



An Exelon Company

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AUG 29 2019

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

August 29, 2019

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: Letter of Notification of PECO Energy Company for Approval to Construct a Transmission Line of Less Than 2 Miles in Length, Entirely on an Existing Transmission Right-of-Way, in the City of Philadelphia, to Connect its Upland Substation to the Transmission Grid, Docket No. A-2019- _____

Dear Secretary Chiavetta:

PECO's hereby files the noted Letter of Notification. In the attachment to this letter, PECO has provided answers to the 27 questions listed in the Commission Staff's Letter of Notification Filing Checklist. All information required by the Commission's regulations is incorporated in those answers. A **Verification Statement** and **Certificate of Service** are enclosed and precede PECO's answers. A **check for \$350** to cover the filing fee is also enclosed.

PECO would like to begin vegetation management work for this project in November 2019, and to begin tower foundation construction work in December 2019. PECO therefore requests that, if possible, the Commission approve this Letter of Notification by the October 24, 2019 Public Meeting, but in any event by the November 14, 2019 Public Meeting.

Sincerely,

Ward L. Smith
Assistant General Counsel

Enclosures
WS/lo

Cc (email only): Robert F. Young, Law Bureau
Darren Gill, Bureau of Technical Utility Services

A- _____ **LETTER OF NOTIFICATION FOR 130-43**

SERVICE LIST

Philadelphia Mayor James Kenney
City Hall, Office 215
Philadelphia, PA 19107
(Chief Executive Officer, City of Philadelphia)

Philadelphia City Council President Darrell C. Clarke
City Hall, Room 313
Philadelphia, PA 19107
(Governing Body, City of Philadelphia)

Department of Licenses and Inspections
City of Philadelphia
Municipal Services Bldng, 11th Floor
1401 John F. Kennedy Blvd
Philadelphia, PA 19102
(Body charged with the duty of planning land use, City of Philadelphia)

Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Secretary, Department of Transportation
Keystone Building
400 North St., Fifth Floor
Harrisburg PA 17120

Chairman, Historical and Museum Commission
State Museum Building
300 North Street
Harrisburg, PA 17120

Jeffrey D. Kueppel
General Manager
SEPTA
1234 Market Street
Philadelphia PA 19107

Richard Kanaskie
Bureau of Investigation & Enforcement
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, Second Floor
Harrisburg, PA 17120

Erin K. Fure
Pennsylvania Office of Small Business
Advocate
300 North Second Street, Suite 202
Harrisburg, PA 17101

Tanya J. McCloskey
Office of Consumer Advocate
Forum Place, 5th Floor
555 Walnut Street
Harrisburg, PA 17101-1923

Letter of Notification Filing Checklist
220-20 Extension to Connect Upland Substation to the Transmission Grid

In an effort to facilitate the Commission's review process for a Letter of Notification (LON) for the Siting and Construction of Electric Transmission Lines, Commission staff has informed jurisdictional utilities that the following checklist may be consulted by the applicant; that the applicable regulatory requirements for a LON application are found in 52 Pa. Code §§ 57.71-77; that this checklist is provided to streamline the review process by anticipating requests for additional information that may arise from Commission staff; and that the checklist does not create additional mandates or regulatory requirements for approval of a LON.

1. Provide the name of the applicant and the address of its principal business office.

PECO Energy Company
2301 Market Street
Philadelphia, PA 19103

2. Name, title and business address of the attorney of the applicant and the person authorized to receive notice and communications with respect to the application if other than the attorney or the applicant.

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3. General description of the proposed route of the HV line, to include the number of route miles, the right-of-way width and the location of the proposed HV line within each city, borough, town and township traversed. Describe which sections of 52 Pa. Code §57.72(d)(1)(i)-(iv) the applicant believes are applicable.

This project involves the construction of a 230 kV transmission line on an existing SEPTA and Amtrak railroad corridor in the City of Philadelphia. As described below in response to Q4, PECO is constructing a new Upland Substation to serve local distribution load; the 220-20 Extension will be used to connect the new Upland Substation to the existing transmission grid. To accomplish this, PECO will tap into its existing 220-20 (Parish – Bala Cynwyd) 230 kV line by constructing eight new transmission poles on the existing electrified SEPTA/Amtrak railroad right-of-way over approximately 3,000 linear feet of right-of-way (approximately 6/10ths of a mile) between PECO's new Upland

Substation and structures 38 and 39 on the existing Parish – Bala Cynwyd line. The new line extension will be a double circuit line. The line from Parish Substation to the new Upland Substation will be designated as the 220-20 line; the line from the Upland Substation to the Bala Cynwyd Substation will be designated as the 220-72 line. For the newly-constructed line, both the 220-20 line and the 220-72 line will be constructed on the same towers. For ease of reference, the two newly-constructed portions of the circuits will be referred to as the 220-20 Extension.

The right-of-way width of the railroad right-of-way varies over the segment over which the transmission line will be built, but PECO's easement within the larger railroad right-of-way will be 100 feet in width.

The proposed project is located entirely within the City of Philadelphia, Pennsylvania. An aerial photograph showing the route of the 220-20 Extension is provided as PECO Attachment Q3.

This application is made pursuant to two provisions of 52 Pa. Code §57.72(d)(1):

- 52 Pa. Code §57.72(d)(1)(i): An HV line which is proposed to be located entirely on an existing transmission line right-of-way, so long as the size, character design or configuration of the proposed HV line does not substantially alter the right-of-way. (The line will be constructed entirely on an existing railroad right-of-way that contains electric transmission circuits used by the railroads to power their trains.)
- 52 Pa. Code §57.72(d)(1)(vi): An HV line having a proposed route of 2 miles or less. (The route of this project work is approximately 0.6 miles.)

4. Provide a general statement of the need for the proposed HV line in meeting identified present and future demands for service, of how the proposed HV line will meet that need and of the engineering justification for the proposed line.

The proposed HV transmission line is necessary to connect the new Upland Substation to the transmission grid.

The Upland Substation is needed for the following reasons, with the most important factor being that PECO needs to replace or retire the existing Overbrook Substation, which has both 34-4 kV transformers and 34-13 kV transformers.

- The Overbrook Substation 34-4 kV equipment has been in service for over 75 years. The 4 kV distribution lines that radiate from the Overbrook 34-4 kV system are also decades old, with some being as old as the Substation itself. Maintenance of the Substation facilities becomes increasingly difficult as replacement parts are not readily available. In addition, the integrity of the Substation equipment diminishes as the equipment insulation becomes brittle

with age. Moreover, 4 kV distribution service is no longer considered to be best utility practice because 4 kV distribution creates greater line losses and difficulty with voltage regulation. In line with that best utility practice, PECO has limited construction of new 4 kV facilities since the 1960s and seeks to retire those facilities when it has the reasonable opportunity to do so. PECO consequently has concluded that the 34-4 kV components of the Overbrook Substation need to be retired in the foreseeable future. A large portion of the 34 kV underground cable in the area supplies both the Overbrook 34-13 and Overbrook 34-4 kV transformers, and have also been in service for many years, with some being of the same vintage as the 34-4 kV Substation. The 34-13 components of the Overbrook Substation, while not as old as the 34-4 kV components, are nonetheless many decades old and suffer from some of the same equipment diminishment, especially in the 34 kV supply lines that provide service to the transformers. PECO thus determined that it needs to retire both the 34-4 kV and 34-13 kV components of the Overbrook Substation. The retirement of the Overbrook Substation 13 and 4 kV systems is the primary driver of the need to construct new 13 kV capacity in the form of the Upland Substation.

- The load that will be served by the new Upland Substation is currently being served from four sources: (1) the Overbrook Substation, which is located approximately 0.5 miles from the site of the new Upland Substation; (2) the 230-13 kV Bala Substation, which is located approximately 1.3 miles from the site of the new Upland Substation; (3) the 230-13 kV Parrish Substation, which is located approximately 2.2 miles from the site of the new Upland Substation, and (4) the 138-13 kV Llanerch Substation, which is located approximately 3.4 miles from the site of the new Upland Substation.
- At the time of the projected in-service date for Upland Substation (2021), PECO projects that these Substation sources will have the following capacity and will be loaded as follows:
- Load that will be need to be served from a new source once the Overbrook Substation is retired:
 - Overbrook 34-4 kV – 2268 amp projected load served at 4 kV. Because of the higher voltage class involved, 13 kV sources can serve more load per amp; on the PECO system an amp of load on the 4 kV system can be served by approximately 0.32 amp of capacity on the 13 kV system. Shifting 2268 amps of 4 kV load from the Overbrook 34-4 kV Substation to 13 kV distribution thus would use approximately $2268 * 0.32 = 728$ amps of 13 kV capacity
 - Overbrook 34-13 kV – 552 amp projected load served at 13 kV
 - Total Overbook load to be served at 13 kV: $728 + 552 = 1280$ amps.

- 13 kV Capacity that will be available to serve the load of the retired Overbrook Substation:

Source	Rating	2021 Projected Load	Loading	Available
Bala 230-13	3000	2946	98%	54
Parrish 230-13	6573	6285	96%	288
Llanerch 138-13	5900	5697	97%	203
Total	15473	14928	96%	545

- While the 545 amps of 13 kV capacity described above as being “available” is available to serve load adjacent to each noted source substation, the capacity may not be immediately available to serve load in the vicinity of the Overbrook/Upland Substations. For example, PECO has currently extended one circuit from the Llanerch Substation to the Upland area, which makes available only a very small percentage of the Llanerch capacity to serve the Upland area. Obtaining total access to the Llanerch or Parrish capacity would require a substantial investment to extend additional circuits 3.4 miles from Llanerch or 2.2 miles from Parrish to the Upland area.
- The 1280 amps of 13 kV capacity that would be needed to serve the load from the retired Overbrook Substation would exceed the available 13 kV capacity in the area. Assuming that all 545 amps of 13 kV capacity at the existing source substations could be made easily available to serve load in the Upland area, there would still be a shortfall of $1280 - 545 = 735$ amps needed in excess of the ratings of the existing 13 kV facilities. Put differently, after retirement of the Overbrook Substation, the source substations that serve this area would have 15,473 amps of 13 kV capacity available to serve 16,208 amps of load (comprised of their expected 2021 load and the transferred Overbrook load), meaning that they would be collectively overloaded at 105% of rated capacity. This solution is unacceptable; in order to retire the Overbrook Substation, additional 13 kV capacity must be built.
- PECO considered expanding the Bala Substation, but there is insufficient land available to accommodate the necessary substation expansion. PECO considered expanding the Parrish or Llanerch Substations to serve the Upland load, but given the distance of those substations from the load to be served (2.2 and 3.4 miles, respectively), and the need to build lengthy 13 kV distribution circuits to serve the local Upland area load if and when additional capacity were to be added to Parrish or Llanerch, best utility practice is to seek a more local solution to serve the load.
- PECO considered building new 13 kV distribution capacity at the site of the existing Overbrook Substation, but the site is not large enough to

simultaneously accommodate existing operations of the Overbrook Substation *and* construction of a new Substation on that same site. It is thus not feasible to use the existing Overbrook site for expanded 13 kV utility operations until after a new source substation has been constructed and the Overbrook facilities have been decommissioned.

- Consequently, PECO concluded that it needs to construct a new Substation to serve at 13 kV, located near the load center but not located directly at the Overbrook site. The Upland Substation meets those criteria.

5. Please provide an engineering assessment of the project including information to address the following:

- a) Provide an analysis of minimum conductor clearances and conductor thermal ratings.**

Conductor clearances for the project meet or exceed the requirements of PECO’s Engineering Practice EPP-2090 OHT Design Clearances. The clearance requirement in EPP-2090 exceeds the requirements of NESC-2017.

The proposed new conductor will be 1590 kcmil 54/19 ACSR “Falcon” conductor. One (1) conductor will be used per phase. The PECO rating methodology AM-PE-4022_R0001 and associated PJM Bare Overhead Conductor Rating-2010 are based on the methodology of the “IEEE-738 Standard for Calculating the Current Temperature Relationship of Bare Overhead Conductors” with the following input parameters:

	<u>Normal Rating</u>	<u>Emergency Rating</u>
Wind speed (fps)	0	2.53
Wind angle	90	90
Latitude	40	40
Amb Temp (Sum/Wint)	35/10	35/10
Elev above sea level (ft)	200	200
Atmosphere	Industrial	Industrial
Sun Time (date@time)	6/10@14:00	6/10@14:00
Emissivity	0.7	0.7
Absorptivity	0.9	0.9
Allowable Conductor Temp.	140°C (284°F)	140°C (284°F)
Conductor Rating	1,835 Amps	2,222 Amps

b) Provide engineering design criteria and parameters such as vertical clearance to ground.

NESC Section 232 required the following vertical clearances for 230 kV facilities:

- Ground, Farmland 22.4'
- Roadways, Driveways, Parking Lots 22.4'
- Railroads, above top or rail 30.4'
- Area not accessible by vehicles 18.4'

For new construction (including this project), PECO designs their facilities to meet the NESC rules plus a minimum of an additional 3 feet of additional vertical clearance. Similarly, for the NESC horizontal clearance, PECO adds a minimum of an additional 2 feet of horizontal clearance.

c) Provide an explanation as to how the project will be in compliance with the current NESC and, where applicable, information on how the applicant's design specifications and safety rules may exceed NESC suggested standards for transmission lines.

As discussed above, all design clearances are based upon PECO's Engineering Practice EPP-2090 OHT Design Clearances. The clearance requirements in EPP-2090 exceed the requirements of NESC-2017.

The easement width for the proposed project is governed by the conductor displacement due to wind with the assumption that buildings can be erected on the property line regardless of local municipality building setback requirements. The proposed easement width will be 100' for the new line, with the proposed structures located on the centerline of the easement. The proposed easement width exceeds the requirements of the NESC and PECO's Engineering Practice EPP-2090 "OHT Design Clearances" and will provide access for line maintenance, repair, and vegetation management.

6. If applicable, provide the current height of the structures expected to be replaced, the proposed height of the new structures to be installed and the height of the structures to remain in place. Provide the number of structures proposed vs. current number of structures. Provide the location and footprint of the current structures compared to the proposed structures.

One existing structure of approximately 133' height will be removed. It will be replaced with one new structure of approximately 135' height. The remaining seven (7) new structures will range in height from a minimum height of 125' up to a maximum height of 165' where the 220-20 Extension will cross an existing automobile bridge.

The location and footprint of the proposed structures are graphically illustrated in PECO's Plan and Profile, which is attached as PECO Attachment Q6.

- 7. If applicable, state if any properties/easements that did not previously have structures will now have a structure. State if the easement agreement allows for structures on these properties that did not previously have a structure. Explain the Company's process of informing the property owners that a structure will be placed on the easement to their property.**

The eight new structures will be located on SEPTA property. PECO has obtained a Right of Entry permit for this work. See PECO Attachment Q7. Once the exploratory work permitted by the Right of Entry permit is complete, PECO will acquire the needed easement from SEPTA.

- 8. If applicable, what is the PJM project ID No. for the proposed project? Has this project been submitted to the PJM Transmission Expansion Advisory Committee (TEAC)? If so, please provide a description of the project as submitted to the TEAC. If this project is part of a larger project, summarize the larger project of which the LON is a part. Please describe how this project may mitigate potential planning criteria violations.**

This project was submitted to PJM as part of PJM's new process to review and approve Supplemental Projects. PECO requested approval build a new 230/13 kV Substation and to construct 230kV taps from the existing 220-20 line that connects its Parrish and Bala Cynwyd Substations so as to allow interconnection of the new Upland Substation with the transmission system. PJM approved the Supplemental project on June 7, 2019. The PJM project number for the overall project to construct the Upland Substation and connect it to the transmission grid is PJM Number S1826. The sub-project to construct the 220-20 Extension is PJM Number S1826.2. Because this is a Supplemental Project to meet increased load (designated PJM driver is "Customer Service"), it does not implicate or mitigate potential planning criteria violations.

- 9. Provide a breakdown of project costs. Please explain who will own, finance and build the proposed project.**

PECO expects the entire project, including the Upland Substation the 220-20 Extension, to cost approximately \$69 million to construct.

The 220-20 Extension is expected to cost approximately \$7.1 million, which is an incorporated part of the overall project costs. Material costs for the 220-20 Extension for the eight poles, appurtenances, and conductors, is expected to be less than \$1 million. The dominant cost of construction will be for labor. Construction will occur on active rail lines, and PECO thus expects that it will only be allowed to perform construction

work at night, and only for a limited time each night; these factors contribute to higher construction costs.

PECO will own, finance, and build the proposed project.

10. If available at the time the LON is filed, please provide a copy of any comments received from state or local officials.

On March 27, 2018, the City of Philadelphia's Department of License and Inspections issued a Zoning/Use Permit for PECO to construct the Upland Substation. A copy of the Permit is attached as PECO Attachment Q10. PECO has not received any comments from the City with respect to the 220-20 Extension.

11. Please provide the anticipated construction commencement date and the proposed in-service date of the project.

PECO received approval from PJM to proceed with this project on June 7, 2019. PECO will begin work on the substation itself, under the zoning approvals received from the City of Philadelphia, in July 2019. For the 220-20 Extension, PECO anticipates beginning vegetation management work no later than November 1, 2019 and to begin work on tower foundations in December 2019.

The proposed in-service date is December 21, 2021. However, PECO expects the City of Philadelphia to conduct road work on the 59th Street Bridge in 2021. To coordinate schedules with the City work and avoid conflicts with the City work, PECO plans to complete construction work on the 220-20 Extension by September 1, 2021.

12. Provide evidence to show that the size, character, design and configuration of the proposed HV line will not substantially alter its existing right-of-way, if applicable. Please identify all alterations necessary to the existing right-of-way.

The project involves construction of a transmission line on an existing electrified railroad right-of-way. The existing corridor contains a catenary system that supports 138 kV Amtrak and SEPTA's 138kV transmission, the railroad's electric traction power system, and multiple active rail tracks. *See* PECO Attachment Q6.

In addition, PECO conducted an EMF study to determine EMF levels associated with the new transmission line. At the L90 loading level (loads will be at or below the L90 level for 90% of operations), EMF levels at edge of PECO's 100 foot right-of-way will be 22 milligauss ("mG"). However, because the PECO right-of-way will be embedded within an active railroad corridor, a fence will not allow the public to approach the edge of the PECO right-of-way. At that fence line that is the limit of public access, the magnetic

field levels will be 0.8 mG. At the nearest residence, magnetic fields from the transmission line will be 0.2 mG.

The full EMF study is attached as PECO Attachment Q12.

