

Good evening. My wife, Anita Witmer, and I live on State Park Road in Centre Township. The Juniata-Sunbury line crosses our property, so we are affected by PPL's plan to expand its ROW as part of its transmission line rebuild project.

As part of our due diligence, we attended both PPL open houses in Millerstown, and for almost a year, I have been researching PPL's vegetation management program.

In this presentation I will share some of what I have learned.

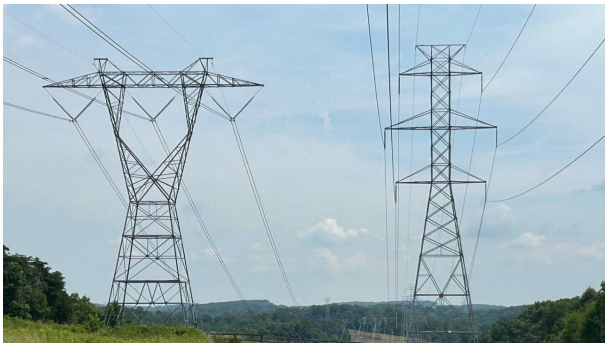
Vegetation Clearing & Management Along Transmission Lines



1. Transmission Lines and Flashover
2. Northeast Blackout of August 14, 2003
3. Federal Vegetation Management Standard (FAC-003-5)
4. PPL's Notification of Right-of-Way Maintenance Practices
5. PPL's Vegetation Management Webpages
6. PPL's Specification for Transmission Vegetation Management
7. PPL's Transmission Line Vegetation Inspection and Treatment Schedule
8. Considerations for Right-of-Way Negotiations

First, I will talk about flashover, since reducing the risk of flashover is what drives vegetation management along transmission lines.
Then, I will discuss the Northeast Blackout of 2003, which directly led to the current federal vegetation management standard.
Then, I will go over four PPL-specific topics including PPL's Notification of Right-of-Way Maintenance Practices; PPL's webpages on line clearing; PPL's specification for vegetation management, and PPL's vegetation inspection and treatment schedule.
Finally, I will point out some items you may want to consider when negotiating aspects of vegetation management as part of your ROW agreement.

Transmission Lines – connect power plants and substations



Single circuit line (left); double circuit line (right)

- Carry bulk electricity long distances
- Typically, 69 to 500, but up to 765 kV
- Tall metal or wood towers
- May be single circuit (**3 conductors**) or double circuit (**6 conductors**)
- Stringent vegetation management requirements due to high voltages

As you know, transmission lines are the big lines that connect power plants and substations.
They carry bulk electricity long distances at voltages typically ranging from 69 to 500 kV, but up to 765 kV (like the proposed Kammer-Juniata line).
The towers are tall and usually composed of metal or wood.
Transmission lines may be single circuit, which means they have 3 wires, **known as conductors**, like the one shown on the left, or double circuit, which means they have 6 conductors, like the one shown on the right.
The Juniata-Sunbury rebuild will replace the existing single circuit line with a double circuit line having taller towers.
Because of their high voltages, transmission lines require stringent vegetation management to reduce the risk of flashover.

What is Flashover?

"An electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space."



Source: Glossary of Terms Used in NERC Reliability Standards, updated April 1, 2026

So, what is flashover?
Well, the North American Electric Reliability Corporation, also known as NERC, defines flashover as "an electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space."
In the case of a flashover due to vegetation, electricity from a transmission line jumps through the air to a nearby tree, creating a dangerous electrical short circuit.

Flashover – Contributing Factors

- **Inadequate vegetation clearance distance**: flashover may occur when vegetation grows too close to lines, even without direct physical contact
- **High temperatures and power loads**: may cause lines to sag, reducing vegetation clearance distance
- **High winds**: may cause trees to fall into power lines or cause conductors and trees to sway, reducing clearance
- **Ice**: may cause trees to fall into lines or lines to sag, reducing clearance



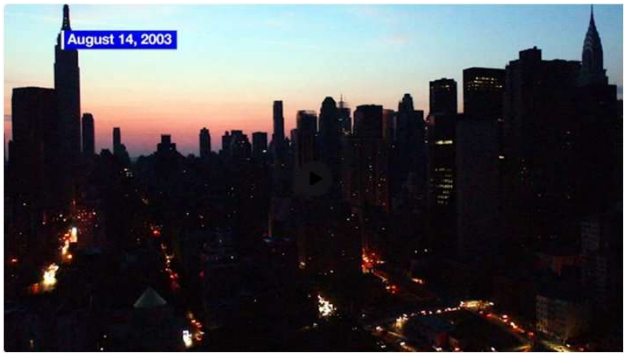
- **Wildfires and smoke**: may reduce the insulating strength of the surrounding air, making flashover more likely

Several factors may increase the likelihood of flashover occurring.
Flashover may occur when vegetation grows too close to lines, even without any direct physical contact.
High temperatures or power loads may cause lines to sag, bringing them closer to vegetation.
High winds may cause trees to fall into lines, or cause the lines and trees to sway, bringing them closer together.
Ice may cause trees to fall into lines or cause lines to sag, bringing them closer to vegetation.
Heat and smoke from wildfires may reduce the insulating strength of the air surrounding lines, making flashover more likely.

Northeast Blackout of August 14, 2003

Affected Population

- 45 million in 7 states
  - MI, OH, PA (confined to 7 northwest counties), NJ, NY, CT, and MA
  - Detroit, Cleveland, and New York City
- 10 million in Ontario, Canada
  - Toronto and Ottawa



Effects

- Cascading outages forced the shutdown of at least 265 power plants
- Disrupted cellular telephone service, traffic at airports, and water supply systems
- Contributed to almost 100 deaths (accidents, fires, and asphyxiations)

Current vegetation management practices along transmission lines are a direct result of the Northeast Blackout of August 14, 2003.
This blackout affected 55 million people in seven states and the province of Ontario.
In Pennsylvania, the blackout was confined to seven northwestern counties, so much of the state, including our area, was not affected.
The blackout caused cascading outages, which forced at least 265 power plants to shut down.
It disrupted cellular service, traffic at airports, water supply systems, and contributed to almost 100 deaths.

Northeast Blackout of August 14, 2003 – Triggering Events

…. a generating plant in Eastlake, Ohio, went offline amid high electrical demand, putting a strain on high-voltage power lines, which later went out of service when they came in contact with **"overgrown trees."** This trip caused load to transfer to other transmission lines, which were not able to bear the load, tripping their breakers ….

An investigation determined the blackout was triggered by FirstEnergy, an investor-owned electric utility headquartered in Akron, Ohio, taking a generating plant offline during a period of high electrical demand.
This put a strain on high-voltage power lines, causing them to sag and contact overgrown trees.
The resulting flashovers caused protective relays to trip those lines, and transfer their load to other lines, which were also tripped, resulting in a cascading failure within a large portion the grid.

Northeast Blackout of August 14, 2003 – Findings on Causes

1. FirstEnergy(FE) and its reliability council *"failed to assess and understand the inadequacies of FE's system, particularly with respect to voltage instability and the vulnerability of the Cleveland-Akron area, and FE did not operate its system with appropriate voltage criteria."*
2. FE *"did not recognize or understand the deteriorating condition of its system."*
3. FE *"failed to manage adequately **tree growth** in its transmission rights-of-way."*
4. The *"failure of the interconnected grid's reliability organizations to provide effective real-time diagnostic support."*

The investigation identified four groups of causes.
Causes one, two, and three related to FirstEnergy's understanding and operation of its system.
The third cause specifically cited FirstEnergy's failure to adequately manage vegetation along its transmission lines.
The fourth cause related to the grid's reliability organizations and their failure to provide effective, real-time diagnostic support.
Although FirstEnergy bore most of the blame for the blackout, no penalties or fines were assessed, because in 2003, federal electric reliability standards were entirely voluntary.

Reform Legislation – Energy Policy Act of 2005 (EPA)

1. **Mandatory Reliability Standards**

   Before EPA, rules governing the reliability of the grid were voluntary; § 215 of EPA made compliance with grid reliability standards mandatory and legally enforceable.

2. **Enforcement Authority**

   Congress granted the Federal Energy Regulatory Commission (FERC) statutory authority to oversee and approve new rules.

3. **Designation of an Electric Reliability Organization (ERO)**

   FERC certified the North American Electric Reliability Corporation (NERC) as the nation's ERO responsible for formulating and enforcing standards.

4. **Heavy Fines**

   Regulators gained authority to levy civil penalties (up to $1 million/day) against energy providers that compromise the stability or safety of the power grid.

In response to the blackout, Congress passed the Energy Policy Act of 2005, which did four things.
First, compliance with grid reliability standards became mandatory and legally enforceable.
Second, Congress granted the Federal Energy Regulatory Commission, or FERC, authority to oversee and approve new rules.
Third, FERC certified the North American Electric Reliability Corporation, or NERC, as the nation's electric reliability organization.
And fourth, the act granted regulators the authority to levy heavy fines against utilities for compromising the stability or safety of the grid.

NERC FAC-003-5 – Transmission Vegetation Management

- **Purpose:** *"To maintain a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading."*
- **Requirement R1:** *"Each applicable Transmission Owner … shall manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance (MVCD) of its applicable line(s)."*
- **MVCD:** *"The calculated minimum distance stated in feet (meters) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages."*

One of the standards established by NERC is FAC-003-5, which covers transmission vegetation management.
The standard requires utilities to manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance of their transmission lines.
NERC defines the minimum vegetation clearance distance as "the calculated minimum distance … to prevent flashover between conductors and vegetation, for various altitudes and operating voltages."

