The temporary impacts to 11.12 acres of suitable nesting and foraging habitat within the Action Area are expected to adversely affect individual rusty patched bumble bees through harming or killing of bees using the Action Area and their associated nests. Foraging individuals may experience harm in the form of increased energy expenditure when they must travel farther to locate floral resources, which can also result in killing due to reduced survivorship. Freshly emerged queens, which have limited mobility and must both forage and tend their nests until workers emerge, are particularly vulnerable; increased foraging distances during this critical period can reduce their fitness and survival by elevating energetic demands. Similarly, workers and males that must travel farther to forage may experience reduced efficiency and survivorship, leading to lower overall colony productivity and diminished colony fitness. Because substantial reductions in the number or efficiency of foraging individuals constrain the resources available to queens, these effects can ultimately reduce the reproductive capacity—and therefore the viability—of the colony. Queens dispersing in the fall may also experience reduced fitness or survival if they must search over greater distances for adequate forage prior to overwintering. Nesting individuals may be killed if heavy equipment operating within the Action Area crushes nests or individuals. Additional mortality may occur if soil compaction blocks burrow openings, resulting in individuals being excluded from their nests or becoming trapped inside. However, adverse effects on the rusty patched bumble bees foraging and nesting in the Action Area are anticipated to have limited effects on the overall population of rusty patched bumble bees using the HPZ as the removal of foraging and nesting habitat is limited to less than 0.05 percent of the HPZ.

Incidental take is expected to be in the form of harm, including lethal harm to rusty patched bumble bees in some instances.

It is not practical to estimate or monitor the total number of rusty patched bumble bees that may be killed or harmed as a result of the proposed action for a number of reasons. The Service (2018) has developed protocols and best practices for conducting rusty patched bumble bee surveys, which are not intended to provide a precise estimate of the number of rusty patched bumble bees in a specific area. Instead, they are designed to: 1) find and document new rusty patched bumble bee locations; 2) determine if the species is still extant at previously documented locations; and 3) monitor rusty patched bumble bee populations to determine long-term population trends, relative abundance (e.g., number observed per hour compared to other *Bombus* species), and bumble bee species richness….” The survey protocols provide information that can be used to infer the presence of one or more colonies. The Service can use records, obtained with the use of its survey protocols (Service 2018), of live individual rusty patched bumble bees to help understand long-term population trends at landscape, regional, or continental scales. However, this information cannot be used at a project-level scale because the quantity of bumble bees changes throughout the active season as worker populations increase or decrease and bumble bee habitat suitability changes over time as floral landscapes change composition. Because suitable habitat may change locations from one year to the next and bumble bee numbers fluctuate throughout the season, quantifying populations precisely in terms of individual bees is not feasible, even with current survey methods. Additionally, the rusty patched bumble bee has a small body size (queen 0.86 to 0.87 inches in length, worker 0.43 to 0.63 inches in length, male 0.51 to 0.69 inches in length; Mitchell 1962) making it difficult to locate, which makes encountering dead or injured individuals unlikely. Rusty patched bumble

bee losses may also be masked by annual fluctuations in numbers. Moreover, the rusty patched bumble bee spends half its life cycle in habitat (i.e., underground) that makes detection difficult and take may occur offsite (e.g., a rusty patched bumble bee may die outside of the Action Area) and would not be detected. Some of the anticipated incidental take, including non-lethal injury, reduced survival of worker bees, and reduced reproductive capacity of the queen is not directly observable and cannot be directly monitored. For these reasons, predicting the precise number of individuals that will be taken by the project is not practical, and likely not possible.

Because it is not practical to monitor take-related impacts in terms of individuals, the Service has determined that it is appropriate to use a surrogate for monitoring incidental take in the form of the acreage of suitable habitat affected. Tree removal, trimming, and ground disturbance within suitable habitat of an HPZ are the causes of take likely to result from the project. Because the location, timing, and extent of these habitat impacts can be clearly identified, measured, and monitored, the use of impacted acreage provides a reliable and enforceable surrogate for take. This approach also establishes a clear threshold for reinitiation of consultation if exceeded. Specifically, we anticipate that a total of 11.12 acres of suitable habitat will be impacted as a result of the proposed action (Table 2). The 11.12 acres encompasses the area where ground disturbance and tree removal/trimming will occur to suitable habitat within the Action Area. Within this total, all 11.12 acres are considered suitable nesting habitat and foraging habitat. A subset of the 11.12 acres (i.e., 7.61 acres) is also considered overwintering habitat. As described in the Opinion above, ground disturbance and effects to trees will directly and indirectly cause the anticipated incidental take within the bounds of the identified acres. This acreage of habitat disturbance sets a clear, enforceable standard, and ground disturbance and tree removal/trimming in rusty patched bumble bee habitat outside of that specific acreage would require the FAA to reinitiate consultation.

**CUMULATIVE EFFECTS**

Cumulative effects are those “effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area” considered in this Opinion (50 CFR 402.02). Future Federal actions, unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Cumulative effects are distinct from the Project but may worsen its impacts. The Service is not aware of any future State, tribal, local, or private actions that are reasonably certain to occur within the action area at this time; therefore, no cumulative effects are anticipated.

**JEOPARDY ANALYSIS FRAMEWORK**

“Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). In this section, the Service adds “the effects of the action and cumulative effects to the environmental baseline and in light of the status of the species…formulate[s] the Service’s opinion as to whether the action is likely to jeopardize the continued existence of listed species ....” (50 CFR 402.14(g)(4)).

Per the Service’s consultation handbook (Service and NMFS 1998), survival is defined as “the species’ persistence as listed or as a recovery unit, beyond the conditions leading to its

endangerment, with sufficient resilience to allow for the potential recovery from endangerment. Said another way, survival is the condition in which a species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a species with a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter."

Per the Service's consultation handbook (Service and NMFS 1998), recovery is defined as "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4(a)(1) of the [ESA]." The "criteria set out in Section 4(a)(1)" means determining when a species no longer meets the definition of an "endangered species" or a "threatened species" because of any of the following factors: (A) present or threatened destruction, modification, or curtailment of habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequate existing regulatory mechanisms; or (E) other natural or manmade factors affecting the species continued existence (16 USC 1533(a)(1)). An endangered species is "in danger of extinction throughout all or a significant portion of its range" (16 USC 1532(6)). A threatened species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC 1532(20)).

To analyze whether the Federal action addressed in this Opinion will jeopardize the continued existence of rusty patched bumble bee, we assess project impacts at the individual, population, and species levels.

Impacts to Individuals

First, we determine how individuals are likely to respond upon exposure to the stressors and/or beneficial actions associated with the proposed action. The response of an individual can be measured by impacts to its breeding, feeding, and/or sheltering. This assessment of effects to individuals provides the basis for the subsequent two steps, in which we determine whether any appreciable reduction of reproduction, numbers, or distribution (RND) is expected at the population or species level.

Impacts to Populations

Because many species are composed of multiple populations and there may be meaningful differences in those populations (e.g., genetics, morphology, size) related to the overall species survival and recovery, it is a logical intermediate step to evaluate the effects of impacts to individuals on the population(s) to which they belong. Specifically, we are analyzing how the change in breeding, feeding, and/or sheltering at the individual level affects the population's abundance, reproduction, or growth rates to make inferences about the population's future reproductive success and its viability. If our analyses indicate that reductions in the condition of the population(s) are not likely to occur, then there can be no appreciable reductions in the RND at a species level and we conclude that the agency has ensured that its' action is not likely to jeopardize the continued existence of the species (i.e., not likely to affect the overall species survival and recovery rangewide).

Impacts to Species

If there are reductions in the condition of the population(s) impacted, we then assess impacts to the species by determining whether the anticipated impacts on the population(s) are likely to reduce the likelihood of both survival and recovery of the species by impacting its RND. Our analysis evaluates how the population-level effects determined above influence the likelihood of progressing towards or maintaining the conservation needs of the species rangewide. To complete this analysis, we evaluate the relative importance of the impacted population(s) within rangewide status of the species (provided in the Status of the Species section) and evaluate the impacts to those populations (positive and negative) from the proposed action.

**Analysis for Jeopardy**

**Rusty Patched Bumble Bee**

*Impacts to Individuals*

As discussed in the Effects of the Action Section of this Opinion, we anticipate adverse effects to individual rusty patched bumble bees present within the Action Area. Effects may include reduced reproductive success of queens present in the Action Area as a result of removal of floral resources, as well as increased energy expenditure of workers and males that are affected by the removal of floral resources and noise and vibrations. Additionally, injury or death of nesting individuals may occur as a result of crushing by machinery during tree removal/trimming and ground-disturbing activities.

In response to the removal of floral resources, rusty patched bumble bees are likely to expend additional energy to forage elsewhere in the foraging range of their nest and may experience reduced fitness. A colony is founded by a single queen and represents one reproductive unit (Chapman and Bourke 2001; Zayed 2009; Service 2016), and individual worker bees are responsible for supporting the reproductive success of the colony by providing food resources to the queen. The health of the colony is dependent on the number of workers foraging and providing resources and on the abundance of foraging habitat. Reduced health of individual rusty patched bumble bee workers as a result of loss of foraging resources may reduce the reproductive success of some queens (i.e., not as many males and foundress queens produced).

Effects on rusty patched bumble bees from loss of foraging habitat are anticipated to be minor, as the foraging habitat lost (i.e., 11.12 acres) constitutes just 0.05 percent of the area within the HPZ (approximately 21,758.91 acres). Nesting (11.12 acres) habitat will be temporarily lost or degraded due to soil compaction from project activities; however, this habitat represents 0.05 percent of available area in the HPZ. In summary, we anticipate the proposed action will have impacts to both survival and reproductive success of individual rusty patched bumble bees in the Action Area.

*Impacts to Populations*

As we have concluded that individual rusty patched bumble bees are likely to experience some reductions in their annual survival or reproduction rates, we need to assess the aggregated consequences of the anticipated impacts on the population to which these individuals belong.

A population of rusty patched bumble bees has been described as “a collection of tens to hundreds of colonies” in “a single 6.2 miles by 6.2 miles grid” (Service 2016, 2021). The grid

size is based on several factors, (see Service 2016, p. 11 for further explanation) and is the size of area where we would expect multiple, interacting colonies to be present (Service 2016, 2021). Since little is known about the species at the 'population' scale, there is uncertainty about the health of populations, how colonies interact within the population, and the number of colonies that would make up a population.

As described previously, HPZs are modeled using a suite of variables that factor in the suitability of the habitat, topography, and known flight distances of individuals. The specific HPZ encompassing the Action Area, which was modeled using two documented occurrences of the species in the immediate area, is approximately 21,758.91 acres in size. This is approximately the area that the Service has defined as a population (approximately 24,602.00 acres). Thus, while there can be multiple rusty patched bumble bee colonies within the same HPZ if it is quite sizable, it is likely that all rusty patched bumble bee colonies within the HPZ affected by this action belong to the same population.