13. A statement identifying the filing date on which the filing of the LON was or is to be made and a statement as found in 57.72(d)(iv) regarding the Commission's review.

PECO's Letter of Notification filing is being made August 29, 2019. PECO understands that, pursuant to 57.72(d)(iv), the Commission will review and, by order, approve or disapprove a letter of notification. If the Commission approves a letter of notification, the HV line shall be located and constructed without the application process set forth in this subchapter. If the Commission does not approve the letter of notification, its order shall direct the applicant to comply with the application process set forth in this subchapter.

14. Provide the number of streams and/or wetlands that will be crossed. Describe how these will be addressed. Will any endangered or threatened species be affected? If a PNDI is required, please provide the results.

None. PECO retained AECOM to review this suite of issues for the 220-20 Extension. AECOM determined that the project does not cross any mapped wetlands or waterway features, and that Pennsylvania Natural Diversity Inventory ("PNDI") records indicate no known impacts to threatened or endangered species. The PNDI receipt, with agency responses (No Further Review Required) is attached as PECO Attachment Q14.

15. Indicate the number of circuits on the proposed line. Note that if only one is being installed at this time, another LON may be needed when the second circuit is added.

See PECO Answer to Q3. The 220-20 Extension will be comprised of two tap circuits that will tie into the 220-20 line to create two (2) new line segments. The new circuits will be designated as:

- 220-20 from Parrish Substation to Upland Substation, and
- 220-72 from Upland Substation to Bala Substation.

Both circuits will be constructed as part of this project.

16. Please provide a copy of the certificate of service.

See PECO Attachment Q16.

17. Provide the specific NERC or other regulatory standard criteria which is driving the proposed project (e.g. TPL-004-1, P.2).

None. This is a Supplemental Project driven by local load, not a Reliability Transmission Enhancement Project.

18. Explain why the NERC, or other regulatory standard, violation, is now an issue where it wasn't previously.

Not applicable. See PECO Answer to Q17.

19. Explain whether the proposed project meets NERC or PJM minimum planning criteria or whether it exceeds these criteria to meet transmission owner planning criteria. If the project exceeds either of these minimum planning criteria to meet transmission owner criteria, provide a detailed explanation as to why.

Not applicable. See PECO Answer to Q17.

20. Explain whether load growth in the area has led to any change in circumstances as it relates to the need for the proposed project. If so, quantify these load growth impacts.

See PECO Answer to #4. The project need is primarily driven by the planned retirement of the Overbrook Substation. With that said, all facilities in the area are loaded at above 95% capacity.

21. State the age and anticipated service life and describe the overall health of the transmission line facilities to be replaced. Additionally, include information related to conditions which may have accelerated aging or led to premature failure of the facilities (e.g. corrosive environment).

Not applicable. The 220-20 Extension is not replacing existing facilities.

However, see PECO Answer to #4 for a discussion of the role of age in replacing the existing 13-4 kV Overbrook Substation.

- 22. Provide information regarding any unplanned outages on the subject transmission facilities over the previous 5 years (or more), including the duration, cause, whether service to customers was interrupted by outages on the subject transmission line(s), and if so, the number and type of customers which were impacted. Additionally, explain whether the proposed project would mitigate the effects of these outages.**

Not applicable.

- 23. Explain whether alternative solutions were considered. If so, provide a brief description of the alternative(s) and provide a detailed explanation of why the chosen solution was selected.**

Yes. As noted previously (see PECO Answers to Q 4), with respect to the Upland Substation, PECO evaluated the potential to expand existing substation sites in the area, including the Overbrook site. It was not able to do so due to physical limitations at the sites or because of distance between those sites and the local load to be served.

As to the 220-20 Extension, PECO evaluated whether underground construction for the transmission facilities was feasible and concluded that it was not. A copy of that analysis is attached as PECO Attachment Q23.

- 24. Explain whether any of the loads served by the transmission facilities to be replaced are considered to be critical customers.**

Not applicable, because PECO is not replacing existing transmission facilities. PECO does note, however, that the 220-20 Extension will provide service to the Upland Substation, which in turn will be the primary source of electric utility distribution service for the Overbrook area of West Philadelphia, including residences, businesses, health care facilities, schools, and government support services.

- 25. Quantify the anticipated increase in reliability in terms of customer average interruption duration index, system average interruption duration index, and system average interruption frequency index.**

Not applicable. This project is driven by the planned retirement of the Overbrook Substation, not by reliability issues.

- 26. If a transmission owner customer requested the proposed project and is not paying the entire cost, explain why the costs will be assumed by other transmission owner customers.**

Not applicable.

27. Provide a detailed description of the methodology used to determine that the subject transmission facilities have reached the end of their useful service life. Additionally, provide any survival curves or utility specific data used in this determination.

Not applicable.

PECO 220-20 Extension Letter of Notification

PECO Attachment Q3

Aerial Photograph Showing Line Route

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AUG 29 2019

**PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU**

Proposed Transmission ROW (on SEPTA & AMTRAK)



PECO 220-20 Extension Letter of Notification

PECO Attachment Q6

PECO Plan and Profile

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AUG 29 2019

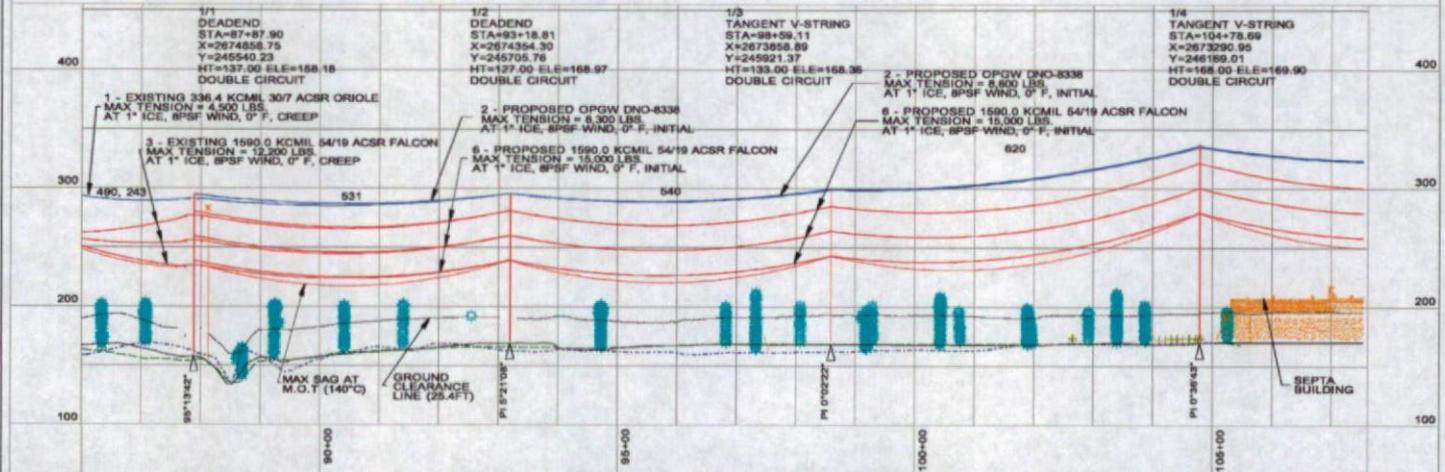
**PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU**



LEGEND

- PROPOSED POLE LOCATION
- EXISTING POLE
- BRIDGE SUPERSTRUCTURE
- LIMIT POLELINE GABOT
- DISTRIBUTION & RAILROAD POLE
- EXISTING POLE TO BE REMOVED
- 100 FT. PROPOSED EASEMENT WIDTH
- APPROXIMATE SEPTA PROPERTY LINE

90.0 FT. HORIZ. SCALE
 30.0 FT. VERT. SCALE



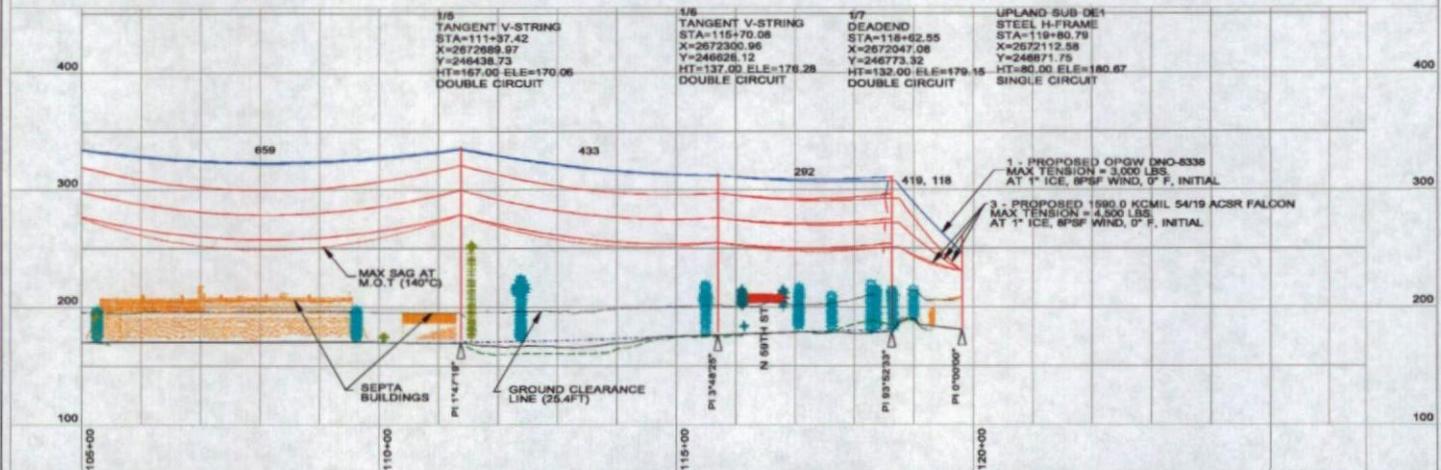
<p>NOTES:</p> <ol style="list-style-type: none"> 540 SHOW AT 60° FINAL (ARISE OVERSIGHT NOTES) 25.4 FT CLEARANCE LINE DISPLAYED FOR CONDUCTOR (25MM) 	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> <th>APPV</th> <th>DESCRIPTION</th> </tr> <tr> <td>1</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>2</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>3</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>4</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>5</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>6</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>7</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>8</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>9</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> <tr> <td>10</td> <td>08/13/2013</td> <td>JIA</td> <td>JIA</td> <td>JIA</td> <td>ISSUED FOR REVIEW</td> </tr> </table>	NO.	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LEGEND

- PROPOSED POLE LOCATION
- BRIDGE DECK
- BRIDGE SUPERSTRUCTURE
- LIGHT POLYMER CABLE
- DISTRIBUTION & BARRAGE POLE
- EXISTING POLE TO BE REMOVED
- 100 FT. PROPOSED EASEMENT WIDTH
- APPROXIMATE SEPTA PROPERTY LINE

60.0 FT HORIZ. SCALE
30.0 FT VERT. SCALE



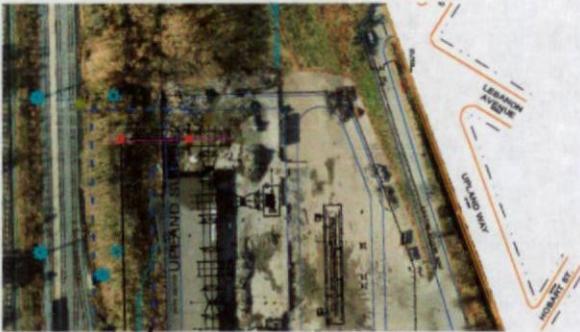
NO.	DESCRIPTION	DATE	BY	CHKD	APP'D
1	ISSUED FOR PERMIT	08/15/2019	JMM	JMM	JMM
2	REVISED FOR CONSTRUCTION	08/15/2019	JMM	JMM	JMM
3	REVISED FOR CONSTRUCTION	08/15/2019	JMM	JMM	JMM
4	REVISED FOR CONSTRUCTION	08/15/2019	JMM	JMM	JMM

NOTES:

- SAG SHOWN AT 60° PING LINE PER STANDARD PRACTICE
- 25.4-FT CLEARANCE LINE DISPLAYED FOR CONDUCTOR (2000)

PROJECT INFORMATION:

PROJECT: SEPTA RAIL LINE TO UPLAND SUB
 DRAWING: PLAN AND PROFILE
 DATE: 08/15/2019
 SCALE: AS SHOWN

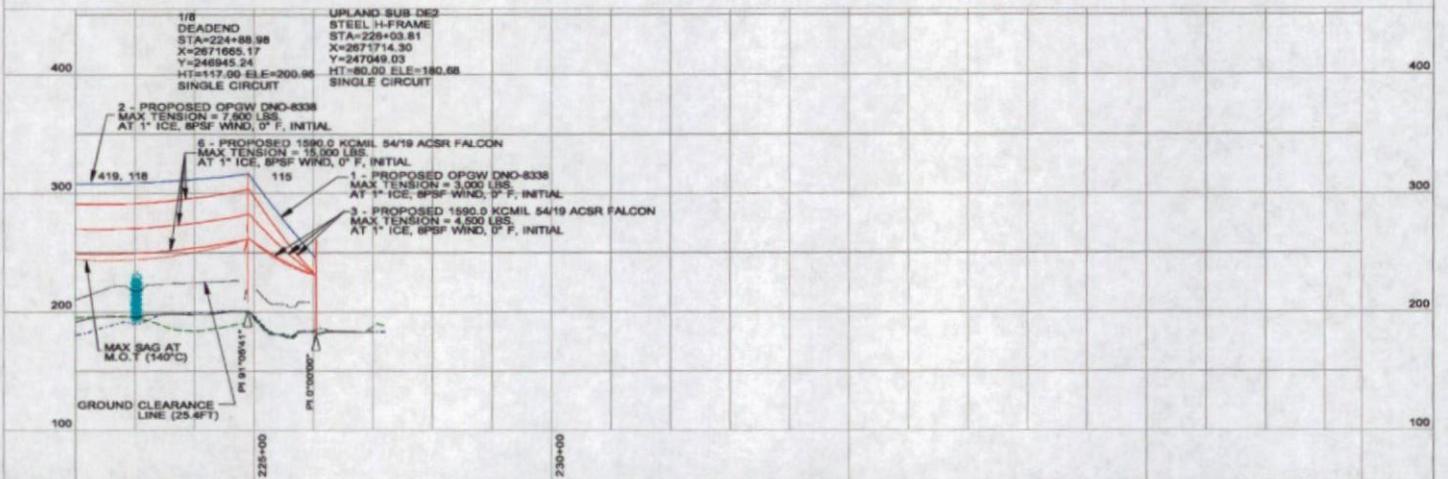


100 FT. PROPOSED EASEMENT WIDTH

LEGEND

- PROPOSED POLE LOCATION
- ⊕ WINDIE SIDE
- ⊕ WINDIE SUPERSTRUCTURE
- ⊕ LIGHT POLLING OBJECT
- DISTRIBUTION & RAILROAD POLE
- ⊕ EXISTING POLE TO BE REMOVED
- ⊕ 100 FT. PROPOSED EASEMENT WIDTH
- APPROPRIATE DEPTA PROPERTY LINE

90.0 FT HORIZ SCALE
30.0 FT VERT. SCALE



<p>NOTES</p> <p>1. AND SHOWN AT 80% FINAL LINES OVERSHOOT NOTED.</p> <p>2. 25-4FT CLEARANCE LINE DISPLAYED FOR CONSTRUCTION (25MFO)</p>		<table border="1"> <tr> <th>REV</th> <th>REVISION</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> <th>APP'D</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	REV	REVISION	DATE	BY	CHKD	APP'D							<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> <th>APP'D</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	BY	CHKD	APP'D						<p>PLS ENERGY COMPANY</p> <p>229-20 LINE TO UPLAND SUB</p> <p>PLAN AND PROFILE</p>	<p>JOB NUMBER: 229-20</p> <p>ISSUED: 08/20/20</p> <p>DRAWING NUMBER: 229-20-01</p> <p>SCALE: 1" = 30.00'</p> <p>DATE: 08/20/20</p> <p>PROJECT: 229-20 LINE TO UPLAND SUB</p> <p>REFERENCE: 229-20-01</p>
REV	REVISION	DATE	BY	CHKD	APP'D																						
NO.	DATE	BY	CHKD	APP'D																							

PECO 220-20 Extension Letter of Notification

PECO Attachment Q7

SEPTA Right of Entry Permit

RECEIVED

AUG 29 2019

**PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU**

ROE PERMIT

RIGHT-OF-ENTRY ("ROE") PERMIT

E.M.& C. Division File No.:	6234	E. M.&C. Permit No.:	
Real Est. Registry No.:	5439	Off of GC CD No.:	4832
"Designee" of Chief Engineer:	Enjoli Edwards	Phone #:	215-580-7091
E-mail Address of Designee:	eedwards@septa.org		
Permit Commencement Date:	December 21, 2018	Permit Expiration Date:	December 31, 2019
Payment Address:	SEPTA - Accounts Payable Dept. P.O. Box 7780-4044 Philadelphia, PA 19182-4044		

WITH THIS
**RIGHT-OF-ENTRY PERMIT
FOR EXPLORATORY DIGGING AND BRUSH CLEARING
THROUGH SEPTA PROPERTY AT OVERBROOK YARD
PHILADELPHIA, PENNSYLVANIA**

And subject to the terms and conditions set forth in the corresponding ROE Permit Agreement, SEPTA grants to PECO Energy Company, as the Permittee, the right to access and enter upon the following SEPTA properties in order to perform the investigation of multiple locations for a future transmission line route and new substation in Philadelphia, Pennsylvania.

SEPTA Premises: The areas in and around the Overbrook Yard at 6110 Woodbine Avenue and the right-of-way for the Yard Rail within Overbrook Yard in Philadelphia, Pennsylvania.

Permittee: PECO Energy Company
2301 Market Street
Philadelphia, PA 19103

Tax Identification No.: 23-0970240

Permittee Representative: Thomas Santacroce
Telephone: 215-841-5388
E-mail Address: thomas.santacroce@exeloncorp.com

ROE PERMIT

ROE PERMIT AGREEMENT **FOR EXPLORATORY DIGGING AND BRUSH CLEARING** **THROUGH SEPTA PROPERTY AT OVERBROOK YARD,** **PHILADELPHIA, PENNSYLVANIA**

SEPTA REGISTRY NO. 5439
CORPORATE DEPARTMENT NO. 4832

This ROE Permit Agreement (herein "**Agreement**"), by and between the Southeastern Pennsylvania Transportation Authority ("**SEPTA**") and PECO Energy Company ("**Permittee**" and also "**PECO**"), is made effective the 21st day of December, 2018 ("**Effective Date**"). This Agreement grants to Permittee a ROE Permit ("**ROE Permit**" or simply "**Permit**" herein), subject to the terms and conditions set forth herein, to access and enter upon the following SEPTA properties (the "**Premises**") in order to perform the investigation of multiple locations for a future transmission line route and new substation (the "**Work**") in Philadelphia, Pennsylvania.