NERC FAC-003-5 – Minimum Vegetation Clearance Distances (ft)

Voltage (kV)	0' up to 500'	>500' up to 1000'	>1000' up to 1500'	>1500' up to 2000'
765	11.6	11.7	11.9	12.1
500	7.0	7.1	7.2	7.4
345	4.3	4.3	4.4	4.5
287	5.2	5.3	5.4	5.5
230	4.0	4.1	4.2	4.3
161	2.7	2.7	2.8	2.9
138	2.3	2.3	2.4	2.4
115	1.9	1.9	1.9	2.0
88	1.5	1.5	1.6	1.6
69	1.1	1.1	1.1	1.2

"The distances in this Table are the minimums required to prevent Flash-over; however, prudent vegetation maintenance practices dictate that substantially greater distances will be achieved at time of vegetation maintenance."

This table summarizes the standard's minimum vegetation clearance distances in feet, for lines ranging from 69 to 765 kV, at altitudes ranging from sea level up to 2000 feet. Over this range of altitudes, the minimum vegetation clearance distance for a 500-kV line increases from 7.0 to 7.4 feet.

The standard indicates that these are the **minimum** distances to prevent flashover, and that "prudent vegetation maintenance practices dictate that **substantially greater** distances will be achieved at time of vegetation maintenance."

Greater distances are required mainly to account for the sag and sway of the lines and for the anticipated vegetation growth between maintenance activities.

NOTIFICATION OF
RIGHT-OF-WAY MAINTENANCE
PRACTICES

The Pennsylvania Public Utility Commission (PUC) requires that PPL Electric Utilities give you the following information on right-of-way maintenance practices for the 500 kV line:

The methods currently used by PPL Electric Utilities are set forth in PPL Electric Utilities **"Program for Vegetation Management", which will be made available to you for your inspection upon request**. If you wish further information concerning right-of-way maintenance methods, you may contact the person named on the cover letter. You may discuss with this person, either before or **during negotiation of the right-of-way agreement**, these methods and any other questions you may have about right-of-way maintenance.

Let's now look at PPL's Notification of Right-of-Way Maintenance Practices.
The PUC requires PPL to give landowners this notice, and you should have received a copy from your land agent.
The second paragraph of the notice refers to PPL's "**Program for Vegetation Management," and states that a copy "will be made available to you for your inspection upon request.**"
The notice invites you to contact the person named on the cover letter (in our case, our land agent) for further information, and to discuss with this person, either before or **during negotiation of the ROW agreement**, these methods and any other questions you may have about ROW maintenance.

PPL Notification of Right-of-Way Maintenance Practices (cont'd)

Once a utility has constructed an electric transmission line on a right-of-way across your land, the utility must maintain the right-of-way free of tall growing trees and brush which might impair the reliability of electric service, the safety of the line and access to the line or its towers. The utility or its contractors may remove and control tall growing trees and brush by several methods: hand cutting of trees, limbs and brush; mechanical cutting with chainsaws or motorized cutting machines or application of herbicides. The utility must confine its maintenance activities to the approved right-of-way across your land, except where tall growing trees or brush or their root systems grow into the right-of-way from adjoining land and constitute a threat to the electric transmission line and its structures.

If you believe that the maintenance method(s) used by the company would raise problems with the use of your land adjacent to the right-of-way, **it is your responsibility as the landowner to bring this to the attention of the utility before you sign the right-of-way agreement**.

The notice indicates that PPL is responsible for keeping the ROW free of tall growing trees and brush that might impair the reliability of electric service, the safety of the line, and access to towers.
Clearing methods may include hand cutting of trees, limbs and brush; mechanical cutting with chainsaws or motorized cutting machines, or application of herbicides.
The notice states that if you believe that the maintenance methods used by the company would raise problems with the use of your land adjacent to the right-of-way, **it is your responsibility as the landowner to bring this to the attention of the utility before you sign the right-of-way agreement**.

PPL Notification of Right-of-Way Maintenance Practices (cont'd)

The utility company has the responsibility to maintain its right-of-way, and regular maintenance must occur. Although you, as the landowner, cannot determine whether or not maintenance will occur, **your right-of-way agreement may specify certain conditions on the performance of the maintenance program which are important to you**. These conditions can be part of the negotiations between you and the utility company for your land, since a right-of-way agreement is a legal contract between a landowner and a utility company. It is important for you to also understand that the maintenance methods used by the utility company may change over time as the costs of maintenance or the methods of performing maintenance change. You may want to specify in your right-of-way agreement that the utility company inform you of changes in its maintenance methods or in the maintenance schedule for your land.

The notice indicates that "although you, as the landowner, cannot determine whether or not maintenance will occur, **your ROW agreement may specify certain conditions on the performance of the maintenance program that are important to you.**"
You can negotiate these conditions with PPL and write them into your ROW agreement, which is a legal contract between you and PPL.
Since PPL's practices may change in the future, you may also want to specify in your agreement that PPL inform you of changes in its maintenance methods or maintenance schedule for your land.

PPL Notification of Right-of-Way Maintenance Practices (cont'd)

The provisions of the right-of-way agreement are enforceable in the local Court of Common Pleas. The right-of-way agreement cannot be enforced by the Pennsylvania Public Utility Commission (PUC). Any claims for damages resulting from improper maintenance of the right-of-way must be settled with the utility, its contractors or in the local Court of Common Pleas at your own expense. The Commission cannot award damages for violations of the right-of-way agreement.

The PUC cannot enforce your ROW agreement or award damages for violations of your agreement.
Damage claims must be settled with PPL, its contractors, or in the local Court of Common Pleas at your own expense.

PPL's "Program for Vegetation Management"

Cordell Gilmore <cordell.gilmore@contractlandstaff.com> Fri, May 22, 2026 at 10:02 AM
To: William Roman <bill.roman.bretz@gmail.com>
Cc: Anita Witmer <4anitawitmer@gmail.com>

Here is the requested Link

PPL Electric Utilities

Kind Regards,

Cordell Gilmore
Right Of Way Agent
Contract Land Staff, LLC.
Representing PPL Electric Utilities
Cell: 717.852.5113
Office: 570.231.5141

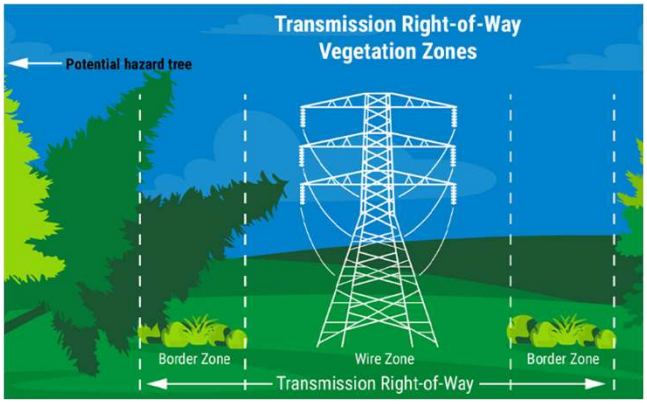
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So, as part of our due diligence, I emailed our land agent to request a copy of PPL's "Program for Vegetation Management."
He replied by emailing me a link to a PPL webpage, which I had already visited.

PPL'S Transmission Line Vegetation Management Webpage

PPL Electric's transmission power line rights of way are managed using integrated vegetation management to promote low-growing and compatible vegetation that is suitable for power distribution and also benefits wildlife habitats.

Our vegetation management practices include a wire zone and border zone approach, which minimizes vegetation threats to the system.



At times, we identify hazard trees outside of our right of way that may potentially cause power outages. In those cases, we work with property owners in advance of any work we plan to address those trees.

PPL's webpage on vegetation management provides only limited, general information.
PPL says it uses "integrated vegetation management to promote low-growing and compatible vegetation that is suitable for power distribution and also benefits wildlife habitats."
PPL also says it uses a wire zone and border zone approach to vegetation management and sometimes needs to address hazard trees located outside of the right-of-way.
The drawing on the website indicates the wire zone is the zone in the center of the ROW containing the towers and conductors, and the border zones are located on each side of the wire zone.

PPL'S Transmission Line Vegetation Management Webpage

Environmental Commitment/Herbicide Use

- We work with conservation, land management and environmental groups on both the state and federal levels to advance common goals associated with electric reliability and environmental stewardship.
- We use integrated vegetation management practices that, over time, reduce the need for herbicides, promote healthy ecosystems and provide measurable results.
- The use of herbicides is an important part of our work that keeps electric service reliable. Our team of certified professionals uses **herbicides that are certified by the U.S. Environmental Protection Agency** and applied under a state-permitted process established and overseen by multiple state agencies.

Frequently Asked Questions (10 FAQs)

Learn more here from our **transmission line vegetation management fact sheet**.

The webpage has three bullets on PPL's environmental commitment and herbicide use.
The second bullet claims that, over time, PPL's integrated vegetation management practices reduce the need for herbicides and promote healthy ecosystems.
Our experience is that line clearing can also result in unhealthy ecosystems dominated by invasive, non-native vegetation.
The third bullet claims that PPL uses **"herbicides that are certified by the U.S. Environmental Protection Agency."**
I find this somewhat misleading, because the reality is that the EPA has never **certified** an herbicide—the EPA only **registers** herbicides.
Registration simply means that EPA has evaluated **data submitted by the product's manufacturer**, and permitted the product to be sold, distributed, and used in the US.
The webpage also has ten frequently asked questions, which I won't go over, and a link to a fact sheet.