While we cannot predict precise numbers of individuals affected, it is reasonable to assume that there will be at least some individuals present in the Action Area that will be affected by project activities, as the project includes tree removal, trimming, and ground disturbing activities in suitable habitat within an HPZ. However, while the loss of foraging resources and the loss of potential nesting and overwintering habitat is anticipated to have at least some negative impact on some individual rusty patched bumble bees, it is not reasonable to assume that the project will have a large impact on all or most of the bees in the population using the HPZ. This relative quantification of impacts is essential to determining the magnitude of the importance of the take on the population and to the species.

The loss of reproductive individuals (e.g., crushing of foundress queens) may reduce the success of future matings and future colonies, leading to a reduction in the number of colonies on the landscape. Should this occur, fewer rusty patched bumble bee males and foundress queens will be available for reproduction, increasing the likelihood of related individuals mating, ultimately reducing the health of the HPZ (i.e., genetic diversity). Additionally, impacts to populations may occur when the health or survival of colony members is reduced due to reductions in foraging resources. In addition, as population size decreases, population growth rate also tends to decrease, and the risk of local extirpation increases. Given the size of the area of disturbance, it is unreasonable to expect that all or most colonies within the population (i.e., the HPZ) will be affected by project activities. Since the vast majority of area within the HPZ (99.95 percent) will remain unaffected, we anticipate that other colonies located elsewhere in the HPZ will maintain normal reproductive capacity. Similarly, multiple overwintering queens are likely to be located in other suitable areas of the HPZ; these queens will be unaffected and will emerge in spring to establish nests and repopulate the HPZ with new colonies. Thus, the collective reproductive capacity of the HPZ (i.e., the population to which rusty patched bumble bees that may be using the Action Area belong) is not expected to be reduced.

The total amount of suitable rusty patched bumble bee habitat disturbed by the action is 0.05 percent (i.e., 11.12 acres) of the total acreage in the HPZ (i.e., 21,758.91 acres). The remaining 99.95 percent of the area (i.e., 21,748.03 acres) within the HPZ will remain unaffected by this action. We expect bees in the area to make use of the suitable habitat that will continue to exist in

areas outside of the Action Area in the HPZ. Therefore, given the small proportion of the HPZ being impacted (i.e., less than 0.05 percent), and the likely availability of suitable habitat outside the Action Area, the distribution of rusty patched bumble bee population occupying this HPZ is not anticipated to be affected.

Due to the population dynamics of the rusty patched bumble bee, where multiple colonies interact across the landscape (collectively forming an HPZ), very few colonies within the HPZ are anticipated to be impacted by the small amount of disturbance (i.e., 11.12 acres) associated with the proposed project. Additionally, natural variation is inherent in animal populations (Eberhardt 1978), making it improbable that the loss of individuals from such a small amount of disturbance to suitable habitat will exceed normal population fluctuations. Therefore, the proposed action is unlikely to negatively impact rusty patched bumble bee numbers at the population level.

*Impacts to Species*
As we have concluded that the population of rusty patched bumble bee to which the bees affected by this project belong is unlikely to experience reductions in reproduction, numbers, or distribution at the population level, there will be no appreciable reduction at the species level; therefore, the proposed action is not likely to affect the overall species survival and recovery range wide.

## CONCLUSION

**Rusty Patched Bumble Bee**

We considered the current overall declining status of the rusty patched bumble bee and the condition of the species within the Action Area (environmental baseline). We then assessed the effects of the proposed action and the potential for cumulative effects in the Action Area on individuals, the affected population, and the species as a whole. We do not anticipate appreciable reductions in the reproduction, numbers, or distribution of the species as a result of the proposed action. The Service's opinion is that the Obstruction Removal (Runway 5-23 Approaches) Project, as proposed, is not likely to jeopardize the continued existence of the rusty patched bumble bee.

## INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations promulgated pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened wildlife species, respectively, without a special exemption. Take is defined in Section 3 of the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 USC 1532(19)). Incidental take "refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity …." (50 CFR 402.02). Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement (ITS).

**AMOUNT OR EXTENT OF TAKE ANTICIPATED**
The anticipated take from the proposed action is described in Table 1, below.

50 CFR 402.14(i)(1)(i) states that surrogates may be used to express the amount or extent of anticipated take provided the Opinion or incidental take statement (ITS): (1) describes the causal link between the surrogate and take of the listed species; (2) describes why it is not practical to express the amount of anticipated take or to monitor take-related effects in terms of individuals of the listed species; and (3) sets a clear standard for determining when the amount or extent of the taking has been exceeded.

**Rusty Patched Bumble Bee**
Because it is not practical to monitor take-related impacts in terms of individuals, the Service has determined that it is appropriate to use a surrogate for monitoring incidental take in the form of the acreage of suitable habitat affected. See above (Effects of the Action Section) for additional details explaining the rationale for the use of a surrogate to express anticipated take. Ground disturbance and tree removal/trimming within suitable habitat within an HPZ, are the causes of take likely to result from the project. Because the location, timing, and extent of these habitat impacts can be clearly identified, measured, and monitored, the use of impacted acreage provides a reliable and enforceable surrogate for take. This approach also establishes a clear threshold for reinitiation of consultation if exceeded. Specifically, we anticipate that a total of 11.12 acres of suitable habitat will be impacted as a result of the proposed action (Table 2). The 11.12 acres encompasses the area where ground disturbance and tree removal/trimming will occur to suitable habitat within the Action Area. Within this total, all 11.12 acres are considered suitable nesting habitat and foraging habitat. A subset of the 11.12 acres (i.e., 7.61 acres) is also considered overwintering habitat. As described in the Opinion above, ground disturbance and effects to trees will directly and indirectly cause the anticipated incidental take within the bounds of the identified acres. This acreage of habitat disturbance sets a clear, enforceable standard, and ground disturbance and tree removal in rusty patched bumble bee habitat outside of that specific acreage would require the FAA to reinitiate consultation. Incidental take within this acreage is expected to be in the form of harm, including lethal harm to rusty patched bumble bees in some instances.

**Table 1**. Amount and type of anticipated incidental take for rusty patched bumble bee impacted by the construction of the Obstruction Removal (Runway 5-23 Approaches) Project in Pocahontas County, West Virginia.

| Species | Amount of Take Anticipated (Surrogate in acres of habitat) | Life Stage when Take is Anticipated | Type of Take | Take is Anticipated as a Result of |
|---|---|---|---|---|
| Rusty patched bumble bee | 11.12 | Adult workers, males, or queens | Harm or Kill | Mortality through crushing or early emergence and disturbance or loss of overwintering insulation during tree removal and trimming. Reduced survival of individuals and reduced reproduction of colonies associated with the loss or alteration of suitable nesting and foraging habitat. |

**REASONABLE AND PRUDENT MEASURES**

"Reasonable and prudent measures refer to those actions the [Service] Director considers necessary or appropriate to minimize the impacts of the incidental take on the species." (50 CFR 402.02). "Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action, may involve only minor changes, and may include measures implemented inside or outside of the action area that avoid, reduce, or offset the impact of incidental take." (50 CFR 402.14(i)(2)). "Priority should be given to developing reasonable and prudent measures and terms and conditions that avoid or reduce the amount or extent of incidental taking anticipated to occur within the action area. To the extent it is anticipated that the action will cause incidental take that cannot feasibly be avoided or reduced in the action area, the Services may set forth additional reasonable and prudent measures and terms and conditions that serve to minimize the impact of such taking on the species inside or outside the action area." (50 CFR 402.14(i)(3)).

The measures described below are nondiscretionary and must be undertaken by the FAA so that they become binding conditions of any grant or permit issued to Applicant, as appropriate, for the exemption in Section 7(o)(2) to apply. The FAA has a continuing duty to regulate the activity covered by this ITS. If the FAA: (1) fails to assume and implement the terms and conditions or (2) fails to require Applicant to adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of Section 7(o)(2) may lapse.

Service considers the following reasonable and prudent measures necessary or appropriate to minimize the impacts of incidental take on rusty patched bumble bee:

- The FAA shall implement all conservation measures as described above to avoid or minimize to the greatest extent possible effects to listed species within the action area.

- The FAA will provide information to individuals involved in project implementation on how to avoid and minimize potential effects to listed species.

- The FAA shall notify the Service's WVFO, in writing (digital format), regarding the projected and actual start dates, progress, and completion of the project and verify that all conservation measures were followed.

**TERMS AND CONDITIONS**
The following terms and conditions must be complied with by the FAA or any applicant to implement the reasonable and prudent measures specified above [50 CFR 402.14(i)(1)(iv)].

- The FAA, their permitted entities, and contractors, shall implement all required measures as described in the BA and this Opinion.

- The FAA will make site visits prior to, during, and post implementation at all project implementation sites to observe and confirm that all conservation measures are being met. The FAA shall notify the Service of any failures to meet these measures within 24 hours of observation.

**MONITORING AND REPORTING REQUIREMENTS**
To monitor the impacts of incidental take, the FAA or any applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(4)].

- The FAA shall monitor the number of acres affected by the action annually for the duration of the project. Each year, the FAA shall provide the Service with a summary of the previous year's activities no later than January 15, beginning with the January following the first year of project implementation. Reports should be submitted to the Service's West Virginia Field Office at 6263 Appalachian Highway, Davis, West Virginia 26260, or emailed to FW5_WVFO@fws.gov.

- Any dead or injured listed rusty patched bumble bees located in the action area during implementation of the proposed action shall be immediately reported to the WVFO at fw5_wvfo@fws.gov. The FAA shall record information regarding the date, time, and location of any listed species found and the possible cause of injury or death and then will provide this information to the Service. Any dead specimens believed to be federally listed shall be transported on ice to the WVFO. Care must be taken in handling dead specimens to preserve biological material in the best possible state. If needed, staff from the WVFO will assist in species determination for any dead or moribund specimens. If a listed species is identified, the WVFO staff will contact the appropriate Service law enforcement office.

- The FAA will notify the Service, in writing (digital format), regarding the projected and actual start dates, progress, and completion of the project throughout the life of the project.

The contact for these reporting requirements is as follows:

West Virginia Field Office
U.S. Fish and Wildlife Service 6263 Appalachian Highway, Davis, West Virginia 26260
FW5_WVFO@fws.gov
Attn: 2024-0053235 Obstruction Removal (Runway 5-23 Approaches) Project

**CONSERVATION RECOMMENDATIONS**

Conservation recommendations are not a required item in a biological opinion or concurrence letter, and their implementation is at the discretion of the Federal action agency or applicant and not required to meet the requirements of Section 7(a)(2). Conservation recommendations are defined in the regulations as "suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information." (50 CFR 402.02). The Service recommends that the FAA consider implementing the following conservation actions:

1. Pursue opportunities to enhance rusty patched bumble bee habitat through enhancement of existing pollinator gardens or planting of new pollinator gardens.

2. Use straw instead of hay when stabilizing and restoring project areas.

3. Develop and participate in educational and outreach efforts on rusty patched bumble bees.

4. Support research projects to understand better the range of plant species, including tree species on which the rusty patched bumble bee forages in forested areas.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

**REINITIATION NOTICE**

This concludes formal consultation on the action outlined above. As provided in 50 CFR 402.16, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this Opinion, or our shared responsibilities under the ESA, please contact our office at FW5_WVFO@fws.gov.

