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Garrett P. Lent  
Associate

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717-731-1979 Direct Fax

August 29, 2022

***VIA ELECTRONIC FILING***

Rosemary Chiavetta, Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street, 2nd Floor North  
P.O. Box 3265  
Harrisburg, PA 17105-3265

**Re: Letter Of Notification Of PPL Electric Utilities Corporation, Filed Pursuant To 52 Pa. Code Chapter 57 Subchapter G, For Approval Of The Rebuild Of The Existing Double-Circuit South Akron-Milwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines Connecting The South Akron 230-69 kV Substation To The Milwood 230-69 kV Substation In East Lampeter Township, Pequea Township, Upper Leacock Township, West Earl Township, And West Lampeter Township All In Lancaster County, Pennsylvania  
Docket No. A-2022-\_\_\_\_\_**

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Dear Secretary Chiavetta:

Attached for filing is the Letter of Notification of PPL Electric Utilities Corporation in the above-referenced proceeding. As indicated on the Certificate of Service, copies of the Letter of Notification are being served by certified mail, return receipt requested, upon the involved governmental agencies, municipalities and property owners. Construction of the Project will commence upon the Commission's approval of this filing, with an estimated construction start date of July 2023 with an anticipated in-service date of September 2025.

If you have any questions concerning this matter, please contact me at the address or telephone numbers provided above.

The associated \$350.00 filing fee has been paid by Post & Schell, P.C. as of the time of filing.

Rosemary Chiavetta, Secretary  
August 29, 2022  
Page 2

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Garrett P. Lent". The signature is written in a cursive style with a large initial "G" and "L".

Garrett P. Lent

GPL/dmc  
Enclosures

cc: Renardo Hicks, Esquire  
Paul T. Diskin, Esquire  
Jordan Van Order, Esquire  
Certificate of Service

## CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

### VIA CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Pennsylvania Bureau of Investigation and Enforcement  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street  
2nd Floor, Room-N201  
Harrisburg, Pennsylvania 17120  
Attn: Richard Kanaskie

Pennsylvania Department of Environmental Protection  
400 Market Street  
10th Floor Rachel Carson State Office Building  
Harrisburg, Pennsylvania 17101  
Attn: Regional Permit Coordination Office

Pennsylvania Department of Transportation  
Keystone Building  
400 North Street, Fifth Floor  
Harrisburg, Pennsylvania 17120  
Attn: Donald J. Smith, Acting Chief Counsel

Pennsylvania Historical and Museum Commission  
Bureau for Historic Preservation  
Commonwealth Keystone Building, Second Floor  
400 North Street  
Harrisburg, Pennsylvania 17120-0053  
Attn: Mr. Douglas C. McLearen, Chief

Pennsylvania Department of Conservation and Natural Resources  
Rachel Carson State Office Building  
400 Market Street  
Harrisburg, Pennsylvania 17105-8767  
Attn: Rebecca Bowen, Ecological Services Section Chief

Pennsylvania Game Commission  
2001 Elmerton Avenue  
Harrisburg, Pennsylvania 17110-9797  
Attn: Peter Sussenbach, Director, Bureau of Wildlife Habitat Management

Pennsylvania Fish and Boat Commission  
Center Region Office  
595 East Rolling Ridge Drive  
Bellefonte, Pennsylvania 16823-9620  
Attn: Christopher A. Urban, Chief, Natural Diversity Section

Pennsylvania Office of Consumer Advocate  
555 Walnut Street  
5th Floor Forum Place  
Harrisburg, Pennsylvania 17101-1923  
Attn: Patrick Cicero, Consumer Advocate

Pennsylvania Office of Small Business Advocate  
555 Walnut Street  
1<sup>st</sup> Floor Forum Place  
Harrisburg, Pennsylvania 17101  
Attn: Steven C. Gray, Senior Supervising Assistant Small Business Advocate

U.S. Army Corps of Engineers  
Baltimore District Corporate  
Communication Office  
2 Hopkins Plaza  
Baltimore, Maryland 21201  
Attn: Planning Division

U.S. Fish and Wildlife Service  
Pennsylvania Field Office  
110 Radnor Road, Suite 101  
State College, Pennsylvania 16801  
Attn: Lesa Lindsay

Lancaster County Conservation District  
1383 Arcadia Road Unit 102  
Lancaster, Pennsylvania 17601  
Attn: Christopher Thompson, Conservation  
District Manager

Lancaster County Planning Commission  
150 North Queen Street  
Lancaster, Pennsylvania 17603  
Attn: Terry Martin, Chairperson

East Lampeter Township  
2250 Old Philadelphia Pike  
Lancaster, Pennsylvania 17602  
Attn: John Blowers, Chairman

Pequea Township  
1028 Millwood Road  
Willow Street, Pennsylvania 17584  
Attn: Harry D. Lehman III, Chairman

Upper Leacock Township  
161 Newport Road  
Leola, Pennsylvania 17540  
Attn: Ronald S. Simmons, Chairman

West Earl Township  
157 West Metzler Road  
P.O. Box 787  
Brownstown, Pennsylvania 17508  
Attn: David Thornton, Chairman

West Lampeter Township  
852 Village Road  
P.O. Box 237  
Lampeter, Pennsylvania 17537  
Attn: Barry L. Hershey, Chairman

Alica B & James L Denlinger  
222 Clearview Rd  
Lancaster, Pa 17602-1504

Amos S & Sylvia L Miller  
2822-C Stumptown Rd  
Bird In Hand, Pa 17505

Amtrack Tax & Insurance Dept  
400 N Capitol St NW  
Washington, DC 20001

Anna S & David B King  
2866 Old Philadelphia Pike  
Bird In Hand, Pa 17505

Annie S & Elmer K Esh  
2874 B Stumptown Rd  
Ronks, Pa 17572

Annie S & Stephen E Beiler  
47 Hartman Bridge Rd  
Lancaster, Pa 17602

Barbara K & Amos K King  
46 Hartman Bridge Rd  
Lancaster, Pa 17602

Bethany G & Christopher S Harnish  
41 Run Valley Rd  
Conestoga, Pa 17516

Bradys High Performance Service LLC  
386 Millwood Rd  
Willow Street, Pa 17584

Brenda J Boyer  
85 Run Valley Rd  
Conestoga, Pa 17516

Clifford S & Shari L Reifsnyder  
1104 W Penn Grant Rd  
Lancaster, Pa 17603

County Of Lancaster C/O Parks Department  
1050 Rockford Rd  
Lancaster, Pa 17602

Craig M & Anne S Esbenshade  
150 Bowman Rd  
Lancaster, Pa 17602

Cynthia C Kropf  
1164 W Penn Grant Rd  
Lancaster, Pa 17603

Dana Michelle Goennemann, Marvin Herr,  
& Denise Y Schirmer  
300 Willow Valley Lakes Dr  
Willow Street, Pa 17584

Daniel B & Katie F Zook  
183 S Farmersville Rd  
Leola, Pa 17540

Daniel S & Katie Ann Stoltzfus  
150 Marticville Rd  
Lancaster, Pa 17603

Danielle N McMichael & Ryan M Glackin  
105 Dianne Cir  
Willow Street, Pa 17584

David & Sylvia K Smucker  
2110 Rockvale Rd  
Lancaster, Pa 17602

David A & Bonnie S Saganich  
75 Silver Mine Rd  
Conestoga, Pa 17516

David H & Dawn R Moore  
313 Brethren Church Rd  
Leola, Pa 17540

David J & Rachel Z Beiler  
200 Maple Ave  
Bird In Hand, Pa 17505

David K & Elizabeth K Esh  
134 Run Valley Rd  
Conestoga, Pa 17516

David M Nolt  
309 N Hershey Ave  
Leola, Pa 17540

David S & Elizabeth K King  
1404 Houser Rd  
Lancaster, Pa 17602

Dennis J & Peggy A Wagner  
106 Lynette Cir  
Willow Street, Pa 17584

Douglas H & E Marvin Herr  
300 Willow Valley Lakes C 100  
Willow Street, Pa 17584

Douglas H Herr  
496 Millwood Rd  
Willow Street, Pa 17584

Earl B Nolt  
129 Hess Rd  
Leola, Pa 17540

Earl Ray & Saraetta M Shirk  
1155 Short Rd  
New Holland, Pa 17557

Edna P & Daniel K King  
139 Bowman Rd  
Lancaster, Pa 17602

Elam M & Ruth E Horning  
177 S Farmersville Rd  
Leola, Pa 17540

Eli M & Rebecca E Beiler  
231 B Lynwood Rd  
Ronks, Pa 17572

Eli S & Nancy L King  
431 Strasburg Pike  
Lancaster, Pa 17602

Eli S & Rebecca S Beiler  
151 Center Square Rd  
Leola, Pa 17540

Elva N & Ervin S Zimmerman  
400 W Metzler Rd  
Ephrata, Pa 17522

Emma & Steve K King  
223 W Metzler Rd  
Ephrata, Pa 17522

Eva N & Earl Z Oberholtzer  
204 E Eby Rd  
Leola, Pa 17540

Francis A & Elizabeth Marchesano  
104 Lynette Cir  
Willow Street, Pa 17584

Franklin Properties Two LLC  
414 E King St  
Lancaster, Pa 17602

Gerald B & Jewel E Garber  
208 Long Rifle Rd  
Willow Street, Pa 17584

Gideon S & Lizzie K Glick  
200 Stone Quarry Rd  
Leola, Pa 17540

Glen A Brodersen  
106 Tracy Ct  
Willow Street, Pa 17584

Harry H, David H Byer, et al  
160 Run Valley Rd  
Conestoga, Pa 17516

Harvey M & Rhoda L Hoover  
343 N Maple Ave  
Leola, Pa 17540

Harvey S & Louise Z Hoover  
236 S Farmersville Rd  
Leola, Pa 17540

Heart Land Enterprises Inc.  
Po Box 525  
411 E Main St  
Leola, Pa 17540

Henry E & Mary S Ebersol  
2936 Stumptown Rd  
Ronks, Pa 17572

Henry K & Esther S Beiler  
416 Strasburg Pike  
Lancaster, Pa 17602

Henry L & Barbara Glick  
1760 Rockvale Rd  
Lancaster, Pa 17602

Isaac J & Elizabeth G Lapp  
1501 Mentzer Rd  
Lancaster, Pa 17602

Jacob P & Evelyn H King  
148 Brick Church Rd  
Leola, Pa 17540

Jacob S Beiler & Marian K Esh  
84 A South Groffdale Rd  
Leola, Pa 17540

James C & Melissa F Brown  
103 Dorianne Dr  
Willow Street, Pa 17584

James F V Wild  
103 Dianne Cir  
Willow Street, Pa 17584

Janet E & Ronald C Sharpe  
2867 Stumptown Rd  
Ronks, Pa 17572

Janet G & Robert E Martin  
429 E Main St  
Leola, Pa 17540

Janette R & Steven R Emerson  
160 Bowman Rd  
Lancaster, Pa 17602

Jay C & Rhoda M Burkholder  
187 Turtle Hill Rd  
Leola, Pa 17540

Jay D & Linda M Ebersole  
529 Strasburg Pike  
Lancaster, Pa 17602

Jennifer L & Chad D Hoover  
292 W Farmersville Rd  
Leola, Pa 17540

Jeremy P & Lesley A Feakins  
1200 W Penn Grant Rd  
Lancaster, Pa 17603

John E & Naomi K Lapp  
49 Eastbrook Rd  
Ronks, Pa 17572

John R King  
2007 Pioneer Rd  
Lancaster, Pa 17602

John Ray & Glenda J Hoover  
186 W Metzler Rd  
Ephrata, Pa 17522-9002

John S & Anna K Beiler  
317 Brethren Church Rd  
Leola, Pa 17540

Jonathan N Zimmerman  
651 Old Akron Rd  
Ephrata, Pa 17522

Judith K Y Denlinger & Rebecca A Sieber  
244 Lynwood Rd  
Ronks, Pa 17572

Karl L & Joan A Knosp  
155 Bowman Rd  
Lancaster, Pa 17602

Kathleen McCabe  
102 Lynette Cir  
Willow Street, Pa 17584

Katie S & Ephraim B King  
348 Marticville Rd  
Conestoga, Pa 17516

Katrina Richter  
108 Tracy Ct  
Willow Street, Pa 17584

Kevin W & Elaine Z Hoover  
35 Balmertown Rd  
Leola, Pa 17540

Keystone Service Systems Inc  
310 N 2nd St  
Harrisburg, Pa 17101

Lavina L & Steven R Stoltzfus  
2966 Stumptown Rd  
Ronks, Pa 17572

Leon Ray & Erma Jane Frey  
151 Hess Rd  
Leola, Pa 17540

Leroy S & Linda Mae Miller  
2931 Miller Ln  
Bird In Hand, Pa 17505

Leroy S & Sadie M Stoltzfus  
22 School Rd  
Leola, Pa 17540

Lester S & Arlene N Nolt  
165 N Hershey Ave  
Leola, Pa 17540

Levi M & Rachel F Beiler  
2823a Old Philadelphia Pike  
Bird In Hand, Pa 17505

Linda A Neff  
110 Tracy Ct  
Willow Street, Pa 17584

Linda F & Elam E Miller  
233 Rock Hill Rd  
Millersville, Pa 17551

Lisa Shach & Robin W Boyd  
1126 W Penn Grant Rd  
Lancaster, Pa 17601

Lloyd H & Doris H Kreider  
200 Sprecher Rd  
Lancaster, Pa 17603

Lloyd N Hoover  
303 W Farmersville Rd  
Leola, Pa 17540

Lynn Audrey & Joseph K Jr., Hemler  
55 Church Rd  
Lancaster, Pa 17603

Martin Family Partnership LP  
697 Wallace Rd  
New Holland, Pa 17557

Mary Ella Witmer  
1402 Eshelman Mill Rd  
Willow Street, Pa 17584

Mary G & John S Swarey  
300 Hess Rd  
Leola, Pa 17540

Mary Jo Cassel & Ben D Kreider  
305 Brethren Church Rd  
Leola, Pa 17540

Mary K & Henry K Esh  
2846 Stumptown Rd  
Ronks, Pa 17572

Mary L & David L Blank  
1230 Gypsy Hill Rd  
Lancaster, Pa 17602

Melanie B Scheid  
157 Marticville Rd  
Lancaster, Pa 17603

Mellinger Manufacturing Inc  
367 Millwood Rd  
Willow Street, Pa 17584

Melvin L & Lydia Ann Fisher  
3007 W Newport Rd  
Ronks, Pa 17572

Mervin R & Miriam L Stoltzfus  
2440 Creek Hill Rd  
Lancaster, Pa 17601

Michael A Angelino  
1140 W Penn Grant Rd  
Lancaster, Pa 17603

Miller-King Family Partnership LP  
2882 Miller Ln  
Bird In Hand, Pa 17505

MMW Properties LLC  
169 N Groffdale Rd  
Leola, Pa 17540

Mylin Holdings  
1345 Bryan Dr  
Lancaster, Pa 17601

Neil S & Cheryl A Hoover  
285 W Farmersville Rd  
Leola, Pa 17540

Omar E & Marian S Fisher  
434a Newport Rd  
Ronks, Pa 17572

Paul F & Grace M Wenger  
190 S Farmersville Rd  
Leola, Pa 17540

Pennsylvania Lines LLC, Southern, Railway  
Co  
110 Franklin Rd SE  
Roanoke, Va 24042

Pioneer Woods LP  
600 Olde Hickory Rd Suite 100  
Lancaster, Pa 17601

Raymond H & Mabel Zimmerman  
95 Balmertown Rd  
Leola, Pa 17540

Richard & Laurie A Pabon  
35 Madge Dr  
Lancaster, Pa 17603

Richard Howell Witmer Foundation  
Po Box 4308  
Lancaster, Pa 17604

Richard J & Rebecca J Rosati  
101 Dorianne Dr  
Willow Street, Pa 17584

Robert W & Vivian S Abel  
200 Marticville Rd  
Lancaster, Pa 17603

Ronald R & Sandra N Murray  
99 Church Rd  
Lancaster, Pa 17603

Roy N & Laverne M Herr  
216 Mentzer Ave  
New Holland, Pa 17557

Ruth Ann & Reuben F King  
263 Clearview Rd  
Lancaster, Pa 17602

Ruth N & Kenneth H Mellinger  
369 Millwood Rd  
Willow Street, Pa 17584

Sadie Mae & Benjamin K Stoltzfoos  
305 E Eby Rd  
Leola, Pa 17540

Samuel & Susie Riehl  
247 E Eby Rd  
Leola, Pa 17540

Samuel J & Annie S King  
110 Long Lane  
Willow Street, Pa 17584

Samuel Jay & Rachel S Stoltzfus  
2823 Old Philadelphia Pike  
Bird In Hand, Pa 17505

Santo M & Denise M Scalzo  
102 Tracy Ct  
Willow Street, Pa 17584

Sara Ann & Quentin M Weaver  
336 Brethren Church Rd  
Leola, Pa 17540

Sara K & Melvin B Beiler  
281 Lynwood Rd  
Ronks, Pa 17572

Sarah E & Melvin G Stoltzfus  
86-88 S Groffdale Rd  
Leola, Pa 17540

Scott A & Ann M Canfield  
91 Run Valley Rd  
Conestoga, Pa 17516

Sharon W & James R Zimmerman  
53 Balmertown Rd  
Leola, Pa 17540

Smucker Associates  
2715 Old Philadelphia Pike  
Bird-In-Hand, Pa 17505

South Lancaster Grace Brethren Church  
300 Willow Valley Sq  
Lancaster, Pa 17602

Steamboat Hospitality LP  
Po Box 11116  
Lancaster, Pa 17605

Stephen S & Susie S Esh  
2810 Old Philadelphia Pike  
Bird In Hand, Pa 17505

Susan W & Linn W Moedinger  
1835 Pioneer Rd  
Lancaster, Pa 17602

Susie Ann & Daniel K King  
143 Turtle Hill Rd  
Leola, Pa 17540

Susie Ellen & John I Stoltzfus  
400b W Newport Rd  
Ronks, Pa 17572

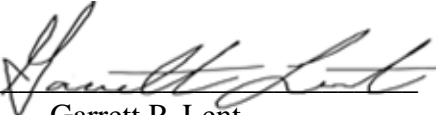
Timothy D Cauler  
101 Dianne Cir  
Willow Street, Pa 17584

Wayne A Hess  
521 Strasburg Pike  
Lancaster, Pa 17602

William III & Linda S Welsh  
89 Run Valley Rd  
Conestoga, Pa 17516

Willow Valley Associates Inc  
100 Willow Valley Lakes Dr  
Willow Street, Pa 17584

Date: August 29, 2022

  
Garrett P. Lent

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Letter Of Notification Of PPL Electric :  
Utilities Corporation, Filed Pursuant To 52 :  
Pa. Code Chapter 57 Subchapter G, For : Docket No. A-2022-\_\_\_\_\_  
Approval Of The Rebuild Of The Existing :  
Double-Circuit South Akron-Milwood 230 :  
kV / South Akron-Earl 69 kV / Millwood- :  
Engleside 69 kV / Millwood-Strasburg 69 :  
kV Transmission Lines Connecting The :  
South Akron 230-69 kV Substation To The :  
Milwood 230-69 kV Substation In East :  
Lampeter Township, Pequea Township, :  
Upper Leacock Township, West Earl :  
Township, And West Lampeter Township :  
All In Lancaster County, Pennsylvania :

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**LETTER OF NOTIFICATION**

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**TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:**

PPL Electric Utilities Corporation (“PPL Electric”) hereby files this Letter of Notification pursuant to Section 57.72(d)(1)(i) of the Pennsylvania Public Utility Commission’s (“Commission”) regulations, 52 Pa. Code § 57.72(d)(1)(i), to rebuild the existing double-circuit South Akron-Millwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines (“South Akron-Millwood 230 kV Transmission Lines”)<sup>1</sup> connecting the South Akron 230-69 kV Substation (“South Akron Substation”) and the Millwood 230-69 kV Substation (“Millwood Substation”) in East Lampeter Township, Pequea

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<sup>1</sup> The towers that comprise the South Akron-Millwood 230 kV Transmission Lines are designed for double-circuit 230 kV operation, but one circuit is currently being operated at 69 kV. The South Akron-Millwood 230 kV line is one of the circuits on these towers, and for a portion of the line the other half of the towers are occupied by 69 kV circuits, as explained in further detail in Attachment 1 – Necessity Statement. PPL Electric notes that the rebuild proposed in this Letter of Notification will upgrade the conductors that comprise the circuit being operated at 69 kV to be designed for 230 kV operation. However, these 69 kV circuits will continue to be operated at 69 kV after the proposed rebuild, unless and until PPL Electric obtains Commission approval to operate these circuits at a higher voltage.

Township, Upper Leacock Township, West Earl Township, and West Lampeter Township, which are all in Lancaster County, Pennsylvania (the “South-Akron Millwood Project” or “Project”).<sup>2</sup>

The proposed Project will address reliability, asset health and safety concerns related to the deteriorated condition of the COR-TEN® lattice towers of PPL Electric’s South Akron-Millwood 230 kV Transmission Lines. The Project contemplates the replacement and rebuilding of these existing COR-TEN® lattice towers to address structural reliability concerns associated with the experience of “pack-out rust”<sup>3</sup> in many of the joints of the subject lattice towers. The experience of pack-out rust in the joints of the subject towers has accelerated asset health concerns and accelerated the rate at which the subject towers were expected to reach end-of-life.

This project will be constructed in East Lampeter Township, Pequea Township, Upper Leacock Township, West Earl Township, and West Lampeter Township, which are all in Lancaster County, Pennsylvania. PPL Electric has provided information regarding this Project to all identified political subdivisions, and none of them have objected to the Project. Construction of the Project will commence upon the Commission’s approval of this filing, with an estimated construction start date of July 2023 with an anticipated in-service date of September 2025. In support thereof, PPL Electric states as follows:

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<sup>2</sup> For a complete list of municipalities and counties crossed by the Project, please refer to Attachment 5 to this Letter of Notification.

<sup>3</sup> As explained in Attachment 1 – Necessity Statement, “pack-out rust” or “pack rust” is a form of localized corrosion typical of steel components that develop a crevice into an open atmospheric environment, which results in rust packing between conjoined steel components. As described further herein, pack-out rust accelerates the deterioration of asset health and can result in shearing off bolts, loss of structural integrity, members disconnecting from lattice towers, and tower failure.

## **I. INTRODUCTION**

1. This Letter of Notification is filed by PPL Electric, a public utility that provides electric distribution, transmission, and provider of last resort services in Pennsylvania subject to the regulatory jurisdiction of the Commission.

2. PPL Electric's address is as follows:

PPL Electric Utilities Corporation  
Two North Ninth Street  
Allentown, Pennsylvania 18101

3. PPL Electric's attorneys are:

Michael J. Shafer (I.D. # 205681)  
PPL Services Corporation  
Two North Ninth Street  
Allentown, PA 18101  
Voice: 610-774-2599  
Fax: 610-774-4102  
E-mail: mjshafer@pplweb.com

David B. MacGregor (I.D. # 28804)  
Garrett P. Lent (I.D. #321566)  
Post & Schell, P.C.  
17 North Second Street  
12th Floor  
Harrisburg, PA 17101-1601  
Voice: 717-731-1970  
Fax: 717-731-1985  
E-mail: dmacgregor@postschell.com  
E-mail: glent@postschell.com

PPL Electric's attorneys are authorized to receive all notices and communications regarding this Letter of Notification.

4. PPL Electric furnishes electric service to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of twenty-nine counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania. PPL Electric is a "public utility" and an "electric distribution company" as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa.C.S. §§ 102, 2803.

5. PPL Electric owns approximately 5,000 miles of transmission lines operating at 69 kV (kilovolts) or higher, approximately 375 substations with a capacity of 10 MVA (megavolt

amperes) or more, and approximately 43,000 miles of distribution lines operating at less than 69 kV.

6. This Letter of Notification includes the following accompanying Attachments:

- Attachment 1 Necessity Statement.
- Attachment 2 Engineering Description.
- Attachment 3 Description of Right-of-Way.
- Attachment 4 PPL Electric Design Criteria and Safety Practices.
- Attachment 5 Landowners And Agencies List.

7. This Letter of Notification and accompanying Attachments, which are incorporated herein by reference, contain all the information required by 52 Pa. Code § 57.72(d)(4).

## **II. THE PROJECT**

### **A. NEED FOR THE PROJECT**

8. PPL Electric has a responsibility to provide transmission assets and maintain them in a manner that is safe, reliable, and resilient to meet the needs of the electric system and the service expectations of its customers. To meet this duty, PPL Electric applies its transmission asset management planning procedure, which includes system performance and condition assessments. These performance and condition assessments identify system needs and prioritize projects based on several variables such as equipment age, condition, maintenance schedule, and impact on system reliability and performance to ensure a reliable electric grid and reasonable service to its customers.

9. As explained in greater detail below and in Attachment 1 – Necessity Statement, this Project is necessary to resolve significant asset health condition concerns across the South Akron-Millwood 230 kV Transmission Lines associated with the presence of pack-out rust in the

existing COR-TEN® steel lattice towers and thereby resolve service reliability and safety risks associated with the potential failure of these structures.

10. The Project as proposed addresses these concerns in a cost-efficient manner, as compared to either a replacement alternative or a remediation and later replacement alternative. In particular, the Project as proposed avoids the substantial uncertainties surrounding potential remediation of the existing COR-TEN® steel lattice towers, avoids redundant inspection and/or additional remediation of these structures, and is the lowest cost alternative. Therefore, and for the reasons more fully explained below, the Commission should approve the Project as proposed.

### **1. Existing System**

11. The South Akron and Millwood Substations are connected by the double-circuit South Akron-Millwood 230 kV Transmission Lines.

12. The South Akron-Millwood 230 kV Transmission Lines are approximately 20.4 miles long and supported by 125 COR-TEN® lattice structures.

13. These towers are designed for double-circuit 230 kV operation, but currently one circuit is being operated at 69 kV. The South Akron-Millwood 230 kV line is one of the circuits on these towers, and the South Akron-Earl 69 kV line and the Millwood-Engleside 69 kV line are in the other position in different sections on more than half of these towers.<sup>4</sup>

14. The double-circuit South Akron-Millwood 230 kV Transmission Lines is in PPL Electric's Lancaster-Harrisburg Region and are part of a larger 230 kV transmission network that connects generation in this region to load throughout PPL Electric and the rest of PJM's footprint.

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<sup>4</sup> As explained in Attachment 1 – Necessity Statement, there is an 8 mile section in the middle of these transmission lines where the towers are built for DC, but the conductor is only strung on the side of the transmission lines where the South Akron-Millwood 230 kV circuit is located. Over this section, the other side of the transmission lines is vacant, with no insulators or conductors. The proposed rebuild contemplates that the towers in this section will be designed to accommodate a second set of arms and conductors, but the second set of arms will only be added in the future if needed.

This 230 kV network includes the Brunner Island-West Hempfield 230 kV Transmission Line, the Brunner Island-South Manheim 230 kV Transmission Line, the West Hempfield-Manor 230kV, the Manor-Millwood 230 kV Transmission Line, the South Akron-South Manheim 230 kV Transmission Line, and the Lauschtown – South Akron #3& #4 230kV lines that support bulk power flow and feeds various 230-69 kV substations in the Lancaster-Harrisburg Regions.

15. A map of the existing system configuration is provided as Figure 1-1, in Attachment 1 – Necessity Statement.

## **2. Definition of the Problem**

16. The existing South Akron-Millwood 230 kV Transmission Lines are comprised of 125 weathering-steel COR-TEN® lattice structures spanning approximately 20.4 miles, which were originally constructed in 1967. COR-TEN® lattice towers were commonly installed by the industry during this time because it was believed that the corrosion-resistant properties of weathering-steel would reduce future maintenance needs/costs. These towers had an expected service life of approximately 75 years at the time they were installed.

17. However, in 2013, PPL Electric hired a third-party contractor to perform an assessment of its 230 kV transmission lines under a steel structure capital maintenance program. The assessment identified that 126 of 131 surveyed structures (96%) had one or more structure legs rated Condition C (poor) or Condition D (very poor). Of those 126 structures, 25 had one or more structure legs that were identified as “priority,” requiring immediate attention. In order to extend the life of the asset and ensure no failures at the ground line, the 25 structures identified as “priority” received maintenance repairs in 2014, which included post leg, diagonal and base shoe repairs. Protective coating was applied to the remaining 101 COR-TEN® structures that rated Condition C or D but were not identified as “priority.” However, these remaining structures face constant asset health concerns due to the presence of pack-out rust.

18. The asset health concerns discovered by the 2013 assessment were heightened by the discovery of pack-out rust in the section joints of the subject COR-TEN® lattice towers. As explained in further detail in Attachment 1 – Necessity Statement, when the presence of pack-out rust becomes too severe, it can deform steel members and connecting hardware. Pack-out rust can also shear off bolts, cause loss of structural integrity, cause members to disconnect from the tower, and even result in tower failure. This now well-known inherent problem with COR-TEN® steel is also being seen in other infrastructure where two pieces of COR-TEN® Steel overlap at joints, such as those present on lattice towers<sup>5</sup> and other steel structures such as steel bridges.

19. PPL Electric further verified the results of the 2013 assessment by contracting with several independent, non-affiliated inspection companies to conduct evaluations of COR-TEN® lattice towers to determine the overall condition of these towers on the PPL Electric Transmission System in 2019. The 2019 evaluations included inspection of 15 randomly selected COR-TEN® lattice towers across the PPL Electric Transmission System by three separate contractors.<sup>6</sup> Review of the three contractor reports revealed that over 90% of the joints at each structure exhibited visible pack-out in the connections. In addition, the review revealed that pack-out and section-loss was most prominent on the lower portions of the towers where there was higher likelihood of moisture build up.

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<sup>5</sup> See, e.g., *Application of Virginia Electric and Power Company d/b/a Dominion Virginia Power For approval and certification of Carson-Rogers Road 500 kV Transmission Line Rebuild under Va. Code § 56-46.1 and the Utility Facilities Act, Va. Code § 56-265.1 et seq.*, Va. SCC Case No. PUE-2016-00078, at pp. 2-3, 9-10 (Hearing Examiner Report dated March 10, 2017) ; *Application of Virginia Electric and Power Company For approval and certification of Cunningham-Dooms 500kV Transmission Line Rebuild under Va. Code § 56-46.1 and the Utility Facilities Act, Va. Code § 56-265.1 et seq.*, Va. SCC Case No. PUE-2016-00020, at pp. 3-4 (Response of Dominion Virginia Power to Staff’s Supplemental Filing of March 30, 2017, filed April 13, 2017) (discussing the problems associated with “pack-out” rust on another utility’s COR-TEN® lattice tower structures).

<sup>6</sup> Each contractor was asked to inspect 5 structures and prepare an engineering analysis of their condition, proposed remediation approach and estimated costs to remediate the identified structural defects.

20. Based on the prevalence of the observed deterioration, PPL Electric determined a more thorough and strategic evaluation was required to determine the full extent of the negative asset health impacts associated with COR-TEN® lattice towers. In early 2020, PPL Electric initiated a second more robust evaluation of the COR-TEN® lattice towers to determine the full extent of the deterioration on the transmission system. The details of this analysis are more fully detailed in Attachment 1 – Necessity Statement.

21. The results of the 2020 inspection program again confirmed the severity of deterioration identified during the 2019 inspection program, as follows:

- Over 90% of the joints showed visible pack-out in the connections, which is anticipated to worsen over time.
- The protective patina needed to protect the steel from corrosion did not properly develop at numerous members resulting in section-loss across the entire structure.
- Pack-out damage was typically more prevalent on lower sections of the tower except for some specific attachment points where severe pack-out was observed on higher sections.
- Structural damage was found on several members from pack-out that ruptured bolts and split/deformed members.

22. Finally, in April 2022, PPL Electric contracted RTR Energy Solutions, Inc. (“RTR”) to perform a condition assessment of on the South Akron-Millwood 230 kV Transmission Lines. The details of the RTR September 2021 Assessment are set forth in Attachment 1 – Necessity Statement. In addition, the average structure classified as “Moderate” is in similar condition to structures classified as “Severe.” Out of the 117 structures classified as “Moderate,” 113 have over 30% of their total joints containing pack-out rust. RTR classifies any structure with over 50% of its joints containing pack-out rust as “Severe.”

23. The majority of pack rust observed on each structure was found in the lower sections of the post leg where horizontal and diagonal members are bolted to the post leg. This

assessment shows that the asset health conditions observed in the system-wide assessment are being exhibited on the specific structures targeted for replacement by the Project.

