United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
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Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

September 10, 2021

Ms. Helena Hayter
Hull and Associates
6397 Emerald Parkway
Dublin, OH 43016

TAILS# 03E15000-2021-TA-2059

Re: Proposed Dixon Run Solar Project, Bloomfield Twp., Jackson County, Ohio

Dear Ms. Hayter:

The U.S Fish and Wildlife Service (Service) has received your recent correspondence requesting information about the subject proposal. We offer the following comments and recommendations to assist you in minimizing and avoiding adverse impacts to threatened and endangered species pursuant to the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq), as amended (ESA).

Federally Threatened and Endangered Species: The endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*) occur throughout the State of Ohio. The Indiana bat and northern long-eared bat may be found wherever suitable habitat occurs unless a presence/absence survey has been performed to document absence. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and breed that may also include adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, woodlots, fallow fields, and pastures. Roost trees for both species include live and standing dead trees ≥3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities. These roost trees may be located in forested habitats as well as linear features such as fencerows, riparian forests, and other wooded corridors. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. In the winter, Indiana bats and northern long-eared bats hibernate in caves, rock crevices and abandoned mines.

We recommend minimizing tree clearing to the maximum extent possible and avoiding clearing of any woodlots. At this time we are unable to fully assess the potential impact of the project on federally listed bats. Therefore, we recommend additional coordination with this office regarding project siting in order for us to provide project-specific conservation recommendations for federally listed bats.

Please provide additional information on the extent and location of tree clearing proposed. We will then evaluate the potential impact to Indiana bats to determine if a summer survey is

warranted, or if seasonal clearing (removal of trees between October 1 and March 31) is sufficient to avoid take.

If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are also warranted. Portal surveys must be conducted by an approved surveyor and be designed and conducted in coordination with the Endangered Species Coordinator for this office.

Section 7 Coordination: If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), then no tree clearing should occur on any portion of the project area until consultation under section 7 of the ESA, between the Service and the federal action agency, is completed. We recommend the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence. This letter provides technical assistance only and does not serve as a completed section 7 consultation document.

Species of Concern: The proposed project is in the range of the running buffalo clover (*Trifolium stoloniferum*), a species that was recently removed from the federal list of endangered species due to recovery. Known locations of this plant occur within 2 miles of the proposed project. This plant can be found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails. Running buffalo clover requires periodic disturbance and a somewhat open habitat to successfully flourish, but cannot tolerate full-sun, full-shade, or severe disturbance. A post-delisting monitoring plan has been developed for this species to ensure permanent recovery of the species. If suitable habitat is present, we recommend that surveys for this species be conducted by a trained botanist in May or June when the plant is in flower. We encourage coordination with the Ohio Field Office if a survey is conducted. This species is state listed as endangered, therefore all work that may impact this state listed species must be coordinated with the Ohio Department of Natural Resources, Division of Natural Areas and Preserves. Please contact Rick Gardener (614-265-6419) at the Division of Natural Areas and Preserves for additional information.

Stream and Wetland Avoidance: Over 90% of the wetlands in Ohio have been drained, filled, or modified by human activities, thus is it important to conserve the functions and values of the remaining wetlands in Ohio (https://epa.ohio.gov/portals/47/facts/ohio_wetlands.pdf). We recommend avoiding and minimizing project impacts to all wetland habitats (e.g., forests, streams, vernal pools) to the maximum extent possible in order to benefit water quality and fish and wildlife habitat. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the U.S. Army Corps of Engineers should be contacted to determine whether a Clean Water Act section 404 permit is required. Best management practices should be used to minimize erosion, especially on slopes. Disturbed areas should be mulched and revegetated with native plant species. In addition, prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats.

Pollinator Comments: The Service is working closely with our partners at Ohio Pollinator Habitat Initiative (OPHI) to create and enhance pollinator habitat at solar power installations. Attached for your use is the Ohio Solar Site Pollinator Habitat Planning and Assessment Form. This form was developed by the OPHI Solar Pollinator Program Advisory Team. We

recommend that the areas between the solar panels be planted with legumes and wildflowers (i.e. forbs) that are beneficial to pollinators and other wildlife instead of non-native grass. Pollinators are beneficial to agricultural communities like the project area because they pollinate many varieties of fruits and vegetables. The recommended legumes and forbs are short (low-growing) so as not to cast shadows on the solar panels and would only require one to two mowings a year for maintenance, which should allow the project proponent to minimize maintenance costs. For other areas of the installation where vegetation does not have to be low-growing, alternative pollinator mixes are available with a more diverse array of flowering plants. This perennial vegetation will provide beneficial foraging habitat to songbirds and pollinators (e.g., monarch butterfly and the federally listed rusty patched bumblebee) while reducing storm water runoff, standing water, and erosion. Native plants can act as host plants for insect larva while flowering plants provide nectar sources for adult butterflies as well as other pollinators such as hummingbirds. Seeds from these plants can also provide food for a wide variety of bird species. Please contact the Ohio Pollinator Habitat Initiative (http://www.ophi.info/, and specifically Mike Retterer mrettere@pheasantsforever.org) for further information on solar power facility pollinator plantings.

Recommended low-growing grasses and forbs may include:

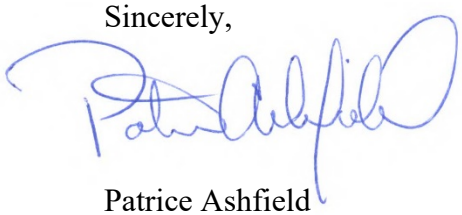
Little Bluestem	*Schizachyrium scoparium*
Sideoats Grama	*Bouteloua curtipendula*
Alfalfa	*Medicago spp.*
Alsike Clover	*Trifolium hybridum*
Brown-eyed Susan	*Rudbeckia triloba*
Butterfly Milkweed	*Asclepias tuberosa*
Lanceleaf Coreopsis	*Coreopsis lanceolata*
Partridge Pea	*Chamaecrista fasciculata*
Timothy	*Phleum pratense*
Orchardgrass	*Dactylis glomerata*
Crimson Clover	*Trifolium incarnatum*
Ladino or White Clover	*Trifolium repens*

Due to the project type, size, and location, we do not anticipate adverse effects to any other federally endangered, threatened, or proposed species, or proposed or designated critical habitat. Should the project design change, or additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, coordination with the Service should be initiated to assess any potential impacts.

