

VIA EMAIL & USPS
June 14, 2024

Daniel Husted, PE, Chief, Permit & Technical Services
DEP Moshannon District Mining Office
186 Enterprise Drive
Phillipsburg, PA 16866

Re: Response to May 22, 2024 Technical Deficiency Letter
Minard Mine – SMP 08230301
Bishop Brothers Construction Company, Inc.
Wysox Township, Bradford County, Pennsylvania

Mr. Aaron:

Enclosed please find a response to the May 22, 2024 technical deficiency letter for the aforementioned project. Three (3) copies of the documents listed in Table 1 are included with this submission. Below are comments and responses to your letter:

MODULE 1 GENERAL INFORMATION:

1. Please note that the permit will be special conditioned to require the driveway permit and flood plain permit from Athens Township prior to activation of the site. (Acts 67, 68, & 120)

Noted; no response required from applicant.

2. On August 15, 2023 Athens Township approved a clarification of the Conditional Use Decision of February 21, 2021. The 2021 Conditional Use Decision only explicitly applied to the Agricultural Zoning District. The August 15, 2023 decision clarified that the Conditional Use Decision applied to the entire Minard property including Woodland Conservation Zoning Districts. The August 15, 2023 decision was subject to two separate appeals in the Pennsylvania Court of Common Pleas. Please inform the Department of any developments related to the appeals. (Acts 67, 68, & 120)

At the time of this response, no decision has been rendered from the court for either appeal.

3. The Pennsylvania Historic & Museum Commission sent a letter dated December 12, 2023 finding that there was high probability of archaeological resources in the Minard Mine permit area. Subsequently a Phase 1 archaeological survey was completed in the stream encroachment areas under jurisdiction of the U.S. Army Corps of Engineers.

PHMC sent a letter dated April 24, 2024 which stated the PHMC agreed with the recommendations of this report and found that no further archaeological work was necessary within the USACE jurisdictional area. However, PHMC still recommends a Phase IA survey be completed for the rest of the proposed permit area. Please indicate if you plan to proceed with the Phase IA survey. If you choose not to proceed with the survey, then please submit a plan detailing what kind of precautions will be implemented and what type of for monitoring for archaeological resources will be conducted during the removal of topsoil and other unconsolidated deposits above the bedrock where the archaeological resources may be located.

Refer to the Discovery Plan for monitoring for archaeological resources (pgs 1-173 to 1-174).

EXHIBIT 6.2 ENVIRONMENTAL RESOURCES MAP:

1. Delineate the area of the Phase 1 Archaeological Survey that was completed on the map. {25 PA Code 77.410}

Exhibit 6.2 updated to detail the area of the archaeological survey.

MODULE 8 HYDROLOGY:

1. Provide updates to the monitoring data where required. Data should include at a minimum 2 background samples for each drilled well water supply within 1,000 feet of the proposed mining operation. {25 PA Code 77.532}

Additional background samples have been collected from all cooperating landowners and Module 8.1A has been updated.

2. Please revise the paragraph of Module 8.6a regarding the proposed piezometers near wetlands I, II, and J to include the following details: {25 PA Code 77.403}
 - a. List the proposed piezometers that are shown on the Exhibit Maps (PZ-1 through PZ-6).
 - b. Describe when the piezometers are proposed to be constructed and monitoring will begin as the mining progresses towards those wetlands.
 - c. Provide the details for how each piezometer would be constructed. Refer to Detail 8 on Exhibit 10-2 with the piezometer construction design.

Module 8.6.a updated as requested.

MODULE 10 OPERATIONAL INFORMATION:

1. The permit line set back is now shown correctly on the cross-sections, however the Exhibit mapping were not updated to show the actual setbacks with the lengths listed. Revise the Exhibit maps to show/list the appropriate setback distances. (25 PA Code 77.572)

Exhibit 9 and Exhibit 7/10 maps updated to identify how the setbacks shall be applied (i.e. permit boundary or barrier area).

2. An agreement to relocate the Penelec electric utility line was not provided. If an agreement is not obtained, a no mining area must be shown around all electric utility lines within the permit boundary. If there is no established right-of-way then the Department assumes a total right-of-way of 50 feet with a 25-foot barrier on either side of the utility line. The only activity that wouldn't require an agreement is when vehicles would just be passing under the electric mine on an existing road. All electric power poles should be shown on the mapping and the allowed setback distance barrier shown around the utility line. The owner of the utility line should be identified on the map or in the map legend. (25 PA Code 77.504)

Penelec (FirstEnergy) agreement is attached (pgs 10-15 to 10-16). Page 10-9 revised to reference the agreement.

3. Item 2 of the construction sequence for the Sand & Gravel Phase 1 area on page 10-4 indicates that a containment berm shall be installed around the mineral extraction area. Please revise this section to indicate that a containment berm will be used in areas outside of the floodway and that a containment moat will be used in areas within the floodway. {25 PA Code 77.452 and 77.458}

Item 2 updated to note the use of a containment moat in the floodway (pg 10-4).

4. The emergency spillway side slope dimensions on Detail 13 on Exhibit 10.1 (4H:1V) are not consistent with the side slopes listed on the pond design sheets (3H:1V). {25 PA Code 77.458}

Emergency spillway side slopes revised to 3H:1V to be consistent throughout the application documents.

5. The inside and outside embankment slopes appear to be reversed on Detail 13 on Exhibit 10.1 from what is proposed on the pond design sheets. {25 PA Code 77.458}

Embankment slopes revised to be consistent with exhibits and pond design sheets so that the sum of the in-slope and out-slope is a minimum of five.

6. Detail 3 on Exhibit 10.2 shows a 4-inch dewatering pipe for Basin 2, but this pipe is not identified on the pond certification sheet for Basin 2 on page 13-11. Revise these sections to be consistent. {25 PA Code 77.458}

Basin 2 sheets revised to be consistent with exhibits and pond design sheets. The dewatering pipe information added to the certification.

7. The riprap size specified for the principal spillway on Detail 2 of Exhibit 10.2 is not consistent with the riprap size proposed on the pond certification sheet for Basin 1 on page 13-9. {25 PA Code 77.458}

Basin 1 principal spillway riprap size is R4. Detail 2, Exhibit 10.2 and pond certification (pg 13-9) updated.

8. The riprap sizes specified for the emergency spillway and principal spillway on Detail 3 of Exhibit 10.2 are not consistent with the rip rap sizes proposed on the pond certification sheet for Basin 2 on page 13-11. Revise these sections to be consistent. {25 PA Code 77.458}

Basin 2 riprap size is R4. Detail 3, Exhibit 10.2 and pond certification (pg 13-11) updated.

9. Detail #8 on Exhibit 10.2 is labeled as "Pipe Perforation Detail". It should specify that it is for the piezometer design. {25 PA Code 77.454}

Detail #8 title corrected and additional piezometer data provided.

MODULE 13 IMPOUNDMENTS/TREATMENT FACILITIES:

1. Module 13.1 indicates that the discharge pipe from Basin 2 is valved and can be closed. This valve should be closed while applying flocculent. There is concern of flocculent reaching Tutelow Creek. Provide a narrative indicating how the operator is going to ensure that all flocculent has settled out prior to opening the valve to Basin 2. {25 PA Code 77.526}

Module 13.1 (pg 13-1) and Module 13.5 (pg 13-7) revised.

2. Pages 13-4 and 13-5 indicate that if Support Area Sump 1's capacity is exceeded; runoff will flow overland to the south towards Support Area Sump 2. If Support Area Sump 2's capacity is exceeded, runoff will flow overland to the south towards Basin 1. Please clarify why the emergency spillway design for Support Area Sump 2 is not based on the drainage area to Support Area Sump 1 plus Support Area Sump 2. Please clarify why the emergency spillway design for Basin 1 is not based on the drainage area to Support Area Sump 1 plus Support Area Sump 2 plus Basin 1. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

The contributing drainage area recalculated for Sump 1, Sump 2, and Basin 1 emergency spillways. The downstream structure includes the upslope drainage area (see pg 13-17).

Sump 1: 5.3 acres
Sump 2: 8.7 acres ($5.3 + 3.4 = 8.7$)
Basin 1: 11.5 acres ($2.8 + 8.7 = 11.5$)

The nomographs on pages 13-18 and 13-19 details the peak runoff value. Page 13-20 provides the emergency spillway calculation along with spillway lining calculations.

3. The response to Module 13, Comment 5 did not fully address the comment. Page 13-5 indicates that Basin 2 was designed to provide a total of 12 hours of detention time based upon the dewatering rate of the pit pump. This page goes on to indicate that a 200 gallon per minute pump is proposed. Page 10-2 indicates that conveyance of pit water from the sump to Basin 2 can be achieved by Ditch 1 (gravity drainage) or by pumping. Page 12-6 indicates that Ditch 1 has a peak discharge of 190 cubic feet per second which converts to 85,278 gallons per minute. Please clarify how Basin 2 will have sufficient capacity to provide a 12-hour detention time should the pit sump fill up to a point where Ditch 1 begins conveying flow to Basin 2 at its peak discharge rate. The elimination of the gravity drainage option for dewatering the pit sump may be the simplest way to address this item. {25 Pa Code 77.458, 77.525, 77.526, and 77.531}

Ditch 1 has been removed from the design. Exhibit 9, Exhibit 9.1, Module 10.1 (pg 10-2) and Module 12 (pg 12-6) revised.

4. The response to Module 13, Comment 5 appears to conflict with the information provided near the top of page 13-2. Page 13-2 indicates that during a major rainfall/snowmelt event, the pit floor will be used for stormwater storage. If the Ditch 1 invert elevation will be approximately four feet below the pit floor elevation as specified in the response to Module 13, Comment 5, it is difficult to envision how the volumes listed in Table 13-1 on page 13- 2 would be able to be contained in the pit. Revise this information as necessary. The elimination of the gravity drainage option for dewatering the pit sump may be the simplest way to address this item. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

Ditch 1 has been removed from the design.

5. The Basin 2 potential inflow is listed as 180 cubic feet per second on page 13-5, but the calculations provided on page 13-19 and the design for Ditch 1 on page 12-6 list a peak discharge rate of 190 cubic feet per second. Revise these areas to be consistent. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

The Basin 2 potential inflow is 190 cfs as determined by pg 13-19. The inflow noted on page 13-5 corrected to 190 cfs.

6. Please provide calculations to demonstrate how the principal spillway capacity of 24.7 cubic feet per second as listed on page 13-9 was determined for the 10-inch principal spillway pipe of Basin 1. This capacity seems to exceed what the expected capacity could be for a 10-inch pipe. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

The 10-inch pipe capacity has been corrected on page 13-9. Refer to page 13-21 for capacity calculation.

7. The emergency spillway capacity on page 13-9 for Basin 1 is listed as 29.7 cubic feet per second. The emergency spillway capacity on page 13-19 for Basin 1 is listed as 24.7 cubic feet per second. Revise these sections to be consistent. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

Page 13-9 emergency spillway capacity corrected to 41.6 cfs (refer to pg 13-20 & comment #2 above regarding drainage areas).

8. Basin 1 does not provide the required 7,000 cubic feet per acre of capacity at the principal spillway elevation. The previous requirement based on the Department's guidance was for 7,000 cubic feet per acre of capacity at the emergency spillway elevation, which this pond does provide. However, all newly designed ponds are

required meet the 7,000 cubic feet per acre capacity at the principal spillway. See the Department's Standard Operating Procedure (SOP) No. BMP-13 for the explanation of the pond design requirements. Revise the pond designs accordingly. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

Module 13.3.c (pg 13-4) Table 13-2 and pond certification page 13-9 updated to provide the required storage volume at the principal spillway.

9. The rainfall amount on pages 13-9, 13-11, 13-13, and 13-15 should be listed as 4.9 inches instead of 4.2 inches. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

Rainfall corrected on pages 13-9, 13-11, 13-13, and 13-15.

10. The top widths of Support Area Sump 1 and Support Area Sump 2 are listed as *five* feet on the pond certification sheets. This dimension also appears on Exhibit 10.2. NRCS Publication Pond 378 specifies a minimum top width of six feet based on the proposed embankment height. Please revise the top width to be a minimum of six feet for these sumps or demonstrate how a top width of *five* feet satisfies the regulatory requirements. {25 PA Code 77.458, 77.525, 77.526, and 77.531}

Top embankment width updated to ten (10') feet for Sump 1 & 2 pond certification pages 13-13 and 13-15.

11. Revise the exhibit maps to show the emergency spillway location for Support Area Sump 1 and Support Area Sump 2. {25 PA Code 77.454}

Exhibit maps updated to identify the location of spillways for Sump 1 & 2.

MODULE 14 STREAMS/WETLANDS:

1. Module 14.1(b) on page 14-14-1 refers to Detail 5 on Exhibit 10.2 which appears to depict a berm adjacent to Tutelow Creek. Berms are no longer proposed within the *floodway* or adjacent to the stream. Please update Detail 5 on Exhibit 10.2 as necessary. {Chapter 105}

Detail 5, Exhibit 10.2 revised. The berm has been replaced with a moat.

2. Module 14.1(b) on page 14-14-1 refers to Detail 7 on Exhibit 10.2 which appears to depict an impoundment safety bench. Should this section instead refer to Detail 11 on Exhibit 10.2? {Chapter 105}

Module 14.1(b), second paragraph, revised to reference Detail 11, Exhibit 10.2.

3. Module 14.1(b) on page 14-14-1 indicates that mining support areas will be utilized for activities such as overburden storage, product storage, and/or E&S controls. This encroachment is specific to the *floodways* and activities such as overburden storage and product storage area not authorized within the *floodway* and are not proposed as per the most recent Exhibit 9 map. Revise this section as necessary to accurately list the activities that are proposed within the floodway. {Chapter 105}

The support activities in Module 14.1(b), third paragraph have been revised.

4. Confirm that the correct details on Exhibit 10.2 are referenced in Module 14.1(d) on page 14-14-2. {Chapter 105}

Module 14.1(d), revised to reference Detail 5 and Detail 11, Exhibit 10.2.

5. The proposed 72-inch culvert is not drawn to scale in cross section D-D' on Exhibit 14 Sheet 2 of 2. {Chapter 105}

The culvert shown on Exhibit 14 Sheet 2 of 2 is revised to scale.

6. The Exhibit 14 stream crossing design drawings must be signed by a professional engineer instead of a professional geologist. {25 PA Code 77.410}

Exhibit 14 stream crossing drawings are signed by a professional engineer.

7. The legend of the Exhibit 14.1 map shows the FEMA 100 Year Flood Plain, but it could not be located on the map. {Chapter 105}

Exhibit 14.1 map legend revised to remove the FEMA 100 Year Flood Plain. Exhibit 14.1 was previously requested by the Department to be a “clean” map that depicts the stream variance areas. The flood plain was not to be displayed on Exhibit 14.1.

MODULE 17 AIR POLLUTION AND NOISE CONTROL PLAN:

1. Revise the *fifth* paragraph of Module 17.3(g) to clearly indicate that berms will only be constructed in areas outside of the *floodway*. Berms are referenced in the *first* and last sentence of this paragraph. {25 PA Code 77.452}

Module 17.3(g) updated (pg 17-4).

ADDITIONAL INFORMATION:

1. Geomorphological and Phase 1 Archaeological Survey, Minard Mine dated April 2024 (pgs 1-125 to 1-172).
2. USCOE PASPGP-6 authorization dated April 25, 2024 (pgs 14-201 to 14-219).

Table 1: Summary of Documents

Updated Document:	Replaces:
Module 1: pgs 1-125 to 1-171, Archaeological Report, dated April 2024	None
Module 1: pg 1-172, PHMC letter dated 04/24/24	None
Module 1: pgs 1-173 to 1-174, PHMC Discovery Plan, revised 06/11/24	None
Exhibit 6.2 dated 05/05/23, revised 06/11/24	Exhibit 6.2 dated 05/05/23, revised 02/26/24
Exhibit 7/10 dated 05/05/22, revised 06/11/24	Exhibit 7/10 dated 05/05/22, revised 02/26/24
Module 8: pg 8-9, revised 06/11/24	Module 8: pg 8-9, revised 02/26/24
Module 8: pgs 8-56 to 8-79, revised 06/11/24	Module 8: pgs 8-56 to 8-79, revised 02/26/24
Exhibit 9 dated 05/05/23, revised 06/11/24	Exhibit 9 dated 05/05/23, revised 02/26/24
Exhibit 9.1 dated 05/05/23, revised 06/11/24	Exhibit 9.1 dated 05/05/23, revised 02/26/24
Module 10: pgs 10-2, 10-4, & 10-9, revised 06/11/24	Module 10: pgs 10-2, 10-4, & 10-9, revised 02/16/24
Module 10: pgs 10-15 to 10-16, revised 06/11/24	None
Exhibit 10.1 & 10.2 dated 05/05/23, revised 06/11/24	Exhibit 10.1 & 10.2 dated 05/05/23, revised 02/26/24
Module 12: pg 12-6, revised 06/11/24	Module 12: pg 12-6
Module 13: pgs 13-1 to 13-29, (ALL) revised 06/11/24	Module 13: pgs 13-1 to 13-27, (ALL) revised 02/26/24
Module 14: pgs 14-14-1 to 14-14-2, revised 06/11/24	Module 14: pgs 14-14-1 to 14-14-2, revised 02/26/24
Module 14: pgs 14-201 to 14-219, USCOE permit, revised 06/11/24	None
Exhibit 14.1: Stream & Floodway Encroachments dated 02/26/24, revised 06/11/24	Exhibit 14.1: Stream & Floodway Encroachments dated 02/26/24
Exhibit 14 dated 12/06/21, revised 06/11/24 – 2 sheets	Exhibit 14 dated 12/06/21, revised 02/26/24 – 2 sheets
Module 17: pg 17-4, revised 06/11/24	Module 17: pg 17-4, revised 02/26/24

Should you have any questions, please contact me at 814-272-0301.

Tract Engineering, PLLC

/s Timothy S Gourley

Timothy S. Gourley, P.E.

encl.

cc: J. Mital, PG, PA DEP (w/ encl.) via email
D. Bishop, BB (w/ encl.) via email
M. Lee, BB (w/ encl.) via email
R. Stormer, PG, EADS (w/ encl.) via email
Athens Township (w/ encl.) public copy for review

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**GEOMORPHOLOGICAL AND
PHASE I ARCHAEOLOGICAL SURVEY
MINARD MINE
ATHENS TOWNSHIP
BRADFORD COUNTY, PENNSYLVANIA
ER # 2020-PR-03544**



REPORT

APRIL 2024

PREPARED FOR:

TRACT ENGINEERING, PLLC
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**GEOMORPHOLOGICAL AND
PHASE I ARCHAEOLOGICAL SURVEY
MINARD MINE
ATHENS TOWNSHIP
BRADFORD COUNTY, PENNSYLVANIA**

ER # 2020-PR-03544

by

Brian L. Fritz

Submitted by

**Quemahoning LLC
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Prepared for

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REPORT
APRIL 2024

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MANAGEMENT SUMMARY

In March 2024, Quemahoning LLC (Quemahoning) completed a geomorphological study and Phase I archaeological survey for the Minard Mine, a proposed non-coal surface mine permit (SMP 08230301) located in Athens Township, Bradford County, Pennsylvania. The geomorphological and archaeological survey area was confined to a limits-of-disturbance (LOD) defined by the U.S. Army Corps of Engineers as the “USCOE Limits for PHMC Evaluation,” containing approximately 53 acres of steep mountain slopes located south of the Chemung River and Tutelow Creek. The proposed mine site access road requires two stream crossings, one for Tutelow Creek and a second for an intermittent tributary stream to Tutelow Creek. Quemahoning was retained by Tract Engineering, PLLC, and Bishop Brothers Construction Co., Inc. to complete the geomorphological study and Phase I archaeological survey.

The geomorphological study identified three alluvial landforms within the Minard Mine limits of disturbance (LOD), a delta-shaped alluvial fan issuing from an intermittent stream hollow, a T0 floodplain adjacent to the northeast side of Tutelow Creek, and a T1 terrace adjacent to the southwest side of Tutelow Creek. The remainder of the LOD consists of very steep mountainous terrain that exceeds 15% slope. The emphasis of the geomorphological study was on these alluvial deposits. Test trenches and shovel test pits revealed shallow gravel-laden soils along the southwest side of Tutelow Creek. Soils examined on the northeast side of Tutelow Creek were determined to have a potential for archaeological deposits to a depth of 85 cm. Deep archaeological testing was not needed for any of the landforms found within the Minard Mine LOD.

The geomorphological findings permitted the use of standard shovel test pits (STPs) for archaeological testing. Fourteen STPs were excavated across the alluvial fan and stream deposits along Tutelow Creek. No cultural artifacts or features were found. An examination of sandstone cliffs overlooking Tutelow Creek found no evidence of rockshelter sites. No archaeological sites were found within the Minard Mine LOD. No further archaeological work is recommended.

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1.0 INTRODUCTION

1.1 Location and Description

In March 2024, Quemahoning LLC (Quemahoning) completed a geomorphological study and Phase I archaeological survey for the Minard Mine, a proposed non-coal surface mine permit (SMP 08230301) located in Athens Township, Bradford County, Pennsylvania. The geomorphological and archaeological survey area was confined to a limits-of-disturbance (LOD) defined by the U.S. Army Corps of Engineers as the “USCOE Limits for PHMC Evaluation,” containing approximately 53 acres of steep mountain slopes located south of the Chemung River and Tutelow Creek (Figure 1). The proposed mine site access road requires two stream crossings, one for Tutelow Creek and a second for an intermittent tributary stream to Tutelow Creek (Figure 2). Quemahoning was retained by Tract Engineering, PLLC, and Bishop Brothers Construction Co., Inc. to complete the geomorphological study and Phase I Archaeological Survey.

The study area is best accessed from the southern terminus of Minard Drive and southward across a wide flat of agricultural fields that extend to Tutelow Creek and the foot of the mountain slopes that overlook the Chemung River Valley (Figure 3). The proposed mine site access road extends from the northeast bank of Tutelow Creek to the footslope of the mountain along the southwest bank of the creek (Figure 4). This footslope is a delta-shaped alluvial fan deposit that issues from an intermittent stream hollow (Figure 5). The emphasis of the geomorphological study was on the alluvial fan deposits and the stream deposits adjacent to Tutelow Creek.

The remainder of the LOD consists of very steep mountainous terrain that exceeds 15% slope. The slopes are forested with a relatively open understory (Figure 6). Hemlock is the dominant tree species, but deciduous hardwoods are scattered throughout. Old logging roads crisscross the steep slopes. No mountain summits, saddles, or benches occur within the upper portions of the LOD, only backslopes. A broken line of sandstone cliffs rises from the hillside approximately 120 feet above the valley floor. The terrain leading up to the cliffs exceeds 40% slope. The rock ledges appear to be unstable, and lack overhangs, or potential habitation floors (Figure 7). Above the rock ledges is a small, abandoned stone quarry (Figure 8). The quarry face shows no evidence of drilling and blasting methods used to extract the rock. The quarry floor is accessed from an old haul road that extends north from the quarry toward the stream hollow.

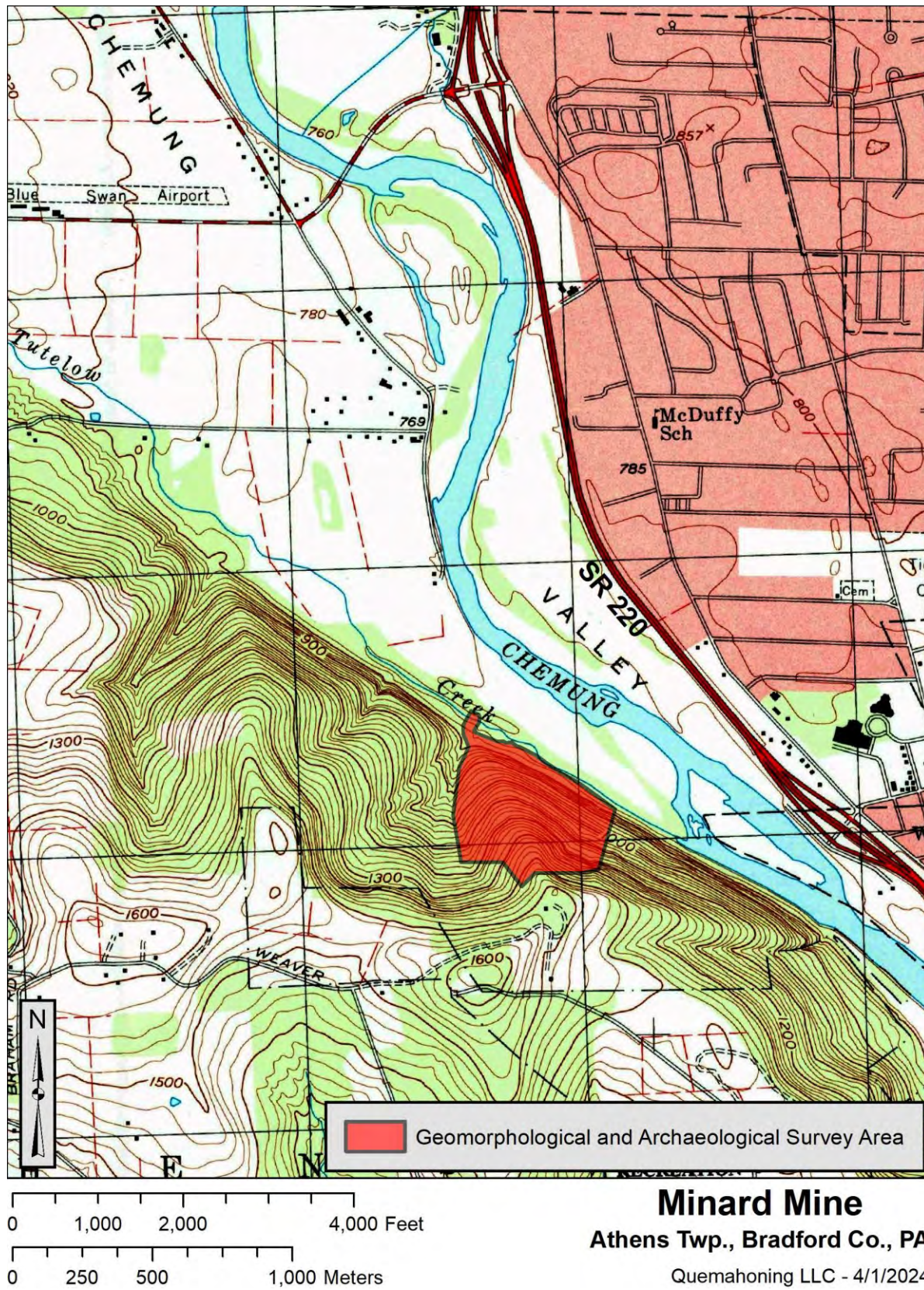


Figure 1. Section of the Sayre, PA-NY USGS 7.5' topographical map showing the geomorphological and archaeological survey area within the Chemung Valley. USGS (1995).

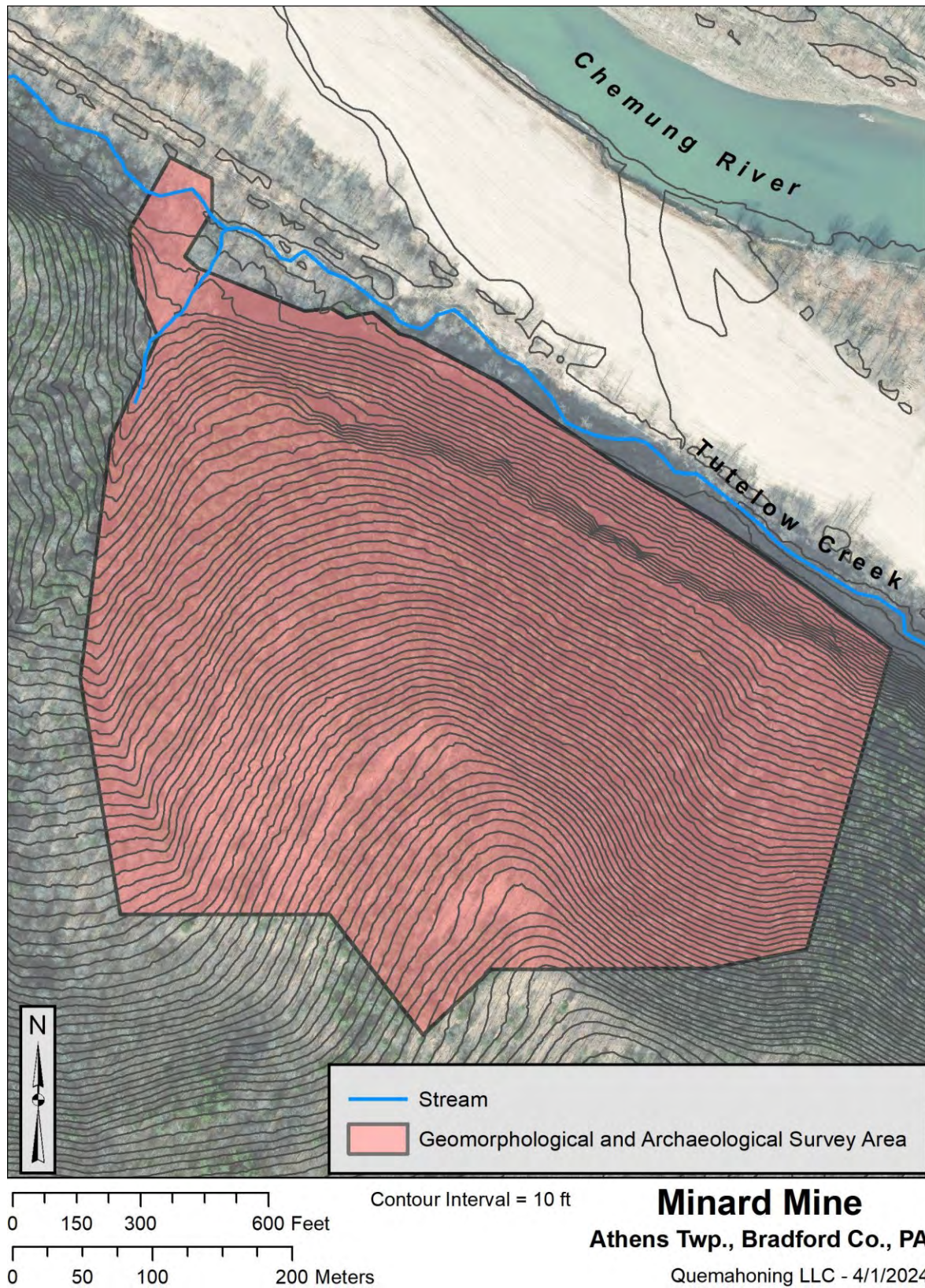


Figure 2. Map showing the locations of streams within the geomorphological and archaeological survey area. PEMA (2018).



Figure 3. View looking south toward the foot of the mountain from the end of Minard Drive.



Figure 4. Looking southeast down Tutelow Creek.



Figure 5. Looking northeast down the alluvial fan toward Tutelow Creek from the mouth of the stream hollow.



Figure 6. Looking north down the steep forested mountain slope and across the stream hollow.



Figure 7. Sandstone cliffs overlooking Tutelow Creek, looking south.



