CAPTION SHEET — CASE MANAGEMENT SYSTEM

1. REPORT DATE: 00/00/00
2. BUREAU: FUS
3. SECTION(S):
4. PUBLIC MEETING DATE: 00/00/00
5. APPROVED BY:
   DIRECTOR:
   SUPERVISOR:
6. PERSON IN CHARGE:
7. DATE FILED: 07/10/03
8. DOCKET NO: A-110500 F0333
9. EFFECTIVE DATE: 00/00/00

PARTY/COMPLAINANT:

RESPONDENT/APPLICANT: PPL ELECTRIC UTILITIES CORP

COMP/APP COUNTY: UTILITY CODE: 110500

ALLEGATION OR SUBJECT

LETTER OF NOTIFICATION OF PPL ELECTRIC UTILITIES CORPORATION FILED PURSUANT TO 52 PA CODE CHAPTER 57, SUBCHAPTER G, WITH RESPECT TO THE PROPOSED WEST HEMPFIELD - MCGOVERNVILLE # 1 AND # 2 138/69 KV TIE LINE TO BE CONSTRUCTED IN EAST HEMPFIELD TOWNSHIP, LANCASTER COUNTY, COMMONWEALTH OF PENNSYLVANIA.

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RECEIVED

JUL 10 2003

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

July 10, 2003

VIA OVERNIGHT MAIL

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: **Letter of Notification of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G With Respect to the Proposed West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line to be Constructed in East Hempfield Township, Lancaster County.**

Dear Secretary McNulty: A-110500F0333

Enclosed for filing in the above-captioned matter are an original and six (6) copies of PPL Electric Utilities Corporation's ("PPL") Letter of Notification and accompanying exhibits requesting approval to construct the West Hempfield – McGovernville #1 and #2 138/69 kV Tie Line. This Letter of Notification is filed pursuant to the Commission's regulations at 52 Pa. Code Section 57.72(d).

Copies of the Letter of Notification and exhibits have been served on the Governmental Agencies listed on the enclosed certificate of service. Notice of the filing of the Letter of Notification and a map of the proposed line route have been served upon the Property Owners listed on the enclosed Certificate of Service. The enclosed documents are to be deemed filed on the date shown above, which is the date they were deposited with an overnight express delivery service as shown on the delivery receipt attached to the mailing envelope.

Also enclosed is an additional copy of the Letter of Notification, which we request that you date stamp, as evidence of filing, and return to us in the stamped, self-addressed envelope provided for that purpose

Very truly yours,

Anthony C. DeCusatis /ap

Anthony C. DeCusatis
Counsel for PPL Electric Utilities Corporation

DOCUMENT FOLDER

Enclosure

cc: Darren Gill

150

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: LETTER OF NOTIFICATION OF PPL ELECTRIC UTILITIES CORPORATION FILED PURSUANT TO 52 PA. CODE CHAPTER 57, SUBCHAPTER G, WITH RESPECT TO THE PROPOSED WEST HEMPFIELD-McGOVERNVILLE #1 AND #2 138/69 kV TIE LINE TO BE CONSTRUCTED IN EAST HEMPFIELD TOWNSHIP, LANCASTER COUNTY	:	**Docket No.** A-110500 F0003

LETTER OF NOTIFICATION

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

I. INTRODUCTION AND OVERVIEW

1. This Letter of Notification is filed by PPL Electric Utilities Corporation ("PPL"), Two North Ninth Street, Allentown, Pennsylvania 18101, a public utility incorporated in Pennsylvania for the purpose of supplying light, heat and power to the public by means of electricity in all or portions of twenty-nine counties in eastern-central Pennsylvania.

2. PPL's attorneys are:

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

3. This Letter of Notification is filed pursuant to 52 Pa. Code § 57.72(d)(1)(vi) for approval of the Pennsylvania Public Utility Commission ("Commission" or "PUC") to construct, operate and maintain the proposed West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line in East Hempfield Township, Lancaster County.

4. The West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line will be approximately 1.8 miles in length and will connect PPL's South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines, via the exisitng Kellogg #1 and #2 Taps, to the existing West Hempfield-Donegal 138/69 kV Line and the West Hempfield-South Manheim #3 138/69 kV Line in order to relieve a potential overloading of the South Manheim-South Akron #1 and #2 Transmission Lines.

5. The route PPL has selected for the West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line parallels existing linear features consisting of a limited access highway and a railroad corridor. As a consequence, the proposed route overlaps highway and railroad easements, thereby reducing the amount of new right-of-way needed for the line.

6. The estimated cost to design and construct the West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line is $2,844,000. Construction is scheduled to begin as soon as the necessary approval is obtained from the PUC in order to support an in-service date in May 2004.

7. Accompanying this Letter of Notification is a separate ring binder containing Exhibits A - D and Appendices A - H, which provide additional information about the project. This Letter of Notification and the accompanying Exhibits and Appendices, which are incorporated herein by reference, contain all of the information required by 52 Pa. Code § 57.72(d)(4). In addition, the supporting information contains a full siting analysis, including an environmental inventory and aerial photographs. Although such additional information is not required for a Letter of Notification, PPL has included all of the information specified by the

Commission's regulations for a full siting application because, as explained in Section VI, infra, it may become necessary to seek PUC approval to acquire a portion of the needed right-of-way by condemnation.

II. DESCRIPTION OF THE PROJECT

8. PPL's South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines are supplied from PPL's South Manheim 230-69 kV Substation. The Kellogg #1 and #2 Taps are 69 kV tap lines from the South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines. The Kellogg Taps supply the Kellogg and McGovernville 69/12 kV Substations, which, in turn supply customer load. This arrangement is depicted in the upper right quadrant of Figure 1 in Exhibit A.

9. PPL's West Hempfield-Donegal 138/69 kV and West Hempfield-South Manheim #3 138/69 kV Transmission Lines are supplied from PPL's West Hempfield 230-69 kV Substation, as depicted in the lower left quadrant of Figure 1 in Exhibit A.

10. The proposed West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line will create a high capacity transmission link, via the Kellogg Tap Lines, between PPL's South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines and PPL's West Hempfield-Donegal 138/69 kV and West Hempfield-South Manheim #3 138/69 kV Transmission Lines. Creating this transmission link will alleviate potential overloading of the South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines under projected 2003 summer peak conditions in the event of a single contingency outage of either of the South Manheim-South Akron circuits. The proposed facility is depicted on Figure 2 in Exhibit A.

III. NECESSITY FOR THE PROPOSED TIE LINE

11. PPL is confronted with the serious problem of alleviating overload constraints on the South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines in the event of a

single contingency outage of either of the circuits on that line. The details of the potential overloading are discussed in Exhibit A, and projected 2003 summer loadings of those circuits under normal and single contingency conditions are set forth in Table 1 of Exhibit A. Another factor that contributes to the need for the proposed Tie Line is the current inability to shift the supply of load between the existing South Manheim and West Hempfield Substations in the event of the loss of all the transformers at either location, as more specifically described in Exhibit A (p. 6).

12. PPL carefully reviewed five possible alternatives for alleviating the overloading condition described above. The analysis of each alternative is described in detail in Exhibit A. As explained therein, the proposed West Hempfield-McGovernville Tie Line was selected as the best functional alternative based on its ability to alleviate the overloading condition, provide capacity to transfer load between the two 230-69 kV substations and facilitate the conversion of PPL's regional transmission system to 138 kV operation when projected increases in load justify that conversion.

IV. ENVIRONMENTAL ASSESSMENT AND SITING ANALYSES

13. PPL conducted an extensive, multi-faceted analysis to select a route for the proposed transmission line that best balances functional requirements, environmental factors and cost considerations.

14. Initially, a "Core Area" was delineated for detailed study. The Core Area is defined by the supply and destination service points and the natural and manmade boundaries beyond which no reasonable alternative line routes exist. The Core Area for this project is approximately 2.5 miles long, 1.6 miles wide, and encompasses 4.25 square miles in total land area. The Core Area is depicted on Map 1 in Exhibit B.

15. PPL conducted a detailed environmental inventory of the Core Area to identify and locate environmental factors that need to be considered when evaluating and selecting transmission line routes, which include:

- Linear features, such as existing electric transmission lines, roads and highways, and railroads.
- Existing land use.
- Municipal zoning.
- Soils and floodplains.
- Slopes and grades.
- Natural and physical features (vegetation, wetlands, streams, wildlife and wildlife habitat and endangered and threatened species of flora and fauna).
- Farmland preservation areas.
- Cultural and other unique features, such as schools, churches, parks, natural and recreational areas, historic sites, and archeological sites.

16. The information gathered from the environmental inventory was recorded on a series of maps, which are provided as Maps 1 - 7 in Exhibit B. The maps can be viewed together to identify areas that provide the most appropriate route for a proposed line considering environmental impact, functional requirements and economics. A detailed description of the environmental inventory and mapping is provided in Exhibit B.

17. Consultation with governmental officials in the Core Area is an important part of PPL's siting analysis. The proposed project was reviewed with municipal and state officials and agencies. This information was used, in conjunction with the environmental inventory, to identify "constraints," i.e., areas that should be avoided, if possible.

18. Using the aforementioned mapping and analysis procedure, PPL identified the proposed line route, which takes advantage of existing linear features and minimizes land use "constraints" to the extent possible. PPL also identified an alternative route that, after thorough

analysis, was rejected because of its greater visual and environmental impacts and higher construction and operating costs, as fully explained in Exhibit C (pp. 6-7).

19. PPL's proposed line route, for which approval is requested herein, is plotted on the aerial map in the Exhibit C map pocket and is described in detail in Exhibit C at pages 1-2. The proposed line route is 1.8 miles long and, for virtually its entire length, parallels existing linear features (a limited access highway and a rail corridor) such that the line's right-of-way will overlap existing highway and railroad easements. The proposed line route begins at its point of interconnection with the West Hempfield-Donegal and West Hempfield-South Manheim #3 138/69 kV Lines, which lies between Route 283 and the Amtrak railroad corridor, approximately 1,650 feet west of Landisville Road. The proposed route then heads northeast and crosses Route 283 approximately 315 feet from that connection point. After crossing Route 283, the line heads southeast, parallel to Route 283, a distance of approximately 1.1 miles. Most of this segment of the route lies over agricultural land, and a portion crosses property formerly owned by Armstrong World Industries. The last segment of the line, approximately 2,890 feet in length, also heads southeast, crosses Route 283 and the Amtrak railroad tracks, and connects to the Kellogg #1 and #2 Taps on the property of Kellogg USA. A small segment of this line section crosses property owned by East Hempfield Township. This undeveloped parcel is presently being farmed but is zoned for Suburban - Residential land use. The balance of this section of the line occupies industrial-zoned property. Agricultural and industrial lands uses are both compatible with transmission line siting.

20. The construction, operation and maintenance of the West Hempfield-McGovernville Tie Line will not have any significant environmental or land use impacts:

- For most of its length, the proposed line will parallel an existing limited access highway and existing Amtrak railroad tracks. By paralleling these linear features,

the amount of right-of-way needed for the transmission line is reduced (Exhibit C, p. 2).

- The proposed line will not affect any airports (Exhibit C, p. 3).
- No endangered or threatened plant or animal species will be affected because state and federal agency reviews indicate that it is unlikely any exist in the entire Core Area and no compatible habitat will be disturbed by the proposed line (Exhibit C, p. 4).
- No lakes, ponds or major bodies of water will be affected. The stream crossings required will be easily spanned. Structures will be located well away from the streams, and no impacts will occur (Exhibit C, p. 4).
- Wetlands along the line will be delineated, and all necessary permits will be obtained from the Pennsylvania Department of Environmental Protection and U.S. Army Corps of Engineers if there is any potential for wetlands to be affected (Exhibit C, p. 3).
- No encroachment on flood-prone areas will occur (Exhibit C, p. 4).
- No landmarks, historic districts or sites of historical or cultural significance will be affected (Exhibit C, p. 5).
- The Pennsylvania Historical and Museum Commission determined that there is no evidence of any archeological sites along the preferred route (Exhibit C, p. 5).
- No schools, churches, cemeteries, parks or recreational areas will be affected (Exhibit C, p. 5).
- The crossings of Route 283 and the Amtrak corridor will not affect adversely either the highway or the railroad because the line will be designed to span these facilities. All appropriate crossing permits will be obtained before construction is commenced (Exhibit C, p. 5)

21. The preferred line route was designed to avoid as many impacts as practical.

Where impacts are unavoidable, PPL will employ mitigating measures to minimize such impacts. Examples of such mitigating measures include PPL's "Transmission Line Right-of-Way Program For Vegetation Management" and "Specifications for Soil Erosion and Sedimentation Control on Transmission Line Rights-Of-Way."

ppl

Before the
Pennsylvania Public Utility Commission

West Hempfield – McGovernville #1 & #2 138/69 kV Tie

Letter of Notification

Application Docket No. A-110500 F0333

Submitted by: PPL Electric Utilities Corp.

V. ENGINEERING DESCRIPTION

22. The 1.8 mile West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line will be designed and constructed for double circuit 138 kV operation. However, the line will initially be operated at 69 kV until load growth projected for this area requires increasing the voltage of the regional transmission system to 138 kV. The West Hempfield-McGovernville Tie Line will connect the existing South Manheim-South Akron #1 and #2 138/69 kV Transmission Lines, via the existing Kellogg #1 and #2 Taps, to the existing West Hempfield-Donegal and West Hempfield-South Manheim #3 138/69 kV Lines. Additionally, six switches will be added to existing and proposed facilities to enhance operating flexibility.

23. The West Hempfield-McGovernville Tie Line will consist of single shaft steel poles with steel upswept conductor support arms. Tangent poles will be direct embedded, and angle poles will be installed on concrete foundations. The line will have approximately 17 structures averaging 95 feet in height. Average span lengths will be 605 feet. The proposed structures are depicted in Figures 1 and 2 of Exhibit D.

24. The West Hempfield-McGovernville Tie Line will consist of six power conductors, three on each side of the poles, and one overhead ground wire (OHGW). The power conductors will be 556.5 KCMIL 24/7 stranding ACSR. The OHGW will be 3/8-inch extra high strength steel.

25. Table 1 of Exhibit D shows the designed minimum conductor-to-ground clearances and the conductor thermal ratings for the proposed line.

26. The West Hempfield-McGovernville Tie Line will be designed, constructed, operated and maintained in accordance with the *National Electrical Safety Code* ("NESC") and will include such further design, construction and maintenance features as are required by PPL

standards and by law. Appendix F contains a detailed discussion of PPL Design Criteria and Safety Practices. The complete Engineering Description is set forth in Exhibit D.

VI. RIGHT OF WAY

27. PPL's standard right-of-way width for 138/69 kV transmission lines is 100 feet. The right-of-way width is determined by structure type, design tensions, span length and the distance that conductors may be moved by cross-winds. Because the proposed line parallels Pennsylvania Department of Transportation ("PaDOT") and Amtrak rights-of-way, the proposed transmission line easement overlaps the highway and railroad easements. The overlapping easements allow PPL to acquire less than the standard 100-foot easement for the majority of the proposed line route. Where easements overlap, the right-of-way width varies between 65 and 85 feet, as shown on the cross-sections provided as Figures 1 and 2 in Exhibit C. The aerial photograph (Exhibit C map pocket) shows the proposed line route, identifies the properties that will be traversed by the proposed line, and denotes right-of-way widths.

28. PPL has acquired right-of-way from five of nine private property owners. Negotiations are progressing with three of the four outstanding property owners. To date, PPL has been unsuccessful in its efforts to negotiate the required easements over the property of John Landis. There is no reasonable alternative routing that would avoid the Landis property. Thus, PPL may have to request that the Commission grant approval for the Company to condemn an easement across the Landis property.

29. Crossing agreements with both PaDOT and Amtrak will be entered into prior to construction of the proposed line.

VII. COST AND COMPLETION DATE

30. The estimated cost to design and construct the West Hempfield-McGovernville Tie Line is $2,844,000. Construction is scheduled to begin as soon as PUC siting approval is obtained to support an in-service date in May of 2004.

VIII. MISCELLANEOUS

31. No litigation has been concluded or is in progress concerning any aspect of the project.

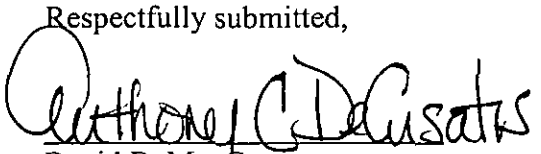
32. Copies of this Application are being served in accordance with the provisions of 52 Pa. Code § 57.72(d)(3).

33. As soon as practicable after the filing of this Letter of Notification, PPL will publish notice of the filing in two newspapers of general circulation in the area of the line. This notice will: (a) note the filing with the Commission; (b) provide a brief description of the project and its location; (c) provide area locations where the complete Letter of Notification and accompanying Exhibits and Appendices may be reviewed by the public; and (d) instruct that any party who wishes to participate in this proceeding should contact the Commission's Secretary, Mr. James J. McNulty, within 15 days, at the Commission's Harrisburg address.

IX. CONCLUSION

PPL respectfully requests that the Commission approve the construction of the West Hempfield-McGovernville #1 and #2 138/69 kV Tie Line as proposed in this Letter of Notification.

Respectfully submitted,



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Attorneys for PPL Electric Utilities Corporation

Dated: July 10, 2003

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA)
: SS
COUNTY OF LEHIGH :
)

JOHN F. SIPICS, being duly sworn according to law, deposes and says that he is Vice President – Asset Management of PPL Electric Utilities Corporation; that he is authorized to and does make this affidavit for it; and that the facts set forth above are true and correct to the best of his knowledge, information and belief and he expects PPL Electric Utilities Corporation to be able to prove the same at hearing hereof.

John F. Sipics

Sworn to and subscribed
before me this 20th day
of June.

James R. Harper

Notarial Seal
James R. Harper, Notary Public
City Of Allentown, Lehigh County
My Commission Expires Dec. 23, 2006
Member, Pennsylvania Association Of Notaries

SUMMARY

This Application is submitted by PPL Electric Utilities Corp. (PPL, or the Company) pursuant to the Pennsylvania Public Utility Commission's (PUC, or the Commission) regulations at 52 Pennsylvania Code, Chapter 57, Subchapter G, for approval to construct the West Hempfield – McGovernville #1 and #2 138/69 kV Transmission Tie Line. The proposed line route is located in East Hempfield Township, Lancaster County.

The proposed West Hempfield – McGovernville #1 and #2 138/69 kV Transmission Tie Line will be approximately 1.8 miles long. It will connect the Kellogg #1 and #2 Taps off the South Manheim - South Akron #1 and #2 138/69 kV Lines with the existing West Hempfield - Donegal and West Hempfield - South Manheim #3 138/69 kV Lines. The proposed double circuit line will be constructed for future 138 kV operation although it will operate initially at 69 kV. The estimated cost of this project is $2.844 million.

This project has a required in-service date of May 2003. (A project's required in-service date is defined as the date the proposed facility needs to be placed in-service to prevent existing facilities from violating the Company's planning principles.) However, the scheduled in-service date has slipped to May 2004 because of right-of-way acquisition problems. Construction of the facility described herein is required to alleviate a forecasted overload on the South Manheim - South Akron #1 and #2 69 kV lines for a single contingency outage of either line.

This document sets forth the necessity statement, siting analysis, and engineering description for the proposed West Hempfield – McGovernville #1 and #2 138/69 kV Transmission Tie Line and is comprised of the following exhibits and appendices:

Exhibit "A" - Necessity Statement
Exhibit "B" - Core Area Environment
Exhibit "C" - Siting Analysis
Exhibit "D" - Engineering Description

LOCATION MAP

EXHIBIT "A"

WEST HEMPFIELD - McGOVERNVILLE #1 & #2 138/69 kV TIE

NECESSITY STATEMENT

TABLE OF CONTENTS

LIST OF FIGURES

MAP

EXHIBIT "A"

WEST HEMPFIELD - McGOVERNVILLE #1 & #2 138/69 kV TIE

NECESSITY STATEMENT

I. INTRODUCTION

PPL proposes to construct a new 1.8-mile double circuit 138/69 kV transmission line. The proposed new West Hempfield - McGovernville #1 and #2 Tie Line will connect the Kellogg #1 and #2 Taps off the South Manheim - South Akron #1 and #2 138/69 kV Lines with the existing West Hempfield - Donegal and West Hempfield - South Manheim #3 138/69 kV Lines. The proposed double circuit transmission line will be operated initially at 69 kV until load growth requires its conversion to 138 kV operation. The proposed 1.8 miles of new transmission line will extend existing transmission line facilities and will transfer supply of the McGovernville and Kellogg 69-12 kV Substations from the South Manheim 230-69 kV Substation to the West Hempfield 230-69kv Substation.

A PPL system map showing the existing transmission line facilities with a design voltage of 35 kV or greater is included as Map 1 in the Exhibit "A" map pocket. This filing addresses only the existing and proposed 138/69 kV system in northwestern Lancaster County.

The estimated cost to design and construct this project is $2.844 million including the cost to acquire rights-of-way. The project's required in-service date is May 2003. The required in-service date is defined as the date the proposed facility needs to be placed in-service to prevent existing facilities from violating the Company's planning guidelines (see discussion below). The current scheduled in-service date has been delayed to May 2004.

II. SYSTEM PLANNING PROCESS AND GUIDELINES

System planning is the process PPL employs to assure that its 69 kV and 138 kV transmission lines (also referred to as the regional system) can supply electricity to all customer load in a reliable, economic and environmentally acceptable manner. The goal of this process is to assure that PPL's regional transmission system is planned and constructed so that:

- It can sustain probable contingencies and disturbances with no loss of load;
- It can adequately serve each customer's needs with regard to capacity, voltage and reliability; and
- It is in conformance with the applicable PPL reliability principles and practices.

The reliable and economical operation of the PPL regional transmission system requires conformity to planning guidelines for system expansion. The principles upon which these planning guidelines are based recognize that:

- System expansion should be coordinated to achieve the most economical balance of construction and operating expenditures;
- System expansion should maintain a proper balance between the degree of risk, amount and type of load interrupted, and the cost of providing the needed expansion; and
- System reliability should be maintained to prevent large scale, long term, or frequent service interruptions and, thereby, avoid the adverse effects and hazards to the public of such interruptions.

In accordance with these guidelines and the PPL Reliability Criteria, PPL's regional transmission system is planned so that:

1. Normal operation of the system will not load any electric facility beyond its normal continuous rating.

2. The loss of a single transmission line, double circuit line (due to the loss or failure of a single tower or pole), generating unit connected to the regional transmission system, power transformer, substation bus, or circuit breaker, does not result in any system electric facility being operated beyond its applicable emergency rating.
3. No customer load should be interrupted for routine maintenance of regional transmission facilities.
4. The loss of any single facility should not result in a voltage drop of more than 5% on the regional transmission system.

The planning process begins with development of a computer model of the future system. A specific study year is chosen, and the future system model is developed using the existing system plus any planned modifications to the transmission system scheduled to be in service prior to the study year. Load levels used in the system model are based on the latest forecast prepared within the Asset Operations Evaluation Department of PPL. The load forecast is based on recent and past summer peak loads and on normal and high temperature and humidity indices.

Once the system model is complete, comprehensive power flow simulations are performed to determine the ability of the system to comply with the PPL Reliability Criteria. This is accomplished by simulating an outage of each regional transmission and bulk power facility. All conditions under which the system is not in conformity with the PPL Reliability Criteria are identified, and system reinforcements are added to bring the system into conformity. Estimated costs and lead-times to implement the required reinforcement are also identified. Computer simulations of the system are developed incorporating the identified reinforcement alternatives in order to ascertain the best overall alternative to meet the needs of the region in a reliable, economic and environmentally acceptable manner.

III. EXISTING REGIONAL TRANSMISSION SUPPLY SYSTEM: WEST HEMPFIELD AND SOUTH MANHEIM AREA

Figure 1 shows the relevant existing 138/69 kV transmission lines in the part of northwestern Lancaster County served by the South Manheim and West Hempfield 230-69 kV Substations. The 230-69 kV power transformers at South Manheim are primarily supplied from the Brunner Island–South Manheim 230 kV Line, part of the PPL bulk power system. The West Hempfield 230-69 kV power transformers are supplied primarily from the Brunner Island–West Hempfield 230 kV Line and, to a lesser degree, from the West Hempfield – Manor 230 kV Line. The 69 kV transmission lines that exit from the South Manheim and West Hempfield 230-69 kV Substations provide electrical supply to 25 69-12kV distribution substations, and are projected to serve a total load in excess of 400 MW by the 2003 summer peak period.

Table 1, below, shows the 69 kV transmission line ratings and expected loading under projected 2003 summer peak conditions.

TABLE 1

SOUTH MANHEIM-SOUTH AKRON #1 AND #2 138/69kV LINE

RATING/LOAD TABLE– SUPPLIED BY SOUTH MANHEIM 230/69 kV SUBSTATION

TABLE OF 2003 SUMMER LOADING VERSUS RATINGS FOR NORMAL AND SINGLE CONTINGENCY CONDITIONS

Substations and 69kV Lines	Line Summer Rating		Without load transfer to West Hempfield Substation		With transfer of approximately 32 MVA to West Hempfield Substation	
	System Normal	First Cont.[1]	System Normal	First Cont[1]	System Normal	First Cont[1]
	MVA Rating	MVA Rating	MVA LOAD	MVA LOAD	MVA LOAD	MVA LOAD
SOUTH MANHEIM 230/69KV SUBSTATION						
S. Manheim – S. Akron #1 69kv line	97	120	69	129 107% overload	48	94
S. Manheim – S. Akron #2 69kv line	97	120	53	129 107% overload	42	94

[1] "First contingency rating" is a short-term rating when one or the other 69 kV line is out.