PPL's Transmission Line Vegetation Management Fact Sheet

Our pledge to you

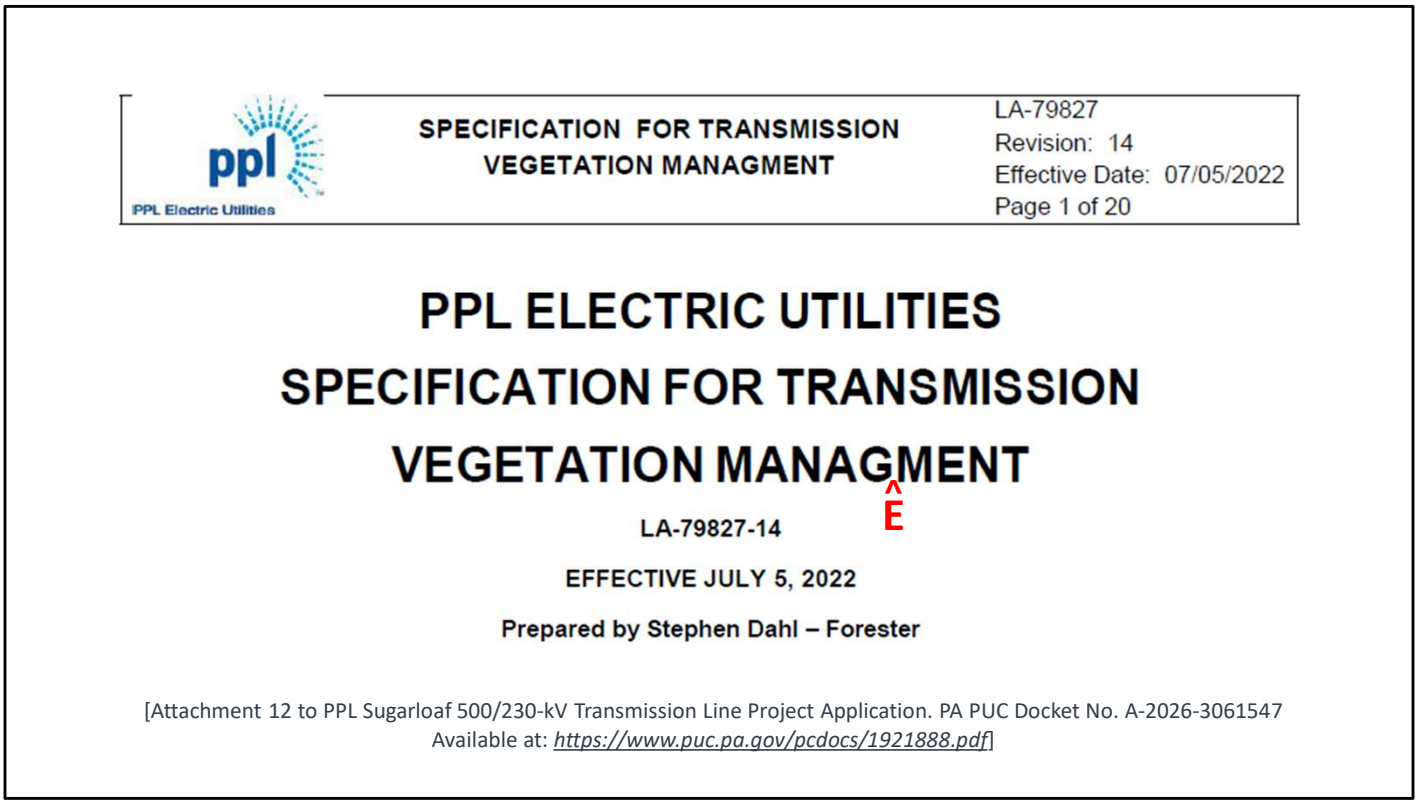
We know removing and trimming trees is not always popular, but it is the right thing to do on behalf of everyone who depends on the grid. We pledge to:

- Communicate with property owners in advance of scheduled work.
- Work in a professional manner, and to work within the limits of the rights we have to perform this work on each property.
- Treat all property with care.
- Strike a careful balance between landowner concerns and the need to keep the grid safe and reliable.

Hazard Trees – Sometimes, trees near the right of way fall into poor condition because of disease, storms or other factors. To prevent these trees from falling onto our lines or equipment, we cut them down at no cost to the property owner. Those who decline the removal of a hazard tree could be liable for the cost of repairs to the power line due if it is damaged by the hazard tree.

Benefits to birds – Managing transmission line rights of way creates openings and edges that provide opportunities for native plants to grow and attract birds. According to the National Audubon Society, there are many types of wildlife that favor shrub lands and thrive along edge habitat.

In the fact sheet, PPL pledges to communicate with landowners in advance of scheduled work, treat all property with care, and strike a careful balance between landowner concerns and the need to keep the grid safe and reliable.
Regarding hazard trees outside the right-of-way, PPL says that those who decline PPL's removal of a hazard tree could be liable for the cost of repairs to the power line if it is damaged by the hazard tree.
PPL notes that transmission line clearing creates openings and edges that attract birds and provide opportunities for native plants to grow.
It is our experience that clearings also provide tremendous opportunities for non-native, invasive plants to move in and take over.



PPL Electric Utilities

SPECIFICATION FOR TRANSMISSION VEGETATION MANAGMENT

LA-79827
Revision: 14
Effective Date: 07/05/2022
Page 1 of 20

PPL ELECTRIC UTILITIES
SPECIFICATION FOR TRANSMISSION VEGETATION MANAGMENT

LA-79827-14

EFFECTIVE JULY 5, 2022

Prepared by Stephen Dahl – Forester

[Attachment 12 to PPL Sugarloaf 500/230-kV Transmission Line Project Application. PA PUC Docket No. A-2026-3061547
Available at: *https://www.puc.pa.gov/pcdocs/1921888.pdf*]

Disappointed with the limited information provided by PPL's website and fact sheet, I did some Googling, and on the PUC's website, I located a copy of PPL's Specification for Transmission Vegetation Management.
The specification, which has an effective date of July 5, 2022, is Attachment 12 of PPL's application for the Sugarloaf Transmission Line Project.
PPL submitted the Sugarloaf application on April 6 of this year, so I suspect it is PPL's current specification.

PPL Vegetation Management Specification – Table of Contents

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PPL's specification includes 13 sections.
I will cover only the five sections highlighted here in yellow.

PPL Vegetation Management Specification – 2.0 Responsibility

All Contractors performing vegetation maintenance activities on PPL EU rights-of-way or adjacent areas shall have a thorough knowledge of PPL EU specifications. A copy of this and other appropriate specifications (provided by the Contractor) must be always on the work site. The Contractor shall make reasonable accommodations for non-English speaking employees. The Contractor shall:

- Provide all supervision, labor, and equipment necessary for the execution of the work. All personnel must be adequately trained in safety and vegetation management techniques **including species identification**. PPL EU Authorized Representatives reserve the right to reject any personnel or equipment that do not meet PPL EU standards.
- Be familiar with all designated wetlands within any job site and keep mechanical equipment outside any such designated wetlands unless specifically approved by a PPL EU Environmental Professional. Upon approval by the PPL EU Environmental Professional, vehicles may only be taken into wetlands by using existing roads or using temporary matting.

Section 2 of the specification lists the contractor's responsibilities.
The contractor must always have a copy of the specification on the work site and make reasonable accommodations for non-English speaking employees.
Work crews must be adequately trained in safety and vegetation management techniques **including species identification**.
The contractor must be familiar with wetlands and keep mechanical equipment outside of wetlands.

PPL Vegetation Management Specification – 2.0 Responsibility

The Contractor shall (cont'd):

- Re-grade and seed any deep cuts, ruts, stump holes, mounded areas, or general soil disturbance caused by the vegetation management operations when, in the opinion of the PPL EU Authorized Representative, they could cause future ground erosion, interfere with line access, or have otherwise caused property damage.
- Without intentional delay, restore and stabilize (e.g., rake out, seed, and mulch) any earth disturbance created during vegetation management activities. If the earth disturbance results in an agency inspection or formal complaint, the PPL EU Environmental professional shall be notified by phone within 4 hours of the event.
- Clean up all debris and rubbish resulting from work as the work progresses, leaving the area in a condition satisfactory to the PPL EU Authorized Representative.
- Take precautions to preserve all survey stakes, hubs, and property corners. Those destroyed shall be replaced at Contractor's expense.

The contractor must re-grade, restore and stabilize areas disturbed by his operations and activities, clean up all debris and rubbish, and preserve all survey markers and property corners.

PPL Vegetation Management Specification – 2.0 Responsibility

The Contractor shall (cont'd):

- Without intentional delay, repair or replace all fences or gates damaged by Contractor at Contractor's expense.
- Take adequate care to assure that gates are not left open. If existing fences or gates along a right-of-way are in a state of disrepair prior to the start of clearing, the property owner shall be so notified. In all cases the Contractor shall close and lock all gates behind them.

The contractor must repair or replace damaged fences and gates, assure that gates are not left open, and close and lock all gates.