Sincerely,

JENNA HINCKS

Digitally signed by JENNA HINCKS
Date: 2026.08.06 15:52:54 -04'00'

Jenna Hincks
Acting Field Supervisor
West Virginia Field Office

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**Appendix A. CONSULTATION HISTORY**

2016 - FAA coordination with the WVFO began.

May 2017 - The FAA submitted a species habitat assessment to the WVFO. The WVFO responded to the FAA with recommendations regarding potential impacts to federally listed species.

August 2018 - The FAA submitted a bat survey report to the WVFO.

December 2018 - The FAA submitted additional information for the project that included “not likely to adversely affect” determinations for five federally listed species.

March 2019 - The WVFO responded in an email to the FAA that concurrence with their small whorled pogonia “not likely to adversely affect” determination could not be provided in absence of a survey for the species due to prior documentation of small whorled pogonia in proximity to the airport.

September 2019 - Surveys were completed within the Action Area for the small whorled pogonia.

October 28, 2019 - The FAA provided an updated project submittal to the WVFO.

November 22, 2019 - The WVFO provided a letter stating that based on the surveys conducted, no federally listed species are expected to be adversely affected by the project and that any take of NLEB associated with the project is exempt under the 4(d) rule.

February 22, 2024 - Due to a change in project activities and time lapsed from prior correspondence with the WVFO, the FAA submitted an updated request for species information through the Service’s Information for Planning and Consultation (IPaC) system.

July 3, 2024 - Skybax Ecological Services, LLC. submitted a study plan form to the WVFO proposing to conduct mist-netting for federally listed bats within the Action Area.

July 9, 2024 - The WVFO sent an email to Skybax Ecological Services, LLC. recommending presence/probable absence bat surveys for the project and requested the survey report upon survey completion.

July 19, 2024 - TranSystems submitted a survey work plan for the Action Area to assess presence of the small whorled pogonia.

August 5, 2024 - The WVFO sent an email to TranSystems approving the survey for small whorled pogonia.

August 8, 2024 - TranSystems submitted the bat survey report to the WVFO.

August 9, 2024 - The WVFO provided technical assistance to TranSystems confirming that the survey results are considered valid.

December 11, 2025 - TranSystems submitted an updated request for species information through the Service's IPaC system.

March 5, 2026 - The FAA submitted a BA for the project.

April 2, 2026 - The WVFO sent an email to the FAA regarding insufficiencies within the submitted BA.

May 13, 2026 - The FAA responded to comments provided by the WVFO and provided an updated project submittal package.

June 11, 2026 - The WVFO provided a letter to the FAA confirming initiation of formal consultation for the project.

August 3, 2026 - The FAA sent an email with additional information for the project to the WVFO.

## Appendix B. RUSTY PATCHED BUMBLE BEE STATUS OF THE SPECIES

**Rusty Patched Bumble Bee**
For links to Service documents, refer to https://ecos.fws.gov/ecp/species/9383.

*Species Distribution*
Historically, the rusty patched bumble bee (*Bombus affinis*) was an abundant and widespread species, with hundreds of populations across an expansive range encompassing the eastern United States, upper Midwest, and southern Quebec and Ontario. Recent records (2000-2015) indicate that the rusty patched bumble bee range has declined, down 60 percent in occupied ecoregions, 68 percent in the number of occupied states, and 89 percent in occupied counties (Service 2016). It currently exists in 13 states and one Canadian province (Figure E.1; Service 2022).

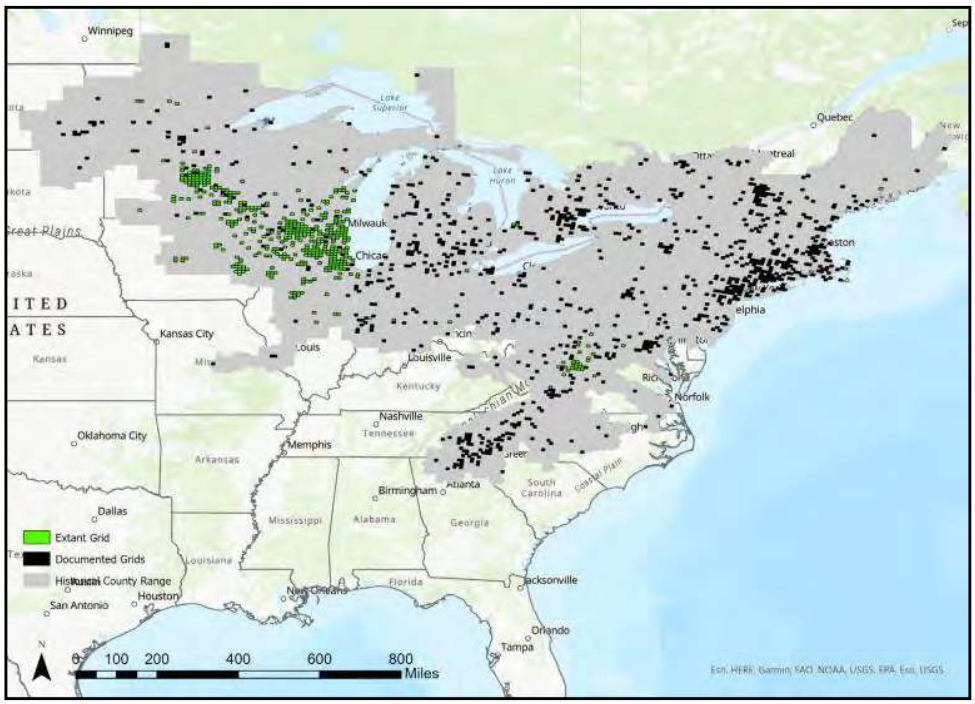



Figure E.1. Rusty patched bumble bee geographic range (Service 2022). Grids with historical observations (pre-2007) are shown in black. Grids with contemporary observations (2007-2021) are shown in green. The gray-shaded area indicates the presumed historical range of rusty patched bumble bee.

*Individual Needs and Ecology*
The rusty patched bumble bee is a eusocial (i.e., highly social) organism that forms colonies of a single queen, female workers, and males. Colony sizes of the rusty patched bumble bee are considered large compared to other bumble bees, and healthy colonies may consist of up to 1,000 individual workers in a season (Macfarlane et al. 1994). Queens and workers differ slightly in size and coloration; queens are larger than workers (Plath 1922; Mitchell 1962). All rusty patched bumble bees have entirely black heads, but only workers and males have a rusty, reddish

patch centrally located on the abdomen.

The rusty patched bumble bee annual cycle begins in early spring with colony initiation by solitary queens and progresses with the production of workers throughout the summer. The life cycle continues with the production of reproductive males and new queens in mid to late summer and early fall (Plath 1922; Macfarlane et al. 1994; Colla and Dumesh 2010). The males and new queens disperse to mate. The founding queen, males, and workers die while new queens go into diapause (i.e., a form of hibernation) over winter.

The following spring, the queen, or foundress, searches for suitable nest sites and collects nectar and pollen from flowers to support the production of her eggs, which are fertilized by sperm she has stored since mating the previous fall. She is solely responsible for establishing the colony. As the workers hatch and the colony grows, they assume the responsibility of food collection, colony defense, and care of the young, while the foundress remains within the nest and continues to lay eggs. During later stages of colony development, the new queens and males hatch from eggs in mid-July or August to September. At the end of the season, the foundress dies, and the new queens (reproductive females) mate before hibernating.

The rusty patched bumble bee has been observed and collected in various habitats, including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens (Colla and Packer 2008; Colla and Dumesh 2010; Service 2016). Broadly, the species requires areas that support sufficient food (i.e., nectar and pollen from diverse and abundant flowers), undisturbed nesting sites in proximity to floral resources, and overwintering sites for hibernating queens (Potts et al. 2010; Goulson et al. 2015). Though capable of occurring throughout West Virginia, rusty patched bumble bees are most frequently observed in rural mountainous and forested areas at high elevations, typically above 2,000 feet.

Bumble bees are generalist foragers, meaning they gather pollen and nectar from a wide variety of flowering plants (Xerces 2013). The rusty patched bumble bee is a short-tongued species (Medler 1962) and can’t easily access the nectar in flowers with deep corollas (i.e., all the petals of a flower). The rusty patched bumble bee is among the earliest species to emerge in spring and the last to hibernate in fall. To meet its nutritional needs, it depends on a consistent and diverse supply of blooming flowers throughout its life cycle, which spans from April to September (Macfarlane et al. 1994). The number of queens a colony can produce is directly related to the amount of available pollen (Burns 2004). It has been suggested that *B. affinis* needs floral resources near its nest sites because other *Bombus* species typically exhibit foraging distances of less than 1 kilometer from their nesting sites (Dramstad 1996; Osborne et al. 1999; Knight et al. 2005; Wolf and Moritz 2008; Rao and Strange 2012). The rusty patched bumble bee may also depend on woodland spring ephemeral flowers because of the species’ early emergence in the spring and its association with woodland habitats (Colla and Dumesh 2010). Floral resource availability depends on the proper soil and precipitation conditions to sustain them. Extended periods of drought, for instance, may lessen the availability and diversity of flowering plants in each area because plant phenology is primarily driven by temperature, precipitation, and snowmelt timing in the spring (Pyke et al. 2016; Service 2016).

Rusty patched bumble bee nests are typically in abandoned rodent nests or similar cavities, one to four feet below ground (Plath 1922; Macfarlane et al. 1994). Nests have also been occasionally observed above ground (Plath 1922). Little is known about the overwintering habitats of *B. affinis* foundress queens. Other species of *Bombus* typically form a chamber in soft soil a few centimeters deep and sometimes use compost or mole hills to overwinter (Goulson 2010).

The rusty patched bumble bee lives in temperate climates and is unlikely to survive extended periods of high temperatures exceeding 95 degrees Fahrenheit (Service 2016). The species can fly in cool temperatures and low light levels, particularly compared to other bees, extending their daytime foraging times (Corbet et al. 1993).

*Population-level Needs*
The population structure of the rusty patched bumble bee operates similarly to a metapopulation. A metapopulation is an assemblage of interacting subpopulations; a population of rusty patched bumble bees is a collection of interacting colonies. Unlike a subpopulation of many reproductive individuals, a rusty patched bumble bee colony is established by a single queen, making each colony a single reproductive unit. Therefore, the population size of rusty patched bumble bees in each geographical area is determined by the number of successful nests or colonies rather than the number of individual bees.

The size of a population influences population viability through the processes of demographic and environmental stochasticity. The number of colonies required to ensure the long-term persistence of the population is unknown and likely varies across spatial scales. Small populations are inherently more vulnerable to extirpation due to environmental and demographic stochasticity (Goulson and Darvill 2008), and the larger the population, the higher the likelihood of persistence over time (Service 2016). The number of colonies comprising a population is determined by the number of foundresses, which is, in turn, determined by the number of mated gynes (i.e., females destined to become queens and reproduce). The number of mated gynes and their overwinter survival is influenced by habitat quality and quantity. Specifically, the quality and density of the floral resources and the proximity of these resources to nest sites and overwintering sites. Given that several kilos of food are needed to support a single nest (Service 2016) and supposing that hundreds of nests represent a minimum population size, the amount of habitat needed to support a population is likely quite large. In addition to habitat availability, the landscape must be permeable and free of hazards for unrelated gynes and males to find and mate with each other successfully. Connectivity among colonies is essential for successfully recruiting next year's queens and, therefore, is influential in determining population size.