24. Based on the results of the inspection programs described above, it is clear that the issue with COR-TEN® lattice towers has accelerated the deterioration of these structures and has brought the assets to the end of their service life much sooner than would have been anticipated. At roughly 55 years of age, the COR-TEN® lattice towers that comprise the South Akron-Millwood 230 kV Transmission Lines have exceeded their useful life and can no longer be relied upon to safely operate as designed.

25. Furthermore, these asset health concerns are particularly important as the South Akron-Millwood 230 kV Transmission Lines are critical components of PPL Electric's Bulk Transmission System and are required to serve local load to several critical customer facilities.

26. If the South Akron-Millwood 230 kV Transmission Lines were to fail, then the Millwood-Engleside 69kV line were to fail, and then the next contingency loss of the Engleside 69kV bus #3 occurred, this would result in the loss of the West Willow Distribution substation. This will result in up to 25 mega-watts ("MW") of load drop resulting in approximately 7,666 customers losing service. In addition, if the South Akron-Millwood 230 kV Transmission Lines were to fail, and then a loss of the Lauschtown – South Akron #3& #4 230kV lines occurred, this contingency may result in overloads on the Brunner Island – South Manhiem 230kV line. Finally, if the South Akron-Millwood 230 kV Transmission Lines were to fail, and then a loss of the Engleside 69kV bus #1 were to occur, this contingency may result in overloads on the Manor – Engleside #1 & #2 69kV lines were to occur.

27. Furthermore, as the topic of severe weather patterns becomes increasingly relevant, there is a need to take into consideration how changing weather patterns will impact the reliability

of the existing COR-TEN® lattice structures. Over the last 20 years, PPL Electric has seen a trend of increasing storms per year within the PPL Electric service territory. With each storm comes more exposure to extreme precipitation and wind events. If a tower is structurally compromised due to COR-TEN® pack-out and section loss, that wind event creates an increased risk of structural failure. With projected increases of more frequent and intense heat waves over the next century in the Northeast in 2021, the occurrence of more severe wind and precipitation events is expected to rise as well. This is evident in the storms associated with Hurricane Ida that hit the Northeast recently, as a storm of that strength would have been rare decades ago. Due to drastic weather pattern changes, it is imperative to re-evaluate the COR-TEN® structures in the safest and most reliable way to protect against the pack rust issue in the joints of the structures and guard the transmission system from catastrophic failures of COR-TEN® towers.

28. At the October 2020 PJM TEAC meeting,<sup>7</sup> PPL Electric presented its plan to address COR-TEN® needs on the 230 kV system. As part of this plan, PPL Electric also shared the need with PJM stakeholders to address COR-TEN® towers on the South Akron-Millwood 230 kV Transmission Lines (need # PPL-2020-0008). The need # PPL-2020-0008 will be addressed by the South Akron-Millwood 230 kV Transmission Lines rebuild under supplemental project s2369, which will be completed at an estimated cost of \$75.4 Million.

## **B. THE PROPOSED PROJECT**

29. In order to resolve the identified COR-TEN® lattice tower health condition, PPL Electric proposes to rebuild the existing South Akron-Millwood 230 kV Transmission Lines. All the COR-TEN® lattice structures as well as the conductors at the 49 locations will be replaced.

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<sup>7</sup> Refer to slides at <https://www.pjm.com/~media/committees-groups/committees/teac/2020/20201006/20201006-item-09-ppl-supplemental.ashx>

30. The proposed Project will address the asset health needs associated with COR-TEN® lattice tower replacement, as well as improve overall reliability, safety, and system resiliency. It will also address the above-identified reliability needs. With respect to the COR-TEN® asset health condition, the Project will immediately and fully resolve the deteriorated condition of the existing structures on a long-term basis by removing the existing COR-TEN® lattice towers and replacing them with steel monopoles. By rebuilding these structures, PPL Electric will resolve the existing COR-TEN® issue and avoid the possibility of the issue worsening and/or recurring with respect to these structures and developing into both a reliability and public safety issue.

31. Importantly, as explained in Attachment 1 – Necessity Statement, the Project as proposed also avoids the additional costs and uncertainties surrounding the alternative remediation solution contemplated PPL Electric. As noted therein, PPL Electric evaluated and rejected the remediation alternative because it carries substantial uncertainties regarding its immediate and long-term effectiveness to address the subject COR-TEN® lattice towers. There are few, if any, other examples of fully remediating substantially deteriorated COR-TEN® towers which PPL Electric could review to benchmark the effectiveness of this alternative against. Although remediation could potentially extend the life of the structures, it would, at a minimum, require that the remediation work be re-evaluated and potentially repeated every ten years after the initial remediation. In addition, the initial cost of remediation could be substantially greater than anticipated, and the cost of repeated remediation would result in additional O&M expense. The Project as proposed avoids these additional costs and uncertainties and proposes to rebuild the transmission lines in a cost-efficient manner to ensure the continued provision of safe and reliable service.

32. The approximate cost of the entire transmission line rebuild Project is \$75.4 Million. On a total cost of service basis, the Proposed Solution is approximately 93% of the cost of Alternative 1 (replacing each of the existing structures) on a 45-year basis and 95% of the cost of Alternative 1 on 75-year basis. In addition, on a total cost of service basis, the Proposed Solution is approximately 88% of the cost of Alternative 2 (remediating the existing structures) on a 45-year basis and 55% of the cost of Alternative 2 on 75-year basis.

### **III. HEALTH AND SAFETY**

33. The proposed lines will not create any unreasonable risk of danger to public health or safety. The proposed lines will be designed, constructed, operated, and maintained in a manner that meets or surpasses all applicable National Electrical Safety Code (“NESC”) minimum standards and all applicable legal requirements. Descriptions of the NESC standards, PPL Electric’s design criteria, and PPL Electric’s safety practices are provided in Attachment 4 to this Letter of Notification.

34. Attachment 4 accompanying this Letter of Notification also explains PPL Electric’s standards for Magnetic Field Management. Ground clearances for the proposed Project will be increased between approximately 3.0 and 7.0 feet higher than those required by the NESC standard in order to reduce the magnetic field exposure. The proposed rebuild of the South Akron-Millwood 230 kV Transmission Lines will continue to allow for double-circuit operation, which will allow for reverse phasing. A reduction in magnetic field exposure is anticipated due to the higher ground clearances and reverse phasing.

#### **IV. DESCRIPTION OF THE RIGHT-OF-WAY**

35. The rebuilt double-circuit South Akron-Millwood 230 kV Transmission Lines will be on the same structure alignment and in the same right-of-way (“ROW”) as the existing transmission lines. The existing fee-owned properties and ROW vary in width from 125 feet to 285 feet wide with the wider areas being some of the fee-owned properties. The Project will require the replacement the existing structures that will be constructed entirely within the existing ROW, on PPL Electric fee-owned properties, or on PPL Electric’s South Akron Substation and Millwood Substation properties. *See* 52 Pa. Code § 57.72(d)(1)(i). In addition, the facilities associated with the Project will be constructed upon the same structure alignment as the existing facilities. PPL Electric does not require any additional ROW for the construction of the Project. An aerial map is provided at the end of Attachment 3 to this Letter of Notification, which depicts the proposed line and associated structures.

36. New structures will be located in close proximity to existing structures where it is reasonably practical to do so. Where structures will be substantially relocated, PPL Electric will discuss the proposed structure locations with the respective property owners. Because the new pole locations are generally similar to the original locations, PPL Electric does not anticipate any objections.

37. As explained in Attachment 2, existing COR-TEN® lattice tower structures range in height from between approximately 120 and 165 feet with an average structure height of approximately 132 feet. The proposed monopole structures for the South Akron-Millwood 230 kV Transmission Lines will range in height from between approximately 120 and 160 feet with an average structure height of approximately 130 feet.

38. Two aerial plot plans are provided at the end of Attachment 1 to this Letter of Notification. Figure 1-1 depicts the location of the existing transmission facilities associated with

this Project. Figure 1-2 depicts the location of the proposed transmission facilities associated with this Project.

## V. LAND USE AND ENVIRONMENTAL EVALUATION

39. As explained above, construction of the proposed Project will take place entirely within existing rights-of-way. Therefore, it is anticipated that the proposed South Akron-Millwood 230 kV Transmission Lines will have minimal incremental impacts on land use in the area.

40. PPL Electric will use and update previously established access roads for construction to the extent practical to further reduce interference with existing uses and minimize land use impacts. A detailed description of the route of each individual component of the Project can be found in Attachment 3.

41. PPL Electric evaluated the existing land uses on the PPL Electric owned properties, within the existing ROW, and within 0.25 mile (1,320 feet) of the ROW (“Project Area”). This broader Project Area was reviewed to provide a sense of the landscape in which the Project is located. Based on review of the 2021 National Land Cover Data (“NLCD”), land use in the Project Area is approximately 90% agriculture with the remaining 10% comprised of mixed residential and commercial areas that are crossed at the intersection with major roads.

42. The Project will not affect any state lands, national parks, local parks, recreational areas or natural landmarks because none of these features are located within the Project Area. In the north portion of the Project Area, conserved lands include the West Earl Municipal Building, which is used as a public recreation area and is located approximately 0.3 miles south of the South Akron Substation. Conserved lands in the central portion of the Project Area include Mascot Park, also known as the William J Morton Bird Sanctuary, which is a popular bird watching area located

along Route 772 and approximately 1,000 feet from the Project. The southern portion of the Project Area is adjacent to the Willow Valley Golf Course located along Route 222 near Lyndon. In addition, Silver Mine Park is a public recreation area located directly adjacent to the Millwood Substation and that is crossed by a 1,500 foot section of PPL Electric owned ROW.

43. No conservation easements are directly crossed by the Project. The closest easements to the Project are two agricultural conservation easements. One is located north of Route 222 near the town of Willow Street and the other is on Route 324 near the Millwood Substation. Neither of these conserved properties will be affected by the Project.

44. PPL Electric conducted an online review of the Project Area and surrounding landscape through the Pennsylvania Historical and Museum Commission (“PHMC”) Cultural Resources Geographic Information System (“GIS”) site for this area. State Historic Preservation Office (“SHPO”) eligible and listed structures and districts that were found within or close to the Project Area are listed in Table 3-1 of Attachment 3. Some of these historic districts and structures are crossed or spanned by the Project.

45. PPL Electric is in the initial stage of coordination with the PHMC for the modifications being made to the transmission lines. This coordination will be required to receive permits to construct the Project and will be conducted in the near future. PPL Electric does not anticipate any impacts to these SHPO eligible or listed properties or any other PHMC related properties. PPL Electric will perform any reviews and field survey/sampling work required by the PHMC to avoid, minimize, and mitigate impacts to archaeological or historic architectural resources that may be located within the Project Area.

46. No nearby communication towers will be affected by the proposed Project. The Project crosses two railroads. The New Holland Secondary freight line crosses the Project

approximately 5 miles south of the South Akron Substation and the Philadelphia/Harrisburg Amtrak Mainline crosses the Project near Smoketown, about halfway between the South Akron and Millwood Substations. Five gas pipelines are crossed by the Project. The Columbia Gas pipeline crosses the Project near Brownstown and the other four pipelines are all within the same right-of-way and are located south of Route 23. The Project also crosses other PPL Electric electrical utility ROW's adjacent to the South Akron and Millwood Substations.

47. The closest active airports relative to the Project Area are the Smoketown Airport, which is located approximately 1.5 miles from the Project near Route 340, and the Lancaster Airport, which is approximately 4 miles to the west of the South Akron Substation. PPL Electric does not anticipate any interference with airport operations because the Project is located in an area where there are existing electrical facilities. However, PPL Electric will comply with any applicable requirements of the Federal Aviation Administration and the Pennsylvania Department of Transportation, Bureau of Aviation.

48. No unique geological, scenic, or natural areas are located within the Project Area, according to the Pennsylvania Department of Conservation and Natural Resources ("PDCNR").

49. Erosion and Sedimentation ("E&S") control plans will be implemented for the Project to minimize the displacement of soils. These plans will require prior approval from the local county conservation districts, each of which will be served with this Letter of Notification. National Pollutant Discharge Elimination System ("NPDES") permits will also be required from the Pennsylvania Department of Environmental Protection ("PADEP") as needed. During construction, PPL Electric will adhere to all conditions specified in the NPDES permit. Impacts to local soil resources are anticipated to be minimal.

50. The existing transmission line spans several National Hydrography Dataset waterways that will remain in place after the Project construction activities have occurred. Review of the USGS mapping website indicated that the Project will aurally span seven named streams which are listed in Table 3-2 in Attachment 3. The Project Area is located within the Middle Conestoga River watershed (USGS Hydrologic Unit Code (“HUC”) 020503061104), the Muddy Run-Mill Creek watershed (HUC 020503061106), the Lower Conestoga River watershed (HUC 020503061107), and the Climbers Run-Pequea Creek watershed (HUC 020503061204). All of these watersheds generally flow to the southwest to the Susquehanna River.

51. Most of the streams in the Project Area have a PADEP Chapter 93 Designated Use Stream Classification of Warm Water Fishes (“WWF”), Migratory Fishes (“MF”). Silver Mine Run has a PADEP Chapter 93 Designated Use Stream Classification of Trout Sticked Fishes (“TSF”), MF. The Pennsylvania Fish and Boat Commission (“PFBC”) has designated Muddy Run as a Stocked Trout Stream, which may require seasonal restrictions for any work planned in these streams.

52. No direct impacts to these stream features are anticipated by the Project activities. An E&S control plan will be developed to address stormwater control in all watershed areas crossed by the Project. PPL Electric will obtain all approvals and permits necessary for the construction of the Project and will comply with any conditions placed on those permits.

53. PPL Electric also reviewed the U.S. Fish and Wildlife Service’s (“USFWS”) National Wetlands Inventory (“NWI”). The Project crosses two Palustrine, Excavated (PUBHh) freshwater ponds. No impacts to these NWI features are anticipated by the proposed Project activities.

54. The NWI only provides a general overview of the potential wetlands that may be located within an area. For federal and state permitting purposes, the wetlands and waterways within the Project area will be delineated, surveyed, and illustrated according to regulatory standards. This information will be used to minimize any identified wetland impacts where feasible. Additionally, PPL Electric will avoid impacts to wetlands where possible by aerially spanning these features.

55. In addition, PPL Electric obtained the National Flood Hazard Layer (“NFHL”) through the Pennsylvania Spatial Data Access (“PASDA”) database and analyzed for 100-year floodplains within the Project Area and surrounding landscape. Based on review of this data, the Project spans the FEMA 100-year floodplain located near the Conestoga River, an adjacent unnamed tributary (“UNT”) to the Conestoga River, Groff Creek, Mill Creek, Muddy Run, an UNT to Mill Creek, and Big Spring Run. The area at the Conestoga River crossing is within Zone AE, a regulatory floodway, and has a 1-percent-annual-chance of inundation due to a flood event. No impacts to these floodplain areas or floodways are anticipated by the proposed Project activities.

56. Vegetative cover in the Project Area consists almost entirely of agricultural fields. Several patches of forest clearings and one detention basin are present based on aerial imagery. The existing ROW areas for the transmission line has previously been cleared of woody vegetation and no extensive tree clearing is anticipated on the line. If vegetation management is required in this specific location, PPL Electric will apply its “Specifications for Transmission Vegetation Management LA-79827” to minimize potential impacts.

57. Based on review of the *Natural Areas Inventory of Lancaster County, Pennsylvania*, published by The Nature Conservancy in 1998, the Project extends through three

Pennsylvania Natural Heritage identified natural areas. In the northern section, the Project crosses the Brownstown natural area which borders the Conestoga River and adjacent tributaries and contains habitat that supports a rare animal species. In the southern section, the Project extends through the Kiwanis Park Woods and Silver Mine Park natural areas. The Kiwanis Park Woods natural area is located along the Conestoga River near Willow Street and contains habitat for rare plant species. Silver Mine Park natural area is located near the Millwood Substation and is an agricultural landscape that is underlain by limestone bedrock that supports rare cave invertebrates. The area also supports other potentially rare and threatened bat and bird species. Natural areas identified in these documents generally focus on sites that provide habitat conditions for threatened and endangered plant or animal species.

58. PPL Electric completed a Pennsylvania Natural Diversity Inventory (“PNDI”) for the Project on August 26, 2021. The PNDI reviews evaluate the databases of the United States Fish and Wildlife Service (“USFWS”), Pennsylvania Fish and Boat Commission (“PFBC”), Pennsylvania Game Commission (“PGC”), and the PDCNR. No agencies reported any known impacts to threatened and endangered species and/or special concern species and resources within the Project Area. PPL Electric will continue to consult with the jurisdictional agencies regarding potential impacts to protected species, complete all required surveys, obtain all necessary approvals and permits for Project construction, and comply with all conditions placed on those permits.

## **VI. NOTICE**

59. PPL Electric has reached out to residents located immediately adjacent to PPL Electric's fee owned parcels and owners of properties that are crossed by the South Akron-Millwood 230 kV Transmission Line. Copies of the Letter of Notification will be served upon landowners in accordance with 52 Pa. Code § 57.72(d)(3). A list of the landowners impacted by this project is provided in Attachment 5.

60. PPL Electric has provided information regarding the Project to representatives of East Lampeter Township, Pequea Township, Upper Leacock Township, West Earl Township, and West Lampeter Township, all in Lancaster County, Pennsylvania. These entities have not objected to the proposed Project. Copies of this Letter of Notification will be served on the governmental agencies, municipalities, and other public entities and organizations in accordance with 52 Pa. Code § 57.72(d)(3). A list of these entities and organizations is also provided in Attachment 5.

## **VII. LETTER OF NOTIFICATION**

61. PPL Electric is proceeding by means of a Letter of Notification, instead of a full Application, pursuant to the Commission's regulations at 52 Pa. Code § 57.72(d)(1)(i).

62. The proposed South-Akron Millwood Project qualifies for use of a Letter of Notification because it will be located entirely on an existing transmission line right-of-way, and the size, character design or configuration of the proposed transmission line will not substantially alter the right-of-way.

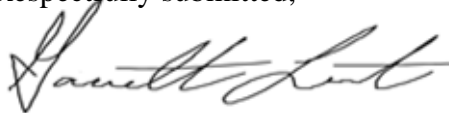
63. This Letter of Notification is filed on the date set forth below. As provided in 52 Pa. Code § 57.72(d)(5), the Commission will review and, by order, approve or disapprove this Letter of Notification. If the Commission approves this Letter of Notification, the proposed South-

Akron Millwood Project will be constructed as proposed herein without the formal application process set forth at 52 Pa. Code §§ 57.71, *et seq.*

**VIII. CONCLUSION**

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the proposed South-Akron Millwood Project located in East Lampeter Township, Pequea Township, Upper Leacock Township, West Earl Township, and West Lampeter Township, in Lancaster County, Pennsylvania, that is explained above and in the Attachments hereto.

Respectfully submitted,



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Date: August 29, 2022

Attorneys for PPL Electric Utilities Corporation

**PPL ELECTRIC  
ATTACHMENT 1**

# SOUTH AKRON-MILLWOOD 230 kV COR-TEN® REBUILD PROJECT

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## 1.0 INTRODUCTION

PPL Electric Utilities (“PPL Electric”) is requesting Pennsylvania Public Utility Commission (“PUC” or “the Commission”) approval to rebuild the existing double-circuit South Akron-Millwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines (“South Akron-Millwood 230 kV Transmission Lines”)<sup>1</sup> connecting the South Akron 230-69 kV Substation (“South Akron Substation”) and the Millwood 230-69 kV Substation (“Millwood Substation”) in Lancaster County, Pennsylvania (“Project”)<sup>2</sup>.

This Project is required to address reliability concerns related to the deteriorated condition of the COR-TEN® lattice towers on the South Akron-Millwood 230 kV Transmission Lines. In addition, the Project is also required to comply with:

- The Consolidated Transmission Owners Agreement (“CTOA”) Rate Schedule - FERC No. 42 (FERC ER10-2713-000), which requires transmission systems to “[b]e kept in place and maintained in good operating condition in accordance with Good Utility Practice and principles, guidelines and standards of the applicable Regional Reliability Council and NERC.”

The Project is necessary for PPL Electric to avoid violating its obligations under the CTOA to maintain its transmission facilities in good operating condition and avoid public safety concerns caused by failed assets. The Project is one of several essential PPL Electric projects designed to address a system-wide concern related to the structural reliability of COR-TEN® lattice towers on its bulk transmission system. As explained below, the existence of “pack-out rust”<sup>3</sup> in many of

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<sup>1</sup> These towers that comprise the South Akron-Millwood 230 kV Transmission Lines are designed for double-circuit 230 kV operation, but one circuit is currently being operated at 69 kV. The South Akron-Millwood 230 kV line is one of the circuits on these towers, and for a portion of the line the other half of the towers are occupied by 69 kV circuits, as explained in further detail below. PPL Electric notes that the rebuild proposed in this Letter of Notification will upgrade the conductors that comprise the circuit being operated at 69 kV to be designed for 230 kV operation. However, these 69 kV circuits will continue to be operated at 69 kV after the proposed rebuild, unless and until PPL Electric obtains Commission approval to operate these circuits at a higher voltage.

<sup>2</sup> For a complete list of municipalities and counties crossed by the Project, please refer to Attachment 5 to the Letter of Notification.

<sup>3</sup> “Pack-out rust” or “pack rust” is a form of localized corrosion typical of steel components that develop a crevice into an open atmospheric environment, which results in rust packing between conjoined steel components. As described in Attachment 1, pack-out rust accelerates the deterioration of asset health and can result in shearing off bolts, loss of structural integrity, members disconnecting from lattice towers, and tower failure.

the joints of the subject lattice towers diminishes structural integrity and increases the risk of system failures that could negatively impact public safety and affect approximately 7,666 PPL Electric customers. The Project is necessary to avoid these risks and provide the best solution to immediately address the identified asset health issues on a long-term basis.

Moreover, in order for PPL Electric’s transmission facilities to be considered in good operating condition, they must be maintained in a manner consistent with the standards of the North American Electric Reliability Corporation (“NERC”), Reliability First Corporation, and Good Utility Practice as defined by the CTOA.

Subject to the Commission’s approval, construction will begin in July 2023 to support an in-service date of September 2025. PPL Electric will continue to own, operate, and maintain the rebuilt 230 kV transmission line. The total estimated cost of this Project, as described below, is approximately \$75.4 Million, and the cost for the Project will be paid by PPL Electric.<sup>4</sup>

## **2.0 BACKGROUND**

PPL Electric has a responsibility to provide transmission assets and maintain them in an adequate, efficient, safe, reliable, and reasonable manner to meet the needs of the electric system and the expectations of its customers. To achieve this, PPL Electric applies its Transmission Asset Management Procedure as part of its system performance and condition assessment process. These performance and condition assessments identify system needs and prioritize projects based on several variables such as equipment age, condition, maintenance schedule, and impact on system reliability and asset performance to ensure a reliable electric grid and service to its customers.

The transmission system is the backbone of the electric grid. Failure to maintain the system in accordance with Good Utility Practice and reliability practices and standards can decrease overall transmission system reliability and increase the risk of customer outages.

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<sup>4</sup> The estimated cost was developed using averages of recent costs for similar projects and without an in-depth analysis of field investigation. The cost is subject to change as the constructability of the Project, sequence of construction, and other factors that may affect cost are identified and analyzed as the Project progresses.

### **3.0 TRANSMISSION SYSTEM PLANNING PROCESS**

The nation’s interconnected transmission system (“Transmission Grid”) serves as the backbone for safe and reliable delivery of large amounts of electricity from generating stations over substantial distances to customers served by transmission and local distribution systems. It is critical that the Transmission Grid be planned and designed to ensure reliable electric service is provided under all loading conditions or when certain elements of the Transmission Grid are out of service (system contingencies) due to planned or unplanned outages.

Robust transmission planning enables the transmission system to supply electricity to all customer loads in a reliable and economical manner. This system planning process ensures that both the Bulk Electric System (“BES”)<sup>5</sup> and non-Bulk Electric System (non-BES)<sup>6</sup> are planned and constructed so that:

- They can accommodate forecasted system flows during summer and winter peak load;
- They can adequately serve each customer’s need regarding capacity, voltage, and reliability for all load levels throughout the daily load cycle;
- They can sustain probable contingencies and disturbances with minimal customer service interruptions; and
- They are in conformance with NERC, PJM Interconnection, LLC (“PJM”), and the Transmission Owner’s reliability criteria for all normal and emergency operating conditions.

PJM is a Federal Energy Regulatory Commission (“FERC”)-approved Regional Transmission Organization (“RTO”) charged with ensuring the reliability of the electric transmission system under its functional control (100 kV and above) and coordinating the movement of electricity in all or parts of thirteen states and the District of Columbia, including Pennsylvania. To ensure reliable transmission service, PJM prepares an annual Regional Transmission Expansion Plan

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<sup>5</sup> Includes transmission facilities operated at voltages of 100 kV or higher.

<sup>6</sup> Includes transmission facilities operated at voltages less than 100 kV.

(“RTEP”)<sup>7</sup> to identify system reinforcements that are required to, among other things, meet the NERC Reliability Standards, PJM reliability planning criteria, and Transmission Owner reliability criteria.

PPL Electric’s Transmission Asset Management Procedure involves identifying system needs and determining the best available solution to address those needs. This process includes asset evaluation, asset condition and system risk assessments, analysis of alternative solutions and project initiation and scheduling. System needs are identified based on the overarching goals of reducing outage frequency and duration, improving system reliability, decreasing system maintenance cost, and maintaining operational flexibility to ensure safe and reliable electric service of the transmission system and to our customers.

When transmission owning utilities (including PPL Electric) set up PJM as an RTO, they agreed to bind themselves to maintaining their existing transmission systems using Good Utility Practice. The CTOA is an agreement among (1) individual Transmission Owners operating within the PJM Region and (2) between the Transmission Owners and PJM. The CTOA facilitates the planning and operation of the Transmission Grid within the PJM region and establishes the rights and responsibilities of each party to the CTOA. Section 4.6 of the CTOA requires that transmission systems “[b]e kept in place and maintained in good operating condition in accordance with Good Utility Practice and principles, guidelines and standards of the applicable Regional Reliability Council and NERC.” This Project is required to fulfil PPL Electric’s obligations under the CTOA.

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<sup>7</sup> PJM’s RTEP process is currently set forth in Schedule 6 of PJM’s Amended and Restated Operating Agreement (“Schedule 6”). Schedule 6 governs the process by which PJM’s members rely on PJM to prepare an annual regional plan for the enhancement and expansion of the transmission facilities to ensure long-term, reliable electric service consistent with established reliability criteria. In addition, Schedule 6 addresses the procedures used to develop the RTEP, the review and approval process for the RTEP, the obligation of transmission owners to build transmission upgrades included in the RTEP, and the process by which interregional transmission upgrades will be developed.

## **4.0 THE NEED FOR THE PROJECT**

### **4.1 Existing System**

The South Akron and Millwood Substations are connected by the double-circuit South Akron-Millwood 230 kV Transmission Lines. The South Akron-Millwood 230 kV Transmission Lines are approximately 20.4 miles long and supported by 125 COR-TEN® lattice structures. These towers are designed for double-circuit 230 kV operation, but currently one circuit is being operated at 69 kV. The South Akron-Millwood 230 kV line is one of the circuits on these towers, and for a portion of the line the other half of the towers are occupied by 69 kV circuits including the South Akron-Earl 69 kV line, the Millwood-Strasburg 69 kV line and the Millwood-Engleside 69 kV. There is an 8 mile section in the middle where the towers are built for DC, but the conductor is only strung on the side of the transmission lines where the South Akron-Millwood 230 kV circuit is located. Over this section, the other side of the transmission lines is vacant, with no insulators or conductor. The proposed rebuild contemplates that the towers in this section will be designed to accommodate a second set of arms and conductors, but the second set of arms will only be added in the future if needed.

The double-circuit South Akron-Millwood 230 kV Transmission Lines are in PPL Electric's Lancaster-Harrisburg Region and are part of a larger 230 kV transmission network that connects generation in this region to load throughout PPL Electric and the rest of PJM's footprint. This 230 kV network includes the Brunner Island-West Hempfield 230 kV Transmission Line, the Brunner Island-South Manheim 230 kV Transmission Line, the West Hempfield-Manor 230kV, the Manor-Millwood 230 kV Transmission Line, the South Akron-South Manheim 230 kV Transmission Line, and the Lauschtown – South Akron #3& #4 230kV lines that support bulk power flow and feeds various 230-69 kV substations in the Lancaster-Harrisburg Regions. As noted below, if the South Akron-Millwood 230 kV and Millwood-Engleside 69 kV section of Transmission Line fails, it is expected that the service of approximately 7,666 customers would be impacted for the next contingency.

A map of the existing system configuration is provided as Figure 1-1.

## 4.2 Project Need

This Project is needed to address asset health concerns that are being accelerated by increased incidences of pack-out rust associated with COR-TEN® lattice towers. The subject lattice towers had an expected service life of 75 years and were installed in the early 1970s. The subsequent discovery of increased incidences of pack-out rust associated with COR-TEN® lattice towers has accelerated the rate at which these towers were expected to reach end-of-life, and, in some cases, the towers have deteriorated and are continuing to deteriorate beyond the point where they can safely operate as designed and cannot be reasonably or cost effectively remediated.

### 4.2.1 Asset Health

There are approximately 236 circuit miles containing COR-TEN® lattice structures or approximately 1,284 structures across PPL Electric's Transmission System that it currently anticipates will need to be addressed in order to resolve asset health concerns similar to those identified below.<sup>8</sup>

Originally constructed in 1967, the existing South Akron-Millwood 230 kV Transmission Lines have 125 weathering-steel COR-TEN® lattice structures spanning approximately 20.4 miles. COR-TEN® lattice towers were commonly installed by the industry during this time because it was believed that the corrosion-resistant properties of weathering-steel would reduce future maintenance needs/costs.

In 2013, PPL Electric utilized a third-party contractor to perform an assessment of the COR-TEN® lattice structures on its 230 kV transmission lines under a steel structure capital maintenance program. The program evaluated the ground-line of the steel structures, performing minor excavation around the base of the structure and assessing the condition of the steel, and then applying a protective coating to the exposed steel. No joints or members above the base of the structure were included in this assessment. The assessment identified that 126 of 131 COR-TEN® structures (96%) had one or more structure legs rated Condition C (poor) or Condition D (very

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<sup>8</sup> PPL Electric anticipates that addressing the currently anticipated COR-TEN® projects associated with the 230 kV system (approx. 1112 of the identified structures) will cost approximately \$562 million in total. However, these estimates are preliminary in nature and subject to change. PPL Electric is also currently evaluating one other transmission line asset that includes 172 COR-TEN® lattice structures, but it has not yet developed a cost estimate for the remediation or replacement of these structures.

poor). Of those 126 structures, 25 had one or more structure legs that were identified as “priority”, requiring immediate attention. In order to extend the life of the asset and ensure no failures at the ground line, the 25 structures identified as “priority” received maintenance repairs in 2014, which included post leg, diagonal and base shoe repairs. Protective coating was applied to the remaining 101 COR-TEN® structures that rated Condition C or D but were not identified as “priority”. However, these remaining structures face constant asset health concerns due to the presence of pack-out rust. Ongoing inspections conducted since 2014 have confirmed that these structures are continuing to degrade.

These asset health concerns were further heightened by the discovery of pack-out rust in the section joints of the COR-TEN® lattice towers. In particular, the protective surface coating of weathering steel that provides resistance to atmospheric corrosion, known as the patina, did not form properly on the structure joints and members due to moisture trapped between the joints. The trapped moisture prevented completion of the required wetting and drying cycle needed to form the patina. Over time, this has led to the formation of pack-out rust within the joints of connecting tower members and section-loss in the steel members and joints. When the pack rust becomes too severe, it can deform steel members and connecting hardware. It can shear off bolts, cause loss of structural integrity, cause members to disconnect from the tower, and even result in tower failure. PPL Electric is experiencing pack-out rust failures on its transmission line system, which are a leading indicator of ultimate structure failure as outlined above. Over the past few years, PPL Electric has encountered multiple instances of COR-TEN® tower members becoming detached, broken, and deformed/corroded to failure due to severe pack-out rust. Failures of this nature on a transmission tower create emergent safety and reliability concerns which must be proactively addressed.