PPL VM Spec – 6.0 Clearing Requirements

6.1 General Requirements

B. Any vegetation, which could grow into the Wire Security Zone (defined in Table 1), shall be treated to remove the potential hazard.[5] Treatment could involve cutting to ground line, and or applying herbicides, **depending on easement and site restrictions**.

[5] No corrective remediation pruning actions required for encroachments of "under" WSZ where compatible species or annual seasonal crops are in the WSZ to the extent vegetation is not expected to encroach into the MVCD. Species acceptability shall be confirmed through on-site review by vegetation management personnel to determine that vegetation growth has been maximized or dead and that the vegetation presents no threat that MVCD could be breached.

Table 1. ROW Clearing Widths & Minimum Conductor-to-Vegetation Clearances

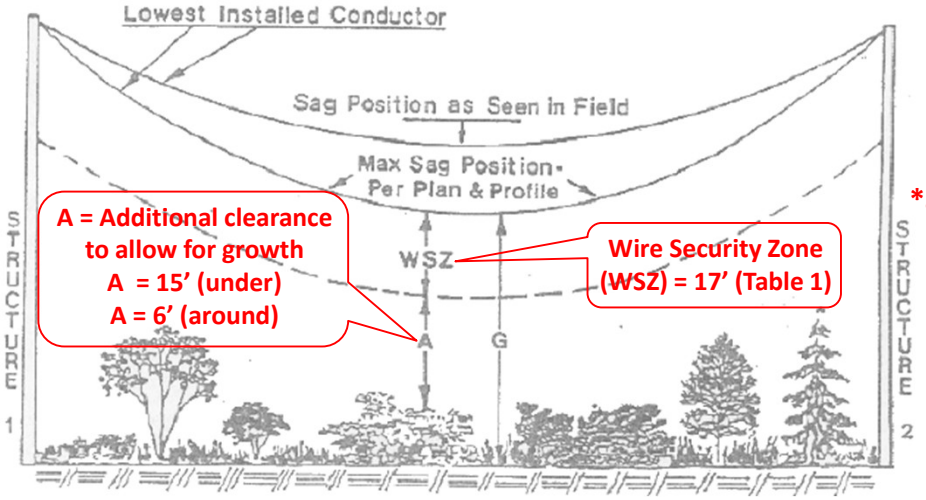
Line Voltage (kV)	Desired Clearing Width[6]	Wire Security Zone	Minimum Acceptable Clearance[7] Under/Around
69-138	100'	7'	22' / 13'
230	150'	14'	28' / 18'
500	**200'**	**17'**	**32' / 23'**

[6] Some lines may have agreements specifying different widths. It is not the practice of PPL EU to clear adjacent un-used rights-of-way beyond the clearing widths listed.

[7] Where possible, these distances are the Minimum Acceptable Clearances at time of maintenance where pre-existing agreements do not allow the full implementation of wire zone-border zone management.

Section 6.1 covers general clearing requirements.
The requirements are **general** because they apply to both initial clearing for a new line **and** vegetation maintenance for existing lines.
Paragraph B calls for treatment of any vegetation capable of growing into the wire security zone.
Treatment may be by cutting to the ground and/or applying herbicides, **depending on easement and site restrictions**.
Per footnote 5, no treatment is required of compatible species or crops **incapable** of growing into the minimum vegetation clearance distance.
In Table 1, for a 500-kV line, you can see that the desired ROW clearing width is 200 feet, the radius of the wire security zone is 17 feet, and the minimum acceptable clearing distance is 32 feet under the conductor and 23 feet around it.
Per footnote 7, the minimum acceptable clearing distances apply when **easement agreements do not allow** the full implementation of PPL's preferred wire zone/border zone method of vegetation management.

Example – Minimum Clearance Under a 500-kV Transmission Line



Minimum Acceptable Clearance* = WSZ + A

32' = 17' + A (under)

23' = 17' + A (around)

***at time of maintenance**

I found this drawing in a 2012 version of PPL's specification attached to another project application.

I added the annotations shown in red.

The drawing shows that the minimum acceptable clearance distance under the wire is the sum of the wire security zone distance, which from Table 1 is 17 feet for a 500-kV line, and the distance "A," which is an allowance for growth of vegetation between line clearing activities.

The drawing suggests PPL's additional clearance to allow for growth of vegetation for a 500-kV line is 15 feet under the line and 6 feet around the line.

The minimum acceptable clearance distance applies to the maximum possible sag of the line and at the time of vegetation maintenance.

6.1 General Requirements (cont'd)

C. Trees shall be felled in a manner that minimizes damage to those trees and/or shrubs which are to be preserved. All stumps shall be cut as low to the ground as practical. Stumps shall be cut parallel to the ground with no sharp splinters or points remaining. Where existing usable fences are attached to trunks of trees to be felled, the trees shall be cut at a height approximately 6" above the top wire strand, unless otherwise specified. The continuity of all electric fences shall be maintained. All stumps shall be treated with the appropriate herbicide for species and site conditions.

Paragraph C requires the contractor to fell trees in a manner that minimizes damage to **those trees and shrubs that are to be preserved** and to treat tree stumps with an appropriate herbicide.

6.1 General Requirements (cont'd)

D. To ensure reliability, vegetation management operations must extend to trees located outside the clearing widths given in Table 1. Hazard trees are a subset of danger trees as defined in ANSI standards (ANSI A300 Part 7). Accordingly, a danger tree is any tree on or off the right-of-way which would either strike the conductor or pass within the minimum conductor clearances noted in Table 2. A hazard tree is a danger tree which is structurally unsound and therefore presents an increased risk to safety and reliability. A PPL EU Authorized Representative will work with vegetation management Contractors to approve the removal of hazard trees during line clearing/maintenance operations.

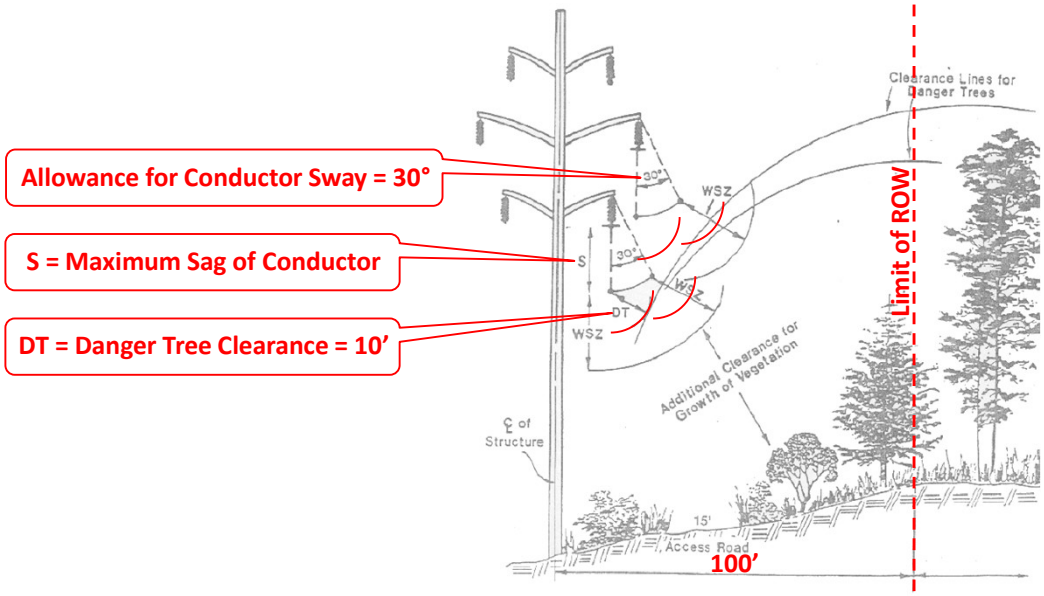
Table 2. Clearances for Hazard and Danger Trees

Line Voltage (kV)	Minimum Clearance for Falling Vegetation[8]
69-230	5'
500	**10'**

[8] Additional clearance to be added to total tree height when assessing hazard and danger trees to prevent flashover.

Paragraph D addresses danger trees and hazard trees, which may be located beyond the width of the right-of-way clearing.
A danger tree is "any tree on or off the ROW that could either strike the conductor or pass within the minimum conductor clearances shown in Table 2."
For a 500-kV line, the minimum clearance for falling vegetation is 10 feet.
A hazard tree "is a danger tree that is structurally unsound," usually due to defects, decay or damage, and therefore poses a greater risk to safety and reliability.

Danger Tree Clearing Distance – 500-kV Line



This drawing is also from the 2012 PPL specification, and again, the red annotations are mine.

The drawing shows that transmission line sway and sag—along with potential tree movement—are considered when identifying danger trees.

PPL VM Spec – 6.0 Clearing Requirements

6.2 Initial Clearing of a New ROW or Transmission Line Rebuild

When initially clearing a transmission corridor for a new transmission circuit or transmission line rebuild, all vegetation shall be cleared from the limits of the right-of-way with the exception of grasses and herbaceous or non-woody plants. This is necessary to both establish the extent of the new right-of-way and to accommodate the many construction activities that will occur within the right-of-way to install new foundations, tower structures, and conductors. After the initial clearing of a new right-of-way, PPL EU shall maintain the right-of-way in accordance with §6.3.

Section 6.2 covers initial clearing of a new ROW or transmission line rebuild.
During initial clearing, PPL's contractor is to clear **the entire limits of the ROW of all vegetation**, except for grasses and non-woody plants.
PPL says this is necessary to establish the extent of the new ROW and to accommodate construction activities.