Thank you for your efforts to conserve listed species and sensitive habitats in Ohio. We recommend coordinating with the Ohio Department of Natural Resources due to the potential for the proposed project to affect state listed species and/or state lands. Contact Mike Pettegrew, Acting Environmental Services Administrator, at (614) 265-6387 or at mike.pettegrew@dnr.state.oh.us

If you have questions, or if we can be of further assistance in this matter, please contact Jenny Finfera at jennifer_finfera@fws.gov.

Sincerely,



Patrice Ashfield
Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW
Rick Gardner, ODNR-DNAP
Michael Retter, OPHI
Donnie Knight, USFWS

Enclosure: Ohio Solar Site Pollinator Habitat Planning and Assessment Form

Ohio Solar Site Pollinator Habitat Planning and Assessment Form

1. Percent of total site planted with native or beneficial introduced flowering plants.

☐ 25-50%	10 points
☐ 51-75%	20 points
☐ 76-100%	30 points

2. Flowering plant diversity in site perimeter & buffer area (species with more than 1% cover).

☐ 9-12 species	5 points
☐ 13-16 species	10 points
☐ 17-20 species	15 points
☐ 20+ species	20 points
☐ Site specific Milkweed included @2,000 pls/ac minimum	10 points

* *If no boxes were selected in questions 1 or 2 then your site does not meet criteria to be considered as an OPHI Solar Pollinator Habitat. However, OPHI can work with you on ways to increase the pollinator score of your site.*

3. Flowering plant seed mixes and plantings to be used.
Native species local to the site are preferred; otherwise species native to Ohio are encouraged.

☐ Includes only native plant species	15 points
☐ Includes native and beneficial introduced plant species	10 points
☐ Includes only beneficial introduced plant species	5 points

4. Flowering plant diversity in rows & under solar array.

☐ 4-6	5 points
☐ 7+	10 points
☐ Site specific Milkweed included @2,000 pls/ac minimum	10 points

5. Seasons with at least 3 blooming species. Check all that apply.

☐ Spring *(April – May)*	5 points
☐ Summer *(June – August)*	5 points
☐ Fall *(September – October)*	5 points

6. Available habitat components within ¼ mile of site. Check all that apply.

☐ Native grasses	2 points
☐ Trees and shrubs	2 points
☐ Forest edge habitat	2 points
☐ Cavity nesting sites	2 points
☐ Clean perennial water sources	2 points

7. Planned vegetative buffers adjacent to the solar site. Check all that apply.

☐ Site has planned buffer adjacent to solar site	5 points
☐ Buffer is at least 30 feet wide as measured from array fencing or edge of flower plantings	5 points
☐ Buffer is at least 50 feet wide as measured from array fencing or edge of flower plantings	10 points
☐ Buffer includes flowering Shrubs/trees and other shrubs/trees that provide food for wildlife	5 points

8. Habitat site preparation prior to implementation.

☐ Measures taken to control weeds and invasive species prior to seeding/planting.	10 points
☐ Appropriate soil preparation done to reduce erosion And enhance germination/growth	5 points
☐ None	-10 points

9. Planned management practices for areas designated as part of the pollinator habitat site. Check all that apply.

☐ Detailed establishment and management plan developed for site	10 points
☐ Mowing Follows OPHI mowing schedule for monarchs each year	5 points
☐ Mowing is staggered over a 2 week period	5 points
☐ Signage indicating site is wildlife & pollinator-friendly	5 points
☐ Creation of habitat features (e.g. boxes, pass-through tunnels, bee hotels)	5 points
☐ Long-term monitoring plan developed that includes re-certification as Solar Site Pollinator Habitat	10 points

10. Insecticide risk. Check if applicable.
Communication with adjacent landowners about the project and possible impacts of their insecticide use is critical

☐ Site is adjacent to land (within 120 ft.) where insecticides are used	-20 points
☐ Planned on-site insecticide use (including pre-treated seeds/plants	-40 points

Total Points: 0 _____

Provides High Quality Pollinator Habitat	**> 85**
Meets OPHI Solar Pollinator Habitat Standards	**70-84**

Site Owner/Operator:

Project Location:

Project Size (acres):

Planned Source of Seeds:

Planned Seeding Date:

Habitat & Vegetation Consultant:

Refer to www.ophi.info for more information regarding solar pollinator habitat development.

Version 1 - March 2018
Developed by the OPHI Solar Pollinator Program Advisory Team

Ohio Pollinator Habitat Initiative

STATE LISTED THREATENED AND ENDANGERED SPECIES IN JACKSON COUNTY

Common Name	Scientific Name	Listing Status*		Habitat	Habitat in Project Area	Likelihood of Occurrence in Project Area
		Federal	State			
Amphibians & Reptiles						
Timber Rattlesnake	*Crotalus horridus*	SC	E	Wooded areas, the timber rattlesnake also utilizes sunlit gaps in the canopy for basking and deep rock crevices known as den sites for overwintering	No	Unlikely to occur. Due to indications from ODNR regarding the location, and the type of habitat present, this species is not likely to occur within the Project Area.
Kirtland's Snake	*Clonophis kirtlandii*	N/A	T	This secretive species prefers wet meadows and other wetlands.	No	Unlikely to occur. Due to indications from ODNR regarding the location, and the type of habitat present, this species is not likely to occur within the Project Area.
Midland Mud Salamander	*Pseudotriton montanus diastictus*	N/A	T	Springs, seeps, and creeks. Much of the life of this animal is probably spent underground in burrows, making sightings of this species rare.	No	Unlikely to occur. Due to indications from ODNR regarding the location, and the type of habitat present, this species is not likely to occur within the Project Area.
Mammals						
Northern long-eared bat	*Myotis septentrionalis*	T	E	Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed upland forests	Yes	Potential to occur. A moderate amount of suitable wooded habitat and rock crevices occur within the Project Area.
Indiana bat	*Myotis sodalis*	E	E	Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-	Yes	Potential to occur. A moderate amount of suitable wooded habitat and rock