PECO is engaging a contractor or contractors to physically perform the Work, however, PECO has decided to be the Permittee under this ROE Permit and ROE Permit Agreement because it is PECO's intention to be responsible for the actions and performance of its contractor(s), and to procure the insurance coverages for the Work.

The Premises consist of the areas in and around the Overbrook Yard at 6110 Woodbine Avenue and the right-of-way for the Yard Rail within Overbrook Yard in Philadelphia, Pennsylvania.

As used herein, and as applicable by the context, the term "Permittee" shall mean Permittee's legal entity, directors, officers, and employees, as well as, its agents, contractors, subcontractors, and representatives. As used herein, and as applicable by the context, a reference to "SEPTA" shall mean SEPTA's legal entity, board members, directors, officers, and employees. SEPTA and Permittee are each individually a "**Party**" and collectively the "**Parties**", to this Agreement.

BACKGROUND

WHEREAS, on or about August 11, 1992, by deed recorded in the Office of the Recorder of Deeds of Philadelphia County on September 11, 1992 in Deed Book D0152, Pages 555 to 561, SEPTA acquired the real property at 6110 Woodbine Avenue in the City of Philadelphia known as "**Overbrook Yard**" from the National Railroad Passenger Corporation (Amtrak);

WHEREAS, SEPTA operates the rail which runs through Overbrook Yard (the "**Yard Rail**") and the spatial area that surrounds the rail line is known as a "right-of way" (herein "**ROW**"), which is also owned and controlled by SEPTA;

WHEREAS, Permittee is undertaking a project to investigate multiple locations for a future transmission line through Overbrook Yard and a new substation West of Overbrook Yard on the ROW that includes exploratory digging and brush clearing (the "**Work**");

ROE PERMIT

WHEREAS, the Work will include the area that comprises the Premises;

WHEREAS, in order to perform the Work, Permittee will have to work near, around and on the Premises, which is involved in active rail operations;

WHEREAS, Permittee has requested that SEPTA grant Permittee the right to access the Premises location identified above to perform the Work;

WHEREAS, SEPTA is willing to grant Permittee the right to access and use the Premises as long as Permittee complies with the terms and conditions of this Agreement; and

NOW THEREFORE, Permittee and SEPTA, agreeing to be legally bound by this Agreement, and for good and valuable consideration by each, the receipt and sufficiency of which is acknowledged, do hereby agree to the following:

1. Work Scope. The Work permitted to be performed by Permittee on the Premises under this ROE Permit and subject to this Agreement is limited to the activities more fully described in the “**Work Scope**” presented in Attachment 1, which is attached hereto and incorporated into this Agreement.
2. Term of the ROE Permit. The term of the ROE Permit (“**Permit Term**”) granted by and under this Agreement, shall be from December 21, 2018 (the “**Commencement Date**”) through December 31, 2019 (the “**Expiration Date**”); however Permittee may not commence any Work on the Premises, even on or after the Commencement Date, until all “**Pre-Conditions**” presented herein have been completed and/or satisfied, and Designee has returned to Permittee, and Permittee has received, a copy of the one-page document that constitutes the ROE Permit and Notice to Proceed.
3. As Pre-Conditions to Permittee’s entry upon the Premises, and regardless of the specified Commencement Date, the following shall be completed by Permittee to SEPTA’s satisfaction prior to the commencement of any Work:
 - A. Permittee shall secure, maintain and provide to SEPTA evidence of insurance coverages as described in Attachment 2, which is attached hereto and incorporated herein. Permittee commits to maintain such insurances for the duration of the Permit Term.
 - B. Permittee shall provide to the SEPTA Designee all back-up documentation, plans, diagrams, pictures, descriptive documents, evidence of other approvals, etc. pertaining to the Work, as SEPTA may find necessary or useful in understanding and assessing the Work for granting the ROE Permit. Permittee understands that SEPTA cannot grant the ROE Permit until Permittee furnishes all relevant information requested by SEPTA.
 - C. Permittee shall pay to SEPTA a \$750.00 Permit Application Fee, which covers the processing and administration of the application and the ROE Permit. The ROE

ROE PERMIT

Permit Application Fee does not cover expenses SEPTA incurs for engineering review, flagging services or other field support, provided for Permittee's Work.

- D. Permittee acknowledges and commits that it will compensate SEPTA for engineering review services at the rate of \$125.00 per hour and required field support, including flagging services, at the rate of \$85.00 per hour, for all such services that SEPTA performs in support of Permittee's Work.
- E. Permittee anticipates the need to enter into, or use equipment that could foul, the area that is 15 feet or less from the centerline of the trackbed (which area is deemed to be the "Right-of-Way"; herein "ROW"). Permittee shall require and ensure that all of its employees, agents, contractors, subcontractors, representatives, and other invitees that may come within the ROW shall have completed SEPTA's Railway Workers Protection Safety Class within the 12 months preceding the Commencement Date.
- F. If Permittee intends to use a drone to perform any of the Work, Permittee must notify SEPTA prior to the Commence Date. Further, Permittee agrees that any such drone operation shall be performed by a FAA-licensed staff drone pilot and shall remain within SEPTA's air rights unless Permittee has permission for another area.

4. Permittee acknowledges and commits to the following:

- A. Permittee is fully responsible for its employees, contractors, subcontractors and agents, if any, and shall take all steps necessary to ensure that its employees, contractors, subcontractors and agents comply with the terms and condition of the Permit and this Agreement. Permittee agrees that its access to, entry upon and use of the Premises is done at Permittee's own risk.
- B. Permittee shall perform all Work in a manner that is lawful, safe, and in full and precise compliance with all applicable law, statutes, regulations, ordinances and rules. Permittee shall ensure that proper emergency medical services are readily available or accessible during the performance of the Work. Permittee will take all appropriate safety measures to protect and ensure the safety of Permittee, SEPTA, and the public in general.
- C. *All activity and work performed by Permittee shall be strictly in accordance with the Work Scope, and shall be conducted in a manner that is in compliance with SEPTA's safety rules, regulations, bulletins and notices, which apply to or are relevant to SEPTA and the Premises. The Designee of the Chief Engineer shall provide to Permittee the relevant SEPTA safety rules, and notices.*
- D. Permittee shall not perform any activities outside of the Work Scope, nor access SEPTA property outside of the Premises, nor access the Premises outside of the Permit Term. Permittee can only continue to perform Work after the Expiration Date upon receiving SEPTA's written approval of an extension of the Permit Term.

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- E. Permittee shall not allow the Work to disrupt or interfere with SEPTA's operations, property or facilities. Permittee and its invitees shall not enter or access the ROW unless Permittee has notified SEPTA and is in compliance with Section 3.D above.
- F. SEPTA is not and shall not be responsible for any costs that Permittee incurs in connection with the Work, the Project or this Agreement.
- G. Permittee will reimburse SEPTA for the costs that SEPTA incurs in connection with this Agreement and the Work, and acknowledges that such costs are not included in the ROE Permit application fee.
- H. Permittee acknowledges and agrees that SEPTA's Chief Engineer has determined that flagging services are needed during some or all of the Work, and Permittee further agrees that it will reimburse SEPTA for such flagging services at the rate specified in Section 3.D above. Permittee further acknowledges and agrees that it will pay SEPTA for engineering review and field support services performed by SEPTA in support of Permittee's Work, in accordance with the rates identified in Section 3.D above. Permittee agrees to pay all invoices for SEPTA services within 30 days of receipt of the invoice.
- I. Permittee will not perform work within the 15 foot ROW perimeter without the railway protections, as determined by SEPTA, in place. Permittee will not leave any material or equipment unattended within the 15-foot ROW perimeter.
- J. Immediately upon the completion of the Work, Permittee must vacate and restore the Premises to its condition immediately preceding the commencement of Permittees' work or to a condition satisfactory to SEPTA.

5. Limitation and Revocations.

- A. Under no circumstances shall this Agreement be construed as a grant of any right, title or interest of any kind in the Premises or in any other property of SEPTA.
- B. If Permittee violates any term or condition of this Agreement, or breaches any commitment memorialized herein, SEPTA has the right to revoke the ROE Permit and Permittee must cease its access and use of the Premises.

6. Environmental.

- A. For the purpose of this Section 6, the term "Work Site" shall mean the area of property on which the Work hereunder is to be performed, as well as any property that is used for staging or access regarding the Work. The delineation of the Work Site will include the SEPTA Property, but may also go beyond the SEPTA Property and include other property that Permittee has a right to access/use for the Work and that is adjacent to and nearby the SEPTA Property ("**Others' Property**").

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- B. Permittee hereby discloses that the Work may include soil disturbance, removal and testing, and that: (1) the soils within the area of the Work Site have been tested and classified as "clean fill above the water table"; (2) no further disclosure or testing of such soils is required; and (3) Permittee shall excavate, stockpile, use and/or dispose of such soils in accordance with applicable state and federal laws, statutes, regulations and ordinances.
- C. Permittee must not knowingly or negligently use, generate, release, manufacture, refine, produce, process, store, or dispose of any hazardous substance on the SEPTA Property, or transport to, from, or across SEPTA property any hazardous substance, except as specifically set forth in the Agreement or as approved in writing by SEPTA.
- D. In the event Permittee causes or creates any Environmental Dangers (either purposefully or accidentally) on the Work Site ("Created Environmental Danger"), Permittee shall immediately notify SEPTA, and Permittee shall be responsible and liable for the Created Environmental Dangers, without regard for the extent thereof, and for the costs thereof, that are caused by, resulting from, or arising out of the Work. In the event of Created Environmental Dangers, Permittee shall be responsible for and liable for, and shall release, hold harmless and indemnify SEPTA for, any loss, claims, lawsuits, costs and reasonable legal expenses, fees, penalties and all other associated costs and expenses, as well as any liabilities due to personal injury of third parties or damage to property of third parties, resulting from, arising out of, or related to, Created Environmental Dangers, without regard to the extent thereof.

7. Liability. Permittee shall be liable to SEPTA for any damage, what so ever, to SEPTA property, and any and all injuries or illness to any person, when caused by, resulting from, or arising out of Permittee's access or use of the Premises or its performance of the Work.

In the event that a claim or action is brought against SEPTA, by anyone, as a result of or related to Permittee's access or use of the Premises, or its performance of the Work, except to the extent the action directly results from the sole negligence of SEPTA, Permittee will release and hold harmless, and will indemnify and defend SEPTA for any and all loss, liability, damage, fees, fines, penalties and expenses, including reasonable attorney's fees, associated with bodily injury, sickness, death, property damage, or any other harm. Permittee shall not bring any claim against SEPTA for damage or injury, unless such damage or injury is directly the result of the sole negligence of SEPTA. Nothing contained in or implied by this ROE Permit shall be deemed a waiver of any immunity, exemption, protection or defense available to SEPTA under law or statute.

8. Governing Law and Jurisdiction. This Agreement is governed by and is to be interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania. All matters, disputes, claims, litigation, or any other proceedings, in connection with this Agreement, shall be brought and resolved, except for enforcement, in the state or federal courts located in the City of Philadelphia, Pennsylvania, irrespective of any procedural rules or laws related to venue and *forum non conveniens*. The Parties expressly consent to such jurisdiction and venue, and waive any

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objection to such jurisdiction or venue and all claims of inconvenience or lack of personal jurisdiction. The Parties represent and acknowledge that their position on jurisdiction and venue described above is reasonable and has been freely and voluntarily made.

9. Severability. If any provision of the Agreement is found to be unlawful, invalid or unenforceable, that provision is deemed deleted without prejudice to the lawfulness, validity and enforceability of the remainder of the Agreement.

10. Counterparts. This Agreement may be executed in two counterparts, each of which shall be deemed an original, but both of which together shall constitute one and the same instrument. A true and accurate facsimile or email pdf file of the signature page shall be deemed an original.

[Remainder of Page Intentionally Left Blank]

ROE PERMIT

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized officials, with the intention that it be effective upon the Execution Date stated above.

PECO, Permittee

By: [Signature]

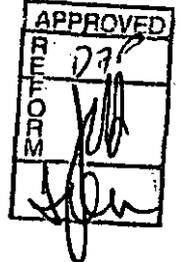
Name: Joseph E Hoffman

Title: Manager, Real Estate & Facilities

Date: 1-23-2019

Attest: [Signature]

Name: THOMAS SANTACROCE



Southeastern Pennsylvania
Transportation Authority, SEPTA

By: [Signature]
Jeffrey D. Queppel
General Manager, SEPTA

Attest: [Signature]
Carol R. Looby
Board Secretary

Date: 2/13/19

Approved as to Form:

By: [Signature]
Office of General Counsel, SEPTA

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ATTACHMENT 1
ROE APPLICATION

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SECRETARY'S BUREAU

SEPTA - RIGHT OF ENTRY APPLICATION FORM

APPLICANT INFORMATION

The Application fee of \$750 is enclosed (mail-in applications only). Check # 0010101811

Legal Name of Applicant (party to agreement) PECO (SPO/SCR), ASP/UNDH (CLEARING CONTRACT) & AECOM (GEOTECH CONTRACT)

Tax ID # Z3-0970240

Mailing Address:

Street 2301 MARKET STREET
 City PHILADELPHIA
 State PA Zip 19103

Name of Contact TOM SANTACROCE

Title REAL ESTATE SPECIALIST

Phone # (215) 841-5388 Fax # ()

E-Mail Address thomas.santacroce@astorcorp.com

Billing Address:

Street SAME
 City _____
 State _____ Zip _____

Billing Contact _____

Title _____

Phone # () Fax # ()

E-Mail Address _____

PROPERTY INFORMATION

Location of property (provide all applicable information)

Street Address: Overbrook Yard

Railroad/Transit Line Name: Paoli/Thorndale Line

Milepost: between 4.06 and 4.77 Nearest Station Overbrook

Sketch of Property: attach a sketch of the worksite that depicts the SEPTA property, adjacent streets, buildings, facilities and utilities in close to proximity to the work.

Duration of occupancy From 12 / 21 / 2018 To 12 / 31 / 2019

Work to be performed is:

Within _____ Ft of the tracks. (If within 25ft of center of the rail, a flagman is required at your expense.)

or At a location that may impede SEPTA's use of the facility. Yes _____ No If yes, attach complete description of potential conflict.

Applicant's intended purpose for this right-of-entry (be specific): Attach description

Were services to be performed requested by SEPTA? Yes No

Requested by whom? PECO

Is the intended purpose of this work related to environmental sampling environmental investigation environmental remediation

Does the Applicant intend to use, disturb, transport or remove Hazardous Material? Yes No

If the above question answered yes, (i) Identify the Hazardous Substances, (ii) Explain the work associated therewith and (iii) Identify the Governmental agencies with which the applicant has had contact regarding the Hazardous Substance or proposed environmental test or studies (Attach answer)

THE Work associated with this application CANNOT place a permanent facility or structure on SEPTA property such as, but not limited to, an underground pipe, overhead wire or support structure WITHOUT a separate easement agreement and RIGHT of WAY application.

I/We understand that submission of this application does not authorize occupation of or entry on the property. Exact fees and insurance requirements will be forwarded after the application has been reviewed and approved by SEPTA.

Signed Thomas Santacroce

Date 09 / 21 / 18

SEPTA Use Only

SEPTA File Number: 6234

SEPTA Permit number: _____

Application Reviewed by: E. Edwards

Permit Authorized by: _____

Application Approval Date: 12 / 21 / 2018

Permit Authorization Date: _____

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PECO

Exploratory Dig/Soil Sampling

SEPTA – Overbrook Yard on Paoli/Thorndale Line

Project Scope

PECO will be investigating multiple locations within SEPTA's Overbrook Yard for a future PECO Transmission Line route through Overbrook Yard to a new PECO Substation just west of SEPTA Overbrook Yard; 59th Street Bridge. PECO has hired Asplundh to perform brush clearing; and AECOM to perform exploratory digs.

Description of Work:

AECOM will perform 8 exploratory digs within SEPTA Overbrook Yard and along the RRD ROW.



Street Name:	Overbrook Yard
Location:	Overbrook Yard
SEPTA Line and MP:	Paoli/Thorndale, MP 4.06-4.77
No. of Track(s):	N/A
Day(s) Required:	14 Days
Manpower:	Assume up to 3 personnel on project per day
Emergency Contact Name (AECOM):	David Whelihan
Emergency Contact No (AECOM):	215-285-1860
Emergency Contact Name (PECO):	John Pappas
Emergency Contact No (PECO):	610-659-6032
Additional Contact Info:	Daniel McDonald (AECOM) 610.721.6016
Notes:	
Equipment in SEPTA ROW:	YES
Fouling:	YES, Yard Rail
Safety Training Required:	YES
SEPTA Flagman:	YES
Operational Impact:	Tracks OOS to be phased per SEPTA guidelines
SEPTA protection:	Restricted Outages. SEPTA protection and escort required. Reporting location will be determined by SEPTA
Site Specific Work Plan:	Submitted

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ATTACHMENT 2
INSURANCE REQUIREMENTS

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ATTACHMENT 2 INSURANCE REQUIREMENTS

Permittee must ensure that appropriate insurances are in place to cover SEPTA, the Work, the Premises during the Work, and all of Permittee's employees, agents, contractors, subcontractors, representatives, and other invitees, for the duration of the Permit Term.

At minimum, Permittee must have the following insurance coverages with the stated limits, and maintain such coverages for the duration of the Permit Term:

- 1) Commercial General Liability Insurance.
\$2,000,000 (bodily injury and property damage) per occurrence and not less than \$6,000,000 general aggregate. Must have CG2417 endorsement or equivalent.
- 2) Commercial Automobile Liability Insurance.
\$2,000,000 combined single limit per occurrence.
- 3) Pollution Liability.
\$2,000,000 combined single limit per occurrence
- 4) Railroad protective liability insurance.
\$2,000,000 combined single limit (bodily injury and property damage) per occurrence and not less than \$6,000,000 annual aggregate.
- 4) Workers Compensation.
Not less than \$1,000,000 per accident.