IV. DEFINITION OF THE PROBLEM

The problem presented is how to alleviate summer 2003 overload constraints on the South Manheim - South Akron #1 and #2 69 kV lines for a single contingency outage of either line. The proposed West Hempfield – McGovernville #1 and #2 138/69 kV Tie Line would address the problem by providing sufficient load transfer capability to alleviate these overloads in a manner consistent with the PPL Reliability Criteria. This project is part of a coordinated effort to provide load transfer capability, as explained below, and facilitates future conversion of the regional transmission system to 138 kV operation. In addition, construction of the proposed line will eliminate concerns with the following conditions that will cause overloads and associated low-voltages in excess of PPL's system expansion planning criteria:

- A loss of the South Manheim 69 kV Bus No. 1 would cause the South Manheim – South Akron #2 69 kV Line to overload and would cause voltage drops exceeding 7.5% on the Homet and Dillerville/Armstrong 69 kV Buses.

- A loss of the South Manheim 69 kV Bus No. 3 would cause the South Manheim – South Akron #1 69 kV Line to overload and would cause voltage drops exceeding 7.5% on the Homet and Dillerville/Armstrong 69 kV Buses.

- In the event of the loss of all 230-69 kV power transformers at either the West Hempfield or South Manheim 230-69 kV Substations, the proposed line will provide a high capacity transmission tie path for quick restoration of service to customers.

V. 138 kV SYSTEM CONVERSION

The conversion to 138 kV operation is expected to occur around the 2011/12 time frame when demand is projected to exceed the capability of the 69 kV transmission lines in this area. Constructing the proposed transmission line for 138 kV operation will facilitate

future conversion of the regional transmission system in this area to 138 kV while minimizing interruptions to customer service during the conversion.

VI. PROPOSED SYSTEM

The proposed system addition will consist of a 1.8-mile double circuit, high-capacity 138/69 kV transmission tie line. The proposed line will provide the link in the regional transmission system that will transfer load between the West Hempfield and South Manheim 230-69 kV Substations under various outage scenarios. Specifically, the proposed line will prevent overloading of the South Manheim – South Akron #1 and #2 69 kV Transmission Lines by transferring the supply of approximately 32 MVA of load from the South Manheim 230-69 kV Substation to the West Hempfield 230-69 kV Substation. Additionally, the proposed line will provide a high capacity 138/69 kV regional transmission tie to accommodate future load growth, allow load transfers between the West Hempfield and South Manheim 230-69 kV Substations for the loss of 230-69 kV power transformers at either substation, and provide improved operating flexibility as compared to the existing system.

A one-line diagram depicting the proposed system additions is shown in Figure 2 at the end of Exhibit "A".

VII. ALTERNATIVES CONSIDERED

Five alternatives were considered for providing the needed reinforcement to northwestern Lancaster County. Each alternative was designed to eliminate the single contingency overload of one circuit of the South Manheim –South Akron 138/69 kV Line if the other circuit were lost and, thereby, ensure that customer load in the region could be supplied in accordance with PPL's reliability criteria in an economic and environmentally acceptable manner. Each of the five alternatives are identified and described below:

Alternative 1 - Construct a 1.8 mile, double circuit 138/69 kV line from the Kellogg #1 and #2 Taps off the South Manheim - South Akron #1 and #2 138/69 kV Lines to the existing West Hempfield - Donegal and West Hempfield - South Manheim #3 138/69 kV lines (Preferred Option).

Alternative 1 would construct a new double circuit 138/69 kV transmission line of approximately 1.8 miles in length to be operated at 69 kV until load growth requires conversion to 138 kV operation. The proposed transmission line will extend the existing transmission facilities to supply the McGovernville and Kellogg 69-12 kV Substations from the West Hempfield 230-69kv Substation.

The transmission line will be constructed with 556.5 KCMIL ACSR conductors to provide a high capacity transmission tie between PPL's West Hempfield and South Manheim 230-69 kV Substations. The lines will connect to the West Hempfield – Donegal and West Hempfield – South Manheim #3 69 kV Lines in the vicinity of the Landisville 69-12 kV Substation on the West Hempfield side and in the vicinity of the McGovernville 69-12 kV Substation on the South Manheim side. The estimated cost to design and construct this project is $2.844 million including the cost to acquire rights-of-way.

This reinforcement alternative resolves the short-term capacity concerns and contributes to the long-term development of the 138/69 kV regional transmission supply system. It will relieve overloading on the South Manheim – South Akron #1 and #2 69 kV Lines by facilitating the transfer of approximately 32 MVA of load to the West Hempfield 230-69 kV Substation. Additionally, it will facilitate the future conversion to 138 kV operation. Additionally, it will establish a high capacity tie line between the West Hempfield and South Manheim Substations to provide transfer capability for the loss of power transformers at either of these substations.

This alternative is more economical because it requires the construction of only 1.8 miles of new transmission line and minimizes right-of-way acquisition by paralleling and overlapping existing state highway and railroad right-of-way. No extensive outages of existing facilities would be required to construct the new transmission line, thus

maintaining the reliable supply to customers in this area. In addition, no substation construction work would be required for this option. For the reasons cited above, this option is the preferred alternative.

Alternative 2 - Construct a new double circuit 69 kV transmission line of approximately 5 mile in length from the South Manheim 230-69 kV Substation to the McGovernville/Kellogg Taps.

Alternative 2 would establish a new double circuit 69 kV transmission line, utilizing 556.5 KCMIL ACSR conductors, from the South Manheim 230/69 kV Substation, a distance of approximately 5 miles, to the McGovernville/Kellogg 69 kV Taps on the South Manheim – South Akron #1 and #2 69 kV lines. This project would eliminate the single contingency overload conditions on the South Manheim-South Akron #1 & #2 69 kV Line by carrying approximately 35 MVA of load to supply the McGovernville and Kellogg Substations. By creating another transmission link between the South Manheim 230-69 kV Substation and the McGovernville/Kellogg Substations, reliability would be improved and customer outages and low voltage concerns would be minimized. This alternative is estimated to cost $8.4 million.

This reinforcement alternative would resolve the short-term capacity concerns and would contribute to the long term development of the 69 kV regional transmission supply system by providing additional transmission lines to the region supplied by the South Manheim 230-69 kV Substation. However, this alternative is less economical, would require more construction lead-time, and would encumber more land because of the greater length of the new transmission line. The lead-time required to acquire right-of-way and construct this alternative would be significantly longer than for the preferred option, and the need to obtain more right-of-way would add uncertainty. In addition, the new transmission line would not facilitate future conversion to 138 kV operation. Finally, this alternative would not connect the West Hempfield and South Manheim 230-69 kV Substations, thereby limiting operating flexibility by preventing load transfers during planned and unplanned outages at either substation. Due to all of these limitations, this alternative was eliminated in favor of Alternative 1.

Alternative 3 – Install a 138-69 kV substation between the existing 138 kV system and the 69 kV System

Alternative 3 would require PPL to construct a new 138-69 kV substation with two 138-69 kV 75 MVA power transformers. In addition, PPL would have to construct the associated transmission line and protection and control facilities to interconnect the existing 69 kV and 138 kV systems. This alternative is estimated to cost approximately $8.35 million.

This reinforcement alternative would resolve the short-term overload concerns. However, it would not provide increased reliability during planned and forced outages of the 138-69 kV transformers. Furthermore, the 138 kV system, when in network operation, is subjected to heavy power transfers during an outage of the Brunner Island – South Manheim 230 kV Line. These heavy power flows cause capacity constraints in the 138 kV system resulting in overloads requiring additional reinforcement of the existing 138 kV system. Additionally, the prospect of finding a suitable site to build a new 138-69 kV substation near a point where the existing 69 and 138 kV systems converge in a congested area would be difficult. Due to all of these limitations, this alternative was eliminated in favor of Alternative 1.

Alternative 4 – Convert the Dillerville and Armstrong Cork 69-12 kV Substations to 138 kV operation

Alternative 4 would require PPL to convert the Dillerville and Armstrong Cork 69-12 kV Substations and their associated transmission line connections to 138 kV operation. This conversion would transfer approximately 50 MVA of summer peak load from the South Manheim – South Akron #1 and #2 69 kV Lines to the 138 kV system. The estimated cost of this alternative is approximately $4.7 million.

This reinforcement alternative would resolve the short-term overload concerns by transferring approximately 50 MVA of load from the South Manheim - South Akron #1 and #2 69 kV Lines to the 138 kV system. However, the conversion of these substations and associated load transfer would cause overloads in the 138 kV system by

approximately the summer of 2006. Therefore, the 138 kV system would also have to be upgraded, at an additional cost of $1 million. Furthermore, conversion of the substations to 138 kV and connecting them to the 138 kV system would require considerably more construction time than the preferred option. Reliability of service to customers supplied by the Dillerville and Armstrong Cork Substations would be affected during the conversion because of limited load transfer capability to adjacent transmission lines. Due to all of these limitations, this alternative was eliminated in favor of Alternative 1.

Alternative 5- Rebuild and reconductor approximately 4 miles of the existing double circuit South Manheim – South Akron #1 & #2 69 kV Lines from the South Manheim Substation to the Kellogg/McGovernville Tap

Alternative 5 would rebuild the existing double circuit 69 kV transmission line with 795 KCMIL ACSR conductors for a distance of approximately four miles from the South Manheim 230-69 kV Substation to the McGovernville/Kellogg 69 kV Taps. This project would eliminate the single contingency overload conditions on the South Manheim - South Akron #1 & #2 69 kV Line. This alternative is estimated to cost $4.6 million

Alternative 5 would resolve the short-term capacity concerns but would not contribute to the long-term development of the 69 kV transmission supply system by providing additional transmission lines to the area supplied by South Manheim Substation. This alternative is less economical, would require rebuilding 4 miles of existing double circuit transmission line and could disrupt service to customers during construction. In addition, rebuilding of the existing transmission lines does not facilitate future conversion to 138 kV and does not provide load transfer capability between the West Hempfield and South Manheim Substations for the loss of transformation at either of these substations. Due to all of these limitations, this alternative was eliminated in favor of Alternative 1.

Conclusion

Based upon the analysis summarized above, PPL determined that Alternative 1 was the best solution to the problem identified in Section IV, above.

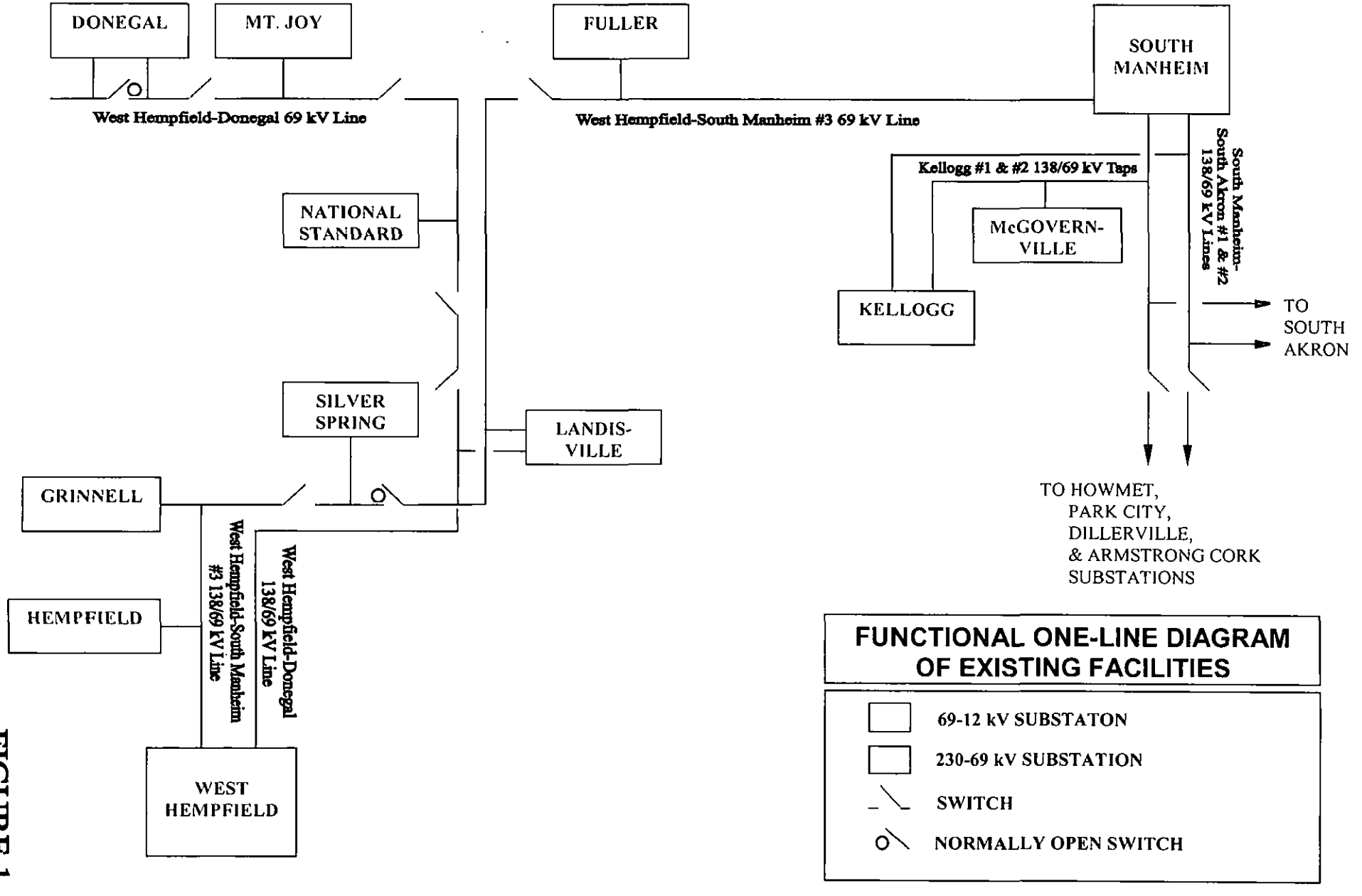

DONEGAL
MT. JOY
FULLER
SOUTH MANHEIM
West Hempfield-Donegal 69 kV Line
West Hempfield-South Manheim #3 69 kV Line
Kellogg #1 & #2 138/69 kV Taps
South Manheim-South Akron #1 & #2 138/69 kV Lines
NATIONAL STANDARD
McGOVERN-VILLE
KELLOGG
TO SOUTH AKRON
SILVER SPRING
LANDIS-VILLE
GRINNELL
TO HOWMET, PARK CITY, DILLERVILLE, & ARMSTRONG CORK SUBSTATIONS
West Hempfield-South Manheim #3 138/69 kV Line
West Hempfield-Donegal 138/69 kV Line
HEMPFIELD
WEST HEMPFIELD
FUNCTIONAL ONE-LINE DIAGRAM OF EXISTING FACILITIES
69-12 kV SUBSTATON
230-69 kV SUBSTATION
SWITCH
NORMALLY OPEN SWITCH

FIGURE 1

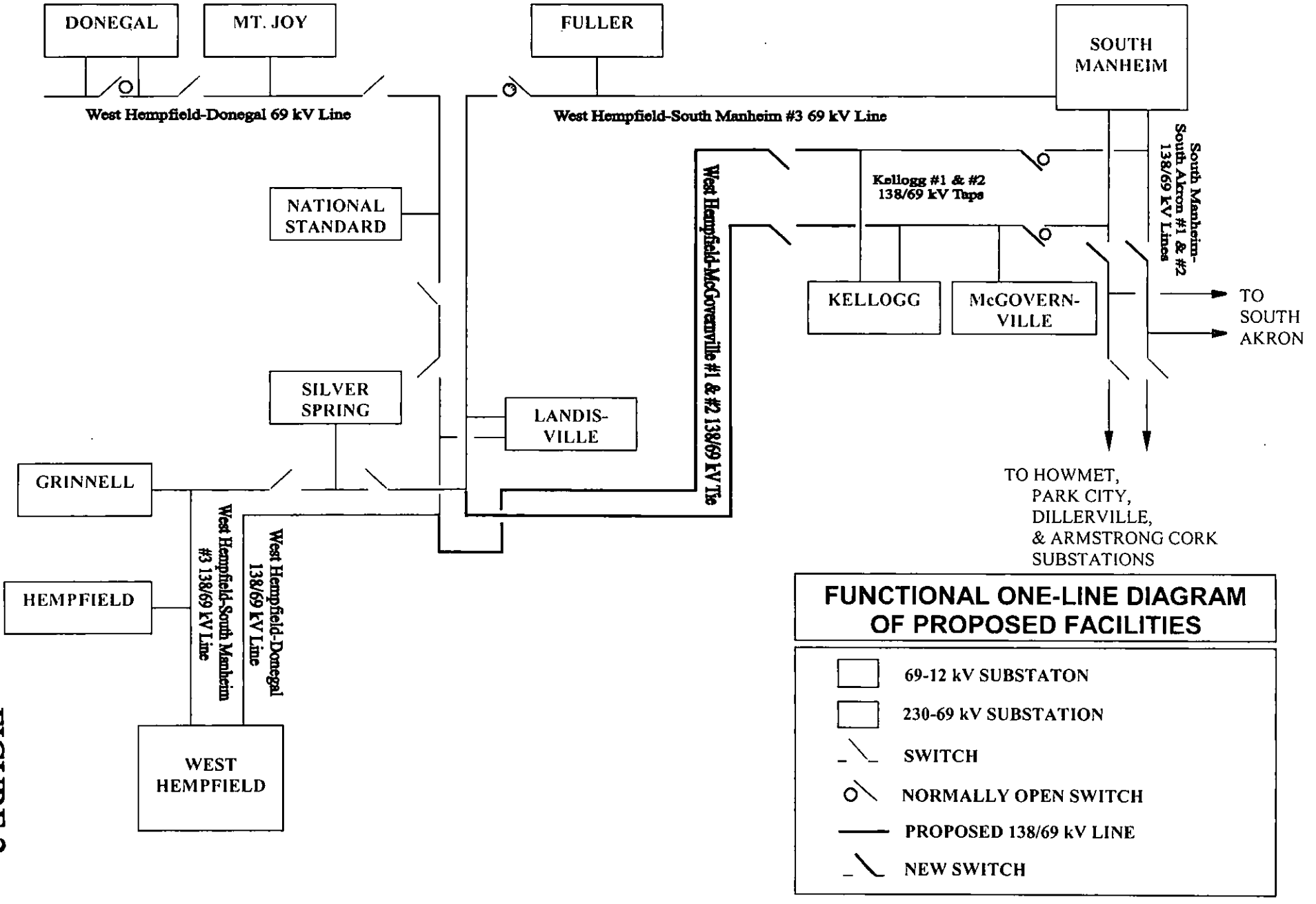
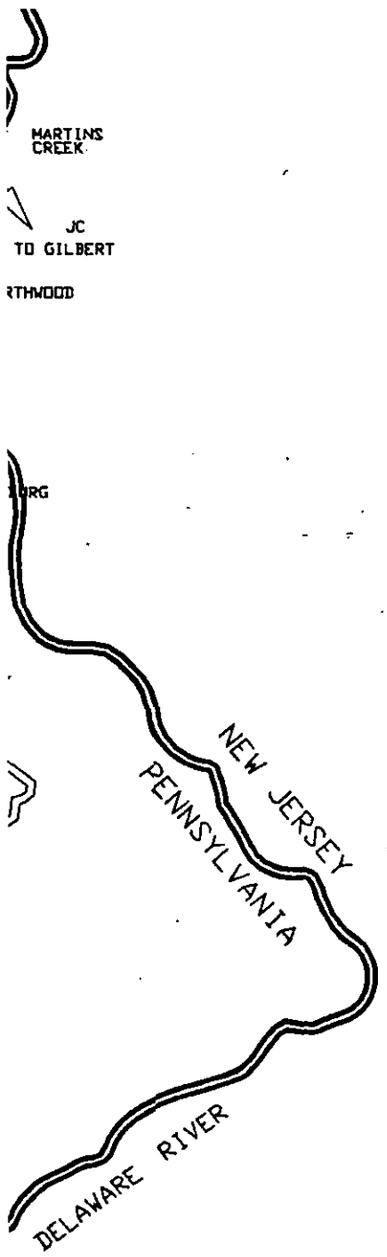

DONEGAL
MT. JOY
FULLER
SOUTH MANHEIM
West Hempfield-Donegal 69 kV Line
West Hempfield-South Manheim #3 69 kV Line
South Manheim-South Akron #1 & #2 138/69 kV Lines
Kellogg #1 & #2 138/69 kV Taps
West Hempfield-McGovernville #1 & #2 138/69 kV Tie
NATIONAL STANDARD
KELLOGG
McGOVERN-VILLE
TO SOUTH AKRON
SILVER SPRING
LANDIS-VILLE
GRINNELL
TO HOWMET, PARK CITY, DILLERVILLE, & ARMSTRONG CORK SUBSTATIONS
West Hempfield-South Manheim #3 138/69 kV Line
West Hempfield-Donegal 138/69 kV Line
HEMPFIELD
WEST HEMPFIELD
FUNCTIONAL ONE-LINE DIAGRAM OF PROPOSED FACILITIES
69-12 kV SUBSTATON
230-69 kV SUBSTATION
SWITCH
NORMALLY OPEN SWITCH
PROPOSED 138/69 kV LINE
NEW SWITCH

FIGURE 2



OVER SIZED DOCUMENTS

PPL ELECTRIC UTILITIES

ELECTRICAL SYSTEM MAP

WEST HEMPFIELD–McGOVERNVILLE

ACCT–

SCALE– NONE

BY–

REVIEWED

APPROVED ORIGINALLY BY G. HAKUN III

DATE 7/17/85

PP&L DRAWING NO. D191830

SHEET NO. 1

REV. 23

APPROVED

PC FORMAT

EXHIBIT "B"

WEST HEMPFIELD - McGOVERNVILLE #1 & #2 138/69 kV TIE

STUDY AREA ENVIRONMENT

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT.)

EXHIBIT "B" MAPS

EXHIBIT "B"

WEST HEMPFIELD – McGOVERNVILLE #1 & #2 138/69 kV TIE

STUDY AREA ENVIRONMENT

I. INTRODUCTION

Exhibit "B" provides an environmental inventory of the West Hempfield-McGovernville Transmission Line Project Core Area and Study Area. The information contained in this report was gathered from several sources, including: black and white aerial photography; field reconnaissance surveys; meetings and discussions with environmental specialists, planners and other individuals familiar with the area; information supplied by public agencies; and appropriate publications. References used and contacts made to gather this environmental information are listed in Appendices "B" (Bibliography) and "C" (Governmental Agencies, Municipalities and Other Public Entities Contacted).

II. PROJECT AREA LOCATION AND DESCRIPTION

The project area is located approximately six miles northwest of the City of Lancaster in Lancaster County. The Core Area is situated entirely within East Hempfield Township and surrounds the village of Landisville.

Physiographically, the project area lies in the Piedmont province, characterized by low, rolling hills. Elevations throughout the Study Area are generally near 400 feet above sea level. Farmland is a prominent landscape of the Study Area, interspersed with occasional tree or shrub rows. In the Core Area, State Highway 283 serves as a dividing line between contrasting land uses. To the south, the villages of Landisville and Salunga dominate, featuring residential areas of varying age, as well as several industrial and commercial

operations. The area north of Highway 283 is largely agricultural. Homes are few, and with the exception of farmsteads, are generally found along local township roads.

III. DELINEATION OF CORE AREA AND STUDY AREA

PPL conducted a detailed siting analysis to determine the most acceptable location for the West Hempfield-McGovernville Transmission Line. These studies included the determination of a Core Area, the compilation of an environmental inventory, and selection and analysis of the proposed line route corridor. Because of the short line length, as well as the physical limitations of existing development and land use patterns, no reasonable alternatives to the proposed line route were identified.

The Core Area for the project is shown on Map 1 – Linear Features. The core area is that territory in which line route alternatives can be sited to feasibly meet the project's functional requirements and, at the same time, minimize environmental impacts and project costs.

The boundaries of the West Hempfield-McGovernville Transmission Line Project Core Area were determined by the potential supply and destination service points viewed with consideration for man-made and natural boundaries beyond which line route alternatives would not be reasonable.

The eastern and western boundaries are dictated by the functional requirement of locating and constructing the West Hempfield-McGovernville Transmission Line between the West Hempfield-Donegal/West Hempfield-South Manheim #3 138/69 kV Transmission Lines and the Kellogg #1 and #2 Tap Lines. The northern and southern boundaries are parallel to and equidistant from State Highway 283 and the Amtrak lines and approximately three-quarters of a mile on either side of this transportation corridor. The boundary lines were established to evaluate potential line route alternatives and impacts on nearby areas.

The Core Area is approximately 2.5 miles long, 1.6 miles wide, and about 4.25 square miles in total land area.