Figure 8. An abandoned sandstone quarry pit along the mountain slope, looking southeast.

2.0 ENVIRONMENTAL BACKGROUND

2.1 Physiography and Hydrology

The project area is situated within the Glaciated Lowland Section of the Appalachian Plateaus Physiographic Province (Figure 9). North of the Pennsylvania-New York border—less than 5 km (3 mi) from the Minard Mine—this same physiographic region is called the Allegheny Plateau region of the Appalachian Plateaus (Isachsen et al. 2004:4). This entire region was overridden by glacial ice during the late Wisconsinan glaciation, or last glacial maximum (LGM) (Sevon 2000; Briggs 1999). The Chemung River Valley with its wide valley bottom and mountainous valley walls is the dominant landscape feature. The river channel averages approximately 82 m (270 ft) wide, and portions of the outwash plain stretch 3.5 km (2 mi) across the valley. The Chemung River passes the Minard Mine LOD at an elevation of 746 feet above mean sea level while the mountain summit to the south climbs to 1,634 ft in elevation, resulting in a local relief of 888 ft.



Figure 9. Physiographic map showing Bradford County and the project location. Sevon (2000).

The entire APE discharges into Tutelow Creek, a second-order stream and tributary to the Chemung River. The creek enters the river 850 m (2,800 ft) southeast of where the LOD crosses the creek. The Chemung River discharges as a third-order stream into the Susquehanna River only 6.7 km (4.2 mi) downstream from the study area. The alluvial fan deposit along the southwest bank of Tutelow Creek was formed by an intermittent stream that empties into Tutelow Creek. The intermittent stream dewateres a northeast-facing hollow that encompasses 0.57 km² (0.22 mi²).

2.2 Geology and Soils

The bedrock underlying the Chemung and Susquehanna River Valleys and the surrounding Mountainous terrain belongs to the Upper Devonian Lock Haven formation. At its type locality near Williamsport, the formation is over 3,540 feet in thickness (Behr and Hand 2013). Due to this thickness, beds of the Lock Port formation dominate the surface geology across an area of 100 km east to west and more than 30 km north to south. Claystone, siltstone, and sandstone are the dominant lithologies. Shale and limestone occur as minor beds. Very fine-grained sandstone occurs in thin to three-foot-thick beds. Fossils are predominately marine in origin. The beds tend to be well-jointed (Behr and Hand 2013). Beds of hard fine-grained Lock Port sandstone, known locally as the bluestone, occur along the mountain slopes surrounding Sayre. Individual members and beds within the Lock Port formation have not been extensively studied, subdivided, or mapped (Harper 1999:126).

Soils across the Minard Mine LOD were mapped and classified by the Soil Survey (2024) as the Ochrepts-rock outcrop complex on slopes along and above Tutelow Creek, and the Dystrudepts, deep-Wellsboro-Oquaga association along steep, rubbly slopes within the intermittent stream hollow. Ochrepts and Dystrudepts are not named soil series, but rather taxonomic soil classifications. Ochrepts within the study area are well-drained, extremely stoney silt loam, and very channery loam derived from upland glacial till containing sandstone and siltstone. Dystrudepts are well-drained, very boulder and channery sandy loam formed in residuum from sandstone and shale along rubbly mountain slopes.

The resolution of the Soil Survey maps was not fine enough to accurately delineate areas of alluvium along Tutelow Creek. However, these soils are likely similar to the Holly, Pope, and Chenango series soils mapped across the adjacent alluvial plains (Figure 10). Holly soils are very deep, very poorly drained soils that form in loamy alluvium on flood plains, particularly in the back swamp areas of floodplains. Shallow gleyed B horizons are a defining characteristic that distinguishes Holly soils from the other soil types. Very deep, well-drained Chenango gravelly silt loam soils occur along higher portions of glacial outwash and kame terraces. Very deep, well-drained Pope loam soils form in acid coarse-loamy alluvium derived from sandstone and shale. Alluvial terraces containing Pope soils are occasionally flooded.

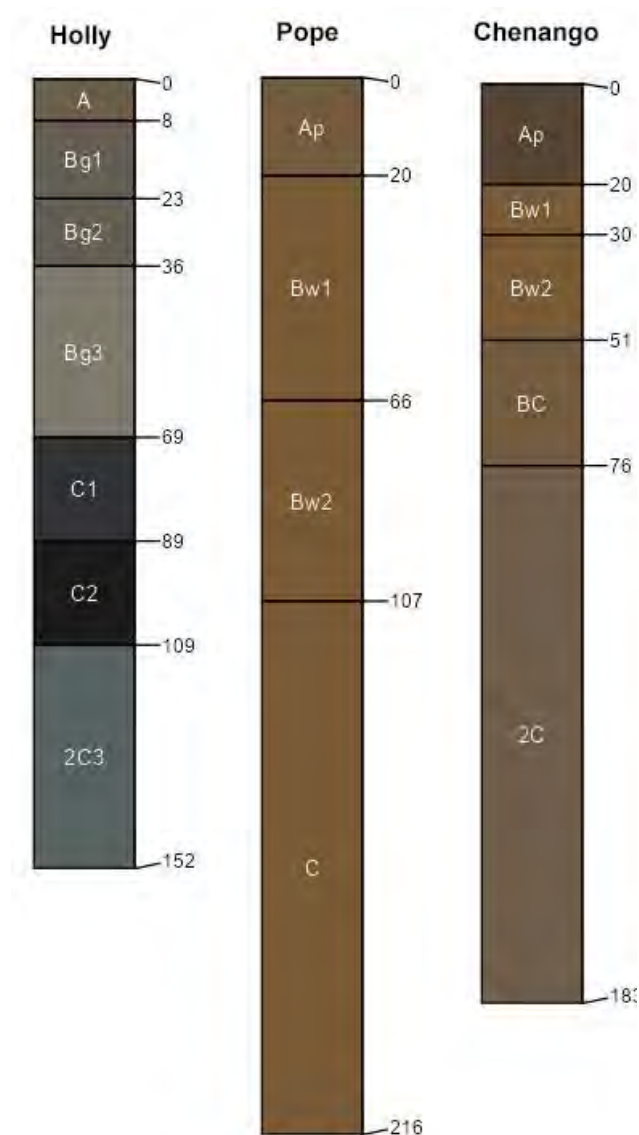


Figure 10. Typical soil profiles. California Soil Resource Lab (2024).

2.3 Geologic and Climate History

The landscape across western Pennsylvania is the result of over a billion years of geologic evolution. Pre-Cambrian basement rocks are overlain by more than 3,000 m (9,800 ft) of Paleozoic sedimentary rocks that represent near-continuous deposition with simultaneous subsidence (Shultz 1999; Saylor 1999). Deposition ended with the climax of the Allegheny Orogeny from which the uplifted and folded Appalachian Mountains and Plateaus were formed. The Allegheny Orogeny marks the suturing of the supercontinent Pangea after which erosion dominated the landscape of western Pennsylvania (Faill 1999). No Mesozoic- and Cenozoic-aged rocks were formed.

From an examination of the post-Triassic sediment record along the Atlantic margin, Poag and Sevon (1989) concluded that the Appalachian region experienced three tectonic uplifts, each followed by tectonic quiescence and high rates of erosion. The removal of large volumes of rock combined with the denuding of structural elements from earlier orogenies resulted in the erosional surfaces that characterize Pennsylvania today. A dominant characteristic of many stream valleys in the Appalachian region is the deep entrenchment of broadly looping meanders, which represent a mature, low-gradient river pattern that was locked into place by regional uplift and rapid river channel downcutting. Smaller streams in the headwaters formed dendritic, or tree-like patterns.

Drainage patterns in the Ridge and Valley Province differ from those on the Appalachian Plateau. The long linear ridgelines that characterize the Ridge and Valley Province are the headwaters for numerous small streams. Their stream valleys generally cut perpendicular to the trend of the ridge as they descend steeply into the valley below. Within the valley floor, the smaller tributaries converge into larger streams that generally traverse parallel to the valleys and ridges. This trellis stream pattern is typical of regions like central Pennsylvania where sharply tilted bedrock exhibits strong structural controls on patterns of erosion and stream formation. The landscapes of both the Plateau region and the Ridge and Valley region owe their origins to the regional uplift that exposed the bedrock to the forces of erosion. The principal difference in the resulting landscapes is in how erosion responded to the flat-lying bedrock underlying the Plateau region and the strongly folded, faulted, and tilted bedrock underlying the Ridge and Valley region.

Dating the geological events that formed the landscapes across Pennsylvania has been difficult and not without disagreement. Anthony and Granger (2007) used radiometric dating of cave sediments to measure episodes of river entrenchment within the Cumberland River Basin located in the southern portion of the Appalachian Plateau. The age of cave sediments combined with evidence of new vertical cave formation due to regional uplift suggests three periods of river entrenchment. Initial entrenchment occurred during the Pliocene between 3.2 and 3.1 Ma (million years), followed by the formation of a regionally recognized strath terrace known as the Parker Strath. Incision of the Parker Strath occurred between 2.5 and 2.4 Ma. Both episodes of incision are attributed to eustasy during periods of major marine regression. The last period of river entrenchment is attributed to the glacial reorientation of the Ohio Basin during the Pleistocene around 1.5 Ma. Region-wide aggregation of sediment at 0.85 Ma marked the beginning of intense glacial-interglacial cycling and shorter cycles of river incision, which resulted in the modern position of the river channel. These three periods of river entrenchment correlate with Poag and Sevon's (1989) last period of Atlantic margin sedimentation, which they attribute to great volumes of sediment removed as a result of continental glaciation.

The ancestral Allegheny and Monongahela Rivers originally drained northward through the St. Lawrence outlet but were reversed to their present southern outlet during the pre- or early Pleistocene by advancing ice sheets (Kaktins and Delano 1999). Anthony and Granger's (2007) 1.5 Ma age for the reorientation of the Ohio basin drainage system differs from previously

accepted chronologies. Kaktins and Delano (1999) place the reversal of the northern flowing Allegheny and Monongahela Rivers to the southern flow of the Ohio River at sometime between 772 ka (thousand years) and the Illinoian advance (302 to 132 ka) based on flow direction in alluvial terraces and lack of magnetic polarity reversals within those sediments. Remnants of the north-flowing ancestral Allegheny and Monongahela Rivers are preserved in a series of abandoned channels and cutoff meanders known as the Parker Strath (Kaktins and Delano 1999). Kaktins and Delano (1999) attribute deep incision of the Parker Strath to the change in base level that resulted from the post 772 ka drainage reversal. Anthony and Granger's (2007) chronology places incision of the Parker Strath at 1.5 Ma, which directly conflicts with Kaktins and Delano's (1999) chronology.

The Susquehanna River dominates the central portion of Pennsylvania and dewateres the largest portion of the Ridge and Valley Province in the state (Figure 11). At about 27,500 square miles, the Susquehanna River Basin is the largest along the Atlantic coast of the United States (Kaktins and Delano 1999:379). Small to medium-sized tributaries exhibit the trellis pattern described above, however, the main stem of the Susquehanna and the North and West Branches traverse perpendicular to the pronounced parallelism of the region. The traverse nature of the river with its crosscuts through major water gaps has been subject to much speculation, all of which points to an origin that predates the present-day landscape. Most hypotheses posit that the origins of the river's modern course began by the Cretaceous period and as early as the Early Triassic period (Kaktins and Delano 1999:382-383). This older origin stands in contrast to the Allegheny and Ohio River systems which were strongly influenced by Late Pleistocene glaciations and reversal of their flow due to the blocking action of continental glaciers.

River entrenchment across Pennsylvania appears to have reached its greatest extent during the Sangamonian interglacial. Across glaciated regions, the Sangamon soil or paleosol formed in Illinoian tills and is the most well-developed and widely recognized paleosol across much of the mid-western U.S. (Hall and Anderson 1999; Jacobs et al. 2009). Climatic conditions that favored Sangamon soil development for 100,000 years also advanced the continued entrenchment of the region's streams. After examining evidence of Sangamon soils in northeastern Ohio, Szabo (1997) suggested that " . . . the post-Illinoian streams were wider and more deeply incised into the landscape than their post-Wisconsinan counterparts . . ." and that "a low-elevation base level may be one of the driving forces in controlling geologic processes during the Sangamonian through middle Wisconsinan substages." This deep entrenchment of stream channels likely enhanced landscape development through processes of hillslope erosion and colluviation as the Late Wisconsinan glaciation approached the northern Appalachian Plateau.

Four major periods of glaciation are recognized in Pennsylvania; two pre-Illinoian, one Illinoian, and one Late Wisconsinan (Crowl and Sevon 1999; Shepps et al. 1959). Each new episode of glaciation tends to erode or bury evidence of the previous glaciations; therefore, Late Wisconsinan tills and outwash dominate the glaciated landscapes of eastern and western Pennsylvania. Landscapes and the regional climate across Pennsylvania were strongly

influenced by the Late Wisconsinan glaciers. Landscapes within the Wisconsin limit were completely reworked by the advancing ice. Areas south of the maximum glacial advance were also strongly influenced by the presence of glaciers and their influence over the local climate. The cold periglacial climatic conditions controlled geological processes and the kinds of flora and fauna that could survive in the harsh conditions.

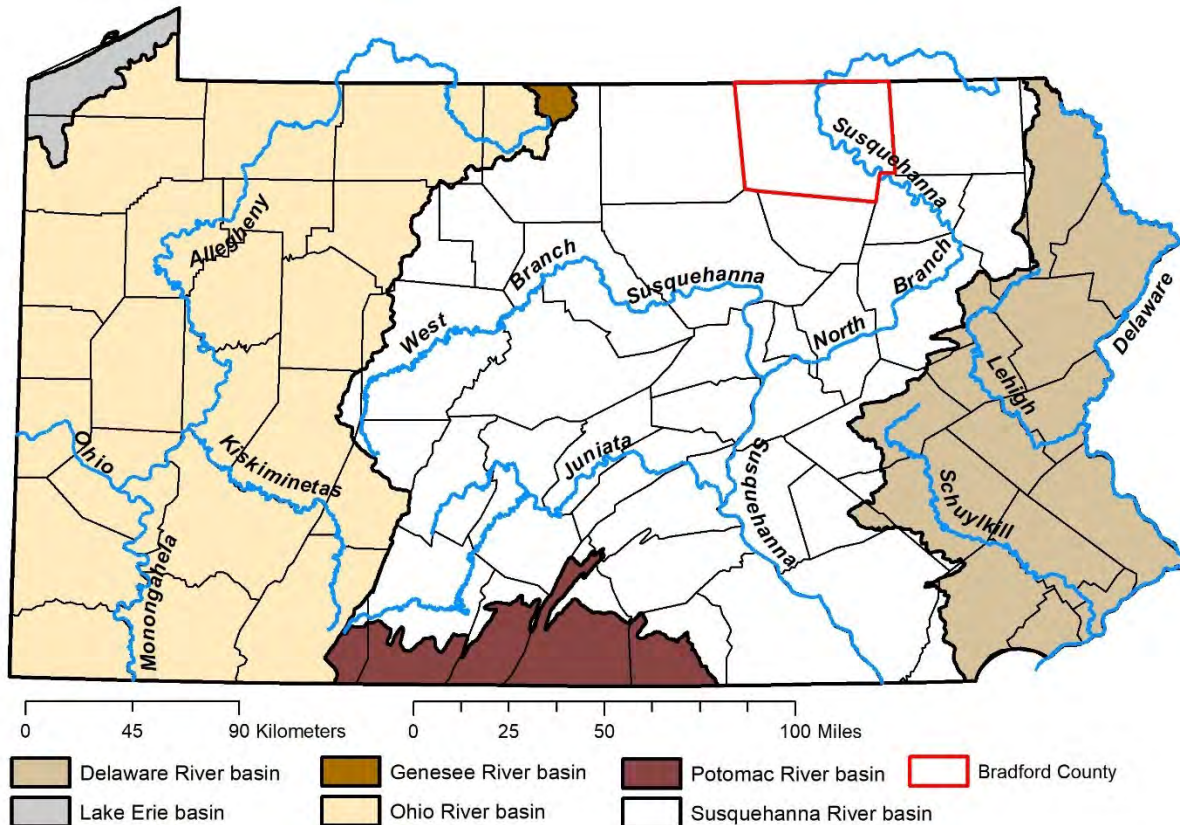


Figure 11. The major river basins of Pennsylvania. Penn State (1998, 1996), PennDOT (2022).

In northeastern Ohio, increasing slope erosion and colluviation after 24,000 radio-carbon years before present (RCY BP) suggests a colder climate and increasing periglacial conditions ahead of the advancing Late Wisconsinan ice (Szabo 1997; Amba et al. 1990). The arrival of the ice front was uneven throughout the northeast. In western Ohio, radiocarbon dates place the maximum advance between 23,000 and 19,000 RCY BP (Szabo et al. 2011). In eastern Ohio and northwestern Pennsylvania, the timing of the advance is less well constrained, but most reports place the LGM near 18,000 RCY BP, followed by a significant retreat of the ice front by 13,000 RCY BP (Szabo et al. 2011; Watts 1979; Schuldenrein and Vento 2010). Clark and Ciolkosz (1988) bracket the cold-phase maximum between 23,000 and 16,500 RCY BP for the Appalachian Highlands. Watts (1980) places the Late Wisconsinan between 22,000 and 13,500 RCY BP but includes words of caution over the arbitrariness of assigning precise dates. More recent studies of the Late Pleistocene chronology in southern New England and eastern New York combine multiple lines of evidence that include correlations with proglacial lake varves,

paleomagnetism, and AMS radiocarbon dates (Ridge 2003). In this study, the Late Wisconsinan Maximum is placed between 28,200 and 23,700 Cal yr BP followed by a period of early ice retreat between 23,700 and 18,300 Cal yr BP, and three phases of deglaciation between 18,300 and 13,000 Cal yr BP. Ridge (2003) also noted that the arrival of the ice sheet at its maximum extent may have varied as much as a few thousand years across the Northeast.

Watts (1979) determined that the cold-climate vegetation zones extending away from the glacial limit were relatively stable between 23,000 and 13,500 RCY BP. During this time the region was cold, dry, and windy. Average temperatures during July were 5 to 15°C (41° to 59° F) colder than today, and annual precipitation was as much as 10 to 30% less (Clark and Ciolkosz 1988). Macrofossil and pollen evidence indicate the presence of sage-dominated tundra across the Appalachian Plateaus and tundra that may have extended south of the ice front as far as 450 km (280 mi) within the higher elevations of Pennsylvania, western Maryland, and West Virginia. Watts (1979) raised two possible causes for the presence of tundra. The presence of sage tundra may have been due to permafrost conditions with maximum annual mean temperatures between -2° and -8°C (28.4 to 17.6°F). Alternatively, tundra conditions could have resulted from an absence of trees due to wind and related environmental factors, but without permafrost. However, Park Nelson et al. (2007) used data collected from block fields found across the Appalachian region as evidence to support the presence of permafrost soils lying above the timberline during the last glacial maximum (LGM). Despite his earlier uncertainty, Watts (1979) also suggested that a band of treeless tundra with permafrost paralleled the ice front and extended south along the higher elevations of Pennsylvania and West Virginia.

Ciolkosz et al. (1986) cite abundant evidence that cold-climate environments once dominated the Pennsylvanian landscape as far as 160 km (100 mi) south of the ice front. Such periglacial environments can exist with or without the presence of permafrost. Relic periglacial features include patterned ground, involutions, ice-wedge casts, pingo scars, grezes litees, boulder fields, block streams, rock cities, hillslope colluvium, and gelifluction (solifluction) lobes with larger-scale hillslope colluvium deposits being the most extensive type of periglacial feature in Pennsylvania (Ciolkosz et al. 1986; Clark and Ciolkosz 1988). Present-day hillslopes in Pennsylvania with low angles of repose may be "super stable," and represent relic landscapes from more active periglacial times (Ciolkosz et al. 1986). Based on a study of late Pleistocene soils within the northernmost portion of the Salamanca Reentrant, Millar and Nelson (2001) attribute periglacial colluviation to solifluction. Solifluction (aka gelifluction) is the active low-gradient downslope movement of meltwater-saturated soil and regolith due to the combination of gravity flow and seasonal freeze-thaw creep but differs from mudflow with slower, more continuous movement that is not confined to channels (Bloom 1991; Thornbury 1969). Snyder and Bryant (2009) concluded that widespread periglacial colluviation within the Salamanca Reentrant was most active between 20,500 and 16,500 RCY BP.

In a study of hillslope deposits in central Pennsylvanian, Gardner et al. (1991) found evidence of two episodes of Late Wisconsinan colluviation. A period of colluviation began with cooling temperatures and the southern advance of ice sheets. The first pulse of colluvial

deposition preceded the glacial maximum (26,000 to 22,000 RCY BP). Slope processes included gelifluction, debris flow, sheet wash, and channelized flow. During the height of glaciation (22,000 to 18,000 RCY BP) colder temperatures and permafrost conditions reduced sediment supply as evidenced by an erosional disconformity at the top of the pre-glacial maximum colluvium and the presence of relic frost cracks and ice-wedge casts within that same surface. This locking of the landscape was followed by a brief episode of mass wasting. The second impulse of periglacial colluviation buried the permafrost surface (18,000 to 13,000 RCY BP). Colluviation ended with the deglaciation of the Wisconsinan ice front and the end of periglacial conditions. Soil formation began on the surface of the colluvial deposits as the Late Pleistocene climate warmed and soil surfaces stabilized during the early Holocene.

Watts (1980) describes the climate trend from 13,500 to 10,000 years ago as transitional with the ice front retreating north of the Great Lakes basin. This period includes the Bolling through Allerod warming trend and the 1,600-year-long return of cold periglacial conditions during the Younger Dryas (Figure 10). Pioneer tree species began to migrate north with spruce tundra parklands while more closed boreal forests were located to the south. Haynes (2008) compiled stratigraphic data and associated radiocarbon dates from more than 90 archaeological sites across North America where Allerod through Younger Dryas-Holocene-aged strata was present. He tightly constrains the Younger Dryas between $10,900 \pm 50$ RCY BP and $9,800 \pm 50$ RCY BP (12,800 and 11,200 Cal yr BP). At many sites, a black organic mat marks the beginning of the Younger Dryas and a catastrophic event that ends the presence of North American ice age megafauna. The onset of the Younger Dryas is also significant to archaeology and first American studies in that the cooling event marks the end of the Clovis culture within the Paleoindian cultural period.

The Holocene began with the return of warmer and wetter climates (Figure 12). Retreating glaciers exerted less influence over the climate, which allowed floral zones to migrate northward. Some of the first migrant tree species included white pine, alder, fir, tamarack, and eastern hemlock (Watts 1979). After 8,500 RCY BP, the climate became more like our modern continental climate with greater seasonal differences in temperature and precipitation (Custer 1996). Oak and hemlock forests covered much of Pennsylvania by 6,000 yr BP. Hickory, chestnut, and other species that characterize the region's modern deciduous forests followed soon after. These migrations were not even across Pennsylvania and varied according to elevation and local environmental factors. The pollen record within Holocene-aged deposits indicates climatic conditions that alternated between warm moist and warm dry, and cool moist and cool dry during the Late Holocene. In the Blytt-Sernander chronostratigraphic model (Figure 10), the Atlantic, Sub-Atlantic, and Neo-Atlantic episodes correspond to warm and moist climate periods; the Boreal and Sub-Boreal were warm and dry; and the Scandic, Pacific, Neo-Boreal, and Modern episodes represent relatively cooler climate periods.

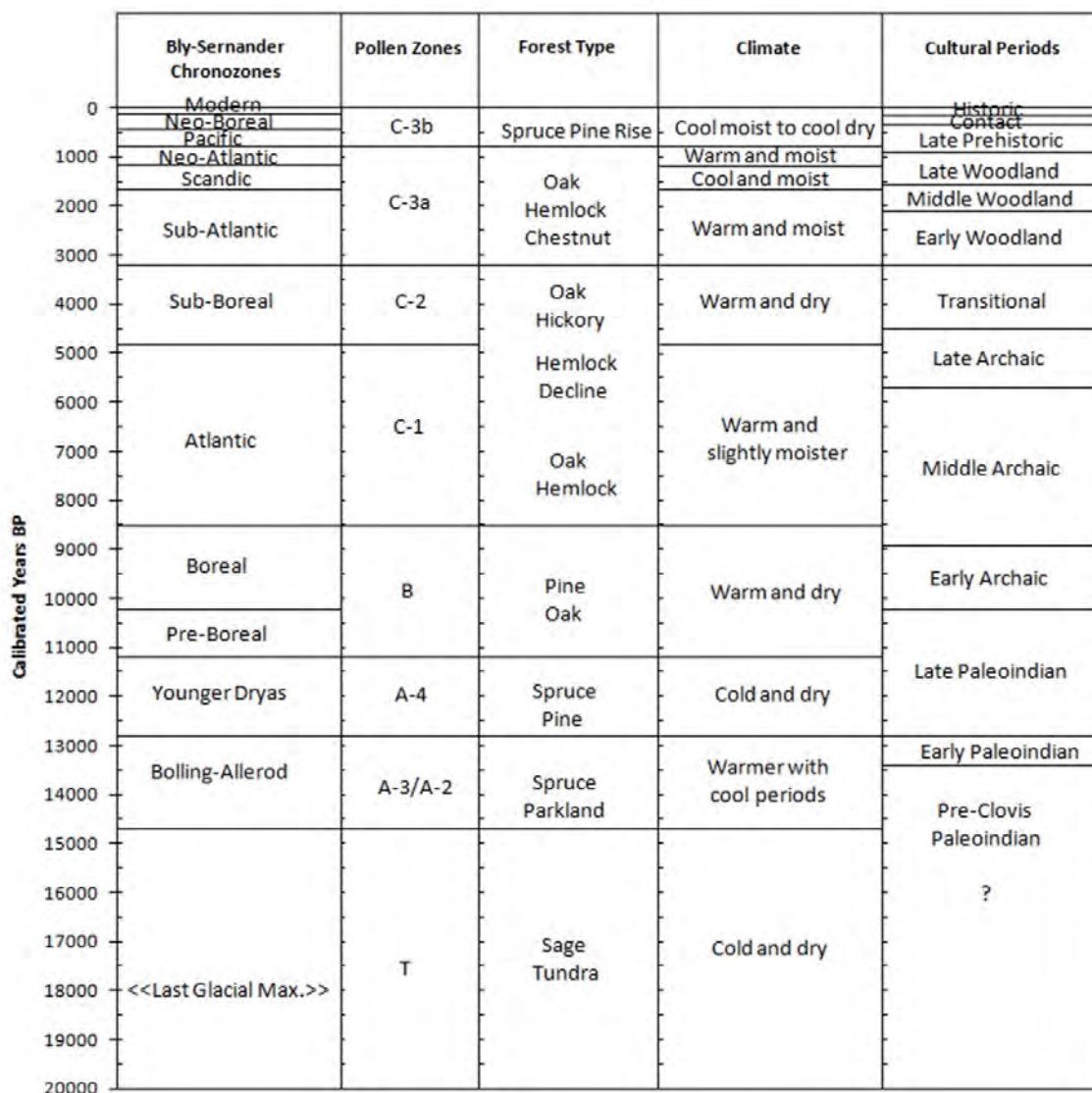


Figure 12. Time plot showing paleoenvironmental trends and cultural periods, after Vento et al. 2008 and Stitler et al. (2010). Ages in Cal yr BP compiled from Haynes (2008); Ellis et al. (2004); Wood (1976); and Schledermann (1976).

2.4 Trajectories of Buried Soils

Changes in climate and vegetation influence the geologic processes that govern the accumulation of sediment and the formation of soil. Over the past 20,000 years, alluvial terraces and colluvial footslope deposits have generally aggraded over time, but not without episodes of instability and degradation. Periods of instability are characterized by increased rates of erosion and deposition, while periods of stability are marked by soil formation due to decreased erosion and deposition. Vento et al. (2008) posit that sequences of buried soil A horizons found within river terraces across the mid-Atlantic region can, with caution, be used as allostratigraphic units that chronostratigraphically correlate to other buried A horizons across a river basin and possibly

between river basins. Case studies for the Ohio, Susquehanna, and Delaware River basins provide examples in which paleosols and lithostratigraphic discontinuities have been radiometrically dated and correlated to specific climatic episodes and cultural periods (Vento et al. 2008; Schuldenrein and Vento 2010; Schuldenrein 2003; Stitler et al. 2010; Foss 1991). Within thick sequences of Holocene alluvial sediment, buried soil A horizons are often associated with strata dating to the late Boreal, mid and late Atlantic, sub-Atlantic, and neo-Atlantic climatic episodes. During these climactic episodes, floodplain stability and soil formation are attributed to reduced rates of overbank discharge and less aggressive slope erosion.

In mid-continent North America, Bettis (2003) found similar region-wide patterns in sedimentation and soil formation within colluvial slopes and alluvial fans. Cycles of aggregation and stability produced a pattern of soil stratigraphy. Major episodes of deposition occurred from 8500 to 6500 yr BP, 6000 to 4000 yr BP, and 3000 to 2000 yr BP. Bracketing these periods of increased erosion and deposition are episodes of landform stability and soil formation dating to about 10,000, 8500, 6500, 4100, and 2500 yr BP. Soil formation was strongest around 6500 and 2500 yr BP with corresponding soils that exhibit A-Bw or A-Bt horizons. Weaker soil-forming cycles typically produced A-C soil profiles. The soil formation patterns described by Bettis (2003) are similar to those described for Pennsylvania, but vary somewhat in chronology, possibly due to geographic variations in paleoclimates between the mid-continental and mid-Atlantic regions.

Many alluvial soils lack buried A horizons. Former surfaces within the soil profile most certainly contained A horizons, but these A horizons were not preserved after burial. Holliday (2004) recognizes sets of geologic processes that can lead to three differing trajectories of soil burial.

1. Rapid burial that leaves a complete soil profile preserved under younger sediment.
2. Erosion before burial, resulting in a truncated soil profile preserved under younger sediments.
3. Slow burial that allows pedogenesis to keep pace with sedimentation.

Under the first scenario, younger sediment encapsulates the buried A horizon (Figure 13). The thicker the overlying new sediment, the more isolated the buried A horizon is from continued soil weathering processes. Rapid and deep burial favor buried A horizon preservation. However, soil organic matter (SOM) is one of the least stable soil constituents, and in time, it can be leached from the profile by post-burial processes (Schaetzl and Anderson 2005; Birkeland 1999).

Holliday's (2004) second trajectory accounts for processes that can remove the surface horizons and place new sediment directly onto the eroded surface of the B horizon. A and E horizons tend to be more friable and less well consolidated than underlying B horizons, thus making them more susceptible to removal during episodes of surface erosion. This is especially true for well-consolidated Bt horizons that resist erosion. Very abrupt horizon boundaries and lithologic discontinuities may be the best indicators of truncated and buried soils.