The reproductive system renders bumble bees particularly sensitive to loss of genetic diversity. Rusty patched bumble bee colonies are relatively large and typically number hundreds of individuals (Macfarlane et al. 1994). Maintaining genetic diversity within populations, thus, requires a large effective population size and gene flow. Genetic data suggests the Appalachian Mountain population is isolated and unique genetically from elsewhere throughout its range (Service 2016).

The viability of a population is also determined by its long-term growth rate. The rusty patched bumble bee and other species that fluctuate greatly with environmental conditions require strong growth rates over time to avoid extirpation. Population viability depends on inhabiting areas with diverse environmental conditions (spatial heterogeneity) for the rusty patched bumble bee. This ensures that floral resources are consistently available throughout the seasons and across years despite climatic variations. The degree of spatial heterogeneity across the population area reduces the chances of all colonies failing concurrently due to poor environmental conditions.

*Species-level Needs*

Resiliency refers to the ability of a species to sustain populations despite environmental variability and temporary disruptions. For the rusty patched bumble bee, resiliency is determined by the number of populations and their distribution relative to the extent and variability of environmental conditions. In general, the more healthy populations and spatial heterogeneity occupied by the species, the greater its likelihood of persisting over time. Healthy populations (i.e., large population sizes, positive growth rates, and occupation of spatially heterogeneous environments) are better equipped to recover from stochastic events and adapt to environmental changes. Environmental stochasticity occurs at both local and regional scales, causing population fluctuations that can synchronize across broad geographic areas (Hanski 1999). Over extended periods, changes in landscapes and habitats may lead to correlated extinction risks across large regions (Hanski 1999). To mitigate these risks, having populations spread across diverse environmental conditions helps buffer against simultaneous declines by creating asynchronous population fluctuations. For rusty patched bumble bees, spatial heterogeneity that offers a range of temperature and precipitation conditions should improve the species' resiliency.

The resiliency of the rusty patched bumble bee is characterized by healthy populations distributed across a range of climatic conditions with the availability of floral resources throughout extended growing seasons. Lastly, a healthy population consists of multiple thriving colonies, access to sufficient floral resources to sustain a large population size, strong connectivity among colonies to support genetic diversity, and the occupation of spatially heterogeneous areas.

*Summary of Biological Threats*

The primary threats to the species are pathogens, negative genetic effects of small populations, the effects of stochastic weather events, pesticides, and habitat degradation or loss (Service 2016). These threats continue to impact the species in the same manner as they did at the time of listing, although the imminence and severity of stochastic weather events impacts may be increasing. These stressors likely operate independently and synergistically.

*Summary of Biological Status*

The Service published the rule listing the rusty patched bumble bee as threatened on January 11, 2017, with an effective date of March 21, 2017 (82 FR 3186). The species' range-wide status is declining (82 FR 3186). In its last five-year review, the Service recommended maintaining the current classification of the rusty patched bumble bee as an endangered species (Service 2022).

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# APPENDIX 4

# WEST VIRGINIA SHPO CONSULTATION

WEST VIRGINIA
DEPARTMENT OF TOURISM

STATE HISTORIC PRESERVATION
1900 Kanawha Blvd. East | The Culture Center
Charleston, West Virginia 25305
(304) 558-0220 | WVculture.org

July 29, 2025

Ms. Susan Stafford
Environmental Protection Specialist
Federal Aviation Administration
Beckley Airports Field Office
176 Airport Circle, Rm 101
Beaver, WV 25813
Via email: susan.stafford@faa.gov

RE: Elkins-Randolph County Regional Airport Runway 5-23 Obstruction Removal
FR#: 16-984-RD-5

Dear Ms. Stafford:

We have reviewed the information submitted in support of the above-referenced project. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties", we submit our comments.

According to the submitted information, the proposed obstruction removal project at the Elkins-Randolph County Regional Airport in Randolph County, West Virginia was amended subsequent to the completion of our reviews in December 2017 and August 2020. The proposed project will now include the removal of three grain silos instead of lowering their overall height. The revised work also includes the removal and trimming of selected trees, the removal of one light structure, and relocating one light structure.

Architectural Resources:
We have reviewed the updated information. Per our previous communications, we remain in concurrence with our findings in our review letters dated May 18, 2022, March 30, 2017, February 24, 2020, and January 4, 2018, that the proposed project will affect no architectural properties eligible for or included in the National Register of Historic Places. No further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change.

Archaeological Resources:
As stated in the current submission, our records note that a vast majority of the proposed project area was previously investigated by a Phase I archaeological survey in 2017. In addition, no recorded archaeological sites are located within the proposed project work areas. Upon review of the current submission, we remain in concurrence with our opinion and the FAA's determination that the proposed project will have no effect on archaeological historic properties. No further consultation is necessary regarding archaeological resources.

WEST VIRGINIA
DEPARTMENT OF TOURISM

STATE HISTORIC PRESERVATION
1900 Kanawha Blvd. East | The Culture Center
Charleston, West Virginia 25305
(304) 558-0220 | WVculture.org

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Abigail M. Ayers, Structural Historian, or Carolyn M. Kender, Archaeologist, at (304) 558-0240.*

Sincerely,

Meredith C. Dreistadt
Acting Deputy State Historic Preservation Officer

MCD/CMK/AMA

**U.S. Department of Transportation**
Federal Aviation Administration

**Beckley Airports Field Office**
**176 Airport Circle, Room 101**
**Beaver, West Virginia 25813**
**Telephone: (609) 916-5790**

July 16, 2025

Ms. Susan M. Pierce, Deputy State Historic Preservation Officer
State Historic Preservation Office
WV Division of Culture and History
1900 Kanawha Blvd East
Charleston, WV 25305

Re: Elkins-Randolph County Regional Airport
Elkins, West Virginia
Runway 5-23 Obstruction Removal
WVSHPO FR #16-984-RD

Dear Ms. Pierce:

The purpose of this letter is to reengage in consultation with your office regarding the Elkins-Randolph County Regional Airport (EKN) Runway 5-23 Obstruction Removal project (FR #16-984-RD). The footprint for the proposed undertaking has been revised based on additional obstructions identified within the project area as well as additional property negotiations which resulted in the full removal of three (3) grain silos rather than the initially proposed lowering of the top elevations of the grain silos.

Enclosed are site plans showing the revised project areas as well as the original project areas included in previous correspondence dated December 13, 2017. The previously proposed project limits for the tree obstruction removal areas and the tree trimming areas are shown as purple and green polygons, respectively, to illustrate the changes. During the period of time that has elapsed during the environmental assessment process, several trees have grown taller and are now obstructions in addition to those originally delineated. To address these changes, the project limits have been altered slightly. The roster of affected property owners remains unchanged. No new parcels have been added, and none have been removed.

Prior consultation with your office resulted in completion of a Phase I archaeological survey and architectural photolog with concurrence that there are no archaeological resources located within the proposed project that are eligible for listing in the National Register of Historic Places (NRHP) and the proposed project will affect no architectural properties eligible for listing in the NRHP. Concurrence with prior documentation also acknowledged removal or alteration of the three silos and stated that the Cupp Farm has been altered numerous times and does not appear to represent any specific agricultural period. Reengagement with your office was requested if the project should change.

The intent of this letter is to provide your office with revisions to the proposed undertaking and request concurrence with the determination that the proposed revisions do not change prior concurrence with the

project. As proposed, in project areas depicted for obstruction removal, stumps remaining after tree cutting in non-maintained areas will be left in place to reduce ground disturbance, and grading/grubbing for stump removal with large equipment such as dozers and graders will be prohibited in areas maintained as lawn.

We sincerely appreciate your assistance with this project. If you have any questions concerning this matter, please do not hesitate to contact me at susan.stafford@faa.gov or 609-916-5793.

Sincerely,

Susan Stafford
Environmental Protection Specialist
Beckley Airports Field Office

Enclosures

Cc: Melissa Defibaugh, PE Transystems (via e-mail)




| LEGEND | | |
|---|---|---|
| ITEM | EXISTING | PROPOSED |
| TREE OBSTRUCTION REMOVAL | N/A | |
| TREE TRIMMING | N/A | |
| TREE OBSTRUCTION REMOVAL AREA (2017) | | N/A |
| TREE TRIMMING AREA (2017) | | N/A |
| ADJACENT PROPERTY LINE | | N/A |
| TAX PARCEL NUMBER | 110-42 | N/A |


TRANSYSTEMS
615 West Highland Ave.
Ebensburg, PA 15931
Phone: 814.472.7700
Email: madefibaugh@transystems.com
Website: www.transystems.com


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| DESIGNED | MAD | 01/24 DATE |
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| CHECKED | CRM | 01/24 DATE |
| APPROVED | MAD | 01/24 DATE |

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| DATE | BY | DESCRIPTION |
| | | |

ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTHORITY
400 Airport Road
Elkins, WV 26241

# ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT (EKN)

ELKINS WEST VIRGINIA

## TREE OBSTRUCTION REMOVAL, PHASE 5

## RUNWAY 23 END SITE PLAN (ADD ALTERNATE BIDS)

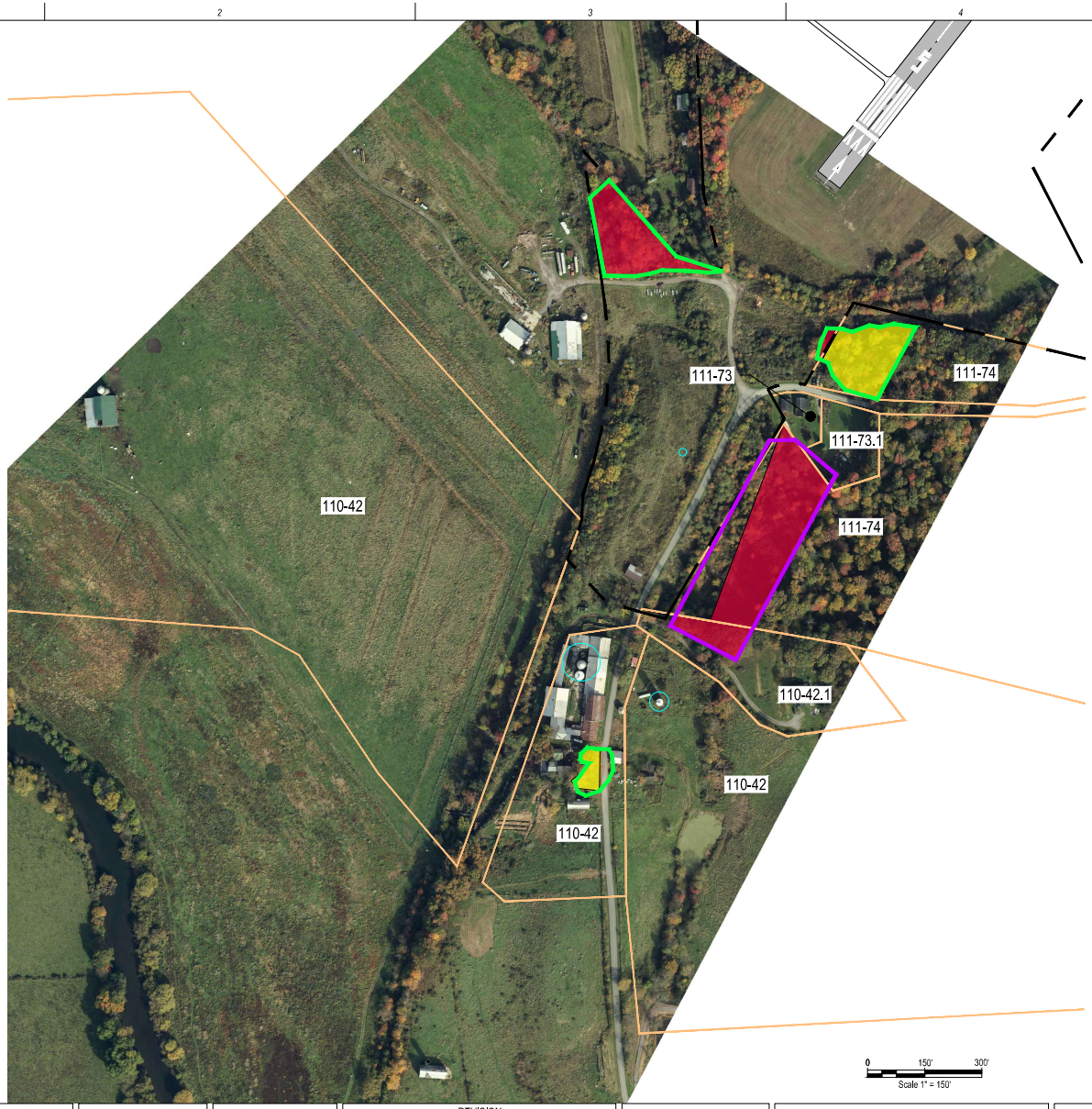
AP-05

PROJECT NO P707230229

DATE JANUARY 2024

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| LEGEND | | |
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| ITEM | EXISTING | PROPOSED |
| TREE OBSTRUCTION REMOVAL | N/A | |
| TREE TRIMMING | N/A | |
| TREE OBSTRUCTION REMOVAL AREA (2017) | | N/A |
| TREE TRIMMING AREA (2017) | | N/A |
| ADJACENT PROPERTY LINE | | N/A |
| TAX PARCEL NUMBER | 110-42 | N/A |

TRANSYSTEMS
615 West Highland Ave.
Ebensburg, PA 15931
Phone: 814.472.7700
Email: madefibaugh@transystems.com
Website: www.transystems.com

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ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTHORITY
400 Airport Road
Elkins, WV 26241

# ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT (EKN)

ELKINS WEST VIRGINIA

## TREE OBSTRUCTION REMOVAL, PHASE 5

## RUNWAY 5 END SITE PLAN (BASE BID)

AP-04

PROJECT NO P707230229 DATE JANUARY 2024

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IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

# APPENDIX 5

# NRCS SOIL RESOURCE REPORT

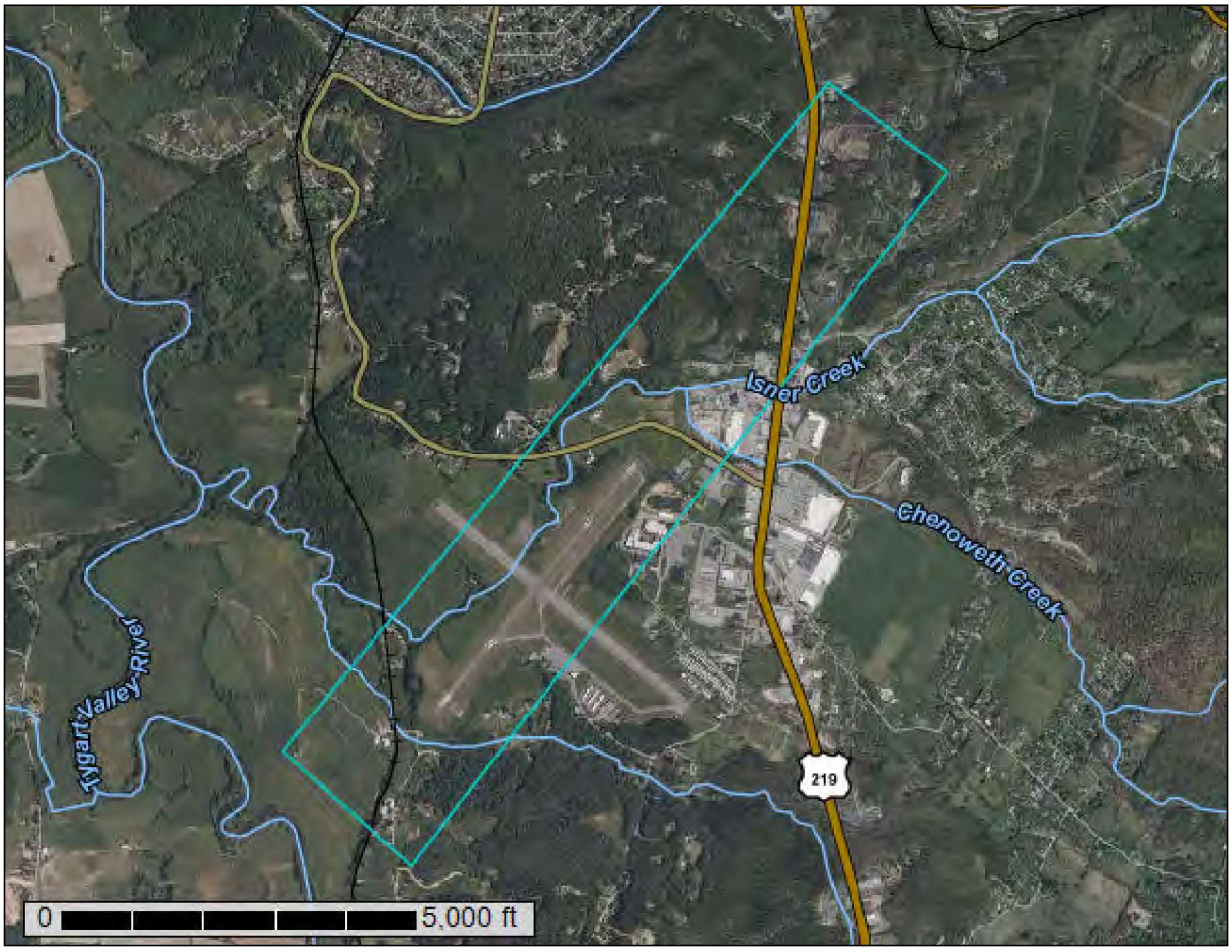
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Randolph County Area, Main Part, West Virginia




October 2, 2026

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

**Preface**.....2
**How Soil Surveys Are Made**.....5
**Soil Map**.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Randolph County Area, Main Part, West Virginia.....14
At—Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded.....14
BkC—Berks-Weikert complex, 8 to 15 percent slopes.....15
BkD—Berks-Weikert complex, 15 to 25 percent slopes.....17
BkE—Berks-Weikert complex, 25 to 35 percent slopes.....18
BkF—Berks-Weikert complex, 35 to 70 percent slopes.....20
Bo—Blago silty clay loam.....22
EnC—Ernest silt loam, moist, 8 to 15 percent slopes.....23
Ka—Kanawha loam.....24
MoB—Monongahela silt loam, moist, 3 to 8 percent slopes.....26
Ph—Philo loam, moist, 0 to 3 percent slopes, occasionally flooded.....27
Pm—Philo variant silt loam.....28
Pn—Pope-Atkins complex.....29
Po—Pope and Linden fine sandy loams.....31
Pv—Pope variant gravelly sandy loam.....33
Py—Purdy silt loam.....34
Tg—Tygart silt loam.....35
Tv—Tygart variant silt loam.....36
U1—Udorthents, cut and fill.....38
**References**.....39

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

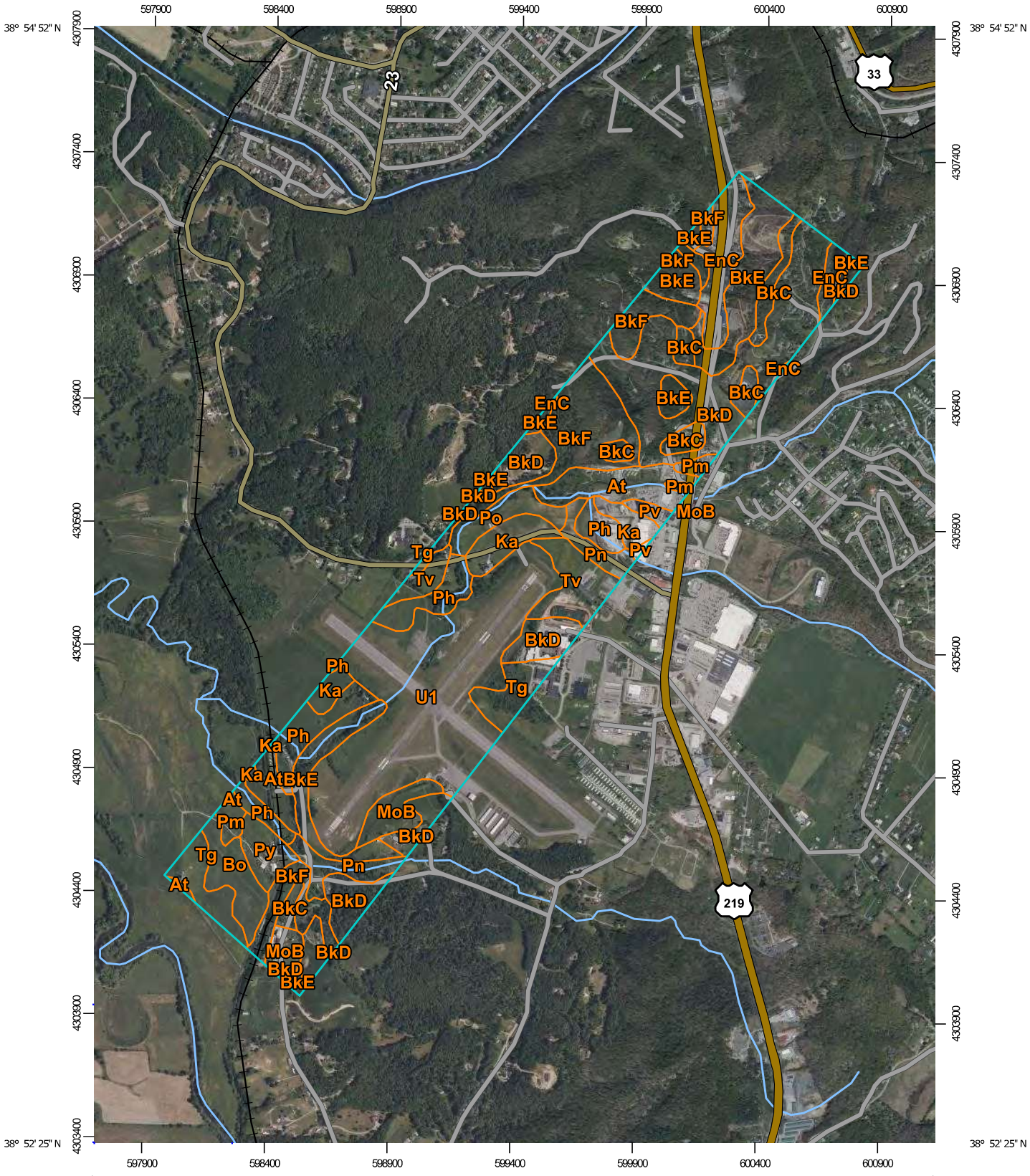
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:22,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Randolph County Area, Main Part, West Virginia
Survey Area Data: Version 21, Aug 31, 2026

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 20, 2023—Aug 19, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| At | Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded | 28.7 | 4.5% |
| BkC | Berks-Weikert complex, 8 to 15 percent slopes | 22.3 | 3.5% |
| BkD | Berks-Weikert complex, 15 to 25 percent slopes | 115.0 | 18.1% |
| BkE | Berks-Weikert complex, 25 to 35 percent slopes | 61.7 | 9.7% |
| BkF | Berks-Weikert complex, 35 to 70 percent slopes | 61.5 | 9.7% |
| Bo | Blago silty clay loam | 15.5 | 2.4% |
| EnC | Ernest silt loam, moist, 8 to 15 percent slopes | 24.4 | 3.9% |
| Ka | Kanawha loam | 22.7 | 3.6% |
| MoB | Monongahela silt loam, moist, 3 to 8 percent slopes | 16.2 | 2.6% |
| Ph | Philo loam, moist, 0 to 3 percent slopes, occasionally flooded | 35.8 | 5.7% |
| Pm | Philo variant silt loam | 6.5 | 1.0% |
| Pn | Pope-Atkins complex | 16.9 | 2.7% |
| Po | Pope and Linden fine sandy loams | 11.7 | 1.8% |
| Pv | Pope variant gravelly sandy loam | 3.2 | 0.5% |
| Py | Purdy silt loam | 9.9 | 1.6% |
| Tg | Tygart silt loam | 24.5 | 3.9% |
| Tv | Tygart variant silt loam | 23.2 | 3.7% |
| U1 | Udorthents, cut and fill | 134.0 | 21.1% |
| **Totals for Area of Interest** | | **633.6** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the

landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present

or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Randolph County Area, Main Part, West Virginia

## At—Atkins silt loam, moist, 0 to 3 percent slopes, frequently flooded

### Map Unit Setting

*National map unit symbol:* 2sfsr
*Landscape:* Dissected plateaus
*Elevation:* 1,460 to 3,820 feet
*Mean annual precipitation:* 46 to 67 inches
*Mean annual air temperature:* 46 to 50 degrees F
*Frost-free period:* 123 to 162 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Atkins, moist, and similar soils:* 85 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Atkins, Moist

#### Setting

*Landscape:* Dissected plateaus
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Linear
*Across-slope shape:* Concave
*Parent material:* Acid fine-loamy alluvium derived from sandstone and shale

#### Typical profile

*Oi - 0 to 1 inches:* slightly decomposed plant material
*Oe - 1 to 2 inches:* moderately decomposed plant material
*A - 2 to 8 inches:* silt loam
*Bg - 8 to 26 inches:* loam
*BCg - 26 to 38 inches:* silt loam
*Cg - 38 to 80 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Runoff class:* Negligible
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 2.00 in/hr)
*Depth to water table:* About 0 to 6 inches
*Frequency of flooding:* Frequent
*Frequency of ponding:* Frequent
*Available water supply, 0 to 60 inches:* Moderate (about 7.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* B/D
*Ecological site:* F127XY004WV - Wet Alluvial Lands
*Hydric soil rating:* Yes

**Minor Components**

**Blago, moist**

*Percent of map unit:* 3 percent
*Landscape:* Dissected plateaus
*Landform:* Lake terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

**Purdy, moist**

*Percent of map unit:* 2 percent
*Landscape:* Dissected plateaus
*Landform:* Terraces
*Landform position (three-dimensional):* Tread, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## BkC—Berks-Weikert complex, 8 to 15 percent slopes

**Map Unit Setting**

*National map unit symbol:* k9fw
*Landscape:* Mountains
*Elevation:* 90 to 490 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Berks and similar soils:* 45 percent
*Weikert and similar soils:* 40 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Berks**

**Setting**

*Landscape:* Mountains
*Landform:* Ridges
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Mountaintop
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Parent material:* Residuum weathered from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 3 inches:* channery silt loam
*H2 - 3 to 21 inches:* very channery silt loam
*H3 - 21 to 35 inches:* extremely channery silt loam
*R - 35 to 39 inches:* bedrock

**Properties and qualities**

*Slope:* 8 to 15 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Dry Uplands (DU3)
*Hydric soil rating:* No

**Description of Weikert**

**Setting**

*Landscape:* Mountains
*Landform:* Ridges
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Mountaintop
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Parent material:* Acid residuum weathered from shale and siltstone

**Typical profile**

*H1 - 0 to 6 inches:* channery silt loam
*H2 - 6 to 16 inches:* extremely channery silt loam
*R - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 8 to 15 percent
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 1.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* D
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath

*Other vegetative classification:* Droughty Shales (SD3)
*Hydric soil rating:* No

## BkD—Berks-Weikert complex, 15 to 25 percent slopes

### Map Unit Setting

*National map unit symbol:* k9fx
*Landscape:* Mountains
*Elevation:* 90 to 490 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Berks and similar soils:* 45 percent
*Weikert and similar soils:* 40 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Berks

#### Setting

*Landscape:* Mountains
*Landform:* Mountain slopes on ridges
*Landform position (two-dimensional):* Backslope, summit
*Landform position (three-dimensional):* Mountainflank, mountaintop
*Down-slope shape:* Linear, convex
*Across-slope shape:* Linear
*Parent material:* Residuum weathered from interbedded sedimentary rock

#### Typical profile

*H1 - 0 to 3 inches:* channery silt loam
*H2 - 3 to 21 inches:* very channery silt loam
*H3 - 21 to 35 inches:* extremely channery silt loam
*R - 35 to 39 inches:* bedrock

#### Properties and qualities

*Slope:* 15 to 25 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* B

*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Dry Hills (DH3)
*Hydric soil rating:* No

**Description of Weikert**

**Setting**

*Landscape:* Mountains
*Landform:* Mountain slopes, Ridges
*Landform position (two-dimensional):* Backslope, summit
*Landform position (three-dimensional):* Mountainflank, mountaintop
*Down-slope shape:* Linear, convex
*Across-slope shape:* Linear
*Parent material:* Acid residuum weathered from shale and siltstone

**Typical profile**

*H1 - 0 to 6 inches:* channery silt loam
*H2 - 6 to 16 inches:* extremely channery silt loam
*R - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 15 to 25 percent
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 1.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* D
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Shale Hills (SH3)
*Hydric soil rating:* No

## BkE—Berks-Weikert complex, 25 to 35 percent slopes

**Map Unit Setting**

*National map unit symbol:* k9fy
*Landscape:* Mountains
*Elevation:* 90 to 490 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Berks and similar soils:* 45 percent
*Weikert and similar soils:* 40 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Berks**

**Setting**

*Landscape:* Mountains
*Landform:* Narrow ridges, Mountain slopes
*Landform position (two-dimensional):* Summit, backslope
*Landform position (three-dimensional):* Mountaintop, mountainflank
*Down-slope shape:* Convex, linear
*Across-slope shape:* Linear
*Parent material:* Residuum weathered from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 3 inches:* channery silt loam
*H2 - 3 to 21 inches:* very channery silt loam
*H3 - 21 to 35 inches:* extremely channery silt loam
*R - 35 to 39 inches:* bedrock

**Properties and qualities**

*Slope:* 25 to 35 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* B
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Dry Hills (DH3)
*Hydric soil rating:* No

**Description of Weikert**

**Setting**

*Landscape:* Mountains
*Landform:* Mountain slopes, Narrow ridges
*Landform position (two-dimensional):* Backslope, summit
*Landform position (three-dimensional):* Mountainflank, mountaintop
*Down-slope shape:* Linear, convex
*Across-slope shape:* Linear
*Parent material:* Acid residuum weathered from shale and siltstone

**Typical profile**

*H1 - 0 to 6 inches:* channery silt loam
*H2 - 6 to 16 inches:* extremely channery silt loam
*R - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 25 to 35 percent
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 1.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Shale Hills (SH3)
*Hydric soil rating:* No

## BkF—Berks-Weikert complex, 35 to 70 percent slopes

**Map Unit Setting**

*National map unit symbol:* k9fz
*Landscape:* Mountains
*Elevation:* 90 to 490 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Berks and similar soils:* 60 percent
*Weikert and similar soils:* 30 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Berks**

**Setting**

*Landscape:* Mountains
*Landform:* Mountain slopes
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Residuum weathered from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 3 inches:* channery silt loam
*H2 - 3 to 21 inches:* very channery silt loam
*H3 - 21 to 35 inches:* extremely channery silt loam

*R - 35 to 39 inches:* bedrock

**Properties and qualities**

*Slope:* 35 to 70 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 2.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* B
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Other vegetative classification:* Not Suited (NS)
*Hydric soil rating:* No

## Description of Weikert

**Setting**

*Landscape:* Mountains
*Landform:* Mountain slopes, Narrow ridges
*Landform position (two-dimensional):* Backslope, summit
*Landform position (three-dimensional):* Mountainflank, mountaintop
*Down-slope shape:* Linear, convex
*Across-slope shape:* Linear
*Parent material:* Acid residuum weathered from shale and siltstone

**Typical profile**

*H1 - 0 to 6 inches:* channery silt loam
*H2 - 6 to 16 inches:* extremely channery silt loam
*R - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 35 to 70 percent
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very low (about 1.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D
*Ecological site:* F127XY003WV - Acidic Shale Upland Oak/Heath
*Hydric soil rating:* No

## Bo—Blago silty clay loam

### Map Unit Setting

*National map unit symbol:* k9g0
*Landscape:* Mountains
*Elevation:* 1,900 to 2,870 feet
*Mean annual precipitation:* 27 to 56 inches
*Mean annual air temperature:* 36 to 56 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Blago and similar soils:* 80 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Blago

#### Setting

*Landscape:* Mountains
*Landform:* Lake terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid, slackwater-deposited alluvium derived from interbedded sedimentary rock

#### Typical profile

*H1 - 0 to 16 inches:* silty clay loam
*H2 - 16 to 51 inches:* silty clay
*H3 - 51 to 72 inches:* clay loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 0 to 12 inches
*Frequency of flooding:* None
*Frequency of ponding:* Frequent
*Available water supply, 0 to 60 inches:* High (about 10.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* C/D
*Ecological site:* F127XY006WV - Terraces
*Other vegetative classification:* Wetlands (W3)

*Hydric soil rating:* Yes

**Minor Components**

**Purdy**

*Percent of map unit:* 5 percent
*Landscape:* Alluvial plain remnants
*Landform:* Low terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## EnC—Ernest silt loam, moist, 8 to 15 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2sgqz
*Landscape:* Dissected plateaus
*Elevation:* 1,460 to 4,200 feet
*Mean annual precipitation:* 46 to 67 inches
*Mean annual air temperature:* 46 to 50 degrees F
*Frost-free period:* 123 to 162 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Ernest, moist, and similar soils:* 80 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Ernest, Moist**

**Setting**

*Landscape:* Dissected plateaus
*Landform:* Hillslopes
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Head slope, base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave, linear
*Parent material:* Acid fine-loamy colluvium derived from shale and siltstone

**Typical profile**

*Oe - 0 to 1 inches:* moderately decomposed plant material
*A - 1 to 4 inches:* silt loam
*E - 4 to 7 inches:* silt loam
*BE - 7 to 11 inches:* silt loam
*Bt - 11 to 23 inches:* silty clay loam
*Btx - 23 to 56 inches:* channery loam
*C - 56 to 65 inches:* channery silt loam

**Properties and qualities**

*Slope:* 8 to 15 percent
*Depth to restrictive feature:* 17 to 30 inches to fragipan
*Drainage class:* Moderately well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 15 to 20 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* D
*Ecological site:* F127XY012WV - Convergent Uplands
*Hydric soil rating:* No

**Minor Components**

**Brinkerton, moist, wooded**

*Percent of map unit:* 5 percent
*Landscape:* Dissected plateaus
*Landform:* Hillslopes
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## Ka—Kanawha loam

**Map Unit Setting**

*National map unit symbol:* k9hs
*Landscape:* Mountains
*Elevation:* 1,890 to 2,890 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Kanawha and similar soils:* 80 percent
*Minor components:* 2 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Kanawha

#### Setting

*Landscape:* Mountains
*Landform:* High flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Lime-influenced and acid alluvium derived from interbedded sedimentary rock

#### Typical profile

*H1 - 0 to 9 inches:* loam
*H2 - 9 to 45 inches:* loam
*H3 - 45 to 72 inches:* loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 9.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 1
*Hydrologic Soil Group:* B
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Moist Loams (ML3)
*Hydric soil rating:* No

### Minor Components

#### Atkins

*Percent of map unit:* 2 percent
*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## MoB—Monongahela silt loam, moist, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 2stxh
*Landscape:* Dissected plateaus
*Elevation:* 790 to 3,300 feet
*Mean annual precipitation:* 46 to 67 inches
*Mean annual air temperature:* 46 to 50 degrees F
*Frost-free period:* 123 to 162 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Monongahela, moist, and similar soils:* 85 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Monongahela, Moist

#### Setting

*Landscape:* Dissected plateaus
*Landform:* Stream terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid loamy alluvium derived from interbedded sedimentary rock

#### Typical profile

*Ap - 0 to 7 inches:* silt loam
*BA - 7 to 12 inches:* silt loam
*Bt - 12 to 24 inches:* silt loam
*Btx - 24 to 52 inches:* silt loam
*C - 52 to 65 inches:* very cobbly silty clay loam

#### Properties and qualities

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* 18 to 30 inches to fragipan
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* About 18 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 4.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* C
*Ecological site:* F127XY006WV - Terraces
*Other vegetative classification:* Acid Loams (AL3)

*Hydric soil rating:* No

## Ph—Philo loam, moist, 0 to 3 percent slopes, occasionally flooded

### Map Unit Setting

*National map unit symbol:* 2sft8
*Landscape:* Dissected plateaus
*Elevation:* 1,880 to 2,860 feet
*Mean annual precipitation:* 46 to 67 inches
*Mean annual air temperature:* 46 to 50 degrees F
*Frost-free period:* 123 to 162 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Philo, moist, and similar soils:* 80 percent
*Minor components:* 9 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Philo, Moist

#### Setting

*Landscape:* Dissected plateaus
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy alluvium derived from sandstone and shale

#### Typical profile

*Ap - 0 to 6 inches:* loam
*Bw1 - 6 to 16 inches:* loam
*Bw2 - 16 to 22 inches:* loam
*C1 - 22 to 42 inches:* sandy loam
*2C2 - 42 to 80 inches:* stratified gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 2.00 in/hr)
*Depth to water table:* About 14 to 31 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 6.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* B/D

*Ecological site:* F127XY005WV - Alluvial Land
*Hydric soil rating:* No

**Minor Components**

**Atkins, moist**
*Percent of map unit:* 9 percent
*Landscape:* Dissected plateaus
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## Pm—Philo variant silt loam

**Map Unit Setting**
*National map unit symbol:* k9j5
*Landscape:* Alluvial plains
*Elevation:* 1,850 to 2,870 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**
*Philo variant and similar soils:* 80 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Philo Variant**

**Setting**
*Landscape:* Alluvial plains
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid alluvium derived from interbedded sedimentary rock

**Typical profile**
*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 40 inches:* silty clay loam
*H3 - 40 to 60 inches:* fine sandy loam

**Properties and qualities**
*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 9.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* C
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Acid Loams (AL3)
*Hydric soil rating:* No

## Pn—Pope-Atkins complex

**Map Unit Setting**

*National map unit symbol:* k9j6
*Landscape:* River valleys
*Elevation:* 1,850 to 3,740 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Pope and similar soils:* 30 percent
*Atkins and similar soils:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Pope**

**Setting**

*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy alluvium derived from sandstone and shale

**Typical profile**

*H1 - 0 to 8 inches:* fine sandy loam
*H2 - 8 to 42 inches:* fine sandy loam
*H3 - 42 to 60 inches:* gravelly sandy loam

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 1
*Hydrologic Soil Group:* A
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Acid Loams (AL3)
*Hydric soil rating:* No

**Description of Atkins**

**Setting**

*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid alluvium derived from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 48 inches:* loam
*H3 - 48 to 60 inches:* stratified gravelly sandy loam to silty clay loam

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.06 to 1.98 in/hr)
*Depth to water table:* About 0 to 12 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* Frequent
*Available water supply, 0 to 60 inches:* High (about 9.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* B/D
*Ecological site:* F127XY004WV - Wet Alluvial Lands
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## Po—Pope and Linden fine sandy loams

### Map Unit Setting

*National map unit symbol:* k9j7
*Landscape:* River valleys
*Elevation:* 60 to 3,770 feet
*Mean annual precipitation:* 27 to 56 inches
*Mean annual air temperature:* 36 to 56 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Pope and similar soils:* 45 percent
*Linden and similar soils:* 40 percent
*Minor components:* 3 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pope

#### Setting

*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid coarse-loamy alluvium derived from sandstone and shale

#### Typical profile

*H1 - 0 to 8 inches:* fine sandy loam
*H2 - 8 to 42 inches:* fine sandy loam
*H3 - 42 to 60 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* A
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Acid Loams (AL3)

*Hydric soil rating:* No

### Description of Linden

#### Setting

*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from interbedded sedimentary rock

#### Typical profile

*H1 - 0 to 11 inches:* fine sandy loam
*H2 - 11 to 26 inches:* sandy loam
*H3 - 26 to 60 inches:* loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* About 36 to 72 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 6.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* A
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Acid Loams (AL3)
*Hydric soil rating:* No

### Minor Components

#### Atkins

*Percent of map unit:* 3 percent
*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## Pv—Pope variant gravelly sandy loam

### Map Unit Setting

*National map unit symbol:* k9j8
*Landscape:* River valleys
*Elevation:* 1,840 to 3,440 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Pope variant and similar soils:* 75 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pope Variant

#### Setting

*Landscape:* River valleys
*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid alluvium derived from sandstone and shale

#### Typical profile

*H1 - 0 to 6 inches:* gravelly sandy loam
*H2 - 6 to 59 inches:* extremely gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 3.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3s
*Hydrologic Soil Group:* A
*Ecological site:* F127XY005WV - Alluvial Land
*Other vegetative classification:* Acid Loams (AL3)
*Hydric soil rating:* No

## Py—Purdy silt loam

### Map Unit Setting

*National map unit symbol:* k9j9
*Landscape:* Alluvial plain remnants
*Elevation:* 1,900 to 2,870 feet
*Mean annual precipitation:* 27 to 56 inches
*Mean annual air temperature:* 36 to 56 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Purdy and similar soils:* 70 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Purdy

#### Setting

*Landscape:* Alluvial plain remnants
*Landform:* Low terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Slackwater-deposited, acid alluvium derived from interbedded sedimentary rock

#### Typical profile

*H1 - 0 to 9 inches:* silt loam
*H2 - 9 to 42 inches:* silty clay
*H3 - 42 to 60 inches:* silty clay

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 0 to 12 inches
*Frequency of flooding:* None
*Frequency of ponding:* Frequent
*Available water supply, 0 to 60 inches:* High (about 9.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* C/D
*Ecological site:* F127XY006WV - Terraces
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

**Minor Components**

**Blago**

*Percent of map unit:* 5 percent
*Landscape:* Mountains
*Landform:* Lake terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## Tg—Tygart silt loam

**Map Unit Setting**

*National map unit symbol:* k9jf
*Landscape:* Alluvial plain remnants
*Elevation:* 1,890 to 2,130 feet
*Mean annual precipitation:* 27 to 56 inches
*Mean annual air temperature:* 36 to 56 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Tygart and similar soils:* 80 percent
*Minor components:* 8 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Tygart**

**Setting**

*Landscape:* Alluvial plain remnants
*Landform:* Terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid and lime-influenced colluvium derived from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 10 inches:* silt loam
*H2 - 10 to 46 inches:* silty clay loam
*H3 - 46 to 60 inches:* silty clay

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 6 to 18 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 8.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* C/D
*Ecological site:* F127XY012WV - Convergent Uplands
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* No

**Minor Components**

**Purdy**

*Percent of map unit:* 4 percent
*Landscape:* Alluvial plain remnants
*Landform:* Low terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

**Blago**

*Percent of map unit:* 4 percent
*Landscape:* Mountains
*Landform:* Lake terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## Tv—Tygart variant silt loam

**Map Unit Setting**

*National map unit symbol:* k9jg
*Landscape:* Alluvial plain remnants
*Elevation:* 1,900 to 2,840 feet
*Mean annual precipitation:* 27 to 56 inches
*Mean annual air temperature:* 36 to 56 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Tygart variant and similar soils:* 75 percent
*Minor components:* 8 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Tygart Variant**

**Setting**

*Landscape:* Alluvial plain remnants
*Landform:* Terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Acid, slackwater-deposited alluvium derived from interbedded sedimentary rock

**Typical profile**

*H1 - 0 to 13 inches:* silt loam
*H2 - 13 to 60 inches:* clay loam
*H3 - 60 to 65 inches:* very gravelly sand

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 6 to 18 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Moderate (about 8.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* C/D
*Ecological site:* F127XY006WV - Terraces
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* No

**Minor Components**

**Blago**

*Percent of map unit:* 4 percent
*Landscape:* Mountains
*Landform:* Lake terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

**Purdy**

*Percent of map unit:* 4 percent

*Landscape:* Alluvial plain remnants
*Landform:* Low terraces
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Other vegetative classification:* Wetlands (W3)
*Hydric soil rating:* Yes

## U1—Udorthents, cut and fill

### Map Unit Setting

*National map unit symbol:* k9jh
*Landscape:* Mountains
*Elevation:* 1,900 to 3,870 feet
*Mean annual precipitation:* 41 to 52 inches
*Mean annual air temperature:* 47 to 53 degrees F
*Frost-free period:* 138 to 163 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Udorthents and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Udorthents

#### Setting

*Landscape:* Mountains
*Anthropogenic Landform:* Cuts (road, railroad, etc.)
*Down-slope shape:* Linear
*Across-slope shape:* Linear

#### Properties and qualities

*Depth to restrictive feature:* More than 80 inches
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Other vegetative classification:* Not Suited (NS)
*Hydric soil rating:* No

# References

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# APPENDIX 6

# AMENDMENT AND RATIFICATION OF EASEMENT AGREEMENT

HOLD FOR PICKUP

Randolph County
Brenda Wiseman, Clerk
Instrument 2023000700
11/01/2023 @ 11:57:39 AM
EASEMENT
Book 635 @ Page 685
Pages Recorded 4
Recording Cost $ 12.00

**AMENDMENT AND RATIFICATION OF EASEMENT AGREEMENT**

This Amendment and Ratification of an Easement Agreement (this "Amendment") is made and entered into this 25th day of July, 2023 by and between Mina Cupp (hereinafter called "Owner"), and **ELKINS-RANDOLPH COUNTY REGIONAL AIRPORT AUTHORITY**, a public corporation, hereinafter called "Airport Authority".

**WHEREAS**, Owner and Airport Authority are parties to that certain easement agreement dated October 25, 1979 of record in Randolph County Book 378, Page 516 (the "Prior Easement Agreement") relating to certain real property of 130 acres more or less located in Beverly District, Randolph County, West Virginia , being the same property conveyed to Owner by C.R. Forinash and Rachel G. Forinash by deed dated November 1, 1968, of record in Randolph County Deed Book 258, at page 55.

**WHEREAS**, Owner and the Airport Authority desire to ratify the Prior Easement Agreement as being in full force and effect and to amend and modify certain provisions of the same.

**NOW THEREFORE**, for and in consideration of the foregoing recitals, other good and valuable consideration, and the mutual advantage to the parties hereto, the sufficiency of which is hereby acknowledged, the parties agree as follows:

1. **Recitals Incorporated by Reference.** Owner and Airport Authority adopt the recitals set forth above as part of the Prior Easement Agreement and such recitals are confirmed to be true and accurate by each party.

2. **Amendments.** The Prior Easement Agreement is hereby amended and modified to include the following provisions:

a. The term of the Prior Easement Agreement is modified to include a perpetual easement unto the Airport Authority, its successors and assigns, for the use and benefit of the public. The easements herein granted shall be terminated if and only upon the condition that the property now known and described as the Elkins-Randolph County Regional Airport shall cease to be used for private or commercial aviation, in which event the easements hereby conveyed shall revert to and become the property of the Owner, their heirs and assigns.

b. The description and rights of the Prior Easement Agreement are amended to include an easement and right of way, appurtenant to the Airport Authority for the unobstructed use and passage of all types of aircraft to make approaches and departures from runways with maximum safety (hereinafter referred to as "Approach Surface"), in and through the airspace above Owner's property located in Beverly District, Randolph County, and of Owner's surface property and air space above which said easement is bounded and described as follows:

> *Horizontal Description*: A portion of that tract or parcel of land more particularly bounded and described in that certain deed to Owner dated November 1, 1968, and of record in the Office of the Clerk of the County Commission of Randolph County, West Virginia, in Deed Book 258, Page 55, situate in Beverly District, Tax Map 110, Parcel 42, Randolph County, West Virginia, being within the horizontal limits of the Approach Surface(s) as defined in all applicable Federal Aviation Administration Advisory Circulars, Orders or Regulations. The horizontal limits of the Approach Surface(s) shall be those limits, as defined by the most recently available edition of applicable Advisory Circulars, Orders or Regulations, associated with the most recently available instrument approach procedure(s).
>
> *Vertical Description*: All the air space above the Approach Surface(s) with the Approach Surface being an imaginary plane beginning at a point located 200 feet southwesterly from the end of Runway 5 as of the date of this Agreement, along the extended runway centerline and extending outward and upward at a rate of one (1) foot vertically for every twenty (20) feet horizontally.

Said easement and burden, together with all things which may be alleged to be incident to or resulting from the use and enjoyment of said easement, including, but not limited to the right to cause in all airspace above or in the vicinity of the surface of Owner's property such noise, vibrations, fumes, deposits of dust or other particulate matter, fuel particles (which are incidental to the normal operation of said aircraft), fear, interference with sleep and communication and any and all other effects that may be alleged to be incident to or caused by the operation of aircraft over or in the vicinity of the Owner's property or in landing at or taking off from, or operating at or on said Elkins-Randolph County Regional Airport is hereby granted; and Owner does hereby fully waive, remise, and release any right or cause of action which they may now have or which they may have in the future against Airport Authority, its successors and assigns, due to such noise,

vibrations, fumes, dust, fuel particles and all other effects that may be caused or any have been caused by the operation of aircraft landing at, or taking off from, or operating at or on said Elkins-Randolph County Regional Airport.

c. Paragraph 12 of the Prior Easement Agreement is deleted and in place, the Airport Authority is hereby granted the permission to remove three silos currently located on the Property, two of which are Harvestore brand porcelain-glass lined silos and one which is a concrete stave silo, which said silos encroach in the approaches to Runway 5. It is understood that the Airport Authority will remove the three silos by their own forces or through the procurement of a qualified contractor. Further, Owner agrees not to build or allow to be built any improvements or structures which may extend into said Approach Surface. Any improvement now existing or hereinafter constructed by Owner shall not be considered to be in violation of any of the terms or provisions of this Amendment, if the same does not penetrate the Approach Surface, as defined by and contained in the most recent publication of the Federal Aviation Advisory Circulars, Orders or Regulations. This shall be limited to the horizontal and vertical limits of the easement area described in this Amendment.

d. Paragraphs 7 and 9 of the Prior Easement Agreement is deleted.

e. Paragraph 11 of the Prior Easement Agreement is amended to provide that the Approach Surface, and the prohibition against obstructions or encroachments into the same, shall be perpetual, and shall be a covenant running with the land. Airport Authority shall be given a perpetual and continual right to come onto Owner's property for the purpose of cutting trees and/or vegetation and the removal of structures which may penetrate the Approach Surface, for the purpose of maintaining an Approach Surface free from obstructions.

f. Owner conveys, also, to Airport Authority, in addition to the easement herein described a right of way over, upon and through Owner's land, plus such other access rights as Owner has over adjacent properties, as are necessary for the Airport Authority to travel upon, over and through Owner's property to cut or remove vegetation or to remove other structures provided for in this Amendment, pursuant to the right of the Airport Authority to maintain an Approach Surface, as herein conveyed. Airport Authority agrees to use all reasonable care to avoid damage to timber or improvements while using said access.

**3. Ratification of Remaining Lease Provisions.** Owner and the Airport Authority hereby (i) ratify and agree that the Prior Easement Agreement is valid and in effect, (ii) agree that the Airport Authority is not in violation of any terms or provisions of the Prior Easement Agreement, (iii) ratify and affirm all of the terms and provisions of the Prior Easement Agreement to the extent that they are not changed, altered or amended by this Amendment.

**4. Conflict.** In the event of a conflict or inconsistency between the printed terms of this Amendment and Ratification and the Prior Easement Agreement, the terms set forth in the Amendment and Ratification shall control and be deemed to supersede the printed terms of the Prior Easement Agreement.

5. **Instrument Is Binding.** The provisions hereof shall be binding upon and inure to the benefit of the parties, their heirs, legatees, devisees, personal representatives, successors, and assigns.

WITNESS the following signature:

PROPERTY OWNER:

Mina Cupp
MINA CUPP

STATE OF WEST VIRGINIA,

COUNTY OF RANDOLPH, TO-WIT:

The foregoing Amendment was acknowledged before me, John J. Wallace IV, Notary Public, on the 25th day of July, 2023, by Mina Cupp.

My commission expires: March 15, 2026

Notary Public

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
John J. Wallace, IV
Wallace Law Offices L.C. Inc.
P.O. Box 7
Elkins, WV 26241
My Commission Expires Mar. 15, 2026

This Agreement prepared by:
Matthew S. Casto
Babst Calland, P.C.
300 Summers Street, Suite 1000
Charleston, WV 25301

WEST VIRGINIA, RANDOLPH COUNTY CLERK'S OFFICE
This instrument was this day presented to me in my office, and thereupon, together with the Certificate thereto annexed, is admitted to record.
11-1-2023
Teste: Brenda Wiseman
Clerk

# APPENDIX 7

# NOTICE OF AVAILABILITY

# Notice of Availability

Publication Date: November 5, 2026

Expiration Date: December 5, 2026 30 Days After Date of Publication

Draft Supplemental Environmental Assessment for Obstruction Removal at Elkins-Randolph County Regional Airport.

The purpose of this Notice of Availability (NOA) is to announce the availability of the Draft Supplemental Environmental Assessment (SEA) for the Elkins-Randolph County Regional Airport (EKN) Obstruction Removal (Runway 5-23 Approaches) project for public review. The Federal Aviation Administration (FAA) is reviewing the Draft SEA for potential environmental impacts related to the proposed obstruction removal. The SEA was required due to additional consultation with the US Fish and Wildlife Service identifying additional endangered species that could potentially be impacted by the proposed action requiring formal consultation.

The Elkins-Randolph County Regional Airport Authority (400 Airport Road, Elkins, WV, 26241) is undertaking the proposed action to remove the following obstructions within their approach surfaces:

- Clearing approximately 16.75 acres of trees;
- Trimming approximately 13.94 acres of trees;
- Removal of one obstruction light structure;
- Relocation of one obstruction light structure; and
- Removal of three silos.

The Draft SEA will be available for review for a period of 30 days from the publication of this notice, and can be found at the following locations during normal operating hours:

Elkins-Randolph County Regional Airport
400 Airport Road
Elkins, West Virginia 26241
Phone: (304) 636-2726

Elkins-Randolph County Public Library
209 Randolph Avenue - Annex
Elkins, West Virginia 26241
Phone: (304) 637-0287

Pioneer Memorial Public Library
22526 Allegheny Highway
Harman, West Virginia 26270
Phone: (304) 227-4788

Russell Memorial Public Library
10038 Seneca Trail
Mill Creek, West Virginia 26280
Phone: (304) 335-6277

The Draft SEA document is also available online for review at https://elkinsairport.com.

Comments and information relating to the Draft SEA for the proposed activity are hereby solicited. Such information on the activity's impact will be considered if received prior to the expiration date of this notice. Any comments should be emailed or submitted in writing to:


Melissa Defibaugh
madefibaugh@gftinc.com
GFT Infrastructure, Inc.
615 West Highland Avenue
Ebensburg, Pennsylvania 15931

Airport Manager
Manager@elkinsairport.com
Elkins-Randolph Co. Regional Airport
400 Airport Road
Elkins, West Virginia 26241

Susan Stafford, Environmental Protection Specialist
Susan.Stafford@faa.gov
Beckley Airports Field Office
176 Airport Circle, Rm 101
Beaver, West Virginia 25813


Comments and information postmarked or emailed later than the expiration date may not be considered.