The project Study Area, shown on Map 7 - Cultural and Unique Features, includes a nearly two-mile area beyond the Core Area boundaries. The Study Area, although relatively remote from the proposed line route, is used for the inventory and mapping of significant archaeological resources, historic sites and unique environmental features.

IV. ENVIRONMENTAL INVENTORY GUIDELINES

An environmental inventory lists environmental factors considered when evaluating and selecting transmission line routes and substation sites. These factors can be either adversely affected by, or compatible with, transmission facilities.

Major environmental factors and the reasons why they are inventoried are listed in Appendix A - Environmental Inventory Guidelines.

V. ENVIRONMENTAL INVENTORY

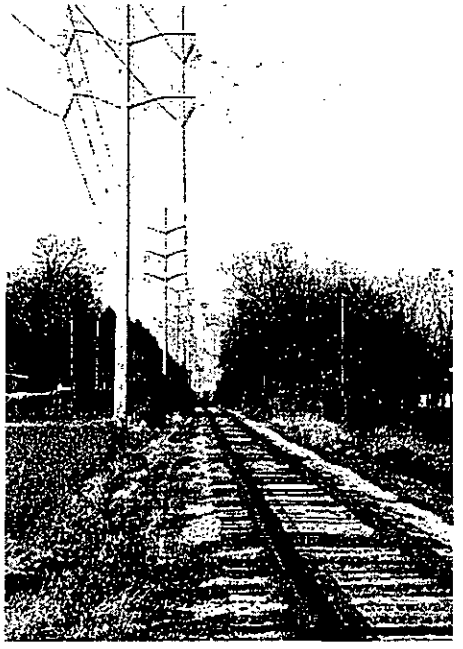
Accurate base maps are used to identify and record environmental data. The maps for the project Core Area have been developed by digitally compiling the most recent United States Geologic Survey (USGS) 1:24,000 scale maps of the area, in conjunction with digital Geographic Information System (GIS) data provided by the Lancaster County GIS Department. The County GIS Department provides information-linked map data for land use, zoning, land and water features, and man-made features, such as roads, buildings and railroads. Additional data, such as soil and floodplain maps, have been acquired from the Pennsylvania State University via the internet. This compilation of data has been manipulated in a GIS program to provide the necessary graphic and informational results. Finally, the resultant maps have been checked and confirmed by field investigations and meetings with local officials.

The environmental inventory data are collected from in-the-field surveys, numerous published and unpublished reports, plans, studies and personal contacts. The environmental data collected included the following subjects:

- Linear Features (Map 1)
- Existing Land Use (Map 2)
- Municipal Zoning (Map 3)
- Soils and 100-Year Floodplains (Map 4)
- Natural Features and Slope (Map 5)
- Agricultural Preservation Areas (Map 6)
- Cultural and Unique Features (Map 7)

A. LINEAR FEATURES – MAP 1

Roadways, railroads, pipelines and transmission lines are examples of linear features. In many situations, it may be desirable for a proposed transmission line to parallel existing linear features. This paralleling approach can eliminate the need for a new corridor and, thereby, reduce land use and environmental impacts, as a new line creates only incremental impacts when added to an existing linear feature.



The following linear features, which are found within the Core Area, appear on all of the Environmental Inventory Maps:

ELECTRIC TRANSMISSION LINES AND SUBSTATIONS

There are several existing transmission lines in the Core Area, all of which will be functionally linked by the proposed line. The names of the existing lines are as follows:

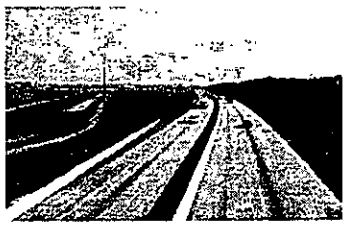
- West Hempfield – Donegal 138/69 kV Transmission Line
- West Hempfield – South Manheim #3 138/69 kV Transmission Line
- Kellogg #1 and #2 138/69 kV Taps

In addition to these transmission line facilities, the McGovernville 69-12 kV Substation is located within the Core Area, on the southeast side of the Route 722/Amtrak overpass.

HIGHWAYS AND ROADS

The area's transportation network is comprised of one major highway and several lesser roads, including the following:

- State Highway 283 (right), a limited-access four-lane freeway, connects the nearby cities of Lancaster and Harrisburg. Interchanges on each side of Landisville provide access to the project area.



- State Route 722, a two-lane road, connects Landisville with East Petersburg Borough to the northeast.

- Old Harrisburg Pike, the original Harrisburg-Lancaster link, now acts as a "business route" through the towns along the Route 283 corridor. In Landisville, this road is known as Main Street.

- Landisville Road, known as Church Street to the south of Route 283, provides access to residential and agricultural areas to the north and south of Landisville, as well a connection to nearby State Routes 72 and 23.

Three smaller roads provide important access to the proposed transmission line location. Champ Boulevard, an access road found off the Spooky Nook Road exit of Route 283, leads to the proposed western terminus of the line. McFarland Drive and Yellow Goose Road, on the north side of Old Harrisburg Pike one mile east of Landisville, serve properties that abut the eastern terminus.

PIPELINES

The Columbia Gas Transmission Company owns an underground gas line that traverses East Hempfield Township approximately 1.6 miles south of Landisville. However, the line does not enter the Core Area.

RAILROADS

Amtrak owns two parallel railroad tracks next to State Highway 283. This east-west line sees heavy train traffic daily, as it is the conveyor of several Amtrak routes carrying passengers from Philadelphia and New York westward to Harrisburg, Pittsburgh and Chicago. Overhead transmission lines provide electricity for the Amtrak trains. The route is occasionally used by Norfolk & Southern freight trains, usually limited to 3-6 trains per week. A spur railroad line stems from the main line in the village of

Landisville, heading in a southerly direction. This single line, owned by the Landisville Railroad Company, originally connected with railroads along the Susquehanna River near Columbia, but now ends just short of Stony Battery Road (2 miles south of Landisville). At the southern terminus, Amherst Industries unloads and stores large lumber wares from freight trains, primarily for lumberyard clients in the Landisville vicinity. Freight activity attracts three trains per week on this line. The same route once continued north from Landisville, but has since been converted to the Lancaster Junction Recreation Trail.

B. LAND USE – MAP 2

Identifying existing land use is important in the siting of electric transmission lines and related facilities. Each type of land use activity varies in the significance of impact from a transmission line. Land uses are mapped to provide an understanding of the wide variety of land activities found in the Core Area and to evaluate the potential impact of a transmission line upon them.

Existing land use data were obtained from the Lancaster County GIS Department's Land Cover/Land Use digital map layer. This data set assigns a land use code to individual areas digitized from aerial photography. Boundaries and sizes of these areas were determined by natural visual breaks in the imagery (this was performed by the Lancaster County GIS Department). Field surveys were undertaken throughout the Core Area to verify and/or update these land use designations.

The land uses inventoried are described below.

- **Agricultural/Pasture** – includes land used exclusively for farming, including cropland, pasture and hay/straw fields.

- **Commercial/Office Park** – includes shopping centers, restaurants, retail, wholesale, service and /or related establishments.

- **Farmstead** – includes a building or group of buildings that may contain a residence, barn and accessory buildings associated with farming and agricultural uses.

- **Feed Operations** – includes land and structures used for the large scale feeding of farm animals.

- **Industrial** – includes uses such as manufacturing plants, warehousing and related production facilities and offices.

- **Orchards/Tree Farms** – includes land used for vineyards, the cultivation of fruit trees and for the growing of Christmas trees.

- **Public/Semi-Public** – includes schools, churches, cemeteries and other related land uses.

- **Recreation** – includes public and private outdoor recreational areas such as campgrounds, bicycling and hiking trails and active and passive parkland.

- **Residential** – includes land used for residential dwellings, residential clusters and manufactured home developments.

- **Transportation/Utilities** – includes transportation corridors (including 4-lane divided highways and railroads), highway departments, electrical substations, water towers/tanks and sewage treatment plants.

- **Undeveloped** – includes woodlands and/or other types of open areas, which are presently undeveloped.

EXISTING LAND USE

A geographical analysis reveals that the project area has many suitable land uses. While there is significant residential development in the Core Area, agriculture is the dominant land use by area. This is especially true in the areas north of State Highway 283, which serves as a man-made barrier between contrasting land uses. Agriculture uses in this area include cornfields, soybean fields, hay/straw fields, grazing pastures, sod farms and evergreen tree farms.

Residential land uses are spotty in the northern half of the Core Area. Many residences are in the form of farmsteads situated in the middle of large agricultural tracts.

Other homes are found along roads, mainly on multiple-acre parcels, though some occur in linear clusters on small lots. The southern area is comprised of the village of Landisville, part of the village of Salunga, and many outlying neighborhoods and subdivisions. Residential neighborhoods in this area display varying age and lot size. The village area features many early 20th Century homes on small lots. South of Elizabeth Street, homes date from the post-war era, with many single-story brick structures. The newest homes in the Core Area are found in subdivisions east of the village on both sides of Old Harrisburg Pike (above). Lot sizes here are slightly larger. Also in this area, on Old Harrisburg Pike, is the Oak Leaf Manor Assisted Living Home, a new facility of considerable size. An isolated pocket of farmstead and agriculture exists in the extreme southern portion of the Core Area, between Church Street and Nissley Road.

Commercial land uses, while not a major land use type in the Core Area, can be found in Landisville's village center (right) and near the Route 283/722 interchange. The main intersection in Landisville (Church and Main Streets) is surrounded by two gas stations, a convenience store and a small strip mall. The north side of the highway interchange features a gas station/convenience store, car dealer, and farm market. The major industrial uses in the Core Area include the Kellogg plant on Route 722 and Yellow Goose Road, the Armstrong Floor Products Distribution Center on Spooky Nook Road, and a large lumber yard along the railroad tracks in the village center.

Major public/semi-public land uses in the Core Area include the campus of public schools on the west side of Church Street in Landisville, the East Hempfield Township Administration Building at the north end of Nissley Road, as well as various churches and the Salunga Fire Station. A police/fire training facility is currently under construction on Champ Boulevard, adjacent to the proposed western terminus of the transmission line.

Recreation uses include Amos Herr Park on Nissley Road (right), the Hempfield Recreation Center in central Landisville, a

golf driving range on Spooky Nook Road, and the Landisville Junction Recreation Trail, extending north from Champ Boulevard. In addition, the expanses of school-owned athletic fields comprise much of the total recreation land.

PROPOSED LAND USE

Proposed land uses are grouped with current land use in this study due to the rare occurrence of large-scale new construction in the Core Area. Residential development is functionally capped in the area, due to full subdivisions and zoning restrictions elsewhere. Construction projects in progress as of November 2002 include a county-operated police and fire training facility on Champ Boulevard, and a house on Colebrook Road. Potential for future construction exists on lands that are zoned industrial or commercial and are now vacant. These include lots in the McFarland Drive industrial park, the large parcel east of Route 722 along the Amtrak line, and the commercial parcel east of the Turkey Hill on Route 722.

AIRPORTS/LANDING STRIPS

The United States Department of Transportation (Federal Aviation Administration) and State Department of Transportation (Bureau of Aviation) have established structure height guidelines that apply in areas near airports. The nearest airports, intended primarily for private use, are located in Columbia and Lititz. Both are situated six miles from the Core Area and will not be impacted by the proposed transmission line.

C. MUNICIPAL ZONING – MAP 3

Local zoning is often an indicator of the potential type and location of future community development. The West Hempfield – McGovernville Transmission Line Project is located in East Hempfield Township, which has adopted an official

zoning ordinance of its own design. The following zoning districts are shown on Map 3:

- Agricultural
- Agricultural Holding
- Suburban Residential
- High Density Residential
- Village Residential
- Local Commercial
- Highway Commercial
- Light Industrial
- General Industrial

Most land zoned for agriculture lies to the north of State Highway 283. In fact, the entire section of Core Area north of Route 283 and east of the Lancaster Junction Recreation Trail is zoned agricultural with the exception of the Route 722 interchange area. Agricultural zoning allows residential construction on a specified minimum lot size. Isolated tracts of agricultural zoning exist in the southern part of the Core Area, near the intersection of Bowman and Nissley Roads, and also near the intersection of Old Harrisburg Pike and Route 722. These particular parcels are all zoned as Agricultural Holding.

Zoning intended for residential development occurs in housing subdivisions spurring from Old Harrisburg Pike, Nissley Road and Bowman Road. Although the central area of Landisville also contains medium to high density residential neighborhoods, this area is considered Village Residential, a zoning designation that allows for a variety of land uses that preserve the historic characteristics of the area. East Hempfield Township has adopted ordinances to restrict growth north of Route 283, maintaining the agricultural character of the land. Furthermore, there are no plans to extend public water or sewer service into this area.

Industrial zoning is intentionally clustered in two locations. The eastern cluster, zoned "Light Industrial", consists of the large Kellogg plant, a popcorn factory, and a small industrial park on McFarland Drive. This "park" is presently 50% occupied. A large parcel east of Route 722 is zoned light industrial but remains vacant. The western cluster of industrial zoning is given "General Industrial" status and is situated along the two railroad corridors that intersect in Landisville, and north of Route 283. Industrial tracts in the village, due to their small size, tend to house smaller operations than the large tracts north of Route 283 that house giants such as Armstrong.

Commercial zoning occurs in three locations within the Core Area. One cluster, designated as Local Commercial, occurs at the intersection of Church and Main Streets in Landisville and contains the Hempfield Shopping Center and several other businesses. A second area of local commercial zoned land is located at the intersection of Old Harrisburg Pike and Yellow Goose Road, where several small, family-owned businesses operate. Another commercial area designated Highway Commercial is located on Route 722 just north of the Route 283 interchange, encompassing the Turkey Hill store, Kelly car dealership, and a vacant lot.

D. SOILS AND 100-YEAR FLOODPLAINS – MAP 4

The characteristics of soils are an important determinant in transmission line siting. Some soil or rock conditions can pose difficult problems in engineering and construction of foundations. Environmental impacts can also occur with erosive soils and with re-vegetation of the right-of-way if droughty soils are found. Using U.S.D.A. Soil Conservation Service (SCS) soils maps for Lancaster County and use classifications, the Core Area was analyzed and mapped to identify the most significant soil problem areas.

Only one soil characteristic was identified in the Core Area as significant to transmission line siting, including construction, operation and maintenance and that is:

- High / Seasonally High Water Table Soils

High / seasonally high water table soils, with a water table at a depth of 36 inches or less, are largely confined to the intermittent stream valleys, natural drainageways and depressions found throughout the Core Area. A large, continuous area of such soil is found along Swarr Run and its feeder brooks. The middle third of the proposed transmission line traverses this area, a factor that may affect structure excavation.

Other soils that were identified and mapped within the Core Area include Class I and Class II prime agricultural soils. The United States Department of Agriculture (USDA) defines prime farmland soils as the land best suited to food, feed, forage, fiber, and oilseed crops. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment. Much of the area is comprised of these soils and they exhibit few constraints for the construction of transmission lines.

PPL has developed standard procedures for dealing with soil problems. These procedures are set forth in the PPL's "Specifications for Soil Erosion and Sedimentation Control on Transmission Line Rights-of-Way" manual.

100-YEAR FLOODPLAINS

The 100-year floodplain boundaries were acquired digitally from Penn State University and were originally derived from Flood Insurance Rate Maps (FIRM) and SCS County Soil Surveys. In the Core Area, these floodplains are confined to the portion of Swarr Run that lies south of the Kellogg rail yards. The proposed

transmission line traverses Swarr Run but does not fall within the 100-year floodplain.

BEDROCK AND KARST TOPOGRAPHY

Soils with shallow depth to bedrock (36" or less) can pose problems in the construction of transmission line structures. According to the Soil Conservation Service maps and related data, there are no such regions in the Core Area.

Karst topography is land with a prevalence of caves, sinkholes, and other ground features associated with porous limestone geology. In Lancaster County, karst topography is common, especially in areas directly northwest of the Core Area. Sinkholes are known to exist in the Route 283 corridor between Mount Joy and Harrisburg, and at least two known caves lie in nearby Mount Joy Township. While no source identifies any karst features in the Core Area, the underlying limestone geology poses the possibility for them to exist. If encountered in proposed tower locations, karst topography could present a challenge for construction.

E. SLOPES AND NATURAL FEATURES – MAP 5

SLOPES

Identification of steep slopes is important to transmission line siting. The steeper the slope, the more difficult it is to clear vegetation, maneuver construction equipment, handle, haul and erect transmission structures and grade access roads and structure sites. Also drainage, erosion control and vegetation management problems generally increase with more severe slopes, especially when a line crosses perpendicular to the slope.

The U.S.G.S. topographic maps of the Landisville area provide the basis for the following three slope classifications:

- 0-15 percent
- 16-24 percent
- 25 percent and greater

Nearly all of the Core Area exhibits flat to gently rolling terrain, which will not pose a problem for transmission line construction. Both the 16 percent to 24 percent and the 25 percent and greater slope classifications are generally found adjacent to each other. These steep slope areas are located mostly in the southeastern section of the Core Area along a hillside. In addition, small areas of man-made steep slope occur on the embankments leading to highway and railroad overpasses. These are found on Landisville Road and Route 722 where they cross Route 283. The proposed transmission line is designed to span these areas. Other insignificant slopes exist near creeks, drainage ponds and swales.

NATURAL FEATURES

The natural features inventory and map represent a compilation of those natural elements in the environment that are considered to be significant to transmission line siting and construction. Elements include terrestrial and aquatic features, as well as visually prominent and scenic features.

Map 5 shows major natural features in the Core Area, including natural vegetation, streams, wetlands and open water. Wildlife habitat, both terrestrial and aquatic, are confined largely to these resources.

STREAMS AND OPEN WATER

Two minor watersheds drain the Core Area. Chickies Creek collects water exclusively from the northwestern portion of the Core Area. The remaining land is

drained by Swarr Run and its small, unnamed tributaries. Swarr Run flows southeasterly and feeds the larger Conestoga Creek. Both Chickies and Conestoga Creeks are first-order streams flowing directly into the Susquehanna River. These streams, as well as several small ponds, are shown on Map 5.

At its closest point, the Susquehanna River is located approximately 7 miles to the southwest of the Core Area. The Lower Susquehanna River Sub-basin, of which the Landisville region is a part, has a drainage area of 5,809 square miles. The northern portion of the Lower Susquehanna River Sub-basin contains ridges trending southwest to northeast and valleys of moderate width. The Susquehanna River cuts through these series of ridges and widens as it flows south to southeast through rolling hills and broad valleys of the central portion of the sub-basin. The Core Area lies within the southern portion of the sub-basin and is characterized by metamorphosed sediments that have been intensely folded and faulted. This material caused the river to carve a deep gorge into the bedrock in a narrowing river valley. The Susquehanna River flows into the Chesapeake Bay at Havre de Grace, Maryland, providing over 50 percent of the freshwater inflow to the bay.

Of the six sub-basins in the Susquehanna River Basin, the Lower Susquehanna Sub-basin is the most developed. The steep river slope and narrow valley of the Lower Susquehanna gorge provide areas for hydropower development. This part of the sub-basin is a major production area for electricity. Some of the most productive agricultural lands and largest population centers of the Susquehanna River Basin are located in the Lower Susquehanna Sub-basin. Intense agricultural development occurs in many of the fertile limestone-type soils throughout the sub-basin.

The Susquehanna River is used for public water supply, recreation, waterpower, irrigation, mining, and other industrial purposes. Most of the river water requires only moderate treatment for industrial use and public distribution throughout the

region. The Susquehanna River in this section of Lancaster County is classified as a warm water fishery by Chapter 93 Water Quality Standards. Fish species that occur in the Susquehanna River include American shad, striped bass, and smallmouth bass. Chickies Creek also has warm water fishery status, while Swarr Run is labeled as a trout stocking fishery.

Many of the water-quality issues in the Susquehanna River Basin can be related to the high human population density in the area and related activities associated with urban, industrial, and agricultural land use. Most concerns are related to human health (the quality of domestic water supply, the safety of water contact recreation, and the safety of eating game fish) and the health of ecological communities.

WETLANDS

Wetlands fulfill an essential role in our landscapes by maintaining water quality, stabilizing shores and stream banks, controlling floods and erosion, and providing critical habitat to many plant and animal species. Wetlands can vary considerably in their vegetation makeup, depending on the system and class to which they are identified. Wetlands in the Core Area include PEM and PUB classifications by the National Wetlands Inventory. The former signifies Palustrine, Persistent Emergent wetlands, the latter, Palustrine Unconsolidated-Bottom wetlands. One area of PEM wetlands is a series of springs between the northern ends of Nissley Road and McFarland Drive, along the Amtrak railroad. While these wetlands do not fall directly in the path of the proposed transmission line, they are within 200 feet.

NATURAL VEGETATION

The Core Area contains a variety of vegetation, ranging from urban/suburban open land and scrubland to mature woodlands. The Core Area is within the Northern Piedmont Section of the Appalachian Oak Forest Region of Pennsylvania. The major vegetation types depicted on Map 5 are discussed below.

The predominant cover in the Core Area consists of urban/suburban/agricultural cover types, including agricultural fields, open fields and areas overgrown with weeds and brush, often referred to as "scrubland". Ground cover in scrubland areas usually consists of a variety of grasses, herbaceous plants, briars, and brambles.

Larger trees can be found in fencerows and in woodlots located throughout the Core Area. A woodland area of particular significance to the project is a strip of mixed hardwood and occasional white pine trees found between Route 283 and the Amtrak railway (above). The woodland strip ranges between 150 and 300 feet in width and runs parallel to the entire length of the proposed transmission line route. This tree row provides a visual backdrop for visitors to Amos Herr Park and Historic Site, as well as for residents of Landisville's northern fringe. The trees also serve as a visual barrier between these areas and busy Route 283, especially during the summer. Only one other area of continuous woodlands exists in the Core Area, on a hillside south of Old Harrisburg Pike in the extreme southeast corner.

Common tree species in the woodland areas include oak, hickory, maple, poplar and beech. Planted trees are common in the Study Area, with weeping willow being an apparent favorite among agricultural landowners north of Route 283. In Landisville, residential lots often feature flowering trees such as dogwood and cherry, as well as Norway spruces and other imported evergreens.

PHYSICAL FEATURES

Physiographic or major natural features are typically inventoried to identify those features that should be considered in determining the visual aspects of alternative routes. Routes crossing prominent physiographic features could create greater visual impacts. Major physiographic features include visually prominent slopes, high points and ridgelines. Investigations and field surveys identified the following physiographic features:

- Gradual south-facing slope from Long Road to Route 283, featuring agricultural fields and few trees.
- Visually prominent north-facing slope in extreme southeastern portion of Core Area (primarily wooded).

WILDLIFE, ENDANGERED AND THREATENED SPECIES

The Pennsylvania Fish and Boat Commission performed a review of the Core Area using the Pennsylvania Natural Diversity Inventory (PNDI) database in conjunction with their own informational resources. While no endangered, threatened or candidate endangered or threatened species are known to exist in the Core Area, several "species of concern" may inhabit the area. A rare invertebrate species called Price's Cave Isopod (*Caecidotea pricei*) is known in the vicinity of the project site. Isopods inhabit cold water springs, seeps and caves, and are threatened by habitat destruction and poor water quality. It is possible that Price's Cave Isopod may be listed as rare or threatened in the near future.

Two other species of concern that are known to exist in Lancaster County are the Bog Turtle (*Clemmys muhlenbergii*) and the Red-Bellied Turtle (*Pseudemys rubriventris*). The former is a small, semi-aquatic turtle that prefers open marshy wetlands associated with springs and groundwater, specific vegetative

communities and mucky soils for burrowing. Due to the lack of pristine habitat, however, the bog turtle has adapted to disturbed, low-quality wetland areas with semi-closed canopies. In addition, the bog turtle is known to use wooded wetland areas as corridors between more open wetland areas. The red-bellied turtle is a large, basking, herbivorous aquatic turtle found in lakes, ponds, and nearby streams and wetlands with open water content. These turtles nest on silty or sandy terrestrial habitats adjacent to their aquatic habitats. Both turtles are threatened by habitat destruction and poor water quality, though they do not appear on official endangered/threatened lists.

The area of wetlands near the northern terminus of Nissley Road in the Core Area may exhibit characteristics similar to the known habitats of the aforementioned organisms. However, Fish and Boat Commission officials do not foresee any significant impacts to these species of concern, or to any other rare or protected species, provided that best management practices are employed and siltation/erosion control measures are upheld.

F. FARMLAND PRESERVATION AREAS – MAP 6

As recognized by the American Farmland Trust, Pennsylvania leads the nation in the number of farms and acres of farmland protected, and Lancaster County is no exception.

The Lancaster County Agricultural Preserve Board oversees the Commonwealth's program to purchase agricultural easements and administers legislative programs designed to preserve farmland through the State Agricultural Preservation Board.

As shown on Map 6, Agricultural Security Areas and Agricultural Easements cover a large portion of the Core Area, especially to the north of Route 283.