This now well-known inherent problem with COR-TEN® steel is also being seen in other infrastructure where two pieces of COR-TEN® steel overlap at joints, such as those present on lattice towers<sup>9</sup> and other steel structures such as bridges. The presence of pack-out rust on COR-

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<sup>9</sup> See, e.g., *Application of Virginia Electric and Power Company d/b/a Dominion Virginia Power For approval and certification of Carson-Rogers Road 500 kV Transmission Line Rebuild under Va. Code § 56-46.1 and the Utility Facilities Act, Va. Code § 56-265.1 et seq.*, Va. SCC Case No. PUE-2016-00078, at pp. 2-3, 9-10 (Hearing Examiner Report dated March 10, 2017) ; *Application of Virginia Electric and Power Company For approval and certification*

TEN® structures and its negative impacts on asset health have diminished the expected service life of these structures from 75 to 50 years. As these structures were installed approximately 50 years ago, they have effectively reached end-of-life<sup>10</sup>. No manufacturer’s warranty currently exists for remediation of the COR-TEN® lattice towers. After a reasonable investigation, PPL Electric is not aware of whether a manufacturer’s warranty was in existence at the time the structures were installed.

To better understand the heightened asset health concerns associated with COR-TEN® steel, PPL Electric contracted with independent, non-affiliated inspection companies to conduct evaluations of COR-TEN® lattice towers to determine the overall condition of these towers on the PPL Electric Transmission System in 2019. The 2019 evaluations included inspection of 15 randomly selected COR-TEN® lattice towers across the PPL Electric Transmission System by three separate contractors.<sup>11</sup> Review of the three contractor reports revealed that over 90% of the joints at each structure exhibited visible pack-out in the connections. In addition, the review revealed that pack-out and section-loss was most prominent on the lower portions of the towers where there was higher likelihood of moisture build up. The contractors’ estimates to remediate each tower ranged from \$140,000 to \$240,000 per tower depending on the contractor’s proposed remediation approach and extent of remediation recommended. For the sake of any analysis associated with the remediation option, a cost of \$183,891 per structure was utilized, which is the average of the 3 remediation costs received from contractors.

Based on the prevalence of observed deterioration on the COR-TEN® lattice towers across the PPL Electric Transmission System and the estimated per-tower cost to rehabilitate, PPL Electric determined that a more thorough and strategic evaluation was needed to determine the full extent of the deterioration of COR-TEN® lattice towers across its system.

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*of Cunningham-Dooms 500kV Transmission Line Rebuild under Va. Code § 56-46.1 and the Utility Facilities Act, Va. Code § 56-265.1 et seq., Va. SCC Case No. PUE-2016-00020, at pp. 3-4 (Response of Dominion Virginia Power to Staff’s Supplemental Filing of March 30, 2017, filed April 13, 2017) (discussing the problems associated with “pack-out” rust on another utility’s COR-TEN® lattice tower structures).*

<sup>10</sup> New steel structures that will be installed under the Project have an anticipated service life of 75 years.

<sup>11</sup> Each contractor was asked to inspect 5 structures and prepare an engineering analysis of their condition, proposed remediation approach and estimated costs to remediate the identified structural defects.

In early 2020, PPL Electric initiated a second, more robust evaluation of the COR-TEN® lattice towers to determine the full extent of the deterioration on the transmission system. PPL Electric’s Data Analytics Team developed a strategic approach that utilized advanced statistical analysis and modeling to comprehensively determine the overall condition of the COR-TEN® lattice towers in a cost-efficient manner. The statistical analysis determined that inspection of 192 randomly selected COR-TEN® towers would provide a statistically significant representation of all 1,284 COR-TEN® towers on the PPL Electric system with a 90% confidence level and 5% confidence interval. To assist with the analysis, PPL Electric contracted with AmpJack, an independent consultant, to complete an inspection of 192 randomly selected COR-TEN® towers and classify the observed condition.

The inspection of 192 randomly selected COR-TEN® towers performed by AmpJack included a field-based visual overhead inspection of each structure from the ground, taking measurements of pack-out at each joint and section-loss at each member on the lower section of each structure, visual observations of pack-out and section loss for the higher sections of the towers, and visual observations of the damage at attachment points. The measured values of each joint and member rated according to guidelines provided by PPL Electric using both the measured and visual observations (A-Good, B-Fair, C-Poor, D-Severe and F-Priority). This approach is consistent with the method used by Osmose, an essential asset inspection service company, in grading steel structure corrosion in applications across the country. The results of the AmpJack overall structure ratings are summarized in Table 1-1 below:

**TABLE 1-1: Structure Rating Summary**

Overall Structure Rating			
Class	Condition	Structure Count	Percent
<b>A</b>	<b>Good</b>	0	0.0%
<b>B</b>	<b>Fair</b>	0	0.0%
<b>C</b>	<b>Poor</b>	95	49.5%
<b>D</b>	<b>Severe</b>	88	45.8%

<b>F</b>	<b>Priority</b>	9	4.7%
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The results of the 2020 inspection program confirmed the severity of deterioration identified during the 2019 inspection program as follows:

- Over 90% of the joints showed visible pack-out in the connections, which is anticipated to worsen over time.
- The protective patina needed to protect the steel from corrosion did not properly develop at numerous members resulting in section-loss across the entire structure.
- Pack-out damage was typically more prevalent on lower sections of the tower except for some specific attachment points where severe pack-out was observed on higher sections.
- Structural damage was found on several members from pack-out that ruptured bolts and split/deformed members.

The accelerated deterioration of the asset health of the COR-TEN® lattice towers that are the subject of the Project revealed by 2019 and 2020 inspection programs has been further corroborated by a recent study prepared by RTR Energy Solutions, Inc. (“RTR”) in April 2022. RTR was contracted to perform a condition assessment on the South Akron-Millwood 230 kV Transmission Lines. The assessment consisted of all 125 COR-TEN® lattice towers on this line. The scope of the assessment included a visual inspection of each selected structure from the ground. Each joint of the structure was reviewed to determine if pack rust was present. The structure condition was noted as either Mild, Moderate or Severe using the following classification:

- **Mild** Condition Rating: <25% of total joints contain pack rust.
- **Moderate** Condition Rating: >25% & <50% of total joints contain pack rust.
- **Severe** Condition Rating: >50% of total joints contain pack rust.

A summary of the results of the inspection are represented in Table 1-2 below:

**TABLE 1-2: Structure Condition Rating Summary**

Condition	Structure Count
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<b>Mild</b>	0
<b>Moderate</b>	117
<b>Severe</b>	8
<b>Total</b>	125

In addition, the average structure classified as “Moderate” is in similar condition to structures classified as “Severe.” Out of the 117 structures classified as “Moderate,” 113 have over 30% of their total joints containing pack-out rust. RTR classifies any structure with over 50% of its joints containing pack-out rust as “Severe.” The majority of pack rust observed on each structure was found in the lower sections of the post leg where horizontal and diagonal members are bolted to the post leg, the extent of pack rust observed is not isolated to only the lower sections of the lattice structure. This assessment shows that the asset health conditions observed in the system-wide assessment are being exhibited on the specific structures targeted for replacement by the Project.

Based on the results of the inspection programs described above, it is clear that the poor performance of the protective patina on the COR-TEN® lattice towers has accelerated the deterioration of these structures and has brought the assets to the end of their service life much sooner than would have been anticipated. At roughly 55 years of age, the COR-TEN® lattice towers that comprise the South Akron-Millwood 230 kV Transmission Lines have exceeded their useful life and can no longer be relied upon to safely operate as designed. The proposed rebuild addresses the safety issues resulting from the presence of pack-out rust (e.g., structures failing due to deteriorated joints at the arms or legs). Possible shearing of bolts, members disconnecting from lattice towers, or complete tower failure pose a major safety risk to both the public and PPL Electric employees. PPL Electric has determined to address these safety risks now, rather than at a later date, in order to avoid these risks increasing.

These asset health concerns are also important as the South Akron-Millwood 230 kV Transmission Lines are a critical component of PPL Electric’s Bulk Transmission System and are required to serve local load to several critical customer facilities. If these transmission lines were to fail due to COR-TEN® issues, the following reliability issues would likely occur:

**A) Failure of South Akron-Millwood 230 kV Transmission Lines and:**

- With Millwood-Engleside 69kV and then the next contingency loss of the Engleside 69kV bus #3 would result in the loss of the West Willow Distribution substation. This will result in up to 25 mega-watts (“MW”) of load drop resulting in approximately 7,666 customers losing service.
- Loss of the Lauschtown – South Akron #3& #4 230kV lines may result in overloads on the Brunner Island – South Manhiem 230kV line.
- Loss of the Engleside 69kV bus #1 may result in overloads on the Manor – Engleside #1 & #2 69kV lines.

As the topic of severe weather patterns becomes increasingly relevant, there is a need to take into consideration how changing weather patterns will impact the reliability of the existing COR-TEN® lattice structures. Over the last 20 years, PPL Electric has seen a trend of increasing storms per year within the PPL Electric service territory. With each storm comes more exposure to extreme precipitation and wind events. If a tower is structurally compromised due to COR-TEN® packout and section loss, that wind event creates an increased risk of structural failure. With projected increases of more frequent and intense heat waves over the next century in the Northeast, the occurrence of more severe wind and precipitation events is expected to rise as well. This is evident in the storms associated with Hurricane Ida that hit the Northeast in 2021, as a storm of that strength would have been rare decades ago. Due to drastic weather pattern changes, it is imperative to re-evaluate the COR-TEN® structures in the safest and most reliable way to protect against the pack rust issue in the joints of the structures and guard the transmission system from catastrophic failures of COR-TEN® towers.

At the October 2020 PJM TEAC meeting,<sup>12</sup> PPL Electric presented its plan to address COR-TEN® needs on the 230 kV system. As part of this plan, PPL Electric also shared the need with PJM stakeholders to address COR-TEN® towers on the South Akron-Millwood 230 kV Transmission Lines (need # PPL-2020-0008). The need # PPL-2020-0008 will be addressed by the South Akron-Millwood 230 kV Transmission Lines rebuild under supplemental project s2369, which will be completed at an estimated cost of \$75.4 Million.

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<sup>12</sup> Refer to slides at <https://www.pjm.com/~media/committees-groups/committees/teac/2020/20201006/20201006-item-09-ppl-supplemental.ashx>

## 5.0 ALTERNATIVES

PPL Electric evaluated three potential solutions to address the degrading health of the South Akron-Millwood 230 kV Transmission Lines. The following three alternatives were considered and compared based upon their ability to resolve the asset health conditions identified by PPL Electric and upon a 45-year and 75-year cost of service basis<sup>13</sup>:

- (1) Alternative 1 – Replace all structures on the South Akron-Millwood 230 kV Transmission Lines;
- (2) Alternative 2 – Remediate all structures on the South Akron-Millwood 230 kV Transmission Lines; and
- (3) Alternative 3 – Full Rebuild of the South Akron-Millwood 230 kV Transmission Lines (“Proposed Solution”).

The Proposed Solution is necessary to address the COR-TEN® asset health condition described above. Although PPL Electric evaluated replacement and remediation options, these alternatives present substantial uncertainties regarding their immediate and long-term effectiveness to address the COR-TEN® issue. As explained herein, the health and safety risks associated with the assets’ advanced age and degree of deterioration are so great that replacement and remediation would fail to adequately address their poor health conditions. For these reasons, the replacement and remediation alternatives were rejected as neither prudent nor reasonable.

Furthermore, the Proposed Solution is the most cost-effective. To estimate the total cost of each alternative over both a 45-year and 75-year period (the expected service life of a new steel

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<sup>13</sup> PPL Electric is providing this comparison based upon a 45-year cost of service basis, due to the Commission’s routine data requests for a 45-year cost of service analysis in prior LON proceedings. PPL Electric notes that it does not utilize a stand-alone cost of service calculation for individual projects, and does not prepare a cost of service analysis for rebuild projects in its regular course of business. However, PPL Electric has prepared this line-specific calculation in anticipation of data requests from the Commission. PPL Electric used its current transmission rate for these calculations and notes that it cannot predict what its transmission rate will be in the future. The Company’s transmission rate, and the associated calculations, are subject to change. Furthermore, PPL Electric submits that it is reasonable and appropriate to consider the 75-year cost of service for this project, as the expected life of the steel structures at issue is 75 years.

structure), cost-of-service calculations for the revenue requirement were completed on a per-structure basis.<sup>14</sup> A summary of this analysis is presented in Table 1-3 below. Based upon this analysis, PPL Electric determined that Alternative 3 – Full Rebuild most efficiently addresses the asset health conditions of the South Akron-Millwood 230 kV Transmission Lines. Therefore, as explained in Section 6.0, PPL Electric has proposed Alternative 3 as the Proposed Solution in this proceeding.

### **5.1 Alternative 1 – Structure Replacement**

The first alternative considered by PPL Electric to address the poor health condition of the weathering steel COR-TEN® lattice towers on these lines was to replace each of the lattice structures. This alternative would include replacing the existing weathering-steel lattice towers with new standard monopole structures. The estimated replacement cost is approximately \$470,093/structure. This option would also require PPL Electric to replace the conductors with new conductors in 2024 when it has reached its end-of-life at an additional \$181,239/structure. In addition, there would be ongoing O&M costs for the remainder of the service life of the transmission lines.

### **5.2 Alternative 2 – Structure Remediation**

The second alternative considered by PPL Electric to address the poor health condition of the weathering steel COR-TEN® lattice towers on these lines was to remediate the entire lattice tower line, which would include replacing badly damaged members with galvanized steel members, installing new hardware and spacers, and cleaning pack-out from affected joints. The average estimated cost of remediation is approximately \$200,943/structure. This alternative was rejected by PPL Electric due to substantial uncertainties regarding its immediate and long-term effectiveness to address the COR-TEN® issue.<sup>15</sup> Although remediation could extend the life of

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<sup>14</sup> Because all COR-TEN® lattice structures on the system are of a similar design and vintage, doing the cost of service calculation on a per structure basis allows for a determination of the most cost effective option for any COR-TEN® structure on the system regardless of the total line length. It is assumed that the cost of service calculation could be extrapolated across the total number of structures on a given line with a similar result. The revenue requirement is the total cost that the customers would be charged based on calculations that include a combination of operations and maintenance (“O&M”) expense, depreciation, and return on capital.

<sup>15</sup> The contractors that provided the cost estimate have never performed a full weathering-steel COR-TEN® lattice tower remediation before. And, moreover, it is PPL Electric’s understanding that complete remediation of COR-

the structures, it would, at a minimum, require re-evaluation and possible subsequent remediation every 10 years following the initial remediation. Moreover, the health and safety risks associated with the assets' advanced age and degree of deterioration are so great that remediation would fail to adequately address their poor health conditions.

Subsequent remediation work would be treated as an O&M expense. However, after 30 years, the structures will have to be replaced with new structures. Further, remediation would not address all underlying issues, ultimately requiring additional, duplicative projects.

For the reasons stated above, it is not reasonable or prudent to pursue Alternative 2. Remediation would fail to address the underlying COR-TEN® asset health conditions on a long-term basis and is a less cost-efficient option.

### **5.3 Alternative 3 – Full Rebuild**

The third alternative considered by PPL Electric is to fully rebuild the existing South Akron-Millwood 230 kV Transmission Lines. Replacing the existing lattice towers with monopoles will improve performance by increasing clearances and improving lightning performance. The estimated rebuild cost is approximately \$603,015/structure.

Although the full rebuild cost per structure is higher than the replacement and remediation options, the revenue requirements over both a 45 and 75-year period<sup>16</sup> are lower (as shown in Table 1-3) due to lower O&M expense and fully replacing the affected structures (as opposed to attempting to add more useful life being added to those structures via remediation), which makes the rebuild a more cost-effective solution. Rebuilds are also less risky than remediation due to factors such as lack of remediation experience, lack of evidence for long-term remediation effectiveness, and risk of returning pack-out rust. The structure replacement option would continue to have ongoing O&M expense with the additional need to return in 2024 to reconductor the line for an additional

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TEN® lattice towers has never been undertaken by another electric utility. Given the lack of industry experience with remediation, PPL Electric cannot adequately benchmark the efficacy and costs of this alternative. Rebuilding the subject transmission lines, as proposed by the Project, would avoid these potential unknown risks and costs.

<sup>16</sup> The 75.4 Million is the total estimated upfront cost of the Project, including design and construction. To evaluate total cost-of-service, the calculation must factor in all lifecycle costs associated with that asset over the analysis window (i.e., 45 years). The Project lifecycle costs include 1) annual depreciation expense over the 45-year window, 2) annual Return on Capital over the 45-year window, and 3) O&M expense for minor repairs at year 45. Those costs will make up the total revenue requirement that is entered annually on the FERC Form 1 formula rate.

\$181,239/structure. When compared to the remediation or replacement options, the full rebuild option has advantages in both cost-effectiveness and lower risk, making full rebuild the best long-term solution.

**TABLE 1-3: Cost of Service of Evaluated Options**

Project Scope	45 Year Cost of Service (\$M)	75 Year Cost of Service (\$M)
Replace Structures on South Akron-Millwood 230 kV Transmission Lines	\$245.7	\$293.0
Remediate Structures on South Akron-Millwood 230 kV Transmission Lines	\$258.1	\$505.9
Full Rebuild of South Akron-Millwood 230 kV Transmission Lines	\$228.1	\$277.1

## 6.0 PROPOSED SOLUTION

To resolve COR-TEN® lattice tower health condition, PPL Electric proposes to rebuild the existing South Akron-Millwood 230 kV Transmission Lines. All the COR-TEN® lattice structures as well as the conductors at the 125<sup>17</sup> locations will be replaced.

The proposed Project will improve overall reliability, safety and system resiliency by resolving the asset health needs associated with COR-TEN® lattice tower replacement. The transmission line rebuild solution was deemed to be the most cost-effective solution to address these needs.

Importantly, the Proposed Solution also avoids excess costs and uncertainties surrounding the remediation solution contemplated in Alternative 2. As noted above, if PPL Electric were to remediate the existing COR-TEN® lattice towers, further routine inspections would be required

<sup>17</sup> See Attachment 2 – Engineering Description for additional details regarding

to identify any new pack-out rust growth requiring additional corrective action. The remediation effort could provide a short-term extension of life, but ultimately these towers will still need to be replaced to permanently address the issue of pack-out rust since structural integrity of the COR-TEN® steel will become too compromised to remediate. In this regard, Alternative 2 does not represent an alternative that effectively addresses the structural issues associated with the COR-TEN® lattice towers. Moreover, PPL Electric is unaware of another project that has undergone full weathering-steel COR-TEN® lattice tower remediation. As such, the recurring costs of remediation could be even greater than anticipated and are unlikely to successfully mitigate the risk. The Proposed Solution avoids these excess costs and uncertainties, efficiently rebuilds the transmission lines to ensure the continued provision of safe and reliable service and resolves the additional reliability concerns identified herein.

The approximate cost of the entire transmission line rebuild Project is \$75.4 Million.

On a total cost of service basis, the Proposed Solution is approximately 93% of the cost of Alternative 1 (replacing each of the existing structures) on a 45-year basis and 95% of the cost of Alternative 1 on 75-year basis. In addition, on a total cost of service basis, the Proposed Solution is approximately 88% of the cost of Alternative 2 (remediating the existing structures) on a 45-year basis and 55% of the cost of Alternative 2 on 75-year basis.

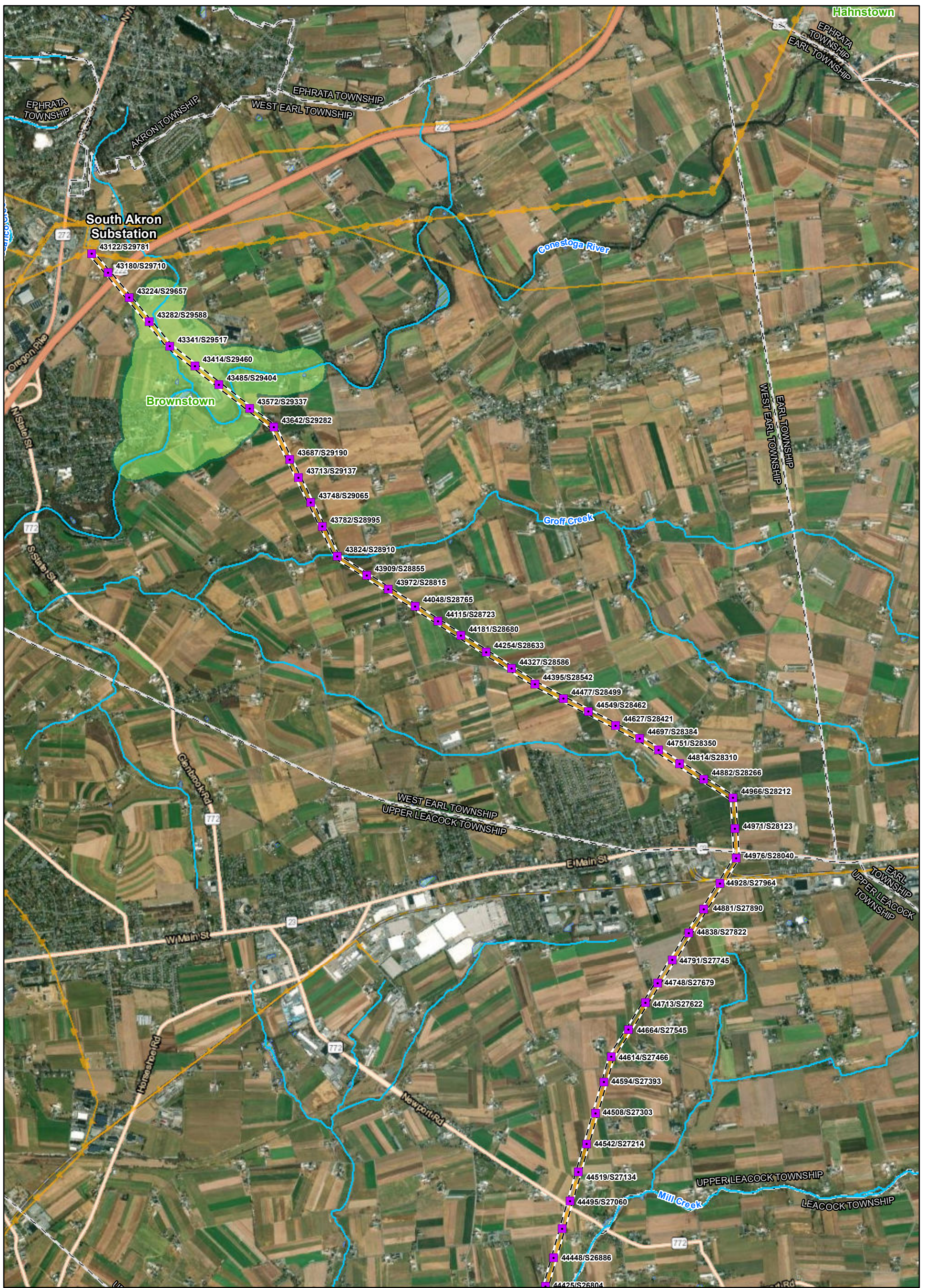
As discussed in Section 4.2.1, above, the project scope (Supplemental Project Number s2369) to rebuild the South Akron-Millwood 230 kV Transmission Lines was presented to PJM in the October 2020 TEAC meeting,<sup>18</sup> to address the COR-TEN® asset health issues.

A map of the proposed system alignment is provided as Figure 1-2.

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<sup>18</sup> Refer to slides 17 and 18 at <https://www.pjm.com/~media/committees-groups/committees/teac/2020/20201006/20201006-item-09-ppl-supplemental.ashx>

## **Figure 1-1: Existing System Configuration**



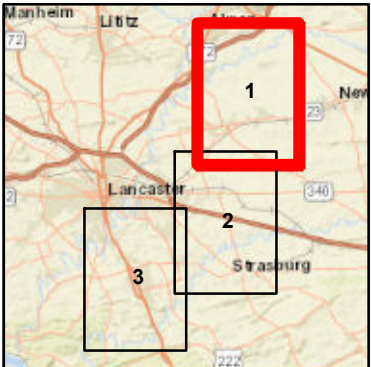
**Legend**

	Existing Structure (To Be Replaced)		Existing Transmission Lines
	PPL Electric Existing ROW		69 kV
	Chapter 93 Designated Use Stream		138
	WWF		230 kV
	NWI Wetlands		
	NHA Core		

**Notes:**

- Existing structure locations provided by PPL Electric in August 2021.
- Proposed structure locations and right of way provided by PPL Electric in January 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 0.25 0.5  
 Miles

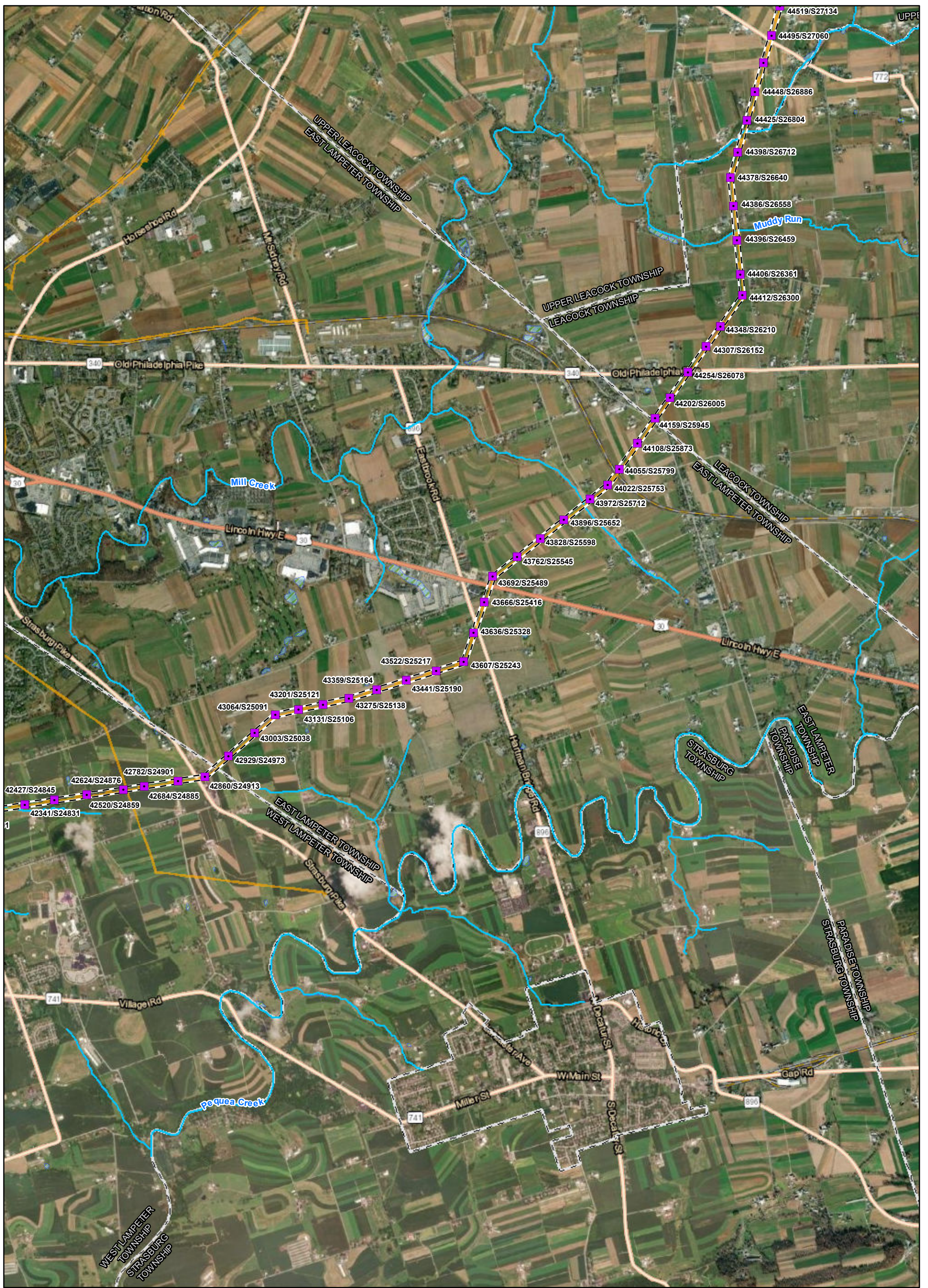


**AECOM**

**Figure 1-1**  
**Existing System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 2/10/2022



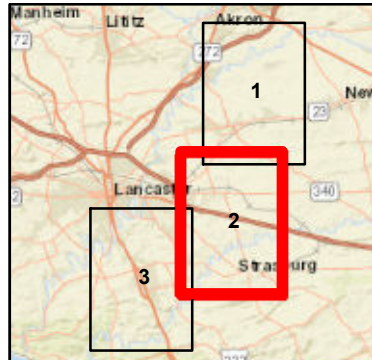
**Legend**

Existing Structure (To Be Replaced)	Existing Transmission Lines
PPL Electric Existing ROW	69 kV
Chapter 93 Designated Use Stream	138
WWF	230 kV
NWI Wetlands	

**Notes:**

- Existing structure locations provided by PPL Electric in August 2021.
- Proposed structure locations and right of way provided by PPL Electric in January 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 0.25 0.5  
 Miles

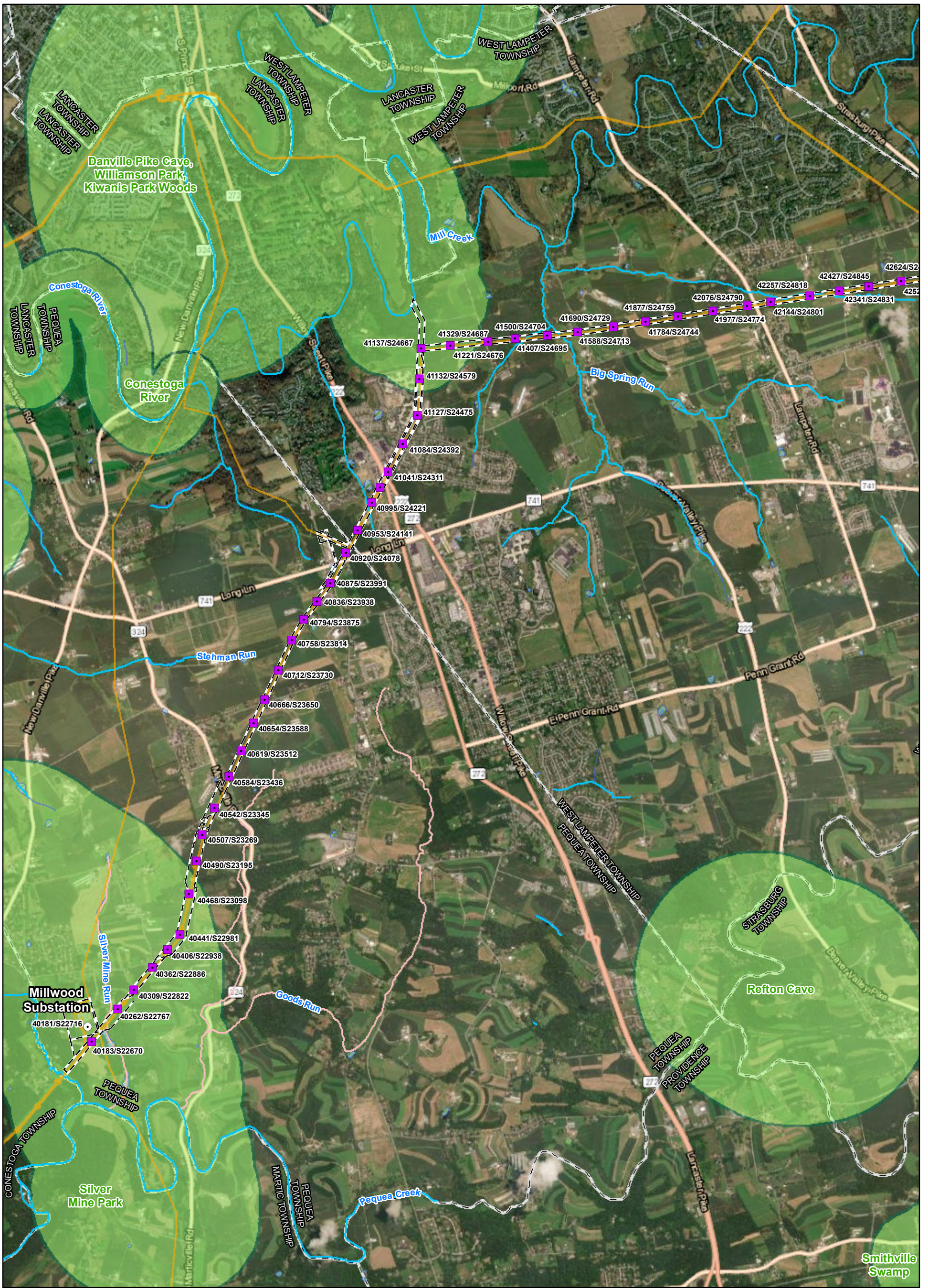


**AECOM**

**Figure 1-1**  
**Existing System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 2/10/2022



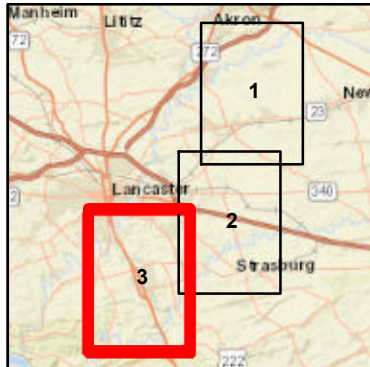
**Legend**

- Existing Structure (To Remain)
- Existing Structure (To Be Replaced)
- PPL Electric Existing ROW
- Chapter 93 Designated Use Stream
  - TSF
  - WWF
  - NWI Wetlands
  - NHA Core
- Existing Transmission Lines
  - 69 kV
  - 230 kV