The third possibility results in cumulative soil horizons in which the A and B horizons become over-thickened as the horizon boundaries move proportionally with the accumulation of new sediment (Figure 11). If the accumulation of new sediment outpaces the leaching of the organic matter, then the A horizon may become overthickened. However, in strongly acidic soils, leaching of organic matter and pedologic weathering at the bottom of the A horizon may offset the accumulation of sediment and new organic matter at the top of the A horizon. In this case, the underlying B horizon upbuilds and becomes over-thickened. As SOM at the bottom of the A horizon leaches away, the residual sediment succumbs to soil weathering processes and becomes welded into the upper portion of the underlying B horizon. Meanwhile, as fresh sediment accumulates on the surface, new SOM is incorporated into the top of the A horizon. The A horizon essentially moves upward, maintaining its thickness with the slow accumulation of sediment, while the underlying B horizon becomes thicker.

2.5 Classification of Landforms

T00 Scour Zone

Scour zones are low areas within the active floodplain that are usually inundated annually but are generally higher than the active stream channel. Scour zones are typically narrow, discontinuous stretches found along the insides of meanders. These areas are relatively low in height above the stream and often support only fast-growing herbaceous vegetation and shrubs. Scour zone surfaces usually slope toward the stream channel or, in areas where they are the widest, exhibit low bars and swales formed in sand and gravel. Sediments within scour zones are composed of lateral alluvial deposits of sand and gravel with minor accumulations of vertical deposits within swales. These lateral deposits often represent areas where new or incipient floodplains are forming. Sediments within scour zones represent recent deposition and have no potential for containing intact cultural deposits.

T0 Floodplain

T-0 surfaces represent active floodplains. Floodplains are defined as alluvial landforms that are usually inundated by overbank flooding every few years on average (Wolman and Leopold 1957). These surfaces are composed of vertically accreted alluvial sediments that were deposited by reoccurring overbank flood events. Floodplains are often longitudinally intermittent landforms along Pennsylvania's streams and are typically best developed along the inside of meanders. T0 floodplains are usually higher above the stream than adjacent scour zones. Levee bars along the proximal portions of floodplains typically delineate the floodplain along adjacent, lower T00 surfaces. Floodplain wetlands or back swamps are common in distal portions of the floodplain and may show evidence of former back channels or sloughs that have become infilled with fine overbank flood deposits.

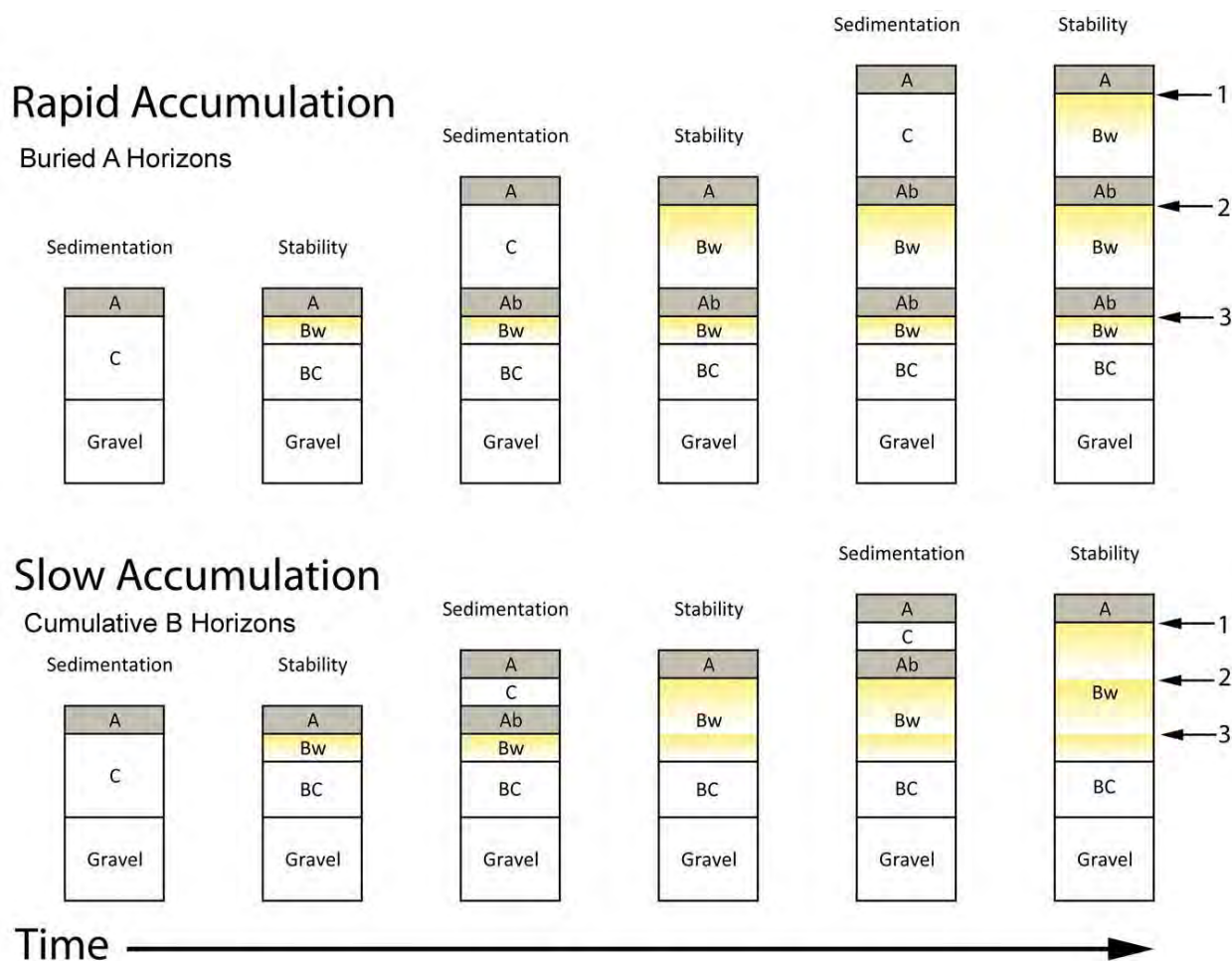


Figure 13. Chart showing two idealized trajectories of soil profile development in alluvial settings.

T0 floodplains are complex landforms that are still under construction. Along many of Pennsylvania's streams, they are often unpaired terraces that form through the combined processes of channel entrenchment and lateral channel migration. Their construction is time-transgressive, and their surfaces exhibit a downstream gradient that exceeds the gradient of the stream channel. Higher portions of the floodplain tend to be in upstream positions and represent more mature surfaces that experience longer flood recurrence intervals. Downstream portions tend to be lower and often exhibit sequences of more recent point bar formation.

T1 Terrace

T1 terraces are represented by alluvial surfaces that are notably higher than the active floodplain. They are old floodplains that have been partially or wholly removed from new overbank flooding as a result of stream channel incision. Structurally, T1 terraces may differ significantly from the lower floodplain, as they were formed during times when drainage-wide vegetation, climate, and rates of erosion may have differed from today. The underlying channel lag deposit within a T1 terrace is often higher in elevation than the basal gravels within the lower

T0 floodplain. Older terraces in Pennsylvania often exhibit more condensed soil profiles as compared to younger floodplains along the same stream segment.

T2 Terrace

T2 Terraces are essentially old floodplains that are higher and older than adjacent T1 terraces. Older terraces are sequentially numbered in order of height above the stream, T1, T2, T3, etc. Along streams that received influxes of glacial melt water, the highest and oldest recognizable terrace is often composed of glacial outwash gravel. Less common, older terraces with highly eroded surfaces can be identified along valley walls. Described as "old alluvium" in older county soil survey books, many of these older terraces pre-date the Wisconsinan glaciation. Soils in pre-Wisconsinan terraces usually contain argillic (Bt) and fragic (Bx) horizons.

Alluvial Fan

Alluvial fans form along smaller tributary streams where the higher gradient of the tributary stream rapidly transitions into the lower gradient setting of the larger river valley. As the gradient decreases, the stream is no longer competent enough to carry its load of sediment and gravel. Over time, the accumulation of sediment forces the stream to break out into areas that are less obstructed, and the channel alters its course. This shifting of the stream channel combined with the buildup of coarser materials at the fan axis creates the characteristic form of the alluvial fan. In Pennsylvania, alluvial fans are not uncommon, but they may be difficult to recognize without the aid of high-resolution elevation maps. Few exhibit the classic delta shape associated with fans found in drier climates and most are simply classified as alluvial terraces.

Little is known about the timing of alluvial fan development in Pennsylvania. In a detailed study of alluvial fans in the mid-continental United States, Bettis (2003) found that there were two major episodes of fan and slope building, occurring at 8500-6500 and 6000-2000 yr B.P. Late Holocene shifts in feeder stream channels removed earlier deposited sediments within the fan apex and mid-section, which created a complex series of cut-and-fill, fan-trench sequences. The climate conditions that controlled fan development in the mid-west may not be directly analogous to the conditions within western Pennsylvania.

Colluvium

Colluvium is sediment and rock fragments that accumulate along the base of gentle slopes and hillsides by rain wash, sheetwash, downslope creep, and other processes of downslope movement under the influence of gravity (Jackson 1997:127; Schaetzl and Anderson 2005:212). In Pennsylvania, colluvium is commonly found as a depositional wedge or apron along foot slopes and toe slopes. Sediments that accumulate at the foot of exposed rock cliffs and within rockshelters are also colluvial, including sediments formed from grain-by-grain attrition of the rock face or overhang. Accumulation rates are typically slow and conducive to the formation of cumulative B horizons. Cumulative A horizons can form where recent deposition has been more rapid, often as a result of sheetwash erosion in cultivated fields or forest slopes denuded of vegetation. Although less common, rapid and thick accumulations of material carried downslope by slumps and debris flows can result in buried A horizons. Colluvial sediments may have a

potential for stratified cultural deposits if episodes of deposition persisted during the Late Pleistocene through the Holocene.

Outwash Terrace

Outwash terraces are alluvial surfaces formed in association with glaciers (glaciofluvial). Glaciers discharge large and highly variable pulses of glacial meltwater. Accompanying the meltwater are large volumes of poorly sorted glacially transported materials. The fluvial action of the water tends to winnow out finer clay and silts leaving behind the coarser sand and gravel called outwash. The injection of outwash into a river valley can produce long valley-filling gravel trains that extend tens of miles downstream from the glacial front (Bloom 1998:387). Gravel trains can fill a valley with hundreds of feet of coarse material, often with pockets of fine-grained glaciolacustrine deposits trapped by temporary pro-glacial lakes. Remnants of glacial outwash and gravel trains are found in all of the major river valleys in Pennsylvania that received glacial meltwater during the Pleistocene. Many of these outwash terraces form the underlying structural core of alluvial terraces that form the modern valley floor.

Kame Terrace

Kame Terraces are glaciofluvial landforms that form in direct association with a glacial ice mass. A kame is a conical mound hill composed of stratified glacial drift that was deposited through an opening in an ice block. Stratified glacial drift is created by the movement of water over, under, and between blocks of ice. Although stratified by the action of moving water, these deposits are usually less well sorted than outwash, but better sorted than glacial till. Kame terraces form between the ice mass and the valley wall (Bloom 1998:386), often as complex arrays of kames and stratified drift along the sides of valleys. Locally, the surfaces of kame terraces undulate, but at larger scales, they may exhibit concordant elevations above the valley floor. Kame terraces form in direct contact with the glacier and do not exist within valleys downstream of the glacial maximum.

2.6 Terraces along the Susquehanna River

Peltier (1949) studied the alluvial and glaciofluvial landforms found within the Susquehanna River Valley. Eight or more terraces were identified, four of which are Wisconsinan age, the Olean terrace, the Binghamton terrace, the Valley Heads terrace, and the Mankato terrace. Outwash deposits underlying the Olean, Binghamton, and Valley Heads terraces have been correlated to their respective glacial sub-stages. Binghamton till has been mapped across western New York and northwestern Pennsylvania. The Olean till is prominent across northeastern Pennsylvania. Till and moraine deposits associated with the Valley Heads substage occur across New York but are absent in Pennsylvania, representing a late stage of the retreating Wisconsinan glacier. The glacial ice front during the Mankato substage was too far north to contribute outwash gravel into the Susquehanna River Valley. Peltier (1949:80)

proposed that the formation of the Mankato terrace is related to the river's response to periglacial climatic conditions during the Mankato substage.

Miller et al. (2004) identified four Susquehanna River terraces in their report on archaeological excavations along SR 11 in Juniata and Perry Counties, Pennsylvania. The lowest terrace (T0) represents recent alluvial deposits with no potential for archeological resources. The Port Huron/Valley Heads (T1/T1A) terrace rests 3.0 m (10 ft) above the river and contains Holocene-age sediments with a high potential for buried pre-contact cultural deposits. At a height of 9 m (30 ft) above the river, the Binghamton (T2) terrace received low rates of Holocene overbank sediments. Pre-contact artifacts occur in the plow zone and to a depth of approximately 40 cm (14 in) below the plow zone. The Olean (T3) terrace is the oldest and highest at 12 m (40 ft) above the river channel. Artifacts found on the Olean terrace are in the plow zone or immediately under the plow zone.

Stacked sequences of A and B horizons are found in Holocene-age sediments along the larger rivers in Pennsylvania. The underlying gravels were likely deposited in the Late Pleistocene. Vento et al. (2008) attribute these buried A horizons to prolonged reduced flood intensity and floodplain stability that correlate to specific climatic episodes. These buried A horizons are best expressed in the Port Huron/Valley Heads terrace near the bank edge or where over-bank deposits are thickest. Correlations occur in the Neo-Atlantic (1100 – 750 BP), Sub-Atlantic (3000 – 1700 BP), Atlantic (4500 BP), and Boreal (8000 BP) climatic episodes. (Vento et al. 2008) propose that these correlations between buried A horizons and climatic episodes can be traced across the major river basins and between the Ohio, Susquehanna, and Delaware basins.

The Memorial Park Site (36CN164) along the West Branch of the Susquehanna River near Lock Haven resides on the Port Huron terrace, 4 m above the river. Seven buried soils were identified in excavation blocks. Mean resident time (MRT) dates ranged from 1470 BP in the surface soil to 7090 BP in the deepest buried A. Excavations were completed to a depth of 300 cm and artifacts were recovered to a depth of 250 cm (Hart 1993:25,111-112).

The Wallis Site (36PE16) along the Susquehanna River near Liverpool rests on a Port Huron terrace 2.5-3.5 m above the river. Soils extended to a depth of at least 2 m. Artifacts contained in the Bw horizons of the surface sola dated to the Middle and Early Archaic periods. The deepest sola contained a sequence of 2AB-C2-C2g-2C3 horizons resting upon gravel. Paleoindian period artifacts were recovered from the C horizon sediments resting immediately above basal gravel (Miller et al. 2007).

A geomorphological assessment was completed along the North Branch of the Susquehanna River in the City of West Pittston. The study area was on an alluvial terrace that rests 5.5 to 6.4 m above the river. Hand auger borings recorded a soil profile with three sola extending to a depth of 410 cm. A 2BA horizon at 110 cm to 130 cm represents a former stable surface. The absence of a buried A horizon at the top of the third solum (3Bw1) indicated a scour and redeposition event. Lateral deposits of loose loamy sand (3C) occurred from 340 to 410 cm (Sams 2021).

3.0 METHODOLOGY

3.1 Field Methods for the Geomorphological Study

Background research included a review of pertinent geological literature, soil survey maps, and historic USGS topographical maps. Environmental spatial data was collected and assembled into a geodatabase. Geospatial data sets included recent and historic aerial imagery, LiDAR derived digital elevation models, and soil survey data. Landform maps were prepared to help guide the field investigation.

A hydraulic excavator provided by Bishop Brothers Construction Co. was used to excavate two trenches into alluvial deposits on the southwest side of Tutelow Creek. In addition, 14 shovel test pits (STPs) were excavated at 15-meter intervals across the alluvial deposits. On the northeast side of Tutelow Creek, one hand excavated shovel test pit (STP) was excavated to a depth of one meter in alluvial deposits. Below one meter, a 3-1/4-inch hand auger was used to sample soils to the depth of basal gravel. Wall profiles were measured, and field descriptions of soils and sediments were recorded. Photographs of selected STPs and each trench were taken with a Canon EOS Rebel XS digital camera and a Motorola One 5G UW Ace phone camera. GPS coordinates for each sample were captured using MapIt GIS software 7.8.0 and a Juniper Systems Geode GNS3 submeter GNSS receiver. Maps showing the results of the investigation were prepared using ESRI ArcGIS 10.6 software.

3.2 Field Methods for the Archaeological Survey

Field methods follow PHMC (2021) Guidelines for Archaeological Investigations in Pennsylvania. The portion of the Minard Mine LOD with slopes less than 15% encompasses approximately one acre. Within this one-acre area, STPs were excavated at 15-m intervals. All excavated soil was screened through ¼" hardware cloth. All STP results and soil profiles were recorded on STP forms. Pedestrian renaissance was conducted along the steep slopes in the forested areas designated as low potential for pre-contact archaeological sites.

Photographs were taken to document the project area and ground conditions. Photographs were captured using a Canon Rebel XS digital SLR camera and a Motorola One 5G UW Ace phone camera. Artifacts and collected samples received a unique Field Specimen number (FS#) that represents the provenience from which the material was removed. A field inventory of the collected materials was maintained. GPS locations were captured with a Juniper Systems Geode GNS3 submeter GNSS receiver and logged using MapIt GIS software 7.8.0. Fieldwork began on March 27, 2024, and was concluded on March 28, 2024. Maps showing the results of the investigation were prepared using ESRI ArcGIS 10.6 software.

4.0 RESULTS

4.1 GIS Analysis

A pre-field landform analysis was generated using high-resolution LiDAR elevation data collected by the US Geological Survey in 2019. A slope analysis found that 98% of the 53-acre LOD contains slopes greater than 15% (Figure 14). More than half of the LOD contains slopes greater than 40%. Linear areas with slopes greater than 80% were interpreted as potential rock ledges. A one-acre area located along Tutelow Creek in the northernmost portion of the LOD was the only terrain containing slopes less than 15%. This area encompasses a delta-shaped alluvial fan deposit that issues from an intermittent stream hollow and spreads across the footslopes and stream terraces along the southwest side of Tutelow Creek (Figure 15). On the northeast side of Tutelow Creek, a small portion of T0 floodplain resides within the LOD. This floodplain rests 4.7 to 5.0 m above the Chemung River, but only 1.0 to 1.3 m above Tutelow Creek. Subsurface testing for both the geomorphological study and the archaeological survey was focused on the alluvial fan and the T0 floodplain.

An examination of historic aerial photographs found that the entire LOD remained forested for more than 100 years (USDA 1939a, 1939b). The area was never cultivated due to the steep slopes and rubbly soils. The landscape patterns show no evidence of clearing or fencing for pastures and no indications of buildings or farmsteads. No previously recorded archaeological sites were found within the PA-SHARE database. The remnants of an early nineteenth-century canal basin are visible in the elevation maps, but the canal structure rests on the alluvial plain outside of the Minard Mine LOD.

4.2 Geomorphology Results

Two trenches were excavated within the alluvial fan deposit (Figure 16). Trench 1 (TR-1) was placed along the edge of the LOD near the center of the fan, approximately 20 m from Tutelow Creek and 18 m from the intermittent stream. Cobbles and pebbles were present on the surface. The trench was excavated to a depth of 120 cm. Dense gravel was encountered in all levels, but the cobbles became large below 90 cm (Figure 17).

Trench 1 (TR-1)

OA - 0 to 5 cm; very gravelly silt loam, black (10YR2/1), loose

AC - 5 to 45 cm; very gravelly silt loam, brown (10YR4/3), loose

BC - 45 to 90 cm; very gravelly loam, dark yellowish brown (10YR4/4), loose

C - 90 to 120 cm; very gravelly loam, dark yellowish brown (10YR4/4), loose

Trench 2 (TR-2) was placed 18 m northwest of Trench 1 and lower on the alluvial fan. Similar to Trench 1, cobbles, pebbles, and channers comprised more than 50% of the soil profile with loose silt loam filling the voids between individual stones (Figure 18). Excavation was discontinued at 95 cm below the ground surface where a coarser gravel was found in gleyed clay loam.

Trench 2 (TR-2)

AC - 0 to 41 cm; very gravelly silt loam, dark brown (10YR3/3), loose

BC - 41 to 95 cm; very gravelly silt loam, dark yellowish brown (10YR4/4), loose

BCg - 95+ cm; very gravelly/channery clay loam, mottled gray (2.5Y5/1) and strong brown (7.5YR4/6), weak subangular blocky

Fifteen STPs were plotted across the alluvial fan. STP 1 exposed 24 cm of alluvial silt loam resting over a gravelly C horizon containing loose pebbles, granules, and silt. Dense coarse gravel was absent from the A horizon. This soil profile may represent a transition from the alluvial fan to the overbank deposits of Tutelow Creek. The height of this surface above Tutelow Creek suggests the presence of a T1 terrace at 1.8 m above the creek.

Shovel Test Pit 1 (STP 1)

AC - 0 to 24 cm; silt loam, dark brown (10YR3/3), loose

BC - 24 to 40 cm; very gravelly silt loam, dark yellowish brown (10YR4/4), loose

STP 4 was not excavated because it landed on the slope of the stream channel. STP 15 was not excavated because it landed on a logging road that was cut from the adjacent footslope. A tree throw along the footslope near STP 15 revealed the underlying accumulation of sandstone channers (Figure 19). A similar surface accumulation of sandstone channers was noted along the footslope near STP 3. The remaining STPs were placed across the alluvial fan. Excavation revealed accumulations of dense gravel from the surface to the depth at which the excavation was ended (Figure 20). Cobbles, pebbles, and channers were found on the surface across most of the fan deposits. The area of the alluvial fan holds no potential for deeply buried cultural deposits. Only the surface soil horizon has the potential to contain cultural deposits.

STP 16 was placed on the T0 floodplain on the northeast side of Tutelow Creek. The upper 56 cm of soil represents a relatively recent accumulation of overbank sediment. The underlying Bw horizon exhibits some degree of stability, but its age is uncertain. The Bg horizon represents the accumulation of sediment within the context of a wet stream bottom. Soils on the T0 floodplain have a low potential for cultural deposits to a depth of 85 cm.

Shovel Test Pit 16 (STP 16)

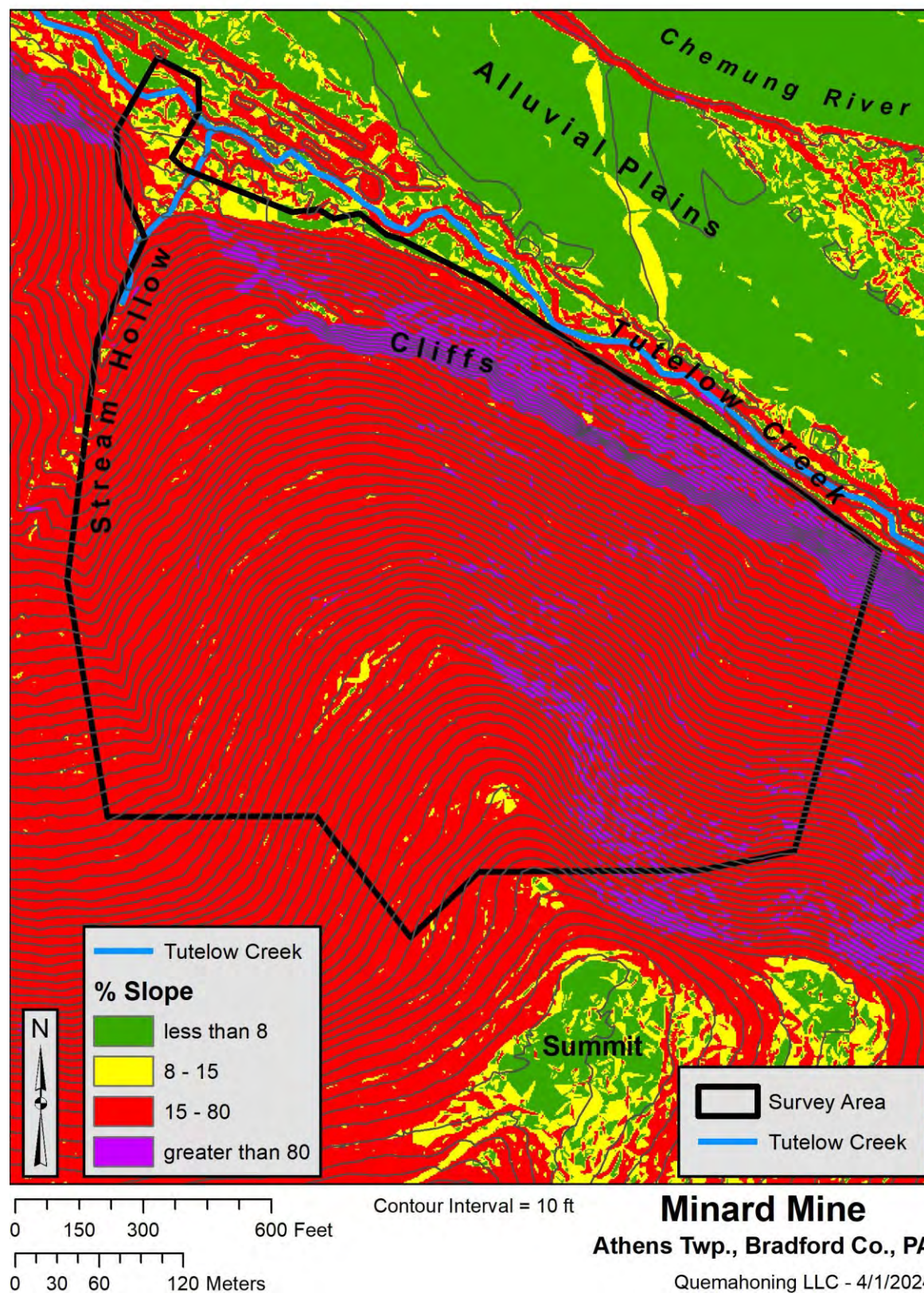
OA - 0 to 5 cm; silt loam, dark brown (10YR3/3), very friable

BC - 5 to 56 cm; silt loam, dark brown (10YR3/3), very friable, massive

Bw - 56 to 85 cm; loam, dark yellowish brown (10YR4/4), very friable, massive

Bg - 85 to 132 cm; loam, gray (2.5YR2/1), very friable, weak subangular blocky

Auger refused by gravel at 132 cm, stream channel lag



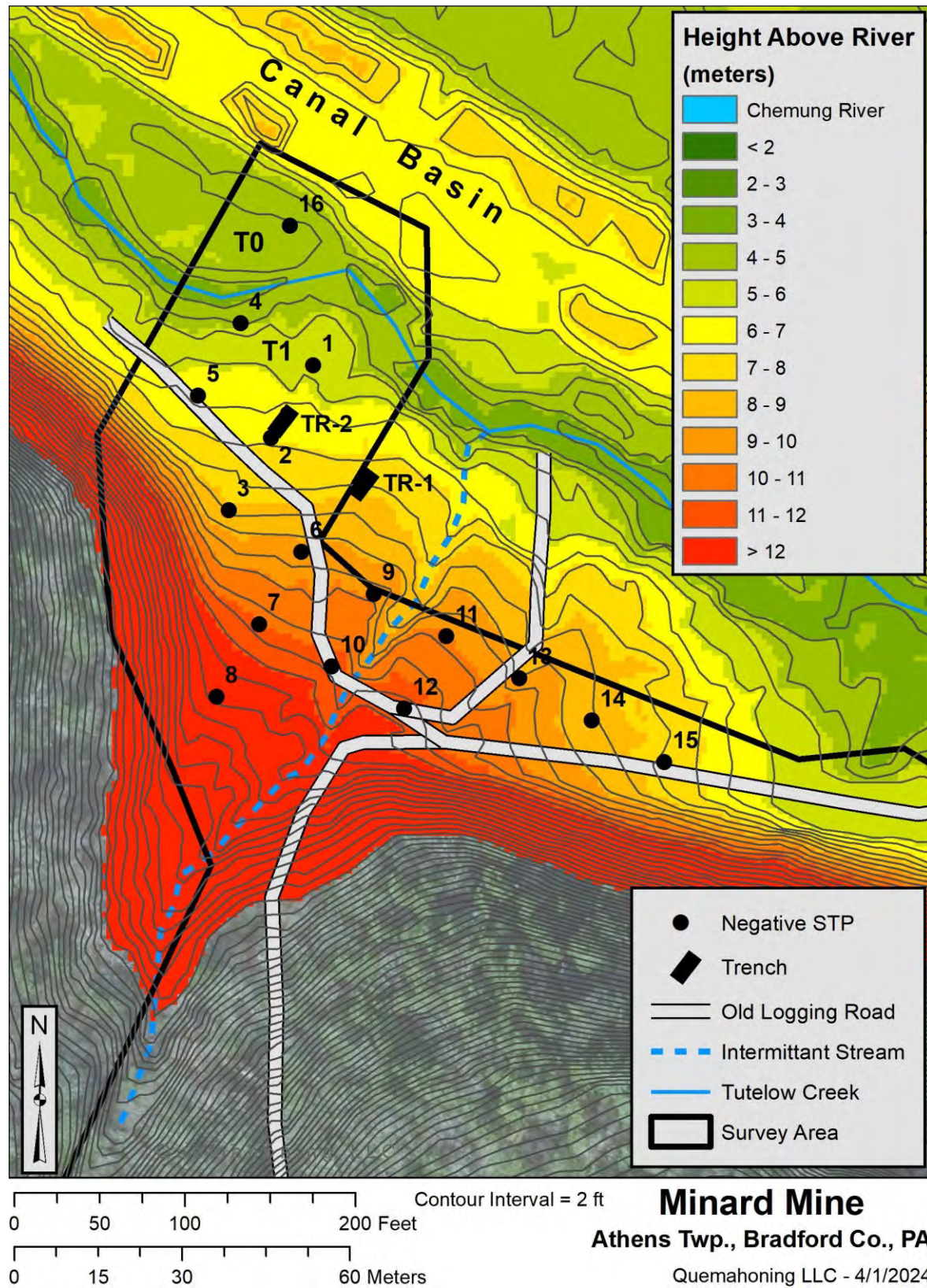




Figure 16. The hydraulic excavator at Trench 1.



Figure 17. The southwest wall profile of Trench 1.



Figure 18. The southeast wall profile of Trench 2.



Figure 19. An accumulation of sandstone channers along the foot slope near STP 15, looking south.



Figure 20. Gravel excavated from the upper 15 cm of STP 9.

4.2 Phase I Archaeological Results

Fourteen STPs were excavated at 15-meter intervals across the alluvial fan and along Tutelow Creek. All fourteen STPs tested negative for cultural artifacts and deposits. Thirteen of the STPs were placed across the alluvial fan along the southwest side of Tutelow Creek. Coarse gravel was found in all thirteen STPs at a depth of 24 cm or less. One STP was excavated on the T0 floodplain along the northeast side of Tutelow Creek to a depth of 100 cm. Cliffs along the steep backslopes were examined for potential rockshelters. No rockshelters were found. A pedestrian reconnaissance survey was conducted across the remaining mountain slopes as much as the terrain permitted. Many of the slopes were too steep and scree-laden to safely traverse. Even segments of old logging roads were difficult to climb. No archaeological sites were found within the Minard Mine LOD.

Although located outside of the LOD, it should be noted that the floor of the canal basin has been graded for use as an electric power line right-of-way and portions of the basin walls lying adjacent to the Minard Min LOD have been removed to facilitate surface drainage (Figure 21).



Figure 21. View looking northwest down the center of the canal basin and electric power line.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The geomorphological study identified three alluvial landforms within the Minard Mine limits of disturbance (LOD), a delta-shaped alluvial fan issuing from an intermittent stream hollow, a T0 floodplain adjacent to the northeast side of Tutelow Creek, and a T1 terrace adjacent to the southwest side of Tutelow Creek. The alluvial fan is comprised of coarse gravel that represents high-energy deposition. The fan deposit built up over time as the stream swept back and forth across the surface while depositing fresh gravel bars and scouring new channels. There is no potential for deeply buried archaeological sites. Only the present-day surface has the potential for preserved archaeological deposits. Any artifacts or features that may have been present on buried surfaces would have been scoured and scattered by the high-energy current before the deposition of the overlying gravel. These findings permitted the use of standard STPs for archaeological testing across the alluvial fan.

Soil found within the T0 floodplain along the northeast side of Tutelow Creek continued to a depth of 132 cm. However, a gleyed B horizon was encountered at a depth of 85 cm which indicates a wet bottom land depositional setting that would not have been suitable for habitation sites. Archaeological testing on the T0 floodplain required excavation to a minimum depth of 85 cm, however, the STP was completed to a depth of 100 cm. Within the T1 terrace on the southwest side of Tutelow Creek, gravel-free silt loam alluvium was found to a depth of 24 cm and overlying a gravelly C horizon. Archaeological testing on the T1 terrace required excavation to a minimum of 24 cm, however, STP-1 was completed to a depth of 40 cm.

The geomorphological findings permitted the use of standard STPs for archaeological testing. Deep archaeological testing was not needed for any of the landforms found within the Minard Mine LOD. Fourteen STPs were excavated across the alluvial fan and stream deposits along Tutelow Creek. No cultural artifacts or features were found. An examination of rockledges overlooking Tutelow Creek found no evidence of rockshelters. No archaeological sites were found within the Minard Mine LOD. No further archaeological work is recommended.

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Pennsylvania State Historic Preservation Office

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

April 24, 2024

Sent Via PA-SHARE

RE: ER Project # 2020PR03544.008, MINARD MINE, LARGE NONCOAL SURFACE MINE PERMIT, PA DEP Non-Coal Mines, Athens Township, Bradford County

Dear Submitter,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeological Resources

SHPO Sends Comments - Environmental Review - Negative Survey Report/Negative Survey Form

This report meets our standards and specifications as outlined in Guidelines for Archaeological Investigations in Pennsylvania (SHPO 2021) and the Secretary of the Interior's Guidelines for Archaeological Documentation. We agree with the recommendations of this report, and in our opinion, no further archaeological work is necessary within the USACE jurisdictional area. Our office recommends a Phase IA archaeological investigation of the remaining APE under the PA State History Code. If project plans should change and/or you should be made aware of historic property concerns, please reinitiate consultation with our office using PA-SHARE.

For questions concerning archaeological resources, please contact Casey Hanson at chanson@pa.gov.

Sincerely,

Emma Diehl
Environmental Review Division Manager

PLAN FOR THE DISCOVERY OF ARCHAEOLOGICAL RESOURCES
DURING GROUND DISTURBANCE ACTIVITIES

THE PERMITTEE'S RESPONSIBILITY:

Any archaeological artifacts discovered during the course of activities conducted under the DEP permit must be adequately protected. The permittee will follow the procedures outlined below.

1. Preliminary Protection Area
 - a. The permittee will instruct their supervisor on-site to be watchful for potential archaeological artifacts.
 - b. Upon discovery of archaeological resources, the supervisor on-site will assure that ground disturbance activities will be ceased immediately for the area (slightly more than a half acre in size) of the permitted activity which is inside the circumference of a circle of which the radius is 85 feet and the center is the location of the initial discovery (the Preliminary Protection Area).
 - c. The Preliminary Protection Area may be larger, as determined by DEP in consultation with the Pennsylvania Historical and Museum Commission (the Commission).
2. The Discovery Notice
 - a. The supervisor on-site will notify the permittee immediately upon discovery of archaeological resources during ground disturbance activities.
 - b. The permittee will notify DEP and the Commission both by phone and in writing immediately upon learning of the discovery of archaeological resources during ground disturbance activities.
 - i. The written notice will be called the Discovery Notice.
 - ii. The Discovery Notice will note the date and location of the discovery.
 - iii. Unless DEP or the Commission indicate otherwise when phone notice is provided, the written Discovery Notice will be sent by certified mail, return receipt requested to:

PA DEP Moshannon DMO
186 Enterprise Drive
Philipsburg, PA 16866

Pennsylvania Historical & Museum Commission
State Historic Preservation Office
400 North Street
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120

3. Expedited Process

Given that halting work during construction can represent an inconvenience and significant delay, the Commission will follow an expedited process, where possible. Using the expedited process, the Commission has 15 days to determine.

- a. Whether the site is significant and the size of the Protection Area, or
- b. Whether the Commission wishes to conduct survey(s) and the size of the Protection Area, or
- c. Whether ground disturbance activities may recommence.

4. Thirty-Day Process

Where it is not possible to adhere to an expedited process upon notification, the Commission has 30 days from the date the Commission received the Discovery Notice to determine.

- a. Whether the site is significant, and the size of the Protection Area, or
- b. Whether the Commission wishes to conduct survey(s) and the size of the Protection Area, or
- c. Whether ground disturbance activities may recommence.

5. Ground disturbance activity may proceed in areas of permitted activities outside the Protection Area.
6. If the Commission determines that the site is significant, DEP will require the permittee to prepare a mitigation plan to protect the significant resources on the site.
7. If the Commission wishes to conduct survey(s) within the Protection Area, it has 60 days to do so.

END PLAN FOR THE DISCOVERY OF ARCHAEOLOGICAL RESOURCES
DURING GROUND DISTURBANCE ACTIVITIES

8.6 Hydrologic Impact Assessment [§ 77.457 and 77.521]

- a) Describe the groundwater hydrology in relation to the proposed mining operation (at maximum depth and lateral development) - i.e. - intercept regional water table, above regional water table, intercept perched water table, etc. State if and when groundwater will be intercepted (e.g., mining below the water table, installation of a production well for support or processing facilities). Include the depth to groundwater and the water table conditions present (artesian, regional, perched, etc.), the relationship to the mineral to be mined.

Minimal groundwater will be intercepted within the upland hard rock portion of this operation, due to the tight nature of the beds to be mined and the relatively steep slopes that shed precipitation rapidly. There are no known uses of this minor aquifer.

Mining on the valley floor for sand and gravel will intercept the regional groundwater system associated with the Chemung River valley. The removal of sand and gravel is proposed below a water table with a fluctuating surface elevation of approximately 750-755 MSL. No attempt will be made to dewater the sand and gravel pit as saturated conditions exist and the use of dredging equipment will be required. Mining is proposed to an elevation of approximately 720 MSL.

Although no impacts are expected to Wetlands I, II, or J, a series of piezometers are proposed adjacent to the wetlands to monitor groundwater conditions in response to mining. Should data reveal that adverse impacts have occurred, an individual Modules 14 including a mitigation plan will be developed to restore the resources.

Piezometers PZ-1, PZ-2, PZ-3, PZ-4, PZ-5, and PZ-6 shall be installed at locations identified on Exhibit 9 adjacent to Wetlands I, II, and J. The piezometers shall be installed prior to mineral extraction north of the existing electric service line to parcel 104. All piezometers shall be installed a minimum of three (3') feet below the adjacent wetland surface elevation. Excavation shall be by hand or power auger; excavatoin shall not be completed by excavator or backhoe to limit the impacts to the surrounding subsurface conditions. Refer to Detail 8, Exhibit 10-2 for the piezometer perforation detail.

Piezometers will be monitored quarterly.

- b) Describe the probable hydrologic consequences of the proposed mining activities on the hydrologic system of the permit area and adjacent area both during the stages of and after the conclusion of operations. Describe the impact, during and after mining, on existing quantity and quality of the surface and groundwater as described in Sections 8.3 and 8.4.

Mining will have little effect on the hydrologic system of the hard rock portion of the permit area as very little groundwater will be entering the pit area. Surface water entering disturbed areas will not negatively react with exposed bedrock as the rock formations present are not known to contain acidic conditions where natural minerals would form toxic conditions, but runoff will likely have periodic opportunity to pick up suspended solids. This water will be captured and conveyed to appropriate erosion and sedimentation facilities prior to being discharged from the site. Discharged water will meet the effluent standards identified in the conditions of the permit.

Mining of the sand and gravel will primarily occur below the surface of the water table as this is where the majority of the reserves are located. Surface disturbances associated with this phase of mining will be directed to an internal pit which will transform into an open impoundment. No water will discharge overland from this phase of mining. Groundwater flow through this portion of the mining area has a very shallow gradient traveling from NNW to SSE through the Chemung River valley. This material is chemically inert from the weathering and transportation process that were involved with the creation and placement of this deposit. An increase in turbidity will likely occur within the open water impoundment as agitation of the fine silt and clay sized particles will be present during excavation and processing of the raw sediments. These settleable solids will drop out of suspension within the open water impoundment, much the same as they would in a sediment pond. Any sediment not dropping out of suspension will be removed from groundwater transport as the particle reaches the downstream undisturbed sand and gravel where it will be filtered out.

The proposed mining will not create hydrologic consequences greater than those historic activities which have been occurring on this and adjacent lands (ie agricultural, commercial, industrial and residential activities).

- c) Is pumping of groundwater planned within the life of the operation. ☐ Yes ☒ No.

If yes, indicate the estimated gallons/day to be pumped for each stage of mining. Submit a science-based estimate of the zone of influence for each proposed stage of the operation. This may require a groundwater model to be developed using existing aquifer data as well as collecting new data, tracer tests or fracture trace analysis. Provide all documentation for the modeling. Use of groundwater modeling may be required to support the discussion of potential effects of groundwater withdrawal if the withdrawal has the potential to adversely impact water supplies, wetlands and other water resources and their affiliated uses, or if the withdrawal has the potential to cause or exacerbate sinkhole formation (See section 8.7). (Key groundwater elevations to cross-sections in 7.1 (c).)

N/A

NOTE: Operations in karst geology areas may be required to complete the *Karst Permitting Supplement* (5600-PM-BMP0456) in addition to supplying this information.

Module 8.1(A)
☐ BACKGROUND or ☒ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: 1A
Latitude: 41 58 23.3
Longitude: 76 33 02.6
Surface Elevation: 770

Description of Sample Point*: Jennette Minard well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
03/05/20	---	---	8.74	8.28	<5	349	14.1	192.69	-190.55	0.37	0.09	---	30.4	212	tg, GC 661538
04/10/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
05/22/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
06/23/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
07/29/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	PROBE	753.4	8.26	8.25	<5	353	22.3	183.32	-170.29	2.19	0.09	---	<5	192	tg, GC 668754
09/30/20	PROBE	752.6	7.64	8.28	<5	345	20.2	166.59	-150.29	0.22	0.08	---	<5	164	tg, GC 668758
10/26/20	PROBE	752.7	7.86	8.05	<5	346	14.9	164.67	-160.79	<0.10	<0.05	---	<5	178	tg, GC 671159
01/31/24	NO	MEASURE	8.40	7.99	5	353	16.9	158.04	-123.57	---	---	---	---	---	tg, GC 719159
02/19/24	NO	MEASURE	8.40	8.26	<5	351	12.5	142.76	-94.52	---	---	---	---	---	tg, GC 719145

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***
Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)
☐ BACKGROUND or ☒ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: 1B
Latitude: 41 58 30.2
Longitude: 76 33 19.6
Surface Elevation: 770

Description of Sample Point*: wetland - north central of SMP

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	VISUAL	0	---	6.39	13	52	---	12.04	-1.01	0.18	0.05	---	15.4	26	tg, GC 660630
03/05/20	VISUAL	0	7.87	7.19	8	190	11.1	77.85	-60.10	1.03	<0.05	---	12.5	128	tg, GC 661534
04/10/20	VISUAL	0	7.98	7.25	<5	193	7.3	76.96	-47.67	0.23	<0.05	---	9.5	114	tg, GC 663240
05/22/20	VISUAL	0	---	7.08	8	170	---	76.16	-59.49	1.22	<0.05	---	10.2	100	tg, GC 665040
06/23/20	VISUAL	DRY	---	---	---	---	---	---	---	---	---	---	---	---	tg
07/29/20	VISUAL	DRY	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	VISUAL	DRY	---	---	---	---	---	---	---	---	---	---	---	---	tg
09/30/20	VISUAL	DRY	---	---	---	---	---	---	---	---	---	---	---	---	tg
10/26/20	VISUAL	DRY	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	VISUAL	0	7.60	6.83	<5	53	4.9	25.00	-23.43	---	---	---	---	---	tg, GC 719154

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***
Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☒ BACKGROUND or ☐ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: 65A
Latitude: ~41 58 33
Longitude: ~76 34 20
Surface Elevation: ~1120

Description of Sample Point*: Onofre well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
08/17/23	no	measure	7.50	7.03	<5	261	21.5	87.70	-82.51	<0.10	<0.05	<0.10	15.1	162	tg, GC 711609

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 66A

Latitude: ~41 58 32

Longitude: ~76 34 30

Surface Elevation: ~1148

Description of Sample Point*: Rose well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
07/31/23	no	measure	8.20	7.60	<5	347	20.5	153.25	-146.02	<0.10	<0.05	<0.10	13.6	202	tg, GC 710965

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

Date

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Minard - REVISED 06/11/24

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Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 94A

Latitude: ~41 58 39

Longitude: ~76 33 48

Surface Elevation: ~790

Description of Sample Point*: Sparduti well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
07/31/23	no	measure	9.00	7.64	<5	286	17.2	106.38	-99.56	0.24	0.08	<0.10	10.0	154	tg, GC 710966
05/24/24	no	measure	8.13	7.98	<5	262	19.1	100.06	-92.50	<0.10	0.05	<0.10	9.5	124	tg, GC 722949

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

Date

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

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Minard - REVISED 06/11/24

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 96A

Latitude: 41 58 39.8

Longitude: 76 33 40.2

Surface Elevation: ~782

Description of Sample Point*: Blackman well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.60	8.14	<5	271	12.1	130.56	-54.72	0.14	<0.05	<0.10	<5	136	tg, GC 719120
05/24/24	no	measure	8.41	7.92	<5	279	19.3	151.76	-136.31	0.12	0.06	<0.10	<5	150	tg, GC 722947

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 99A

Latitude: 41 58 43.8

Longitude: 76 33 19.2

Surface Elevation: ~777

Description of Sample Point*: Elsbree well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.50	8.20	<5	240	11.6	120.39	-103.87	0.19	<0.05	<0.10	<5	112	tg, GC 719122
05/24/24	owner requested no additional testing														tg

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

Date

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 100A

Latitude: ~41 58 40

Longitude: ~76 33 15

Surface Elevation: ~776

Description of Sample Point*: Forest well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.40	8.12	<5	287	12.1	147.63	-98.50	0.25	<0.05	<0.10	<5	144	tg, GC 719121
05/24/24	no	measure	8.30	8.19	<5	286	23.1	157.28	-96.79	<0.10	0.05	<0.10	<5	130	tg, GC 722950

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☒ BACKGROUND or ☐ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: 101A
Latitude: ~41 58 40
Longitude: ~76 33 11
Surface Elevation: ~774

Description of Sample Point*: Rosh well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.60	7.96	<5	274	11.9	129.88	-74.22	0.10	<0.05	<0.10	<5	124	tg, GC 719119
05/24/24	no	measure	8.28	8.17	<5	278	22.7	130.68	-119.94	0.34	0.09	<0.10	<5	148	tg, GC 722951

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 103A

Latitude: 41 58 39.6

Longitude: 76 33 05.8

Surface Elevation: 766

Description of Sample Point*: JDS well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
07/14/21	PROBE	755.8	7.83	8.12	<5	261	20.5	127.89	-121.20	0.29	0.06	---	<5	158	tg, GC 680230
08/31/21	PROBE	755.6	7.84	8.06	<5	263	21.0	127.33	-120.40	0.58	0.09	---	<5	156	tg, GC 682111
09/23/21	PROBE	754.9	7.91	8.10	<5	260	19.3	126.26	-91.05	0.21	<0.05	---	<5	146	tg, GC 683194
01/31/24	no	measure	---	8.16	<5	261	---	127.89	-94.92	---	---	---	---	---	tg, GC 719150
02/19/24	no	measure	8.40	8.26	<5	261	11.4	124.19	-94.72	---	---	---	---	---	tg, GC 719146
05/24/24	no	measure	8.29	8.22	<5	264	25.4	124.12	-111.44	<0.10	0.05	<0.10	<5	132	tg, GC 722946

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Minard - REVISED 06/11/24

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 104-1A

Latitude: 41 58 38.8

Longitude: 76 33 26.3

Surface Elevation: 782

Description of Sample Point*: Richard Minard well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
03/05/20	PROBE	762.0	8.85	8.24	<5	287	14.2	148.73	-99.29	0.42	0.07	---	14.2	182	tg, GC 661539
04/10/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
05/22/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
06/23/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
07/29/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	PROBE	757.0	8.32	8.28	7	295	19.0	143.38	-111.10	0.28	0.08	---	<5	150	tg, GC 668755
09/30/20	PROBE	756.1	7.74	8.31	9	287	16.5	140.41	-136.75	0.31	0.07	---	5.1	152	tg, GC 669763
10/26/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	NO	MEASURE	7.90	8.13	<5	292	9.5	---	---	---	---	---	---	---	tg, GC 719153

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 107-1A

Latitude: 41 58 42.2

Longitude: 76 33 09.3

Surface Elevation: ~773

Description of Sample Point*: Ward well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.50	8.14	<5	253	7.9	121.63	-112.83	<0.10	<0.05	<0.10	<5	114	tg, GC 719118
05/24/24	no	measure	8.60	7.66	<5	302	21.8	187.78	-127.14	<0.10	0.07	<0.10	<5	150	tg, GC 722953

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

Date

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 107-2A

Latitude: 41 58 42.4

Longitude: 76 33 17.3

Surface Elevation: ~776

Description of Sample Point*: Wheeler well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/19/24	no	measure	8.50	8.15	<5	246	13.5	127.02	-96.91	0.20	0.06	<0.10	<5	110	tg, GC 719117
05/24/24	no	measure	8.36	8.11	<5	146	24.6	158.84	-118.24	<0.10	0.08	<0.10	<5	146	tg, GC 722952

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

Date

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

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Minard - REVISED 06/11/24

Monitoring Point ID: 108A
Latitude: ~41 58 45
Longitude: ~76 33 05
Surface Elevation: ~768

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

[illegible]

Date _____

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)
☐ BACKGROUND or ☒ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: S1A
Latitude: 41 57 52.7
Longitude: 76 32 25.4
Surface Elevation: 745

Description of Sample Point*: Tutelow Creek - downstream at confluence with Chemung River

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	10 CFS	---	7.62	14	100	---	26.09	-20.50	0.34	<0.05	---	9.1	50	tg, GC 660626
03/05/20	VISUAL	0	8.62	7.90	<5	111	8.3	22.77	-11.46	0.22	<0.05	---	12.3	84	tg, GC 661529
04/10/20	VISUAL	0	8.89	7.77	<5	119	7.1	33.96	-26.79	<0.10	<0.05	---	9.3	70	tg, GC 663237
05/22/20	EST	4 CFS	---	7.57	<5	127	---	44.03	-35.66	0.19	<0.05	---	8.9	90	tg, GC 665036
06/23/20	EST	<1	7.62	7.80	7	430	24.7	219.19	-197.99	0.59	0.29	---	18.4	256	tg, GC 666304
07/29/20	EST	<1	7.91	7.92	35	428	28.5	219.65	-212.56	1.68	0.67	---	11.8	228	tg, GC 667923
08/25/20	EST	<1	7.94	7.91	25	399	26.9	191.10	-181.60	1.48	0.70	---	10.5	214	tg, GC 668752
09/30/20	EST	<<1	6.95	7.50	22	353	18.7	165.48	-100.60	4.51	1.02	---	18.8	172	tg, GC 669759
10/26/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	NO	MEASURE	8.10	7.18	<5	90	4.8	32.14	-10.14	---	---	---	---	---	tg, GC 719157
02/19/24	NO	MEASURE	8.20	7.59	<5	143	3.2	47.65	-44.97	---	---	---	---	---	tg, GC 719143

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: S1B

Latitude: 41 58 04.2

Longitude: 76 32 50.6

Surface Elevation: 756

Description of Sample Point*: Tutelow Creek at existing crossing

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	10 CFS	---	7.63	14	96	---	61.27	-56.08	1.03	<0.05	---	11.5	60	tg, GC 660627
03/05/20	EST	7.5 CFS	8.47	7.52	<5	89	6.3	22.89	-15.48	0.14	<0.05	---	12.0	72	tg, GC 661532
04/10/20	EST	2.5 CFS	8.62	7.72	<5	107	6.4	30.37	-23.84	<0.10	<0.05	---	8.6	62	tg, GC 663239
05/22/20	EST	4 CFS	---	7.56	<5	97	---	29.47	-23.25	0.19	<0.05	---	8.1	68	tg, GC 665038
06/23/20	EST	<1	7.34	7.44	68	194	22.7	95.31	-85.70	0.90	0.5	---	8.2	138	tg, GC 666306
07/29/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
09/30/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
10/26/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	EST	1 CFS	8.00	7.38	<5	83	4.4	27.62	-22.08	---	---	---	---	---	tg, GC 719155
02/19/24	EST	2.5 CFS	7.80	7.52	<5	96	1.9	54.29	-31.84	---	---	---	---	---	tg, GC 719141

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Minard - REVISED 06/11/24

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: S1C

Latitude: 41 58 41.7

Longitude: 76 33 47.1

Surface Elevation: 784

Description of Sample Point*: Tutelow Creek at T-303 crossing

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	10 CFS	---	7.57	13	104	--	23.99	-19.10	0.45	<0.05	---	10.8	58	tg, GC 660632
03/05/20	EST	7.5 CFS	8.42	7.54	<5	98	6.2	25.07	-19.50	0.14	<0.05	---	8.8	74	tg, GC 661537
04/10/20	EST	2.5 CFS	8.66	7.45	8	120	7.3	35.04	-21.08	<0.10	<0.05	---	9.3	64	tg, GC 663242
05/22/20	EST	4 CFS	---	6.93	<5	120	---	40.41	-28.37	<0.10	<0.05	---	<5	102	tg, GC 665042
06/23/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
07/29/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
09/30/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
10/26/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	EST	1 CFS	7.10	7.47	<5	87	---	23.17	-7.36	---	---	---	---	---	tg, GC 719152
02/19/24	EST	2.5 CFS	7.80	7.58	<5	110	7.8	43.39	-38.40	---	---	---	---	---	tg, GC 719140

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Minard - REVISED 06/11/24

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: S2A

Latitude: 41 58 05.0

Longitude: 76 32 56.4

Surface Elevation: 776

Description of Sample Point*: UNT 1 to Tutelow Creek

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	50	---	6.89	16	52	---	10.09	3.22	0.21	<0.05	---	12.5	26	tg, GC 660628
03/05/20	EST	15	8.60	7.33	<5	51	6.4	10.21	-6.63	0.19	<0.05	---	12.3	60	tg, GC 661531
04/10/20	EST	40	8.45	7.44	8	58	5.2	13.31	-9.85	0.19	<0.05	---	9.2	46	tg, GC 663238
05/22/20	EST	30	---	7.47	14	60	---	14.81	-10.84	0.49	<0.05	---	12.3	42	tg, GC 665037
06/23/20	EST	<1	7.52	7.83	79	86	20.6	26.54	-19.50	0.66	<0.05	---	13.8	58	tg, GC 666305
07/29/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
09/30/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
10/26/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	EST	60	8.20	7.19	<5	46	6.0	17.09	-2.98	---	---	---	---	---	tg, GC 719156
02/19/24	EST	20	8.00	7.32	<5	55	1.0	20.76	-12.53	---	---	---	---	---	tg, GC 719142

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)
☒ BACKGROUND or ☐ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: S3A
Latitude: 41 58 12.8
Longitude: 76 33 10.1
Surface Elevation: 764

Description of Sample Point*: UNT 2 to Tutelow Creek

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	3	---	7.30	9	55	---	11.04	-4.82	0.12	<0.05	---	12.9	39	tg, GC 660629
03/05/20	EST	1	8.51	7.29	<5	57	5.6	11.99	-8.04	<0.10	<0.05	---	13.4	56	tg, GC 661533
04/10/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
05/22/20	EST	3	---	7.43	<5	67	---	15.88	-8.87	0.23	<0.05	---	11.8	47	tg, GC 665039
06/23/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
07/29/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
08/25/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
09/30/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg
10/26/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ BACKGROUND or ☐ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: S4A

Latitude: 41 58 23.1

Longitude: 76 33 30.2

Surface Elevation: 778

Description of Sample Point*: POND A outfall

(S4A identification was made in error at the start of sampling.

The identification has not been changed to maintain consistency

tracking the samlpe point data.)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	15	---	6.88	7	48	---	9.06	-6.63	0.17	<0.05	---	10.1	22	tg, GC 660631
03/05/20	EST	2	8.65	6.91	<5	51	4.7	9.55	-5.43	0.15	<0.05	---	11.5	36	tg, GC 661535
04/10/20	VISUAL	0	10.22	8.79	6	53	8.1	12.29	-5.32	0.17	<0.05	---	9.7	34	tg, GC 663241
05/22/20	VISUAL	0	---	7.45	<5	54	---	14.03	-11.62	0.37	0.08	---	8.8	38	tg, GC 665041
06/23/20	VISUAL	0	9.88	7.69	17	65	27.2	27.79	-18.91	0.75	0.78	---	11.0	42	tg, GC 666307
07/29/20	VISUAL	0	8.84	7.44	14	74	30.2	27.64	-14.18	1.27	0.21	---	10.9	53	tg, GC 667925
08/25/20	VISUAL	0	9.14	7.49	21	80	28.7	30.87	-23.84	0.49	0.08	---	7.5	36	tg, GC 668753
09/30/20	VISUAL	0	8.05	7.49	16	83	18.6	31.35	-16.36	1.09	0.37	---	13.5	60	tg, GC 669761
10/26/20	VISUAL	0	---	---	---	---	---	---	---	---	---	---	---	---	tg

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signatory is other than company official. Signature not necessary if this report is submitted as part of the permit application.

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Minard - REVISED 06/11/24

Module 8.1(A)
☐ BACKGROUND or ☒ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: S5A
Latitude: 41 57 53.3
Longitude: 76 32 24.5
Surface Elevation: 744

Description of Sample Point*: Chemung River downstream at confluence with
Tutelow Creek

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	4760 CFS	---	7.93	58	262	---	59.31	-52.26	0.40	<0.05	---	17.3	126	tg, GC 660625
03/05/20	EST	9340 CFS	8.43	7.66	86	165	5.2	39.05	-32.76	3.05	0.12	---	16.6	132	tg, GC 661530
04/10/20	EST	3190 CFS	9.00	8.05	8	300	11.8	67.27	-56.93	0.65	<0.05	---	27.6	174	tg, GC 663236
05/22/20	EST	2550 CFS	---	7.77	<5	344	---	78.71	-68.95	0.55	<0.05	---	19.1	118	tg, GC 665035
06/23/20	EST	573 CFS	7.90	7.98	<5	516	24.3	153.08	-144.40	0.14	<0.05	---	18.6	392	tg, GC 666303
07/29/20	EST	276 CFS	8.12	8.17	6	657	28.0	163.82	-148.74	0.17	<0.05	---	20.2	334	tg, GC 667924
08/25/20	EST	205 CFS	7.99	8.13	7	728	26.8	194.06	-190.49	0.12	<0.05	---	16.9	360	tg, GC 668751
09/30/20	EST	263 CFS	7.53	8.11	8	748	17.8	189.03	-162.00	0.12	<0.05	---	23.9	376	tg, GC 669760
10/26/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	EST	9880 CFS	8.30	7.63	53	173	4.9	45.05	-35.57	---	---	---	---	---	tg, GC 719158
02/19/24	EST	1650 CFS	8.10	7.89	<5	378	6.4	101.93	-66.86	---	---	---	---	---	tg, GC 719144

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***
Date

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* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.
** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)
☐ BACKGROUND or ☒ MONITORING POINT*
(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.
Operation Name: Minard
Permit No: 08230301
Township: Athens
County: Bradford

Monitoring Point ID: S5B
Latitude: 41 59 08.1
Longitude: 76 33 11.7
Surface Elevation: 783

Description of Sample Point*: Chemung River upstream at park at Mile Lane Road

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler
02/13/20	EST	4760 CFS	---	7.87	16	262	---	60.46	-53.67	0.74	0.05	---	17.5	134	tg, GC 660633
03/05/20	EST	9340 CFS	8.40	7.65	110	167	9.2	41.08	-35.78	2.71	0.10	---	16.6	114	tg, GC 661536
04/10/20	EST	3190 CFS	8.24	7.98	8	305	7.6	68.82	-59.49	0.32	0.05	---	26.6	162	tg, GC 663243
05/22/20	EST	2550 CFS	---	7.81	7	342	---	86.30	-74.86	0.65	0.06	---	24.3	224	tg, GC 665043
06/23/20	EST	573 CFS	8.63	8.41	<5	460	26.2	121.98	-112.29	0.17	<0.05	---	19.3	250	tg, GC 666308
07/29/20	EST	276 CFS	8.49	8.46	<5	484	28.1	111.65	-103.43	0.23	<0.05	---	28.3	218	tg, GC 667922
08/25/20	EST	205 CFS	8.73	8.61	<5	539	28.5	116.79	-102.01	0.14	<0.05	---	23.6	252	tg, GC 668750
09/30/20	EST	263 CFS	7.96	8.54	7	544	19.5	118.13	-84.64	0.10	<0.10	---	32.1	296	tg, GC 669762
10/26/20	NO	SAMPLE	---	---	---	---	---	---	---	---	---	---	---	---	tg
01/31/24	EST	9880 CFS	7.40	7.75	23	211	5.6	58.65	-50.69	---	---	---	---	---	tg, GC 719151
02/19/24	EST	1650 CFS	7.60	7.96	<5	334	4.2	77.98	-64.67	---	---	---	---	---	tg, GC 719139

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

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** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 001

Latitude: 41 58 01.1

Longitude: 76 32 42.8

Surface Elevation: 750

Description of Sample Point*: NPDES discharge point 001

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

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* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Minard - REVISED 06/11/24

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING POINT*

(check appropriate box)

Operator: Bishop Brothers Const. Co. Inc.

Operation Name: Minard

Permit No: 08230301

Township: Athens

County: Bradford

Monitoring Point ID: 002

Latitude: 41 58 04.1

Longitude: 76 32 51.1

Surface Elevation: 755

Description of Sample Point*: _____

NPDES discharge point 002

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measure- ment	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Specific Conductance (micromhos) @ 25 C	Field Temperature C	Alkalinity mg/l	Acidity mg/l	Iron mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Laboratory and Name of Sampler

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

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* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

berms, the operation will be virtually self-contained so that under normal climatic conditions all runoff from the site will be directed to sedimentation basins or pit sumps.

The operator may vary the phase sequence and bonded area based upon subsurface conditions encountered during mining and market demand. The characteristics of the mined material will guide development of each phase of mining.

Hard Rock Phase 1 (Initial Bond Increment):

The initial bond increment will develop the mine site infrastructure and Hard Rock Phase 1.

Support Areas:

1. Install support area sumps at the perimeter of the bonded area as indicated on Exhibit 9.
2. Install E&S controls and temporary crossing of Tutelow Creek to begin construction of the Tutelow Creek Bridge. Refer to Module 14 and Exhibit 14 for additional details.
3. Install E&S controls for the UNT 1 Tutelow Creek pipe crossing. Refer to Module 14 and Exhibit 14 for additional details.
4. Install E&S controls downslope of Basin 2.
5. Clear and grub access road between support area and Hard Rock mining area. Trees shall be harvested and stumps and brush shall be chipped or stockpiled in the bonded overburden pile area.
6. Install office and storage trailers. Scales may be installed at any time during this sequence.
7. Strip topsoil and stockpile.
8. Begin construction of Tutelow Creek Bridge. Refer to Module 14 and Exhibit 14 for additional details.
9. Begin construction of Basin 2. Utilize excavated material from Basin 2 area to construct access road base from Hard Rock mining area to the support area. Continue constructing the access road to the north entrance utilizing suitable material excavated from the Hard Rock mining area. Install Basin 2 emergency spillway, riprap protection, outlet pipe and seed and mulch all disturbed areas.
10. Once bridge complete, backfill abutments and finalize access road grade. Install perimeter E&S controls and Haul Road E&S Sediment Trap (see detail on Exhibit 10.1). Remove temporary crossing and revegetate disturbed areas.
11. Continue with the installation of the access road from the bridge north to Meadowlark Drive. Install Haul Road E&S Sediment Traps. At the northern end of the access road at the intersection of the paved driveway, install a rock construction entrance. Refer to detail on Exhibit 10.2.
12. Complete all requirements of the Athens Township approval (subject to change based upon receipt of final Township approval):
 - a. Evergreen screening along homes on Meadowlark Drive
 - b. Place conspicuous signage at regular intervals, and fencing where appropriate along the property line adjacent to Round Top Park, sufficient to ensure that park visitors are aware of the mining activity.
13. Stabilize support area for processing and stockpiling material.

Hard Rock Phase 1 Mining Area:

1. Clear and grub area. Trees shall be harvested and stumps and brush shall be chipped or stockpiled in the bonded overburden pile area.
2. Install perimeter controls (super silt fence) as noted on the Exhibit maps.
3. Strip and stockpile topsoil and overburden. Topsoil shall be utilized for perimeter containment berms around the mining operation. Due to the site topography, berm size will be limited by site conditions. Efforts will be made to construct a berm to prevent unauthorized entry into the mining area. Safety is the primary goal of the perimeter berms; storage of excess material will be provided by the bonded Overburden Storage Pile.
4. Install diversion ditches upslope of the perimeter berms to divert runoff away from the mining area.
5. All berms will be seeded and mulched to develop vegetative cover to stabilize the berm. Overburden will be placed in the Overburden Storage Pile and utilized for construction of the access road to Meadowlark Drive.
6. The initial mineral extract will occur at or near the final pit floor elevation and work into the hillside. Exploration efforts indicate there is approximately 50-75' of material that can be removed by general excavation before consolidated rock is encountered. The initial blast at the site will be far enough away from the surrounding stream barrier areas to prevent blasted material encroaching the barrier areas. Future blasts will be oriented to minimize the potential for blasted material from entering the stream barrier area.
7. Mine Hard Rock Phase 1 to the west and south to Phase 1 mining limits. Phased mining increments are developed to enhance sediment collection and control. Phasing increments are developed by successively stripping sections of ~5-6 acres in size. Containment berms and low walls along the mining phase boundary are utilized to define the current mining area. No overburden shall be placed downslope of the containment berm or low wall. A pit sump shall be developed behind the low wall in conjunction with the perimeter controls to collect pit runoff for conveyance to Basin 2. The pit sump will be constructed by blasting and excavating consolidated material from the pit floor. Conveyance of pit water from the sump to Basin 2 may be achieved by pumping or other method.
8. Excess overburden that cannot be placed in perimeter berms shall be placed in the Overburden Storage Pile.
9. Proceed to Hard Rock Phase 2

Sand & Gravel Phase 1:

When market conditions demand sand and gravel from the operation, Sand & Gravel Phase 1 bond increment application will be submitted to DEP.

Sand & Gravel Phase 1 Operation Sequence:

1. Install erosion and sedimentation controls around mining support and Sediment Basin 1. As directed on Exhibit 9 as required by PHMC (see Module 1), install geofabric on existing ground and place material to construct the mining support area at the south end of the SMP.
2. Install erosion and sedimentation controls: a containment berm or containment moat shall be installed around the mineral extraction area. Containment moats shall be utilized within the floodway. Containment berms shall be utilized outside of the floodway.
3. Strip and stockpile overburden.
4. Recover sand & gravel reserves from south to north to the Phase 1 mining limits. Processing area, stockpiles and other support areas shall be relocated as necessary to facilitate mineral extraction. Stormwater runoff will be collected in the pit sump and infiltrate into the subsurface.
5. As each consecutive mine phase is stripped, mining equipment will be used to remove raw materials for processing. Mining equipment will develop working face(s) to an approximate elevation of 755'± (above the projected ground water elevation). Excavation to 720'± will commence when the pit floor area at elevation 755'± is of adequate size for the processing area and mineral extraction area. Recovery of material to 720'± will require mining below the water table; no pumping will be conducted to lower the water level in the pit for mineral removal. Excavators or dredging tools will be positioned on the 755'± pit floor to mine to 720'±. Both mining above and below the water table progress is dependent upon market demand and material quality.
6. Proceed to Sand & Gravel Phase 2.

Sand & Gravel Phase 2:

Sand & Gravel Phase 2 bond increment application will be submitted to DEP.

Sand & Gravel Phase 2 Operation Sequence:

1. Install erosion and sedimentation controls: a containment berm shall be installed around the mineral extraction area.
2. Strip and stockpile overburden.
3. Recover sand & gravel reserves from south to north to the Phase 2 mining limits. Stormwater runoff will be collected in the pit sump and infiltrate into the subsurface.
4. As each consecutive mine phase is stripped, mining equipment will be used to remove raw materials for processing. Mining equipment will develop working face(s) to an approximate elevation of 755'± (above the projected ground water elevation). Excavation to 720'± will commence when the pit floor area at elevation 755'± is of adequate size for the processing area and mineral extraction area. Recovery of material to 720'± will require mining below the water table; no pumping will be conducted to lower the water level in the pit for mineral removal. Excavators or dredging tools will be positioned on the 755'± pit floor to mine to 720'±. Both mining above and below the water table progress is dependent upon market demand and material quality.

10.11 Underground Mines

Where proposed surface mining activities will be conducted within 500 feet of any point of either an active or abandoned underground mine (coal or noncoal), provide a description of the nature, timing, and sequence of the operation. Identify the location of each underground mine opening and the manner in which the opening will be sealed or otherwise managed including appropriate cross sections and design specifications for mine seals. Provide a description of the potential hydrologic impacts of the proposed activities, the effects on the existing groundwater system, and the effect the proposed activities will have upon abatement of pollution or the elimination of hazards to the health and safety of the public.

N/A

10.12 Public Highways

Where opening or expansion of pits are proposed within 100 feet of the outside right-of-way of a public highway, or a relocation of a public highway is proposed, identify the name and section of the public highway involved, a description of the activities to be conducted and detailed plans and cross-sections of the proposed activities. Include the written approval of the government agency having jurisdiction over the highway.

(**Note:** If the initial public notice advertisement does not contain a notice of the variance request, attach the proof of publication for advertisement of the variance.)

N/A

10.13 Public Parks and Historic Places

Where the proposed mining activities may affect any public park or historic place, provide a demonstration of the measures which will be taken to minimize or prevent adverse impacts.

Mining activities will not affect any public park. The operation is not within 300' of a public park as required by PA DEP Chapter 77 regulations.

Mining activities will not affect any historic place. Refer to PHMC information provided in Module 1.

10.14 Utilities

Where the proposed mining activities may adversely affect services provided by oil, gas, and water wells; oil and gas pipelines; railroads; utility lines; and water and sewage lines, provide a demonstration of the measures which will be taken to minimize or prevent these impacts.

No utility services will be adversely affected by the operation. Haul roads will pass under the utility lines.

When the sand and gravel mining operation approaches the electric line, the operator will coordinate with the utility to re-routing the electric service around the mining area.

Refer to the agreement with First Energy (pgs 10-15 to 10-16).

10.15 Bonding Calculations

Attach a completed Bond Calculation Summary-Noncoal for consolidated (5600-FM-BMP0474) or unconsolidated (5600-FM-BMP0473) material (sand, gravel, shale, soil). Complete a Bonding Increment Application and Authorization To Conduct Noncoal Mining Activities (5600-FM-BMP0304).

February 21, 2024

Bishop Brothers Construction
Company, Inc.
1376 Leisure Drive
Towanda, PA 18848

Re: Permit for Access Road to be Constructed Under FirstEnergy Pennsylvania Electric Company
34kV Distribution Line – Circuit 00514-61
Bishop Brothers Construction Company, Inc., Minard Mine Project, Athens Twp., Bradford Co.
Tax Parcel 09-020.00-104

We have reviewed the request for an access road to be constructed under FirstEnergy Pennsylvania Electric Company's existing 34kV Distribution Line in Athens Twp., Bradford County, PA within parcel ID 09-020.00-104. Based on this review, we have no objection to you proceeding with the Minard Mine Project provided you agree to the following conditions:

1. Must know & comply with Occupational Safety Health Administration (OSHA) safe-working clearances between persons or any conductive object and the energized bare wires (conductors). NOTICE: Wire/conductor position changes continuously depending on load, ambient temperature, wind speed, etc. FirstEnergy is not responsible for providing conductor position to determine OSHA safe-working clearance.
2. Driveways or parking areas near FirstEnergy structures (poles, towers, guys, etc.) shall include protective barriers. Parking or operating a vehicle or equipment within or adjacent to the right-of-way may induce an electric charge. Induced electric charges may also be imposed on objects such as fences, signs, or any other conductive object. Proper grounding system designed by licensed engineering firm to prevent induced electric shock is required. Construction vehicles and equipment operating near distribution lines should also be properly grounded.
3. FirstEnergy authorized personnel, vehicles and equipment shall have continuous access to the right-of-way, all line structures and use of the access road.
4. No changes to grade elevations within the right-of-way shall be made without prior written approval from FirstEnergy. No excavations near Distribution structures (poles, towers, guys, etc.) shall occur without prior written approval from FirstEnergy.
5. No buildings, lighting fixtures, signs, billboards, swimming pools, decks, flag posts, sheds, barns, garages, playgrounds, fences or other structures shall be located within the right-of-way. Other restrictions may apply for specific situations.
6. All vegetation on or adjacent to the right-of-way shall be low growing. Vegetation that is 10- foot maximum mature height is permitted on FirstEnergy distribution rights of way, however it is preferred that the planting of any woody vegetation be done outside of the wire zone of distribution facilities. (The wire zone is the area directly under the conductors and extending to about 25' on each

side.) Shrubbery planted near FirstEnergy structures (poles, towers, guys, etc.) shall allow for working area at ground level. (No closer than 25-feet from the structure, in any direction).

7. No explosive or combustible liquid, substance, or material shall be located within the right-of-way. Prohibited materials include but are not limited to: fuel, wood chips, mulch, brush, and tires.
8. Kite flying, model airplane flying, or similar activities is prohibited on or near FirstEnergy right-of-way.
9. Bishop Brothers Construction Company, Inc. shall release and waive as against FirstEnergy and its affiliates, any right to damages. Further, to indemnify, defend and hold harmless FirstEnergy and its affiliates, from and against any and all loss or damage, cost or expense resulting from, or in any manner arising out of the use of the corridor.
10. Records do not indicate the presence of a buried ground wire. However, if buried ground wires are severed or any other FirstEnergy facility is damaged, the damage shall be reported immediately to FirstEnergy and will be corrected by FirstEnergy at the responsible party's expense.
11. Penelec will not be liable for any damage to the privately owned property of Jeanette H. Minard.
12. Extreme caution must be used when working in the vicinity of Pennsylvania Electric Company's facilities. Any contact with or damage to Penelec's facilities shall be reported immediately to the Customer Service Center at 800-545-7741.
13. All underground facilities located within the right-of-way shall be installed to a sufficient depth or have sufficient strength to withstand an axle load of thirty (30) tons without damage when traversed by heavy equipment.
14. Bishop Brothers Construction Company, Inc. must comply with all provisions of the PA State one-call system.

Kindly acknowledge your agreement with the guidelines and restrictions stated above, by signing both copies of the enclosed letter. You may retain one of the copies for your files and please forward the second fully executed document to; Penelec ATTN: Kristen Burkett, 311 Industrial Park Road, Johnstown, PA 15904.

Sincerely,

Steven A. Matha
Supervisor, Engineering Services
SMatha@FirstEnergyCorp.com

Agreed to on the 25 day of March, 2024

Bishop Brothers Construction Company

By: [Signature]

Title: Secretary

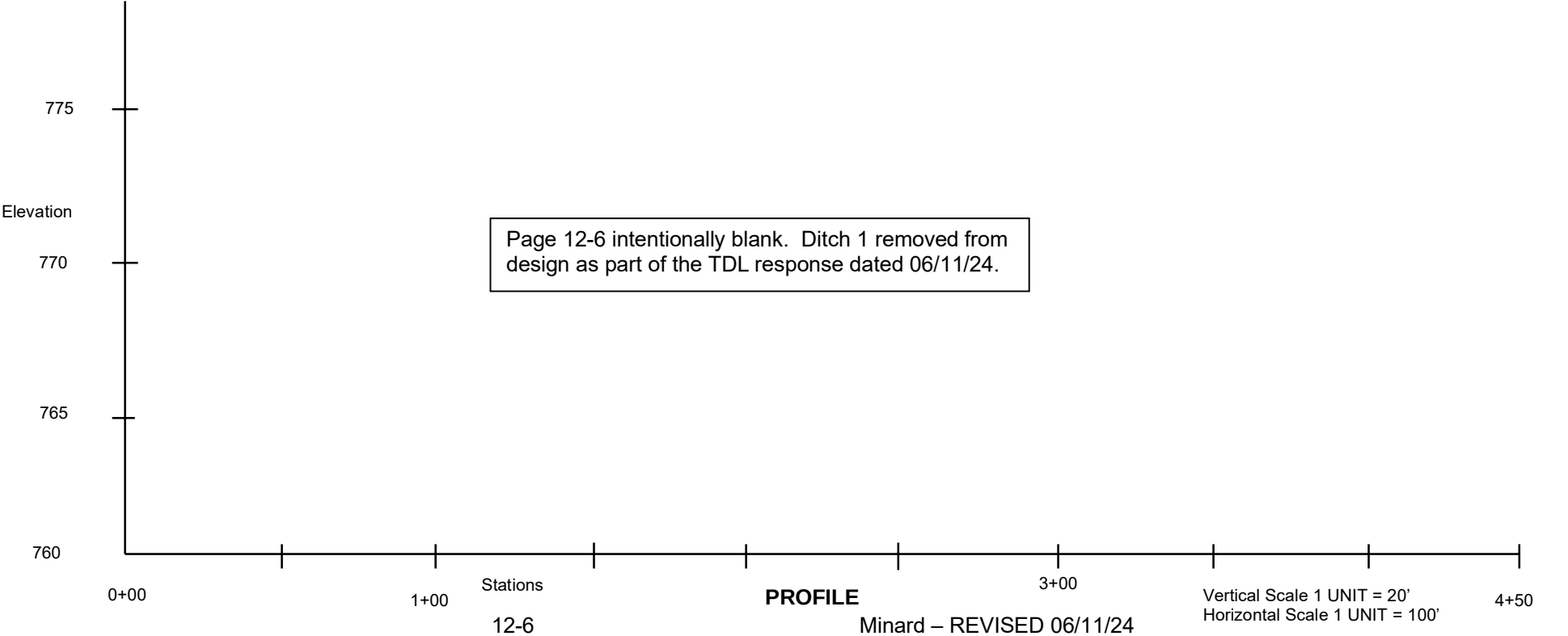
12.1 Diversion/Collection Ditch Data Sheet

Title: Ditch 1 - REMOVED FROM DESIGN 06/11/24	Site:	Company:	Permit Number:
Prepared by:	Telephone Number:	Date:	Sheet 1__ of 1__

Design Calculations:

Station		Drainage Area acres	Design Storm (yrs.)	Average Watershed Slope (%)	Curve Number	Peak Discharge Q cfs	Channel Bed Slope (%)	Freeboafd (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes	Flow Area (sq.ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (ft/sec)	Q Available cfs	With Freeboard		
Start	Eleva- tion																	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available cfs
End	tion																			

Page 12-6 intentionally blank. Ditch 1 removed from design as part of the TDL response dated 06/11/24.



Module 13: Impoundments/Treatment Facilities

[§§77.457/77.461/77.526/77.531/Chapter 105]

13.1 Treatment

Provide a plan for the treatment of surface and groundwater drainage from the areas disturbed by the mining activities. Include a construction and treatment narrative, flow diagram, design criteria, and design calculations (which include the proposed capacity) of the treatment facilities. Identify treatment chemicals to be used. Do not include any facilities included in Module 12.

Basin 2 (Treatment Facility)

Surface water accumulating in the pit, as well as any ground water encountered during mining will be conveyed to the sump prior to conveyance to Basin 2. Basin 2 will discharge runoff from the site. The primary focus of treatment will be settling of solids in the runoff. When the sediment holding capacity of the basin has been reached, the basin will be cleaned. This refuse will be incorporated into the site reclamation. The basins should be cleaned when fines reach designed cleanout depth (1/3 of basin depth, max.).

The treatment basin volume was determined by the volume of water conveyed to the treatment facility.

Final discharge of Basin 2 will be via closed conduit to Tutelow Creek to Outfall 002.

The basin design and construction is detailed in Module 13.3(c)

In the event suspended solids do not settle in a timely manner in the basins, a flocculant will be utilized to promote settling of suspended solids. MasterCat 4239, a liquid coagulant, supplied by Process Masters or equivalent may be utilized to treat water to effluent limits. Field testing shall be performed to determine the proper dosage.

The flocculant will be dosed at the Basin 2 entrance. Turbulent flow at the entrance into the basin will promote mixing of the flocculant and stormwater. Basin 2 is divided into two (2) cells by a rock filter berm. The multi-cell basin configuration will promote settling of solids in the first cell and polishing in the second cell. The outlet pipe is valved to stop the discharge should water quality effluent limits not be met; refer to Module 13.5 for operation narrative.

Settled solids will collect in the basins. Basins will be inspected quarterly to evaluate the volume of solids collected. The volume of collected solids collected in the basin will determine when sediment will need to be removed from the basins.

Product data sheet for MasterCat 4239 attached (pg 13-22) and a SDS (pg 13-23).

13.2 Quarry/Pit Sump

Provide a description of the sump including size, location, depth, method of pumping, etc. (Key location to Exhibits 6.2 and 9).

Support Area for Hard Rock Mining (located in the Sand & Gravel Phase 1 mineral extraction area):

Support Area Sumps (infiltration ditches) will be located at the edges of the proposed support area for the initial bond increment for the hard rock mining area. The sumps will be excavated into the unconsolidated gravel and infiltrate runoff into the substrate. Refer to Exhibit 9 for locations of Support Area Sumps.

Water will be conveyed by overland flow to the Support Area Sumps. Sumps will be inspected monthly and cleaned by operator on an as-needed basis to ensure infiltration capacity. Sumps may be connected to the containment moat at the perimeter of the operation.

Support Area Sump 1 has a contributing drainage area of 5.3 acres.

Support Area Sump 2 has a contributing drainage area of 3.4 acres.

Hard Rock Mining, Phase 1, 2, & 3:

The proposed pit will be utilized as a sump to collect pit water. A 50'x50'x10' (or as conditions warrant) sump will collect rainfall/snowmelt events. The sump elevation and location will change as mining progresses.

Water will be conveyed from the sump as condition warrant. The operator will a diesel powered trash pump or gravity channel to convey water from the sump to a treatment basin.

Quarry sump volume design considerations:

1. Maximum drainage area of the phase of mining.
2. During a major rainfall/snowmelt event, the pit floor will be used for stormwater storage. A conservative estimate of available area for runoff storage is approximately 15% of the pit floor area.

Using the equation $V = 1.33 \text{ (ARC)}$ from section 6.4 of the DEP Mining Manual where:

A = maximum drainage area in square feet

R = 4.2 inches in 24 hours = 0.35 ft /24 hrs

C = 0.5

V = volume in cubic feet

TABLE 13-1: PIT STORAGE CAPACITY DURING MINING

	<i>Calculated Drainage Area</i>	<i>Design Drainage Area</i>	<i>Design Criteria</i>	<i>Required Volume</i>	<i>Pit Floor Storage Area ~15% of DA</i>	<i>Calculated Approximate Water Depth</i>
	ACRES	ACRES		CF	AC	FT
Phase 1 Pit Floor	3.6	5	V = 1.33 ARC	51,000	0.75	1.6
Phase 1+2 Pit Floor	7.4	10	V = 1.33 ARC	102,000	1.5	1.6
Phase 1+2+3 Pit Floor	37.1	40	V = 1.33 ARC	406,000	6	1.6

The calculated water depth is less than the pit depth and/or perimeter berm depth.

The pit sump must be constructed away from the working face. All traffic (equipment and trucks) shall be routed around the pit sump area. Traffic shall not run through pit water. See "Pit Sump Location" detail on Exhibit 10.2.

In the event the pit does not dewater in a timely manner, the operator will move to other benches above the water level.

13.3 Dams and Impoundments (General) Do not include any facilities included in Module 12

a) Proposed use.

Basin 1 (Sediment Basin), Support Area Sump 1, & Support Area Sump 2

Runoff from the Support Area will be collected in Basin 1, Support Area Sump 1, or Support Area Sump 2 by containment berm, containment moat constructed along the perimeter of the Storage Area or overland flow. The primary focus of treatment will be settling of solids in the runoff. When the sediment holding capacity of the basin has been reached, the basin will be cleaned. This refuse will be incorporated into the site reclamation. The basin should be cleaned when fines reach the designed cleanout depth. The basin volume was determined by the basin's drainage area and 7000 CF/acre storage at the principal spillway. Of the 7000 CF, 2000 CF/acre is for sediment storage.

When Phase 1 Sand & Gravel mining commences, runoff from the Support Area will be directed to the pit sump. Support Area Sump 1 and Support Area Sump 2 will be mined out as mining progresses. Areas of the Support Area that cannot drain to the Phase 1 Sand & Gravel pit sump will continue to drain to Basin 1.

Basin 1 discharge will be via closed conduit to Outfall 001 to Tutelow Creek. Support Area Sump 1 and Support Area Sump 2 will infiltrate to the subsurface. In the event of a major runoff event and the capacity of sumps is exceeded, runoff will flow overland to Basin 1 and exit the site.

Basin discharge rates and stormwater volumes were established using the TR-55 methodology and/or $V = CIA$. Where:

TR-55:

24 hour storm event rainfall: *Engineering Manual Table 2-1*

2 yr = 2.8 inches

10 yr = 4.2 inches

25 yr = 4.9 inches

50 yr = 5.4 inches

100 yr = 5.8 inches

CN = 89 for mined areas & 71 for unmanaged habitat (Hydrologic Soil Group D)

Tc = calculated for each drainage area

V = CIA

V = Volume in cubic feet

A = Area of open pit, areas between highwall and diversion ditch, and area that drains into the pit

I = Rainfall (in feet)/24 hours x detention time of 6 hours.

C = % of rainfall not absorbed by soils.

1. Open pit = 0.50
2. Area above backfill = 0.30
3. Backfilled area = 0.25

Sump infiltration rate is assumed to be 2.0 inches per hour (minimum). If the infiltration rate is below the design rate, the sump shall be cleaned of sediment to restore the design infiltration rate.

All basin construction will be conducted as detailed in Module 13.3(c) along with proposed capacity calculations.

Basin 2 (Treatment Facility):

The series of multiple treatment cells in Basin 2 is designed to treat water conveyed from the pit sump. Water collected in the pit will be conveyed to the first treatment cell. Once the water has entered the basin, it will flow through the various cells permitting the sediments to settle prior to discharge. A flocculant may be utilized should effluent limits required treatment of suspended solids.

The basin has been designed with sufficient storage capacities and residency to allow for efficient material processing. See Module 13.3(c)

Basin 2 discharge will be via closed conduit to Outfall 002 to Tutelow Creek.

- b) Map and location (key to maps).

Refer to Exhibit 9

- c) Provide a design report and construction plans and specifications to include detailed cross-sections and plan view scale drawings of the proposed structure which show: principal spillway, dewatering devices, embankment details (including maximum height, top width, and cutoff trench), crest of emergency spillway and existing ground.

Refer to Exhibit 7/10 (cross sections), Exhibit 9, Exhibit 9.1, and exhibits included with this module for impoundment details.

Basin 1 (Sediment Basin), Support Area Sump 1, & Support Area Sump 2 - Surface Hydrology:

Peak flows were determined by either utilizing the SCS Engineering Field Manual Charts or by creating a hydrograph for the upslope watershed for the design storm (10, 25 or 50 year event) utilizing HydroCAD 10.00. Time of concentration was determined using the TR-55 calculations for sheet flow (not to exceed 50'), shallow concentrated flow, and channel flow. CN values were input based on the number of disturbed areas or current field conditions for those areas not to be disturbed. These were then "weighted" within the program. The hydrographs were then used to determine the maximum water surface elevation in the basins along with the requirement to discharge within 2-7 days. Results of the analysis are included herein.

Basin 1 (Sediment Basin), Support Area Sump 1, & Support Area Sump 2 - Geometrics:

Sedimentation basins are designed to provide at a minimum of a total of 7,000 cu. ft. of storage per disturbed acre contributory to the basin (5,000 cu. ft. for undisturbed areas) at the basin principal spillway (or emergency spillway crest if no principal spillway provided). Sediment storage was calculated at 2,000 cu. ft. per disturbed acre. Upslope areas which will not be impacted by the mining activities were included in the basin design at 5,000 cu ft.

Volumes were computed using prismoidal, trapezoidal or triangular volumetric formulas applied to achieve the design volumes required.

Emergency spillways are designed to have sufficient capacity so that the combination of temporary storage capacity above the principal spillway and the discharge from the principal spillway will safely convey the runoff from a 24 hour storm. Ponds with 20 acres of drainage or less will be designed to handle the 25 year storm event, and basins with 20-100 acres will be designed to convey the 50 year event. Ponds which are to remain permanently will have an emergency spillway capable of handling a routed 100 year storm.

Basin 1

Basin 1 will be located at the south end of the storage area. The basin will function as a sediment basin during mining and the emergency spillway is designed to convey the 25 year storm event. The principal spillway is a 10" hooded drain pipe and the dewatering pipe is a valved standpipe. The basin will discharge from the permit at Outfall 001. Table 13-2 summarizes the elevations and storage capacities.

Rock filter volume is deducted from the gross volume of the basin. Each filter is 8' top width, 18' bottom width, 55' tall, & 35' wide. The volume of one (1) rock filter is 2,275 CF = $[5 \times 8 + (2)(5 \times 5/2)] \times 35$. Assume 40% voids, rock volume is 1,365 CF.

The volume of one (1) rock filter at the sediment storage elevation is 736 CF = $[2 \times 14 + (2)(2 \times 2/2)] \times 23$. Assume 40% voids, rock volume is 442 CF.

TABLE 13-2: BASIN 1 STORAGE CAPACITY - DRAINAGE AREA = 3 ACRES

	<i>Elevation</i>	<i>Length</i>	<i>Width</i>	<i>Gross Volume (ft³)</i>	<i>Net Volume (ft³)</i>
Top	762	232	47	46820	52895
Emergency Spillway	759	220	35	26420	25055
Principal Spillway	758.5	218	33	22700	21335
Sediment Storage	756	208	23	7770	7328
Bottom	754	200	15	0	0

To prevent short circuiting of the basin, all runoff will enter the north end of the basin and discharge from the south end. If the detention time in the basin is inadequate to settle solids, a rock filter berm may be added to promote settling.

Accumulated sediment will be removed from the basin and included in the reclamation as mining progresses.

For the 25 year storm event:

Basin 1 peak inflow is 40 cfs considering the total contributing drainage areas of Sump 1 + Sump 2 + Basin 1. The emergency spillway is designed to convey the influent flow. Calculations are provided on pages 13-18 and 13-20. Refer to Exhibit 10.2 for basin details.

Support Area Sump 1

Support Area Sump 1 will be located south of the initial mining support at the end of the storage area. The sump will function as an infiltration basin during mining. If the basin's capacity is exceeded, runoff will flow overland to the south towards Basin 1. Table 13-3 summarizes the elevations and storage capacities.

TABLE 13-3: SUPPORT AREA SUMP 1 STORAGE CAPACITY - DRAINAGE AREA = 5.3 ACRES

	<i>Elevation</i>	<i>Length</i>	<i>Width</i>	<i>Gross Volume (ft³)</i>	<i>Net Volume (ft³)</i>
Top	761	228	48	52304	52304
Emergency Spillway	760	224	44	41568	41568
Bottom	754	200	20	0	0

Accumulated sediment will be removed from the basin and included in the reclamation as mining progresses.

For the 25 year storm event:

Sump 1 inflow is 22 cfs for the Sump 1 drainage area. The emergency spillway is designed to convey the influent flow. Calculations are provided on pages 13-18 and 13-20. Refer to Exhibit 10.2 for basin details.

Support Area Sump 2

Support Area Sump 2 will be located between Support Area Sump 1 and Basin 1. The sump will function as an infiltration basin during mining. If the basin's capacity is exceeded, runoff will flow overland to the south towards Basin 1. Table 13-4 summarizes the elevations and storage capacities.

TABLE 13-4: SUPPORT AREA SUMP 2 STORAGE CAPACITY - DRAINAGE AREA = 3.4 ACRES

	<i>Elevation</i>	<i>Length</i>	<i>Width</i>	<i>Gross Volume (ft³)</i>	<i>Net Volume (ft³)</i>
Top	761	228	48	52304	52304
Emergency Spillway	760	224	44	41568	41568
Bottom	754	200	20	0	0

Accumulated sediment will be removed from the basin and included in the reclamation as mining progresses.

For the 25 year storm event:

Sump 2 inflow is 33 cfs considering the total contributing drainage areas of Sump 1 + Sump 2. The emergency spillway is designed to convey the influent flow. Calculations are provided on pages 13-18 and 13-20. Refer to Exhibit 10.2 for basin details.

Basin 2 (Treatment Facility)

Geometrics:

The multi-cell treatment basin was designed to provide a total of twelve (12) hours of detention time based upon the dewatering rate of pit pump. The operator will use a 200 gpm trash pump to dewater the pit.

$$12 \text{ hrs} \times 200 \text{ gpm} = 19,500 \text{ ft}^3$$

$$\text{Treatment System} = 19,500 + 33\% \text{ additional storage} = 26,000 \text{ ft}^3$$

Volumes were computed using prismoidal, trapezoidal or triangular volumetric formulas applied to achieve the design volumes required.

Basin 2 rock filter volume is deducted from the gross volume of the basin. Each filter is 8' top width (max), 20' bottom width (max), 6' tall, & 44' wide. The volume of one (1) rock filter is 3696 CF = $[6 \times 8 + (2)(6 \times 6/2)] \times 44$. Assume 40% voids, rock volume is 2,218 CF. Deduct this rock volume from the gross basin volume at the principal spillway elevation.

TABLE 13-3: BASIN 2 STORAGE CAPACITY DURING MINING

	<i>Elevation</i>	<i>Length</i>	<i>Width</i>	<i>Gross Volume (ft³)</i>	<i>Net Volume (ft³)</i>
Top	772.25 (+10.25')	241	61	92980	90762
Spillway	768 (+6')	224	44	41000	38782
Bottom	762 (+0')	200	20	0	0

38,782 CF > 26,000 CF of required storage.

Accumulated sediment will be removed from the basin and included in the reclamation as mining progresses when sediment reaches 1/3 depth of basin.

For the 25 year storm event:

Basin 2 potential inflow is 190 cfs. The emergency spillway is designed to convey the influent flow. Calculations are provided on pages 13-19 and 13-20.

Refer to Exhibit 10.2 for basin details.

Basin Construction Specifications (Basins 1 & 2 & Sumps 1 & 2):

1. Prior to the beginning of excavations, the topsoil from the impoundment construction area will be removed and stockpiled per Module 21.
2. The embankment will be constructed with slopes as noted on the construction details or flatter. As a rule of thumb, the total ratio of the slopes will be 5:1 assuming a 10' top width embankment. Incised slopes will be steeper (vertical to 1:1).
3. There will be a "key-way" cutoff incorporated into the embankment to aid in the stability of the structure, and to prevent seepage.
4. The embankment will be constructed in lifts of 8" (eight inch) maximum thickness and compacted by a minimum of four (4) passes of the loader or dozer over each lift.
5. No cobbles, boulders, or rock fragments having a maximum dimension of more than 5" (five inches) shall be incorporated into the embankment.
6. No brush, sod, roots, or other perishable or unsuitable materials shall be placed in the embankment.

7. The embankment shall have a minimum crest width of 10' (ten feet) or as noted.
8. Seeding and mulching of the embankment shall be at the rates and by the methods contained in Module 23. In the event of winter construction, disturbed areas will be seeded and mulched as soon as practicable. Embankment out slopes will be mulched.
9. Select material will be placed adjacent to the discharge pipe in 6" (six inch) lifts and compacted to prevent seepage and scouring. Anti-seep collars will be incorporated into the embankment as an additional safety measure for smooth pipe over 6" (six inches) in diameter or corrugated pipe over 12" (twelve inches).
10. The emergency spillways will be a trapezoidal type with 3:1 sideslopes; and constructed on undisturbed ground. Where topographic conditions do not allow for the emergency spillway to be constructed on original ground, added measures will be taken to assure the stability of the spillway. These would include the placement of a geotextile foundation from the crest to original ground with the addition of riprap over the fabric.
11. If design specifications require additional protection, a rock lining will be placed at the point of discharge in the emergency spillway. This rock will be D50=6" at 165 lb/cu. ft. or equivalent or as specified in the individual pond design sheets. The spillway slopes are to be rip-rapped. Placement of the rock will be over a filter bed 6" (six inches) in depth, 2" (two inch) coarse aggregate or a geotextile base can be used.
12. Riprap shall be placed to grade in a manner to ensure that the large rock fragments are uniformly distributed with smaller fragments placed to fill the residual spaces and create a densely placed, uniform, well keyed layer of riprap of the specified thickness.
13. It should be noted that the designs submitted are to be followed as closely as possible.

- d) Complete a Certification Form for each structure as appropriate:
Sediment Pond Certification form 5600-PM-BMP0408
Treatment Pond Certification form 5600-PM-BMP0455

Refer to page 13-9 for Basin 1 Sediment Pond Certification.
Refer to page 13-11 for Basin 2 Treatment Pond Certification.
Refer to page 13-13 for Support Area Sump 1 Sediment Pond Certification.
Refer to page 13-15 for Support Area Sump 2 Sediment Pond Certification.

- e) If the impoundment is located outside of the area covered by the geology and hydrology description contained in Modules 7 and 8, include a preliminary geology and hydrology report.

N/A

- f) Describe the potential effect on the structure from subsidence from underground mining when applicable.

N/A

- g) If the detailed design plans are not included with the initial submittal of this application, identify when the detailed design plans will be submitted. (**Note:** The detailed design plans must be approved by the Department before construction of the structure begins.)

N/A

13.4 Class C Dams

N/A

13.5 Operation and Maintenance Requirements

Describe the operation and maintenance requirements for the structure, including dewatering of the impoundments following storm events.

BASIN 1 (Sediment Basin)

Basin 1 will operate as a sediment basin. The basin is designed to provide 7000 ft³/acre of storage for disturbed areas. The lowest level of dewatering will provide 2000 ft³/acre of sediment storage. Dewatering of the basins will be achieved via a valved perforated stand pipe. The outlet will be as close to original ground and protected by riprap. The basin will require periodic sediment removal as to provide storage capacity. The dimensions and placement have been designed with anticipated maintenance in mind. In the unlikely event that the basins reach their maximum storage capacity, the emergency spillway will be activated.

OPERATION:

1. Basin 1 will operate as a sediment basin on an as needed basis. Runoff from the Support Area will be conveyed to Basin 1.
2. The operator will evaluate the conditions of the Basin 1 water quality. If the suspended solids concentration is high (turbid water), the water shall be permitted to settle the suspended solids prior to discharge by closing the discharge valve of the dewatering pipe. Once water quality meets effluent standards, water can be discharged to Outfall 001.
3. Discharge water will be conveyed via a pipe to Outfall 001.
4. The operator shall collect a water sample when Basin 1 is discharging at Outfall 001. The NPDES permit dictates the frequency of monitoring.

BASIN 2 (Treatment Facility):

Basin 2 will operate as a treatment basin on an as needed basis. Pit sump water will be conveyed to Basin 2 by gravity flow or pumped when needed. There is no pumped discharge from Basin 2; discharge will be by gravity.

OPERATION:

1. Basin 2 will operate as a treatment basin on an as needed basis. Pit water will be conveyed to Basin 2.
2. The operator will evaluate the influent and effluent conditions of the Basin 2 water quality. If the suspended solids concentration is high (turbid water), the water shall be permitted to settle the suspended solids prior to discharge by closing the valve of the discharge pipe. Once water quality meets effluent standards, water can be discharged to Outfall 002.
3. In the event suspended solids do not settle in a reasonable time period, the operator may utilize a flocculent to accelerate settling of the solids. Dispense flocculent in accordance with the manufacturer's recommendations at the entrance to Basin 2. The discharge pipe valve will be closed and remain closed until the effluent will meet NPDES permit limits and prevent the discharge of flocculant to the receiving stream. Once effluent will meet NPDES permit limits, the valve can be opened to dewater the basin.
4. Discharge water will be conveyed via a pipe to Outfall 002.
5. The operator shall collect a water sample when Basin 2 is discharging at Outfall 002. The NPDES permit dictates the frequency of monitoring.

SUPPORT AREA SUMP 1 & 2 (Infiltration Basin)

Sumps 1 & 2 will operate as an infiltration basin. The basin is designed to provide 7000 ft³/acre of storage for disturbed areas. The basin will require periodic sediment removal as to provide storage capacity.

OPERATION:

1. Sumps 1 & 2 will operate as a sediment basin on an as needed basis. Runoff from the Support Area will be conveyed to the sumps.
2. The operator will evaluate the infiltration rate of the sumps. The design sump infiltration rate is assumed to be 2.0 inches per hour (minimum). If the infiltration rate is below the design rate, the sump shall be cleaned of sediment to restore the design infiltration rate.

MAINTENANCE:

Inspection will be made after each storm event and on a monthly basis. The operator or assigned person will inspect the sump and its associated structures to include: condition of the outlet structure, deficiencies in the collection ditches, an evidence of instability of the embankment, the presence of vegetative cover, and any accelerated erosion occurring at the inlet or discharge points or by rill and gully erosion of the embankments themselves.

Corrective measures will include the reseeding of any areas which may require additional cover. If the season is not favorable to the germination of seeds, a mulch cover of straw or hay will be substituted.

Structural failures or instabilities will be referred to the engineer for further investigation and corrective measures. Until such time as the repairs can be made, the operator will inspect the structure in question daily, and have available on site a pump capable of dewatering the basin in a timely manner should it become necessary.

Sediment shall be removed from the basin when the storage capacity has reached one third ($1/3$) of the depth of the basin or infiltration rates drop below the design infiltration rate. Removal will be accomplished by either pumping or mechanical dredging. Sediments will then be transported to be stored or spread over backfilled areas and used as a topsoil layer.

Exhibit 9, typical drawings and details on Exhibit 10.1 and Exhibit 10.2, and information presented in this Module are to be used as a general guideline; however, changes or modifications should be made to fit field conditions.

13.6 Removal

Describe the timetable and plans for removal of the impoundment and reclamation of the area.

Basin 1 and 2 will be removed at the completion of reclamation of the contributing drainage area to the basin.

Sump 1 and 2 will be removed at the completion of reclamation or will be mined out as mining progresses.

SEDIMENT POND CERTIFICATION

Permittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301
 Engineer/Land Surveyor: Tim Gourley, PE Structure ID #: Basin 1 NPDES Outfall ID #: 001
 Location (point of discharge): Latitude (DMS): 41 58 01.0 Longitude (DMS): 76 32 42.7
 Drainage Area: 3 acres Design Storm: 25 year / 24 hour Rainfall Amount: 4.9 inches
 Average Watershed Slope: 2 Land Use: SUPPORT Soil Type: N/A Curve Number: 89
 Peak Discharge: 40 cubic feet/second NPDES Average Flow: 0.03 mgd NPDES Design Flow: 0.4 mgd

		<i>Permit Application</i>	<i>As Constructed</i>
Embankment	Top Width (Minimum)	<u>10'</u>	
	Outside Slope (Maximum) (H:V)	<u>---</u>	
	Inside Slope (Maximum) (H:V)	<u>---</u>	
	Top Elevation	<u>762</u>	
	Bottom Elevation	<u>754</u>	
	Upstream Toe Elevation	<u>n/a</u>	
	Downstream Toe Elevation	<u>n/a</u>	
	Type of Cover	<u>vegetation</u>	
	Incised Slope (if any)	<u>YES</u>	
	Inside Slope (Maximum) (H:V)	<u>2:1</u>	
Principal Spillway	Top Elevation	<u>762</u>	
	Bottom Elevation	<u>754</u>	
	Type	<u>10" hooded pipe</u>	
	Conduit Diameter (if barrel/riser give both)	<u>10" PVC</u>	
	Inlet Elevation	<u>758.5</u>	
Dewatering Device	Outlet Protection	<u>R4</u>	
	Spillway Capacity (cubic feet/second)	<u>1.14</u>	
	Type/Size	<u>standpipe</u>	
	Inlet Elevation	<u>756</u>	
	Discharge Regulation (self-draining or valved)	<u>valved</u>	
Emergency Spillway	Discharge Capacity (cubic feet/second)	<u>0.25 cfs</u>	
	Time to Dewater Full Pond	<u>3.8 days</u>	
	Type	<u>broadcrested weir</u>	
	Width	<u>42'</u>	
	Depth (with 2 feet of freeboard)	<u>3'</u>	
	Length	<u>24'</u>	
	Sideslopes (H:V)	<u>3:1</u>	
	Crest Elevation	<u>759</u>	
	Slope	<u>2%</u>	
	Type of Lining/Protection	<u>R3</u>	
Storage Capacity	Spillway Capacity (provide design calculations)	<u>41.6 (40 required; see pg 13-20)</u>	
	Length @ Bottom	<u>200</u>	
	Width @ Bottom	<u>15</u>	
	Length @ Dewatering Device	<u>208</u>	
	Width @ Dewatering Device	<u>23</u>	
	Volume @ Dewatering Device	<u>7770-442(FILTER)=7328</u>	
	Length @ Principal Spillway	<u>218</u>	
	Width @ Principal Spillway	<u>33</u>	
	Volume @ Principal Spillway	<u>22700-1365(FILTER)=21335</u>	
	Length @ Crest of Emergency Spillway	<u>220</u>	
	Width @ Crest of Emergency Spillway	<u>35</u>	
	Volume @ Crest of Emergency Spillway	<u>26420-1365(FILTER)=25055</u>	

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material? ☒ Yes ☐ No

If yes, specify the type of liner that will be used: NONE

SEDIMENT POND CONSTRUCTION CERTIFICATIONPermittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301Engineer/Land Surveyor: _____ Structure ID #: Basin 1 NPDES Outfall ID #: 001

- | | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit? | ☐ Yes | ☐ No | |
| 2. Is the emergency spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 3. Is the principal spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 6. Do the collection channel inlets have adequate inlet protection? | ☐ Yes | ☐ No | |
| 7. Has the liner been installed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 9. Was coal encountered during construction of the pond? | ☐ Yes | ☐ No | |
| 10. If yes, was a liner used? | ☐ Yes | ☐ No | |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected. | | | ☐ NA |

Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Date of Inspection**Inspected By**

_____	_____	_____
_____	_____	_____
_____	_____	_____

Supervising Professional Engineer/Registered Professional Land Surveyor _____

Address and phone _____

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor _____

Date _____

Registration Number and Expiration Date _____

SEAL

Signature of Permittee or Responsible Official _____

Date _____

Title _____

TREATMENT POND CERTIFICATION

Permittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301
 Engineer/Land Surveyor: Tim Gourley, PE Structure ID #: Basin 2 NPDES Outfall ID #: 002
 Location (point of discharge): Latitude (DMS): 41 58 03.8 Longitude (DMS): 76 32 51.7
 Treatment Basin Sizing Calculation: $V = 1.33 (A R C) + (\text{Expected Groundwater Inflow Rate to Pit} \times \text{Design Detention Time})$
 Drainage Area to System: 5 acres Design Storm: 25 year / 24-hour Rainfall Amount: 4.9 inches
 Detention Time: 12 hours Expected Groundwater Inflow Rate to Pit: 0 gpm
 Required Basin Volume: 26000 cubic feet NPDES Average Flow: 0.04 mgd NPDES Design Flow: 0.3 mgd

		<i>Permit Application</i>	<i>As Constructed</i>
Basin #: <u>2</u> Embankment	Top Width (Minimum)	10	
	Outside Slope (Maximum) (H:V)	3	
	Inside Slope (Maximum) (H:V)	2	
	Top Elevation (with 2 feet of freeboard)	772.25	
	Bottom Elevation	762	
	Upstream Toe Elevation	---	
	Downstream Toe Elevation	---	
	Type of Cover	vegetation	
	Incised Slope (if any)	YES	
	Inside Slope (Maximum) (H:V)	1:1	
	Top Elevation	772.25	
	Bottom Elevation	762	
Basin #: <u>2</u> Spillway	Size/Type	8" PVC	
	Inlet Elevation	768	
	Outlet Protection	R4	
	Spillway Capacity (cubic feet/second)	0.5	
Basin #: <u>2</u> Storage Capacity	Length @ Bottom	200	
	Width @ Bottom	20	
	Length @ Spillway	224	
	Width @ Spillway	44	
	Volume @ Spillway	41000-2218 (FILTER)=38782	
	Sludge Cleanout Elevation	764	
Emergency Spillway	Type	broadcrested weir	
	Width (ft)	45'	
	Depth with 2' of freeboard (ft)	3.58	
	Length (ft)	18	
	Sideslopes (H:V)	3:1	
	Crest Elevation	768.67	
	Slope	2%	
	Type of Lining/Protection	R4	
	Spillway Capacity (cfs)	231 (190 required)	
Basin #: <u>2</u> Dewater	Size/Type	4" PVC valved	
	Inlet Elevation	764	
	Outlet Protection	R4	
	Spillway Capacity (cubic feet/second)	0.5	

Will the treatment pond be constructed in previously disturbed, fractured, or unconsolidated material? ☐ Yes ☒ No

If yes, specify the type of liner that will be used: _____

Note: If additional basins are necessary, please complete and attach an additional form.

TREATMENT POND CONSTRUCTION CERTIFICATION

Permittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301
 Engineer/Land Surveyor: _____ Structure ID #: Basin 2 NPDES Outfall ID #: 002

- | | | | |
|---|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit? | ☐ Yes | ☐ No | |
| 2. Is the spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 3. Has the liner been installed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 4. Has the non-discharge alternative been constructed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 5. Was coal encountered during construction of the pond? | ☐ Yes | ☐ No | |
| 6. If yes, was a liner used? | ☐ Yes | ☐ No | |
| 7. Identify any conditions or deficiencies in the facility that need to be corrected. | | | ☐ NA |

Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Date of Inspection**Inspected By**

_____	_____	_____
_____	_____	_____
_____	_____	_____

Supervising Professional Engineer/Registered Professional Land Surveyor _____

Address and phone _____

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor _____ Date _____

Registration Number and Expiration Date _____

SEAL

Signature of Permittee or Responsible Official _____ Date _____

_____ Title _____

SEDIMENT POND CERTIFICATION

Permittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301
 Engineer/Land Surveyor: Tim Gourley, PE Structure ID #: Sump 1 NPDES Outfall ID #: 003
 Location (point of discharge): Latitude (DMS): 41 58 10.3 Longitude (DMS): 76 32 52.4
 Drainage Area: 5.3 acres Design Storm: 25 year / 24 hour Rainfall Amount: 4.9 inches
 Average Watershed Slope: 2 Land Use: SUPPORT Soil Type: N/A Curve Number: 89
 Peak Discharge: 22 cubic feet/second NPDES Average Flow: --- mgd NPDES Design Flow: --- mgd

		Permit Application	As Constructed
Embankment	Top Width (Minimum)	<u>10'</u>	
	Outside Slope (Maximum) (H:V)	<u>---</u>	
	Inside Slope (Maximum) (H:V)	<u>---</u>	
	Top Elevation	<u>761</u>	
	Bottom Elevation	<u>754</u>	
	Upstream Toe Elevation	<u>n/a</u>	
	Downstream Toe Elevation	<u>n/a</u>	
	Type of Cover	<u>vegetation</u>	
	Incised Slope (if any)	<u>YES</u>	
	Inside Slope (Maximum) (H:V)	<u>2:1</u>	
Principal Spillway	Top Elevation	<u>761</u>	
	Bottom Elevation	<u>754</u>	
	Type	<u>none</u>	
	Conduit Diameter (if barrel/riser give both)		
	Inlet Elevation		
Dewatering Device	Outlet Protection		
	Spillway Capacity (cubic feet/second)		
	Type/Size	<u>infiltration</u>	
	Inlet Elevation	<u>754</u>	
	Discharge Regulation (self-draining or valved)	<u>---</u>	
Emergency Spillway	Discharge Capacity (cubic feet/second)	<u>0.4 cfs</u>	
	Time to Dewater Full Pond	<u>2 days</u>	
	Type	<u>broadcrested weir</u>	
	Width	<u>25'</u>	
	Depth (with 2 feet of freeboard)	<u>---</u>	
	Length	<u>---</u>	
	Sideslopes (H:V)	<u>---</u>	
	Crest Elevation	<u>760</u>	
	Slope	<u>0%</u>	
	Type of Lining/Protection	<u>vegetation</u>	
Storage Capacity	Spillway Capacity (provide design calculations)	<u>24.7 (22 required; see pg 13-20)</u>	
	Length @ Bottom	<u>200</u>	
	Width @ Bottom	<u>20</u>	
	Length @ Dewatering Device	<u>---</u>	
	Width @ Dewatering Device	<u>---</u>	
	Volume @ Dewatering Device	<u>---</u>	
	Length @ Principal Spillway	<u>---</u>	
	Width @ Principal Spillway	<u>---</u>	
	Volume @ Principal Spillway	<u>---</u>	
	Length @ Crest of Emergency Spillway	<u>224</u>	
	Width @ Crest of Emergency Spillway	<u>44</u>	
	Volume @ Crest of Emergency Spillway	<u>41568</u>	

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material? ☒ Yes ☐ No

If yes, specify the type of liner that will be used: NONE

SEDIMENT POND CONSTRUCTION CERTIFICATIONPermittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301Engineer/Land Surveyor: _____ Structure ID #: Sump 1 NPDES Outfall ID #: 003

- | | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit? | ☐ Yes | ☐ No | |
| 2. Is the emergency spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 3. Is the principal spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 6. Do the collection channel inlets have adequate inlet protection? | ☐ Yes | ☐ No | |
| 7. Has the liner been installed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 9. Was coal encountered during construction of the pond? | ☐ Yes | ☐ No | |
| 10. If yes, was a liner used? | ☐ Yes | ☐ No | |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected. | | | ☐ NA |

Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Date of Inspection**Inspected By**

_____	_____	_____
_____	_____	_____
_____	_____	_____

Supervising Professional Engineer/Registered Professional Land Surveyor _____

Address and phone _____

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor _____

Date _____

Registration Number and Expiration Date _____

SEAL

Signature of Permittee or Responsible Official _____

Date _____

Title _____

SEDIMENT POND CERTIFICATION

Permittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301
 Engineer/Land Surveyor: Tim Gourley, PE Structure ID #: Sump 2 NPDES Outfall ID #: 004
 Location (point of discharge): Latitude (DMS): 41 58 07.2 Longitude (DMS): 76 32 48.0
 Drainage Area: 3.4 acres Design Storm: 25 year / 24 hour Rainfall Amount: 4.9 inches
 Average Watershed Slope: 2 Land Use: SUPPORT Soil Type: N/A Curve Number: 89
 Peak Discharge: 33 cubic feet/second NPDES Average Flow: --- mgd NPDES Design Flow: --- mgd

		Permit Application	As Constructed
Embankment	Top Width (Minimum)	<u>10'</u>	
	Outside Slope (Maximum) (H:V)	<u>---</u>	
	Inside Slope (Maximum) (H:V)	<u>---</u>	
	Top Elevation	<u>761</u>	
	Bottom Elevation	<u>754</u>	
	Upstream Toe Elevation	<u>n/a</u>	
	Downstream Toe Elevation	<u>n/a</u>	
	Type of Cover	<u>vegetation</u>	
	Incised Slope (if any)	<u>YES</u>	
	Inside Slope (Maximum) (H:V)	<u>2:1</u>	
Principal Spillway	Top Elevation	<u>761</u>	
	Bottom Elevation	<u>754</u>	
	Type	<u>none</u>	
	Conduit Diameter (if barrel/riser give both)		
	Inlet Elevation		
Dewatering Device	Outlet Protection		
	Spillway Capacity (cubic feet/second)		
	Type/Size	<u>infiltration</u>	
	Inlet Elevation	<u>754</u>	
	Discharge Regulation (self-draining or valved)	<u>---</u>	
Emergency Spillway	Discharge Capacity (cubic feet/second)	<u>0.4 cfs</u>	
	Time to Dewater Full Pond	<u>2 days</u>	
	Type	<u>broadcrested weir</u>	
	Width	<u>35'</u>	
	Depth (with 2 feet of freeboard)	<u>---</u>	
	Length	<u>---</u>	
	Sideslopes (H:V)	<u>---</u>	
	Crest Elevation	<u>760</u>	
	Slope	<u>0%</u>	
	Type of Lining/Protection	<u>R4</u>	
Storage Capacity	Spillway Capacity (provide design calculations)	<u>34.6 (33 required; see pg 13-20)</u>	
	Length @ Bottom	<u>200</u>	
	Width @ Bottom	<u>20</u>	
	Length @ Dewatering Device	<u>---</u>	
	Width @ Dewatering Device	<u>---</u>	
	Volume @ Dewatering Device	<u>---</u>	
	Length @ Principal Spillway	<u>---</u>	
	Width @ Principal Spillway	<u>---</u>	
	Volume @ Principal Spillway	<u>---</u>	
	Length @ Crest of Emergency Spillway	<u>224</u>	
	Width @ Crest of Emergency Spillway	<u>44</u>	
	Volume @ Crest of Emergency Spillway	<u>41568</u>	

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material? ☒ Yes ☐ No

If yes, specify the type of liner that will be used: NONE

SEDIMENT POND CONSTRUCTION CERTIFICATIONPermittee: Bishop Bros Constr Co Inc Site Name: Minard Mine SMP No.: 08230301Engineer/Land Surveyor: _____ Structure ID #: Sump 2 NPDES Outfall ID #: 004

- | | | | |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit? | ☐ Yes | ☐ No | |
| 2. Is the emergency spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 3. Is the principal spillway constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | ☐ Yes | ☐ No | |
| 6. Do the collection channel inlets have adequate inlet protection? | ☐ Yes | ☐ No | |
| 7. Has the liner been installed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan? | ☐ Yes | ☐ No | ☐ NA |
| 9. Was coal encountered during construction of the pond? | ☐ Yes | ☐ No | |
| 10. If yes, was a liner used? | ☐ Yes | ☐ No | |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected. | | | ☐ NA |

Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Date of Inspection**Inspected By**

_____	_____	_____
_____	_____	_____
_____	_____	_____

Supervising Professional Engineer/Registered Professional Land Surveyor _____

Address and phone _____

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor _____

Date _____

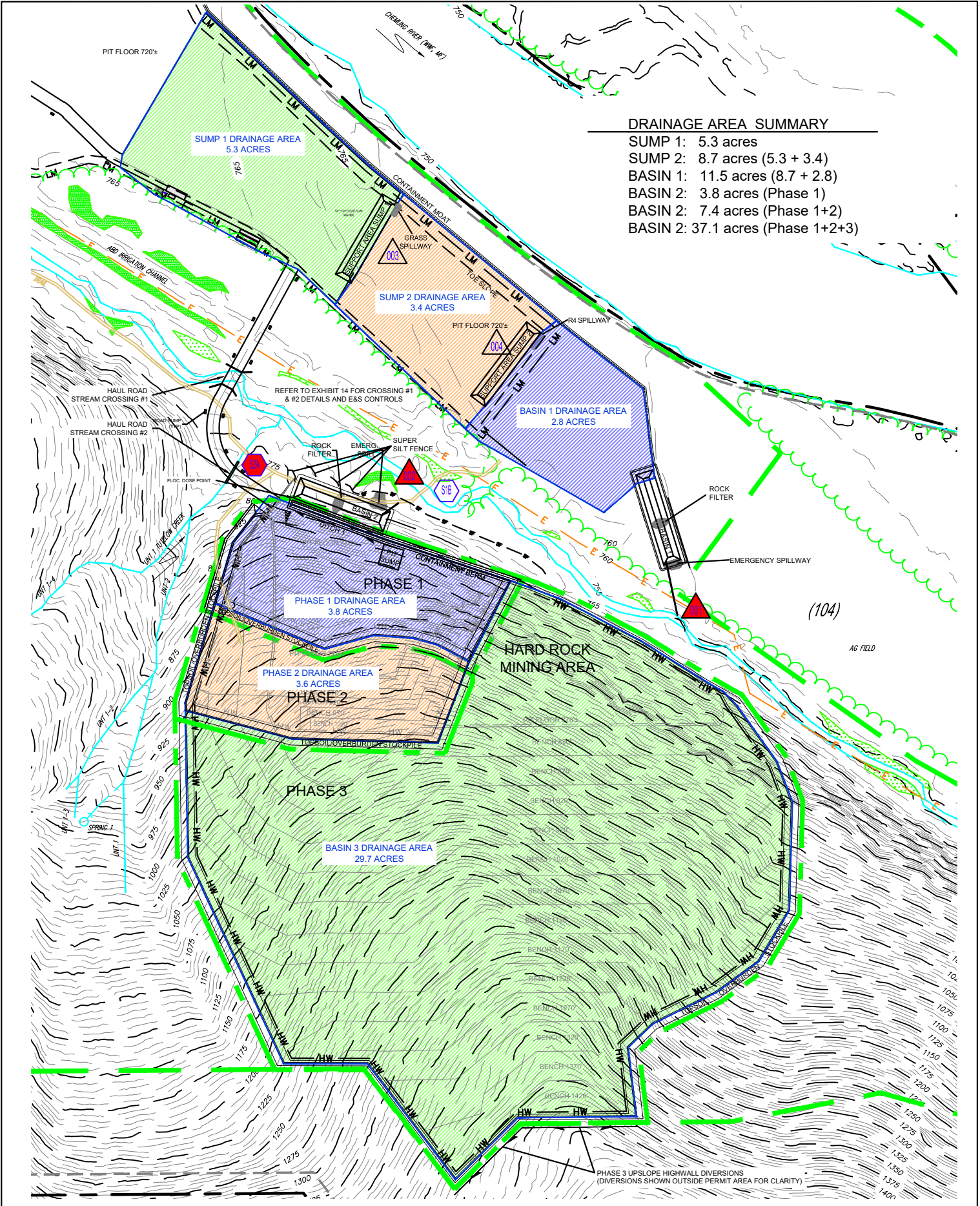
Registration Number and Expiration Date _____

SEAL

Signature of Permittee or Responsible Official _____

Date _____

Title _____



DRAINAGE AREA SUMMARY

SUMP 1: 5.3 acres
SUMP 2: 8.7 acres (5.3 + 3.4)
BASIN 1: 11.5 acres (8.7 + 2.8)
BASIN 2: 3.8 acres (Phase 1)
BASIN 2: 7.4 acres (Phase 1+2)
BASIN 2: 37.1 acres (Phase 1+2+3)

Date: 05/05/23

Rev No: 3

Sheet No:

1 of 1

PROJECT: **Minard Mine**
Bishop Brothers Construction Co. Inc.
Athens Township, Bradford County, Pennsylvania

TITLE: **Exhibit 13.3:
Basin Drainage Areas**

TRACT ENGINEERING, PLLC

120 Ridge Avenue
State College, PA 16803
814 272 0301
www.TractLLC.com

PROJECT NO: 20.0113

DRAWING NO: Minard

DRAWN BY: tsq 05/05/23

CHKD BY: TSG 06/11/24

REV.	DATE	BY	COMMENT
3	06/11/24	tsq	DEP. TOL. of 05/22/24
2	02/26/24	tsq	DEP. TOL. of 12/21/23
1		placeholder	

Minard - REVISED 06/11/24

PEAK RATES OF DISCHARGE FOR SMALL WATERSHEDS TYPE II STORM DISTRIBUTION

SLOPES - FLAT
CURVE NUMBER - 90

24 HOUR RAINFALL FROM US WB TP-40

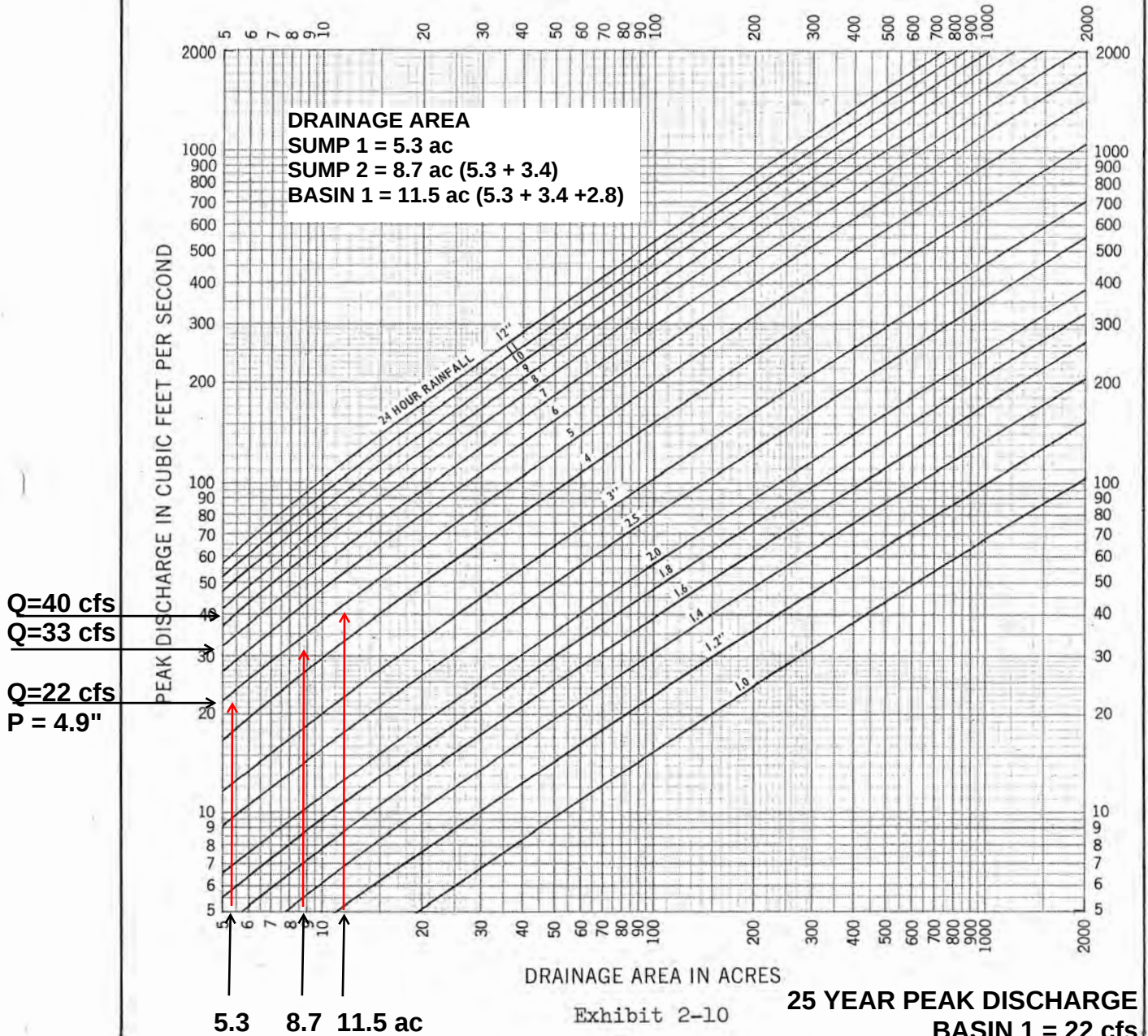


Exhibit 2-10

REFERENCE

"Chapter 2, Engineering Field Manual
for Conservation Practices"

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ENGINEERING DIVISION - HYDROLOGY BRANCH

STANDARD DWG. NO.

ES-1027

SHEET 7 OF 21

DATE 2-15-71

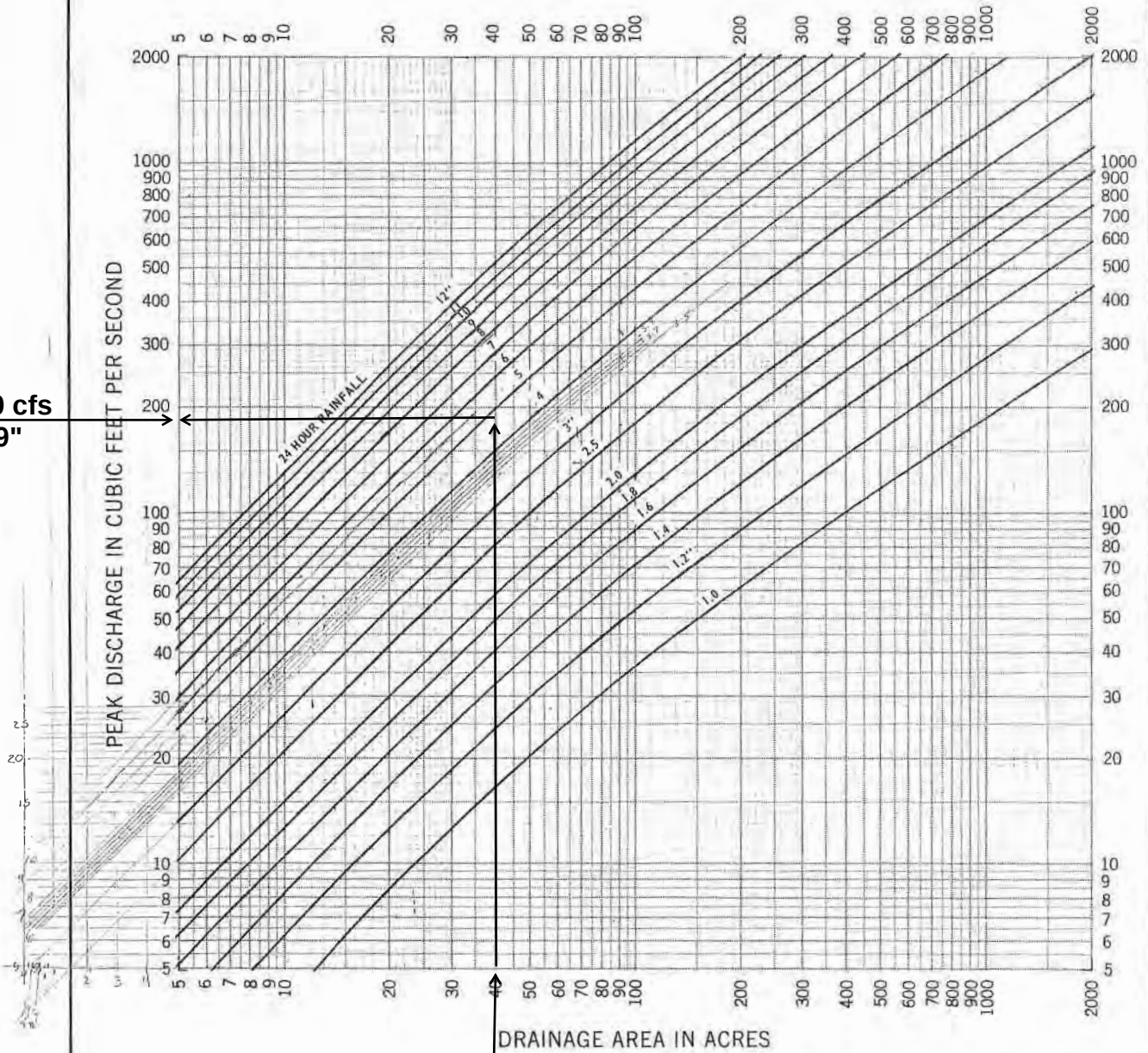
PEAK RATES OF DISCHARGE FOR SMALL WATERSHEDS TYPE II STORM DISTRIBUTION

2-751

SLOPES - STEEP
CURVE NUMBER - 90

24 HOUR RAINFALL FROM US WB TP-40

$Q = 190$ cfs
 $P = 4.9"$



40 ac Exhibit 2-10

**25 YEAR PEAK RUNOFF
BASIN 2 = 190 cfs**

REFERENCE

"Chapter 2, Engineering Field Manual
for Conservation Practices"

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ENGINEERING DIVISION - HYDROLOGY BRANCH

STANDARD DWG. NO.

ES-1027

SHEET 21 OF 21

DATE 2-15-71

Emergency Spillway Calculations

Minard Mine

Exhibit 13.1

05/05/23, REVISED 06/11/24

Weir Flow: $Q = C L H^{1.5}$

	C	L	H	Qs	Q max (25 yr)	Qs > Qmax
		ft	ft	cfs	cfs	
Basin 1	2.8	42	0.5	41.6	40	YES
Basin 2	2.8	45	1.5	231.5	190	YES
Sump 1	2.8	25	0.5	24.7	22	YES
Sump 2	2.8	35	0.5	34.6	33	YES

VELOCITY CALCULATIONS:

Solving using Manning's Equation.

Basin 1 Spillway Outfall Channel

Q = 40.0 cfs
 Base width = b = 42 ft
 Side Slopes = z = 3 ___:1
 S = 0.330 ft/ft

} channel dimensions

y	Q'	V	A	R
(ft)	(cfs)	(ft/s)	(ft ²)	(ft.333)
0.21	41.2	4.60	8.95	0.207

V < 9 ft/s

R4: Vmax = 9.0 n = .065 @ d<0.50

Basin 2 Spillway Outfall Channel

Q = 190.0 cfs
 Base width = b = 45 ft
 Side Slopes = z = 3 ___:1
 S = 0.330 ft/ft

} channel dimensions

y	Q'	V	A	R
(ft)	(cfs)	(ft/s)	(ft ²)	(ft.333)
0.51	197.8	8.34	23.73	0.492

V < 9 ft/s

R4: Vmax = 9.0 n = .064 @ d=0.51

Sump 1 Spillway Outfall Channel

Q = 22.0 cfs
 Base width = b = 25 ft
 Side Slopes = z = 3 ___:1
 S = 0.330 ft/ft

} channel dimensions

y	Q'	V	A	R
(ft)	(cfs)	(ft/s)	(ft ²)	(ft.333)
0.14	23.2	3.65	6.36	0.139

V < 4.5 ft/s

Vegetated channel: Vmax = 4.5 n = .035

Pond B Spillway Outfall Channel

Q = 33.0 cfs
 Base width = b = 40 ft
 Side Slopes = z = 3 ___:1
 S = 0.330 ft/ft

} channel dimensions

y	Q'	V	A	R
(ft)	(cfs)	(ft/s)	(ft ²)	(ft.333)
0.14	37.0	5.82	6.36	0.139

V < 9 ft/s

R4: Vmax = 9.0 n = .065 @ d<0.5

Basin 1 & 2 Pipe Capacity Calculation

Minard Mine

Exhibit 13.1

06/11/24

Circular Vertical Orifice: $Q = C A \text{ SQRT } (2 g h)$

$$C = \frac{C_c}{1 + K_E}$$

$$C = 0.474$$

$$C_c = 0.9$$

$$1 + K_E = 0.9 \text{ projecting, no headwall}$$

A = opening area

	BASIN 1	BASIN 2
type	principal	dewatering
diameter	10	4 inches
A =	0.545	0.087 ft ²

h = headwater above center opening area

H = total water depth above invert for 25 year e

Water Elev.	759.22	766.31 ft
-------------	--------	-----------

Invert Elev.	758.50	764 ft
--------------	--------	--------

H =	0.72	2.31 ft
-----	------	---------

$$h = H - r$$

h =	0.303	2.143 ft
-----	-------	----------

$$Q = C A \text{ SQRT } (2 g h)$$

Q =	1.14	0.49 cfs
-----	------	----------

Reference: HydroCAD, Version 8, Owner's Manual

Eqns 69, 70, & 75

MASTERCAT 4239

GENERAL DESCRIPTION

MasterCat 4239, a liquid coagulant, is a highly effective treatment for wastewater clarification, clay, and color removal. This product can handle large swings in pH, temperature, alkalinity, organics, and solids loading. MasterCat 4239 achieves superior total suspended solids results while minimizing the dose.

MasterCat 4239 provides easy product handling by direct injection without the need for a makeup system. The resulting superior performance over traditional treatments translates into lower dosages, fewer deliveries, more effective storage, and potentially lowers overall treatment costs. If faster settling rates of suspended material are required, the MasterFloc series can be overlaid. In most cases, this is not required.

PRODUCT APPLICATION

MasterCat 4239 should be fed with a genuine MasterCat feed system. This feed system is supplied and serviced by your Process Masters representative as part of the treatment program as long as you are using Process Masters products. Feeding of MasterCat products should always be done in a manner that enables the best continuous distribution and mixing of the product. Your Process Masters representative will assist you with the proper product feed points and feed rate.

PHYSICAL DESCRIPTION

Form	Liquid	pH	4.0 - 4.4
Appearance	Yellowish	Solubility in Water	Complete
Odor	None	Freeze Point	20°F
Bulk Density	10.04 - 11.21 lbs./gal.	Boiling Point	230°F
Specific Gravity	1.33 - 1.35	Vapor Pressure	None

DOSAGE

Your Process Masters representative will run all the tests required to determine the optimum product and dosage for your application.

COMPATIBILITY

Compatible: FRP, PVC, HDPE, or Rubber

PACKAGING

55 gallon reusable drums, 275 gallon reusable totes, and 2,000-4,000 gallon bulk quantities.

FOR MORE INFORMATION

Please contact your local Process Masters representative.



940 Krumsville Road

Kutztown, PA 19530

(610) 683-5674

Processmasterscorp.com

Product Number 4239
Safety Data Sheet

Page: Page 1 of 7
Revision Date: 2/11/2019
Print Date: 2/22/2021

1. Identification Of The Product

Product Name: **MasterCat 4239**

Company Identification: Process Masters Corporation
Kutztown, Pennsylvania. 19530

Emergency Phone Number: 610-683-5674

2. Hazards Identification

OSHA/HCS Status: While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of the product.

Classification of the substance or mixture: No classified.

GHS label elements:

Signal word: No signal word.

Hazard statements: No known significant effects or critical hazards.

Precautionary statements:

Prevention: Not applicable.

Response: Not applicable.

Storage: Not applicable.

Disposal: Not applicable.

Hazards not otherwise classified: None known.

3. Composition and Information of Ingredients

Substance/mixture: Mixture

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

4. First Aid Measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact: Flush contaminated skin with plenty of water. Get medical attention if symptoms occur.

Ingestion: Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Product Number 4239
Safety Data Sheet

Page: Page 2 of 7
Revision Date: 2/11/2019
Print Date: 2/22/2021

Most important symptoms/effects, acute and delayed

Potential acute health effects:

Eye contact: No known significant effects or critical hazards.
Inhalation: No known significant effects or critical hazards.
Skin contact: No known significant effects or critical hazards.
Ingestion: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact: No known significant effects or critical hazards.
Inhalation: No known significant effects or critical hazards.
Skin contact: No known significant effects or critical hazards.
Ingestion: No known significant effects or critical hazards.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments: No specific treatments.
Protection of first aiders: No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11).

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for surrounding fire.
Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: No specific fire or explosion hazard.
Hazardous thermal decomposition products: Decomposition products may include the following materials:
Halogenated compounds; metal oxide/oxides.

Special protective actions for fire-fighters: No special protection is required.
Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel."
Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Product Number 4239
Safety Data Sheet

Page: Page 3 of 7
Revision Date: 2/11/2019
Print Date: 2/22/2021

Methods and materials for containment and cleaning up

Spill: Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and Storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure Controls / Personal Protection
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Control parameters

Occupational exposure limits:	None
Appropriate engineering controls:	Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
Environmental exposure controls:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases, or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
Skin protection:	
Hand protection:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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Respiratory protection: Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

9. Physical and Chemical Properties

Physical state:	Liquid	Lower and upper explosive (flammable) limits:	Not available
Color:	Colorless to light yellow	Vapor Pressure:	Not available
Odor:	None	Vapor Density:	1 [Air=1]
Odor threshold:	Not available	Relative Density:	1.33 to 1.35
pH:	4 - 5	Solubility:	Easily soluble in the following materials: cold water and hot water
Melting Point:	-7° C (19.4° F)	Solubility in Water:	Not available
Boiling Point:	110° C (230° F)	Partition coefficient: n-octanol/water	Not available
Flash Point:	Not applicable	Auto-ignition temperature:	Not available
Burning time:	Not applicable	Decomposition temperature:	Not available
Burning rate:	Not applicable	SADT:	Not available
Evaporation Rate:	Not available	Viscosity:	Not available
Flammability (solid,gas):	Not available		

10. Stability and Reactivity

Reactivity: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability: The product is stable.
Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid: No specific data.
Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials and metals.
Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. Toxicological Information

Information on toxicological effects

Acute toxicity: There is no data available.
Irritation/Corrosion:
 Skin: There is no data available.
 Eyes: There is no data available.
 Respiratory: There is no data available.
Sensitization:
 Skin: There is no data available.
 Respiratory: There is no data available.
Mutagenicity: There is no data available.
Carcinogenicity: There is no data available.
Reproductive toxicity: There is no data available.
Teratogenicity: There is no data available.
Specific target organ toxicity (single exposure): There is no data available.
Specific target organ toxicity (repeated exposure): There is no data available.
Aspiration hazard: There is no data available.

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Information on the likely routes of exposure: Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects:

Eye contact: No known significant effects or critical hazards.
Inhalation: No known significant effects or critical hazards.
Skin contact: No known significant effects or critical hazards.
Ingestion: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics:

Eye contact: No known significant effects or critical hazards.
Inhalation: No known significant effects or critical hazards.
Skin contact: No known significant effects or critical hazards.
Ingestion: No known significant effects or critical hazards.

Delayed and immediate effects and also chronic effects from short and long term exposure:

Short term exposure:

Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.

Long term exposure:

Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.

Potential chronic health effects:

General: No known significant effects or critical hazards.
Carcinogenicity: No known significant effects or critical hazards.
Mutagenicity: No known significant effects or critical hazards.
Teratogenicity: No known significant effects or critical hazards.
Developmental effects: No known significant effects or critical hazards.
Fertility effects: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates: There is no data available.

12. Ecological Information

Toxicity

Product/ingredient name	Result	Species	Exposure
Product	Chronic EC 6999 mg/L	Daphnia – Daphnia magna	-
	Chronic LC50 3623 mg/L	Fish – Fathead minnow	-

Persistence and degradability: There is no data available.

Bioaccumulation potential: There is no data available.

Mobility in soil: Soil/water partition coefficient (Koc): -2.49

Other adverse effects: No known significant effects or critical hazards.

13. Disposal Considerations

Disposal Methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any byproducts should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the

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requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport Information

	DOT Classification	IMDG	IATA
UN number	Not regulated	Not regulated	Not regulated
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing Group	-	-	-
Environmental hazards	No.	Yes.	No.
Additional information	-	-	-

Special precautions for user: **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.

15. Regulatory Information

US Federal regulations:

TSCA 8(a) CDR Exempt/Partial exemption:	Not determined.
United States Inventory (TSCA 8b):	All components are listed or exempted.
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs):	Not listed
Clean Air Act Section 602 Class I Substances:	Not listed
Clean Air Act Section 602 Class II Substances:	Not listed
DEA List I Chemicals (Precursor Chemicals):	Not listed
DEA List II Chemicals (Essential Chemicals):	Not listed

SARA 302/304

Composition/information on ingredients: No products were found.
SARA 304 RQ: Not applicable.

SARA 311/312

Classification: Not applicable.
Composition/information on ingredients: No products were found.

State regulations:

Massachusetts -	None of the components are listed.
New York -	None of the components are listed.
New Jersey -	None of the components are listed.
Pennsylvania -	The following components are listed: Dialuminium Chloride Pentahydroxide
California Prop. 65:	No products were found.

International regulations:

International lists:	Australia inventory (AICS):	All components are listed or exempted.
	China inventory (IECSC):	All components are listed or exempted.
	Japan inventory:	Not determined.

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Korea inventory:	All components are listed or exempted.
Malaysia inventory (EHS Register):	Not determined.
New Zealand Inventory of Chemicals (NZIoC):	All components are listed or exempted.
Philippines inventory (PICCS):	All components are listed or exempted.
Taiwan inventory (CSNN):	Not determined.

Chemical Weapons Convention List Schedule I Chemicals:	Not listed
Chemical Weapons Convention List Schedule II Chemicals:	Not listed
Chemical Weapons Convention List Schedule III Chemicals:	Not listed

16. Other Information

Key to abbreviations:

ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and labeling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate bulk container
IMDG = International Maritime Dangerous Goods
LogPow = Logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process unless specific in the text.

Module 14: Streams/Wetlands – Floodway Encroachments to Tutelow Creek & Chemung River [Chapter 105/§77.504/§77.523]

Note: The United States Army Corp of Engineers (Corps) authorizes a Pennsylvania State Programmatic General Permit – 4 (PASPGP-4) when there will be a discharge of dredged or fill materials, or the placement of both temporary and/or permanent structures, which individually or cumulatively result in impacts to 1.0 acre or less of waters including wetlands. Projects will be sent to the Corps as a Category III activity for review. The Commonwealth has issued 401 Water Quality Certification for projects eligible under PASPGP-4.

If there will be a discharge of dredged or fill materials, or the placement of both temporary and/or permanent structures, which individually or cumulatively result in impacts to more than 1.0 acre of waters including wetlands, or such activities are otherwise ineligible for a PASPGP-4, the Corps may require an individual permit in accordance with Section 404 of the Clean Water Act and separate 401 Water Quality Certification.

Stream/Wetland encroachments may also require authorization from the US Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. If this project requires a federal permit, you may be eligible for either PASPGP-4 authorization or you must file a separate application with the Corps. If you require a permit and are not eligible under the PASPGP-4 you must request a Section 401 Water Quality Certification from the Department using module 14A "Request for Federal Clean Water Act (CWA) Section 401 Certification for Mining Activities."

Does this project require a permit from the Corps? ☐ Yes ☒ No

If no, explain why not. **The proposed encroachments do not place fill materials in a water or wetland.**

14.1 Mining Activities Within 100 Feet of a Stream/Stream Relocation/Channel Change

If the mining activities are proposed within 100 feet of an intermittent or perennial stream, including haul road crossings, or the relocation or channel change of an intermittent or perennial stream provide the following information: (**Note:** Variance request for these and the expansion of pits must be included in the proof of publication. A separate Module 14.1 should generally be completed for each proposed encroachment.)

- a) Name and location of the stream; and location, length, and acreage disturbed by the proposed activities (Identify the location of the proposed activities on Exhibits 9 and 18);

Tutelow Creek is located within the SMP as shown on Exhibit 9 and 18.

Chemung River is located adjacent to the SMP as shown on Exhibit 9 and 18.

The floodway encroachment variance areas are detailed on Exhibit 14.1.

NORTHWEST FLOODWAY VARIANCE AREA

The disturbance is approximately 410,000 SF (9.4 acres) for the northwest floodway encroachment to Tutelow Creek. The area is not a uniform shape. The overall dimensions of the disturbance area is: ~350' x ~1,910.

SOUTHEAST FLOODWAY VARIANCE AREA

The disturbance is approximately 385,000 SF (8.8 acres) for the southeast floodway encroachment at the confluence of Tutelow Creek and Chemung River. The area is not a uniform shape. The overall dimensions of the disturbance area is: ~400' x ~2,200.

- b) A narrative giving a description and the purpose and justification of the proposed activities;

NORTHWEST FLOODWAY VARIANCE AREA

Mineral extraction will occur in the variance area of Tutelow Creek for Sand & Gravel Phase 2. Mineral extraction will not occur within 100' of Tutelow Creek. See detail 5 on Exhibit 10.2.

SOUTHEAST FLOODWAY VARIANCE AREA

Mineral extraction will occur in the variance area of Tutelow Creek and Chemung River for Sand & Gravel Phase 1. Mining support areas will be located within 100' of Tutelow Creek and Chemung River for the initial support area for the Hard Rock mining. Mineral extraction will not occur within 100' of Tutelow Creek or Chemung River. See detail 11 on Exhibit 10.2.

The encroachments are justified as the immediate stream channel buffer will be maintained and immediately stabilized where mining support activities are completed. Mining support areas will be utilized for activities such as haul roads, stream crossings, and/or E&S controls.

- c) A description of the character of the stream bed and banks, and a profile of the stream for a reasonable distance above and below the proposed site showing bed slopes, normal and flood water surfaces and a description of the riparian vegetation including a characterization of the resident aquatic community, a description of the riparian vegetation and an assessment of the probable hydrologic consequences of the proposed activities on the water quality and quantity and the resident aquatic community. Provide the name(s), address(es) and telephone number(s) of the individual(s) responsible for the collection and analysis of this data and provide a description of the methodologies used to collect and analyze the data;

Tutelow Creek flows from northwest to southeast through the southern portion of the SMP. The stream channel has a top of bank with of 30-40 wide and is 5-8 feet deep. Tutelow Creek has a 15-20' flow path, normal water depths vary from 4"-3'. The channel and surrounding topography is flat. Substrate within the stream consists of cobble, gravel, and sand. Benthic macroinvertebrates communities observed consist of caddis flies, mayflies, and stoneflies. The slope of the stream is approximately 2%. The riparian vegetation is dominated by red maple, yellow birch, black walnut, reed canary grass, American hornbeam, and rambler rose.

Chemung River flows south to north along the east side of the SMP. The stream channel has a top of bank with of ~300 feet wide and is 6-15 feet deep. The water surface has a ~250' flow path, normal water depths vary from 2-4'. The channel and surrounding topography is flat. Substrate within the stream consists of cobble, gravel, and sand. Benthic macroinvertebrates communities observed consist of caddis flies, mayflies, and stoneflies. The slope of the stream is approximately <1%. The riparian vegetation is dominated by red maple, yellow birch, hemlock stands, various oak species, American hornbeam, rambler rose, and garlic-mustard.

The proposed encroachments will not impact stream flow.

Mining of the sand and gravel across the valley floor will not occur within 100 feet of any stream. Despite portions of both Phase 1 and 2 mining areas being within the FEMA floodway, these flood prone areas are typically back flow channels where velocities are very low and the potential for erosion is minimal. Away from these back channels, a 15+ foot thickness of the sand and gravel deposit above normal groundwater elevation, and a minimum separation of 100 feet of vegetated, primarily forested, barrier area provides sufficient separation and stability between streams and the pits to ensure that stream migration into a pit would only be possible from a cataclysmic event that would alter the landscape of the entire valley.

- d) A stream profile for the existing and proposed channel for a reasonable distance upstream, downstream and within the proposed change, showing bed slopes, pool-riffle ratios, normal and flood water surfaces, and existing obstructions;

A stream detail sheet has been provided showing the existing and proposed stream sections and profiles has been provided; see Exhibit 14, page 1 and details 5 and 11 on Exhibit 10.2.

- e) A hydrologic and hydraulic analysis which shall include:
1. data on size, shape and characteristics of the watershed;
 2. the size and frequency of the design storm;
 3. the hydraulic capacity of any structures or replacement channel;
 4. the hydraulic capacity of the channel upstream and downstream of the structure or the relocation/channel change;

N/A – no impacts by the encroachment



DEPARTMENT OF THE ARMY
U. S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
STATE COLLEGE FIELD OFFICE
1631 SOUTH ATHERTON STREET, SUITE 101
STATE COLLEGE, PENNSYLVANIA 16801-6260

April 25, 2024

Operations Division

Dustin Bishop
Bishop Brothers Construction Company, Incorporated
1376 Leisure Drive
Towanda, Pennsylvania 18848

Dear Mr. Bishop:

This is in reference to your application, identified by this office as NAB-2020-00282-P12 (Minard Mine), for Department of the Army authorization to discharge dredged and/or fill material into Tutelow Creek and a tributary associated with the construction of two stream crossings (a bridge over Tutelow Creek and a culvert pipe on an unnamed tributary to Tutelow Creek) for a proposed non coal mine. The project is located just west of the Chemung River at 312 Minard Drive, Athens, Bradford County, Pennsylvania (Latitude 41.968813/Longitude -76.551303).

In accordance with Section 404 of the Clean Water Act, a Department of the Army authorization is required for the discharge of dredged and/or fill material into waters of the United States, including jurisdictional wetlands. Section 10 of the Rivers and Harbors Act also requires Department of the Army authorization for any work in, over, or under a navigable water of the United States.

We have determined that your proposed work, if accomplished in accordance with the enclosed terms and conditions and the information included in your application, is authorized under the Pennsylvania State Programmatic General Permit-6 (PASPGP-6). This PASPGP-6 verification is provided pursuant to Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act. This authorization may be subject to modification, suspension, or revocation if any of the information contained in the application, including the plan(s), is later found to be in error.

The enclosed list of conditions must be followed for purposes of the PASPGP-6 (Enclosure 1). In accordance with General Condition 34 of PASPGP-6 you are required to submit a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. An example of the information that is required is posted on the Baltimore District webpage at:
<https://www.nab.usace.army.mil/Portals/63/self%20cert%20example.pdf>.

You and your contractor are also requested to sign, date and return enclosure 2 of this verification letter whereby you are acknowledging and agreeing to comply with the

terms and conditions, including the special conditions, of this PASPGP-6 verification. These documents should be submitted to the following email address: nab-regulatory@usace.army.mil, with the Corps permit number NAB-2020-00282-P12 included in the subject line. In addition, the following special conditions are incorporated as part of this authorization:

1. All authorized work shall be constructed in accordance with project plans prepared by Tract Engineering, PLLC, entitled: "Exhibit 14.1 – Stream & Floodway Encroachments", dated February 26, 2024, sheet 1 of 1 and Prepared by The EADS Group entitled: "Minard Mine Exhibit 14 Plans and Details", dated December 6, 2021, last revised February 26, 2024, sheets 1 and 2 of 2.
2. The authorized work shall result in the construction of a 46 foot long by 30 foot wide permanent bridge with concrete wingwalls protected with R8 riprap. Construction of the bridge will include temporarily dewatering approximately 80 linear feet of creek for construction and a temporary roadway crossing for construction equipment access. In addition, a permanent 60 foot long 72 inch diameter culvert pipe with riprap stone protection at the inlet and outlet end will be installed. Approximately 120 linear feet of stream channel will be temporarily dewatered during construction to allow for work in the dry. There are no wetland impacts associated with this project.
3. The permittee shall require its contractors and/or agent to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit.
4. Any Pennsylvania Fish and Boat Commission time-of-year restrictions assigned to Tutelow Creek in the project area is a condition of this authorization.
5. The permittee shall implement proper sediment and erosion control measures, as approved by the Bradford County Conservation District and/or the Pennsylvania Department of Environmental Protection, for the purpose of protecting the waterways and wetlands located beyond the area designated for fill.

In accordance with PASPGP-6, Part V, A, 29, state authorization from the Pennsylvania Department of Environmental Protection is required to be obtained prior to commencement of any work authorized by PASPGP-6.

This verification is valid for the length of the Pennsylvania Department of Environmental Protection permit, including 401 Water Quality Certification, or until the PASPGP-6 expires (June 30, 2026), is modified, reissued, suspended, or revoked, whichever occurs sooner. You must remain informed of changes to the PASPGP-6. We will issue (a) public notice(s) announcing the changes as they occur.

Activities authorized under PASPGP-6 that have commenced construction or are under contract to commence construction, will remain authorized provided the activity is completed within 12 months of the date of the PASPGP-6 expiration (June 30, 2026), modification, or revocation, or until the expiration date of the project specific PASPGP-6 verification or Pennsylvania Department of Environmental Protection permit, including 401 Water Quality Certification, whichever is less.

Be advised that this verification authorizes the aforementioned work as a single and complete (one time only) activity. If additional work is to be performed, you must notify this office. Subsequent work in this area may require a separate letter of authorization from this office.

Please note that as of the date of this authorization, your project is in compliance with Section 7 of the Endangered Species Act (ESA). However, new species may be listed or additional populations found. Therefore, it is your responsibility to ensure that construction of the authorized work does not adversely affect any existing or newly listed federally endangered or threatened species. Information on threatened and endangered species and their critical habitat can be obtained from the offices of the United States Fish and Wildlife Service and National Marine Fisheries Service or their web pages at: <https://ecos.fws.gov/ipac> and <https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/index.html> respectively.

This verification does not obviate the need for obtaining other federal, state, or local authorizations, nor does it address or include any consideration for geographic jurisdiction on aquatic resources and shall not be interpreted as such.

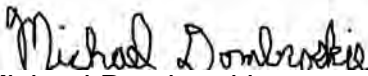
In addition, please note, if you sell the property associated with this permit, when the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new property owner(s). Although the construction period for work authorized by this PASPGP-6 is finite, the permit itself, with its limitations, does not expire. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, you must have the transferee (new owner) complete the enclosed permit transfer form (Enclosure 3). The transferee is required to provide a mailing address and telephone number along with their signature and date in the space

provided. Please submit to this office by email to nab-regulatory@usace.army.mil. The Corps permit number NAB-2020-00282-P12 must be included in the subject line.

This authorization has been sent to the Pennsylvania Department of Environmental Protection Bradford Regional Office, the Bradford County Conservation District Office, and Tract Engineering.

If you have any questions concerning this matter, please call Mr. Michael Dombroskie, of this office, at 814-235-0571 or via email at mike.dombroskie@usace.army.mil.

Sincerely,


Michael Dombroskie
Project Manager, Pennsylvania Section
Regulatory Branch

Enclosures

To identify how we can better serve you, we need your help. Please take the time to fill out our new customer service survey at:
<https://regulatory.ops.usace.army.mil/customer-service-survey/>

PENNSYLVANIA STATE PROGRAMMATIC GENERAL PERMIT – 6
(PASPGP-6)
July 1, 2021

Please note: the full text of the PASPGP-6 may be viewed on the Baltimore District web site at <http://www.nab.usace.army.mil/Missions/Regulatory/PermitTypesandProcess.aspx> or by calling the Corps at 814-235-0570

Permittee:

Date of PASPGP-6 Verification: 4/24/2024

State Authorization(s):

Corps District:

☒ **Baltimore District**

U.S. Army Corps of Engineers State College Field Office
1631 South Atherton Street
Suite 101
State College, Pennsylvania 16801-6260
Email: NAB-Regulatory@usace.army.mil

☐ **Philadelphia District**

U.S. Army Corps of Engineers
Regulatory Branch
1650 Arch Street
Philadelphia, Pennsylvania 19103
Email: PhiladelphiaDistrictRegulatory@usace.army.mil

☐ **Pittsburgh District**

U.S. Army Corps of Engineers, Regulatory Branch
William S. Moorhead Federal Building, 20th floor
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222-4186
Email: Regulatory.Permits@usace.army.mil

It has been determined that your proposed project, which includes the discharge of dredged and/or fill material and/or the placement of structures into waters of the United States, including wetlands, qualifies for federal authorization under the provisions of Section 404 of the Clean Water Act and /or Section 10 of the River and Harbor Act of 1899, under the terms and conditions of the PASPGP-6.

All activities authorized under PASPGP-6 must comply with all conditions of the authorization, including General, Procedural, and Special Conditions. Failure to comply with all the conditions of the authorization, including project special conditions, will constitute a permit violation and may be subject to criminal, civil, or administrative penalties, and /or restoration.

The authorized activity must be performed in compliance with the following General Conditions to be authorized under PASPGP-6:

General Conditions:

1. Permit Conditions: The permittee shall conduct all work and activities in waters of the United States, including jurisdictional wetlands, in strict compliance with the approved authorization/verification including all final maps, plans, profiles, and design specifications.
2. 401 State Water Quality Certification (SWQC) Conditions: The permittee shall comply with the following conditions unless a project specific SWQC is required as identified below:
 - a. Prior to beginning any activity authorized by the Corps under PASPGP-6, the applicant shall obtain from the Department all necessary environmental permits, authorizations or approvals, and submit to the Department environmental assessments and other information necessary to obtain the permits and approvals, as required under state law, including The Clean Streams Law (35 P.S. §§ 691.1—691.1001), the Dam Safety and Encroachments Act (32 P.S. §§ 693.1—693.27), the Surface Mining Conservation and Reclamation Act (52 P.S. §§ 1396.1—1396.19b), the Noncoal Surface Mining Conservation and Reclamation Act (52 P.S. §§ 3301—3326), the Bituminous Mine Subsidence and Land Conservation Act (52 P.S. §§ 1406.1—1406.21), the Coal Refuse Disposal Control Act (52 P.S. §§ 30.51—30.66), the Solid Waste Management Act (35 P.S. §§ 6018.101—6018.1003), the Hazardous Sites Cleanup Act (35 P.S. §§ 6020.101—6020.1305), the Land Recycling and Environmental Remediation Standards Act (35 P.S. §§ 6026.101—6026.908), 58 Pa.C.S. §§ 3201—3274 (related to development), the Air Pollution Control Act (35 P.S. §§ 4001—4015), the Storage Tank and Spill Prevention Act (35 P.S. §§ 6021.101—6021.2104) and the regulations promulgated thereunder, including 25 Pa. Code Chapters 16, 71, 77, 78, 78a, 86—91, 92a, 93, 95, 96, 102, 105, 106, 127, 245 and 260a—299.
 - b. Fill material may not contain any wastes as defined in the Solid Waste Management Act.
 - c. Applicants and projects eligible for the PASPGP-6 must obtain all state permits or approvals, or both, necessary to ensure that the project meets the state's applicable water quality standards, including a project-specific SWQC.

Note: As part of PADEP's issuance of 401 SWQC for PASPGP-6 on February 12, 2021, the following was included to clarify the meaning of this condition:

This 401 SWQC is only available for projects that do not require any federal authorization other than authorization from the Corps under Section 404 of the Act or Section 10 of the Rivers and Harbors Act of 1899. Applicants seeking authorization for activities not eligible for coverage under PASPGP-6, or for activities that require another federal authorization (such as an interstate natural gas pipeline, a gas storage field or a nuclear or hydroelectric project requiring authorization by another federal agency), must submit a request to the Department for a project-specific SWQC. The scope of the issuance of this SWQC is related only to the scope and applicability of the proposed PASPGP-6. Any activity or project requiring the Department to

issue 401 SWQC that is beyond the scope of the proposed PASPGP-6 or other programmatically issued SWQC (e.g. Nationwide Permits) will require the applicant to obtain a project-specific SWQC from the Department. This would include any activity or project requiring a SWQC associated with an authorization, permit or license issued by a federal agency, such as Federal Energy Regulatory Commission or Nuclear Regulatory Commission. Such activities or projects include, but are not limited to, an interstate natural gas pipeline, a gas storage field or a nuclear or hydroelectric project.

3. Terms and Conditions Related to Coastal Zone Management Act (CZMA) Certification: For those projects located within Pennsylvania's Coastal Zones, Non-Reporting Activities have General CZMA consistency determination and Reporting Activities must obtain individual CZMA consistency determination (see General Condition 30(b)).
4. Aquatic Life Movements: No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless crossing cannot be used, then culverts should be designed, constructed, and appropriately depressed, if possible, below the stream invert to minimize adverse effects to aquatic life movements.
5. Threatened and Endangered Species: By signing the Pennsylvania Natural Diversity Inventory (PNDI) receipt, the permittee has agreed to comply with all avoidance measures identified by the PNDI receipt. The applicant may also agree in writing to comply with all avoidance measures identified in U.S. Fish and Wildlife Service (USFWS) correspondence, including IPaC, as part of the application. To ensure compliance with the Endangered Species Act (ESA), those avoidance measures associated with federally listed, threatened, or endangered species are a condition of the PASPGP-6 verification, unless modified by the Corps.

If an activity is verified under the PASPGP-6, and a federally listed, threatened, or endangered species, or proposed species, is subsequently found to be present, all work must cease, and the Corps and USFWS (or National Marine Fisheries Service (NMFS)) must be notified by telephone immediately (contact information below). The PASPGP-6 verification is automatically suspended without additional notification to the permittee and will not be re-issued until consultation pursuant to Section 7 of the ESA is concluded and adverse effects to federally listed, threatened, endangered, and proposed species are avoided, or incidental take authorization issued.

Furthermore, persons have an independent responsibility under Section 9 of the ESA to avoid any activity that could result in the "take" of a federally listed species.

USFWS:
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801
office phone: 814 234-4090
fax: 814-234-0748 or 814 206-7452

NMFS:
Ms. Jennifer Anderson
Assistant Regional Administrator
Protected Resources Division NOAA Fisheries
55 Greater Republic Drive
Gloucester, Massachusetts 01930

6. Spawning Areas: The permittee shall comply with all time-of-year-restrictions (see below) associated with spawning areas as set forth by the Pennsylvania Fish and Boat Commission (PFBC) or other designated agency. Discharges or structures in spawning or nursery areas shall not occur during spawning seasons unless written approval is obtained from the PFBC or another designated agency. In addition, work in areas used for other time sensitive life span activities of fish and wildlife (such as hibernation or migration) may necessitate the use of seasonal restrictions for avoidance of adverse impacts to vulnerable species. Impacts to these areas shall be avoided or minimized to the maximum extent practicable during all other times of the year.

Wild Trout	October 1 - December 31
Class A Wild Trout	October 1 - April 1

List of Trout Streams found at:

<https://www.fishandboat.com/Fish/PennsylvaniaFishes/Trout/Pages/TroutWaterClassifications.aspx>.

7. Shellfish Production: No discharge of dredged and/or fill material and/or the placement of structures may occur in areas of concentrated shellfish production, unless the discharge is directly related to an authorized shellfish harvesting activity.
8. Adverse Effects From Impoundment: If the regulated activity creates an impoundment of water, the adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow, including impacts to wetlands, shall be minimized to the maximum extent practicable.
9. Management of High Flows: To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity,

and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Erosion and Sediment Controls: Appropriate soil erosion and sediment controls, in accordance with state regulations, must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States, including jurisdictional wetlands, during periods of low-flow or no-flow, or during low tides.
11. Suitable Material: No activities, including discharges of dredged and/or fill material or the placement of structures, may consist of unsuitable material (i.e., asphalt, trash, debris, car bodies, etc.). No material discharged shall contain toxic pollutants in amounts that would violate the effluent limitation standards of § 307 of the Clean Water Act (CWA).
12. Temporary Fill and Structures: Temporary fill (i.e., access roads and cofferdams) and structures in waters and/or wetlands authorized by PASPGP-6 shall be properly constructed and stabilized during use to prevent erosion and accretion. Temporary fill in wetlands shall be placed on geotextile fabric laid on existing wetland grade, unless such requirement is specifically waived by the Corps. Whenever possible, rubber or wooden mats should be used for equipment access through wetlands to the project area. Temporary fills and structures shall be removed, in their entirety, to an upland site, and suitably contained to prevent erosion and transport to a waterway or wetland. Temporarily impacted areas shall be restored to their preconstruction contours, elevations, and hydrology, and revegetated with a wetland seed mix that contains non-invasive, native species, to the maximum extent practicable. Unless approved by the Corps, the restoration work must be completed within 30 days of the date the temporary fill/structure is no longer needed.
13. Equipment Working in Wetlands: Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
14. Installation and Maintenance: Any regulated structure or fill authorized by PASPGP-6 shall be properly installed and maintained to ensure public safety.
15. PASPGP-6 Authorization:
 - a. PASPGP-6 expires June 30, 2026, unless suspended or revoked.
 - b. Verifications of PASPGP-6 expire June 30, 2026, unless the PASPGP-6 permit is suspended, revoked, or the PADEP authorization expires, whichever date occurs sooner. Activities authorized under PASPGP-6 that have commenced construction or are under contract to commence construction will remain authorized provided the activity is completed within 12 month of the date of the PASPGP-6 expiration, modification, or revocation; or until the expiration date of the project specific verification, whichever is sooner.

16. One-Time Use: A PASPGP-6 verification is valid to construct the project, or perform the activity, one time only, except for PASPGP-6 verifications specifically issued for reoccurring maintenance activities.
17. Water Supply Intakes: No regulated activity may occur in the proximity of a public water supply intake and adversely impact the public water supply. In order to minimize the effects of intakes on anadromous fish eggs and larvae, and oyster larvae, intake structures should be equipped with screening (with mesh size no larger than 2 mm) of wedge wire or another material of equal or better performance. Where feasible, intakes should be located away from spawning or nursery grounds, or to minimize the impingement on, or entrainment of, eggs or larvae. In addition, intake velocities should not exceed 0.5 ft/sec.
18. Historic Properties: For all activities verified under a PASPGP-6, upon the unanticipated discovery of any previously unknown historic properties (historic or archeological), all work must cease immediately, and the permittee must notify the State Historic Preservation Officer (SHPO) and the Corps. The Corps will contact the tribes with whom they routinely consult, within 24 hours in accordance with each District's tribal consultation process. PASPGP-6 may be re-verified, and special conditions added if necessary, after an effect's determination on historic properties and/or tribal resources is made, in consultation with the SHPO, the tribes and other interested parties. The PASPGP-6 verification may be modified and/or rescinded for the specific activity if an adverse effect on the historic property cannot be avoided, minimized, or mitigated.
19. Tribal Rights: No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
20. Corps Civil Works Projects: The PASPGP-6 does not authorize any work which will interfere with an existing or proposed Corps Civil Works project, or any Corps-owned or managed property or easement (i.e., flood control projects, dams, reservoirs, and navigation projects), unless specifically approved by the Corps in writing. Pursuant to 33 U.S.C 408, a review by, or permission from the Corps is required for activities that will alter or temporarily or permanently occupy or use a Corps federally authorized Civil Works project. Any activity that requires Section 408 permission and/or review is not authorized by PASPGP-6 until the appropriate Corps office issues the Section 408 permission or completes its review to alter, occupy, or use the Corps Civil Works project, and Corps issues a written PASPGP-6 verification.
21. Navigation: No activity verified under PASPGP-6 may cause more than minimal adverse effect on navigation. No attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein. In addition, activities that require temporary causeways that prohibit continued navigational use of a waterway (i.e., temporary causeways extending greater than $\frac{3}{4}$ the width across the waterway) shall be removed in their entirety upon completion of their use. Any safety lights and signals prescribed by the U.S. Coast Guard (USCG), through regulation or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. The permittee understands and agrees that, if further operations by the United States require the removal, relocation, or other alteration, of the

structure or work herein authorized, or if, in the opinion of the Secretary of the Army or an authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

22. Inspections: The permittee shall allow a District Engineer or an authorized representative(s) to make periodic inspections at any time deemed necessary in order to ensure that the work is being performed in accordance with all the terms and conditions of PASPGP-6. The District Engineer may also require post-construction engineering drawings (as-built plans) for completed work.
23. Modifications of Prior Verifications: Any proposed modification of a previously verified Single and Complete project that results in a change in the verified impact to, or use of waters of the United States, including jurisdictional wetlands, must be approved by PADEP, or the Corps if applicable. Corps written approval is required if the prior verification was reviewed by the Corps, or if the proposed modification is a Reporting Activity under PASPGP-6. Project modifications that cause a Single and Complete Project to exceed 0.5 acre of loss of waters of the United States, including jurisdictional wetlands (except those identified in Part II A.2. a. and b.), or greater than 1,000 linear feet of permanent jurisdictional stream loss (except those identified in Part II A.2. a and b.), are not eligible for PASPGP-6 and will be forwarded to the Corps for review under an alternative permit review procedure.
24. Recorded Conservation Instruments: As per Part III.D.27 and Part III.E.8 of this permit, proposed Draft Conservation Instruments may be submitted by the applicant as part of the permit application package for review and approval. When such proposed Conservation Instruments are submitted by the applicant, proof of the recorded deed restriction, conservation easement, or deed restricted open space area shall be forwarded to the appropriate Corps District and appropriate PADEP offices, prior to the initiation of any permitted work, unless specifically waived by the Corps in writing. Conservation Instrument templates can be found at:
<http://www.nab.usace.army.mil/Missions/Regulatory/PermitTypesandProcess.aspx>
25. Property Rights: PASPGP-6 does not obviate the need to obtain other federal, state, or local authorizations required by law, nor does the permit grant any property rights or exclusive privileges or authorize any injury to the property or rights of others.
26. Navigable Waters of the United States (Section 10 Waters):

In addition to the other general conditions, the following conditions are applicable for activities in the eligible navigable waters of the United States identified in Appendix B:

- a. For aerial transmission lines, the following minimum clearances are required for aerial electric power transmission lines crossing navigable waters of the United States. These clearances are related to the clearances over the navigable channel provided by the

existing fixed bridges, or the clearances which would be required by the USCG for new fixed bridges, in the vicinity of the proposed aerial transmission line. These clearances are based on the low point of the line under conditions producing the greatest sag, taking into consideration temperature, load, wind, length of span, and type of supports as outlined in the National Electric Safety Code:

Nominal System Voltage (kV)	Minimum Additional Clearance (ft.) Above Clearance Required for Bridges
115 and below	20
138	22
161	24
230	26
350	30
500	35
700	42
750-765	45

- i. Clearances for communication lines, stream gauging cables, ferry cables, and other aerial crossings must be a minimum of ten feet above clearances required for bridges, unless specifically authorized otherwise by the District Engineer.
 - ii. Corps regulation ER 1110-2-4401 prescribes minimum vertical clearances for power communication lines over Corps lake projects. In instances where both regulation and ER 1110-2-4401 apply, the greater minimum clearance is required.
- b. Encasement: The top of any cable, encasement, or pipeline shall be located a minimum of three feet below the existing bottom elevation of the streambed and shall be backfilled with suitable heavy material to the preconstruction bottom elevation. Where the cable, encasement, or pipeline is placed in rock, a minimum depth of one foot from the lowest point in the natural contour of the streambed shall be maintained. When crossing a maintained navigation channel, the requirements are a minimum of eight feet between the top of the cable, encasement, or pipeline and the authorized depth of the navigation channel. For maintained navigational channels, where the utility line is placed in rock, a minimum depth of two feet from the authorized depth of the navigation channel shall be maintained.
- c. As-Built Drawings: Within 60 days of completing an activity that involves an aerial transmission line, submerged cable, or submerged pipeline across a navigable water of the United States (i.e., Section 10 waters), the permittee shall furnish the Corps and National Oceanic and Atmospheric Administration, Nautical Data Branch, N/CS26, Station 7317, 1315 East-West Highway, Silver Spring, Maryland, 20910 with professional, certified as-built drawings, to scale, with control (i.e., latitude/longitude, state plane coordinates), depicting the alignment and minimum clearance of the aerial wires above the mean high water line at the time of survey or depicting the elevations and alignment of the buried cable or pipeline across the navigable waterway.

d. Aids to Navigation: The permittee must prepare and provide for USCG approval, a Private Aids to Navigation Application (CG-2554). The application can be found at: https://media.defense.gov/2017/Nov/20/2001846135/-1/-1/0/CG_2554.pdf. The completed application must be sent to the appropriate USCG office as indicated below:

- i. Baltimore/Philadelphia Districts: Commander Fifth Coast Guard District, 431 Crawford Street, Room 100, Portsmouth, VA 23704-5504, Attn: Mr. Matthew Creelman; by email to Matthew.K.Creelman2@uscg.mil; or by FAX to (757) 398-6303.
- ii. Pittsburgh District: Eighth Coast Guard District, Sector Ohio Valley, USCGC Osage, 300 McKown Ln, Sewickley, PA 15143; phone (412) 741-1180

Within 30 days of the date of receipt of the USCG approval, the permittee must provide a copy to the appropriate Corps district office.

27. PADEP Waiver: If the Corps determines a specific activity, which is eligible for a PADEP Non-reporting Waiver, has a significant adverse impact on life, property or important aquatic resources, the Corps may require the owner to modify the activity to eliminate the adverse condition or to obtain a Corps Individual Permit. In accordance with 33 CFR 325.7(a), "The District Engineer may reevaluate the circumstances and conditions of any permit, including regional permits, either on his own motion, at the request of the permittee, or a third party, or as the result of periodic progress inspections, and initiate action to modify, suspend, or revoke a permit as may be made necessary by considerations of the public interest. In the case of regional permits, this reevaluation may cover individual activities, categories of activities, or geographic areas."
28. Corps Water Releases: For projects located downstream of a Corps dam, the permittee should contact the appropriate Corps, Area Engineer Office, to obtain information on potential water releases and to provide contact information for notification of unscheduled water releases. It is recommended that no in-water work be performed during periods of high-water flow velocities. Any work performed at the project site is at the permittee's own risk.
29. State Authorization: The activity must receive state authorization. For the purpose of this requirement, any one of the following is considered as a state authorization:
 - a. A PADEP Chapter 105 Water Obstruction and Encroachment Permit, including PADEP approved Environmental Assessment pursuant to 25 Pa. Code § 105.15; or
 - b. A PADEP GP issued pursuant to 25 Pa. Code §§ 105.441-105.449; or
 - c. A PADEP approved Environmental Assessment for activities not otherwise requiring a PADEP permit pursuant to 25 Pa. Code § 105.12; or
 - d. A PADEP Dam Permit, including maintenance or repairs of existing authorized dams, including maintenance dredging; or

- e. A PADEP Emergency Permit issued pursuant to 25 Pa. Code § 105.64; or
 - f. A PADEP permit for the construction of a bridge or culvert which allows for maintenance activities of bridges and culverts; or
 - g. A PADEP Chapter 105 Dam Safety and Encroachment Enforcement Action.
30. Other Authorizations: Additional federal, state, and/or local authorizations or approvals may be required and where applicable must be secured by the applicant, prior to initiating any discharge of dredged and/or fill material, and/or the placement of structures into waters of the United States, including jurisdictional wetlands. These approvals include, but are not limited to:
- a. A project specific 401 SWQC issued by PADEP or considered waived, consistent with Section 401 of the CWA.
- PADEP has issued 401 SWQC for activities authorized by PASPGP-6 with conditions. See General Condition 2 for conditions and for identification when a project specific 401 SWQC or a waiver thereof is required. If the permittee cannot comply with all of the conditions of the 401 SWQC previously issued for PASPGP-6, then the permittee must obtain a project specific 401 SWQC or waiver for the proposed discharge in order for the activity to be authorized by PASPGP-6. The Corps or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality; and
- b. Reporting Activities located within the designated CZM Areas. Require a CZMA consistency determination issued by PADEP or a presumption of concurrence pursuant to Section 307 of the Federal Coastal Zone Management Act.
- The District Engineer or PADEP may require additional measures to ensure that the authorized activity is consistent with state CAM requirements; and
- c. Fills within the 100-year floodplains. This activity must comply with applicable Federal Emergency Management Agency approved state or local floodplain management requirements.
31. Federal Liability: In issuing this permit and any subsequent activity verification, the federal government does not assume any liability, including but not limited to the following:
- a. Damages to permitted project or users, thereof, as a result of other permitted or unpermitted activities or from natural causes;
 - b. Damages to the permitted project or uses, thereof, as a result of current or future activities undertaken by or on behalf of the United States in the public interest;
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit;

- d. Design or construction deficiencies associated with the permitted work; and
- e. Damage claims associated with any future modification, suspension, or revocation of the PASPGP-6.

32. False and Incomplete Information: The Corps may modify or rescind a previously issued project specific verification, if it determines that the original verification was issued based on false, incomplete and/or inaccurate information; or other information becomes available whereby such action is necessary to ensure compliance with other federal laws and regulations.

33. Anadromous Fish Waters: To protect anadromous fish during their migration and spawning, no work can take place in the following anadromous fish waterways listed in the table below from March 15 to June 30 unless approved in writing by the Corps. Questions on the applicability of this condition should be directed to the Corps, Philadelphia District.

<u>Waterway</u>	<u>Downstream extent</u>	<u>Upstream extent</u>	<u>Upstream Latitude (N)</u>	<u>Upstream Longitude (E)</u>
<u>Delaware River in Pennsylvania (including W. Branch)</u>	<u>Rte. 220 Bridge</u>	<u>PA/NY Border</u>	<u>41.999448</u>	<u>-75.359573</u>
<u>Lehigh River and adjacent canals</u>	<u>confluence with Delaware River</u>	<u>500 feet upstream of the Cementon Dam</u>	<u>40.690275</u>	<u>-75.503800</u>
<u>Little Lehigh Creek</u>	<u>confluence with Lehigh River</u>	<u>500 feet upstream of the lowermost dam</u>	<u>40.596318</u>	<u>-75.475570</u>
<u>Hokendauqua Creek</u>	<u>confluence with Lehigh River</u>	<u>State Route 4014 (West Scenic Drive)</u>	<u>40.793273</u>	<u>-75.439262</u>
<u>Bushkill Creek</u>	<u>confluence with Delaware River</u>	<u>500 feet upstream of the lowermost dam</u>	<u>40.694859</u>	<u>-75.212406</u>
<u>Waterway</u>	<u>Downstream extent</u>	<u>Upstream extent</u>	<u>Upstream Latitude (N)</u>	<u>Upstream Longitude (E)</u>
<u>Brodhead Creek</u>	<u>confluence with Delaware River</u>	<u>500 feet upstream of the Stroudsburg Water Co. Dam</u>	<u>41.018667</u>	<u>-75.201063</u>
<u>Bush Kill</u>	<u>confluence with Delaware River</u>	<u>500 feet upstream of Resica Falls</u>	<u>41.111235</u>	<u>-75.095824</u>
<u>Lackawaxen River</u>	<u>confluence with Delaware River</u>	<u>500 feet upstream of the Woolen Mill Dam</u>	<u>40.984304</u>	<u>-75.191569</u>
<u>Dyberry Creek</u>	<u>confluence with Lackawaxen River</u>	<u>Jadwin Dam</u>	<u>41.612088</u>	<u>-75.263391</u>
<u>Darby Creek</u>	<u>Confluence with Delaware River</u>	<u>500 feet upstream of the confluence of Cobbs Creek and Darby Creek</u>	<u>39.907278</u>	<u>-75.255432</u>

Schuylkill River	Fairmount Dam	500 feet upstream of the Bingaman St. Bridge in Reading, Pennsylvania	40.326411	-75.934417
Neshaminy Creek	Confluence with Delaware River	500 feet upstream of the lowermost dam	40.143369	-74.915828

34. Compliance Certification: Each permittee who receives a written PASPGP-6 verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. This certification should indicate if the success of any required permittee-responsible mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits. The signature of the permittee is also required to certify the completion of the activity and mitigation. The completed certification document must be submitted to the District Engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.
35. Migratory Birds and Bald and Golden Eagles: The permittee is responsible for ensuring that an action authorized by PASPGP-6 complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the USFWS to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity. The permittee should contact the appropriate local office of the USFWS to determine if such authorizations are required for a particular activity. Information on the conservation of migratory birds and Bald and Golden Eagles can be found at the following USFWS web site:
<http://www.fws.gov/northeast/pafo/>
36. Migratory Bird Breeding Areas: Activities in waters of the United States, including jurisdictional wetlands, that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable. Recommendations pertaining to the conservation of migratory birds can be found at the following USFWS web site:
<http://www.fws.gov/northeast/pafo/>

By Authority of the Secretary of the Army:

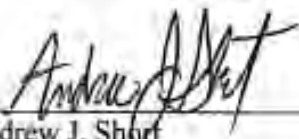
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John T. Litz
Colonel, U.S. Army
Commander and District Engineer
Baltimore District

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David C. Park
Lieutenant Colonel, Corps of Engineers
District Commander
Philadelphia District



Andrew J. Short
Colonel, Corps of Engineers
District Engineer
Pittsburgh District

Acknowledgment and Agreement for Compliance with Terms & Conditions of PASPGP-6

Project Number: NAB-2020-00282-P12(Minard Mine)

Project Location: 312 Minard Drive, Athens, Bradford County, Pennsylvania (Latitude 41.968813/Longitude -76.551303)

I hereby accept and agree to comply with the terms and conditions, of the PASPGP-6 authorizations, as stated.

Applicant's Signature

Date

I hereby accept and agree to comply with the terms and conditions, of the PASPGP-6 authorizations, as stated.

Applicant's Contractor's Signature

Date

Contractor Name (please print)

AREA CODE/TELEPHONE NO.

ADDRESS

Please return form by email to NAB-Regulatory@usace.army.mil. The Corps permit number (NAB-2020-00282-P12) must be included in the subject line.

Permit Transfer Form

Project Number: NAB-2020-00282-P12(Minard Mine)

Project Location: 312 Minard Drive, Athens, Bradford County, Pennsylvania (Latitude 41.968813/Longitude -76.551303).

Project Description: The project includes the construct of two road crossings associated with the installation of limestone shale mine.

TRANSFeree SIGNATURE

DATE

AREA CODE/TELEPHONE NO.

PRINTED NAME

ADDRESS

Please return form by email to NAB-Regulatory@usace.army.mil. The Corps permit number (NAB-2020-00282-P12) must be included in the subject line.

- e) Describe the pre-mining environmental sound levels within the adjacent area during weekdays, night time, weekends, and holidays.

The pre-mining environmental sound levels are equivalent to a rural farm land setting with a four (4) lane limited access highway east of the site. Pre-mining sound levels are vary based upon traffic conditions during weekdays, night time, weekends, and holidays.

- f) Has a noise study been conducted to characterize the pre-mining noise levels of the surrounding area and estimate the noise levels from the proposed mine operation? ☐ Yes ☒ No
If yes, submit that study.

- g) Describe the measures (best management practices) that will be taken to mitigate noise and prevent noise from becoming a public nuisance.

The operation is located in a rural area with few dwellings immediately adjacent to the site.

The mining activities will be in a pit depressed below natural grade.

Evergreen trees will be planted along the north side of the site as detailed on Exhibit 9

Operations in unconfined areas will be minimized to the extent possible.

Noise will be controlled by the method of operations and the implementation of a berm around the site. Berms are limited to locations outside of the floodway. Berms will be used for the hardrock mining area and the northern portions of the sand and gravel extraction areas near adjacent dwellings as detailed on Exhibit 9. Equipment used for the removal and transport of raw materials to the processing facility will be maintained in ways to reduce noise generation (ie mufflers). Excessive engine reving will be minimized, especially in areas of initial mineral recovery where the topography may be elevated above adjacent natural ground and sound is more likely to migrate outward from operations. The mining area will begin to self-absorb sound as mineral removal will create perimeter walls. Once the pit is established and the majority of pit area will be below the natural ground, machinery noise generated within these areas will be absorbed by the pit area itself and the berm constructed outside of the floodway around the working areas.

The processing equipment will be maintained to minimize unnecessary noise levels (ie loose belts, plates, screens). The processing facilities will relocate throughout the site to be near the mineral extraction area.

Because of the rural nature of the area and the remote location of the site, the noise pollution for this site will be very minimal. Additionally, hours of operation will be generally during daylight hours.