* * * *

SEPTA must be provided with true copies of Declaration Pages, and upon request, copies of policies of insurance.

SEPTA must be listed as the additional insured on all applicable liability coverages. Each policy (and Declaration Page therefor) shall state that the insurance provided to the additional insured is primary and non-contributory to any other insurance available to the additional insured. SEPTA must be a certificate holder, and this should be noted on the Insurance Certificate and policies. While SEPTA will not be an additional insured on Permittee's Workers' Compensation Insurance, this insurance must provide a waiver of subrogation.

SEPTA must be provided with acceptable proof of insurance that demonstrates compliance with these requirements, identifies all applicable limits and lists all other mandated aspects of coverage. Proof of insurance should be sent to SEPTA addresses as follows:

ROE PERMIT

**SEPTA - Insurance Dept.
1234 Market Street - 6th Floor
Philadelphia, PA 19107-3780
Attn: Insurance Program Manager**

PECO 220-20 Extension Letter of Notification

PECO Attachment Q10

City of Philadelphia Zoning/Use Permit for Upland Substation

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**PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU**

ZONING/USE PERMIT		CITY OF PHILADELPHIA DEPARTMENT OF LICENSES & INSPECTIONS 1401 JOHN F KENNEDY BLVD PHILADELPHIA, PA 19102-1667		PERMIT NUMBER 815402	
SUBJECT TO REVOCATION IF FULL INFORMATION IS MISREPRESENTED OR NOT PROVIDED		FEE \$650.00	DATE 03/27/18		
LOCATION OF WORK: 02000 N 59TH ST PHILADELPHIA, PA 19131-3031			ZONING CLASSIFICATION I-1		
OWNER PECO ENERGY COMPANY 2301 MARKET ST N3-3 PHILADELPHIA, PA 19103		APPLICANT PECO ENERGY COMPANY 2301 MARKET ST N3-3 PHILADELPHIA, PA 19103		PLAN EXAMINER SARAH KAISER	
				ZONING BOARD OF ADJUSTMENT DECISION CALENDAR # DATE	

THIS PERMIT DOES NOT AUTHORIZE ANY CONSTRUCTION UNTIL RELATED CONSTRUCTION PERMITS ARE ISSUED

**UNDER REGULATIONS OF THE PHILADELPHIA ZONING ORDINANCE FOR
ZONING APPROVAL**

FOR THE ERECTION OF AN ELECTRICAL SUBSTATION EQUIPMENT ENCLOSURE WITH TRANSFORMERS AND BREAKERS. SIZE AND LOCATION AS SHOWN ON PLANS AND APPLICATION.

USE REGISTRATION

SPACES INCLUDING ONE (1) VAN ACCESSIBLE SPACE. NO SIGNS ON THIS APPLICATION.

SUBJECT TO THE FOLLOWING PROVISOS AS ESTABLISHED BY THE ZONING BOARD OF ADJUSTMENT:

ANY PERSON AGGREIVED BY THE ISSUANCE OF THIS PERMIT MAY APPEAL TO THE ZONING BOARD OF ADJUSTMENT (ZBA). FOR INSTRUCTIONS ON FILING AN APPEAL, PLEASE CONTACT THE ZBA AT 215-686-2429 OR 215-686-2430.

IT SHALL BE THE OWNER'S RESPONSIBILITY TO SECURE THE APPROVAL OF THE PHILADELPHIA HISTORICAL COMMISSION PRIOR TO ANY ALTERATION TO A HISTORIC PROPERTY. TO CHECK THE HISTORIC STATUS OF A PROPERTY, CALL THE PHILADELPHIA HISTORICAL COMMISSION AT 215-688-7880.

FOR ESTABLISHMENTS THAT PREPARE AND SERVE FOOD: APPLICANTS MUST OBTAIN ALL NECESSARY APPROVALS FROM THE HEALTH DEPARTMENT. SEPARATE PLAN REVIEWS AND FEES MAY BE REQUIRED. CONTACT THE PHILADELPHIA DEPARTMENT OF PUBLIC HEALTH - ENVIRONMENTAL HEALTH SERVICES / OFFICE OF FOOD PROTECTION: 321 UNIVERSITY AVE. - 2ND Floor, PHILADELPHIA, PA 19104 TELEPHONE NUMBER: (215) 685-7485

LIMITATIONS:

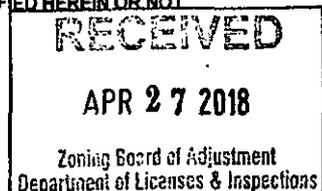
IN CASES WHERE NO CONSTRUCTION OR INTERIOR ALTERATIONS ARE INVOLVED: THIS PERMIT BECOMES INVALID SHOULD THIS USE NOT START WITHIN SIX (6) MONTHS FROM THE DATE OF ISSUANCE OR THE DATE OF ZONING BOARD OF ADJUSTMENT DECISION, WHICHEVER COMES FIRST.

IN CASES WHERE CONSTRUCTION OR INTERIOR ALTERATIONS ARE INVOLVED: THIS PERMIT BECOMES INVALID SHOULD CONSTRUCTION NOT START WITHIN THREE (3) YEARS FROM THE DATE OF ISSUANCE OR THE DATE OF ZONING BOARD OF ADJUSTMENT DECISION, WHICHEVER COMES FIRST.

THIS PERMIT IS NOT A CERTIFICATE OF OCCUPANCY OR A LICENSE.

ALL PROVISIONS OF THE CODE AND OTHER CITY ORDINANCES MUST BE COMPLIED WITH, WHETHER SPECIFIED HEREIN OR NOT. THIS PERMIT CONSTITUTE APPROVAL FROM ANY STATE OR FEDERAL AGENCY, IF REQUIRED.

Cal No 33737



PECO 220-20 Extension Letter of Notification

PECO Attachment Q12

EMF Study

October 16, 2018

PECO ENERGY COMPANY

PECO 220-20
230 kV Transmission Line Extension
EMF Analysis

Revision B

PROJECT NUMBER:
151445

PROJECT CONTACT:
KURT BELL, P.E.

EMAIL:
KURT.BELL@POWERENG.COM

PHONE:
208-288-6343



EMF ANALYSIS

PREPARED FOR:
PECO ENERGY COMPANY

PREPARED BY:
KIVA HERMANSEN, P.E. – (207) 869-1284 KIVA.HERMANSEN@POWERENG.COM
KIP PRENTICE – (208) 288-6436 – KIP.PRENTICE@POWERENG.COM

REVISION HISTORY						
REV.	ISSUE DATE	ISSUED FOR	PREP BY	CHKD BY	APPD BY	NOTES
A	2018-09-21	Appvl	KAH	KPP	JTL	Issued for Review and Approval.
B	2018-10-16	Appvl	KAH	KPP	JTL	Issued for Record

"Issued For" Definitions:

- "Prelim" means this document is issued for preliminary review, not for implementation
- "Appvl" means this document is issued for review and approval, not for implementation
- "Impl" means this document is issued for implementation
- "Record" means this document is issued after project completion for project file

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1.0 INTRODUCTION

1.1 Project Discussion

POWER Engineers, Inc. (POWER) has been tasked by PECO to analyze the electric and magnetic fields (EMF) for the conceptual design of the extension from PECO's existing 220-20 230 kV transmission line (220-20 Line) to the new Upland Substation in northwestern Philadelphia. The existing 220-20 Line extends from Parrish Substation to Bala Substation. The proposed extension will split the existing transmission line between structures 38 and 39. The existing 220-20 Line will extend from structure 39 to the proposed Upland Substation. The remaining portion of the existing 220-20 Line will be renamed to 220-72 and extend from structure ST-38 to the proposed Upland Substation, thereby connecting the proposed Upland Substation to the Parrish Substation. The extensions for the 220-20 Line and the 220-72 Line to Upland Substation will share structures and, for ease of reference in the remainder of this report, these extensions together will be referenced as the "220-20 Extension," as they both extend from the existing 220-20 Line.

The purpose of this study is to perform calculations to determine the EMF levels for the proposed extension to the 220-20 Line corridor (to be referenced as "220-20 Extension" here on).

There are no defined electric or magnetic field limits for Pennsylvania. However, to provide a point of comparison to the limits calculated in this study, IEEE Std. C95.6-2002 maximum permissible exposure (MPE) limits are provided in Table 1, as well as limits defined by New York and New Jersey (included due to their proximity to Philadelphia). The lowest of each of these limits are noted in Table 1 and are shown as points of reference to the values calculated in the plots found in the results section, Section 4.

STANDARD	ELECTRIC FIELD		MAGNETIC FIELD	
	In ROW	Edge of ROW	In ROW	Edge of ROW
IEEE Std C95.6-2002	10 kV/m	5 kV/m	9,040 mG*	9,040 mG
New York	7 kV/m*	1.6 kV/m*	None	200 mG*
New Jersey	None	3 kV/m	None	None

*Lowest limits to be used in comparison for results

1.2 Summary

EMF levels have been analyzed for the PECO 220-20 Extension. While there are no governing limits to electric and magnetic field limits for the area, the investigation indicates that the 60 Hz electrical loading for both the electric field and the magnetic field were below the IEEE defined maximum permissible exposure (MPE) limits per IEEE Std C95.6-2002. As a means of comparison, the calculated limits were also below the limits defined by adjacent states New York and New Jersey.

Electric and magnetic fields were analyzed at a minimum conductor height of one meter and reported as the maximum resultant field. In this report, the worst-case results for both L90 and maximum loadings are reported. Any changes to the characteristics of the conductors or their arrangement could affect the results of the study and may need to be further investigated. See Sections 4.1 and 4.2 for further discussion of the EMF results. Table 2 provides the worst-case values inside the right-of-way (ROW) and at the edge of the ROW for Electric and Magnetic field along the new corridor.

TABLE 2: MAXIMUM ELECTRIC AND MAGNETIC FIELD RESULTS					
CASE	EDGE OF ROW		WITHIN ROW		REFERENCE FIGURE
	Allowable Limit*	Maximum Calculated	Allowable Limit*	Maximum Calculated	
Electric Field	1.6 kV/m	1.02 kV/m	7.0 kV/m	2.0 kV/m	Figure 2
Magnetic Field (L90 Loading)	200 mG	22.0 mG	9,040 mG	46.4 mG	Figure 7
Magnetic Field (Maximum Loading)	200 mG	38.4 mG	9,040 mG	80.7 mG	Figure 8

*Lowest value from Table 1. For comparison purposes only.

2.0 EMF DATA

Electric and magnetic fields (EMF) discharge from a transmission line are based on the electrical and physical characteristics of the transmission line. A copy of the Plan and Profile drawing used for this investigation is included in Appendix A. Data was extrapolated from the PLS-CADD model "line 220-20_upland sub" to develop the model for this investigation.

Specifically, the primary characteristics affecting the investigation are:

- Voltage and current loading of the PECO 60 Hz transmission lines.
- Physical conductor characteristics and bundling.
- Relationship of each phase conductor to the other phases and shield wires.
- Height of the conductors from ground.

The data used for this analysis are listed below. Should any of this data change, the electric and magnetic field calculation results will also change.

- Voltage: 241.5 kV (105% of 230 kV nominal)
- Conductor: 1590 kcmil 54/19 ACSR Falcon
- OPGW: Two DNO-8338 with 0.614 inch diameter
- Right of Way: 100 feet
- Phasing: A-B-C top to bottom for both circuit
- Number of Circuits: Two (220-20 Line and 220-72 Line)
- Configuration: Vertical
- Insulator Configuration: V-String

Length of Transmission Line: 0.7 miles

The two transmission lines that comprise this extension to the new Upland Substation, 220-20 and 220-72, will have currents flowing in opposite directions. Therefore, the similar phasing of A-B-C from top-to-bottom for both circuits was chosen specifically to reduce magnetic field values due to cancellation with the opposing directions of current flow.

Table 3 shows the L90 and max loadings provided by PECO in an email, dated August 27th, 2018. The email provided the L90 and max loadings for the two 230 kV lines, 220-20 Extension and 220-72 Line, along with the existing loading of the 220-20 Line. POWER's proposed conceptual design has one circuit into Upland Substation and one circuit out of the substation: Parrish to Upland and Upland to Bala respectively.

TABLE 3: PROPOSED CORRIDOR CIRCUIT LOADING (AMPS)		
TRANSMISSION LINE	L90 LOADING	MAXIMUM LOADING
Parrish-Upland 220-20 Extension	516.9	900
Upland-Bala 220-72 Line	561.2	977.3

There were a few locations of direct impact to the public that were reviewed. These locations are where the public might regularly be in proximity to the new transmission line. These locations are detailed in Table 4 and depicted in Figure 1.

TABLE 4: NEARBY ACCESS LOCATIONS FOR THE PUBLIC		
POINT OF INTEREST	DISTANCE FROM ROW CENTERLINE	LOCATION
Closest Public Access: 59 th Street Bridge	0 feet (directly under)	Span from Structure 1/6 to 1/7
Closest Public Buffer: Public Fence	220 feet	Span from Structure 1/2 to 1/3
Closest Residence	330 feet	Span from Structure 1/3 to 1/4
Closest Occupied Non-Residential Location: Distribution Center	80 feet	Span from Structure 1/4 to 1/5



Figure 1: Public Access Locations in Relation to the 220-20 Line

Information on the bridge and its height in relation to the transmission line were obtained from drawing “Str. 1/6 – Str 1/7 Crossing N. 59th St. Bridge 230kV Transmission Line”, which is provided for reference in Appendix H.

3.0 ELECTRIC AND MAGNETIC FIELD (EMF) ANALYSIS OVERVIEW

The EMF analysis was performed using the Safe Engineering Services (SES) Current Distribution, Electromagnetic interference, Grounding and Soil analysis (CDEGS) computer program (version 16.0.8590). The analysis for this study involved creating a three-dimensional model of the power lines and track systems throughout the new transmission line corridor for the 220-20 Extension. The HIFREQ module of the CDEGS software can analyze a three-dimensional system at any given frequency (accurately up to the megahertz range) and can calculate the electromagnetic fields throughout the areas modeled. Inductive, capacitive, and conductive interference effects are computed simultaneously for an

AC interference investigation. Based on these effects, electric and magnetic fields (EMF) can be calculated at any point in space (the maximum values are determined from this investigation). These values can then be tabulated or plotted in color plots and/or presented as numerical values on a plot of any part of the line system. Due to the model complexity and the varying functionalities of the HIFREQ software, there is no simple way to plot out a specific summary. Therefore, the results are presented in a simplified tabular and graphical form for this analysis.

An electric or magnetic field strength is represented by three orthogonal components in space, which vary in time. These orthogonal components are represented by a field ellipse located in three dimensions and is characterized by its major and minor axis. The maximum value of the field ellipse is typically reported as the semi-major axis (one-half of the major axis magnitude). Results in this report are tabulated as the maximum resultant field (RMS magnitude of the semi-major and semi-minor axis magnitudes). Dependent upon the polarization of the field, the resultant field can either be equal to or larger than the magnitude of the maximum field magnitude. Therefore, it is considered a conservative prediction of the expected electric and magnetic fields.

The electric field strengths are primarily a function of the maximum operating voltage of conductors. Therefore, the electric fields are calculated at maximum operating voltage (105% rating). Magnetic field strengths are primarily a function of the line current loading, which varies over time. Therefore, the magnetic fields calculations are performed at both L90 and maximum load ratings.

The EMF levels are typically depicted at various points across the right-of-way. Therefore, values reported include the maximum and average values within the right-of-way for the given structures, along with the calculated values at the edge of the right-of-way. Also included for reference are plots of the results for all analyzed values across the entire width of the right-of-way and beyond the right-of-way.

For this investigation, electric and magnetic fields were analyzed as follows:

- A minimum conductor height (mid-span, maximum sag), as this location will produce the worst-case scenario.

- A calculation height of one meter (approximately 3.28 feet) above ground.

4.0 RESULTS

Seven EMF profiles were analyzed, one for each new span on the 220-20 Expansion to the Upland Substation. The profiles were placed in the new corridor mid-span at the location of lowest conductor height. The tabulated EMF results shown below report the worst-case values at the ROW locations.

4.1 Electric Field Results

The electric field strength is a measure of the force per unit charge at a given point in space relative to a charged object. It is typically measured in volts or kilovolts per meter (kV/m). Table 5 shows a summary of the worst case electric field values in the right-of-way (ROW) and at the edge of the ROW. Since the electric field strength is a direct result of the voltage associated with the line, the predicted values for each loading condition will not vary and only one case for each structure is presented below. Electric field

strength values are calculated at the minimum conductor height (greatest sag) and at a height of one meter above ground per IEEE Standard 644-1994 (R2008).

Figure 2 shows a plot of the electric field strength across the right-of-way for each of the new spans on the 220-20 transmission line.

ELECTRIC FIELD STRENGTHS (kV/m)					
LOCATION	CALCULATED		LOWEST LIMIT PER TABLE 1*		REFERENCE FIGURE
	EDGE OF ROW	IN ROW	EDGE OF ROW	IN ROW	
Span from Structure 1/2 to 1/3	-	2.0	-	7.0	FIGURE 2
Span from Structure 1/6 to 1/7	1.02	-	1.6	-	

*For comparison purposes only

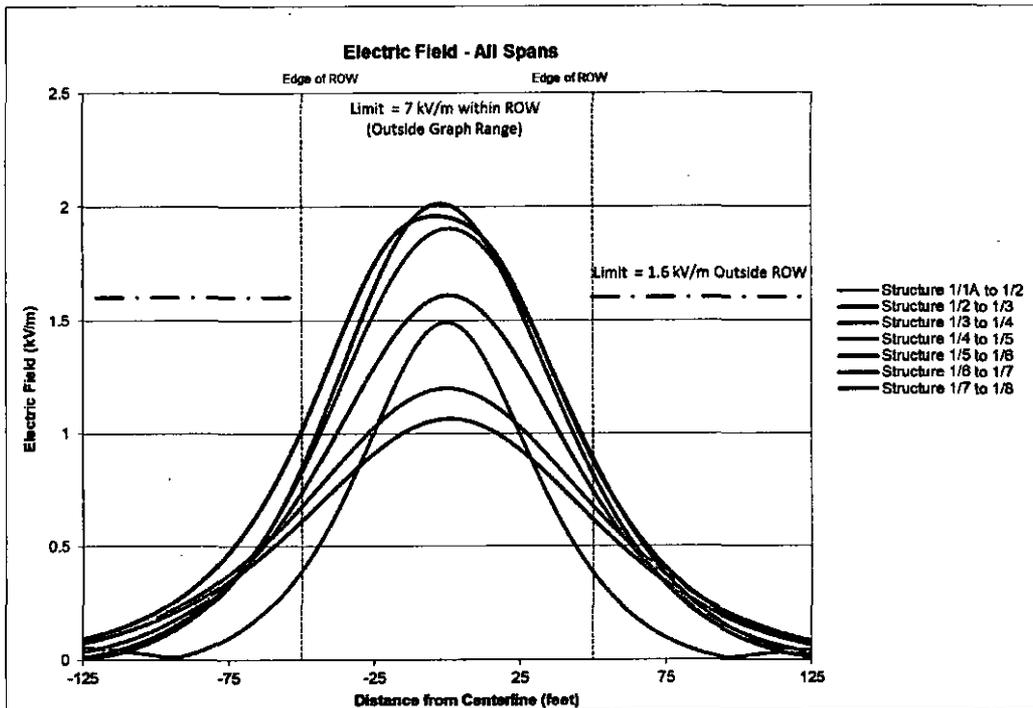


FIGURE 2 ELECTRIC FIELD STRENGTHS ACROSS THE ROW FOR THE 220-20 EXTENSION

Table 6 lists the calculated electric field strengths from the 220-20 Extension at points of interest noted in Table 3. Figure 3 through Figure 6 shows plots of the electric field strengths out to these specified locations.