**Notes:**

- Existing structure locations provided by PPL Electric in August 2021.
- Proposed structure locations and right of way provided by PPL Electric in January 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 0.25 0.5 Miles



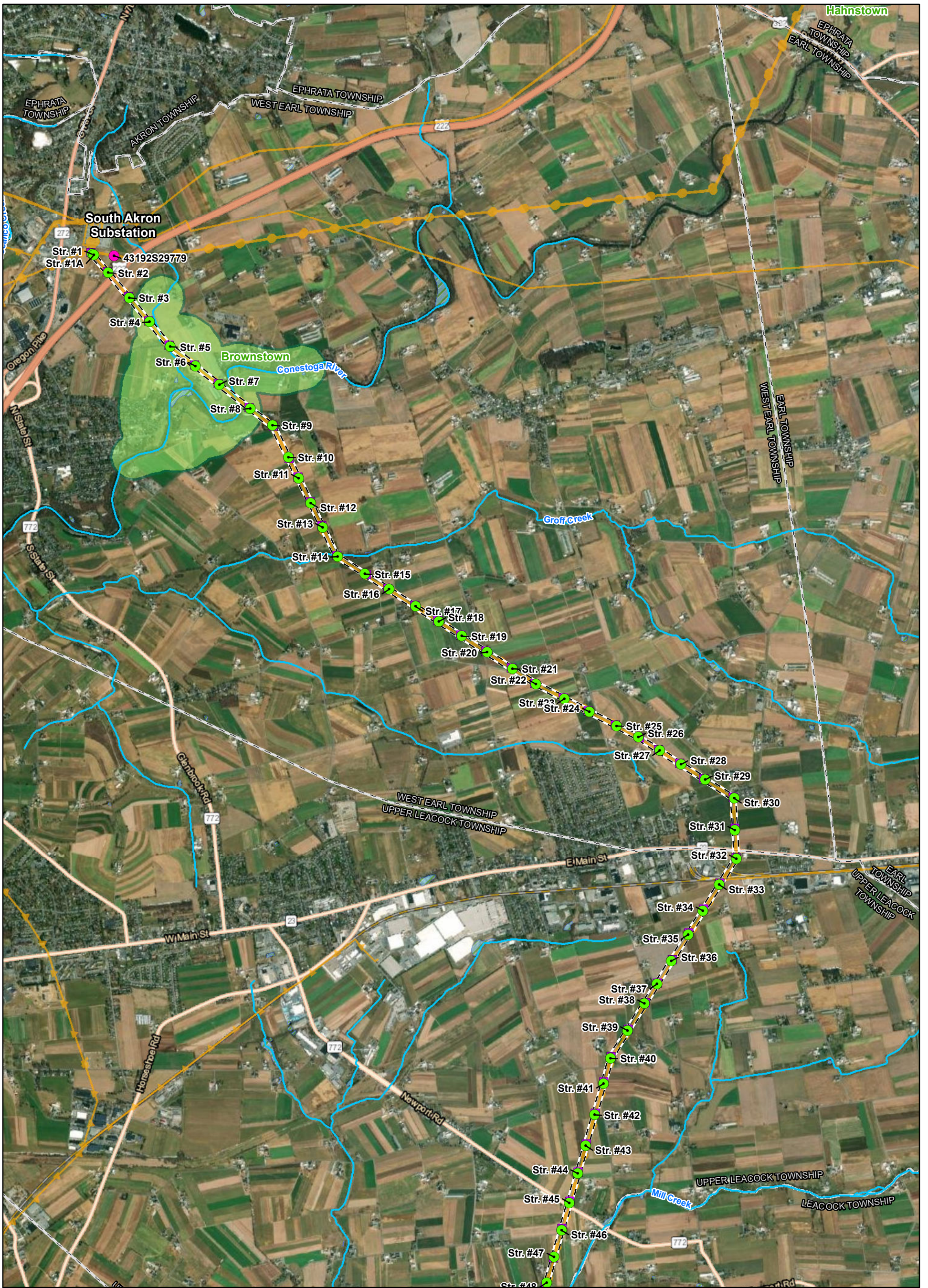
**AECOM**

**Figure 1-1**  
**Existing System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 2/10/2022

## **Figure 1-2: Proposed System Configuration**



**Legend**


- Possible Structure To Be Replaced
- Proposed Structure
- Existing Structure (To Be Replaced)
- PPL Electric Existing ROW
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- NHA Core

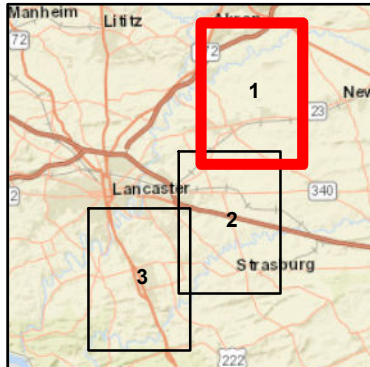
**Existing Transmission Lines**

- 69 kV
- 138
- 230 kV

**Notes:**

1. Existing structure locations and right of way provided by PPL Electric in January 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

  
 0    0.25    0.5  
 Miles



**AECOM**

**Figure 1-2**  
**Proposed System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



**Legend**


- Proposed Structure
- Existing Structure (To Be Replaced)
- PPL Electric Existing ROW
- Chapter 93 Designated Use Stream
- WWF
- ▨ NWI Wetlands

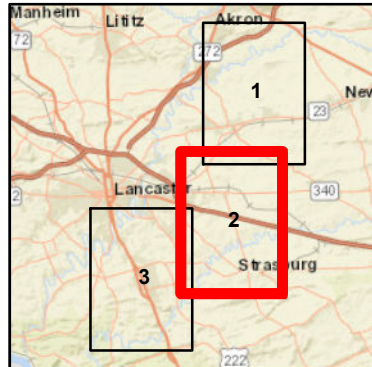
**Existing Transmission Lines**

- 69 kV
- 138
- 230 kV

**Notes:**

1. Existing structure locations and right of way provided by PPL Electric in January 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

  
 0 0.25 0.5  
 Miles

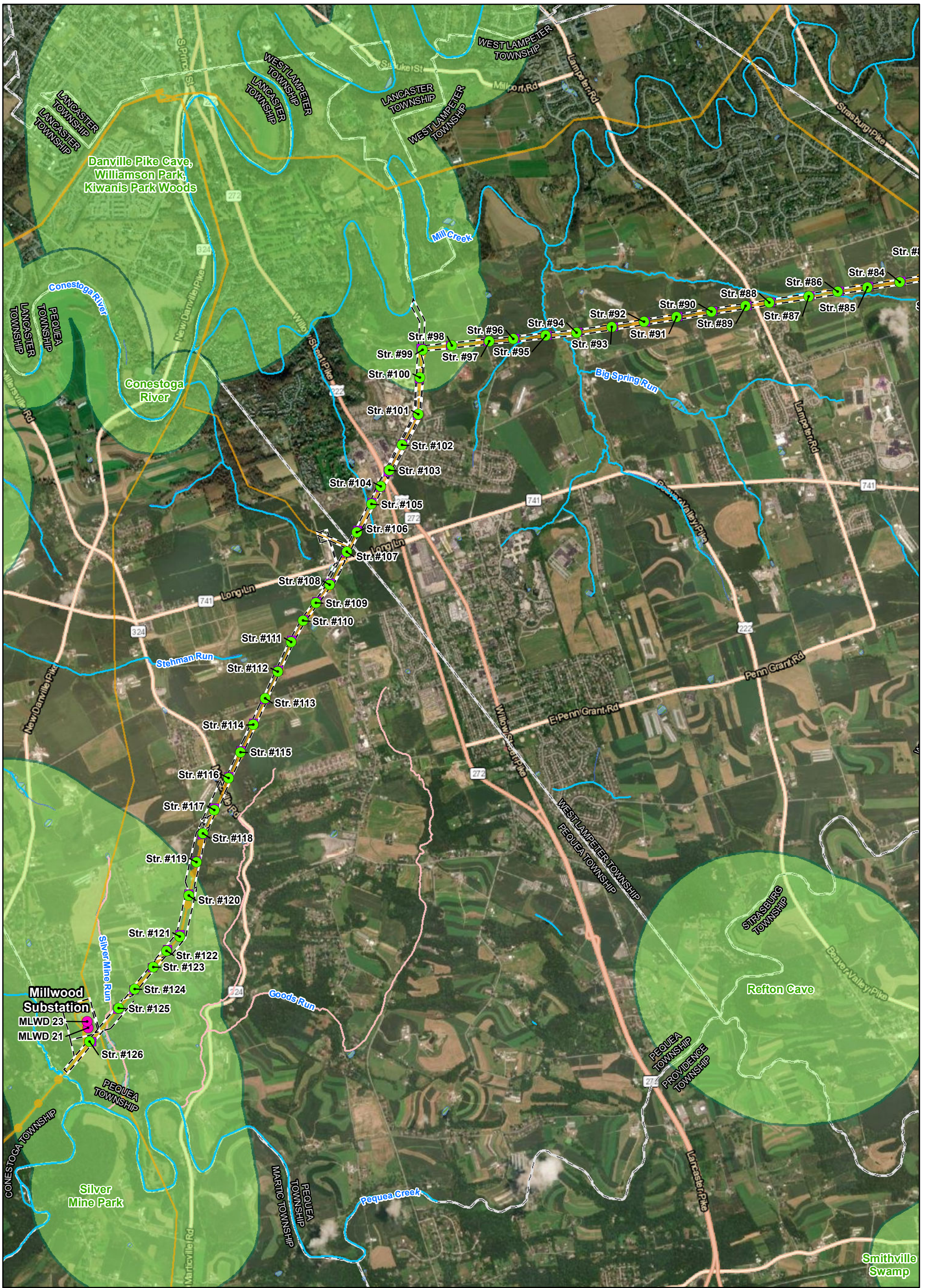


**AECOM**

**Figure 1-2**  
**Proposed System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



**Legend**

- Possible Structure To Be Replaced
- Proposed Structure
- Existing Structure (To Remain)
- Existing Structure (To Be Replaced)

**Existing Transmission Lines**

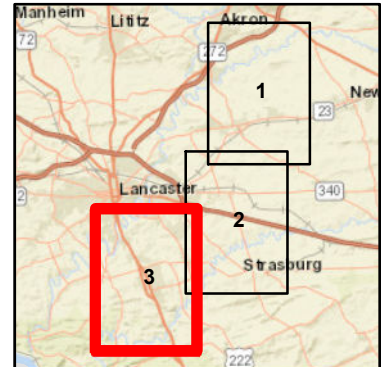
- 69 kV
- 230 kV

--- PPL Electric Existing ROW

**Notes:**

1. Existing structure locations and right of way provided by PPL Electric in 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

0    0.25    0.5  
 Miles



**AECOM**

**Figure 1-2**  
**Proposed System Configuration**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania

PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mlwd	Date: 8/29/2022

**PPL ELECTRIC  
ATTACHMENT 2**

# SOUTH AKRON-MILLWOOD 230 kV COR-TEN® REBUILD PROJECT

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## **1.0 INTRODUCTION**

As explained in **Attachment 1**, PPL Electric Utilities (“PPL Electric”) is requesting Pennsylvania Public Utility Commission (“PUC” or “the Commission”) approval to rebuild the existing double-circuit South Akron-Millwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines (“South Akron-Millwood 230 kV Transmission Lines”) connecting the South Akron 230-69 kV Substation (“South Akron Substation”) and the Millwood 230-69 kV Substation (“Millwood Substation”) in Lancaster County, Pennsylvania (“Project”).

The proposed transmission line system will be designed according to, and generally exceed, all National Electrical Safety Code (“NESC”) standards. Design specifications and safety rules adhered to by PPL Electric are included as **Attachment 4**.

## **2.0 DESCRIPTION OF THE EXISTING AND PROPOSED LINES AND STRUCTURES**

Connection between the South Akron Substation and Millwood Substation involves a 20.4-mile-long section of the double-circuit South Akron-Millwood 230 kV Transmission Lines. The existing South Akron-Millwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines contain three 1033 kcmil<sup>1</sup>, 54/7 stranding, “Curlew” ACSR<sup>2</sup> conductor wires for the 230 kV line and three 566 kmcil, 24/7 stranding, “Parakeet” ACSR conductor wires for the 69 kV sections. The arrangement also includes two overhead ground wires (“OHGW”). These conductor and ground wires are supported by a series of transmission line structures that include 125 COR-TEN® double-circuit steel lattice tower structures. At the South Akron Substation, an existing single-circuit 69 kV tie-in monopole structure (Tower 43131-S-29774) will be replaced with a 230 kV structure that will allow for future conversion of the alignment to a double-circuit 230 kV system. Additional structural analysis studies are also being conducted on an adjacent 230 kV monopole structure (Tower 43192-S-

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<sup>1</sup> A kcmil is a thousand circular mils. A circular mil is the cross-sectional area of a wire one mil in diameter, where 1 kcmil = 0.5067 mm<sup>2</sup>.

<sup>2</sup> ACSR stands for aluminum conductor steel reinforced.

29779) that connects the Laushtown-South Akron 230 kV Transmission Line to existing Tower 43122-S-29781 (Structure 1) on the South Akron-Millwood 230 kV Transmission Lines. At the Millwood Substation, the 230 kV and 69 kV circuits are separated onto single-circuit monopoles. Three single-circuit monopoles are used to support the 230 kV line in this area. Due to the additional weight of the new ACSS<sup>3</sup> conductor, one of these structures will also be replaced as part of the Project. The remaining two structures (Millwood STR 21 and STR 23) may be replaced pending additional structural analysis studies, but they will be upgraded with new ground wires.

Due to the corrosion and development of pack rust<sup>4</sup> on these COR-TEN® lattice tower structures, PPL Electric proposes to replace them with double-circuit steel monopole structures. The COR-TEN® lattice tower structures to be replaced extend consecutively between existing Tower 43122-S-29781 (Structure 1) located next to the South Akron Substation and Tower 40262-S-22767 (Structure 125) located near the Millwood Substation. PPL Electric also proposes to replace the following existing structures:

- Tower 40182-S-22672 (Structure 126) is an existing single-circuit monopole located near the Millwood Substation.
- Tower 43131-S-29774 (Structure 1A) is an existing 69 kV tie-in structure that will be replaced with a 230 kV monopole structure to allow for future conversion of the alignment to a double-circuit 230 kV system.
  - This update will increase the number of 230 kV structures in the Project from 126 to 127.

A detailed map of the Project alignment is provided as **Figure 3-1 in Attachment 3**.

The existing COR-TEN® lattice tower structures range in height from between approximately 120 and 165 feet with an average structure height of approximately 132 feet. The proposed monopole structures for the South Akron-Millwood 230 kV Transmission Lines will range in height from between approximately 120 and 160 feet with an average structure height of approximately 130 feet. **Table 2-1** provides a summary of the number and heights of the existing and proposed structures.

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<sup>3</sup> ACSS stands for aluminum conductor steel supported

<sup>4</sup> “Pack-out rust” or “pack rust” is a form of localized corrosion typical of steel components that develop a crevice into an open atmospheric environment, which results in rust packing between conjoined steel components. As described in Attachment 1, pack-out rust accelerates the deterioration of asset health and can result in shearing off bolts, loss of structural integrity, members disconnecting from lattice towers, and tower failure.

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**Table 2-1: Existing and New Transmission Line Structures**

Transmission Line	No. of Existing Structures	Existing Structure Height Range (feet)	Proposed No. of New Structures	Proposed Structure Height Range (feet)	Applicable Framing/ Specifications
SOUTH AKRON-MILLWOOD 230 kV	126	120-165	127	120-160	7-009-061 7-009-062 7-009-064 7-009-013
<b>Total</b>	<b>126<sup>5</sup></b>		<b>127<sup>6</sup></b>		

**Figures 2-1 through 2-4** depict typical structure types that will be used for the South Akron-Millwood 230 kV Transmission Lines, which include the following:

- Install approximately 79 new double-circuit long span suspension structures (**Figure 2-1**).
- Install approximately 18 new double-circuit long span angle suspension structures (**Figure 2-2**).
- Install approximately 28 new double-circuit long span angle tension structures (**Figure 2-3**).
- Install approximately 2 new single-circuit long span angle tension structure (**Figure 2-4**).

The proposed monopole structures for the South Akron-Millwood 230 kV Transmission Lines will be constructed in generally the same location as the existing COR-TEN® lattice towers. The transmission lines cannot be fully deenergized during the construction process, thereby requiring the new monopoles to be offset typically 20 to 25 feet ahead or behind and horizontally offset 1 to 4 feet from the COR-TEN® structure locations as a safety precaution. PPL Electric has designed the proposed transmission line system so that it fits entirely within the existing right-of-way (“ROW”).

The proposed South Akron-Millwood 230 kV Transmission Lines will consist of six 1590 kcmil, 54/19 stranding, “Falcon” ACSS conductors. The two OHGW will be removed and be replaced with dual 48 count fiber optical ground wires (“OPGW”) from Structure 1 to 125 and single 144 count OPGW will be used from Structure 125 to the Millwood Substation. The minimum conductor-to-ground clearance will be 25.5 feet which occurs at the emergency maximum thermal

<sup>5</sup> Inclusive of Tower 43131-S-29774, as described above.

<sup>6</sup> Inclusive of Tower 40182-S-22672 and Tower 43131-S-29774, as described above.

conductor temperature of 250°C (482°F). The design minimum conductor clearances and conductor thermal ratings for the reconstructed lines are noted in **Tables 2-2 and 2-3**.


**Table 2-2: Design for Minimum Conductor Clearance for 1590 kcmil 54/19 Stranding ACSS**

Condition	Transmission Double-Circuit Design Clearance-to-Ground
PPL Heavy Ice (1" ice, 32°F)	25.5'
Max Operating Temperature (250°C / 482°F)	25.5'
PPL Blowout (15psf, 60°F)	25.5'

**Table 2-3: Conductor Thermal Rating 1590 kcmil 54/19 Stranding Falcon ACSS – 200°C Normal Maximum Conductor Temperature (250°C Emergency)**

Condition	Ambient Temperature (°C)	Wind Speed (Ft./sec)	Ampacity (Amps)
Summer Normal	35	0	2344
Winter Normal	10	0	2506
Summer Emergency	35	2.53	3074
Winter Emergency	10	2.53	3201

Figure 2-1: Typical 230 kV Long Span Double-Circuit Steel Pole Structure

	<b>7-009-061</b> 230kV Long Span Double Circuit Steel Pole 0° to 1° Suspension Structure	Revision: 0 Effective Date: 3/18/2016 Sheet 1 of 1

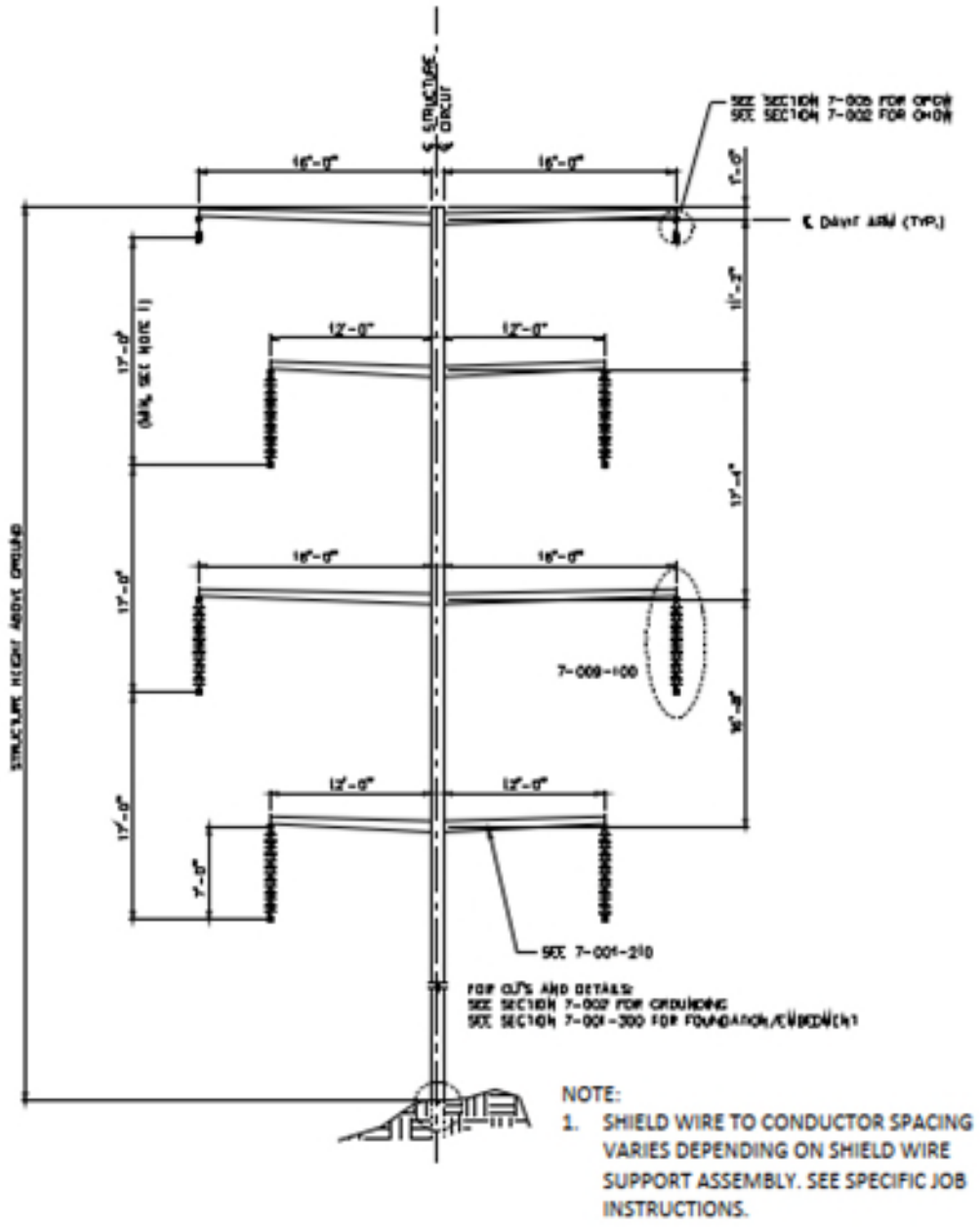

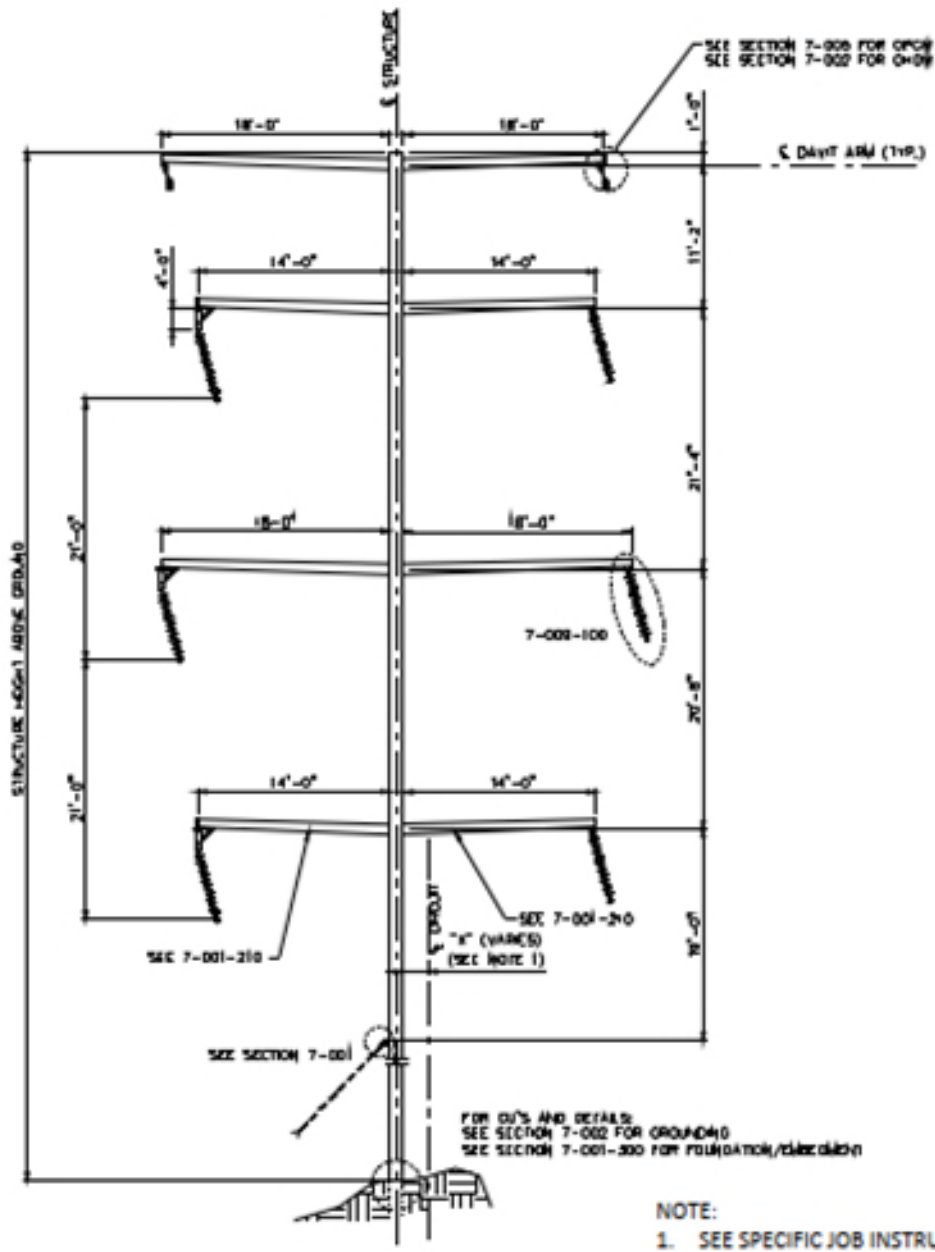



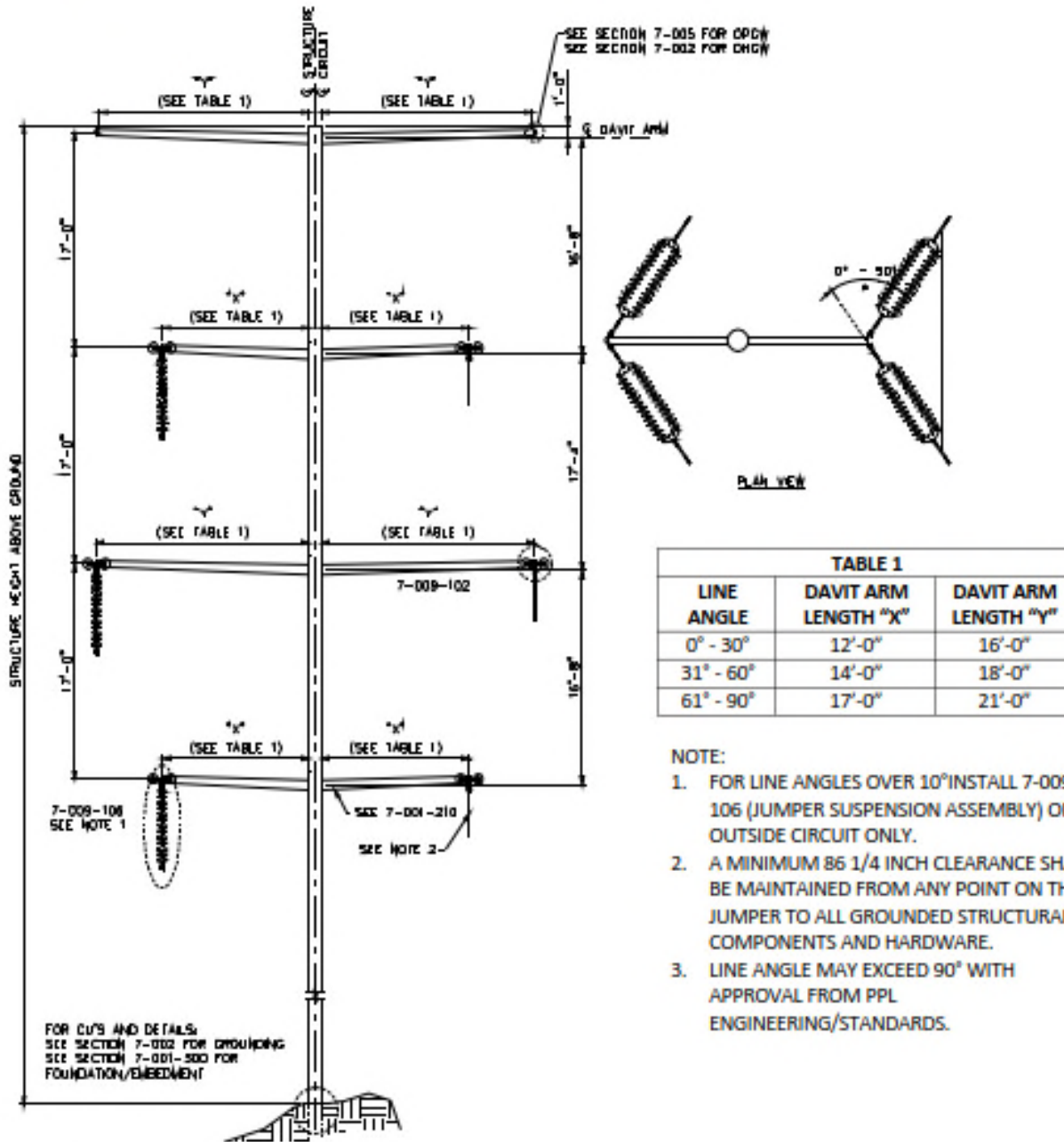
Figure 2-2: Typical 230 kV Long Span Double-Circuit Steel Pole Angle Suspension Structure

	<b>7-009-062</b> 230kV Long Span Double Circuit Steel Pole 1° to 10° Angle Suspension Structure	Revision: 0 Effective Date: 3/18/2016 Sheet 1 of 1
	SEE SECTION 7-008 FOR OPCH SEE SECTION 7-002 FOR OH-09	
	SEE SECTION 7-001-210 SEE SECTION 7-001-210 SEE SECTION 7-001-210	



**Figure 2-3: Typical 230 kV Long Span Double-Circuit Steel Pole Angle Tension on Arm Structure**

 PPL Electric Utilities	<b>7-009-064</b> 230kV Long Span Double Circuit Steel Pole 0° To 90° Angle Tension on Arm Structure	Revision: 0 Effective Date: 3/18/2016 Sheet 1 of 1
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**PPL ELECTRIC  
ATTACHMENT 3**

# SOUTH AKRON-MILLWOOD 230 kV COR-TEN® REBUILD PROJECT

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<b>4.0 NATURAL FEATURES .....</b>	<b>5</b>
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## **1.0 INTRODUCTION**

PPL Electric Utilities (“PPL Electric”) is requesting Pennsylvania Public Utility Commission (“PUC” or “the Commission”) approval to rebuild the existing double-circuit South Akron-Millwood 230 kV / South Akron-Earl 69 kV / Millwood-Engleside 69 kV / Millwood-Strasburg 69 kV Transmission Lines (“South Akron-Millwood 230 kV Transmission Lines”) connecting the South Akron 230-69 kV Substation (“South Akron Substation”) and the Millwood 230-69 kV Substation (“Millwood Substation”) in Lancaster County, Pennsylvania (“Project”).

