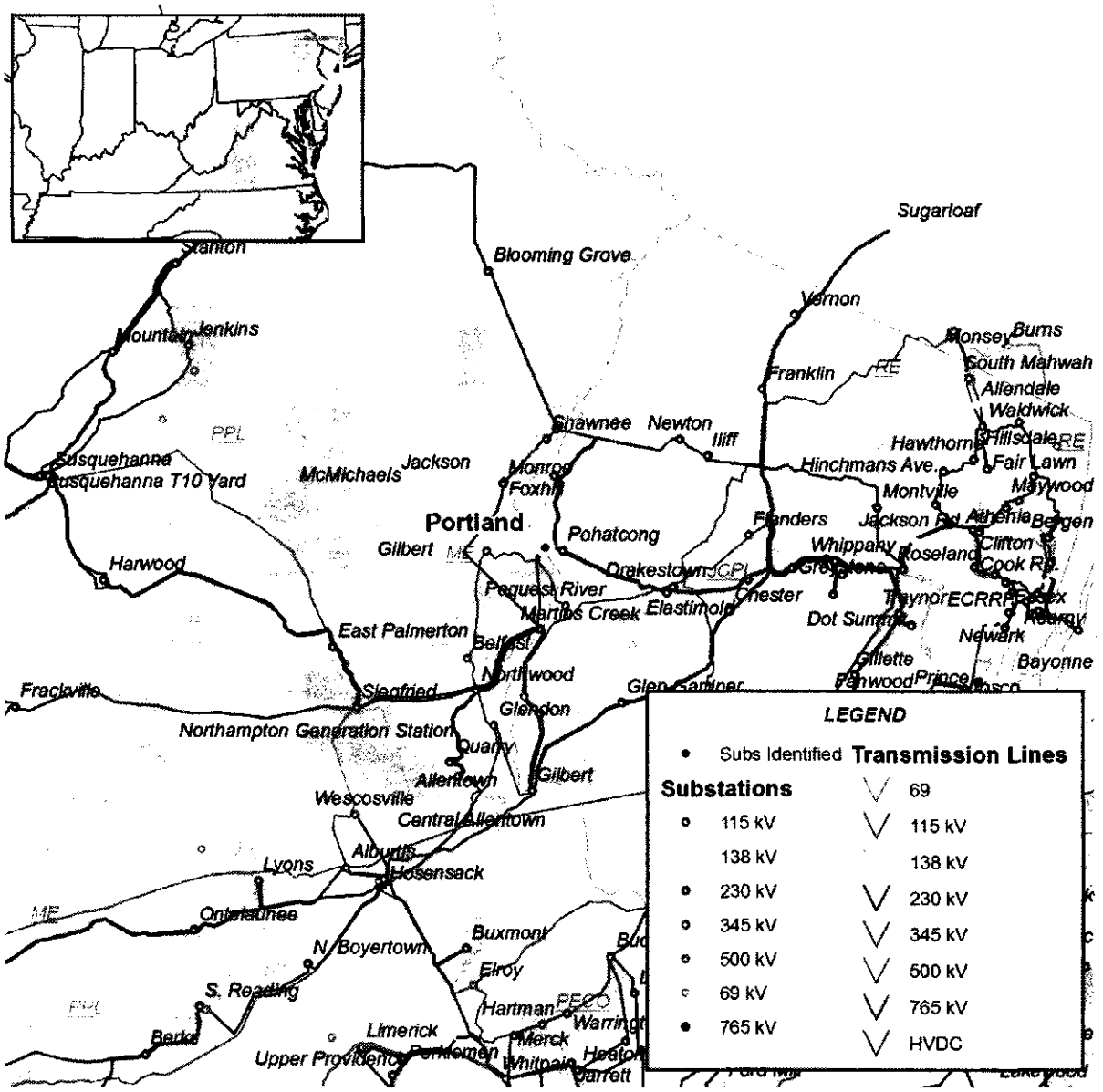
SECTION: 3 OF 4

NUMBER OF PAGES: 200

DESCRIPTION OF DOCUMENT: Application

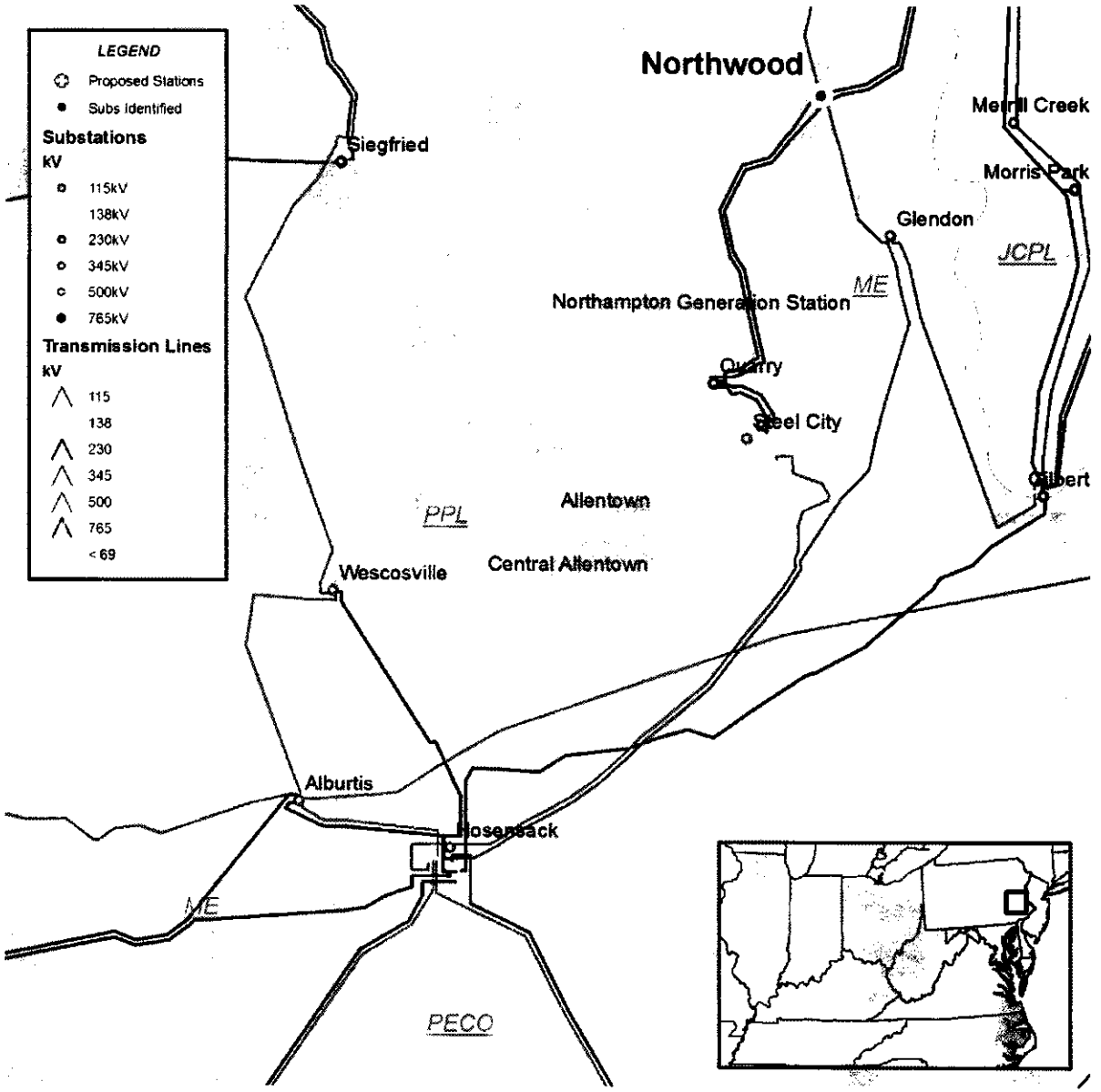
ME Transmission Zone Reinforcement

- Portland 23/115kV #3 transformer loads to 110.1% of its rating of 277 MVA for the loss of Northwood – Quar + Northwood #6 transformer followed by the loss of Macr – Morr – Gilb 230kV
- Replace limiting circuit breaker and substation conductor transformer components at Portland 230kV.
- Estimated Project Cost: $0.4M
- Projected in-service date: 6/1/2015



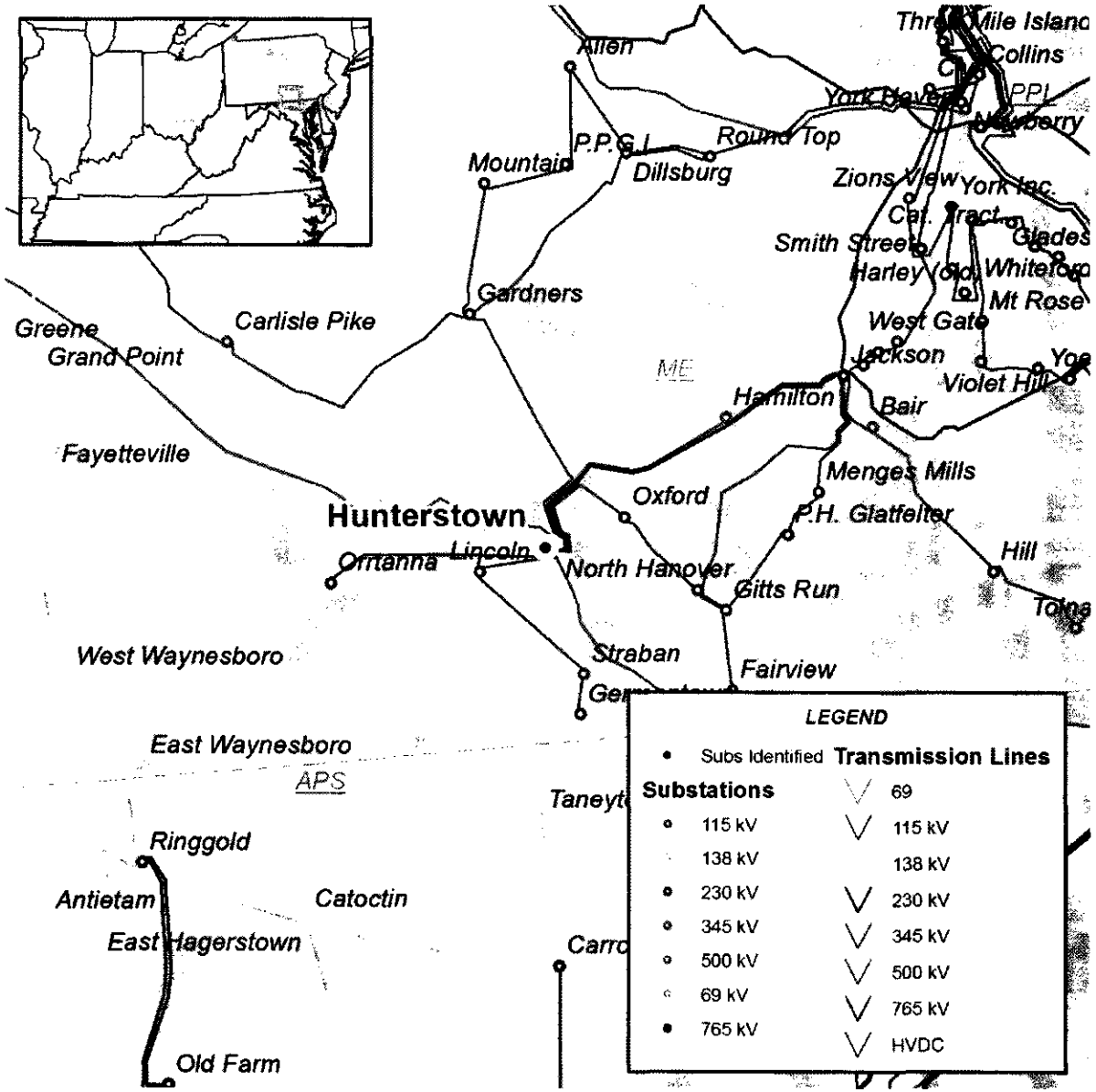
ME Transmission Zone Reinforcement

- Northwood transformer loads to 105.8% of its emergency rating of 221 MVA for N-1-1 scenario of loss Portland 230/115 kV transformer + base case.
- Northwood 230/115 kV Transformer upgrade
- Estimated Project Cost: $4M
- Projected in-service date: 6/1/2015



ME Transmission Zone Reinforcement

- N-1-1 voltage
- Install a 500 MVAR SVC at the Hunterstown 500 kV substation (existing base line upgrade b1800)
- Estimated Project Cost: $60M
- Projected in-service date: 6/1/2015 (no advancement needed)



JCPL Violations

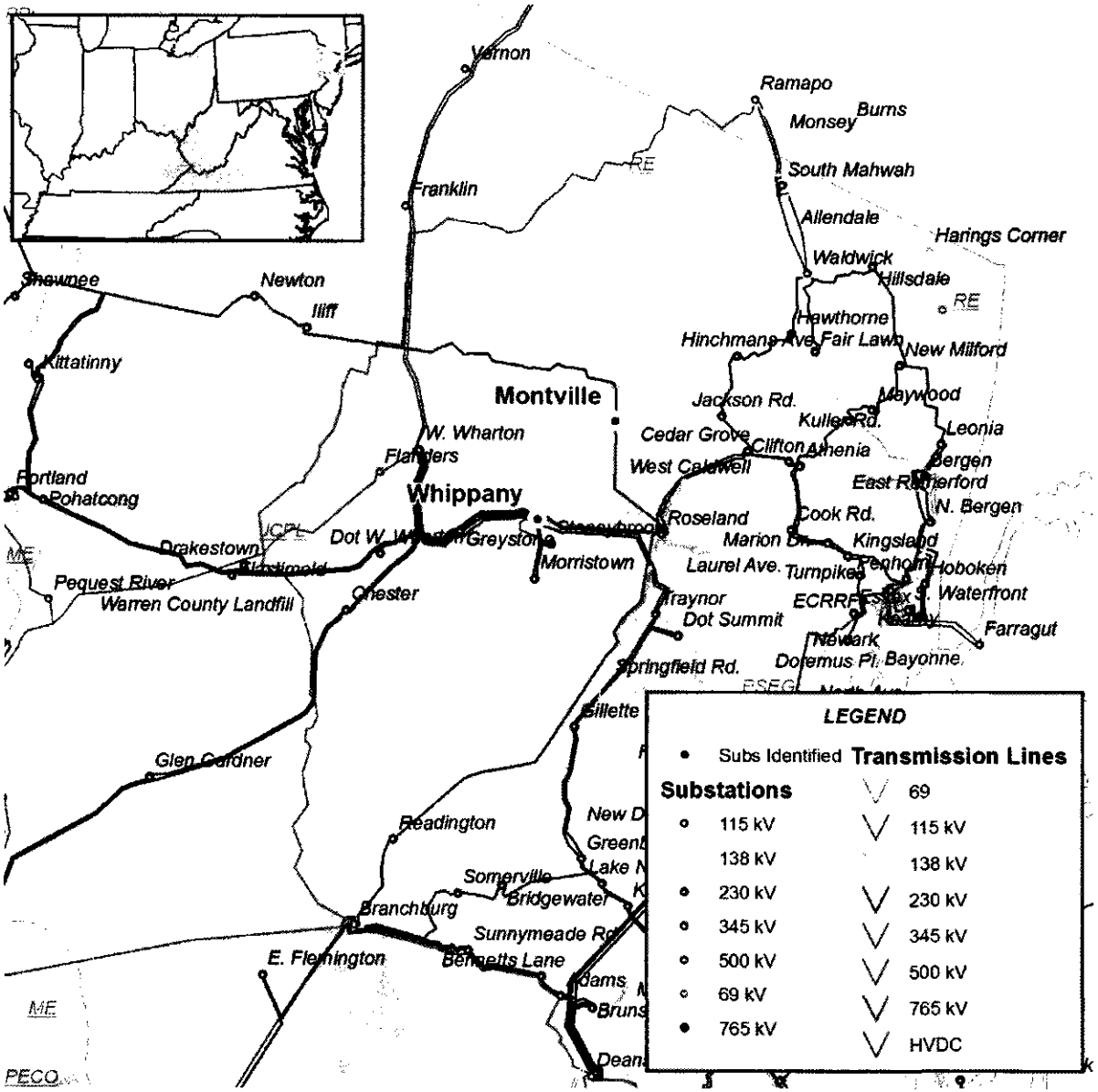
- Criteria violations
- N-1-1 Voltage magnitude
- N-1-1 Voltage drop

- Multiple 230kV bus voltage drop violations

- Multiple 115kV and 230kV low voltage violations

JCPL Transmission Zone Reinforcement

- N-1-1 case divergence issue due to the loss of Montville – Roseland 230 kV line followed by the loss of Kitattiny – Newton 230kV line + Newton 230/34.5 kV transformer and shunt at Newton 34.5kV.
- Construct a Whippany to Montville 230 kV line (6.4 miles)
- Estimated Project Cost: $37.5M
- Projected in-service date: 6/1/2015



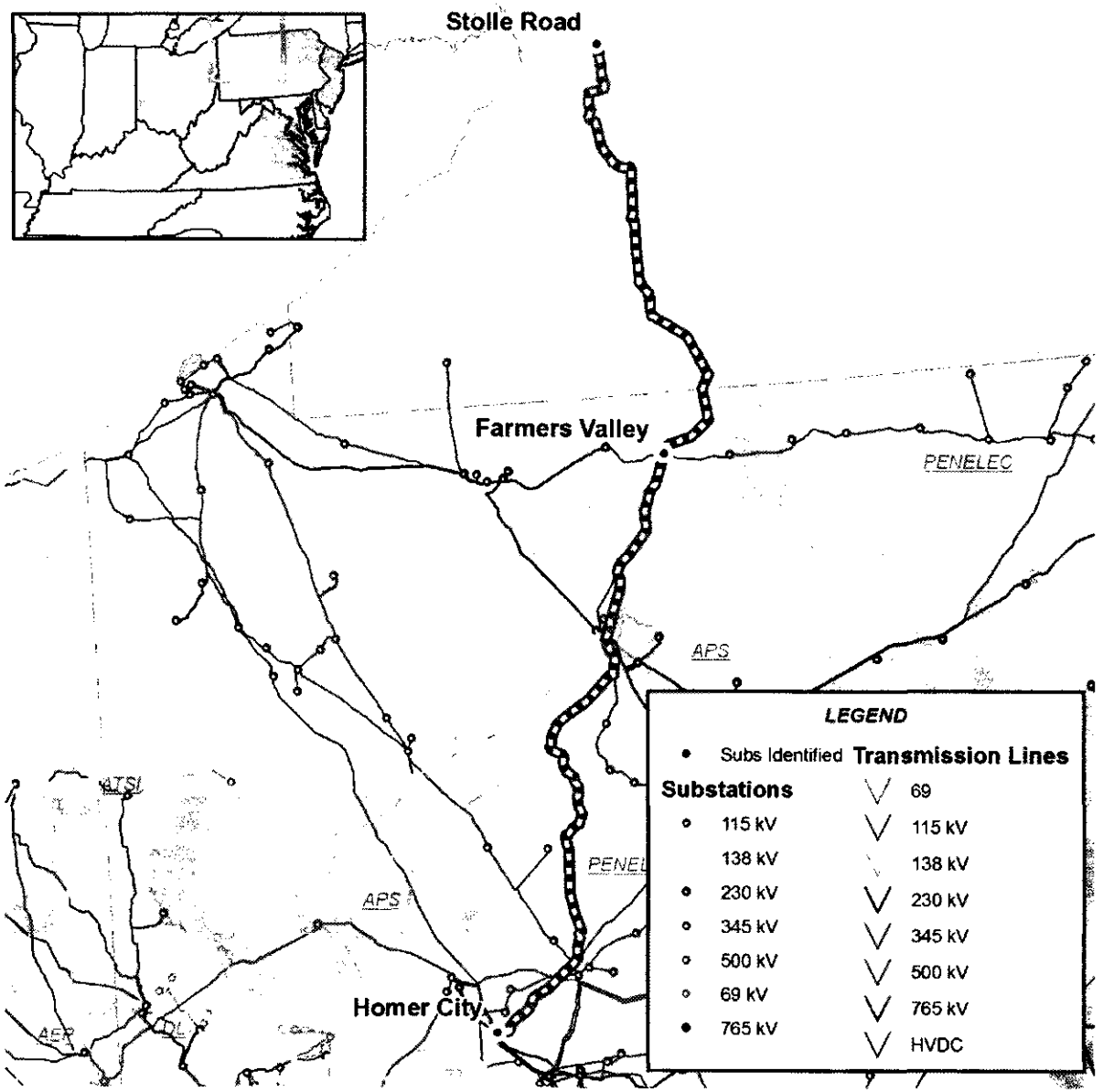
PN Violations

- Criteria violations
- N-1 Voltage drop

- Multiple 115kV, 138kV and 230kV voltage drop violations

PN Transmission Zone Reinforcement

- Voltage of 0.8075 p.u. is observed on Farmers Valley 115kV bus for a stuck breaker at Glade 230kV sub.
- Towanda – Towanda5 115kV line loads to 150.32% of its rating of 156MVA for the loss of Glade – Lewis Run 230kV + Lewis Run #2&4 transformers followed by the loss of Farmers Valley – Ridgeway 115kV.
- Multiple other voltage and thermal violations. Construct Farmers Valley 345/230 kV and 230/115 kV substation. Loop the Homer City-Stolle Road 345 kV line into Farmers Valley
- Estimated Project Cost: $29.5M
- Projected in-service date: 6/1/2015



PPL Violations

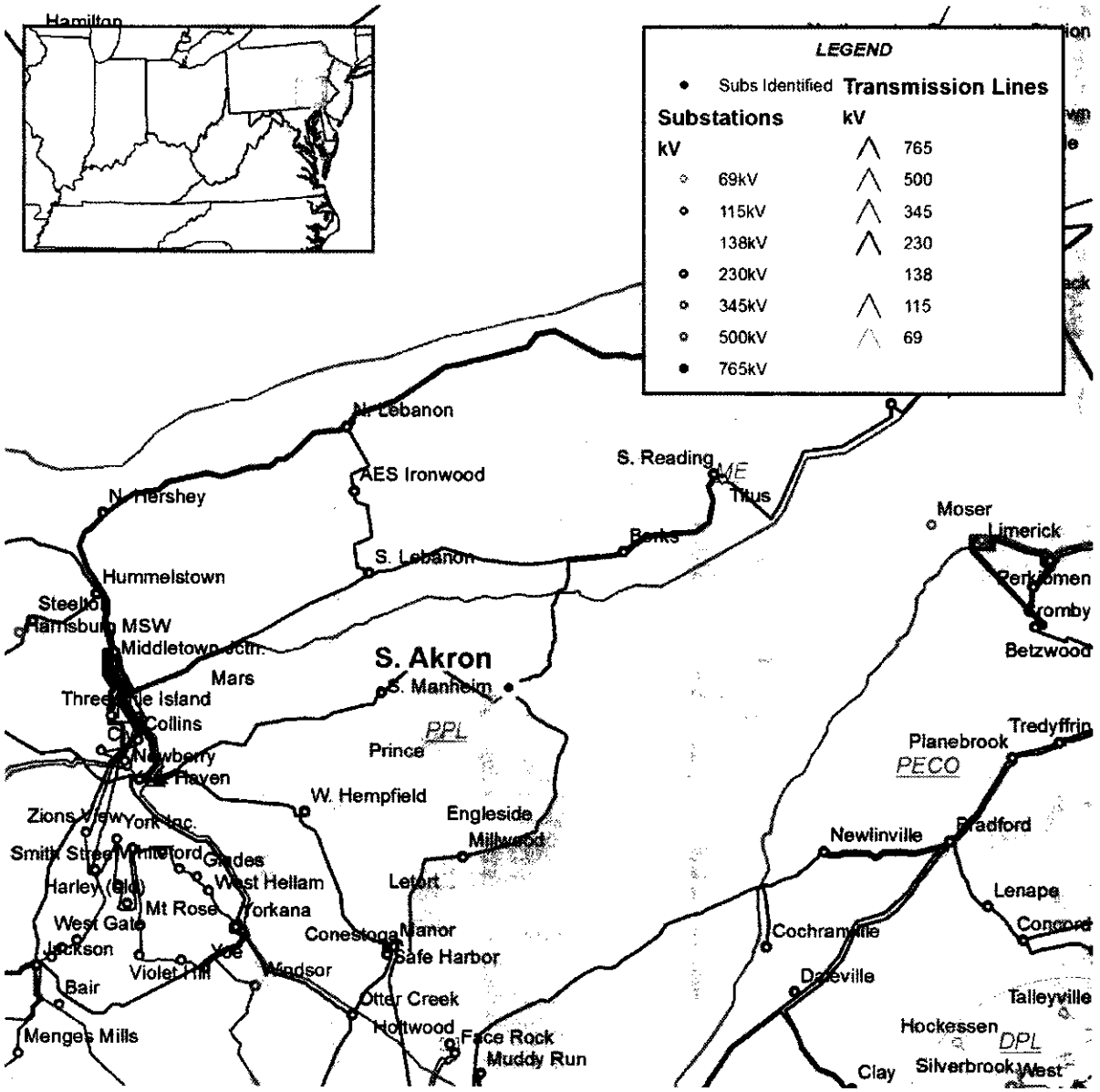
- Criteria violations
  - N-1-1 Thermal
  - N-1-1 Voltage magnitude
  - N-1-1 Voltage drop

  - N-1 Voltage Magnitude
  - N-1 Voltage drop
  - Generation Deliverability
  - Load Deliverability

- Multiple 138kV low voltage violations
- Multiple 230kV line thermal violations
- Multiple 230kV low voltage violations

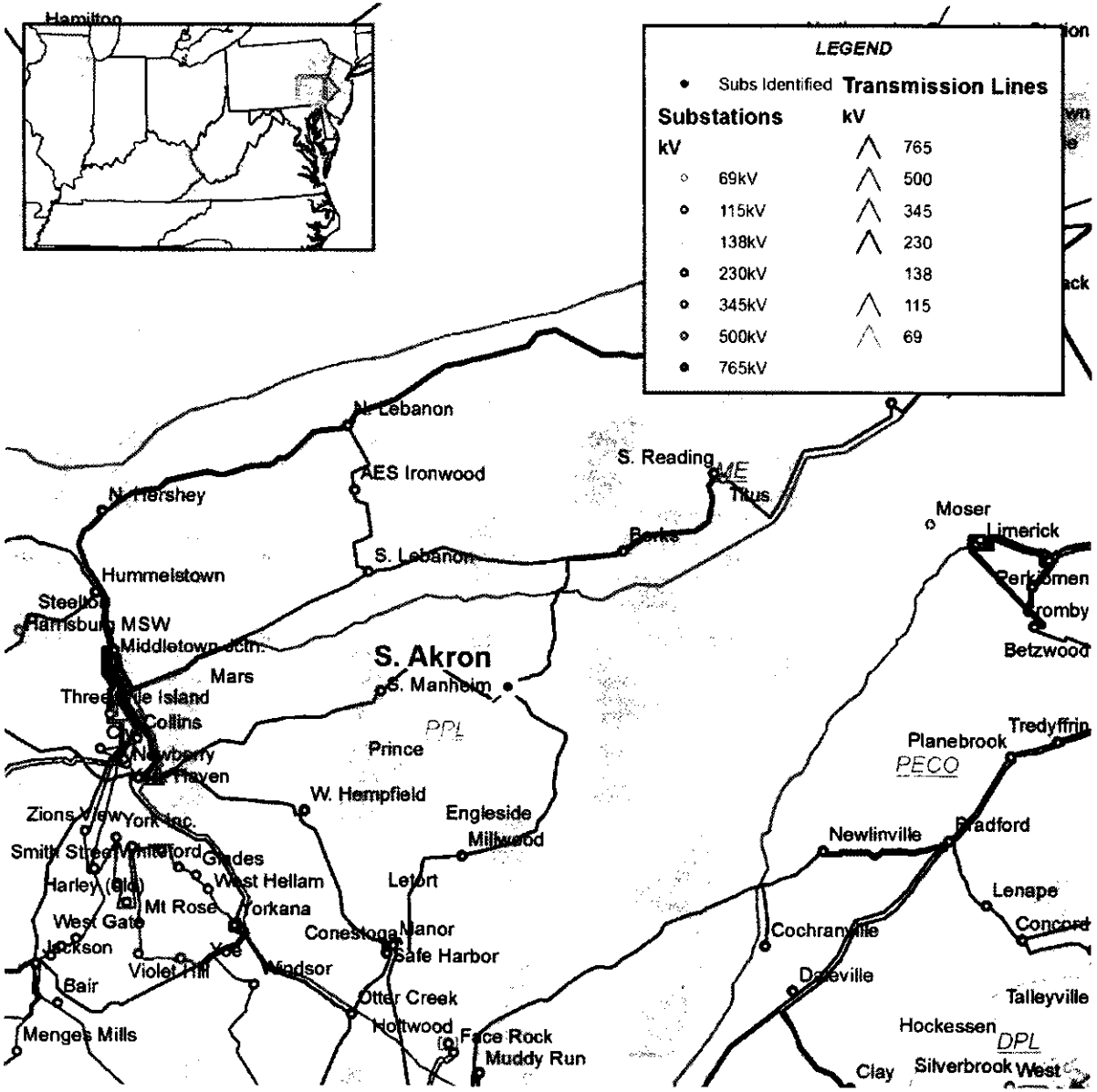
PPL Transmission Zone Reinforcement

- The South Akron TR 4 - South Manheim TR4 230 kV line loads to 109% of its rating of 588.4 MVA for the N-1-1 contingency loss of the S. Akron – Millwood 230 kV line + loss of the Berks – S. Lebanon 230 kV line.
- Short-term solution: temporary operating procedure to transfer load
- Long-term solution: Replace the CTs and switch in South Akron Bay 4 to increase the rating to 493/624 SN/SE MVA.
- Estimated Project Cost: $0.525M
- Projected in-service date: 6/1/2014



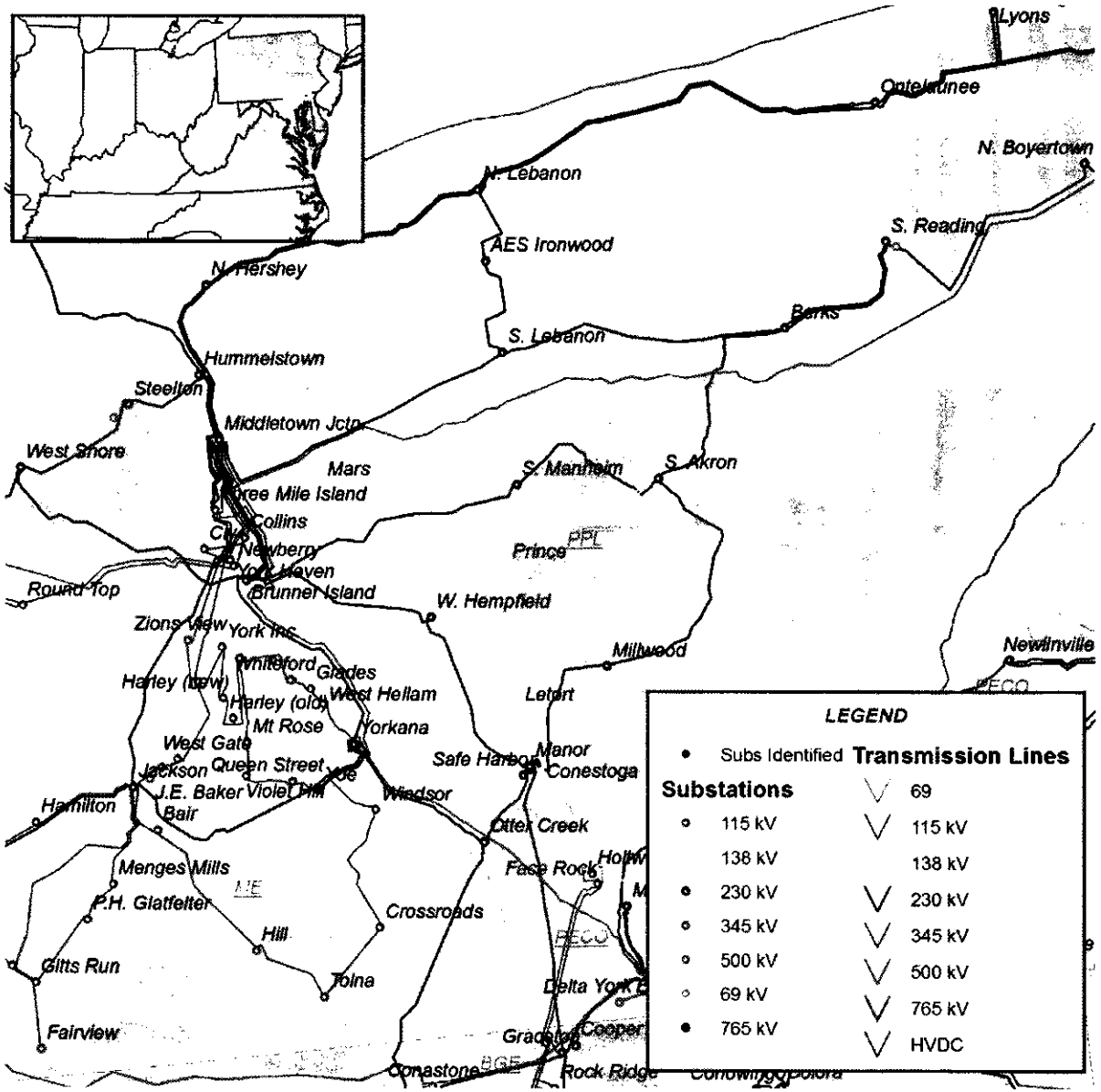
PPL Transmission Zone Reinforcement

- The South Akron - South Akron transformer 3 gets loaded to 108% of its emergency rating of 588 MVA for the N-1-1 contingency loss of the Berks – S. Lebanon 230 kV line + loss of the S. Akron – Millwood 230 kV line.
- Short-term solution: Temporary operating procedure to transfer load
- Longer-term solution: Replace the CTs and switch in South Akron Bay 3 to increase the rating of the Millwood-South Akron 230 kV Line to 493/624 SN/SE MVA and increase the rating in Bay 3 to 664/793 SN/SE MVA.
- Estimated Project Cost: $0.525M
- Projected in-service date: 6/1/2014



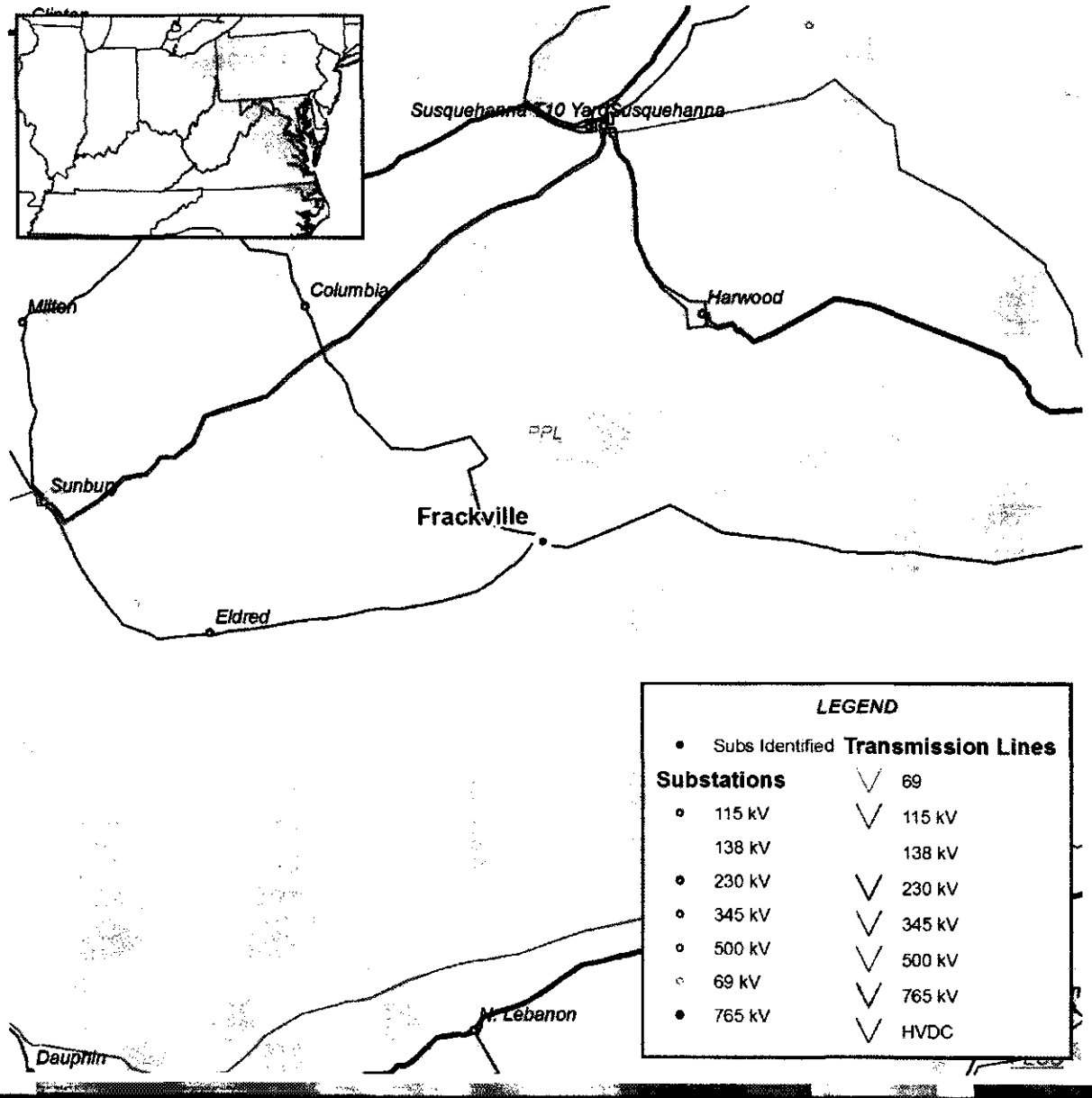
PPL Transmission Zone Reinforcement

- The South Akron TR 4 - South Manheim TR4 230 kV line loads to 109% of its rating of 588.4 MVA for the N-1-1 contingency loss of the S. Akron – Millwood 230 kV line + loss of the Berks – S. Lebanon 230 kV line.
- Install North Lancaster 500/230 kV substation
- Estimated Project Cost: $42M
- Projected in-service date: 6/1/2017



PPL Transmission Zone Reinforcement

- N-1-1 Voltage drop is observed on the FrackVille Transformer #3 230kV bus for various contingencies combinations
- Install a 90 MVAR capacitor bank at the Frackville 230 kV Substation (bus 207973)
- Estimated Project Cost: $3M
- Projected in-service date: 6/1/2015



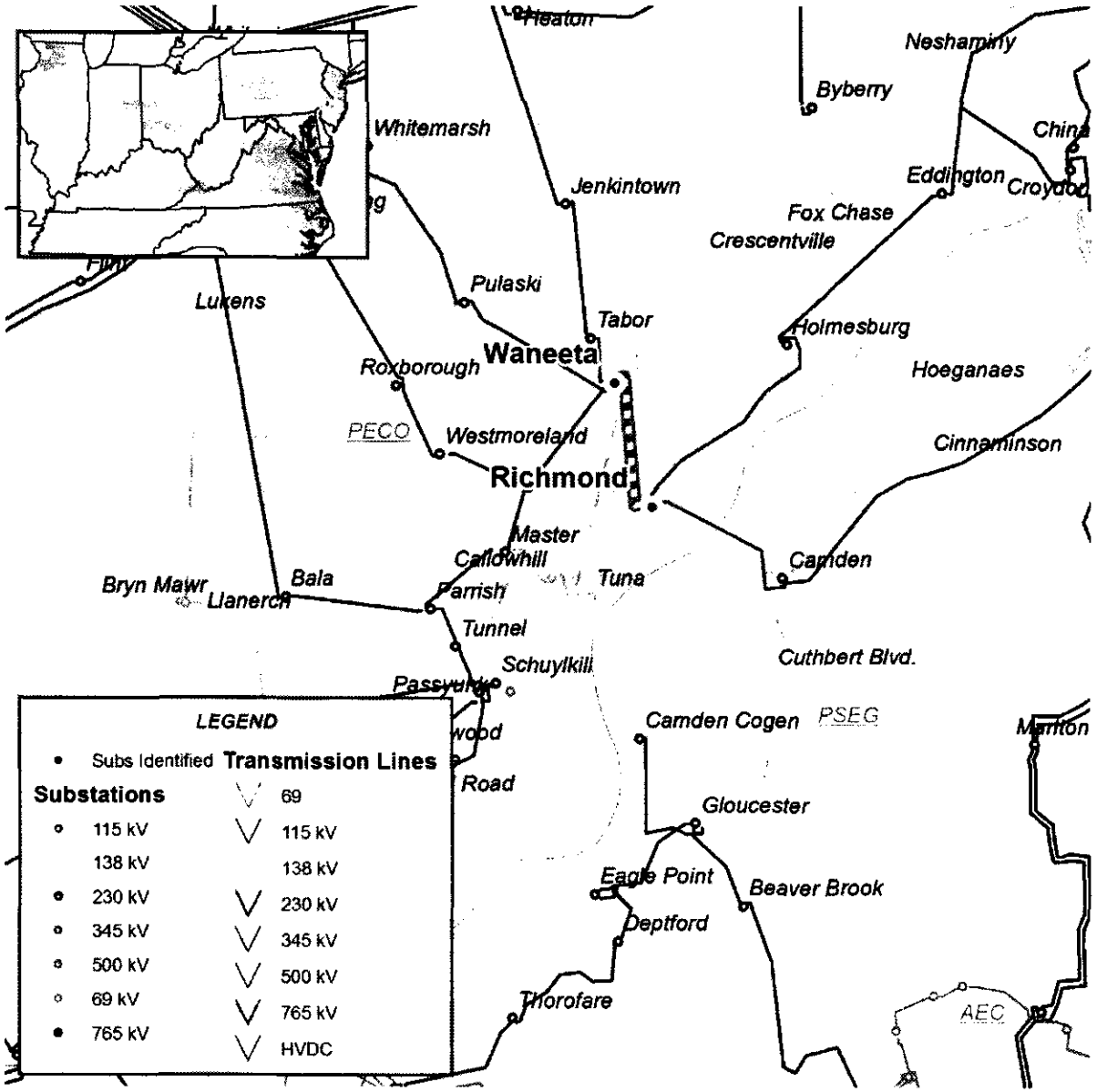
PECO Violations

- Criteria violations
  - N-1-1 Thermal
  - Generation Deliverability

- Multiple 138kV thermal violations
- Multiple 230kV thermal violations

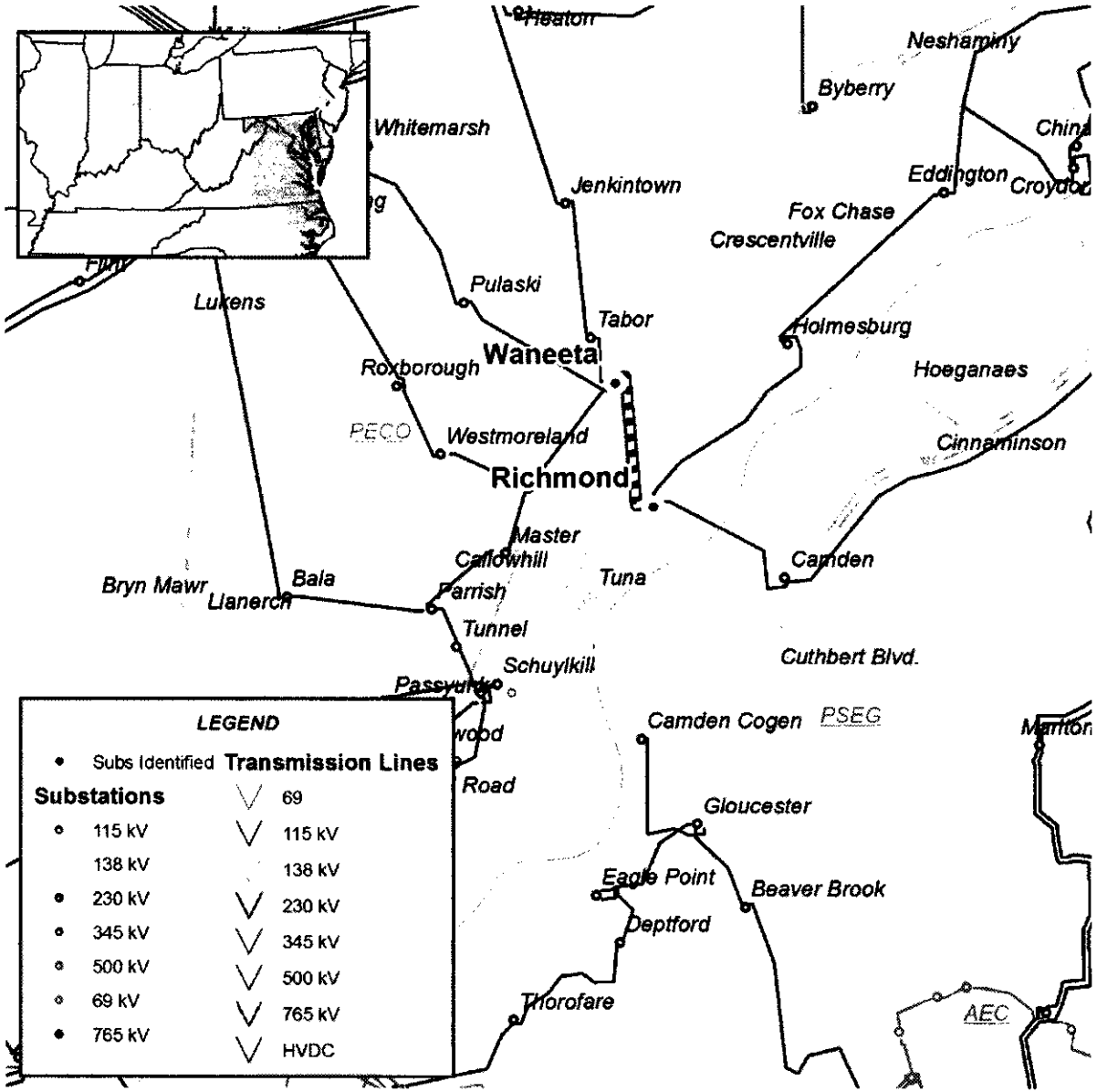
PECO Transmission Zone Reinforcement

- The Richmond – Waneeta 230kV line loads to 127.1% of its emergency rating of 914 MVA for the breaker contingency loss of the Chichester #1 230 kV bus section.
- Reconductor Richmond – Waneeta 230 kV and replace terminal equipment at Waneeta substation (existing baseline b1398.8)
- Estimated Project Cost: $4M
- Projected in-service date: 6/1/2015