TABLE 6: ELECTRIC FIELD STRENGTHS AT POINTS OF INTEREST TO PUBLIC (kV/m)

POINT OF INTEREST	SPAN LOCATION	DISTANCE FROM ROW CENTER	CALCULATED VALUE	REFERENCE FIGURE
59 th Street Bridge	1/6 to 1/7	0 feet	1.96	Figure 2
Public Fence	1/2 to 1/3	220 feet	0.05	Figure 4
Closest Residence	1/3 to 1/4	330 feet	0.03	Figure 5
Distribution Center	1/4 to 1/5	80 feet	0.32	Figure 6

*For comparison purposes only

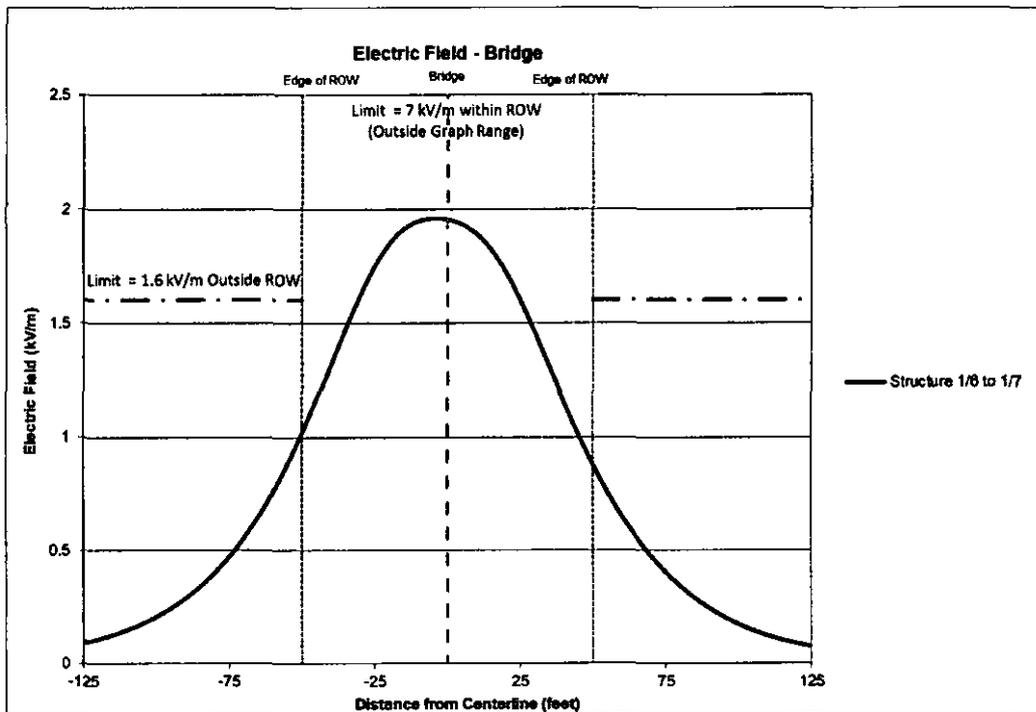


Figure 3: Electric Field at Bridge Crossing

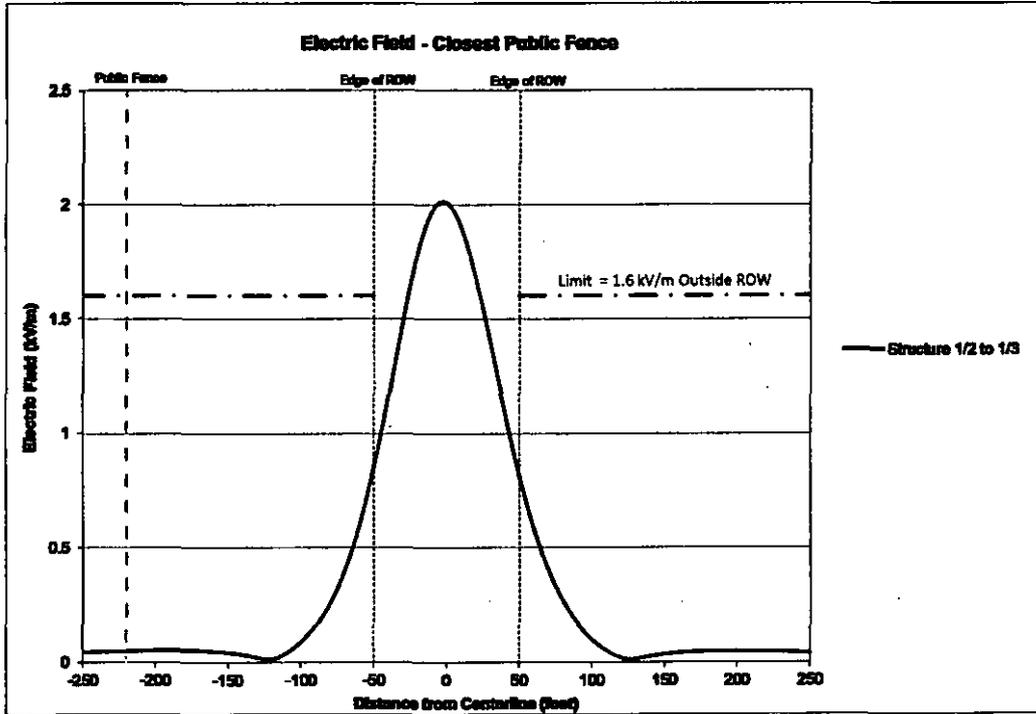


Figure 4: Electric Field out to Closest Public Fence

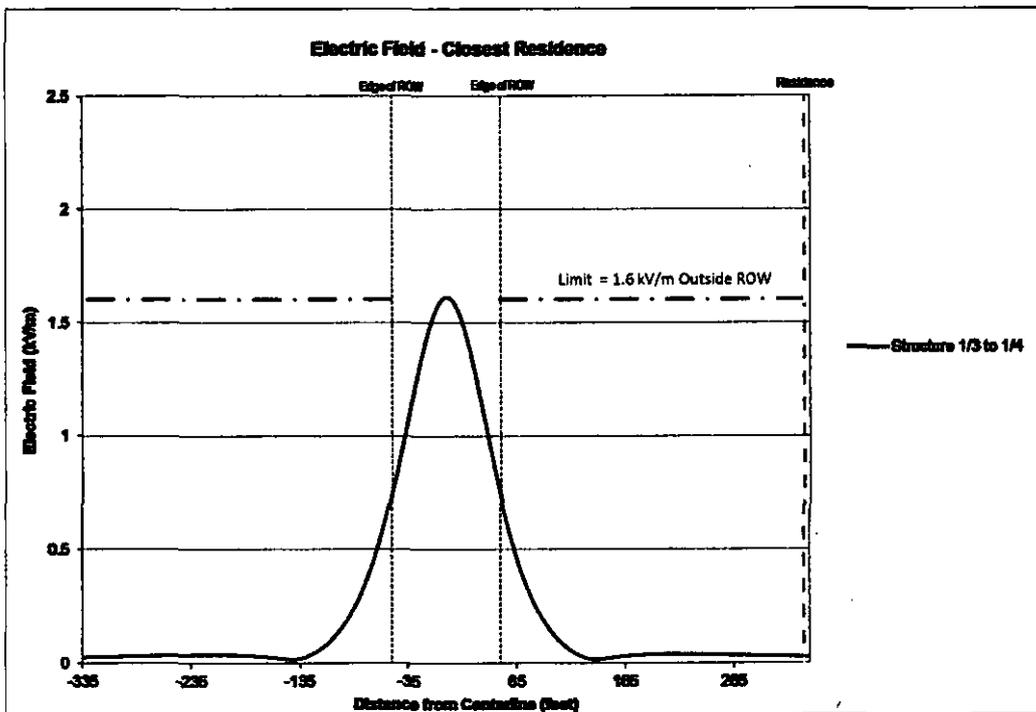


Figure 5: Electric Field out to Closest Residence

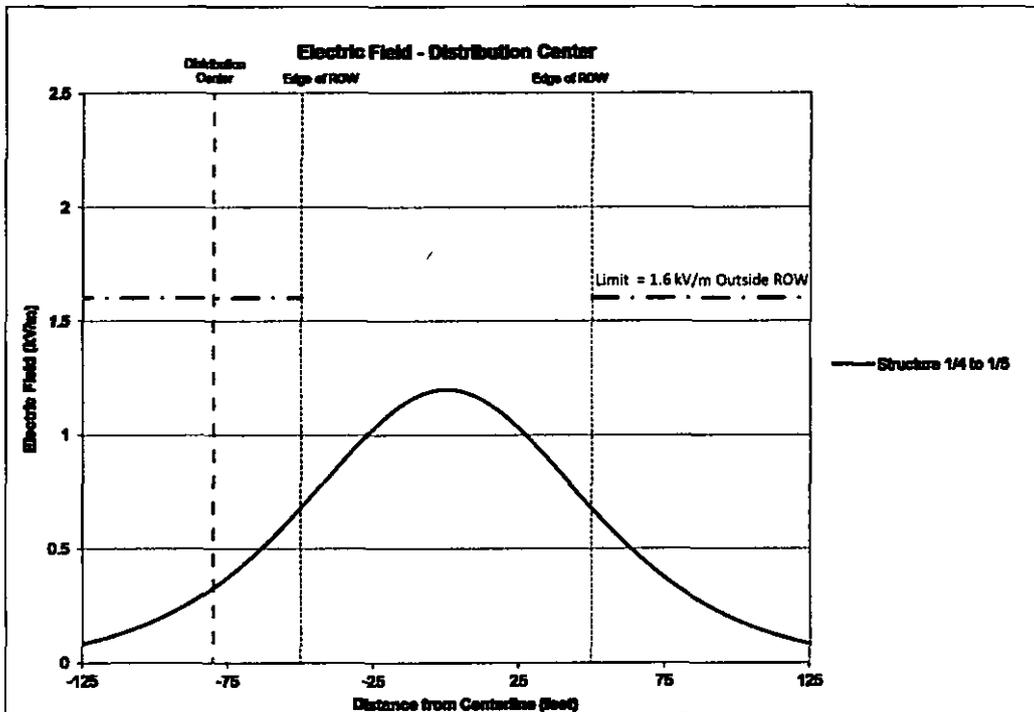


Figure 6: Electric Field out to Distribution Center

4.2 Magnetic Field Results

The reported magnetic field strength values are the magnetic flux densities at a given point in space. Magnetic flux density is evaluated in units of Gauss, milligauss (mG), or in micro-Tesla (μT). These values can be converted (one Tesla equals 10,000 Gauss, or simply 10 mG equals 1 μT). Magnetic field strength values are calculated at the minimum conductor height (mid-span) and at a height of one meter above the ground per IEEE Standard 644-1994 (R2008).

Table 7 shows a summary of the worst case magnetic field values in the right-of-way (ROW) and at the edge of the ROW, for both L90 and maximum loading. Figure 7 shows a plot of the magnetic field strength, at L90 loading, across the right-of-way for each span. Figure 8 shows a plot of the magnetic field strength, at maximum loading, across the right-of-way for each span.

TABLE 7: MAXIMUM MAGNETIC FIELD STRENGTHS (MILLIGAUSS)

LOADING SCENARIO	LOCATION	CALCULATED		LOWEST LIMIT PER TABLE 1*		REFERENCE FIGURE
		EDGE OF ROW	IN ROW	EDGE OF ROW	IN ROW	
L90	Span from Structure 1/6 to 1/7	22.0	46.4	200	9,040	Figure 7
Maximum	Span from Structure 1/6 to 1/7	38.4	80.7			Figure 8

*For comparison purposes only

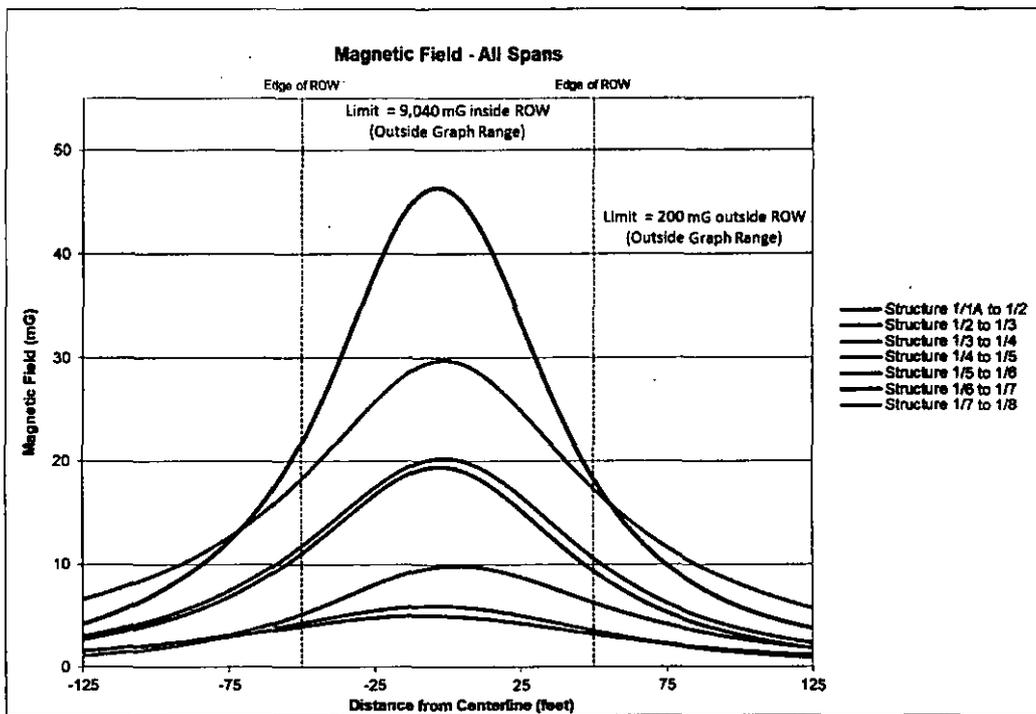


Figure 7: L90 Load Magnetic Field Strength for Proposed 220-20 Extension

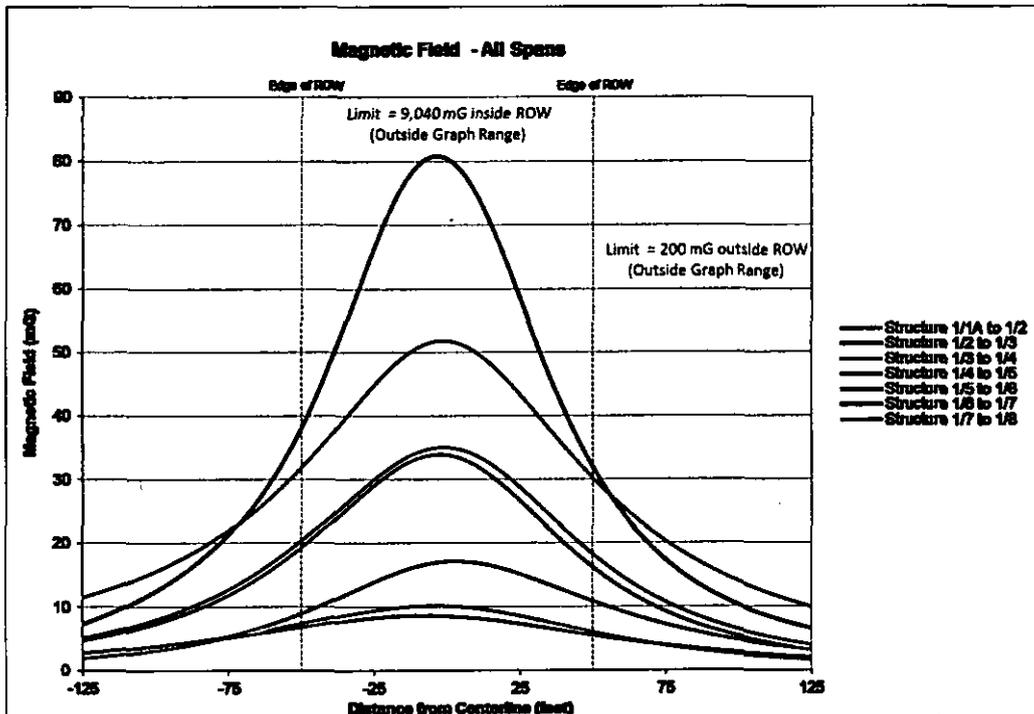


Figure 8: Maximum Load Magnetic Field Strength for Proposed 220-20 Extension

Table 8 lists the calculated magnetic field strengths from the 220-20 Extension at points of interest noted in Table 3. Figure 9 through Figure 12 shows plots of the magnetic field strengths out to these specified locations for both L90 and maximum loading.