The rebuilt double-circuit South Akron-Millwood 230 kV Transmission Lines will be on the same structure alignment and in the same right-of-way (“ROW”) as the existing transmission lines. The Project will remain on the same PPL Electric fee-owned properties and in the same ROW as the existing transmission lines. The existing fee-owned properties and ROW vary in width from 125 feet to 285 feet wide with the wider areas being some of the fee-owned properties. The Project will require the replacement of 126 existing structures<sup>1</sup> that will be constructed entirely within the existing ROW, on PPL Electric fee-owned properties, or on PPL Electric’s South Akron Substation and Millwood Substation properties. A network of existing access roads or temporary roads will be utilized during construction of the rebuilt transmission lines. Detailed maps of the proposed rebuilt double-circuit South Akron-Millwood 230 kV Transmission Lines and associated structures are provided in **Figure 3-1**.

From the South Akron Substation, the Project travels in a southeasterly direction across predominantly agricultural fields before turning more southwesterly as it extends into the Millwood Substation as shown in **Figure 3-1**. The ROW for the Project is further described below:

- From Structure 1 at the South Akron Substation, the Project will extend southeast approximately 4.8 miles (25,260 feet) to Structure 30 (Sheets 1 to 7, Structures 1 to 30 in **Figure 3-1**). This section involves thirty COR-TEN® structures that will be replaced with 18 long span suspension structures (7-009-061), four long span angle suspension structures (7-009-062), and eight long span angle tension structures (7-009-064). These structures are located entirely on PPL Electric’s South Akron Substation property or PPL Electric

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<sup>1</sup> See Attachment 2 – Engineering Description for further details.

maintained ROW. This section spans U.S. Route 222 and the Conestoga River and crosses predominantly agricultural lands.

- From Structure 30, the Project turns south and extends 0.35 mile (1,820 feet) over residential and commercial lined State Route 23 to Structure 32 (Sheet 7, Structures 31 to 32 in **Figure 3-1**). This section involves two COR-TEN® structures that will be replaced with one long span angle suspension structures (7-009-062) and one long span angle tension structures (7-009-064). These structures are located entirely on ROW maintained by PPL Electric.
- From Structure 32, the Project turns southwesterly for 6.1 miles (32,430 feet) to Structure 70 (Sheets 7 to 16, Structures 33 to 70 in **Figure 3-1**). The thirty-eight COR-TEN® structures along this segment will be replaced with 28 long span suspension structures (7-009-061), three long span angle suspension structures (7-009-062), and seven long span angle tension structures (7-009-064). These structures are located entirely on ROW maintained by PPL Electric. This segment spans a freight railroad near State Route 23, State Route 340, U.S. Route 30, and the Amtrak commuter railroad.
- From Structure 70, the Project turns west for 4.9 miles (25,850 feet) to Structure 99 (Sheets 16 to 23, Structures 71 to 99 in **Figure 3-1**). The twenty-nine COR-TEN® structures along this segment will be replaced with 18 long span suspension structures (7-009-061), six long span angle suspension structures (7-009-062), and five long span angle tension structures (7-009-064). These structures are located entirely on PPL Electric fee-owned property or on ROW maintained by PPL Electric. Land use in this segment is predominantly agriculture with commercial and residential uses near roadways.
- From Structure 99, the Project turns to the southwest for 4.3 miles (22,460 feet) to Structure 126 from where the conductor lines connect into the Millwood Substation (Sheets 23 to 28, Structures 100 to 126 in **Figure 3-1**). The twenty-six COR-TEN® structures along this segment will be replaced with 15 long span suspension structures (7-009-061), four long span angle suspension structures (7-009-062), and seven long span angle tension structures (7-009-064). Structure 126 is an existing single-circuit monopole that will be replaced with a single-circuit long span angle tension structure (7-009-013). These structures are located entirely on PPL Electric fee-owned property, ROW maintained by PPL Electric, or

on PPL Electric’s Lycoming Substation property. Land use in this segment is more commercially and residentially developed.

## **2.0 LAND USE**

PPL Electric evaluated the existing land uses on the PPL Electric owned properties, within the existing ROW, and within 0.25 mile (1,320 feet) of the ROW (“Project Area”). This broader Project Area was reviewed to provide a sense of the landscape in which the Project is located. Based on review of the 2021 National Land Cover Data (“NLCD”), land use in the Project Area is approximately 90% agriculture with the remaining 10% comprised of mixed residential and commercial areas that are crossed at the intersection with major roads.

No communication towers will be affected by the proposed Project. The Project crosses two railroads. The New Holland Secondary freight line crosses the Project approximately 5 miles south of the South Akron Substation and the Philadelphia/Harrisburg Amtrak Mainline crosses the Project near Smoketown, about halfway between the South Akron and Millwood Substations. Five gas pipelines are crossed by the Project. The Columbia Gas pipeline crosses the Project near Brownstown and the other four pipelines are all within the same right-of-way and are located south of Route 23. The Project also crosses other PPL Electric electrical utility ROW’s adjacent to the South Akron and Millwood Substations.

The closest active airports relative to the Project Area are the Smoketown Airport, which is located approximately 1.5 miles from the Project near Route 340, and the Lancaster Airport, which is approximately 4 miles to the west of the South Akron Substation. PPL Electric does not anticipate any interference with airport operations because the Project is located in an area where there are existing electrical facilities. However, PPL Electric will comply with any applicable requirements of the Federal Aviation Administration and the Pennsylvania Department of Transportation, Bureau of Aviation.

### ***Conserved Lands***

The proposed Project will not affect any national parks, state parks, local parks, recreational areas, or natural landmarks. None of these features are located within the Project Area. In the north portion of the Project Area, conserved lands include the West Earl Municipal Building, which is used as a public recreation area and is located approximately 0.3 miles south of the South Akron Substation. Conserved lands in the central portion of the Project Area include Mascot Park, also known as the William J Morton Bird Sanctuary, which is a popular bird watching area located along Route 772 and approximately 1,000 feet from the Project. The southern portion of the Project Area is adjacent to the Willow Valley Golf Course located along Route 222 near Lyndon. In addition, Silver Mine Park is a public recreation area located directly adjacent to the Millwood Substation and that is crossed by a 1,500-foot section of PPL Electric owned ROW.

No conservation easements are directly crossed by the Project. The closest easements to the Project are two agricultural conservation easements. One is located north of Route 222 near the town of Willow Street and the other is on Route 324 near the Millwood Substation. Neither of these conserved properties will be affected by the Project.

### 3.0 CULTURAL RESOURCES

An online review of the Project Area and surrounding landscape was conducted through the Pennsylvania Historical and Museum Commission (“PHMC”) State Historic and Archaeological Resource Exchange site. State Historic Preservation Office (“SHPO”) eligible and listed structures and districts that were found within or close to the Project Area are listed in Table 3-1.

**Table 3-1: Cultural Resources Located in the Project Area**

Resource Name	Resource Type	Eligibility	Location
Brownstown Mill Historic District	District	Eligible	South of Conestoga River
Brownstown Mill Barn	Structure	Eligible	Within Brownstown Mill Barn District
Wolf House (II)	Structure	Eligible	Within Brownstown Mill Barn District
Brownstown Mill	Structure	Eligible	Within Brownstown Mill Barn District
Wolf House (I)	Structure	Eligible	South of Brownstown Mill Barn District
Bridge in West Earl Township	Structure	Listed	West of Brownstown Mill Barn District - Along East Main Street

Resource Name	Resource Type	Eligibility	Location
East Brandywine & Waynesburg Railroad (Manheim to East Earl)	District	Eligible	South of Route 23 near Bareville
Mill Creek Rural Historic District	District	Eligible	South of Route 23 near Bareville - Extends South to Route 340
Mascot Roller Mills	Structure	Listed	Newport Road/Stumptown Road Intersection
Bird-In-Hand Hotel	Structure	Listed	North of Route 340 near Smoketown
Pequea North Rural Historic District	District	Eligible	South of Route 340 near Smoketown
Mill Creek Tributary Rural HD	District	Eligible	South of Route 340 near Smoketown
Pennsylvania Railroad: Main Line (Philadelphia to Harrisburg)	District	Eligible	South of Route 340 near Smoketown
Philadelphia & Columbia Railroad	District	Eligible	South of Route 340 near Smoketown
Landis, David, House	Structure	Eligible	North of Route 30
Ebenshade, Eliza, House	Structure	Eligible	South of Route 30
Pequea South Rural Historic District	District	Eligible	South of Route 30
Denlinger Property	Structure	Eligible	South of Route 30
Weber/Weaver Farm	Structure	Listed	West of Strasburg Pike near Wheatland Mills
Stoner, Henry K., Farm	Structure	Eligible	East of Morningside Drive
Harnish, Johannes & Anna, Farmstead	Structure	Listed	East of Willow Street Pike near Lyndon
David and Barbara Meyers Farm	Structure	Eligible	Along Millwood Road near Rockhill
Silver Mine Farm	District	Eligible	Along Silver Mine Road, South of Millwood Substation

Some of these historic districts and structures are crossed or spanned by the Project. PPL Electric is in the initial stage of coordination with the PHMC for the modifications being made to the transmission lines. This coordination will be required to receive permits to construct the Project and will be conducted in the near future. PPL Electric does not anticipate any impacts to SHPO listed or eligible structures or districts. PPL Electric will perform any reviews and field survey/sampling work required by the PHMC to avoid, minimize, and mitigate impacts to archaeological or historic architectural resources that may be located within the Project Area.

## **4.0 NATURAL FEATURES**

### *Unique Natural Features*

No unique geological, scenic, or natural areas are located within the Project Area, according to the Pennsylvania Department of Conservation and Natural Resources (“PDCNR”).

### *Soils*

The Project Area is generally flat crossing mostly farmland with minor topography changes ranging from approximately 220 feet above sea level (“abs”) near the Conestoga River to approximately 560 feet abs near Route 23 and the town of Bareville. Soils present within the Project Area consist of mainly silt loams with small pockets of silty clay loams around South Akron Substation and very stony silt loams closer to Millwood Substation.

Erosion and Sedimentation (“E&S”) control plans will be developed and implemented for the Project to minimize the displacement of soils. These plans will require prior approval from the local county conservation districts. National Pollutant Discharge Elimination System (“NPDES”) permits will also be required from the Pennsylvania Department of Environmental Protection (“PADEP”) as needed. During construction, PPL Electric will adhere to all conditions specified in the NPDES permit. Impacts to local soil resources are anticipated to be minimal.

### *Waterways*

The existing transmission lines span several National Hydrography Dataset waterways that will remain in place after the Project construction activities have occurred. Review of the USGS mapping website indicated that the Project will aurally span seven named streams which are listed in Table 3-2. The Project Area is located within the Middle Conestoga River watershed (USGS Hydrologic Unit Code (“HUC”) 020503061104), the Muddy Run-Mill Creek watershed (HUC 020503061106), the Lower Conestoga River watershed (HUC 020503061107), and the Climbers Run-Pequea Creek watershed (HUC 020503061204). All of these watersheds generally flow to the southwest to the Susquehanna River.

Most of the streams in the Project Area have a PADEP Chapter 93 Designated Use Stream Classification of Warm Water Fishes (“WWF”), Migratory Fishes (“MF”). Silver Mine Run has a PADEP Chapter 93 Designated Use Stream Classification of Trout Sticked Fishes (“TSF”), MF. The Pennsylvania Fish and Boat Commission (“PFBC”) has designated Muddy Run as a Stocked Trout Stream, which may require seasonal restrictions for any work planned in these streams. No direct impact to these stream features is anticipated by the Project activities.

**Table 3-2: Named Streams Crossed by the Project**

Stream Name	Chapter 93 Designated Stream Classification	Watershed Name	Special PFBC Designation
Conestoga River	WWF, MF	Middle Conestoga River	NO
Groff Creek	WWF, MF	Middle Conestoga River	NO
Mill Creek	WWF, MF	Muddy Run-Mill Creek	NO
Muddy Run	WWF, MF	Muddy Run-Mill Creek	YES
Big Spring Run	WWF, MF	Muddy Run-Mill Creek	NO
Stehman Run	WWF, MF	Lower Conestoga River	NO
Silver Mine Run	TSF, MF	Climbers Run-Pequea Creek	NO

An E&S control plan will be developed to address stormwater control in all watershed areas crossed by the Project. PPL Electric will obtain all approvals and permits necessary for the construction of the Project and will comply with any conditions placed on those permits.

***Wetlands***

Based on review of the U.S. Fish and Wildlife Service’s (“USFWS”) National Wetlands Inventory (“NWI”), the Project crosses two Palustrine, Excavated (PUBHh) freshwater ponds. No impacts to these NWI features are anticipated by the proposed Project activities.

The NWI only provides a general overview of the potential wetlands that may be located within an area. For federal and state permitting purposes, the wetlands and waterways within the Project Area have been delineated, surveyed, and illustrated according to regulatory standards. This information is being used to minimize wetland and waterway impacts where feasible. Additionally, PPL Electric will avoid impacts to wetlands and waterways where possible by aerially spanning these features.

### ***100-year Floodplains***

The National Flood Hazard Layer for Lancaster County, Pennsylvania was obtained through the Federal Emergency Management Agency (“FEMA”) Flood Map Service Center website and analyzed for 100-year floodplains within the Project Area and surrounding landscape. Based on review of this data, the Project spans the FEMA 100-year floodplain located near the Conestoga River, an adjacent unnamed tributary (“UNT”) to the Conestoga River, Groff Creek, Mill Creek, Muddy Run, an UNT to Mill Creek, and Big Spring Run. The area at the Conestoga River crossing is within Zone AE, a regulatory floodway, and has a 1-percent-annual-chance of inundation due to a flood event. No impacts to these floodplain areas or floodways are anticipated by the proposed Project activities.

### ***Vegetation***

Vegetative cover in the Project Area consists almost entirely of agricultural fields. Several patches of forest clearings and one detention basin are present based on aerial imagery. The existing ROW areas for the transmission lines have previously been cleared of woody vegetation and no extensive tree clearing is anticipated on the line. If vegetation management is required in this specific location, PPL Electric will apply its “Specifications for Transmission Vegetation Management LA-79827” to minimize potential impacts.

## **5.0 THREATENED AND ENDANGERED SPECIES**

### ***Natural Areas Inventory***

Based on review of the *Natural Areas Inventory of Lancaster County, Pennsylvania*, published by The Nature Conservancy in 1998, the Project extends through three Pennsylvania Natural Heritage identified natural areas. In the northern section, the Project crosses the Brownstown natural area which borders the Conestoga River and adjacent tributaries and contains habitat that supports a

rare animal species. In the southern section, the Project extends through the Kiwanis Park Woods and Silver Mine Park natural areas. The Kiwanis Park Woods natural area is located along the Conestoga River near Willow Street and contains habitat for rare plant species. Silver Mine Park natural area is located near the Millwood Substation and is an agricultural landscape that is underlain by limestone bedrock that supports rare cave invertebrates. The area also supports other potentially rare and threatened bat and bird species. Natural areas identified in these documents generally focus on sites that provide habitat conditions for threatened and endangered plant or animal species.

### *Threatened and Endangered Species*

A Pennsylvania Natural Diversity Inventory was run for the Project on August 26, 2021, to assess the potential presence of threatened and endangered species and/or special concern species. Specific agencies reviewing the Project included the following:

- Pennsylvania Game Commission,
- PFBC,
- PDCNR, and
- USFWS.

No agencies reported any known impacts to threatened and endangered species and/or special concern species and resources within the Project Area. PPL Electric will continue to consult with the jurisdictional agencies regarding potential impacts to protected species, complete all required surveys, obtain all necessary approvals and permits for Project construction, and comply with all conditions placed on those permits.

**Figure 3-1: Aerial Map of the Project**



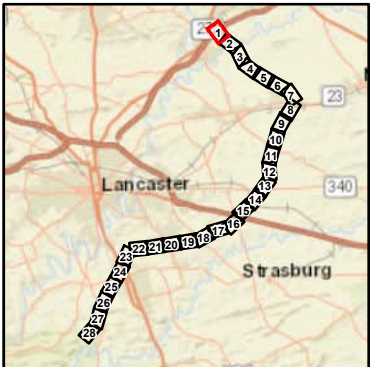
**Legend**

Proposed Structure	NWI Wetlands
Possible Structure To Be Replaced	NHA Core
Existing Structure (To Be Replaced)	Parcel Boundary
Proposed Centerline	<b>Existing Transmission Lines</b>
PPL Electric ROW	69 kV
Chapter 93 Designated Use Stream	138
WWF	230 kV

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 1 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022

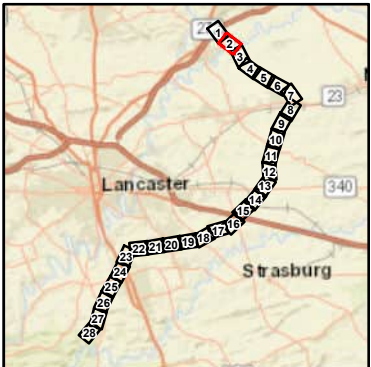


Legend	
	Proposed Structure
	Existing Structure (To Be Replaced)
	Proposed Centerline
	PPL Electric ROW
	Chapter 93 Designated Use Stream
	WWF
	NWI Wetlands
	NHA Core
	Parcel Boundary
	Existing Transmission Lines
	69 kV
	230 kV
	Eligible Historic Aboveground Resources
	Eligible Historic District

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

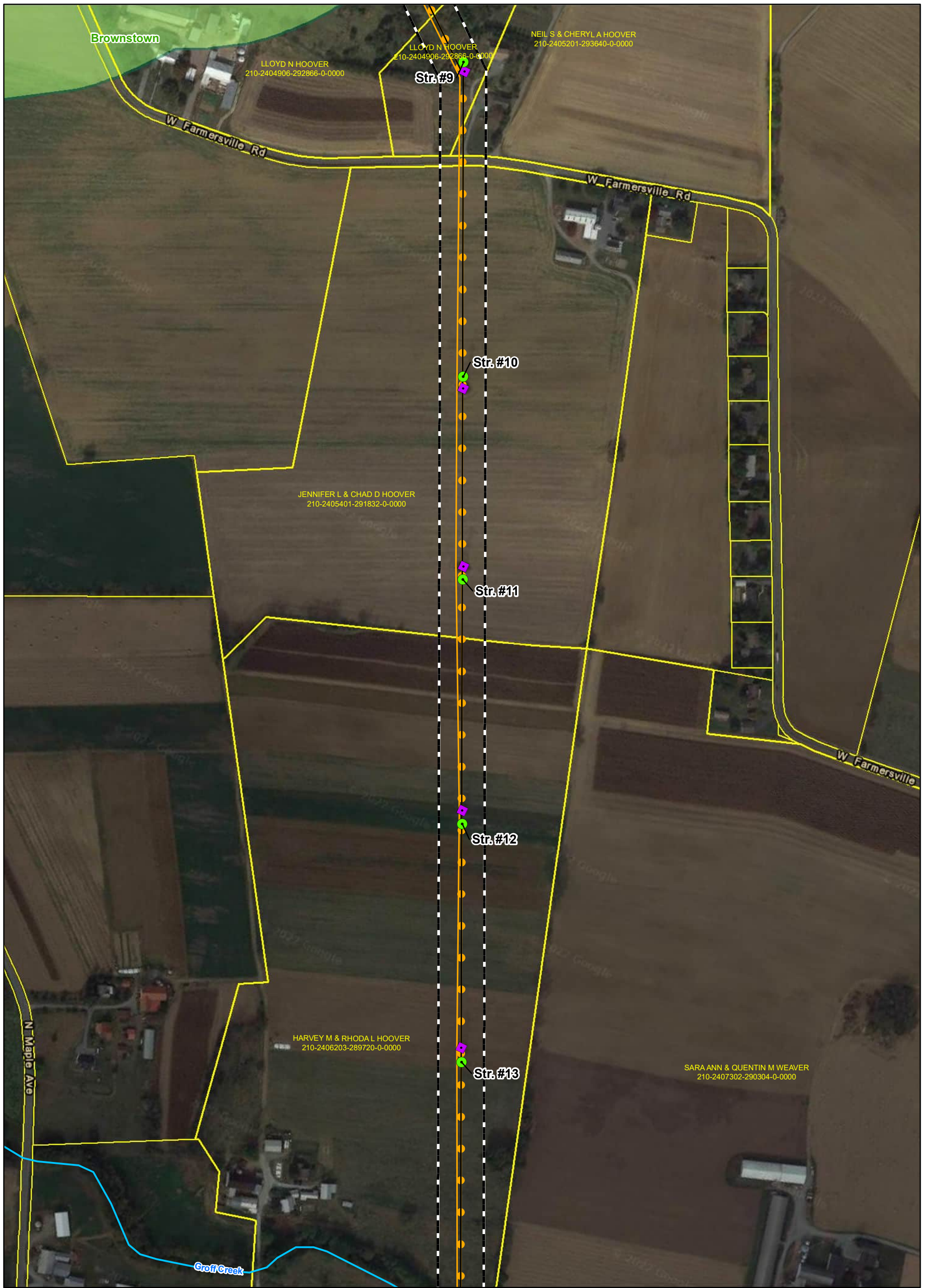
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Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
Lancaster County, Pennsylvania  
Sheet 2 of 28  
PPL Electric Utilities  
Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022

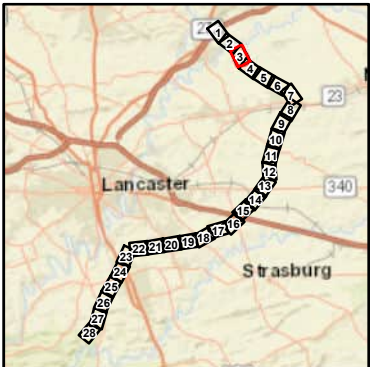


Legend	
	Proposed Structure
	Existing Structure (To Be Replaced)
	Proposed Centerline
	PPL Electric ROW
	Chapter 93 Designated Use Stream
	WWF
	NWI Wetlands
	NHA Core
	Parcel Boundary
Existing Transmission Lines	
	69 kV
	230 kV

**Notes:**

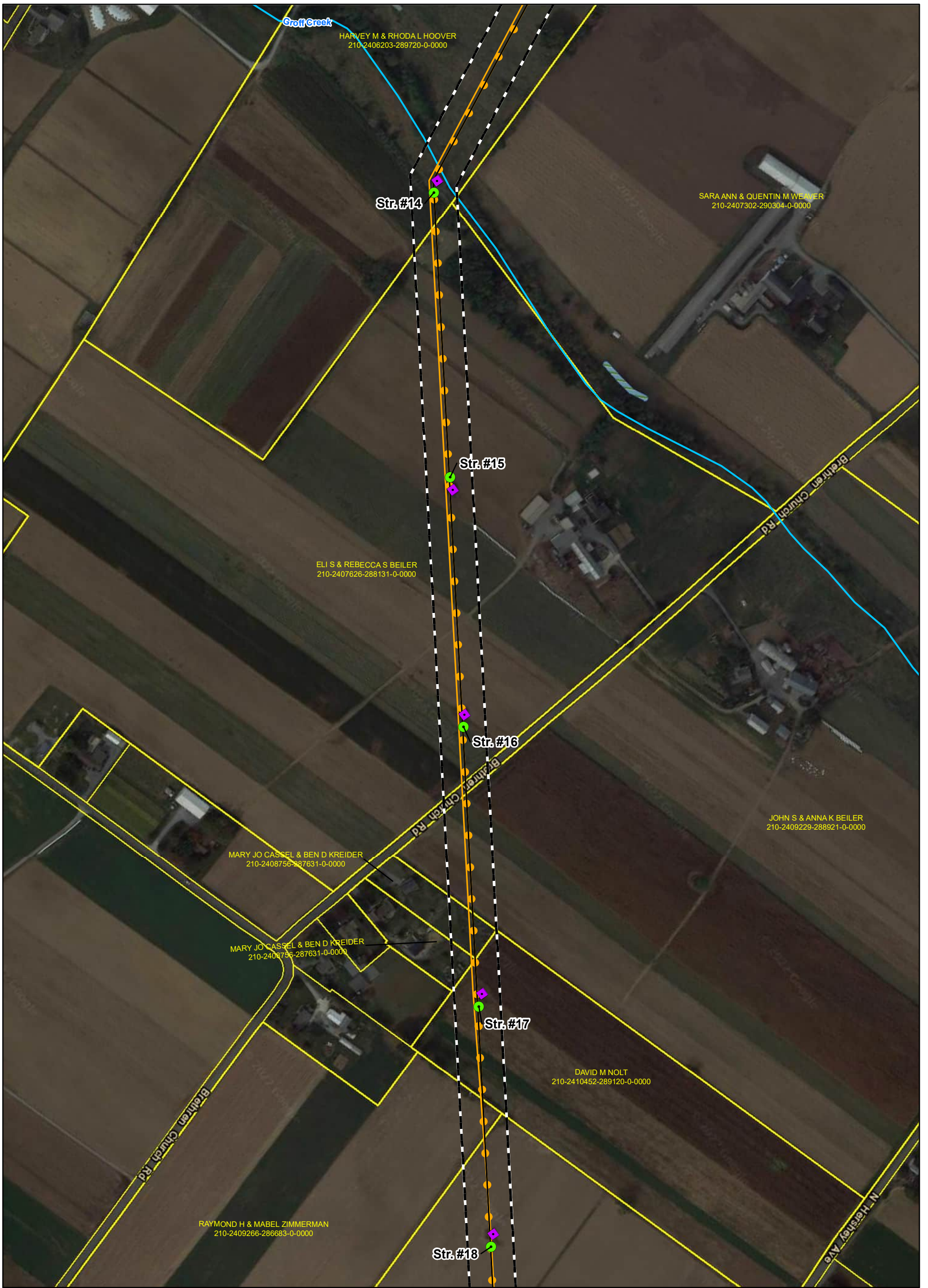
- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 3 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



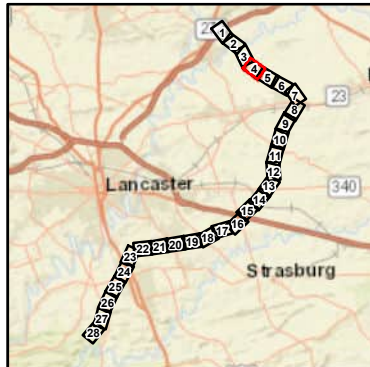
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	69 kV
Proposed Centerline	NWI Wetlands	230 kV
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 4 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



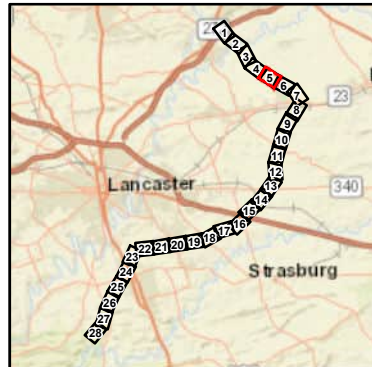
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines
  - 69 kV
  - 230 kV

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

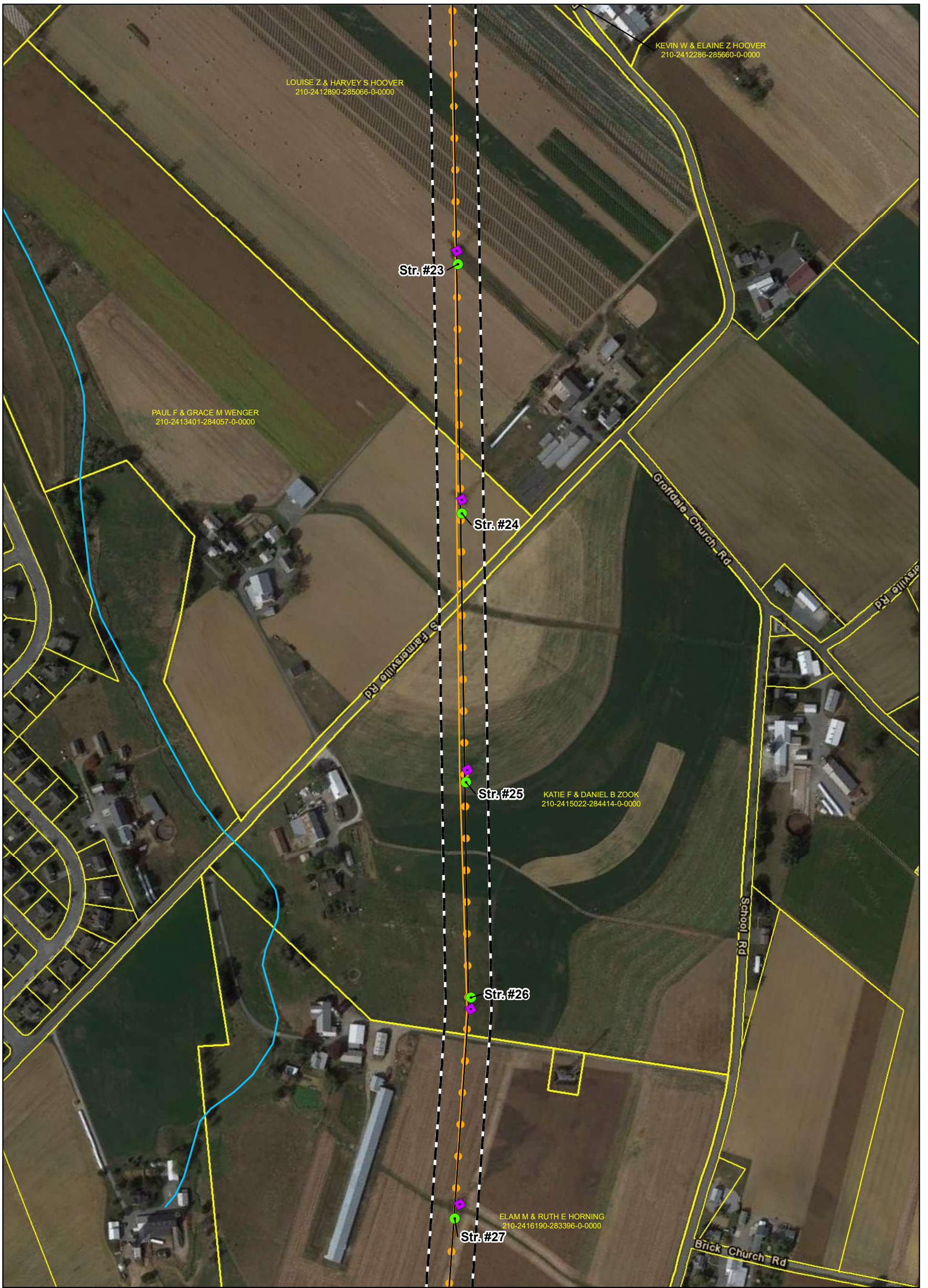
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Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
Lancaster County, Pennsylvania  
Sheet 5 of 28  
PPL Electric Utilities  
Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



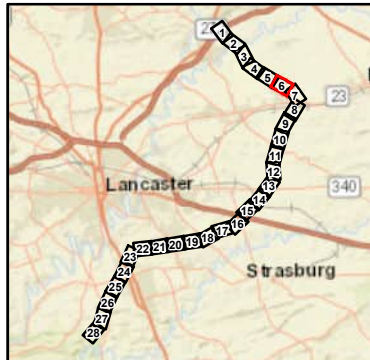
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	69 kV
Proposed Centerline	NWI Wetlands	230 kV
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

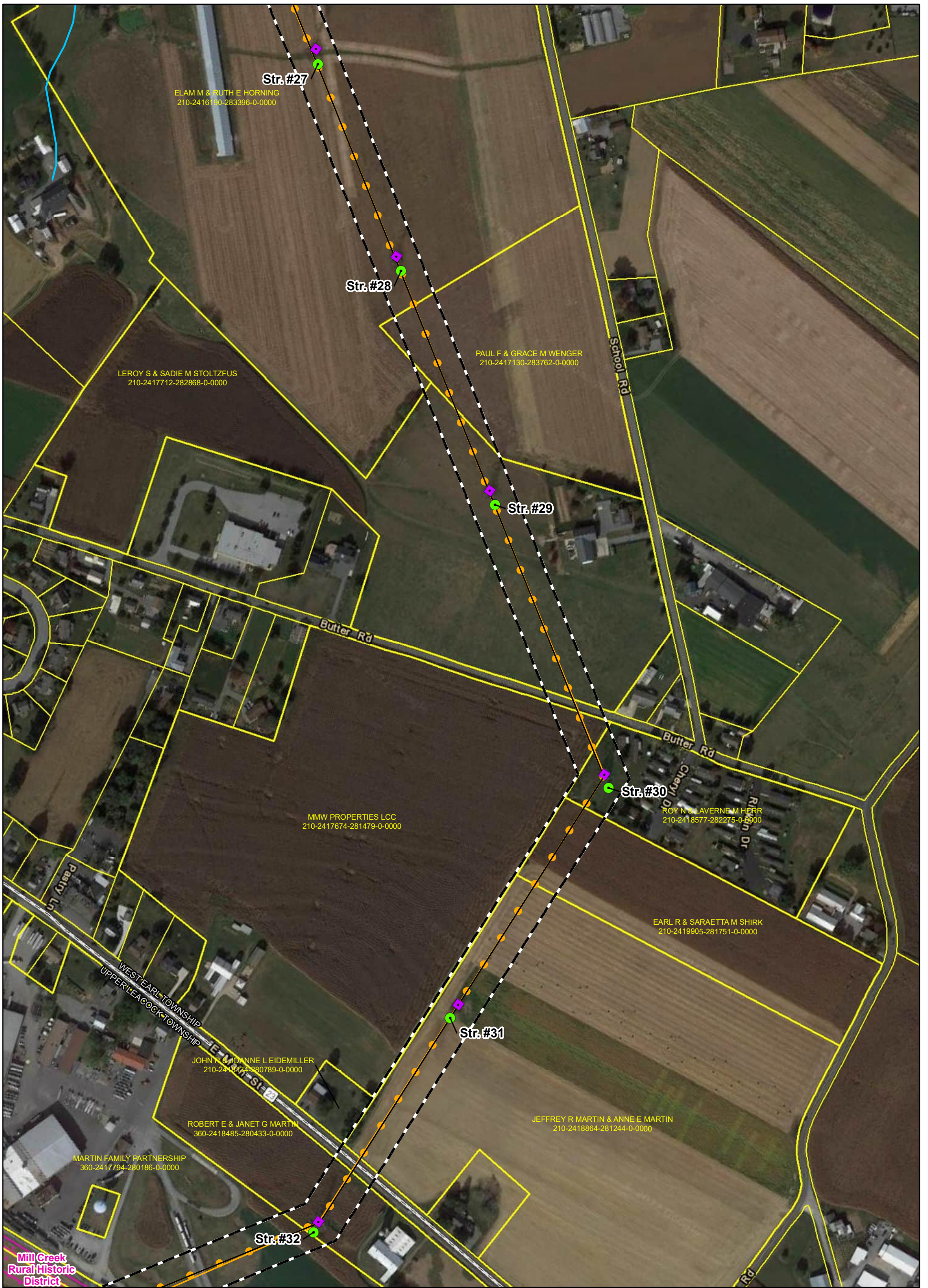
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Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 6 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022

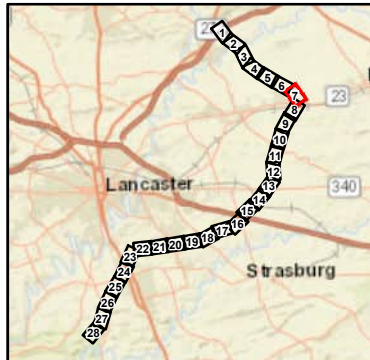


**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines**
- 69 kV
- 230 kV
- Eligible Historic District

**Notes:**

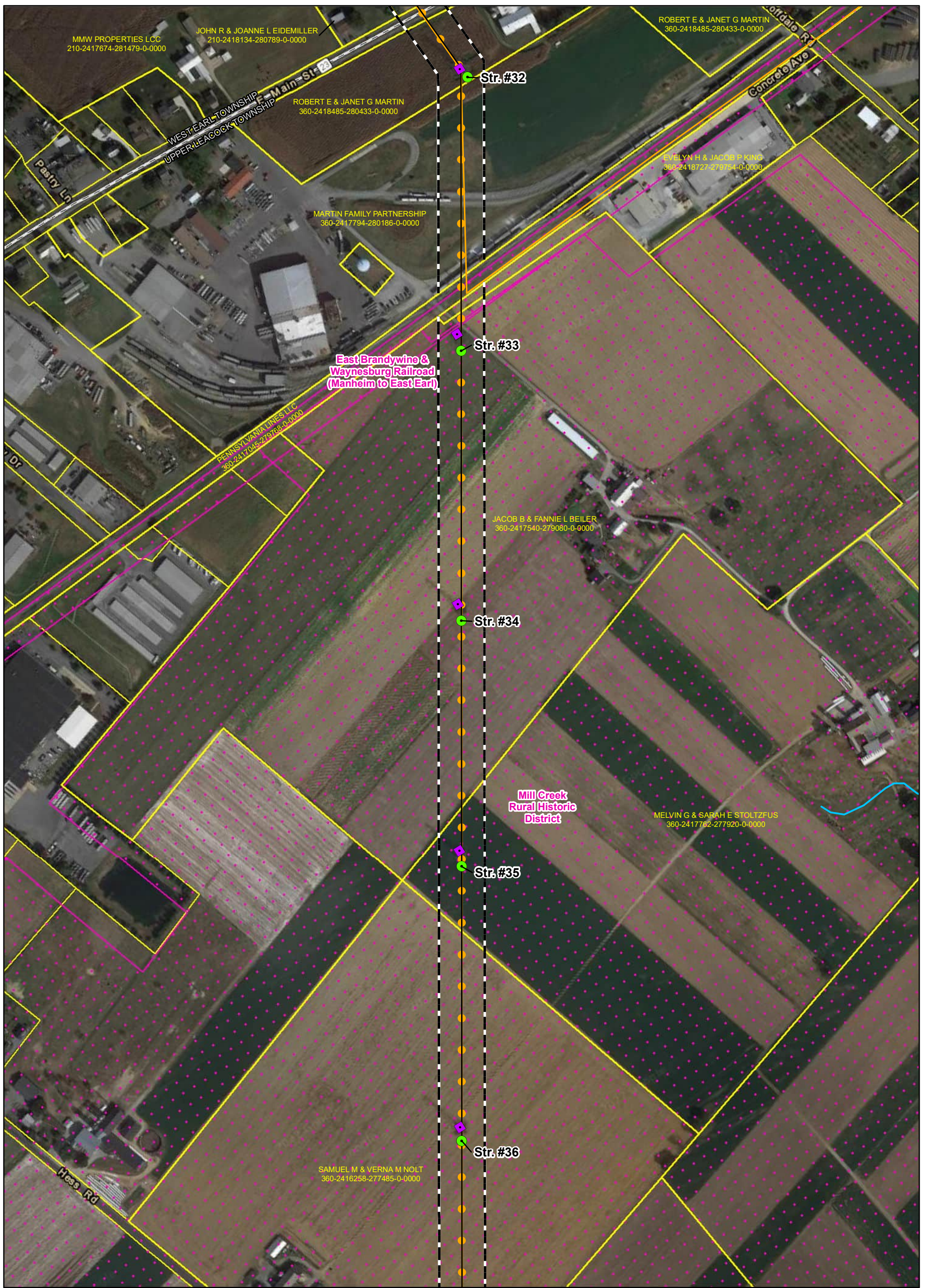
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2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 7 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mlwd	Date: 8/29/2022



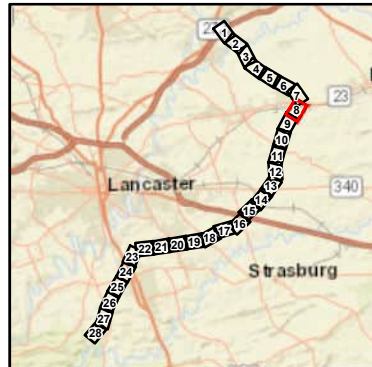
**Legend**

Proposed Structure	NWI Wetlands
Existing Structure (To Be Replaced)	Parcel Boundary
Proposed Centerline	<b>Existing Transmission Lines</b>
PPL Electric ROW	69 kV
Chapter 93 Designated Use Stream	230 kV
WWF	Eligible Historic District

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 8 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



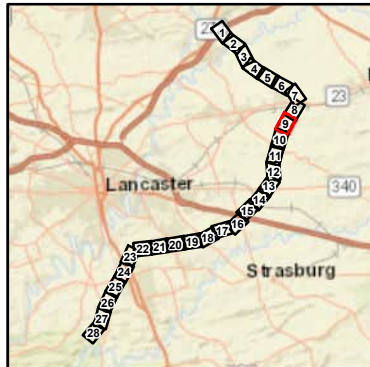
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Proposed Structure	PPL Electric ROW	Existing Transmission Lines
Existing Structure (To Be Replaced)	NWI Wetlands	230 kV
Proposed Centerline	Parcel Boundary	Eligible Historic District

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

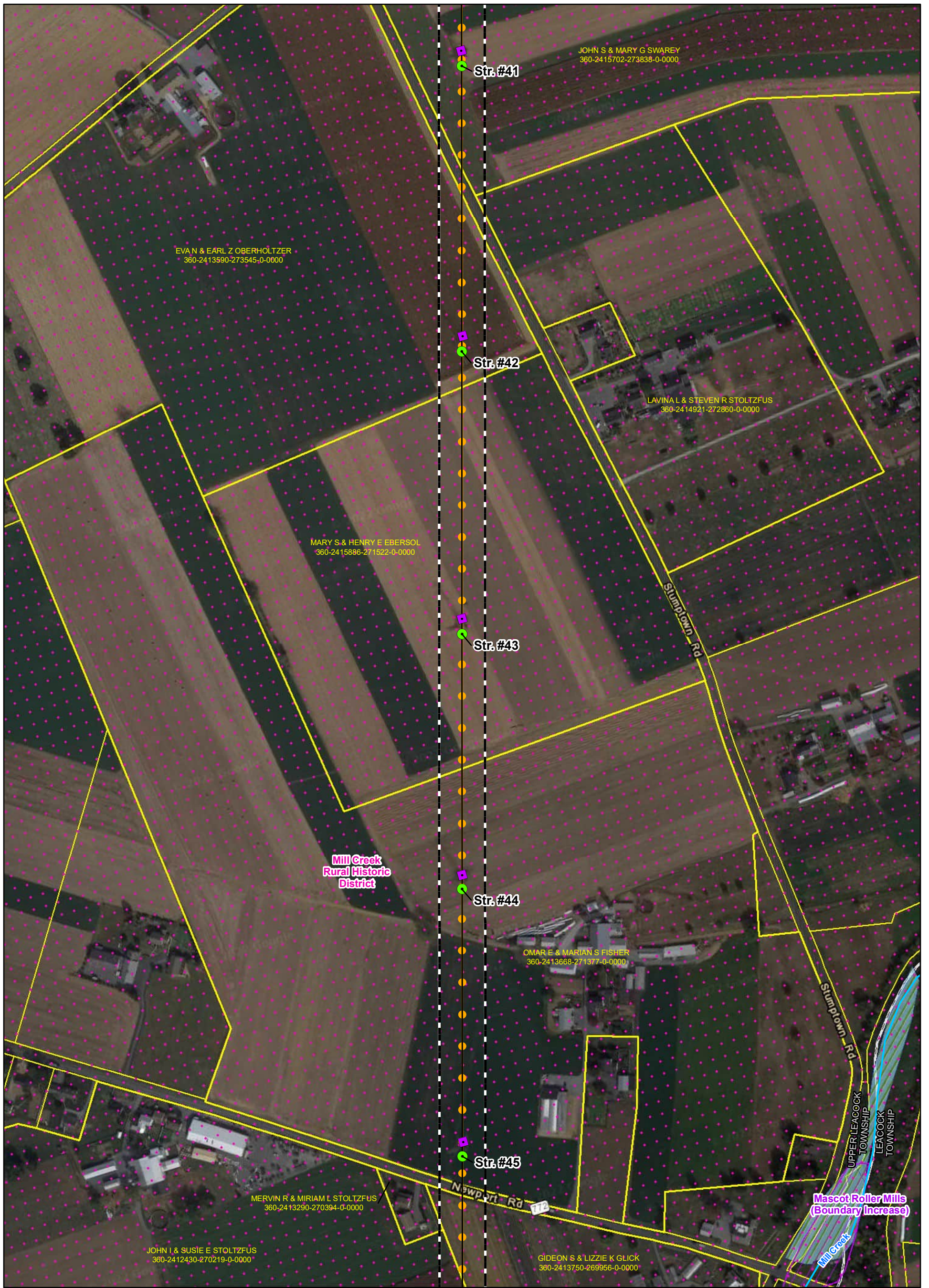
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 Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 9 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022

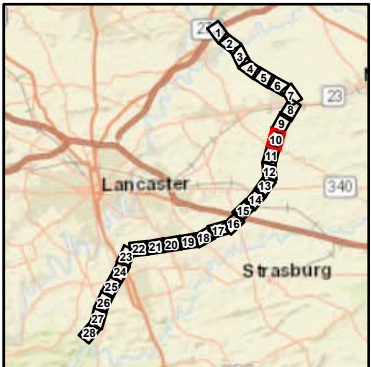


**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines**
- 230 kV
- Listed Historic Aboveground Resources
- Eligible Historic District

**Notes:**

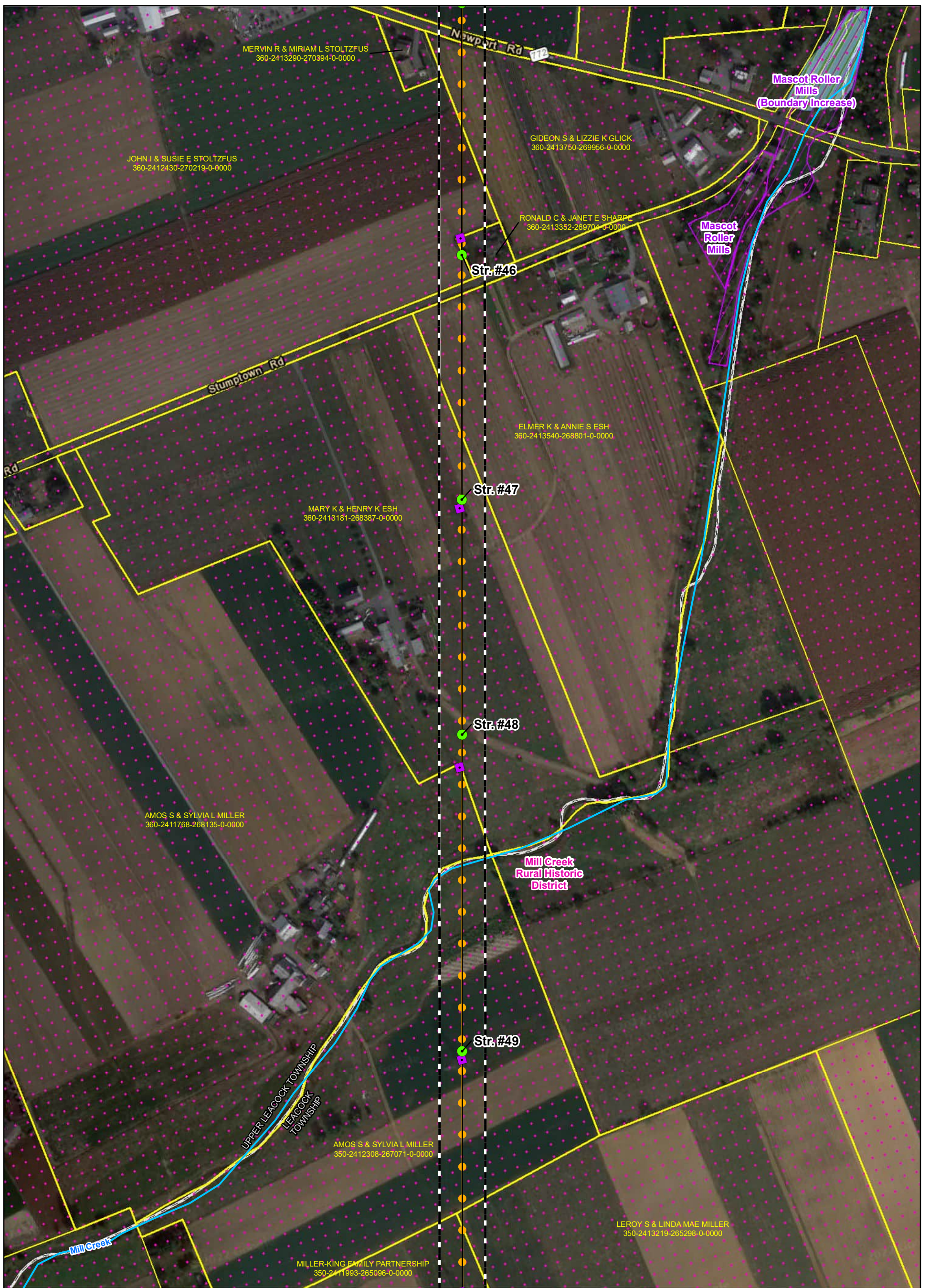
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2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 10 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/BB
Job: Sakr - Mwd	Date: 8/29/2022



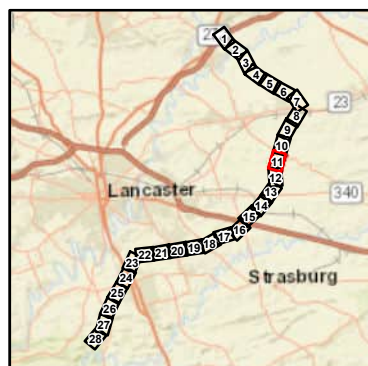
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- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines
  - 230 kV
- Listed Historic Aboveground Resources
- Eligible Historic District

**Notes:**

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- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
Lancaster County, Pennsylvania  
Sheet 11 of 28  
PPL Electric Utilities  
Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



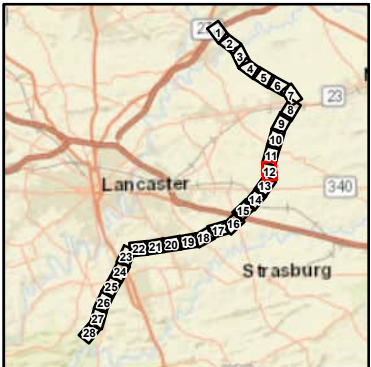
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	230 kV
Proposed Centerline	NWI Wetlands	Eligible Historic District
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

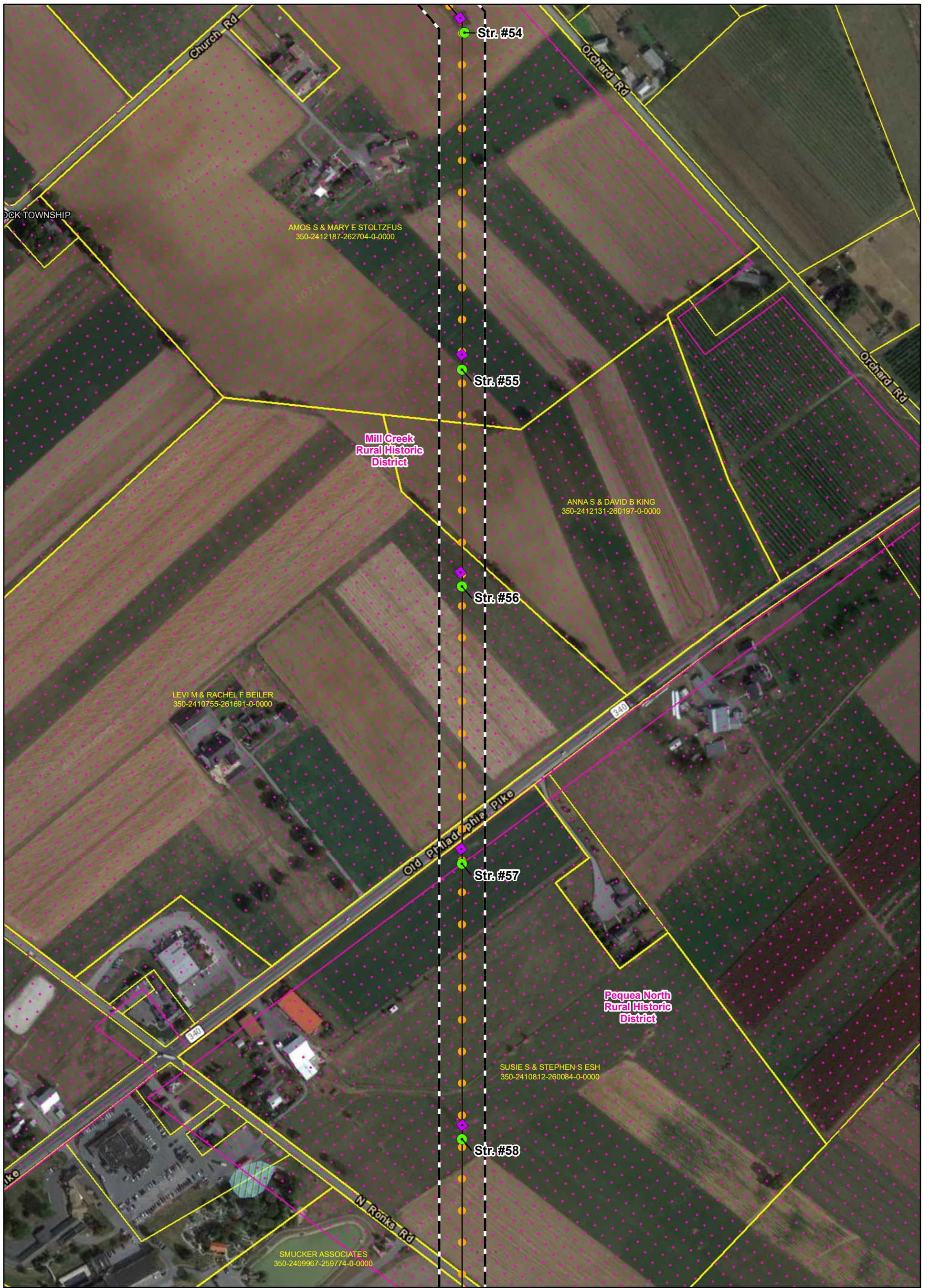
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**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 12 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



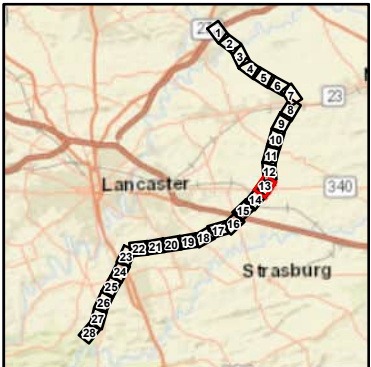
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- ▨ NWI Wetlands
- ▭ Parcel Boundary
- Existing Transmission Lines
- 230 kV
- ▭ Eligible Historic District

**Notes:**

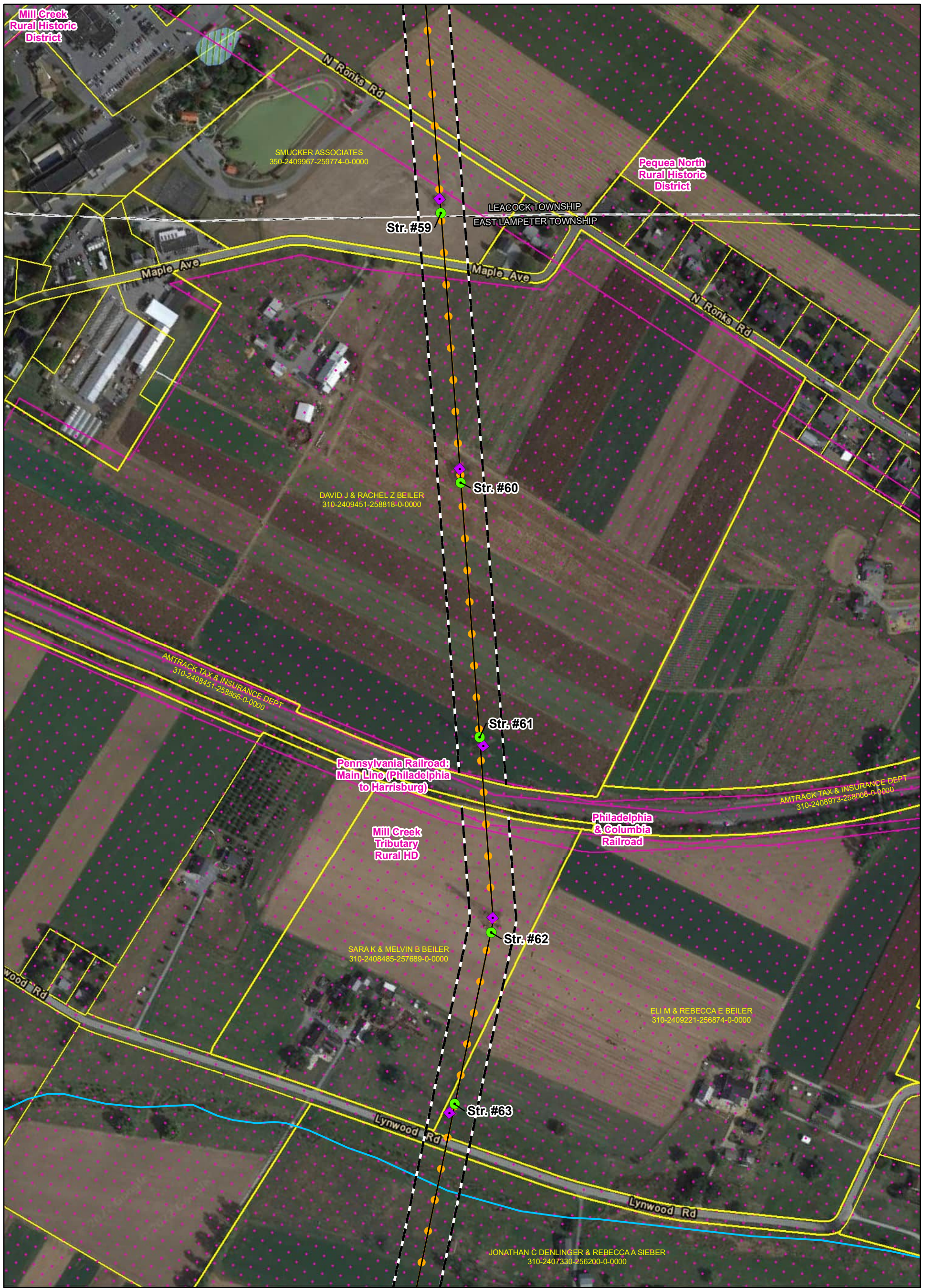
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2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 13 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



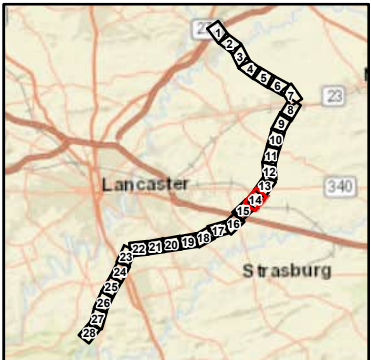
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Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	230 kV
Proposed Centerline	NWI Wetlands	Eligible Historic District
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 14 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



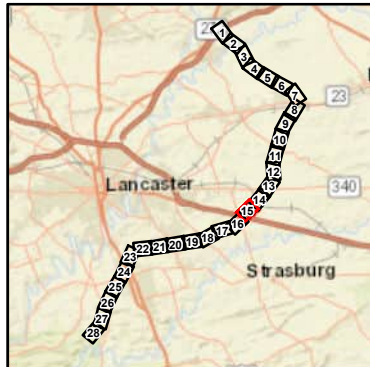
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines**
- 230 kV
- Eligible Historic Aboveground Resources
- Eligible Historic District

**Notes:**

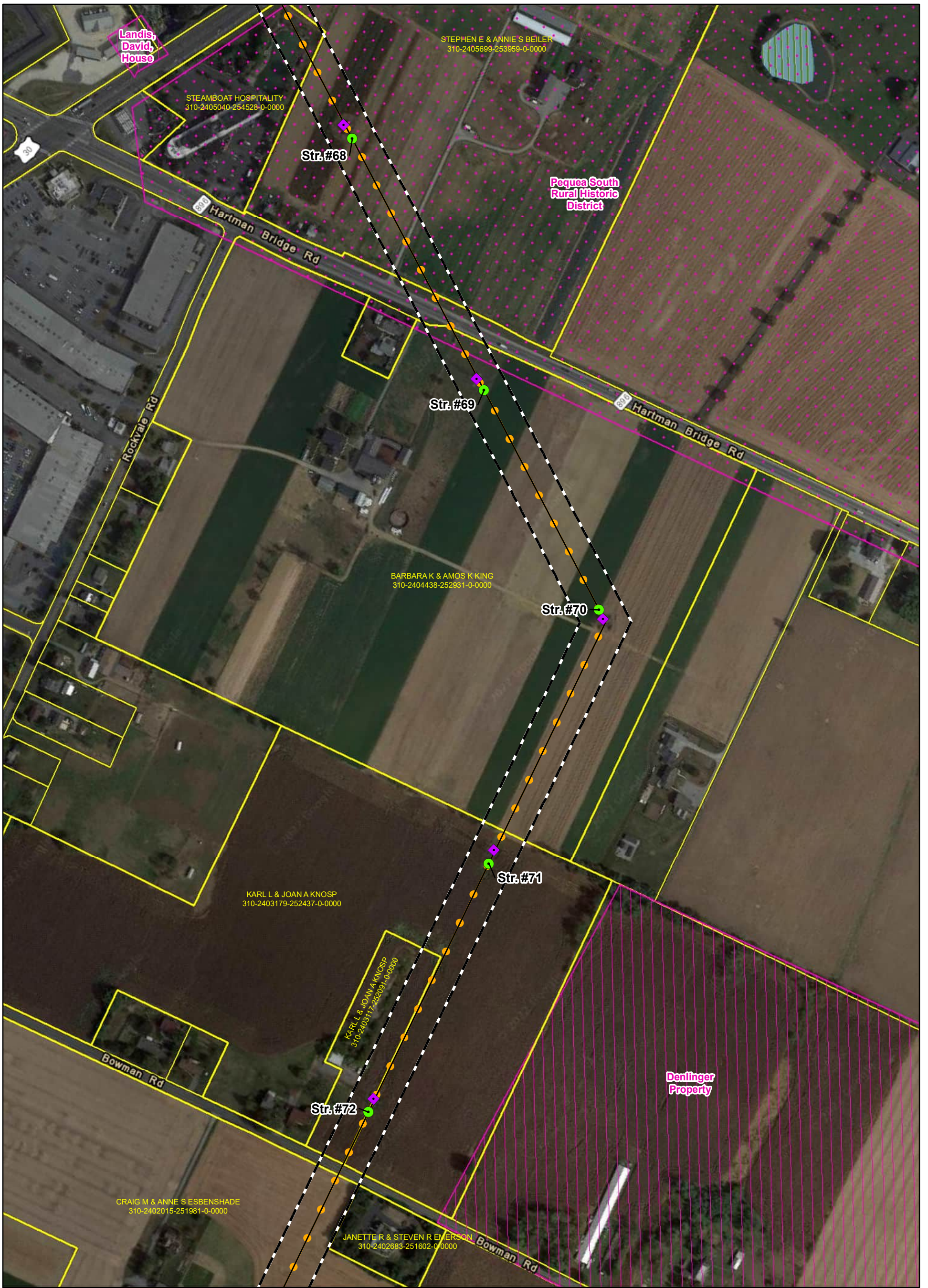
1. Existing structure locations and right of way provided by PPL Electric in January 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 15 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



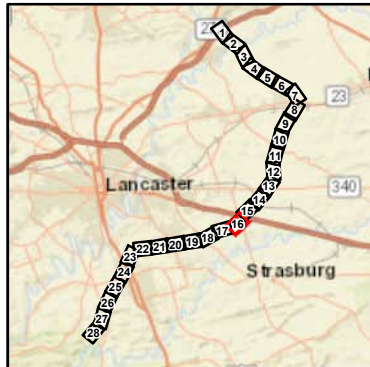
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines
  - 230 kV
- Eligible Historic Aboveground Resources
- Eligible Historic District

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 16 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