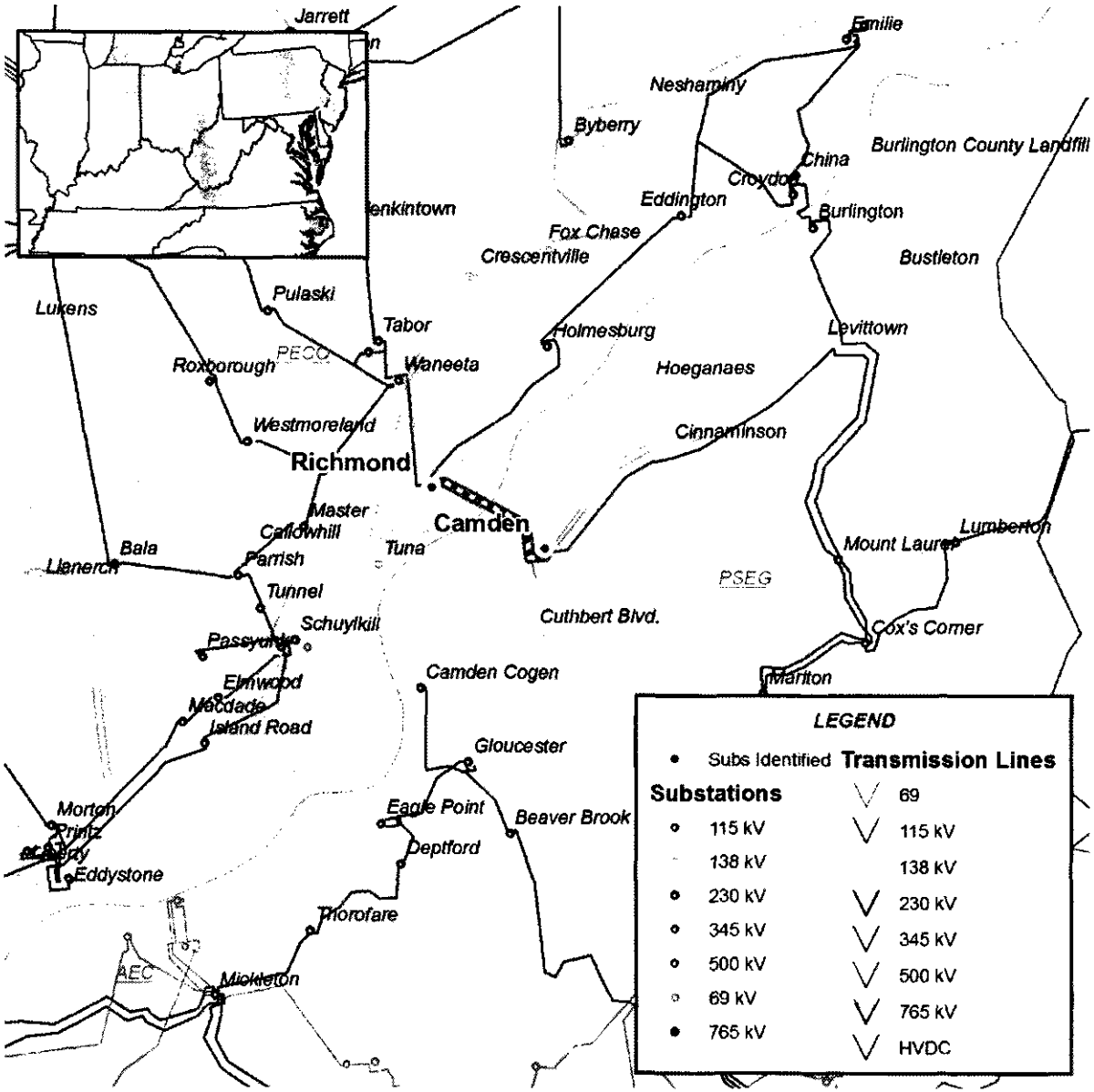
PECO Transmission Zone Reinforcement

- The Richmond – Waneeta 230kV line loads to 127.1% of its emergency rating of 914 MVA for the breaker contingency loss of the Chichester #1 230 kV bus section.
- Reconductor the underground portion of the Richmond - Waneeta 230 kV and replace terminal equipments (existing base line upgrade b1591)
- Estimated Project Cost: $12M
- Additionally, the scope of b1591 will be increased to include replacing three 230 kV circuit breakers. (Replacing the three 230 kV circuit breakers is estimated to cost $867K.) This will result in a new emergency rating of 1195 MVA.
- Projected in-service date: 6/1/2016



PECO Transmission Zone Reinforcement

- The Camden - Richmond 230kV line loads to 102.12% of its emergency rating of 1037 MVA for the single contingency loss of the Chichester 230 kV bus tie.
- Upgrade the PECO portion of the Camden - Richmond 230 kV to a six wire conductor (existing base line upgrade b1590.1)
- Estimated Project Cost: $2.7M
- Replace terminal equipment at Richmond (Camden - Richmond 230 kV) (existing base line upgrade b1590.2)
- Estimated Project Cost: $0.8M
- Projected in-service date: 6/1/2015 (advance from 2016)



PSEG Violations

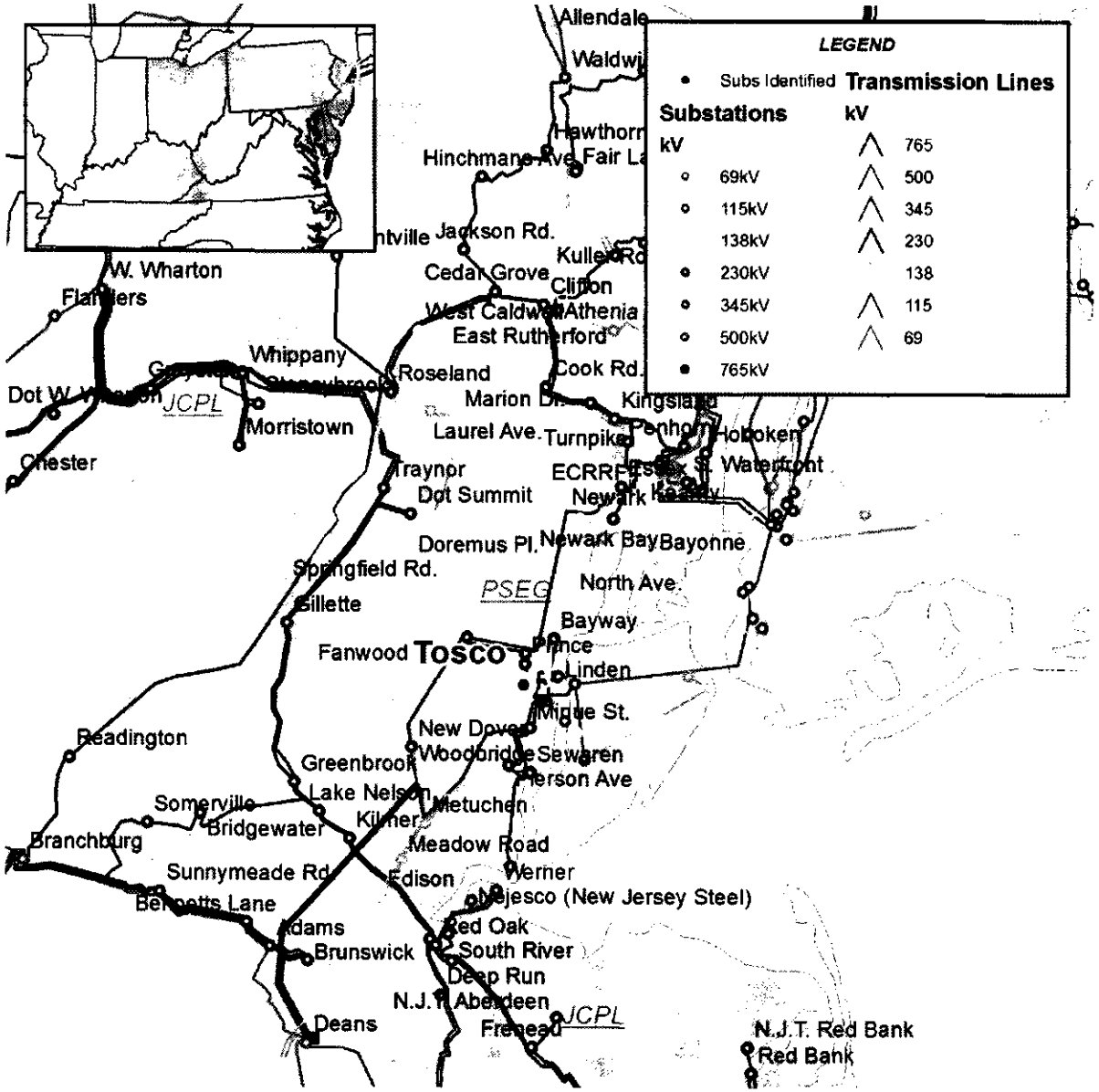
- Criteria violations
  - N-1-1 Thermal
  - Generation Deliverability

- Multiple 230kV thermal violations

PSEG Transmission Zone Reinforcement

Solution under review

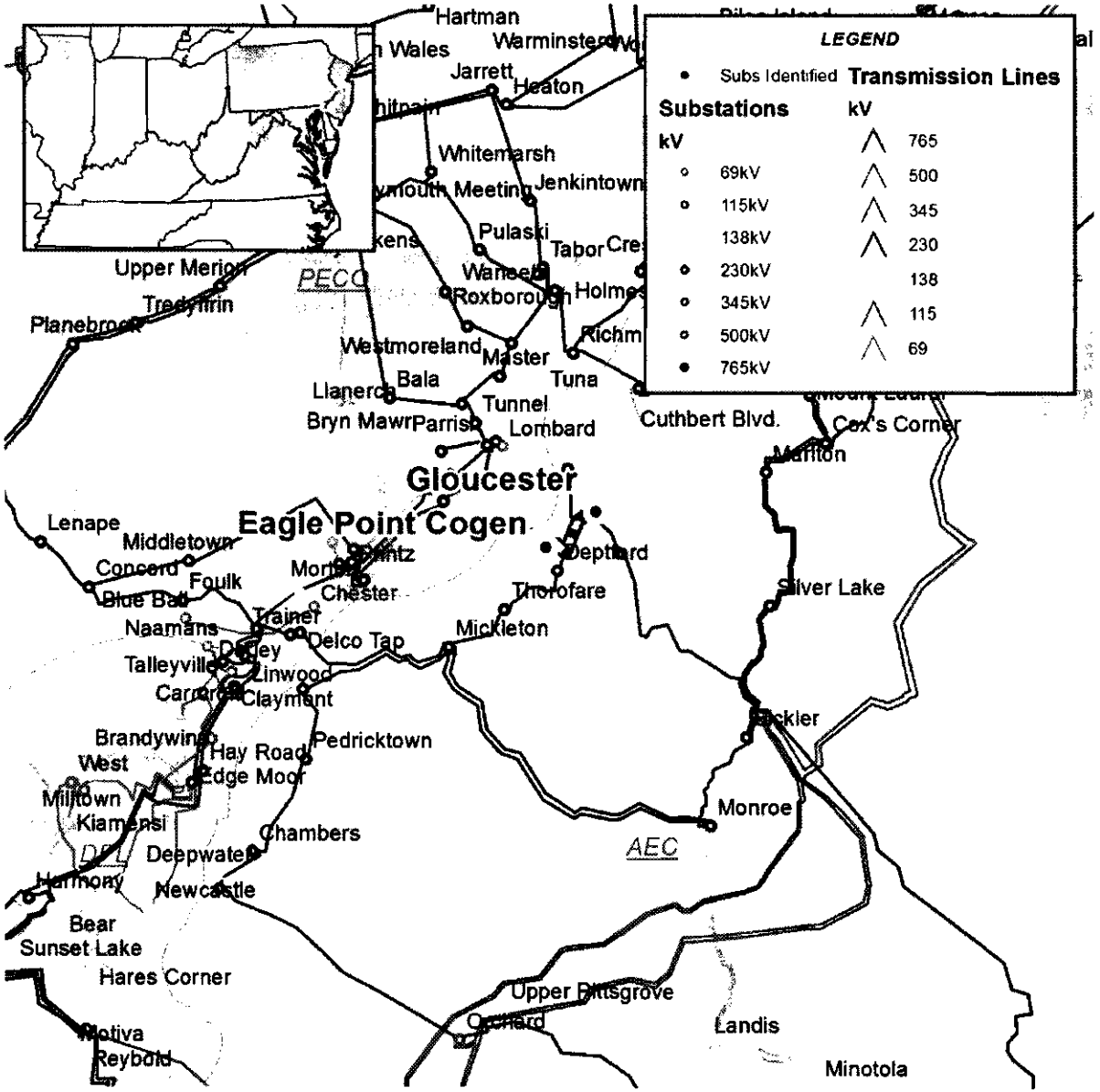
- The Tosco – G22_MTX5 230kV line loads to 101.9% of its emergency rating of 1093 MVA for the tower loss of Deans - Westfield 230 KV line & Sewaren (Pierson Ave) - Roseland 230 KV DCTL.
- Tosco – G22_MTX5 : Re-conductor 0.3 miles of the circuit
- Estimated Project Cost: TBD
- Projected in-service date: 6/1/2015



PSEG Transmission Zone

Solution under review

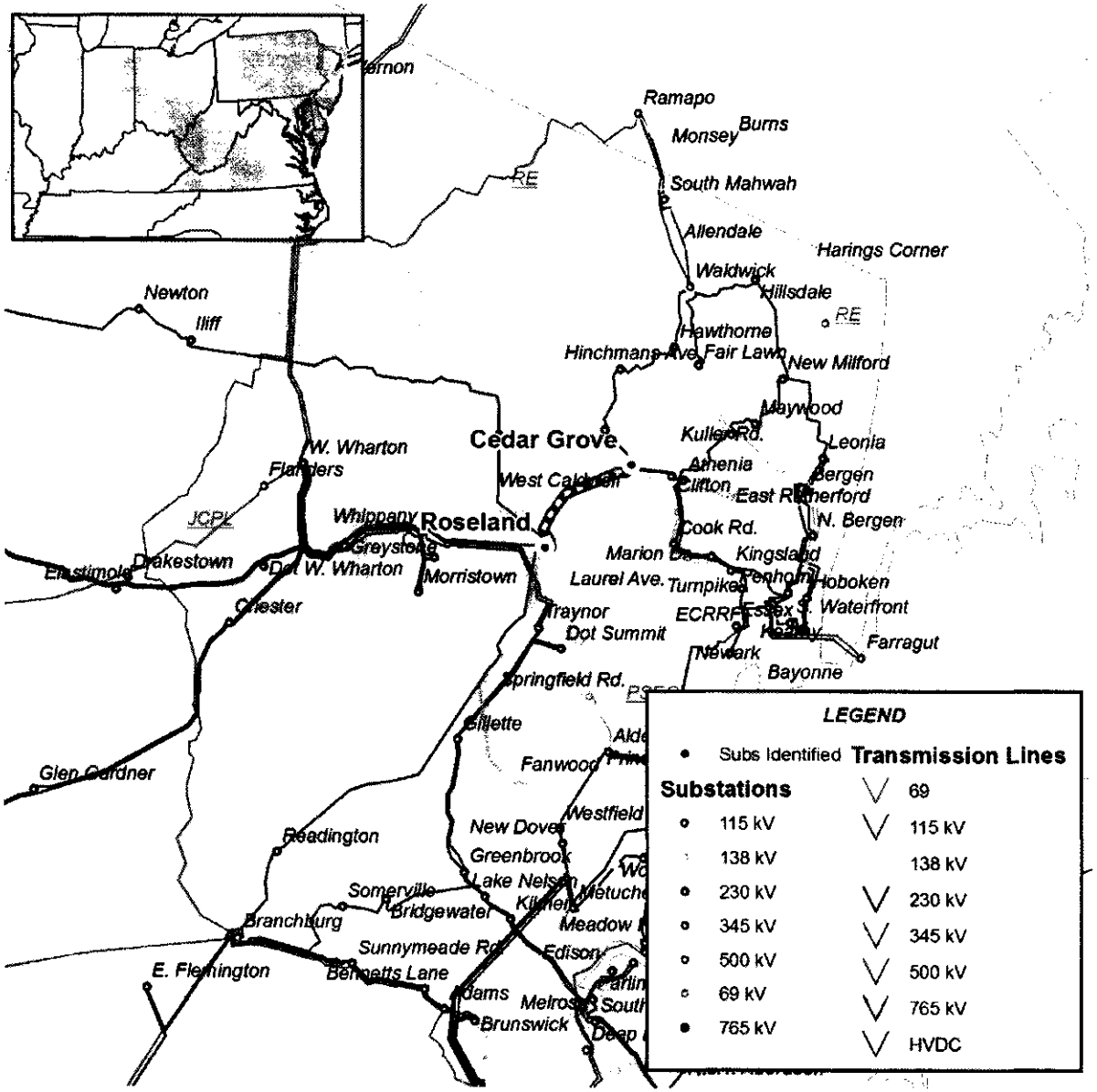
- Generation Deliverability
- Eagle Point – Gloucester 230 kV line #1 & Eagle Point – Gloucester 230 kV line #2
- Expedite the 2016 baseline upgrade B1588 from 2016 year to 2015 year
- If B1588 can't be expedited, establish operating procedures and/or a protection scheme(s) to alleviate the element loading until B1588 goes in service.
- Estimated Project Cost: $25M
- Expected IS date: 6/1/2015



PSEG Transmission Zone Reinforcement

Solution under review

- The line Cedar Grove F (and B) - Roseland ckt 1 loads to 109.1% of its emergency rating of 887 MVA for the loss of Roseland – Athenia 230 kV line followed by the loss of the Ramapo – Jefferson 500 kV line.
- Reconductor the B and F circuits of the Cedar Grove - Roseland 230kV line
- Estimated Project Cost: TBD
- Projected in-service date: 6/1/2015



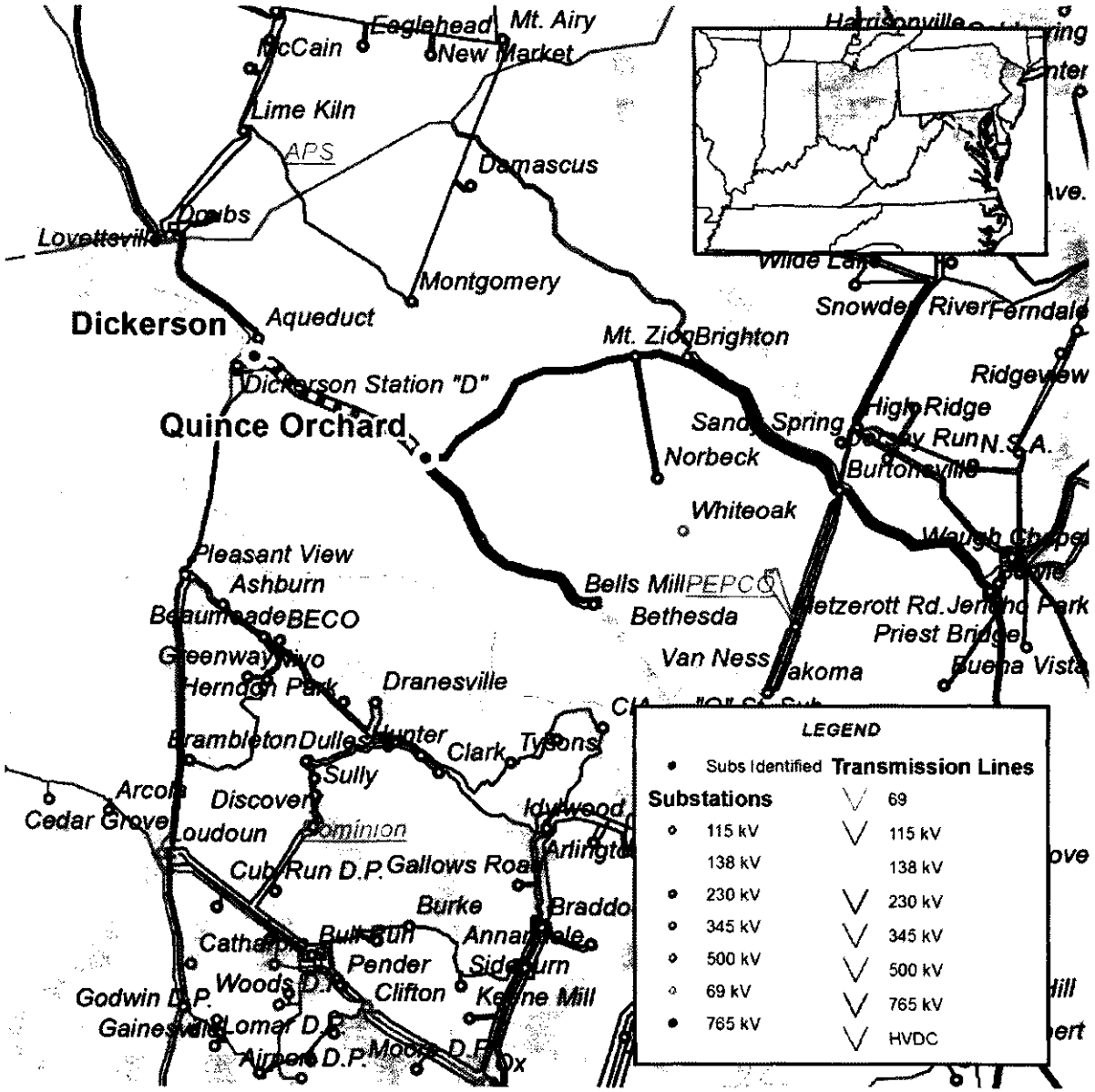
PEPCO Violations

- Criteria violations
  - Generation Deliverability

- 230kV thermal violation

PEPCO Reinforcement

- The Station H – Quince Orchard 032 230kV line gets overloaded to 101.88% of its emergency rating for a tower contingency on Dickerson – Quincy
- Reconductor feeder 23032 and 23034 (these feeders share common towers and cross arms would need to be raised) to the high temperature conductor (10 miles)
- Estimated Project Cost: $16M
- Projected in-service date: 6/1/2015

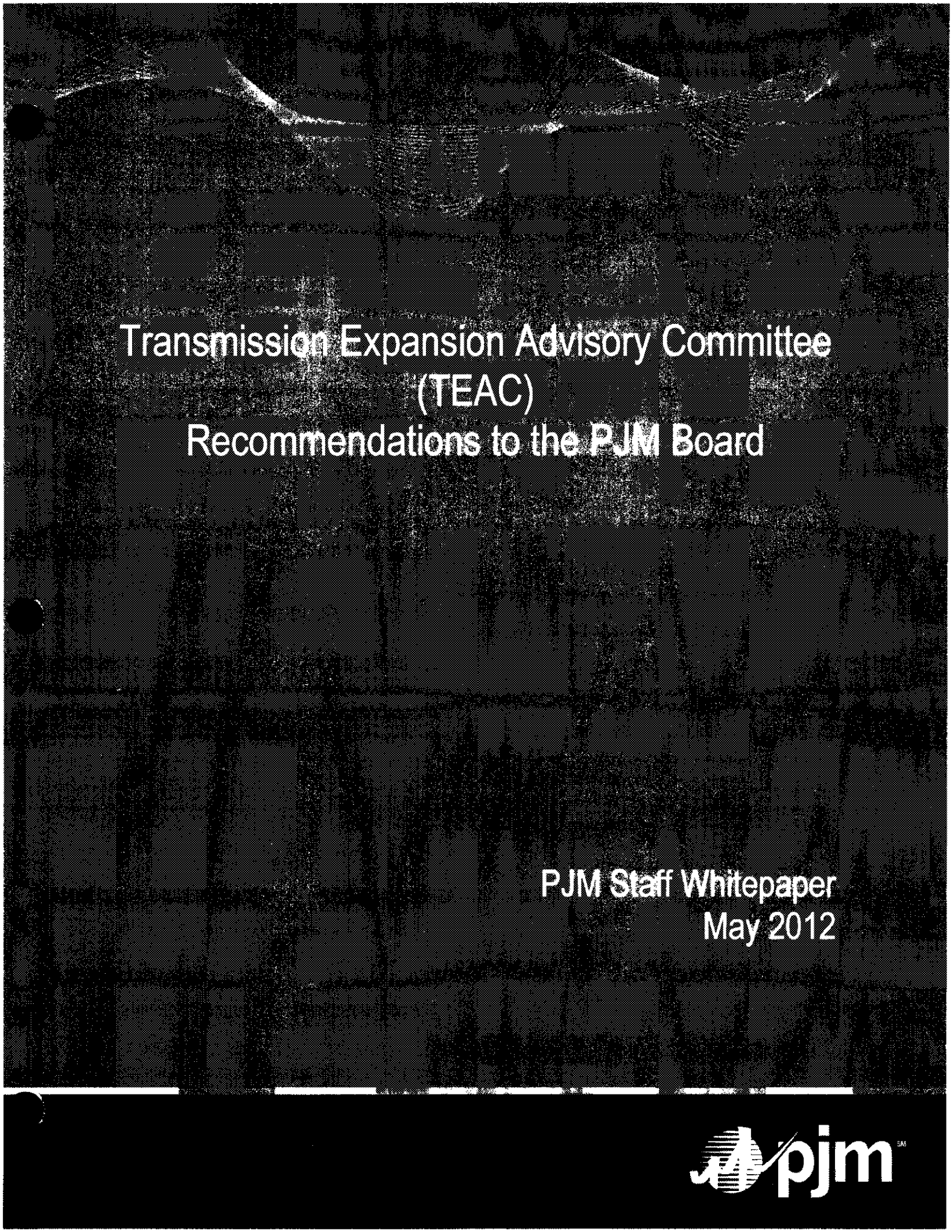


Deactivation Studies - Next Steps

- Analysis underway for the following:
  - Avon Lake – finalizing initial results
  - AEP – reviewing alternate solutions from transmission owner
  - Calpine – analysis in progress
- Continue evaluations of need to retain units on RMR
- Consider 2016, 2017 & 2018 effects
- Review 2014 impacts

- Approval of all of the upgrades in this presentation, except those noted as still under review will be sought from the PJM Board of Mangers at their May 17th meeting.

- Comments or questions should be directed to: RTEP@pjm.com



Transmission Expansion Advisory Committee (TEAC) Recommendations to the PJM Board

PJM Staff Whitepaper
May 2012

EXECUTIVE SUMMARY

Since November, PJM has received notification from several generation owners of their intent to deactivate a number of generators totaling over 13,000 MW of generation. Generation owners are required to notify PJM of their intent to deactivate generation per Article V of the PJM tariff. Baseline reliability criteria violations have been identified as a result of the generation deactivations. Transmission reinforcements to address the reliability criteria violations are being developed.

The baseline upgrades related to the generation deactivation studies completed as of this time are summarized below. The requested generation deactivations range from May 2012 through the end of 2015. If the transmission upgrades that are required to maintain reliability cannot be implemented by the requested deactivation date, generation may need to be retained through Reliability Must Run (RMR) agreements. Based on the expected in-service date of some of the transmission upgrades included in this report, RMR agreements are being pursued.

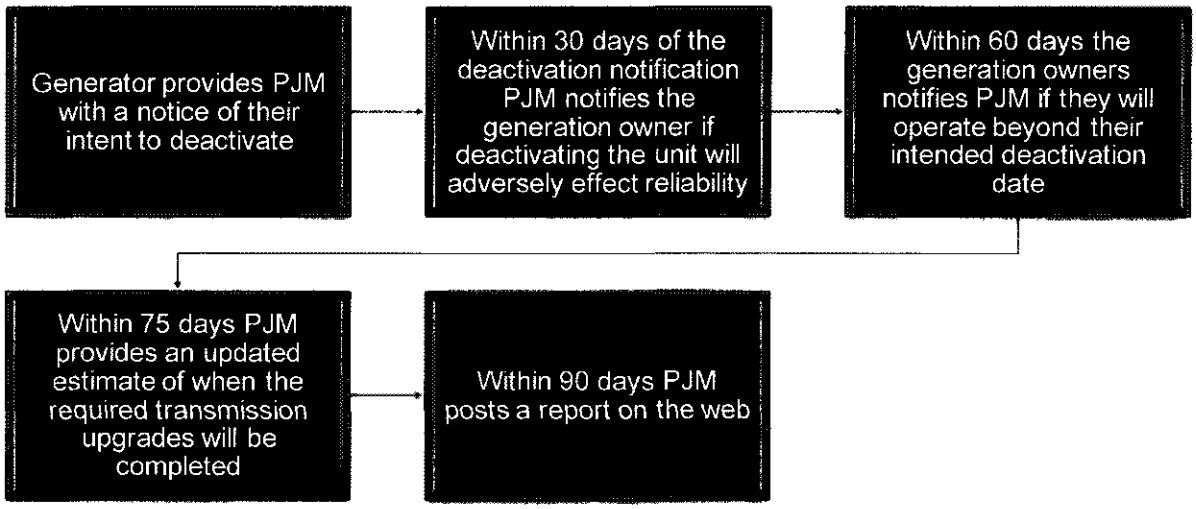
The total increase to the RTEP to include these baseline project changes is $1,881 million. With these changes, the RTEP will include over $23.410 billion of transmission additions and upgrades since the first plan was approved by the Board in 2000.

SUMMARY OF RESULTS

Generation Deactivation Process

As noted above, generation deactivation is covered under Article V of the PJM tariff. The flowchart below details the generation deactivation process. After a generation owner notifies PJM of their intent to deactivate a unit, PJM conducts a series of studies to determine if deactivating the generator will have an adverse impact on the reliability of the bulk electric system. This baseline analysis determines the compliance of the system with reliability criteria and standards. If reliability criteria violations are identified, transmission upgrades are developed to resolve the identified issues. If the transmission upgrades can be put in place prior to the intended deactivation date, the unit can retire as requested. If the transmission upgrades cannot be put in place prior to the requested deactivation date then an RMR agreement may be pursued. The generation owner is not under any obligation to pursue the RMR agreement and may retire the unit at any time. PJM cannot compel a generator to remain in-service. Transmission upgrades required to maintain a reliable system are identified and reviewed with the Sub-regional RTEP Committees and the

Transmission Expansion Advisory Committee (TEAC). The cost of transmission upgrades to mitigate criteria violations caused by generation deactivation is allocated to load.



The upgrades included in this report are needed due to the deactivation of multiple units from several different generation owners. The table below summarizes the generation deactivations driving the need for the upgrades included in this report.

Unit Name	Capacity (MW)	Owner	Official Owner Request Date
Chesapeake 1	111	Dominion	11/15/2011
Chesapeake 2	111	Dominion	11/15/2011
Yorktown 1	159	Dominion	11/15/2011
Chesapeake 3	147	Dominion	11/15/2011
Chesapeake 4	207	Dominion	11/15/2011
Bergen 3	21	PS Power	12/1/2011
Burlington 8	21	PS Power	12/1/2011
National Park 1	21	PS Power	12/1/2011
Mercer 3	115	PS Power	12/1/2011
Sewaren 6	111	PS Power	12/1/2011
Armstrong 1	172	FE Solutions	1/26/2012
Armstrong 2	171	FE Solutions	1/26/2012

Unit Name	Capacity (MW)	Owner	Official Owner Request Date
Ashtabula 5	244	FE Solutions	1/26/2012
Bay Shore 2	138	FE Solutions	1/26/2012
Bay Shore 3	142	FE Solutions	1/26/2012
Bay Shore 4	215	FE Solutions	1/26/2012
Eastlake 1	132	FE Solutions	1/26/2012
Eastlake 2	132	FE Solutions	1/26/2012
Eastlake 3	132	FE Solutions	1/26/2012
Eastlake 4	240	FE Solutions	1/26/2012
Eastlake 5	597	FE Solutions	1/26/2012
Lake Shore 18	245	FE Solutions	1/26/2012
R Paul Smith 3	28	FE Solutions	1/26/2012
R Paul Smith 4	87	FE Solutions	1/26/2012
Walter C Beckjord 1	94	Duke Energy	2/1/2012
Walter C Beckjord 2	94	Duke Energy	2/1/2012
Walter C Beckjord 3	128	Duke Energy	2/1/2012
Walter C Beckjord 4	150	Duke Energy	2/1/2012
Walter C Beckjord 5	238	Duke Energy	2/1/2012
Walter C Beckjord 6	414	Duke Energy	2/1/2012
Albright 1	73	Monongahela Power	2/8/2012
Albright 2	73	Monongahela Power	2/8/2012
Albright 3	137	Monongahela Power	2/8/2012
Rivesville 5	35	Monongahela Power	2/8/2012
Rivesville 6	86	Monongahela Power	2/8/2012
Willow Island 1	51	Monongahela Power	2/8/2012
Willow Island 2	138	Monongahela Power	2/8/2012
New Castle 3	93	GenOn	2/29/2012
New Castle 4	92	GenOn	2/29/2012
New Castle 5	140	GenOn	2/29/2012
New Castle Diesels	5.5	GenOn	2/29/2012
Portland 1	158	GenOn	2/29/2012
Portland 2	243	GenOn	2/29/2012
Glen Gardner CTs	160	GenOn	2/29/2012
Shawville 1 - 4	597	GenOn	2/29/2012
Titus 1 - 3	243	GenOn	2/29/2012
Niles 1 & 2	217	GenOn	2/29/2012
Elrama 1 - 4	396	GenOn	2/29/2012
Fisk 19	326	Midwest Generation	3/8/2012
Crawford 7	213	Midwest Generation	3/8/2012
Crawford 8	319	Midwest Generation	3/8/2012

The baseline deactivation analysis, discussed herein, resulted in the need for transmission upgrades in several transmission zones. In total these analyses identified over 130 upgrades ranging from simple line terminal equipment upgrades, new substations and substation additions to reinforce underlying systems, rebuilding existing lines to higher capacity, and new transmission lines. A summary of the major baseline project additions that are $5 million or greater are detailed below. A complete listing of all of the projects is included as an attachment to this document.

Mid-Atlantic Region System Upgrades

- PEPCO Transmission Zone
  - Reconductor 230 kV line 23032 and 23034 with high temperature conductor - $16M

- PENELEC Transmission Zone
  - Construct a 115 kV ring bus at Claysburg Substation - $5.25M
  - Construct Farmers Valley 345/230 kV and 230/115 kV substation by looping the Homer City to Stolle Road 345 kV line into Farmers Valley – $29.5M
  - Relocate the Erie South 345 kV line bay - $13M
  - Convert the Lewis Run – Farmers Valley 115 kV line to 230 kV - $46.8M

- PPL Transmission Zone
  - Install a new North Lancaster 500/230 kV substation - $42M

- JCPL Transmission Zone
  - Construct a new Whippany to Montville 230 kV line - $37.5M

Western Region System Upgrades

- American Electric Power
  - Reconductor Kammer – West Bellaire 345 kV - $20M
  - Install a new 765/345 substation at Mountaineer and build a ¾ mile 345 kV line to Sporn - $65M
  - Terminate Transformer #2 at SW Lima in a new bay position - $5M
  - Add four 765 kV breakers at Kammer - $30M

- APS Transmission Zone
  - Loop the Homer City-Handsome Lake 345 kV line into the Armstrong substation and install a 345/138 kV transformer at Armstrong - $27.8M
  - Install a new Buckhannon – Weston 138 kV line - $17.5M
  - Convert Moshannon substation to a four breaker 230 kV ring - $6.5M

- ATSI Transmission Zone
  - Install a 345/138 kV transformer at the Inland Q-11 station - $7.2M

- Convert Eastlake units 1, 2, 3, 4 and 5 to synchronous condensers - $100M
- Convert Lakeshore 18 to synchronous condensers - $20M
- Re-conductor the Galion – GM Mansfield – Ontario - Cairns 138 kV line - $9.8M
- Install a 2nd 345/138 kV transformer at the Allen Junction station - $7.2M
- Install a 2nd 345/138 kV transformer at the Bay Shore station - $7.2M
- Create a new Northfield Area 345 kV switching station by looping in the Eastlake – Juniper 345 kV line and the Perry - Inland 345 kV line - $37.5M
- Build a new Mansfield - Northfield Area 345 kV line - $184.5M
- Create a new Harmon 345/138/69 kV substation by looping in the Star – South Canton 345 kV line - $46M
- Build a new Harmon – Brookside + Harmon - Longview 138 kV line - $9.2M
- Create a new Five Points Area 345/138 kV substation by looping in the Lemoyne – Midway 345 kV line - $30M
- Build a new 345-138kV Substation at Niles - $32M
- Build a new substation near the ATSI-AEP border and a new 138kV line from new substation to Longview - $17.7M
- Build new Allen Jct - Midway - Lemonye 345kV line - $86.3M
- Build a new Leroy Center 345/138 kV substation by looping in the Perry – Harding 345 kV line - $46M
- Build a new Toronto to Harmon 345 kV line - $218.3M
- Build a new Toronto 345/138 kV substation - $41.8M
- Build a new West Fremont – Groton – Hayes 138 kV line - $45M
- Reconductor the ATSI portion of South Canton – Harmon 345 kV line - $6M
- Add a new 150 MVAR SVC and 100 MVAR capacitor at New Castle - $31.7M

- Duquesne Transmission Zone
  - Install a third 345/138 kV transformer at Collier - $8M

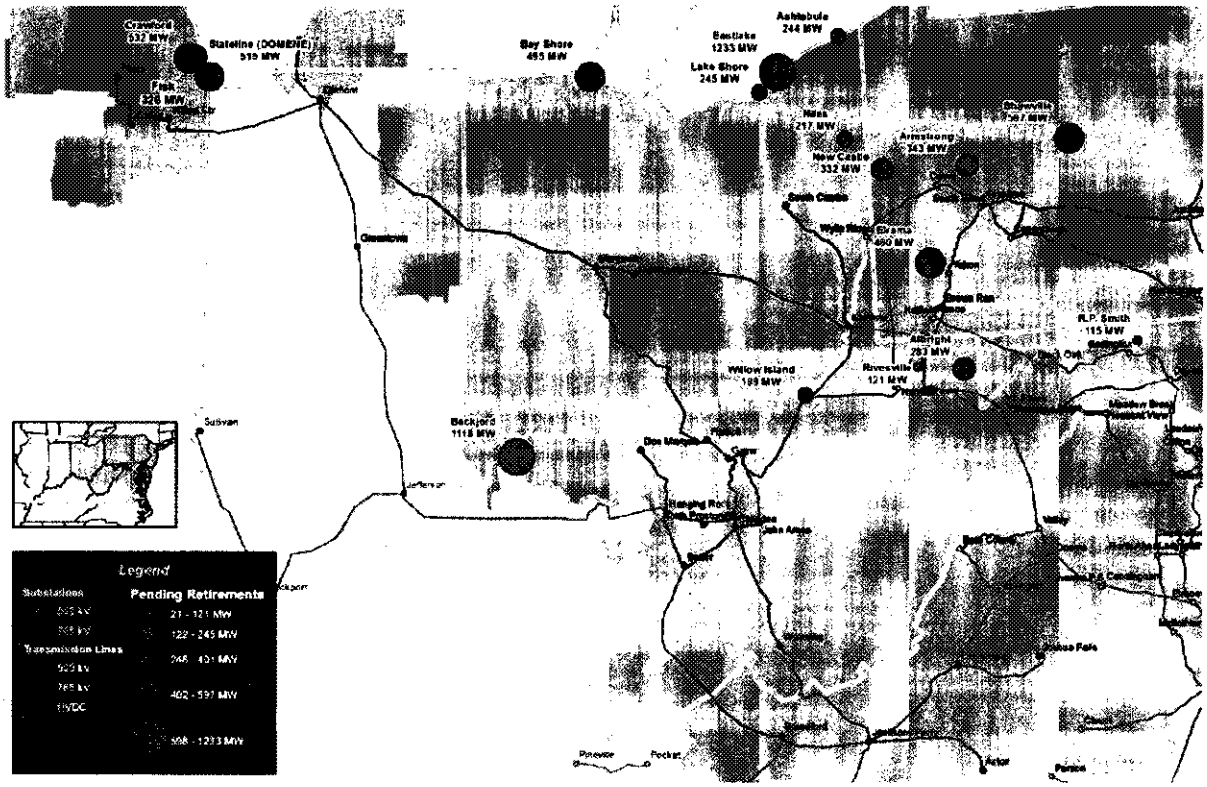
Southern Region System Upgrades

- Dominion Virginia Power Transmission Zone
  - Build new Surry to Skiffes Creek 500 kV line - $58.3M
  - Build new Skiffes Creek 500/230 substation - $42.4M
  - Build new Skiffes Creek – Whealton 230 kV line - $46.4M
  - Expand Yadkin 500/230 kV and 230/115 kV substation and Chesapeake 230/115 kV substation - $45M
  - Add a third 500/230 kV transformer at Yadkin - $16M
  - Add six 500 kV breakers at Yadkin - $8M
  - Install a third 500/230 kV transformer at Clover - $16M
  - Rebuild Lexington to Dooms 500 kV line - $120M

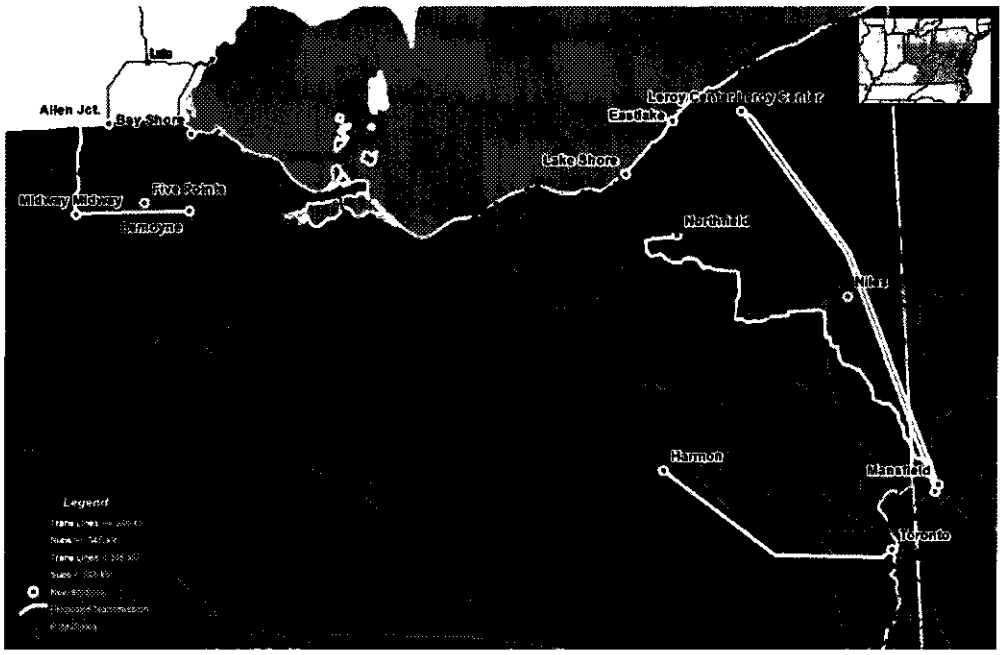
- Upgrade Bremo – Midlothian 230 kV line - $10M
- Build a new Suffolk to Yadkin 230 kV line - $40M
- Install a second Valley 500/230 kV transformer - $16M
- Build a 500 MVAR SVC at Landstown 230 kV - $60M

Western Region System Upgrades

The majority of the generator deactivations that PJM has received since November are for units in the western region of PJM. Generation owners including First Energy Solutions, Duke Energy, GenOn and Midwest Generation have notified PJM of their intent to deactivate units in the western region of PJM. As shown in the map below a number of these deactivations are clustered around Lake Erie in the American Transmission System Inc. (ATSI) transmission zone. Deactivation of the generation along Lake Erie will require significant transmission upgrades to resolve thermal and voltage violations in and around the City of Cleveland which has historically been constrained due to voltage limitations.