6.2 Initial Clearing of a New ROW or Transmission Line Rebuild (cont'd)

Initial clearing of a new right-of-way must adhere to these requirements:

A. All vegetation shall be cleared from the limits of the right-of-way with the exception of herbaceous or non-woody plants. Any mowed areas shall be treated with an appropriate cut stubble application **wherever easement rights and regulation allow**. Any vegetation that is hand cut shall be treated with the appropriate herbicide **whenever easement rights and regulation allow**. All debris shall be handled in accordance with the provisions of this document, or as specified by a PPL EU Authorized Representative, and/or by applicable agreements.[9, 10]

[9] Exceptions for ravine crossings are described in item D of § 6.3.1 of this document.

[10] Wetland Vegetation Management is described in § 6.4 of this document.

After clearing all woody vegetation, Paragraph A requires mowed areas to be treated with an appropriate cut stubble application.
Typically, this means a soil-active herbicide is sprayed directly on the cut stubble, so it can leach into the soil and be absorbed by the roots of the cut plants to prevent re-sprouting.
Hand-cut vegetation must also be treated with an herbicide to prevent re-sprouting.
Note that herbicide treatments are permitted **only if allowed by the easement agreement and regulation.**
Footnotes 9 and 10 indicate that exceptions and special conditions may apply to ravine crossings and wetlands.

6.2 Initial Clearing of a New ROW or Transmission Line Rebuild (cont'd)

B. The edge of the right-of-way shall be trimmed "Ground to Sky". Ground to sky means that all branches overhanging into the easement area shall be removed. All required tree pruning shall conform to the latest approved edition of ANSI Z133 Safety Standards, ANSI A-300 Plant Maintenance, and OSHA 1910.269 as a minimum to assure safety and industry standards are maintained.

C. All off corridor hazard trees shall be removed including edge trees which cannot be properly pruned to the standards outlined above.

Paragraph B requires that the edge of the ROW be trimmed "Ground to Sky" so that all branches overhanging into the easement area are removed.
Paragraph C requires the contractor to remove all hazard trees outside the ROW if they cannot be properly pruned.

6.2 Initial Clearing of a New ROW or Transmission Line Rebuild (cont'd)

D. All stumps and hardwood brush which have not been mechanically removed shall be treated with herbicides to prevent the growth and regrowth of non-compatible vegetation. All applications shall be made under the direction of PA Certified Commercial Pesticide Applicators and done in accordance with product labels and all applicable laws. Herbicide applications may be applied during the following growing season upon mutual agreement of the vegetation Contractor and PPL EU.

E. When required, off right-of-way access roads and structure pad sites shall be cleared of all vegetation. This clearing shall be specified by project management personnel.

Paragraph D requires the contractor to treat all remaining stumps and hardwood brush with herbicides to prevent the growth and regrowth of non-compatible vegetation. Paragraph E calls for clearing of vegetation from off-ROW access roads and structure pads.

6.2 Initial Clearing of a New ROW or Transmission Line Rebuild (cont'd)

F. While general clearing activities (e.g., maintenance) do not generally require job specific environmental permits, the clearing of a new right-of-way will often be done as part of a larger capital job with unique environmental permits. Unless specifically directed otherwise by the PPL EU Environmental Professional, the vegetation clearing contractor will need to review and ensure compliance with any constraints or limitations detailed in the site-specific permit (i.e., General NPDES, General Permit, Joint Permit, etc.).

Paragraph F requires the contractor to review and comply with site-specific permits, unless specifically directed otherwise by PPL's Environmental Professional.

PPL VM Spec – 6.0 Clearing Requirements

6.3 Vegetation Cycle Maintenance for Existing Circuits

6.3.1 Wire Zone/Border Zone

The Wire Zone/ Border Zone (WZ/BZ) method of managing transmission rights-of-way is the preferred vegetation management method of PPL EU. Wire Zone/ Border Zone shall be applied **where the WZ/BZ method is not explicitly prohibited by easement restriction**.

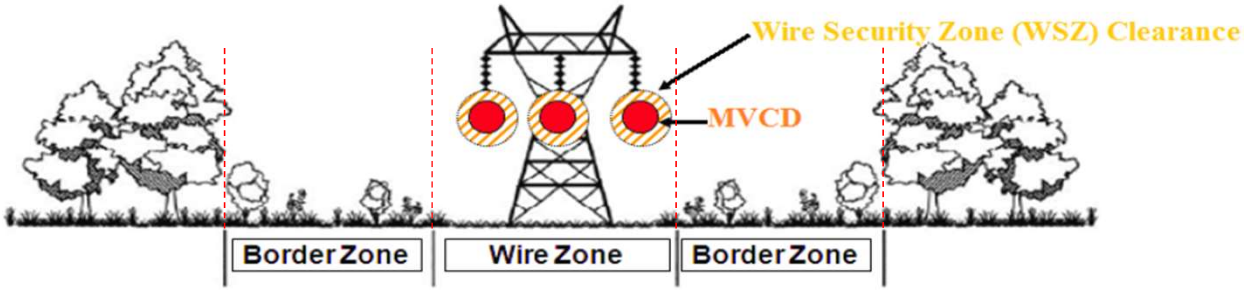
Section 6.3 covers vegetation cycle maintenance for **existing** transmission lines.
Along existing ROWs, PPL prefers to use the wire zone/border zone method.
Section 6.3.1 requires the contractor to use the wire zone/border zone method, **unless the easement agreement explicitly prohibits use of the method**.
So, if you don't want PPL to use the wire zone/border zone method, you will need to explicitly prohibit its use in your agreement.
Otherwise, PPL will use the wire zone/border zone method.

PPL VM Spec – 6.3.1 Wire Zone/Border Zone (cont'd)

A. The **Wire Zone** is defined as that area of the right-of-way corridor that extends from the centerline to a distance ten (10) feet from the outer most conductors. All woody stems shall be controlled in the wire zone. Only Grasses, Ferns, and Herbaceous Plants may be preserved in the Wire Zone.

B. The **Border Zone** is defined as that area of the right-of-way corridor that extends from the limits of the Wire Zone to the limits of the easement boundary. Low growing trees and shrubs may be preserved in the border zone.

C. The area outside the easement boundary shall be managed for Hazard Trees.

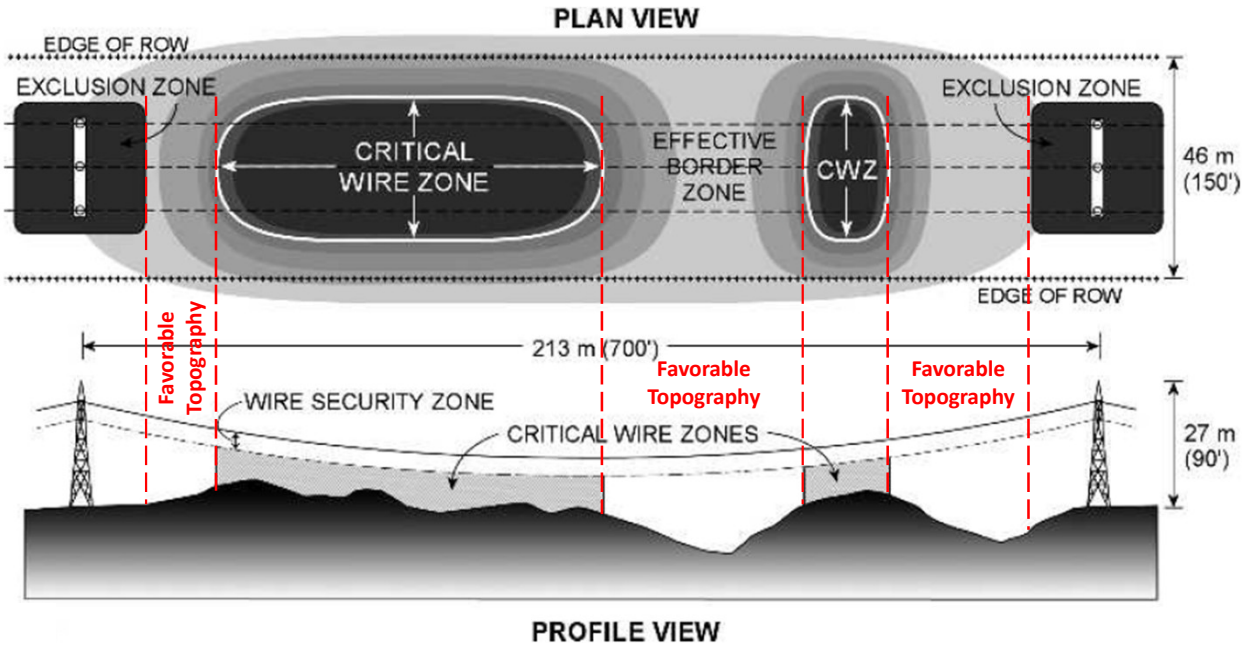


The **wire zone** extends from the centerline to a distance of 10 feet beyond the outermost conductor on each side of the transmission line.
Contractors are required to control all woody plants in the wire zone, leaving only grasses, ferns, and herbaceous plants.
The **border zone** extends from the limit of the wire zone to the limit of the ROW.
Low-growing trees and shrubs may be preserved in the border zone.
The area outside the ROW is managed for trees that could fall into the danger tree clearance zone.