G. CULTURAL AND UNIQUE FEATURES – MAP 7

As required by the Commission's siting regulations, Map 7 depicts the location of significant cultural areas and historic and archaeological resources within two miles of the preferred transmission line route. The resources identified within the Study Area are described below:

Historic Structures/Districts – the following is a list of historic structures/districts within the Study Area listed on the National Register of Historic Places. (Source: National Register Information System)

- Shenck's Mill Covered Bridge – Shenck Road at Chickies Creek (border with Rapho Township)
- Landis Mill Covered Bridge – Reiner Station Road at Conestoga Creek (border with Manheim Township)
- Samuel N. Mumma Tobacco Warehouse – Elizabeth Street at Barbara Avenue, Landisville

The Amos Herr House, located at the northern end of Nissley Road in Landisville, is a farmhouse dating from 1845 (left). While the municipally owned property is not included in the National Historic Register, East Hempfield Township conducts tours and operates a craft store in the house. At its closest point, the proposed transmission line is located approximately 500 feet from The Herr House. However, the Rt. 283 and Amtrak rail corridor lie between the proposed line route and the Amos Herr House.

Recreation Opportunities - Several opportunities exist for recreation on public grounds within the Study Area as shown in the following list:

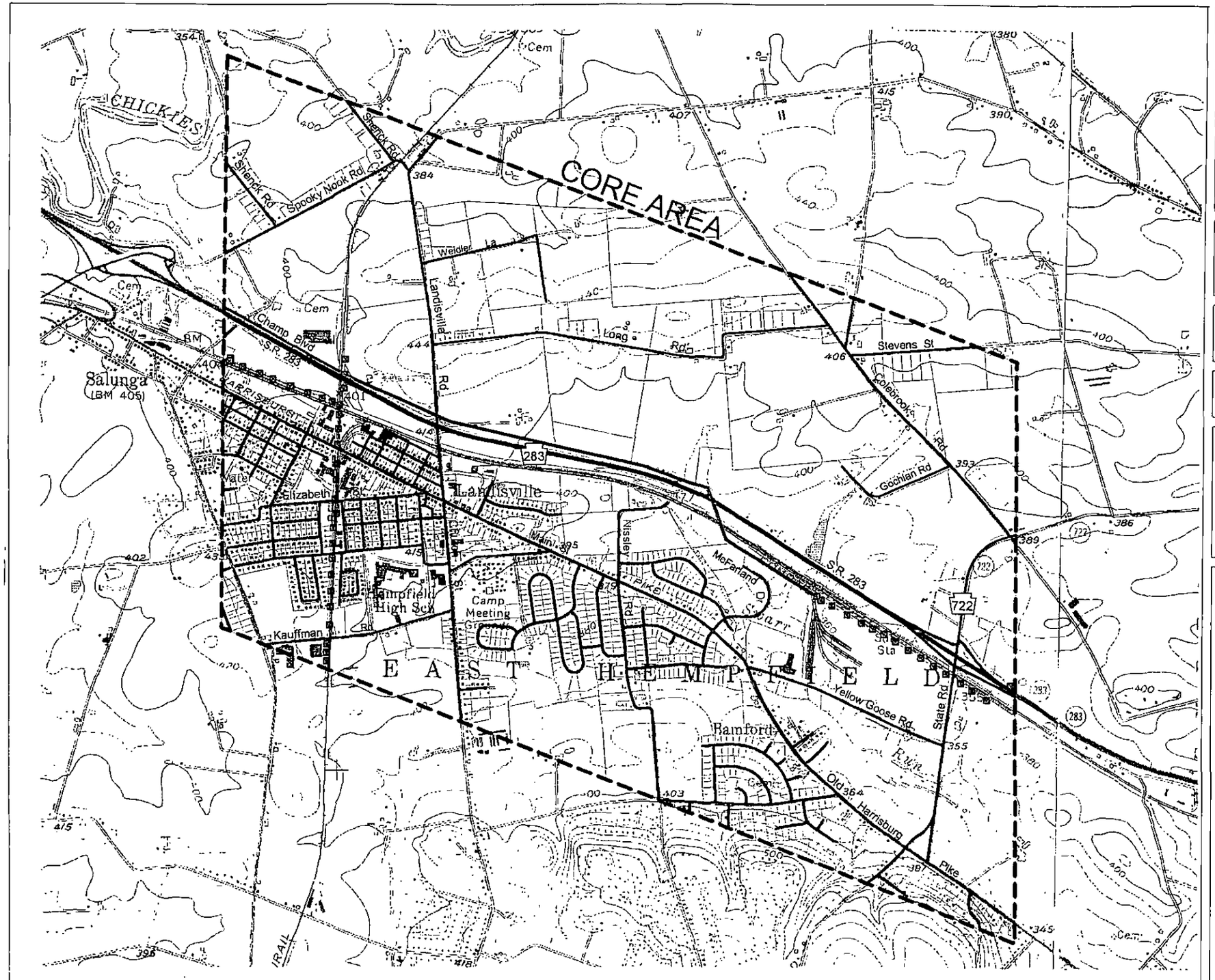
- Amos Herr Park – A township park on Nissley Avenue featuring expansive grassy areas, a picnic pavilion, tennis court, softball field, and the aforementioned Amos Herr historic farmhouse.
- East Hempfield Sports Complex – An extensive recreation facility on South Church Street serving several municipalities. Numerous coordinated indoor and outdoor athletic activities take place here.

- Lancaster Junction Recreation Trail (below) – A former railroad bed now intended for walkers, bikers and joggers. The 2.5-mile route allows users to travel from the northern edge of Landisville through agricultural areas to the banks of Chickies Creek.

- **Cemeteries** - 25 listed cemeteries dot the landscape of the Study Area. Many of these are historical resources, as many gravestones date from the 18th and 19th centuries.

The information compiled in this environmental assessment was used in developing the proposed line route, as explained in Exhibit "C".

OVER SIZED DOCUMENTS



Map 1

Exhibit B

Linear Features

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

N

Linear Features

- Preferred Line Route
- Transmission Lines
- Railroads
- Township Boundary

Legend

- Parcels Boundaries

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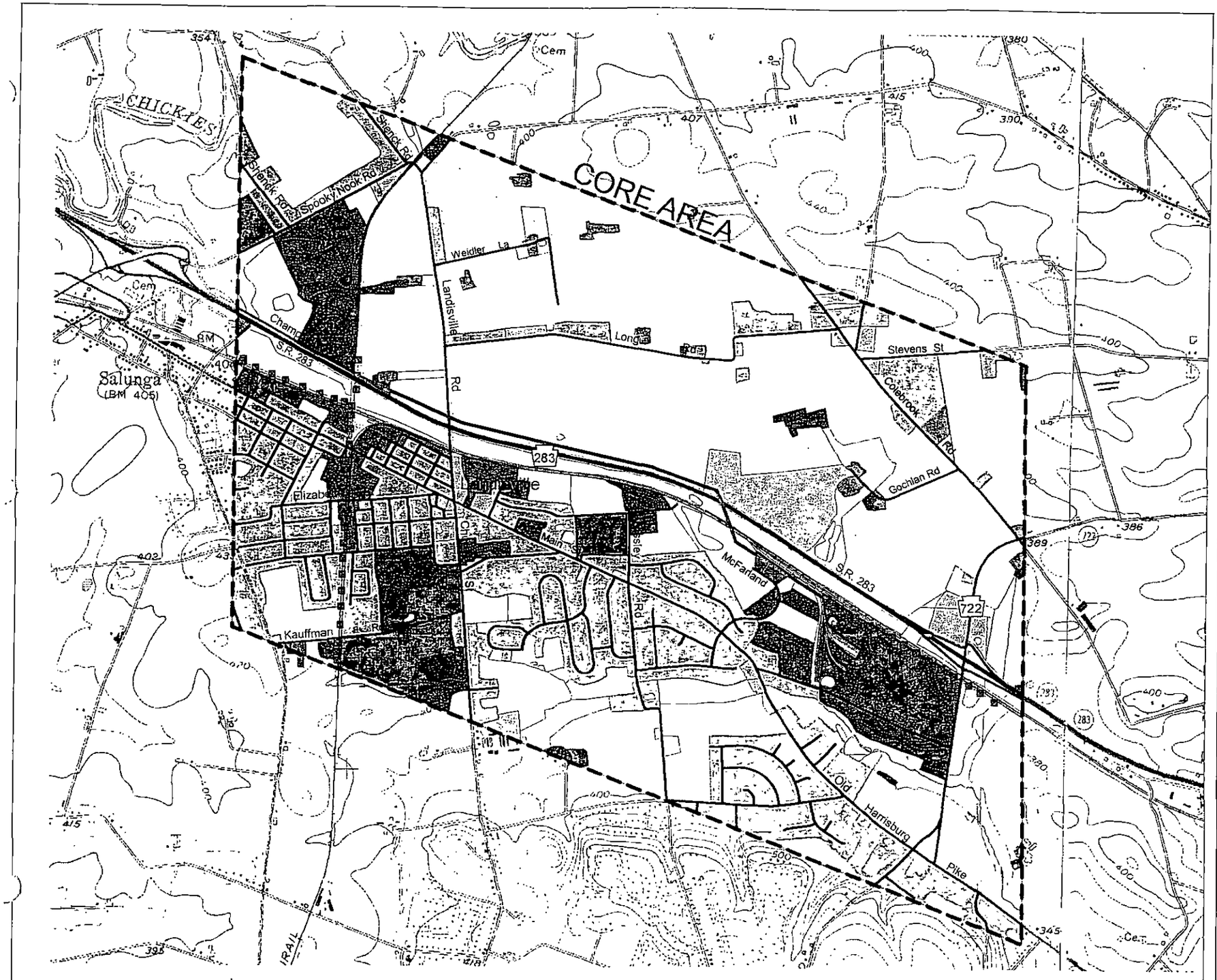
URDC



Map 2

Exhibit B

Land Use

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

N

Linear Features

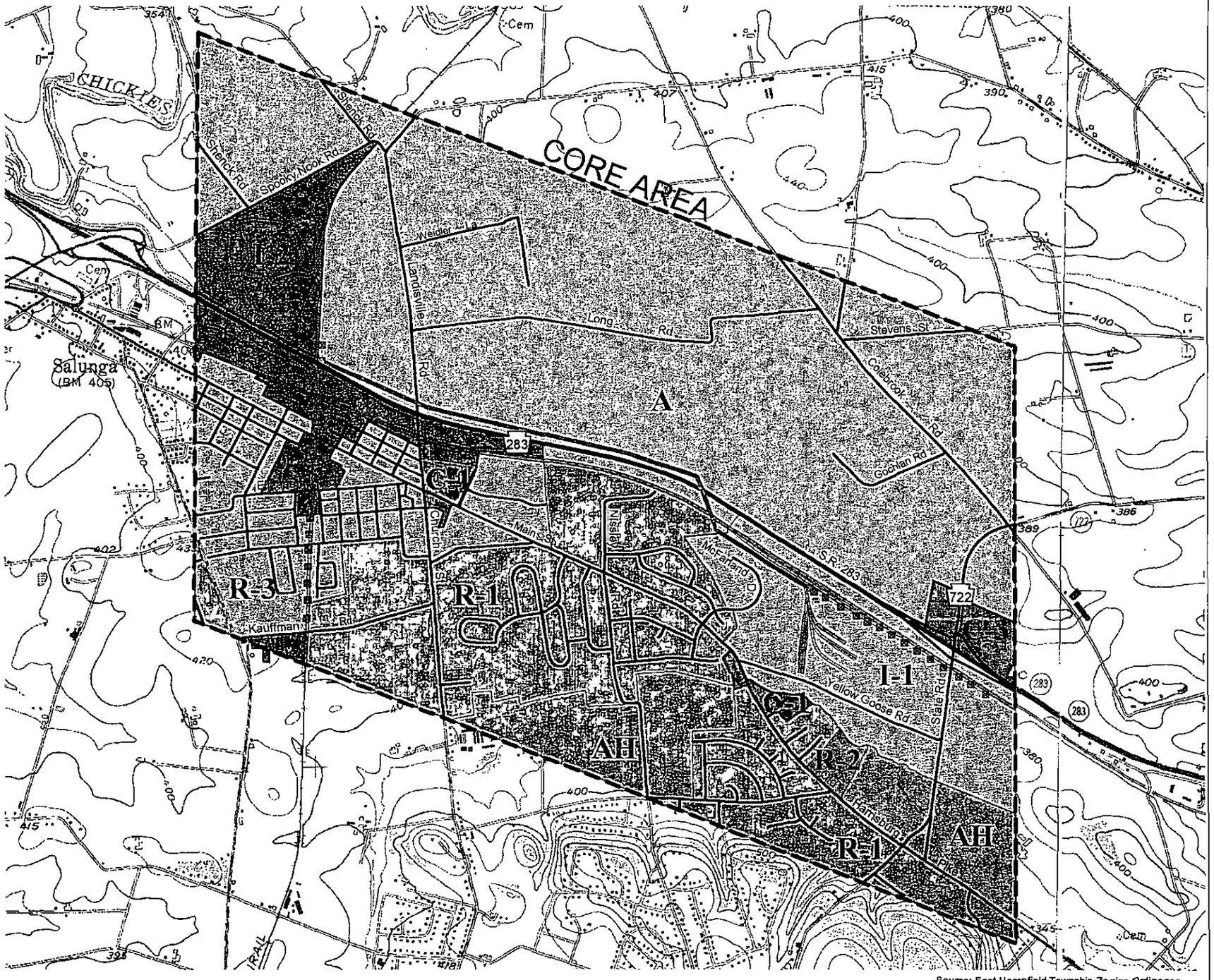
- Preferred Line Route
- Transmission Lines
- Railroads
- Township Boundary

Legend

- Agricultural/Pasture
- Commercial/Office Park
- Farmstead
- Feed Operations
- Industrial
- Orchards/Tree Farms
- Public/Semi-Public
- Recreation
- Residential
- Transportation/Utilities
- Undeveloped

Urban Research & Development Corporation

URDC



Source: East Hempfield Township Zoning Ordinance

Map 3

Exhibit B

Municipal Zoning

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

N

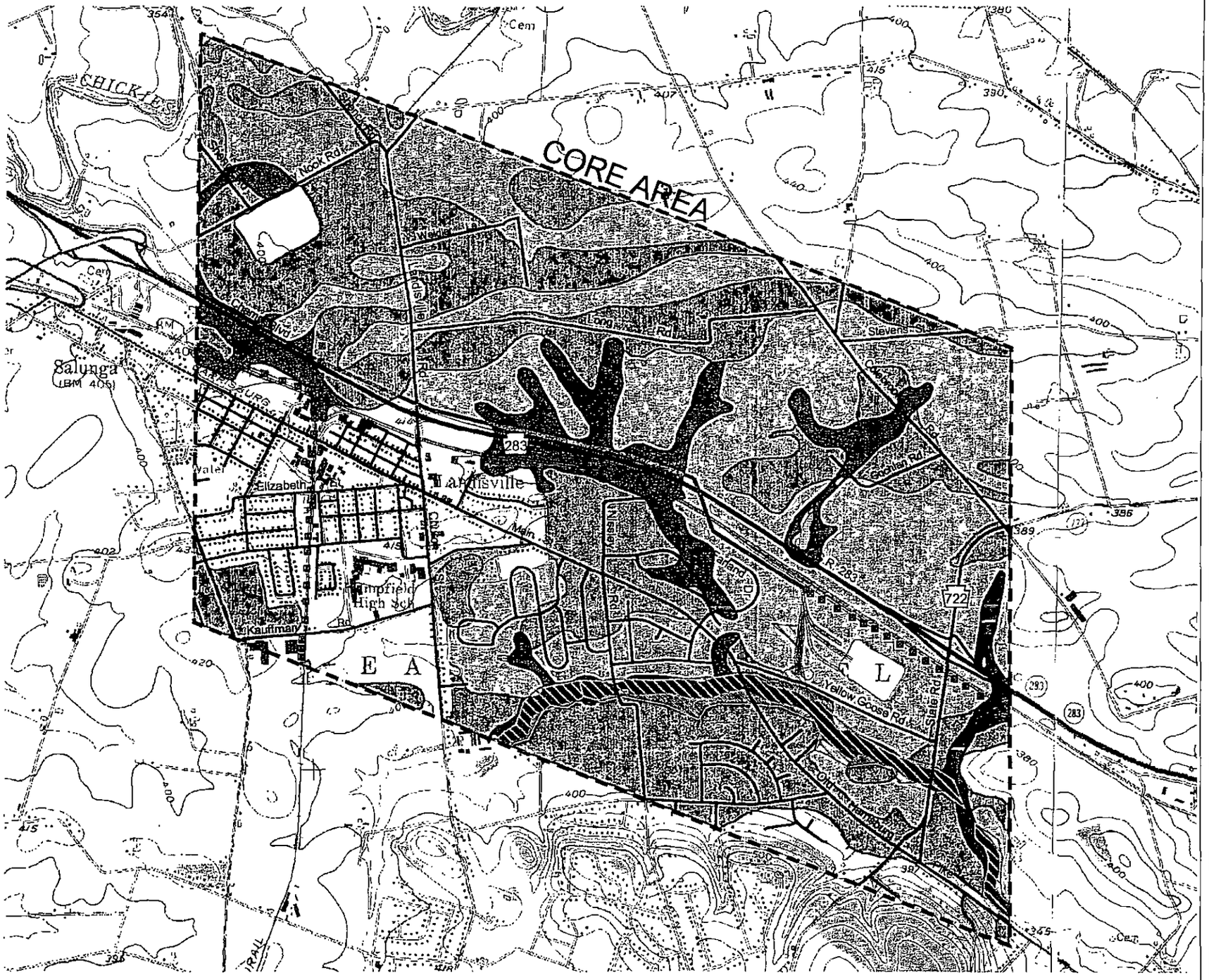
Linear Features

- Preferred Line Route
- Transmission Lines
- Railroads
- Township Boundary

Legend

- A — Agricultural
- AH — Agricultural Holding
- R-1 — Suburban Residential
- R-2 — High Density Residential
- R-3 — Village Residential
- C-1 — Local Commercial
- C-2 — Highway Commercial
- I-1 — Light Industrial
- I-2 — General Industrial

URDC Urban Research & Development Corporation



Map 4

Exhibit B

Soils

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

N

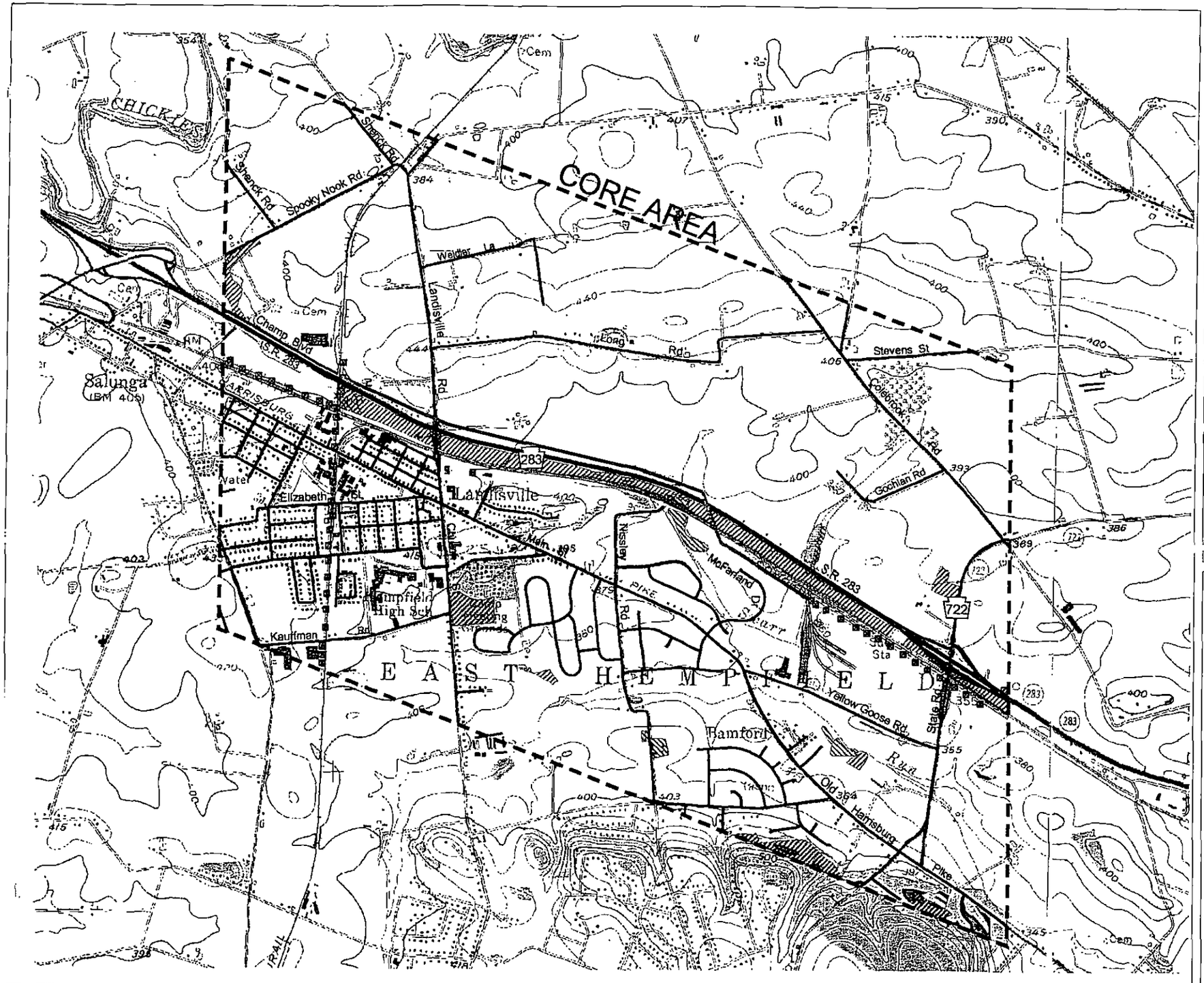
Linear Features

- Preferred Line Route
- Transmission Lines
- Railroads
- Township Boundary

Legend

- Prime Agricultural-Class I
- Prime Agricultural-Class II
- 100-year Floodplain
- High/Seasonally High Water Table Soils
  (Water Table At A Depth Of 36" Or Less)

URDC Urban Research & Development Corporation



Map 5

Exhibit B

Natural & Physical Features and Slope

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

N

Linear Features

- Preferred Line Route
- Transmission Lines
- Railroads
- Gas Pipelines

Legend

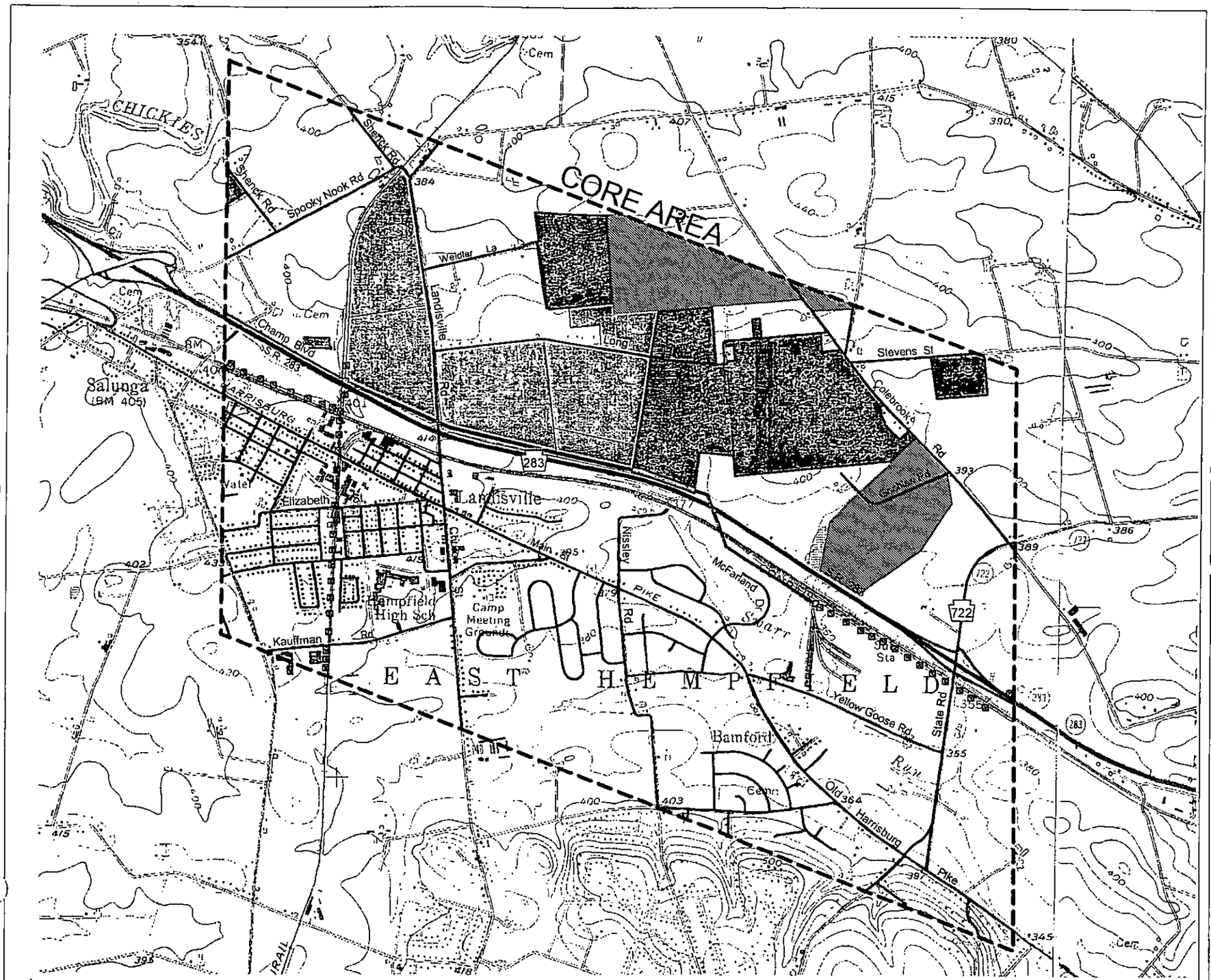
- Woodlands
- Wetlands
- Streams
- Lakes