**AECOM**

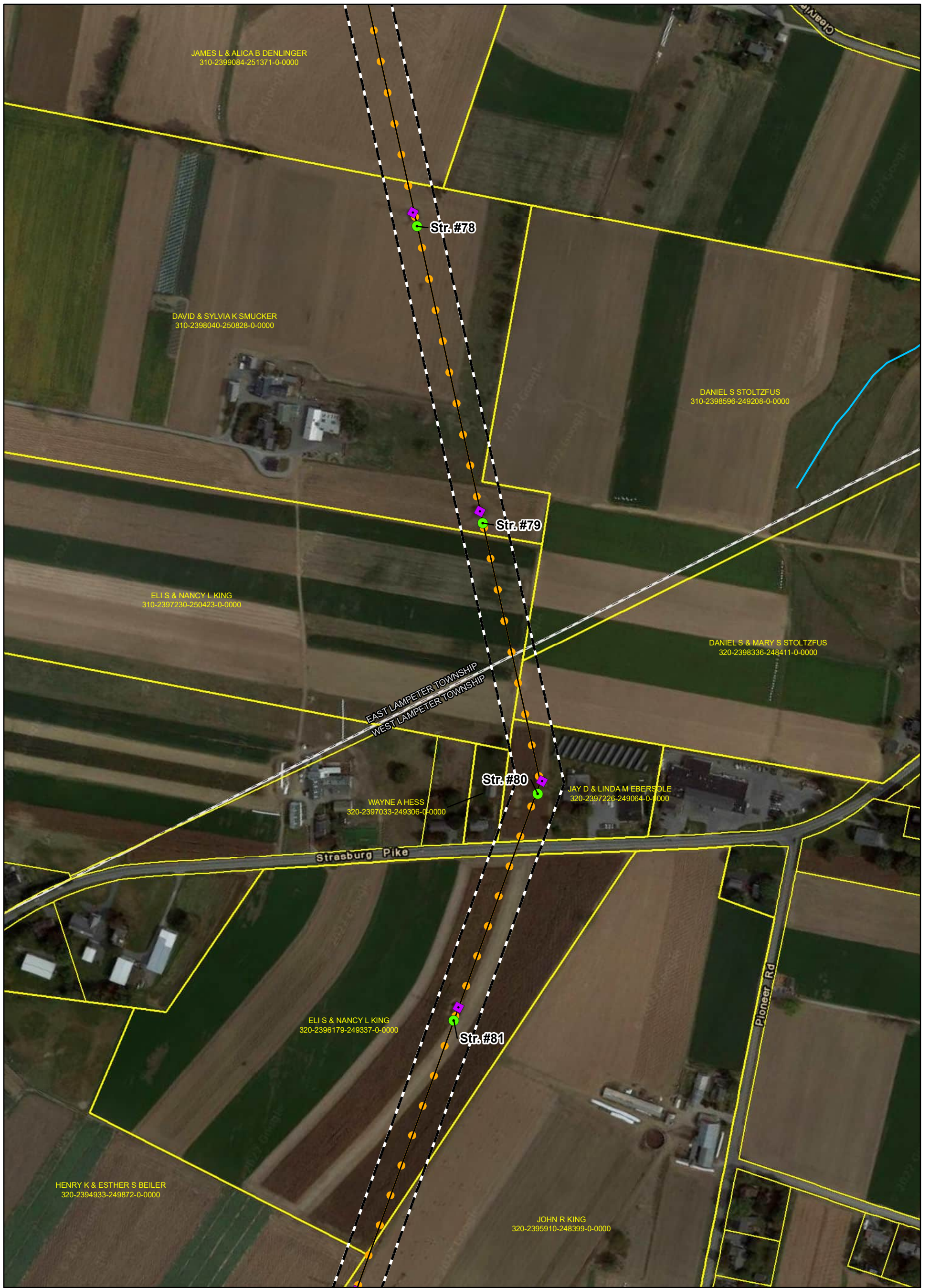
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**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 17 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF

Checked By: DY/RB

Job: Sakr - Mwd

Date: 8/29/2022



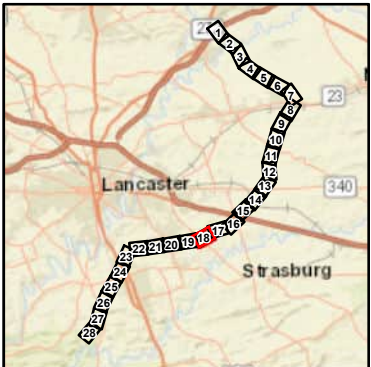
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	230 kV
Proposed Centerline	NWI Wetlands	
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 18 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



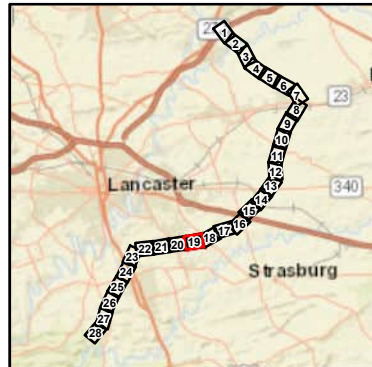
**Legend**

- Proposed Structure (Green circle)
- Existing Structure (To Be Replaced) (Purple square)
- Proposed Centerline (Black line)
- PPL Electric ROW (Dashed white line)
- Chapter 93 Designated Use Stream (Blue line)
- WWF (Light blue area)
- NWI Wetlands (Blue hatched area)
- Parcel Boundary (Yellow outline)
- Existing Transmission Lines (Orange line)
- 69 kV (Thin orange line)
- 230 kV (Thick orange line)
- Listed Historic Aboveground Resources (Purple hatched area)

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

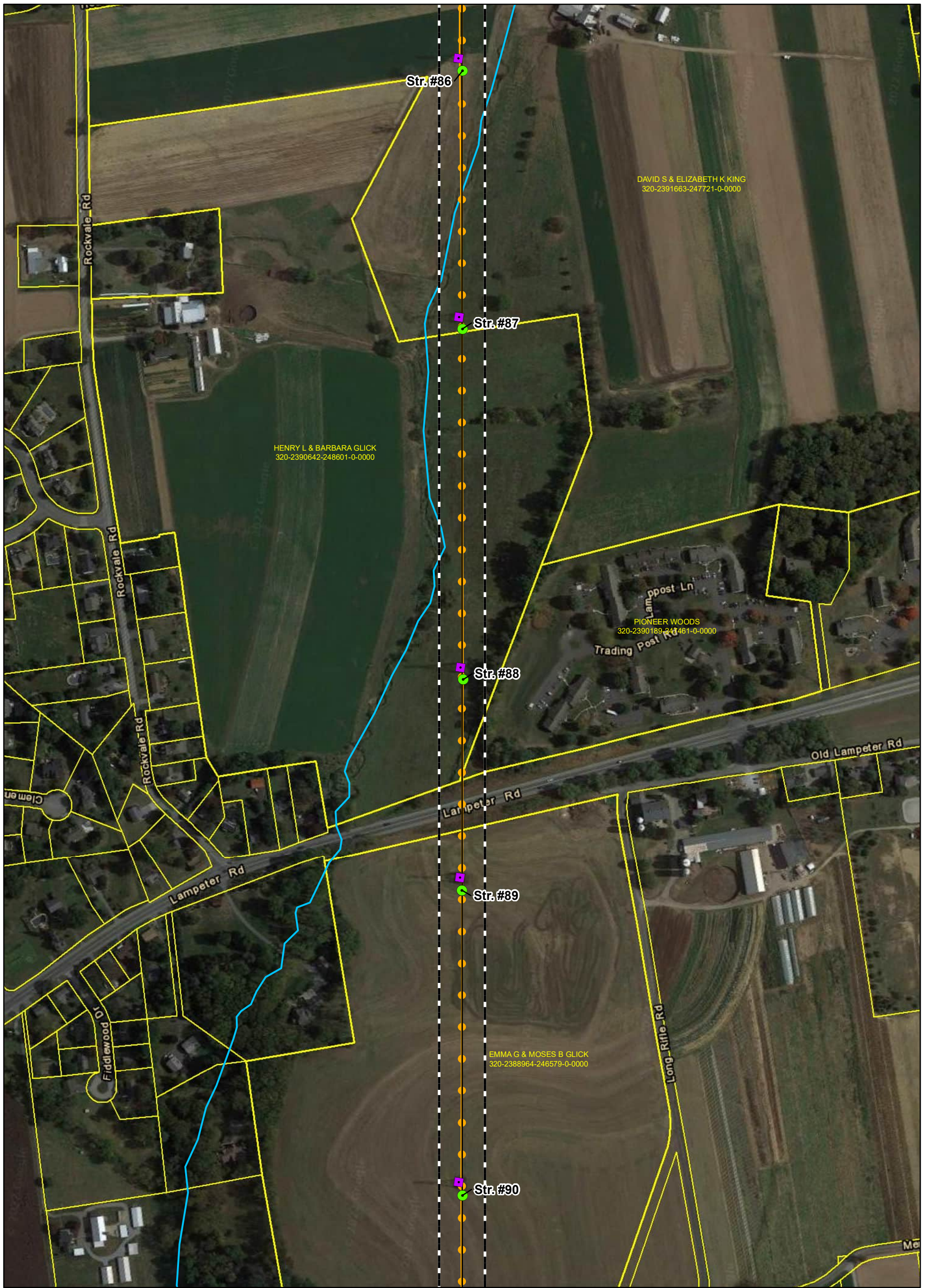
0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 19 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



DAVID S & ELIZABETH K KING  
320-2391663-247721-0-0000

HENRY L & BARBARA GLICK  
320-2390642-248601-0-0000

PIONEER WOODS  
320-2390189-247461-0-0000

EMMA G & MOSES B GLICK  
320-2388964-246579-0-0000

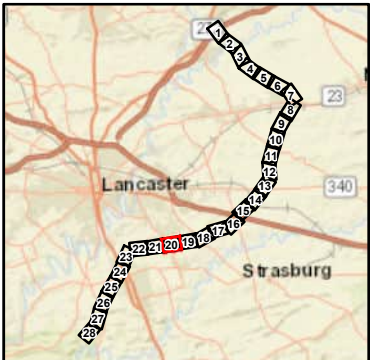
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	69 kV
Proposed Centerline	NWI Wetlands	230 kV
PPL Electric ROW	Parcel Boundary	

**Notes:**

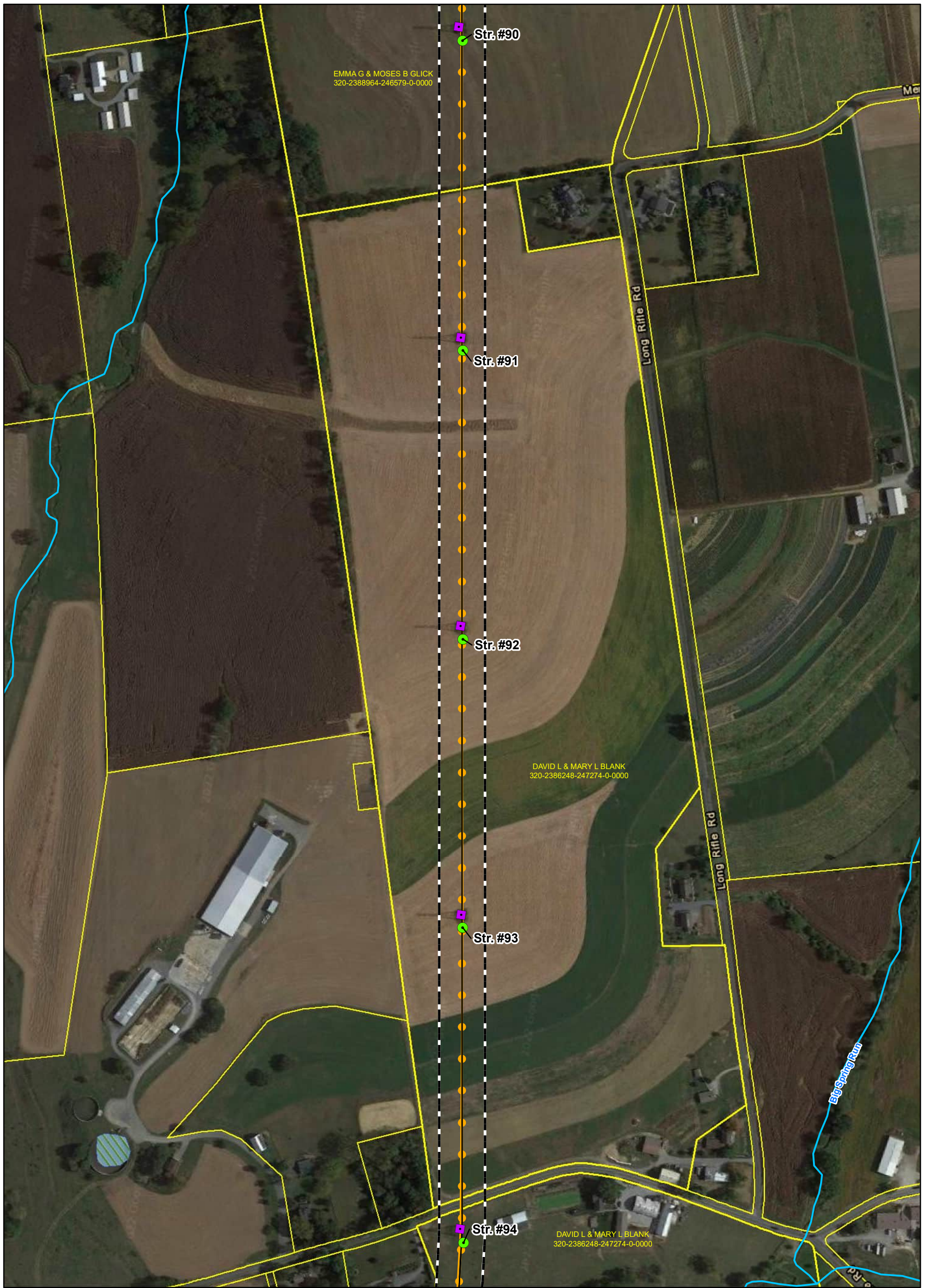
- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 20 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



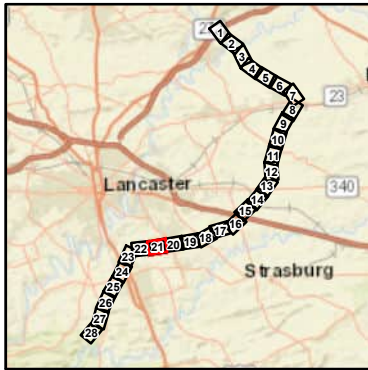
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	WWF	69 kV
Proposed Centerline	NWI Wetlands	230 kV
PPL Electric ROW	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

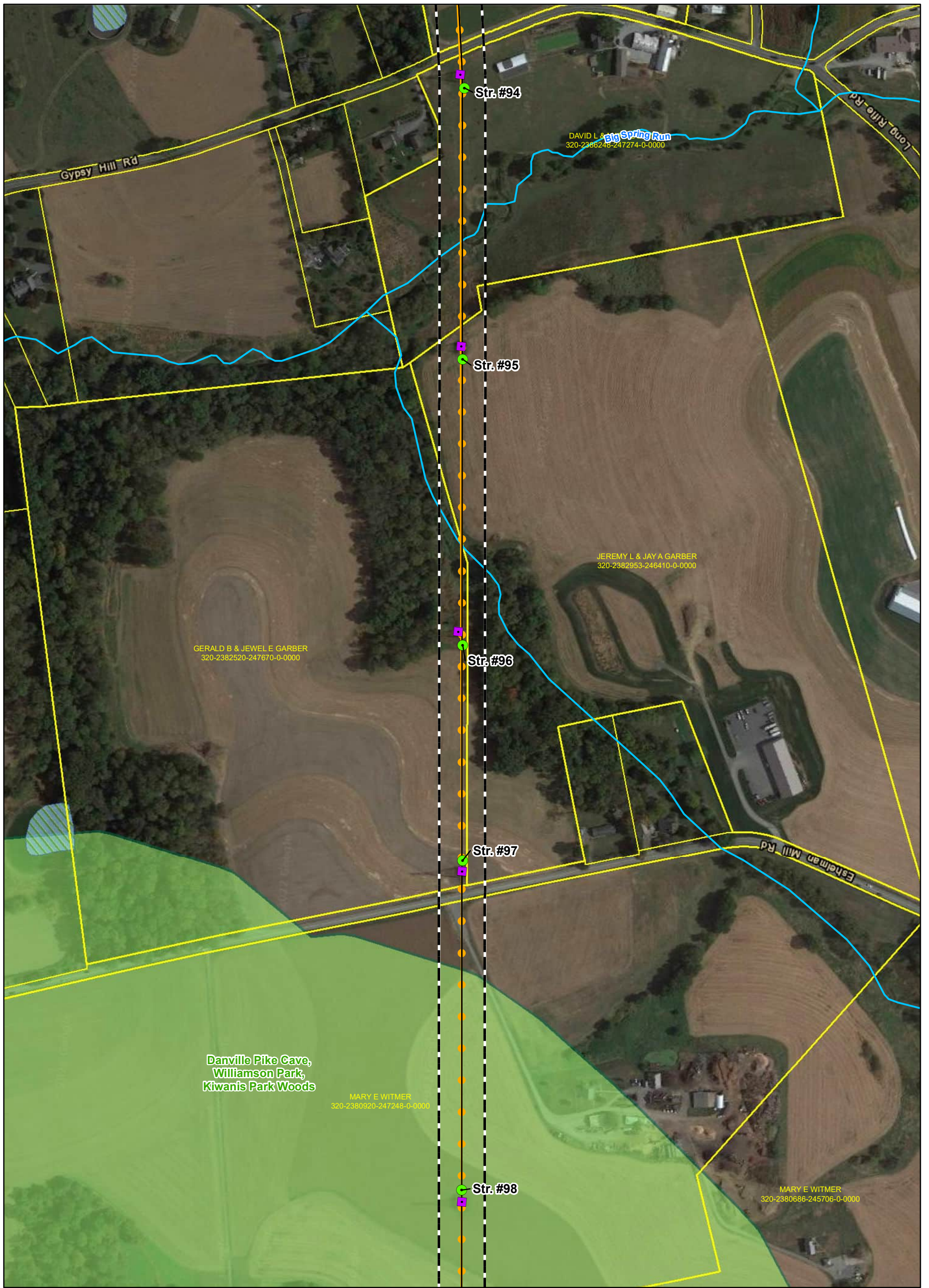
0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
Lancaster County, Pennsylvania  
Sheet 21 of 28  
PPL Electric Utilities  
Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022

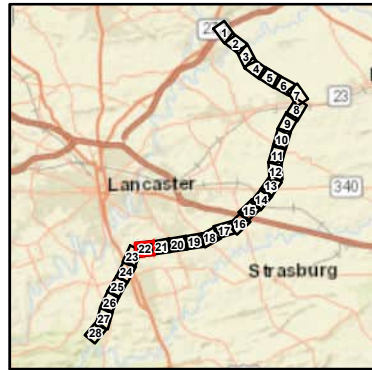


Legend	
	Proposed Structure
	Existing Structure (To Be Replaced)
	Proposed Centerline
	PPL Electric ROW
	Chapter 93 Designated Use Stream
	NWI Wetlands
	NHA Core
	Parcel Boundary
Existing Transmission Lines	
	69 kV
	230 kV

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 22 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



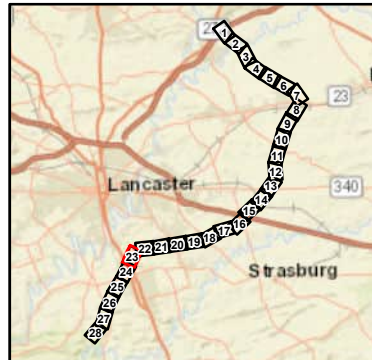
**Legend**

Proposed Structure	NWI Wetlands
Existing Structure (To Be Replaced)	NHA Core
Proposed Centerline	Parcel Boundary
PPL Electric ROW	<b>Existing Transmission Lines</b>
PPL Electric Property Line	69 kV
Chapter 93 Designated Use Stream	230 kV
WWF	Listed Historic Aboveground Resources

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

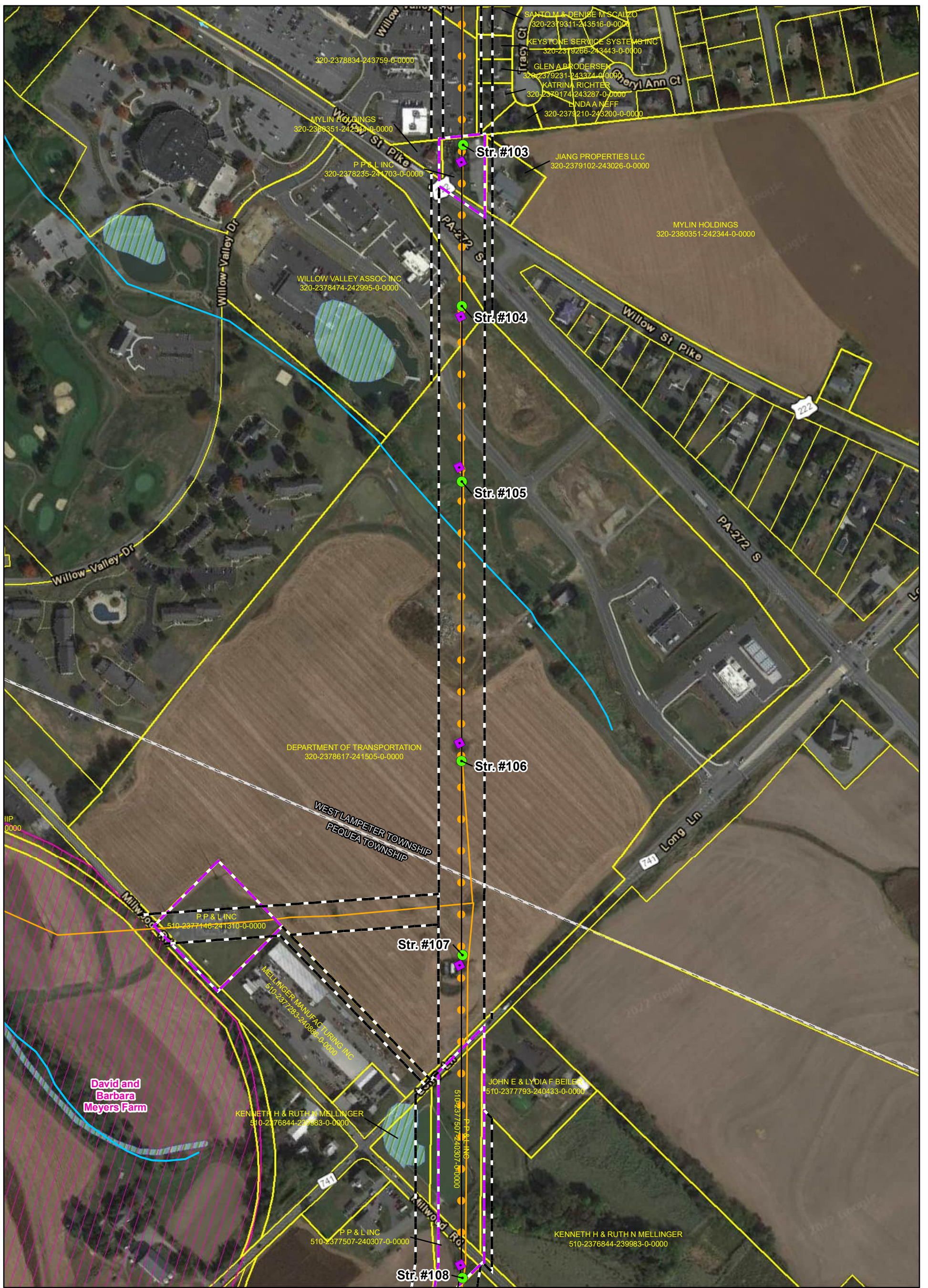
0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 23 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RS
Job: Sakr - Mwd	Date: 8/29/2022



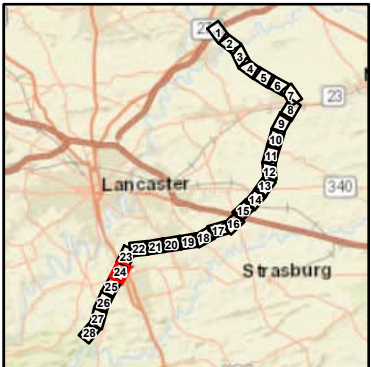
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- PPL Electric Property Line
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines**
- 69 kV
- 230 kV

**Notes:**

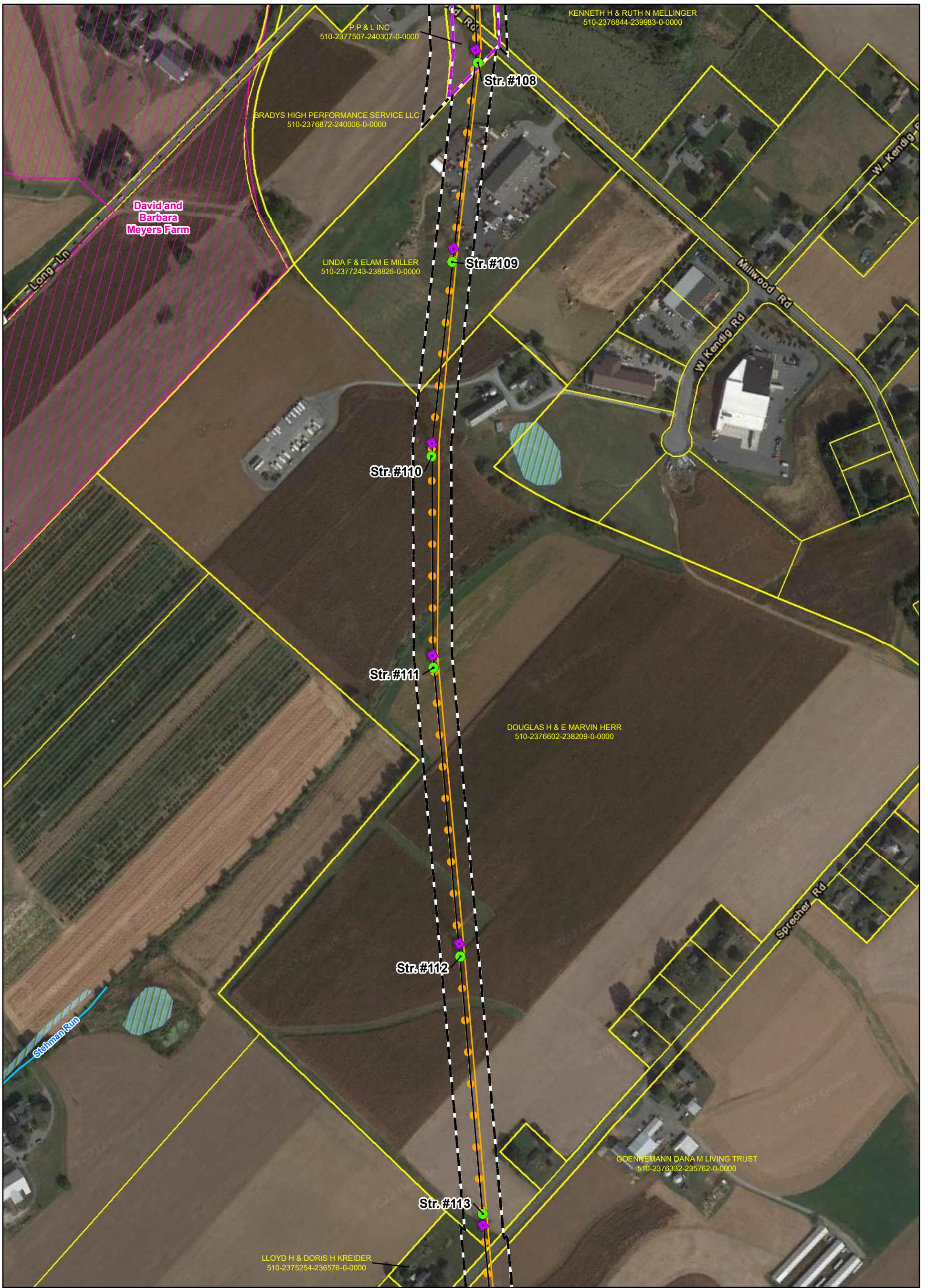
1. Existing structure locations and right of way provided by PPL Electric in January 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 24 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



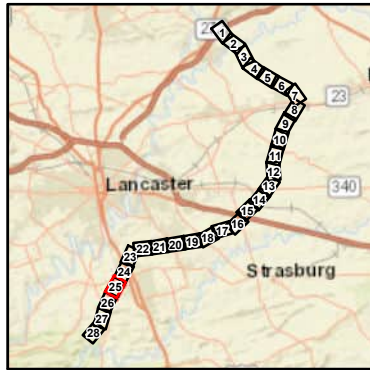
**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- PPL Electric Property Line
- Chapter 93 Designated Use Stream
- WWF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines
  - 69 kV
  - 230 kV

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

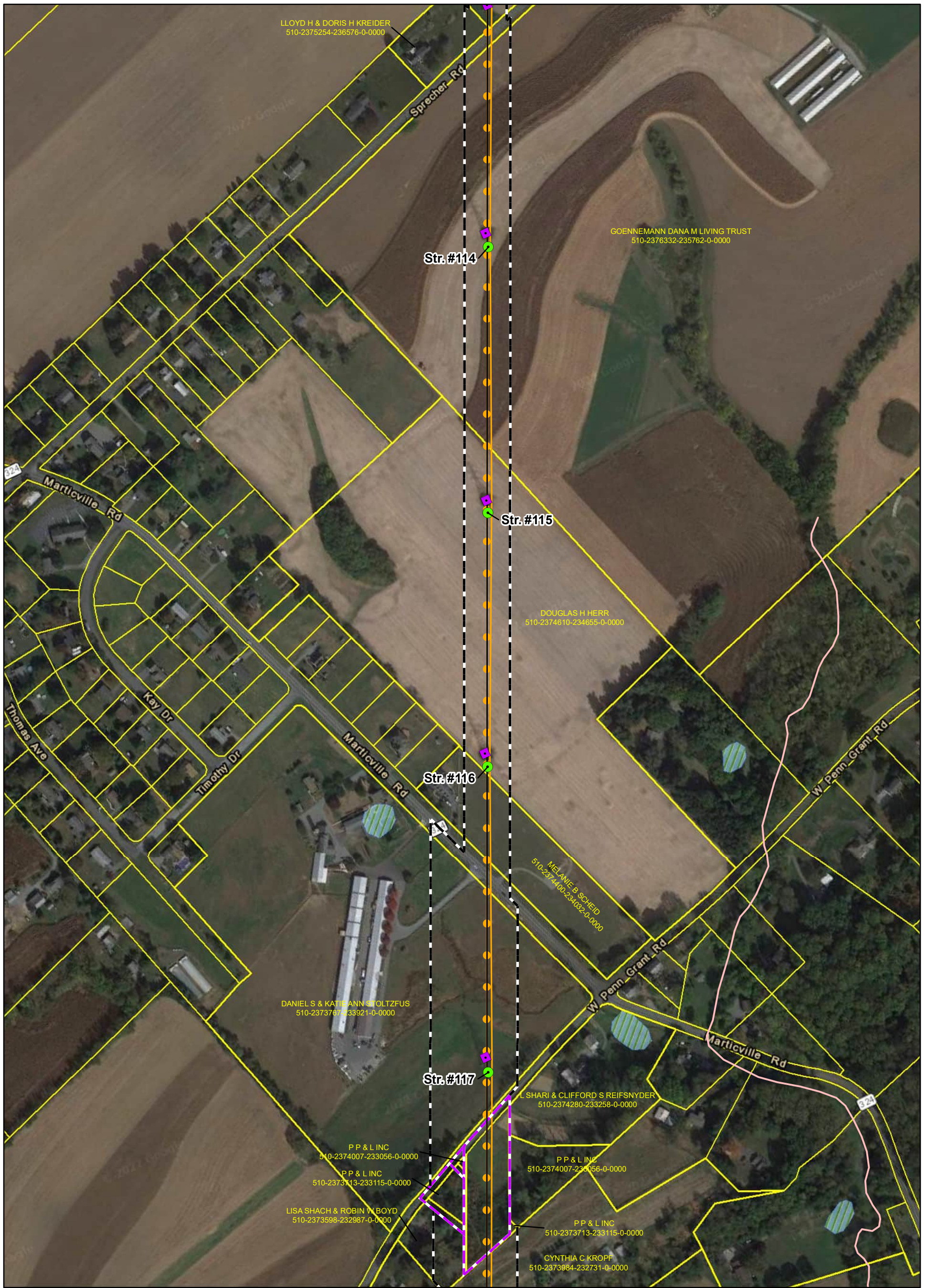
0 150 300 Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 25 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DYRB
Job: Sakr - Mwd	Date: 8/29/2022



**Legend**

- Proposed Structure
- Existing Structure (To Be Replaced)
- Proposed Centerline
- PPL Electric ROW
- PPL Electric Property Line
- Chapter 93 Designated Use Stream
- TSF
- NWI Wetlands
- Parcel Boundary
- Existing Transmission Lines**
- 69 kV
- 230 kV

**Notes:**

1. Existing structure locations and right of way provided by PPL Electric in January 2022.
2. Proposed structure locations provided by PPL Electric in July 2022.
3. Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 26 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



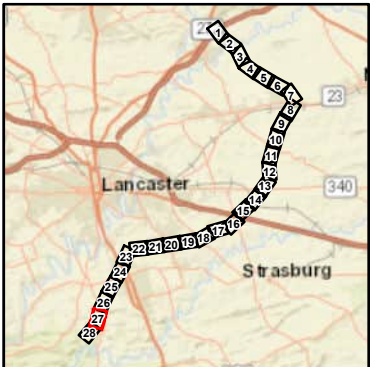
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	Existing Transmission Lines
Existing Structure (To Be Replaced)	TSF	69 kV
Proposed Centerline	NWI Wetlands	230 kV
PPL Electric ROW	NHA Core	
PPL Electric Property Line	Parcel Boundary	

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

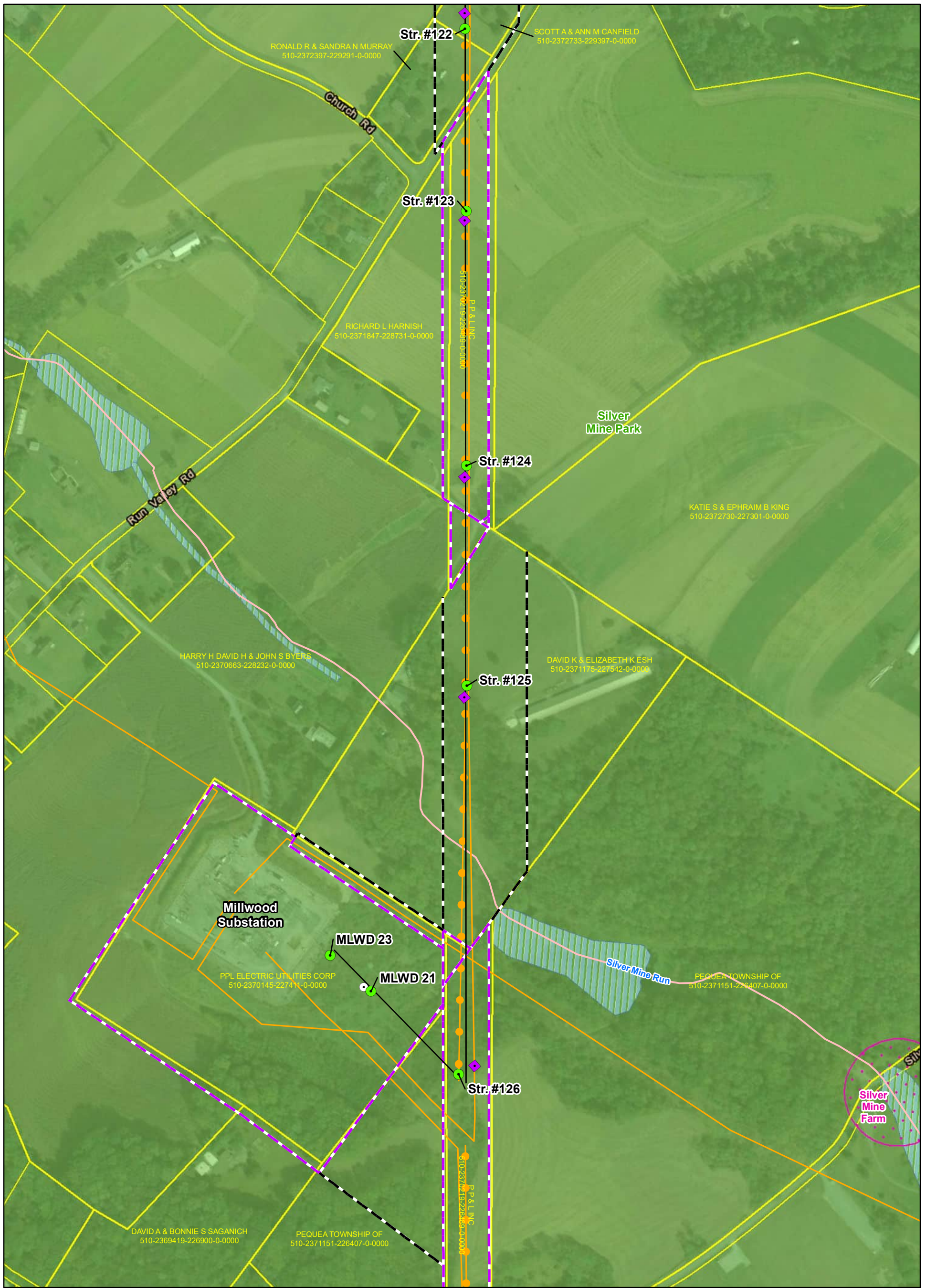
0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 27 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mwd	Date: 8/29/2022



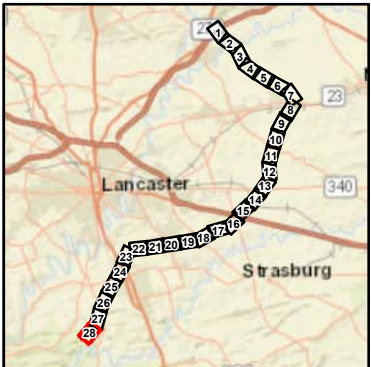
**Legend**

Proposed Structure	Chapter 93 Designated Use Stream	230 kV
Existing Structure (To Remain)	TSF	Eligible Historic District
Existing Structure (To Be Replaced)	NWI Wetlands	
Proposed Centerline	NHA Core	
PPL Electric ROW	Parcel Boundary	
PPL Electric Property Line	Existing Transmission Lines	
		69 kV

**Notes:**

- Existing structure locations and right of way provided by PPL Electric in January 2022.
- Proposed structure locations provided by PPL Electric in July 2022.
- Existing Transmission Lines provided by PPL Electric in April 2019.

0 150 300  
Feet



**AECOM**

**Figure 3-1**  
**Aerial Map of the Project**  
**South Akron - Millwood COR-TEN**  
**Rebuild Project**  
 Lancaster County, Pennsylvania  
 Sheet 28 of 28  
 PPL Electric Utilities  
 Allentown, Pennsylvania

Prepared By: BSF	Checked By: DY/RB
Job: Sakr - Mlwd	Date: 8/29/2022

**PPL ELECTRIC  
ATTACHMENT 4**

# SOUTH AKRON-MILLWOOD 230 kV COR-TEN® REBUILD PROJECT

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## **1.0 DESIGN CONSIDERATIONS**

PPL Electric Utilities Corporation’s (“PPL Electric”) new and rebuilt transmission lines are designed according to, and generally exceed, all National Electric Safety Code (“NESC”) minimum standards. The NESC is a set of rules guiding safety standards during the installation, operation, and maintenance of electric power lines. The NESC contains the basic provisions considered necessary for the safety of employees and the public. Although it is not intended as a design specification, its provisions establish minimum design requirements. PPL Electric has developed design specifications and safety rules which meet or surpass all requirements specified by the NESC.

The NESC includes loading requirements and clearances for the design, construction, and operation of power lines. The "loads" on conductors and supporting structures are the mechanical forces that develop from the weight of the conductors, the weight of ice on the conductors, plus wind pressure on the conductors and supporting structures. Loading requirements are the loads on the conductors and structures that are anticipated assuming certain ice and wind conditions. Loading requirements always contain "safety factors" to allow for unknown or unanticipated contingencies. The clearances and loading requirements contained in the NESC are designed to maintain public safety.

The NESC specifies strength and loading rules based on three different “grades of construction” for conductors and supporting structures:

- Grade B – This grade of construction provides the highest margin of safety and is required when the pole supports spans that cross limited access highways, railroads, and waterways.
- Grade C – This grade of construction is most common and provides a basic margin of safety. It is often utilized for the typical power and joint-use distribution pole.
- Grade N – This is the lowest grade of construction and is most often used for emergency and temporary construction.

PPL Electric designs all its transmission lines for Grade B construction. The use of Grade B design and construction translates to higher levels of structural reliability and safety to withstand the environmental conditions of ice and/or wind loading.

PPL Electric’s rigorous design standards are further incorporated into the parameters utilized to account for ice and wind loadings on the wires and structure. Structure loading and line designs must accommodate a variety of operating conditions as different ice and wind combinations can

impact the conductor sags and tensions of the line. PPL Electric’s transmission lines are designed to exceed NESC requirements by accounting for additional load cases due to various ice and wind loading conditions beyond what is required by NESC. This means that PPL Electric lines are designed to operate safely and reliably during extreme inclement weather. In addition, PPL Electric design standards include a clearance to ground buffer in excess of NESC required clearances to account for construction and design tolerances and the filling or grading of land within the right-of-way by property owners. This buffer also significantly reduces the risk of a property owner inadvertently contacting a transmission line. This has occurred on PPL Electric’s system in the past and higher clearances minimize the likelihood of future occurrences.

**TABLE 4-1: 69 kV Vertical Clearance to Ground**

Surface Underneath Conductors	NESC Standard Clearance	PPL Conductor Clearances
Roads, streets, and other areas subject to truck traffic	19.2 Ft.	22.2 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	19.2 Ft.	22.2 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	15.2 Ft.	22.2 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	27.2 Ft.	30.2 Ft.

**TABLE 4-2: 138 kV Vertical Clearance to Ground**

Surface Underneath Conductors	NESC Standard Clearance	PPL Conductor Clearances
Roads, streets, and other areas subject to truck traffic	20.6 Ft.	23.6 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	20.6 Ft.	23.6 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	16.6 Ft.	23.6 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	28.6 Ft.	31.6 Ft.

**TABLE 4-3: 230 kV Vertical Clearance to Ground**

Surface Underneath Conductors	NESC Standard Clearance	PPL Conductor Clearances
Roads, streets, and other areas subject to truck traffic	22.5 Ft.	25.5 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	22.5 Ft.	25.5 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	18.5 Ft.	25.5 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	30.5 Ft.	33.5 Ft.

**TABLE 4-4: 500 kV Vertical Clearance to Ground**

Surface Underneath Conductors	NESC Standard Clearance	PPL Conductor Clearances
Roads, streets, and other areas subject to truck traffic	28.4 Ft.	31.4 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	28.4 Ft.	31.4 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	24.4 Ft.	31.4 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	36.4 Ft.	39.4 Ft.

A relay protection system is also used on PPL Electric’s transmission lines to protect public safety, as well as the equipment on the transmission system. The purpose of relay protection is to automatically de-energize the line in the unlikely event that the line or supporting structure fails and the line contacts the ground.

## **2.0 PERIODIC MAINTENANCE PROGRAM ON ALL TRANSMISSION LINES**

To ensure continued public safety and integrity of service, a periodic maintenance and inspection program is implemented for every transmission line. The program is administered using helicopter patrols, with supplemental foot patrols as needed. Helicopter patrols are performed on all lines on a predetermined frequency, depending on voltage level. The two-man helicopter crew flies parallel to and above the line so that the observer can look for signs of line damage or deterioration and observe clearances between vegetation and conductors. The observations are included in a report that is forwarded to the appropriate department for corrective action.

## **3.0 PERSONNEL SAFETY RULES**

Overall, PPL Electric designs and constructs projects with high regard to both public and employee safety and follows or exceeds all codes and requirements. The following are a few examples of PPL Electric’s safety rules that demonstrate its dedication to employee and contractor safety:

- Procedures have been developed to allow work to be performed on energized facilities in a safe manner. When lines or apparatus are removed from service to be worked on, the Energy Control Process system is applied. This system provides that a red tag must be physically placed on the control handle of the de-energized equipment.
- The red tag may be removed only after proper authorization to energize the equipment has been received.
- Various other tags are used for limited operations and informational purposes.
- Employees or contractors will not apply or remove a tag or change the status of tagged equipment unless authorized.

- Temporary safety grounds are used on de-energized facilities for employee lineman safety during maintenance, construction, or reconstruction work. Safety grounds are wires connecting the de-energized facility to an electrical ground. If the facility should be energized, the safety grounds will divert the current directly to ground and reduce the likelihood of personal injury.
- Before applying grounds, a voltage test is performed to confirm that the line is de-energized. The voltage test device is checked before and after use to assure reliability.
- Poles or structures are inspected and examined for structural integrity before climbing. If there is any reason to believe that a pole is unsafe, it is stabilized before work is performed. Appropriate safety gear in the form of body belts, safety straps, hard hats, gloves, etc., is worn by linemen during line work activity.

#### **4.0 MAGNETIC FIELD MANAGEMENT PLAN**

PPL Electric’s Magnetic Field Management Program is applied to new and reconstructed transmission line projects. Although there is no current scientific evidence demonstrating that magnetic fields cause any adverse health effects or pose a health or safety threat to the public, PPL Electric has established a policy to design its new and rebuilt transmission lines to reduce magnetic fields. To lower magnetic field exposures, the program generally prescribes the use of a line design that provides ground clearances higher than the required minimum NESC ground clearance and reverse phasing of new double circuit lines where it is feasible to do so at low or no cost. The implementation of additional modifications to reduce magnetic field levels is considered, provided those modifications can be made at low or no cost and will not interfere with the operation of the line.

The program will be applied to this Project and the Project is designed with clearances that are at least three feet higher than NESC standards.

**PPL ELECTRIC  
ATTACHMENT 5**

## **SAKR-MLWD REBUILD PROJECT**

### **STATE AGENCIES**

Pennsylvania Bureau of Investigation and Enforcement  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street  
2nd Floor, Room-N201  
Harrisburg, Pennsylvania 17120  
Attn: Richard Kanaskie

Pennsylvania Department of Environmental Protection  
400 Market Street  
10th Floor Rachel Carson State Office Building  
Harrisburg, Pennsylvania 17101  
Attn: Regional Permit Coordination Office

Pennsylvania Department of Transportation  
Keystone Building  
400 North Street, Fifth Floor  
Harrisburg, Pennsylvania 17120  
Attn: Donald J. Smith, Acting Chief Counsel

Pennsylvania Historical and Museum Commission  
Bureau for Historic Preservation  
Commonwealth Keystone Building, Second Floor  
400 North Street  
Harrisburg, Pennsylvania 17120-0053  
Attn: Mr. Douglas C. McLearn, Chief

Pennsylvania Department of Conservation and Natural Resources  
Rachel Carson State Office Building  
400 Market Street  
Harrisburg, Pennsylvania 17105-8767  
Attn: Rebecca Bowen, Ecological Services Section Chief

Pennsylvania Game Commission  
2001 Elmerton Avenue  
Harrisburg, Pennsylvania 17110-9797  
Attn: Peter Sussenbach, Director, Bureau of Wildlife Habitat Management

Pennsylvania Fish and Boat Commission  
Center Region Office  
595 East Rolling Ridge Drive  
Bellefonte, Pennsylvania 16823-9620  
Attn: Christopher A. Urban, Chief, Natural Diversity Section

Pennsylvania Office of Consumer Advocate  
555 Walnut Street  
5th Floor Forum Place  
Harrisburg, Pennsylvania 17101-1923  
Attn: Patrick Cicero, Consumer Advocate

Pennsylvania Office of Small Business Advocate  
555 Walnut Street  
1<sup>st</sup> Floor Forum Place  
Harrisburg, Pennsylvania 17101  
Attn: Steven C. Gray, Senior Supervising Assistant Small Business Advocate

**FEDERAL AGENCIES**

U.S. Army Corps of Engineers  
Baltimore District Corporate Communication Office  
2 Hopkins Plaza  
Baltimore, Maryland 21201  
Attn: Planning Division

U.S. Fish and Wildlife Service  
Pennsylvania Field Office  
110 Radnor Road, Suite 101  
State College, Pennsylvania 16801  
Attn: Lesa Lindsay

**COUNTY AGENCIES**

Lancaster County Conservation District  
1383 Arcadia Road UNIT 102  
Lancaster, Pennsylvania 17601  
Attn: Christopher Thompson, Conservation District Manager

Lancaster County Planning Commission  
150 North Queen Street  
Lancaster, Pennsylvania 17603  
Attn: Terry Martin, Chairperson

**MUNICIPALITIES**

East Lampeter Township  
2250 Old Philadelphia Pike  
Lancaster, Pennsylvania 17602  
Attn: John Blowers, Chairman

Pequea Township  
1028 Millwood Road  
Willow Street, Pennsylvania 17584  
Attn: Harry D. Lehman III, Chairman

Upper Leacock Township  
161 Newport Road  
Leola, Pennsylvania 17540  
Attn: Ronald S. Simmons, Chairman

West Earl Township  
157 West Metzler Road  
P.O. Box 787  
Brownstown, Pennsylvania 17508  
Attn: David Thornton, Chairman

West Lampeter Township  
852 Village Road,  
P.O. Box 237  
Lampeter, Pennsylvania 17537  
Attn: Barry L. Hershey, Chairman

**LANDOWNERS**

ALICA B & JAMES L DENLINGER 222 CLEARVIEW RD LANCASTER, PA 176021504	AMOS S & SYLVIA L MILLER 2822-C STUMPTOWN RD BIRD IN HAND, PA 17505
AMTRACK TAX & INSURANCE DEPT 400 N CAPITOL ST NW WASHINGTON, DC 20001	ANNA S & DAVID B KING 2866 OLD PHILADELPHIA PIKE BIRD IN HAND, PA 17505
ANNIE S & ELMER K ESH 2874 B STUMPTOWN RD RONKS, PA 17572	ANNIE S & STEPHEN E BEILER 47 HARTMAN BRIDGE RD LANCASTER, PA 17602
BARBARA K & AMOS K KING 46 HARTMAN BRIDGE RD LANCASTER, PA 17602	BETHANY G & CHRISTOPHER S HARNISH 41 RUN VALLEY RD CONESTOGA, PA 17516
BRADYS HIGH PERFORMANCE SERVICE LLC 386 MILLWOOD RD WILLOW STREET, PA 17584	BRENDA J BOYER 85 RUN VALLEY RD CONESTOGA, PA 17516
CLIFFORD S & SHARI L REIFSNYDER 1104 W PENN GRANT RD LANCASTER, PA 17603	COUNTY OF LANCASTER C/O PARKS DEPARTMENT 1050 ROCKFORD RD LANCASTER, PA 17602
CRAIG M & ANNE S ESBENSHADE 150 BOWMAN RD LANCASTER, PA 17602	CYNTHIA C KROPF 1164 W PENN GRANT RD LANCASTER, PA 17603
DANA MICHELLE GOENNEMANN, MARVIN HERR, & DENISE Y SCHIRMER 300 WILLOW VALLEY LAKES DR WILLOW STREET, PA 17584	DANIEL B & KATIE F ZOOK 183 S FARMERSVILLE RD LEOLA, PA 17540

DANIEL S & KATIE ANN STOLTZFUS 150 MARTICVILLE RD LANCASTER, PA 17603	DANIELLE N MCMICHAEL & RYAN M GLACKIN 105 DIANNE CIR WILLOW STREET, PA 17584
DAVID & SYLVIA K SMUCKER 2110 ROCKVALE RD LANCASTER, PA 17602	DAVID A & BONNIE S SAGANICH 75 SILVER MINE RD CONESTOGA, PA 17516
DAVID H & DAWN R MOORE 313 BRETHERN CHURCH RD LEOLA, PA 17540	DAVID J & RACHEL Z BEILER 200 MAPLE AVE BIRD IN HAND, PA 17505
DAVID K & ELIZABETH K ESH 134 RUN VALLEY RD CONESTOGA, PA 17516	DAVID M NOLT 309 N HERSHEY AVE LEOLA, PA 17540
DAVID S & ELIZABETH K KING 1404 HOUSER RD LANCASTER, PA 17602	DENNIS J & PEGGY A WAGNER 106 LYNETTE CIR WILLOW STREET, PA 17584
DOUGLAS H & E MARVIN HERR 300 WILLOW VALLEY LAKES C 100 WILLOW STREET, PA 17584	DOUGLAS H HERR 496 MILLWOOD RD WILLOW STREET, PA 17584
EARL B NOLT 129 HESS RD LEOLA, PA 17540	EARL RAY & SARAETTA M SHIRK 1155 SHORT RD NEW HOLLAND, PA 17557
EDNA P & DANIEL K KING 139 BOWMAN RD LANCASTER, PA 17602	ELAM M & RUTH E HORNING 177 S FARMERSVILLE RD LEOLA, PA 17540
ELI M & REBECCA E BEILER 231 B LYNWOOD RD RONKS, PA 17572	ELI S & NANCY L KING 431 STRASBURG PIKE LANCASTER, PA 17602

<p>ELI S &amp; REBECCA S BEILER          151 CENTER SQUARE RD          LEOLA, PA 17540</p>	<p>ELVA N &amp; ERVIN S ZIMMERMAN          400 W METZLER RD          EPHRATA, PA 17522</p>
<p>EMMA &amp; STEVE K KING          223 W METZLER RD          EPHRATA, PA 17522</p>	<p>EVA N &amp; EARL Z OBERHOLTZER          204 E EBY RD          LEOLA, PA 17540</p>
<p>FRANCIS A &amp; ELIZABETH MARCHESANO          104 LYNETTE CIR          WILLOW STREET, PA 17584</p>	<p>FRANKLIN PROPERTIES TWO LLC          414 E KING ST          LANCASTER, PA 17602</p>
<p>GERALD B &amp; JEWEL E GARBER          208 LONG RIFLE RD          WILLOW STREET, PA 17584</p>	<p>GIDEON S &amp; LIZZIE K GLICK          200 STONE QUARRY RD          LEOLA, PA 17540</p>
<p>GLEN A BRODERSEN          106 TRACY CT          WILLOW STREET, PA 17584</p>	<p>HARRY H, DAVID H BYER, ET AL          160 RUN VALLEY RD          CONESTOGA, PA 17516</p>
<p>HARVEY M &amp; RHODA L HOOVER          343 N MAPLE AVE          LEOLA, PA 17540</p>	<p>HARVEY S &amp; LOUISE Z HOOVER          236 S FARMERSVILLE RD          LEOLA, PA 17540</p>
<p>HEART LAND ENTERPRISES INC,          PO BOX 525 411 E MAIN ST          LEOLA, PA 17540</p>	<p>HENRY E &amp; MARY S EBERSOL          2936 STUMPTOWN RD          RONKS, PA 17572</p>
<p>HENRY K &amp; ESTHER S BEILER          416 STRASBURG PIKE          LANCASTER, PA 17602</p>	<p>HENRY L &amp; BARBARA GLICK          1760 ROCKVALE RD          LANCASTER, PA 17602</p>
<p>ISAAC J &amp; ELIZABETH G LAPP          1501 MENTZER RD          LANCASTER, PA 17602</p>	<p>JACOB P &amp; EVELYN H KING          148 BRICK CHURCH RD          LEOLA, PA 17540</p>

JACOB S BEILER & MARIAN K ESH 84 A SOUTH GROFFDALE RD LEOLA, PA 17540	JAMES C & MELISSA F BROWN 103 DORIANNE DR WILLOW STREET, PA 17584
JAMES F V WILD 103 DIANNE CIR WILLOW STREET, PA 17584	JANET E & RONALD C SHARPE 2867 STUMPTOWN RD RONKS, PA 17572
JANET G & ROBERT E MARTIN 429 E MAIN ST LEOLA, PA 17540	JANETTE R & STEVEN R EMERSON 160 BOWMAN RD LANCASTER, PA 17602
JAY C & RHODA M BURKHOLDER 187 TURTLE HILL RD LEOLA, PA 17540	JAY D & LINDA M EBERSOLE 529 STRASBURG PIKE LANCASTER, PA 17602
JENNIFER L & CHAD D HOOVER 292 W FARMERSVILLE RD LEOLA, PA 17540	JEREMY P & LESLEY A FEAKINS 1200 W PENN GRANT RD LANCASTER, PA 17603
JOHN E & NAOMI K LAPP 49 EASTBROOK RD RONKS, PA 17572	JOHN R KING 2007 PIONEER RD LANCASTER, PA 17602
JOHN RAY & GLENDA J HOOVER 186 W METZLER RD EPHRATA, PA 175229002	JOHN S & ANNA K BEILER 317 BRETHERN CHURCH RD LEOLA, PA 17540
JONATHAN N ZIMMERMAN 651 OLD AKRON RD EPHRATA, PA 17522	JUDITH K Y DENLINGER & REBECCA A SIEBER 244 LYNWOOD RD RONKS, PA 17572
KARL L & JOAN A KNOSP 155 BOWMAN RD LANCASTER, PA 17602	KATHLEEN MCCABE 102 LYNETTE CIR WILLOW STREET, PA 17584

KATIE S & EPHRAIM B KING 348 MARTICVILLE RD CONESTOGA, PA 17516	KATRINA RICHTER 108 TRACY CT WILLOW STREET, PA 17584
KEVIN W & ELAINE Z HOOVER 35 BALMERTOWN RD LEOLA, PA 17540	KEYSTONE SERVICE SYSTEMS INC 310 N 2ND ST HARRISBURG, PA 17101
LAVINA L & STEVEN R STOLTZFUS 2966 STUMPTOWN RD RONKS, PA 17572	LEON RAY & ERMA JANE FREY 151 HESS RD LEOLA, PA 17540
LEROY S & LINDA MAE MILLER 2931 MILLER LN BIRD IN HAND, PA 17505	LEROY S & SADIE M STOLTZFUS 22 SCHOOL RD LEOLA, PA 17540
LESTER S & ARLENE N NOLT 165 N HERSHEY AVE LEOLA, PA 17540	LEVI M & RACHEL F BEILER 2823A OLD PHILADELPHIA PIKE BIRD IN HAND, PA 17505
LINDA A NEFF 110 TRACY CT WILLOW STREET, PA 17584	LINDA F & ELAM E MILLER 233 ROCK HILL RD MILLERSVILLE, PA 17551
LISA SHACH & ROBIN W BOYD 1126 W PENN GRANT RD LANCASTER, PA 17601	LLOYD H & DORIS H KREIDER 200 SPRECHER RD LANCASTER, PA 17603
LLOYD N HOOVER 303 W FARMERSVILLE RD LEOLA, PA 17540	LYNN AUDREY & JOSEPH K JR HEMLER 55 CHURCH RD LANCASTER, PA 17603
MARTIN FAMILY PARTNERSHIP LP 697 WALLACE RD NEW HOLLAND, PA 17557	MARY ELLA WITMER 1402 ESHELMAN MILL RD WILLOW STREET, PA 17584

MARY G & JOHN S SWAREY 300 HESS RD LEOLA, PA 17540	MARY JO CASSEL & BEN D KREIDER 305 BRETHERN CHURCH RD LEOLA, PA 17540
MARY K & HENRY K ESH 2846 STUMPTOWN RD RONKS, PA 17572	MARY L & DAVID L BLANK 1230 GYPSY HILL RD LANCASTER, PA 17602
MELANIE B SCHEID 157 MARTICVILLE RD LANCASTER, PA 17603	MELLINGER MANUFACTURING INC 367 MILLWOOD RD WILLOW STREET, PA 17584
MELVIN L & LYDIA ANN FISHER 3007 W NEWPORT RD RONKS, PA 17572	MERVIN R & MIRIAM L STOLTZFUS 2440 CREEK HILL RD LANCASTER, PA 17601
MICHAEL A ANGELINO 1140 W PENN GRANT RD LANCASTER, PA 17603	MILLER-KING FAMILY PARTNERSHIP LP 2882 MILLER LN BIRD IN HAND, PA 17505
MMW PROPERTIES LLC 169 N GROFFDALE RD LEOLA, PA 17540	MYLIN HOLDINGS 1345 BRYAN DR LANCASTER, PA 17601
NEIL S & CHERYL A HOOVER 285 W FARMERSVILLE RD LEOLA, PA 17540	OMAR E & MARIAN S FISHER 434A NEWPORT RD RONKS, PA 17572
PAUL F & GRACE M WENGER 190 S FARMERSVILLE RD LEOLA, PA 17540	PENNSYLVANIA LINES LLC, SOUTHERN, RAILWAY CO 110 FRANKLIN RD SE ROANOKE, VA 24042
PEQUEA TOWNSHIP OF 1028 MILLWOOD RD WILLOW STREET, PA 17584	PIONEER WOODS LP 600 OLDE HICKORY RD SUITE 100 LANCASTER, PA 17601

<p>RAYMOND H &amp; MABEL ZIMMERMAN          95 BALMERTOWN RD          LEOLA, PA 17540</p>	<p>RICHARD &amp; LAURIE A PABON          35 MADGE DR          LANCASTER, PA 17603</p>
<p>RICHARD HOWELL WITMER FOUNDATION          PO BOX 4308          LANCASTER, PA 17604</p>	<p>RICHARD J &amp; REBECCA J ROSATI          101 DORIANNE DR          WILLOW STREET, PA 17584</p>
<p>ROBERT W &amp; VIVIAN S ABEL          200 MARTICVILLE RD          LANCASTER, PA 17603</p>	<p>RONALD R &amp; SANDRA N MURRAY          99 CHURCH RD          LANCASTER, PA 17603</p>
<p>ROY N &amp; LAVERNE M HERR          216 MENTZER AVE          NEW HOLLAND, PA 17557</p>	<p>RUTH ANN &amp; REUBEN F KING          263 CLEARVIEW RD          LANCASTER, PA 17602</p>
<p>RUTH N &amp; KENNETH H MELLINGER          369 MILLWOOD RD          WILLOW STREET, PA 17584</p>	<p>SADIE MAE &amp; BENJAMIN K STOLTZFOOS          305 E EBY RD          LEOLA, PA 17540</p>
<p>SAMUEL &amp; SUSIE RIEHL          247 E EBY RD          LEOLA, PA 17540</p>	<p>SAMUEL J &amp; ANNIE S KING          110 LONG LANE          WILLOW STREET, PA 17584</p>
<p>SAMUEL JAY &amp; RACHEL S STOLTZFUS          2823 OLD PHILADELPHIA PIKE          BIRD IN HAND, PA 17505</p>	<p>SANTO M &amp; DENISE M SCALZO          102 TRACY CT          WILLOW STREET, PA 17584</p>
<p>SARA ANN &amp; QUENTIN M WEAVER          336 BRETHERN CHURCH RD          LEOLA, PA 17540</p>	<p>SARA K &amp; MELVIN B BEILER          281 LYNWOOD RD          RONKS, PA 17572</p>
<p>SARAH E &amp; MELVIN G STOLTZFUS          86-88 S GROFFDALE RD          LEOLA, PA 17540</p>	<p>SCOTT A &amp; ANN M CANFIELD          91 RUN VALLEY RD          CONESTOGA, PA 17516</p>

SHARON W & JAMES R ZIMMERMAN 53 BALMERTOWN RD LEOLA, PA 17540	SMUCKER ASSOCIATES 2715 OLD PHILADELPHIA PIKE BIRD IN HAND, PA 17505
SOUTH LANCASTER GRACE BROTHERS CHURCH 300 WILLOW VALLEY SQ LANCASTER, PA 17602	STEAMBOAT HOSPITALITY LP PO BOX 11116 LANCASTER, PA 17605
STEPHEN S & SUSIE S ESH 2810 OLD PHILADELPHIA PIKE BIRD IN HAND, PA 17505	SUSAN W & LINN W MOEDINGER 1835 PIONEER RD LANCASTER, PA 17602
SUSIE ANN & DANIEL K KING 143 TURTLE HILL RD LEOLA, PA 17540	SUSIE ELLEN & JOHN I STOLTZFUS 400B W NEWPORT RD RONKS, PA 17572
TIMOTHY D CAULER 101 DIANNE CIR WILLOW STREET, PA 17584	WAYNE A HESS 521 STRASBURG PIKE LANCASTER, PA 17602
WILLIAM III & LINDA S WELSH 89 RUN VALLEY RD CONESTOGA, PA 17516	WILLOW VALLEY ASSOCIATES INC 100 WILLOW VALLEY LAKES DR WILLOW STREET, PA 17584

## VERIFICATION

I, JOSEPH B. LOOKUP, being the Director of Asset Management at PPL Services Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 08/29/2022

  
Joseph Lookup (Aug 29, 2022 14:16 EDT)  
Joseph B. Lookup