PPL VM Spec – 6.3.1 Wire Zone/Border Zone (cont'd)

D. The only exception to the above applies to non-compatible trees growing in ravines, gullies, or on side hills where topography is such that vegetation at a species maximum height will never encroach into the maximum sag wire security zone. In those areas non-compatible species may be preserved across with entire corridor at the desecration [sic] of the PPL EU Authorized Representative.

Paragraph D makes an exception for non-compatible trees growing in ravines, gullies, or hillsides where the topography is such that vegetation at a species' maximum height will never encroach into the maximum wire sag security zone.



Source: *Ballard, B. D.; McLoughlin, K. T.; and Nowak, C. A., 2007, New Diagrams and Applications for the Wire Zone-Border Zone Approach to Vegetation Management on Electric Transmission Line Rights-of Way: Arboriculture & Urban Forestry, v.. 33, no. 6, pp 435-439.*

This figure, from an article in an arboriculture journal, illustrates the concept behind the exemption.

In the plan view in the upper part of the figure, the darker zones labeled “critical wire zones” or “CWZ” represent areas where tall shrubs or trees pose the greatest threat due to a relatively shorter distance between the ground and the conductors.

Where ravines or valleys are present, as shown in the lower profile view, shrubs and short trees may be preserved, even within the wire zone, because the ground-to-conductor distances are greater.

These areas are considered “effective border zones” because of their favorable topography.

6.3 Vegetation Cycle Maintenance for Existing Circuits (cont'd)

Where wire zone/ border zone cannot be applied due to an **existing documented easement restriction** or other limitation such as a documented site or environmental concern, the following procedures may be utilized as appropriate to the site conditions present.

6.3.2 Selective Clearing

A. All compatible species[11] shall be preserved to the greatest extent possible. Those, which would violate the wire security zone before the next scheduled treatment, shall be removed.[12]

[11] Compatible species guidelines are located in the "attachments" section of this document.

[12] No corrective remediation pruning actions required for encroachments of "under" WSZ where compatible species or annual seasonal crops are in the WSZ to the extent vegetation is not expected to encroach into the MVCD. Species acceptability shall be confirmed through on-site review by vegetation management personnel to determine that vegetation growth has been maximized or dead and that the vegetation presents no threat that MVCD could be breached.

When the wire zone/border zone method is not an option, due to an easement restriction, or other limitation such as a documented site or environmental concern, the specification allows the use of other methods.
The first of these is called "selective clearing."
The selective clearing method calls for the preservation of all compatible species, to the greatest extent possible.
Compatible species are listed in Attachment 11, which we get to later.
Vegetation that may grow into the wire security zone before the next scheduled treatment are to be removed.

6.3.2 Selective Clearing (cont'd)

B. Any species that exhibits growth characteristics which may violate PPL EU clearances in its lifetime are considered a "non-compatible species" and shall be removed to the greatest extent possible.

C. Selective clearing is an acceptable practice for 69 kilovolt transmission lines which are not designated as an element of an IROL (Interconnection Reliability Operating Limit).

Species that may eventually violate PPL's clearances are considered "non-compatible species," and are to be removed to the greatest extent possible, even if the violation of the clearance distance will not occur before the next scheduled treatment.
PPL considers selective clearing as an acceptable practice for 69-kV lines that are not designated as an element of an Interconnection Reliability Operating Limit.
The IROL is a special kind of power system limit that, if exceeded, can cause major grid failures.

6.3.3 Restricted Clearing

A. All compatible species shall be preserved, wherever possible. Those which would violate the wire security zone before the next scheduled treatment shall be pruned or removed to obtain required "Minimum Acceptable Clearance" (defined in Table 1).

B. Any non-compatible species, which have violated or would violate the wire security zone before the next scheduled treatment shall be removed.

C. The remaining non-compatible species shall be preserved until the time comes when they can no longer be effectively pruned to maintain line clearance throughout the vegetation management maintenance cycle. This means that smaller (young) trees of non-compatible species are temporarily retained. As an adequate compatible cover becomes established over time, these non-compatible species shall be removed.

Restricted clearing is another alternative to the wire zone/border zone method.
Similar to selective clearing, restricted clearing preserves compatible species, wherever possible, unless they would encroach on the wire security zone before the next scheduled treatment, in which case, they are pruned or entirely removed.
Non-compatible species are removed only if they would violate the wire security zone **before** the next scheduled treatment.
So, unlike selective clearing, the restricted clearing method temporarily preserves non-compatible vegetation until it reaches the point where it would violate the minimum acceptable clearance prior to the next scheduled treatment.
A benefit of temporarily retaining non-compatible vegetation is that it reduces the opportunity for invasive non-native plant species to move in and take over.

6.3.4 Centerline Agreements

Some PPL EU rights-of-way may be described under what is referred to as a Centerline Agreement. Centerline Agreements establish the location of the centerline of the right-of-way; however, they do not define the total width of the easement or the distance from the centerline to the edge of the right-of-way.

A. Rights-of-way with centerline agreements shall be cleared to the existing large tree edge or at a minimum to 20’ from the outmost conductor, whichever distance is greater.
B. Any tree at or beyond the large tree edge with limbs encroaching within 20’ of the outermost conductor shall be pruned back to the main stem from ground to sky.

The wire zone/border zone method can’t be applied where the easement agreement defines the centerline, but not the width of the easement.
PPL hasn’t negotiated agreements that don’t specify the ROW width for quite some time, so these are very old agreements.
In these situations, the right-of-way is cleared to the existing large tree edge or to at least 20 feet beyond the outermost conductor, whichever distance is greater.

6.3.5 Tree Pruning

Tree pruning for apical clearance is **only considered when specified within the language of pre-existing right-of-way agreements** and may only be undertaken with PPL EU authorization. Removal of vegetation that poses a clearance concern is the preferred method of management.

All trees will be pruned by the guidelines detailed in the most current revision of the American National Standard for Tree Care Operations (ANSI A300). All pruning cuts should be made back to lateral branches at least one-third the diameter of the limb being removed or to the branch collar of the parent stem. [i.e., directional pruning, a.k.a. “drop-crotch pruning”]

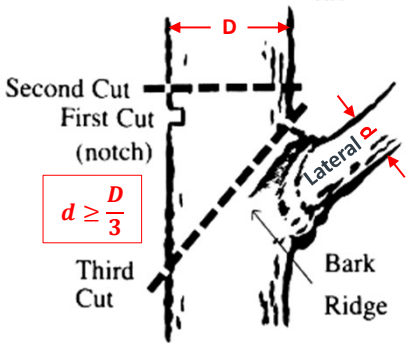
Every effort shall be made during the pruning process, to prevent damage to surrounding property and/or the tree itself. Tree gaffs or hooks will not be permitted in any maintained yard tree to be pruned. They will, however, be permitted in any tree to be removed or in forest trees to be pruned, unless objected to by the property owner.

Tree pruning for clearance beneath power lines is considered only when specified by the language in the right-of-way agreement and must be authorized by PPL. Tree pruning is to be done using the directional pruning method, also known as drop-crotch pruning.
During pruning, the contractor must strive to prevent damage to property and the tree itself.

What is Directional Pruning?

PennState Extension

"The most appropriate way to prune trees for electric utility line clearance is by directional pruning. This pruning method removes branches growing toward conductors in favor of those growing away. Reduction cuts are used for all branches that are pruned. With reduction cuts branches are pruned properly back to a lateral branch that is at least one-third the diameter of the branch being removed. This allows for good wound closure and protects apical dominance, which reduces water sprouting. In addition, directional pruning removes fewer leaves, which trees need for making food. Directional pruning actually removes fewer branches and increases wound closure, thereby reducing internal decay."



https://extension.psu.edu/pruning-for-utility-line-clearance

Penn State Extension considers directional pruning to be the most appropriate way to prune trees when clearing power lines.
Clearance is created by removing branches growing toward the power line in favor those growing away from the power line.
Branches being removed are carefully cut back to a lateral branch having a diameter of at least one-third the diameter of the branch being removed.
As you can see in the illustration, three cuts are made.
First, a small under cut is made to minimize tearing of the tree bark.
The second cut removes the branch, and the third cut trims the portion of the branch remaining above the tree collar.

6.4 Wetland Vegetation Management

Wetlands are defined in Section 404 of the Federal Clean Water Act and PA DEP's Chapter 105 regulations as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions including swamps, marshes, bogs, and similar areas.

Note: Wetlands may have standing water, have plants that are adapted to wet conditions, and/or contain hydric soils. Not all wetlands have visible water or classic wetland plants (i.e., cat tails) so **it is imperative the wetland surveys are completed**, and the areas noted on the plans and/or in the field. **The contractor shall use a combination of the National Wetlands Inventory and actual field observations to make a final wetlands determination**.

Section 6.4 addresses wetland vegetation management.
The specification states that not all wetlands have visible water or classic wetland plants, like cattails, **so it is imperative that wetland surveys are completed**, and wetlands noted on the plans and in the field.
The specification assigns to the contractor the responsibility for making final wetland determinations using a combination of the National Wetlands Inventory and actual field observations.
I don't like PPL's shifting responsibility for wetland determinations to the contractor for two reasons.
First, the National Wetlands Inventory maps were prepared primarily from analysis of high-altitude imagery and do not show all wetlands, especially smaller wetlands.
Second, I doubt that the contractor's field crew will include a qualified wetland professional capable of making wetlands determinations.