Slope

- 0-15%
- 16-24%
- 25% and Greater

Urban Research & Development Corporation

URDC



Map 6

Exhibit B

Farmland Preservation Areas

West Hempfield - McGovernville Transmission Line Project

0.1 0 0.1 0.2 Miles

1 inch = 1500 feet

Prepared By:
PPL Electric Utilities Corporation

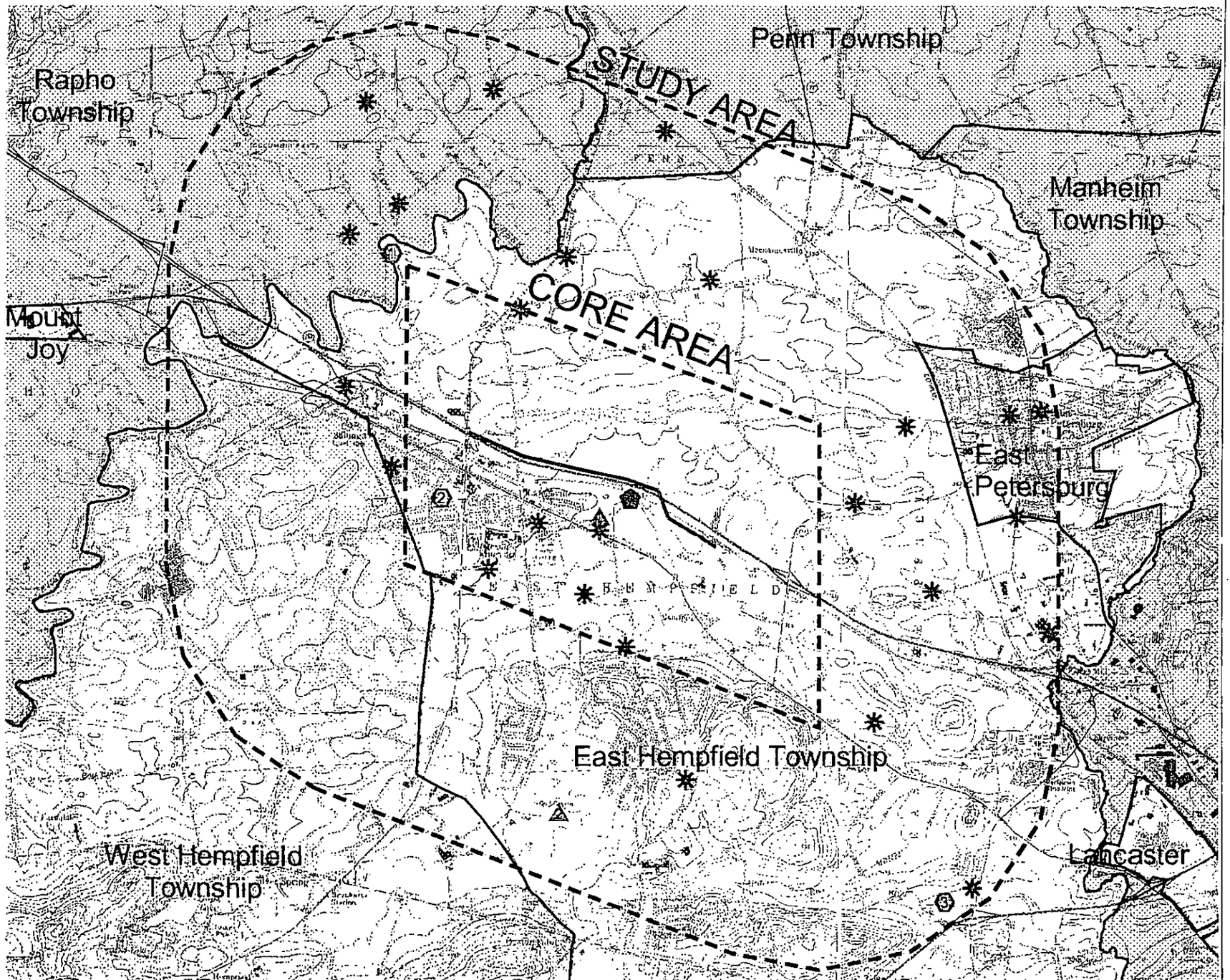
N

Linear Features

- Preferred Line Route
- Transmission Lines
- Railroads
- Township Boundary

Legend

- Agricultural Easements
- Agricultural Security Areas
- Both



Map 7

Exhibit B

Cultural & Unique Features

West Hempfield - McGovernville Transmission Line Project

0.2 0 0.2 0.4 0.6 Miles

1 inch = 3000 feet

Prepared By:
PPL Electric Utilities Corporation

N

Legend

- National Register Historic Sites
  1. Shenck's Mill Covered Bridge
  2. Samuel N. Mumma Tobacco Warehouse
  3. Landis Mill Covered Bridge
- Municipal Parks
  1. Amos Herr Park
  2. East Hempfield Sports Complex
- Amos Herr House
- Cemeteries
- Lancaster Junction Recreation Trail
- Preferred Transmission Line Route
- Municipal Boundaries

URDC Urban Research & Development Corporation

EXHIBIT "C"

WEST HEMPFIELD - McGOVERNVILLE #1 & #2 138/69 kV TIE

ENVIRONMENTAL ASSESSMENT

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MAPS

EXHIBIT C

WEST HEMPFIELD – McGOVERNVILLE #1 & #2 138/69 kV TIE

ENVIRONMENTAL ASSESSMENT

I. LINE ROUTE SELECTION

A. INTRODUCTION

PPL conducted detailed studies to determine the most reasonable route to construct the proposed double circuit 138/69 kV transmission line. The proposed line route was based on the functional requirements, which are described in detail in Exhibit "A", the environmental analysis provided in Exhibit "B", as well as discussions with the local municipality.

B. DESCRIPTION OF PROPOSED LINE ROUTE

The proposed line route begins at the West Hempfield - Donegal and West Hempfield - South Manheim #3 138/69 kV lines approximately 1,650 feet west of Landisville Road. The point of connection lies between Rt. 283 and the Amtrak railroad corridor. The proposed route heads northeast and crosses Rt. 283 approximately 315 feet from that connection point.

After crossing Rt. 283, the line heads southeast, paralleling Rt. 283, a distance of approximately 1.1 miles. The majority of this line route section occupies farmland. A portion of the line crosses former Armstrong World Industries property. An old farmhouse on this 48-acre parcel has been sold to a private party and is being converted into a residence.

The last section of line, approximately 2,890 feet long, also heads southeast and crosses both Rt. 283 and the Amtrak railroad tracks. A small segment of this line section occupies property owned by East Hempfield Township. This

undeveloped parcel is presently being farmed but is zoned for Suburban Residential land use. The balance of this section of the line occupies industrial-zoned property. The proposed line route ties into the existing Kellogg #1 and #2 Taps on the property of Kellogg USA.

II. PREDICTED IMPACTS AND MITIGATING MEASURES OF THE PROPOSED LINE ROUTE

The proposed line was routed to avoid as many impacts as practical. Where impacts are unavoidable, mitigating measures will be employed. PPL's standard mitigating measures are set forth in its "Transmission Line Right-of-Way Program for Vegetation Management" and "Specifications for Soil Erosion and Sedimentation Control on Transmission Line Rights-of-Way". For a full understanding of the impacts, refer to the appropriate inventory maps and discussions in Exhibit "B."

A. LAND USE

The proposed line route was analyzed in relation to current and future land use. The route will not create a significant adverse impact on existing or potential land use. By paralleling existing linear features, the amount of right-of-way required for the proposed transmission line is reduced. This reduction in easement width is due to the fact that the transmission line right-of-way overlaps highway or railroad property. Also, because the proposed line route abuts highway or railroad property, the majority of the transmission line right-of-way falls within the building setback area, and, under local zoning regulations, would not be available for development. Finally, approximately 0.9 miles of the proposed line route crosses farmland preserved by an agricultural security easement. Transmission line construction across preserved farmland is expressly permitted by the statutes authorizing agricultural security easements and, thus, is not inconsistent with this land classification.

The nearest residence is approximately 260 feet from the centerline of the proposed transmission line. Impacts to the residence are minimal due to the distance from the proposed line and because the property owner is installing dirt mounds to reduce highway noise between the proposed line and the home.

No pipelines, communication towers, or other utilities will be affected by the proposed line. The nearest airport (Lancaster Airport) is more then 4.8 miles away and, because of its distance from the line, will not be impacted.

The right-of-way required for the proposed transmission line will preclude certain uses, such as locating buildings or swimming pools within the easement. Because the majority of land being crossed is agricultural, these impacts, if any, will be minimal. Property owners will be reimbursed for the right-of-way. Additionally, PPL's Encroachment Policy allows for future compatible land uses on transmission line easements.

B. NATURAL FEATURES

The impact to terrestrial and aquatic resources will be minimal and incremental because the majority of the line route utilizes existing linear features. Only minor tree clearing will be necessary. Any herbicides used on the right-of-way will be EPA-approved and will be applied selectively in accordance with label instructions.

The proposed line will not impact any lakes, ponds, or other major water bodies. The proposed line crosses three unnamed tributaries of Swarr Run. The stream crossings are easily spanned, and no impacts to the streams are expected. A consultant will be retained to delineate any wetlands along the proposed line route. Permits, as required, will be obtained from the Pennsylvania Department of Environmental Protection and the United States Army Corps of Engineers

prior to the start of construction. No flood prone areas were noted along the proposed line route.

The proposed line will not impact any endangered or threatened plant or animal species because, according to the appropriate state and federal agency reviews, it is unlikely that any exist in the Core Area. As mentioned in Exhibit "B", several "species of concern" may inhabit the Core Area. The wetland at the northern terminus of Nissley Road exhibits habitat characteristics that may be attractive to these "species of concern". However, the proposed line route places the transmission line on the opposite side of the highway and railroad corridor from the wetland area. Thus, impacts to these species are not anticipated. Lastly, paralleling existing linear features and crossing agricultural land will minimize any impacts to common plants and animals.

C. CULTURAL FEATURES

As noted in Exhibit "B," several National Register Historic Sites are located within both the Core and Study Areas. The Samuel N. Mumma Tobacco Warehouse is the closest site to the preferred line route. The warehouse is located in Landisville, approximately 1,700 feet from the proposed line. There will not be any impacts to this historic site because of its distance from the proposed line and the development that has occurred between it and the project site.

Also, the Amos Herr House, which is locally significant, is located approximately 500 feet from the proposed transmission line. Impacts to the Herr House will be minimal, if any. Rt. 283 and the Amtrak railroad corridor separate the Herr House from the proposed transmission line. The treeline located between the highway and the railroad will screen the Herr House from any potential visual intrusion from the proposed line. Eventually, the proposed line will cross the highway and the railroad and will be on the same side of the

transportation corridor as the Herr House. However, even the crossing point will be more then 1,100 feet from the Herr House. Visual intrusion in this location will not be significant because the proposed structures will blend with the Kellogg plant, which provides a backdrop to the proposed line when viewed from the Herr House.

PPL also reviewed the proposed line routing with the Pennsylvania Historical and Museum Commission (PHMC) to determine if any significant archaeological sites were present. PHMC informed PPL that there were no known sites along the proposed line route, and further, it was unlikely that unknown sites exist in the immediate area.

D. COMMUNITY FEATURES

Several recreational areas are located within the project Core Area. The closest to the proposed line route is Amos Herr Park. The park is separated from the propose line by Rt. 283 and the Amtrak railroad corridor. A tree line between the highway and the railroad will provide screening from the visual impacts of the line.

Numerous cemeteries are located within the Study and Core Areas. However, none of them are close enough to be impacted by the proposed transmission line.

E. MISCELLANEOUS ITEMS

The proposed transmission line will cross both Rt. 283 and the Amtrak railroad corridor. There will be no impact to these facilities because the line will be designed to span these features. All appropriate crossing permits will be obtained prior to the start of construction. All other roads and utilities are easily spanned and will not be impacted. A PA 1-Call will be performed during

engineering and again prior to construction to determine the location of all underground utilities.

Soil and subsurface geology found within the Core Area will have no significant impact on the proposed line.

F. CONCLUSIONS

Land use south of the highway/rail corridor is highly developed with a mix of industrial, commercial, residential, and recreational land uses. The largest tract of open space is the Amos Herr Park. The park is a mixture of playground, soccer, tennis, baseball fields and open space. The park also includes the historic Amos Herr House. For these reasons, no attempt was made to route the proposed line in this area.

Only one other alternative was studied. This alternative attempted to locate the proposed line between Rt. 283 and the Amtrak railroad tracks. This alternative was rejected for the following reasons:

- Poor access for construction and maintenance of the line.
- East Hempfield Township is opposed to this line route because the tree line separating the railroad from the highway would need to be removed. The tree line provides a backdrop to the township park and the historic Herr House and screens these areas from the visual impacts of Rt. 283.
- Heavy traffic on the railroad would require a flagman and would limit the continuous periods available for construction, thus, increasing the amount of time required for construction and driving up project cost.
- Overhead railroad catenary would require taller structures increasing project cost.

- PennDOT does not allow steel poles on limited access highways. This would introduce more angle structures for the transmission line also driving up project cost.

In contrast, the proposed line route has the following advantages:

- Has the support of East Hempfield Township.
- Agricultural land use is highly compatible with transmission line construction.
- Parallels existing linear feature where easements overlap reducing the amount of required right-of-way.
- Minimal tree clearing.
- Most of the farms are in an Agricultural Security Zone that restricts future development.

III. SPECIFIC RIGHT-OF-WAY REQUIREMENTS

A. DESCRIPTION OF RIGHT-OF-WAY REQUIREMENTS

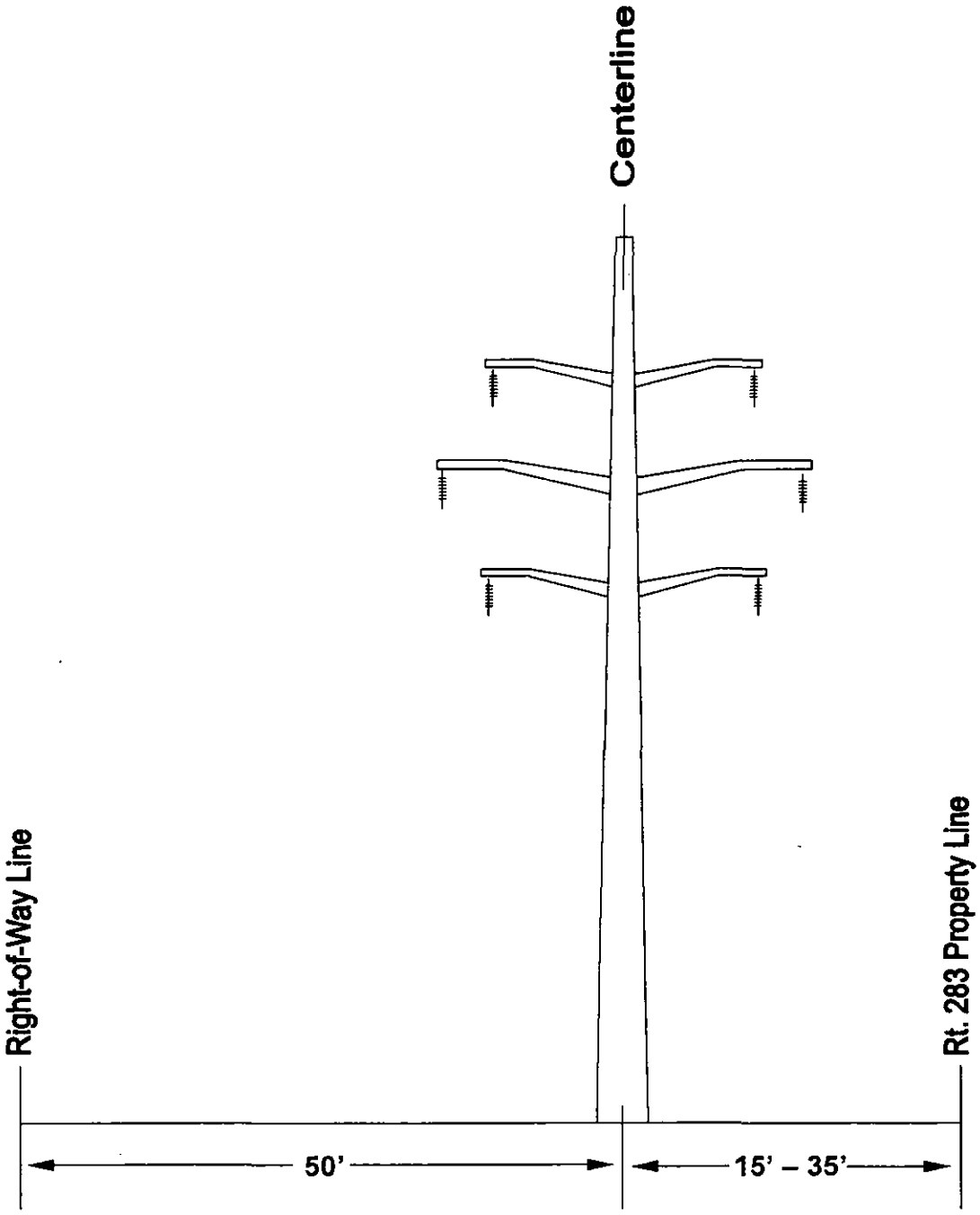
PPL's standard right-of-way width for 138/69 kV transmission lines is 100 feet. The right-of-way width is determined by structure type, design tensions, span length and conductor "blowout" (the distance the wires are moved by a crosswind). Because the proposed transmission line parallels PennDOT and Amtrak rights-of-way, the proposed transmission line easement overlaps the highway and railroad easements. The overlapping easements allow acquisition of less then the standard 100-foot easement for the majority of the proposed line. Where these easements overlap, the right-of-way width varies between approximately 65 and 85 feet.

Cross-sections of the rights-of-way discussed above are illustrated in Figures 1 and 2. The aerial exhibit (see Exhibit "C" map pocket) shows the location of the proposed line route, identifies the properties that are traversed by the proposed line, and denotes right-of-way widths.

B. STATUS OF RIGHT-OF-WAY NEGOTIATIONS

Right-of-way has been acquired from five of nine private property owners. Negotiations are progressing with three of the four outstanding property owners. PPL has been unsuccessful in its efforts to negotiate the required easements over the property of John E. Landis. There is no reasonable alternative routing that would avoid the Landis property. Thus, PPL will request that the commission grant the authority for the Company to condemn an easement across the Landis property.

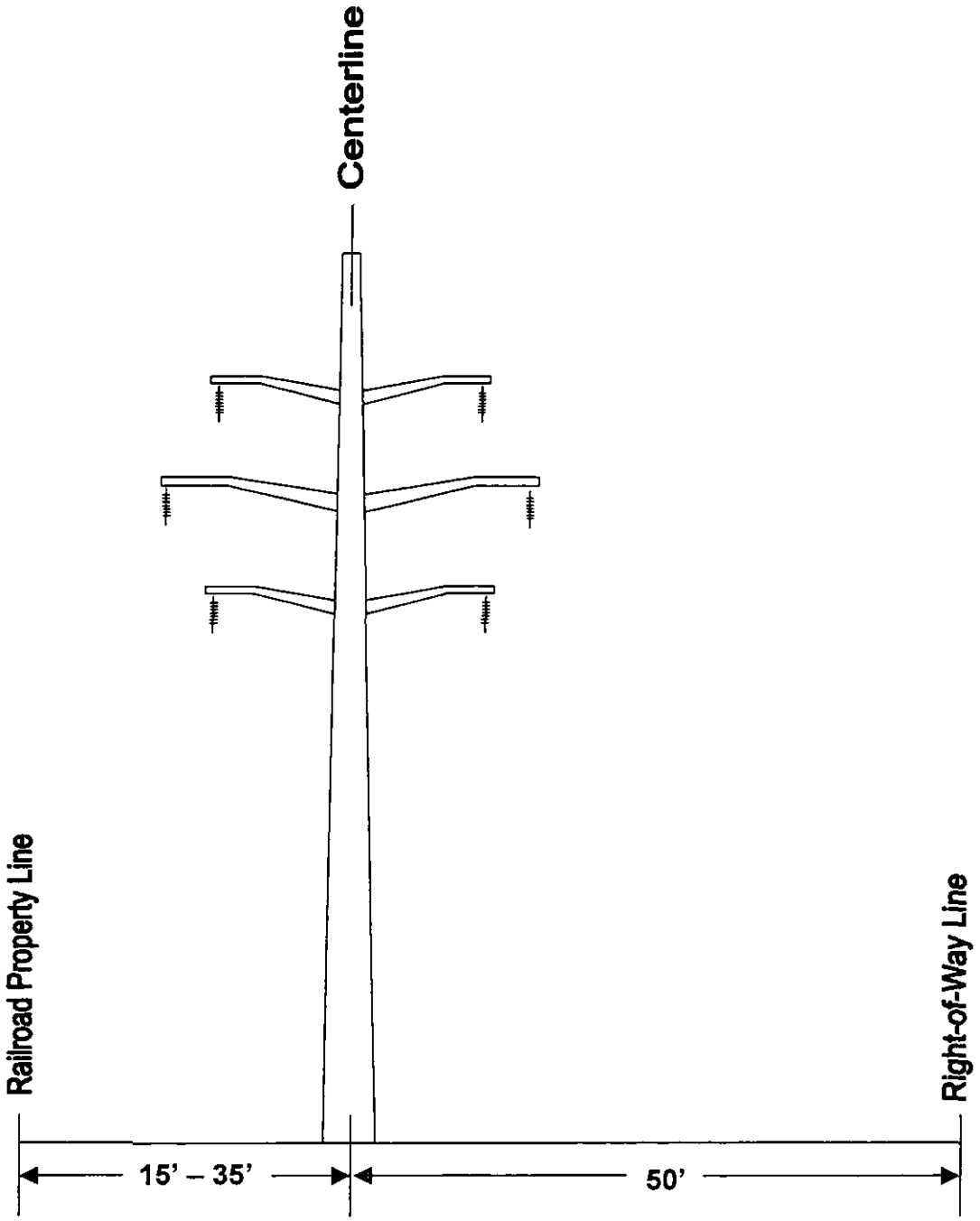
Crossing agreements from both PennDOT and Amtrak will be secured prior to construction.



Typical Right-of-Way Cross Section, Long Span Construction Adjacent to Rt. 283. Due to shifting property lines, right-of-way requirements vary. Widths falling within the ranges shown above are common.

Not to Scale

FIGURE 1



Typical Right-of-Way Cross Section, Long Span Construction Adjacent to Amtrak. Due to shifting property lines, right-of-way requirements vary. Widths falling within the ranges shown above are common.

Not to Scale

FIGURE 2

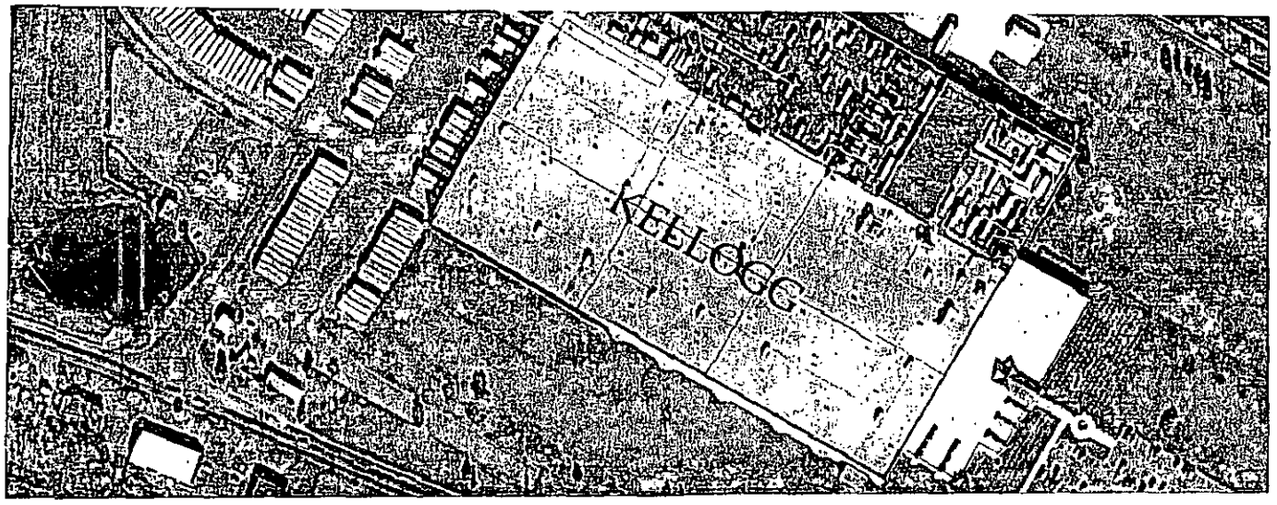


EXHIBIT C

AERIAL EXHIBIT

SHEET 1 OF 1

WEST HEMPFIELD - MCGOVERNVILLE 138/69 KV TIE LINE

EAST HEMPFIELD TOWNSHIP
LANCASTER COUNTY

SCALE 1" = 300'

300 0 150 300 600

PREPARED BY:
PPL ELECTRIC UTILITIES CORP.