Several new 345 kV transmission lines, new 345/138 kV substations, and new reactive upgrades have been identified in addition to a large number of incremental upgrades to existing facilities. The map on the following page shows the new 345 kV lines and the new 345/138 kV stations.

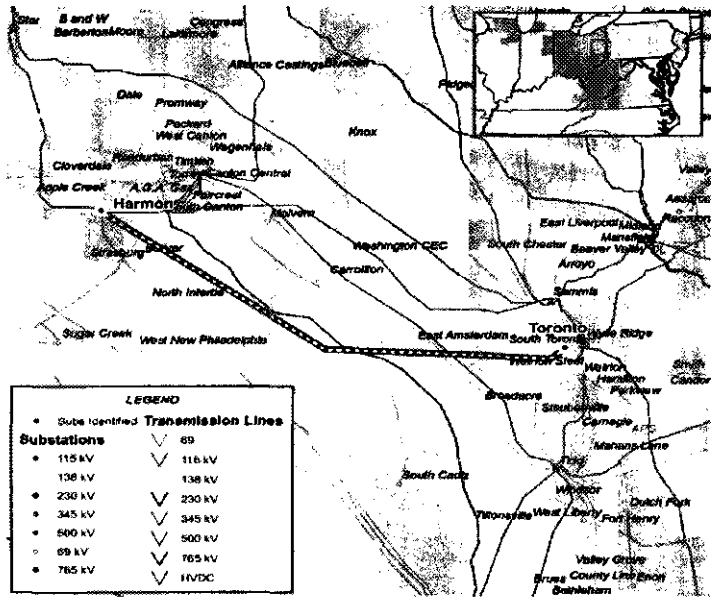


As noted above, the ability to import power into the Cleveland area has historically been limited by voltage problems. Deactivation of the generation in and around Cleveland will exacerbate these voltage limitations. As a result, a significant number of upgrades have been identified to address voltage and voltage stability criteria. The Eastlake units 1 – 5 and the Lakeshore 18 unit were recommended to be converted to synchronous condensers. The estimated cost for this work is $20M for each machine. The expected reactive capability for the Eastlake units 1 – 3 is 124 MVAR/machine, Eastlake unit 4 is 268 MVAR, Eastlake unit 5 is 485 MVAR and 260 MVAR for the Lakeshore 18 machine. In addition a new 345/138 kV substation at Leroy Center was recommended. The new station will be established by looping the existing Perry to Harding 345 kV line through the station. The estimated cost for the new Leroy Center substation is $46M. A new Northfield area 345/138 kV substation was recommended to address voltage violations under load deliverability conditions. The new substation will be established by tapping the existing Eastlake to Juniper 345 kV line and the Perry to Inland 345 kV line. The estimated cost for that work is $37.5M. A new 345 kV line from Mansfield to Northfield was also recommended to reinforce the 345 kV feed into the Northfield area. The estimated cost for this new line is $184.5M. In addition, a new 345 kV line from Beaver Valley to Leroy Center and another new 345 kV line from Mansfield to Leroy Center are being considered to address ATSI voltage stability criteria violations. The estimated cost of the two new 345 kV lines is $393M. The Beaver Valley to Leroy Center and Mansfield to Leroy Center 345 kV lines were not recommended to the PJM Board at this time. Additional analysis using the ATSI voltage stability is in progress.

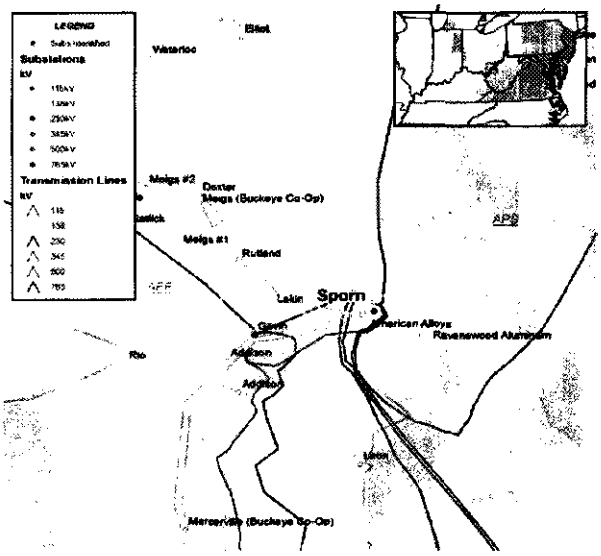
A new Five Points 345/138 kV substation was recommended to address NERC category C3 (N-1-1) voltage violations. The new station will be created by looping the existing Lemoyne to Midway 345 kV line through the station. The estimated cost for this work is $30M. A second Bayshore 345/138 kV transformer was also recommended to address NERC category C3 (N-1-1) voltage violations. The estimated cost for adding the second transformer at Bayshore is $7.2M. In addition to these upgrades to address voltage problems in and around the City of Cleveland, a 150 MVAR SVC and 100 MVAR capacitor were

recommended at New Castle station in western Pennsylvania to address voltage problems primarily related to the deactivation of the New Castle generation.

There are also a number of projects that are required to address thermal violations. A new Harmon 345/138/69 kV station was recommended to address several NERC category C (breaker failure) contingency overloads. The new Harmon station will be established by looping the South Canton to Star 345 kV line through the station. The estimated cost for this project is $46M. In addition, a new Toronto 345/138 kV substation was recommended to address a number of NERC category C3 (N-1-1) violations. The new substation will be established by looping the existing Sammis to Wylie Ridge 345 kV line through the station. The estimated cost for the new Toronto station is $41.8M. In addition, a new Toronto to Harmon 345 kV line was recommended to reinforce the 345 kV system in the area. The estimated cost for the new Toronto to Harmon 345 kV line is $218.3M.



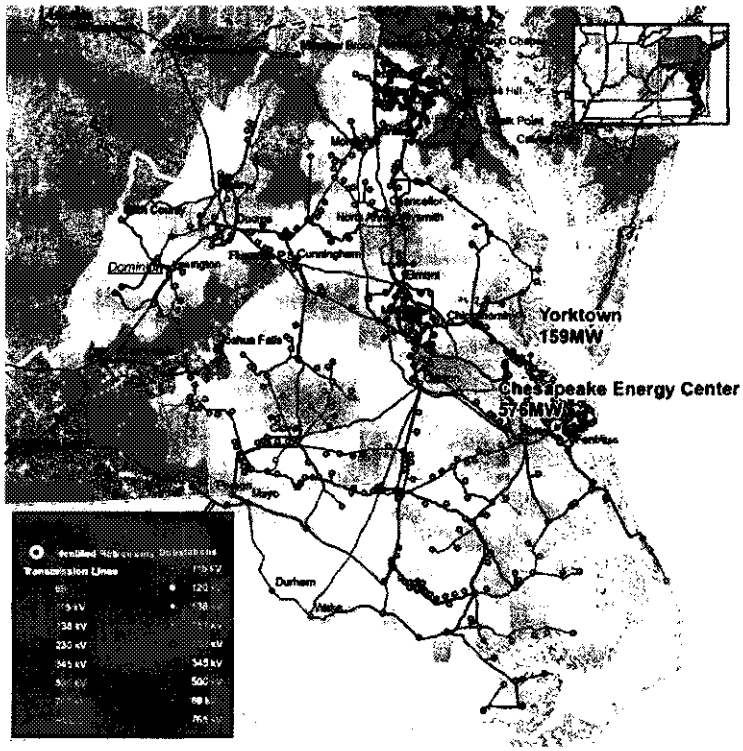
A new 345 kV line from Allen Junction to Midway to Lemoyne was recommended to address a NERC category C3 (N-1-1) thermal violation on Lemoyne to BG Tap 138 kV line. The violation is being driven by the loss of the Allen Junction to Lulu 345 kV tie line to Michigan and the Lemoyne to Five Points 345 kV line. Approximately 48 miles (roughly 3/4 of the line) will utilize an open tower position on an existing double circuit tower structures. The estimate cost for Allen Junction to Midway to Lemoyne line is $86.3M. A new 138 kV line between West Fremont and Hayes was recommended to address thermal violations on other 138 kV facilities for NERC category C5 (double circuit tower) contingency. Specifically the Ottowa to Lakeview 138 kV line and the Lakeview to Greenfield 138 kV line are both overloaded for a double circuit towerline contingency. The estimated cost of the new 138 kV line is $45M.



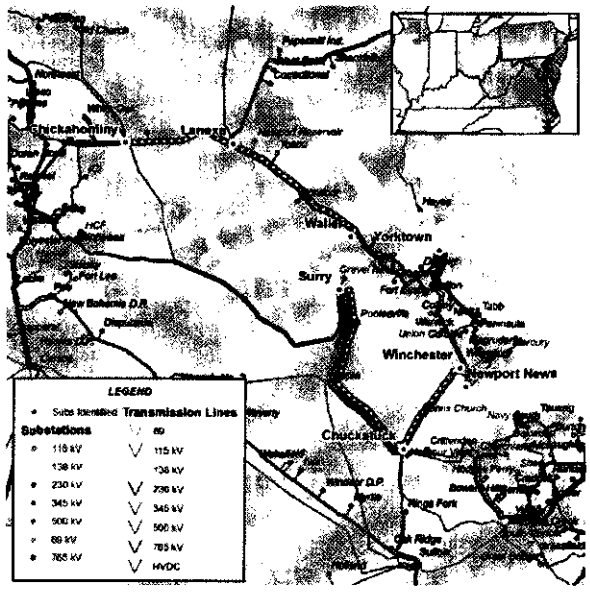
A new 345 kV source into the Sporn station was recommended to address an overload on the Mountain to Belmont 765 kV line for a NERC category C breaker failure contingency at Marysville that trips the Marysville – Sorenson 765 kV line and the Marysville – Flatlick 765 kV line. The recommended project is to add a new 765/345 kV transformer at Mountaineer and build a new 345 kV line from Mountaineer to Sporn. The Sporn station is approximately ¾ of a mile from Mountaineer. The estimated cost for this project is approximately $65M.

Southern Region System Upgrades

Several new upgrades have been identified in the Dominion transmission zone. A number of the more significant upgrades are summarized below. These upgrades are being driven primarily by the deactivation of the Yorktown 1 unit (159 MW) and the Chesapeake 1 – 4 units (576 MW total). The map below shows the relative location of these units within the Dominion transmission zone.

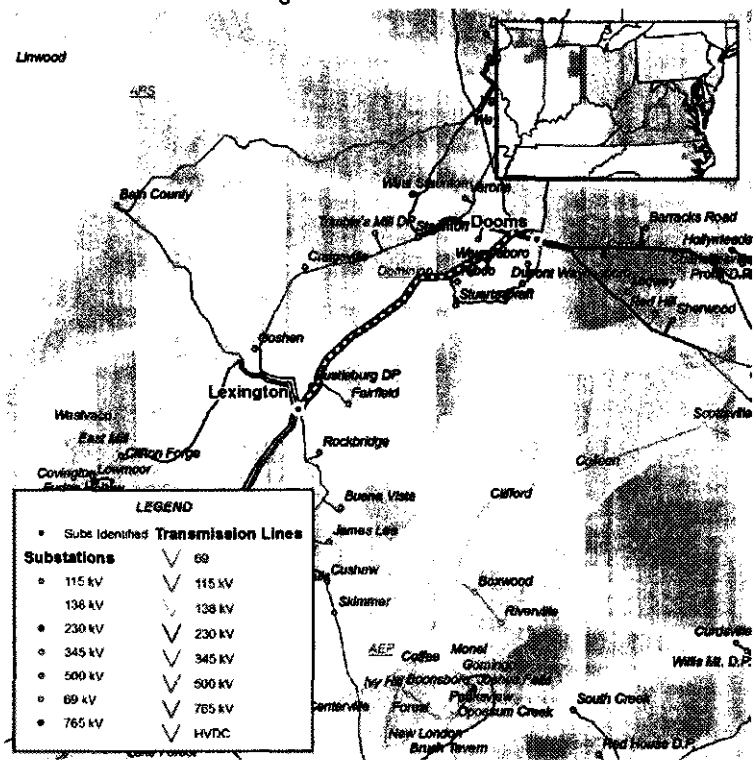


Thermal and voltage violations were identified on the 230 kV facilities noted on the diagram at the right which serve the northern Hampton Roads area of Virginia. Several alternatives were evaluated to address these issues including a new 500 kV line from Chickahominy to a new station called Skiffes Creek, a new 500 kV line from Surry crossing the James River to the new Skiffes Creek station, and a new 230 kV line from Surry to Skiffes Creek. Each of these alternatives also included a new 230 kV line from Skiffes Creek to Whealton with an estimated cost of $46.4 million. PJM staff is recommending the new 500 kV line from Surry to Skiffes Creek which has an estimated cost of $100.7 million including the new Skiffes Creek 500/230 kV substation. Each alternative resolved the reliability



criteria violations in 2015, however the 230 kV alternative was found to be less robust and would not be adequate under certain at-risk generation scenarios that were evaluated by PJM staff. In addition, the 230 kV alternative required a Phase Angle Regulator (PAR) to control the flow of power on the proposed Surry to Skiffes Creek 230 kV line which would add additional operational complexity. The 500 kV line from Chickohominy to Skiffes Creek was not chosen primarily due to it being the highest cost alternative.

A violation of Dominion planning criteria was identified on the Lexington to Dooms 500 kV line. One of the Dominion planning criteria establishes the critical system conditions by removing a single generator followed by the single contingency outage of any other line or generator. Under these conditions with either the Yorktown 3 unit or the Surry 2 unit off-line, the Lexington to Dooms 500 kV line overloads for the loss of the Bath to Valley 500 kV line. The recommended upgrade to address this violation is to rebuild the 40 mile Lexington to Dooms 500 kV line. The estimated cost for this work is $120 million. The line is being recommended to be rebuilt to address the thermal overload and to address the aging infrastructure issues that are similar to problems that are driving the need for the rebuild of the Mt Storm – Doubs 500 kV line.



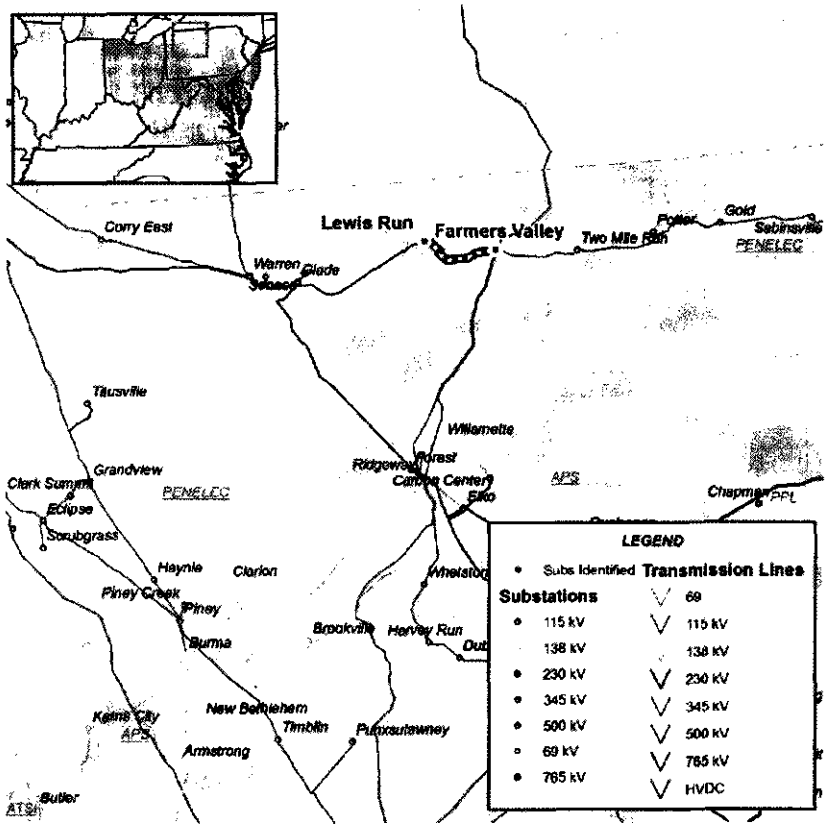
Other significant upgrades in the Dominion transmission zone include a third 500/230 kV transformer at Yadkin (estimated cost $16 million) to address thermal overloads on the existing Yadkin 500/230 kV transformers for the loss of the other transformer, a third 500/230 kV transformer at Clover (estimated cost $16 million) to address overloads on the existing Clover 500/230 kV transformers, a new Suffolk to Yadkin 230 kV line (estimated cost $40 million) to address a NERC category C3 (N-1-1) overload, a second Valley 500/230 kV transformer to address overloads on the existing transformer to address NERC category C3(N-1-1) violations, and a new 500 MVAR Static VAR Compensator (SVC) on the 230 kV at Landstown to address NERC category C3 (N-1-1) voltage violations in the Southern Hampton Roads area.

Mid-Atlantic Region System Upgrades

There are a number of upgrades in the Mid-Atlantic region. Many of these upgrades are being driven by the deactivation of the GenOn units at Portland, Shawville, Titus and Glen Gardner.

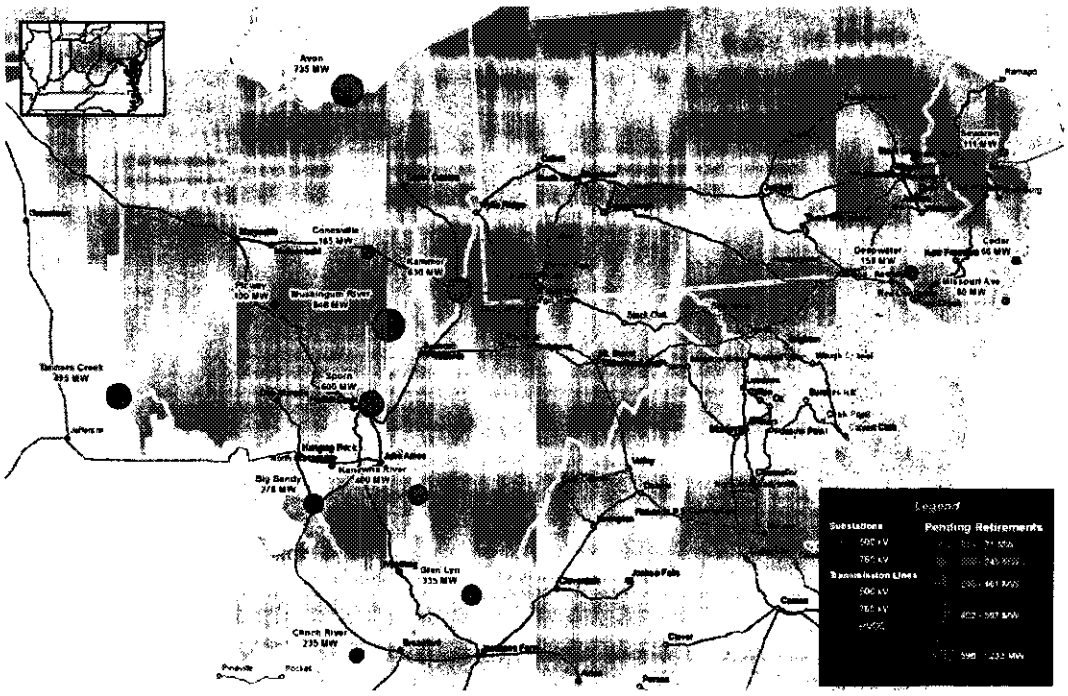
In the PPL transmission zone a new 500/230 kV substation is being recommended to address several overloads on 230 kV facilities in the South Akron and South Manheim areas. The estimated cost for the project is $42M. In the JCPL transmission zone a new 6.4 mile 230 kV line between Whippany and Montville is being recommended to address NERC Category C3 (N-1-1) violations due to the loss of the Montville to Roseland 230 kV line followed by the loss of the Kittatiny to Newton 230 kV line. The estimated cost for the project is $37.5M.

There are several upgrades in the Pennelec transmission zone to address both thermal and voltage violations. A new 345/230/115 kV substation was recommended at the existing Farmers Valley 115 kV substation. The 345 kV source will be from the Homer City to Stolle Road 345 kV line that passes near the station. This project is needed to address NERC category B (single contingency) voltage drop violations, generator deliverability violations and NERC category C3 (N-1-1) thermal violations. The estimated cost for this work is $29.5M. In addition to this upgrade, the existing 115 kV line from Farmers Valley to Lewis Run be converted to 230 kV. This upgrade is required to address generator deliverability violations. The estimated cost for this conversion work is $46.8M.



Next Steps

PJM staff continues to work on a number of generator deactivation studies for units shown on the map below including twenty two units in the AEP transmission zone, two Avon Lake units in the ATSI transmission zone, several units at Sewaren in the PSEG zone and several units in the Atlantic Electric transmission zone. Although upgrades will be required to address reliability violations for these deactivations, based on initial analysis the number and scope of upgrades required for these deactivations is expected to be less than those described in this report.



Review by the Transmission Expansion Advisory Committee (TEAC)

The results of all of the deactivation analyses were reviewed with the TEAC at the February 16th, March 15th, April 12th meetings. Final upgrades included in this report were reviewed with the TEAC at the April 27, 2012 meeting.

Board Approval

The PJM Board met on May 17th and approved the elements of the 2012 RTEP documented herein.

Appendix: Retirement Baseline Upgrades

Upgrade ID	Project Description	Transmission Owner	Cost Estimate
b1879	Perform a sag study on the Hansonville - Meadowview 138 kV line (Improve the emergency rating to 245 MVA)	AEP	$ 0.10
b1946	Perform a sag study on the Brues – West Bellaire 138 kV line	AEP	$ 0.03
b1947	A sag study of the Dequine - Meadowlake 345 kV line #1 line may improve the emergency rating to 1400 MVA	AEP	$ 0.01
b1948	Establish a new 765/345 interconnection at Sporn. Install a 765/345 kV transformer at Mountaineer and build ¾ mile of 345 kV to Sporn	AEP	$ 65.00
b1949	Perform a sag study on the Grant Tap – Deer Creek 138 kV line and replace bus and risers at Deer Creek station	AEP	$ 0.30
b1950	Perform a sag study on the Kammer – Ormet 138 kV line of the conductor section	AEP	$ 0.10
b1951	Perform a sag study of the Maddox- Convoy 345 kV line to improve the emergency rating to 1400 MVA	AEP	$ 0.03
b1952	Perform a sag study of the Maddox – T130 345 kV line to improve the emergency rating to 1400 MVA	AEP	$ 0.03
b1953	Perform a sag study of the Meadowlake - Olive 345 kV line to improve the emergency rating to 1400 MVA	AEP	$ 0.06
b1954	Perform a sag study on the Milan - Harper 138 kV line and replace bus and switches at Milan Switch station	AEP	$ 0.35
b1955	Perform a sag study of the R-049 - Tillman 138 kV line may improve the emergency rating to 245 MVA	AEP	$ 0.03
b1956	Perform a sag study of the Tillman - Dawkins 138 kV line may improve the emergency rating to 245 MVA	AEP	$ 0.03
b1957	Terminate Transformer #2 at SW Lima in a new bay position	AEP	$ 5.00
b1958	Perform a sag study on the Brookside - Howard 138 kV line and replace bus and risers at AEP Howard station	AEP	$ 0.50
b1960	Sag Study on 7.2 miles SE Canton-Canton Central 138kV ckt	AEP	$ 0.30
b1961	Sag study on the Southeast Canton – Sunnyside 138kV line	AEP	$ 0.25
b1962	Add four 765 kV breakers at Kammer	AEP	$ 30.00
b1963	Build approximately 1 mile of circuit comprising of 2-954 ACSR to get the rating of Waterford-Muskinum 345 kV higher	AEP	$ 3.50
b1970	Reconductor 13 miles of the Kammer – West Bellaire 345kV circuit	AEP	$ 20.00
b1971	Perform a sag study to improve the emergency rating on the Bridgville – Chandlersville 138 kV line	AEP	$ 0.05
b1972	Replace disconnect switch on the South Canton 765/345 kV transformer	AEP	$ 0.30
b1973	Perform a sag study to improve the emergency rating on the Carrollton – Sunnyside 138 kV line	AEP	$ 0.05
b1974	Perform a sag study to improve the emergency rating on the Bethel Church – West Dover 138 kV line	AEP	$ 0.03
b1975	Replace a switch at South Millersburg switch station	AEP	$ 0.20
b1837	Replace breaker risers and wave traps at Marlowe 138 kV and wave traps at Bedington 138 kV	APS	$ 0.60
b1840	Install a new Buckhannon - Weston 138 kV line	APS	$ 17.50

Upgrade ID	Project Description	Transmission Owner	Cost Estimate
b1902	Replace line trap at Stonewall on the Stephenson 138 kV line terminal	APS	$ 0.08
b1941	Loop the Homer City-Handsome Lake 345 kV line into the Armstrong substation and install a 345/138 kV transformer at Armstrong	APS	$ 27.80
b1942	Change the CT ratio at Millville to improve the Millville – Old Chapel 138 kV line ratings	APS	$ 0.05
b1964	Convert Moshannon substation to a 4 breaker 230 kV ring bus	APS	$ 6.50
b1965	Install a 44 MVAR 138 kV capacitor at Luxor substation	APS	$ 1.50
b1986	Upgrade the AP portion of the Elrama – Mitchell 138 kV line by replace breaker risers on the Mitchell 138 kV bus on the Elrama terminal	APS	$ 0.05
b1987	Reconductor the Osage-Collins Ferry 138 kV line with 795 ACSS. Upgrade terminal equipment at Osage and Collins Ferry	APS	$ 1.80
b1988	Raise structures between Lake Lynn and West Run to eliminate the clearance de-rates on the West Run – Lake Lynn 138 kV line	APS	$ 0.32
b1989	Raise structures between Collins Ferry and West Run to eliminate the clearance de-rates on the Collins Ferry - West Run 138 kV line	APS	$ 0.32
b1913	Convert Eastlake units 1, 2, 3, 4 and 5 to synchronous condensers	ATSI	$ 100.00
b1914	Convert Lakeshore 18 to a synchronous condenser	ATSI	$ 20.00
b1915	Install a 50 MVAR capacitor bank at the Maclean 138 kV station	ATSI	$ 3.00
b1916	Install a 345/138 kV transformer at the Inland Q-11 station	ATSI	$ 7.20
b1917	Install a 138 kV circuit breaker at the Inland Q-11 station	ATSI	$ 0.90
b1918	Upgrade terminal equipment on the Avon – Crestwood 138 kV line	ATSI	$ 0.30
b1919	Re-conductor the Galion – Leaside 138 kV line with 336 ACSS	ATSI	$ 4.90
b1920	Re-conductor the Galion – GM Mansfield – Ontario - Cairns 138 kV line with 477 ACSS	ATSI	$ 9.80
b1921	Install a 2nd 345/138 kV transformer at the Allen Junction station	ATSI	$ 7.20
b1922	Install a 2nd 345/138 kV transformer at the Bayshore station	ATSI	$ 7.20
b1923	Create a new Northfield Area 345 kV switching station by looping in the Eastlake – Juniper 345 kV line and the Perry - Inland 345 kV line	ATSI	$ 37.50
b1924	Build a new Mansfield - Northfield Area 345 kV line	ATSI	$ 184.50
b1925	Create a new Harmon 345/138/69 kV substation by looping in the Star – South Canton 345 kV line	ATSI	$ 46.00
b1926	Build a new Harmon – Brookside + Harmon - Longview 138 kV line	ATSI	$ 9.20
b1927	Create a new Five Points Area 345/138 kV substation by looping in the Lemoyne – Midway 345 kV line	ATSI	$ 30.00
b1928	Install a 50 MVAR capacitor at Hayes 138 kV	ATSI	$ 1.50
b1929	Install a 138/69 kV transformer at the Avery station	ATSI	$ 3.20
b1930	Increase design temperature limitation on the Avery – Hayes 138 kV line by raising the existing structures	ATSI	$ 0.13
b1931	Reconductor Cloverdale - Harmon #2 and #3 138 kV lines with 795 ACSS or greater conductor 6 miles total + Terminal upgrades	ATSI	$ 3.60
b1932	Change the transformer tap settings on the Maclean 138/69 kV transformers	ATSI	$ 0.05
b1933	Replace 336.4 ACSR SCCIR at Richland to upgrade the Richland – Naomi 138 kV line	ATSI	$ 0.04

Upgrade ID	Project Description	Transmission Owner	Cost Estimate
b1934	Build a new 345/138 kV Substation at Niles	ATSI	$ 32.00
b1934.1	Loop 1.2 miles of 345 kV into substation of the Highland – Shenango 345 kV line	ATSI	
b1934.2	New 345/138 kV transformer at Niles	ATSI	
b1935	ATSI-AEP 138 kV Substation on near territory border + 138 kV from new substation to Longview approx. 8 miles	ATSI	$ 17.70
b1936	Build new Allen Jct - Midway - Lemonye 345 kV line (48 miles of open tower position)	ATSI	$ 86.30
b1937	Build a new Leroy Center 345/138 kV substation by looping in the Perry – Harding 345 kV line	ATSI	$ 46.00
b1938	Place a portion of the 138 kV Leroy Center 345/138 kV project into service by summer 2015	ATSI	$ 3.30
b1939	Reconductor the Barberton – West Akron 138 kV line with 477 ACSS or greater (7.3 miles) + Terminal upgrades at Barberton	ATSI	$ 4.23
b1959	Build a new West Fremont-Groton-Hayes 138kV line	ATSI	$ 45.00
b1976	Reconductor ATSI portion of South Canton – Harmon 345 kV line	ATSI	$ 6.00
b1977	Build new Toronto 345/138 kV substation by looping in the Sammis – Wylie Ridge 345 kV line and tie in four 138 kV lines	ATSI	$ 41.80
b1977.1	Build a new Toronto-Harmon 345kV line	ATSI	$ 218.30
b1978	Reconductor Inland – Clinic Health Q-11 138 kV line	ATSI	$ 1.10
b1981	Replace relay on the Highland – G689 138 kV line	ATSI	$ 0.05
b1982	Reconductor the Hoytdale – Newcastle 138 kV lines #1 and #2 with 795 ACSS	ATSI	$ 4.80
b1983	Add 150 MVAR SVC and a 100 MVAR capacitor at New Castle	ATSI	$ 31.70
b1984	Install a 50 MVAR capacitor at the Boardman 138 kV bus	ATSI	$ 1.70
b1968	Establish operating procedure such that breaker 89, connecting Cheswick-Logans Ferry Z-53 to the No. 3 138 kV bus at Cheswick Substation is normally open	DL	$ -
b1969	Install a third 345-138 kV autotransformer at Collier Substation. Currently s0321 and will be converted to baseline.	DL	$ 8.00
b1985	Upgrade the Duquesne portion of the Elrama – Mitchell 138 kV line	DL	
b1905.1	Surry to Skiffes Creek 500 kV Line (7 miles overhead)	Dominion	$ 58.30
b1905.2	Surry 500 kV Station Work	Dominion	$ 1.50
b1905.3	Skiffes Creek 500-230 kV Tx and Switching Station	Dominion	$ 42.40
b1905.4	New Skiffes Creek - Whealton 230 kV line	Dominion	$ 46.40
b1905.5	Whealton 230 kV breakers	Dominion	$ 2.10
b1905.6	Yorktown 230 kV work	Dominion	$ 0.20
b1905.7	Lanexa 115 kV work	Dominion	$ 0.13
b1905.8	Surry 230 kV work	Dominion	$ 0.13
b1905.9	Kings Mill, Peninmen, Toano, Waller, Warwick	Dominion	$ 0.03
b1906.1	At Yadkin 500 kV, install six 500 kV breakers	Dominion	$ 9.00
b1906.2	Install a 2nd 230/115 kV TX at Yadkin	Dominion	$ 5.00
b1906.3	Install a 2nd 230/115 kV TX at Chesapeake	Dominion	$ 5.00
b1906.4	Uprate Yadkin – Chesapeake 115 kV	Dominion	$ 10.00
b1906.5	Install a third 500/230 kV TX at Yadkin	Dominion	$ 16.00
b1907	Install a 3rd 500/230 kV TX at Clover	Dominion	$ 16.00

Upgrade ID	Project Description	Transmission Owner	Cost Estimate
b1908	Rebuild Lexington – Dooms 500 kV	Dominion	$ 120.00
b1909	Uprate Bremo – Midlothian 230 kV to its maximum operating temperature	Dominion	$ 10.00
b1910	Build a Suffolk – Yadkin 230 kV line (14 miles) and install 4 breakers	Dominion	$ 40.00
b1911	Add a second Valley 500/230 kV TX	Dominion	$ 16.00
b1912	Install a 500 MVAR SVC at Landstown 230 kV	Dominion	$ 60.00
b2003	Construct a Whippany to Montville 230 kV line (6.4 miles)	JCPL	$ 37.50
b1999	Replace limiting wave trap, circuit breaker, substation conductor, relay and current transformer components at Northwood	ME	$ 0.90
b2000	Replace limiting wave trap on the Glendon - Hosensack line	ME	$ 0.05
b2001	Replace limiting circuit breaker and substation conductor transformer components at Portland 230kV	ME	$ 0.40
b2002	Northwood 230/115 kV Transformer upgrade	ME	$ 4.00
b1943	Construct a 115 kV ring bus at Claysburg Substation. Bedford North and Saxton lines will no longer share a common breaker	PENELEC	$ 5.25
b1944	Reconductor Eclipse substation 115 kV bus with 1033 kcmil conductor.	PENELEC	$ 0.15
b1945	Install second 230/115 kV autotransformer at Johnstown	PENELEC	$ 4.50
b1966	Replace the 1200 Amp Line trap at Lewistown on the Raystown-Lewistown 230 kV line and replace substation conductor at Lewistown	PENELEC	$ 0.15
b1967	Replace the Blairsville 138/115 kV transformer	PENELEC	$ 4.20
b1990	Install a 25 MVAR 115 kV Capacitor at Grandview	PENELEC	$ 0.90
b1991	Construct Farmers Valley 345/230 kV and 230/115 kV substation. Loop the Homer City-Stolle Road 345 kV line into Farmers Valley	PENELEC	$ 29.50
b1992	Reconductor Cambria Slope-Summit 115kV with 795 ACSS Conductor	PENELEC	$ 4.80
b1993	Relocate the Erie South 345 kV line terminal	PENELEC	$ 13.00
b1994	Convert Lewis Run-Farmers Valley to 230 kV using 1033.5 ACSR conductor. Project to be completed in conjunction with new Farmers Valley 345/230 kV transformation	PENELEC	$ 46.80
b1995	Change CT Ratio at Claysburg	PENELEC	$ 0.00
b1996.1	Replace 600 Amp Disconnect Switches on Ridgeway-Whetstone 115 kV line with 1200 Amp Disconnects	PENELEC	$ 0.50
b1996.2	Reconductor Ridgway and Whetstone 115 kV Bus.	PENELEC	$ 0.20
b1996.3	Replace Wave Trap at Ridgway.	PENELEC	
b1996.4	Change CT Ratio at Ridgway	PENELEC	
b1997	Replace 600 Amp Disconnect Switches on Dubois-Harvey Run-Whetstone 115 kV line with 1200 Amp Disconnects	PENELEC	$ 0.20
b1998	Install a 75 MVAR 115 kV Capacitor at Shawville	PENELEC	$ 1.50
b2008	Reconductor feeder 23032 and 23034 to high temp. conductor (10 miles)	PEPCO	$ 16.00
b2004	Replace the CTs and switch in South Akron Bay 4 to increase the rating	PPL	$ 0.53
b2005	Replace the CTs and switch in SAKR Bay 3 to increase the rating of the Millwood-South Akron 230 kV Line and of the rating in Bay 3	PPL	$ 0.53
b2006	Install North Lancaster 500/230 kV substation	PPL	$ 42.00
b2007	Install a 90 MVAR capacitor bank at the Frackville 230 kV Substation	PPL	$ 3.00

Appendix: Baseline Cost Allocation

Upgrade ID	Description	Cost Estimate	Transmission Owner	Required IS Date
b1840	Install a new Buckhannon - Weston 138 kV line	$ 17.50	APS	6/1/2016
b1906.2	Install a 2nd 230/115 kV TX at Yadkin	$ 5.00	Dominion	6/1/2015
b1906.3	Install a 2nd 230/115 kV TX at Chesapeake	$ [illegible]	Dominion	6/1/2015
b1906.4	Uprate Yadkin – Chesapeake 115 kV	$ 10.00	Dominion	6/1/2015
b1906.5	Install a third 500/230 kV TX at Yadkin	$ 16.00	Dominion	6/1/2016
b1910	Build a Suffolk – Yadkin 230 kV line (14 miles) and install 4 breakers	$ 40.00	Dominion	6/1/2016
b1913	Convert Eastlake units 1, 2, 3, 4 and 5 to synchronous condensers	$ 100.00	ATSI	6/1/2015
b1914	Convert Lakeshore 18 to a synchronous condenser	$ 20.00	ATSI	6/1/2015
b1915	Install a 50 MVAR capacitor bank at the Maclean 138 kV station	$ 3.00	ATSI	6/1/2013
b1916	Install a 345/138 kV transformer at the Inland Q-11 station	$ 7.20	ATSI	6/1/2013
b1917	Install a 138 kV circuit breaker at the Inland Q-11 station	$ 0.90	ATSI	6/1/2013
b1918	Upgrade terminal equipment on the Avon – Crestwood 138 kV line	$ 0.30	ATSI	6/1/2013
b1919	Re-conductor the Galion – Leaside 138 kV line with 336 ACSS	$ 4.90	ATSI	6/1/2014
b1921	Install a 2nd 345/138 kV transformer at the Allen Junction station	$ 7.20	ATSI	6/1/2014
b1922	Install a 2nd 345/138 kV transformer at the Bayshore station	$ 7.20	ATSI	6/1/2014
b1923	Create a new Northfield Area 345 kV switching station by looping in	$ 37.50	ATSI	6/1/2015
b1924	Build a new Mansfield - Northfield Area 345 kV line	$ 184.50	ATSI	6/1/2015
b1925	Create a new Harmon 345/138/69 kV substation by looping in the Star	$ 46.00	ATSI	6/1/2015
b1926	Build a new Harmon - Brookside + Harmon - Longview 138 kV line	$ 9.20	ATSI	6/1/2015
b1927	Create a new Five Points Area 345/138 kV substation by looping in	$ 30.00	ATSI	6/1/2015
b1928	Install a 50 MVAR capacitor at Hayes 138 kV	$ 1.50	ATSI	6/1/2015
b1929	Install a 138/69 kV transformer at the Avery station	$ 3.20	ATSI	6/1/2015
b1930	Increase design temperature limitation on the Avery – Hayes 138 kV	$ 0.13	ATSI	6/1/2015
b1931	Reconductor Cloverdale - Harmon #2 and #3 138 kV lines with 795	$ 3.60	ATSI	6/1/2015
b1932	Change the transformer tap settings on the Maclean 138/69 kV	$ 0.05	ATSI	6/1/2015
b1933	Replace 336.4 ACSR SCCIR at Richland to upgrade the Richland –	$ 0.04	ATSI	6/1/2015
b1934	Build a new 345/138 kV Substation at Niles	$ 32.00	ATSI	6/1/2015
b1934.1	Loop 1.2 miles of 345 kV into substation of the Highland – Shenango		ATSI	6/1/2015
b1934.2	New 345/138 kV transformer at Niles		ATSI	6/1/2015
b1936	Build new Allen Jct - Midway - Lemonye 345 kV line (48 miles of open	$ 86.30	ATSI	6/1/2016
b1937	Build a new Leroy Center 345/138 kV substation by looping in the	$ 46.00	ATSI	6/1/2016
b1938	Place a portion of the 138 kV Leroy Center 345/138 kV project into	$ 3.30	ATSI	6/1/2015
b1939	Reconductor the Barberton – West Akron 138 kV line with 477 ACSS	$ 4.23	ATSI	6/1/2016
b1942	Change the CT ratio at Millville to improve the Millville – Old Chapel 138	$ 0.05	APS	6/1/2015
b1943	Construct a 115 kV ring bus at Claysburg Substation. Bedford North	$ [illegible]	PENELEC	6/1/2015
b1944	Reconductor Eclipse substation 115 kV bus with 1033 kcmil	$ 0.15	PENELEC	6/1/2013
b1945	Install second 230/115 kV autotransformer at Johnstown	$ 4.50	PENELEC	6/1/2015
b1946	Perform a sag study on the Brues – West Bellaire 138 kV line	$ 0.03	AEP	12/1/2014
b1947	A sag study of the Dequine - Meadowlake 345 kV line #1 line may improve the emergency rating to 1400 MVA	$ 0.01	AEP	12/1/2013
b1949	Perform a sag study on the Grant Tap – Deer Creek 138 kV line and replace bus and risers at Deer Creek station	$ 0.30	AEP	12/1/2014

Upgrade ID	Description	Cost Estimate	Transmission Owner	Required IS Date
b1950	Perform a sag study on the Kammer – Ormet 138 kV line of the conductor section	$ 0.10	AEP	12/1/2012
b1951	Perform a sag study of the Maddox- Convoy 345 kV line to improve the emergency rating to 1400 MVA	$ 0.03	AEP	12/1/2013
b1952	Perform a sag study of the Maddox – T130 345 kV line to improve the emergency rating to 1400 MVA	$ 0.03	AEP	12/1/2013
b1953	Perform a sag study of the Meadowlake - Olive 345 kV line to improve the emergency rating to 1400 MVA	$ 0.06	AEP	12/1/2013
b1954	Perform a sag study on the Milan - Harper 138 kV line and replace bus and switches at Milan Switch station	$ 0.35	AEP	12/1/2014
b1955	Perform a sag study of the R-049 - Tillman 138 kV line may improve the emergency rating to 245 MVA	$ 0.25	AEP	12/1/2014
b1956	Perform a sag study of the Tillman - Dawkins 138 kV line may improve the emergency rating to 245 MVA	$ 0.25	AEP	12/1/2013
b1958	Perform a sag study on the Brookside - Howard 138 kV line and replace bus and risers at AEP Howard station	$ 0.50	AEP	12/1/2014
b1960	Sag Study on 7.2 miles SE Canton-Canton Central 138kV ckt	$ 0.30	AEP	12/1/2012
b1961	Sag study on the Southeast Canton – Sunnyside 138kV line	$ 0.25	AEP	12/1/2012
b1963	Build approximately 1 mile of circuit comprising of 2-954 ACSR to get the rating of Waterford-Muskinum 345 kV higher	$ 3.50	AEP	12/1/2013
b1965	Install a 44 MVAR 138 kV capacitor at Luxor substation	$ 1.50	APS	6/1/2014
b1966	Replace the 1200 Amp Line trap at Lewistown on the Raystown-	$ 0.15	PENELEC	12/1/2013
b1967	Replace the Blairsville 138/115 kV transformer	$ 4.20	PENELEC	6/1/2014
b1968	Establish operating procedure such that breaker 89, connecting	$ -	DL	6/1/2012
b1971	Perform a sag study to improve the emergency rating on the Bridgville – Chandlersville 138 kV line	$ 0.05	AEP	12/1/2014
b1972	Replace disconnect switch on the South Canton 765/345 kV transformer	$ 0.30	AEP	12/1/2014
b1973	Perform a sag study to improve the emergency rating on the Carrollton – Sunnyside 138 kV line	$ 0.05	AEP	12/1/2014
b1974	Perform a sag study to improve the emergency rating on the Bethel Church – West Dover 138 kV line	$ 0.03	AEP	12/1/2014
b1975	Replace a switch at South Millersburg switch station	$ 0.20	AEP	12/1/2014
b1978	Reconductor Inland – Clinic Health Q-11 138 kV line	$ 1.10	ATSI	6/1/2015
b1981	Replace relay on the Highland – G689 138 kV line	$ 0.05	ATSI	12/31/2012
b1982	Reconductor the Hoytdale – Newcastle 138 kV lines #1 and #2 with	$ 4.80	ATSI	6/1/2015
b1983	Add 150 MVAR SVC and a 100 MVAR capacitor at New Castle	$ 31.70	ATSI	6/1/2015
b1984	Install a 50 MVAR capacitor at the Boardman 138 kV bus	$ 1.70	ATSI	6/1/2015
b1985	Upgrade the Duquesne portion of the Elrama – Mitchell 138 kV line	TBD	DL	4/16/2015
b1986	Upgrade the AP portion of the Elrama – Mitchell 138 kV line by replace	$ 0.05	APS	6/1/2015
b1987	Reconductor the Osage-Collins Ferry 138 kV line with 795 ACSS.	$ 1.80	APS	6/1/2015
b1988	Raise structures between Lake Lynn and West Run to eliminate the	$ 0.32	APS	6/1/2015
b1989	Raise structures between Collins Ferry and West Run to eliminate the	$ 0.32	APS	6/1/2015