				developed riparian woods and upland forests		crevices occur within the Project Area.
Little brown bat	*Myotis lucifugus*	N/A	E	Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed upland forests	Yes	Potential to occur. A moderate amount of suitable wooded habitat and rock crevices occur within the Project Area.
Tricolored bat	*Perimyotis subflavus*	N/A	E	Hibernates in caves and abandoned mines; Maternity and foraging habitat includes stream corridors with well-developed riparian woods and upland forests	Yes	Potential to occur. A moderate amount of suitable wooded habitat and rock crevices occur within the Project Area.
Mussels						
Little Spectaclecase	*Villosa lienosa*	N/A	E	Spectaclecase mussels are found in large rivers where they live in areas sheltered from the main force of the river current. This species often clusters in firm mud and in sheltered areas, such as beneath rock slabs, between boulders and even under tree roots.	No	Unlikely to occur. Streams of sufficient size to support mussel populations are not present within the Project Area.
Fish						
Ohio Lamprey	*Ichthyomyzon bdellium*	N/A	E	Ohio lamprey adults are found in medium to large rivers in the Ohio River drainage; they lay their eggs in nests constructed in gravel streambeds. The ammocoete larvae burrow into the muddy bottoms of tributary streams to feed by filtration.	No	Unlikely to occur. Streams of sufficient size to support this species are not present within the Project Area. However, in-water work in perennial streams should be avoided between March 15-June 30.
Spotted darter	*Etheostoma maculatum*	N/A	E	Spotted darters are found in medium sized rivers and streams, typically in areas of swift current where there are many very	No	Unlikely to occur. Streams of sufficient size to support this species are not present within the

				large boulders or flat slabs of rock.		Project Area. However, in-water work in perennial streams should be avoided between March 15-June 30.
Lake chubsucker	*Erimyzon sucetta*	N/A	T	In Ohio, lake chubsuckers are found in glacially formed natural lakes, including those flooded to form a larger reservoir and very sluggish streams or marshes with dense aquatic vegetation and clear waters.	No	Unlikely to occur. Streams of sufficient size to support this species are not present within the Project Area. However, in-water work in perennial streams should be avoided between March 15-June 30.
Birds						
Northern Harrier	*Circus hudsonis*	N/A	E	The northern harrier is an occupant of grasslands and is found both in upland or wetland habitat types in Ohio such as wet prairies, damp meadows, the grassy margins of large wetlands, pastures, hayfields, some cultivated fields and reclaimed strip mines. Hunting over grasslands and marshes, this species prefers undisturbed grasslands for nesting.	Yes	Potential to occur. Impacts to grasslands and wetlands within the Project Area should be avoided between April 15-July 31.
Sandhill Crane	*Grus canadensis*	N/A	T	Large marshes and wetland complexes; migrants often rest on shores and mudflats of lakes and in agricultural fields.	Yes	Potential to occur. Impacts to grasslands and wetlands within the Project Area should be avoided between April 1-August 31.

* (E) Endangered, (T) Threatened, (SC) Species of Concern

Attachment C

Birds Within The Study Area Desktop Review

BIRDS WITHIN THE STUDY AREA DESKTOP REVIEW

As of March 2021, 443 species of birds were included on the official Ohio Ornithological Society (OOS) Ohio Bird Checklist. Approximately 180 bird species breed in Ohio every year.

The eBird website (www.ebird.org, Cornell Lab of Ornithology) was used to identify "Hot Spots" important for bird populations. These areas are known locations for breeding, wintering, and migration stop-over for birds in central Ohio. Eleven eBird "Hot Spots" were identified within five miles of the Ecological Study Area:

- **Broken ARO and Flint Run Wildlife Areas** is located approximately 4.8 miles north of the Ecological Study Area. At least two bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Buckeye Furnace State Memorial** is located approximately 4.8 miles northeast of the Ecological Study Area. At least 69 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Keystone Furnace** is located approximately 2.5 miles east of the Ecological Study Area. At least 42 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Cooper Hollow Wildlife Area** is located approximately four miles southeast of the Ecological Study Area. At least 86 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Cooper Hollow Wildlife Area – Headquarters and Iron Furnace** is located approximately four miles south of the Ecological Study Area. At least 50 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Grassy Fork Bottoms, Jackson County Road 20** is located 4.3 miles south of the Ecological Study Area. At least 33 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Cackley Swamp** is located 4.3 miles southwest of the Ecological Study Area. At least 35 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

- **Pyro Wetlands** is located four miles southwest of the Ecological Study Area. At least 13 bird species have been observed at this location. No federal or state-listed birds have been observed at this location.

The bald eagle is no longer a state-threatened species in Ohio although it remains protected under the Bald and Golden Eagle Protection Act originally passed in 1940. Bald eagle sightings were not noted at any of the eBird, "hot spot" locations listed above. In addition, consultation with USFWS and ODNR did not identify bald eagle nests within the Ecological Study Area.

Attachment D

Horizontal Directional Drilling Inadvertent Return Response and Contingency Plan

HORIZONTAL DIRECTIONAL DRILLING INADVERTENT RETURN RESPONSE AND CONTINGENCY PLAN

FOR THE:
DIXON RUN SOLAR PROJECT
JACKSON COUNTY, OHIO

PREPARED FOR:
ENVIRONMENTAL DESIGN & RESEARCH, LANDSCAPE ARCHITECTURE, ENGINEERING, & ENVIRONMENTAL SERVICES, D.P.C
274 NORTH GOODMAN STREET
ROCHESTER, NEW YORK 14607

PREPARED BY:
HULL & ASSOCIATES LLC
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SEPTEMBER 2021

HULL
Environment / Energy / Infrastructure

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1.0 INTRODUCTION

This Horizontal Directional Drilling (HDD) Inadvertent Return (IR) Response and Contingency Plan (Plan) provides procedures to address an IR of drilling fluid used in HDD crossings for the Dixon Run Solar Project (Project) being developed in Jackson County, Ohio. The Plan was prepared for the Project to satisfy Section 4906-4-08(B)(2)(b)(ii) of the Ohio Administrative Code, which requires an application for an electric generation facility to include, as part of its description of mitigation procedures to minimize construction impacts, "a detailed frac out contingency plan for stream and wetland crossings that are expected to be completed via" HDD.

The vast majority of the buried lines for the project will be installed by open-ditch trenching. While the placement of utility lines in an open trench is the most economical and practicable means of installation, trenching may not be feasible or allowed in situations that require avoidance of sensitive environmental or cultural resources and other obstacles on the surface or near surface. In such situations, the project is expected to employ HDD to install the line below the resource or obstacle.