PPL ELECTRIC UTILITIES

ACCT-169857
SCALE-AS SHOWN
BY-CDW

REVIEWED

APPROVE

WEST HEMPFIELD-MCGOVERNVILLE
138 KV LINE AND RIGHT-OF-WAY

OVER SIZED DOCUMENTS

LITIES

PPL DRAWING NO.

SHEET NO.

1 0

PC CAD

EXHIBIT "D"

WEST HEMPFIELD - McGOVERNVILLE #1 & #2 138/69 kV TIE

ENGINEERING DESCRIPTION

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EXHIBIT D

WEST HEMPFIELD – McGOVERNVILLE #1 & #2 138/69 kV TIE

ENGINEERING DESCRIPTION

I. PROPOSED LINE DESIGN

PPL proposes to construct a new double circuit 138/69 kV transmission line to connect the existing Kellogg #1 and #2 138/69 kV Taps off the South Manheim - South Akron #1 and #2 138/69 kV Lines with the existing West Hempfield - Donegal and West Hempfield - South Manheim #3 138/69 kV Lines. Additionally, six switches will be added to existing and proposed facilities to enhance operating flexibility. The line will be designed and built for 138 kV operation, but will initially be operated at 69 kV until load growth justifies increasing the operating voltage to 138 kV. The proposed project is located in East Hempfield Township, Lancaster County.

The proposed line is approximately 1.8 miles long. It will consist of single steel poles equipped with steel upswept conductor support arms. Tangent poles will be direct embedded, and angle poles will be installed on concrete foundations. The line will have approximately 17 structures averaging 95 feet high. Average span lengths will be 605 feet. The proposed structures are shown in Figures 1 and 2.

The proposed new line construction described above will be designed according to, and will meet, all National Electrical Safety Code standards. Design specifications and safety rules practiced by PPL are included in Appendix F. The proposed West Hempfield - McGovernville Line will consist of six power conductors, three on each side of the poles, and one overhead ground wire (OHGW). The power conductors will be 556.5 KCMIL 24/7 stranding ACSR. The OHGW will be 3/8-inch extra high strength steel.

Table 1 shows the designed minimum conductor ground clearances and the conductor thermal ratings of the proposed line.

TABLE 1

DESIGN MINIMUM CONDUCTOR CLEARANCES

FOR 556.5 KCMIL 24/7 STRANDING ACSR*

WEST HEMPFIELD – McGOVERNVILLE #1 & #2 138/69 kV LINE

Condition	Transmission Double-Circuit Design Clearance-to-Rail	Transmission Double-Circuit Design Clearance-to-Ground
Normal load average weather (16°C ambient temperature)	64 feet	37 feet
Predicted extreme thermal load (125°C conductor temperature)	60 feet	30 feet
Predicted extreme weather conditions (1/2 inch ice, 0 lb. Wind, -18°C)	64 feet	35 feet

*Clearances based on a maximum tension of 9,000 pounds and a ruling span of 750 feet.

CONDUCTOR THERMAL RATING
556.5 KCMIL 24/7 STRANDING ACSR
125°C MAXIMUM CONDUCTOR TEMPERATURE

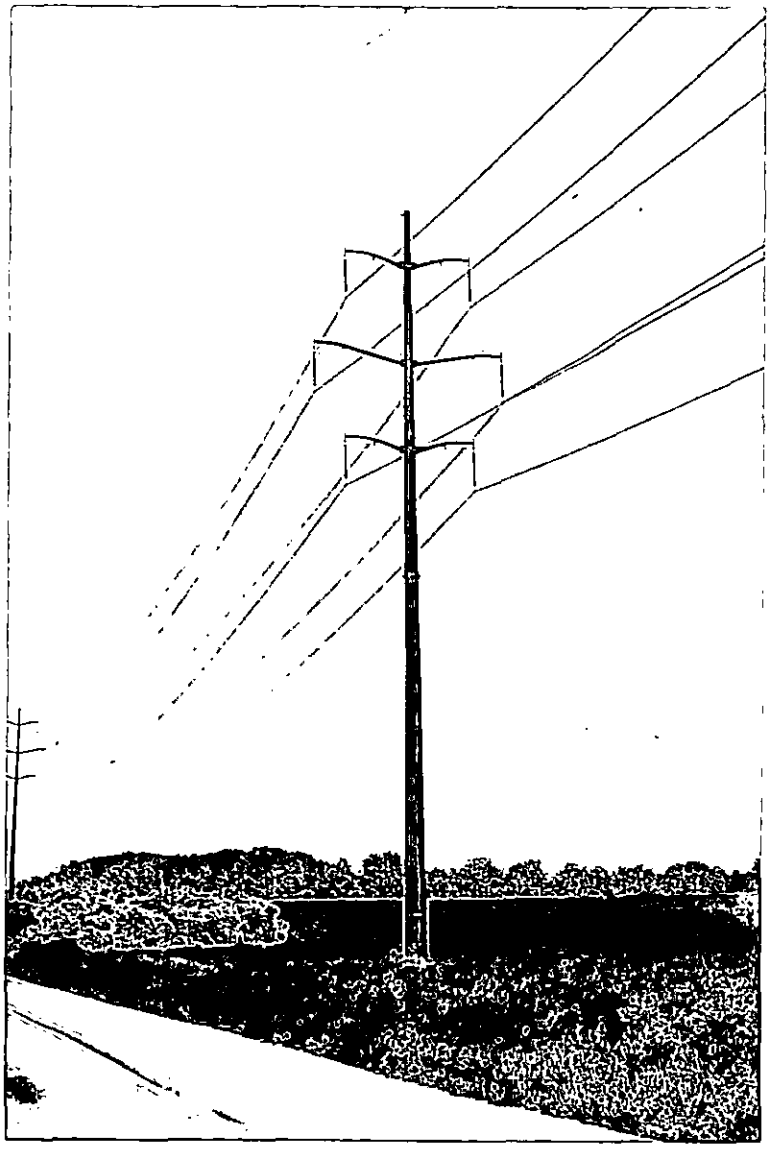
Condition	Ambient Temperature °C	Wind Speed Knots	Ampacity Amps
Summer Normal	35	0	815
Winter Normal	10	0	926
Summer Emergency	35	1-1/2	1041
Winter Emergency	10	1-1/2	1163

II. MAGNETIC FIELD MANAGEMENT PLAN

PPL has instituted a Magnetic Field Management Program for new and rebuilt transmission lines, which is set forth in Appendix G to this Application. The Company does not believe that the current scientific evidence demonstrates that magnetic fields cause any adverse health effects or pose a health or safety danger to the public. Nevertheless, PPL has determined, as a matter of policy, to design its new and rebuilt transmission lines to reduce magnetic fields when that can be done at low or no cost and consistent with functional requirements. PPL's Magnetic Field Management Program has been developed to implement that policy decision.

Because this line is being constructed for double-circuit operation, PPL engineers investigated the possibility of reverse phasing to mitigate magnetic fields. In order to employ reverse phasing on the proposed line, two transposition structures would have to be installed at each end of the line. However, the existing and proposed railroad infrastructure on Kellogg property at the eastern terminus of the line does not provide sufficient room to install of the transposition structures. Therefore, reverse phasing on this line cannot be employed without incurring expenditures beyond the scope of PPL's EMF policy.

Proposed 138 kV Double Circuit
Tangent Structure



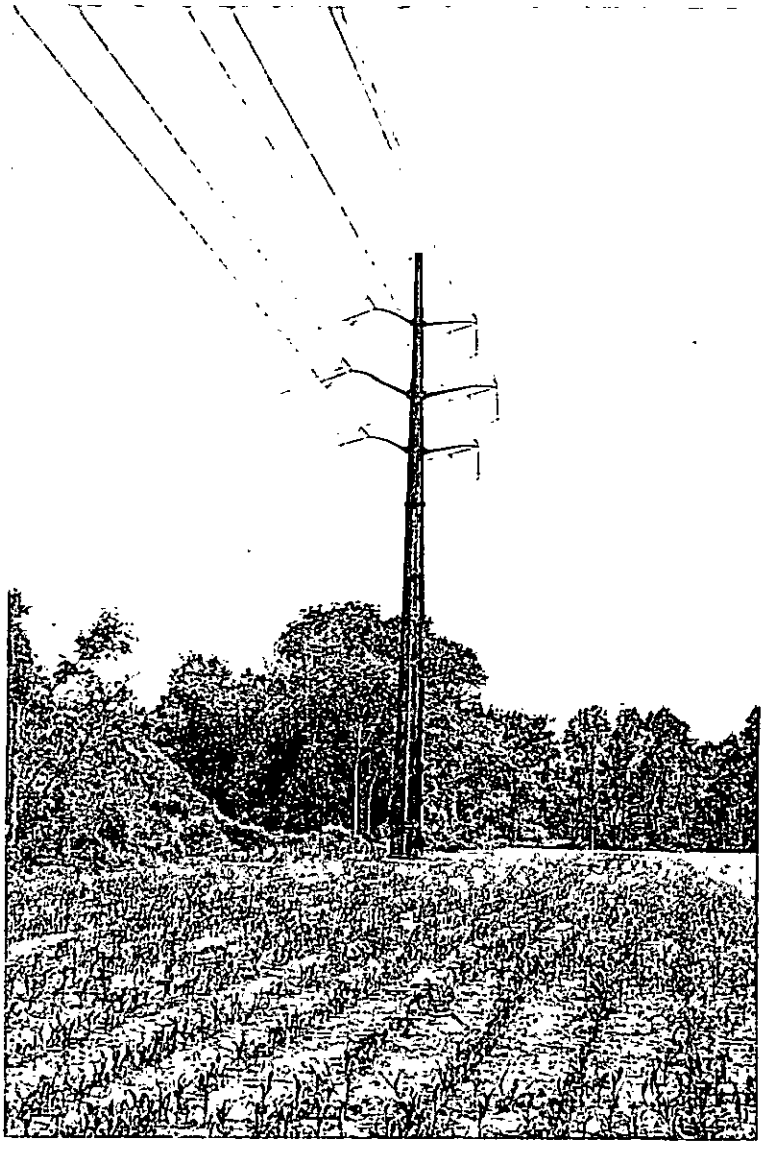
POLE STATISTICS

Average Height – 95 Feet
Arm Length (Top & Bottom) – 7 Feet
Arm Length (Middle) – 11 Feet

Conductor Spacing:
Overhead Groundwire to Top Phase – 12 Feet
Phase to Phase – 12 Feet

FIGURE 1

Proposed 138 kV Double Circuit
Self-Supporting Angle Structure



POLE STATISTICS

Average Height – 95 Feet
Arm Length (Top & Bottom) – 7 Feet
Arm Length (Middle) – 11 Feet

Conductor Spacing:
Overhead Groundwire to Top Phase – 12 Feet
Phase to Phase – 12 Feet

FIGURE 2

LIST OF APPENDICIES

APPENDIX A

ENVIRONMENTAL INVENTORY GUIDELINES

An environmental inventory lists environmental factors considered when evaluating and selecting transmission line routes. These factors can be adversely affected by, or be compatible with, transmission facilities.

Major factors and the reasons why they are inventoried are listed in the following table:

CATEGORY	WHY INVENTORIED
A. Linear Features	
1. Turnpikes, Interstate Highways, Major U.S., Pennsylvania, and Legislative Routes (LR) 2. Pipelines 3. Railroads 4. Floodwalls, Levees 5. Communication Facilities 6. Property Lines 7. Vacant Right-of-Way 8. Power Lines 9. Tree Rows	Paralleling existing linear features, particularly transmission lines, is often desirable for several reasons. Paralleling usually adds only incrementally to existing impacts, rather than creating new impacts. Narrower rights-of-way are needed because maximum utilization is made of land already encumbered. Existing access roads can be used, less tree clearing is needed, and, from a community planning perspective, the combination of linear features into a common corridor is desirable.
B. Land Use	
1. Residential a. Dwellings b. Subdivisions c. Developments d. Future Developments e. Urbanized Areas	Whenever possible, avoiding present and proposed residential development is desirable because land use impacts, potential visual intrusions and costs are minimized. Compatible joint uses of land are also explored.

CATEGORY	WHY INVENTORIED
2. Commercial and Industrial	Because these areas are generally compatible with transmission facilities, the possibility of routing through these areas is explored.
3. Interference Zones a. Radio Stations b. Microwave Towers c. Airports	These are usually avoided, if feasible. If this is not feasible, undergrounding or mitigating measures are considered.
4. Agricultural a. Cropland b. Pasture	Generally, this is a compatible land use. There is minimal impact at the borders of these areas. The number of structures is kept to a minimum, and irrigation equipment is avoided.
5. Public Areas a. Cemeteries b. Churches c. Hospitals d. Schools	Visual intrusions into these areas are avoided where possible.
6. Recreational Areas a. Parks b. Golf Courses c. Ski Areas d. Preserves and Game Lands e. Tourist Recreational Facilities	Visual intrusions into these areas are avoided where possible.

CATEGORY	WHY INVENTORIED
7. Extractive a. Coal b. Limestone c. Peat Bogs	Areas where significant mineral resources can be economically extracted are generally avoided. Where practical, lines span small areas and are routed along boundaries.
8. Orchards and Nurseries	Removal of productive trees and interference with orchard maintenance (spraying, irrigating, etc.) are avoided where possible.
C. Visual and Scenic Features	
1. Unique Scenic Areas	It is preferable to avoid these areas.
2. Highpoints Prominent Slopes Ridge Lines Panoramic Views Scenic Highways Residential Areas	These features are avoided where practical to eliminate or minimize visual intrusion in areas of potentially high visual exposure and scenic quality. Views from residential areas are avoided, if possible.
D. Soils and Slopes	
1. Soils a. Shallow Bedrock b. Stony Soils c. Wet Soils d. Erodible Soils	These soil types are generally avoided due to both construction and environmental constraints. High construction costs and disruption to the area may result from blasting, road construction, structure grading and setting, and material handling and hauling.
2. Slopes	Steep slopes (15 percent to 25 percent or greater) are avoided where possible to minimize the potential for soil erosion and slower revegetation.

CATEGORY	WHY INVENTORIED
	Again, increased construction costs and environmental damage may occur when building on slopes due to road construction, vegetation clearing, and the handling, hauling and setting of structures.
3. 100-Year Floodplain	These areas are generally avoided to prevent potential disruption of floodplains and flood control facilities. Construction costs necessary to maintain reliability also are higher.
E. Cultural Features	
1. Historic Sites	Visual intrusions on historic sites are avoided where possible.
2. Archaeological Areas	Known sites and areas of high potential are avoided to prevent damage to resources.
F. Geology	Bedrock type is determined to predict the potential presence of endangered species and other wildlife, and mineral resources are identified. Special attention is given to certain bedrock types with particular characteristics or problems. Caves, springs, and sinkholes are avoided.
1. Unique Geological Areas	Visual intrusions on unique formations and destruction of collection sites are avoided where practical.

CATEGORY	WHY INVENTORIED
G. Natural Features	
1. Aquatic Resources, Water Bodies, Streams, Rivers and Wetlands	The potential for siltation or obstruction with silt or mud, and temperature increases due to removal of bank vegetation are avoided to the greatest extent possible. Special caution is exercised near waters recognized for exceptional quality. Measures used to mitigate effects of crossing water bodies may result in reduced reliability or increased maintenance costs.
a. Water Quality	
b. Fish, Aquatic Life	Major aquatic organisms present in potentially affected water bodies are identified to determine potential impacts. Widely used fisheries are avoided. If this is not practical, caution is exercised in crossing to prevent decrease in water quality, especially due to siltation. The presence or likely occurrence of endangered or threatened aquatic species is determined, and known locations of such species are avoided or impacts are mitigated.
2. Terrestrial Resources	
a. Vegetation Types	Major types of vegetation are identified to characterize area habitats and predict the occurrence of wildlife species and potential impacts of removing these vegetation types. Important areas are identified, especially vegetation not common in the area, and attempts

CATEGORY	WHY INVENTORIED
	are made to avoid them where possible (e.g., coniferous growth in a primarily deciduous woodland; trees in an urban area, etc.).
	An attempt is made to minimize clearing of wooded areas, which is considered a constraint due to disruption of existing environment, costs of clearing, future maintenance, and reduced liability. However, clearing through areas of heavy woodland can benefit wildlife as open areas resprout and are widely used as browse and cover areas.
	Attempts are made to avoid or minimize interference with commercially-used vegetation and tree plantations, lumbering operations, etc.
b. Wildlife	Positive and negative impacts on area species are predicted.
	The presence or likely occurrence of endangered or threatened animal species or their critical habitat requirements are considered. Known areas of occurrence are avoided or impacts are mitigated.
c. Unique Natural Wilderness Areas	Visual intrusion and disruption of the natural environment should be avoided where possible.

APPENDIX B

BIBLIOGRAPHY FOR EXHIBIT 'B'

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Pennsylvania Spatial Data Access Center. Fp-Lancaster, Cparks, S4007661 0a digital shapefiles, Columbia East, Lancaster, Lititz, Manheim USGS 1:24,000 digital raster graphics. World Wide Web site. www.pasda.psu.edu. Pennsylvania State University, November 2002.

Shipe, John Mark. Owner, Landisville Terminal and Transfer Station. Phone interview. 22 November 2002.

US Department of Agriculture Soil Conservation Service. Soil Survey of Lancaster County. National Cooperative Soil Survey, 1985.

APPENDIX C

GOVERNMENTAL AGENCIES, MUNICIPALITIES AND OTHER PUBLIC ENTITIES CONTACTED

Federal

United States Department of the Interior
Fish and Wildlife Service
Pennsylvania Field Office
315 S. Allen Street, Suite 322
State College, PA 16801-4850
CONTACT: David Densmore, Supervisor

State

Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823
CONTACT: John Arway, Chief

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
CONTACT: Gary R. Camus, Game Land Office Manager

Pennsylvania Natural Diversity Inventory
Bureau of Forestry Division of Forest Advisory Services
P. O. Box 8552
Harrisburg, PA 17105-8552
CONTACT: Andrew Gorman, Environmental Review Assistant

County

Lancaster County GIS Department
50 North Duke Street
Lancaster, PA 17608
CONTACT: Steve Gochenaur, Director

Lancaster County Engineering Office
50 North Duke Street
Lancaster, PA 17603
CONTACT: Dave McCudden

Local

East Hempfield Township
1700 Nissley Road
Landisville, PA 17538
CONTACT: Ronald Kissler, Zoning Officer

East Hempfield Township Manager
1700 Nissley Road
Landisville, PA 17538
CONTACT: George Marcinko

Landisville Terminal and Transfer Company
A Division of Amherst Industries
3900 Nolt Road
Landisville, PA 17538
CONTACT: Mark Shipe, Owner

APPENDIX D

NATIONAL HISTORIC REGISTER LISTED AND ELIGIBLE PROPERTIES

Pennsylvania Historical and Museum Commission
August 2002

MUNICIPALITY	ID #	HISTORIC NAME	ADDRESS / LOCATION	STATUS	LIST DATE
East Hempfield Twp.	081806	Building	2345 Old Harrisburg Pike	Eligible	5/18/1992
East Hempfield Twp.	105435	Bamford, Charles, Farmstead	Yellow Goose Road	Eligible	12/20/1993
East Hempfield Twp.	103079	Bassier Farm	1366 Colebrook Road	Eligible	3/7/1995
East Hempfield Twp.	081773	Baughman, Michael & Elizabeth, House	1790 Kauffman Road, Landisville	Eligible	2/12/1987
East Hempfield Twp.	081791	Brubaker House	1836 Marietta Pike	Eligible	4/8/1994
East Hempfield Twp.	083690	Colebrook Road Bridge	Colebrook Road (T-374)	Eligible	5/9/1984
East Hempfield Twp.	102201	Eshleman, John, Farm	2352 Marietta Pike	Eligible	4/6/1994
East Hempfield Twp.	101682	Habecker, Christian, Farm	2301 Spring Valley Road	Listed	8/30/1994
East Hempfield Twp.	103081	Kolb Dairy Farm	Dairy Road/Rohrerstown Road	Eligible	3/7/1995
East Hempfield Twp.	101914	Landis Mill	1048 W. Roseville Road	Eligible	11/3/1993
East Hempfield Twp.	050797	Landis Mill Covered Bridge	Shreiner Station Road, West of Oreville	Listed	12/10/1980
East Hempfield Twp.	121467	Miller Property	2348 Harrisburg Pike	Eligible	7/5/2002
East Hempfield Twp.	104608	Mumma, Sammuel N., Tobacco Warehouse	Elizabeth Street, southeast corner of Barbara Avenue	Listed	5/30/1997
East Hempfield Twp.	050812	Shenk's Mill Covered Bridge	T-372, northwest corner of Landisville	Listed	12/10/1980

MUNICIPALITY	ID #	HISTORIC NAME	ADDRESS / LOCATION	STATUS	LIST DATE
East Hempfield Twp.	105446	Structures on Proposed Hechinger Site	North of Harrisburg Pike	Eligible	12/31/1993
Penn Twp.	120373	Cornwall Fire Tower	Valley Forge State Forest	Eligible	5/29/2002
Penn Twp.	050805	Kaufman's Distillery Covered Bridge	T-889, northeast of Sporting Hill	Listed	12/10/1980
Penn Twp.	096846	Mount Hope Estate (Boundary Increase)	Route 72, ½ mile south of Pennsylvania Turnpike	Listed	9/6/1991
Penn Twp.	050804	Shearer's Covered Bridge	High School Memorial Park	Listed	12/10/1980
Rapho Twp.	001526	Hossler School House	Hossler Road	Eligible	5/6/1994
Rapho Twp.	050805	Kaufman's Distillery Covered Bridge	T-889, northeast of Sporting Hill	Listed	12/10/1980
Rapho Twp.	104653	Lindemuth, Jacob, Property	Longenecker Road	Eligible	2/1/1996
Rapho Twp.	104652	Lindenmuth, Peter, Property	East side of S. R. 4003	Eligible	2/1/1996
Rapho Twp.	001078	Mount Hope Estate	Route 72, ½ mile south of Pennsylvania Turnpike	Listed	12/01/1980
Rapho Twp.	096846	Mount Hope Estate (Boundary Increase)	Route 72, ½ mile south of Pennsylvania Turnpike	Listed	9/6/1991
Rapho Twp.	082054	Old Harrisburg Pike House	Old Harrisburg Pike, east of Newcomer Road	Eligible	8/18/1994
Rapho Twp.	050803	Risser's Mill Covered Bridge	L. R. 36011, Hunsecker	Listed	12/10/1980
Rapho Twp.	050811	Seigrist's Mill Covered Bridge	T-360, north of Ironville	Listed	12/10/1980
Rapho Twp.	050804	Shearer's Covered Bridge	High School Memorial Park	Listed	12/10/1980
Rapho Twp.	050812	Shenk's Mill Covered Bridge	T-372, northwest of Landisville	Listed	12/10/1980
Rapho Twp.	082035	Zug, Samuel, Farm	Colebrook Rd., west of Chiques Rd.	Eligible	7/1/1993

MUNICIPALITY	ID #	HISTORIC NAME	ADDRESS / LOCATION	STATUS	LIST DATE
West Hempfield Twp.	097289	Chickies Furnace Site No. 1	Route 441 at Chickies Creek	Eligible	5/1/1991
West Hempfield Twp.	097284	Chickies Industrial Historic District	Route 441, Furnace Road, Chickies Creek	Eligible	5/1/1991
West Hempfield Twp.	097286	Chickies Lock	0.1 miles west of Route 441	Eligible	5/1/1991
West Hempfield Twp.	097287	Chickies Silica Stone Crusher	Along Susquehanna River, between Chickies Rock and Jones	Eligible	5/1/1991
West Hempfield Twp.	050814	Forry's Mill Covered Bridge	T-362, northwest of Ironville	Listed	12/10/1980
West Hempfield Twp.	097288	Haldeman, S. S., Mansion site	Route 441 near Chickies Rock	Eligible	5/1/1991
West Hempfield Twp.	097285	Henry Clay Furnace Ruins	0.3 miles west of Route 441	Eligible	5/1/1991
West Hempfield Twp.	097293	Saint Charles Furnace Ruins	North of Columbia on Conrail Right-of-way	Eligible	5/1/1991
West Hempfield Twp.	050811	Seigrist's Mill Covered Bridge	T-360, north of Ironville	Listed	12/10/1980

Note: This list contains all municipalities that lie within the study area, with the exception of Manheim Township, of which only a very small portion exists within the study area boundary, and East Petersburg Borough, which does not contain any listed or eligible historic properties.