Upgrade ID	Description	Cost Estimate	Transmission Owner	Required IS Date
b1990	Install a 28 MVAR 115 kV Capacitor at Grandview	$ 0.90	PENELEC	6/1/2015
b1991	Construct Farmers Valley 345/230 kV and 230/115 kV substation.	$ 29.50	PENELEC	6/1/2015
b1992	Reconductor Cambria Slope-Summit 115kV with 795 ACSS Conductor	$ 4.80	PENELEC	6/1/2015
b1995	Change CT Ratio at Claysburg	$ 0.00	PENELEC	6/1/2015
b1996.1	Replace 600 Amp Disconnect Switches on Ridgeway-Whetstone 115	$ 0.50	PENELEC	6/1/2015
b1996.2	Reconductor Ridgway and Whetstone 115 kV Bus.	$ 0.20	PENELEC	6/1/2015
b1996.3	Replace Wave Trap at Ridgway.		PENELEC	6/1/2015
b1996.4	Change CT Ratio at Ridgway		PENELEC	6/1/2015
b1997	Replace 600 Amp Disconnect Switches on Dubois-Harvey Run-	$ 0.20	PENELEC	6/1/2015
b1998	Install a 75 MVAR 115 kV Capacitor at Shawville	$ 1.50	PENELEC	6/1/2015
b1999	Replace limiting wave trap, circuit breaker, substation conductor,	$ 0.90	ME	6/1/2015
b2000	Replace limiting wave trap on the Glendon - Hosensack line	$ 0.05	ME	6/1/2015
b2001	Replace limiting circuit breaker and substation conductor transformer	$ 0.40	ME	6/1/2015
b2002	Northwood 230/115 kV Transformer upgrade	$ 4.00	ME	6/1/2015
b2003	Construct a Whippany to Montville 230 kV line (8.4 miles)	$ 37.50	JCPL	6/1/2015
b2004	Replace the CTs and switch in South Akron Bay 4 to increase the	$ 0.53	PPL	6/1/2014
b2005	Replace the CTs and switch in SAKR Bay 3 to increase the rating of	$ 0.53	PPL	6/1/2014
b2007	Install a 90 MVAR capacitor bank at the Frackville 230 kV Substation	$ 3.00	PPL	6/1/2015

Upgrade ID	Description	Multi-Zone Cost Allocation	Required IS Date
b1905.1	Surry to Skiffes Creek 500 kV Line (7 miles overhead)	AEC - 1.83%, AEP - 15.12%, APS - 5.53%, ATSI - 8.65%, BGE - 4.46%, ComEd - 14.64%, ConEd - 0.55%, Dayton - 2.21%, DL - 1.85%, DPL - 2.61%, Dominion - 12.38%, ECP - 0.19%, JCPL - 4.07%, ME - 1.92%, Neptune - 0.41%, PECO - 5.54%, PENELEC - 1.93%, PEPCO - 4.33%, PPL - 4.77%, PSEG - 6.74%, RE - 0.27%,	6/1/2015
b1905.2	Surry 500 kV Station Work	AEC - 1.83%, AEP - 15.12%, APS - 5.53%, ATSI - 8.65%, BGE - 4.46%, ComEd - 14.64%, ConEd - 0.55%, Dayton - 2.21%, DL - 1.85%, DPL - 2.61%, Dominion - 12.38%, ECP - 0.19%, JCPL - 4.07%, ME - 1.92%, Neptune - 0.41%, PECO - 5.54%, PENELEC - 1.93%, PEPCO - 4.33%, PPL - 4.77%, PSEG - 6.74%, RE - 0.27%,	6/1/2015
b1905.3	Skiffes Creek 500-230 kV Tx and Switching Station	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2015
b1905.4	New Skiffes Creek - Whealton 230 kV line	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1905.5	Whealton 230 kV breakers	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1905.6	Yorktown 230 kV work	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1905.7	Lanexa 115 kV work	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1905.8	Surry 230 kV work	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1905.9	Kings Mill, Peninmen, Toano, Waller, Warwick	Dominion - 99.84%, PEPCO - 0.16%,	6/1/2016
b1906.1	At Yadkin 500 kV, install six 500 kV breakers	AEC - 1.83%, AEP - 15.12%, APS - 5.53%, ATSI - 8.65%, BGE - 4.46%, ComEd - 14.64%, ConEd - 0.55%, Dayton - 2.21%, DL - 1.85%, DPL - 2.61%, Dominion - 12.38%, ECP - 0.19%, JCPL - 4.07%, ME - 1.92%, Neptune - 0.41%, PECO - 5.54%, PENELEC - 1.93%, PEPCO - 4.33%, PPL - 4.77%, PSEG - 6.74%, RE - 0.27%,	6/1/2016
b1907	Install a 3rd 500/230 kV TX at Clover	APS - 5.83%, BGE - 4.74%, Dominion - 81.79%, PEPCO - 7.64%,	6/1/2016

Upgrade ID	Description	Multi-Zone Cost Allocation	Required IS Date
b1908	Rebuild Lexington – Dooms 500 kV	AEC - 1.83%, AEP - 15.12%, APS - 6.62%, ATSI - 8.65%, BGE - 4.46%, ComEd - 14.64%, ConEd - 0.55%, Dayton - 2.21%, DL - 1.85%, DPL - 2.61%, Dominion - 12.38%, ECP - 0.19%, JCPL - 4.07%, ME - 1.92%, Neptune - 0.41%, PECO - 5.54%, PENELEC - 1.93%, PEPCO - 4.33%, PPL - 4.77%, PSEG - 6.74%, RE - 0.27%,	6/1/2016
b1909	Uprate Bremo – Midlothian 230 kV to its maximum operating temperature	APS - 6.31%, BGE - 3.81%, Dominion - 81.9%, PEPCO - 7.98%,	6/1/2016
b1911	Add a second Valley 500/230 kV TX	APS - 14.85%, BGE - 3.1%, Dominion - 74.12%, PEPCO - 7.93%,	6/1/2016
b1912	Install a 500 MVAR SVC at Landstown 230 kV	DEOK - 0.46%, Dominion - 99.54%,	6/1/2016
b1920	Re-conductor the Galion – GM Mansfield – Ontario - Cairns 138 kV line with 477 ACSS	ATSI - 94.47%, DL - 2.9%, PENELEC - 2.63%,	6/1/2014
b1935	ATSI-AEP 138 kV Substation on near territory border + 138 kV from new substation to Longview approx. 8 miles	ATSI - 94.9%, DL - 2.97%, PENELEC - 2.13%,	
b1941	Loop the Homer City-Handsome Lake 345 kV line into the Armstrong substation and install a 345/138 kV transformer at Armstrong	APS - 67.86%, PENELEC - 32.14%,	6/1/2014
b1948	Establish a new 765/345 interconnection at Sporn. Install a 765/345 kV transformer at Mountaineer and build ¾ mile of 345 kV to Sporn	ATSI - 61.08%, DL - 21.87%, Dominion - 13.97%, PENELEC - 3.08%,	6/1/2015
b1957	Terminate Transformer #2 at SW Lima in a new bay position	AEP - 69.41%, ATSI - 23.11%, ECP - 0.17%, HTP - 0.19%, PENELEC - 2.42%, PSEG - 4.52%, RE - 0.18%,	12/1/2014
b1959	Build a new West Fremont-Groton-Hayes 138kV line	APS - 4.24%, ATSI - 87.76%, DL - 4.27%, PENELEC - 3.73%,	6/1/2018

Upgrade ID	Description	Multi-Zone Cost Allocation	Required IS Date
b1962	Add four 765 kV breakers at Kammer	AEC - 1.83%, AEP - 15.12%, APS - 5.53%, ATSI - 8.65%, BGE - 4.46%, ComEd - 14.64%, ConEd - 0.55%, Dayton - 2.21%, DL - 1.85%, DPL - 2.61%, Dominion - 12.38%, ECP - 0.19%, JCPL - 4.07%, ME - 1.92%, Neptune - 0.41%, PECO - 5.54%, PENELEC - 1.93%, PEPCO - 4.33%, PPL - 4.77%, PSEG - 6.74%, RE - 0.27%,	6/1/2015
b1964	Convert Moshannon substation to a 4 breaker 230 kV ring bus	APS - 41.06%, DPL - 6.68%, JCPL - 5.48%, ME - 10.7%, Neptune - 0.53%, PECO - 15.53%, PPL - 20.02%,	6/1/2014
b1969	Install a third 345-138 kV autotransformer at Collier Substation. Currently s0321 and will be converted to baseline.	APS - 18.69%, DL - 81.31%,	6/1/2013
b1970	Reconductor 13 miles of the Kammer – West Bellaire 345kV circuit	APS - 33.51%, ATSI - 32.21%, DL - 18.64%, Dominion - 6.01%, ECP - 0.1%, HTP - 0.11%, JCPL - 1.68%, Neptune - 0.18%, PENELEC - 4.58%, PSEG - 2.87%, RE - 0.11%,	6/1/2014
b1976	Reconductor ATSI portion of South Canton – Harmon 345 kV line	ATSI - 88.77%, ECP - 0.12%, HTP - 0.11%, JCPL - 1.24%, Neptune - 0.13%, PENELEC - 6.54%, PSEG - 2.94%, RE - 0.12%,	6/1/2015
b1977	Build new Toronto 345/138 kV substation by looping in the Sammis – Wylie Ridge 345 kV line and tie in four 138 kV lines	APS - 7%, ATSI - 88.14%, DL - 0.81%, PENELEC - 4.05%,	6/1/2017
b1977.1	Build a new Toronto-Harmon 345kV line	APS - 7%, ATSI - 88.14%, DL - 0.81%, PENELEC - 4.05%,	6/1/2017
b1993	Relocate the Erie South 345 kV line terminal	APS - 10.09%, ECP - 0.45%, HTP - 0.49%, JCPL - 5.14%, Neptune - 0.54%, PENELEC - 70.71%, PSEG - 12.1%, RE - 0.48%,	6/1/2015
b1994	Convert Lewis Run-Farmers Valley to 230 kV using 1033.5 ACSR conductor. Project to be completed in conjunction with new Farmers Valley 345/230 kV transformation	APS - 33.2%, ECP - 0.44%, HTP - 0.44%, JCPL - 8.64%, ME - 5.52%, Neptune - 0.86%, PENELEC - 36.81%, PSEG - 13.55%, RE - 0.54%,	6/1/2015
b2006	Install North Lancaster 500/230 kV substation	AEC - 1.1%, ECP - 0.37%, HTP - 0.37%, JCPL - 9.61%, ME - 19.42%, Neptune - 0.75%, PECO - 6.01%, PPL - 50.57%, PSEG - 11.35%, RE - 0.45%,	6/1/2017
b2008	Reconductor feeder 23032 and 23034 to high temp. conductor (10 miles)	BGE - 33.05%, DPL - 1.38%, PECO - 1.35%, PEPCO - 64.22%,	6/1/2015

Agency Letters Submitted

THE Louis Berger Group, INC.

May 25, 2012

Dr. Mary Knapp
U.S. Fish and Wildlife Service
Ohio Ecological Services Office
4625 Morse Road, Suite 104
Columbus, OH 43230

Re: Bruce Mansfield-Glenwillow 345 kV Transmission Line Project
Request for Project Review

The Louis Berger Group, Inc. (LBG) has been contracted by FirstEnergy Service Company (FirstEnergy) to conduct a siting study for the proposed Bruce Mansfield-Glenwillow 345 kV Electric Transmission Line Project (the Project) in western Pennsylvania and northeast Ohio. The proposed project is needed to reinforce the transmission system to address transmission reliability issues as generation plants are retired in the region.

The proposed project will consist of a new 345 kV transmission line and a new transmission substation. The transmission line will be approximately 110 miles in length depending upon the route chosen and connect the existing Bruce Mansfield Substation, operated by FirstEnergy affiliates, located along Shippingport Rd. in Shippingport, Beaver County, Pennsylvania, to a new transmission substation, named Glenwillow Substation, proposed to be located on a site in Glenwillow, Cuyahoga County, Ohio. To this end, FirstEnergy and its consultants have identified several potential routes for further consideration. These potential routes are shown in the attached figure. FirstEnergy respectfully requests that your agency provide a preliminary review for any current federal listed threatened and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the potential routes being considered in the Ohio portion of the Project. Your input will be used to help FirstEnergy further evaluate the proposed routes in order to minimize potential impacts of the Project on the natural environment.

As shown on the attached map, the potential routes in Ohio are located in Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties and may traverse through Fairfield, Middleton, and Unity townships in Columbiana County; Beaver, Berlin, Canfield, Ellsworth, Green, Jackson, and Milton townships in Mahoning County; Newton Township and the Village of Lordstown in Trumbull County; Deerfield, Edinburg, Palmyra, Ravenna, Rootstown, and Shalersville townships, and the cities of Aurora and Streetsboro in Portage County; Twinsburg, Northfield Center, and Sagamore Hills townships in Summit County; and the villages of Glenwillow, Oakwood, and Walton Hills in Cuyahoga County. The potential routes are located on the following USGS quadrangle maps: Atwater, Aurora, Canfield, Columbiana, Deerfield, East Liverpool North, East Palestine, Elkton, Lake Milton, Mantua, Midland, Newton Falls, Northfield, Ravenna, Salem, Twinsburg, and Warren.

100 Commercial Street | 2nd Floor, North | Manchester, NH 03101 | USA
Tel 603.644.5200 | Fax 603.644.5220 | www.louisberger.com

It is anticipated that much of the line will be installed on existing transmission structure "open arms" that were constructed originally with the expectation that an additional circuit would someday be needed. As a result, a second circuit can be installed without adding more structures or increasing the width of the existing, cleared right-of-way. The other segments of the proposed line are anticipated to be a combination of new construction and rebuilding existing lines to make them capable of accommodating an additional line. The attached map indicates the locations where open arms, rebuilt lines, or new right-of-way would be utilized. In areas where structures can be rebuilt, little if any new right-of-way is expected to be needed. New areas would require the acquisition and clearing of a new 150-foot-wide right-of-way. In both new and rebuilt areas, the transmission structures are expected to be steel poles approximately 130 to 175 feet tall. FirstEnergy intends to use existing access roads to the maximum extent practicable.

Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you are able to provide the locations of any records you find during your review on a GIS shapefile for us, we would appreciate that as well. Note that a similar request has also been sent to the USFWS' Pennsylvania Field Office in State College for input on federal resources in the Pennsylvania portion of the Project. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

cc: Jay Ruberto, FirstEnergy

attachment

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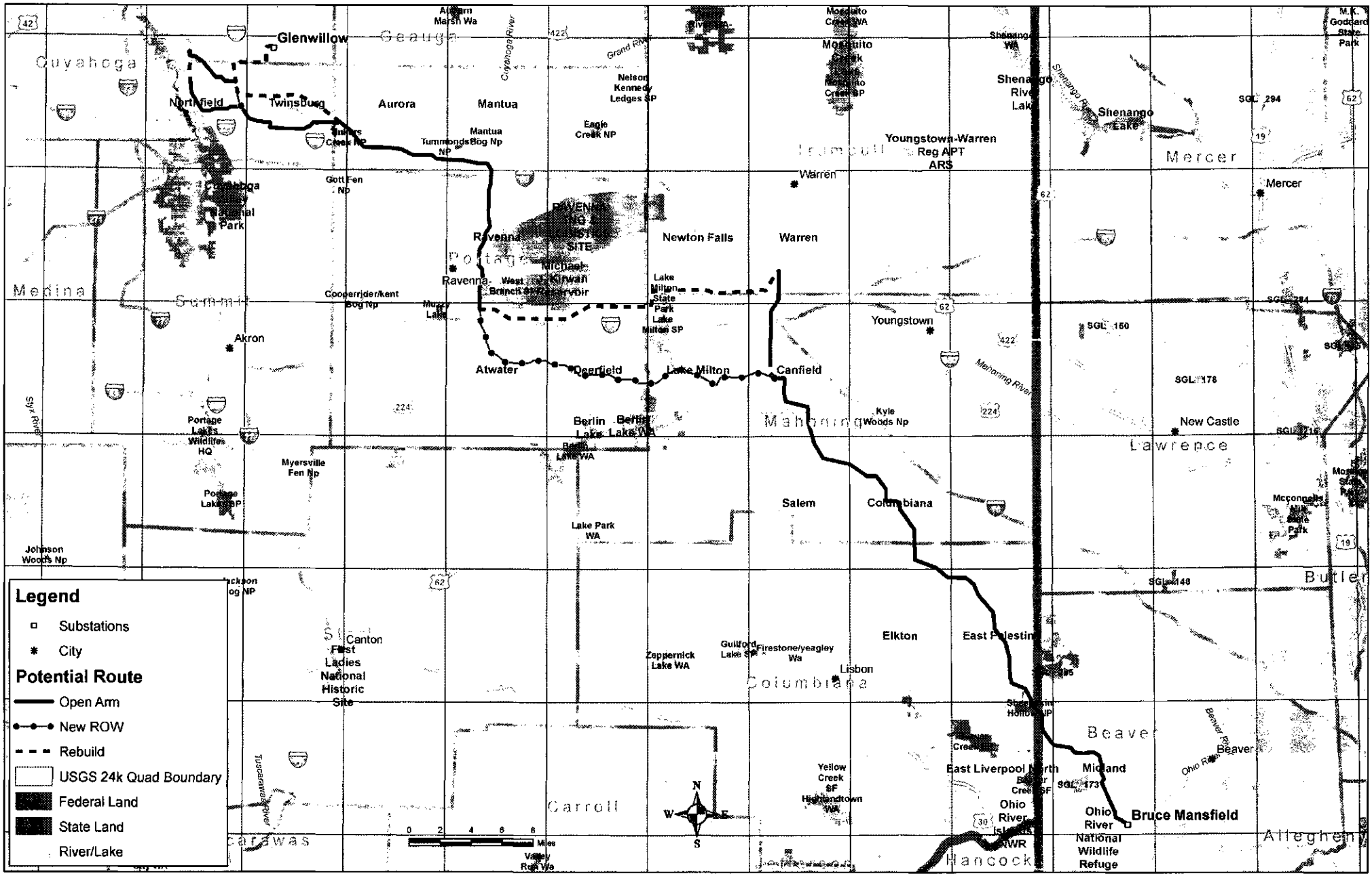
Glenwillow
Twinsburg
Northfield
Aurora
Mantua
Ravenna
Newton Falls
Warren
Youngstown
Akron
Atwater
Deerfield
Lake Milton
Canfield
Salem
Columbiana
Canton
Elkton
East Palestine
Lisbon
East Liverpool
Midland
Bruce Mansfield
Ohio River National Wildlife Refuge
Shenango Lake
Mercer
New Castle
Cuyahoga
Geauga
Portage
Summit
Medina
Mahoning
Trumbull
Lawrence
Beaver
Butler
Carroll
Columbiana
Hancock
Allegheny
Legend
Substations
City
Potential Route
Open Arm
New ROW
Rebuild
USGS 24k Quad Boundary
Federal Land
State Land
River/Lake
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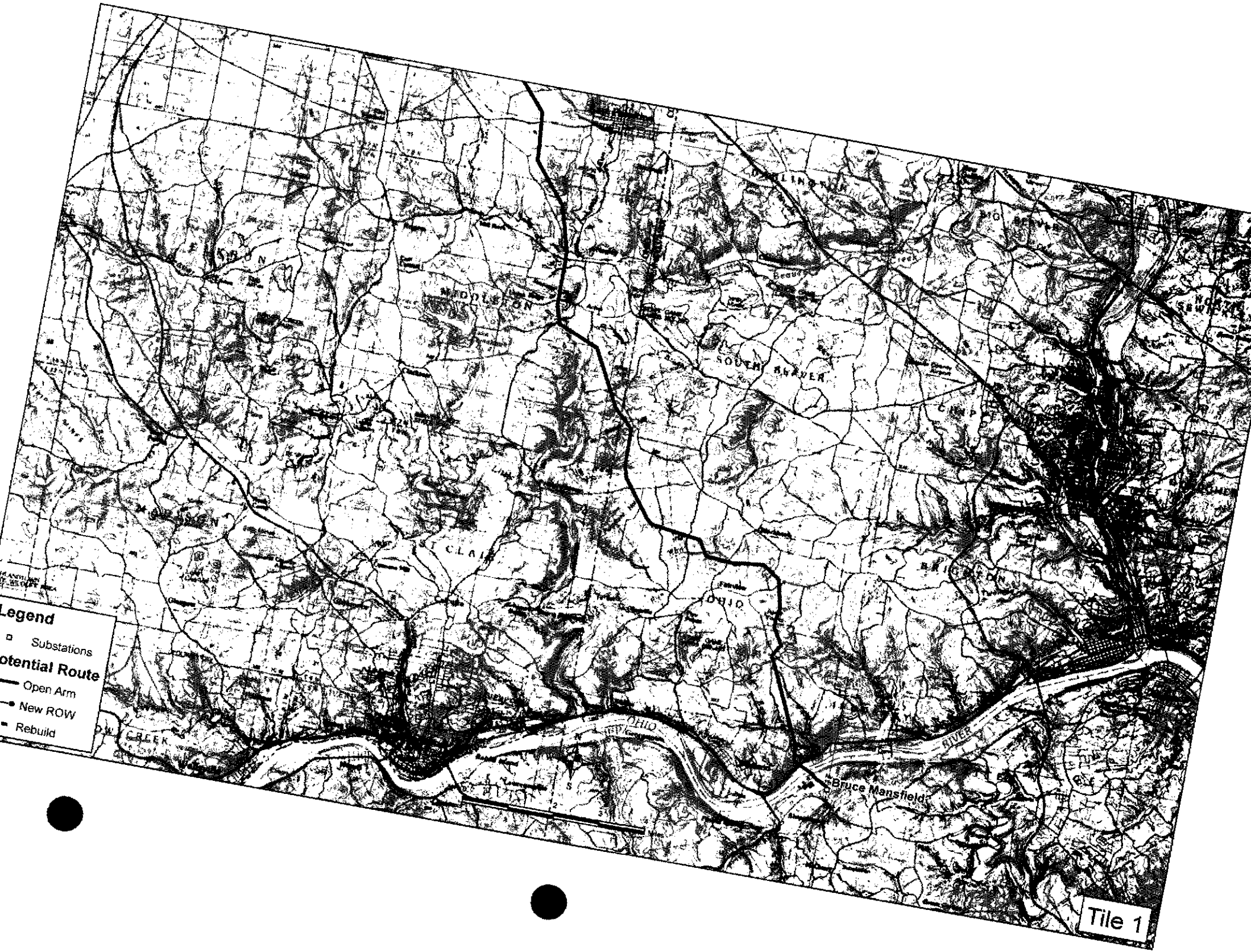
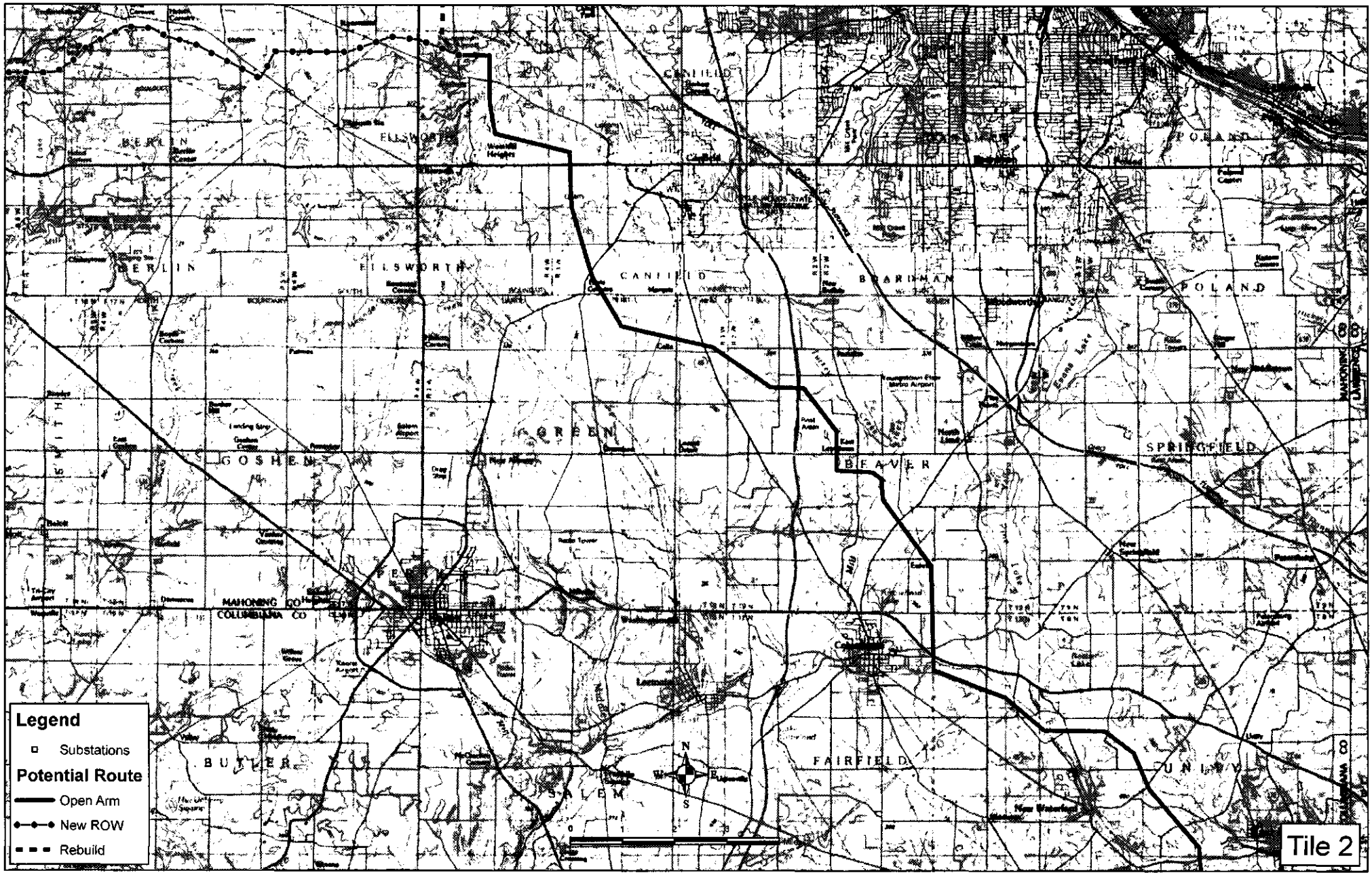

Legend
Substations
otential Route
Open Arm
New ROW
Rebuild
Bruce Mansfield
Tile 1


Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 2
BERLIN
ELLSWORTH
CANFIELD
BOARDMAN
POLAND
GOSHEN
GREEN
BEAVER
SPRINGFIELD
MAHONING CO
COLUMBIANA CO
BUTLER
SALEM
FAIRFIELD
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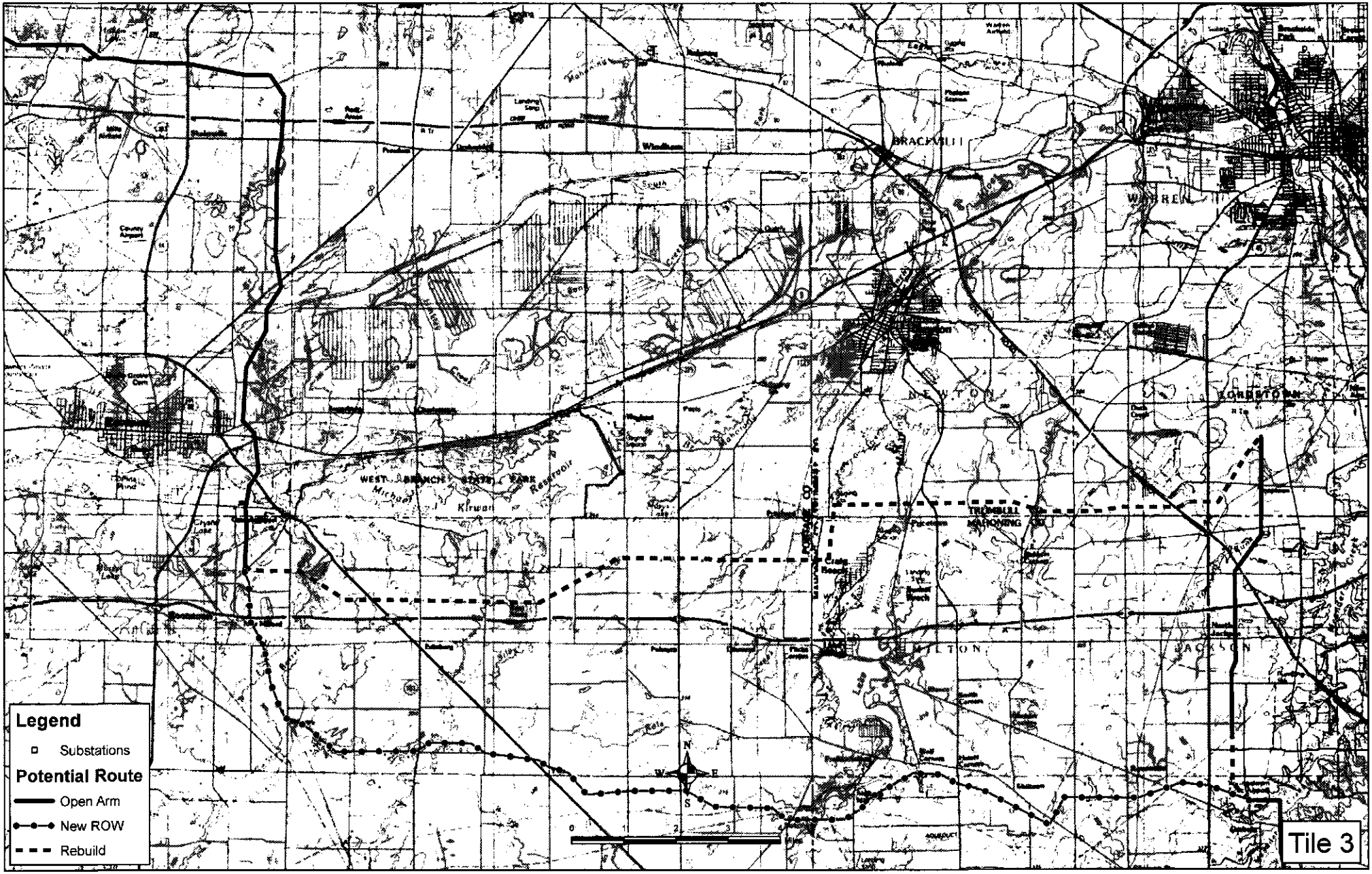
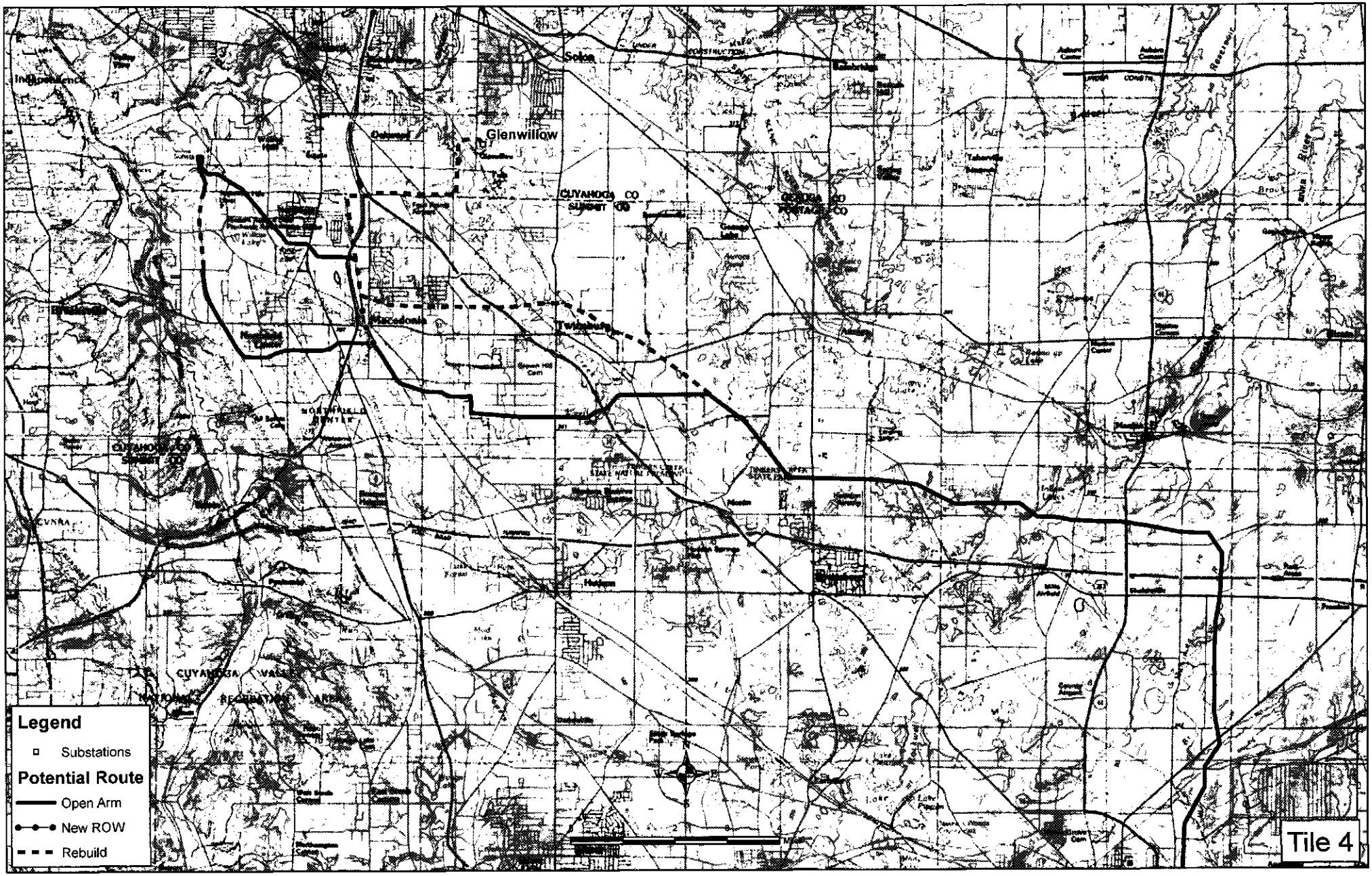

Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 3


Solon
Glenwillow
Twinsburg
Macedonia
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 4

THE Louis Berger Group, INC.

May 25, 2012

Chief, Division of Wildlife
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road G-3
Columbus, Ohio 43229-6693

Re: Bruce Mansfield-Glenwillow 345 kV Transmission Line Project
Request for Project Review

The Louis Berger Group, Inc. (LBG) has been contracted by FirstEnergy Service Company (FirstEnergy) to conduct a siting study for the proposed Bruce Mansfield-Glenwillow 345 kV Electric Transmission Line Project (the Project) in western Pennsylvania and northeast Ohio. The proposed project is needed to reinforce the transmission system to address transmission reliability issues as generation plants are retired in the region.

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As shown on the attached map, the potential routes in Ohio are located in Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties and may traverse through Fairfield, Middleton, and Unity townships in Columbiana County; Beaver, Berlin, Canfield, Ellsworth, Green, Jackson, and Milton townships in Mahoning County; Newton Township and the Village of Lordstown in Trumbull County; Deerfield, Edinburg, Palmyra, Ravenna, Rootstown, and Shalersville townships, and the cities of Aurora and Streetsboro in Portage County; Twinsburg, Northfield Center, and Sagamore Hills townships in Summit County; and the villages of Glenwillow, Oakwood, and Walton Hills in Cuyahoga County. The potential routes are located on the following USGS quadrangle maps: Atwater, Aurora, Canfield, Columbiana, Deerfield, East Liverpool North, East Palestine, Elkton, Lake Milton, Mantua, Midland, Newton Falls, Northfield, Ravenna, Salem, Twinsburg, and Warren.

100 Commercial Street | 2nd Floor, North | Manchester, NH 03101 | USA
Tel 603.644.5200 | Fax 603.644.5220 | www.louisberger.com

It is anticipated that much of the line will be installed on existing transmission structure "open arms" that were constructed originally with the expectation that an additional circuit would someday be needed. As a result, a second circuit can be installed without adding more structures or increasing the width of the existing, cleared right-of-way. The other segments of the proposed line are anticipated to be a combination of new construction and rebuilding existing lines to make them capable of accommodating an additional line. The attached map indicates the locations where open arms, rebuilt lines, or new right-of-way would be utilized. In areas where structures can be rebuilt, little if any new right-of-way is expected to be needed. New areas would require the acquisition and clearing of a new 150-foot-wide right-of-way. In both new and rebuilt areas, the transmission structures are expected to be steel poles approximately 130 to 175 feet tall. FirstEnergy intends to use existing access roads to the maximum extent practicable.

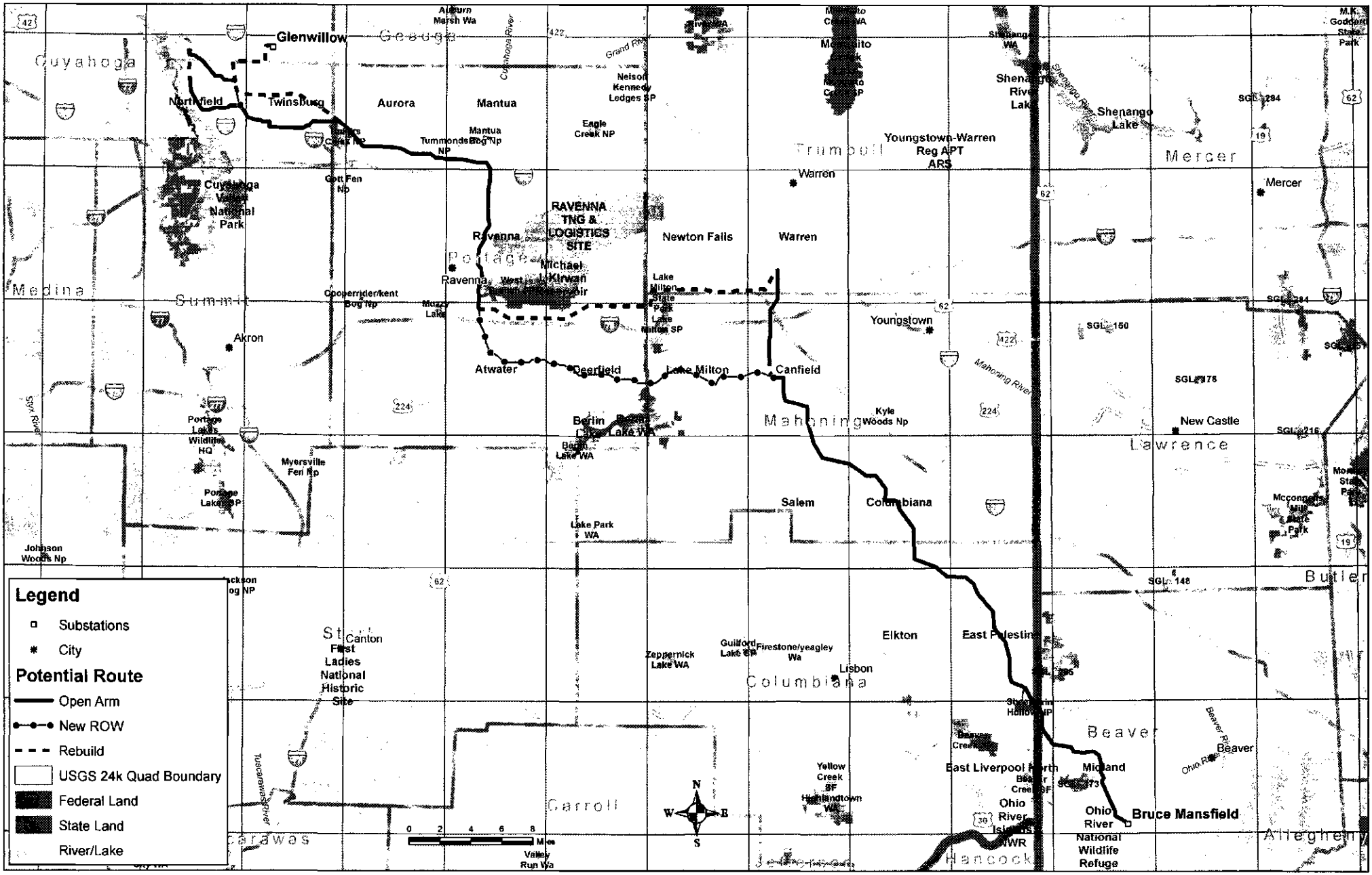
Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you are able to provide the locations of any records you find during your review on a GIS shapefile for us, we would appreciate that as well. Note that a similar request has also been sent to ODNR's Division of Natural Areas and Preservation for input on resources under their jurisdiction. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