TABLE 8: MAGNETIC FIELD STRENGTHS AT POINTS OF INTEREST TO PUBLIC (mG)					
POINT OF INTEREST	SPAN LOCATION	DISTANCE FROM ROW CENTER	CALCULATED VALUE AT L90	CALCULATED VALUE AT MAXIMUM	REFERENCE FIGURE(S)
59 th Street Bridge	1/6 to 1/7	0 feet	46.4	80.7	Figure 9
Public Fence	1/2 to 1/3	220 feet	0.8	1.3	Figure 10
Closest Residence	1/3 to 1/4	330 feet	0.2	0.4	Figure 11
Distribution Center	1/4 to 1/5	80 feet	2.8	4.9	Figure 12

*For comparison purposes only

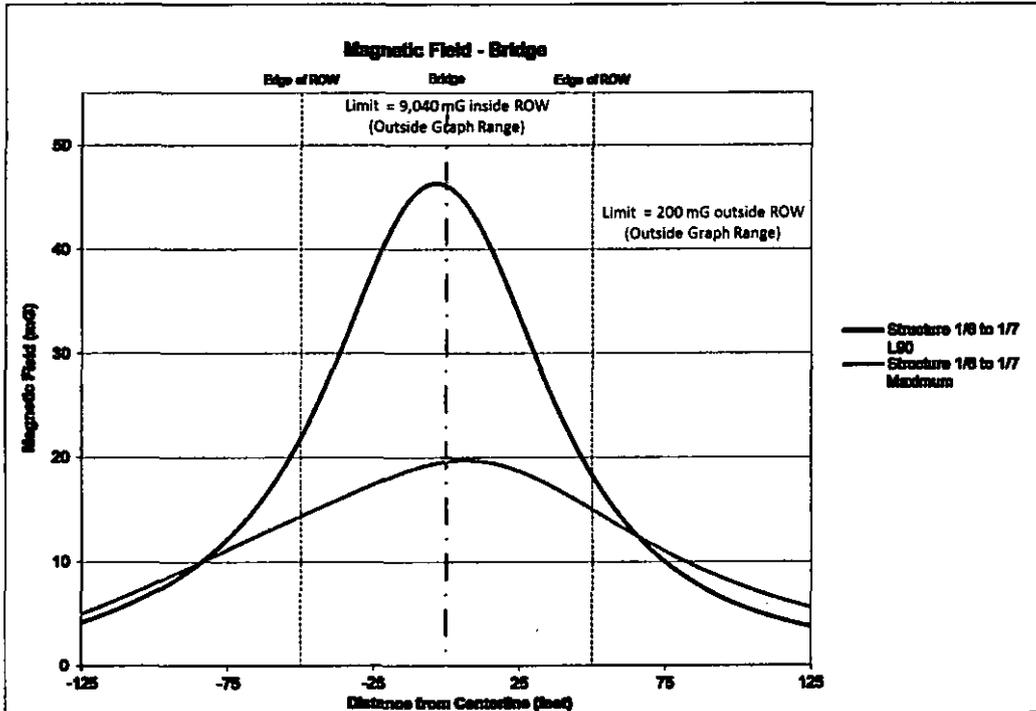


Figure 9: Magnetic Field at Bridge Crossing

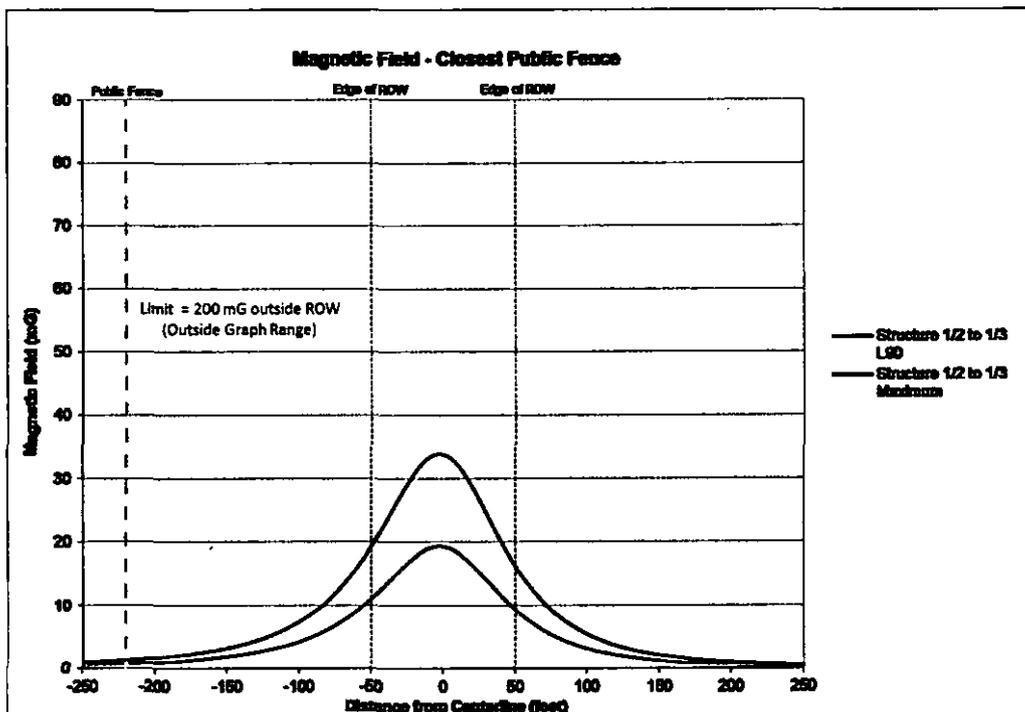


Figure 10: Magnetic Field out to Closest Public Fence

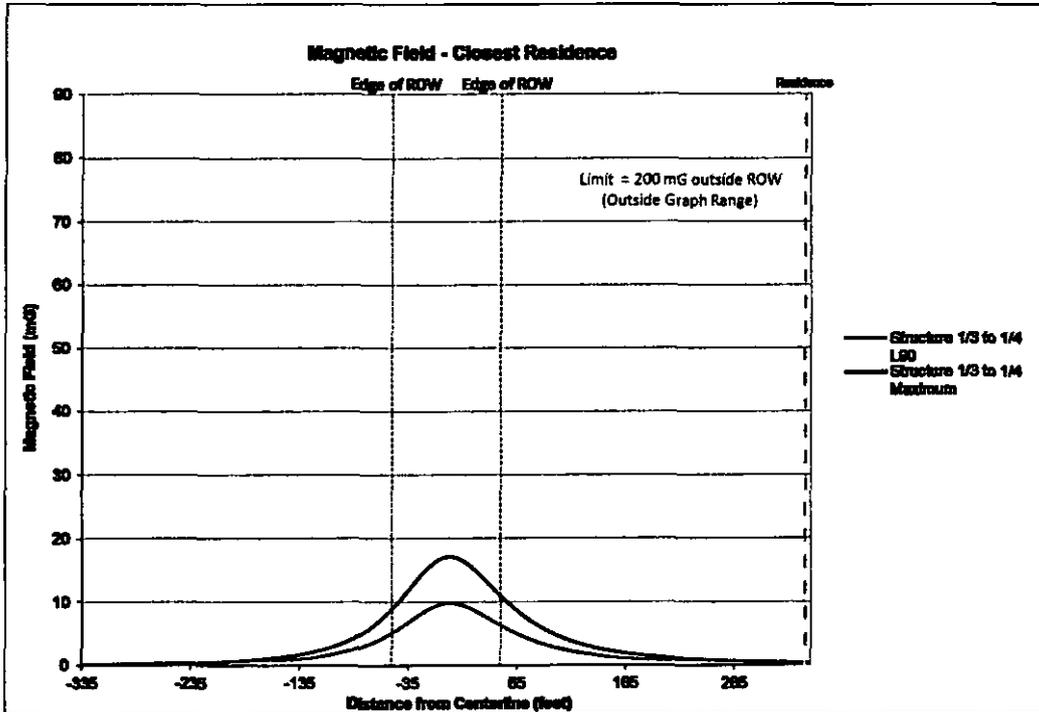


Figure 11: Magnetic Field Out to Closest Residence

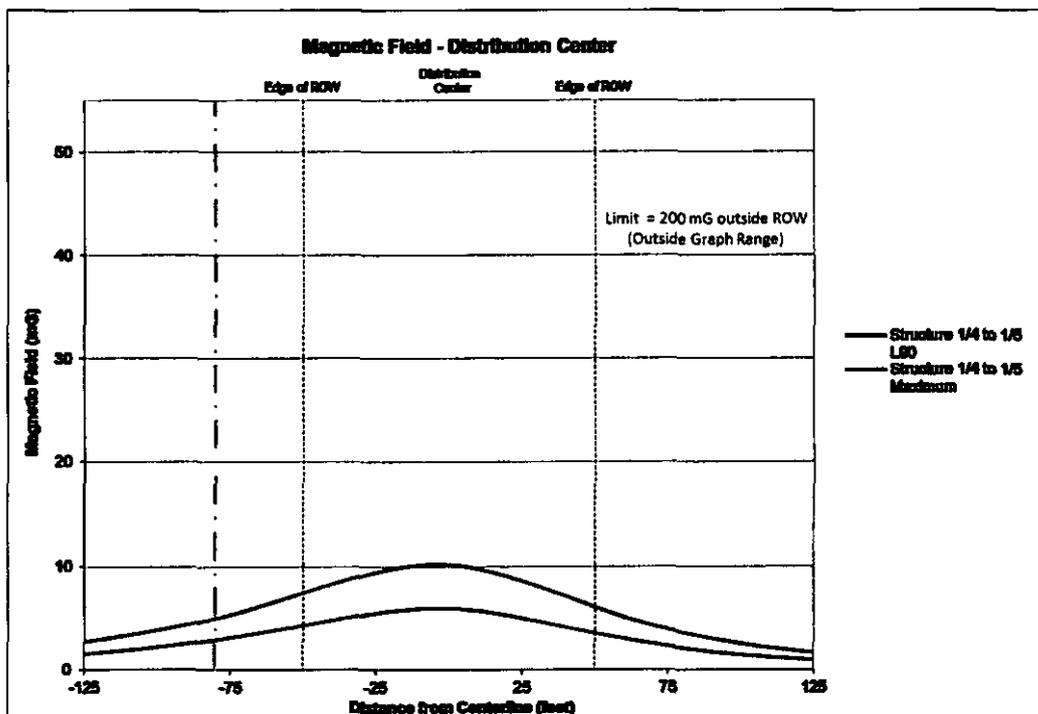
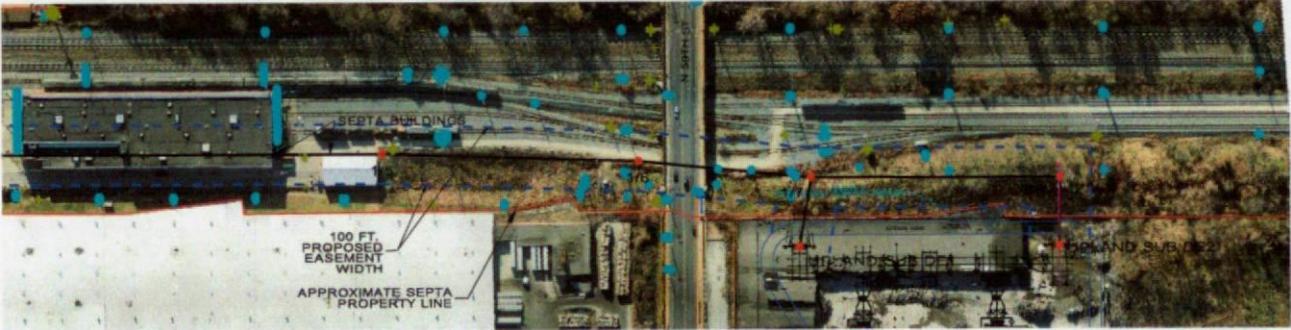


Figure 12: Magnetic Field out to Distribution Center

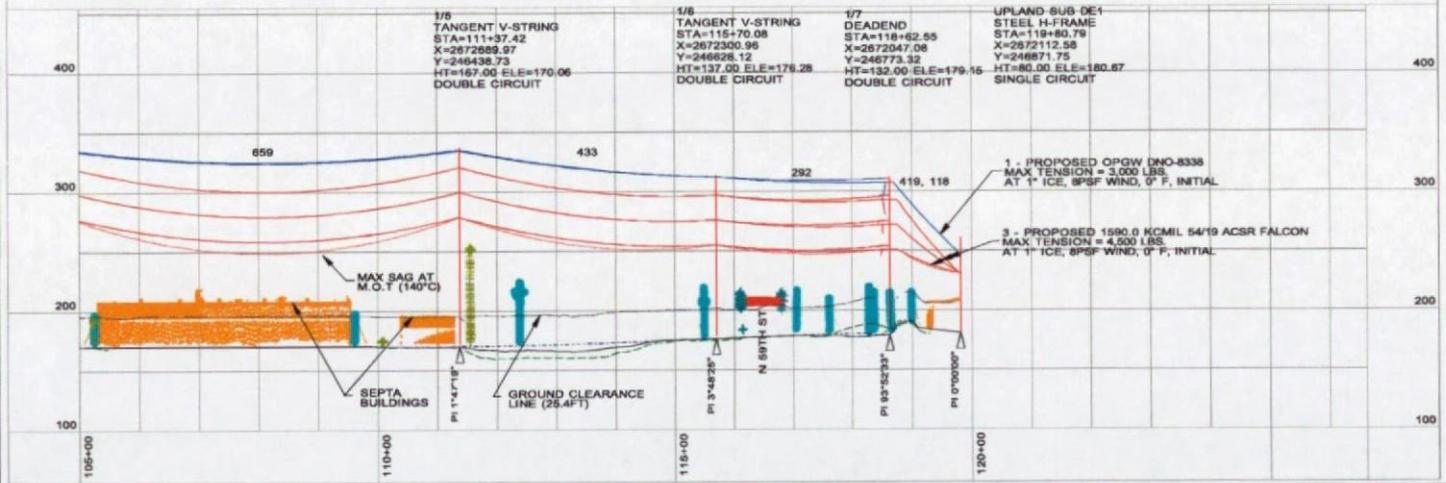
APPENDIX A – DRAWINGS



LEGEND

- PROPOSED POLE LOCATION
- + BRIDGE DECK
- + BRIDGE SUPERSTRUCTURE
- + LIGHT POLEMING OBJECT
- DISTRIBUTION & RAILROAD POLE
- EXISTING POLE TO BE REMOVED
- ▬ 100 FT. PROPOSED EASEMENT WIDTH
- ▬ APPROXIMATE SEPTA PROPERTY LINE

90.0 FT HORIZ. SCALE
30.0 FT VERT. SCALE



NOTES:

- SAG SHOWN AT 87°F FINAL UNLESS OTHERWISE NOTED.
- 25-FT CLEARANCE LINE DISPLAYED FOR CONDUCTOR (20KV)

NO.	REVISED BY	DATE	DESCRIPTION
1
2

PROJECT: PEED ENERGY COMPANY
 DRAWING NO: 220-55 LINE TO UPLAND SUB
 SCALE: 1" = 30' HORIZ, 1" = 30' VERT
 DATE: 08/15/2011
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]



100 FT. PROPOSED EASEMENT WIDTH

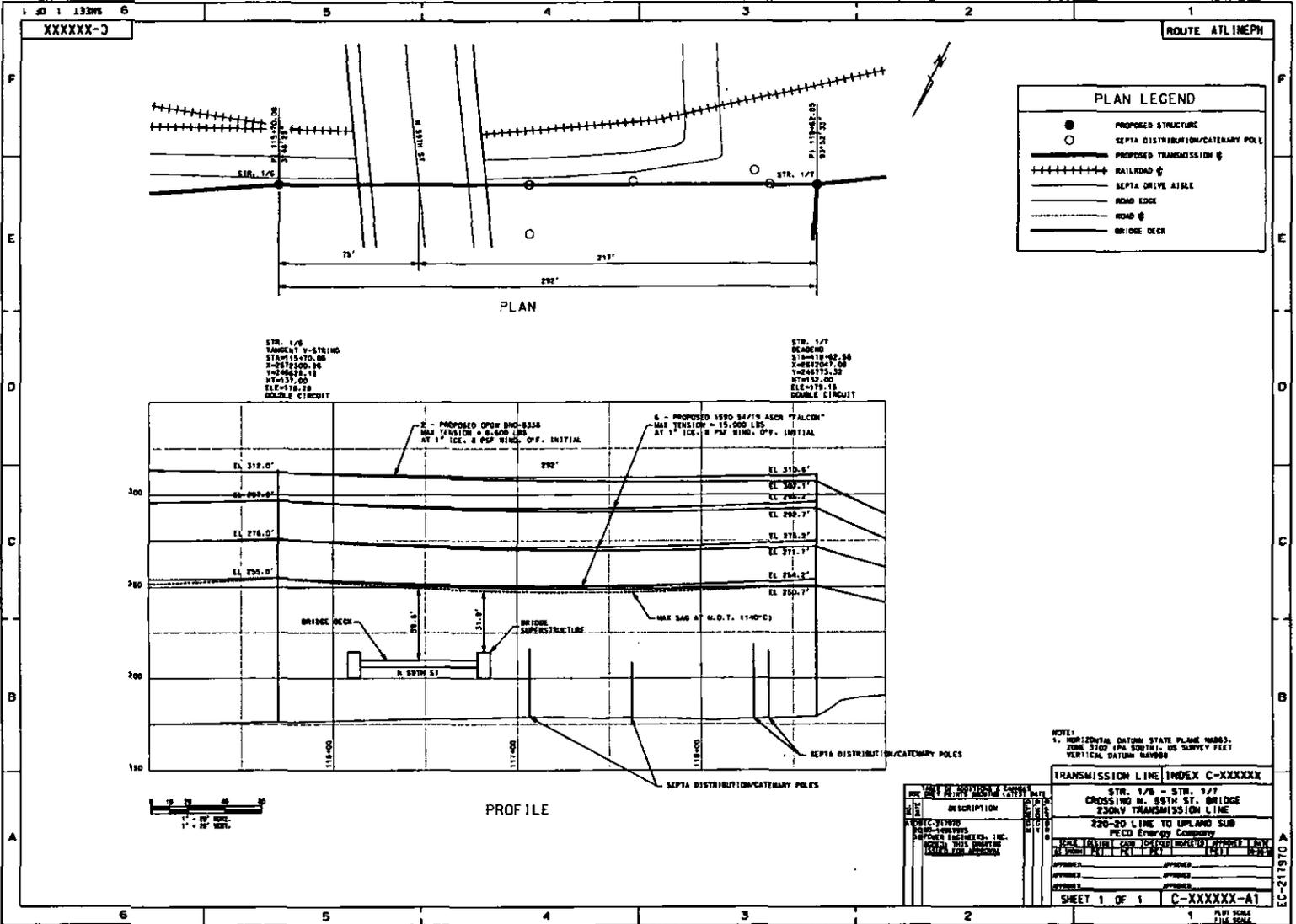
LEGEND

- PROPOSED POLE LOCATION
- WIRE SIDE
- WIRE SUPERSTRUCTURE
- LIGHT PULSING OBJECT
- DISTRIBUTION & TALLIED POLE
- EXISTING POLE TO BE REMOVED
- 100 FT. PROPOSED EASEMENT WIDTH
- APPROXIMATE DEPTA PROPERTY LINE