APPENDIX E

LIST OF PROPERTY OWNERS IN THE PROPOSED RIGHT-OF-WAY

Property Owner/Address	Parcel Number
Pennsylvania Department of Transportation (Rt. 283) Commonwealth Keystone Building 400 North Street, 8th Floor Harrisburg, Pennsylvania 17120	1
M. Gregory Gehman Karolyn S. Gehman 556 Oak Tree Road Manheim, PA 17545	2
John E. Landis 2942 King Lane Lancaster, PA 17601	3
Warren K. Witmer Marion E. Witmer 503 Long Road Manheim, PA 17601	4
AMTRAK Mr. Larry K. Lewis Director, I & C Projects National Railroad Passenger Corporation 30th Street Station, 3rd Floor, South Tower Philadelphia, PA 19104-2817	5
East Hempfield Township 1700 Nissley Road, P.O. Box 128 Landisville, Pa. 17538 George R. Marcinko, Township Manager	6
Maholn N. and Rozanne Zimmerman 204 S. Conestoga View Drive Akron, Pa. 17501	7

Property Owner/Address	Parcel Number
Gary P. Loiseau Christopher O. Coder 658 W. Vine Street Lancaster, PA 17603	8
Brian E. Shank Rebecca M. Shank 2024 Main Street Lititz, PA 17543	9
Sigma Electronics Inc. 1184 Enterprise Road East Petersburg, PA 17520	10
Kellogg USA Inc. 2050 State Road P.O. Box 3006 Lancaster, PA 17601	11

APPENDIX F

PPL DESIGN CRITERIA AND SAFETY PRACTICES

The National Electrical Safety Code (NESC) is a set of rules to safeguard people during the installation, operation, and maintenance of electric power lines. The NESC contains the basic provisions considered necessary for the safety of employees and the public. Although it is not intended as a design specification, its provisions establish minimum design requirements. PPL Electric Utilities Corp. (PPL) has developed design specifications and safety rules which meet or surpass all provisions specified by the NESC.

Engineering Design Criteria and Parameters

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

PPL transmission line design standards meet or surpass the NESC standards. For example, the relative order of grades of construction for conductors and supporting structures is B, C, and N; Grade B being the highest. According to the NESC standards, construction Grades B, C, or N may be used for transmission lines (except at crossings of railroad tracks and limited access highways where Grade B construction is specified). However, PPL designs all of its transmission lines for Grade B construction. The use of Grade B design and construction specifies such things as larger-minimum crossarm dimensions, larger-minimum conductor size, and increased safety factors.

Another example is the design parameters utilized to account for ice and wind loadings on the overhead ground wire (OHGW) and power conductors. The NESC standard ice and wind design magnitudes for the PPL territory are 0.5 inch thickness of radial ice combined with four pounds per square foot horizontal wind pressure (equivalent to 40-mile per hour wind velocity). The conductor sags and tensions used in line designs are the result of various ice and wind combinations, depending on the elevation at the line location and line design voltage. The conductor sags and tensions used in the design of all PPL transmission lines are at least 0.5-inch ice combined with eight pounds wind pressure (equivalent to 57 miles per hour wind velocity). This means that PPL lines are designed to operate safely and reliably during inclement weather even more severe than assumed by the NESC. In addition, PPL transmission lines are designed with more clearance to the ground than required by the NESC. The tables below compare PPL and NESC ground clearances for lines of various voltages.

138 kV

Surface Underneath Conductors	Vertical Clearance to Ground	
	NESC Standard	**PPL Design**
Roads, streets, alleys	**21 Ft.**	**30 Ft.**
Other land traversed by vehicles (such as cultivated Field, forest, etc.)	21 Ft.	30 Ft.
Spaces accessible to pedestrians only	**17 Ft.**	**30 Ft.**
Railroad tracks	**31 Ft.**	**35 Ft.**

230 kV

Surface Underneath Conductors	Vertical Clearance to Ground NESC Standard	PPL Design
Roads, streets, alleys	**23 Ft.**	**32 Ft.**
Other land traversed by vehicles (such as cultivated Field, forest, etc.)	23 Ft.	32 Ft.
Spaces accessible to pedestrians only	**19 Ft.**	**32 Ft.**
Railroad tracks	**31 Ft.**	**36 Ft.**

500 kV

Surface Underneath Conductors	Vertical Clearance to Ground NESC Standard	PPL Design
Roads, streets, alleys	**28 Ft.**	**53 Ft.**
Other land traversed by vehicles (such as cultivated Field, forest, etc.)	28 Ft.	53 Ft.
Spaces accessible to pedestrians only	**24 Ft.**	**53 Ft.**
Railroad tracks	**38 Ft.**	**53 Ft.**

A relay protection system is used to protect the public safety and welfare as well as equipment and the transmission system. Relay protection is installed for all transmission lines to automatically de-energize the line in the unlikely event that the line or supporting structure fails and the line contacts the ground.

Periodic Maintenance Program on All Transmission Lines

To ensure continued public safety and integrity of service, a periodic maintenance and inspection program is implemented for every transmission line. The program is administered through the use of helicopter patrols, with supplemental foot and structure

climbing patrols. A number of helicopter patrols are performed on all lines annually. The two-man helicopter crew flies parallel, to the left, and above the line so that the observer can look for signs of line damage or deterioration and observe clearances between vegetation and conductors. The observations are included in a report that is forwarded to the appropriate department for corrective action.

Foot and structure climbing patrol programs for a transmission line begin approximately three to five years after the line is energized, unless a helicopter patrol reports a need for earlier action. The frequency of foot patrols varies from once every year to once every several years depending on line type and age.

An assigned foot patroller checks right-of-way conditions, including access roads, bridges, pole washouts, tower footers, vegetation height and clearance to conductors, pole and tower deterioration and, with the use of binoculars, insulators, and condition of hardware. Identified problems are included in a report which is forwarded to the appropriate department for corrective action.

A scheduled line outage is required to perform an overhead patrol because of "hands-on" inspection of hardware. Overhead patrols are conducted on a schedule determined by line age, operating record, and observed general condition. The necessary repairs are also done during the inspection outage.

Personnel Safety Rules

The following are a few of the PPL safety rules which demonstrate the Company's concern for employee safety:

- Work procedures have been developed to allow work to be performed on energized facilities in a safe manner. When lines or apparatus are removed from service to be worked on, the Energy Control Process system is applied. This system provides that a red tag must be physically placed on the control handle of the de-energized equipment. The red tag may be removed only after proper authorization to energize the equipment. Various other tags are used for limited operations and informational purposes.

Employees will not apply or remove a tag or change the status of tagged equipment unless authorized.

- Temporary safety grounds are used on de-energized facilities for employee safety during maintenance, construction, or reconstruction work. Safety grounds are wires connecting the de-energized facility to an electrical ground. If the facility should be energized, the safety grounds will divert the current directly to ground and reduce the likelihood of personal injury. The conductor size and attachment clamps of temporary safety grounds must be capable of conducting anticipated fault currents. Rubber gloves, rubber sleeves, and additional rubber protective equipment are used as required when applying or removing temporary safety grounds to or from the lines or apparatus to be grounded. An approved nonconductive working stick of sufficient length to allow workers to maintain the following required minimum clearances is used to test that the line has been de-energized and to apply temporary safety grounds:

Voltage-kV	**Minimum Clearance**
138	3'-7"
230	5'-3"
500	11'-3"

Before applying grounds, a test is done to confirm that the line is de-energized. The voltage test device is checked before and after use to assure reliability. When ground pins are used to establish proper ground points, they are driven to a depth of not less than four feet as near vertical as possible.

- Poles or structures are inspected and examined for structural integrity before climbing. If there is any reason to believe that a pole is unsafe, it is stabilized before work is performed. Appropriate safety gear in the form of body belts, safety straps, hard hats, gloves, etc., is worn by linemen during line work activity.

APPENDIX G

MAGNETIC FIELD MANAGEMENT

PP&L, Inc.

OCTOBER 1998

TABLE OF CONTENTS

INTRODUCTION

At PP&L, Inc., magnetic field management means investigating and implementing methods at low or no cost to reduce magnetic fields in new or rebuilt transmission and distribution lines. This document explains PP&L, Inc.'s Magnetic Field Management Program, which is part of PP&L, Inc.'s larger Electric and Magnetic Fields ("EMF") policy.

PP&L, Inc.'s View

Some people are worried that electric and magnetic fields are harming their health. Others think the scientific research does not show a problem at all, and still others believe there's just too much scientific uncertainty to draw any conclusions.

Here's what we do know now. Various panels of scientists that have reviewed the EMF research generally have drawn two main conclusions. First, the large body of evidence does not demonstrate that EMF are harmful. Second, additional research is recommended to explore questions raised in some studies.

Given these conclusions, PP&L, Inc. is taking a reasoned approach in responding to the EMF issue. PP&L, Inc.'s approach to the EMF issue consists of five elements:

- Providing EMF information to customers and employees
- Providing magnetic field measurements
- Establishing and implementing a magnetic field management program to reduce magnetic fields in new or rebuilt facilities when it can be done at no, or low, cost
- Integrating EMF in the public involvement process that PP&L, Inc. undertakes in the siting of transmission lines
- Have supported additional research

EMF Are All Around Us

Electric and magnetic fields occur in nature and in all living things. The earth, for instance, has a magnetic field, which makes the needle on a compass point north.

Electric fields and magnetic fields of a different type also surround every wire that carries electricity. In everyday life, these EMF arise from several basic sources, including power lines, electrical appliances, home and building wiring, other utility lines and cables, and currents flowing on water pipes. Though they often occur together, EMF are made up of two separate components:

Electric Fields

Electric fields are produced by the voltage — or electrical pressure — on a wire. The higher the voltage, the higher the electric field. As long as a wire is energized — has voltage present — an electric field is present (see figure 1). In other words, an appliance, or an electric power line, doesn't actually have to be turned on to create an electric field. It just has to be plugged in. Electric fields diminish with distance and can be blocked or partially shielded by objects such as trees and houses.

Magnetic Fields

Magnetic fields are created by the current or flow of electricity through a wire. Generally speaking, the higher the current, the higher the magnetic field. Because they only occur when current is flowing, magnetic fields are present only when the power is turned on (see figure 1). Magnetic fields also diminish with distance, but — unlike electric fields — are not blocked by common objects. In recent years, public and scientific interest has turned toward the magnetic field component of EMF because of some scientific studies regarding these fields.

Figure 1

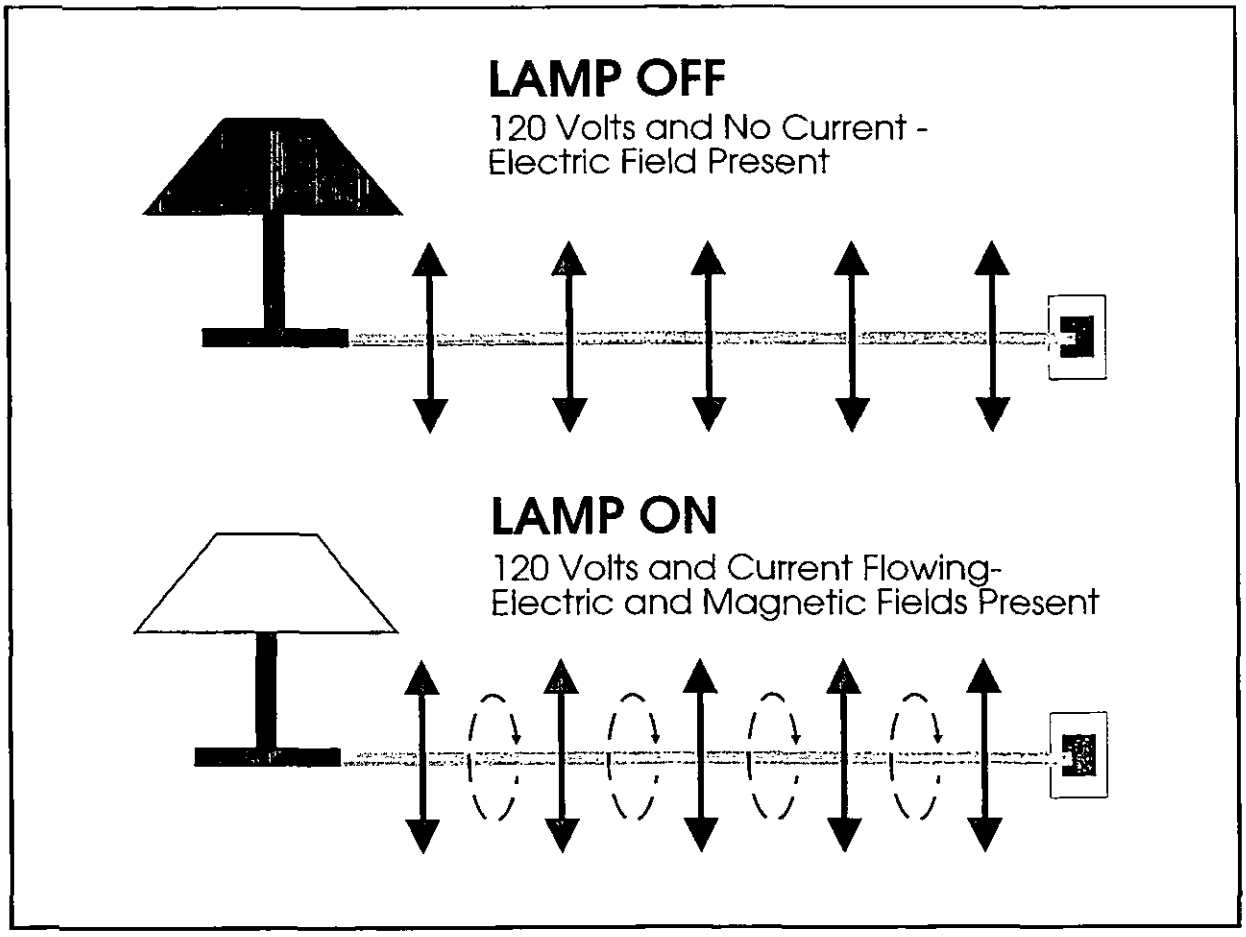


Figure 2

Magnetic field strengths decrease with distance Magnetic fields are measured in milligauss	Source: "EMF In Your Environment", U.S. Environmental Protection Agency 1992 At 6 inches	At 1 foot	At 2 feet
Clothes dryer 	2 to 10	* to 3	*
Microwave oven 	100 to 300	1 to 200	1 to 30
Toaster 	5 to 20	* to 7	*
Power drill 	100 to 200	20 to 40	3 to 6
Can opener 	500 to 1500	40 to 300	3 to 30
Mixer 	30 to 600	5 to 100	* to 10
Hair dryer 	1 to 700	* to 70	* to 10
Color television 	Data not available	* to 20	* to 8

FIGURE 2 * The magnetic field measurement at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.

Measuring Magnetic Fields

Magnetic fields usually are measured in a unit called a milligauss. Magnetic field levels found in the living areas of homes typically range from less than 1 milligauss to about 4 milligauss according to the U.S. Environmental Protection Agency. They can be higher in some cases. The levels next to appliances can exceed 1,000 milligauss (1 gauss). Figures 2 and 3 show how the strength of the field falls off as you move away from the source, just as the heat of a campfire grows weaker as you walk away from it.

For overhead power lines, the strength of the magnetic fields is dependent upon a number of factors that will be explained later. Those factors produce a magnetic field that drops off rapidly as you move away from the power line.

Figure 3

Sample Magnetic Field Levels in Milligauss				
Type of Overhead Power Line	**Distance from the line**			
	Under the line	**50 ft.**	**100 ft.**	**200 ft.**
220 kV and 500 kV	5-400	5-250	1-75	0.5-20
69 kV and 138 kV	3-80	0.5-25	0.1-10	0.1-3
12 kV and below	0.4-20	0.1-1	-	-

The magnetic field values provided in this table represent a general range of values associated with the types of overhead power lines listed and are provided for illustration. There will be circumstances in which there will be magnetic field levels above or below the range of values provided due to variations in such factors as height of the wires, current flow and so on.

DEVELOPMENT OF PP&L, INC.'S MAGNETIC FIELD MANAGEMENT PROGRAM

One element of our response to EMF concerns expressed by some of our customers is PP&L, Inc.'s Magnetic Field Management Program. The program was initiated in March 1991 because PP&L, Inc. believes it makes good sense, as a matter of policy, to respond to the concerns expressed by some of our customers and to reduce magnetic fields in new and rebuilt facilities where it can be done with either no-cost or low-cost design changes.

This document updates the original program which has been revised several times since 1991. These guidelines were developed by PP&L, Inc.'s EMF Working Group.

VARIABLES THAT AFFECT MAGNETIC FIELDS

Magnetic fields from transmission and distribution lines are a function of a number of design variables. The following parameters affect the magnetic field levels produced by transmission and distribution lines:

- Current
- Height of conductors above ground
- Configuration of conductors
- Distance from the line

Effect of Phase Current on Magnetic Fields

At power frequencies (i.e. 60 hertz), the magnetic field level is a function of the current or flow of electricity through a wire. Keeping all other parameters the same, the magnetic field is proportional to the current. Hence, if the current increases by 25 percent, the resulting magnetic field level will increase by 25 percent.

The overall load current on any line varies with the demand for power. It's usually highest during daytime hours and lowest at night. There also are weekly, monthly, seasonal and yearly variations.

The difference in the currents between each phase in a multiphase line also can affect the magnetic field. This difference is called phase unbalance. For a constant load, a statistical analysis of this phase unbalance can be made to determine its effect on the magnetic field. Close to the line, there is very little effect. However, the phase unbalance slows the rate at which the magnetic field decreases with distance from the line.

Effect of Conductor Configuration on Magnetic Fields

In the transmission and distribution of power, utilities like PP&L, Inc. presently use both three-phase and single-phase lines. Each phase on a three-phase power line has either a single conductor or a bundle of two or more conductors. In a three-phase system, the ground-level magnetic field is a result of the fields produced by the currents in each of the phases. Placing the three phases as close together as possible (compaction) creates some field cancellation, and the ground-level magnetic field is reduced. However, appropriate phase separation is required for the reliable operation of the line. In addition, the arrangement of the phases can create some field cancellation and reduction of the ground-level magnetic field.

Effect of Distance From the Magnetic Field Source

Magnetic field strength diminishes with the vertical and lateral distances from the magnetic field source. Increasing the height of the conductors above ground is useful for magnetic field reduction at ground level, but may result in increased structure costs and increased aesthetic impact of the structures. Another possible method of increasing the distance to the magnetic field source is to increase the right-of-way requirements. By keeping buildings off increased rights of way, thereby requiring the public to live and work further away from lines, exposure to magnetic fields produced by the lines can be reduced. Increases in right of way are not always practical and may increase costs significantly, however.

SUMMARY OF PP&L, INC.'S MAGNETIC FIELD MANAGEMENT PROGRAM

Under its Magnetic Field Management Program, PP&L, Inc. has changed the way it builds and rebuilds some of its transmission and distribution lines. These design changes reduce magnetic field levels (assuming balanced circuit loadings and phase currents) by up to 69 percent in most of the company's new transmission lines. These guidelines now are being applied to new and reconstructed transmission facilities, based on this program.

The distribution component of the program focuses on 12 kV lines, the company's standard distribution voltage. It concentrates on the three-phase, primary 12 kV lines, since these are the most heavily loaded facilities and often are located in densely populated areas. The guidelines in this program are being applied to these three-phase, primary 12 kV lines.

A maximum 3-5 percent change in estimated cost was used as the limit for the guidelines since this value is consistent with low cost, is within estimating accuracy and is likely to have little impact on overall line costs.

The magnetic field calculations used in this document for the design of PP&L, Inc.'s overall magnetic field management plan assume balanced load conditions among the phases and a fixed level of current, not necessarily representative of specific transmission or distribution lines. These levels were calculated using the Electric Power Research Institute's ENVIRO computer program. Under actual operating conditions, the magnetic field levels that result may vary due to such things as actual load per circuit, overall current on each phase conductor and the electrical configuration and operation of each line.

MAGNETIC FIELD MANAGEMENT PROGRAM GUIDELINES

The guidelines for magnetic field management are noted below, with discussion points for each.

OVERHEAD LINES

New or Rebuilt Transmission Lines

1. **Balance transmission circuit loads and phase currents as much as possible.**
   - PP&L, Inc. should continue to make every effort to balance loadings between the two circuits of a double circuit line when planning new or rebuilt facilities to maximize the effects of reverse phasing.
   - PP&L, Inc. should continue the practice of balancing single-phase loads across the three phases of the distribution system. (Unbalanced phase currents on the distribution system are reflected through to the transmission system.)
     - — Unbalanced phase currents result in higher magnetic fields that do not drop off as quickly with distance as do the fields resulting from balanced phase currents.
     - — For a 5 percent phase current unbalance, the magnetic field 50 feet from the centerline of a single circuit 138 kV line could be more than twice the value than if the same line had balanced phase circuits.
       - Balanced phase currents on each three-phase distribution circuit also reduce magnetic fields from the distribution circuits themselves. In addition, they reduce magnetic fields on the transmission system from which the distribution system circuits are supplied and connected through substations.
       - Apart from magnetic field considerations, balanced phase currents on each three-phase distribution circuit also reduce line losses and improve the system voltage.

2. **Continue with the present practice of using long-span construction as the PP&L, Inc. 138/69 kV standard.**
   - Structure designs for short-span and long-span construction are illustrated on charts I and II, respectively.
   - Short-span design does not significantly reduce magnetic fields when compared to long-span design even though it is more compact than long-span design. Comparison of the magnetic field values from chart III indicates essentially the same values. Therefore, short-span design should not be used solely to reduce magnetic fields.
   - PP&L, Inc. will continue to use long-span construction for 138/69 kV double-circuit lines and for single-circuit/future-double-circuit lines.
   - For single-circuit/future-double-circuit lines, PP&L, Inc. will continue to install two conductors

on the top positions and one in the middle position as shown in chart IV.

— This arrangement minimizes magnetic fields as shown in chart V by placing the three initial conductors higher on the structure, which increases the ground clearances, and by placing the conductors in a triangular configuration.

3. **Compact design structures are not a low-cost alternative and should be used for magnetic field reduction only in special applications.**

Chart VI illustrates the compact design structure.

- The compact design increases the initial installation costs by 79 percent when compared to the long-span design but reduces the magnetic field from 9 mG to 3 mG (about 67 percent) at the edge of the 100-foot-wide right of way as shown on chart III.

4. **Reverse phase new or rebuilt double-circuit transmission lines for all voltage levels.**

- Reverse phasing was adopted by PP&L, Inc. in March 1991 for double-circuit 138/69 kV transmission lines and in April 1992 for all other double circuit transmission lines. Reverse phasing is shown in chart VII. Reverse phasing will reduce the magnetic fields when the current flow on both circuits is in the same direction. Calculated values contained here are based on balanced and equal phase currents on both circuits.
  — Reverse phasing reduces the magnetic field of a double circuit 138 kV single pole transmission line from 29 mG to 9 mG (about 69 percent) at the edge of the 100-foot-wide right of way as shown on chart III.
  — Reverse phasing reduces the magnetic field of a double circuit 230 kV single pole transmission line from 49 mG to 16 mG (about 67 percent) at the edge of the 150-foot-wide right of way as shown on chart VIII.
  — Reverse phasing reduces the magnetic field of a double-circuit 500 kV single pole transmission line from 37 mG to 21 mG (about 43 percent) at the edge of the 200-foot-wide right of way as shown on chart IX.
- When new or rebuilt double-circuit lines require tapping existing double-circuit lines, PP&L , Inc. will review the existing lines to determine if reverse phasing can be provided at low cost.
- Computer modeling is required to develop the optimum phasing and overall conductor arrangements for lines added to, or rebuilt in, multiple-line corridors.
  — Merely adding a reverse-phase double-circuit line to an existing transmission line corridor or reverse phasing a rebuilt line in the multiple-line corridor will not necessarily produce lower magnetic field levels at the edge of the corridor right of way.
  — The corridor must be computer modeled with all the lines, existing phase conductor locations and currents. Then, magnetic field calculations must be made varying the phase arrangements of the new or reconstructed line to determine the appropriate phasing arrangement.
  — Current flow direction on a line also must be considered. For example, a reverse-phased

line should have the current flowing in the same direction on both circuits. If the current flow is in the opposite direction for one circuit, reverse phasing will not produce the lowest magnetic field and another phase arrangement that produces lower fields may need to be utilized.

5. Increase the minimum ground clearance for all new transmission lines.

138/69 kV Transmission Lines

- Increasing the minimum line design ground clearance from 25 feet to 30 feet may add up to about 5 percent to the installed cost of a new double-circuit single pole 138/69 kV line. For a given project, such cost may be substantially less, however. In fact, PP&L, Inc. frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. With long-span reverse-phase design, the magnetic field is reduced from 9 mG to 7 mG (about 22 percent) at the edge of a 100-foot-wide right of way as shown in chart X.
  - — In the actual design of transmission lines to include higher minimum ground clearances, there may be limited segments (such as highway crossings, severe slopes and transmission line crossing locations) where National Electrical Safety Code (NESC) minimum ground clearances may need to be used. The NESC minimum ground clearances are less than the increased ground clearance discussed previously.

230 kV Transmission Lines

- Increasing the minimum line design ground clearances from 27 feet to 32 feet may add up to about 5 percent to the cost of a single-circuit single-pole line (current standard). For a given project, such cost may be substantially less, however. In fact, PP&L, Inc. frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 30 mG to 28 mG (about 7 percent) at the edge of a 150-foot-wide right of way.
- Increasing clearances from 27 feet to 32 feet could theoretically add up to about 2.8 percent to the cost of a double-circuit single-pole line (current standard) and reduce the magnetic field of a reverse-phase line from 16 mG to 15 mG (about 6 percent) at the edge of a 150-foot-wide right of way. Chart XI is a summary of this data.
- Studies are required for each new 230 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced phase spacing (a "Delta" configuration on a single-circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

500 kV Transmission Lines

- Increasing ground clearances from 33 feet to 53 feet may add up to about 4.5 percent to the

cost of a single-circuit "H-frame" line (current standard). For a given project, such cost may be substantially less, however. In fact, PP&L, Inc. frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 42 mG to 35 mG (about 17 percent) at the edge of a 200-foot-wide right of way.

- Increasing ground clearances from 33 feet to 53 feet could theoretically add up to 2.8 percent to the cost of a double-circuit "H-frame" line (current standard) and reduces the magnetic field of a reverse-phase line from 21 mG to 16 mG (about 24 percent) at the edge of a 200-foot-wide right of way. Chart XII is a summary of this data.
- Studies are required for each new 500 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced-phase spacing (a "Delta" configuration on a single circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

Reconductoring or Adding Additional Circuits to Existing Transmission Lines

When reconductoring or adding additional circuits to existing transmission lines, PP&L, Inc. will evaluate low-cost or no-cost options for magnetic field management on a case-by-case basis.

When reconductoring existing transmission lines or adding additional circuits, low-cost alternatives may not exist; however, the following steps will be taken:

- For a single-circuit line, the use of a Delta arrangement or other modifications on the existing structure, with reduced-phase spacing, will be evaluated.
- For double-circuit lines, application of reverse phasing may reduce the magnetic field under the line and within the right of way and will be evaluated.
- For single- and double-circuit lines, evaluate using higher conductor tensions that can increase the minimum line design ground clearance.

Distribution Lines

At the 12 kV distribution level, new main three-phase lines will continue to be constructed with five feet of additional ground clearance.

- Main lines are the most heavily loaded sections of a distribution line and therefore have the highest magnetic fields associated with them.
- Increasing the ground clearance by five feet reduces the magnetic field under the line from 14 mG to 11 mG using the standard eight-foot crossarm design. These values are based on increasing pole heights from 45 feet to 50 feet and a typical operating current of 300 amps per phase.

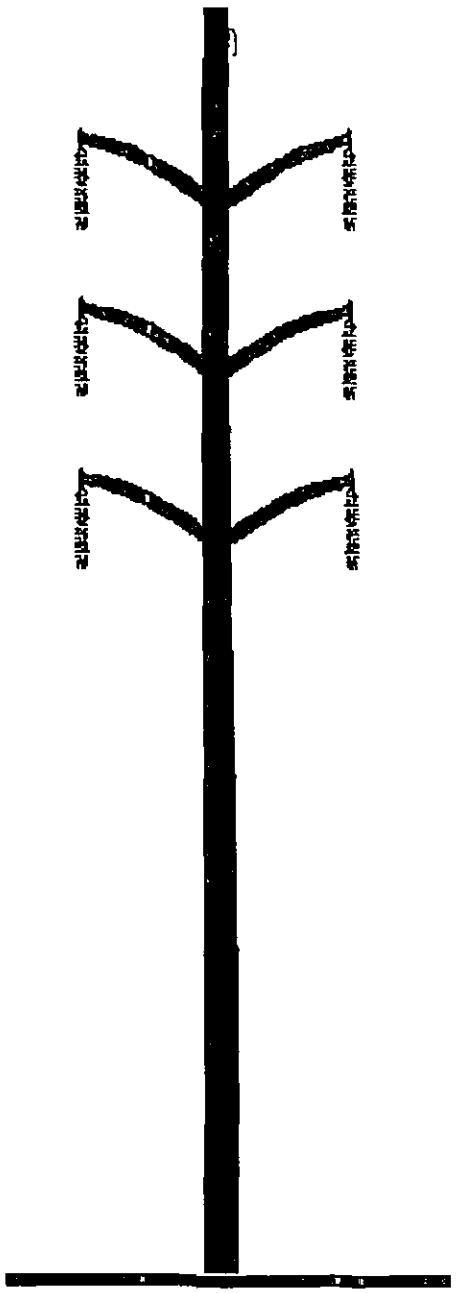
• Chart XIII is a summary of this data. Increasing ground clearance by five feet could theoretically add about 5 percent to the cost of a typical distribution line.

Underground Transmission Lines

If underground transmission lines are required due to environmental or land use factors or restrictions on available clearances, PP&L, Inc. will evaluate options for magnetic field management techniques on a case-by-case basis.

- The phase arrangement that produces the lowest field will be determined.
- The depth of burial of the line will be determined considering the cost of excavation and the location of other buried utilities in the area.
- The use of steel pipe ferromagnetic shielding that reduces magnetic fields will be evaluated.

Short-Span Construction

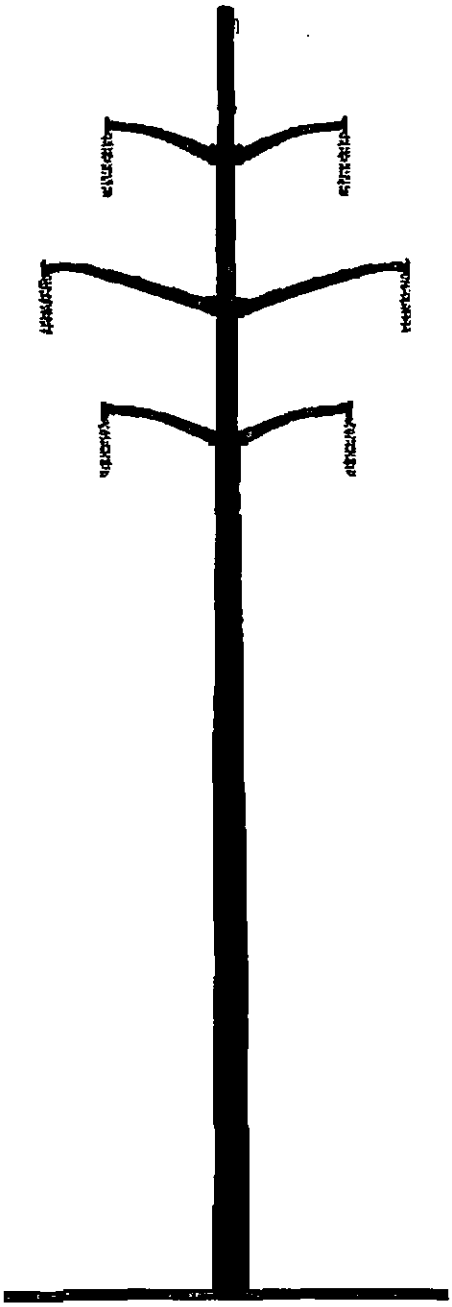


- More compact design
- Should not be used solely to reduce magnetic fields
- Typical conductor data:

  1 3/8" HS steel overhead ground wire - 7.3 feet sag
  6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 10.0 feet sag
  Average span - 400 feet

CHART II

Long-Span Construction Remains PP&L, Inc. 138kV Standard



- **Lower cost alternative**
- **Reduces magnetic fields due to higher structures**
- **Typical conductor data:**

  1 3/8" HS steel overhead ground wire - 17.3 feet sag
  6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 23.0 feet sag
  Average span - 600 feet

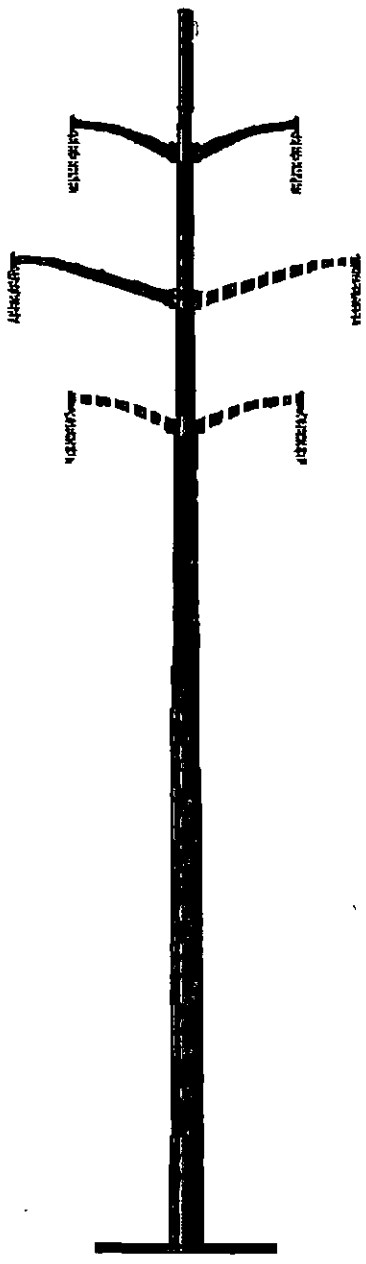
138/69 kV REVERSE-PHASE TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SHORT SPAN (CHART I)	30
SHORT SPAN (REVERSE PHASE)	8
LONG SPAN (CHART II)	29
LONG SPAN (REVERSE PHASE)	9
COMPACT (CHART VI)	14
COMPACT (REVERSE PHASE)	3

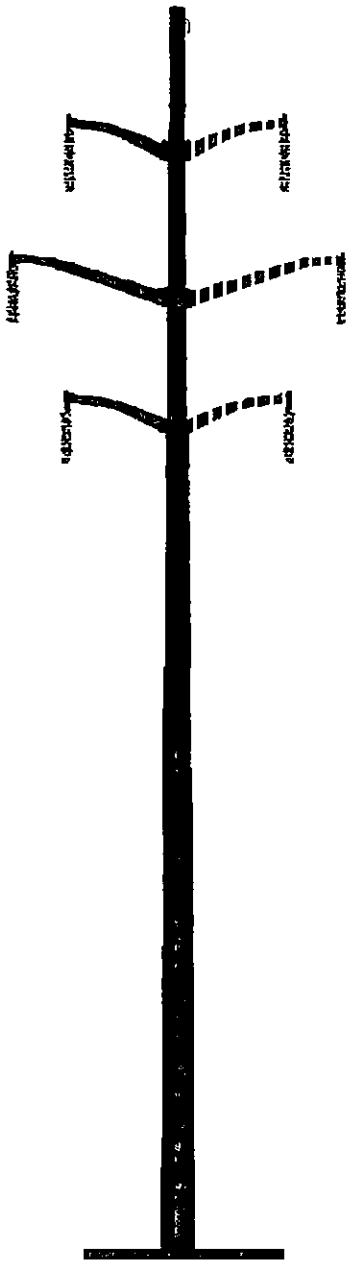
The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 25 feet.
LONG SPAN, SHORT SPAN and COMPACT are double-circuit lines.

CHART IV

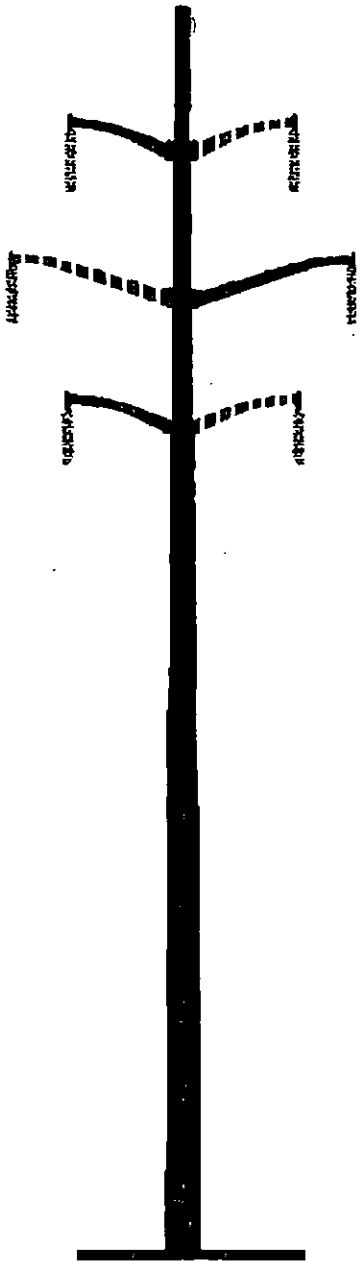
Typical Single-Circuit Structure Designs



Top/Middle



Vertical



Top/Middle/Bottom

initial single circuit

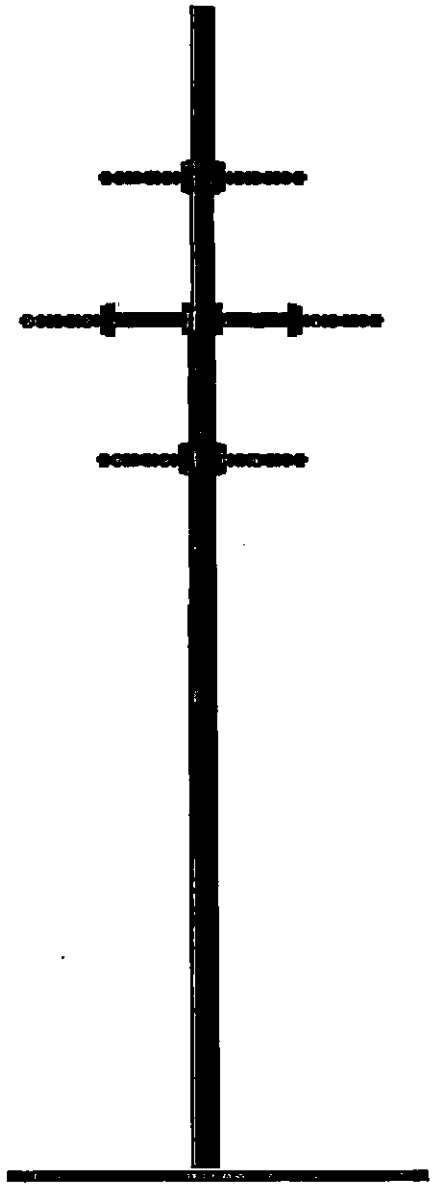
future second circuit

138/69 kV SINGLE CIRCUIT TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
TOP/MIDDLE/BOTTOM	20
VERTICAL	17
TOP/MIDDLE	12

The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 25 feet.

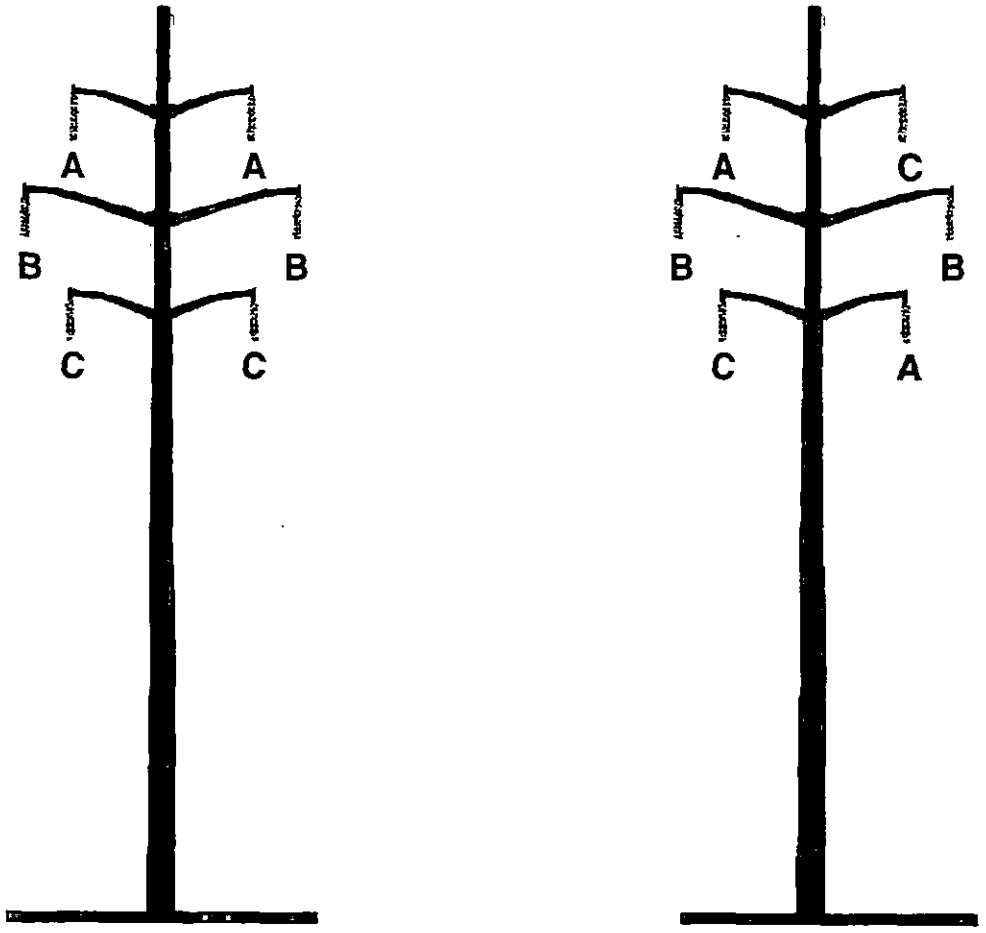
Compact Design Structure



- **Minimize magnetic fields due to compact design**
- **Not a low-cost alternative**
- **Typical conductor data:**

  1 3/8" HS steel overhead ground wire - 9.0 feet sag
  6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 9.0 feet sag
  Average span -300 feet

Reverse Phasing of Double-Circuit Transmission Lines



From: ⟶ ⟶ ⟶ ⟶ To:

Reverse phasing also can be one of the following phase arrrangements:

A	B		B	A		B	C		C	A		C	B	
C	C	or	C	C	or	A	A	or	B	B	or	A	A	
B	A		A	B		C	B		A	C		B	C	

CHART VIII

230 kV REVERSE-PHASE TRANSMISSION LINES CALCULATED MAGNETIC FIELDS AT 800 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	49
DOUBLE CIRCUIT POLE (REVERSE-PHASE)	16

The edge of right of way is 75 feet from the line centerline.
The 800 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 27 feet.

CHART IX

500 kV REVERSE-PHASE TRANSMISSION LINES CALCULATED MAGNETIC FIELDS AT 1100 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	37
DOUBLE CIRCUIT POLE (REVERSE PHASE)	21

The edge of right of way is 100 feet from the line centerline.
The 1,100 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 33 feet.

INCREASED 138/69 kV MINIMUM GROUND CLEARANCE CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	25	12
SINGLE CIRCUIT TOP/MIDDLE	30	10
LONG SPAN	25	29
LONG SPAN	30	26
LONG SPAN (REVERSE PHASE)	25	9
LONG SPAN (REVERSE PHASE)	30	7

The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.

CHART XI

INCREASED 230 kV MINIMUM GROUND CLEARANCE CALCULATED MAGNETIC FIELDS AT 800 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	27	30
SINGLE CIRCUIT TOP/MIDDLE	32	28
DOUBLE CIRCUIT POLE	27	49
DOUBLE CIRCUIT POLE	32	46
DOUBLE CIRCUIT POLE (REVERSE PHASE)	27	16
DOUBLE CIRCUIT POLE (REVERSE PHASE)	32	15

The edge of right of way is 75 feet from the line centerline.
The 800 ampere phase current is balanced between phases.

INCREASED 500 kV MINIMUM GROUND CLEARANCE CALCULATED MAGNETIC FIELDS AT 1,100 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT "H" STRUCTURE	33	42
SINGLE CIRCUIT "H" STRUCTURE	53	35
DOUBLE CIRCUIT POLE	33	37
DOUBLE CIRCUIT POLE	53	31
DOUBLE CIRCUIT POLE (REVERSE PHASE)	33	21
DOUBLE CIRCUIT POLE (REVERSE PHASE)	53	16

The edge of right of way is 100 feet from the line centerline.
The 1,100 ampere phase current is balanced between phases.

CHART XIII

12 kV DISTRIBUTION LINES
CALCULATED MAGNETIC FIELDS AT 300 AMPERES

TYPE CONSTRUCTION	POLE HEIGHT FEET	MAGNETIC FIELD IN MILLIGAUSS*	
		AT CENTERLINE	AT 30 FEET FROM CENTERLINE
STANDARD CROSSARM	45	14	7
STANDARD CROSSARM	50	11	6

* Field level under the line at mid-span based on 300 amps, balanced loading, one meter above ground level.

APPENDIX H

LIST OF GOVERNEMENTAL AGENCIES, MUNICIPALITIES AND OTHER PUBLIC ENTITIES RECEIVING APPLICATIONS

1. Pennsylvania Historical and Museum Commission
   Bureau for Historic Preservation
   Division for Archaeology and Protection
   P. O. Box 1026
   Harrisburg, Pennsylvania 17108-1026
   Attn: Mr. Kurt W. Carr, Chief

2. Pennsylvania Department of Transportation
   Commonwealth Keystone Building
   400 North Street, 8th Floor
   Harrisburg, Pennsylvania 17120
   Attn: The Honorable Bradley L. Mallory, Secretary

3. Department of Environmental Protection
   P. O. Box 2063
   Market Street Office Building
   Harrisburg, Pennsylvania 17105-2063
   Attn: Mr. Joseph Sieber

4. Lancaster County Commissioners
   50 N. Duke Street
   Lancaster, Pennsylvania 17603
   Attn: Mr. Paul Thibault, Chair

5. Lancaster County Planning Commission
   50 N. Duke Street
   Lancaster, Pennsylvania 17603
   Attn: Mr. Ronald Bailey, Executive Director

6. Lancaster County Agricultural Preserve Board
   50 N. Duke Street
   P. O. Box 83480
   Lancaster, PA 17608
   Attn: Ms. June L. Mengel, Director

7. East Hempfield Township Supervisors
   1700 Nissley Road
   PO Box 128
   Landisville, PA 17538
   Attn: Mr. R. Michael Wagner - Chairperson

8. East Hempfield Township Planning Commission
1700 Nissley Road
PO Box 128
Landisville, PA 17538
Attn: Bernard Krutsick - Chairperson

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G With Respect to the Proposed West Hempfield – McGovernville #1 and #2 138/69 kV Tie Line to be Constructed in East Hempfield Township Lancaster County	:	**Docket No.** A-110500 F0333

CERTIFICATE OF SERVICE

I hereby certify that I have, this 10th day of July, 2003, served true and correct copies of the Letter of Notification and accompanying Exhibit Nos. A, B, C and D upon the Governmental Agencies listed below and served a Notice of filing and map upon the Property Owners listed below, in the manner indicated.

BY CERTIFIED MAIL/RETURN RECEIPT REQUESTED

(GOVERNMENTAL AGENCIES)

Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Division for Archaeology and Protection
P.O. Box 1026
Harrisburg, Pennsylvania 17108-1026
Attn: Mr. Kurt W. Carr, Chief

Pennsylvania Department of Transportation
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, Pennsylvania 17120
Attn: The Honorable Bradley L. Mallory, Secretary

Department of Environmental Protection
P.O. Box 2063
Market Street State Office Building
Harrisburg, Pennsylvania 17105-2063
Attn: Mr. Joseph Sieber

Lancaster County Commissioners
50 N. Duke Street
Lancaster, Pennsylvania 17603
Attn: Mr. Paul Thibault, Chair

Lancaster County Planning Commission
50 N. Duke Street
Lancaster, Pennsylvania 17603
Attn: Mr. Ronald Bailey, Executive Director

Lancaster County Agricultural Preserve Board
50 N. Duke Street
P.O. Box 83480
Lancaster, PA 17608
Attn: Ms. June L. Mengel, Director

East Hempfield Township Supervisors
1700 Nissley Road
PO Box 128
Landisville, PA 17538
Attn: Mr. R. Michael Wagner – Chairperson

East Hempfield Township Planning Commission
1700 Nissley Road
PO Box 128
Landisville, PA 17538
Attn: Bernard Krutsick – Chairperson

(PROPERTY OWNERS)

Pennsylvania Department of Transportation (Rt. 283)
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, Pennsylvania 17120

M. Gregory Gehman
Karolyn S. Gehman
556 Oak Tree Road
Manheim, PA 17545

John E. Landis
2942 King Lane
Lancaster, PA 17601

Warren K. Witmer
Marion E. Witmer
503 Long Road
Manheim, PA 17601

AMTRAK
Mr. Larry K. Lewis
Director, I & C. Projects
National Railroad Passenger Corporation
30th Street Station, 3rd Floor, South Tower
Philadelphia, PA 19104-2817

East Hempfield Township
1700 Nissley Road, P.O. Box 128
Landisville, PA 17538
George R. Marcinko, Township Manager

Maholn N. and Rozanne Zimmerman
204 S. Conestoga View Drive
Akron, PA 17501

Gary P. Loiseau
Christopher O. Coder
658 W. Vine Street
Lancaster, PA 17603

Brian E. Shank
Rebecca M. Shank
2024 Main Street
Lititz, PA 17543

Sigma Electronics Inc.
1184 Enterprise Road
East Petersburg, PA 17520

Kellogg USA Inc.
2050 State Road
P.O. Box 3006
Lancaster, PA 17601

Anthony C. DeCusatis
Counsel for PPL Electric Utilities Corporation

July 10, 2003