cc: Jay Ruberto, FirstEnergy

attachment


Glenwillow
Cuyahoga
Geauga
Northfield
Twinsburg
Aurora
Mantua
Auburn Marsh Wa
Cuyahoga River
Grand River
Nelson Kennedy Ledges SP
Eagle Creek NP
Mantua Tummonds Bog Np
Cuyahoga Valley National Park
Gott Fen Np
RAVENNA TNG & LOGISTICS SITE
Ravenna
Portage
Michael J Kirwan Reservoir
Newton Falls
Warren
Trumbull
Youngstown-Warren Reg APT ARS
Shenango River Lake
Shenango Lake
Mercer
Medina
Summit
Cooperrider/kent Bog Np
Mozzy Lake
Lake Milton State Park
Lake Milton SP
Akron
Atwater
Deerfield
Lake Milton
Canfield
Youngstown
Mahoning River
Kyle Woods Np
Mahoning
Lawrence
New Castle
Portage Lakes Wildlife HQ
Myersville Fen Np
Portage Lakes SP
Berlin Lake WA
Lake Park WA
Salem
Columbiana
Johnson Woods Np
Canton
First Ladies National Historic Site
Zeppernick Lake WA
Guilford Lake SP
Firestone/yeagley Wa
Lisbon
Elkton
East Palestine
Stark
Carroll
Columbiana
Beaver
Beaver River
Ohio River
Yellow Creek SF
Highlandtown WA
East Liverpool North
Midland
Bruce Mansfield
Ohio River National Wildlife Refuge
Tuscarawas River
Tuscarawas
Hancock
Allegheny
Butler
Valley Run Wa
Legend
Substations
City
Potential Route
Open Arm
New ROW
Rebuild
USGS 24k Quad Boundary
Federal Land
State Land
River/Lake
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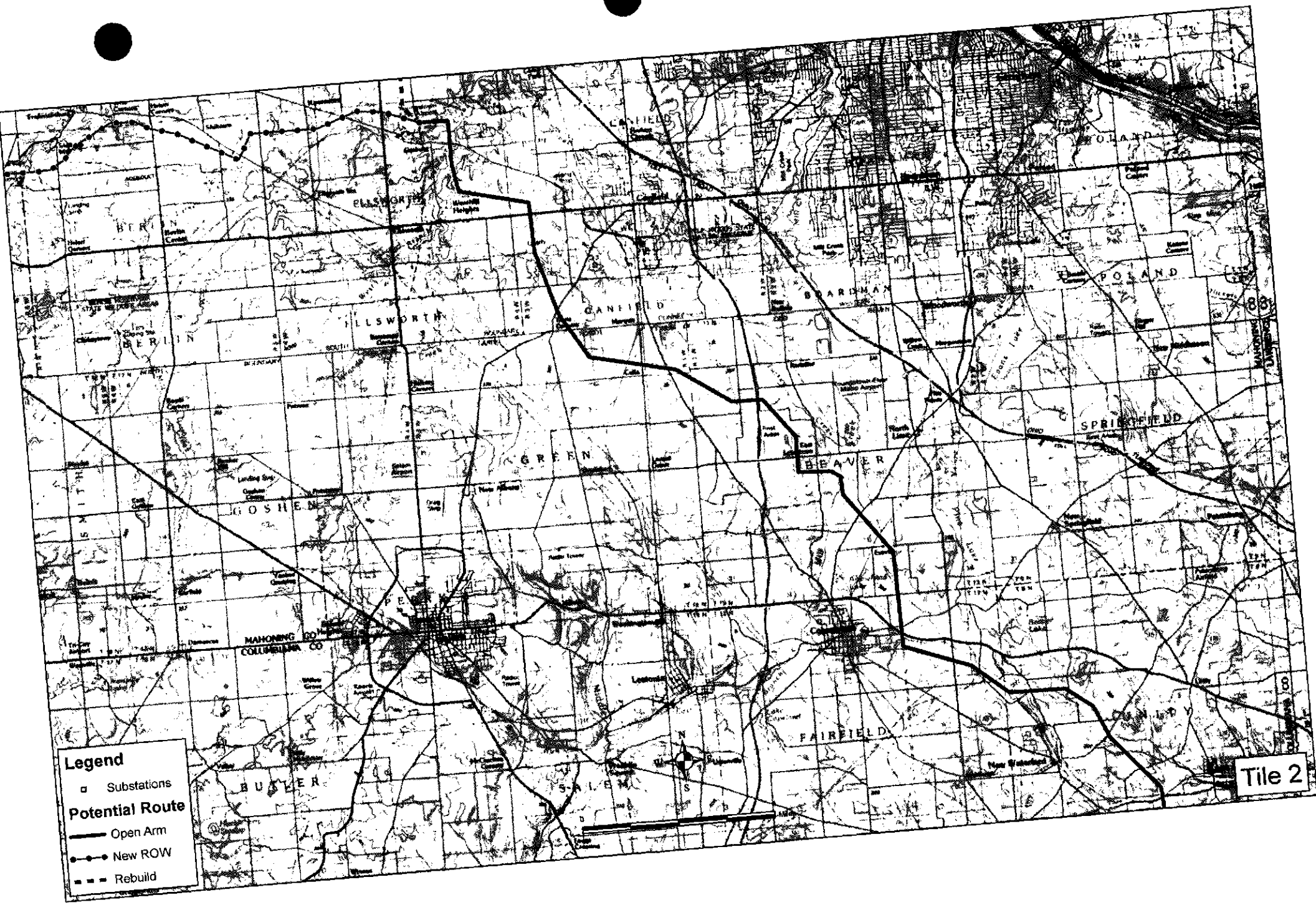
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Bruce Mansfield
Tile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Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 2
BERLIN
ELLSWORTH
CANFIELD
BOARDMAN
POLAND
GREEN
BEAVER
GOSHEN
SPRINGFIELD
MAHONING CO
COLUMBIANA CO
BUTLER
SALEM
FAIRFIELD
N
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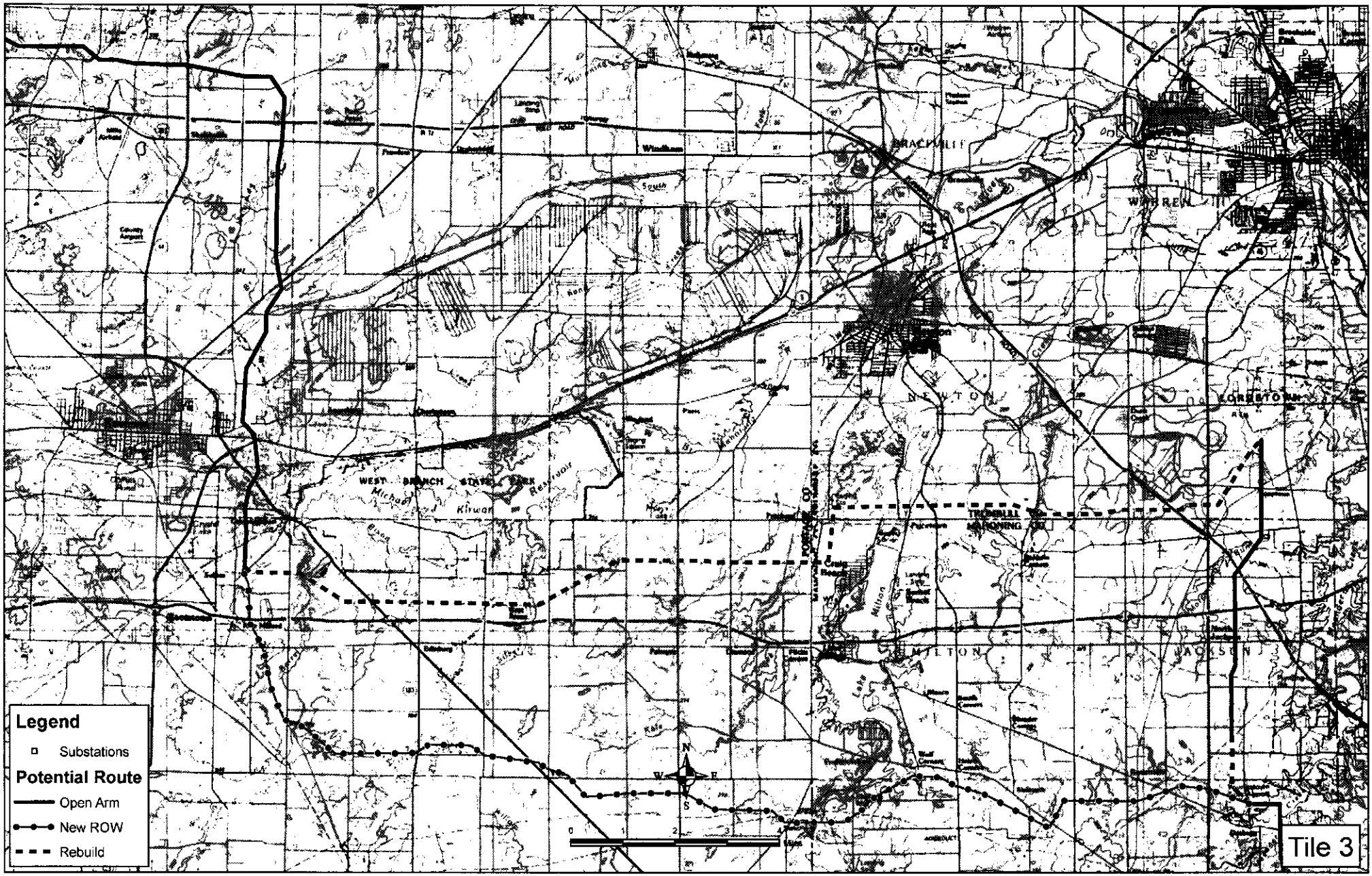
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Potential Route
Open Arm
New ROW
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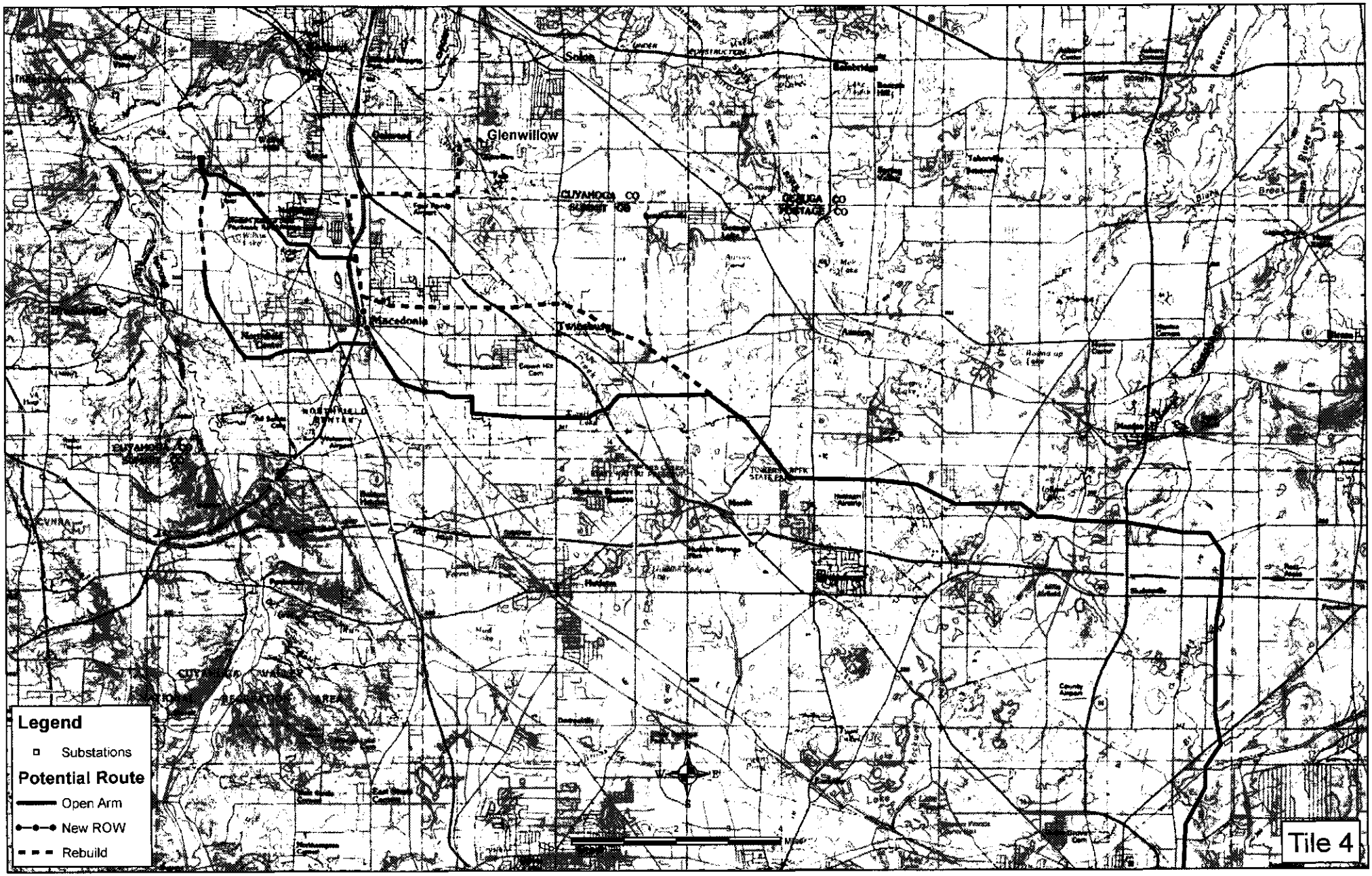
Salem
Glenwillow
Macedonia
Twinsburg
CUYAHOGA CO
PORTAGE CO
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 4

THE Louis Berger Group, INC.

May 25, 2012

Chief, Division of Natural Areas and Preservation
Ohio Department of Natural Resources
Division of Natural Areas and Preservation
2045 Morse Road F-1
Columbus, Ohio 43229-6693

Re: Bruce Mansfield-Glenwillow 345 kV Transmission Line Project
Request for Project Review

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As shown on the attached map, the potential routes in Ohio are located in Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties and may traverse through Fairfield, Middleton, and Unity townships in Columbiana County; Beaver, Berlin, Canfield, Ellsworth, Green, Jackson, and Milton townships in Mahoning County; Newton Township and the Village of Lordstown in Trumbull County; Deerfield, Edinburg, Palmyra, Ravenna, Rootstown, and Shalersville townships, and the cities of Aurora and Streetsboro in Portage County; Twinsburg, Northfield Center, and Sagamore Hills townships in Summit County; and the villages of Glenwillow, Oakwood, and Walton Hills in Cuyahoga County. The potential routes are located on the following USGS quadrangle maps: Atwater, Aurora, Canfield, Columbiana, Deerfield, East Liverpool North, East Palestine, Elkton, Lake Milton, Mantua, Midland, Newton Falls, Northfield, Ravenna, Salem, Twinsburg, and Warren.

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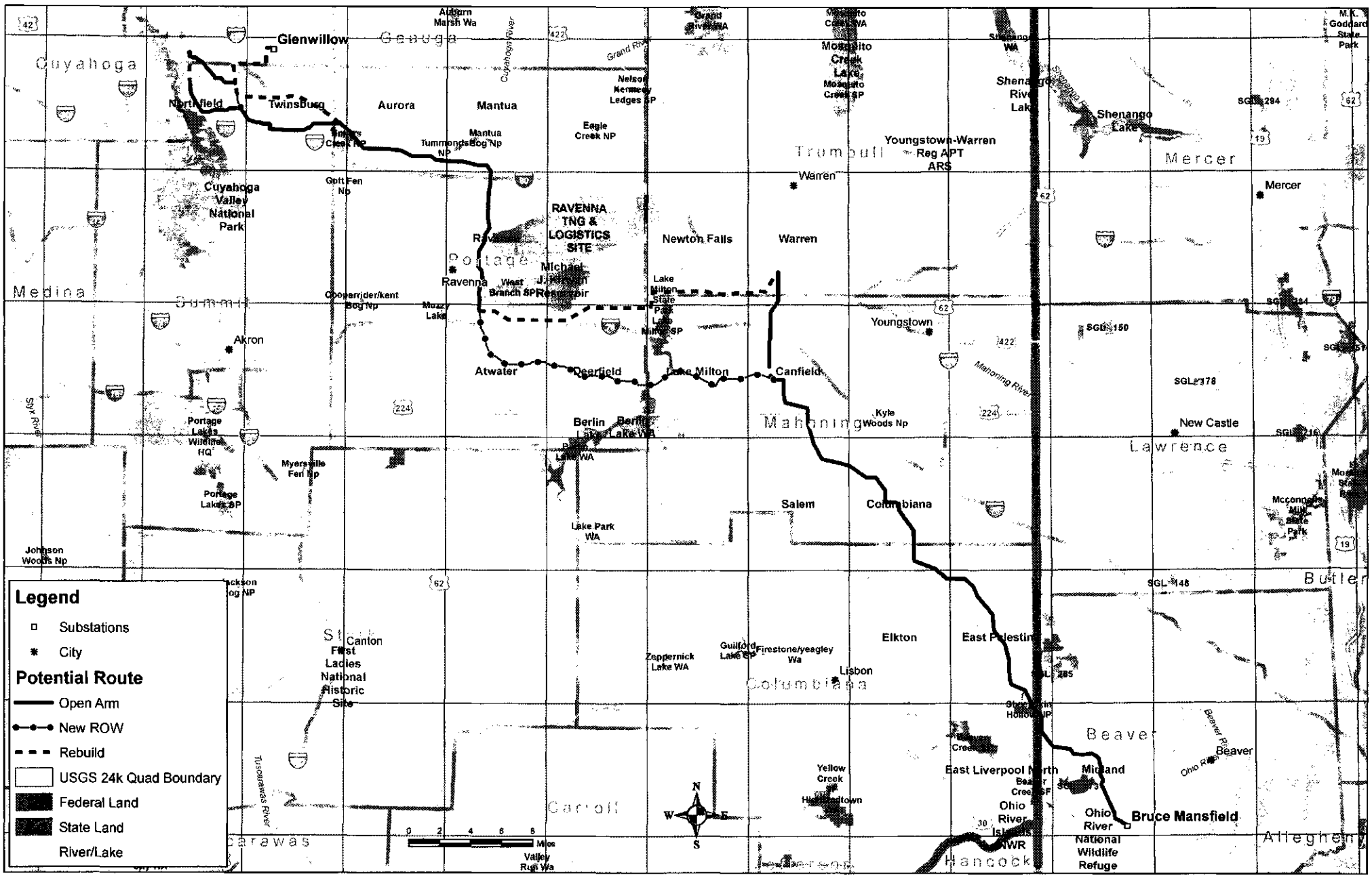
Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

cc: Jay Ruberto, FirstEnergy

attachment


Glenwillow
Cuyahoga
Geauga
Northfield
Twinsburg
Aurora
Mantua
Cuyahoga Valley National Park
RAVENNA TNG & LOGISTICS SITE
Ravenna
Portage
Medina
Summit
Akron
Atwater
Deerfield
Lake Milton
Canfield
Newton Falls
Warren
Youngstown-Warren Reg APT ARS
Trumbull
Mercer
Shenango Lake
Mahoning
Kyle Woods Np
Berlin
Lake Park WA
Salem
Columbiana
New Castle
Lawrence
Butler
Stark
Canton First Ladies National Historic Site
Carroll
Elkton
East Palestine
Lisbon
Columbiana
Beaver
Beaver
East Liverpool North
Midland
Ohio River National Wildlife Refuge
Bruce Mansfield
Allegheny
Carawas
Hancock
Legend
Substations
City
Potential Route
Open Arm
New ROW
Rebuild
USGS 24k Quad Boundary
Federal Land
State Land
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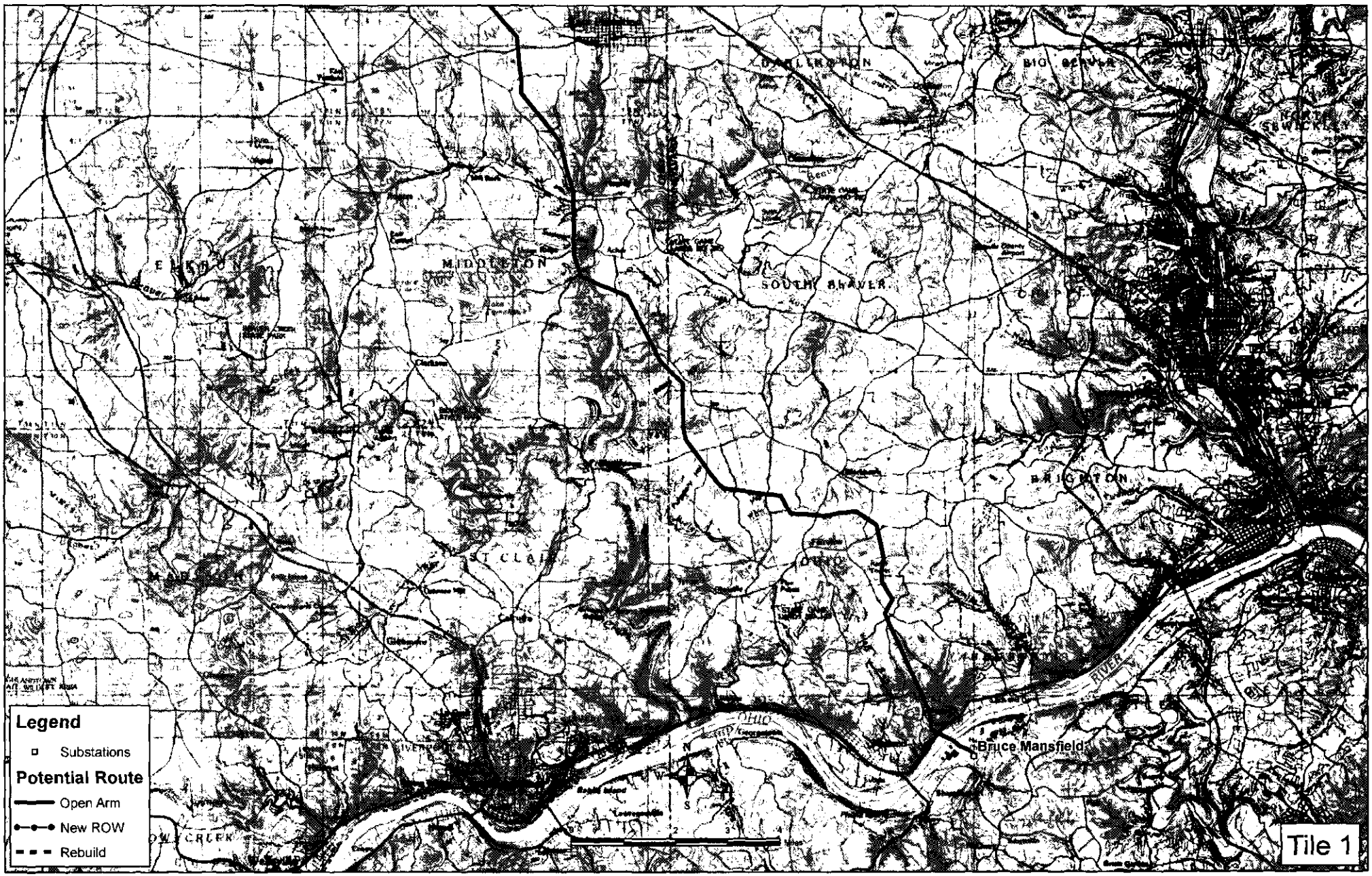
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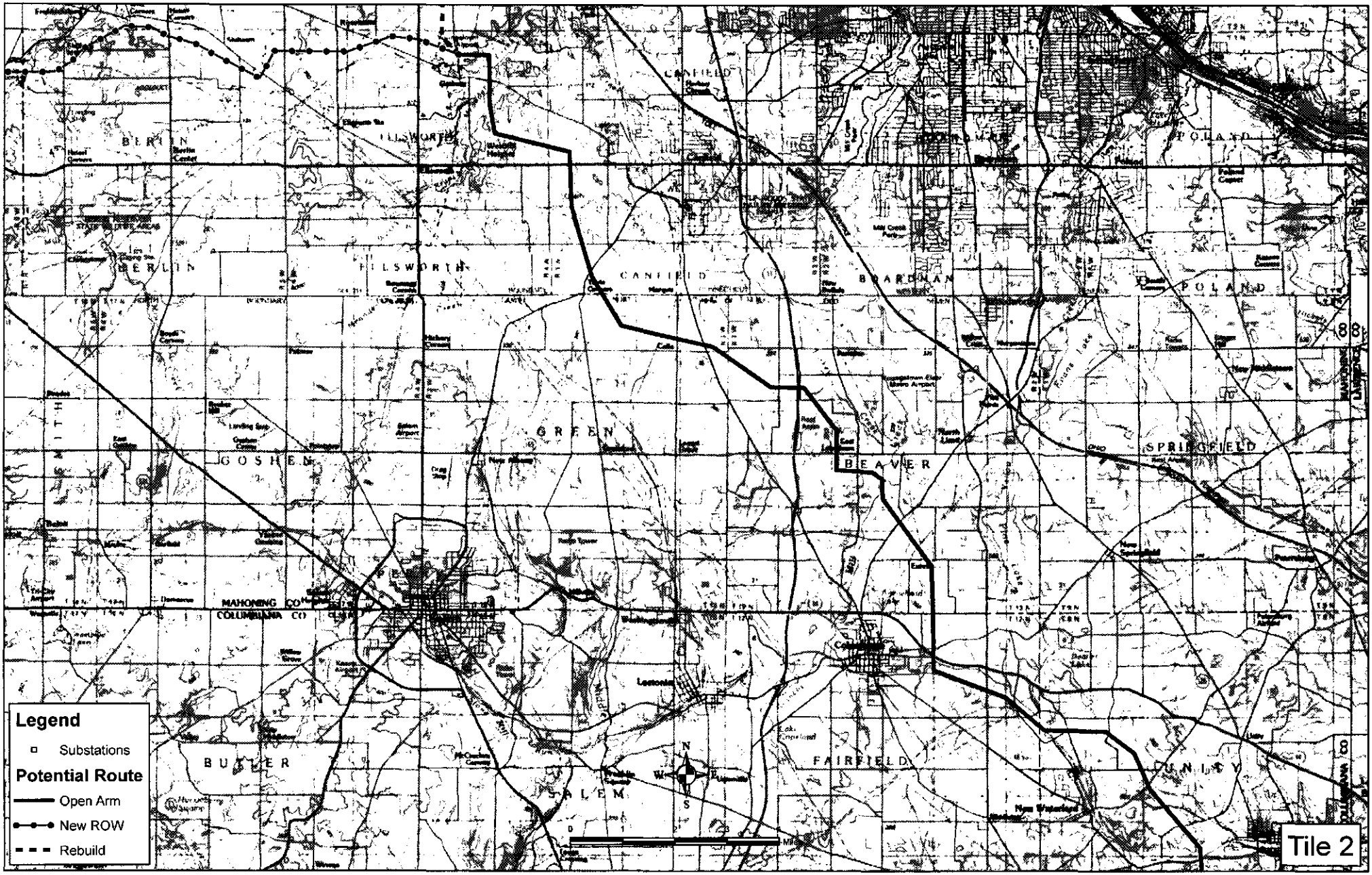
Substations
Potential Route
Open Arm
New ROW
Rebuild
Bruce Mansfield
Tile 1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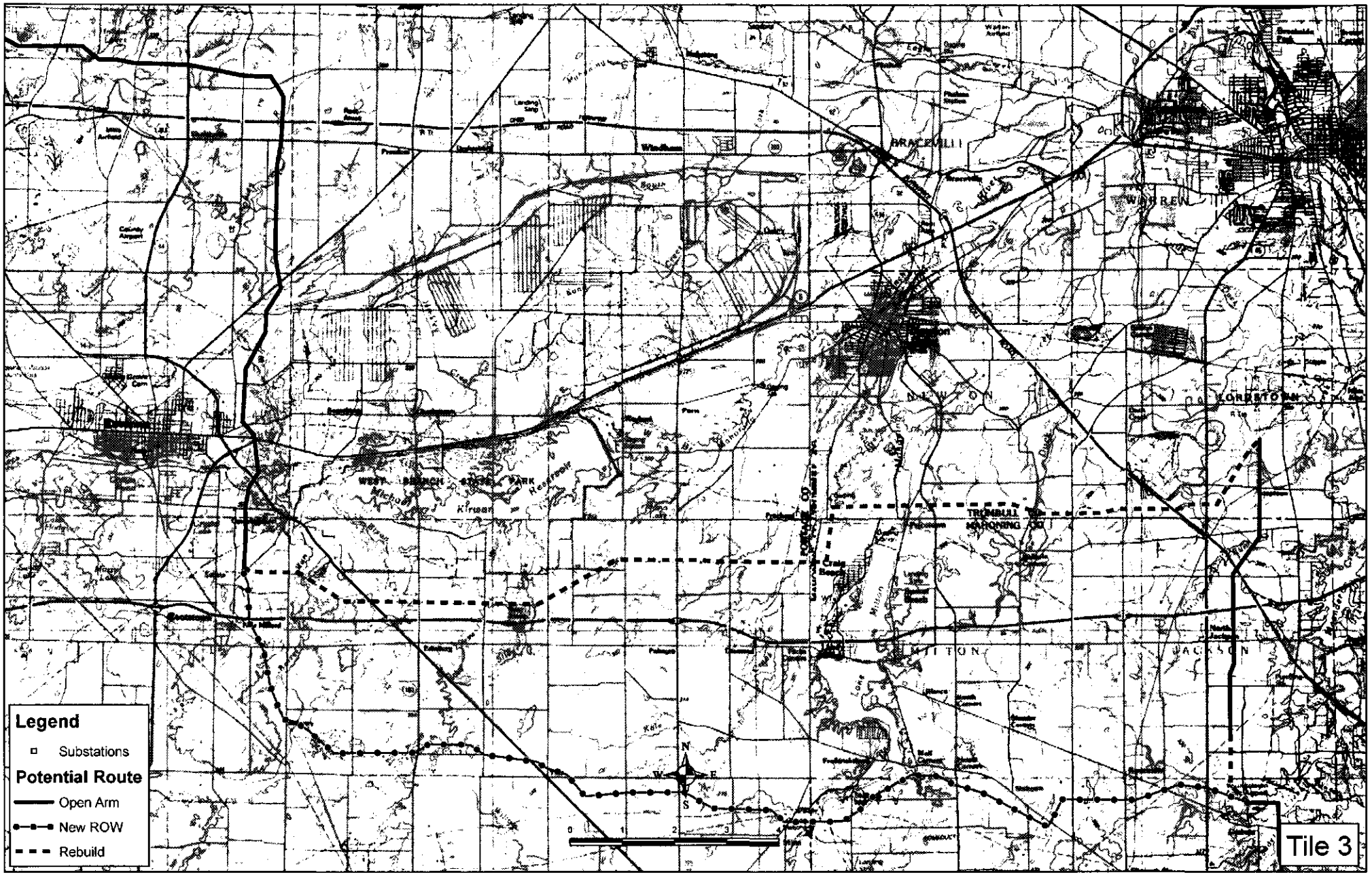
Open Arm
New ROW
Rebuild
BERLIN
FILLSWORTH
CANFIELD
BOARDMAN
POLAND
GOSHEN
GREEN
BEAVER
SPRINGFIELD
MAHONING CO
COLUMBIANA CO
BUTLER
SALEM
FAIRFIELD
Tile 2


Legend
Substations
Potential Route
Open Arm
New ROW
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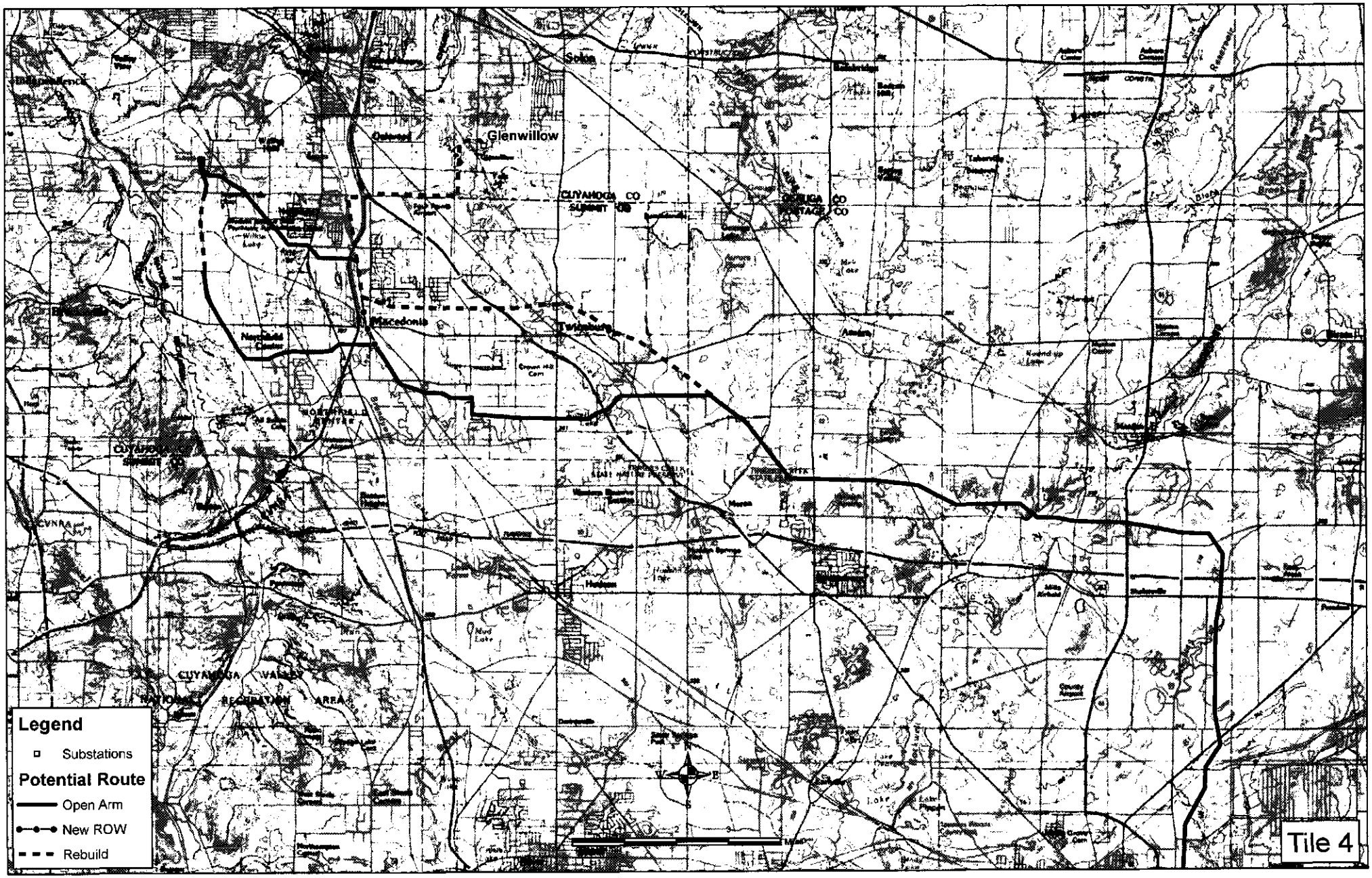
Solon
Glenwillow
Macedonia
Twinsburg
Hudson
CUYAHOGA VALLEY NATIONAL RECREATION AREA
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Tile 4

THE Louis Berger Group, INC.

June 1, 2012

Mark J. Epstein
Resource Protection and Review Department Head
Ohio Historic Preservation Office
800 E. 17th Avenue
Columbus, OH 43211

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As shown on the attached maps, the potential routes in Ohio are located in Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties and may traverse through Fairfield, Middleton, and Unity townships in Columbiana County; Beaver, Berlin, Canfield, Ellsworth, Green, Jackson, and Milton townships in Mahoning County; Newton Township and the Village of Lordstown in Trumbull County; Deerfield, Edinburg, Palmyra, Ravenna, Rootstown, and Shalersville townships, and the cities of Aurora and Streetsboro in Portage County; Twinsburg, Northfield Center, and Sagamore Hills townships in Summit County; and the villages of Glenwillow, Oakwood, and Walton Hills in Cuyahoga County. The potential routes are located on the following USGS quadrangle maps: Atwater, Aurora, Canfield, Columbiana, Deerfield, East Liverpool North, East Palestine, Elkton, Lake Milton, Mantua, Midland, Newton Falls, Northfield, Ravenna, Salem, Twinsburg, and Warren.

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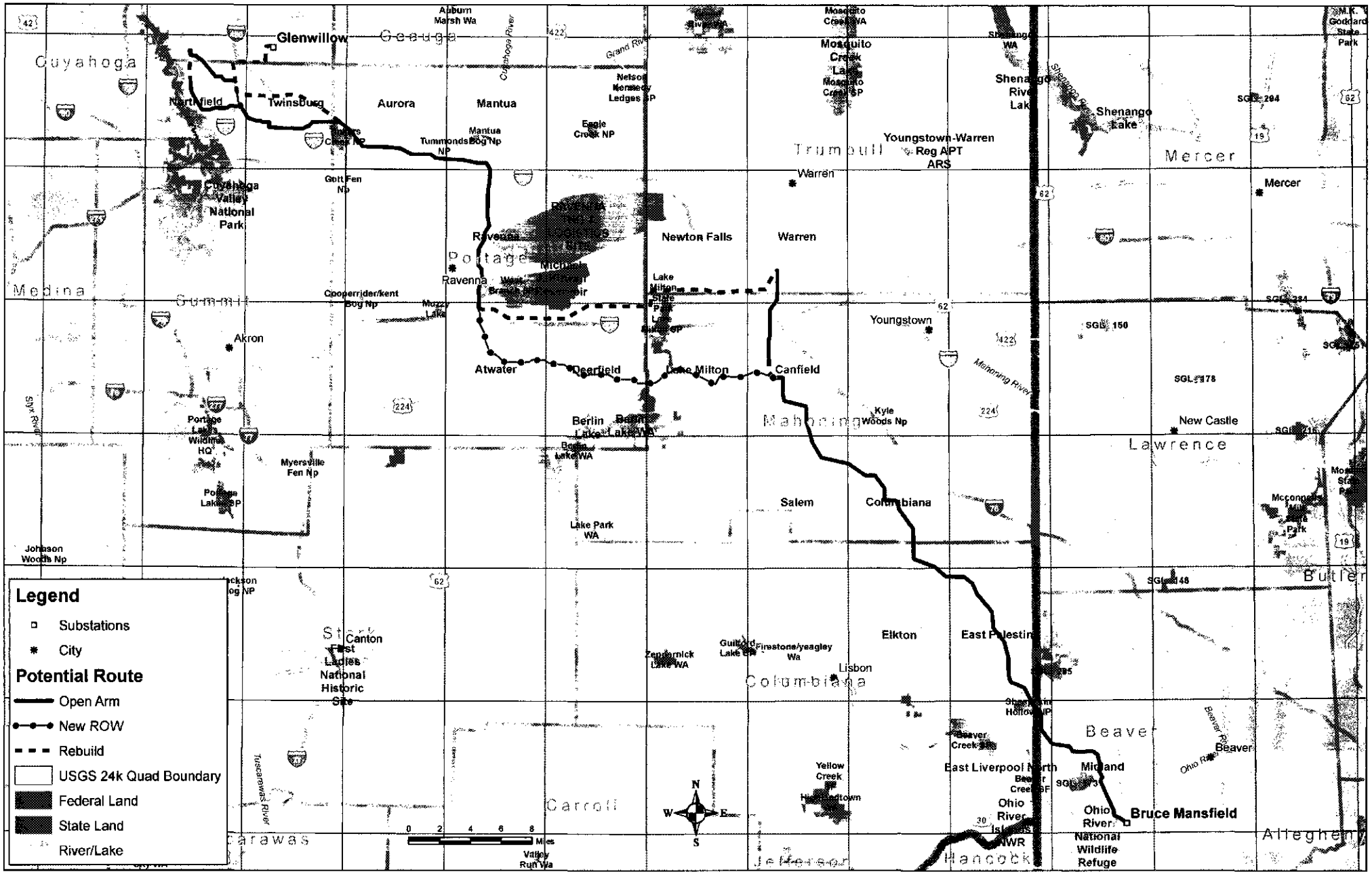
Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you are able to provide the locations of any records you find during your review on a GIS shapefile for us, we would appreciate that as well. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

cc: Jay Ruberto, FirstEnergy
Eric Voigt, Louis Berger Group

attachment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Substations
City
Potential Route
Open Arm
New ROW
Rebuild
USGS 24k Quad Boundary
Federal Land
State Land
River/Lake
Glenwillow
Twinsburg
Aurora
Mantua
Cuyahoga
Geauga
Portage
Trumbull
Mercer
Medina
Summit
Lawrence
Mahoning
Carroll
Columbiana
Beaver
Butler
Stark
Jefferson
Harrison
Allegheny
Warren
Youngstown
Akron
Ravenna
Newton Falls
Atwater
Deerfield
Lake Milton
Canfield
Salem
Columbiana
New Castle
Shenango Lake
Mosquito Creek Lake
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Berlin Lake
Lake Park WA
Kyle Woods Np
Myersville Fen Np
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Canton East Ladies National Historic Site
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Ohio River
Bruce Mansfield
Ohio River National Wildlife Refuge
Shenango River Lake
Mahoning River
Beaver Creek
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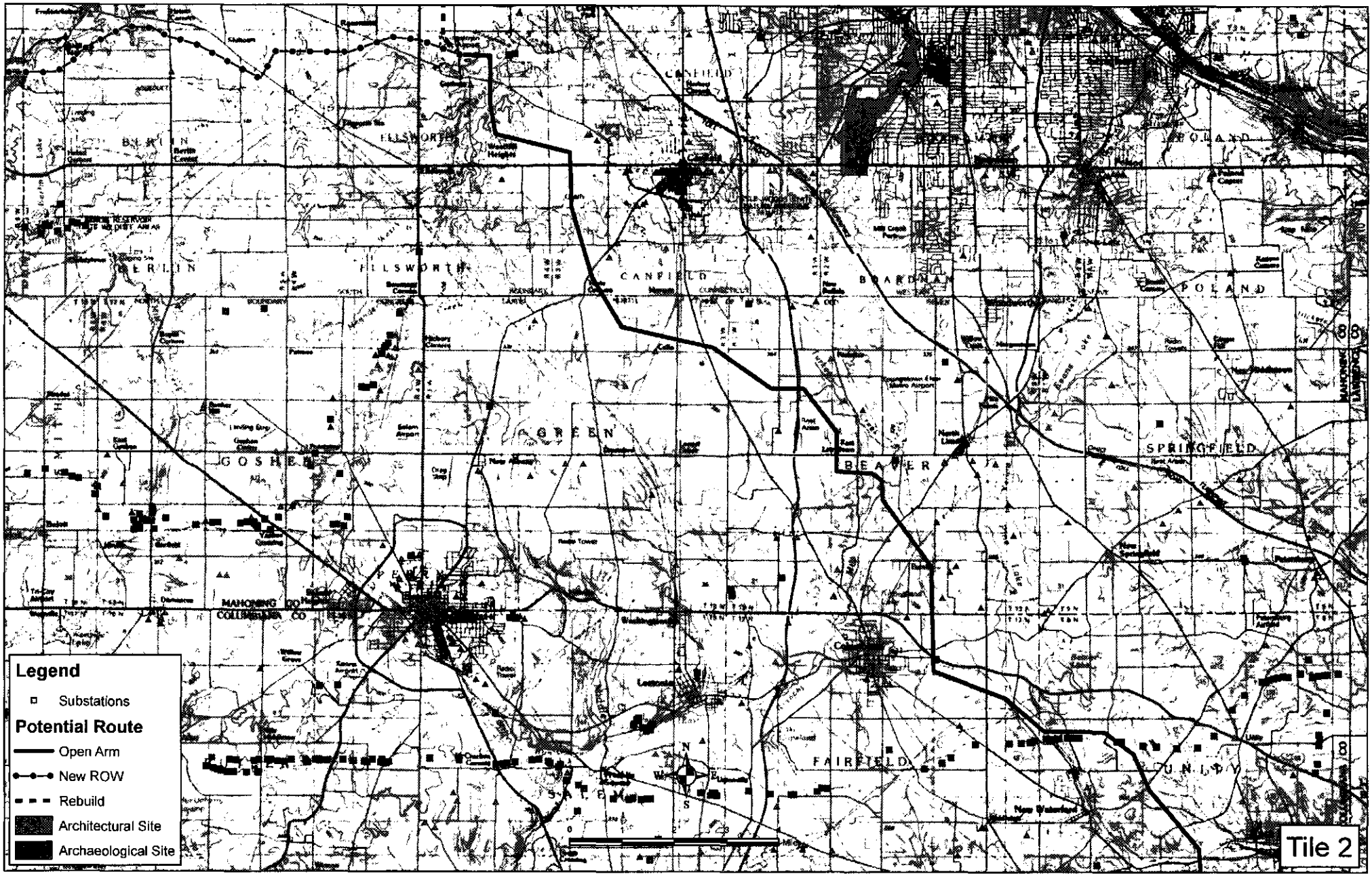
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Architectural Site
Archaeological Site
Bruce Mansfield
Tile 1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Potential Route
Open Arm
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Rebuild
Architectural Site
Archaeological Site
Tile 2
BERLIN
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CANFIELD
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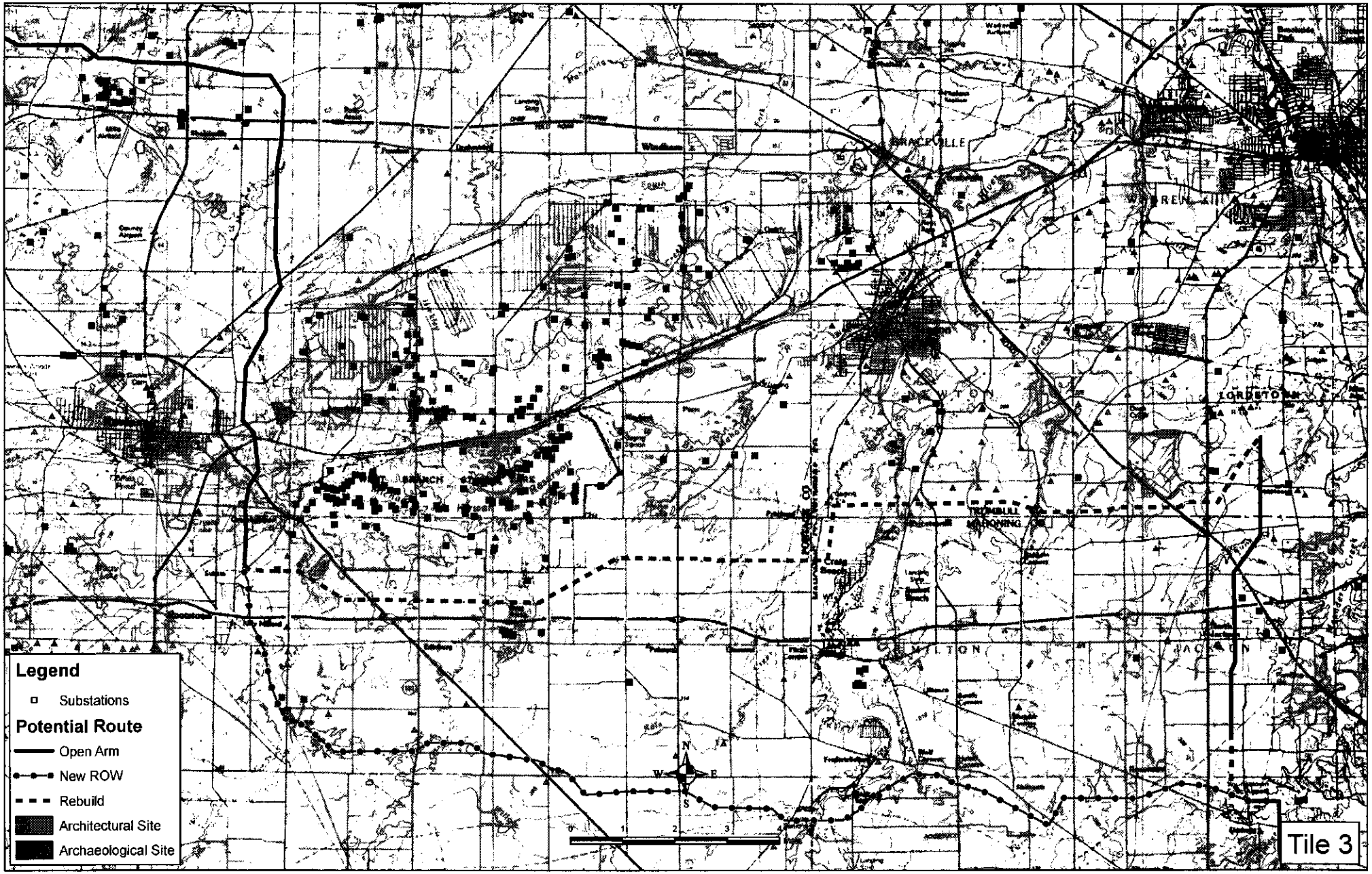
SPRINGFIELD
FAIRFIELD
MAHONING CO
COLUMBIANA CO


Legend
Substations
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Architectural Site
Archaeological Site
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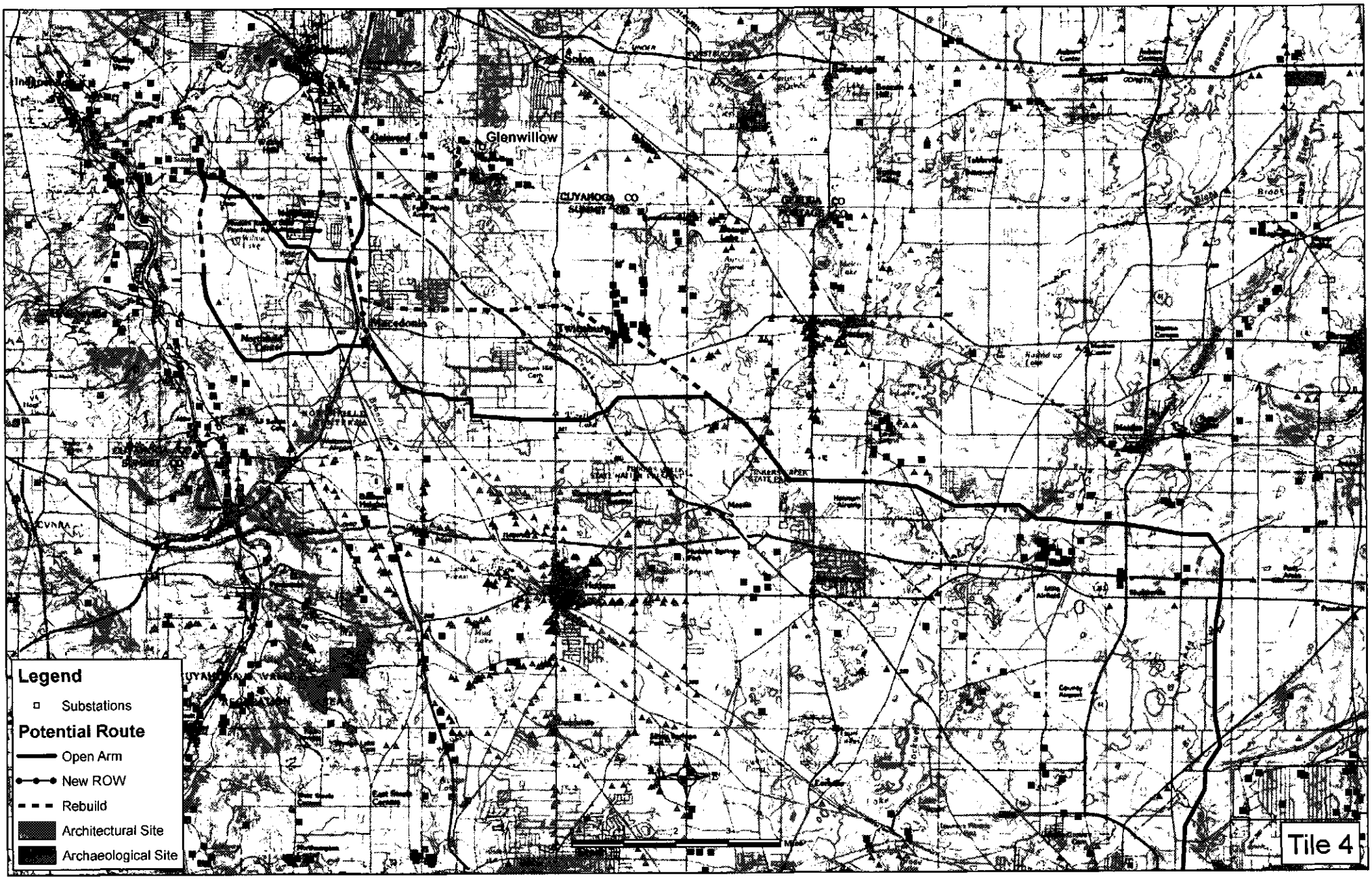
Tile 3


Solon
Glenwillow
CUYAHOGA CO
Legend
Substations
Potential Route
Open Arm
New ROW
Rebuild
Architectural Site
Archaeological Site
Tile 4

Agency Responses Received

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

June 20, 2012

The Louis Berger Group
Attn: Sue Sutter
1001 Elm Street, Suite 203
Manchester, NH 03101

TAILS: 03E15000-2012-TA-0880

Re: FirstEnergy Service Company
Bruce Mansfield,-Glenwillow 345 kV Transmission Line
Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties

Dear Ms. Sutter:

This is in response to your May 25, 2012 letter requesting information on federally threatened and endangered species that might be present in the vicinity of the above referenced project. The project involves the construction of a new 345 kV transmission line and new substation. The transmission line will be approximately 110 miles and will connect the existing Bruce Mansfield Substation in Shippingport, Beaver County, Pennsylvania to the proposed new substation in Glenwillow, Cuyahoga County, Ohio. The majority of the route will utilize an existing open arm alignment in an existing Right of Way. Two sections of the route have two potential alignments, one section is located in northern Summit County; the second section is located in Portage, Mahoning and potentially Trumbull Counties. The two proposed routes in Mahoning and Portage Counties would require the construction of a new Right of Way in the southern option, or the rebuilding of an existing line to the north.