6.4 Wetland Vegetation Management (cont'd)

- "Drop and lop" (see § 7.2 of this document) shall be the preferred method for the disposal of woody debris in wetlands. The intention of drop and lop is to minimize impacts to the wetland by leaving woody debris where it falls.
- Special care will be made to ensure that felled trees, logs, slash, brush, and chips do not impede any running water or seasonally dry waterways or drainage culverts. Slash will be compacted in such a manner that it will not be carried away by high water.
- Mechanical Equipment shall not be used in wetlands unless specifically approved by a PPL EU Environmental Professional. Upon approval by the PPL EU Environmental Professional, vehicles may only be taken into wetlands by using existing roads or through the use of temporary matting.

Within wetlands, the specification calls for use of the "drop and lop" method.
This method consists of felling the trees, cutting the limbs from the trunks, and then cutting the trunks into shorter lengths.
The trunk sections and limbs are left where they fall, provided they do not impede drainageways.
Mechanical equipment is not to be used in wetlands, and vehicles can enter the wetlands only by using existing roads or temporary matting.

7.0 Disposition of Cleared Vegetation

The procedures and equipment used for the disposition of cleared vegetation should minimize disturbance to both the right-of-way soil cover and to the vegetation that is to remain within the right-of-way. All disposal operations shall closely follow (by no more than 3 days) clearing operations to keep work confined to one area and to prevent unsightly and unsafe conditions. Wind Rowing as described below, shall be the preferred method of debris disposition unless otherwise specified by a PPL EU Authorized Representative or as required by site conditions or permit restriction.

Section 7 covers disposition of cleared vegetation.
Disposition activities should minimize disturbance to soils and the remaining vegetation and occur within three days of the clearing operations.
Wind rowing is the preferred method of debris disposition.

7.1 Wind Rowing – Timber Piles (6” or larger in diameter)

- All timber shall be placed in neat piles along the edge of the right-of-way, away from areas of preserved compatible vegetation. Under normal conditions timber piles will be interspersed with slash piles.
- Timber shall be stacked in tree length piles unless otherwise specified, in piles not greater in length than the longest tree length. A separation of at least 10' shall be provided on either side of each pile.
- All access roads, trails and streams (including their banks) shall be kept clear. Piling shall not be done where piles would be highly visible from any improved road.
- When working in a floodway or floodplain, all timber piles shall be placed on the side of the ROW furthest from the river/water source to the greatest extent possible.

All timber is to placed in neat piles along the edge of the right-of-way and away from areas of preserved compatible vegetation.
Piles are to be no longer than the longest tree length, and piles are to be at least 10 feet apart.
Roads, trails, and streams, including their banks, are to be kept clear.
Piles are to be kept away from streams to the greatest extent possible.

7.1 Wind Rowing – Slash Piles

- All slash (i.e., trees less than 6” in diameter, treetops, and limbs) shall be stacked in flattened mounds along the edge of the right-of-way, away from areas of preserved compatible vegetation.
- Slash piles shall be dressed of excessively protruding limbs and compacted to keep visual obstruction to a minimum. Generally, they should not exceed 5-6' in height, except where site conditions are such that higher piles are acceptable (e.g., depressions, rough terrain in remote areas). Compaction of piles may be facilitated by use of equipment employed in the associated clearing operation.
- The length of a slash pile should not be any greater than a tree length timber pile, and its width limited so as not to interfere with access road construction or conductor stringing. A separation of at least 10' shall be provided on either side of each pile.

Slash is to be stacked in flattened mounds along the edge of the ROW, and away from areas of preserved compatible vegetation.
Slash piles are to be free of protruding limbs and compacted so they are no more than 6 feet high.
Slash piles are to be no longer than a tree length timber pile and at least 10 feet apart.

7.1 Wind Rowing – Slash Piles (cont'd)

- All roads, trails, and streams (including their banks) shall be kept clear. No piling shall be undertaken where piles would be highly visible from any improved roads, at other locations involving high public visibility, or near tower or pole sites.
- When working in a floodway or floodplain, all slash piles shall be placed on the side of the ROW furthest from the river/water source to the greatest extent possible.

Roads, trails, and streams are to be kept clear of slash, and slash piles should not be highly visible from improved roads.
Slash piles are to be kept away from streams to the greatest extent possible.

7.2 Drop and Lop

- All non-compatible vegetation shall be cut so that it falls toward the edge of the right-of- way, away from any designated access paths. After trees are felled, all long limbs shall be removed from the trunk, and the tree shall be bucked in order to keep the vegetation as close to the ground as possible.
- If necessary, trees and/or slash shall be moved to create a clear path for wire stringing, as needed.
- In all areas where drop and lop is implemented, the Contractor shall establish a path for reasonable access between structures.

Drop and lop was described earlier as the method to be used when clearing in wetlands.
Again, this method consists of felling the trees, cutting the limbs from the trunks, and then cutting the trunks into shorter lengths.

7.3 Chipping

- All timber shall be stacked, according to the procedure described under “Wind Rowing” above.
- All slash shall be fed through a mechanical chipper immediately after cutting.
- Unless otherwise specified, chips may be randomly scattered on the right-of-way, except in the following areas: fields, along city streets, park areas, within wetlands, and on the banks of streams or ponds. In such areas, chips must be disposed of at an acceptable site.

Section 7.3 states that “all slash shall be fed through a mechanical chipper immediately after cutting.”
This requirement seems inconsistent with Section 7.1, which allows for slash to be placed and compacted in piles.
The specification is not clear on when slash is to be chipped or when it can be left in piles.
If the slash is chipped, then the chips may be randomly scattered on the right-of-way, except in fields, along city streets, park areas, within wetlands, and on the banks of streams or ponds.

8.0 Herbicide Applications

- Shall be performed in accordance with the latest version of "PPL EU Herbicide Application Policy".
- Contractor employees shall possess appropriate Commercial Applicator/ Technician certification, and the Contractor shall have a pesticide application business license, in compliance with the Pennsylvania Pesticide Control Act of 1973 (3 P. S. § § 111.21—111.61).
- The Contractor shall maintain a record of all required property owner contacts on log sheets. These records will be submitted to a PPL EU Authorized Representative at his/her request and at the completion of each line.

Section 8 covers herbicide applications.
Applications are to be in accordance with PPL's Herbicide Application Policy.
I haven't located a copy of that policy.
The contractor is to be properly licensed, and employees are to have appropriate certifications.
The contractor is to maintain a record of all required property owner contacts.

8.0 Herbicide Applications (cont'd)

- All target species will be adequately treated to produce the necessary control. A responsible Contractor Representative will review all prior year herbicide applications for quality control. The Contractor shall retreat at their own expense until the desired results are obtained.
- Vehicles used for application and property owner contacts must have Contractor identification of suitable size lettering as approved by a PPL EU Authorized Representative.

All target species are to be adequately treated.
Quality control consists of a contractor rep reviewing prior year applications and retreating vegetation as necessary to obtain the desired results.
Vehicles used for application and landowner contacts must bear the name of the contractor.

11.0 Attachments – Compatible Species List[13]

I. SMALL TREES[14]

a) Flowering Dogwood (*Cornus florida*) [20’-40’]
b) Redbud (*Cercis canadensis*) [15’-30’]
c) Hawthorn (*Crataegus spp.*) [Pennsylvania, 15’-30’]
d) Blue Beech (American Hornbeam) (*Carpinus caroliniana*) [40’]
e) Shadbush (Juneberry, Serviceberry) (*Amelanchier spp.*) [15’-30’]
f) Eastern Red Cedar (*Juniperus virginia*) [30’-40’, up to 90’]
g) Northern White Cedar (*Thuja occidentalis*) [30’-60’]
h) Dwarf Willow (*Salix spp.*) [Pussy, Shining, 20’]
i) Deciduous Holly (Winterberry) (*Ilex verticillata*) [20’]

Speckled Alder [20’-40’]
Alternateleaf Dogwood [20’-35’]
Beaked Hazelnut [25’-40’]
American Hornbeam [40’]
Mountain Maple [20’-35’]
Striped Maple [35’]
Nannyberry [20’-30’]
Scrub Oak [12’-20’]
Winged Sumac [20’-35’]

[13] This list is not all inclusive and is meant to be a guideline. These species are to be preserved as appropriate in accordance with this and other PPL EU Vegetation Management Specifications. Some species represented on this list as compatible may require removal due to site conditions, regulatory requirements, and other needs of PPL EU to build, operate, and maintain a safe and reliable transmission system.

[14] These species shall be evaluated on an individual basis. Over mature specimens can exceed 40’ in height and must be removed if they become a clearance threat.

Section 11 is the attachment with the compatible species list.
Part I lists nine compatible small trees.
I added the mature height ranges in red font.
Footnote 13 states that the list is not all inclusive.
I added nine more small trees to the list in red font on the right side of the slide.
All the listed species are native to Pennsylvania.

11.0 Attachments – Compatible Species List (cont'd)

II. LARGE SHRUBS

a) Alder (*Alnus spp.*) [Smooth, 12'-20']
b) Witch-hazel (*Hamamelis virginiana*) [10'-15', up to 35']
c) Spicebush (*Lindera benzoin*) [6'-15']
d) Common Chokecherry (*Prunus virginiana*) [20'-30']
e) Elderberry (*Sambucus spp.*) [12']
f) Rhododendron (*Rhododendron spp.*) [wild, 4'-15']
g) Virburnum (*Viburnum spp.*) [Blackhaw, 12'-15, up to 30']
h) Dogwood (*Cornus spp.*) [Silky, 15'; Gray, 16']
i) Smooth (Dwarf) Sumac (*Rhus glabra*) [10'-20']
j) Staghorn Sumac (*Rhus typhina*) [15'-30']
k) Chokeberry (~~*Pyrus*~~ *Aronia arbutifolia*) [6'-12']

Highbush Blueberries [15']
Buttonbush [6'-12']
Hercules Club [12'-20']
Red Osier Dogwood [6'-12']
Fireberry Hawthorn [20']
Hobblebush [6'-12']
Ninebark [3'-10']
Fragrant Sumac [6'-12']
Sandbar Willow [4'-15']
Silky Willow [12']
Possumhaw Viburnum [12'-20']
Witherod Viburnum [6'-12']
Highbush-Cranberry [6'-12']

Part II lists eleven compatible large shrubs.
I added another 13 large shrubs in red font on the right side of the slide.

11.0 Attachments – Compatible Species List (cont'd)

III. SMALL SHRUBS

a) Mountain Laurel (*Kalmia latifolia*) [12'-20']
b) American Yew-Ground Hemlock (*Taxus canadensis*) [3'-6']
c) Sweetfern (*Comptonia peregrina*) [2'-5']
d) Honeysuckle (*Lonicera spp.*) [American Fly, 6']
e) Huckleberries (*Gaylussacia spp.*) [Black, 1'-3']
f) Blueberries (*Vaccinium spp.*) [Lowbush, 6"-2']
g) Viburnum (*Viburnum spp.*) [Southern Arrowwood, 6'-8']
h) Meadowsweet (*Spirea spp.*) [1'-6']
i) Wintergreen (*Gaultheria procumbens*) [6"]
j) Trailing Arbutus (*Epigaea repens*) [4"-6"]
k) Blackberry (*Rubus allegheniensis*) [3'-6']
l) Raspberry (*Rubus occidentalis*) [6'-8']
m) Hazelnut or Filbert (*Corylus spp.*) [6'-12']
n) Scrub Oak (*Quercus spp.*) [12'-20']

Northern Bush Honeysuckle [3']
Coralberry [4'-6']
Jersey Tea [2'-3']
Carolina Rose [6']
Swamp Rose [6'-10']
Virginia Rose [10']
Common Snowberry [2'-5']
Western Snowberry [4']
Shrubby St. John's-wort [3']
Steeplebush [3'-5']
Virginia Sweetspire [10']
Mapleleaf Viburnum [4'-6']

IV. ALL NATIVE GRASSES, FERNS, AND HERBACEOUS PLANTS

Part III lists 14 small shrubs.
I added another 12 small shrubs to the list.
Part !V notes that all native grasses, ferns, and herbaceous plants are considered compatible species.

PPL Transmission Line Inspection and Treatment Cycle

ACTIVITY	Cycle 1				Cycle 2			
	2026	2027	2028	2029	2030	2031	2032	2033
Aerial LiDAR Inspection	X	X	X	X	X	X	X	X
Physical Inspection		X		X		X		X
Hazard Tree Inspection/Removal		X		X		X		X
Herbicide Application		X				X		
Tree Trimming				X				X
Reclearing		*		*		*		*

* Tall-growing, undesirable vegetation growing within the right-of-way corridor is selectively removed in those situations where herbicides cannot be used. Low-growing vegetation that does not represent a hazard to the safe, reliable operation of PPL Electric's facilities is preserved wherever possible.

Source: https://www.puc.pa.gov/pcdocs/1679217.pdf

This table summarizes my understanding of PPL's transmission line inspection and treatment schedule based on conversations with a PPL forester and a PPL document I found on the PUC's website.
Inspection and treatment are performed in 4-year cycles.
Aerial LiDAR inspection is performed annually to verify clearances of vegetation from transmission lines.
Physical inspections, including inspection for and removal of hazard trees, are performed every two years.
Herbicide application, to manage vegetation on the floor of the corridor, is done every 4 years.
Herbicide applications must be done when the trees have their leaves, so they usually occur in the summer.
Tree trimming along the edge of the corridor is done every 4 years.
Note that the cycles of herbicide application and tree trimming are offset by 2 years, so a treatment activity occurs every 2 years.
Where herbicides cannot be utilized, reclearing is performed instead.

NOTIFICATION OF RIGHT-OF-WAY MAINTENANCE PRACTICES

Although you, as the landowner, cannot determine whether or not maintenance will occur, **your right-of-way agreement may specify certain conditions on the performance of the maintenance program which are important to you**. These conditions can be part of the negotiations between you and the utility company for your land, since a right-of-way agreement is a legal contract between a landowner and a utility company.

[Consider engaging an attorney to help you negotiate special provisions into your agreement that address the conditions important to you.]

This last section of my presentation covers considerations for ROW negotiations, specifically with respect to vegetation clearing and management.
The Notification of Right-of-Way Maintenance Practices, which you should have received from your land agent, states, "your right-of-way agreement may specify certain conditions on the performance of the vegetation management program that are important to you."
These conditions must be clearly stated in your easement agreement.
Otherwise, PPL has no obligation to comply with your conditions.
For best results, I recommend you engage the services of an attorney to help you negotiate the conditions important to you into your easement agreement.

Considerations for Right-of-Way (ROW) Negotiations

Program activities to consider making subject to specific conditions:

- Communications
  - Notification
  - Site meeting
- Scheduling
- Right-of-way access
- Initial clearing and restoration
- Maintenance clearing methods
  - Wire zone/border zone
  - Selective clearing
  - Restricted clearing
  - Tree pruning
- Herbicide applications
- Disposition of cleared vegetation
  - Wind rowing
    - Timber piles
    - Slash piles
  - Drop and Lop
  - Chipping
- Protection of sensitive resources
  - Wetlands, ponds, and stream buffers
  - Wells and springs
  - Important natural habitats

Special provisions you might consider negotiating into your easement agreement may cover **Communications**—How much notification of program activities do you need? Do you want to have an on-site meeting prior to program activities to go over procedures and to identify and label compatible vegetation that should be preserved? Keep in mind that PPL has a huge incentive—avoiding heavy fines due to a vegetation-related grid failure—to remove non-compatible vegetation, but little or no incentive to preserve compatible vegetation that might be important to you.

Scheduling—Would it suit you better if program activities were performed in the winter when the ground may be frozen to avoid soil compaction and to avoid conflicts with crops or breeding season?

ROW Access—Do you want to deny access across any areas of your land outside the ROW or have any say in how PPL accesses the ROW across your land? **Initial Clearing**--Do you need a certain amount of time before clearing begins to harvest trees? Do you have a preference on the type of vegetation planted during site restoration?

Considerations for Right-of-Way (ROW) Negotiations

Program activities to consider making subject to specific conditions:

- Communications
  - Notification
  - Site meeting
- Scheduling
- Right-of-way access
- Initial clearing and restoration
- Maintenance clearing methods
  - Wire zone/border zone
  - Selective clearing
  - Restricted clearing
  - Tree pruning
- Herbicide applications
- Disposition of cleared vegetation
  - Wind rowing
    - Timber piles
    - Slash piles
  - Drop and Lop
  - Chipping
- Sensitive resources and features
  - Wells, springs, wetlands, ponds, stream buffers
  - Important natural habitats
  - Steep slopes

Maintenance Clearing Methods—Do you want low-growing trees and shrubs to be preserved in the border zone or portions of the wire zone where they are incapable of violating PPL's minimum acceptable clearance distance? Do you want to require selective or restrictive clearing and tree pruning to maximize the preservation of compatible vegetation and to reduce opportunities for invasive non-native vegetation to move in and take over?

Herbicide Applications—Do you want to prohibit the use of herbicides if you do organic gardening or farming, or want to retain the opportunity to do so in the future? Do you want to restrict the use of herbicides in proximity to waterways and wetlands?

Disposition of Cleared Vegetation—Do you have any preferences for the location or size of timber and slash piles? Do you want the slash to be chipped or left in piles?

Sensitive Resources—Do you have any sensitive resources and features, like wells, springs, wetlands, ponds, stream buffers, important natural habitats, and steep slopes, that may require special provisions to protect them?

Considerations for Right-of-Way (ROW) Negotiations

Right-of-Ways and Easements for Electric Facility Construction in Wisconsin

https://www.wistatedocuments.org/digital/collection/p267601coll4/id/16520/

Wisconsin law provides certain rights to landowners affected by transmission lines 100-kV or larger or over a mile in length.
Since we live in Pennsylvania, the Wisconsin law does not apply, but you may want to consider negotiating provisions establishing some of these rights into your easement agreement.
You can obtain a copy of a publication with a discussion of Wisconsin's landowner rights through the link at the bottom of this slide.

PPL Contacts for Transmission Vegetation Management

Joshua Maron – PPL EU Regional Forester(responsible for the transmission/ distribution vegetation management program in the Harrisburg region)
jmaron@pplweb.com
717.975.7219

Megan Schmid – PPL Transmission Utility Forester (Harrisburg region)
mschmid@pplweb.com
717.908-9393

Finally, if your land agent is not being helpful in answering your questions about vegetation management, you may try reaching out to Johsua Maron or Megan Schmid, who are PPL foresters involved in transmission line vegetation management. While they cannot advise you on your easement negotiation, they can answer questions you may have about PPL's vegetation management program.


QUESTIONS?
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Perry Preservation

Thank you.