90.0 FT. HORIZ. SCALE
 30.0 FT. VERT. SCALE



<p>NOTES:</p> <ol style="list-style-type: none"> SAG SHOWN AT 80°F FINAL UNLESS OTHERWISE NOTED. 25.4 FT CLEARANCE LINE DISPLAYED FOR CONDUCTOR (2MM) 	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> <th>APP'D</th> <th>REVISION</th> </tr> <tr> <td>1</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>ISSUED FOR PERMITS</td> </tr> <tr> <td>2</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> <tr> <td>3</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> <tr> <td>4</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> </table>	NO.	DATE	BY	CHKD	APP'D	REVISION	1	08/14/14	JKM	JKM	JKM	ISSUED FOR PERMITS	2	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	3	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	4	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> <th>APP'D</th> <th>REVISION</th> </tr> <tr> <td>1</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>ISSUED FOR PERMITS</td> </tr> <tr> <td>2</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> <tr> <td>3</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> <tr> <td>4</td> <td>08/14/14</td> <td>JKM</td> <td>JKM</td> <td>JKM</td> <td>REVISED FOR REVIEW</td> </tr> </table>	NO.	DATE	BY	CHKD	APP'D	REVISION	1	08/14/14	JKM	JKM	JKM	ISSUED FOR PERMITS	2	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	3	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	4	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW	<p>SCALE: 1" = 30'</p>	<p>PROJECT: 220-20 LINE TO UPLAND SUB</p>	<p>DATE: 08/14/14</p>	<p>PLANS AND PROFILE</p>	<p>2 OF 3</p>
NO.	DATE	BY	CHKD	APP'D	REVISION																																																														
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2	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW																																																														
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4	08/14/14	JKM	JKM	JKM	REVISED FOR REVIEW																																																														



PLAN LEGEND

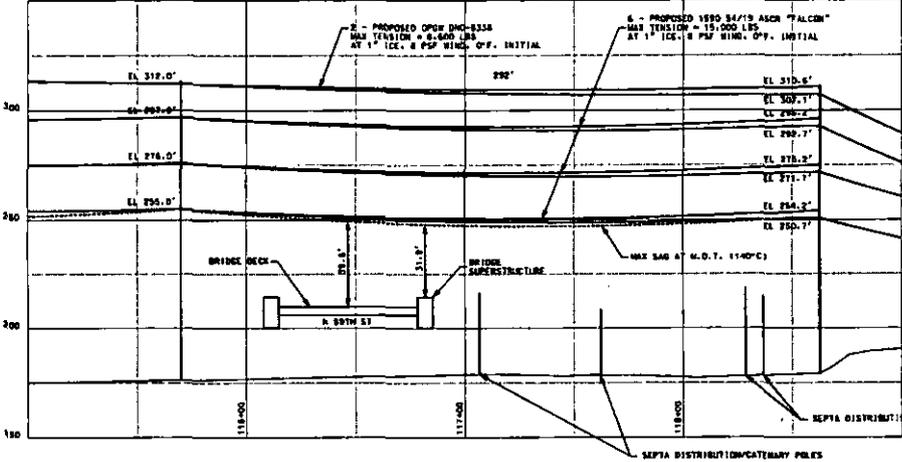
- PROPOSED STRUCTURE
- SEPTA DISTRIBUTION/CATEGORY POLE
- PROPOSED TRANSMISSION LINE
- ++++ RAILROAD
- +—+ SEPTA DRIVE AISLE
- ROAD EDGE
- ROAD
- BRIDGE DECK

STR. 1/6
TANGENT 9-STRING
STATION 1+47.00
2+257200.00
V=66628.11
HT=152.00
ELE=578.78
DOUBLE CIRCUIT

STR. 1/7
BEARER
STATION 1+48.54
2+257204.54
V=66773.57
HT=152.00
ELE=579.18
DOUBLE CIRCUIT

2 - PROPOSED OPEN DRUM-2225
MAX TENSION = 6,600 LBS
AT 1" ICE, 8 PSF WIND, 0°F. INITIAL

6 - PROPOSED 1580 84/19 ASER "FALCON"
MAX TENSION = 15,000 LBS
AT 1" ICE, 8 PSF WIND, 0°F. INITIAL



NOTES:
1. HORIZONTAL DATUM: STATE PLANE NAD83,
ZONE 1700 (48 SOUTH); US SURVEY FEET
VERTICAL DATUM: NAVD83

NO.	DESCRIPTION	DATE	BY	CHECKED

TRANSMISSION LINE INDEX C-XXXXXX	
STR. 1/6 - STR. 1/7	CROSSING M. 85TH ST. BRIDGE
220-KV LINE TO UPLAND SUB	
PECO Energy Company	
APPROVED: _____	DATE: _____
APPROVED: _____	DATE: _____
APPROVED: _____	DATE: _____
SHEET 1 OF 1	C-XXXXXX-A1

EC-21370
A

PECO 220-20 Extension Letter of Notification

PECO Attachment Q14

AECOM Wetlands and Environmental Review

Memo
PECO Upland Transmission Line



AECOM
825 West Ridge Pike, Ste. E-100
Conshohocken, PA 19428
aecom.com

Project name:
PECO Upland Transmission Line

Project ref:
60588390

From:
Emily Phelan, AECOM

Date:
March 6, 2019

To:
John Pappas, PECO

Memo

Subject: Desktop Review of Wetlands, Waterways, and Threatened & Endangered Species
PECO Upland Transmission Line
Overbrook, City of Philadelphia, PA

PECO Energy Company (PECO) proposes to construct a new aerial transmission line to connect the new Upland Substation with the existing power grid. The site extends from the vicinity of Woodcrest Avenue to the vicinity of North 53rd Street and parallels the SEPTA and AMTRAK railroad line. The aerial transmission line will be supported on eight new steel monopoles.

AECOM reviewed the following websites to assess the potential for wetlands and waterways, and for threatened and endangered species to be present on-site:

- US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping (<https://www.fws.gov/wetlands/data/mapper.html>) – mapped wetlands and waterways
- Pennsylvania Department of Environmental Protection (PADEP) eMapPA (<http://www.depgis.state.pa.us/eMapPA/>) – USGS topographic maps; FEMA mapped floodplains and floodways; historic NHD stream lines
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>) – soil information
- Google Earth Pro – historic aerial photographs
- Pennsylvania Department of Conservation and Natural Resources (DCNR) – Pennsylvania Natural Heritage Program (PNHP) Pennsylvania Natural Diversity Inventory (PNDI) Database (<https://conservationexplorer.dcnr.pa.gov/>) – potential threatened and endangered (T&E) species impacts due to project activities

The USFWS NWI maps did not show any mapped wetland or waterway features on or in the vicinity of the Site. Similarly, a review of the eMapPA website did not show any mapped resources on or in the vicinity of the Site. The NRCS soil map showed that the entire project area has soils mapped as Urban land (Ub), which is not a listed hydric soil. Historic aerial photographs from 1992 through 2018 were reviewed on Google Earth Pro. The aerial photograph from June 2004, along with the site photographs taken in 2018 show an area at the east end of the project that could be an emergent wetland; a site visit was not conducted to determine the presence or absence of wetland resources. The PNDI receipt (attached) states that the project will have no known impact to T&E species and no further agency review is required.

1. PROJECT INFORMATION

Project Name: **PECO Upland T-Line**

Date of Review: **3/5/2019 02:37:23 PM**

Project Category: **Energy Storage, Production, and Transfer, Energy Transfer, Power/electric line - New (new location for above/under-ground line)**

Project Area: **4.44 acres**

County(s): **Philadelphia**

Township/Municipality(s): **PHILADELPHIA**

ZIP Code: **19131**

Quadrangle Name(s): **PHILADELPHIA**

Watersheds HUC 8: **Schuylkill**

Watersheds HUC 12: **City of Philadelphia-Schuylkill River**

Decimal Degrees: **39.982095, -75.236034**

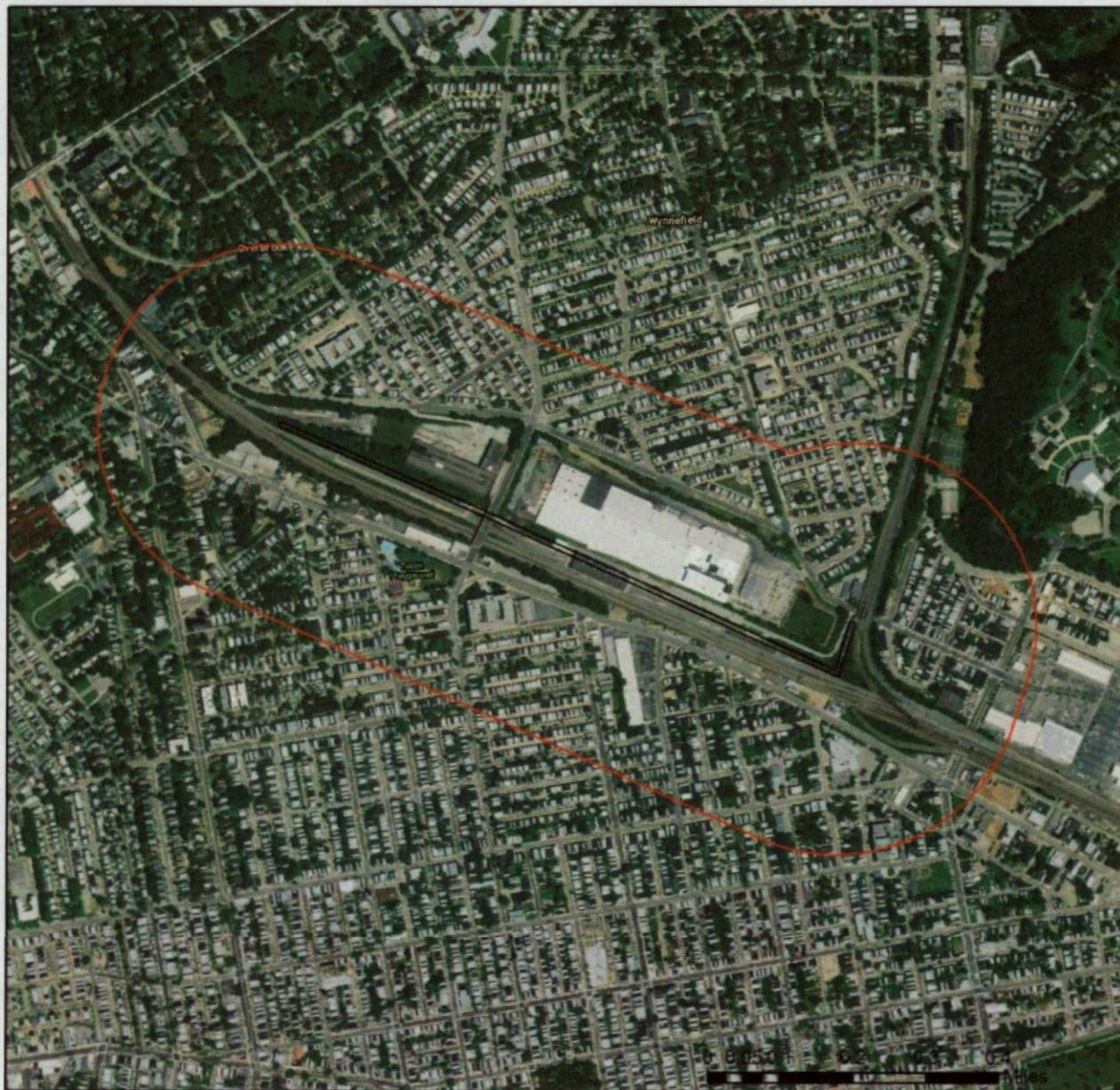
Degrees Minutes Seconds: **39° 58' 55.5427" N, 75° 14' 9.7230" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

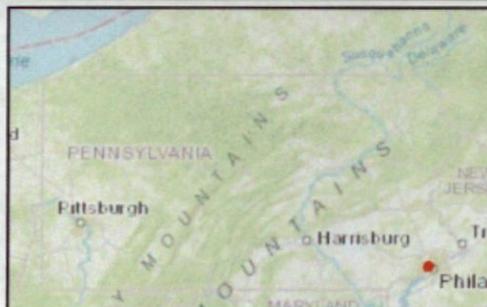
As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

PECO Upland T-Line



- Project Boundary
- Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

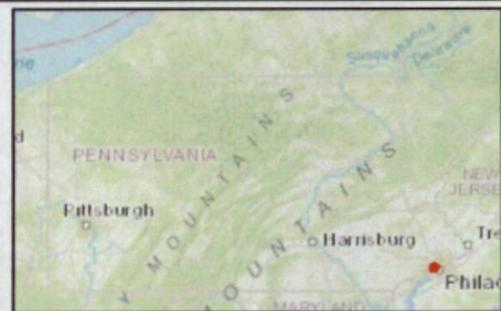


PECO Upland T-Line



- Project Boundary
- Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,



3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <https://conservationexplorer.dcnr.pa.gov/content/resources>.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service

Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Fish and Boat Commission

Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: _____
Company/Business Name: _____
Address: _____
City, State, Zip: _____
Phone: (____) _____ Fax: (____) _____
Email: _____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

date

PECO 220-20 Extension Letter of Notification

PECO Attachment Q16

Certificate of Service

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Letter of Notification of PECO Energy Company :
For Approval to Construct its 220-20 Transmission : A-2019-
Line Extension in the City of Philadelphia, :
Pennsylvania :

Certificate of Service

I, Ward Smith, hereby certify, pursuant to 52 Pa. Code §57.74, that I have this day served a copy of PECO Energy Company's above-noted Letter of Notification on the individuals and entities named on the attached certificate of service by registered or certified mail, return receipt requested.

Aug 29
Dated at Philadelphia, Pennsylvania, ~~June 19~~, 2019.



Ward L. Smith
Counsel for PECO Energy Company
2301 Market Street, S23-1
P.O. Box 8699
Philadelphia, PA 19101-8699

A- _____ LETTER OF NOTIFICATION FOR 130-43

SERVICE LIST

Philadelphia Mayor James Kenney
City Hall, Office 215
Philadelphia, PA 19107
(Chief Executive Officer, City of Philadelphia)

Philadelphia City Council President Darrell C. Clarke
City Hall, Room 313
Philadelphia, PA 19107
(Governing Body, City of Philadelphia)

Department of Licenses and Inspections
City of Philadelphia
Municipal Services Bldng, 11th Floor
1401 John F. Kennedy Blvd
Philadelphia, PA 19102
(Body charged with the duty of planning land use, City of Philadelphia)

Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Secretary, Department of Transportation
Keystone Building
400 North St., Fifth Floor
Harrisburg PA 17120

Chairman, Historical and Museum Commission
State Museum Building
300 North Street
Harrisburg, PA 17120

Jeffrey D. Kueppel
General Manager
SEPTA
1234 Market Street
Philadelphia PA 19107

Richard Kanaskie
Bureau of Investigation & Enforcement
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, Second Floor
Harrisburg, PA 17120

Erin K. Fure
Pennsylvania Office of Small Business
Advocate
300 North Second Street, Suite 202
Harrisburg, PA 17101

Tanya J. McCloskey
Office of Consumer Advocate
Forum Place, 5th Floor
555 Walnut Street
Harrisburg, PA 17101-1923

PECO 220-20 Extension Letter of Notification

PECO Attachment Q23

Underground Alternative Analysis

October 23, 2018

PECO

**Upland Substation
220-20 & 220-72 Transmission Line**
Underground Route Feasibility Report



An Exelon Company

PROJECT NUMBER:
151445
PROJECT CONTACT:
BRIAN BAILEY, P.E.
EMAIL:
BRIAN.BAILEY@POWERENG.COM
PHONE:
609-570-2722



Underground Route Feasibility Report

PREPARED FOR:
PECO ENERGY COMPANY

PREPARED BY:
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BRIAN.BAILEY@POWERENG.COM

CAITLIN SCHUERMANN
314-851-4072
CAITLIN.SCHUERMANN@POWERENG.COM

REVISION HISTORY		
DATE	REVISED BY	REVISION
10-23-2018	BRB / CS	A

TABLE OF CONTENTS

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APPENDICES:

Appendix A – Preliminary Terminal Yard Layout

Appendix B – Preliminary Route

1.0 Executive Summary

PECO has requested POWER Engineers, Inc. (POWER) to perform conceptual engineering to determine the feasibility for a new double circuit, underground 230 kV transmission path. The new line would tie into the existing 220-20 line (Parrish to Bala) at the location of structure SP-17 and would extend west approximately 0.6 miles along SEPTA property to the proposed Upland Substation site near the corner of 59th Street and Upland Way in Philadelphia, PA.

PECO and POWER have performed a feasibility study for an overhead transmission route along the same corridor. An overhead route has been deemed to be a viable and constructible option through Phase 1 (conceptual) engineering which includes identifying proposed pole locations and heights, as well as due diligence and coordination with SEPTA.

An underground route is being reviewed to determine if it would be feasible as well. POWER has performed conceptual engineering for an underground route and identified the following key concerns:

- *Terminal Yard Space* – A double circuit, overhead-to-underground terminal yard would require approximately a 45 ft x 126 ft area to hold the necessary structures and equipment. There does not appear to be adequate room to install and maintain a double circuit terminal yard near existing structure SP-17.
- *Duct Bank Routing* – The narrow SEPTA access road corridor may not have enough space to fit the required underground duct banks. Per Figure 2-1 of this report, the duct bank installation would be approximately 16.5' wide, plus additional space for construction. The current SEPTA property, especially at its narrowest point between buildings, will be very tight for this type of installation.
- *Constructability* – SEPTA's maintenance facility is a 24/7 operation. Building an underground line would disturb the entire width of the SEPTA driveway potentially closing the road during construction, which is not acceptable.
 - An overhead route would require disturbance to one pole location at a time, which would limit the disturbance to SEPTA's operations.
- *Alternative Route* – Upland Way may be considered as an alternative underground route. This would lengthen the overall route by approximately 0.2 miles. Given the existing underground facilities buried in Upland Way, along with the ongoing PWD work and planned underground distribution lines to be installed within Upland Way, routing two (2) 230kV duct banks may not be feasible along this route.

In summary, constructing a new double circuit, 230kV underground line to the new proposed Upland Substation would present many significant challenges, some of which may make an underground route infeasible. These challenges must be heavily weighed against the originally proposed overhead transmission design.

2.0 Project Description

The proposed underground line extension would tie into the existing 220-20 line near structure SP-17, approximately 450 feet southwest of the intersection between N 54th Street and W Jefferson Street at a new terminal yard. The two new underground lines into Upland Substation would be designated as

circuits 220-20 (Parrish – Upland) & 220-72 (Upland – Bala). From the terminal yard, the line would proceed west along the entrance road to SEPTA's maintenance facility. After traveling approximately 1,900 feet, the line would either pass between a SEPTA building and an ACME supermarkets warehouse, or between two SEPTA buildings. The separation between the SEPTA and ACME buildings at the narrowest point is approximately 50 feet. The line would then continue west, crossing underneath the N. 59th Street bridge, and then turn north into the proposed Upland substation site.

The proposed underground line would need to meet or exceed the capacity of the existing 220-20 line (2,222 A for 1590 ACSR "Falcon" conductor). In order to achieve this new line rating, the underground line would require two (2) 3750 kcmil specialized (oxidized or enameled) copper conductor cables per phase on the 220-20 and 220-72 lines (for a total of twelve (12) 3750 kcmil cables). Each circuit would be built in its own concrete encased duct bank.

Duct Bank Configuration

The underground transmission line would be two (2) sets of cables with 3750 kcmil specialized copper conductor. The cables would be installed in two (2) separate duct banks, separated by a minimum of ten (10) feet, center to center.

Each duct bank would contain the following:

- Nine (9) – 8" schedule 40 polyvinyl chloride (PVC) conduits used for the transmission line cables. Six (6) out of the nine (9) conduits would have cable installed; three conduits would be reserved as spare.
- Two (2) – 2" schedule 40 polyvinyl chloride (PVC) conduits used for ground continuity cables.
- Two (2) – 2" schedule 40 polyvinyl chloride (PVC) conduits used for relaying and communication, if needed, or as spare.

The final duct bank size and layout would be determined during the detailed engineering phase of the project. Figure 2-1 shows a typical three-high by three-wide trench configuration for the proposed underground transmission.

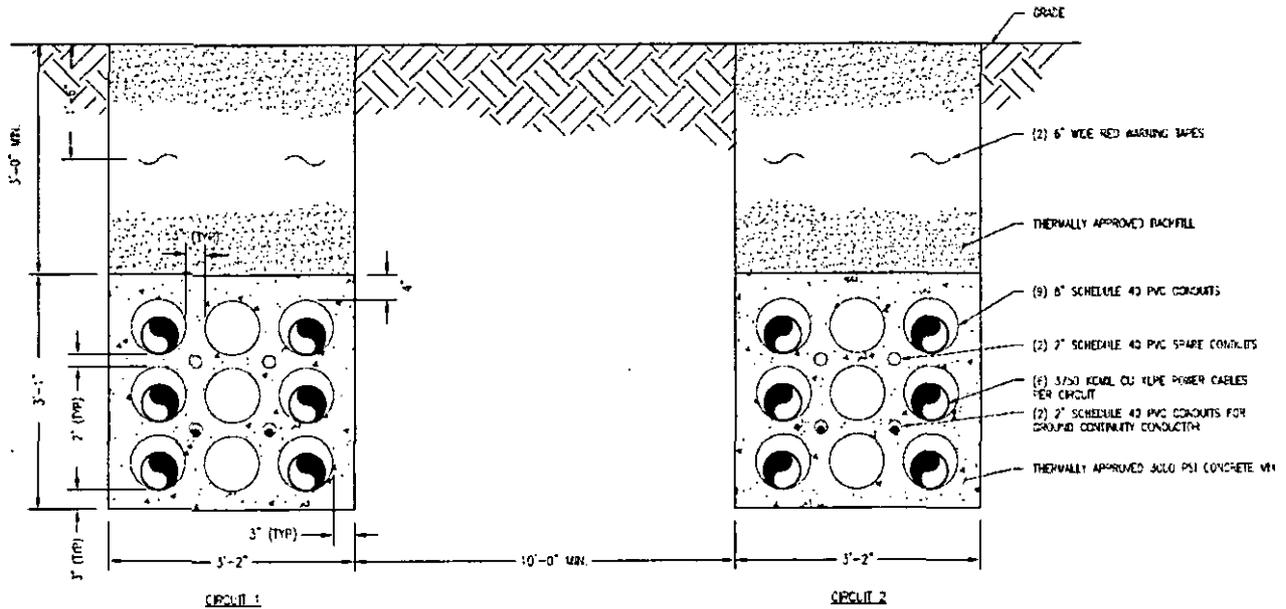


Figure 2-1 Typical 3Hx3W Trench Cross Section

3.0 Design Considerations

Terminal Yard

At the tap into the overhead 220-20 line, a double circuit terminal yard would be required. The terminal yard would be approximately 45' x 126' and would need to be located near structure SP-17. A preliminary layout for the terminal yard is shown in Appendix A.



Figure 3-1 Potential Terminal Yard Locations Near SP-17

Two (2) potential locations have been identified in Figure 3-1 for an overhead-to-underground transmission terminal yard near structure SP-17. Please refer to Appendix A for additional detail regarding the termination yard.

- Location A is closer to structure SP-17, but poses many challenges. Because of the railroad tracks to the east and south, as well as the railroad tunnel, the terrain is very uneven in this location and would require heavy grading to build a terminal yard. This could impact the operation of both Amtrak's and SEPTA's existing tracks in the immediate vicinity. Additionally, there is not adequate space to route the overhead transmission to new overhead transmission poles and into the terminal yard from the existing line. These challenges rule out Location A as a terminal yard option.
- Location B would also be challenging, as it is located on private property. Location B would be preferred to Location A, as it does not present the same constraints with the railroad and tunnel, but may face challenges with land acquisition. In addition, Location B sits at the edge of a retention basin and would also require major grading efforts to build a terminal yard.

Duct Bank Routing

In order to achieve the desired ratings, the proposed underground duct banks would have to maintain a minimum spacing of 10-ft between duct banks. This may prove to be very challenging along the narrow SEPTA property corridor. It is unknown at this time how many existing underground utilities

already run along the corridor. In addition, the area shown in Figure 3-2 below may prove especially difficult for routing multiple large duct banks.

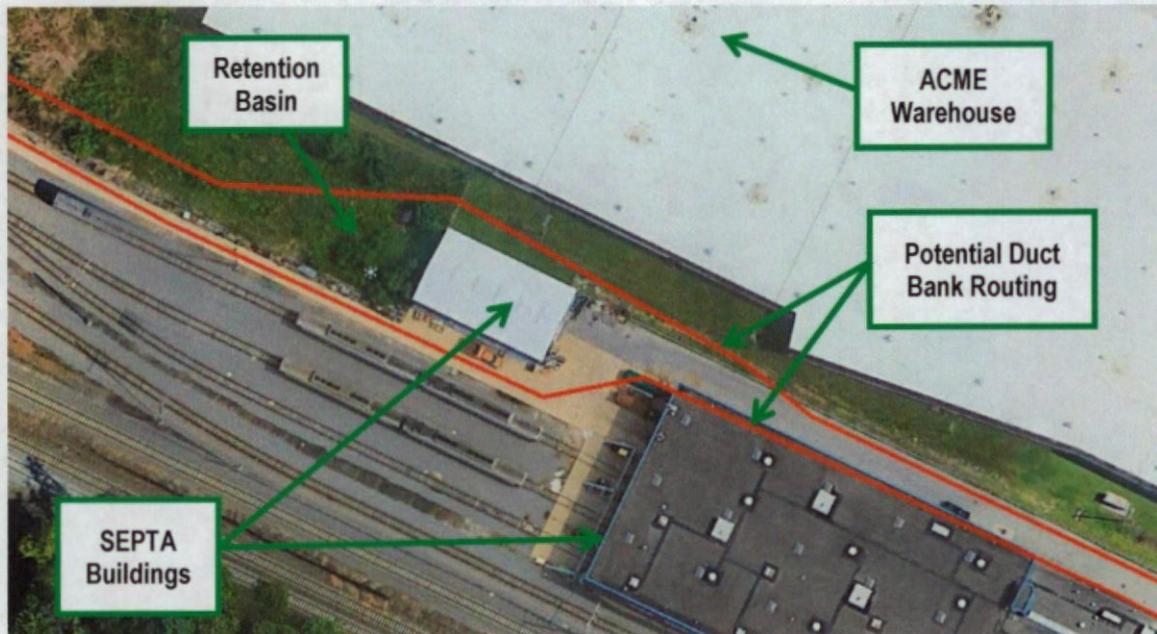


Figure 3-2 Challenging Routing Location

As shown in Figure 3-2, at the western end of the SEPTA roadway, there is a small SEPTA building with a retention basin on the western side. The two duct banks may fit in between the SEPTA building and ACME warehouse, or may have to split the small SEPTA building. The bend radius required on the southern duct bank to snake in between the SEPTA buildings would be challenging to maintain. The retention basin would also need to be open cut for duct bank installation, which could be problematic.

Due to the circuit length, a splice location would be required. At this time, it is PECO's preference to have a vault for each set of three cables, for a total of four (4) vaults at the splice location. Installing four (4) vaults close together in the narrow SEPTA roadway would be challenging.

Constructability

In addition to the terminal yard and duct bank routing challenges discussed above, the SEPTA driveway would be a highly sensitive working area. SEPTA operations requires access to their facility 24 hours a day, 7 days a week. Constructing two large duct banks along the only access road would disrupt the flow of traffic in and out of SEPTA, and would potentially block all access at certain times during construction.

Alternative Route

An alternative underground route to tie Line 220-20 into the new Upland Substation would be along Upland Way. Upland Way has many existing underground utilities, with additional underground distribution planned as part of the Upland Substation project. In addition to this, the Philadelphia Water Department (PWD) currently has work ongoing within Upland Way. Routing the underground

transmission along Upland Way would extend the overall length by approximately 0.2-miles. This alternative would require additional study, but does not appear feasible at this time.

4.0 Cost Estimates

The following cost estimates are based on recent 230 kV projects and preliminary engineering, and should not be considered final pricing. Estimates should only be used for cost comparisons between options. There are many factors that affect the overall cost of a transmission project, such as:

- Cost of materials.
- Contractor/Manufacturer availability.
- Subsurface conditions - The type and depth of soil and rock that must be excavated to place the underground cable can dramatically impact the cost. For example, construction costs in rock formations are significantly higher than construction costs in clay soils. The presence of existing underground facilities also presents a significant uncertainty when estimating the cost of an underground project.

4.1 Cost Estimate Assumptions

The following assumptions were made in the development of the above estimates:

1. Estimates are based on preliminary (study phase) engineering and should not be considered final pricing. Estimates should only be used for cost comparisons between options.
2. Costs represent direct costs to PECO and do not include staff costs, tax, or interest accrued during construction.
3. Materials used in the cost estimates meet all applicable industry standards.
4. Construction would be performed by qualified craftsmen experienced in installing high voltage underground and overhead transmission systems.
5. Due to the volatility of material costs, these estimates are subject to market fluctuations.
6. Drilled pier foundations are assumed for all overhead structures.
7. Cost for rock excavation was not included. If rock exists, additional cost may be incurred depending on the amount of rock.
8. Estimates contain a 20% contingency.
9. Costs to install temperature monitoring equipment for the underground cable system are not included.
10. No spare cable or spare parts have been included in the estimates.
11. Single point bonding of the XLPE cable sheaths was assumed.
12. Communication conduits, cable, and accessories have been included in the underground estimates.
13. The proposed underground circuits would be installed with 230 kV 3750 kcmil specialized copper cables, two cables per phase.
14. The underground construction cost estimate is Class Level 4, in accordance with the AACE Cost Estimate Classification System. The estimate was produced as part of a feasibility study and is expected to have the following level of accuracy: Low -15% to -30%, High: +20% to +50%.
15. SWPPP costs have not been included.
16. Real estate and permitting costs have not been included.

17. These estimates were assembled via "desktop study." Aerial photos were used to layout preliminary underground transmission routes.
18. All underground installation is to be performed via open cut trenching. Trenchless methods were not included.

4.2 Summary of Cost Estimates

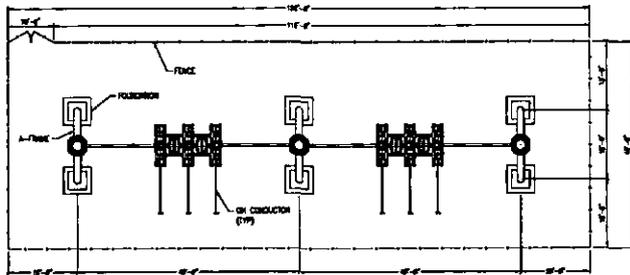
A summary of the costs for the cable investigated has been included in Table 4-1 below.

TABLE 4-1			
CONSTRUCTION COST ESTIMATES – UNDERGROUND SEPTA CORRIDOR			
	Material Costs	Labor Costs	Total Costs
Duct Bank	\$13,104,000	\$8,956,000	\$22,060,000
Manholes	\$152,000	\$140,000	\$292,000
Cable	\$4,090,000	\$818,000	\$4,908,000
Splices	\$216,000	\$192,000	\$408,000
Terminations	\$720,000	\$432,000	\$1,152,000
Arresters	\$30,000	\$30,000	\$60,000
Additional Cable Accessories	\$166,000	\$105,000	\$271,000
Communication System	\$39,000	\$46,000	\$85,000
Termination Structures	\$200,000	\$144,000	\$344,000
Terminal Yard,	\$0	\$228,000	\$228,000
Mob/Demob	\$400,000	\$500,000	\$900,000
Engineering & Construction Mgmt	\$0	\$1,220,000	\$1,220,000
Subtotal	\$19,117,000	\$12,811,000	\$31,928,000
Contingency (20%)	\$3,824,000	\$2,563,000	\$6,387,000
TOTAL UG ESTIMATE (Rounded)	\$22,941,000	\$15,374,000	\$38,315,000

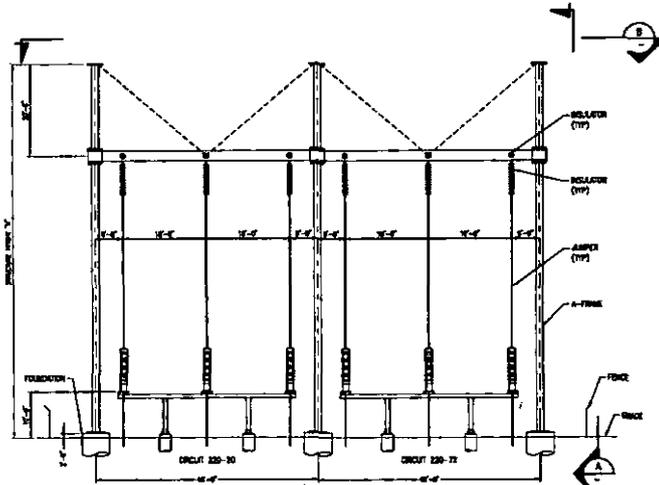
5.0 Conclusion

This feasibility study evaluated an underground alternative to tie the existing overhead 220-20 line into the new Upland Substation. The main option evaluated would run new underground duct banks along the SEPTA access roadway. This route would present many challenges including higher construction costs compared to an overhead alternative, construction access, real estate availability for the terminal yard, narrow corridor for duct bank routing, and constructability with the 24/7 operations at the SEPTA facility. Preliminary cost estimates have been provided as a means to compare this underground alternative to the proposed overhead transmission line design.

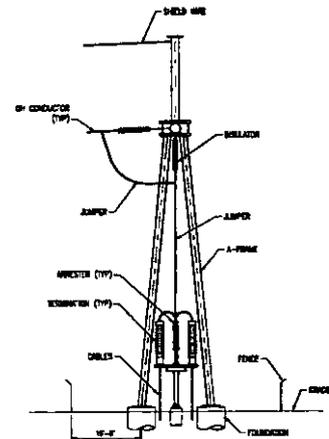
Appendix A
Preliminary Terminal Yard Layout



SECTION B-B



ELEVATION VIEW



SECTION A-A

PLEASE REFER TO SHEET U3-2 FOR DIMENSIONS AND NOTES. THIS DRAWING IS THE PROPERTY OF POWER ENGINEERS. IT IS TO BE USED ONLY FOR THE PROJECT AND AT THE LOCATION SPECIFIED HEREON. IT IS NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF POWER ENGINEERS.

REV	DESCRIPTION	DATE	BY	CHK	APPD	REFERENCE DRAWINGS
A	DESIGNED FOR REVIEW	10-10-18	JLD	EJC	JPS	

DESIGN	CE	10-10-18
DRAW	JLD	10-20-18
CHK	JPS	10-10-18
SCALE:	AS SHOWN	



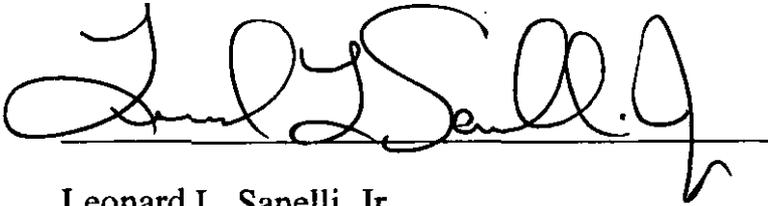
PROJECT	UPLAND SUBSTATION
DRAWING NUMBER	220-72 CIRCUIT & 220-72 CIRCUIT
DRAWING NUMBER	220V DOUBLE CIRCUIT A-TOWER TRANSMISSION STRUCTURE

DWG NUMBER	131445
DRAWING NUMBER	U3-3

Appendix B
Preliminary Route

VERIFICATION

I, Leonard L. Sanelli, Jr., hereby state that I am PECO's Director – Project and Contract Management, that the facts set forth in the following Letter of Notification and checklist are true and correct to the best of my knowledge, information and belief, and that I expect PECO to be able to prove the same at any 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).



Leonard L. Sanelli, Jr.

Director -- Project and Contract Management

PECO Energy Company

~~June 19~~, 2019

Aug 29,

RECEIVED

AUG 29 2019

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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Aug 29
Dated at Philadelphia, Pennsylvania, ~~June 19~~, 2019.



Ward L. Smith
Counsel for PECO Energy Company
2301 Market Street, S23-1
P.O. Box 8699
Philadelphia, PA 19101-8699

RECEIVED

AUG 29 2019

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