There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

The U.S. Fish and Wildlife Service recommends that proposed activities minimize water quality impacts and impacts to quality fish and wildlife habitat, such as forests, streams, and wetlands. Riparian zone habitat should be preserved wherever possible. Vegetated areas along streams and rivers stabilize the banks, provide fish and wildlife habitat, filter pollutants and excess nutrients, store excess water during storm events, and minimize sedimentation. Best Management Practices (BMP's) should be utilized to minimize sedimentation and erosion. All disturbed areas should be mulched and revegetated with native woody and herbaceous species.

MIGRATORY BIRD COMMENTS: The project lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*), a species protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Due to the project type, location, and onsite habitat, this species would not be expected within the project area, and no impact to this species is expected. Relative to this species, this precludes the need for further action on this project as required by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation,

pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

A portion of the proposed route crosses Summit County's Liberty Metropark, an area known to support Indiana bats, and a suspected Indiana bat hibernaculum. Liberty Metropark is located northwest of the intersection of Route 82 and the Summit/Portage County line. In addition, portions of the proposed route cross Cuyahoga Valley National Park, also known to support Indiana bats. Furthermore, female Indiana bats were captured at these locations, indicating the likely presence of maternity colonies of Indiana bats within the vicinity of the project. Within a five mile radius of a hibernaculum, data indicate that Indiana bats are present year-round. Suitable habitat (as defined above) within the five-mile radius is especially important for fall swarming and spring staging activities. During swarming, Indiana bats move in and out of hibernacula from dusk to dawn with most continuing to roost in trees during the day. Swarming is a critical time period for Indiana bats for breeding and increasing winter fat storage for hibernation. Spring staging is a stressful period for Indiana bats because their fat reserves are low from their recent hibernation, food resources in the surrounding environment are still scarce, and their upcoming migration to summer habitat may be hazardous. In addition, male Indiana bats often stay near hibernacula throughout the entire summer and can be assumed to be present in small numbers within a 10-mile radius.

Your letter indicates that the one of the potential routes through this area would require no additional tree clearing due to the utilization of an open arm on an existing transmission line alignment. The other potential route may require some tree clearing to rebuild an existing transmission line. The Service recommends that route minimizing impacts to the habitat described above be utilized.

Even with the utilization of existing Right of Ways, the Service is very concerned with the potential for negative impacts on the Indiana bat from the loss of suitable habitat in close proximity to the hibernaculum. In order for the Service to evaluate potential impacts to the Indiana bat, the Applicant must submit additional information. We recommend including the following information:

1. A map of the site with all forested areas indicated, and a general description of the habitat, including acreage, dominant species composition, age, density of understory, and canopy cover, and representative photos of these areas.
2. A map identifying the location of any exposed bedrock that supports caves, crevices, fissures, or sinkholes, or abandoned mines of any kind, and representative photos of these areas.
3. A map indicating the location of suitable roost trees (dead or live trees with peeling bark, cracks, or crevices), and describe species, condition (live or dead), size (dbh), and canopy cover. In particular, potential maternity roost trees should be located and quantified. Potential maternity roosts are typically large diameter trees with peeling bark that receive solar exposure for at least half the day. Please include representative photos of these trees.
4. A map indicating the location of any wetlands, streams, ponds, and cleared paths or trails.
5. A description and quantification of any forested parcels and potential roost trees onsite that will be preserved.
6. A description of any other forested properties within the vicinity of the project that are protected in perpetuity (ex. parks, conservation easements, etc.).
7. A description of the connectivity of forested areas onsite and other adjacent forested parcels.

8. A list of avoidance and minimization measures to protect the bat and its habitat (such as preservation of suitable habitat, seasonal tree clearing, etc.).
9. Using the information above as justification, please include your determination of whether or not the project is likely to adversely affect the Indiana bat.

Based on this information, the Service will evaluate potential impacts to the Indiana bat from the proposed project. Depending on the extent of impacts to suitable Indiana bat habitat, we may recommend mist net or emergence surveys to determine bat usage of the project area. These surveys must be designed and conducted in coordination with this office, and *may only be completed between May 15 and August 15* by a permitted Indiana bat. Furthermore, if the habitat evaluation and/or mist net surveys do not provide sufficient information to document a "not likely to adversely affect" determination, formal consultation under section 7 of the Endangered Species Act of 1973, as amended, will be necessary.

The portions of the proposed project that may cross Newton and Lordstown Townships in Trumbull County and Streetsboro Township in Portage County, lie within the range of the **eastern massasauga** (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. Since designated as a candidate species in 1999, it has declined significantly throughout its range and populations in Ohio that were once throughout glaciated portions of the state, are now small and isolated. The species has been listed by the State of Ohio as endangered since 1996. Several factors have contributed to the decline of the species including habitat loss and fragmentation, indiscriminate killing, collection, gene pool contamination and incompatible land use practices.

Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. Should the proposed project area contain any of the habitat types or features described above, we recommend that a habitat assessment be conducted to determine if suitable habitat for the species exists within the vicinity of the proposed site. Please note that habitat assessments should only be conducted by approved eastern massasauga surveyors due to variable habitat types and cryptic nature of the species. Any habitat assessments or surveys should be coordinated with this office.

The proposed project lies within the range of the **eastern hellbender** (*Cryptobranchus a. alleganiensis*), a Federal amphibian species of concern and an Ohio endangered species. The eastern hellbender is a salamander that inhabits perennial streams with large, flat rocks and is known to occur in the North Fork of Little Beaver Creek in Columbiana County. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the eastern hellbender in the vicinity of the proposed project site. The following herpetologists are authorized to conduct hellbender surveys within the State of Ohio:

Jeff Davis	Greg Lipps	Doug Wynn
625 Crescent Road	1473 County Road 5-2	241 Chase Street, Apt. A3L
Hamilton, OH 45013	Delta, OH 43515	Russells Point, OH 43348
anura@fuse.net	GregLipps@aol.com	Sistrurus@aol.com
(513) 868-3154	(419) 376-3441	(614) 306-0313

The proposed project lies within the range of the **Mitchell's satyr** (*Neonympha mitchellii*), a federally listed endangered butterfly. The favored habitat for this species is sedge-dominated fens with low shrubs

and tamaracks. Appropriate habitat may exist in Aurora Township, Portage County. If this habitat is found on the site, further coordination with this office will be necessary to determine if a survey is warranted.

The project lies within the range of three federally endangered freshwater mussels, the **clubshell** (*Pleurobema clava*), **sheepnose** (*Plethobasus cyphyus*) and **snuffbox** (*Epioblasma triquetra*); two federally endangered birds, the **piping plover** (*Charadrius melodus*) and **Kirtland's warbler** (*Setophaga kirtlandii*); and **northern monkshood** (*Aconitum noveboracense*), a federally listed threatened plant species. Due to the project type, location, and onsite habitat, these species would not be expected within the project area, and no impacts to these species are expected.

Should additional information on listed or proposed species or their critical habitat become available or if new information reveals effects of the action that were not previously considered, our comments and recommendations may be reconsidered. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. If you have questions, or if we may be of further assistance in this matter, please contact David Henry at extension 27 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH,

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

July 24, 2012

The Louis Berger Group
Attn: Sue Davis
1001 Elm Street, Suite 203
Manchester, NH 03101

TAILS: 03E15000-2012-TA-0880

Re: Bruce Mansfield-Glenwillow 345 kV Transmission Project
Indiana Bat (*Myotis sodalis*) Surveys and Section 7 Requirements
Columbiana, Mahoning, Trumbull, Portage, Summit and Cuyahoga Counties, Ohio

Dear Ms. Davis:

This is in response to your July 3, 2012 e-mail requesting confirmation of the proposed survey and avoidance measures taken to avoid impacts to the Indiana bat. Based on the information in our June 20, 2012 letter and subsequent phone conversations, the measures necessary to avoid impacts to Indiana bats in the northwestern section of the transmission line (north and west of Page Road in Streetsboro, Ohio) are different from the remaining alignment due to the presence of potential hibernacula and female Indiana bat capture records. Although two approaches to avoiding and minimizing impacts to the Indiana bat are being employed for this project, no tree clearing should be initiated anywhere within the project area until all Indiana bat studies (habitat evaluations, mist-net surveys, emergence surveys) have been completed and the results of these studies have been coordinated and approved by the USFWS.

In areas south and east of the intersection with Page Road (outside the 5-mile buffer):

- Mist net surveys are not required in areas where only a narrow amount of clearing is required (in the 10-20' wide category, if the linear length of clearing is not excessive) if tree clearing occurs only between the dates of September 30 and April 1.
- If the winter tree clearing restrictions cannot be met, mist net surveys need to take place and be submitted to USFWS for review.
- No habitat assessments are required in this section of the project area.

In areas within the buffer around the suspected hibernaculum in Liberty Park and the female capture near Cuyahoga Valley NP (north and west of Page Road):

- No mist net surveys to take place west and north of Page Street in Streetsboro.
- Habitat assessments need to take place for all areas within this buffer where trees need to be cut
- All habitat assessments will be submitted to USFWS for review.
- For identified potential maternity roost trees that are proposed to be cut; the coordinates, a description of the tree characteristics (size, amount of pealing bark, solar exposure etc.), photographs, and a description of the available roosting habitat in the vicinity, must be provided in the habitat assessment.
- Based on the information in the habitat assessment, emergence surveys may be necessary to determine if bats are utilizing the potential roost trees. Emergence surveys may only be conducted

between the dates of May 15 and August 15, when the presence of maternity colonies could be detected.

- Should an emergence survey detect bats utilizing a potential roost tree, the USFWS will be consulted to determine if further surveys will be necessary or if an incidental take permit will be necessary.
- All project activities within Liberty Metro Park should be coordinated with Metro Parks, Serving Summit County.

Section 404 permits issued by the US Army Corps of Engineers are required to complete this project. As a result, the Corps is required by section 7(a)(2) of the Endangered Species Act (ESA) to insure that any action it authorizes is not likely to jeopardize the continued existence of any listed species. Consultation with the Service is required for any action that may affect listed species. "Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02). "Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). Since no individual segment of the proposed transmission line has independent utility aside from the complete project, no tree clearing on any portion of the alignment should occur until consultation under section 7 of the ESA between the Service and the Federal action agency is completed. We recommend that the Federal action agency submit to this office a determination of effects for the entire action area to the Indiana bat for our review and concurrence.

Should additional information on listed or proposed species or their critical habitat become available or if new information reveals effects of the action that were not previously considered, our comments and recommendations may be reconsidered. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If you have questions, or if we may be of further assistance in this matter, please contact David Henry at extension 27 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

mjohnson@summitmetroparks.org

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR | JAMES ZEHRINGER, DIRECTOR

Division of Parks & Recreation
Glen Cobb, Chief
2045 Morse Road – C3
Columbus, OH 43229-6693
Phone: (614) 265-6561 Fax: (614) 261-8407

June 21, 2012

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.
100 Commercial Street
2nd Floor North
Manchester, NH 03101

RE: Bruce Mansfield-Glenwillow 345 kV Transmission Line Project

Dear Ms. Sutter:

Thank you for allowing the Ohio Department of Natural Resources, Division of Parks and Recreation (Division) the opportunity to review and comment on the proposed project mentioned above.

By the information provided it appears a portion of the project may affect some of the Division's managed properties, including parks and preserves. If this is the case the Division prefers the project be routed away from the parks and preserves; new right of ways will most likely not be granted in regards to preserves. If Division land and/or water will be affected by this project please contact Jayne Maxwell, the Division's Real Estate Manager, at 614-265-6512 to discuss the necessary agreement. Please contact Mrs. Maxwell at least 7 (seven) months prior to any work taking place on Division property; all comments and requirements will be addressed at this time.

It appears the Louis Berger Group is requesting an Ohio Biodiversity Database search regarding this project. The Division of Wildlife (DOW) handles such requests and I will forward the project information to DOW today.

Should you have any questions please contact me at 614-265-6568 or at melissa.taylor@dnr.state.oh.us.

Sincerely,

Melissa Taylor, Outdoor Recreation Planner
Division of Parks and Recreation

cc: Greg Schneider, Ohio Biodiversity Database Program Administrator, DOW
Jayne Maxwell, Real Estate Manager, Division of Parks and Recreation
Louis Andres, North Central District Manager, Mohican State Park
Doug Lyons, Northeast District Manager, Wingfoot Lake State Park

JUN 25 2012

From: Kessler, John [John.Kessler@dnr.state.oh.us]
Sent: Wednesday, August 08, 2012 11:45 AM
To: Davis, Susan
Subject: FW: 12-474 Bruce Mansfield
Attachments: fe ma.dbf; fe sr.shx; fe sr.shp; fe sr.sbx; fe sr.sbn; fe sr.prj; fe sr.dbf; fe species half mile buffer.shx; fe species half mile buffer.shp; fe species half mile buffer.sbx; fe species half mile buffer.sbn; fe species half mile buffer.prj; fe species half mile buffer.dbf; fe ma.shx; fe ma.shp; fe ma.sbx; fe ma.sbn; fe ma.prj; Glenwillow ODNR Repsonse_6-21-12.pdf

ODNR COMMENTS TO: Sue Davis, The Louis Berger Group, Inc.; sjdavis@louisberger.com

Project: Bruce Mansfield – Glenwillow 345 kV Transmission Line

Location: Columbiana, Mahoning, Trumbull, Portage, Summit, and Cuyahoga Counties

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The portion of the project located in Columbiana County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (Populus deltoides), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the sheepnose (*Plethobasus cyphyus*), a state endangered and federal endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federal endangered mussel. If there is a history of mussels near the proposed project area, it may be necessary for a professional malacologist approved by the DOW to conduct a mussel survey in the project area. Surveys are to be done within six months before in-water work. If no in-water work is proposed, the project is not likely to impact these species.

The project is within the range of the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. Due to the lack of records in the project area for this species, the project is not likely to impact this species.

The project is within the range of the bald eagle (*Haliaeetus leucocephalus*), a state threatened species. However, the Ohio Biodiversity Database (recently renamed the Ohio National Heritage Database) currently has no records of this species near the project area.

The project is within the range of the Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), a state endangered amphibian currently being evaluated for Federal Candidate status. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from that area. Therefore, if in-water work in perennial streams is proposed for this project, a survey conducted by an approved herpetologist is required to determine the presence or absence of the species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species. Due to the mobility of these species, the project is not likely to have an impact on these species.

The project is within the range of the American bittern (*Botaurus lentiginosus*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Nesting bitterns prefer large undisturbed wetlands that have scattered small pools amongst dense vegetation. They occasionally occupy bogs, large wet meadows, and dense shrubby swamps. If this type of habitat will be impacted, construction must be avoided in this habitat during the species' nesting period of May 1 to July 31. If this type of habitat will not be impacted, the project is not likely to impact this species.

The portion of the project located in Mahoning County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis*), Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (*Populus deltoides*), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consjsts of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the bald eagle (*Haliaeetus leucocephalus*), a state threatened species. However, the Ohio Biodiversity Database currently has no records of this species near the project area.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species. Due to the mobility of this species, the project is not likely to have an impact on this species.

The project is within the range of the Northern harrier (*Circus cyaneus*), a state endangered bird. This is a common migrant and winter species. Nesters are much rarer, although they occasionally breed in large marshes and grasslands. Harriers often nest in loose colonies. The female builds a nest out of sticks on the ground, often on top of a mound. Harriers hunt over grasslands. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Therefore, if this type of habitat will be impacted, construction must not occur in this habitat during the species' nesting period of May 15 to August 1. If this habitat will not be impacted, the project is not likely to impact this species.

The project is within the range of the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. If wetlands are within the vicinity of the project area, a habitat survey is required on the proposed site to determine if eastern massasaugas are likely to occur on site. The survey must be done by a professional herpetologist approved by the DOW. If necessary, a presence/absence survey may be required. If no wetland habitat is present in the vicinity of the project area, the project is not likely to impact the species.

A portion of the project crosses Vickers Nature Preserve, managed by Mill Creek Metroparks. This project should be coordinated with Mill Creek Metroparks.

The portion of the project located in Trumbull County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (Populus deltoides), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the clubshell (*Pleurobema clava*), a state and federally endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federal endangered mussel.

If there is a history of mussels near the proposed project area, it may be necessary for a professional malacologist approved by the DOW to conduct a mussel survey in the project area. If no in-water work is proposed, the project is not likely to impact these species.

The project is within the range of the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. Due to the lack of records in the project area for this species, the project is not likely to impact this species.

The project is within the range of the mountain brook lamprey *(Ichthyomyzon greeleyi*), a state endangered fish. The DOW recommends no in-water work in perennial streams at least April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed, the project is not likely to impact these species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species, and the bobcat (*Lynx rufus*), a state endangered species. Due to the mobility of these species the project is not likely to impact these species.

The project is within the range of the trumpeter swan (*Cygnus buccinator*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Trumpeter swans prefer large marshes and lakes ranging in size from 40 to 150 acres. They like shallow wetlands one to three feet deep with a diverse mix of plenty of emergent and submergent vegetation and open water. Therefore, if this type of wetland habitat will be impacted, construction must be avoided in this habitat during the species' nesting period of May 1 to August 1. If this type of wetland habitat will not be impacted, the project is not likely to impact this species.

The project is within the range of the yellow-bellied sapsucker (*Sphyrapicus varius*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Yellow-bellied sapsuckers occupy wet deciduous forests or the margins of bogs where yellow birch, beech and aspen are prevalent. Therefore, if tree removal is proposed in this type of habitat, tree removal must not occur during the species' nesting period of May 1 to July 1. If no tree removal is proposed, the project is not likely to impact this species.

The portion of the project located in Portage County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (Populus deltoides), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the pointed sallow (*Epiglaea apiata*), a state endangered moth, and the Mitchell's satyr (*Neonympha mitchellii*), a state and federally endangered butterfly. Due to the habitat used by these species and the type of work proposed, the project is not likely to impact these species.

The project is within the range of the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. If wetlands are within the vicinity of the project area, a habitat survey is required on the proposed site to determine if eastern massasaugas are likely to occur on site. The survey must be done by a professional herpetologist approved by the DOW. If necessary, a presence/absence survey may be required. If no wetland habitat is present in the vicinity of the project area, the project is not likely to impact the species.

The project is within the range of the bald eagle (*Haliaeetus leucocephalus*), a state threatened species. The Ohio Biodiversity Database currently has a record of this species near the project area. For guidance on reducing impacts to this nest, the DOW recommends the guidelines found at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf
Or,
http://www.fws.gov/midwest/eagle/guidelines/index.html

The project is within the range of the eastern pondmussel (*Ligumia nasuta*), a state endangered mussel. In addition, the Ohio Biodiversity Database has records for this species in the vicinity of the project.
Since there is a history of mussels near the proposed project area, it may be necessary for a professional malacologist approved by the DOW to conduct a mussel survey in the project area. If no in-water work is proposed, the project is not likely to impact this species.

The project is within the range of the American emerald (*Cordulia shurtleffi*), a state endangered dragonfly, the frosted whiteface (*Leucorrhinia frigida*), a state endangered dragonfly, the brush-tipped emerald (*Somatochlora walshii*), a state endangered dragonfly, and the chalk-fronted corporal (*Ladona julia*), a state endangered dragonfly. Wetland impacts must be avoided in order to avoid potential impacts to these species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species, and the bobcat (*Lynx rufus*), a state endangered species. Due to the mobility of these species, the project is not likely to have an impact on these species.

The portion of the project located in Summit County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. In addition, the Ohio Biodiversity Database has a record within the vicinity of the project area. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the bald eagle (*Haliaeetus leucocephalus*), a state threatened species. However, the Ohio Biodiversity Database currently has no records of this species near the project area.

The project is within the range of the elfin skimmer (*Nannothemis bella*), a state endangered dragonfly, the racket-tailed emerald (*Dorocordulia libera*), a state endangered dragonfly, and the chalk-fronted corporal (*Ladona julia*), a state endangered dragonfly. Wetland impacts must be avoided in order to avoid impacts to these species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species, and the bobcat (*Lynx rufus*), a state endangered species. Due to the mobility of these species, the project is not likely to have an impact on these species.

A portion of the project crosses Liberty Park, managed by Summit County Metroparks. This project should be coordinated with Summit County Metroparks.

The portion of the project located in Cuyahoga County is within the range of the following species:

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (Populus deltoides), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut,

cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the piping plover (*Charadrius melodus*), a state and federally endangered bird species, and the Kirtland's warbler (*Setophaga kirtlandii*), a state and federally endangered species. These species do not nest in the state but only utilize stopover habitat as they migrate through the region. Therefore, the project is not likely to have an impact on these species.

The project is within the range of the bald eagle (*Haliaeetus leucocephalus*), a state threatened species. However, the Ohio Biodiversity Database currently has no records of this species near the project area.

The project is within the range of the Canada darner (*Aeshna canadensis*), a state endangered dragonfly. Wetland impacts should be avoided in order to avoid this species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species, and the bobcat (*Lynx rufus*), a state endangered species. Due to the mobility of these species, the project is not likely to have an impact on these species.

The project is within the range of the king rail (*Rallus elegans*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Nests for this species are deep bowls constructed out of grass and usually hidden very well in marsh vegetation. Therefore, if this type of habitat will be impacted, construction must be avoided in this habitat during the species' nesting period of May 1 to August 1. If this type of habitat will not be impacted, the project is not likely to impact this species.

The project is within the range of the yellow-bellied sapsucker (*Sphyrapicus varius*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Yellow-bellied sapsuckers occupy wet deciduous forests or the margins of bogs where yellow birch, beech and aspen are prevalent. Therefore, if tree removal is proposed in this type of habitat, tree removal must not occur during the species' nesting period of May 1 to July 1. If no tree removal is proposed, the project is not likely to impact this species.

Attached is a set of ArcView shape files with the Ohio National Heritage Database records for the Bruce Mansfield-Glenwillow 345 kV Transmission Line Project. The files are projected in NAD83 Ohio State Plane South. The units are feet. Records included in the "data" layer may be for rare and endangered plants and animals, geologic features, high quality plant communities and animal assemblages. Fields included are scientific and common names, state and federal statuses, as well as managed area and date of the most recent observation. State and federal statuses are defined as: E = endangered, T = threatened, P = potentially threatened, SC = species of concern, SI = special interest, A = recently added to inventory, status not yet determined, FE = federal endangered, FT = federal threatened, FPE = federal potentially endangered, FC = federal candidate and FSC = federal species of concern.

Please note that wetlands known to contain an individual of or documented occurrences of federal or state-listed threatened or endangered plant or animal species are most likely considered high quality, Category 3 wetlands by the Ohio Environmental Protection Agency.

State Forests: The Division of Forestry has the following comments

This project crosses Beaver Creek State Forest. This portion of the project should be coordinated with the ODNR Division of Forestry. Please contact Cotton Randall at 614-265-6667 or cotton.randall@dnr.state.oh.us for assistance.

State Scenic Rivers: The Division of Watercraft has the following comments.

This project crosses Little Beaver Creek State Scenic River. This project should be coordinated with the ODNR Scenic Rivers Program. Please contact Bob Gable, Scenic Rivers Program Manager, at 614-265-6814 or bob.gable@dnr.state.oh.us for assistance.

Parks and Recreation: Please refer to the June 21, 2012 correspondence to you from Melissa Taylor, Outdoor Recreation Planner (attached).

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler, P.E.
Ohio Department of Natural Resources
Office of Real Estate
2045 Morse Rd., Columbus, OH 43229-6605
phone: 614-265-6621
email: john.kessler@dnr.state.oh.us

APPENDIX 6-2: OFFICIALS SERVED COPY OF APPLICATION
Glenwillow Transmission Switching Substation Project
Case NO. 12-1727-EL-BSB

Cuyahoga County

Ed Fitzgerald, County Executive
Cuyahoga County Council
County Administration Building
1219 Ontario Street, 4th Floor
Cleveland, OH 44113

Ellen Connally, President, County Council
Cuyahoga County Council
County Administration Building
1219 Ontario Street, 4th Floor
Cleveland, OH 44113

Jeanne M. Schmotze
Clerk of Council
Cuyahoga County Council
County Administration Building
1219 Ontario Street, 4th Floor
Cleveland, OH 44113

Jack Schron, County Council Member – District 6
County Administration Building
1219 Ontario Street, 4th Floor
Cleveland, OH 44114

Mr. Nathan Kelly, Chair
Cuyahoga County Planning Commission
County Administration Building
1219 Ontario Street
Cleveland, OH 44113

Glenwillow Village

Mark A. Cegelka, Mayor
29555 Pettibone Road
Glenwillow, OH 44139

John A Baca, Vice-Mayor – Ward 2
29555 Pettibone Road
Glenwillow, OH 44139

Bill Davis, Planning Commission Chairman
29555 Pettibone Road
Glenwillow, OH 44139

Michael E. Henry, Engineer
29555 Pettibone Road
Glenwillow, OH 44139

County Park Districts

Cleveland MetroParks
Attn: Dan T. Moore, President
4101 Fulton Parkway
Cleveland, OH 44144

Libraries

Cuyahoga County Public Library
Solon Branch
Attn: Lane Edwards
34125 Portz Parkway
Solon, OH 44139-6803

Newspaper Advertisement

Notice of Public Information Meeting for Proposed Major Utility Facility

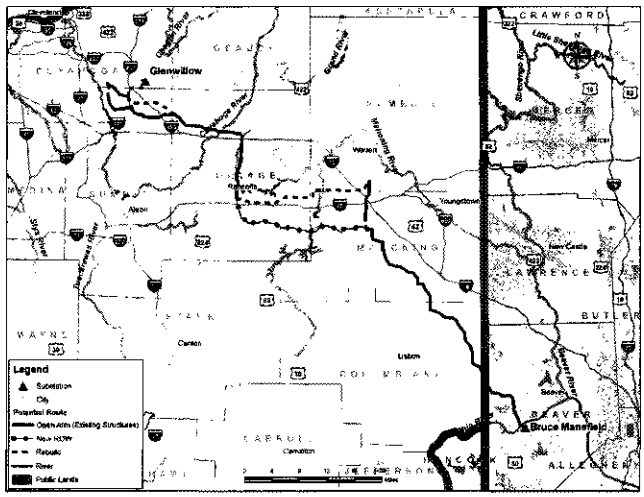
American Transmission Systems, Incorporated (ATSI), and Trans-Allegheny Interstate Line Company (TrAILCo), subsidiaries of FirstEnergy Corp. (FirstEnergy) that own portions of the company's transmission lines, will hold public information meetings to discuss the proposed Bruce Mansfield-Glenwillow 345 kV Electric Transmission Line and new Glenwillow Substation projects. The purpose of the meetings is to explain the Ohio portion of the proposed projects and to seek input from the community. The meetings will be held on Monday, June 18, 2012 from 6:00 p.m. to 8:00 p.m. in the East Palestine Elementary School, located at 360 West Grant St., East Palestine, Ohio; Tuesday, June 19, 2012 from 6:00 p.m. to 8:00 p.m. in the Mahoning County Career and Technical Center, located at 7300 North Palmyra Rd., Canfield, Ohio; Wednesday, June 20, 2012 from 6:00 p.m. to 8:00 p.m. in the Maplewood Career Center, located at 7075 State Route 88, Ravenna, Ohio; and Thursday, June 21, 2012 from 6:00 p.m. to 8:00 p.m. in the Nordonia High School cafeteria, located at 8006 S. Bedford Rd., Macedonia, Ohio.

The proposed projects are needed to reinforce the transmission system to address potential transmission reliability issues as generation plants are retired in the region. PJM, the regional transmission organization that coordinates the movement of electricity in this region, has identified the need for these projects to ensure continued system reliability. PJM and FirstEnergy have projected it will be a challenge to meet mandated reliability requirements in 2015 without these planned system enhancements. The new equipment will help prevent the overloading of critical transmission facilities that are necessary to serve customers and maintain acceptable voltages in the region.

The proposed project will consist of a new 345 kV transmission line and a new transmission substation. The transmission line will be approximately 110 miles in length depending upon the route chosen and connect the existing Bruce Mansfield Substation, located along Shippingport Rd. in Shippingport, Pennsylvania, to a new transmission substation, named Glenwillow Substation, proposed to be located in or near Glenwillow, Ohio. The company has carefully studied the general project area to identify potentially sensitive areas and land uses, and has evaluated multiple routes for the transmission line in an effort to identify the most appropriate route. It is anticipated much of the line will be proposed to be installed on existing transmission structure "open arms" that were constructed originally with the expectation that an additional circuit would someday be needed. As a result, a second circuit can be installed without adding more structures or increasing the width of the right-of-way. The company anticipates that it will propose the open arm segments as part of the both the Preferred and Alternate routes for the project and will only propose separate Preferred and Alternate routes where new transmission line structures are proposed to be installed. As shown on the map, open arm segments that the company may use include approximately 40 miles between the Bruce Mansfield Substation and Ellsworth Township, Mahoning County; approximately 10 miles between Ellsworth and Lordstown Township, Trumbull County; approximately 20 miles between Rootstown Township and Aurora Township, Portage County; and at least 10 miles in the Twinsburg and Macedonia areas in Summit County.

The other segments of the proposed line are anticipated to be a combination of new construction and rebuilding existing lines to make them capable of accommodating an additional line. The final design depends on the route that is ultimately selected. In areas where structures can be rebuilt, little if any new right of way is expected to be needed. In both new and rebuilt areas, the steel poles supporting the wires are expected to be approximately 130-175 feet tall.

The proposed Glenwillow Substation will connect to the new Bruce Mansfield-Glenwillow 345 kV line as well as with two existing 345 kV lines that pass close to the proposed substation site. Potential suitable sites for the substation are located in close proximity to these existing transmission lines as shown on the map included with this notice.



The Ohio portion of the transmission project falls under the jurisdiction of the Ohio Power Siting Board ("OPSB"). Before construction can begin on the transmission line or substation, the company must file two applications with the OPSB, one for the transmission line and one for the substation. The OPSB must issue a Certificate of Environmental Compatibility and Public Need for both the line and the substation. The application for the line will likely identify a preferred route and an alternate route in areas where the open arm will not be used. The application for the Glenwillow Substation will identify a preferred and alternate site. It is expected that the company plans to make the necessary submittals to the OPSB for the project later this year. If all approvals are granted, construction on the project will begin in 2013.

Public comments from the meetings will be considered as part of the company's process of further evaluating the proposed line routes and substation sites. If you cannot attend the meetings but wish to comment on the projects, please leave a message for the project team at 1-800-589-2837, or send your written comments or questions to FirstEnergy Service Company, Attention Bruce Mansfield-Glenwillow Transmission Line Project Team, A-GO-3, 76 South Main Street, Akron, Ohio, 44308.

Information Presented at Public Open House Meetings

Ensuring Service Reliability
for FirstEnergy Customers

Proposed Transmission Line from Beaver County, Pennsylvania, to Glenwillow, Ohio

Energizing the Future

FirstEnergy's "Energizing the Future" initiative involves installing transmission projects within FirstEnergy's footprint that PJM has determined are needed to ensure system reliability as power plants in the region are retired.

PJM Interconnection (PJM) is the regional transmission organization that coordinates the movement of electricity and oversees reliability in all or part of 13 states and the District of Columbia. PJM has identified numerous transmission projects that are needed throughout the region to ensure system reliability as power plants in the region are retired. The power plant retirements include nine FirstEnergy plants that are being retired in the region due to the high cost of complying with the U.S. EPA Mercury and Air Toxics Standards (MATS) and other environmental rules.

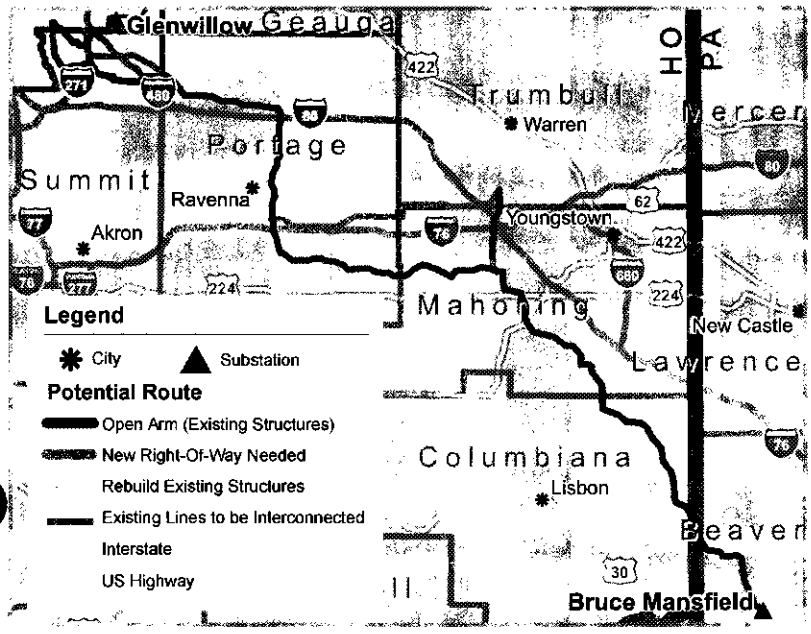
While the bulk of FirstEnergy's projects are needed to ensure system reliability as power plants are retired in northern Ohio, transmission projects will also be completed in Pennsylvania, West Virginia, New Jersey and Maryland as part of FirstEnergy's ongoing commitment to enhance its transmission system reliability. The company estimates spending between $700 million - $900 million over the next five years on these projects.

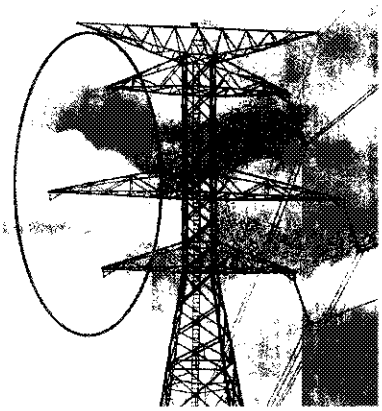
FirstEnergy's projects are both small and large. The small projects include adding transformers and other facilities in existing substations and replacing conductors on existing transmission lines. The larger projects involve three main types of transmission reinforcement: building new 138 and 345 kilovolt (kV) transmission lines; constructing new substations; and converting some of FirstEnergy's retired generating units to synchronous condensers to provide voltage support in the northern Ohio region.

Proposed Transmission Line from Beaver County, Pennsylvania, to Glenwillow, Ohio

One of the FirstEnergy projects involves building a new 345 kV transmission line that will run more than 100 miles from the company's Bruce Mansfield Plant in Beaver County, Pa. to a new substation that will be built in the Cleveland suburb of Glenwillow.

Continued on back





Depending on the final route, up to 70 percent of the project will involve adding a line to the "open-arm" position on existing structures to minimize impact.

FirstEnergy

Transmission: More than 100 miles of single circuit 345kV transmission line is planned for the project. If approved, the line will run from the Bruce Mansfield Plant in Beaver County, Pa. to the new Glenwillow Substation in Cuyahoga County, Ohio. The preliminary estimate for this part of the project is $184 million.

Wherever practical, the new lines will be installed on current transmission structures or other existing rights-of-way in parts of the following Ohio counties: Cuyahoga, Summit, Portage, Mahoning, Columbiana, Trumbull; and Beaver County in Pennsylvania.

Depending on the final route, early studies indicate that up to 70 percent of the project and almost all of the Pennsylvania portion of the project will involve adding a line to the "open-arm" position on existing structures to minimize impact.

Substation: The new Glenwillow Substation will connect the new line with two existing transmission lines serving the region. Various sites are being evaluated. The goal is to locate the new Glenwillow Substation as close as possible to the existing lines. The preliminary cost estimate for this part of the project is $37 million.

Public Involvement and the Process: Any transmission project encompasses a multi-step process that includes significant public input.

- **Evaluation:** FirstEnergy's siting consultant began route studies for the line in January 2012. Various potential routes are being further studied to minimize the impact to the environment and property owners.
- **Informational Meetings:** Potential routes will be discussed at informational meetings held in the areas that may be affected by the project. Members of the public and local officials will be invited to provide input for consideration. These comments will be used to help determine the proposed routes that are ultimately developed. These meetings are planned for June 2012.
- **Application:** As part of the siting process in Ohio, "preferred" and "alternate" routes for the line and site for the substation are identified. FirstEnergy will then file a formal application for the project with the Ohio Power Siting Board, which will hold public hearings as part of its review process. In Pennsylvania, as the line is likely to be installed almost entirely on open-arm positions, the line can be proposed using a Letter of Notification to the Pennsylvania Public Utility Commission. Each filing is expected to occur in August 2012. A final decision for each filing is anticipated within one year after being submitted.
- **Easement/Property Acquisition:** Early study results indicate there is a large potential to utilize existing rights-of-way for much of the project, greatly reducing the amount of new rights-of-way needed. Acquiring any transmission rights-of-way will occur after the application is filed. However, construction will not begin until necessary approvals are received. The construction of the transmission line and substation project will be simultaneous in order to meet PJM's June 2015 in-service date.

For more information about FirstEnergy's investment in reliability, visit **www.firstenergycorp.com/transmission**.

PRELIMINARY PROJECT TIMELINE

January to August	Route Study
May/June 2012	Proposed Routes Developed
June 2012	Public Informational Meetings – Input Considered
August 2012	Application filed with Ohio Power Siting Board and Pennsylvania Public Utility Commission; Public Comment Period
To be determined by OPSB	Public Hearings
Mid-2013	Permits Received/Construction Begins
June 1, 2015	PJM Requested In-Service Date

FirstEnergy

GLENWILLOW-BRUCE MANSFIELD TRANSMISSION LINE PROJECT
RIGHTS-OF-WAY/EASEMENT INFORMATION

The Glenwillow-Bruce Mansfield Transmission Project involves building a new 345 kilovolt transmission line from the company's Bruce Mansfield Substation at the Bruce Mansfield Plant in Shippingport, Pa., to a new substation that will be built in the Cleveland suburb of Glenwillow. This project differs from many other transmission line construction projects because up to 70 percent of the project involves adding a new line on the "open arm" of an existing transmission structure. Depending on the route selected, existing rights-of-way also could be utilized to complete the portion of the project that involves new construction. Or, new rights-of-way will need to be obtained.

Procedure

In Ohio, an electric utility is required to obtain regulatory approval prior to beginning construction of a transmission substation or transmission line project. The Ohio Power Siting Board (OPSB) has been given the authority by the Ohio legislature to grant these approvals. For significant projects, the utility typically submits an application to the OPSB and proposes a preferred and an alternative route or location for the proposed project. In the application, the utility explains the need for the facility, and presents data to establish that the proposed facility represents the minimum adverse impact.

The OPSB evaluates the data in the application, collects and evaluates additional data and ultimately determines if a project should or should not be constructed. The OPSB provides approval of transmission projects in the form of a Certificate of Environmental Compatibility and Public Need. The Certificate may impose restrictions or conditions on construction of the project and will establish whether the facility should be constructed at the proposed preferred or alternate location.

Utilities may negotiate or purchase property or right-of-way prior to the OPSB making a decision on a project. Although property rights in the possession of the utility are an important factor, property rights alone do not dictate the location of a facility. Other factors, or a combination of factors, may be more important for a particular project and ultimately lead the utility to propose, or the OPSB to approve, other sites. Once certification for a project has been granted by the OPSB, FirstEnergy will begin to finalize any necessary negotiations with property owners of the substation site or along the approved route of the transmission line where new property rights are required. In the event that a utility is unable to negotiate for the necessary property rights, Section 4933.15 of the Ohio Revised Code includes provisions that allow a utility to appropriate the necessary land rights for a substation or transmission line.

Substation Property

FirstEnergy transmission substations are typically located on property parcels owned by FirstEnergy, its operating companies, or other subsidiaries. The substation property includes the fenced-area of the substation, access roads, adjacent transmission line routes and a buffer zone around the substation. The new Glenwillow Substation will be designed to connect the new line with existing 345 kilovolt transmission lines that run through Glenwillow. Currently, various sites in the Glenwillow area are being evaluated.

Transmission Line Right-of-Way

Typically, it is necessary to obtain specific land rights to construct, operate, and maintain a transmission line. This may be accomplished by purchasing land or obtaining an easement for the necessary right-of-way to construct, operate, and maintain the transmission line. An easement is an interest in real estate that entitles the holder of the easement to specific limited use of land owned by another.

Easements for transmission line rights-of-way typically permit the construction, maintenance and operation of a transmission line within a designated location for a specific width and length across each specific property, including the right to trim, cut or clear vegetation in the

right-of-way or adjacent to the right-of-way. Where possible, it will align with transportation corridors and other existing facilities.

The easement will also provide for reasonable access to the electrical facilities located in the right-of-way for construction, operation, and maintenance purposes.

The easement further provides for the removal of trees within the right-of-way as well as the trimming and removal of priority trees, which are trees located outside of the right-of-way that may interfere with or potentially contact the electrical facilities. The property owner typically retains the right to use the land within the right-of-way for purposes that are compatible with the operation of the electrical facilities such as farming and gardening. Easements for transmission lines typically do not allow buildings or obstructions to be constructed in the right-of-way in order to preserve adequate electrical clearances to the facilities.

Right-of-Way Management
The vegetation within the right-of-way (easement) will be managed to avoid interference with operation of the transmission line. Where agricultural crops or other compatible uses are present in the right-of-way, specific vegetation management is typically not required.

Property Ownership
When an easement is granted, the property owner retains property ownership in the area covered by the easement. The easement will allow the property owner to utilize the right-of-way portion of their property to the extent it does not interfere with maintenance and operation of the transmission line.