HDD is a proven technique for the installation of subsurface utility lines with minimal surface disturbance. It is a trenchless, steerable method that has been successfully used in the United States since the 1960s. HDD has been successfully utilized to limit surface disturbance for decades, and modern technology and best management practices have been developed by industry and regulatory authorities over decades of experience.

However, HDD does present some potential environmental risk, primarily in the form of IRs. IRs typically occur when pressurized drilling fluid follows a path of least resistance outside of the borehole annulus through natural or manmade voids in subsurface materials such as soil and rock. When IRs occur in sensitive areas such as streams and wetlands, environmental impact may result. Adequate pre-drill investigation and planning, and operational process controls can reduce the risk of IR occurrence. Likewise, adequate IR contingency planning, preparation and rapid response can limit the spatial and temporal impact if an IR does occur. The Plan provides the framework for reducing the risk of IR during construction of the project and planning, preparation and response for one should it occur.

2.0 DESCRIPTION OF HORIZONTAL DIRECTIONAL DRILLING

The HDD method requires establishing staging areas at both ends of the proposed crossing, typically known as the entry and exit points, or workspaces. The process commences with the drilling of a pilot hole along a predetermined path beneath the area to be crossed. The drilling head is tracked and guided by a telemetry system that controls its depth and lateral position to ensure that the borehole is installed in the pre-determined route. IRs most commonly occur during the installation of the pilot hole primarily due to the small aperture of the hole and relative lack of space for the drilling fluid and soil cuttings to be returned to the entry point. However, because the pilot hole has a relatively small diameter compared to the diameter of the borehole necessary to accept the utility line, far less drilling fluid is required, thus reducing the overall risk of a problematic IR. The pilot hole is also critically important to ensure that the final borehole meets design specifications thereby limiting overall subsurface activity.

Once the pilot hole has been completed, the borehole is enlarged with one or more passes of a reamer until the diameter of the borehole is adequate to complete the installation of the utility line. Installation typically includes feeding the line into the borehole from the entry point while pulling the line through the exit point. This process limits the forces exerted on the subsurface and prevents unwanted conditions, such as borehole collapse, which would require additional reaming and/or drilling.

2.1 Drilling Fluid Role

Drilling fluid is a critical component of HDD, without which avoidance of sensitive receptors would not be possible. Drilling fluid has several important roles in HDD operations:

- Clearing Soil and Rock Cuttings – Excavated soil and rock are suspended in the drilling fluid and transported back to the entry or exit points via fluid flow. It is crucial to achieve adequate viscosity and pressure to maintain circulation of cuttings to prevent blockages that can lead to pressure spikes.

- Friction Reduction – Drilling fluid lubricates, cools, and cleans the cutting head to ensure efficient drilling.

- Borehole Stabilization – Drilling fluid mixes with subsurface materials to form a "wall cake" against the walls of the boring. The wall cake can be thought of as a grout that seals fissures or voids through which drilling fluid could be lost, possibly resulting in an IR. The wall cake also adds strength to the borehole walls, and along with the drilling fluid filling the bore, prevents collapse of the bore.

- Drilling Power – Drilling fluid is used to transmit hydraulic power from the surface to operate the cutting bit in the borehole.

The drilling fluid is mixed and prepared at the surface and then introduced through a pipe to the cutting head in the borehole. The fluid is then circulated through the borehole annulus back to the entry or exit point, where it is collected into the drilling fluid recycling system. The recycling system, through a series of mechanical operations, separates the drilling fluid from soil and rock cuttings and adjusts water content to ensure proper viscosity, before the fluid is recycled back into circulation. Excess drilling fluid will either be stored for recycling and reused or transported off-site for disposal.

2.2 Drilling Fluid Composition

Fresh water is the main component of drilling fluid. Bentonite clay (sodium montmorillonite) is added to the fresh water to increase viscosity, which affords the drilling fluid its beneficial properties. Bentonite clay is a naturally occurring clay typically mined in a very pure form in Wyoming; however, bentonite is somewhat ubiquitous in the environment. It is non-toxic and can be found as an ingredient in many skin care products and dietary supplements, is a common soil supplement used in farming, and is frequently used to seal freshwater ponds and earthen dams. Bentonite is not a hazardous material as defined by the United States Environmental Protection Agency (USEPA) Emergency Planning and Community Right-to-Know Act (EPCRA) or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Bentonite is non-toxic; however, due to regulation, it is classified as a non-hazardous waste when used in an industrial process such as HDD. Bentonite is not toxic to the aquatic environment; however, if introduced to a stream, wetland, lake or other water body in a large quantity, it can be temporarily disruptive, particularly to benthic organisms.

Depending on the subsurface conditions encountered during an HDD operation, certain drilling fluid additives, such as loss circulation materials (LCM), may be added to the drilling fluid mixture. LCMs may be used during inadvertent return events and/or in certain cases when drilling fluid circulation is diminished or completely lost. If naturally-occurring preferential flow paths (faults, fractures, voids, large pores etc.) intersect the HDD path, LCMs may be used to seal around the borehole and prevent drilling fluid from escaping into the formation and allow for the reestablishment of drilling fluid circulation. Many types of LCMs available for use during HDD operations are inert and environmentally benign.

Only those drilling fluid additives and LCMs that are not petroleum-based, meet NSF/ANSI Standard 60 (NSF 60) or food additive standards, and are consistent with materials used in the drinking water distribution industry will be available for use by the company performing the HDD for the project (HDD Contractor). NSF 60 establishes health and safety criteria for the chemical treatment of drinking water. Most drilling fluid additives used in the HDD industry are NSF 60 compliant, as these products are also used in other rotary drilling applications such as water well drilling and completion. Other drilling fluid additives may not have NSF compliant requirements but will meet U.S. food additive standards.

3.0 HDD FEASIBILITY ANALYSIS

3.1 Necessity of HDD

The first step in determining HDD feasibility is identifying the need for an HDD. As stated previously, open cut trenching is the most economical and efficient method for installing subsurface utility lines. HDD is utilized when an environmental, infrastructure, or cultural asset must be avoided, or when open cut trenching is otherwise not possible or practicable. Each HDD crossing identified for the Project will be reviewed, including an assessment of alternate methods.

3.2 Physical Characteristics of Crossing Locations

After determining the necessity of employing HDD at a proposed crossing, the suitability and accessibility of each location based on topographic and physical characteristics will be evaluated. This part of the feasibility analysis will determine whether each proposed crossing can accommodate the HDD work, necessary equipment, contractors, and permit-required controls. Determining the difference in elevation between entry and exit locations is crucial in planning the minimum recommended depth of cover required for each HDD. The results of this evaluation will be used to determine if additional evaluations are necessary, such as geotechnical investigations.

Public and private utility investigations, including One-Call notifications, at each crossing will be conducted and document that the HDD alignment and depth will not interfere with any pre-existing utilities. The bore alignments and profiles will be designed to maintain adequate lateral and vertical separation from all existing underground utilities and pipelines.

4.0 INADVERTENT RETURN PREVENTION AND MINIMIZATION

The application of HDD methods for avoiding sensitive environmental, infrastructure, and cultural assets during utility line installation has been proven effective over decades of practice. The feasibility analysis summarized in the previous section will be the first measure of prevention by reducing the probability of an IR through an understanding of subsurface conditions to the extent practicable, identifying and avoiding proximate sensitive receptors, and identifying construction design controls. The following section details operational controls that will be employed during HDD operations to further reduce the probability of IR occurrence, and the scale of an IR should one occur.

4.1 Drilling Fluid Management and Control

Maintaining drilling fluid circulation from the cutting head through the borehole annulus and back to the entry or exit point is the primary operational control used to reduce both the probability of IR occurrence and the scale of an IR should one occur. The HDD Contractor will have overall control of the HDD operation and will be responsible for maintaining drilling fluid circulation.

4.1.1 Drilling Fluid Composition

The drilling fluid will be mixed in accordance with the manufacturer's recommendations and physical characteristics of the crossing. The most effective composition for a given soil/rock condition will be established, monitored, and maintained throughout the drilling process. The HDD Contractor will ensure that the drilling fluid composition is adequate for each application during the duration of HDD activities.

4.1.2 Drilling Fluid Management Equipment

The HDD Contractor will ensure regular inspection and maintenance of all drilling fluid handling equipment including, but not limited to hoses, pumps, valves, tanks, recycling equipment, cutting heads, reamers, etc. All equipment will be clean and functioning properly to ensure uninterrupted operation. The HDD Contractor will ensure that all equipment is sized properly to accommodate the actual volume and flow rate of drilling fluid and provide capacity for increased volume or flow rate of returns throughout HDD operations.

4.1.3 Process Monitoring Instrumentation

The HDD Contractor will be prepared and able to measure borehole annular pressure, drilling fluid discharge rate, the drill string axial and torsional loads and the lateral and vertical position of the drilling bit or reamer bit.

4.1.4 Loss of Drilling Fluid Circulation

Loss of drilling fluid circulation is defined as a reduction in the volume of drilling fluid returning to the entry or exit point through the borehole annulus, relative to the volume of drilling fluid that is being transmitted into the borehole from the cutting head. This condition can result from several issues, which may include blockages at the cutting head, blockages in the borehole annulus, and loss of drilling fluids to the formation through natural or manmade voids. A loss of circulation concurrent with an increase in annular pressure typically indicates a blockage in the circulation system. A loss of circulation absent an increase in annular pressure or concurrent with a decrease in annular pressure may indicate a loss of drilling fluid to a formation, which increases the probability of an IR. Increased annular pressure due to a blockage in the circulation system, or due to non-ideal drilling fluid composition, can also increase the probability of losing drilling fluid to the formation. The HDD Contractor will use all available methods, some of which are provided below, to reduce the probability of drilling fluid loss:

- maintain clean and unobstructed drilling fluid handling equipment;
- maintain clean and unobstructed borehole annual space;
- closely monitor and adjust annular pressure to ensure that the minimum necessary pressure is used for HDD operations;
- reduce "plunger effect" by ensuring clean cutting heads and reamers, and minimizing the speed of drill string advancement and retraction; and
- monitor and adjust drilling fluid viscosity as necessary to maintain minimum required annular pressure, but still allowing circulation back to the HDD entry point.

If a loss of drilling fluid occurs, the HDD Contractor will use all appropriate methods to regain full drilling fluid circulation to prevent an IR, such as:

- decrease pump pressure;
- decrease penetration rate;
- retract the drill string sufficiently to restore circulation ("swab" the hole);
- introduce additional drilling fluid flow along the borehole using "weeper" subs; and
- utilize bentonite plugs, grout, and/or LCM to seal voids and eliminate loss of drilling fluid to the formation. Ensure that seals are effective before continuing HDD operations.

4.2 HDD Monitoring and Inspection Protocols

HDD activities will be closely and continually monitored by the HDD Contractor as necessary to meet the objectives of this plan. Monitoring and inspection procedures will include, but are not limited to:

- Visual and pedestrian field inspection along the HDD route, to the extent allowable by the terrain, including monitoring drainage features and surface waters for evidence of an IR. The HDD route will be inspected prior to the beginning of an HDD, and any condition that impedes the ability to conduct the visual inspections of any portion of the bore route will be identified and a site-specific modification to the inspection routine at that location will be developed.

- Monitoring of the HDD fluid composition, drilling pressures, and return flows.

- Monitoring of drill status information regarding drill conditions, pressures, returns, and progress during the course of drilling activities.

Upon the discovery of a sustained loss of drilling fluid circulation and/or a sustained drop in annular pressure, the HDD Contractor will notify the on-site project representative, reduce downhole pressure and conduct a detailed inspection of the HDD equipment and performance, and inspect the HDD route and surrounding area for evidence of an IR. If an IR is not observed, and based on a consultation with the project representative, the HDD contractor may elect to continue drilling. In these cases, the corrective action may include altering the viscosity of the drilling mud, adding an approved LCM, or slightly altering the drill path profile to avoid unsuitable subsurface materials. If an IR is identified or suspected, HDD operations will immediately cease and response actions will be initiated, as described in Section 5.

5.0 RESPONSE TO INADVERTENT RETURNS

These response protocols have been developed with full consideration of the potential risk posed by IRs to the aquatic environment. While upland IRs are generally not associated with environmental risk due to the lack of drilling fluid toxicity, upland IRs can impact the aquatic environment if the drilling fluid is transported to surface water via runoff through natural or man-made drainage features. The HDD contractor will strictly adhere to this Plan and the overall goal of IR prevention and mitigation through rapid response, containment, and recovery.

Releases of drilling fluid in upland areas typically can be contained to prevent further migration and are cleaned up during and following completion of the crossing. Inadvertent returns into watercourses, however, can present greater risks and clean-up challenges. In large quantities or in sensitive environments, bentonite slurry may pose a threat particularly to benthic macroinvertebrates (e.g., aquatic larval insects). The threat to aquatic life is typically acute, although the long term impact of IRs on aquatic life appears to be negligible. Prompt and thorough removal of bentonite deposits in streams, coupled with normal stream hydrology and sediment dynamics, should disperse the bentonite to levels where aquatic faunal communities can recover quickly. The rapidity of the response to an IR is dependent on several elements:

- prompt detection and communication of the IR;
- training and adequate number of response staff;
- access to needed materials and equipment that are present in sufficient quantity and ready for use; and
- clear and timely direction regarding measures to be taken by the HDD Contractor (e.g., suspending drill operations), and where IR response materials, equipment, and labor should be deployed, depending on the location of the IR and the sensitive resource potentially affected.

5.1 Response Protocol for IR in Uplands

Upland areas are generally located above and away from surface waters. Releases to upland areas are most likely to occur within the LOD near the HDD entry and/or exit points; however, IRs are also possible in upland areas outside the LOD. The primary focus of the response action is to stop and contain the IR to prevent further surface migration, especially to surface water receptors. If an upland IR is identified, the protocol described in this section will be followed.

Upland IR Within the Limit of Disturbance

Upland IRs typically occur at the HDD entry and exit points within the limit of disturbance (LOD) as defined in the approved erosion and sediment control plan. These IRs, referred to as "punch out" returns, generally

occur at shallow depths where overburden soils are weak. Response actions will focus on containing the release and preventing migration outside the LOD. If the punch out return is fully contained within the LOD, and surface water features and water supplies are not threatened, HDD operations may continue.

In the event of an upland IR within the LOD, the HDD Contractor will notify the project representative, determine the approximate volume of the IR, and oversee and document the containment and recovery operations. If at any time the IR threatens to migrate beyond the LOD, the IR exceeds the erosion and sedimentation controls, or the rate of return exceeds the capacity of response operations, HDD operations will be suspended until such time that the IR is completely contained. Released drilling fluid can be recovered and reused in HDD operations. Excess drilling fluid, if disposed, will be managed as waste in accordance with applicable regulations. After the IR is contained and recovered, the area will be restored in accordance with applicable requirements.

Upland IR Outside the Limits of Disturbance

While uncommon, upland IRs can occur outside the LOD when drilling fluid is pushed through natural or manmade voids to the surface. These IRs are sometimes preceded by ground swelling and groundwater seepage and can occur anywhere along the HDD alignment. Diligent inspections are necessary to identify evidence of an upland IR so response protocols can be initiated quickly.

Upland IRs do not generally pose significant risk to the environment if they are contained and prevented from migrating to surface water via natural and man-made drainage features. If an upland IR occurs outside the LOD, the following response protocols will be followed:

- HDD operations will immediately cease which will immediately reduce borehole annular pressure. Resumption of HDD operations will be contingent upon approval of the project representative, and, if required, applicable regulatory agencies.
- The HDD Contractor will obtain the coordinate location and estimated volume of the release and determine whether surface water, natural or man-made drainage features, or any other sensitive receptors are impacted or threatened.
- The project representative will confirm access rights to enter the affected property for containment and recovery operations. If access is not granted, the project representative will notify and work with applicable regulatory agencies to gain access.
- The HDD Contractor will initiate containment and collection of the drilling fluid.
    - Contain the IR to the smallest area possible with physical barriers such as hay bales, sandbags, silt fencing, silt socks, all of which will be installed in accordance with best management practices as defined in the approved erosion and sedimentation control plan. Small excavated pits, dikes and diversion ditches may also be used.

- If recovery equipment is not immediately available due to the location of the IR, especially if precipitation is expected, plastic sheeting will be used to cover the IR to minimize contact with stormwater.
- The IR will be recovered to the maximum extent practicable. All necessary erosion and sediment control protocols will be utilized during recovery operations.
- All recovered material will be managed as a residual waste in accordance with applicable regulations, including the retention of all disposal documentation.
- The impacted area will be restored to pre-existing conditions, including re-establishment of vegetation. All necessary erosion and sediment control protocols will be utilized until site restoration is complete.

5.2 Response Protocol for IR in Surface Water

HDD techniques are often employed to cross streams and wetlands without physically impacting the watercourse. Due to the typical morphology of streams (association with bedrock fractures), IRs can occur within a surface stream. Likewise, natural and man-made drainage features, wetlands, springs, and riparian zones can also be susceptible to IRs that migrate through the subsurface, or from upland areas. Wetlands generally occur in depositional environments, and consequently wetland biological systems are highly resilient to acute inputs of sediments. The biological systems of riparian zones and springs are also much less susceptible to damage from IRs than streams, and the lack of moving water reduces the extent to which drilling fluid can be transported. However, rapid containment and recovery of IRs in these areas is critical to reducing the possibility of environmental impact to adjacent streams or other sensitive areas. For these reasons, if an IR threatens a surface water feature, the focus of the response will be stopping the release of drilling fluid, containing the fluid to the smallest possible area, and quickly removing as much drilling fluid as possible.

Aquatic life is typically concentrated in stream riffles (shallow areas of fast-moving water between natural stream pools). Aquatic macroinvertebrates live in the oxygen-rich stream riffles and are especially susceptible to increased sedimentation associated with IRs. Accordingly, response actions will be designed to prevent sediment accumulation in stream riffles to the extent possible. While aquatic biological systems are sensitive, streams are effective at clearing excess sediment. Accordingly, response actions also will be tempered to prevent additional harm. Response actions such as power washing and artificial flushing, while effective at removing drilling fluid, may cause additional or even greater harm than the IR, and so will be avoided. In the event of a surface water IR, a person with experience with or professional certification relevant to stream dynamics, morphology and aquatic ecology will approve and oversee in-stream response actions.

Specific permits may be required prior to entering a surface water body to conduct IR assessment, containment, and recovery operations. The HDD Contractor will not place or allow the placement of equipment or materials in the water course without direct approval of the project representative. The project representative will coordinate with applicable federal, state and local regulatory agencies to ensure that any necessary permits are in place prior to conducting containment and recovery operations in surface water.

With consideration given to specific permit requirements, the following general response protocols will be followed in the event of an IR to surface water:

- HDD operations will immediately cease, and the HDD Contractor will immediately reduce borehole annular pressure to the extent practicable. Resumption of HDD operations will be contingent upon approval of the project representative and applicable regulatory agencies.
- The HDD Contractor will immediately notify the project representative and provide the coordinate location and estimated volume of the release.
- The Ohio EPA Spill Hotline will be notified within 30 minutes of the discovery of an IR at 1-800-282-9378.
- The Ohio Department of Natural Resources – Division of Wildlife will be notified within 30 minutes of the discovery of an IR in surface waters known to contain endangered species at 614-265-6346.
- An attempt to contact all property owners that may be affected by the IR will be made.
- The project representative will confirm access rights to enter the affected property for containment and recovery operations. If access is not granted, the project representative will notify and work with applicable regulatory agencies and property owner(s) to gain access.
- The project representative and HDD Contractor will work with internal resources, consultants and federal, state, and local regulatory agencies in an expeditious manner to prepare, submit, and gain approval of any permits as might be required prior to entering a water course for containment and recovery operations.
- The HDD Contractor will determine the need for containment and clean-up personnel, including whether third-party contractors and equipment are necessary.
- Once access to enter the surface water feature has been granted by the property owner, and/or via permit approval, the HDD Contractor will initiate, oversee, and document containment and recovery operations. A qualified professional will oversee all corrective actions associated with a surface water IR:
    - Contain the IR as close to the release point as possible using sediment control devices such as silt fencing, silt curtains, mulch tubes, hay bales, and sandbags.
    - Immediately begin recovering drilling fluid as close to the release point as possible using vacuum trucks, pumps, and manual methods, as applicable.

- Install sediment control devices downstream of the release point. Avoid installing sediment control devices immediately downstream of riffles, as the resulting accumulation of sediment can harm these sensitive areas at the following locations:
    - Immediately downstream of the release point.
    - Upstream of riffles.
    - Downstream side of existing natural pools.
- Once sediment control features are installed, sediment will begin to accumulate in the natural stream pools, which will allow efficient recovery. Natural pools typically offer more convenient access for recovery operations.
- A qualified professional will determine the need for additional actions.
- All recovered material will be managed as a waste in accordance with applicable regulations, including document retention.

- If necessary, the project representative will design and implement a monitoring program consistent with permit requirements, regulatory agency requirements, and the scale of the IR and response actions.

5.3 Containment and Recovery Materials and Equipment

The HDD Contractor will ensure that adequate IR containment and recovery equipment and materials are located at the HDD location prior to the initiation of HDD activities. Prior to the start of HDD operations and at the beginning of each workday, the HDD Contractor will verify the inventory and condition of equipment and materials as part of the daily pre-drill checklist. This equipment will be on standby and ready for use for the entirety of the drilling process. The materials and equipment may include:

- Compost filter sock
- Silt fence, hay bales, sandbags, and wood stakes for installation
- Hand tools (shovels, rakes, brooms, buckets, etc.)
- Centrifugal, trash, and sump pumps with associated hoses
- Pump water filter bags
- Vacuum truck
- Mini backhoe/loader (rubber tire or wide track to minimize surface disturbance)
- Equipment mats and timbers
- Aqua barriers/floating turbidity curtains and mounting hardware
- Plastic sheeting (6 mil minimum)

After an IR response, all equipment will be cleaned, inspected, repaired and/or replaced, and be fit for use before HDD operations can resume. Likewise, consumable materials (silt fence, hay bales, etc.) will be properly disposed and replaced before resuming HDD operations.

6.0 HDD CONTINGENCY PLAN

6.1 Contingency Plan for a Failed HDD

In the event that corrective measures are not sufficient to maintain the integrity of an HDD borehole, the HDD Contractor will abandon the borehole and in consultation with the project representative consider alternate crossing locations and/or techniques. If necessary, the project representative will consult with applicable regulatory agencies to determine if an HDD failure has occurred and evaluate alternate, site-specific remedies.

In the event of borehole failure, the borehole will be properly abandoned, and a decision will be made regarding whether to re-attempt the HDD crossing, or use another crossing method, as described below:

- grout will be used to seal the bore hole;
- the top 5 feet will be filled with topsoil; and
- the location will be graded to the original contour and re-vegetated.

The above abandonment procedures will be discussed with all appropriate permitting and regulatory agencies prior to implementation.

6.2 Alternative Crossing Locations and Methods

If the HDD bore cannot be completed at the proposed location, the HDD crossing may be re-attempted at an alternate location. Before a determination is made on an alternate crossing location, an effort will be made to identify and assess the reason for the HDD failure. This may be critical for the selection of the alternate crossing. Considerations of alternative locations include, but are not limited to:

- horizontal relocation of the drill hole,
- changing of the drill profile (depth of bore),
- changing drill procedures (slurry viscosity/pressure/flow velocity, bit rotation/velocity, etc.), and
- geotechnical considerations.

If the entry and exit points must be relocated, consideration will be given to:

- proximity to surface water, wetlands, sensitive habitats, cultural resources, existing utilities;
- surrounding topography,
- entry and exit angles for the HDD path, and

- permitting considerations.

These and other factors will be considered and discussed with appropriate regulatory agencies to secure any necessary approvals. Alternate crossing methods, such as open cut, may also be evaluated.

Attachment E

Plant and Wildlife Summary

Hull performed field surveys of the Study Area in August 2021. During the fieldwork, Hull completed a surface water delineation, visually assessed habitat, and recorded observations of local wildlife.

Habitat Assessment

Hull assessed wildlife habitat for the 1,474-acre Study Area by focusing on visual observations of plant communities and evidence of wildlife. Visual reconnaissance was conducted during the wetlands and waterbody delineation. Hull ecologists did not observe any threatened or endangered species. Additionally, Hull visually inspected a 0.25-mile buffer around the Study Area for ecologically important or sensitive features.

Plant Communities

Plant communities were initially evaluated during the desktop review of historical aerial imagery and subsequently assessed during the field survey. Land cover in the Study Area is predominantly hayfields/pasture, deciduous or mixed forest, herbaceous, and scrub/shrub. The plant communities and land cover classifications in the Study Area are common to southern Ohio. There were no rare or protected plant species observed during the field survey. Coordination with ODNR did not identify any known occurrences of rare or protected plants in the vicinity of the Study Area, so species-specific surveys were not conducted.

Hayfields/Pasture

Approximately 43 percent of the Study Area is maintained as hayfields or pasture for cattle. At the time of the field survey, the pastures within the Study Area were dominated by red fescue (*Festuca rubra*) and red clover (*Trifolium pratense*). Hull observed several ponds within the pasture areas. Several of these features contained wetland fringe habitat while others were ruled out as jurisdictional surface waters.

Forest

Deciduous and mixed forest was identified throughout the Study Area. The dominant tree species on the site include red oak (*Quercus rubra*) and red maple (*Acer rubrum*). Portions of these forests were delineated as palustrine forested wetlands.

Herbaceous and Scrub/Shrub

At the time of the field survey, the herbaceous and scrub/shrub areas within the Study Area were dominated by Canada goldenrod (*Solidago canadensis*) and Russian olive (*Elaeagnus angustifolia*).

Developed

Development, in the form of buildings and roads, comprises less than 1 percent of the land cover in the Study Area. Developed areas typically were unvegetated.

Wildlife Observations

Most of the Study Area lacked significant characteristics of habitat for threatened or endangered species known to inhabit Licking County. Forested areas in the Study Area contained potentially suitable habitat for Indiana bats (*Myotis sodalis*) and Northern long-eared bats (*Myotis septentrionalis*). These protected bat species utilize trees with diameters greater than three inches with cavities or exfoliating bark for summer roosting. Bats were not observed or collected during the field survey. If tree-clearing is proposed, then further coordination has been requested by USFWS and will be necessary at that time.

Habitat quality in the remainder of the Study Area was low due to its history of mining activity and impacts from cattle. White-tailed deer (*Odocoileus virginianus*), eastern chipmunks (*Tamias striatus*), and fox squirrels (*Sciurus niger*) were frequently observed foraging within the Study Area. Common bird species were observed during the field survey, including robins (*Turdus migratorius*), house sparrows (*Passer domesticus*), red-winged blackbirds (*Agelaius phoeniceus*), and great blue heron (*Ardea herodias*). Otherwise, Hull observed minimal wildlife using the Study Area and there were no observations of threatened or endangered species during the field survey. Species-specific surveys for protected species were not conducted.

Attachment F

Soils Within the Ecological Study Area

SOILS WITHIN THE ECOLOGICAL STUDY AREA

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey (WSS) of Jackson County, Ohio was used to identify the soil types and hydric ratings of soils located within the Project Area (Figure 8). The soil survey identifies soil mapping units and their associated hydric soil rating, based on percent hydric components; 0 being the least percent hydric components and 100 being the most. Mapped non-hydric soils may contain inclusions of hydric components in terraces, in depressions, on floodplains, and in drainage ways. The hydric soils identified within the Project Area are Piopolis silt loam, 0 to 2 percent slopes, frequently flooded (Pio1AF).

The most prevalent soil types are Latham-Wharton silt loams, 15 to 25 percent slopes, eroded (LhW1D2) and Rigley-Latham association, steep (RgLZE1). Slopes of 12 percent or greater are frequent throughout the Ecological Study Area (Figure 14). Majority of soil types within the Ecological Study Area have been determined to be Highly Erodible Land (HEL) and Potentially Highly Erodible Land (PHEL) by the USDA, NRCS (Figure 15).

SOILS WITHIN THE ECOLOGICAL STUDY AREA SUMMARY

Type	Map Unit Description	Hydric Rating	Ecological Study Area (Acres)	Ecological Study Area (%)
LhW1D2	Latham-Wharton silt loams, 15 to 25 percent slopes, eroded	0	308.436	20.93%
RgLZE1	Rigley-Latham association, steep	0	256.565	17.41%
RrW1C2	Rarden-Wharton silt loams, 8 to 15 percent slopes, eroded	0	131.462	8.92%
FaD	Fairpoint silty clay loam, 8 to 25 percent slopes	0	129.596	8.79%
Bhv1D	Bethesda silt loam, 8 to 25 percent slopes, reclaimed	1	125.012	8.48%
Bhv1B	Bethesda silt loam, 0 to 8 percent slopes, reclaimed	1	78.965	5.36%
CkC	Clymer silt loam, 8 to 15 percent slopes	0	78.663	5.34%
ShLZE1	Shelocta-Latham association, steep	0	71.527	4.85%
RgLXD1	Rigley-Latham complex, 15 to 25 percent slopes	0	67.907	4.61%

FaB	Fairpoint silty clay loam, 0 to 8 percent slopes	0	54.998	3.73%
Omu1C1	Omulga silt loam, 6 to 12 percent slopes	0	46.694	3.17%
RmE	Rigley-Clymer association, steep	0	33.325	2.26%
AkD	Allegheny loam, 15 to 25 percent slopes	0	32.277	2.19%
BaD	Barkcamp gravelly loamy sand, 8 to 25 percent slopes	0	16.894	1.15%
Bhs4D	Bethesda channery silt loam, 8 to 25 percent slopes, unreclaimed	1	13.877	0.94%
Omu1B1	Omulga silt loam, 2 to 6 percent slopes	0	11.227	0.76%
Dol1A1	Doles silt loam, 0 to 2 percent slopes	2	4.702	0.32%
Bhs4B	Bethesda channery silt loam, 0 to 8 percent slopes, unreclaimed, highwall	1	2.561	0.17%
WhC	Wharton silt loam, 8 to 15 percent slopes	0	2.405	0.16%
Stn1AO	Stendal silt loam, 0 to 3 percent slopes, occasionally flooded	5	1.635	0.11%
Pio1AF	Piopolis silt loam, 0 to 2 percent slopes, frequently flooded	92	1.634	0.11%
RgD	Rigley sandy loam, 15 to 25 percent slopes	0	1.621	0.11%
Bhs4F	Bethesda channery silt loam, 25 to 70 percent slopes, unreclaimed	0	1.067	0.07%
ChD	Clymer loam, 15 to 25 percent slopes	0	0.494	0.03%
WeB	Wellston silt loam, 3 to 8 percent slopes	0	0.170	0.01%
SkP1AF	Stokly-Philo silt loams, 0 to 3 percent slopes, frequently flooded	7	0.139	0.01%
RcC	Richland silt loam, clayey substratum, 8 to 15 percent slopes	0	0.045	<0.01%
Total			**1473.900**	**100%**

Attachment G

Additional Mapping