Easement Acquisition
Once the route has been determined, FirstEnergy's representatives will typically contact property owners to discuss details of the transmission line, address concerns and negotiate terms for the rights to be obtained in the right-of-way easement. If the engineering and survey work is completed, the easement documents will be prepared and presented to the property owner along with an offer of compensation for the property rights. An alternative approach is to negotiate an option agreement that allows the right-of-way to be purchased at a later date. A partial payment is typically made for option agreements. The option agreement defines the route, final compensation, and other details necessary for the right-of-way easement. Option agreements for transmission line rights-of-way are typically exercised after an OPSB Certificate is issued, engineering and surveying work is completed, and the easement documents have been prepared.

The final compensation paid for easements is based on the fair market value of the rights to be acquired. The easement may provide compensation to property owners for damages to crops and/or property during construction, operation, and maintenance of the transmission line.

For More Information
Please call FirstEnergy's Transmission Project Information Line at 1-800-589-2837.

Transmission Project Siting Process – Ohio

- In Ohio, the Ohio Power Siting Board (OPSB), an adjunct to the Public Utilities Commission of Ohio, is responsible for approving the location of major utility facilities. For the Glenwillow-Bruce Mansfield Transmission Project, FirstEnergy must obtain OPSB approval to build both the transmission line and substation.

- The Louis Berger Group, Inc., an engineering and environmental consultant, was retained to assist FirstEnergy with the route selection study for this project.
    - The final result of the study is the identification of preferred and alternate routes for the transmission line and substation that would be submitted to the OPSB for review.
    - The methodology utilized in the route selection study is similar to previous FirstEnergy transmission line projects proposed and approved by the OPSB.

- The process is designed to identify suitable routes that minimize the overall effects on property owners, the environment, and sensitive land uses to the greatest extent practical while maintaining economic and technical feasibility.

- As part of the OPSB process, public information meetings and hearings are required to gain input from residents in the communities potentially impacted by the project.
    - Public information meetings have been scheduled in the following locations to provide an overview of the project:
        - Industry, Pa. – June 18, 2012
        - East Palestine – June 18, 2012
        - Canfield – June 19, 2012
        - Ravenna – June 20, 2012
        - Macedonia – June 21, 2012
    - Public comments from these meetings will be considered as part of FirstEnergy's process of further evaluating the routes.
    - Local, state and federal officials, along with potentially affected commercial and industrial customers, also have been briefed about the project and why it is needed.

- FirstEnergy plans to complete the evaluation process, identify the proposed preferred and alternate sites for the substation and transmission line, and submit the application for the project to the OPSB by the end of August 2012.

- Once FirstEnergy initially submits the application, the OPSB then has 60 days to determine if the application satisfies all of the regulatory requirements for going forward with the regulatory process. If it does, FirstEnergy will file a "certified" application with the OPSB for the project. Copies of the certified application will be provided to local officials and placed in local libraries for residents to review.

- The OPSB staff then will review the application and issue a preliminary staff report. OPSB regulations allocate 75 days for this process, although the process can take longer.

- The subsequent steps are to convene formal public and adjudicatory hearings. These hearings will be noticed in advance in local newspapers. The public hearing, typically held locally, will provide all interested parties the opportunity to speak on the record regarding the project. The adjudicatory hearing, held before an administrative law judge, provides an opportunity for parties to call and examine witnesses and is typically held at OPSB's offices in Columbus Ohio.

- The final step of the siting process is when the OPSB makes its official decision as to whether the project should go forward and, if so, the location for the project.
    - FirstEnergy anticipates this decision to be announced in mid 2013.

- If the OPSB approves the project, FirstEnergy anticipates the project to be in-service by June 1, 2015.

- The OPSB has assigned two case numbers for this project:
    - Glenwillow – Bruce Mansfield Transmission Line – 12-1726-EL-BTX
    - Glenwillow Substation – 12-1727-EL-BSB

- Written correspondence to the OPSB should include the Case Number and can be sent to the OPSB at :

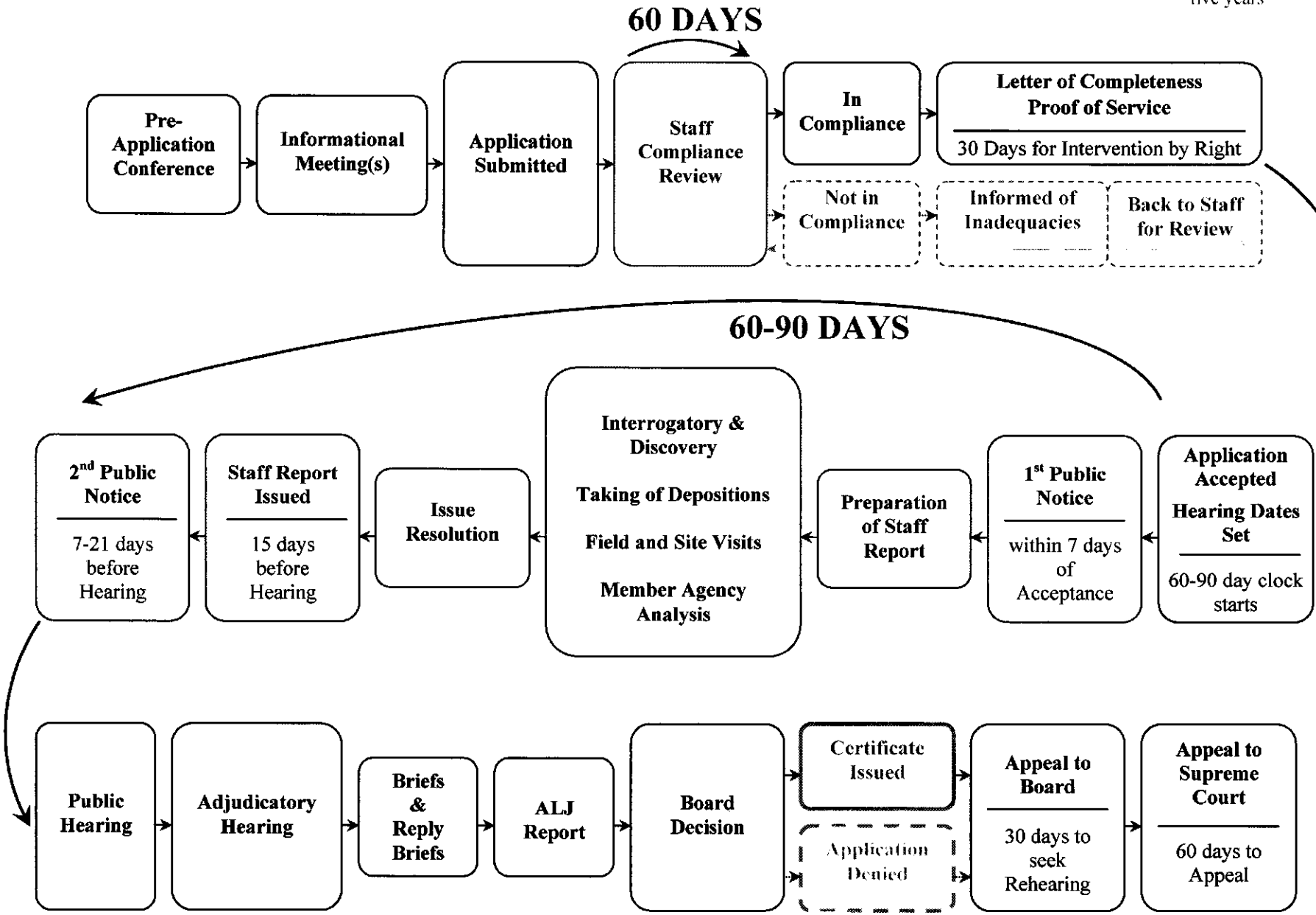
  The Ohio Power Siting Board
  180 East Broad Street
  Columbus, Ohio 43215

- The OPSB's website address is*: www.opsb.ohio.gov*

- A detailed Ohio Power Board Process Flow Chart is available at:
  http://www.puco.ohio.gov/emplibrary/files/media/OPSB/flowchart.pdf

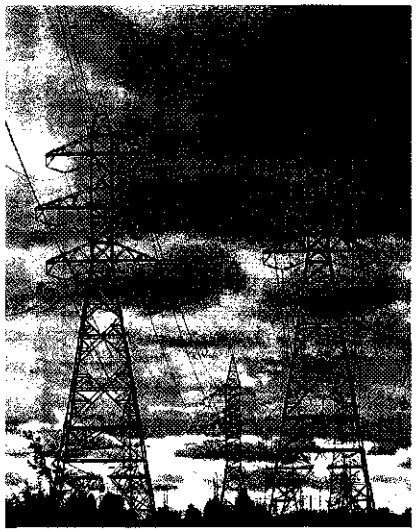
OHIO POWER SITING STATUTE PROCESS FLOWCHART*

* This is a living DRAFT which may be subject to administrative review every five years



BOARD MONITORS CONSTRUCTION AND FIRST TWO YEARS OF OPERATION OF FACILITY

Conditions of Certificate Apply for Life of Facility



What Are Electric And Magnetic Fields?

Electric and magnetic fields are invisible lines of force that surround anything that generates (batteries, generators), transmits (power lines, wiring), or uses electricity (appliances). Electric fields are the result of voltage, which pushes electrons through a wire. Magnetic fields are produced by the flow of current through wires and electrical devices. Together, these fields from electric power sources are commonly referred to as **EMF**.

The highest levels of electric and magnetic fields, or EMF, can be measured directly near the source, and levels decrease rapidly with distance. Since electric fields are easily blocked or weakened by walls or other objects, more research has been conducted on magnetic fields.

represents a real relationship between the exposure and the disease. Experimental studies of animals and isolated cells and tissues are less likely to be inconsistent because these studies have greater control over exposures and potential confounding factors. For these reasons, it is important to consider the entire body of research, rather than focusing on the results of a single epidemiology study.

Why Has Research Continued?

As time goes on, researchers develop better ways to conduct studies and think of new questions to ask. They continue to conduct studies to be sure that these new methods and additional questions produce consistent results. For example, research continues to understand what factors might account for the statistical associations observed between childhood leukemia and magnetic fields in some studies.

What Do Scientific Health Agencies Recommend?

Since the research has not established that EMF is a cause of any long-term health effect, scientific health agencies have not recommended exposure limits at the field levels we encounter in our environment, nor have they recommended taking any official action. The WHO, for example, recommends that, if companies or individuals want to take precautionary measures regarding EMF, the measures should be low in cost and convenient to implement.

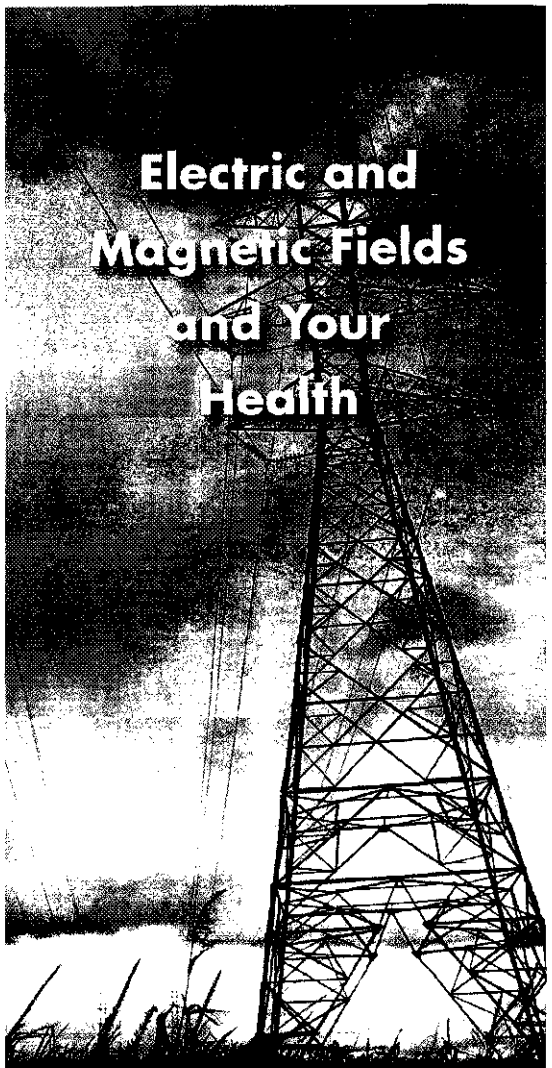
If you are looking for more information on this topic, please visit:

National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/magnetic-fields

World Health Organization
http://www.who.int/peh-emf/en/

Exponent®

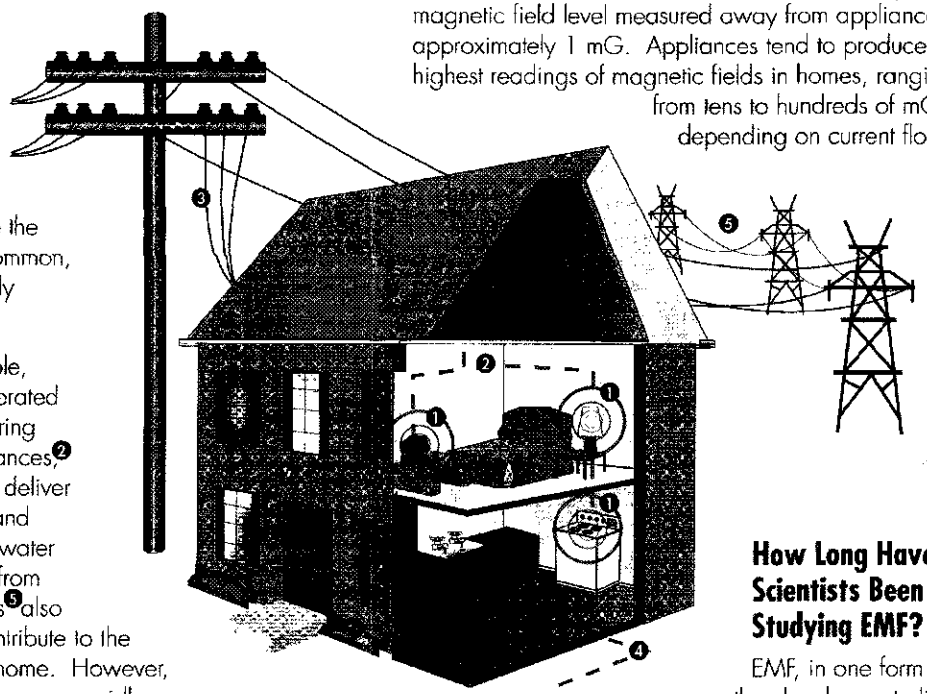
Electric and Magnetic Fields and Your Health



Electric and magnetic fields are properties of the space that surrounds anything that generates, transmits or uses electricity.

Where Can EMF Be Found?

We use electricity to light our homes, cook our food, and power the many appliances we use for work and leisure. Since the use of electricity is so common, EMF can be found nearly everywhere.



In our homes, for example, magnetic fields are generated from appliances,❶ the wiring that powers those appliances,❷ the distribution lines that deliver electricity to the home,❸ and any currents flowing on water pipes.❹ Magnetic fields from nearby transmission lines❺ also have the potential to contribute to the magnetic field inside a home. However, since magnetic fields decrease rapidly as you get farther away from the source of the field, the contribution of transmission lines to a home's magnetic field level may be less than from other closer sources.

Equipment within substations also produces magnetic fields, but because of the way this equipment is configured, the fields drop off quickly with distance. For example, at the fence surrounding substations, the magnetic field from the substation equipment is typically within the range of levels found inside our homes. Thus, the dominant source of magnetic fields near substations is the power lines that serve that substation.

How Are Magnetic Fields Measured, And What Levels Are Typically Measured Inside Homes In The United States?

Magnetic fields are measured using a device called a gaussmeter and are reported in units called milligauss (mG).

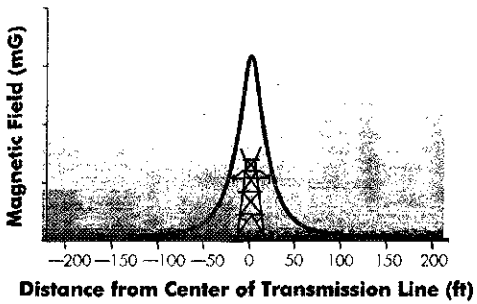
Most homes in the United States have an average magnetic field level measured away from appliances of approximately 1 mG. Appliances tend to produce the highest readings of magnetic fields in homes, ranging from tens to hundreds of mG, depending on current flow.

How Long Have Scientists Been Studying EMF?

EMF, in one form or another, has been studied for centuries. Beginning in the 1970s, scientists began to question whether these fields have the potential to cause health effects, such as cancer. This hypothesis has been tested with hundreds of studies, including:

- epidemiology studies to understand whether people with diseases were exposed to higher EMF levels;
- animal studies to test if animals exposed to very high levels of EMF have higher rates of disease; and
- studies on cells and tissues to see if EMF causes biological changes that could lead to disease.

The method scientists use to evaluate this large body of research involves examining all studies (epidemiology, animal, and cellular), giving more weight to studies of higher quality. In evaluating this large body of research, scientists look for patterns in the research that suggest a causal relationship, such as a similar result across many studies, and provide conclusions based on this process.



What Have Scientists Concluded?

Numerous scientific organizations have assembled groups of scientists with expertise in a variety of disciplines to review all of this research. These organizations include the International Agency for Research on Cancer (IARC), the International Commission of Non-Ionizing Radiation (ICNIRP), the National Institute of Environmental Health Sciences (NIEHS), the Health Protection Agency/National Radiological Protection Board (HPA/NRPB) of Great Britain, and the World Health Organization (WHO). Overall, the conclusions of these panels have been consistent:

- The research does not support the conclusion that magnetic fields cause any long-term, adverse health effects.
- Some epidemiology studies have reported an association between high, average magnetic field levels and childhood leukemia. However, due to the limitations of these studies and the lack of evidence from laboratory studies, no agency has concluded that magnetic fields cause childhood leukemia.
- The animal studies, overall, do not report an increase in cancer among animals exposed to high levels of magnetic fields after lifetime exposures.
- The laboratory studies provide no explanation as to how magnetic fields could cause disease.

These panels also concluded that, at very high field levels, EMF has the potential to cause nerve and muscle stimulation. However, the field levels found in our environment are far too low to cause these shock-like effects.

Why Do Scientific Studies Often Appear To Reach Different Conclusions On EMF Health Effects?

Epidemiology studies often report conflicting results because they are observational in nature, meaning they observe people in their ordinary environments without any control over their exposures. The results of epidemiology studies (reported as statistical associations) must be carefully evaluated to determine whether the association

Welcome and Sign-in

Welcome to FirstEnergy's Open House

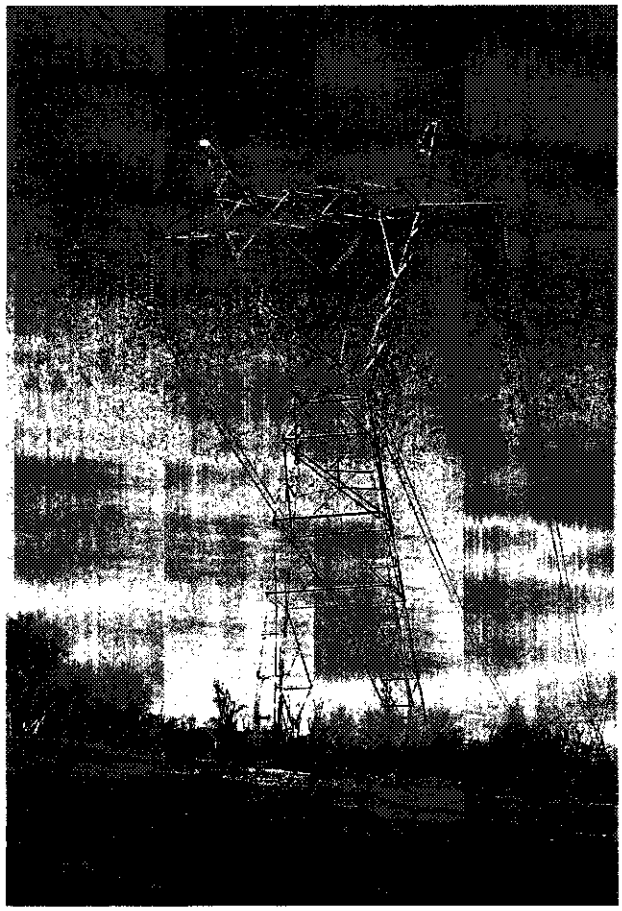
for the

Bruce Mansfield – Glenwillow 345 kV Transmission Line Project

FirstEnergy®

Project Need

- PJM has identified numerous transmission projects that are needed throughout the region to ensure system reliability as power plants in the region are retired.

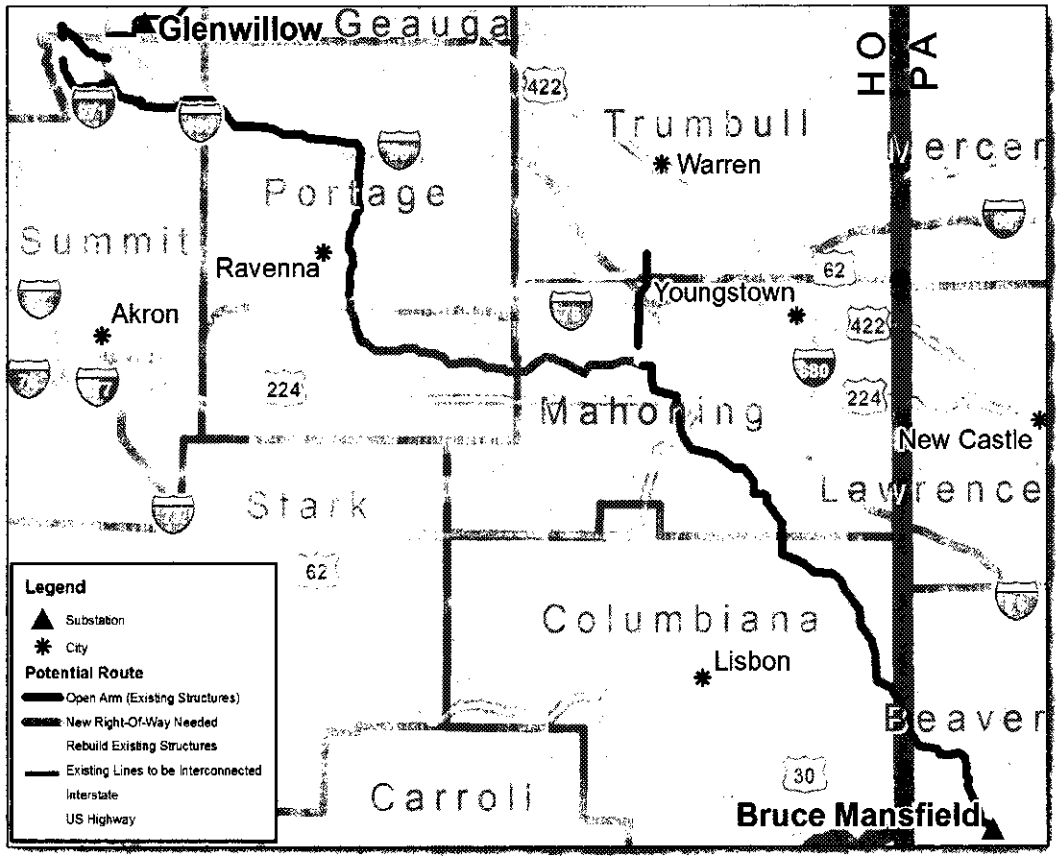


- The power plant retirements include nine FirstEnergy plants that are being retired in the region due to the high cost of complying with environmental rules, including the U.S. EPA Mercury and Air Toxics Standards (MATS).

- This project is part of FirstEnergy's "Energizing the Future" initiative to install new transmission line and associated electric substations needed within FirstEnergy's footprint.

FirstEnergy®

Project Summary



- FirstEnergy proposes to construct a new, single-circuit 345 kV transmission line and a new transmission substation (Glenwillow).

- The line will begin at the existing Bruce Mansfield Substation in Shippingport, PA, and end at the proposed Glenwillow Substation in Cuyahoga County, OH.

- The line will be approximately 110 miles long.

- The majority of the line will be placed on existing transmission structure "open arms" or will involve rebuilding existing structures.

FirstEnergy®

Route Selection

- FirstEnergy always considers the impact on people and the environment when planning new power lines and facilities.

- The entire project area is mapped to identify:
  - Developed/urban areas
  - Farmland and woodlands
  - Natural areas, including wetlands and streams, nature preserves, sensitive habitats, parks
  - Cultural resources, including historic buildings and archaeological sites

- The Team develops potential routes or "links" to minimize overall impacts on these resources

- The Team conducts field reviews of the potential routes to collect additional information.

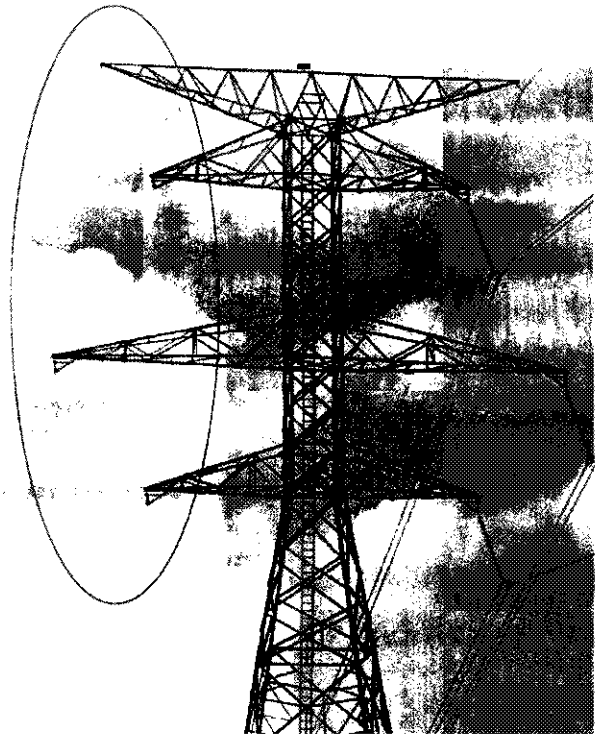
- Alternative routes are identified for further analysis.

- A preferred route is selected following public and agency input.

FirstEnergy®

Right-of-Way

- The majority of the line will be placed on existing "open arms" or rebuilt in existing rights-of-way.
- If new or additional right-of-way is required, a real estate representative will contact the affected property owner.
- Right-of-way acquisition does NOT mean FE is planning to buy your property. The property owner maintains ownership of the easement area.



Depending on the final route, up to 70 percent of the project will involve adding a line to the "open-arm" position on existing structure to minimize impact.

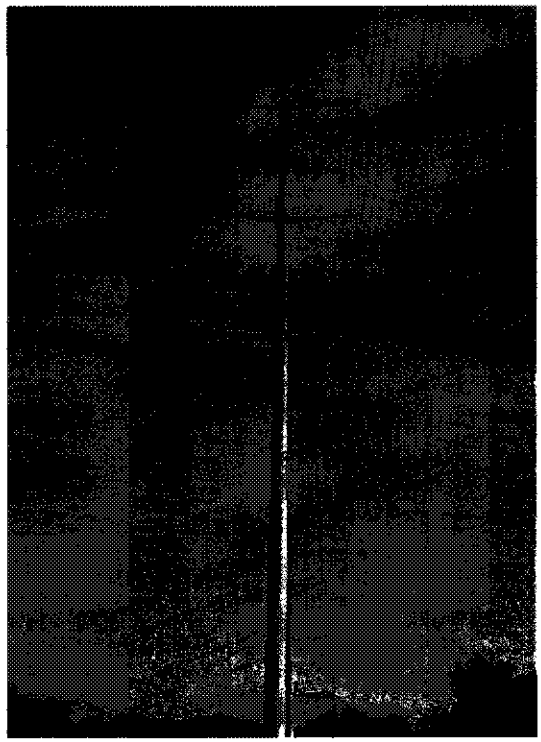
- Acquiring any needed transmission rights-of-way will occur after the state applications are filed.

FirstEnergy®

Engineering & Construction

- On the open arm or rebuilt sections, a second circuit can be installed without adding more structures or increasing the width of the existing right-of-way.
- In areas that require rebuilding or new construction, transmission structures are expected to be steel poles.
- Existing steel lattice structures will be replaced with steel poles.
- The new Glenwillow Substation will connect the new line with two existing transmission lines serving the region.

Existing 345 kV Steel Lattice Structure



Typical 345 kV Steel Pole Structure

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Engineering & Construction

- Construction in open arm or rebuild segments typically includes:
  - Minimal additional tree trimming/clearing to provide adequate safety clearance.
  - Staging of conductor pulling equipment necessary to install the second circuit.
  - Removal of existing structures (if rebuild) and installation of new transmission structures

- Construction of new segments typically includes:
  - Vegetation clearing
  - Access road construction
  - Equipment and transmission structure staging
  - Installation of new transmission structures
  - Conductor installation

- Substation construction typically includes:
  - Vegetation clearing
  - Grading
  - Equipment installation
  - Fencing

- Construction is expected to begin in mid-2013 and take approximately 2 years to meet PJM's required in-service date of June 2015.

FirstEnergy®

Environmental

- FirstEnergy strives to minimize impacts to the environment, including:
  - Wetlands and streams
  - Threatened and endangered species
  - Sensitive habitats
  - Nature preserves and parks
  - Cultural resources.

- FirstEnergy consults with State, Federal and Local agencies throughout the planning and permitting process.

- FirstEnergy will comply with all applicable environmental regulations and obtain all required federal, state and local permits prior to construction.

- As specified in the environmental permits, construction best management practices will be employed during construction to minimize impacts to the environment.

FirstEnergy®

OPSB Process

- Before construction can begin on a new transmission line or substation, FirstEnergy must file for a Certificate of Environmental Compatibility and Public Need from the Ohio Power Siting Board (OPSB).

- Following public open house meetings, FirstEnergy will submit an application to the OPSB, identifying both a preferred and alternate route.

- Once the OPSB deems the application complete, a copy is sent to local public officials, legal notices are published in newspapers, and copies will be available for public review.

- The OPSB evaluates the application and prepares a staff report that will include the Board's findings and recommendations.

- Public hearings are held to allow citizens, interest groups, and governmental entities to participate in the approval process.

- Following the hearings, the Board determines whether or not to approve the proposed project.

FirstEnergy®

How to Stay Informed

- FirstEnergy considers many factors when identifying potential routes and substation locations. Public input is one of those factors.

- You can provide input in several ways:
  - Speak with a FirstEnergy representative here tonight
  - Complete a comment card
  - Call FirstEnergy at (800) 589-2837 or email: transmissionprojects@firstenergycorp.com anytime during the siting process.

- You can stay informed throughout the process via the project website:

  https://www.firstenergycorp.com/about/transmission_projects.html

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Proposed Glenwillow Substation

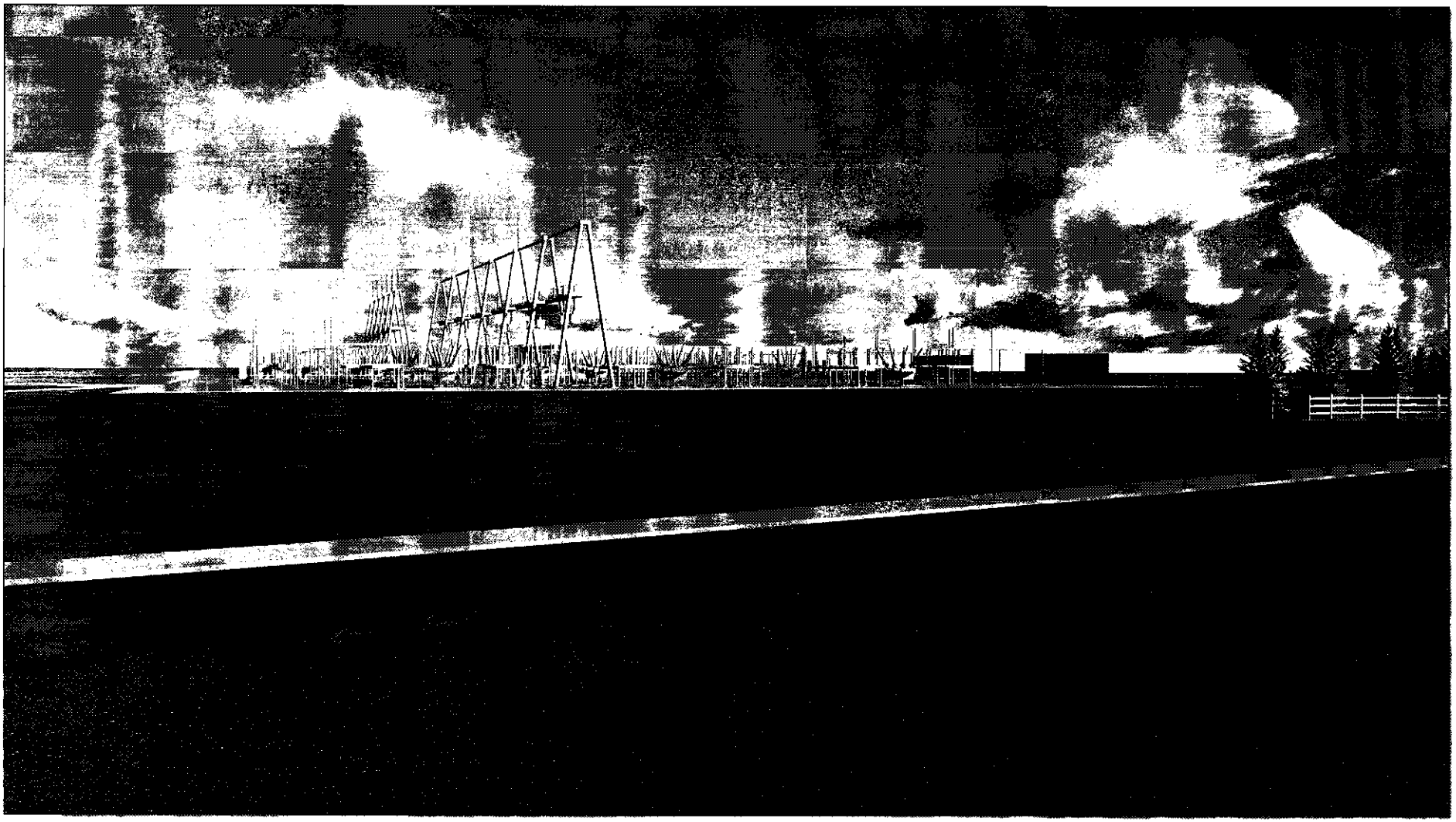
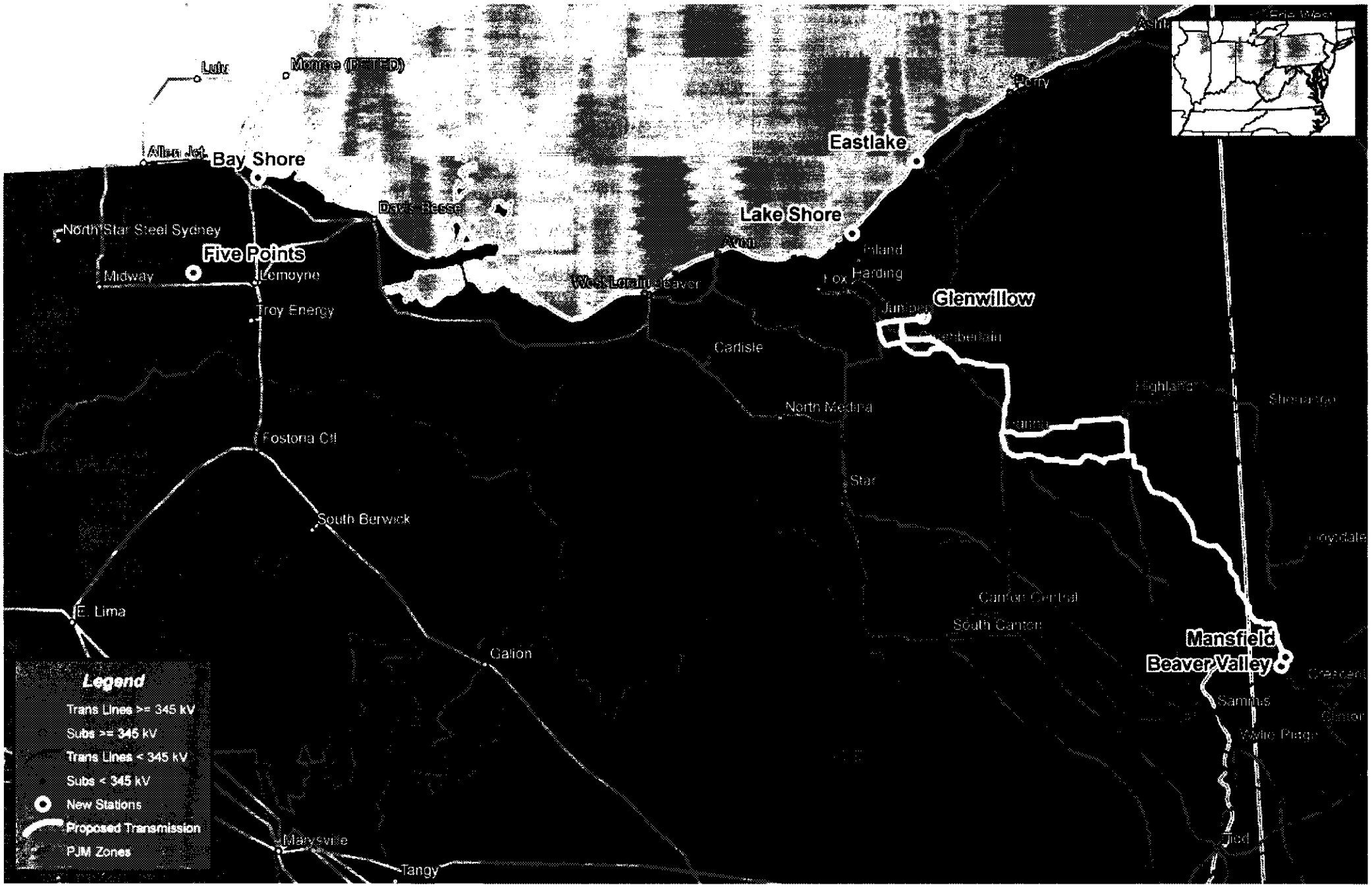


Figure 1. Artist's rendering of typical 345 kV substation

Proposed Glenwillow Substation

Figure 2. Artist's rendering of typical 345 kV substation with tree screening


Lutz
Monroe (PENELEC)
Allen Jct.
Bay Shore
Davis Besse
Eastlake
Lake Shore
North Star Steel Sydney
Five Points
Midway
Lemoyne
Troy Energy
West Lorain
Beaver
Glenwillow
Carlisle
North Medina
Fostoria CII
South Berwick
E. Lima
Galion
Marysville
Tangy
Mansfield
Beaver Valley
Legend
Trans Lines >= 345 kV
Subs >= 345 kV
Trans Lines < 345 kV
Subs < 345 kV
New Stations
Proposed Transmission
PJM Zones

FirstEnergy®

Bruce Mansfield – Glenwillow 345 kV Transmission Line

OPEN HOUSE SIGN IN SHEET **Meeting Location: _____**

No.	Name	Address	Phone No.	Email

Bruce Mansfield – Glenwillow 345 kV Transmission Line Project

FirstEnergy®

Today's Date: _____

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Email _____

Comments: _____

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Name of FirstEnergy Representative Taking Inquiry (if applicable) _____

Bruce Mansfield – Glenwillow 345 kV Transmission Line Project

FirstEnergy®

Today's Date: _____

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Email _____

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Name of FirstEnergy Representative Taking Inquiry (if applicable) _____

GLENWILLOW TRANSMISSION SWITCHING STATION PROJECT

WETLAND DELINEATION AND STREAM ASSESSMENT REPORT FOR THE PREFERRED AND ALTERNATE SITES

Prepared for:
American Transmission Systems, Incorporated
a subsidiary of
FirstEnergy Corp.
76 South Main Street
Akron, Ohio 44308

ATSI

Prepared by:
The Louis Berger Group, Inc.
350 Eagleview Boulevard, Suite 250
Exton, Pennsylvania 19341-1178

THE Louis Berger Group, INC.

November 2012

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1.0 INTRODUCTION

In conjunction with the proposed Bruce Mansfield – Glenwillow 345 kV Transmission Line, American Transmission Systems, Incorporated ("ATSI"), a subsidiary of FirstEnergy Corp., determined that a new switching station is necessary in the vicinity of the existing Eastlake – Juniper and Perry – Inland 345 kV lines, which converge in Summit and Cuyahoga counties, Ohio. To resolve this need, ATSI is proposing the construction of a new switching station in Cuyahoga County that is referred to as the Glenwillow Transmission Switching Station Project ("Project"). The proposed switching station will connect three 345 kV transmission lines and reinforce the Bulk Electric System ("BES").

ATSI has identified a Preferred and an Alternate Site for the Glenwillow Switching Station. Both sites are located within the Village of Glenwillow in Cuyahoga County, Ohio on vacant parcels zoned as industrial and adjacent to the existing Eastlake – Juniper, Perry – Inland and Perry – Harding 345 kV transmission lines. ATSI contracted The Louis Berger Group, Inc. (LBG) to conduct wetland delineations of the Preferred and Alternate substation sites.

The Preferred Site (Site C) is located adjacent to several existing high voltage electric transmission lines on an irregular shaped parcel at the intersection of Austin Powder Drive and Cochran Road. The parcel is approximately 24.8 acres in size and classified by Cuyahoga County as Commercial Vacant Land and zoned by the Village of Glenwillow as Industrial District A. The majority of the Site is cleared, with a small area of forested land on the eastern border. The northern portion of the Preferred Site is traversed by three existing 345 kV transmission lines: Eastlake – Juniper, Perry – Inland and Perry – Harding. In addition, the Mayfield – Northfield #1 & #2 138 kV transmission lines and the Longfield 138 kV Substation border the Site to the north. ATSI plans to connect the existing Eastlake – Juniper and Perry – Inland 345 kV transmission lines and the proposed Bruce Mansfield – Glenwillow 345 kV Transmission Line into the new Glenwillow Switching Station.

The Alternate Site (Site B) is located on an adjacent irregular shaped parcel located north of the existing 345 kV transmission lines west of the Wheeling and Lake Erie Railroad tracks. The western parcel is approximately 23 acres in size and classified by Cuyahoga County as Commercial Vacant Land and zoned by the Village of Glenwillow as Industrial District A. The majority of the parcel is forested and a tributary to Tinkers Creek traverses the eastern portion of the property. An electric distribution line bisects the property. If the Alternate Site is approved, ATSI would need to acquire transmission ROW through the half-moon shaped adjacent parcel to the east, which is approximately 25 acres in size and also classified as Commercial Vacant Land and zoned as Industrial District A. Use of Site B would require ATSI to acquire approximately 400 to 800 feet of new, 150-foot-wide transmission ROW through the adjacent parcel (Site A) in order to connect the existing Eastlake – Juniper and Perry – Inland 345 kV transmission lines

into the new substation. Therefore, LBG also delineated wetlands and streams located within Site A as well. For the purposes of this delineation report, the Alternate Site includes information about both Sites B and A. Where appropriate, features locations and calculations are referenced to either Site B and/or Site A.

The fenced area of the proposed Glenwillow Transmission Switching Station will be approximately 465 feet by 490 feet and will be entirely graded and covered in gravel or equipment. The Preferred Substation Site will be accessed from Cochran Drive. The Alternate Site will be accessed from Beaver Meadow Parkway. When the Project is completed, the Glenwillow Substation will connect the new Bruce Mansfield – Glenwillow 345 kV transmission line with two existing transmission lines currently serving the region

2.0 METHODOLOGY

The purpose of the field survey was to determine whether wetlands and other waters of the U.S. (WOUS) are present within the Preferred and Alternate Sites. Prior to conducting field surveys, digital and published county Natural Resources Conservation Service (NRCS) soil surveys of Summit County; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps of Ohio; and U.S. Geological Survey (USGS) 7.5-minute topographic maps were reviewed as an exercise to identify the occurrence and location of potential wetland areas.

During the month of July 2012, LBG wetland delineators walked the Preferred and Alternate Sites to conduct a wetland and waters delineation. During field surveys, the physical boundaries of observed wetlands and other WOUS were recorded using sub-meter accurate Trimble Global Positioning System (GPS) units. The GPS data were then reviewed, geo-corrected using GPS Pathfinder Office software (version 4.20), and edited for errors.

The results presented in this report reflect the existing and reasonably foreseeable site conditions at the time of our survey. The results cannot apply to site changes occurring after the survey that LBG has not had the opportunity to review. During the course of any survey, changes in site conditions may occur over time due to human and/or natural causes; as such, the results presented in this report may be invalidated, either wholly or in part, by changes beyond the control of LBG or its subcontractors.

2.1 WETLAND DELINEATION

The US Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) define wetlands as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR, Part 328.3). The USACE regulates development in jurisdictional wetlands pursuant to Section 404 of

the CWA (33 CFR, Parts 320-330). A jurisdictional determination is the process of identifying and locating jurisdictional waters of the United States (WOUS) (including wetlands). Identification and delineation of jurisdictional wetlands is based on three parameters:

1. Hydrophytic vegetation - the dominant vegetation consists of species capable of growing in water or on substrate that is at least periodically deficient in oxygen as a result of the presence of water;
2. Hydric soils - soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth of hydrophytic vegetation; and
3. Wetland hydrology - the area is inundated permanently or periodically, or the soil is saturated to the surface for sufficient duration during the growing season to support hydrophytic vegetation.

The sites were evaluated according to the procedures outlined in the U.S. Army Corps of Engineers (USACE) *1987 Wetland Delineation Manual* (*1987 Manual*) (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version2.0)* (*Regional Supplement*) (USACE, 2012). The *Regional Supplement* was released in September 2010 by the USACE to address regional wetland characteristics and improve the accuracy and efficiency of wetland delineation procedures.

LBG performed the routine delineation method described in the *1987 Manual* and *Regional Supplement* that consisted of a pedestrian site reconnaissance, including identifying the vegetation communities, soils identification, a geomorphologic assessment of hydrology, and notation of disturbance. The methodology used to examine each parameter is described in the following sections. Completed USACE wetland delineation forms recorded for the site are included in Appendix A.

2.1.1 Soils

Prior to beginning field work, soil surveys were reviewed for reported presence of hydric soils. A table of soil map units reported to exist in the study area is located in Appendix I. Soils were examined using a Dutch auger to extract a sample. To the extent possible, soils were observed to a depth of 18 inches below the soil surface; in instances where refusal was encountered before 18 inches, this was noted on field data sheets. The soils were examined for hydric soil characteristics according to the guidelines in the *Field Indicators of Hydric Soils in the United States, Version 7.0* (USDA, 2010). A *Munsell Soil Color Chart* (Kollmorgen Corporation, 1988) was used to identify the hue, value, and chroma of the matrix and redoximorphic features of the soils. Generally, hydric soils have a matrix value of four or more and a matrix chroma of two or

less; frequently, redoximorphic concentrations are present within the soil matrix. However, field delineators considered all hydric soil indicator possibilities while completing the surveys.

2.1.2 Hydrology

The *1987 Manual* requires that an area be inundated or saturated to the surface for an absolute minimum of five percent of the growing season (areas saturated between five percent and 12.5 percent of the growing season may or may not be wetlands, while areas saturated over 12.5 percent of the growing season fulfill the hydrology requirements for wetlands). The *Regional Supplement* states that the growing season dates are determined through onsite observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature (12-in. depth) is 41 degree Fahrenheit (°F) or higher as an indicator of soil microbial activity. Therefore, the beginning of the growing season in a given year is indicated by whichever condition occurs earlier, and the end of the growing season by whichever persists later.

The *Regional Supplement* also states that if onsite data gathering is not practical, the growing season can be approximated by the number of days between the average (five years out of ten, or 50 percent probability) date of the last and first 28°F air temperature in the spring and fall, respectively. The National Weather Service WETS data obtained from the NRCS National Water and for Cuyahoga County, Ohio reveals that in an average year, this period begins April 16, and lasts until November 3, or 198 to 201 days. In the Project area, five percent of the growing season equates to approximately 10 days (USDA, 2012).

Field surveyors assessed potential wetland areas for indicators of wetland hydrology described in the *1987 Manual.* Observation of at least one primary indicator, or at least two secondary indicators, was sufficient to positively say wetland hydrology was present (USACE, 2010).

2.1.3 Vegetation

To determine the presence of hydrophytic vegetation, dominant vegetation was visually assessed for each stratum (tree, sapling/shrub, herb and woody vine) and an indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and/or upland (UPL) was assigned to each plant species based on the *2012 Northwest-Northeast Region National Wetland Plant List* (USACE, 2012). Hydrophytic vegetation is dominant when more than 50 percent of the composition of the dominant species are rated OBL, FACW and/or FAC. Vegetation of an area was determined to be non-hydrophytic when 50 percent or more of the composition of the dominant species was rated FACU and/or UPL. In addition to the dominance test, field delineators used prevalence tests to determine if a wetland has a predominance of hydrophytic vegetation.

2.1.4 Wetland and Other WOUS Classifications

Wetlands and other WOUS were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al*, 1979). All identified waters within the survey corridor were classified as either freshwater, Palustrine Systems, which includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens or Riverine Systems, which includes all wetlands and deepwater habitats contained within a channel except those wetlands that are Palustrine and which have habitats with ocean-derived salinities in excess of 0.5 parts per thousand.

Four Palustrine wetland classes were identified within the Preferred and Alternate Site surveys. The four classes are as follows:

- ***PEM*** – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

- ***PFO*** – Forested wetlands are characterized by woody vegetation that is 3 inches or more DBH, regardless of height. The woody angiosperms (i.e. trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season.

- ***PFO/PEM*** – A combination of forested wetlands and emergent wetlands.

- ***PSS/PEM*** – A combination of scrub/shrub wetlands and emergent wetlands. Scrub/shrub wetlands are characterized by woody vegetation that is less than 3 inches diameter at breast height (DBH), and greater than 3.28 feet tall. The woody angiosperms (i.e. small trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season.

Riverine systems were also identified in the Preferred Route survey corridor. These systems are classified by their flow regimes; perennial (R3), intermittent (R4), and ephemeral (RE).

2.1.5 Ohio Rapid Assessment Method V 5.0

The Ohio Environmental Protection Agency (Ohio EPA) Ohio Rapid Assessment Method for Wetlands v. 5.0 (ORAM) was developed to determine the relative ecological quality and level of disturbance of a particular wetland in order to meet requirements under Section 401 of the Clean Water Act. Wetlands are scored on the basis of six metrics; 1) area, 2) upland buffer, 3) hydrology, 4) habitat alteration, 5) special wetland communities, and 6) vegetation communities. The wetland area is based upon the reviewer's estimate of the entire wetland/wetland complex and is not limited to the area contained to the survey corridor. During this survey, field teams

did not always have access to parcels outside of the study area; in these instances, aerial maps, soil surveys, and topographic maps aided in determining the best estimate of the entire wetland area. Each of the six metrics contains several sub categories from which a score is derived. Each wetland is given a score using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance). Wetlands scored from 0 to 29.9 are grouped into "Category 1", 30 to 59.9 are "Category 2" and 60 to 100 are "Category 3". Transitional zones exist between "Categories 1 and 2" from 30 to 34.9 and between "Categories 2 and 3" from 60 to 64.9. However, according to the Ohio EPA, if the wetland score falls into the transitional range, it must be given the higher Category unless scientific data can prove it should be in a lower Category (Mack, 2001). The ORAM scores for the wetlands that were delineated are discussed in Section 3.1.4 of this report. Completed ORAM data sheets are included in Appendix B.

Category 1 Wetlands

Category 1 wetlands support minimal wildlife habitat, hydrological and recreational functions, and do not provide for or contain critical habitats for threatened or endangered species. In addition, Category 1 wetlands are often hydrologically isolated and have some or all of the following characteristics: low species diversity, no significant habitat or wildlife use, limited potential to achieve wetland functions, and/or a predominance of non-native species. These limited quality wetlands are considered to be a resource that has been severely degraded or has a limited potential for restoration, or is of low ecological functionality.

Category 2 Wetlands

Category 2 wetlands "...support moderate wildlife habitat, or hydrological or recreational functions," and as wetlands which are "...dominated by native species but generally without the presence of, or habitat for, rare, threatened or endangered species; and wetlands which are degraded but have a reasonable potential for reestablishing lost wetland functions." Category 2 wetlands constitute the broad middle category of "good" quality wetlands, and can be considered a functioning, diverse, healthy water resource that has ecological integrity and human value. Some Category 2 wetlands are lacking in human disturbance and considered to be naturally of moderate quality; others may have been Category 3 wetlands in the past, but have been degraded to Category 2 status.

Category 3 Wetlands

Wetlands that are assigned to Category 3 have "...superior habitat, or superior hydrological or recreational functions." They are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands which contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide. It is important to stress

that a wetland may be a Category 3 wetland because it exhibits one or all of the above characteristics. For example, a forested wetland located in the flood plain of a river may exhibit "superior" hydrologic functions (e.g. flood retention, nutrient removal), but not contain mature trees or high levels of plant species diversity.

2.2 STREAM AND RIVER CROSSINGS

Regulatory activities under the Clean Water Act provide authority for states to issue water quality standards and "designated uses" to all waters of the U.S. upstream to the highest reaches of the tributary streams. In addition, the Federal Water Pollution Control Act of 1972 and its 1977 and 1987 amendments require knowledge of the potential fish or biological communities that can be supported in a stream or river, including upstream headwaters. Streams were identified by the presence of a defined bed and bank, and evidence of an ordinary high water mark. As stated above in Section 2.1.4, streams were classified under Cowardin as various Riverine systems based on their flow regime. This section discusses the two methodologies used describe the designated uses of the observed streams. Stream assessments were conducted using the methods described in the Ohio EPA's Methods for Assessing Habitat in Flowing Waters: Using Ohio EPA's *Qualitative Habitat Evaluation Index* (Rankin, 2006) and *Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams, version 1* (Davic, 2002).

2.2.1 Ohio EPA Qualitative Habitat Evaluation Index

The qualitative habitat evaluation index ("QHEI") is designed to provide a rapid determination of habitat features assessing physical characteristics of streams most desirable by fish and, to a lesser extent, macroinvertebrates and smaller microinvertebrates. The QHEI uses six metrics to assign a score to a reach of stream; the scoring protocol was calibrated using Indices of Biotic Integrity ("IBI") for fish, which makes QHEI sufficient, in most cases, to properly indicate the habitat quality of the assessed streams.

The QHEI method is generally considered appropriate for waterbodies with drainage basins greater than one square mile, if natural pools are greater than 40 cm, or if the water feature is shown as blue-line waterways on USGS 7.5-minute topographic quadrangle maps. Streams fitting this description are scored on the basis of six metrics; 1) substrate, 2) instream cover, 3) channel morphology, 4) bank erosion and riparian zone, 5) pool/glide and riffle/run quality, and 6) gradient. In order to convey general stream habitat quality to the regulated public, the Ohio EPA has assigned narrative ratings to QHEI scores. The ranges vary slightly for headwater streams (streams with a watershed area less than or equal to 20 square miles) versus larger streams (L are those with a watershed area greater than 20 square miles). The Narrative Rating System includes:

- Very Poor (<30 for both headwater and larger streams);

- Poor (30 to 42 for headwater streams, 30 to 44 for larger streams);
- Fair (43 to 54 for headwater streams, 45 to 59 for larger steams);
- Good (55 to 69 for headwater streams, 60 to 74 for larger streams); and
- Excellent (70 or greater for headwater streams, 75 or greater for larger streams).

Results of the QHEI assessments are discussed in Section 3.2.1 of this report. Completed QHEI data sheets are included in Appendix C.

2.2.2 Ohio EPA Primary Headwater Habitat Evaluation Index

Headwater streams are typically considered to be first-order and second-order streams, meaning streams that have no upstream tributaries (or "branches") and those that have only first-order tributaries, respectively. In Ohio, headwater streams are recognized as important ecological and biological habitats, providing retention of sediment and nutrients, and providing important breeding areas for benthic macroinvertebrates. Impacts to headwater streams have direct effects on downslope waters. The headwater habitat evaluation index ("HHEI") is a rapid field assessment method for physical habitat that can be used to appraise the biological potential of most Primary Headwater Habitat ("PHWH") streams. The HHEI was developed using many of the same techniques as used for QHEI, but has criteria specifically designed for headwater habitats. To use HHEI, the stream must have a "defined bed and bank, with either continuous or periodically flowing water, with watershed area less than or equal to 1.0 mi^2 (259 ha), *and* a maximum depth of water pools equal to or less than 15.75 inches (40 cm)" (Davic, 2002).

Headwater streams are scored on the basis of three metrics; 1) channel substrate composition, 2) maximum pool depth, and 3) bankfull width. Assessments result in a score (0 to 100) that is converted to a specific PHWH stream class. Streams that are scored from 0 to 29.9 are typically grouped into "Class 1 PHWH Streams", 30 to 69.9 are "Class 2 PHWH Streams", and 70 to 100 are "Class 3 PHWH Streams". A flow chart, provided in the HHEI manual, allows the scorer to score the stream using the prescribed score category and site observations (Davic, 2002). Evidence of anthropogenic alterations to the natural channel will result in a "Modified" qualifier for the stream. Results of HHEI assessed streams are discussed in Section 3.2.2 of this report.

Class 1 PHWH Streams: Class 1 PHWH Streams are those that have "normally dry channels with little or no aquatic life present" (Davic, 2002). These waterways are usually ephemeral, with water present for short periods of time due to infiltration from snowmelts or rainwater runoff.

Class 2 PHWH Streams: Class 2 PHWH Streams are equivalent to "warm-water habitat" streams. This stream class has a "moderately diverse community of warm-water adapted native

fauna either present seasonally or on an annual basis" (Davic, 2002). These species communities are composed of vertebrates (fish and salamanders) and/or benthic macroinvertebrates that are considered pioneering, headwater temporary, and/or temperature facultative species.

Class 3 PHWH Streams: Class 3 PHWH Streams usually have perennial water flow with cool-cold water adapted native fauna. The community of Class 3 PHWH Streams is comprised of vertebrates (either cold water adapted species of headwater fish and or obligate aquatic species of salamanders, with larval stages present), and/or a diverse community of benthic cool water adapted macroinvertebrates present in the stream continuously (on an annual basis).

Results of the HHEI assessments are discussed in Section 3.2.2 of this report. Completed HHEI data sheets are included in Appendix D

3.0 RESULTS

3.1 WETLAND DELINEATION

Within the Preferred Site, LBG delineated approximately 2.85 acres of wetlands and approximately 1,110 linear feet of streams. The streams delineated on the Preferred Site include one perennial stream (Beaver Meadow Creek) and one intermittent stream. At the Alternate Sites LBG identified approximately 5.31 acres of wetlands and approximately 4,710 feet of streams. The streams on the Alternative Site include two perennial streams, one intermittent stream, and four ephemeral tributaries. These wetlands and other water features are discussed in detail in the following sections.

The location and approximate extents of the wetlands and other WOUS delineated in this survey are shown in Appendix K. Completed USACE wetland delineation forms are provided in Appendix F. Color photographs were taken of each delineated wetland during the field survey and are provided in Appendix E.

3.1.1 Preliminary Soils Evaluation

According to the NRCS Soil Data Mart for Cuyahoga County (NRCS, 2010), Ohio and the NRCS Hydric Soils List of Ohio, three soil series are mapped within the Preferred Site. Of the three mapped soil series, only one is defined as being hydric (Orrville silt loam, frequently flooded). Five soil series are mapped within the Alternate Sites; of these, only one is defined as being hydric (Orrville silt loam, frequently flooded). The soil series located within the Preferred and Alternate Sites are shown in Appendix J. Appendix D provides a detailed overview of all soil series within the Preferred and Alternate Sites.

3.1.2 National Wetland Inventory Map Review

The USFWS prepared an inventory of wetlands in the US, the National Wetland Inventory ("NWI"). NWI wetlands represent areas of potential wetlands based largely on interpretation of aerial photographs and available soil data; typically, the features represented in NWI data have not been field verified. Because the data set is not field verified, it is impossible to show all of the wetlands that appear in any given area and, often, the wetland features shown are not present. However, NWI data is still an important tool to utilize prior to beginning a survey for wetlands and other WOUS. The following section describes the number and types of wetlands identified on NWI maps for the various USGS topographic quadrangles within the Preferred and Alternate Sites.

Both the Preferred and Alternate sites are located on the Twinsburg quadrangle. The NWI maps for the Twinsburg quadrangle identified 15 wetlands: five palustrine forested broad leaved deciduous wetlands, three palustrine forested broad leaved deciduous/scrub-shrub broad leaved deciduous wetlands, one palustrine emergent persistent wetland, and six palustrine unconsolidated bottom intermittently exposed wetlands (USFWS, 2012). According to the NWI data, there are 1.9 acres of freshwater forested/scrub shrub wetlands on the Preferred Site and 8.4 acres of freshwater forested/scrub shrub wetlands on the Alternate Site. NWI mapped wetlands are shown in Appendix J.

3.1.3 Delineated Wetlands

Preferred Site

The wetland delineation of the Preferred Site identified three wetlands, totaling approximately 2.85 acres, within the Preferred Site. Many of the wetland boundaries extended beyond the boundary of the Preferred Site. Although the entire wetland was assessed for the ORAM analysis, acreages presented here refer only to the area of wetlands within the boundary of the Preferred Site.

The three wetlands identified in the Preferred Site fall in to two different wetland habitat types: one of the wetlands is palustrine forested/emergent (PFO/PEM) and two of the wetlands are palustrine emergent (PEM).

Alternate Site

Delineation of the Alternate Site identified 15 wetlands, totaling approximately 5.31 acres. Many of the wetland boundaries extended beyond the boundary of the Alternate Site. Although the entire wetland was assessed for the ORAM analysis, acreages presented here refer only to the area of wetlands within the boundary of the Alternate Site.

The fifteen wetlands identified in the Alternate Site fall in to four different wetland habitat types: four of the wetlands are palustrine emergent (PEM), seven of the wetlands are palustrine forested (PFO), one of the wetlands is palustrine forested/emergent (PFO/PEM), and three of the wetlands are palustrine scrub-shrub/emergent (PSS/PEM).

The locations, approximate extents, and acreages of the wetlands identified within the Preferred and Alternate sites are shown in Appendix K. Completed USACE wetland delineation forms are provided in Appendix F. Color photographs were taken of each delineated wetland during the field survey and are provided in Appendix E. Table 1 summarizes the wetlands identified on the Preferred and Alternate sites.

Table 1. SUMMARY OF DELINEATED WETLANDS WITHIN THE PREFERRED AND ALTERNATE SITES

Cowardin Wetland Type	Number of Wetlands	Category 1	Category 2	Category 3	Acreage within Site Boundary
Preferred Site – Parcel C					
PEM	2	0	2	0	1.51
PFO/PEM	1	0	1	0	1.34
Preferred Site Total	**3**	**0**	**3**	**0**	**2.85**
Alternate Site – Parcel A					
PEM	1	0	1	0	0.2
PFO	7	0	7	0	1.29
PSS/PEM	3	0	3	0	1.29
Alternate Site Parcel A Total	**11**	**0**	**11**	**0**	**2.78**
Alternate Site – Parcel B					
PEM	3	2	1	0	1.25
PFO/PEM	1	0	1	0	1.28
Alternate Site Parcel B Total	**4**	**2**	**2**	**0**	**2.53**

3.1.4 Delineated Wetlands ORAM V5.0 Results

Within the Preferred Site, all three wetlands are Category 2 wetlands. The Category 2 wetlands include one wetland whose score placed it in the Modified 2 category. Within the Preferred Site, Wetlands CFBS and CFBT had the highest ORAM scores (49), while wetland CFBR had the lowest score (42).

Of the 15 wetlands identified at the Alternate Site, two wetlands are Category 1 wetlands and 13 wetlands are Category 2 wetlands. The Category 2 wetlands include five wetlands whose scores place them in the Modified 2 Category. Within the Alternate Site, Wetland CFCB had the highest ORAM score (57), while wetland CFBP had the lowest ORAM score (8). Completed ORAM forms for the wetlands are provided in Appendix G.

Category 1 Wetlands

Two Category 1 wetlands were identified at the Alternate Site, wetlands CFBP and CFBV. These two wetlands appeared to have been created to retain and treat stormwater runoff. Both wetlands had greater than 80 percent coverage by reed canarygrass (*Phalaris arundinacea*), an invasive exotic species that outcompetes most native species.

Category 2 Wetlands

Field surveys identified three Category 2 wetlands within the Preferred Site. The three Category 2 wetlands include 2 palustrine emergent wetlands and one palustrine forested/emergent wetland. The highest scoring Category 2 wetlands within the Preferred Site were Wetlands CFBS and CFBT with ORAM scores of 49, while wetland CFBR had the lowest score ORAM score (42) and was categorized as Modified 2.

Thirteen Category 2 wetlands were identified during field surveys of the Alternate Site. Wetland vegetation types found in Category 2 wetlands included palustrine emergent, palustrine forested, palustrine scrub-shrub/emergent, and palustrine forested/emergent. Within the Alternate Site, Wetland CFCB had the highest ORAM score (57), while wetland CFBP had the lowest ORAM score (8). The Category 2 wetlands include five wetlands (CFBY, CFBZ, CFCA, CFCE, and TSDQ) whose scores place them in the Modified 2 Category. Category 2 wetlands generally exhibited moderate to high quality plant communities with few invasive species, moderate to good plant community interspersion, low to high intensity surrounding land use (e.g. young second growth woodlots, shrub-land, etc.), and recovered and/or no modification to natural hydrology and habitat.

Category 3 Wetlands

No Category 3 wetlands were observed at the Preferred or Alternate sites.

3.2 STREAM AND RIVER CROSSINGS

Review of USGS watershed data indicates that the Preferred and Alternate sites are located within the Cuyahoga River drainage basin (HUC 04110002). The nine stream segments that were assessed within the Preferred and Alternate sites survey are listed in Appendices B and C,

separated by QHEI and HHEI analysis. The locations of streams identified within the survey area are shown in Appendix K.

The Ohio EPA has established water use designation for streams throughout Ohio as outlined in the Ohio Administrative Code (OAC), OAC-3745-1-07. Beaver Meadows Creek, which flows through both the Preferred and Alternate sites, was the only stream in the survey area that has a state of Ohio aquatic use designation (warmwater habitat).

Preferred Site Summary

Two streams are present within the Preferred Site: Beaver Meadows Creek, a perennial tributary of Tinkers Creek, and an unnamed intermittent tributary of Tinkers Creek. Beaver Meadows Creek (flag series CFBL) was assessed using the QHEI methodology for streams with drainage areas greater than 1 mi^2. The unnamed intermittent tributary to Tinkers Creek (flag series CFBS) was assessed using the HHEI methodology for streams with drainage areas less than 1 mi^2.

Alternate Sites Summary

Two perennial streams are present within the Alternate Site: Beaver Meadows Creek (flag series CFBL) and an unnamed tributary to Tinkers Creek (flag series CFBM). These streams were assessed using the QHEI methodology for streams with drainage areas greater than 1 mi^2. In addition, one intermittent stream (flag series CFBU) and four ephemeral streams (flag series CFBN, TSDL, TSDM, and TSDO) are present at the Alternate Site. The intermittent stream and the four ephemeral streams were assessed using the HHEI methodology for streams with drainage areas less than 1 mi^2.

3.2.1 Qualitative Habitat Evaluation Index

Only two streams were assessed using the QHEI methodology; both are perennial streams and tributaries to Tinkers Creek. The stream delineated with the CFBL flag series crosses both the Preferred and Alternate sites; whereas, the stream delineated with the CFBM flag series only flows through the Alternate site. Details of the streams assessed with the QHEI methodology are below and Table 2 summarizes the QHEI streams identified on the Preferred and Alternate sites. Forms for the streams assessed using the QHEI methodology are provided in Appendix H. A table of characteristics for all streams assessed using the QHEI methodology is included in Appendix B. Color photographs were taken of each sampled location of the stream during the field survey and are provided in Appendix E. Maps showing the location of the streams assessed during this survey are shown in Appendix K.

Table 2. SUMMARY OF QHEI STREAMS WITHIN THE PREFERRED AND ALTERNATE SITES

Flow Regime	Number of Streams	Very Poor	Poor	Fair	Good	Excellent	Length Within Site Boundary (Feet)
Preferred Site – Parcel C							
Perennial (R3)	1	0	0	0	0	1	453
Preferred Site Total	**1**	**0**	**0**	**0**	**0**	**1**	**453**
Alternate Site – Parcel A							
Perennial (R3)	1	0	0	0	1	0	1,036
Alternate Site Parcel A Total	**1**	**0**	**0**	**0**	**1**	**0**	**1,036**
Alternate Site – Parcel B							
Perennial (R3)	1	0	0	0	0	1	2,026
Alternate Site Parcel B Total	**1**	**0**	**0**	**0**	**0**	**1**	**2,026**

Good Warmwater Habitat Streams – The unnamed tributary to Tinkers Creek, delineated with the CFBM flag series, received a score of 68.5. This stream was located entirely on the Alternate sites. The substrate of this stream was generally dominated by cobbles, gravel, and sand. The stream showed evidence of sparse coverage of undercut banks, rootmats, rootwads, logs or woody debris, and none to very little erosion. The bankfull width of the stream averaged 31 feet in the surveyed reach.

Excellent Warmwater Habitat Streams – The score for Beaver Meadows Creek, which was delineated with the CFBL flag series, received a score of 78. Beaver Meadow Creek flows through both the Preferred and Alternate sites and drains into Tinkers Creek. The substrate of this stream was generally dominated by cobble with lesser amounts of boulders, gravel and sand. The stream showed evidence of sparse overhanging vegetation, rootmats, aquatic macrophytes, logs and woody debris, and moderate erosion. The average bankfull width in the survey reach was 41 feet.

None of the streams delineated on the Preferred and Alternate sites were classified as Very Poor, Poor, or Fair warmwater habitat streams.

3.2.2 Primary Headwater Habitat Evaluation Index

Field surveys of the proposed Preferred and Alternate Sites identified six headwater stream segments: four Class 1 streams and two Modified Class 2 streams. Descriptions of the streams assessed with the HHEI methodology are below and Table 3 summarizes the HHEI streams identified on the Preferred and Alternate sites. Forms for the streams assessed using the HHEI methodology are provided in Appendix I. A table of characteristics for all streams assessed using the HHEI methodology is included in Appendix C. Color photographs were taken of each sampled location of the stream during the field survey and are provided in Appendix E. Maps showing the location of the streams assessed during this survey are shown in Appendix K.

Class 1 Headwater Streams – Field surveys identified four Class 1 headwater streams at the Alternate Site (flag series CFBN, TSDL, TSDM, and TSDO). Scores for these streams range between 17 and 18, and all have ephemeral flow regimes. The substrates consisted primarily of clay or hardpan, gravel, and sand, with lesser amounts of boulder. The streams were dry at the time of the survey and, and bank full width does not exceed 2 feet.

Modified Class 2 Headwater Streams – Field surveys identified two Modified Class 2 headwater streams. Both streams have intermittent flow regimes. The Modified Class 2 headwater stream that crosses the Preferred Site scored 30 (flag series CFBS), while the Modified Class 2 headwater stream that crosses the Alternate Site scored 41 (flag series CFBU). The substrates mainly consisted of cobble, gravel, and sand. Both streams may have been creating to drain adjacent wetlands, which results in these streams receiving a Modified Class 2 designation. The streams were dry at the time of the survey and, and bank full width does not exceed 3.3 feet.

None of the streams delineated on the Preferred and Alternate sites were classified as Modified Class 1, Class 2, Class 3, or Rheocrene potential.

Table 3. SUMMARY OF HHEI STREAMS WITHIN THE PREFERRED AND ALTERNATE SITES

Flow Regime	Number of Streams	Mod. Class I PHWH	Class I PHWH	Mod. Class II PHWH	Class II PHWH	Class III PHWH	Rheocrene Potential	Length Within Site Boundary (Feet)
Preferred Site – Parcel C								
Ephemeral (RE)	0	0	0	0	0	0	0	0
Intermittent (R4)	1	0	0	1	0	0	0	657
Perennial (R3)	0	0	0	0	0	0	0	0
Preferred Site Total	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**657**
Alternate Site – Parcel A								
Ephemeral (RE)	4	0	4	0	0	0	0	576
Intermittent (R4)	0	0	0	0	0	0	0	0
Perennial (R3)	0	0	0	0	0	0	0	0
Alternate Site Parcel A Total	**4**	**0**	**4**	**0**	**0**	**0**	**0**	**576**
Alternate Site – Parcel B								
Ephemeral (RE)	0	0	0	0	0	0	0	0
Intermittent (R4)	1	0	0	0	1	0	0	1,070
Perennial (R3)	0	0	0	0	0	0	0	0
Alternate Site Parcel B Total	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1,070**

4.0 SUMMARY

4.1 PREFERRED SITE

The delineation of the Preferred Site identified a total of three wetlands, totaling 2.85 acres. The three wetlands are of two different wetland habitat types: one wetland is palustrine forested/emergent (PFO/PEM) and two wetlands are palustrine emergent (PEM). Two of the wetlands at the Preferred Site are Category 2 wetlands, while one wetland is categorized as a Modified Category 2 wetland.

There are two streams within the Preferred Site: Beaver Meadows Creek, a perennial stream, and one intermittent unnamed tributary to Tinkers Creek. Beaver Meadows Creek was assessed using the QHEI methodology for streams with drainage areas greater than 1 mi^2 and was classified as excellent warmwater habitat. The intermittent unnamed tributary to Tinkers Creek was assessed using the HHEI methodology for streams with drainage area less than 1 mi^2 and was classified as Modified Class II Primary Headwater Habitat.

4.2 ALTERNATE SITES

Fifteen wetlands totaling 5.31 acres were identified at the Alternate Site. The 15 wetlands can be divided into four wetland types: four are palustrine emergent (PEM); seven are palustrine forested (PFO); three are palustrine scrub-shrub/palustrine emergent (PSS/PEM); and, one is palustrine forested/palustrine emergent (PFO/PEM). Two of the wetlands are classified as Category 1 wetlands, eight of the wetlands are classified as Category 2 wetlands, and the remaining five wetlands are classified as Modified Category 2 wetlands.

Seven streams or stream segments were identified within the Alternate Site. Beaver Meadows Creek and one unnamed tributaries to Tinkers Creek were observed to have perennial flow. These streams were assessed using the QHEI methodology for streams with drainage areas greater than 1 mi^2 Beaver Meadows Creek, which flows through the Preferred and Alternate sites, was classified as excellent warmwater habitat, while the unnamed perennial tributary that flows only across the Alternate Site was classified as good warmwater habitat. There is one unnamed tributary to Tinkers creek that has intermittent flow. The remaining unnamed tributaries have ephemeral flow. The intermittent and ephemeral tributaries were assessed using the HHEI methodology for streams with drainage area less than 1 mi^2. The intermittent stream was classified as Modified Class II Primary Headwater Habitat while the ephemeral streams were classified as Class I Primary Headwater Habitat.

5.0 REFERENCES

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APPENDIX A
DESCRIPTIVE TABLE OF ALL WETLANDS WITHIN THE PREFERRED AND ALTERNATE SITES

Flag Series	Cowardin Type	ORAM Score	ORAM Category	Acreage Within the Site Boundary	Photo Number/ Feature Page
Preferred Site – Parcel C					
CFBS	PEM	49	2	1.42	7 /
CFBT	PEM	49	2	0.09	9 /
CFBR	PFO/PEM	42	Modified 2	1.34	6 /
Total Acreage in Parcel C				**2.85**	
Alternate Site – Parcel A					
CFBY	PFO	39	Modified 2	0.005	14 /
CFBZ	PFO	39	Modified 2	0.003	
CFCA	PFO	39	Modified 2	0.008	
CFCE	PFO	39	Modified 2	0.05	17 /
TSDQ	PSS/PEM	44	Modified 2	0.59	24 /
CFBX	PFO	48	2	0.52	13 /
TSDP	PFO	50	2	0.18	23 /
CFCC	PSS/PEM	52	2	0.31	16 /
TSDK	PEM	52	2	0.20	18 /
TSDN	PSS/PEM	52	2	0.39	21 /
CFCB	PFO	57	2	0.52	15 /
Total Acreage in Parcel A				**2.78**	
Alternate Site – Parcel B					
CFBV	PEM	9	1	0.15	11 /
CFBP	PEM	8	1	1.07	5 /
CFBW	PEM	49	2	0.03	12 /
CFBO	PFO/PEM	49	2	1.28	4 /
Total Acreage in Parcel B				**2.53**	

APPENDIX B
DESCRIPTIVE TABLE OF THE QHEI STREAMS DELINEATED WITHIN THE PREFERRED AND ALTERNATE SITE

Flag Series	Water Body	Flow Regime	Form Used	Score	Class or Narrative Description	Bankfull Width (feet)	Length Within The Site Boundary (feet)	Photo Number/ Figure Page
Preferred Site – Parcel C								
CFBL	Beaver Meadows Creek	Perennial	QHEI	78	Excellent	41	453	1/1
Alternate Site – Parcel A								
CFBM	UNT to Tinker Creek	Perennial	QHEI	68.5	Good	31	1,036	2/1
Alternate Site – Parcel B								
CFBL	Beaver Meadows Creek	Perennial	QHEI	78	Excellent	41	2,026	1/1

APPENDIX C
DESCRIPTIVE TABLE OF THE HHEI STREAMS DELINEATED WITHIN THE PROPOSED ROUTE

Flag Series	Water Body	Flow Regime	Form Used	Score	Class or Narrative Description	Bankfull Width (feet)	Length within Preferred Site (feet)	Photo Number/ Figure Page
Preferred Site – Site C								
CFBS	UNT to Tinkers Creek	Intermittent	HHEI	30	Modified Class II PHWH	3.3	657	7/1
Alternate Site – Site A								
TSDL	UNT to Tinkers Creek	Ephemeral	HHEI	17	Class I PHWH	2	272	19/1
TSDM	UNT to Tinkers Creek	Ephemeral	HHEI	17	Class I PHWH	1.7	168	20/1
TSDO	UNT to Tinkers Creek	Ephemeral	HHEI	18	Class I PHWH	1.7	83	22/1
CFBN	UNT to Tinkers Creek	Ephemeral	HHEI	18	Class I PHWH	1	53	3/1
Total HHEI Stream Length in Parcel A							*576*	
Alternate Site – Site B								
CFBU	UNT to Tinkers Creek	Intermittent	HHEI	41	Modified Class II PHWH	3.3	1070	10/1

APPENDIX D
TABLE OF SOILS LISTED BY NRCS IN THE PREFERRED AND ALTERNATE SITES

Soil Map Unit (SMU) Name	SMU Abbreviation	Hydric (Y/N)
Preferred Site – Parcel C		
Orrville silt loam, frequently flooded	Or	Yes
Wadsworth silt loam, 2 to 6 percent slopes	WaB	No
Rittman silt loam, 6 to 12 percent slopes	RsC	No
Alternate Site – Parcel A		
Orrville silt loam, frequently flooded	Or	Yes
Mahoning silt loam, 2 to 6 percent slopes	MgB	No
Ellsworth silt loam, 6 to 12 percent slopes	ElC	No
Ellsworth silt loam, 25 to 70 percent slopes	ElF	No
Alternate Site – Parcel B		
Orrville silt loam, frequently flooded	Or	Yes
Ellsworth silt loam, 6 to 12 percent slopes	ElC	No
Ellsworth silt loam, 25 to 70 percent slopes	ElF	No
Wadsworth silt loam, 2 to 6 percent slopes	WaB	No

APPENDIX E
PHOTOGRAPHS OF FEATURES DELINEATED WITHIN THE PREFERRED AND ALTERNATE SITES

1. CFBL-S

2. CFBM-S

3. CFBN-S

4. CFBO

5. CFBP

6. CFBR

7. CFBS

8. CFBS-S

9. CFBT

10. CFBU-S

11. CFBV

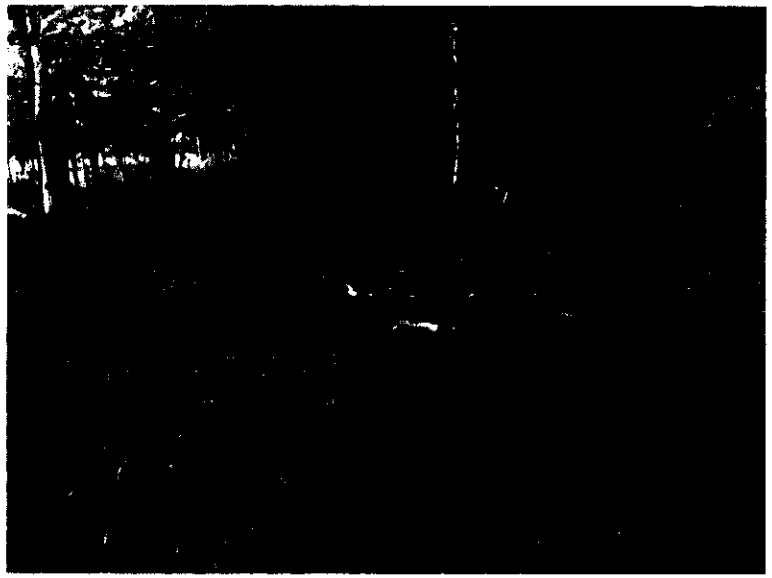
12. CFBW

13. CFBX

14. CFBY

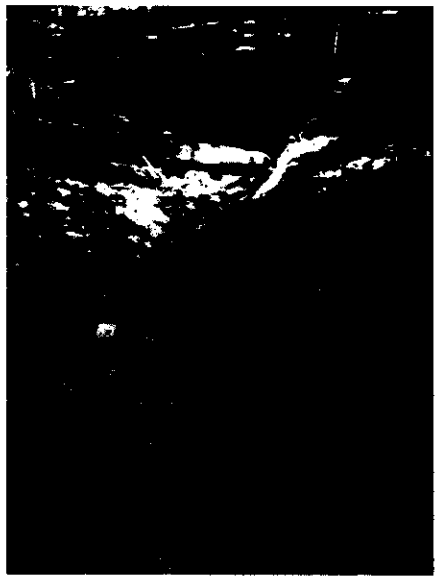
15. CFCB

16. CFCC



17. CFCE

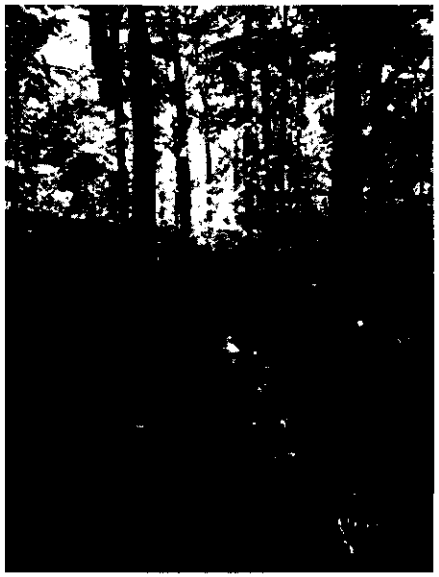
18. TSDK



19. TSDL-S

20. TSDM-S

21. TSDN



22. TSDO-S

23. TSDP

24. TSDQ

APPENDIX F
U.S. ARMY CORPS OF ENGINEERS WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbo w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: Or: Orville silt loam, frequently flooded NWI classification: PFO/PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbo w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	20	Y	FACW
2. Platanus occidentalis	10	N	FACW
3. Carya ovata	40	Y	FACU
4.			
5.			
6.			
7.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Cretaegus sp	40	Y	NI
2. Lindera benzoin	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
	60	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	80	Y	FACW
2. Glyceria striata	50	Y	OBL
3. Myosotis scorpioides	30	N	OBL
4. Carex frankii	15	N	OBL
5. Symplocarpus foetidus	10	N	OBL
6. Boehmeria cylindrica	20	N	OBL
7. Acorus americanus	5	N	OBL
8.			
9.			
10.			
11.			
12.			
	210	= Total Cover	
Woody Vine Stratum (Plot size: 15)			
1. Vitis sp	25	Y	OBL
2. Toxicodendron radicans	15	Y	FAC
3.			
4.			
	40	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbo w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					SiL	
3-9	10YR 4/2	95	10YR 5/8	5	C	M	SiCL	
9-16	10YR 4/3	95	10YR 5/6	5	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ *Hydrogen Sulfide* (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ *Loamy Mucky Mineral* (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ *Dark Surface* (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/17/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbp w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No _____ Hydric Soil Present? Yes X No _____ Wetland Hydrology Present? Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____ If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbp w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	100	Y	FACW
2. Juncus effusus	20	N	FACW
3. Dipsacus sylvestris	5	N	NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	125 = Total Cover		
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbp w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					L	
2-5	10YR 5/4	100					SiCL	
5-15	10YR 4/1	90	10YR 5/8	10	C	M	SiCL	
15-18	10YR 4/1	90	10YR 6/8	10	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/17/12

Applicant/Owner: First Energy State: OH Sampling Point: CFBP U

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): linear

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slopes NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbp u

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phragmites australis	30	Y	FACW
2. Phalaris arundinaceca	50	Y	FACW
3. Apocynum canabinum	40	Y	FAC
4. Solidago canadensis	15	N	FACU
5. Dipsacus sylvestris	10	N	NI
6. Daucus carota	5	N	UPL
7.			
8.			
9.			
10.			
11.			
12.			
	150 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbp u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					L	
3-7	10YR 4/2	100					SiCL	
7-15	10YR 4/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (**F1**) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbr w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): depresssion/floodplain Local relief (concave, convex, none): concave

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: Or: Orville silt loam, frequently flooded NWI classification: PEM/PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbr w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5)			
1. Symplocarpus foetidus	60	Y	OBL
2. Urtica dioica	60	Y	FAC
3. Alliaria petiolata	40	Y	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	160 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbr w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/1	100					SiCL	
10-18	5YR 4/1	95	10YR 5/8	5	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbr u

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave/convex

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: Or: Orville silt loam, frequently flooded NWI classification: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbr u

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fagus grandifolia	60	Y	FACU
2. Prunus serotina	10	N	FACU
3.			
4.			
5.			
6.			
7.			
	70 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		

Herb Stratum (Plot size: 5)			
1. Fagus grandifolia	40	Y	FACU
2. Rosa multiflora	10	N	FACU
3. Dactylis glomerata	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60 = Total Cover		

Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbr u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					SiL	
4-12	10YR 4/4	100					SiCL	
12-18	10YR 4/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbs w

Investigator(s): Flannagan Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): nonw

Slope (%): 0-2 Lat: 41.3652 Long: -81.464401 Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbs w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	90	Y	FACW
2. Apocynum cannabinum	20	N	FAC
3. Juncus effusus	20	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbs w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	95	10YR 5/8	5	C	M	SL	
4-10	10YR 4/1	90	10YR 5/8	10	C	M	SiCL	
10-18	10YR 4/2	90	10YR 5/6	10	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: CFBS U

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-2 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slopes NWI classification: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes X No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbs u

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	50	Y	FACW
2. Cretaegus sp.	65	Y	NI
3.			
4.			
5.			
6.			
7.			
	115	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	70	Y	FACW
2. Leersia oryzoides	60	Y	OBL
3. Glyceria striata	30	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	160	= Total Cover	

Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbs u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					SiL	
4-12	10YR 4/3	100					SiCL	
12-18	10YR 4/3	95	10YR 5/6	5	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbt w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): concave

Slope (%): 3-8 Lat: 41.365501 Long: -81.4664 Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☒ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbt w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	80	Y	FACW
2. Juncus effusus	10	N	FACW
3. Cirsium arvense	20	N	FACU
4. Typha latifolia	20	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbt w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					L	
4-11	10YR 4/2	95	10YR 5/8	5	C	M	SiCL	
11-18	10YR 4/2	90	10YR 5/8	5	C	M	SiCL	
			10YR 5/6	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix **(F3)**
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbt u

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): linear

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slope NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbt u

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	70	Y	FACW
2. Holcus latanus	5	N	FACU
3. Asclepias syriaca	5	N	UPL
4. Daucus carota	5	N	UPL
5. Rudbeckia hirta	5	N	UPL
6. Dipsacus sylvestris	10	N	NI
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbt u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					L	
3-7	10YR 4/3	100					CL	
7-18	10YR 5/4	90	10YR 6/8	5	C	M	CL	
			10YR 4/1	5	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbv w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 3-8 Lat: 41.369301 Long: -81.462402 Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12% slope NWI classification: PEM/POW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	***Is the Sampled Area*** **within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbv w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	100	Y	FACW
2. Carex vulpinoidea	5	N	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes V No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbv w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5YR 4/2	90	7.5YR 5/8	10	C	M	SiCL	
9-16	10YR 4/1	90	10YR 6/8	10	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbv u

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): LINEAR

Slope (%): 3-8 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: EIC: Ellsworth silt loam, 6-12 % slope NWI classification: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☒ Presence of Reduced Iron (C4)
- ☒ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☒ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbv u

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	60	Y	FAC
2. Prunus serotina	20	Y	FACU
3. Platanus occidentalis	10	N	FACW
4.			
5.			
6.			
7.			
	90	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. Asimina triloba	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	20	Y	FACW
2. Andropogon virginicus	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	= Total Cover	

Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbv u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					L	
3-10	10YR 4/3	100					CL	
10-16	10YR 4/4	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Glenwillow Substation City/County: Cuyahoga Sampling Date: 07/18/12

Applicant/Owner: First Energy State: OH Sampling Point: cfbw w

Investigator(s): Flannagan Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-2 Lat: _____ Long: _____ Datum: WGS 84

Soil Map Unit Name: Or: Orville silt loam, frequently flooded NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: cfbw w

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Rubus allegheniensis	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	80	Y	FACW
2. Verbesina alternifolia	30	Y	FACW
3. Urtica dioica	30	Y	FAC
4. Impatiens capensis	25	N	OBL
5. Myosotis scorpioides	30	Y	OBL
6. Cirsium arvense	30	Y	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	225 = Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: cfbw w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	100					CL	
3-10	10YR 4/1	95	10YR 5/8	5	C	M	CL	
10-18	10YR 5/2	95	10YR 5/8	5	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: