



Indiana Department of Environmental Management

Office of Water Quality

Wetlands Section

Publication Date:
November 24, 2025

Closing Date:
December 15, 2025

IDEM ID Number:
2025-797-87-EJW-WQC

Corps of Engineers ID Number:
LRH-2018-00738-OHR-Pigeon Creek

PUBLIC NOTICE

To all interested parties:

This letter shall serve as a formal notice of the receipt of an application for **Section 401 Water Quality Certification** by the Indiana Department of Environmental Management (IDEM). The purpose of the notice is to inform the public of active applications submitted for water quality certification under Section 401 of the Clean Water Act (33 U.S.C. § 1341) and to solicit comments and information on any impacts to water quality related to the proposed project. IDEM will evaluate whether the project complies with Indiana's water quality standards as set forth at 327 IAC 2.

- 1. Applicant:** James Boswell
United Minerals Company, LLC
566 Dickeyville Road
Lynnville, IN 47619
- 2. Agent:** James Boswell
United Minerals Company, LLC
566 Dickeyville Road
Lynnville, IN 47619
- 3. Project location:** Approximately 1.05 miles Northeast of Ditney Hill Road and Schultz Road intersection near Elberfield in Warrick County.
Latitude: 38.1381, Longitude: -87.4092
- 4. Affected waterbody:** 65.09 acres of federally jurisdictional forested wetland, 12.86 acres of federally jurisdictional scrub-shrub wetland, and 2,802 linear feet of intermittent streams that are unnamed tributaries to Pigeon Creek.
- 5. Project Description:** The applicant proposes to mine the Indiana Coal-7, Indiana Coal-6, Herrin, and Indiana Coal-5 seams within the SMCRA permit area. The project area encompasses 80.46 acres, which includes up to 63.14 acres of coal removal area. Proposed discharge of dredged and/or fill material into Waters of the United States are in conjunction with the associated constructed infrastructure, such as a temporary levee, overburden material, bituminous coal extraction, and reclamation of a 69.63 acre area. Coal extraction within this area will add over 1.5 million tons of coal and 1 year of mine life to the Seven Hills Mine. Proposed mitigation incorporates a watershed approach for Pigeon Creek (HUC 05140202) and Little Pigeon Creek (HUC 05140201) that will re-establish 2,802 linear feet of relatively permanent waters within the additional post mine site, re-establish and establish 80.0 acres of PFO wetlands within the additional post mine site, and provide site protection for the mitigation areas with deed restrictions and/or conservation easements. Two off-site mitigation areas have been identified to restore 119.54 acres of forested wetlands, restore 28.84 acres of forested buffer, and preserve 19.45 acres of forested wetland with 2.28 acres of forested buffer at the Squaw Creek Mitigation Area. The other off-site mitigation will restore 34.73 acres of forested wetlands with 9.61 acres of forested buffer, and preserve 7.58 acres of forested wetland with 1.18 acres of forested buffer at the Lake Drain Mitigation Area.

Additional information may be found on line at <https://www.in.gov/idem/5474.htm>

Comment period: Any person or entity who wishes to submit comments or information relevant to the aforementioned project may do so by the closing date noted above. Only comments or information related to water quality or potential impacts of the project on water quality can be considered by IDEM in the water quality certification review process.

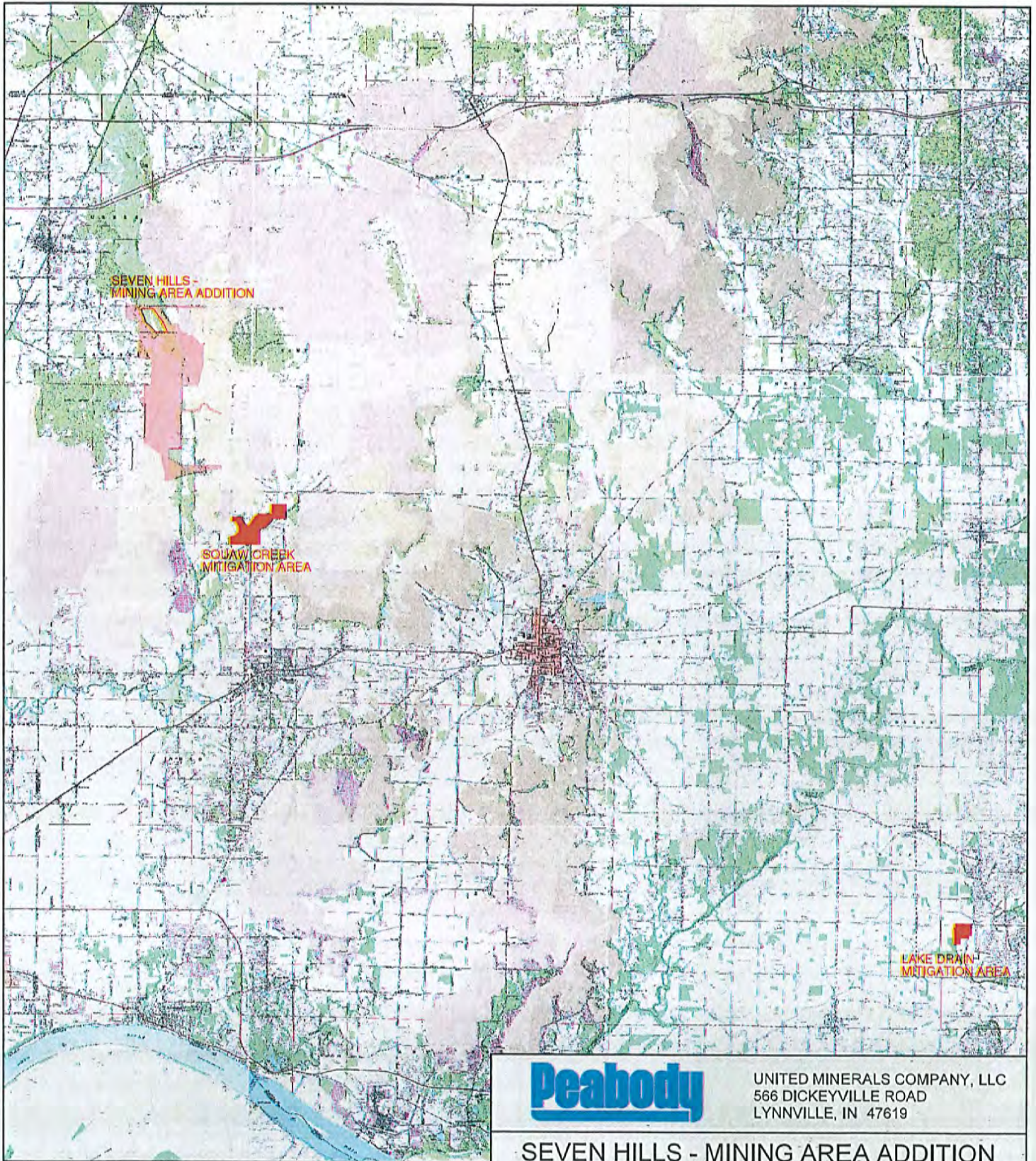
Public Hearing:

Any person may submit a written request that a public hearing be held to consider issues related to water quality in connection with the project detailed in this notice. The request for a hearing should be submitted within the comment period to be considered timely. The request should also state the reason for the public hearing as specifically as possible to assist IDEM in determining whether a public hearing is warranted.

Questions?

Additional information may be obtained by emailing waterwayscomments@idem.in.gov. Please address all correspondence to the project manager and reference the IDEM project identification number listed on this notice. Indicate if you wish to receive a copy of IDEM's final decision. Written comments and inquiries may be forwarded to -

Indiana Department of Environmental Management
100 North Senate Avenue
MC65-42 WQS IGCN 1255
Indianapolis, Indiana 46204-2251 FAX: 317/232-8406



UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION OVERALL PROJECT LOCATION MAP MAP A

DESIGNED BY: AMN
DRAWN BY: AMN
APPROVED BY: —
DATE: SEPTEMBER 2025
SCALE: 1" = 13,000'

COUNTRY: USA
COUNTY, STATE: WARRICK & SPENCER, IN
DATUM: NAD 27/INDIANA WEST
DRAWING: MAP A
C.I.: 10 FT

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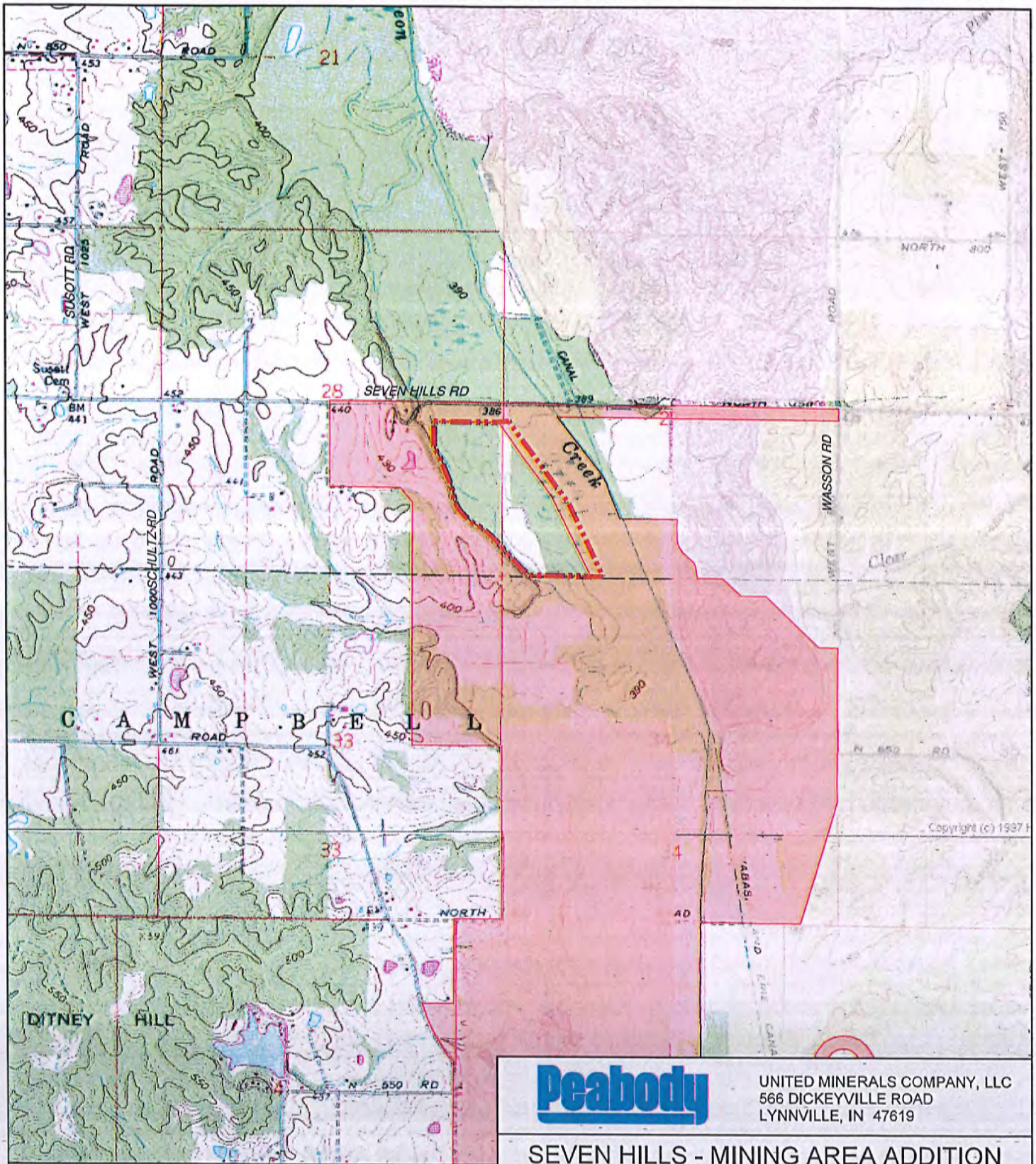
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PROJECT LOCATION

LEGEND

- SEVEN HILLS - MINING AREA ADDITION
- SEVEN HILLS MINE LRH 2018-738
- MINING AREA ADDITION OFF-SITE MITIGATION AREAS
- PREVIOUSLY SURFACED MINED



- LEGEND**
- · — · — SEVEN HILLS - MINING AREA ADDITION
 - SEVEN HILLS MINE LRH 2018-738
 - PREVIOUSLY SURFACE MINED



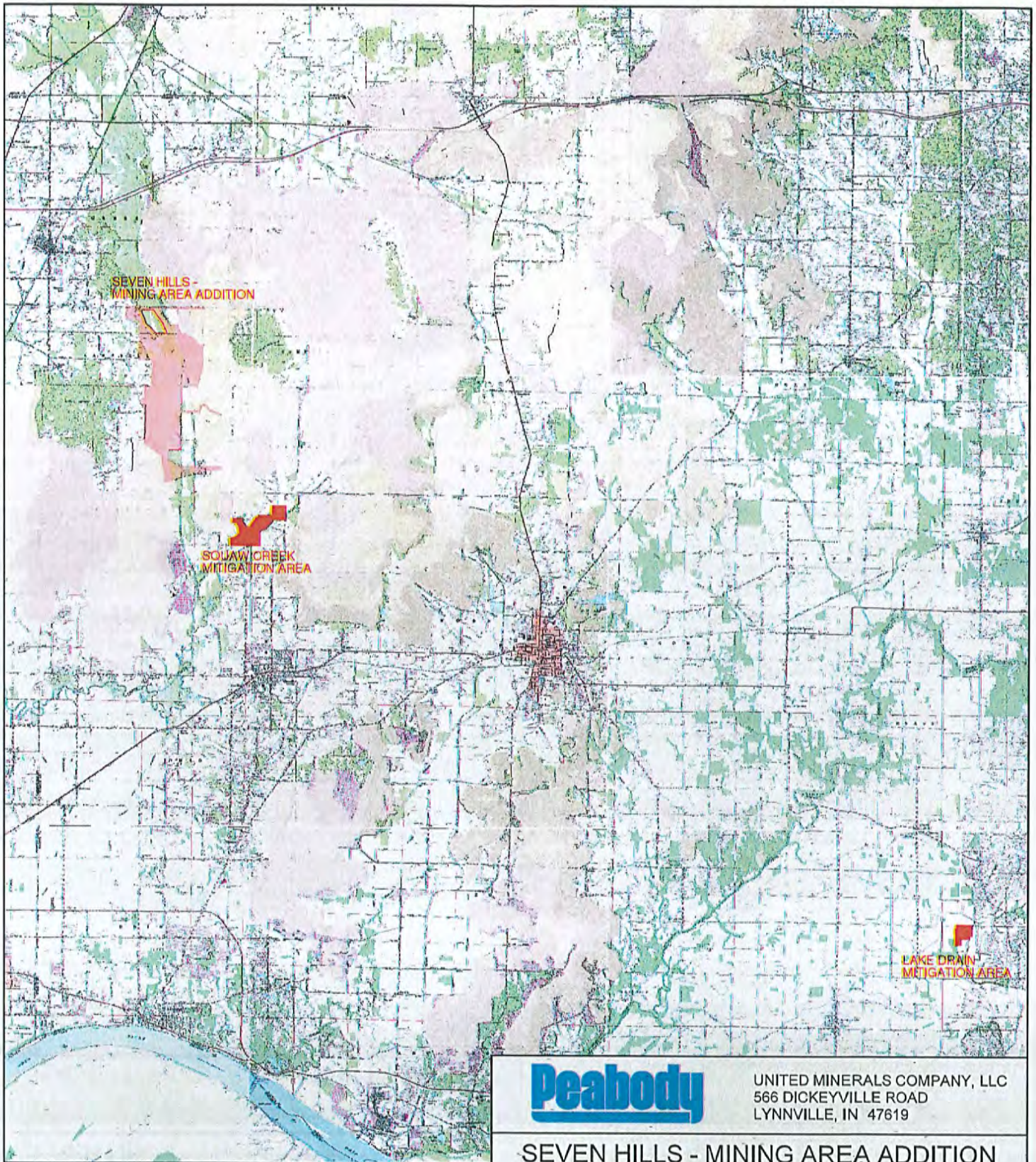
UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION PROJECT LOCATION MAP MAP A

DESIGNED BY: AMN DRAWN BY: AMN APPROVED BY: --- DATE: SEPTEMBER 2025 SCALE: 1" = 2,000'	COUNTRY: - USA COUNTY, STATE: WARRICK, INDIANA DATUM: NAD 27/INDIANA WEST DRAWING: - MAP A1 C.I.: 10 FT
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UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION OVERALL PROJECT LOCATION MAP MAP A

DESIGNED BY: AMN
DRAWN BY: AMN
APPROVED BY: —

COUNTRY: USA
COUNTY, STATE: WARRICK & SPENCER, IN
DATUM: NAD 27/INDIANA WEST

DATE: SEPTEMBER 2025
SCALE: 1" = 13,000'

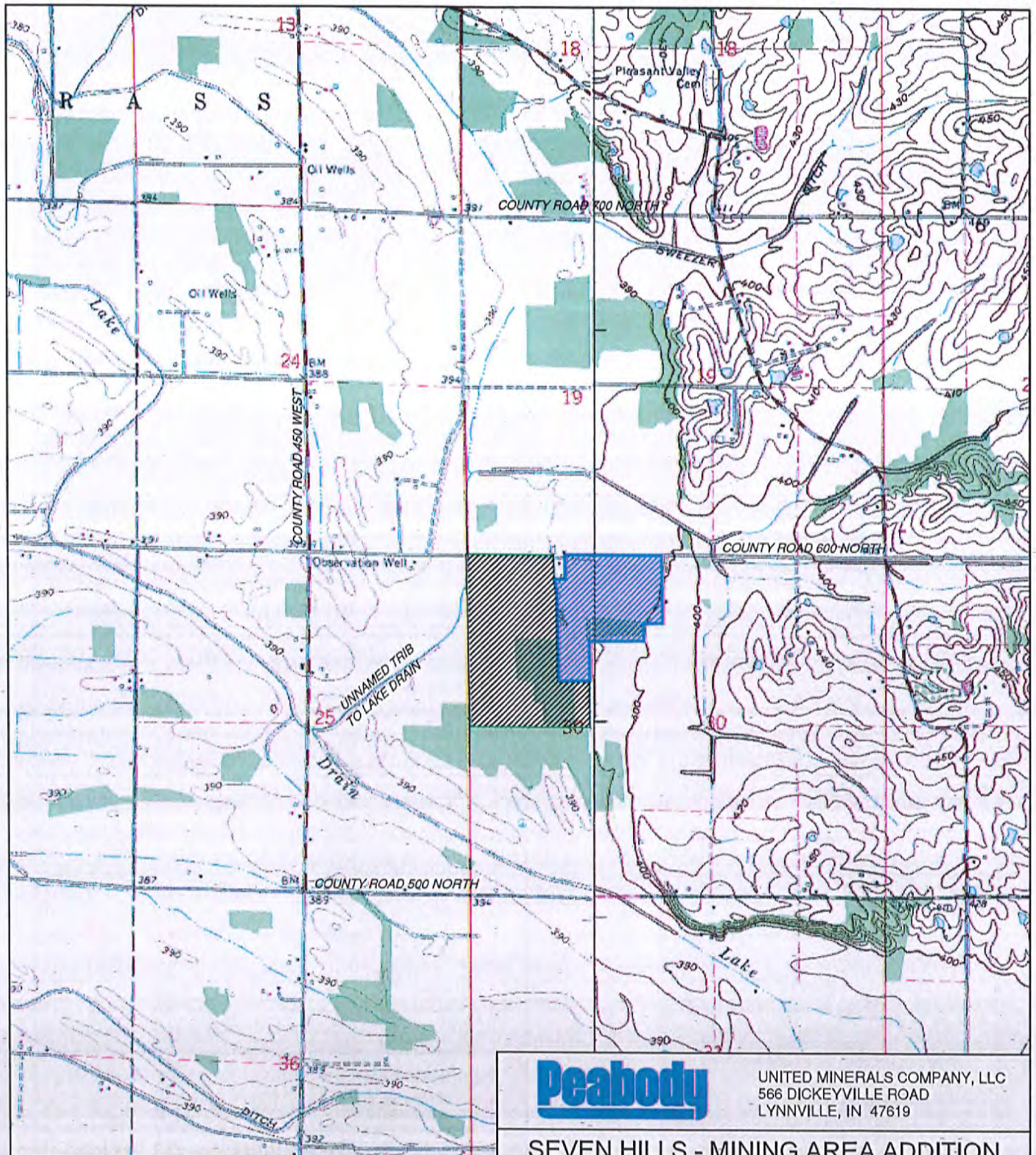
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PROJECT LOCATION

LEGEND

- SEVEN HILLS - MINING AREA ADDITION
- SEVEN HILLS MINE LRH 2018-738
- MINING AREA ADDITION OFF-SITE MITIGATION AREAS
- PREVIOUSLY SURFACED MINED



UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION OFF-SITE LAKE DRAIN LOCATION MAP A

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SCALE: 1" = 2,000'

COUNTRY: USA
COUNTY, STATE: SPENCER, INDIANA
DATUM: NAD 27/INDIANA WEST
DRAWING: MAP A3
C.I.: 10 FT

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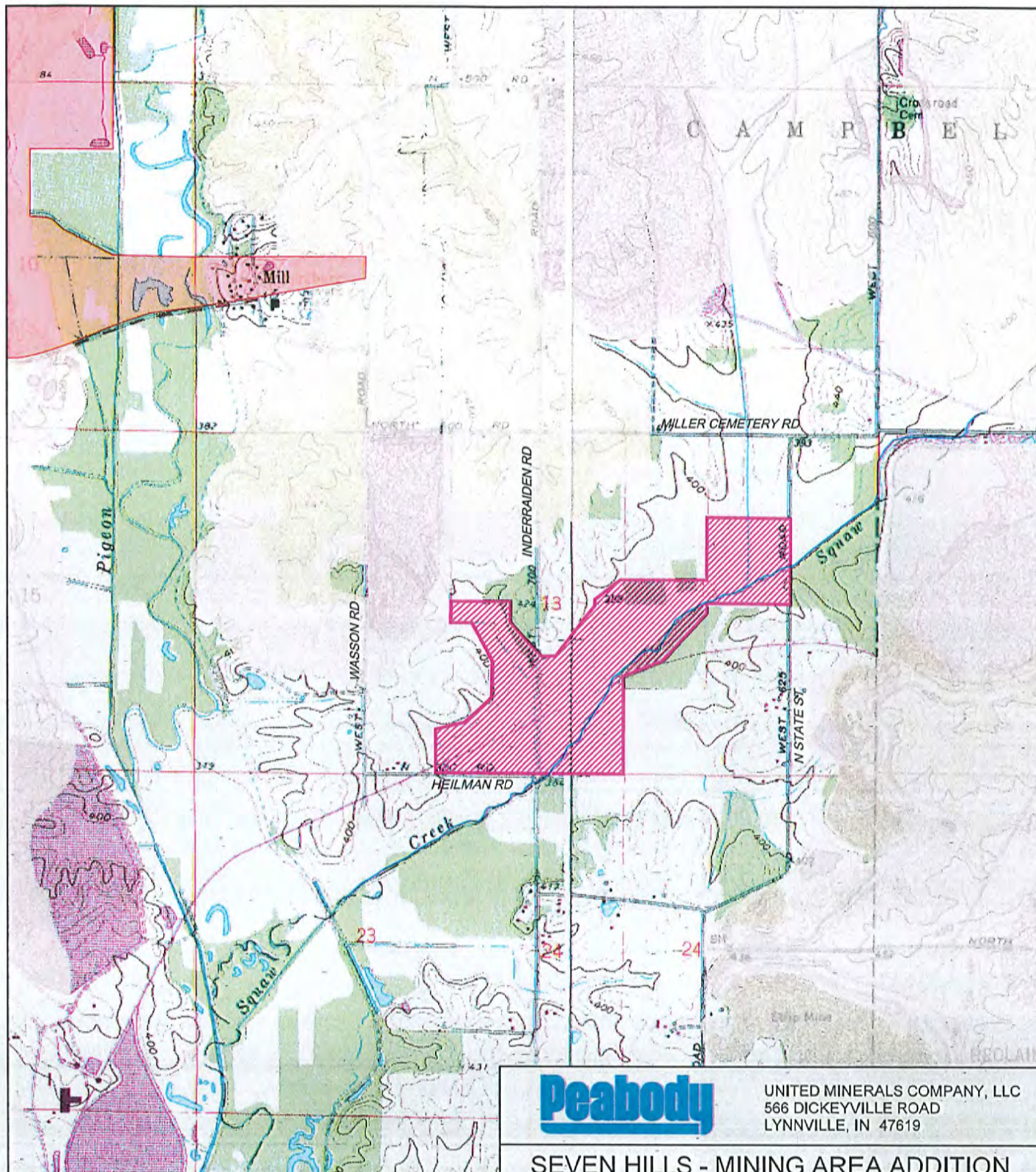
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PROJECT LOCATION

LEGEND

- LAKE DRAIN MITIGATION AREA
- PROPERTY TRACT(S)
- MITIGATION AREA FOR LRL-2020-00269-GJD



UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION OFF-SITE SQUAW CREEK LOCATION MAP A

DESIGNED BY: AMN
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APPROVED BY: ---

COUNTRY: USA
COUNTY, STATE: WARRICK, INDIANA
DATUM: NAD 27/INDIANA WEST

DATE: SEPTEMBER 2025
SCALE: 1" = 2,000'

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C.I.: 10 FT



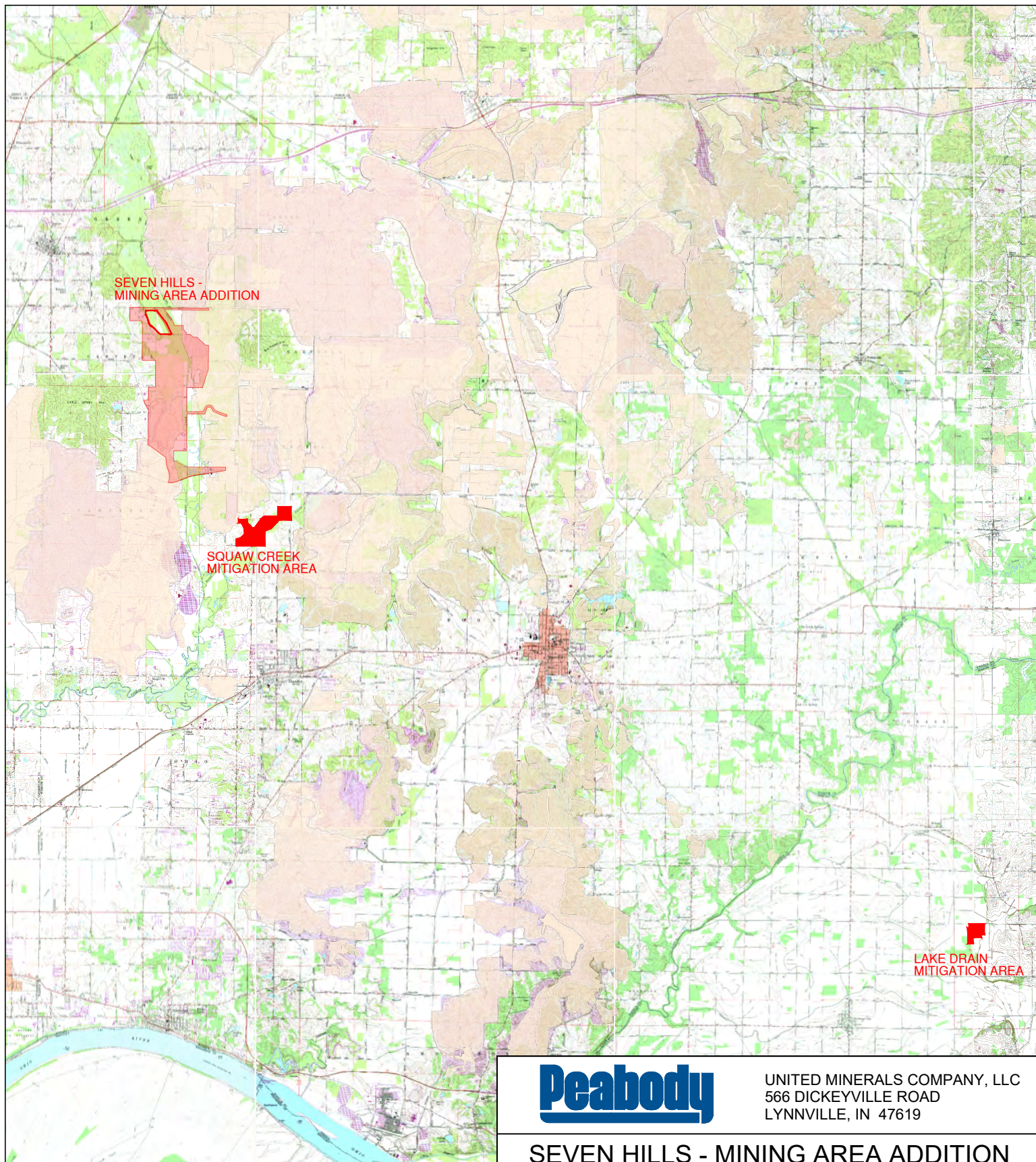
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PROJECT LOCATION

LEGEND

-  SQUAW CREEK MITIGATION AREA
-  SEVEN HILLS MINE ORIGINAL MINING AREA
-  PREVIOUSLY SURFACE MINED



SEVEN HILLS -
MINING AREA ADDITION

SQUAW CREEK
MITIGATION AREA

LAKE DRAIN
MITIGATION AREA



UNITED MINERALS COMPANY, LLC
566 DICKEYVILLE ROAD
LYNNVILLE, IN 47619

SEVEN HILLS - MINING AREA ADDITION OVERALL PROJECT LOCATION MAP MAP A

DESIGNED BY: AMN
DRAWN BY: AMN
APPROVED BY: ---

COUNTRY: USA
COUNTY, STATE: WARRICK & SPENCER, IN
DATUM: NAD 27/INDIANA WEST

DATE: SEPTEMBER 2025
SCALE: 1" = 13,000'

DRAWING: MAP A
C.I.: 10 FT



PROJECT LOCATION

LEGEND

- SEVEN HILLS - MINING AREA ADDITION
- SEVEN HILLS MINE LRH 2018-738
- ▨ MINING AREA ADDITION OFF-SITE MITIGATION AREAS
- PREVIOUSLY SURFACED MINED



United Minerals Company, LLC
566 Dickeyville Road
Lynnville, IN 47619
(812) 922-1015

September 10, 2025

Teresa Spagna
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701-2070

**RE: UNITED MINERALS COMPANY, LLC SEVEN HILLS MINE
Indiana Department for Natural Resources SMCRA Permit No. S-00357
U.S. Army Corps of Engineers (USACE) Section 404 Permit LRH-2018-00738-OHR-Pigeon Creek
Permit Modification Request – Mining Area Addition**

Dear Ms. Spagna:

On behalf of **United Minerals Company, LLC (UMC)**, enclosed is an application for the modification of the Seven Hills Mine Department of Army Permit LRH-2018-00738-OHR-Pigeon Creek under the provisions of Section 404 of the Clean Water Act for the proposed discharge of dredged and/or fill material into waters of the United States (US) in conjunction with the construction of infrastructure including a temporary levee, and the overburden removal, bituminous coal extraction, and reclamation of a 69.63-acre area. Coal extraction within this area will add over 1.5 million tons of coal and 1 year of mine life to the Seven Hills Mine, which is nearing the end of the coal reserve. Without the mine area addition, Seven Hills Mine will exhaust the coal reserve in 2027 placing a significant economic hardship on UMC. As such, UMC requests the permit application be processed under the Emergency Processing Procedures for Activities Subject to Executive Order 14156 (National Energy Emergency).

This mining area was excluded internally within the original DA authorization due to concerns raised by the Corps Louisville District and USEPA Region 5 and the resulting request to maximize the avoidance of wetlands on the Seven Hills Mine (Indiana Department of Natural Resources Surface Mining Control and Reclamation Act (SMCRA) Permit S-00357. The primary concerns raised which resulted in the exclusion of the area and overall agency resistance to the initial permit issuance were 1) the impacts to water quality in Pigeon Creek, 2) the degradation of the unpermitted adjacent forested floodplain wetlands, and 3) the likelihood of success in reclaiming forested wetlands.

Over the previous five years of active mining, mitigation construction, and monitoring within and adjacent to Seven Hills Mine, UMC has successfully shown that these original concerns were unfounded. No detrimental impacts to or significant negative trends in water quality or the aquatic life community have been observed. Pigeon Creek has shown no exceedances of water quality standards and shows no trend in water quality upstream to downstream. Macroinvertebrate and fish index scores continue to remain comparable to baseline and also show no significant difference upstream to downstream. The data presented on any secondary impacts to the existing floodplain wetlands is similar, showing that wetland function and value are being retained with no negative impacts or trends observed in Pigeon Creek during the active mining at the Seven Hills Mine. The floodplain groundwater levels within the avoidance area have maintained their seasonal pattern, with water levels steady at or near the surface during spring and sudden out-of-bank rises and recessions in response to intense rain events over summer and through fall. Lastly, construction of the wetland and stream mitigation features located both onsite and at adjacent mine sites (Wild Boar Mine) is proceeding as planned with areas being contemporaneously regraded, topsoiled, seeded, and planted as areas become available behind the advancing pit. As of November 2024, over 44 acres of onsite wetland mitigation has been reclaimed, graded, soiled, and temporarily seeded to aid in stabilizing the soils to prevent erosion prior to planting the trees. There has also been significant success at all the offsite mitigation locations including the 104 acres of wetlands constructed in the reclaimed mining areas on the Wild Boar Mine. This demonstrates that stream and wetland mitigation construction within

previously mined areas can be done successfully, producing hydrologically stable streams and riparian features and diverse and expansive wetland complexes. Annual reports submitted since 2021 provide additional detail regarding each of these primary concerns and present monitoring data substantiating the ongoing compliance with permit conditions.

The proposed project would discharge dredged or fill material into wetlands and unnamed tributaries of Pigeon Creek. Pigeon Creek is a tributary of the Ohio River, a traditional navigable waterway. The project is located approximately 3.0 miles southeast of the town of Elberfeld, in Warrick County, Indiana along Pigeon Creek approximately 22.5 miles upstream of its confluence with the Ohio River.

Should you have any questions or require additional information, please feel free to contact me at 812-922-1046.

Sincerely,



James Boswell
Authorized Representative

Enclosures

cc: Seven Hills Mine, USACE File (1x)
 Section 401 WQC IDEM (1x electronically)

Project Information Narrative Document for Mining Area Addition

**Seven Hills Mine – Mining Area Addition
USACE File Number: LRH-2018-00738-OHR-Pigeon Creek**

United Minerals Company, LLC
566 Dickeyville Road
Lynnville, Indiana 47619

Prepared by:
United Minerals Company, LLC
566 Dickeyville Road
Lynnville, Indiana 47619

Table of Contents

1.0	BASELINE INFORMATION	7
A.	PROJECT SUMMARY	7
B.	PROJECT INFORMATION	8
1.	LOCATION	8
2.	UNITED STATES GEOLOGICAL SURVEY (USGS) WATERSHED(S).....	8
3.	LAND USE AND SOILS	9
3.1	LAND USE	9
3.2	SOILS	9
4.	CLASSIFICATION	10
4.1	WETLANDS	10
4.2	STREAMS	11
4.3	OPEN WATERS	12
4.4	UNIT ID LABELING SYSTEM:.....	12
5.	EXISTING CONDITIONS	13
5.1	WETLANDS	13
5.2	STREAMS	14
5.3	OPEN WATERS	15
5.4	AQUATIC RESOURCE IMPACTS.....	15
6.	FIELD OBSERVATIONS	16
7.	CLIMATE	16
8.	WATER QUALITY	16
9.	GEOLOGY	18
9.1	UNCONSOLIDATED MATERIALS	19
9.2	BEDROCK.....	19
9.3	GEOCHEMISTRY OF BEDROCK	20
9.4	AQUIFERS (UNCONSOLIDATED AND CONSOLIDATED).....	20
10.	ALTERNATIVES ANALYSIS	20
10.1	PROJECT PURPOSE, NEED AND OBJECTIVES.....	21
10.2	PROJECT ALTERNATIVES.....	22
10.3	DETERMINE PRACTICABILITY OF ALTERNATIVES.....	23
10.4	ALTERNATIVES ANALYSIS	25
10.4.1	ALTERNATIVE 1: NO ACTION ALTERNATIVE	26
10.4.2	ALTERNATIVE 2: PROJECT RELOCATION ALTERNATIVE	28
10.4.3	ALTERNATIVE 3: ALTERNATIVE MINING METHODS	29
10.4.4	ALTERNATIVE 4: PREFERRED ACTION (SURFACE MINE & LEAVE FINAL CUT).....	35
10.4.5	ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE AND RECLAIM FINAL CUT).....	37

10.4.6	SUMMARY AND COMPARISON OF ALTERNATIVES	40
10.5	DESCRIPTION OF APPLICANT’S PREFERRED ALTERNATIVE	65
10.6	LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE (LEDPA)	75
10.7	CONCLUSION	75
11.	SOCIAL AND ECONOMIC IMPORTANCE	75
12.	CUMULATIVE ACTIVITY	79
12.1	HUC 12 WATERSHED	79
12.1.1	STREAM AND WETLANDS (SECTION 404 IMPACTS)	80
12.1.2	PIGEON CREEK AND ADJACENT FLOODPLAINS AND WETLANDS	83
12.1.3	LAND RESOURCES	95
12.1.4	COAL RESOURCES	96
12.1.5	ABANDONED MINE LANDS (AML)	98
12.1.6	SURFACE WATER QUALITY	99
12.1.7	GROUNDWATER	110
12.1.8	BIOLOGICAL QUALITY	116
12.1.9	THREATENED AND ENDANGERED SPECIES	120
12.1.10	AIR QUALITY	121
12.1.11	TRAFFIC AND TRANSPORT	122
12.1.12	CULTURAL RESOURCES	123
12.1.13	SOCIAL	123
12.1.14	ECONOMIC	124
12.1.15	PRIME FARMLAND AND CROP	125
12.1.16	REFORESTATION	126
12.1.17	CONSTRUCTION IN A FLOODWAY PERMIT	127
12.2	HUC 8 WATERSHED	128
12.2.1	STREAMS AND WETLANDS (SECTION 404 IMPACTS) - HUC8	129
12.2.2	PIGEON CREEK AND ADJACENT FLOODPLAINS AND WETLANDS - HUC8	134
12.2.3	LAND RESOURCES - HUC8	135
12.2.4	COAL RESOURCES – HUC8	136
12.2.5	ABANDONED MINE LANDS (AML) - HUC8	139
12.2.6	SURFACE WATER QUALITY - HUC8	139
12.2.7	GROUNDWATER QUALITY AND QUANTITY - HUC8	143
12.2.8	BIOLOGICAL QUALITY - HUC8	145
12.2.9	THREATENED AND ENDANGERED SPECIES - HUC8	146
12.2.10	AIR QUALITY – HUC8	151
12.2.11	TRAFFIC AND TRANSPORT - HUC8	152
12.2.12	CULTURAL RESOURCES - HUC8	154
12.2.13	SOCIAL - HUC8	156

12.2.14	ECONOMIC - HUC8	156
12.2.15	PRIME FARMLAND AND CROP - HUC8.....	161
12.2.16	REFORESTATION - HUC8.....	162
12.2.17	CONSTRUCTION IN A FLOODWAY – HUC 8.....	163
12.2.18	ENVIRONMENTAL JUSTICE - HUC8	164
C.	MAPS.....	165
D.	AERIAL PHOTOGRAPHY	166
E.	USDA/NRCS COUNTY SOIL SURVEY	166
F.	PHOTOGRAPHS OF THE SITE	166
G.	RESPONSIBLE PARTIES	166

List of Tables

TABLE 1	WATERSHED SUMMARY	8
TABLE 2	PRE-MINE LAND USES	9
TABLE 3	POST-MINE LAND USES	9
TABLE 4	SOIL TYPES.....	10
TABLE 5	WETLAND IMPACT SUMMARY	13
TABLE 6	WETLAND IMPACT SUMMARY BY SETTING.....	14
TABLE 7	STREAM IMPACT SUMMARY	14
TABLE 8	STREAM IMPACT SUMMARY BY SETTING	14
TABLE 9	STREAM IMPACT SUMMARY BY TYPE	15
TABLE 10	WETLAND IMPACT SUMMARY BY TYPE	16
TABLE 11	AREA 33 REGIONAL SURFACE WATER QUALITY	17
TABLE 12	SMCRA RECEIVING STREAM BASELINE SURFACE WATER QUALITY.....	17
TABLE 13	BIOASSESSMENT WATER QUALITY RESULTS	17
TABLE 14	USEPA RBP FIELD WATER QUALITY RESULTS	18
TABLE 15	SUMMARY OF STRATIGRAPHY	19
TABLE 16	AGE OF WETLANDS WITHIN MINING AREA ADDITION	27
TABLE 17	TECHNICAL CRITERIA FOR ALTERNATIVE MINING METHODS	30
TABLE 18	ADDITIONAL COST FOR ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE AND RECLAIM FINAL CUT)	39
TABLE 19	OTHER FEDERAL, STATE OR LOCAL AUTHORIZATIONS.....	40
TABLE 20	ALTERNATIVES ANALYSIS COMPARISON	40
TABLE 21	PRE-MINING AND POST-MINING LAND USES.....	41
TABLE 22	PREDICTED ANNUAL IMPACT ON EMPLOYMENT BY INDUSTRY.....	42
TABLE 23	PREDICTED IMPACT ON STATE AND FEDERAL TAX COLLECTIONS (PRESENT VALUE FOR PROJECT LIFE).....	42
TABLE 24	COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES	43
TABLE 25	PROJECTED IMPACTED TO PUBLIC INTEREST FACTORS OF ALTERNATIVES.....	50
TABLE 26	TECHNICAL EVALUATION FACTORS OF ALTERNATIVES FOR PROJECTED IMPACTS.....	59

TABLE 27	CRITERIA USED TO EVALUATE ALTERNATIVES	63
TABLE 28	POSSIBLE CONTAMINANTS IN DREDGED/FILL MATERIAL	65
TABLE 29	ENVIRONMENTAL PROTECTION MEASURES AND MITIGATION MEASURES	71
TABLE 30	HUC12 WATERSHED SUMMARY	80
TABLE 31	NPDES OUTFALL ANALYSIS FROM 1 ST QTR 2020 THROUGH 4 TH QTR 2022 AT THE SEVEN HILLS MINE	90
TABLE 32	UPSTREAM TO DOWNSTREAM WATER QUALITY ANALYSIS FOR PIGEON CREEK & FLOODPLAIN SAMPLING	91
TABLE 33	SUMMARY OF HGM MONITORING AT THE SEVEN HILLS MINE	92
TABLE 34	SUMMARY OF RBP MONITORING AT THE SEVEN HILLS MINE	93
TABLE 35	SUMMARY OF MIBI ASSESSMENTS AT THE SEVEN HILLS MINE	93
TABLE 36	SUMMARY OF FIBI ASSESSMENTS AT THE SEVEN HILLS MINE	93
TABLE 37	PERCENT OF TOLERANT & INTOLERANT MACROINVERTEBRATE TAXA ASSESSED AT THE SEVEN HILLS MINE	94
TABLE 38	LAND COVER SUMMARY BY HUC WATERSHEDS	95
TABLE 39	2013 WARRICK COUNTY CROPPING PRACTICES ¹²	95
TABLE 40	HUC12 WATERSHED CUMULATIVE SURFACE EFFECTS SUMMARY	97
TABLE 41	HUC12 WATERSHED STREAM AND WETLAND IMPACTS FROM PAST MINING	97
TABLE 42	HUC12 WATERSHED POTENTIAL STREAM AND WETLAND IMPACTS FOR FUTURE MINING	97
TABLE 43	INDIANA’S DRAFT 2018 303(D) LISTED WATERS ⁵⁴	99
TABLE 44	LOCAL WATER QUALITY SEASONAL VARIATION RANGE	101
TABLE 45	USEPA MYWATERWAY INFORMATION	102
TABLE 46	USEPA MYWATERWAY CLEAR BRANCH-PIGEON CREEK INFORMATION	102
TABLE 47	2023 PIGEON CREEK WATER QUALITY MONITORING	108
TABLE 48	2023 PIGEON CREEK WATER QUALITY STATISTICS	109
TABLE 49	CALCULATED RADIUS OF INFLUENCE	115
TABLE 50	CALCULATED DEWATERING VOLUME	116
TABLE 51	IDEM QUEI ASSESSMENT SCORES WITHIN HUC8 WATERSHED	119
TABLE 52	IDEM MACROINVERTEBRATE IBI ASSESSMENT SCORES WITHIN HUC8 WATERSHED	119
TABLE 53	IDEM FISH IBI ASSESSMENT SCORES WITHIN HUC8 WATERSHED	120
TABLE 54	SEVEN HILLS MINE BIO-ASSESSMENT RESULTS	120
TABLE 55	WATERSHED SUMMARY (HUC8 PIGEON CREEK)	128
TABLE 56	UMI/PEABODY COMPENSATORY MITIGATION AS OF DECEMBER 31, 2024 (HUC8 PIGEON CREEK)	133
TABLE 57	FLOODPLAINS, FLOOD ZONE, AND WETLANDS (HUC8 PIGEON CREEK)	134
TABLE 58	LAND RESOURCES (HUC8 PIGEON CREEK)	135
TABLE 59	COAL MINING IMPACTS (HUC8 PIGEON CREEK)	137
TABLE 60	WETLAND AND STREAM IMPACTS FROM COAL MINING (HUC8 PIGEON CREEK)	138
TABLE 61	WATER QUALITY (HUC8 PIGEON CREEK)	140
TABLE 62	NPDES PERMIT SUMMARY (HUC8 PIGEON CREEK)	142
TABLE 63	STREAM LENGTH (HUC8 PIGEON CREEK)	143
TABLE 64	WATER DEMAND AND SOURCES (HUC8 PIGEON CREEK)	144

TABLE 65	BIOLOGICAL CONDITION (HUC8 PIGEON CREEK)	145
TABLE 66	THREATENED AND ENDANGERED SPECIES LIST (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	147
TABLE 67	AIR PERMITS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	151
TABLE 68	ROADS AND RAIL (HUC8 PIGEON CREEK)	152
TABLE 69	ROAD STREAM CROSSING (HUC8 PIGEON CREEK)	153
TABLE 70	PROTECTED AREAS (HUC8 PIGEON CREEK)	155
TABLE 71	POPULATION DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	156
TABLE 72	EDUCATION DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	156
TABLE 73	ECONOMIC DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	157
TABLE 74	MAJOR EMPLOYERS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	157
TABLE 75	OCCUPATION CLUSTER DETAILS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	157
TABLE 76	INDUSTRY DETAILS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	158
TABLE 77	COMMUTING PERCENTAGE (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)	160
TABLE 78	TOP 20 COUNTIES RESIDENTS ARE COMMUNTING TO FOR EMPLOYMENT	160
TABLE 79	TOP 20 COUNTIES COMMUTING INTO REGION FOR EMPLOYMENT	161
TABLE 80	CULTIVATED CROP AND SOIL INFORMATION (HUC8 PIGEON CREEK)	162
TABLE 81	FORESTED LAND INFORMATION (HUC8 PIGEON CREEK)	162
TABLE 82	100-YEAR FLOOD ZONE INFORMATION (HUC8 PIGEON CREEK)	163
TABLE 83	VULNERABLE POPULATION INFORMATION (HUC8 PIGEON CREEK)	165

List of Figures

FIGURE 1	MINING AND RECLAMATION SEQUENCING DIAGRAM	70
FIGURE 2	<i>STANLEY PIT</i> SECTION OF UNCONSOLIDATED & ITS CONNECTION WITH FLOODPLAIN	87
FIGURE 3	<i>STANLEY PIT</i> CONCEPTUAL CROSS-SECTION OF ACTIVE PIT & FLOODPLAIN	87
FIGURE 4	<i>STANLEY PIT</i> DIAGRAM OF ACTIVE PIT AND FLOODPLAIN WITH PRIMARY DRAINAGES	88
FIGURE 5	UNCONFINED FLOW TO A SEEPAGE FACE	113
FIGURE 6	FLOW TO AN UNCONSOLIDATED ZONE EQUIVALENT TO WELL OR MINE PIT	114
FIGURE 7	IDEM MACROINVERTEBRATE & FISH SAMPLING LOCATIONS WITHIN THE HIGHLAND-PIGEON WATERSHED	118

List of Appendices

APPENDIX A	MAPS
APPENDIX B	ON-SITE JURISDICTIONAL DETERMINATION (JD) REPORT
APPENDIX C	BIOLOGICAL ASSESSMENT AND WATER QUALITY REPORT
APPENDIX D	SITE PROTECTION INSTRUMENT TEMPLATE
APPENDIX E	ARCHAEOLOGICAL REPORTS AND CLEARANCE LETTERS
APPENDIX F	CHANNEL DESIGN TYPICALS AND STREAM STRUCTURE DETAILS
APPENDIX G	CONSTRUCTION IN A FLOODWAY INFORMATION
APPENDIX H	THREATENED AND ENDANGERED SPECIES LISTS

1.0 **BASELINE INFORMATION**

A. **PROJECT SUMMARY**

The following application has been submitted for a Department of Army Permit under the provisions of Section 404 of the Clean Water Act for the proposed discharge of fill material into waters of the United States (US). The proposed discharge is to add a 69.63-acre area that was excluded and internal to the approved DA authorization LRH-2018-738 to allow further mining of the reserve to obtain another 1.5 million tons of coal and prolong mining another year. Also requested is permission to impact 10.83 acres of avoidance area denoted in LRH-2018-738 for development of the temporary levee in conjunction with the mining area addition. It is proposed that this area be authorized to be mined to successfully complete acquisition of the original Seven Hills coal reserve that was permitted and approved as the Seven Hills Mine (Indiana Department of Natural Resources Surface Mining Control and Reclamation Act (SMCRA) Permit S-00357). See the **SMCRA OPERATIONS MAP** in **APPENDIX P** of the **APPROVED DA AUTHORIZATION LRH-2018-738** which shows the inclusion of the Mining Area Addition.

Please note the **SMCRA OPERATIONS MAP** is current to the last non-significant permit revision dated May 4, 2016. Additional permit revisions are required that have not been submitted yet.

The project area for the Mining Area Addition encompasses 80.46 acres, which includes up to 63.14 acres of coal removal area.

The proposed project would consist of the:

- permanent discharge of dredged and/or fill material into 2,746 linear feet (1.20 acres) of intermittent stream, 50.01 acres of PFO wetland and 10.62 acre of PSS wetland in conjunction with coal removal and backfilling activities; and
- permanent/temporary discharge of dredged and/or fill material into portions of 56 linear feet (0.02 acre) of intermittent stream, 15.08 acres of PFO wetland, and 2.24 acres of PSS wetland in conjunction with ancillary impacts related to area surface mining for coal removal including, temporary soil stockpiles, temporary sediment ponds, temporary diversions, and temporary levee system.

The purpose of the proposed disturbance is to continue mining into an area that was excluded from the original Section 404 authorization for LRH-2018-738. Activities would include the construction of a temporary levee, drainage control structures, the excavation of a single pit for bituminous coal recovery, and reclamation of the impacted areas within the floodplain of Pigeon Creek. The coal removal area extends into the floodplain and include areas subject to overbank flooding from Pigeon Creek. Inundation of the active pit would cause significant disruption of the mining operation and result in damage to the mining equipment which will be comprised of shovels, dozers, and haul trucks. To avoid the negative economic consequences resulting from such a disruption, a temporary earthen levee will be constructed to protect the open pit.

The general purpose of this disturbance is to mine the Indiana **Coal-7**, Indiana **Coal-6**, **Herrin**, and Indiana **Coal-5** seams within the Mining Area Addition ensuring the complete use of the coal reserve and contributing to the power production for the United States. Mining this coal provides the Applicant with another 1.5 million tons of coal and increases the life of mine one more year. The Mining Area Addition was included in the SMCRA Mining Permit Authorization obtained from the Indiana Division Reclamation. It was during the initial Section 404 application process through the Louisville US Army Corps of Engineers that the agencies requested further minimization of impacts. This resulted in the 69.63-acre area being excluded from the previous Section 404 application in 2017, which was maintained into the Huntington US Army Corps of Engineers DA authorization in 2020.

The recovery of the coal seam requires the excavation of the overlying soil and rock materials. The nature of the activity involves the mining through wetlands and streams as the operation advances across the landscape. Sediment basins will be developed as close to the mining area as possible to effectively control sedimentation and surface runoff from the area. A temporary levee will be constructed along the west side of Pigeon Creek to prevent floodwater from inundating the open pit during mining. Surface water or groundwater that collects in the open pit will be pumped to sediment basins for treatment before release to receiving streams.

The mining and reclamation will occur simultaneously as pits are backfilled and re-soiled as the next cut is made. The re-soiled area is then vegetated and returned to the approved post-mining land use. The impacts covered by this permit include temporary levee construction in 2026 with mining reaching the mining area addition in the first quarter of 2027; however, the timing and rate of mining is dependent on market demand fluctuations, any unforeseen geologic conditions, and land control negotiations.

See **MAP B** in **APPENDIX A** for the locations of the delineated and assessed aquatic resources along with the areas depicted as avoided, conditional, mining, and floodway enhancement.

B. PROJECT INFORMATION

1. LOCATION

The proposed project is located approximately 3.0 miles southeast of the town of Elberfeld, in Warrick County, Indiana adjacent to Pigeon Creek situated approximately 22.5 miles upstream of its confluence with the Ohio River. The project is located on the Elberfeld, Indiana USGS Quadrangle Maps. See **MAP A** in **APPENDIX A** for the Project Location Map.

A description of the project area follows:

Portions of Sections 27 and 28, T4S, R9W in Warrick County, Indiana.

UTM coordinates: E: 464070.244 N: 4221426.894 Zone: 16
Latitude: N 38.139990°
Longitude: W -87.410015°
7.5 Minute Quad: Elberfeld, Indiana

2. UNITED STATES GEOLOGICAL SURVEY (USGS) WATERSHED(S)

The proposed project is located within the Highland-Pigeon 8-digit (05140202) hydrologic unit code (HUC) watershed in southwest Indiana. The watershed drainage area is approximately 235,252 acres located in five different counties. The primary water body is Pigeon Creek, a perennial stream, which originates in Gibson County and flows south through Warrick and Vanderburgh Counties, and discharges into the Ohio River in Evansville, Indiana. The 12-digit HUC watershed which contains the mining area addition is Clear Branch-Pigeon Creek (051402020203) and has a drainage area of approximately 22,961 acres. **TABLE 1** depicts the acreage of potential impacts for the watersheds including the conditional area and floodway enhancements. See **MAP E – ON-SITE HUC12 WATERSHED** in **APPENDIX A** for boundaries.

TABLE 1 WATERSHED SUMMARY

Watershed Summary			
Watershed	Watershed Area	Impact Area	Percent of Watershed
	(acres)	(acres)	(percent)
Highland-Pigeon (Indiana only)	235,252	80.46	0.03
Clear Branch-Pigeon Creek	22,961	80.46	0.35

3. LAND USE AND SOILS

3.1 LAND USE

The primary pre-impact land uses within the mining addition area are wildlife and forests as found on Map 3 of the SMCRA S-00357 Mine Permit dated April 22, 2005. Minor land uses included an old crop field which has been left to go fallow since 2005 and is currently a shrub-scrub wetland that would be considered a wildlife land use today.

TABLE 2 depicts the pre-mining land uses within the project area from the 2005 approved Pre-Mine Land Use Map (**MAP 3**). See **APPENDIX P** in **APPROVED DA AUTHORIZATION LRH-2018-738**:

TABLE 2 PRE-MINE LAND USES

Pre-Mining Land Use	Area	Percent of Total Area	Comments
	(acres)	(percent)	
Cropland	9.12	11.33	Denoted as prime farmland
Forest	37.50	46.61	
Wildlife	33.84	42.06	
Totals:	80.46	100	

Post-mine land uses in the permit area will be consistent with the existing land uses and will be achieved by a coordinated and planned effort, combining the reclamation capabilities, landowner comments, and state regulations. The following post-mine land uses in **TABLE 3** are subject to change due to property owner waivers and modifications to the mining plan but are current as of the updated Post-Mine Land Use Map (Map 7) dated August 4, 2024.

TABLE 3 POST-MINE LAND USES

Post-Mining Land Use	Area	Percent of Total Area	Comments
	(acres)	(percent)	
Forest	47.58	59.13	
Wildlife	29.93	37.20	
Water	2.95	3.67	
Totals:	80.46	100	

Regarding the note above that the land uses and acreages are subject to change, potential changes to the post-mining landscape will be minor in the big picture. The cropland assessed in the pre-mining land uses was determined to be prime farmland by the soil type and the vegetative state when it was originally evaluated in 2005. Following that time, this area has been left fallow and has been returning to a forested wetland. Rather than replace the prime farmland in its original location, a request to the Indiana Department of Natural Resources – Division of Reclamation will be made to move the acreage off-site to a more ideal location. A suitable location may be at the adjacent Wild Boar Stanley Pit, Somerville South Mine, or the Wild Boar Mine.

3.2 SOILS

The *Soil Survey of Warrick County*¹ maps the following soils within the Seven Hills - Mining Area Addition:

Bonnie silt loam (map symbol *Bn*): Bonnie soil is nearly level, deep, poorly drained soil on broad, very slightly concave flood plains. Available water capacity is very high, and permeability is slow. The organic matter content is low and surface runoff is slow.

Stendal silt loam (map symbol *Sn*): Stendal soils are nearly level, deep, somewhat poorly drained soil on broad, long, very slight swales of the flood plains. Available water capacity is very high and permeability is moderate. The organic matter content is low and surface runoff is slow.

Zanesville silt loam (map symbol(s) *ZaC3*): *ZaC3* soils are sloping, deep, well drained soils on side slopes on the uplands. It has available water capacity is moderate and permeability is slow. The organic matter content of *ZaC3* is moderate or low because part of the original surface layer has been removed by erosion. Surface runoff is rapid.

TABLE 4 lists the soils and their acreages for the Mining Area Addition. Please see **MAP D – ON-SITE SOILS** in **APPENDIX A** for the boundaries of the various soil types.

TABLE 4 SOIL TYPES

Soil Series	Map Symbol(s)	Area in Project	Percent of Total Area	Soil Type	Slope	USDA Comments
		(acres)	(percent)		(percent)	
Bonnie	Bn*	68.42	85.04	Silt loam	0-1	
Stendal	Sn*	11.96	14.86	Silt loam	0-2	
Zanesville	ZaC3	0.08	0.10	Silt loam	6-12	Severely eroded
Totals:		80.46	100			

Source: Soil Survey of Warrick County¹

Bonnie is listed as hydric on the Indiana Hydric Soils list². The Stendal silt loam is frequently flooded and may contain hydric inclusions. These hydric and potentially hydric soils encompass a total of 80.38 acres or 99.90% of the Mining Area Addition. Stendal silt loam soils are designated as prime soils and if the land is farrow during the pre-mine land use reconnaissance during the SMCRA permitting process, it is designated as prime farmland. It is the IDNR's duty to ensure that land, such as prime farmland, is replaced and can continue to be a valuable resource for the people of America.

4. CLASSIFICATION

4.1 WETLANDS

Delineations were conducted Wetland Services, Inc. of Henderson, Kentucky using the 1987 *Corps of Engineers Wetland Delineation Manual*³ and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*⁴ in August 2025 as a reverification of delineations conducted for the original application and prior to that. These methods resulted in the identification of wetlands, which met the criteria for hydrophytic vegetation, hydric soils, and wetland hydrology. Field data points and wetland-upland boundaries were recorded with Global Positioning System (GPS) equipment and downloaded onto the maps. Once wetland conditions were confirmed in the field: soils, vegetation, and hydrology were documented. The wetlands were classified according to the U.S. Fish and Wildlife Service Cowardin classification system which organizes wetlands in a hierarchical system based on a series of several layers that include the following conditions: a subsystem of water flow; classes of substrate types; subclasses of vegetation types and dominant species; as well as flooding regimes and salinity levels for each system. The typical wetlands found in the Illinois Basin are classified as palustrine which includes all nontidal wetlands that are dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens. Riverine wetlands may be found along the larger river systems in the Illinois Basin and these encompass all wetlands contained within a channel except those wetlands dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens. Palustrine wetlands are found at the proposed project site. Palustrine

wetlands are further classified by the dominant vegetation. Palustrine forested (PFO) wetlands are dominated by trees or shrubs greater than 20 feet tall having greater than 30% cover. Palustrine scrub-shrub (PSS) wetlands are dominated by woody shrubs less than 20 feet tall with at least 30% cover. Palustrine emergent (PEM) wetlands are dominated by non-woody, rooted vascular plants having at least 30% cover. Palustrine Aquatic Bed (PAB) wetlands are dominated by less than 30% vegetation cover and substrate greater than 25% being a mix of silt, clay, and organic matter. Palustrine Unconsolidated Bed (PUB) wetlands are dominated with at least 25% cover of particles smaller than stones and vegetative cover less than 30%. In most cases in the Midwest, PUB wetlands are shallow open waters.

See **APPENDIX B** for the August 2025 **WATERS OF THE U.S. JURISDICTIONAL DETERMINATION REPORT STREAMS, WETLANDS, AND OPEN WATERS (JD REPORT)** with detailed wetland delineations. Their locations can be found on **MAP B – ON-SITE EXISTING CONDITIONS** in **APPENDIX A**.

4.2 STREAMS

Streams were assessed according to criteria set forth in the most recent "Revised Definition of Waters of the United States" was published in the Federal Register on January 18, 2023 (2023 Rule). The rule took effect on March 20, 2023. In May 2023, the U.S. Supreme Court decision in *Sackett v. Environmental Protection Agency* required amending of the 2023 Rule. On August 29, 2023 the USEPA and Corps issued a conforming rule. The "Revised Definition of "Waters of the United States"; Conforming," amends the provisions of agency definition to "Waters of the United States" to that of the Supreme Court's interpretation in the *Sackett* decision. The conforming rule became effective on September 8, 2023 upon publication in the *Federal Register*. In addition, the 2023 Rule, as amended, is not currently operative in Indiana due to litigation. Instead, the pre-2015 regulatory regime is being implemented consistent with the Supreme Court's decision in *Sackett*. Indiana is one of these states.

Pre-2015 Regulatory Regime "Waters of the United States" (WOUS): 40 CFR 230.3(s) The term *Waters of the United States* means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
 - a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - c. Which are used or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in paragraphs (1) through (4) of this section;
6. The territorial seas;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

The Clean Water Act regulatory scope of "waters" encompasses only those relatively permanent, standing or continuously flowing bodies of water forming geographical features that are described in ordinary parlance as streams, oceans, rivers, and lakes.

Wetlands are “Waters of the United States” when they have a continuous surface connection to bodies that are “Waters of the United States” in their own right, so that there is no clear demarcation between “waters” and wetlands.

Regulatory Exclusions include the waste treatment exclusion and prior converted cropland exclusion. The Corps and USEPA will continue to generally rely on valid prior-converted cropland (PCC) designations made by USDA-NRCS for making determinations of the applicability of the PCC exclusion, provided that the PCC has not been abandoned and that land use will not change. However, the final authority regarding Clean Water Act (CWA) jurisdiction remains with USEPA. Also excluded are features generally not jurisdictional per the 1986 preamble language and the 2008 *Rapanos* guidance.

Wetland Services has developed an assessment protocol to identify relatively permanent waters and their boundaries, along with a determination form to record existing conditions. The North Carolina Division of Water Quality, Methodology for Identification of Intermittent and Perennial Streams and Their Origins was utilized to provide a flow regime score. A higher point total indicates greater likelihood of relatively permanent water (RPW) status. Stream Channel dimensions and morphology were documented via Rosgen methodology. Riparian conditions have been recorded on the data form. A photograph of the assessment location has been included. Non-Relatively Permanent Waters (NRPW) including intermittent streams with less than seasonal water, ephemeral streams, swales, gullies, rills, and/or pools are excluded waters, but were mapped and illustrated to thoroughly document surface water transmission onsite.

Stream assessments also utilized an abbreviated Rosgen stream classification method. Typically, the Rosgen stream classification method⁵ is used to predict what adjustments a stream needs to achieve stability, which is the ability of a stream to transport sediment, in the present climate and streamflow regime to maintain dimension, profile, and pattern without aggrading or degrading. Because stream mitigation for coal mining is predominately stream reconstruction or relocation rather than stream channel restoration, an abbreviated Rosgen stream classification has been utilized in classifying the pre-mining streams and has been an USACE-accepted method for the low gradient streams in the Illinois Basin. A few of the Level I, II, and III Rosgen stream parameters are visually assessed in the field and recorded along with photographs of the assessment site. Stream dimensions (i.e., bottom width, bankfull width, flood-prone width, and bankfull mean depth) are measured and recorded on the assessment sheets. The assessment location and track of the stream planiform are recorded with GPS equipment and downloaded into the maps. Any buffering vegetation adjacent to the streams is assessed out to 100 feet on either side of the stream or to the watershed divide. The width and primary type of vegetation is noted on the assessment sheet. Non-buffering land uses such as agriculture and impervious areas are disregarded.

The United States Environmental Protection Agency Rapid Bioassessment Protocol⁶ (USEPA RBP) was utilized for stream habitat assessments with any field collected water quality data (pH, conductivity, temperature, and turbidity) also recorded at every stream assessment. The data sheets are included behind each assessment sheet.

The USEPA RBP habitat assessment procedure is a well-established method for evaluating the structure and function of the physical habitat in a stream and its surrounding riparian area. Since biological potential is limited by the quality of the stream’s physical habitat, an assessment of physical habitat is a vital component of any biological stream survey.

See **APPENDIX B** for August 2025 **WATERS OF THE U.S. JURISDICTIONAL DETERMINATION REPORT STREAMS, WETLANDS, AND OPEN WATERS (JD REPORT)** with detailed geomorphic assessments with photographs as well as the rapid bioassessments and **MAP B ON-SITE EXISTING CONDITIONS** in **APPENDIX A** for their locations.

4.3 OPEN WATERS

No open waters were assessed in the Seven Hills – Mining Area Addition.

4.4 UNIT ID LABELING SYSTEM:

A portion of the streams and wetlands within the proposed project have a unique naming convention which is discussed below. Wetland Services, Inc. developed a watershed approach in labeling the streams, wetlands, and open waters. A watershed has been defined as any stream that leaves the permit boundary on its own accord. For accurate record-keeping purposes, a unit specific labeling system has been developed as shown by the example below.

1NS2A1-1 = Unit ID

- 1 = Watershed (any single stream that leaves the permit boundary)
- N = Land use (Natural, Reclaimed, Pre-law, Agriculture, Mixed, Logged, or Excavated)
- S = Unit type (Stream, Wetland, Open Water)
- 2 = Unit number (2nd stream assessed in watershed 1)
- A = 1st branch of stream 2
- 1 = 1st branch of stream 2A
- 1 = Subsequent assessment on stream 2A1

5. EXISTING CONDITIONS

5.1 WETLANDS

The proposed project area is within the floodplain of Pigeon Creek, a historically straightened and channelized perennial stream. Meandering side channels reveal the approximate original meander pattern. The Mining Area Addition is forested wetland in the floodplain.

From the original Seven Hills Section 404 application, the floodplain wetlands were determined to not be rare or unique. A professional forester (see **APPENDIX N** for the Wetland Species Survey and Assessment) determined that the trees to be disturbed are very typical of what would be found in a Southern Indiana bottomland timber stand for a wetland area that has been almost 80% previously farmed and then abandoned. The typical primary invader species that were noted include: green ash, sweet gum, sycamore, black gum, river birch, hackberry, pin oak, honey locust, elm, silver maple, black willow, cottonwood, and box elder. He noted some pockets of larger timber that included additional species of swamp chestnut oak, Shumard oak, mockernut hickory, swamp white oak, and shagbark hickory, but overall, no rare or unique species were found.

Most of the wetlands proposed to be disturbed have been previously farmed based on historic aerial photography. **MAP H** excerpts in **APPENDIX A** overlay the Mining Area Addition on historical aerial collages from 1937, 1940, 1953, 1966, 1980, and 2016. The wetlands to be disturbed constitute a very small percentage of wetlands in the local and regional watersheds. The proposed project disturbs approximately 0.8% of the wetlands in the Pigeon Creek watershed.

TABLE 5 lists the wetlands delineated within the Mining Area Addition.

TABLE 5 WETLAND IMPACT SUMMARY

Wetland ID	12-Digit HUC Watershed	Wetland Type				Dominant Vegetation (as shown on the delineation sheet)
		PFO	PSS	PEM	PUBG	
		(acres)	(acres)	(acres)	(acres)	
1MW1T1P1	Clear Branch-Pigeon Creek	65.09				<i>Acer rubrum, Ulmus americana, Betula nigra, and Carya laciniosa</i>
1MW1T2P4	Clear Branch-Pigeon Creek		12.86			<i>Acer rubrum, Betula nigra, Liquidambar styraciflua, and Ulmus americana</i>
	Totals	65.09	12.86	0	0	

A total of 77.95 acres of jurisdictional wetlands were delineated within the project area. See **MAP B – ON-SITE EXISTING CONDITIONS** in **APPENDIX A** for the location of each wetland and see **APPENDIX B** for the delineations.

Using information provided in the table above, **TABLE 6** denotes the delineated wetlands by land use setting:

TABLE 6 WETLAND IMPACT SUMMARY BY SETTING

Setting	PFO	PSS	PEM	PUBG
	(acres)	(acres)	(acres)	(acres)
Natural/Mixed	65.09	12.86	0	0
Totals	65.09	12.86	0	0

5.2 STREAMS

Mapped RPW stream (1MS1) is the remnant channel of Pigeon Creek. The feature is low gradient and includes multiple old, degraded beaver dams. Woody debris jams and sediment accumulation have created a riffle/pool profile. Substrate was fine particle silt/clay, woody debris and organic detritus. The channel met Rosgen C type dimensions. Erosion potential was low and channel stability was good. When the watershed is fully charged during the wet season, 1MS1 transports an elevated base flow of water for an extended period of time.

TABLE 7 lists the jurisdictional stream assessed within the Seven Hills – Mining Area Addition:

TABLE 7 STREAM IMPACT SUMMARY

Stream ID	Rosgen Stream Channel Type	Ephemeral		Intermittent		Perennial		Woody Riparian Buffer Width*		USEPA RBP Score
		(feet)	(acres)	(feet)	(acres)	(feet)	(acres)	Left (feet)	Right (feet)	
1MS1	C6	0	0.00	2,802	1.22	0	0.00	100	100	129
Totals		0	0.00	2,802	1.22	0	0.00			

* Denotes only woody riparian buffer widths are shown. They are delineated out to a maximum of 100 feet, to the watershed divide, or to change in vegetation type. Grassy buffers and non-buffering land uses such as agriculture and roadways are disregarded in the table.

Using information provided in the **TABLE 7** above, **TABLE 8** denotes the stream by land use setting.

TABLE 8 STREAM IMPACT SUMMARY BY SETTING

Setting	Ephemeral		Intermittent		Perennial	
	(feet)	(acres)	(feet)	(acres)	(feet)	(acres)
Natural/Mixed	0	0.00	2,802	1.22	0	0.00
Totals	0	0.00	2,802	1.22	0	0.00

A total of 2,802 linear feet of intermittent stream were delineated in the Mining Area Addition. Please see **APPENDIX B** for August 2025 **WATERS OF THE U.S. JURISDICTIONAL DETERMINATION REPORT STREAMS, WETLANDS, AND OPEN WATERS (JD REPORT)** that summarizes the streams and surface drainage features found within the permit area including the field data forms. See **MAP B – ON-SITE EXISTING CONDITIONS** in **APPENDIX A** for the location of the features.

5.3 OPEN WATERS

No open waters features are present in the Mining Area Addition.

5.4 AQUATIC RESOURCE IMPACTS

The following table provides specific information regarding the proposed individual aquatic resource impacts. Impacts are categorized into two primary types: **COAL REMOVAL** activities (coal removal and backfilling) and **ANCILLARY** activities (drainage control and temporary levees).

COAL REMOVAL disturbances include the removal of the soil and overburden down to the coal seam(s) to be mined. Prior to coal removal, the topsoil and subsoil are removed and stockpiled. Tractors (dozers), end dump trucks, and hydraulic shovels will be the primary removal and reclamation equipment. Tractors will wind-row soils, which will be picked up by the shovel, put into trucks, and placed either in stockpiles or directly on graded spoil areas. Spoil will be graded to a design elevation considering the thickness of the soil, both topsoil and subsoil to be replaced to maintain approximate original contours. Soil compaction will be minimized by utilizing low-pressure tracked equipment during final soil grading. Topsoil spreading and grading will also be limited to times when soil moisture is low to further reduce potential for undesirable compaction. Deep tillage will be conducted as necessary to alleviate undesirable compaction.

ANCILLARY activities include temporary soil stockpiles, along with sedimentation basin disturbances which require excavation of a basin that has been designed to adequately handle and treat affected area surface runoff, and temporary levee impacts. The locations of basins are chosen to maximize water treatment efficiency by considering topography, property control boundaries, coal extraction boundaries, and existing vegetation, but are typically constructed downstream of the disturbance.

Activities for the temporary levee will consist of the following:

1. Footprint area of the levee will be cleared of vegetation;
2. Approximately 1 foot of topsoil will be removed and stockpiled;
3. A keyway will be excavated approximately 1 foot deeper along the entire length and width of the levee with the exposed soil in the bottom compacted to 92% compaction for cohesive soil materials;
4. Non-toxic material from the mining area will be placed in 1-foot lifts and compacted to 92% compaction;
5. The levee will be constructed with 2.5H:1V side slopes with a minimum ten (10) foot top width up to a height that will be a minimum of one (1) foot above the base flood elevation (100-year flood) as determined by the analysis in the Construction in a Floodway permit; and
6. Following construction, the levee will be mulched and seeded to protect against erosion.

The Applicant has successfully constructed levees on the original Seven Hills Mine permit area and also near the Patoka River north of Francisco, Indiana utilizing the same type of soils to protect the open pit for the Francisco surface mine. No failure of the levee systems has been observed.

TABLE 9 and **TABLE 10** depicts the streams and wetlands, respectively, designated by the type of impact it will receive.

TABLE 9 STREAM IMPACT SUMMARY BY TYPE

Stream ID	Proposed Impacts	Ephemeral		Intermittent		Perennial	
		(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)	(acres)
1NS1-1	Coal Removal	0	0.00	2,746	1.20	0	0.00
1NS1-1	Ancillary	0	0.00	56	0.02	0	0.00

Stream ID	Proposed Impacts	Ephemeral		Intermittent		Perennial	
		(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)	(acres)
Subtotal Coal Removal		0	0.00	2,746	1.20	0	0.00
Subtotal Ancillary		0	0.00	56	0.02	0	0.00
Total Direct Impacts		0	0.00	2,802	1.22	0	0.00

TABLE 10 WETLAND IMPACT SUMMARY BY TYPE

Wetland ID	Proposed Impacts	PFO	PSS	PEM	PUB	Open Water Acreage
		(acres)	(acres)	(acres)	(acres)	(acres)
1MW1T1P1	Coal Removal	50.01	0	0	0	0
1MW1T1P1	Ancillary	15.08	0	0	0	0
1MW1T2P4	Coal Removal	0	10.62	0	0	0
1MW1T2P4	Ancillary	0	2.24	0	0	0
Subtotal Coal Removal		50.01	10.62	0	0	0
Subtotal Ancillary		15.08	2.24	0	0	0
Total Direct Impacts		65.09	12.86	0	0	0

6. FIELD OBSERVATIONS

Field observations are provided on the assessments found in **APPENDIX B** in the August 2025 **WATERS OF THE U.S. JURISDICTIONAL DETERMINATION REPORT STREAMS, WETLANDS, AND OPEN WATERS (JD REPORT)** for the streams and wetlands. These include stream assessments, wetland delineations, stream habitat assessments, and photographs. **MAP B – ON-SITE STREAMS AND WETLANDS** in **APPENDIX A** shows the location of each jurisdictional assessment along with the assessment path and/or boundaries.

7. CLIMATE

The climate of Warrick County is typical of eastern interior North America. The seasonally variable weather patterns are mostly influenced by cyclical movements of cold air from the northwest and warm air from the southwest. The mean surface air temperature is 55.4 °F and the annual range between temperature extremes is about 125 °F. August is the normally warmest month averaging 79 °F and January the coldest at 29 °F. Prevailing winds are mostly from the southwest in summer and the northwest in winter. The average wind speed is about 11 miles per hour. Evapotranspiration totals about 27 inches annually. Cumulative annual precipitation averages about 43 inches. Monthly precipitation averages about 3.0 inches in autumn through winter and peaks at about 4.0 inches between late spring and mid-summer. Summer precipitation events are typically in the form of thunderstorms. The 24-hour precipitation event for the project area ranges from 2.8 inches for a 1-year frequency event to 5.3 inches for a 25-year frequency. The 2-hour rainfall intensities range from 1.6 inches for a 1-year frequency to 2.9 inches for a 25-year frequency.

8. WATER QUALITY

There are no known Section 303(d) impaired water bodies⁸ within the Mining Area Addition.

TABLE 11 lists the regional surface water quality as found in the USGS Open-File Report 81-423⁹ for Area 33. Area 33 is the southeastern area of the Interior Coal Province of the Eastern Coal Region and covers an area of about 1,630 square miles. Watersheds within Area 33 include Pigeon Creek, Little Pigeon Creek, Cypress Creek, and Anderson River in southern Indiana.

TABLE 11 AREA 33 REGIONAL SURFACE WATER QUALITY

Parameter	Range	Median	No. of Stations
pH	3.27-8.40	7.15	119
Specific Conductance (µmhos /cm)	80-1,600	358	120
Sulfate (mg/l)	18-4,000	150	59
Total Iron (mg/l)	0.03-31.5	14.5	4
Total Manganese (mg/l)	0-33	0.56	49

Source: USGS Open-File Report 81-423¹¹

The water quality of Pigeon Creek and its immediate tributaries is variable and affected by backwater from the Ohio River. Local streams receive drainage from past mining and extensive agricultural activities. Pre-mine surface water quality for the site varies in response to geology, precipitation events, seasonal changes in vegetation and hydrology, and agricultural practices such as tillage methods and fertilizer and pesticide applications.

The Applicant has obtained and provided representative baseline conditions through the prior collection and analysis at applicable area streams that include biological assessments, USEPA RBP assessments as well as surface water sampling, which include both upstream and downstream monitoring of Pigeon Creek as it enters and exits the permit boundary. The biological assessments were utilized to characterize the condition and structure of the aquatic communities in the permitted streams. Water quality parameters for the biological assessments included temperature, pH, total dissolved solids (TDS), total acidity, total alkalinity, total iron, total manganese, and total suspended solids (TSS). The SMCRA baseline surface water sampling required temperature, pH, TDS, total iron, and total manganese. For streams where water was present at time of the USEPA RBP assessment, temperature, conductivity, pH, and turbidity were recorded. Summary results are provided below and serve as baseline data

TABLE 12 depicts the range of water quality results for the SMCRA baseline receiving stream sampling. The locations of the sampling points in relation to the project area are found on **MAP A** in **APPENDIX A**.

TABLE 12 SMCRA RECEIVING STREAM BASELINE SURFACE WATER QUALITY

Parameter	DS2180	DS2181	SW 1	SW 2	SW 3
	Range	Range	Range	Range	Range
Q (CFS)	0-1.33	0-3.25	7.5-2410	0.167-2.5	5-2400
pH	7.07-8.48	7.81-9.14	7.22-8.79	7.35-8.91	7.27-8.81
TDS (mg/l)	40-200	515-2500	190-1530	150-1700	200-1700
Total Iron (mg/l)	<0.1-3.20	<0.1-0.782	<0.1-44	<0.-17	<0.1-30
Total Manganese (mg/l)	0.019-0.05	0.023-0.23	<0.01-2.5	<0.01-0.22	<0.01-0.84

Source: Applicant monitoring records (see **APPENDIX E** in **APPROVED DA AUTHORIZATION LRH-2018-738**)

Water quality samples were conducted with the biological assessments performed by Eco-Tech Consultants, Inc. during their aquatic survey in September 2011 and Wetland Services in October 2018. Sample locations can be found in the Stream Sampling and Assessment Report in **APPENDIX C** for the Eco-Tech survey and the Biological Assessment and Water Quality Report from Wetland Services. **TABLE 13** summarizes the results.

TABLE 13 BIOASSESSMENT WATER QUALITY RESULTS

Bioassessment Point	pH	Total Dissolved Solids	Temperature	Dissolved Oxygen	Conductivity	Turbidity
	(s.u.)	(mg/l)	(°C/°F)	(mg/l)	(µs/cm)	
AS1	8.3	1,588	17.5 °C	No assessment	No assessment	No assessment

AS2	8.8	863	17.5 °C	No assessment	No assessment	No assessment
AS3	8.4	1,129	18.9 °C	No assessment	No assessment	No assessment
Bio 1	6.62	127	51 °F	6.21	265	SI Turbid
Bio 2	6.78	131	53 °F	6.40	274	SI Turbid
Bio 3	6.86	156	58 °F	4.89	251	SI Turbid
Bio 4	7.85	579	51 °F	8.70	1,170	SI Turbid

Surface water quality field sampling was performed in conjunction with the USEPA RBP evaluation on each stream assessed by Wetland Services, Inc. during their 2015 and 2018 jurisdictional waters determination on additional features on the original authorization, if flow was present. Sampling included temperature, conductivity, total dissolved solids (TDS), turbidity, and pH. If no water was present at the time of the evaluation, it is noted on the habitat assessment worksheet. **TABLE 14** summarizes the past data for the features in the Mining Area Addition. No RBP water quality data was obtained during the 2025 redelineation due to the dry conditions.

TABLE 14 USEPA RBP FIELD WATER QUALITY RESULTS

Stream ID (Previous Stream ID)	Evaluation Date	pH	Total Dissolved Solids	Temperature	Conductivity	Turbidity
		(s.u.)	(mg/l)	(°C)	(µs/cm)	
1MS1 (1NS1-1)	10/29/18	ND	ND	ND	ND	SI Turbid
1MS1A (1MS1A)	1/29/15	6.63	110	40	220	Clear
1MS1B (1NS1B)	1/29/15	6.55	92	39	130	Turbid

ND denotes no data recorded

During active or reclamation mining periods, ongoing compliance surface water quality monitoring will be conducted to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed. Discharges from the mine site are subject to ongoing NPDES and SMCRA limits as required by the applicable regulatory agencies and state water quality standards. The Seven Hills Mine will employ several measures to control coal mining discharge. Sediment basins have been proposed and included in the operations plan to control mobilized solids obtained through erosion and runoff volume from affected areas. Sediment basins greatly reduce or eliminate contributions of sediment to off-site receiving streams, i.e. Pigeon Creek.

Monitoring of surface water quality will continue through final bond release. This information can be used to verify the effectiveness of control measures and to act as an alerting mechanism in the event of potential problems. After stream mitigation has been constructed and monitoring has commenced, both habitat and water quality assessments will be initiated in the form of USEPA RBP assessments. Biological monitoring will also be initiated in the approximate locations of the pre-mine assessments to evaluate the natural succession of species to a post-mining landscape.

As demonstrated above, water quality in natural streams varies widely both spatially and temporally. Surface water quality is influenced by geology, seasonal hydrology, precipitation, flow velocity, vegetation, agricultural influences and other minor factors. Based on the above monitoring, post mitigation TDS values for the reclaimed streams are expected to range from 21 to 3,220 mg/l, iron from <0.1 to 44 mg/l, manganese from <0.1 to 2.5 mg/l and pH from 6.0 – 9.14. However, outliers may occur due to the factors stated above or other unanticipated circumstances.

9. GEOLOGY

The Mining Area Addition is comprised of unmined tracts located in Warrick County, Indiana, on the eastern shelf of the Illinois Basin, within the Wabash Lowland physiographic province, and within Hydrologic Area 33.

Topographic relief within the project area is about 15 feet, ranging from about 400 feet above mean sea level in the uplands to about 385 feet in the lowlands. See **MAP A** in **APPENDIX A** for the Mining Area Addition on a USGS 7.5-minute quadrangle.

9.1 UNCONSOLIDATED MATERIALS

Quaternary unconsolidated material covers the Pennsylvanian bedrock in the Mining Area Addition. This material is typically compositionally heterogeneous and can include organic matter, clay, alluvium, and weathered and fragments of the underlying bedrock. The unconsolidated interval generally thickens away from the uplands and exhibits maximum thickness directly adjacent to streams. Site-specific drilling data indicate that the unconsolidated layer ranges between 5.5 and 42.0 feet in thickness within and adjacent to the Mining Area Addition.

9.2 BEDROCK

The interval of bedrock to be affected by mining within the proposed project area consists of cyclic sequences of shale and sandstone with intermittent units of coal and limestone. These strata exhibit considerable variability in composition, thickness, and continuity over very short horizontal distances. Lithologic variability of this degree is a defining characteristic of Pennsylvanian rocks in this region. Mississippian strata unconformably underlie the Pennsylvanian interval regionally but these rocks were not encountered in any of the test borings. The table below summarizes thickness and lithology variations for the strata down to and including the stratum directly beneath the lowest coal seam to be mined. Information obtained from drill logs indicates regional structural dip to be in a generally southwesterly direction at a rate of about 25 feet per mile.

TABLE 15 is the stratigraphic column based upon the Applicant's drill logs for the reserve:

TABLE 15 SUMMARY OF STRATIGRAPHY

Thickness Range (feet)	Description
5.5-42.0	Unconsolidated material (soil, clay, alluvium)
0-100.9	Discontinuous shale, sandy shale, sandstone, limestone
0-3.6	Indiana Coal-7 (Danville, Upper Millersburg)
0-31.9	Discontinuous shale, sandy shale, limestone, underclay
0-8.9	Indiana Coal-6 (Hymera, Lower Millersburg)
0-20.8	Discontinuous shale, limestone, sandstone, underclay
0-2.2	Herrin Coal
37.9-124.6	Discontinuous underclay, shale, sandy shale, siltstone, sandstone, shaley limestone, limestone
1.1-8.8	Indiana Coal-5 (Springfield)
??	Underclay, shale, sandstone

The coal seams proposed for mining are the Indiana **Coal-7**, **Coal-6**, **Herrin Coal** and **Coal-5**, of which the latter will be the lowest coal seam to be mined. The Applicant will extract all coal seams encountered above the lowest coal seam to be mined that exhibit suitable thickness and quality. Coal deemed by the Applicant to be unsuitable for extraction will be handled as toxic or acid-forming overburden or left in place.

Coal-7 is described by the Indiana Geological Survey as a bright-banded bituminous coal, containing thin partings of clay and shale, with films of clay in vertical joints, and local concentrations of pyrite and marcasite. **Coal-7** averages about 2.65 feet in thickness. The interburden between **Coal-7** and **Coal-6** averages about 6.25 feet in thickness locally.

Coal-6 is described by the Indiana Geological Survey as bright-banded bituminous coal containing shale and pyrite partings. The seam is noted for its characteristic content of spores from the genera *Laevigatosporites* and *Lycospora*. The thickness of **Coal-6** averages about 5.43 feet.

A coal seam of limited areal extent occupying a stratigraphic position possibly equivalent to the **Herrin Coal** seam of Illinois was identified by the Applicant in 3 proximal drill holes on the east side of the original Seven Hills permit area. According to the Indiana Geological Survey, **Herrin Coal** is a bright-banded coal that contains clay or shale partings. **Herrin Coal** is generally thin and discontinuous in Indiana but thickens westward in Vanderburgh and Posey Counties, where it can be over 5 feet thick. Within the Seven Hills Mine authorization area, the seam averages about 1.32 feet in thickness.

Coal-5 is the lowest coal seam to be mined within the Mining Area Addition. **Coal-5** is described by the Indiana Geological Survey as a bright coal that dulls upward. The seam is said to exhibit distinctive spore content. **Coal-5** is considered the most economically important coal seam in Indiana. The mean thickness of **Coal-5** within the reserve is approximately 5.57 feet locally.

9.3 GEOCHEMISTRY OF BEDROCK

Drilling data from the proposed extraction area indicates that approximately 7.56% of the proposed affected overburden exhibits net neutralization potential equal to or less than -5.0 t/kt CaCO₃. The remaining percentage of the stratigraphic column has an excess CaCO₃ equivalent. The carbonate content of the overburden is important for predicting the neutralization potential of the material when doing acid-base accounting. Any acidic overburden material will be covered by a minimum of 4 feet of non-toxic earthen material or buried in the pit.

9.4 AQUIFERS (UNCONSOLIDATED AND CONSOLIDATED)

There are no known significant unconsolidated aquifers in the Mining Area Addition. The potentiometric surface within the unconsolidated layer generally corresponds to surface topography. A small percentage of precipitation penetrates the ground surface sufficiently to engage the water table within the unconsolidated interval while the majority runs off or is intercepted via photosynthetic/metabolic processes of living vegetation and thereby subsequently entrained in their tissues or released to the atmosphere through evapotranspiration.

There are no known significant bedrock aquifers in the Mining Area Addition. Groundwater may occur and flow along jointing, fracturing and bedding planes between strata, in the cleats of coal seams, or within the intergranular pore spaces of clastic rocks exhibiting sufficient connectivity between pore spaces. Shale, underclay, siltstone, and limestone typically have low yields. These strata almost always behave as confining layers. In general, the complex stratigraphy of the Pennsylvanian System in the region can contain water-bearing rock bodies. However, these units are typically isolated, low yielding, finite and generally do not interconnect with each other over long distances or communicate directly with the surface.

There are no public drinking water sources, wellhead protection zones, or significant water bearing units identified in or within 1,000 feet of the Mining Area Addition. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the area. A single residence was identified as obtaining potable water from a cistern which is gutter fed and supplemented with hauled water. All other residents receive water from a publicly operated water utility. A few shallow-excavated wells were identified in the groundwater users survey but were deemed by their owners as obsolete because of poor reliability and susceptibility to surface contamination. If an active well is later discovered and has or will be affected by mining it will be replaced per the permit language in the SMCRA permit.

10. ALTERNATIVES ANALYSIS

In the evaluation of permit applications to discharge dredged or fill material into waters of the U.S., including wetlands, various alternatives to the proposed project that achieve its purpose must be analyzed pursuant to the Section 404(b)(1) Guidelines (Guidelines) after taking into consideration practicability, cost, existing technology, and logistics considering the overall project purposes. The analysis below considers numerous alternatives and

evaluates practicability under the Guidelines' factors, impacts on aquatic resources, and other environmental consequences.

10.1 PROJECT PURPOSE, NEED AND OBJECTIVES

BASIC PURPOSE. The basic purpose of a project is the fundamental purpose of the proposed project and is used to determine water dependency (40 CFR 230.10(a)(3)). The basic purpose of the Applicant's project is to facilitate the economic extraction of bituminous coal to sell to coal fired power plants for the purpose of producing electricity.

NEED. The need for the Applicant's project, both immediate and future, is primarily dictated by the demand for bituminous coal to generate electricity and the Applicant's utilization of its existing land and coal reserves to continue its Indiana mining operations. Coal resources play a major role in fulfilling the nation's energy needs. Through the construction, operation, and reclamation of the proposed Mining Area Addition, the Applicant proposes to recover nearly 1.5 million tons of bituminous coal reserves from the previously mentioned coal seams. The proposed mining area addition would provide continued employment for another year for approximately 134 employees that work between the adjacent High Point Mine and the Seven Hills Mine including the mechanics. Approximately 1.4 million tons (on average) has been produced annually from the active mine.

OVERALL PURPOSE AND OBJECTIVES. Under Section 404 guidelines, the overall purpose of a project is determined by further defining the basic purpose to logically describe the Applicant's specific project and is used in the alternative site identification process to evaluate practicable alternatives under the Section 404(b)(1) Guidelines. In this instance, the overall project purpose is to recover high-quality coal reserves from the Indiana **Coal-7** (Danville, Upper Millersburg), **Coal-6** (Lower Millersburg) and the Indiana **Coal-5** (Springfield) for sell to coal fired power plants for the purpose of producing electricity. This will be achieved by the installation and operation of access, processing, and necessary facilities to provide for the environmentally responsible and economically efficient recovery of as much bituminous coal within this permitted area of the Seven Hills reserve. The coal seams of interest include the Indiana **Coal-7** (Danville, Upper Millersburg), **Coal-6** (Lower Millersburg), and **Coal-5** (Springfield), of which the latter will be the lowest coal seam to be mined. These seams are locally higher in quality than the same adjacent seams being mined nearby in that they display a higher BTU content and lower sulfur content which makes these seams ideal for blending with nearby reserves to meet utility requirements to meet USEPA emission standards. These seams are high-volatile and high BTU bituminous coal, with quality specification of 11,000 BTU, 6 lbs SO₂, 10.0% ash, and 15.0% moisture, which will meet the specifications and requirements of the Applicant's targeted customer base which includes all coal-fired generating stations in the Midwest, but more specifically Indianapolis Power and Light's generating station in Petersburg, Indiana, Kentucky Utilities' E.W. Brown generating station in Harrodsburg, Kentucky, and Alcoa Warrick Operations' generating station for aluminum smelting in Newburgh, Indiana.

With regards to specific project objectives, coal produced from the Seven Hills project would be sold into established domestic utility producers for the purpose of generating electricity. Proximity to existing processing, handling, and transportation infrastructure is one of the primary factors in site selection and the evaluation of the practicability of project alternatives.

An important element also affecting project efficiency, viability, and economics is the statutory obligation to maximize recovery of mineable and marketable coal from within the project area. Coal is a valuable, yet finite and depleting resource. Public Law 95-87 (Surface Mining Control and Reclamation Act of 1977, or "SMCRA") requires that "consideration (be) given to maximize the utilization and conservation of the solid fuel resource being recovered so that re-affecting the land in the future can be minimized." Economic surface mineable reserves have declined significantly in recent years. The Seven Hills reserve is critical to ongoing mining and employment of the Applicant's existing operations in Gibson and Warrick counties. The reserve is very desirable in today's competitive market in terms of its very favorable mining ratio and unusually high amount of coal under each acre to be mined. Approximately 20,000 tons of high-quality coal is present under each surface acre.

An essential project objective is therefore to minimize both disturbance and disturbance of the land and surrounding environment by designing mining projects to achieve economic recovery of as much of a coal reserve as practicable, while avoiding and minimizing waste and the sterilization of other reserves. Accordingly, in evaluating operational plans and project alternatives, consideration must be given to site-specific conditions to ensure that efficient utilization and conservation of the solid fuel resource can be achieved versus present-day economics, while avoiding reserve sterilization and preserving the opportunity to recover currently uneconomic or marginal reserves later.

WATER DEPENDENCY. The proposed project does not require access to or siting within waters of the U.S. to fulfill its basic purpose and is therefore considered a non-water dependent activity. Section 404(b)(1) Guidelines state that for non-water dependent activities, practicable alternatives which do not involve fill in waters of the U.S. are presumed to be available unless clearly demonstrated otherwise.

10.2 PROJECT ALTERNATIVES

Project alternatives were developed and considered by the Applicant that would eliminate and/or minimize impacts to waters of the U.S. These alternatives were then analyzed to determine their practicability.

Alternatives that were analyzed included, not mining the project area, relocating the project to another location, mining the reserve by alternative mining techniques such as area and pod mining from the surface and underground by room and pillar, longwall, auger, and highwall mining, mine the reserve and maintain a final cut following the close of mining, and mine the reserve and fill the final cut to establish PFO wetlands.

A summary of the alternatives analysis is listed below. Detailed descriptions of the alternatives are included in **SECTION 10.4 ALTERNATIVES ANALYSIS.**

ALTERNATIVE 1: NO ACTION ALTERNATIVE

- Cease plans for mining the coal reserve under the Mining Area Addition.

ALTERNATIVE 2: PROJECT RELOCATION ALTERNATIVE

- Relocate project to another site with reduced impacts to waters of the U.S. to obtain approximately 1.5 million tons of coal at another location that has similar coal quality to meet contractual obligations.

ALTERNATIVE 3: ALTERNATIVE MINING METHODS

- Conduct mining at the Mining Area Addition using methods other than open-pit mining (i.e., underground mining, pod mining, and trench and auger mining).

ALTERNATIVE 4: PREFERRED ACTION (SURFACE MINE & LEAVE FINAL CUT)

- Conduct open-pit mining and reclamation operations to obtain approximately 1.5 million tons of coal from three coal seams by mining the reserve with pits that are aligned east to west with a continuous pit from the original Seven Hills Mine that progresses northward. Mining would be conducted while maintaining safe operating conditions from Pigeon Creek flooding through utilization of a levee along the eastern and northern boundaries. Following completion of mining, the final cut will be left and allowed to fill with water. This final cut would be approximately 42 acres in size. The overall impact area for the Seven Hills – Mining Area Addition would be 80.46 acres. Following mining, the levee will be removed and the final cut pit will be left to fill with water.

ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE & RECLAIM FINAL CUT) - (LEDPA)

- Conduct open-pit mining and reclamation operations to obtain approximately 1.5 million tons of coal from three coal seams by mining the reserve with pits that are aligned east to west with a continuous pit from the original Seven Hills Mine that progresses northward. Mining would be conducted while maintaining safe operating conditions from Pigeon Creek flooding through utilization of a levee along the eastern and northern boundaries. Following completion of mining, the final cut will be filled with spoil and reclaimed to approximate original contours allowing complete restoration of the 80.46 acres impacts. Following reclamation, the levee will be removed and the site returned to a forested floodplain wetland.
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Evaluation of these potential operational alternatives is detailed in the following sections.

10.3 DETERMINE PRACTICABILITY OF ALTERNATIVES

10.3.1 CONSIDERING PROJECT PURPOSE

The overall project purpose of the Seven Hills Mine – Mining Area Addition disturbances is to produce bituminous coal that meet specific quantity and quality for existing and future utility requirements to contribute to the power production for the United States. The utility regulations require that the Applicant supply approximately 1.4 million tons of coal annually and the coal meets quality specifications for specific parameters, including heating value and sulfur content. Mining, the 1.5-million-ton reserve under the Mining Area Addition would prolong the life of the mine another year. This would be beneficial for utilities who are beginning to experience pressure to maintain energy production. If the Applicant fails to meet utility obligations despite best efforts, they could be ruled in default, which could result in reputational repercussions, making the project economically unfeasible. Therefore, a practicable alternative to the project purpose must be able to meet utility requirements in terms of coal volume, coal quality specifications, and delivery timing as well as maximize the utilization of the entire reserve.

10.3.2 AVAILABILITY

An alternative may not be available if implementation is outside the Applicant's control. For example, this may occur, when needed property or resources are owned or controlled by others, or when the alternative cannot timely receive regulatory approval. In this case, coal resources not owned or controlled by the Applicant may not be available to timely meet utility obligations. Further, if additional regulatory approvals are required, those processes may not allow for timely production of coal. Accordingly, timing associated with the specific alternatives has a bearing on that alternative's feasibility and availability.

The Applicant's preferred project site is a readily available option, as much of the area is owned and controlled through surface leases by affiliate companies of the Applicant, American Land Holdings of Indiana, LLC and Midwest Coal Reserves of Indiana, LLC. Most of the coal reserve is also controlled by affiliate companies and has been held by the companies for many years. In addition, the surface mining operation has an active permit to conduct mining and reclamation operations from the Indiana Department of Natural Resources – Division of Reclamation. The Division of Reclamation administers Indiana's Surface Coal Mine Reclamation Act (SMCRA) following the grant of primacy to the state by the United States Department of Interior, Office of Surface Mining, in 1982. The Regulatory Program is responsible for permitting and compliance verification, enforcement and financial assurance of comprehensive environmental protection performance standards related to surface and underground mining and reclamation operations. The Seven Hills SMCRA permit (S-00357) was issued on March 23, 2014 and the original DA authorization was received March 17, 2020. See **APPENDIX P** in **APPROVED DA AUTHORIZATION LRH-2018-738** for the SMCRA permit.

10.3.3 PRACTICABILITY FACTORS

To be practicable, an alternative must be available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of overall project purpose. Those practicability factors are first explained and then considered below for alternatives.

10.3.3.1 COST

The cost factor considers the associated capital outlay, economic viability, and reasonableness of cost increases to determine practicability. An alternative that is unreasonably expensive is not practicable. In addition, the geology and geography of the coal seams, overburden, and interburden, as well as mining equipment, techniques, and logistics also contribute to cost considerations.

10.3.3.2 LOGISTICS

Mining logistics are determined by the mine plan and the subsequent operation and reclamation plans to specify locations, timing, sequencing, techniques for coal production, maintenance of safe working conditions and considering risk management strategies. Risk management strategies include maintaining sufficient coal stockpiles and providing safe working conditions to maintain sufficient coal volumes for blending or to utility requirements. This enables delivery of a steady supply of appropriate quality coal. These strategies are necessary and standard business practices that consider the specific circumstances at the Seven Hills Mine - Mining Area Addition. Conditions that may cause production delays include:

- Poor weather conditions – flooded pits or muddy road conditions can cause production or coal transport delays.
- Highwall or spoil bank instability or failure – highwalls and spoil banks are continuously monitored for instability. If unstable conditions are detected, operations are restricted.
- Unplanned equipment outages due to mechanical failure.

Some of the operating constraints that are included in the Applicant's plan to minimize the risk of coal production delays at the Seven Hills Mine – Mining Area Addition include:

- Maintain a stockpile of the high-quality high heating value Seven Hills coal so that it can be blended with the lower heating value coal from nearby active operations.
- Maintain properly managed equipment and flexibility to allow mechanical repairs.
- Construct properly designed levee system to maintain floodway capacity and protect the open pit from any flooding that may occur.

10.3.3.3 EXISTING TECHNOLOGY

The technology needed to accomplish the overall project purpose must consider the constraints at the Seven Hills Mine, including geology and specialized mining equipment. These physical constraints set the technology and operating parameters of the Seven Hills Mine and the mining into the Mining Area Addition and include:

- Geology and pit development at the Seven Hills Mine. There are four named coal seams at Seven Hills Mine with 3 being of sufficient thickness to be minable. Mineable coal seam thickness at Seven Hills Mine ranges from 2.65 to 5.57 feet thick. Coal seams have an average dip of 25 feet per mile from east to west in the mine. The surrounding topography increases from east to west which increases the strip ratio. The geology of the surrounding rock at Seven Hills requires that a portion of the overburden and interburden be drilled and blasted for removal.

- Equipment constraints. The essential pieces of equipment at the mine are the hydraulic shovel, bulldozers, and haulage dump trucks. To ensure that the mine operates at optimum and safe parameters the mining pit needs to be of a minimum size to provide sufficient access for drilling, blasting, coal removal, and reclamation operations.

10.3.4 CONSIDERING ENVIRONMENTAL CONSEQUENCES

For each available and practicable alternative, USACE is required to assess the impacts (adverse and beneficial) on the aquatic ecosystem and the overall environment. By comparing the environmental consequences of the practicable alternatives, the least environmentally damaging practicable alternative (LEDPA) can be identified that achieves the project's purpose.

A summary of the findings and analysis for the alternatives are included in **SECTION 10.4**.

10.4 ALTERNATIVES ANALYSIS

The Applicant considered a few alternatives to produce 1.5 million tons of coal of the same quality as found at the Seven Hills Mine – Mining Area Addition. In this section, each alternative is screened to determine if it is available and practicable while meeting the project purpose.

10.4.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Alternative 1 or the No Action Alternative would essentially be to “not conduct mining in the Mining Area Addition”. This would result in the valuable bituminous coal reserves not being recovered down to the Indiana *Coal-5 (Springfield)* seam and extending employment for the 134 employees with another year of mining.

This alternative would be perceived as environmentally preferred because it would neither result in the excavation or filling of waters of the U.S. nor in the re-disturbance of any of the land surface. This alternative was rejected because it fails to meet the project’s purpose and need, however. The Applicant is contractually obligated to mine and recover high-quality bituminous coal to be used in electrical generation. There is significant domestic and worldwide demand and need for this product. To not continue to mine this remaining reserve would result in the loss of a valuable mineral resource that is economically and easily able to be recovered.

The No Action Alternative would result not extend employment for another year for 134 direct jobs with estimated wages and benefits exceeding \$22.1 million annually as well as up to 670 indirect jobs supported the mining operation; income and property tax revenues that would annually be paid to Warrick County that would exceed \$44,000 and \$158,000, respectively; and the loss of royalty income which would have been paid to the mineral owner of the coal seams being leased by the Applicant.

Under the No Action Alternative, it would be assumed that direct impacts to jurisdictional water would be avoided at this site. However, direct, indirect, and cumulative impacts would likely continue to occur in this region, with or without the approval of this project due to the demand and need for this valuable mineral resource.

The No Action Alternative is included in this analysis to act as a control for comparison with subsequent alternatives. As utilized in this analysis, it is essentially the “future without the project”. The No Action Alternative does not necessarily represent “no alteration” of the existing environment. Even without the authorization being sought by this application, timbering, agriculture, and potentially even development could occur in and around the Mining Area Addition. With bituminous coal being a valuable mineral and a global commodity, it is likely that other mining operations would continue to be permitted and mined in the region - independently of whether this project is approved or not. Further, it is likely that those operations could result in similar jurisdictional and environmental impacts. Quite simply, coal reserves in this region occur in close proximity to jurisdictional waters because the widespread dendritic patterns and stream valleys overlie the coal seams.

Last, timber and agricultural operations within the project and cumulative watersheds could and would continue to occur in the future - either preceding mining operations or independently of them. If mining at the Mining Area Addition were to not occur, it is reasonable to predict that any of the landowners may choose to accelerate timbering to recoup investment, property tax, and holding expenses if mining were not to occur. It is even possible that an attempt to reactivate agricultural activities could be taken at the site which was successfully done as shown on the **MAP H(s)** in **APPENDIX A**, which are the historical aerial photographs. It clearly shows that more than 85% of the site has been in under agricultural activities within the past almost 100 years.

10.4.1.1 PRACTICABILITY ANALYSIS FOR ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the Alternative 1, no mining would occur at the Seven Hills – Mining Area Addition. The continued mining of an addition 1.5 million tons of high-quality coal that can be blended with lower quality coal would not be extracted. Contractual specifications that specify the delivery of coal to a certain standard (i.e. a minimum heating value of 11,000 BTU) would be intermittent resulting in financial and reputation repercussions. No Action would not extend high-paying jobs, important tax revenue, ancillary economic growth, financial losses on investments to the Applicant as well as potential interruptions to the coal supply for basic electricity production for another year.

10.4.1.2 ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVE 1: NO ACTION ALTERNATIVE

As a practicable alternative, the environmental consequences must be considered for the No Action Alternative. There would be no impacts to jurisdictional waters of the U.S. in regard to the mining operation, but this does not preclude impact from future anthropomorphic activities. Past activities at the Seven Hills Mine project area have included the clearing and conversion of a significant portion of the wetlands in the project area to an agricultural land use as shown on the **MAP H(s)** in **APPENDIX** which show the aerial conditions over the past almost 100 years. Based on historical aerial photography, the **TABLE 16** depicts the wetland acreage and approximate age of the wetland following its conversion when tillage activities ceased.

TABLE 16 **AGE OF WETLANDS WITHIN MINING AREA ADDITION**

Wetland Age based on Aerial Photography	Wetland Acreage	Percentage of Wetland
(years)	(acres)	(percent)
> 88 (1937 aerial)	12.0 acres	15%
> 85 (1940 aerial)	4.0 acres	5%
> 72 (1953 aerial)	7.0 acres	9%
> 59 (1966 aerial)	0 acres	0%
> 45 (1980 aerial)	33.0 acres	42%
> 22 (2003 aerial)	11.0 acres	14%
> 9 (2016 aerial)	11.2 acres	14%
> 5 (2020 aerial)	0 acres	0%
Total	78.20 acres	100%

Impacts to other environmental factors (biological, threatened and endangered species, water quality, groundwater, etc.) are detailed in **SECTION 12: CUMULATIVE IMPACTS**.

10.4.2 ALTERNATIVE 2: PROJECT RELOCATION ALTERNATIVE

Under this alternative, the project would be relocated to an alternate site. Use of alternate mine sites was eliminated for several reasons, most significantly relating to lack of controlled available coal reserves and land, economics, and timing. Implementation of project relocation would require acquisition of land and coal, environmental and mining feasibility studies, plan development and regulatory approvals and require a shift in strategies. This process typically takes longer than 5 years if there are willing sellers of land and coal reserves. With the Mining Area Addition utilizing the existing coal preparation plant and rail loadout facility at the Wild Boar Mine, a new mine relocated elsewhere may require the construction of a new preparation plant and loadout facilities.

The Seven Hills reserve is under control by the Applicant and meets the project's purpose and need. It is of sufficient size and desirable quality; and it is located in proximity to rail transportation routes in a region of historical bituminous coal production. Through the avoidance and minimization process, the original Seven Hills Mine utilizes the existing coal preparation plant, refuse disposal areas, and rail loadout facility. A new mine relocated elsewhere may require the construction of a new preparation plant and rail loadout facility. Relocating the project would require significant investment in mine plan design as well as property and reserve acquisition. The capital cost to develop a brand-new facility to meet the same coal volume and same coal quality would be uneconomical and unfeasible. The Project Relocation alternative cannot timely receive regulatory and other approvals in time to meet the existing utility requirements.

10.4.2.1 PRACTICABILITY ANALYSIS FOR ALTERNATIVE 2: PROJECT RELOCATION ALTERNATIVE

The Project Relocation alternative is not practicable given the need for the reserve to meet contractual volume and quality needs as adjacent mines' coal quality in regard to heating value begins to drop. As noted above, the Applicant has not been able to identify an alternative location with available reserves that, using existing technology, could support the volume and composition of coal needed to meet the overall project purpose. Without alternate reserve opportunities in this or other regions, the Applicant cannot evaluate whether these alternative locations would meet the logistical concerns or operating constraints that would be needed.

10.4.2.2 ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVE 2: PROJECT RELOCATION ALTERNATIVE

The environmental consequences for the Project Relocation alternative are unknown. A comparable reserve of the same quality and volume in the Illinois Basin does not likely exist in a large tract, resulting in multiple sites being needed to replace the planned production. The alternative does not assure the new site will produce lesser impacts with more disturbance likely needed to produce the same amount of coal.

10.4.3 ALTERNATIVE 3: ALTERNATIVE MINING METHODS

There are several different methods commonly used in the coal mining industry to recover the coal resource from its natural geologic setting. These methods include underground mining; open pit mining; auger mining; and thin-seam mining. Each of these alternative methods has certain advantages and disadvantages as well as inherent limitations where they can be successfully utilized. Each reserve area is unique in the geologic conditions it presents, and these conditions generally limit the alternatives available to the mining operation. Not every reserve area is conducive to employing alternative methods.

- **UNDERGROUND MINING**

Underground mining is generally utilized to recover coal seams that are too deep to be efficiently mined using surface mining methods. The major limiting factor determining whether a seam can be mined using underground methods is the seam height. Due to the size of equipment used in underground mining and the adverse working conditions resulting from confined spaces, seams with a coal thickness less than 4 - 5 feet are generally not considered mineable. One major disadvantage of underground mining relative to surface mining is the amount of coal that must be left in place in the form of pillars to provide support for the mine roof. The size of the pillars that must be left depends on the relative strengths of the roof, coal, and floor as well as the depth of the seam below the surface. Conventional underground mines in the Illinois Basin, which includes Indiana, generally result in the extraction of about 50% of the in-situ coal being mined. Thus, if a reserve is recoverable by both surface and underground mining methods, underground mining would result in the loss of half of the coal reserves. The thickest coal seam that could be underground mined at the Seven Hills – Mining Area Addition is the Indiana **Coal-6** seam which has an average thickness of 5.43 feet. The Indiana **Coal-5** seam is also underground mineable at an average thickness of 5.57 feet. While these seams are underground mineable, they cannot be both underground mined. Only one or the other is available.

The depth of the **Coal-6** seam (75 feet) and the combined seam thickness of the **Coal-7** and **Coal-6** seams (5.43 feet) render these seams surface minable but not underground minable due to the relatively shallow depth and the incompetent overburden consisting of fissile, carbonaceous marine shale and silty shale interbedded with thin coal lenses and rash that occur above the **Coal-6** seam. These bedding phenomena occur sporadically throughout the reserve. The poor compressive strength of these directly overlying strata renders the **Coal-6** seam and seams above unsuitable for mining by any method other than surface mining. Furthermore, the lower coal recovery rate for this mining method would also reduce the likelihood that the remaining coal reserve would be sufficient for utility obligations or blending. To meet the contractual obligations all the other seams need to be mined via the surface mining method. Thus, this method was eliminated.

- **AUGER MINING**

This method of recovery is generally used in conjunction with open-pit surface mining operations because auger mining requires the coal seam to be exposed in the face or wall of a pit. Highwall mining and auger mining techniques use highwall continuous miners or augers to extract the coal by penetrating the horizontal coal seams exposed by the highwall or vertical walls in an existing pit. It is unlikely that any of these mining methods would meet the “maximum economic recovery” requirement for the three coal seams to be extracted if utilized with the Proposed Action with Avoidance Alternative. Due to the relatively short pits in this alternative, reclamation and mining would become discontinuous while the auger contractors’ setup their equipment on the narrow end of the pit wall. Clearing the area and securing loose overburden for safety reasons will increase the laybacks of the side slopes eliminating effective dozer push and grading to obtain coal from each of the three coal seams to be extracted via surface mining methods. Therefore, auger mining the Seven Hills – Mining Area Addition reserve has been eliminated.

- **POD MINING**

Pod mining would consist of the excavation of smaller pits in between the aquatic resources. Since the entire site contains jurisdictional aquatic resources, pod mining is not feasible. This technique would make mining economically unfeasible as mining costs would more than double while coal recovery would diminish dramatically. Many streams and wetlands encompass the reserve area. The entirety of the reserve planned for extraction (includes Indiana **Coal-7**, Indiana **Coal-6**, and Indiana **Coal-5** seams) exists here. Any pit would have to be excavated to the lowest coal seam with lay backs on all sides to insure safe operating conditions. Additional lay backs would be needed to allow for construction of separate diversions and sediment basins for each pod area. The overburden from each pit would have to be stockpiled and then placed back into the pit after coal extraction, as opposed to conventional open-pit surface mining where pits advance continuously with overburden being deposited into the previous pit (direct haul back). Coal recovery would be lost under each aquatic resource, the drainage control lay back areas, and overburden stockpile areas. The extra costs associated with these factors, coupled with less recovery of the resource, eliminates pod mining as an option. This type of mining would result in an inconsistent supply of coal to processing facilities, transportation facilities, and ultimately to the electric utilities.

Implementation of any alternative mining techniques would require many plan revisions and regulatory approvals including revision to the SMCRA permit and additional engineering analysis. Underground ground mining would require a shift in strategies. Detailed geotechnical evaluations and altered mine planning would be required to deal with these changes. Conversion to underground mining would require significant investment in redesign, equipment, and employee training. The capital cost for equipment alone is estimated to be about \$300 million. This estimate is based on company experience with development of the Gateway North Mine in western Illinois and current operations and development costs which include development of the portal or shaft, ventilation system, specialized mining equipment, and conveyor to bring the coal out.

TABLE 17 summarizes the specific set of technical criteria that must be met for each of the three alternative mining techniques (underground mining, pod mining, and auger/highwall mining) and whether the criteria can be met for the Seven Hills Mine – Mining Area Addition.

TABLE 17 TECHNICAL CRITERIA FOR ALTERNATIVE MINING METHODS

Technical Criteria for Underground Mining		
Minimum seam height of three (3) feet or 36 inches (modern equipment constraints)	Average coal seam heights: Indiana Coal-7 : 2.65 feet Indiana Coal-6 : 5.43 feet Indiana Coal-5 : 5.57 feet	Indiana Coal-7 does not meet the criteria Indiana Coal-6 meets the criteria Indiana Coal-5 meets the criteria
No overlying or underlying existing mine workings within 40 vertical feet of the coal seams (rule of thumb for ensuring stable ground)	No known overlying or underlying mine workings exist around the coal seams to be mined	Meets the criteria
No major rider seams within 20 feet of the top of the identified reserve body (maximizes coal recovery and minimizes future disturbance)	The Indiana Coal-7 seam lies approximately six (6) feet from the top of the Indiana Coal-6 seam The Indiana Coal-6 seam is approximately 90 feet from the top of the Indiana Coal-5 seam	Indiana Coal-6 does not meet the criteria Indiana Coal-5 meets the criteria
Maximum in-seam parting of 18 inches (maximizes efficiency of post-extraction coal processing)	No in-seam partings of greater than eighteen (18) inches are known to exist within the three coal seams	Meets the criteria
Minimum of 100 feet of vertical cover above coal seam to be mined (MSHA requirement to minimize potential for mine subsidence and maintain safety)	The consolidated vertical cover above the coal seams to be mined are as follows: Indiana Coal-7 : approximately 45 feet Indiana Coal-6 : approximately 6 feet Indiana Coal-5 : approximately 90 feet (to Indiana Coal-6 seam)	None of the coal seams meets the criteria
Each coal seam in the reserve body must yield a minimum of 250,000 clean recoverable tons (industry standard to ensure recovery of capital investment)	Total reserve tonnage by coal seam are as follows: Indiana Coal-7 : approximately 0.2 million tons Indiana Coal-6 : approximately 0.6 million tons Indiana Coal-5 : approximately 0.7 million tons	Indiana Coal-7 does not meet the criteria Indiana Coal-6 meets the criteria Indiana Coal-5 meets the criteria

	Assume 50% recovery per coal seam utilizing room and pillar method of underground mining, if underground mining were to occur	
Minimum resource recovery of 60% of total reserve	Approximately 50% is recovered per each coal seam, if underground mining were to occur Recoverable reserve from underground mining the Indiana Coal-5 seam: approximately 0.35 million tons or 23%	Does not meet the criteria as none of the coal seams, individually or combined, are available to be underground mined
Avoid sterilization of marketable reserves within the project area	Remaining coal pillars leave approximately 50% of the coal in-situ thus sterilizing that portion of the reserve	Does not meet the criteria
		Overall, underground mining is not a viable option for the Mining Area Addition
Technical Criteria for Auger/Highwall Mining		
Minimum recoverable seam height for auger mining of 24 inches	Average coal seams heights: Indiana Coal-7 : 2.65 feet Indiana Coal-6 : 5.43 feet Indiana Coal-5 : 5.57 feet	Indiana Coal-7 meets the criteria Indiana Coal-6 meets the criteria Indiana Coal-5 meets the criteria
Maximum in-seam parting for auger mining cannot exceed 6 inches	No in-seam partings greater than six (6) inches are known to exist within the three coal seams	Meets the criteria
Minimum recoverable seam height for highwall mining of 33 inches	Average coal seams heights: Indiana Coal-7 : 2.65 feet Indiana Coal-6 : 5.43 feet Indiana Coal-5 : 5.57 feet	Indiana Coal-7 does not meet the criteria Indiana Coal-6 meets the criteria Indiana Coal-5 meets the criteria
Maximum in-seam parting for highwall mining in seams under 36 inches cannot exceed 6 inches	No in-seam partings greater than six (6) inches are known to exist within the three coal seams	Meets the criteria
Maximum in-seam parting for highwall mining in seams over 36 inches cannot exceed 18 inches	No in-seam partings greater than eighteen (18) inches are known to exist within the three coal seams	Meets the criteria
Minimum resource recovery of 60% of available resources	Auger mining in general will recover from 40% to 60% of a single coal seam	Does not meet the criteria
Economical cumulative overburden to coal ratio based on current market and site-specific criteria	Difficult to maintain a steady supply of coal due to being labor intensive, typically auger mining in coal recovery is utilized to give additional tonnage at minimal cost in combination with surface mining when the pit is large enough to allow	Does not meet the criteria
Avoid sterilization of marketable reserves identified within the project area	Remaining coal pillars between the holes leave approximately 50% of the coal in-situ per seam thus sterilizing that portion of the reserve	Does not meet the criteria
Minimize environmental impacts	Construction of the highwall trench to maximize recovery of the reserve will require impacts through the middle of the permit area and require the need for impacts associated with the construction of temporary levee, floodway enhancement area, and overburden stockpiles and disposal	Does not meet the criteria
		Overall, auger/highwall mining is not a viable option to mine the Mining Area Addition
Technical Criteria for Pod Mining		
Reclaimed slopes must be re-graded to configuration to achieve approximate original contours as required by IDNR and SMCRA mining regulations	Achieving approximate original contours following pod mining is achievable but requires the double handling of overburden material during removal and then replacement back into the open pit	Does meet the criteria
Availability of areas for excess overburden storage must be located within 1.75 miles of the mining area	An existing excess spoil disposal area is located within the permit on a previously surface-mined area which is within 1.75 miles of the mining areas	Does meet the criteria

Economical cumulative overburden to coal ratio based upon current market and site-specific criteria	Considerable operating cost are incurred as a result of the double handling of stockpiles material to fill the open pit back to approximate original contours	Does not meet the criteria
Minimum resource recovery of 60% of total reserve	A maximum recovery of 0% of the total reserve is expected based on maintaining a 50-foot offset from all waters of the U.S. and considering the pit slope angle for recovery in the available areas Recoverable reserve from pod mining: 0 million tons	Does not meet the criteria
Avoidance of sterilization of marketable reserves in the project area	Coal reserve left under waters of the U.S. and 50-foot buffer, leaves more than 75% of the coal in-situ, sterilizing this reserve	Does not meet the criteria
Minimization of environmental impacts	Off-set buffers will be maintained from the waters of the U.S. except where impacts need to occur for overburden stockpiles and haulage roads	Does not meet the criteria
		Overall, pod mining is not a viable option to mine the Mining Area Addition

- **OPEN PIT (SURFACE) MINING**

Open pit or surface mining methods are limited to reserve areas where the coal is located at relatively shallow depths below the ground surface. The maximum depth to which a surface mining operation can proceed is dependent on the amount of material that must be removed to recover the coal and the limitations of the equipment used. In the mining industry, the feasibility of using surface mining methods is related to stripping ratio. The stripping ratio is defined as the proportion of overburden that must be removed to the amount of coal recovered. Although there are several units in which this proportion can be defined, the most common in the industry is the in-situ cubic yards of overburden removed to recover one ton of clean coal. Thus, a stripping ratio of ten (10) implies that ten (10) cubic yards of soil and rock must be removed to recover one (1) ton of clean coal. The removal of overburden, or stripping, is the most significant component of surface coal mining costs. Variations in stripping ratio affect the scale of the equipment and the efficiency of its operation as far as overburden handling is concerned. As the overburden depth and stripping ratio increase, more money is spent on exposing the coal seam until a limit is reached when the value of the recovered material (clean coal) is just enough to pay all the cost involved in mining, preparing and selling the material. This is referred to as the break-even stripping ratio, a point value beyond which the coal seam cannot be economically stripped. The break-even stripping ratio is related to the selling price of coal. Thus, as the selling price of coal rise, areas with higher stripping ratios can be economically mined. In today's coal market, surface mining operations are general limited to reserve areas with maximum average stripping ratios of twenty (20) or less, depending on other contributing factors. These operations can recover coal within small areas of the reserve that have higher ratios depending on the coal quality and incremental cost of production. However, it is rare that surface mining occurs in reserves with ratios above twenty-five (25). Regardless of the stripping ratio, today's surface mining equipment is generally limited to a maximum mining depth of approximately 200 to 250 feet.

The Seven Hills – Mining Area Addition reserve is mineable using surface mining methods with an average depth of 130 feet to the lowest coal seam. The overburden stripping ratio is approximately 11:1 for the Indiana **Coal-5** seam and 9:1 for the Indiana **Coal-6**. The stripping ratio of shallowest seam is considerably higher at 27:1 for the Indiana **Coal-7**, which would be considered an unprofitable stripping ratio. The consequences of this geology are that all seams down to at least the Indiana **Coal-6** would need to be extracted for the proposed project to be considered economical and with pit and available equipment already in the area going down to the Indiana **Coal-5** would be prudent.

10.4.3.1 PRACTICABILITY ANALYSIS FOR ALTERNATIVE 3: ALTERNATIVE MINING METHODS

Highwall/auger mining is supplemental to surface mining in limited circumstances. Subsurface support (coal pillars) increase proportionally in width as the depth to the coal seam increases. This results in decreased

extraction rate of coal, or loss of reserve. The order and organization of in-pit operations is critical to the efficient and safe operation of the mine. Auger mining requires pit areas to be idled from the normal stripping operation for the auger mining to occur. This delays and increases the costs of reclamation by forcing rehandling of material to fill the voids that are left open for this method. Additional cost prohibitive factors to be considered are the transportation, setup and tear down of the auger miner. Recovery is less than 40% on any coal seam and auger penetration is limited to 200 to 300 feet in best cases. The Applicant includes the auger mining options in its SMCRA permits to provide options for maximizing coal recovery at pit ends and final pits, but historically auger mining activities have proven to not be cost effective in large scale extraction of a coal reserve. Use of a highwall miner allows deeper (800 to 1200 feet) extraction than a conventional auger and slightly higher recovery (up to 55% in best cases), but it also creates even more complications from an operational and consistent production standpoint. Even larger working areas are required to accommodate use of a highwall miner, which further increases reclamation costs and prevents consistent production to meet utility needs. Highwall mining requires excavation of long narrow pits to allow the highwall miner to access the coal seams(s) along both sides of the pits. After extraction of the highest seam, excavation would then occur to the seam below and the process repeated until the lowest seam has been extracted. This mining process does not allow for consistent production and reduces coal extraction. Furthermore, it does not reduce surface impacts as levees, drainage control, haul roads, stockpile areas, and other support features will have to be constructed for each pit area.

To date, the shortest available highwalls for highwall miner extraction have been 5,500 feet conducted at the Wild Boar Mine - Interchange Pit and in excess of 6,000 feet at the West 61 Mine. Two highwalls were available for highwall miner extraction at each operation. The maximum highwall length at the Seven Hills Mine will not be in excess of 1,500 feet which will eliminate highwall mining as being an alternative method.

Pod mining would consist of the excavation of smaller pits in between the aquatic resources. This technique is not feasible as there is not room between aquatic resources to construct a smaller pit. Mining costs would more than double while coal recovery would diminish dramatically. The majority of streams and wetlands to be impacted are located in the valleys that bisect the reserve area. The entirety of the reserve planned for extraction (includes Indiana **Coal-5**, **Coal-6**, and **Coal-7** seams) on this permit area exists beneath those same valleys. Each pit would have to be excavated to the lowest coal seam with lay backs on all sides to insure safe operating conditions. Additional lay backs would be needed to allow for construction of separate diversions and sediment basins for each pod area. The overburden from each pit would have to be stockpiled and then redeposited back into the pit after coal extraction, as opposed to conventional open pit surface mining where pits advance continuously with overburden being deposited into the previous pit (direct haul back). Coal recovery would be lost under each aquatic resource, the drainage control lay back areas, and overburden stockpile areas. The extra costs associated with these factors, coupled with less recovery of the resource, eliminates pod mining as an option. This type of mining would result in an inconsistent supply of coal to processing facilities, transportation facilities, and ultimately to the electric utilities.

From previous company experience, the underground mining method utilizing room and pillar techniques requires a minimum average coal thickness of 5 feet before it is considered for evaluation due to economic and safety factors. Both the **Coal-6** and **Coal-7** seams meet this criteria by being on average 5.4 feet and 5.6 feet, respectively, but due to the relatively shallow depth to the coals seams, 66 feet to 130 feet, respectively and the incompetent overburden consisting of fissile, carbonaceous marine shale, and silty shale interbedded with thin coal lenses and rash that occur above the **Coal-6** seam renders the seams not mineable by underground methods. Based on seam thicknesses, if underground mining was feasible in the **Coal-6** or **Coal-5** seam, approximately 77% of the coal reserve would be left in place. If both the **Coal-6** and **Coal-5** seam could be mined by underground methods, approximately 60% of the coal reserve would be left in place. This reduction is mandated by the retention of coal pillars to support the roof to provide safe working conditions and prevent surface subsidence. This enormous reduction in reserve would not support the existing and future investment in the mining infrastructure and not supply the needed coal volume to meet utility requirements.

Feasible underground mines in Indiana are a minimum of 250-300 feet below the surface. If extraction by underground methods was in fact feasible, the relatively small reserve would be too small to justify the

infrastructure required for underground mining. Shallow multiple seam reserves are conducive to surface mining methods while deeper single seams are conducive to underground mining methods. To construct an underground mine in Indiana, a recoverable coal reserve of at least twenty-five million tons would typically be needed to support such an investment.

10.4.3.2 ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVE 3: ALTERNATIVE MINING METHODS

Under this alternative, there would continue to be impacts to waters of the U.S. with more fragmentation of the streams and wetlands to open smaller pits in pod mining. The auger mining would have the same impacts as Preferred Action of surface mining but with a temporal lag before any pits could be backfilled and returned to its intended use. The reclamation would be delayed with this alternative because the topsoil would need to be removed, the pit opened, and all auger extraction completed prior to beginning reclamation of the pit. Underground mining methods typically require the additional excavation of incompetent roof and/or floor to provide safe mining conditions. This material is brought out with the coal and separated. This material called coal refuse is most economically disposed of in large pile adjacent to the mine. These piles become a permanent fixture on the landscape rather than conventional area surface mining that can recreate the landscape incorporating improvements over the existing conditions in terms of vegetation and stability.

10.4.4 ALTERNATIVE 4: PREFERRED ACTION (SURFACE MINE & LEAVE FINAL CUT)

Alternative 4 is the typical surface mining and reclamation plan which is most cost efficient and economic but not conducive for complete restoration back to pre-mining land uses. This alternative involves conducting surface mining operations in rolling terrain and leaving the final pit to fill with water. Minor reclamation occurs in ensuring the highwall is not exposed and side slopes are stable. These lakes created in the final cuts have proven to be valuable by-product of surface mining at most locations. Throughout the Midwest, these lakes provide extensive areas for fishing, boating, swimming, and other forms of outdoor recreation.

Alternative 4 would be to conduct surface mining and reclamation operations ending in an open final pit to extract approximately 1.5 million tons of high-quality coal from three coal seams at the Seven Hills Mine to extend utility obligations and extend employment for another year for the current mining workforce. The disturbances have been minimized to the greatest extent possible while maximizing coal recovery to the highest degree possible considering the presence of a large mineable coal reserve. This will maximize coal recovery and ensure re-disturbance does not occur in the future. Equipment and employees will maintain their current active mining in the original Seven Hills Mine and progress into the Mining Area Addition following the construction of a new temporary levee to protect the proposed pit.

Alternative 4 proposes to discharge dredged and/or fill material into 2,802 linear feet of streams and 77.95 acres of wetlands, in conjunction with the construction, operation and reclamation of the Seven Hills – Mining Area Addition. The proposed surface mine operation would continue from the main Seven Hills Mine into the Mining Area Addition using area mining techniques to recover 1.5 million tons of additional bituminous coal reserves within the SMCRA permit area. To mine into this area, a temporary levee would be constructed over 600 feet from Pigeon Creek to prevent floodwaters from inundating the open pit during operation to maintain safe mining conditions. The mining plan for the Mining Area Addition, exclusive of reclamation, would occur over a period of one (1) year. The post-mine land use would include forested wetlands and an approximately 40 acres final cut lake.

The material proposed to be discharged into waters of the U.S. would consist of native material. To be clear, the temporary impacts to waters of the U.S. involve mining through the waters and replacement on-site. There is no permanent filling of waters of the U.S. with this project. Best management practices, including the use of temporary sediment control structures and contemporaneous reclamation and revegetation of disturbed areas, would be utilized. As streams are being mined through, diversion ditches would be constructed to direct water around the pit on a temporary basis to facilitate the mining process. Surface drainage would flow to sediment control structures. A minimum buffer width of a minimum of 600 feet would be maintained between the coal removal area and Pigeon Creek. During active or reclamation mining periods, ongoing compliance surface water quality monitoring will continue to be conducted pursuant to the Section 402 National Pollutant Discharge Elimination System permit to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed, which has not been case over the past 5 years of mining on the primary Seven Hills Mine permit.

To compensate for the temporary impacts to waters of the U.S., the Applicant proposes to re-establish/establish 43.00 acres of forested wetlands on-site, re-establish/establish 2,260 linear feet of intermittent streams on-site, and create 41.90 acres of open water on-site (37.40 acres will be in the Mining Area Addition and the rest on the original Seven Hills Mine); and restore 191.93 acres of forested wetlands off-site.

The mitigation streams would be re-established in the same general locations as they existed prior to mining except for the portion replaced by the final cut lake. At this location, the upstream stream will be directed into the final cut lake and a spillway will be constructed on the southern end that will serve as the upstream terminus of the proposed stream mitigation through the Mining Area Addition. The general topography, geomorphology and the regraded watersheds would generally mimic the pre-mining conditions. The stream mitigation channels would be constructed using natural channel design techniques to ensure the width to depth ratios, entrenchment ratios, meander lengths and sinuosity ratios are similar to or better than the current conditions. The original site soils

would be placed on the regraded spoil areas and mixed with mine run rock to form the stream bed substrates. Woody debris and bracing boulders would be incorporated into the stream design to provide stabilization and future shading for natural pool development. The permanent post-mine final cut impoundment will provide flood storage and would reduce stream discharge and help maintain a longer base flow in the constructed stream and flooding to wetlands areas.

Constructed on-site wetlands would be graded to match the elevation of the current floodplain and would appropriately position with sufficient upstream drainage to provide surface runoff to maintain the wetland areas with hydric conditions. The on-site wetland mitigation would be completed as a forested wetland in a manner representative of the impact site. The Applicant proposes leave an approximately 40-acre final cut lake that will provide some flood storage abatement during flooding episodes along Pigeon Creek. The Applicant would remove the existing shallow levee along the west bank of Pigeon Creek in strategic locations to improve the connectivity and overbank flooding of the creek into the existing and mitigated wetlands and the final cut lake.

Long-term site protection would be provided for each mitigation area. The Applicant's compensatory mitigation plan includes 10 years of monitoring and an adaptive management plan to assess the success of the mitigation sites using geomorphic, biological, and habitat assessment tools.

10.4.4.1 PRACTICABILITY ANALYSIS FOR ALTERNATIVE 4: PREFERRED ACTION (SURFACE MINE & LEAVE FINAL CUT)

Alternative 4 could be implemented at reasonable cost. The proposed mine plan will utilize current equipment, employees, and the existing Wild Boar Mine preparation plant where the coal will be transported to for preparation and shipment by rail. The mine plan enables mining with an optimal stripping ratio by balancing the deeper cuts of the western ends of the mining pits with the shallower cuts of the eastern end as mining progresses from south to north through the Mining Area Addition in a continuously mining east-west pit. Logistically, all conditions that could cause production delays and operational risks are managed or mitigated by careful execution and construction of the levee.

Reserves that are economically viable to mine utilizing surface mining techniques are becoming scarce as time goes on, therefore, areas that have been mined in past decades where lower seams were not extracted and/or areas where the coal bed/s are deeper (higher mining ratio) are being more closely evaluated by industry. Modern-day equipment size and efficiencies in combination with creative mine planning allow, in some cases, mining to deeper depths. Therefore, the Seven Hills reserve is being mined utilizing present-day technology and extending into the Mining Area Addition would not change the current methods. That being said, the depths of the coal beds to be mined presents unique obstacles for the final pit excavation and material handling, infrastructure construction, drainage control, and post-mining reclamation. The most efficient and economical way to recover the natural resource to the maximum extent possible is to excavate one initial pit and advance the pit continuously across the landscape from point A to point B without interruption and to leave a final pit in the landscape.

Therefore, Alternative 4 (multi-seam surface mine that leaves a final cut) is a practicable alternative.

10.4.4.2 ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVE 4: PREFERRED ACTION (SURFACE MINE & LEAVE FINAL CUT)

As a practicable alternative, the environmental consequences must be considered for Alternative 4: Preferred Action (multi-seam surface mine that leaves a final cut instead of reclaiming to a floodplain forested wetland). As a practicable alternative, the environmental consequences must be considered. The consequences are analyzed and summarized in this report. The potential impacts to jurisdictional waters of the U.S. for Alternative 4 would be 2,802 linear feet of streams and 77.95 acres of wetlands. Impacts to other environmental factors (biological, threatened and endangered species, water quality, groundwater, etc.) are detailed in **SECTION 12: CUMULATIVE IMPACTS**.

10.4.5 ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE & RECLAIM FINAL CUT)

Alternative 5 is a surface mining and reclamation plan which will backfill the final cut to restore the maximum amount of floodplain forested wetlands along Pigeon Creek. The backfilling of the final cut at the Seven Hills – Mining Area Addition will coincide with the opening/operating of the adjacent Wild Boar Stanley Pit multi-seam surface mine which is located across Seven Hills Road. The Wild Boar Stanley Pit will be developed initially with two boxcuts at the southern end of its permit. The boxcuts will be developed down to the Indiana **Coal-5**. A singular pit cannot be developed due to the Ditney Hill underground mine operated by Ingle Coal Company between the years of 1940 to 1965 which mined in the Indiana **Coal-6** seam. A designated overburden spoil disposal has been designated on the Wild Boar Stanley Pit, but economically and environmentally reclaim the final cut on the Mining Area Addition, spoil will be transported across the road for backfill. This would eliminate the rehandling of the original boxcut spoil that was disposed of out of the Pigeon Creek floodplain over two (2) miles to the south. The distance of haul from the Wild Boar Stanley Pit will be approximately half a mile.

Alternative 5 would be to conduct surface mining and reclamation operations to extract approximately 1.5 million tons of high-quality coal from three coal seams at the Seven Hills Mine to extend utility obligations and extend employment for another year for the current mining workforce with the final reclamation backfilling the final cut pit to allow for the complete reestablishment of the floodplain forested wetlands along Pigeon Creek. The disturbances have been minimized to the greatest extent possible while maximizing coal recovery to the highest degree possible considering the presence of a large mineable coal reserve. This will maximize coal recovery and ensure re-disturbance does not occur in the future. Equipment and employees will maintain their current active mining in the original Seven Hills Mine and progress into the Mining Area Addition following the construction of a new temporary levee to protect the proposed pit.

Alternative 5 proposes to discharge dredged and/or fill material into 2,802 linear feet of streams and 77.95 acres of wetlands, in conjunction with the construction, operation and reclamation of the Seven Hills – Mining Area Addition. The proposed surface mine operation would continue from the main Seven Hills Mine into the Mining Area Addition using area mining techniques to recover 1.5 million tons of additional bituminous coal reserves within the SMCRA permit area. To mine into this area, a temporary levee would be constructed over 600 feet from Pigeon Creek to prevent floodwaters from inundating the open pit during operation to maintain safe mining conditions. The mining plan for the Mining Area Addition, exclusive of reclamation, would occur over a period of one (1) year. The post-mine land use would be comprised almost entirely of forested wetlands.

The material proposed to be discharged into waters of the U.S. would consist of native material. To be clear, the temporary impacts to waters of the U.S. involve mining through the waters and replacement on-site. There is no permanent filling of waters of the U.S. with this project. Best management practices, including the use of temporary sediment control structures and contemporaneous reclamation and revegetation of disturbed areas, would be utilized. As streams are being mined through, diversion ditches would be constructed to direct water around the pit on a temporary basis to facilitate the mining process. Surface drainage would flow to sediment control structures. A minimum buffer width of a minimum of 600 feet would be maintained between the coal removal area and Pigeon Creek. During active or reclamation mining periods, ongoing compliance surface water quality monitoring will continue to be conducted pursuant to the Section 402 National Pollutant Discharge Elimination System permit to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed, which has not been the case over the past 5 years of mining on the primary Seven Hills Mine permit.

To compensate for the temporary impacts to waters of the U.S., the Applicant proposes to re-establish/establish 80.00 acres of forested wetlands on-site, re-establish/establish 2,802 linear feet of intermittent streams on-site, and restore 153.85 acres of forested wetlands off-site.

The mitigation streams would be re-established in the same general locations as they existed prior to mining by perpetuating any upstream segments through the permit area that were there previously connecting them into stream mitigation from the original Seven Hills Mine. The general topography, geomorphology and the regraded

watersheds would generally mimic the pre-mining conditions. The stream mitigation channels would be constructed using natural channel design techniques to ensure the width to depth ratios, entrenchment ratios, meander lengths and sinuosity ratios are similar to or better than the current conditions. The original site soils would be placed on the regraded spoil areas and mixed with mine run rock to form the stream bed substrates. Woody debris and bracing boulders would be incorporated into the stream design to provide stabilization and future shading for natural pool development. The permanent post-mine final cut impoundment will provide flood storage and would reduce stream discharge and help maintain a longer base flow in the constructed stream and flooding to wetlands areas.

Constructed on-site wetlands would be graded to match the elevation of the current floodplain and would appropriately position with sufficient upstream drainage to provide surface runoff to maintain the wetland areas with hydric conditions. The on-site wetland mitigation would be completed as a forested wetland in a manner representative of the impact site. The Applicant would remove the existing shallow levee along the west bank of Pigeon Creek in strategic locations to improve the connectivity and overbank flooding of the creek into the mitigated wetlands.

Long-term site protection would be provided for each mitigation area. The Applicant's compensatory mitigation plan includes 10 years of monitoring and an adaptive management plan to assess the success of the mitigation sites using geomorphic, biological, and habitat assessment tools.

10.4.5.1 PRACTICABILITY ANALYSIS FOR ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE & RECLAIM FINAL CUT)

Alternative 5 could be implemented at a higher cost due to the handling, backfilling, and grading of the spoil from the Wild Boar Stanley Pit over just leaving an open final cut pit. The handling of the material increases costs and extends the time to reclaim, but it results in maintaining the same amount of forested floodplain storage along Pigeon Creek. The proposed mine plan will utilize current equipment, employees, and the existing Wild Boar Mine preparation plant where the coal will be transported to for preparation and shipment by rail. The mine plan enables mining with an optimal stripping ratio by balancing the deeper cuts of the western ends of the mining pits with the shallower cuts of the eastern end as mining progresses from south to north through the Mining Area Addition in a continuously mining east-west pit. Logistically, all conditions that could cause production delays and operational risks are managed or mitigated by careful execution and construction of the levee.

Reserves that are economically viable to mine utilizing surface mining techniques are becoming scarce as time goes on, therefore, areas that have been mined in past decades where lower seams were not extracted and/or areas where the coal bed/s are deeper (higher mining ratio) are being more closely evaluated by industry. Modern-day equipment size and efficiencies in combination with creative mine planning allow, in some cases, mining to deeper depths. Therefore, the Seven Hills reserve is being mined utilizing present-day technology and extending into the Mining Area Addition would not change the current methods. That being said, the depths of the coal beds to be mined presents unique obstacles for the final pit excavation and material handling, infrastructure construction, drainage control, and post-mining reclamation. The most efficient and economical way to recover the natural resource to the maximum extent possible is to excavate one initial pit and advance the pit continuously across the landscape from point A to point B without interruption and to leave a final pit in the landscape except with this alternative, the final open cut pit will be backfilled and wetlands restored.

Alternative 5 (multi-seam surface mine that reclaims the final cut) is a practicable alternative.

TABLE 18 is a breakdown of the increased cost for Alternative 5 which is the preferred mining method that includes reclaiming the final cut.

TABLE 18 ADDITIONAL COST FOR ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE & RECLAIM FINAL CUT)

Cost Items	Description	Units	Unit Cost	Cost
Fill Final Cut	Following mining, the final cut will be reclaimed to approximate original contours to allow the	4,000,000 cys	\$2.00/cys	\$8,000,000
Soil Replacement of Final Cut	Extra cost of stockpiling soil versus direct placement 42 acres (4-foot depth)	271,040 cys	\$1.75/cys	\$474,320
	Total Additional Cost Over Alternative 4			\$8,474,320

As noted above, Alternative 5: Preferred Action (multi-seam surface mine with reclamation of final cut to floodplain forested wetlands) incurs an additional cost of approximately **\$8.5 million** over Alternative 4: Preferred Action (multi-seam surface mine leaving a final cut). While both alternatives mine multiple seams to obtain an additional 1.5 million tons of coal, this alternative is the least environmentally damaging practical alternative (LEDPA) because it maintains approximately the same acres of forested floodplain wetlands as prior to disturbance. This does not require additional wetlands to be restored off-site to satisfy the needed compensatory mitigation. While it is an added cost to fill the final cut, there will be material readily available with the development and mining of the adjacent Wild Boar Stanley Pit. The haul from the Stanley Pit to the final cut in the Mining Area Addition would be a distance of approximately one mile. Filling the final cut would alleviate the material to be stockpiled on the Stanley Pit.

10.4.5.2 ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVE 5: PREFERRED ACTION (SURFACE MINE & FILL FINAL CUT)

As a practicable alternative, the environmental consequences must be considered for Alternative 5: Preferred Action (multi-seam surface mine with reclamation of final cut to floodplain forested wetlands). The potential impacts to jurisdictional waters of the U.S. for Alternative 5 would be 2,802 linear feet of streams and 77.95 acres of wetlands. Impacts to other environmental factors (biological, threatened and endangered species, water quality, groundwater, etc.) are detailed in **SECTION 12: CUMULATIVE IMPACTS**.

10.4.6 SUMMARY AND COMPARISON OF ALTERNATIVES

Alternative 1, Alternative 2, and Alternate 3 were not considered to be reasonable or practicable alternatives. Alternative 4 and Alternative 5 were considered to be practicable alternatives by the Applicant. Due to reasons discussed above, the Applicant selected Alternative 5 as its Least Environmentally Damaging Preferred Alternative due to the complete restoration of the impact site back to PFO wetlands.

TABLE 19 provides a summary of the required authorizations that need to be in place to commence mining the coal reserve. **TABLE 20** summarizes and compares the alternatives with respect to potential impacts to waters of the United States, the amount of disturbed acreage, and acres disturbed per marketable ton along with other pertinent information. In addition to the numerical criteria detailed in the table, fulfillment of the project purpose and need, current mining technology, environmental and legal restrictions, rules, and regulations, and agency consultation were considered in selection of the Applicant's preferred alternative. Alternative 3, Alternative 4, and Alternative 5 would be designed to avoid direct impacts to Pigeon Creek as well as maintaining a natural buffer between the mining operations and Pigeon Creek.

TABLE 19 OTHER FEDERAL, STATE OR LOCAL AUTHORIZATIONS

Type of Authorization	Issuing Authority	Identification No.	Status
SMCRA	Indiana Department of Natural Resources Division of Reclamation (DOR)	S-00357	Issued March 23, 2014
Section 404	U.S. Army Corps of Engineers, Huntington District (USACE)	LRH-2018-00738-OHR	Issued March 17, 2020
Section 401 WQC	Indiana Department of Environmental Management (IDEM)	2018-628-87-JWR-A	Issued June 20, 2019
Air Permit	Indiana Department of Environmental Management (IDEM)	173-40875-00020	Included with Wild Boar Mine, Submitted December 27, 2018, Issued March 1, 2019
NPDES	Indiana Department of Environmental Management Office of Water Management (IDEM)	ING040290	Issued May 29, 2019, Renewed March 27, 2024
Safety Permit	Mine Safety and Health Administration (MSHA)	1202441	Included with Wild Boar Mine, Issued October 11, 2010
Floodway	Indiana Department of Natural Resources Division of Reclamation (DOR)	Associated with S-00357	Issued March 23, 2014 with the SMCRA Permit

TABLE 20 ALTERNATIVES ANALYSIS COMPARISON

Project	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Permit Acreage	80.46 acres	Unknown	80.46 acres	80.46 acres	80.46 acres
Area to be Impacted	0 acres	Unknown	80.46 acres	80.46 acres	80.46 acres
Wetlands					
Total Wetlands Delineated	78.0 acres	Unknown	77.95 acres	77.95 acres	77.95 acres
Total Jurisdictional Wetlands	78.0 acres	Unknown	77.95 acres	77.95 acres	77.95 acres
Total Wetlands to be Impacted	0 acres	Unknown	77.95 acres	77.95 acres	77.95 acres
PFO to be Impacted	0 acres	Unknown	65.09 acres	65.09 acres	65.09 acres
PSS to be Impacted	0 acres	Unknown	12.86 acres	12.86 acres	12.86 acres

Project	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
PEM to be Impacted	0 acres	Unknown	0 acres	0 acres	0 acres
PUB to be Impacted	0 acres	Unknown	0 acres	0 acres	0 acres
Total Wetlands Avoided	77.95 acres	Unknown	0 acres	0 acres	0 acres
PFO to be Avoided	65.09 acres	Unknown	0 acres	0 acres	0 acres
PSS to be Avoided	12.86 acres	Unknown	0 acres	0 acres	0 acres
PEM to be Avoided	0 acres	Unknown	0 acres	0 acres	0 acres
PUB to be Avoided	0 acres	Unknown	0 acres	0 acres	0 acres
Streams					
Total Streams Assessed	2,802 feet	Unknown	2,802 feet	2,802 feet	2,802 feet
Total Streams to be Impacted	0 feet	Unknown	2,802 feet	2,802 feet	2,802 feet
Intermittent Streams to be Impacted	0 feet	Unknown	2,802 feet	2,802 feet	2,802 feet
Total Streams Avoided	2,802 feet	Unknown	0 feet	0 feet	0 feet
Intermittent Streams to be Avoided	2,802 feet	Unknown	0 feet	0 feet	0 feet
Open Waters					
Total Open Waters Assessed	0 acres	Unknown	0 acres	0 acres	0 acres
Total Jurisdictional Waters	0 acres	Unknown	0 acres	0 acres	0 acres
Total Open Waters to be Impacted	0 acres	Unknown	0 acres	0 acres	0 acres
Total Open Waters Avoided	0 acres	Unknown	0 acres	0 acres	0 acres
Aerial Impacts by Type					
Coal Removal	0 acres	Unknown	<63.14 acres	63.14 acres	63.14 acres
Ancillary (temporary levee)	0 acres	Unknown	17.32 acres	17.32 acres	17.32 acres
Total Disturbed Acres	0 acres	Unknown	Up to 80.46 acres	80.46 acres	80.46 acres
Mining Statistics					
Direct Employment	0	Unknown	134	134	134
Annual Coal Production	0 tons/year	Unknown	350,000 tons/year	1,500,000 tons/year	1,500,000 tons/year
Total Coal Production	0 tons	Unknown	350,000 tons	1,500,000 tons	1,500,000 tons
Value of Annual Tonnage	\$0	Unknown	\$14,000,000	\$60,000,000	\$60,000,000
Acres Disturbed/Ton	0 acres/ton	Unknown	0.0001811 acres/tons	0.00005364 acres/ton	0.00005364 acres/ton

Note: No new operation plan was completed for Alternative 2

TABLE 21 summarizes the pre-mining and post-mining land uses for all the alternatives.

TABLE 21 PRE-MINING AND POST-MINING LAND USES

Land Use	Pre-Mine Land Use	Post-Mine Land Use Alternative 1 (No Action Alternative)	Post-Mine Land Use Alternative 2 (Project Relocation Alternative)	Post-Mine Land Use Alternative 3 (Alternate Mining Methods)	Post-Mine Land Use Alternative 4 (Proposed Action with Final Cut)	Post-Mine Land Use Alternative 5 (Proposed Action with Final Cut Reclaimed)
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Cropland	9.12	9.12	Unknown	Unknown	0	0
Pasture	0	0	Unknown	0	0	0

Forest	37.50	37.50	Unknown	Unknown	43.00	80.46
Wildlife	33.84	33.84	Unknown	Unknown	0	0
Water	0	0	Unknown	Unknown	37.46*	0
Residential	0	0	Unknown	Unknown	0	0
Roads	0	0	Unknown	0	0	0
Total	80.46	80.46	Unknown	80.46	80.46	80.46

* Denotes the water surface area in the Mining Area Addition

TABLE 22 and **TABLE 23** summarizes and compares the economic impacts of the alternatives.

TABLE 22 PREDICTED ANNUAL IMPACT ON EMPLOYMENT BY INDUSTRY

Industry	Alternative 1 (No Action Alternative)			Alternative 2 (Project Relocation Alternative)			Alternative 3 (Alternate Mining Methods)			Alternative 4 (Proposed Action with Final Cut)			Alternative 5 (Proposed Action with Final Cut Reclaimed)		
	Direct Effect	Indirect Effect	Total	Direct Effect	Indirect Effect	Total	Direct Effect	Indirect Effect	Total	Direct Effect	Indirect Effect	Total	Direct Effect	Indirect Effect	Total
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mining	0	0	0	Unk	Unk	Unk	134	670	804	134	670	804	134	670	804
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Government Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Total	0	0	0	Unk	Unk	Unk	134	670	804	134	670	804	134	670	804
Mine Life	0			Unk			Unk			3			3		

TABLE 23 PREDICTED IMPACT ON STATE AND FEDERAL TAX COLLECTIONS (PRESENT VALUE FOR PROJECT LIFE)

Instrument	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Total Tons of Coal	0	unknown	Less than 1,500,000 tons	1,500,000 tons	1,500,000 tons
State & Local Taxes	0	unknown	\$552,500	\$552,500	\$552,500
Corporate Net Income Tax	0	unknown	0	0	0
Personal Income Tax	0	unknown	\$350,000	\$350,000	\$350,000
Sales & Use Taxes	0	unknown	\$418,000	\$418,000	\$418,000
Property Taxes	\$1,776,640	unknown	\$1,776,640	\$1,776,640	\$1,776,640
Coal Severance	0	unknown	0	0	0
Total State & Local Taxes	\$3,063,640	unknown	\$2,717,140	\$2,717,140	\$2,717,140
Federal Taxes	0	unknown	\$7,885,000	\$7,885,000	\$7,885,000
FICA	0	unknown	\$8,407,500	\$8,407,500	\$8,407,500
Income	0	unknown	\$94,810,000	\$94,810,000	\$94,810,000

Project life denotes 1 year of mining and 2 years of reclamation

TABLE 24 summarizes and compares the project environmental impacts of all the project alternatives.

TABLE 24 COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Geology and Mineral Resources					
Modification of topography in the project area	No modification of topography.	No modification of topography at this location.	Topography would be altered by the removal of overburden and coal, and temporary levee.	Topography would be altered by the removal of overburden and coal, and temporary levee.	Topography would be altered by the removal of overburden and coal, and temporary levee.
Geologic hazards	No effects on geologic hazards.	No adverse impacts due to compliance with regulatory requirements and standards for stability of regraded areas.	No adverse impacts due to compliance with regulatory requirements and standards for stability of regraded areas.	No adverse impacts due to compliance with regulatory requirements and standards for stability of regraded areas.	No adverse impacts due to compliance with regulatory requirements and standards for stability of regraded areas.
Removal of bituminous coal resource making it unavailable in the future	No bituminous coal resources would be removed.	No bituminous coal resources would be removed at this location.	Approximately 23% of the reserve of bituminous coal would be extracted and utilized for power generation.	Approximately 78.5% (63.14/80.46) of the reserve of bituminous coal would be extracted and utilized for power generation.	Approximately 78.5% (63.14/80.46) of the reserve of bituminous coal would be extracted and utilized for power generation.
Oil and gas resources	No effects on oil and gas.	No effects on oil and gas at this location.	No effects on oil and gas by proposed mining operation.	No effects on oil and gas by proposed mining operation.	No effects on oil and gas by proposed mining operation.
Ground Water					
Groundwater level declines in private and municipal wells	No effect to groundwater users.	No effect to groundwater users at this location.	There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area.	There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area.	There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area.
Groundwater levels in the project and surrounding areas	No effect to groundwater levels.	No effect to groundwater levels at this location.	No anticipated adverse impacts to groundwater levels. There are no known significant unconsolidated or bedrock aquifers in the project area.	No anticipated adverse impacts to groundwater levels. There are no known significant unconsolidated or bedrock aquifers in the project area.	No anticipated adverse impacts to groundwater levels. There are no known significant unconsolidated or bedrock aquifers in the project area.
Surface Water					
Removal of surface water features	No removal of surface water features.	No removal of surface water features at this location.	Approximately 2,802 linear feet of intermittent stream channel would be permanently removed. No net impacts would be anticipated following implementation and successful achievement of the proposed reclamation and mitigation plans.	Approximately 2,802 linear feet of intermittent stream channel would be permanently removed. No net impacts would be anticipated following implementation and successful achievement of the proposed reclamation and mitigation plans.	Approximately 2,802 linear feet of intermittent stream channel would be permanently removed. No net impacts would be anticipated following implementation and successful achievement of the proposed reclamation and mitigation plans.
Flow effects of watershed modifications	No watershed modifications.	No watershed modifications at this location.	Temporary effects will be increased runoff during vegetation establishment.	Temporary effects will be increased runoff during vegetation establishment.	Temporary effects will be increased runoff during vegetation establishment.

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Flow effects from groundwater discharges to streams	No effects on groundwater discharges to streams.	No effects on groundwater discharges to streams at this location.	Temporary effects – will be disrupted during the mining process.	Temporary effects – will be disrupted during the mining process.	Temporary effects – will be disrupted during the mining process.
Flooding hazards	No increase flooding hazards to what a baseline hazard is already.	No increase flooding hazards to what a baseline hazard is already at this location.	Temporary increase in flooding during installation of levee system.	Temporary increase in flooding during installation of levee system.	Temporary increase in flooding during installation of levee system.
Effect on floodways/floodplains	No effect on floodways/floodplains.	No effect on floodways/floodplains at this location.	Temporary impacts to those areas protected by the levees.	Temporary impacts to those areas protected by the levees.	Temporary impacts to those areas protected by the levees.
Water quality	No effect on water quality.	No effect on water quality at this location.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.
Erosion and sedimentation	No effect on erosion and sedimentation.	No effect on erosion and sedimentation at this location.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.	No adverse impacts following implementation of the drainage control and compliance with SMCRA and NPDES permit requirements.
Loss of Waters of the U.S., including wetlands	No change in wetlands or streams.	No change in wetlands or streams at this location.	A total of 77.95 acres of jurisdictional wetlands and 2,802 linear feet of jurisdictional streams would be temporarily impacted as a result of the Seven Hills – Mining Area Addition. The proposed mitigation plan would enhance, restore and/or replace the streams impacted at a ratio of 1:1 for intermittent streams and the wetlands at a ratio of 3:1 for PSS and PFO.	A total of 77.95 acres of jurisdictional wetlands and 2,802 linear feet of jurisdictional streams would be temporarily impacted as a result of the Seven Hills – Mining Area Addition. The proposed mitigation plan would enhance, restore and/or replace the streams impacted at a ratio of 1:1 for intermittent streams and the wetlands at a ratio of 3:1 for PSS and PFO.	A total of 77.95 acres of jurisdictional wetlands and 2,802 linear feet of jurisdictional streams would be temporarily impacted as a result of the Seven Hills – Mining Area Addition. The proposed mitigation plan would enhance, restore and/or replace the streams impacted at a ratio of 1:1 for intermittent streams and the wetlands at a ratio of 3:1 for PSS and PFO.
Soils					
Accelerated erosion in disturbed areas	No effect on erosion.	No effect on erosion at this location.	Impacts to soils would be minimized through the implementation of erosion control measures, best management practices, and contemporaneous reclamation measures.	Impacts to soils would be minimized through the implementation of erosion control measures, best management practices, and contemporaneous reclamation measures.	Impacts to soils would be minimized through the implementation of erosion control measures, best management practices, and contemporaneous reclamation measures.
Vegetation					
Impact to native vegetation	Vegetation would not be affected.	Vegetation would not be affected at this location.	Temporary loss of woody species and herbaceous vegetation would occur but would be rectified during reclamation and implementation of the proposed mitigation plan.	Temporary loss of woody species and herbaceous vegetation would occur but would be rectified during reclamation and implementation of the proposed mitigation plan.	Temporary loss of woody species and herbaceous vegetation would occur but would be rectified during reclamation and implementation of the proposed mitigation plan.
Establishment of invasive species	There would be no change in the vegetation currently present.	There would be no change in the vegetation currently	No anticipated increase of invasive plant species within the project area. A	No anticipated increase of invasive plant species within the project area. A	No anticipated increase of invasive plant species within the project area. A

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		present at this location.	corrective action plan for invasive species is outlined in the proposed mitigation plan.	corrective action plan for invasive species is outlined in the proposed mitigation plan.	corrective action plan for invasive species is outlined in the proposed mitigation plan.
Impacts to economically harvestable vegetation	Vegetation would not be removed.	Vegetation would not be removed at this location.	Temporary loss of potentially harvestable trees would occur but would be rectified during reclamation and implementation of the proposed mitigation plan. Implementation of off-site mitigation would occur within 1 growing season following permit issuance to minimize temporal lag and offset the cumulative impacts.	Temporary loss of potentially harvestable trees would occur but would be rectified during reclamation and implementation of the proposed mitigation plan. Implementation of off-site mitigation would occur within 1 growing season following permit issuance to minimize temporal lag and offset the cumulative impacts.	Temporary loss of potentially harvestable trees would occur but would be rectified during reclamation and implementation of the proposed mitigation plan. Implementation of off-site mitigation would occur within 1 growing season following permit issuance to minimize temporal lag and offset the cumulative impacts.
Impacts to special status plant species	No impact to special status plant species.	No impact to special status plant species at this location.	Applicant is not aware of any special status plant species within the project area.	Applicant is not aware of any special status plant species within the project area.	Applicant is not aware of any special status plant species within the project area.
Fish and Wildlife					
Loss of aquatic habitat from mining	No loss of stream or wetland habitat.	No loss of stream or wetland habitat at this location.	A total of 2,802 feet of stream and 77.95 acres of wetlands would be temporarily impacted. Following reclamation and mitigation, there would be 2,802 feet of stream and 80.00 acres of wetland created within the project area. In addition, 153.85 acres of wetlands would be required off-site.	A total of 2,802 feet of stream and 77.95 acres of wetlands would be temporarily impacted. Following reclamation and mitigation, there would be 2,260 feet of stream and 43.00 acres of wetland created within the project area. In addition, 191.93 acres of wetlands would be required off-site.	A total of 2,802 feet of stream and 77.95 acres of wetlands would be temporarily impacted. Following reclamation and mitigation, there would be 2,802 feet of stream and 80.00 acres of wetland created within the project area. In addition, 153.85 acres of wetlands would be required off-site.
Habitat reduction due to runoff and water level changes	No effect to water levels and runoff.	No effect to water levels and runoff at this location.	There would be minor changes in water levels in Pigeon Creek of less than 0.14 feet in the floodway. Water quality will improve as a result of sediment control structures and compliance with NPDES permit limits for runoff from the mining area. No significant change is expected to habitat as a result of the compensatory mitigation.	There would be minor changes in water levels in Pigeon Creek of less than 0.14 feet in the floodway. Water quality will improve as a result of sediment control structures and compliance with NPDES permit limits for runoff from the mining area. No significant change is expected to habitat as a result of the compensatory mitigation.	There would be minor changes in water levels in Pigeon Creek of less than 0.14 feet in the floodway. Water quality will improve as a result of sediment control structures and compliance with NPDES permit limits for runoff from the mining area. No significant change is expected to habitat as a result of the compensatory mitigation.
Direct habitat loss or alteration	No habitat loss.	No habitat loss at this location.	Temporary impacts from direct disturbance up to 80.46 acres , most of which currently provides wildlife habitat. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as	Temporary impacts from direct disturbance 80.46 acres , most of which currently provides wildlife habitat. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as	Temporary impacts from direct disturbance 80.46 acres , most of which currently provides wildlife habitat. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
			practicable, to pre-mine land uses.	practicable, to pre-mine land uses.	practicable, to pre-mine land uses.
Disturbance to nesting raptors and other migratory birds	No disturbance to nesting habitat.	No disturbance to nesting habitat at this location	Possible temporary loss of nesting habitat through the disturbance of forested habitat within the project area during mining operations. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as practicable, to pre-mine land uses.	Possible temporary loss of nesting habitat through the disturbance of forested habitat within the project area during mining operations. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as practicable, to pre-mine land uses.	Possible temporary loss of nesting habitat through the disturbance of forested habitat within the project area during mining operations. Complete impact would not occur at once and disturbed areas would be reclaimed, as contemporaneously as practicable, to pre-mine land uses.
Impacts to special status wildlife, endangered, or threatened species	No impacts to special status wildlife, endangered, or threatened species.	No impacts to special status wildlife, endangered, or threatened species at this location.	Possible temporary impacts to special status wildlife, endangered or threatened species. However, all listed species known to be present in the area were identified and their protection was addressed in the SMCRA permit.	Possible temporary impacts to special status wildlife, endangered or threatened species. However, all listed species known to be present in the area were identified and their protection was addressed in the SMCRA permit.	Possible temporary impacts to special status wildlife, endangered or threatened species. However, all listed species known to be present in the area were identified and their protection was addressed in the SMCRA permit.
Cultural Resources					
Potential impacts to cultural resources	No impacts to cultural resources.	No impacts to cultural resources at this location.	Any impacts to cultural resources will be addressed through the statutory requirements of Article 25 of the Indiana Administrative Code: Coal Mining and Reclamation Operations and all provisions in Section 106 of the National Historic Preservation Act and other legislation and directives regarding treatment of cultural resources.	Any impacts to cultural resources will be addressed through the statutory requirements of Article 25 of the Indiana Administrative Code: Coal Mining and Reclamation Operations and all provisions in Section 106 of the National Historic Preservation Act and other legislation and directives regarding treatment of cultural resources.	Any impacts to cultural resources will be addressed through the statutory requirements of Article 25 of the Indiana Administrative Code: Coal Mining and Reclamation Operations and all provisions in Section 106 of the National Historic Preservation Act and other legislation and directives regarding treatment of cultural resources.
Air Quality					
Effects of fugitive dust on air quality	No impacts to air quality.	No impacts to air quality at this location.	Potential effects of fugitive dust on air quality in the project area and areas immediately adjacent to the project but effects would be minimized with the implementation of the Fugitive Dust Control Plan.	Potential effects of fugitive dust on air quality in the project area and areas immediately adjacent to the project but effects would be minimized with the implementation of the Fugitive Dust Control Plan.	Potential effects of fugitive dust on air quality in the project area and areas immediately adjacent to the project but effects would be minimized with the implementation of the Fugitive Dust Control Plan.
Land Use					
Compliance with local development plans and policies	No effect to local development plans and policies.	No effect to local development plans and policies at this location.	Compliance will be coordinated with Warrick County Area Plan Commission.	Compliance will be coordinated with Warrick County Area Plan Commission.	Compliance will be coordinated with Warrick County Area Plan Commission.
Potential destruction of prime farmland	No impact on prime farmland.	No impact on prime farmland at this location.	Temporary impact of prime farmland. However, disturbed prime farmland would	Temporary impact of prime farmland. However, disturbed prime farmland would	Temporary impact of prime farmland. However, disturbed prime farmland would

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
			be relocated off permit and held to rigid standards by DNR.	be relocated off permit and held to rigid standards by DNR.	be relocated off permit and held to rigid standards by DNR.
Recreation					
Impacts on recreational activities	No impacts on recreational activities.	No impacts on recreational activities at this location.	Impacts only to private landowners within the permit area. No public access within the permit area.	Impacts only to private landowners within the permit area. No public access within the permit area.	Impacts only to private landowners within the permit area. No public access within the permit area.
Impacts on public recreation areas and/or state parks	No impacts on public recreation areas and/or state parks.	No impacts on public recreation areas and/or state parks at this location.	No impacts on public recreation areas would occur. The closest public recreation area is Blue Grass Fish and Wildlife Area located three (3) miles west-southwest of the project area.	No impacts on public recreation areas would occur. The closest public recreation area is Blue Grass Fish and Wildlife Area located three (3) miles west-southwest of the project area.	No impacts on public recreation areas would occur. The closest public recreation area is Blue Grass Fish and Wildlife Area located three (3) miles west-southwest of the project area.
Loss of wildlife viewing and hunting opportunities due to habitat loss	No change in wildlife viewing and hunting opportunities.	No change in wildlife viewing and hunting opportunities at this location.	Impacts only to private landowners within the permit area. No public access within the permit area.	Impacts only to private landowners within the permit area. No public access within the permit area.	Impacts only to private landowners within the permit area. No public access within the permit area.
Social and Economic Values					
Population change	No impact on area population.	No impact on area population at this location.	The operational workforce of the Seven Hills Mine is estimated to be approximately 134 skilled workers . Existing skilled workers that transfer from other mines might impact the local demographic and population by choosing to take up residence in the local area and more importantly relocate with their families. It is likely that workers who are single or have young families would be more inclined to move. It is unlikely that any significant change in the overall age structure of the local resident population.	The operational workforce of the Seven Hills Mine is estimated to be approximately 134 skilled workers . Existing skilled workers that transfer from other mines might impact the local demographic and population by choosing to take up residence in the local area and more importantly relocate with their families. It is likely that workers who are single or have young families would be more inclined to move. It is unlikely that any significant change in the overall age structure of the local resident population.	The operational workforce of the Seven Hills Mine is estimated to be approximately 134 skilled workers . Existing skilled workers that transfer from other mines might impact the local demographic and population by choosing to take up residence in the local area and more importantly relocate with their families. It is likely that workers who are single or have young families would be more inclined to move. It is unlikely that any significant change in the overall age structure of the local resident population.
Employment and income change	134 skilled workers would potentially be unemployed. Indirect jobs would be reduced and the tax income for the state and local communities would be reduced.	134 skilled workers would potentially be unemployed at this location. Indirect jobs would be reduced and the tax income for the state and local communities would be reduced.	The operational workforce of the project is estimated to be approximately 134 skilled workers . Up to 189 high-paying direct and indirect jobs with annual payrolls exceeding \$15.3 million will be facilitated by the project. Many private landowners and the local and state economies will receive significant income from the mining operation in the form of royalty payments	The operational workforce of the project is estimated to be approximately 134 skilled workers . Up to 189 high-paying direct and indirect jobs with annual payrolls exceeding \$15.3 million will be facilitated by the project. Many private landowners and the local and state economies will receive significant income from the mining operation in the form of royalty payments	The operational workforce of the project is estimated to be approximately 134 skilled workers . Up to 189 high-paying direct and indirect jobs with annual payrolls exceeding \$15.3 million will be facilitated by the project. Many private landowners and the local and state economies will receive significant income from the mining operation in the form of royalty payments

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
			and/or acquisition proceeds and taxes.	and/or acquisition proceeds and taxes.	and/or acquisition proceeds and taxes.
Change to local public finance	Tax revenue in Warrick County would be reduced below the current level.	Tax revenue in Warrick County would be reduced below the current level at this location.	Increased tax revenues are estimated to be \$44,000 in income tax and \$158,000 in property tax to Warrick County on an annual basis.	Increased tax revenues are estimated to be \$44,000 in income tax and \$158,000 in property tax to Warrick County on an annual basis.	Increased tax revenues are estimated to be \$44,000 in income tax and \$158,000 in property tax to Warrick County on an annual basis.
Change in demand for public services	No change in demand for public services.	No change in demand for public services at this location.	Maintained service demand is likely due to existing workers in the area.	Maintained service demand is likely due to existing workers in the area.	Maintained service demand is likely due to existing workers in the area.
Decline in property values	No change in property values.	No change in property values at this location.	Temporary potential decline in residential values in close proximity to active mining due to noise and visual impacts. Decrease in mineral property values due to the depletion of coal reserves.	Temporary potential decline in residential values in close proximity to active mining due to noise and visual impacts. Decrease in mineral property values due to the depletion of coal reserves.	Temporary potential decline in residential values in close proximity to active mining due to noise and visual impacts. Decrease in mineral property values due to the depletion of coal reserves.
Loss of quality of life	No effect on quality of life in the project area.	No effect on quality of life in the project area at this location.	Temporary increase in noise and visual effects in close proximity to active mining could affect quality of life for nearby residents.	Temporary increase in noise and visual effects in close proximity to active mining could affect quality of life for nearby residents.	Temporary increase in noise and visual effects in close proximity to active mining could affect quality of life for nearby residents.
Transportation					
Heavy Truck Traffic	No increase in truck traffic.	No increase in truck traffic at this location.	Temporary increase in truck traffic from Seven Hills Road from light- and medium-duty vehicles. Coal haulage would be on private Applicant-constructed roadways.	Temporary increase in truck traffic from Seven Hills Road from light- and medium-duty vehicles. Coal haulage would be on private Applicant-constructed roadways.	Temporary increase in truck traffic from Seven Hills Road from light- and medium-duty vehicles. Coal haulage would be on private Applicant-constructed roadways.
Highway Safety	No change in area roadways.	No change in area roadways at this location.	Temporary, minor increase in accident risk on public roads during shift changes due to higher employee traffic. Coal haulage would be on private Applicant-constructed roadways.	Temporary, minor increase in accident risk on public roads during shift changes due to higher employee traffic. Coal haulage would be on private Applicant-constructed roadways.	Temporary, minor increase in accident risk on public roads during shift changes due to higher employee traffic. Coal haulage would be on private Applicant-constructed roadways.
Noise and Visual Resources					
Loss of landscape and vegetation diversity	No mine-related change in landscape or vegetation diversity.	No mine-related change in landscape or vegetation diversity at this location.	Temporary impacts to landscape of the project area would occur, however, the reclaimed mine site would blend into the surrounding landscape upon final reclamation. Vegetation diversity would decrease from the time of initial clearing until reclamation has been successfully completed.	Temporary impacts to landscape of the project area would occur, however, the reclaimed mine site would blend into the surrounding landscape upon final reclamation. Vegetation diversity would decrease from the time of initial clearing until reclamation has been successfully completed.	Temporary impacts to landscape of the project area would occur, however, the reclaimed mine site would blend into the surrounding landscape upon final reclamation. Vegetation diversity would decrease from the time of initial clearing until reclamation has been successfully completed.
Aesthetic impacts	No aesthetic impacts.	No aesthetic impacts at this location.	Temporary aesthetic impacts for travelers and residents in the project area. No change from current conditions.	Temporary aesthetic impacts for travelers and residents in the project area. No change from current conditions.	Temporary aesthetic impacts for travelers and residents in the project area. No change from current conditions.

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Increase in ambient and annoyance noise levels	No increase in noise levels.	No increase in noise levels at this location. At an unknown location, temporary increase in ambient noise levels during the life of the replacement operation.	Temporary increase in ambient noise levels during the life of the mine operation. No change from current conditions.	Temporary increase in ambient noise levels during the life of the mine operation. No change from current conditions.	Temporary increase in ambient noise levels during the life of the mine operation. No change from current conditions.
Hazardous Materials					
Generation of hazardous wastes	No hazardous waste would be generated.	No hazardous waste would be generated at this location. At an unknown alternate location, minimal if any hazardous waste will be generated by the mining operation. Any hazardous waste would be disposed of in accordance with current regulations.	Minimal if any hazardous waste will be generated by the mining operation. Any hazardous waste would be disposed of in accordance with current regulations.	Minimal if any hazardous waste will be generated by the mining operation. Any hazardous waste would be disposed of in accordance with current regulations.	No hazardous waste would be generated.
Spill of hazardous materials during transportation	Mine-related hazardous material transportation would not be necessary.	Mine-related hazardous material transportation would not be necessary at this location. At an unknown alternate location, hazardous material transporters are required to be trained in spill response and have spill response plans that can be implemented in the event of an accidental spill. The mine would be equipped with spill response clean-up kits, and mine personnel trained in spill response.	Hazardous material transporters are required to be trained in spill response and have spill response plans that can be implemented in the event of an accidental spill. The mine would be equipped with spill response clean-up kits, and mine personnel trained in spill response.	Hazardous material transporters are required to be trained in spill response and have spill response plans that can be implemented in the event of an accidental spill. The mine would be equipped with spill response clean-up kits, and mine personnel trained in spill response.	Hazardous material transporters are required to be trained in spill response and have spill response plans that can be implemented in the event of an accidental spill. The mine would be equipped with spill response clean-up kits, and mine personnel trained in spill response.
Spill of hazardous materials during storage and use	No mine-related hazardous materials would be stored or used.	No mine-related hazardous materials would be stored or used at this location. At an unknown alternate location, hazardous materials could be spilled during their storage and use within the project area. The potential risk would be minimized by secondary containment structures and implementation of the spill prevention control and countermeasure plan (SPCC) in the event of a spill.	Hazardous materials could be spilled during their storage and use within the project area. The potential risk would be minimized by secondary containment structures and implementation of the spill prevention control and countermeasure plan (SPCC) in the event of a spill.	Hazardous materials could be spilled during their storage and use within the project area. The potential risk would be minimized by secondary containment structures and implementation of the spill prevention control and countermeasure plan (SPCC) in the event of a spill.	Hazardous materials could be spilled during their storage and use within the project area. The potential risk would be minimized by secondary containment structures and implementation of the spill prevention control and countermeasure plan (SPCC) in the event of a spill.
Public Health					

Environmental Resources	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Impacts to health of local population	No impacts on public health.	No impacts on public health at this location. At an unknown alternate location, no adverse health impacts to the local population would be anticipated to occur due to effects on water quality, air quality or noise.	No adverse health impacts to the local population would be anticipated to occur due to effects on water quality, air quality or noise.	No adverse health impacts to the local population would be anticipated to occur due to effects on water quality, air quality or noise.	No adverse health impacts to the local population would be anticipated to occur due to effects on water quality, air quality or noise.
Environmental Justice					
Low income or minority population disproportionately affected	No disproportionate effects on low income or minority populations.	No disproportionate effects on low income or minority populations at this location. At an unknown alternate location, the effects to low income or minority populations are unknown.	No disproportionate effects on low income or minority populations.	No disproportionate effects on low income or minority populations.	No disproportionate effects on low income or minority populations.
Children under 5	No disproportionate effects on children under 5.	No disproportionate effects on children under 5 at this location. At an unknown alternate location, the effects to children under 5 are unknown.	No disproportionate effects on children under 5.	No disproportionate effects on children under 5.	No disproportionate effects on children under 5.

TABLE 25 summarizes and compares the projected impacts to public interest factors of Alternative 1, Alternative 2, Alternative 3, Alternative 4, and the No Action Alternative.

TABLE 25 PROJECTED IMPACTED TO PUBLIC INTEREST FACTORS OF ALTERNATIVES

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Conservation	The increased wetlands due to 3:1 off site mitigation would not occur. No conservation easements would be placed on wetlands associated with this project. The total wetland acres would not increase.	At an unknown alternate location, no effect- through compliance with the purposes of the SMCRA a conservation approach to the design of the mining project occurs. Additional measures to enhance conservation include a mitigation plan, a contemporaneous reclamation plan, and restoration of land uses.	No Effect- Through compliance with the purposes of the SMCRA a conservation approach to the design of the mining project occurs. Additional measures to enhance conservation include a mitigation plan, matching of the area's complex drainage system, a contemporaneous reclamation plan, and restoration of land uses.	No Effect- Through compliance with the purposes of the SMCRA a conservation approach to the design of the mining project occurs. Additional measures to enhance conservation include a mitigation plan, matching of the area's complex drainage system, a contemporaneous reclamation plan, and restoration of land uses.	No Effect- Through compliance with the purposes of the SMCRA a conservation approach to the design of the mining project occurs. Additional measures to enhance conservation include a mitigation plan, matching of the area's complex drainage system, a contemporaneous reclamation plan, and restoration of land uses.
Economics	No adverse or beneficial effects to the economy.	No adverse or beneficial effects to the economy at this location. At an unknown alternative location, beneficial effects due to coal production,	Beneficial Effects due to coal production, employment, and economic activity generated by mining. Coal plays a vital role in Indiana's economy by with its jobs and	Beneficial Effects due to coal production, employment, and economic activity generated by mining. Coal plays a vital role in Indiana's economy by with its jobs and	Beneficial Effects due to coal production, employment, and economic activity generated by mining. Coal plays a vital role in Indiana's economy by with its jobs and

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		employment, and economic activity generated by mining. Coal plays a vital role in Indiana's economy by with its jobs and moderating electricity prices in Indiana.	moderating electricity prices in Indiana.	moderating electricity prices in Indiana.	moderating electricity prices in Indiana.
Aesthetics	No Effect-The site will remain with its current aesthetics due to no mining occurring.	No Effect-The site will remain with its current aesthetics due to no mining occurring at this location. At an unknown alternate location, the impacts to visual resources may vary depending on the location.	No Effect-The project is in a relatively remote and isolated area. The impacts to visual resources will vary with the life of the project and would occur incrementally at the site.	No Effect-The project is in a relatively remote and isolated area. The impacts to visual resources will vary with the life of the project and would occur incrementally at the site.	No Effect-The project is in a relatively remote and isolated area. The impacts to visual resources will vary with the life of the project and would occur incrementally at the site.
General Environmental Concerns (Air Quality, Dust, Noise, Blasting, Transportation, etc.)	No Effect-Environmental concerns due to mining will not occur.	No Effect-Environmental concerns due to mining will not occur at this location. At an unknown alternate location, there will be no effect with adherence to the SMCRA regulatory program. The effects of dust, noise, blasting, transportation, and air quality will be negligible.	No effect with adherence to the SMCRA regulatory program. The effects of dust, noise, blasting, transportation, and air quality will be negligible.	No effect with adherence to the SMCRA regulatory program. The effects of dust, noise, blasting, transportation, and air quality will be negligible.	No effect with adherence to the SMCRA regulatory program. The effects of dust, noise, blasting, transportation, and air quality will be negligible.
Wetlands	No Effect- The wetlands on the proposed site will remain in their current state.	No Effect- The wetlands on the proposed site will remain in their current state at this location. At an unknown alternate location, there will be beneficial effects. Any wetland impacts will be mitigated following DA authorization in the form of PFO wetlands with increased acreage.	Beneficial effects. Any wetland impacts will be mitigated following DA authorization in the form of PFO wetlands with increased acreage.	Beneficial effects. Any wetland impacts will be mitigated following DA authorization in the form of PFO wetlands with increased acreage.	Beneficial effects. Any wetland impacts will be mitigated following DA authorization in the form of PFO wetlands with increased acreage.
Historic Properties	No effect. Any historic properties will remain unaffected.	No effect. Any historic properties will remain unaffected at this location. At an unknown alternate location, there may historic properties but that is unknown.	No effect. No historically significant sites were found that will be impacted by the proposed mining disturbance.	No effect. No historically significant sites were found that will be impacted by the proposed mining disturbance.	No effect. No historically significant sites were found that will be impacted by the proposed mining disturbance.
Fish and Wildlife Values	No effect. The impacts to wildlife habitat will not occur.	No effect. The impacts to wildlife habitat will not occur at this location. At an unknown alternate location, there will be adverse effect. While stresses	Adverse effect. While stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment, it is expected to be minimal due to	Adverse effect. While stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment, it is expected to be minimal due to	Adverse effect. While stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment, it is expected to be minimal due to

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment, it is expected to be minimal due to conscientious and timely reclamation. A compensatory mitigation plan will replace and increase fish and wildlife value and habitat.	conscientious and timely reclamation. A compensatory mitigation plan will replace and increase fish and wildlife value and habitat.	conscientious and timely reclamation. A compensatory mitigation plan will replace and increase fish and wildlife value and habitat.	conscientious and timely reclamation. A compensatory mitigation plan will replace and increase fish and wildlife value and habitat.
Flood Hazards	No effect. Flood levels will not be impacted due to the project not occurring.	No effect. Flood levels will not be impacted due to the project not occurring at this location. At an alternate unknown location, there may be no to major effect on flood hazards depending on the location.	No effect. The mining permit reflects IDNR's rules prohibiting increases greater than 0.14 feet on uncontrolled properties unless flood easements are obtained.	No effect. The mining permit reflects IDNR's rules prohibiting increases greater than 0.14 feet on uncontrolled properties unless flood easements are obtained.	No effect. The mining permit reflects IDNR's rules prohibiting increases greater than 0.14 feet on uncontrolled properties unless flood easements are obtained.
Floodplain Values	No effect. Floodplain values will not be impacted.	No effect. Floodplain values will not be impacted at this location. At an alternate unknown location, there will be no effect due to the application of a compensatory mitigation plan. Floodplains will be restored or compensated for resulting in a negligible effect on floodplain values.	No effect. Through the application of a compensatory mitigation plan, floodplains will be restored and/or compensated for resulting in a negligible effect on floodplain values.	No effect. Through the application of a compensatory mitigation plan, floodplains will be restored and/or compensated for resulting in a negligible effect on floodplain values.	No effect. Through the application of a compensatory mitigation plan, floodplains will be restored and/or compensated for resulting in a negligible effect on floodplain values.
Land Use	No effect. The land uses will not be impacted.	No effect. The land uses will not be impacted at this location. At an alternate unknown location, there will no effect. Post-mine land uses in that permit area will be consistent with the pre-mining land uses as regulated by state regulations, landowner comments, and reclamation capabilities.	No effect. Post-mine land uses in the permit area will be consistent with the pre-mining land uses as regulated by state regulations, landowner comments, and reclamation capabilities.	No effect. Post-mine land uses in the permit area will be consistent with the pre-mining land uses as regulated by state regulations, landowner comments, and reclamation capabilities.	No effect. Post-mine land uses in the permit area will be consistent with the pre-mining land uses as regulated by state regulations, landowner comments, and reclamation capabilities.
Navigation	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Shoreline Erosion and Accretion	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Recreation	No effect. Recreational use of the area will not be impacted.	No effect. Recreational use of the area will not be impacted at this location. At an alternate unknown location,	Minor temporary effect. The recreational use of the land will be hindered during the mining operation, but following reclamation	Minor temporary effect. The recreational use of the land will be hindered during the mining operation, but following reclamation	Minor temporary effect. The recreational use of the land will be hindered during the mining operation, but following reclamation

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		there may be a minor temporary effect to the recreational use of the land during the mining operation, but following reclamation and final bond release, recreational use, where allowed, may resume.	and final bond release, recreational use, where allowed, may resume.	and final bond release, recreational use, where allowed, may resume.	and final bond release, recreational use, where allowed, may resume.
Water Supply and Conservation	No effect. Water supply and conservation would not be impacted.	No effect. Water supply and conservation would not be impacted at this location. At an alternate unknown location, there may be no to minor effect on water supply and conservation.	No effect on water supply and conservation would occur. There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area. There are no known significant unconsolidated or bedrock aquifers in the project area.	No effect on water supply and conservation would occur. There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area. There are no known significant unconsolidated or bedrock aquifers in the project area.	No effect on water supply and conservation would occur. There are no public drinking water sources, wellhead protection zones or significant water bearing units identified within 1,000 feet of the proposed project area. Groundwater is not used as a potable water source by any resident in or within 1,000 feet of the project area. There are no known significant unconsolidated or bedrock aquifers in the project area.
Water Quality	No effect. Water quality would not be impacted.	No effect. Water quality would not be impacted at this location. At an alternative unknown location, there would potentially be no effect on water quality. During the SMCRA permitting process, consideration of effects of water discharges from the proposed operations, combined with existing water quality information including that from pre-law and post-law surface and underground coal mining operations, are evaluated. All discharges at the relocated mine location are required to meet NPDES effluent limitations and State WQS. The SMCRA permit, Section 404 permit, Section 401 permit and NPDES permit all include extensive and duplicative requirements designed to minimized potential harm to water quality.	No effect on water quality will occur as a result of the Mining Area Addition. From the findings document that accompanied the SMCRA permit issuance for the Seven Hills Mine, the following assessment was determined. "The consideration of effects of water discharges from the proposed operations, combined with existing water quality information including that from pre-law and post-law surface and underground coal mining operations, are not anticipated to cause significant adverse impacts to post-mining water quality (or quantity) beyond that which is present in the cumulative impacts assessment (CIA) in its pre-mining state." With the conclusion being, "The assessment of the probable cumulative impacts of all anticipated coal mining in the cumulative impact	No effect on water quality will occur as a result of the Mining Area Addition. From the findings document that accompanied the SMCRA permit issuance for the Seven Hills Mine, the following assessment was determined. "The consideration of effects of water discharges from the proposed operations, combined with existing water quality information including that from pre-law and post-law surface and underground coal mining operations, are not anticipated to cause significant adverse impacts to post-mining water quality (or quantity) beyond that which is present in the cumulative impacts assessment (CIA) in its pre-mining state." With the conclusion being, "The assessment of the probable cumulative impacts of all anticipated coal mining in the cumulative impact	No effect on water quality will occur as a result of the Mining Area Addition. From the findings document that accompanied the SMCRA permit issuance for the Seven Hills Mine, the following assessment was determined. "The consideration of effects of water discharges from the proposed operations, combined with existing water quality information including that from pre-law and post-law surface and underground coal mining operations, are not anticipated to cause significant adverse impacts to post-mining water quality (or quantity) beyond that which is present in the cumulative impacts assessment (CIA) in its pre-mining state." With the conclusion being, "The assessment of the probable cumulative impacts of all anticipated coal mining in the cumulative impact

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		During active or reclamation mining periods, ongoing compliance surface water quality monitoring would be conducted to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed. Control measures such as sediment basins would be used to control mobilized solids from affected areas. Sediment basins greatly reduce or eliminate contributions of sediment to off-site receiving streams. Monitoring of surface water quality would continue through final bond release. This information can be used to verify the effectiveness of control measures and to act as an alerting mechanism in the event of potential problems. Compensatory mitigation would be provided for stream impacts. After stream mitigation has been constructed and monitoring has commenced, both habitat and water quality assessments will be initiated in the form of USEPA RBP assessments. Biological monitoring will also be initiated in the approximate locations of the pre-mine assessments to evaluate the natural succession of species to a post-mining landscape.	area on the hydrologic balance finds the operations proposed under the permit (S-00357) have been designed to prevent material damage to the hydrologic balance outside the permit area.” All discharges from the mine site are required to meet NPDES effluent limitations and State WQS. The SMCRA permit, Section 404 permit, Section 401 permit and NPDES permit all include extensive and duplicative requirements designed to minimized potential harm to water quality. The Applicant has provided representative baseline conditions through the prior collection and analysis at applicable area streams that included three (3) biological assessments, 72 USEPA RBP assessments as well as five surface water sampling sites, which include both upstream and downstream monitoring of Pigeon Creek, within and adjacent to the project area for the original permit area. The biological assessments were utilized to characterize the condition and structure of the aquatic communities in the permitted streams. Water quality parameters for the biological assessments included temperature, pH, total dissolved solids (TDS), total acidity, total alkalinity, total iron, total manganese, and total suspended solids (TSS). The SMCRA baseline surface water sampling required temperature, pH, TDS, total iron, and total manganese. For streams where water was present at time of the USEPA RBP assessment,	area on the hydrologic balance finds the operations proposed under the permit (S-00357) have been designed to prevent material damage to the hydrologic balance outside the permit area.” All discharges from the mine site are required to meet NPDES effluent limitations and State WQS. The SMCRA permit, Section 404 permit, Section 401 permit and NPDES permit all include extensive and duplicative requirements designed to minimized potential harm to water quality. The Applicant has provided representative baseline conditions through the prior collection and analysis at applicable area streams that included three (3) biological assessments, 72 USEPA RBP assessments as well as five surface water sampling sites, which include both upstream and downstream monitoring of Pigeon Creek, within and adjacent to the project area for the original permit area. The biological assessments were utilized to characterize the condition and structure of the aquatic communities in the permitted streams. Water quality parameters for the biological assessments included temperature, pH, total dissolved solids (TDS), total acidity, total alkalinity, total iron, total manganese, and total suspended solids (TSS). The SMCRA baseline surface water sampling required temperature, pH, TDS, total iron, and total manganese. For streams where water was present at time of the USEPA RBP assessment,	area on the hydrologic balance finds the operations proposed under the permit (S-00357) have been designed to prevent material damage to the hydrologic balance outside the permit area.” All discharges from the mine site are required to meet NPDES effluent limitations and State WQS. The SMCRA permit, Section 404 permit, Section 401 permit and NPDES permit all include extensive and duplicative requirements designed to minimized potential harm to water quality. The Applicant has provided representative baseline conditions through the prior collection and analysis at applicable area streams that included three (3) biological assessments, 72 USEPA RBP assessments as well as five surface water sampling sites, which include both upstream and downstream monitoring of Pigeon Creek, within and adjacent to the project area for the original permit area. The biological assessments were utilized to characterize the condition and structure of the aquatic communities in the permitted streams. Water quality parameters for the biological assessments included temperature, pH, total dissolved solids (TDS), total acidity, total alkalinity, total iron, total manganese, and total suspended solids (TSS). The SMCRA baseline surface water sampling required temperature, pH, TDS, total iron, and total manganese. For streams where water was present at time of the USEPA RBP assessment,

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			temperature, conductivity, pH, and turbidity were recorded. During active or reclamation mining periods, ongoing compliance surface water quality monitoring will be conducted to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed. Several measures to control coal mining discharge will be utilized including sediment basins to control mobilized solids obtained through erosion and runoff from affected areas. Sediment basins greatly reduce or eliminate contributions of sediment to off-site receiving streams, i.e. Pigeon Creek. Monitoring of surface water quality will continue through final bond release. This information can be used to verify the effectiveness of control measures and to act as an alerting mechanism in the event of potential problems. The Applicant seeks approval for impacts totaling up to 2,802 linear feet of streams. Compensatory mitigation will be provided for these impacts. After stream mitigation has been constructed and monitoring has commenced, both habitat and water quality assessments will be initiated in the form of USEPA RBP assessments. Biological monitoring will also be initiated in the approximate locations of the pre-mine assessments to evaluate the natural succession of species to a post-mining landscape.	temperature, conductivity, pH, and turbidity were recorded. During active or reclamation mining periods, ongoing compliance surface water quality monitoring will be conducted to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed. Several measures to control coal mining discharge will be utilized including sediment basins to control mobilized solids obtained through erosion and runoff from affected areas. Sediment basins greatly reduce or eliminate contributions of sediment to off-site receiving streams, i.e. Pigeon Creek. Monitoring of surface water quality will continue through final bond release. This information can be used to verify the effectiveness of control measures and to act as an alerting mechanism in the event of potential problems. The Applicant seeks approval for impacts totaling up to 2,802 linear feet of streams. Compensatory mitigation will be provided for these impacts. After stream mitigation has been constructed and monitoring has commenced, both habitat and water quality assessments will be initiated in the form of USEPA RBP assessments. Biological monitoring will also be initiated in the approximate locations of the pre-mine assessments to evaluate the natural succession of species to a post-mining landscape.	temperature, conductivity, pH, and turbidity were recorded. During active or reclamation mining periods, ongoing compliance surface water quality monitoring will be conducted to verify any potential degradation or alteration of applicable parameter or constituent concentration levels that may be observed. Several measures to control coal mining discharge will be utilized including sediment basins to control mobilized solids obtained through erosion and runoff from affected areas. Sediment basins greatly reduce or eliminate contributions of sediment to off-site receiving streams, i.e. Pigeon Creek. Monitoring of surface water quality will continue through final bond release. This information can be used to verify the effectiveness of control measures and to act as an alerting mechanism in the event of potential problems. The Applicant seeks approval for impacts totaling up to 2,802 linear feet of streams. Compensatory mitigation will be provided for these impacts. After stream mitigation has been constructed and monitoring has commenced, both habitat and water quality assessments will be initiated in the form of USEPA RBP assessments. Biological monitoring will also be initiated in the approximate locations of the pre-mine assessments to evaluate the natural succession of species to a post-mining landscape.

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Energy Needs	Potentially adverse effects on energy needs could occur as a result of not mining the Mining Area Addition by creating potential interruptions to the coal supply for basic electricity production.	Potentially adverse effects on energy needs could occur as a result of not mining the Mining Area Addition by creating potential interruptions to the coal supply for basic electricity production at this location. At an alternate unknown location, there would be beneficial effects on energy needs would occur as a result of the Mining Area Addition. Coal sources play a major role in fulfilling the nation's energy needs. In 2022, coal made up 45% of Indiana's electricity net generation. The manufacturing sector consumes 43-45% of all the energy. In 2023, Indiana ranked 14th in the nation in total electricity sales, but the state was sixth in electricity sales to the industrial sector, which accounted for 43% of Indiana's electricity consumption. The residential sector, where 3 in 10 households use electricity as their primary energy source for home heating, accounted for 33% of state power use. The commercial sector consumed 24%. In part because of the retirement of several large coal-fired power plants, since 2012 Indiana consumers used more electricity than in-state generators could provide. In 2022, 13% of Indiana's electricity supply came from other states. The alternate unknown location will contribute to the basic electricity production in Indiana and surrounding states by providing an unknown tonnage of bituminous coal for the purposes	Beneficial effects on energy needs would occur as a result of the Mining Area Addition. Coal sources play a major role in fulfilling the nation's energy needs. In 2022, coal made up 45% of Indiana's electricity net generation. The manufacturing sector consumes 43-45% of all the energy. In 2023, Indiana ranked 14th in the nation in total electricity sales, but the state was sixth in electricity sales to the industrial sector, which accounted for 43% of Indiana's electricity consumption. The residential sector, where 3 in 10 households use electricity as their primary energy source for home heating, accounted for 33% of state power use. The commercial sector consumed 24%. In part because of the retirement of several large coal-fired power plants, since 2012 Indiana consumers used more electricity than in-state generators could provide. In 2022, 13% of Indiana's electricity supply came from other states. The Mining Area Addition will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover much less than 1.5 million tons of bituminous coal from the project for the purpose of generating electricity.	Beneficial effects on energy needs would occur as a result of the Mining Area Addition. Coal sources play a major role in fulfilling the nation's energy needs. In 2022, coal made up 45% of Indiana's electricity net generation. The manufacturing sector consumes 43-45% of all the energy. In 2023, Indiana ranked 14th in the nation in total electricity sales, but the state was sixth in electricity sales to the industrial sector, which accounted for 43% of Indiana's electricity consumption. The residential sector, where 3 in 10 households use electricity as their primary energy source for home heating, accounted for 33% of state power use. The commercial sector consumed 24%. In part because of the retirement of several large coal-fired power plants, since 2012 Indiana consumers used more electricity than in-state generators could provide. In 2022, 13% of Indiana's electricity supply came from other states. The Mining Area Addition will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover nearly 1.5 million tons of bituminous coal from the project for the purpose of generating electricity.	Beneficial effects on energy needs would occur as a result of the Mining Area Addition. Coal sources play a major role in fulfilling the nation's energy needs. In 2022, coal made up 45% of Indiana's electricity net generation. The manufacturing sector consumes 43-45% of all the energy. In 2023, Indiana ranked 14th in the nation in total electricity sales, but the state was sixth in electricity sales to the industrial sector, which accounted for 43% of Indiana's electricity consumption. The residential sector, where 3 in 10 households use electricity as their primary energy source for home heating, accounted for 33% of state power use. The commercial sector consumed 24%. In part because of the retirement of several large coal-fired power plants, since 2012 Indiana consumers used more electricity than in-state generators could provide. In 2022, 13% of Indiana's electricity supply came from other states. The Mining Area Addition will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover nearly 1.5 million tons of bituminous coal from the project for the purpose of generating electricity.

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		of generating electricity.			
Safety	No effect. Safety would not be impacted.	No effect. Safety would not be impacted at this location. At an alternate unknown location, there will be no effects on public health and safety. The SMCRA permit includes a variety of requirements to assure public safety. Project activity is regulated and controlled through MSHA regulations to assure protection of public safety, health and property.	No effects on public health and safety would occur as the result of the Mining Area Addition. The SMCRA permit includes a variety of requirements to assure public safety. Project activity is regulated and controlled through MSHA regulations to assure protection of public safety, health and property.	No effects on public health and safety would occur as the result of the Mining Area Addition. The SMCRA permit includes a variety of requirements to assure public safety. Project activity is regulated and controlled through MSHA regulations to assure protection of public safety, health and property.	No effects on public health and safety would occur as the result of the Mining Area Addition. The SMCRA permit includes a variety of requirements to assure public safety. Project activity is regulated and controlled through MSHA regulations to assure protection of public safety, health and property.
Food and Fiber Production	No effect. Food and fiber production would not be impacted.	No effect. Food and fiber production would not be impacted at this location. At an alternate unknown location, temporary minor effects on food and fiber production would occur depending on the relocation of the project. If the area had prime farmland, the Indiana SMCRA program requires that no prime farmland be lost. Prime farmland would be reclaimed as contemporaneously as practicable.	Temporary minor effects on food and fiber production would occur as a result of the Mining Area Addition. Prime farmland comprises 9.12 acres , or 11.3% of the permit area. The Indiana SMCRA program requires that no prime farmland be lost. Prime farmland would be reclaimed as contemporaneously as practicable.	Temporary minor effects on food and fiber production would occur as a result of the Mining Area Addition. Prime farmland comprises 9.12 acres , or 11.3% of the permit area. The Indiana SMCRA program requires that no prime farmland be lost. Prime farmland would be reclaimed as contemporaneously as practicable.	Temporary minor effects on food and fiber production would occur as a result of the Mining Area Addition. Prime farmland comprises 9.12 acres , or 11.3% of the permit area. The Indiana SMCRA program requires that no prime farmland be lost. Prime farmland would be reclaimed as contemporaneously as practicable.
Mineral Needs	Adverse effects on mineral needs would occur as this would leave mineable reserve that would be too small of an area to profitably remove if it was a standalone project.	Adverse effects on mineral needs would occur as this would leave mineable reserve that would be too small of an area to profitably remove if it was a standalone project at this location. At an alternate unknown location, beneficial effects on mineral needs are expected to occur. Coal resources play a major role in fulfilling the nation's energy needs. The project will contribute to the basic electricity production in Indiana and surrounding states.	Beneficial effects on mineral needs are expected to occur as a result of the Mining Area Addition. Coal resources play a major role in fulfilling the nation's energy needs. The project will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover much less than 1.5 million tons of bituminous coal for the purpose of generating electricity.	Beneficial effects on mineral needs are expected to occur as a result of the Mining Area Addition. Coal resources play a major role in fulfilling the nation's energy needs. The project will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover nearly 1.5 million tons of bituminous coal for the purpose of generating electricity.	Beneficial effects on mineral needs are expected to occur as a result of the Mining Area Addition. Coal resources play a major role in fulfilling the nation's energy needs. The project will contribute to the basic electricity production in Indiana and surrounding states. The Applicant proposes to recover nearly 1.5 million tons of bituminous coal for the purpose of generating electricity.
Consideration of Property Ownership	No effect. Property ownership would not be impacted, although private landowners would not benefit	No effect. Property ownership would not be impacted, although private landowners would not benefit	No effects on property ownership would occur as a result of the proposed activities. The site is privately	No effects on property ownership would occur as a result of the proposed activities. The site is privately	No effects on property ownership would occur as a result of the proposed activities. The site is privately

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
	from coal royalty from the Mining Area Addition.	from coal royalty from the Mining Area Addition. At an alternate unknown location, there would be no effect on property ownership as a result of the project relocation. Section 24 of the DA application lists the property owners. Adjacent property owners would be notified via public notices during the SMCRA, DA, and NPDES permitting process. The SMCRA and NPDES permit process and SMCRA permit conditions would assure the project would not result in an adverse condition to surrounding properties. The SMCRA permit would require measures necessary to avoid and minimize adverse effects.	owned. Section 24 of the DA application lists the property owners. Adjacent property owners were notified via public notices during the SMCRA permitting process. The SMCRA and NPDES permit process and SMCRA permit conditions assure the project would not result in an adverse condition to surrounding properties. The SMCRA permit requires measures necessary to avoid and minimize adverse effects.	owned. Section 24 of the DA application lists the property owners. Adjacent property owners were notified via public notices during the SMCRA permitting process. The SMCRA and NPDES permit process and SMCRA permit conditions assure the project would not result in an adverse condition to surrounding properties. The SMCRA permit requires measures necessary to avoid and minimize adverse effects.	owned. Section 24 of the DA application lists the property owners. Adjacent property owners were notified via public notices during the SMCRA permitting process. The SMCRA and NPDES permit process and SMCRA permit conditions assure the project would not result in an adverse condition to surrounding properties. The SMCRA permit requires measures necessary to avoid and minimize adverse effects.
Needs and Welfare of the People	The no action alternative would result in minor adverse effects on the needs and welfare of the people. The benefits of employment and tax revenues from the prolonging the mining operation into the Mining Area Addition would not be realized.	At an alternate unknown location, any project is expected to maintain beneficial effects on the needs and welfare of the people by providing employment and tax revenues. The project will not raise environmental justice concerns which are defined as the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations or tribes in developing, implementing, or enforcing environmental laws, regulations, and policies. If a project at an alternate unknown location is located in Warrick County, Warrick County is clearly below the state and country percentages for minority, low-income, and indigenous populations as well as	The Seven Hills – Mining Area Addition is expected to maintain beneficial effects on the needs and welfare of the people by providing employment and tax revenues by adding another year of mining for the active Seven Hills Mine. The project will not raise environmental justice concerns which are defined as the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations or tribes in developing, implementing, or enforcing environmental laws, regulations, and policies. Warrick County is clearly below the state and country percentages for minority, low-income, and indigenous populations as well as children under the age of five and females.	The Seven Hills – Mining Area Addition is expected to maintain beneficial effects on the needs and welfare of the people by providing employment and tax revenues by adding another year of mining for the active Seven Hills Mine. The project will not raise environmental justice concerns which are defined as the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations or tribes in developing, implementing, or enforcing environmental laws, regulations, and policies. Warrick County is clearly below the state and country percentages for minority, low-income, and indigenous populations as well as children under the age of five and females.	The Seven Hills – Mining Area Addition is expected to maintain beneficial effects on the needs and welfare of the people by providing employment and tax revenues by adding another year of mining for the active Seven Hills Mine. The project will not raise environmental justice concerns which are defined as the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations or tribes in developing, implementing, or enforcing environmental laws, regulations, and policies. Warrick County is clearly below the state and country percentages for minority, low-income, and indigenous populations as well as children under the age of five and females.

Public Interest Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		children under the age of five and females. The population of Warrick County in 2020 was determined to be 63,898 by the United States Census Bureau. Overall, Warrick County exceeds the state and country percentages for persons under the age of 18 and 65 years and older. The younger persons typically live at home and are concentrated in the population centers of the county that include Newburgh, Boonville, Lynnville, and Chandler. The alternate unknown location would have no impact on the population dynamics, but it may contribute to the employment dynamics. From employment statistics from the U.S. government, the unemployment rate for the United States was 4.1%, the state of Indiana was 3.6%, and the Warrick County was 2.9% for June 2025. This clearly shows that more people find employment and raise their economic status to above the poverty level in Warrick County which is indicated by the above statistic of 6.4% of the population is below the poverty level in Warrick County compared the national average of 12.4%.	The population of Warrick County in 2020 was determined to be 63,898 by the United States Census Bureau. Overall, Warrick County exceeds the state and country percentages for persons under the age of 18 and 65 years and older. The younger persons typically live at home and are concentrated in the population centers of the county that include Newburgh, Boonville, Lynnville, and Chandler which are all greater than 4.0 miles from the project site. The Mining Area Addition would have no impact on the population dynamics, but it may contribute to the employment dynamics. From employment statistics from the U.S. government, the unemployment rate for the United States was 4.1%, the state of Indiana was 3.6%, and the Warrick County was 2.9% for June 2025. This clearly shows that more people find employment and raise their economic status to above the poverty level in Warrick County which is indicated by the above statistic of 6.4% of the population is below the poverty level in Warrick County compared the national average of 12.4%. The Seven Hills Mine will employ 134 workers.	The population of Warrick County in 2020 was determined to be 63,898 by the United States Census Bureau. Overall, Warrick County exceeds the state and country percentages for persons under the age of 18 and 65 years and older. The younger persons typically live at home and are concentrated in the population centers of the county that include Newburgh, Boonville, Lynnville, and Chandler which are all greater than 4.0 miles from the project site. The Mining Area Addition would have no impact on the population dynamics, but it may contribute to the employment dynamics. From employment statistics from the U.S. government, the unemployment rate for the United States was 4.1%, the state of Indiana was 3.6%, and the Warrick County was 2.9% for June 2025. This clearly shows that more people find employment and raise their economic status to above the poverty level in Warrick County which is indicated by the above statistic of 6.4% of the population is below the poverty level in Warrick County compared the national average of 12.4%. The Seven Hills Mine will employ 134 workers.	The population of Warrick County in 2020 was determined to be 63,898 by the United States Census Bureau. Overall, Warrick County exceeds the state and country percentages for persons under the age of 18 and 65 years and older. The younger persons typically live at home and are concentrated in the population centers of the county that include Newburgh, Boonville, Lynnville, and Chandler which are all greater than 4.0 miles from the project site. The Mining Area Addition would have no impact on the population dynamics, but it may contribute to the employment dynamics. From employment statistics from the U.S. government, the unemployment rate for the United States was 4.1%, the state of Indiana was 3.6%, and the Warrick County was 2.9% for June 2025. This clearly shows that more people find employment and raise their economic status to above the poverty level in Warrick County which is indicated by the above statistic of 6.4% of the population is below the poverty level in Warrick County compared the national average of 12.4%. The Seven Hills Mine will employ 134 workers.

TABLE 26 summarizes and compares the projected impacts to 404(b)(1) Guidelines technical evaluation factors of Alternative 1, Alternative 2, Alternative 3, Alternative 4, and Alternative 5.

TABLE 26 TECHNICAL EVALUATION FACTORS OF ALTERNATIVES FOR PROJECTED IMPACTS

404(b)(1) Technical Evaluation Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Physical and Chemical Characteristics					

404(b)(1) Technical Evaluation Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
Substrate	No effect since mining would not occur on the site and the substrate will remain in its current state, however events upstream have the potential to impact the substrate onsite. Currently the most significant impacts occur from agricultural practices.	No effect since mining would not occur on the site and the substrate will remain in its current state at this location. At an alternate unknown location, there would be minor temporary effect to the substrate from the mining process, but with the application of a mitigation plan, effects to the substrate onsite will be short term with mitigation construction conducted for the favorable redevelopment of substrate. Effects downstream will be limited by compliance with the NPDES program.	Minor effect. Through the application of a mitigation plan, effects to the substrate onsite will be short term by establishing conditions favorable to the redevelopment of substrate. Effects downstream will be limited by compliance with the NPDES program.	Minor effect. Through the application of a mitigation plan, effects to the substrate onsite will be short term by establishing conditions favorable to the redevelopment of substrate. Effects downstream will be limited by compliance with the NPDES program.	Minor effect. Through the application of a mitigation plan, effects to the substrate onsite will be short term by establishing conditions favorable to the redevelopment of substrate. Effects downstream will be limited by compliance with the NPDES program.
Suspended particulates/turbidity	No effect due to mining not occurring. The surface will not be disturbed and the suspended particulates will remain at their current, natural state.	No effect due to mining not occurring. The surface will not be disturbed and the suspended particulates will remain at their current, natural state at this location. At an alternate unknown location, there may be a minor effect with the level of suspended solids is expected to increase during the mining cycle; however, will decrease with reclamation. Through proper application of the NPDES permit and its measures, compliances with TSS effluent limits would be achieved.	Minor effect with the level of suspended solids is expected to increase during the mining cycle; however, it will decrease with reclamation. Through proper application of the NPDES permit, compliances with TSS effluent limits will be achieved.	Minor effect with the level of suspended solids is expected to increase during the mining cycle; however, it will decrease with reclamation. Through proper application of the NPDES permit, compliances with TSS effluent limits will be achieved.	Minor effect with the level of suspended solids is expected to increase during the mining cycle; however, it will decrease with reclamation. Through proper application of the NPDES permit, compliances with TSS effluent limits will be achieved.
Water	No effect to water due to not mining the Mining Area Addition. The water will remain in its current state unless impacted by another source.	No effect to water due to not mining the Mining Area Addition. The water will remain in its current state unless impacted by another source at this location. At an alternate unknown location, there might be minor effects to water with temporary impacts to runoff, peak flow, and temperature. Negligible effects on the water column would be anticipated downstream of any	Temporary minor effects to runoff, peak flow, and temperature will occur onsite. Negligible effects on the water column would be anticipated downstream of any temporary sediment ponds due to a number of measures such as monitoring water quality, a runoff control plan, and a mitigation plan.	Temporary minor effects to runoff, peak flow, and temperature will occur onsite. Negligible effects on the water column would be anticipated downstream of any temporary sediment ponds due to a number of measures such as monitoring water quality, a runoff control plan, and a mitigation plan.	Temporary minor effects to runoff, peak flow, and temperature will occur onsite. Negligible effects on the water column would be anticipated downstream of any temporary sediment ponds due to a number of measures such as monitoring water quality, a runoff control plan, and a mitigation plan.

404(b)(1) Technical Evaluation Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		proposed temporary sediment ponds due to a number of measures such as monitoring water quality, a runoff control plan, and a mitigation plan.			
Current patterns and water circulation	No effect. Current patterns and water circulation will not be impacted.	No effect. Current patterns and water circulation will not be impacted at this location. At an alternate unknown location, there will be minor effect but no significant, direct, indirect, or cumulative impact on the current patterns or water circulation of the aquatic ecosystem. Application of an approved mitigation plan will mitigate these effects.	Minor temporary effect to current patterns and water circulation of the aquatic ecosystem, but no significant, direct, indirect, or cumulative impact. Application of an approved mitigation plan will mitigate these effects.	Minor temporary effect to current patterns and water circulation of the aquatic ecosystem, but no significant, direct, indirect, or cumulative impact. Application of an approved mitigation plan will mitigate these effects.	Minor temporary effect to current patterns and water circulation of the aquatic ecosystem, but no significant, direct, indirect, or cumulative impact. Application of an approved mitigation plan will mitigate these effects.
Normal water fluctuations	No effect. The site will experience no change to normal water fluctuations.	No effect. The site will experience no change to normal water fluctuations at this location. At an alternate unknown location, there could be minor effects to normal water fluctuation due to mining. Through the use of properly sized drainage structures, the increase in runoff to receiving streams due to mining activities will be abated.	Minor effect to normal water fluctuations but through the use of properly sized drainage structures, the increase in runoff to receiving streams will be abated. It is known that discharges during- and post-mining would be less than pre-mining.	Minor effect to normal water fluctuations but through the use of properly sized drainage structures, the increase in runoff to receiving streams will be abated. It is known that discharges during- and post-mining would be less than pre-mining.	Minor effect to normal water fluctuations but through the use of properly sized drainage structures, the increase in runoff to receiving streams will be abated. It is known that discharges during- and post-mining would be less than pre-mining.
Biological Characteristics					
Threatened and endangered species	No effect as the site will remain undisturbed and there will be no change to any threatened or endangered species. Additional habitat that would have been developed in mitigation areas would not occur.	No effect as the site will remain undisturbed and there will be no change to any threatened or endangered species. Additional habitat that would have been developed in mitigation areas would not occur at this location. At an alternate unknown location, there may be negligible effect if the project area is within the range of the bat species of concern. While mining may impact the summer habitat, reclamation of any forested areas could include species	Negligible effect as the project is within the range of the bats of concern. However, no known critical habitats occur within the project area. While mining may impact their summer habitat, reclamation of these forested areas will include species more suitable for their return and success.	Negligible effect as the project is within the range of the bats of concern. However, no known critical habitats occur within the project area. While mining may impact their summer habitat, reclamation of these forested areas will include species more suitable for their return and success.	Negligible effect as the project is within the range of the bats of concern. However, no known critical habitats occur within the project area. While mining may impact their summer habitat, reclamation of these forested areas will include species more suitable for their return and success.

404(b)(1) Technical Evaluation Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
		more suitable to this species.			
Fish, crustaceans, mollusk, and other aquatic organisms	No effect to fish, crustaceans, mollusk, and other aquatic organisms as they will not be disturbed.	No effect to fish, crustaceans, mollusk, and other aquatic organisms as they will not be disturbed at this location. At an alternate unknown location, there will be minor effect to fish, crustaceans, mollusk, and other aquatic organisms during mining. Stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment and it is expected to be temporary with timely reclamation.	Minor effect to fish, crustaceans, mollusk, and other aquatic organisms during mining. Stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment and it is expected to be temporary with timely reclamation.	Minor effect to fish, crustaceans, mollusk, and other aquatic organisms during mining. Stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment and it is expected to be temporary with timely reclamation.	Minor effect to fish, crustaceans, mollusk, and other aquatic organisms during mining. Stresses on the aquatic ecosystem will occur as a result of physical, chemical, and biological alterations of the environment and it is expected to be temporary with timely reclamation.
Other wildlife	No effect to other wildlife due to no mining occurring. The existing ecosystem will not be disturbed and the wildlife left unaffected.	No effect to other wildlife due to no mining occurring. The existing ecosystem will not be disturbed and the wildlife left unaffected at this location. At an alternate unknown location, there will be minor effect to other wildlife, but with utilization of a continuous reclamation plan, the area disturbed by mining would be minimized. The impacts to wildlife will be temporary due to adherence to a post mine land use plan.	Minor effect to other wildlife, but with utilization of a continuous reclamation plan, the area disturbed by mining would be minimized. The impacts to wildlife will be temporary due to adherence to a post-mine land use plan.	Minor effect to other wildlife, but with utilization of a continuous reclamation plan, the area disturbed by mining would be minimized. The impacts to wildlife will be temporary due to adherence to a post-mine land use plan.	Minor effect to other wildlife, but with utilization of a continuous reclamation plan, the area disturbed by mining would be minimized. The impacts to wildlife will be temporary due to adherence to a post-mine land use plan.
Special Aquatic Sites					
Wetlands	No effect due to no mining. The wetlands will remain undisturbed and no additional wetlands would be developed as part of a 3:1 mitigation plan.	No effect due to no mining. The wetlands will remain undisturbed and no additional wetlands would be developed as part of a 3:1 mitigation plan at this site. Minor effect to wetlands, but with the utilization of a compensatory mitigation plan, the disturbed wetlands will be restored and/or relocated in excess per the DA authorization.	Minor effect to wetlands, but through the utilization of a compensatory mitigation plan, the disturbed wetlands will be restored and/or relocated in excess per the DA authorization.	Minor effect to wetlands, but through the utilization of a compensatory mitigation plan, the disturbed wetlands will be restored and/or relocated in excess per the DA authorization.	Minor effect to wetlands, but through the utilization of a compensatory mitigation plan, the disturbed wetlands will be restored and/or relocated in excess per the DA authorization.
Human Use Characteristics					
Municipal and private water supplies	No effect. No municipal or private	No effect. No municipal or private	No effect. No municipal or private	No effect. No municipal or private	No effect. No municipal or private

404(b)(1) Technical Evaluation Factor	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
	well supplies are located within or near the footprint of the project site.	well supplies are located within or near the footprint of the project site at this location. At an alternate unknown location, there may be minor effect if municipal or private well supplies are located nearby depending on the location.	well supplies are located within or near the project site. No adverse impacts to groundwater that supplies private wells are anticipated.	well supplies are located within or near the project site. No adverse impacts to groundwater that supplies private wells are anticipated.	well supplies are located within or near the project site. No adverse impacts to groundwater that supplies private wells are anticipated.
Recreational and commercial fisheries	No effect. There are no waterways that provide viable populations of economically important fish and shellfish species.	No effect. There are no waterways that provide viable populations of economically important fish and shellfish species at this location. At an alternate unknown location, there may be effects to viable populations of economically important fish and shellfish species depending on the location.	No effect. There are no waterways that provide viable populations of economically important fish and shellfish species.	No effect. There are no waterways that provide viable populations of economically important fish and shellfish species.	No effect. There are no waterways that provide viable populations of economically important fish and shellfish species.
Water-related recreation	No effect. There are no waterways that provide water-related recreation.	No effect. There are no waterways that provide water-related recreation at this location. At an alternate unknown location, there may be effects to water-related recreation depending on the location.	No effect. There are no waterways that provide water-related recreation.	No effect. There are no waterways that provide water-related recreation.	No effect. There are no waterways that provide water-related recreation.
Aesthetics	No effect. The Mining Area Addition will remain with its current aesthetics due to no mining occurring.	No effect. The Mining Area Addition will remain with its current aesthetics due to no mining occurring. At an alternate unknown location, there may be a minor effect or major effect depending on the location.	Minor effect. The project is in a relatively remote and isolated area. The impacts to visual resources will be negligible.	Minor effect. The project is in a relatively remote and isolated area. The impacts to visual resources will be negligible.	Minor effect. The project is in a relatively remote and isolated area. The impacts to visual resources will be negligible.
Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves	N/A	N/A	N/A	N/A	N/A

TABLE 27 CRITERIA USED TO EVALUATE ALTERNATIVES

<u>Potential Issues</u> Measurement and/or Constraints	Alternative 1 (No Action Alternative)	Alternative 2 (Project Relocation Alternative)	Alternative 3 (Alternate Mining Methods)	Alternative 4 (Proposed Action with Final Cut)	Alternative 5 (Proposed Action with Final Cut Reclaimed)
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<u>Location and Characteristics of Coal Reserve</u> Geologic surveys including on-site coal borings and analysis	N/A	Drill logs would need to be completed at an alternate unknown location to demonstrate the type and extent of the potential coal reserve along with the unconsolidated and bedrock strata	Site-specific drill logs along with published reports were utilized to demonstrate the type and extent not only of the coal reserve, but also the unconsolidated strata and bedrock strata.	Site-specific drill logs along with published reports were utilized to demonstrate the type and extent not only of the coal reserve, but also the unconsolidated strata and bedrock strata.	Site-specific drill logs along with published reports were utilized to demonstrate the type and extent not only of the coal reserve, but also the unconsolidated strata and bedrock strata.
<u>Property Ownership and Control</u> Mining site must be on property owned by, under the control of, or obtainable by the Applicant	N/A	A SMCRA permit would need to be obtained for the alternate unknown location. It would include the Right of Entry listing property ownership and control.	The Applicant has provided information under the IDNR SMCRA permit process under Part II Identification of Permit Area and Right of Entry listing property ownership and control.	The Applicant has provided information under the IDNR SMCRA permit process under Part II Identification of Permit Area and Right of Entry listing property ownership and control.	The Applicant has provided information under the IDNR SMCRA permit process under Part II Identification of Permit Area and Right of Entry listing property ownership and control.
<u>Practicability of Coal Extraction</u> Mining activities must be able to be conducted in accordance with applicable SMCRA, NPDES, and Mine Safety and Health Administration (MSHA) regulations	N/A	A SMCRA permit along with a NPDES permit and MSHA application would need to be applied for if the project is taken to an alternate unknown location.	The Applicant submitted a mining permit application to the IDNR Division of Reclamation where they received permit approval on February 18, 2014 with thirteen (13) condition. From their findings, mining is able to be conducted with applicable regulations. The NPDES permit was issued May 29, 2019. MSHA regulations are continually followed.	The Applicant submitted a mining permit application to the IDNR Division of Reclamation where they received permit approval on February 18, 2014 with thirteen (13) condition. From their findings, mining is able to be conducted with applicable regulations. The NPDES permit was issued May 29, 2019. MSHA regulations are continually followed.	The Applicant submitted a mining permit application to the IDNR Division of Reclamation where they received permit approval on February 18, 2014 with thirteen (13) condition. From their findings, mining is able to be conducted with applicable regulations. The NPDES permit was issued May 29, 2019. MSHA regulations are continually followed.
<u>Costs and Current Market Conditions</u> Mining activities must be economically feasible or "practicable" in today's market conditions and maximize recovery to minimize future disturbance to the area	N/A	Mining will be maximized to the greatest extent possible to minimize future disturbance at an alternate unknown location with extraction by the surface mining method which is the most economically viable to obtain all of a reserve.	Mining has been maximized to the greatest extent possible to minimize future disturbance but only the Indiana <i>Coal-5</i> will be extracted by the underground method which leaves the Indiana <i>Coal-7</i> and Indiana <i>Coal-6</i> behind. Other alternate mining methods will primarily focus on extracting one coal seam and leave the others behind.	Mining has been maximized to the greatest extent possible to minimize future disturbance – the Indiana <i>Coal-7</i> , the Indiana <i>Coal-6</i> , and the Indiana <i>Coal-5</i> will be extracted through the surface mining method which is the most economically viable option.	Mining has been maximized to the greatest extent possible to minimize future disturbance – the Indiana <i>Coal-7</i> , the Indiana <i>Coal-6</i> , and the Indiana <i>Coal-5</i> will be extracted through the surface mining method which is the most economically viable option.
<u>Excess Overburden Storage Capacity and Stability</u> Overburden storage areas must have sufficient capacity to accommodate overburden material within the permit. This material must be disposed and configured in such a manner as to ensure stability (minimum 1.3 static factor of safety for non-valley fill disposal areas) and at a ground slope that does not exceed 20°	N/A	A designated overburden disposal area would need to be located near the alternate unknown location if the project was relocated.	An overburden spoil disposal would be placed on upland areas. The material will be disposed and configured in a manner to ensure stability.	An overburden spoil disposal would be placed on upland areas. The material will be disposed and configured in a manner to ensure stability.	An overburden spoil disposal would be placed on upland areas. The material will be disposed and configured in a manner to ensure stability.
<u>Haulage</u> Haulage routes should avoid and/or minimize the use of public roads	N/A	Coal haulage distances and use of public roads will be dependent on the location of the project relocation which is currently an alternate unknown location.	Coal will be transported to the existing preparation plant at the Wild Boar Mine over existing permitted and private transportation routes with mining haul trucks. Coal will be transported to the utilities via train.	Coal will be transported to the existing preparation plant at the Wild Boar Mine over existing permitted and private transportation routes with mining haul trucks. Coal will be transported to the utilities via train.	Coal will be transported to the existing preparation plant at the Wild Boar Mine over existing permitted and private transportation routes with mining haul trucks. Coal will be transported to the utilities via train.
<u>Site Development Costs</u>	N/A	The siting of the alternate unknown location to relocate the project to	The existing coal processing facilities at the active Wild Boar Mine will	The existing coal processing facilities at the active Wild Boar Mine will	The existing coal processing facilities at the active Wild Boar Mine will

Siting of the coal removal activities must minimize development costs. The use of existing infrastructure and support facilities is highly desirable		would need to consider the site development needs and infrastructure available to minimize development costs.	be utilized keep any site development costs to a minimum.	be utilized keep any site development costs to a minimum.	be utilized keep any site development costs to a minimum.
<u>Aquatic Considerations</u> Mining activities should be developed and sited to avoid impacts to high quality streams, wetlands, and other special aquatic sites and such that impacts to any water of the U.S. is minimized to the maximum extent practicable. Where waters of the U.S. cannot be avoided, previously impacted watersheds are favored over undisturbed watersheds	N/A	Aquatic consideration would need to be considered at an alternate unknown location to minimize impacts to waters of the U.S. to the maximum extent possible.	Aquatic consideration has been considered to minimize impacts to the waters of the U.S. to the maximum extent possible with resulting impacts to 77.95 acres of wetlands and 2,802 linear feet of streams.	Aquatic consideration has been considered to minimize impacts to the waters of the U.S. to the maximum extent possible with resulting impacts to 77.95 acres of wetlands and 2,802 linear feet of streams.	Aquatic consideration has been considered to minimize impacts to the waters of the U.S. to the maximum extent possible with resulting impacts to 77.95 acres of wetlands and 2,802 linear feet of streams.

10.5 DESCRIPTION OF APPLICANT'S PREFERRED ALTERNATIVE

The preferred alternative (Proposed Action with Reclamation of Final Cut) for the Seven Hills – Mining Area Addition is to multi-seam surface mine into an area that was excluded from the original Seven Hills Mine application to recover an additional 1.5 million tons and extend the life of the mine for another year. This would complete the reserve. Following mining the final cut pit would be backfilled with spoil material from the adjacent Wild Boar Stanely Pit to allow for the entire disturbed area to be reconstructed to approximate original contour for the creation of a forested floodplain wetland that it was initially. Prior to mining into the area, a temporary levee will be constructed along the eastern and northern boundary to hinder any flood waters from inundating the open pit causing a disruption in coal extraction.

The Seven Hills Mine will employ approximately 134 employees with an estimated payroll of \$22.1 million. In addition, taxation income to Warrick County would be generated from real and personal property taxes, severance taxes, and sales taxes related to the mine.

The active Seven Hills Mine uses the existing infrastructure at the Wild Boar preparation plant facility and loadout facility located at the Wild Boar Mine for coal shipment. Coal refuse material from the preparation plant has been allowed to be buried below the elevation of the unconsolidated strata surrounding the active Seven Hills Mine.

The Seven Hills - Mining Area Addition would consist of surface mining multiple seams of coal, including the Indiana **Coal-7** (Danville and Upper Millersburg), **Coal-6** (Lower Millersburg), and **Coal-5** (Springfield) seams, through the use of multiple units of "Truck-Shovel-Loader" equipment.

The proposed Seven Hills – Mining Area Addition would result in the discharge a minimum of approximately 3,000 cubic yards of dredged and fill material into approximately 2,802 linear feet of streams and 77.95 acres of wetlands over a mining period of one (1) year. **TABLE 28** details the possible contaminants in the fill material at the Mining Area Addition.

TABLE 28 POSSIBLE CONTAMINANTS IN DREDGED/FILL MATERIAL

Physical characteristics	Quaternary unconsolidated material is compositionally heterogeneous and includes organic matter, clay, alluvium, and weathered and fragments of the underlying bedrock. The interval of bedrock to be affected by mining consists of cyclic sequences of shale and sandstone with intermittent units of coal and limestone.
Hydrography in relation to known or anticipated sources of contaminants	Based on aerial photography all potential routes of contaminates or contaminated sediments lead to Pigeon Creek, the receiving water. Measures to minimize the potential for contamination include best management practices, monitoring discharges, and provide a buffer between the mining and the creek.
Results from previous testing of the material or similar material in the vicinity of the project	The bedrock interval proposed for disturbance for the original Seven Hills Mine permit area was characterized via six rock cores. Four of these cores penetrated rocks at least through the Indiana Coal-6 and two cores

	penetrated rocks through the lowest coal seam to be mined, Indiana Coal-5 . Calculations by the Applicant using laboratory testing data of these cores indicate that about 7.56% of the overburden proposed for disturbance exhibits net neutralization potential equal to or less than -5.0 tons of calcium carbonate per kiloton. These strata will be handled as toxic or acid-forming materials, when possible, although these typically are the coals seams, which will be extracted. The majority of the overburden (approximately 92.44% of the column) includes multiple limestone and calcareous shale beds, exhibits surplus neutralization potential represents a substantial impediment for the generation and mobilization of toxic discharge.
Known, significant sources of persistent pesticides from land runoff or percolation	The predominate land use in the headwaters of Pigeon Creek is agriculture which may provide a source for pesticides from land runoff.
Spill records for petroleum products or designated (Section 331 of CWA) hazardous substances	The Applicant would handle all petroleum products in accordance with the Spill Prevention, Control, and Countermeasure (SPCC) Regulation (40 CFR 112).
Other public records or significant introduction of contaminants from industries, municipalities, or other sources	None found
Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	None found

The first year will have the maximum acreage of impact for the Seven Hills – Mining Area Addition with the clearing and development of the temporary levee. The appropriate season to clear trees is from October 1 to March 31. Levee construction is anticipated to take approximately three to six months to construct during idea weather conditions.

Following construction of the new temporary levee, the northernmost east-west levee on the Seven Hills active mine area will be removed and mined through as the active pit advances towards onto the Mining Area Addition. Mined areas to the south will be contemporaneously reclaimed as the pit advances northward. Once the pit reaches its final location, the reclamation plan will be implemented. As the mining employees move to the Wild Boar Stanley Pit, the final pit will be either backfilled with spoil material from the soon to be active Stanley Pit.

SURFACE WATER CONTROL FACILITIES. Surface water control facilities have already been constructed for the active Seven Hills Mine to provide runoff and sediment control from disturbed areas, including the support facilities construction areas. These facilities would include a combination of diversion ditches, sediment ponds, and other control structures or techniques designed to minimize erosion and control surface water volumes and quality discharged from the site. **MAP 6 – OPERATIONS MAP** shows the primary structures that have been constructed during the initial project phase and maintained through the project.

The drainage control structures for the project are designed to minimize sediment discharges into waters of the U.S. downstream of the structures. Before disturbance, the required drainage control structure(s) were constructed and certified. All sediment ponds are constructed to meet the applicable design requires of 312 IAC 25-6-17 and certified after construction by a registered professional engineer prior to the use of the structure. Runoff from the mining area is routed through drainage and erosion control channels, leading into drainage control structures (ponds) providing drainage control for backfill areas. All surface drainage from the disturbed area has been meeting the applicable effluent limitations as specified under Indiana Water Pollution Control Board regulation 327 ISAC 15-7 and USEPA regulation 40 CFR 434.

Discharges from the surface water control system would continue to be monitored by the Applicant as required by the NPDES permit conditions to control the quality of water released to local drainages. The standard NPDES sampling parameters monitored at the outfalls include flow, pH, total suspended solids (TSS), and iron (Fe) under base flow conditions and flow, pH, and settleable solids under precipitation conditions. Additional monitoring occurs in both receiving drainages below the outfall points to satisfy the requirements of the Section 401 and 402 permits. This monitoring includes quarterly and annual sampling for a broader suite of physical and chemical parameters.

As mining progresses throughout the project area, any needed drainage control structures would be constructed prior to disturbance within each of the receiving drainage areas. **MAP 6 – OPERATIONS MAP** shows the locations

of all of the drainage control structures proposed to be constructed as part of the original Seven Hills Mine which included impacts within the Mining Area Addition.

CLEARING AND GRUBBING. Once drainage control has been constructed, removal of trees and vegetation would be completed utilizing clearing and grubbing equipment with any trees, brush, shrubs either disposed in the active pit or stockpiled for wildlife enhancement. Timber and brush may be piled and burned with proper authorization.

ANCILLARY SUPPORT FACILITIES. Support facilities have already been established for the active Seven Hills Mine which are required for the operation of the mine. They include the following, but are not limited to temporary mine buildings, coal storage and loading facilities, equipment storage facilities, and fueling and maintenance areas. Support facilities were located, designed, constructed, and maintained to prevent or control erosion and siltation, water pollution, and damage to private and public property. For the active Seven Hills Mine, the primary ingress and egress to support facilities is located off Seven Hills Road along the northern boundary of the permit in an upland area.

TEMPORARY SOIL STOCKPILES. All topsoil will be removed as a separate layer prior to mining and segregated from subsoils except when used as alternative soil material. Topsoil will be removed for a distance of 10 feet around surface affects, 10 feet on the pit ends, 10 feet behind the pit cuts, and 25 feet beyond the disturbed area of the overburden storage area. No prime topsoil or subsoil will be lost into the pit. Topsoil and subsoil from the first three cuts will be placed in stockpiles. After spoil that was dumped into the first cut is graded, topsoil from the fourth cut will be placed on the graded subsoil which will have been deposited on graded spoil. Thereafter, soils will be deposited directly on graded spoil. Soils handling may occur during all months of the year. Soils will not be handled during unusually wet weather or when protection of the soils from erosion by adequate mulching cannot be accomplished. Soils will be replaced as soon as is practicable on graded spoil and seeded so that a quick cover can be established. Stockpiles will be selectively placed within the permit area on bonded areas. They will be protected from contamination and unnecessary compaction that would interfere with vegetation and protected from wind and water erosion through the prompt establishment and maintenance of an effective, quick growing non-noxious vegetative cover. Temporary stockpiles will be final graded, mulched with hay or straw (1.5 tons/acre), and as weather allows seeded with a mixture of 2 bushels/acre wheat. Stockpiles planned to be in place for more than 1 year will be seeded with the permanent pasture species at the rates discussed in the SMCRA Permit – **ATTACHMENT VII.B.2.A** which can be found in **APPENDIX P** in **APPROVED DA AUTHORIZATION LRH-2018-738**. Stockpiled soils will be clearly marked by signage.

TEMPORARY LEVEE SYSTEM. The proposed coal recovery limits for the Seven Hills – Mining Area Addition is located in the Pigeon Creek floodplain and is subject to overbank flooding. To alleviate the threat of inundation of the active pit and harm to miners, it is necessary to protect the mining area from flooding by constructing a temporary earthen levee. With the current levee still in place, a northern leg will be constructed that will protect the Mining Area Addition. Once this section is constructed and tied into the north-south section of the levee on the primary Seven Hills Mines, the east-west levee constructed will be removed as the mining operations track northward on the Mining Area Addition. The levees are temporary and will be removed upon the completion of mining and reclamation operations. The levee will be constructed using the best-available cohesive soil material excavated from the mining area and constructed with 3H:1V side slopes and a 15-foot top width. The areas beneath the levee will be cleared and grubbed to removal vegetation, and topsoil materials will be removed and stockpiled for use in reclamation. The elevation of the top of the levee will be set to provide a minimum of 1.0 feet of freeboard above the projected 100-year flood level.

HAULROADS. Haul roads and access roads will be constructed in the permit area and will be located in areas where sediment control is present. After mining is complete, these roadways will be removed as part of the final grading process unless otherwise approved to remain permanently. The material used to construct these roads that requires removal will be disposed of in a final cut pit or will be respreads over spoil as part of the grading process. Topsoil will then be redistributed depending upon the area of location (prime or non-prime) and the area will be revegetated.

LIGHTING. The facility's areas would be equipped with lighting for safety and security reasons. Mobile light plants would be used in the active pit areas, as required by Mine Safety and Health Administration (MSHA), to provide for night-time mining activity.

CLOSURE AND RECLAMATION. The general sequence of mining and reclamation activities is depicted in **MAP 6 – OPERATIONS MAP** and **MAP 7 – RECLAMATION PLAN MAP** in **APPENDIX P** in **APPROVED DA AUTHORIZATION LRH-2018-738**. Reclamation would be performed as backfilling of an area is completed as contemporaneously as practicable. Restoration of the ground surface to the approximate original contour is required by the Division of Reclamation coal mining regulations and is designed in the Applicant's Permit S-00357 and Incidental Boundary Revision #1.

Reclamation for the proposed Seven Hills Mine would include both short-term and long-term goals for the project area. The short-term goals would include soil stabilization and maintenance of vegetative cover, providing for safety. The primary objective of revegetation would be the rapid establishment of ground cover for erosion control purposes. The long-term goal of reclamation would be the establishment of a sustainable vegetative cover that would promote reforestation and thereby restore the project area to the desired post-mining land use as shown on the post-mining land use map (**MAP 7 – RECLAMATION MAP**). IDNR regulations require that the Applicant post a reclamation bond throughout the life of the mine through final closure. Bond money would assure that reclamation would be completed regardless of the Applicant's financial ability to do so. The closure and reclamation of the Seven Hills Mine would be completed in three phases (Phases I, II, and III), as summarized in the following paragraphs.

The Division of Reclamation will release the bond, in whole or in part, upon a determination the reclamation covered by the bond that has been accomplished as required by the Division's regulations according to the following schedule:

- **PHASE I BOND RELEASE.** After the operator completes the backfilling, regrading, and drainage control of a bonded area under the approved reclamation plan, sixty percent (60%) of the bond or collateral for the applicable permit may be released.
- **PHASE II BOND RELEASE.** After the operator establishes revegetation on the regraded mined lands under the approved reclamation plan, an additional twenty-five percent (25%) of the total original bond amount may be released. No part of the bond or deposit shall be released under this subdivision if the lands to which the release would be applicable are contributing suspended solids to the stream flow or run-off outside the permit area in excess of the limitations in IC 14-34 and until soil productivity for prime farmlands has returned to the equivalent levels of yield as non-mined land of the same soil type in the surrounding area as determined from the soil survey performed under IC 14-34. If a siltation structure is to be retained as a permanent impoundment, a bond release may occur under this subdivision if provisions for sound future maintenance by the operator or the landowner are made with the Division of Reclamation.
- **PHASE III BOND RELEASE.** The Division of Reclamation may release the remaining bond only after the Applicant has successfully completed all surface coal mining and reclamation activities and expiration of the period specified for operator responsibility.

Reclamation of the mining area will occur currently with the mining operations. The mine will utilize a truck shovel fleet of equipment to mine and reclaim the project area. The advantage to this method of mining is that it allows the exact placement of overburden material to achieve the post mining land uses and elevations needed to restore floodplain elevations. This method will also allow the loose dumping of soil on graded spoil areas reducing compaction. Reduced compaction is important for vegetation and tree growth success. In mining up to 160 feet of overburden material, the anticipated swell factor will be approximately 25% to 30%. Even after removing the coal, this could leave approximately 40 to 50 feet increase in replaced material depth. To construct the forested

floodplain, this excess material will be hauled onto an upland disposal area along the western boundary of the original Seven Hills Mine.

The reclamation sequence will follow the pattern on **FIGURE 1** where it started on the original Seven Hills Mine. Topsoil and subsoil from the first three cuts will be placed in stockpiles. After spoil that is dumped into the first cut is graded, topsoil from the fourth cut will be placed on the graded subsoil which will have been deposited on graded spoil. Thereafter, soils will be deposited directly on graded spoil. Soils handling may occur during all months of the year. Soils will not be handled during unusually wet weather or when protection of the soils from erosion by adequate mulching cannot be accomplished. Soils will be replaced as soon as is practicable on graded spoil and seeded so that a quick cover can be established. The average time for replacement of soils is sixty days. After the optimum planting season has passed in the fall, topsoil will be stockpiled in an area closest to the point of final deposition or directly replaced and mulched per the approved SMCRA plan. Replaced soils will be protected within a time short enough to prevent erosion but no longer than 30 days after redistribution, by mulching at 1.5 tons per acre, and by seeding. To maintain elevation in floodway areas some material as needed will be hauled to the spoil disposal area as mining continues. GPS equipment will be utilized to assure the needed elevations are maintained. Soil depths replaced will range from 4 to 6 feet. This will provide additional root media for vegetation and trees.

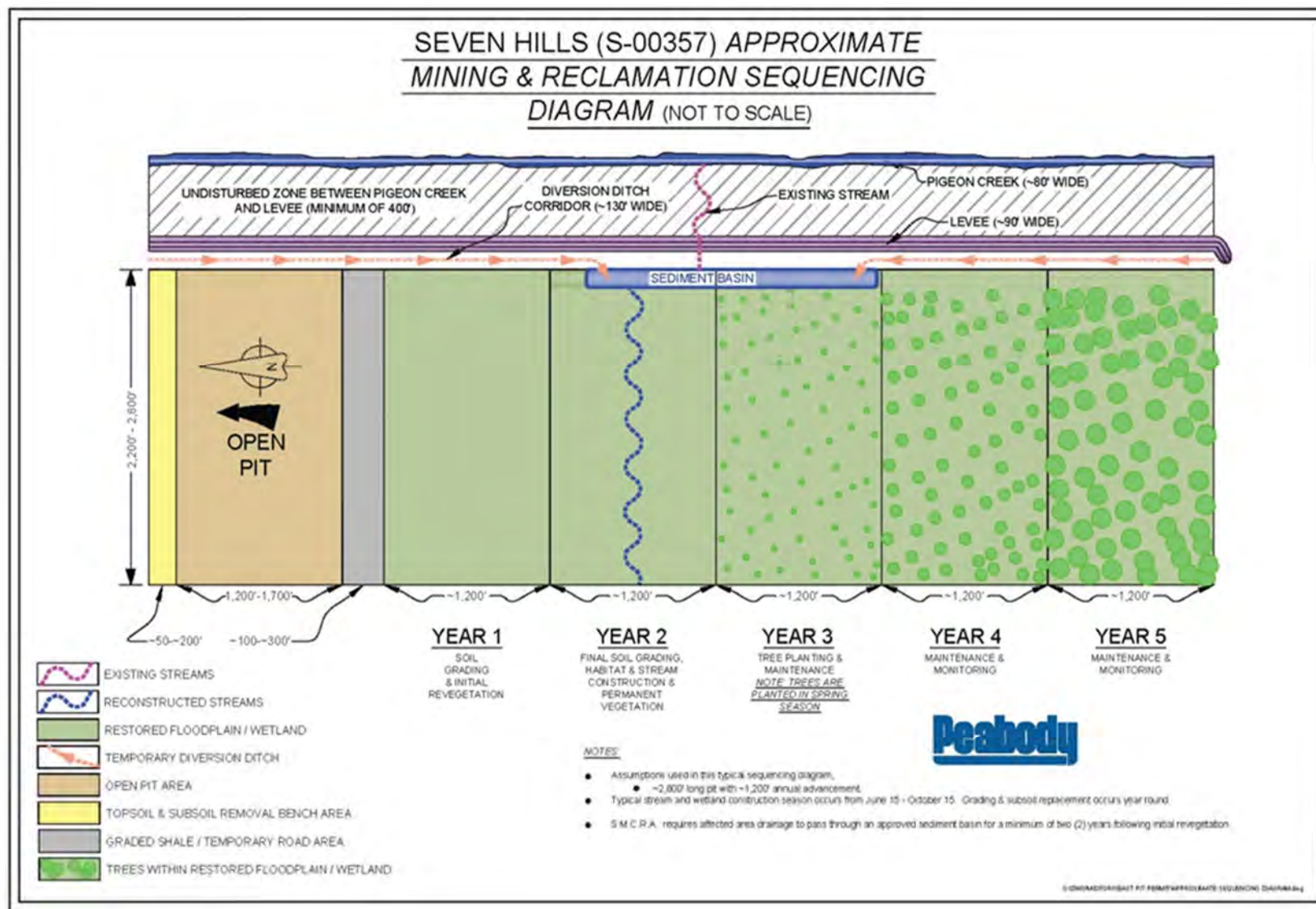
Standard soil test sampling and analysis procedures will be conducted for texture, pH, buffer pH, nitrogen, phosphorus, and potassium to provide accurate soil amendment recommendations prior to permanently seeding.

The specific impacts to soil infiltration, ground water recharge after reclamation and effects to base flow are discussed in detail in the groundwater section of this application.

Erosion control methods will vary depending on the slope and land use of the reclamation area. The quick establishment of vegetation will be the first defense to prevent erosion. As noted above some areas may require mulch to prevent sheet erosion prior to vegetation establishment. Terraces will be used as needed on steeper slopes and on some cropland areas. The flat slopes in the floodplain areas will usually require erosion control where flows are concentrated. Methods to control erosion in the flat areas would include mulching, temporary seeding with quick germinating species, coconut matting, silt fences, straw bales, and riprap, if needed. These erosion control methods are usually only required until vegetation is fully established. When stream channels are restored in the reclamation areas, structures will be placed in the streams that will prevent erosion and stabilize the stream. Appropriate grades will be maintained in the restored streams. The stream restoration plans are discussed in detail in the mitigation plan.

The experienced Seven Hills Mine employees and equipment will be utilized to mine and reclaim into the Seven Hills – Mining Area Addition. Many of the employees previously worked at the Wild Boar Mine who had extensive experience restoring forest, wildlife, cropland, stream floodplains, and wetlands. Wild Boar has restored a wide floodplain in its current mining area in the Big Creek drainage area. Big Creek prior to mining was a straightened dredged channel. Utilizing the mine's truck shovel fleet excess spoil material was moved to nearby previously mined areas within the permit allowing Big Creek to be restored with a floodplain up to 900 feet wide. This will allow additional floodway capacity and provide a more natural stream in the reclamation area than what was present in its pre-mining condition and allowing development of many acres of forested wetlands.

FIGURE 1 MINING AND RECLAMATION SEQUENCING DIAGRAM



SUMMARY OF COMMITTED ENVIRONMENTAL PROTECTION MEASURES. The **TABLE 29** summarizes the Applicant's proposed environmental protection measures to reduce environmental impacts of the Seven Hills – Mining Area Addition. In addition, the table identifies potential mitigation measures currently that could be considered by the Corps Huntington District based on comments received for the original Seven Hills Mine application from federal and state agencies and the public.

TABLE 29 ENVIRONMENTAL PROTECTION MEASURES AND MITIGATION MEASURES

Environmental Resources	Applicant's Committed Environmental Resource Protection Measures	Applicant's Mitigation Measures
Geology and Mineral Resources	As required by the SMCRA permit for the original Seven Hills Mine which includes the Mining Area Addition, the disturbed area would be regraded to the approximate original contour prior to being revegetated.	Approximately 80 acres of PFO wetland mitigation and 2,802 linear feet of jurisdictional intermittent stream will be constructed on-site considering approximate original contour of the Pigeon Creek floodplain.
Ground Water	Division of Reclamation (DOR) and Indiana Department of Environmental Management (IDEM) permits for the project (SMCRA & NPDES) require groundwater monitoring to be conducted pre-mining, during mining and post mining. The results of this monitoring are reported to the agencies to verify and ensure compliance. The Cumulative Hydrologic Impact Analysis (CHIA) prepared by the DOR found that the project would not have significant adverse impacts on the hydrologic balance. Acid-base testing of the strata and coal seams to be excavated and extracted has been completed at (6) core hole locations. Acid-base testing of the overburden strata and coal was performed by Standard Laboratories, Inc. The overburden analyses indicated that the overburden in the project area contains an abundance of alkaline materials with only a few thin units having acid-producing potential. Data obtained from the laboratory testing indicate that about 7.56% of the overburden proposed for disturbance exhibits net neutralization potential equal to or less than -5.0 tons of calcium carbonate per kiloton. These strata will be handled as toxic or acid-forming materials when possible. The balance of the overburden of approximately 92.44% which includes multiple limestone and calcareous shale beds, exhibits surplus neutralization potential which represents a substantial impediment to the generation and mobilization of toxic discharges.	
Surface Water	Sediment basins would be constructed such that all runoff from disturbed areas reports to a basin before leaving the permitted area. The water quality of the basins would be monitored according to the NPDES permit. Applicant would monitor and report discharges per the NPDES permit issued by IDEM. Applicant would monitor surface water runoff from active areas of the Seven Hills Mine. Daily precipitation would be monitored, with records maintained and available for monthly reporting, as required. Applicant would monitor outfalls until the area is regraded, vegetation has been established, and Phase III bond release is approved. Applicant would have macroinvertebrate and water chemistry sampling and analysis as required by the approved Section 404 CWA permit. Applicant would handle all petroleum products in accordance with the Spill Prevention, Control, and Countermeasure (SPCC) Regulation (40 CFR 112). Applicant would comply with the state and federal laws and regulations pertaining to any substance designated as hazardous that would be used, stored or disposed of at the Seven Hills Mine. The compensatory mitigation plan will offset the functions and values of the aquatic resources permanently and temporarily impacted by proposed activities.	

Environmental Resources	Applicant's Committed Environmental Resource Protection Measures	Applicant's Mitigation Measures
	The goals of the compensatory mitigation plan are to result in a "no net loss" of habitat and offset the permanent and temporary impacts to streams and wetlands by creating and restoring waters of the U.S. These goals would be met by provide in-kind, onsite stream mitigation totaling 2,802 linear feet, on-site wetland mitigation totaling 80.00 acres, and providing in-kind and out-of-kind, off-site wetland mitigation totaling 153.85 acres to offset secondary impacts to waters of the U.S. and temporal losses.	
Soils	Acid-base testing of the strata and coals that would be excavated and extracted by the original Seven Hills Mine has been completed at (6) core hole locations. Acid-base testing of the overburden strata and coal was performed by Standard Laboratories, Inc. The overburden analyses indicated that the overburden in the project area contains an abundance of alkaline materials with only a few thin units having acid-producing potential. Data obtained from the laboratory testing indicate that about 7.56% of the overburden proposed for disturbance exhibits net neutralization potential equal to or less than -5.0 tons of calcium carbonate per kiloton. These strata will be handled as toxic or acid-forming materials when possible. The balance of the overburden of approximately 92.44% which includes multiple limestone and calcareous shale beds, exhibits considerable surplus neutralization potential which represents a substantial impediment to generation and mobilization of toxic or acidic discharge. Soils existing within or adjacent to the S-357 permit area are referenced with the publication Soil Survey of Warrick County, Indiana, United States Department of Agriculture, Soil Conservation Service. As such, the soil composition in the Mining Area Addition has not been previously disturbed by surface mining and identified as silt loam. Applicant would conduct soil sampling in the soiled areas, if needed, to ensure that a suitable substitute growth media is present for revegetation. Any areas that are deemed as unsuitable would be amended to create suitable growth medium. Applicant would implement erosion control measures such as ponds, rock check dams, riprap, matting, diversion ditches, silt fence, straw bales, etc.	
Vegetation	Applicant would reclaim the project area concurrently with the mining operations as mined areas are backfilled and regraded. Ancillary facility areas would be reclaimed following completion of mining. Successful reclamation would minimize the encroachment of invasive species into reclaimed areas. Applicant would revegetate disturbed areas according to the approved post-mine land uses. Reclamation for the Seven Hills Mine would include both short-term and long-term goals for the project area. The short-term goals would include soil stabilization and maintenance of vegetative cover. The primary objective of revegetation would be the rapid establishment of groundcover for erosion control purposes. The long-term goal of reclamation would be the establishment of sustainable vegetative cover conducive to the approved post-mining land uses. Restoration of the ground surface to the approximate original contour is required by the IDNR. Areas where final grading would be completed during the summer would initially be revegetated with a temporary cover; permanent revegetation would occur in the spring to achieve the post-mining land use. Tree and shrub planting would occur during the spring to ensure maximum survival rate of seedlings. Temporary vegetation also would be implemented to minimize erosion and soil loss. Concurrent reclamation activities would be conducted throughout the life of the project. The following tables list the herbaceous and tree species proposed to be planted. A minimum of 5 species would be planted to ensure diversity. In addition to trees, shrubs will be planted as well.	

Environmental Resources	Applicant's Committed Environmental Resource Protection Measures	Applicant's Mitigation Measures																																																																																																									
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Fish and Wildlife	Land clearing operation would be minimized in advance of the mining operation, where practical. Applicant coordinated a review of potential impacts on threatened and endangered species through the SMCRA process. Aside from the listed bats, the Indiana bat (<i>Myotis sodalis</i>) and northern long-eared (<i>Myotis septentrionalis</i>) consideration was also given to the northern harrier (<i>Circus hudsonius</i>), red-shouldered hawk (<i>Buteo lineatus</i>), three-toed amphiuma (<i>Amphium tridactylum</i>), and cerulean warbler (<i>Setophaga cerulean</i>) during the SMCRA process for the original Seven Hills Mine. Applicant has addressed concerns for endangered bat species and submitted an Indiana and Northern Long-Eared Bat Protection and Enhancement Plan in the SMCRA permit.																												
Land Use & Recreation	The proposed post-mining land use would result in the restoration of more beneficial habitat with the relocation of the prime farmland that was originally assessed in the Mining Area Addition.																												
Social and Economic Values	No environmental protection measures have been proposed for social and economic values other than sustaining the social and economic values associated with the mining operation for one more year at the Seven Hills Mine.																												
Transportation	All coal haulage would be internal to the project and the adjacent plant and loadout complex and would not require any upgrade to public roads adjacent to the project area.																												
Noise and Visual Resources	The proposed project would be required to comply with any applicable noise restrictions imposed by regulatory agencies. Equipment noise effects would be reduced by the distance between the various noise sources. When possible, the equipment would be oriented such that the loudest noise sources would not be directed toward nearby residences. Applicant would minimize visual impacts to nearby travelers and residents through contemporaneous reclamation of disturbances.																												
Hazardous Materials	Fuel storage facilities would include spill containment measures designed to meet state and federal regulations and would allow for the identification and containment of accidental spills. Waste oils and lubricants would be disposed by a licensed recycler/hauler during both construction and operation.																												
Public Health	No environmental protection measures for public health have been proposed.																												
Cultural Resources	Applicant had a Phase 1 archeological survey conducted to identify historic resources within the Mining Area Addition. No significant resources were identified.																												
Air Quality	Applicant would apply water and/or chemical dust suppressants, as needed, to minimize dust on access/haul roads.																												

Environmental Resources	Applicant's Committed Environmental Resource Protection Measures	Applicant's Mitigation Measures
Environmental Justice	No environmental protection measures for environmental justice have been proposed for the Mining Area Addition.	

10.6 LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE (LEDPA)

Based upon the above analysis, it has been concluded that the least damaging practicable alternative (or LEDPA) consists of surface mining the Seven Hills – Mining Area Addition utilizing Alternative 5 which restores more wetlands on-site following mining.

The alternative would optimize the recovery of the aforementioned coal seams while maximizing on-site restoration. All of the jurisdictional waters would be returned to the site with the rest of the compensatory mitigation needed completed prior to impacts at two off-site mitigation locations in the form of wetland restoration on prior converted farmland with long-term protection in the form of conservation easements or deed restrictions with ultimate transfer to a state or federal agency like the Indiana Department of Natural Resources or the U.S. Fish and Wildlife Service.

No other practicable or available alternatives have been identified that meet the overall project purpose and objectives, and which would eliminate or further reduce jurisdictional impacts. For these reasons, Alternative 5 was determined by the Applicant to be the Least Environmentally Damaging Practicable Alternative and was therefore selected as the Applicant's Preferred Alternative.

10.7 CONCLUSION

In light of the Project purpose, no alternatives to Alternative 5 are environmentally practicable, primarily due to the logistical obstacles, operational risks, additional costs, lack of controlled land and reserves, and permitting time required to implement the various alternatives. Alternative 5 not only maximizes resource recovery but also mines the area in the most logical way and reclaiming the entire disturbance area back to a floodplain wetland. Surface mining is a temporary impact to the land and careful reclamation returns the land to a natural state as opposed to other land uses such as commercial developments, housing developments, and transportation projects which essentially alter the land use indefinitely.

11. SOCIAL AND ECONOMIC IMPORTANCE

Mining is different from many other industries in that the mine and support facilities must be located where the resources occur. Other factors such as proximity to transportation, transmission lines, and reserve configuration dictate facility locations and are critically important to the viability and success of an operation. Reserves may be owned or controlled many years before mining occurs and involve a substantial long-term investment.

Coal mining is regarded to be of social and economic importance by Indiana Statute as follows: *IC 14-34-1-3 (7) Assure that the coal supply essential to the nation's energy requirements and economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the nation's need for coal as an essential source of energy.*

Further, an additional Indiana Statute requires that operations be conducted in a manner that maximizes the use of the coal resource as follows: *IC 14-34-10-2 Duties of permittee ...(b) In addition to other standards a permittee must meet under rules of the commission, a permittee shall do the following: ...(2) Conduct the surface coal mining operation in a manner that maximizes the use and conservation of the solid fuel resource that is recovered so that re-affecting the land in the future through surface coal mining is minimized.*

The following state energy profile analysis¹ is from the U.S. Energy Information Administration which was obtained from their website August 15, 2025. This information was last updated October 17, 2024.

- Indiana's industrial sector is the state's largest energy consumer, accounting for 45% of Indiana's energy consumption in 2022. The state leads the nation in steelmaking, an energy-intensive industry, and in 2023 it manufactured about 84% of the recreational vehicles sold in the nation.
- In 2023, Indiana was the nation's second-largest coal consumer, after Texas. Coal fueled 45% of Indiana's electricity net generation that year, the seventh-highest share of any state.
- In 2023, wind power provided 10% of Indiana's total electricity net generation, and solar, biomass, and hydropower combined accounted for about 3%.
- In 2023, Indiana was the nation's second-largest coal consumer, after Texas.
- In 2023 Indiana ranked 8th with 23.7 million tons of coal produced.

Indiana, a Great Lakes state, extends 270 miles south from Lake Michigan to the Ohio River at its southern border. The state is almost twice as long as it is wide, but, with the exception of Hawaii, it is the smallest state west of the Appalachians. Sediments deposited over millions of years, when much of the state was covered by inland seas and later by lush swamps, became the geologic layers that contain Indiana's fossil fuel resources, predominantly coal but also crude oil and some natural gas. The slightly rolling terrain in the northern two-thirds of the state is the result of the 2,000-foot-thick glacier that covered much of the state during the most recent Ice Age. The retreat of the glaciers more than 10,000 years ago left behind the fertile topsoil that supports Indiana's agriculture. Ample rainfall and rich prairie soils allow Indiana farmers to produce the abundant corn and soybean crops that are the feedstock for the state's ethanol and biodiesel industries. Indiana's open prairie also has abundant wind energy resources, and there are many large wind farms in west-central Indiana.

Although Indiana is not a large state, it has a varied climate. In the north, Indiana experiences lake-effect snows and winds off Lake Michigan. In the south, the hilly terrain creates localized weather variations. The interplay of polar air moving south from Canada and warm, moist air moving north from the Gulf of America influence the weather statewide. Indiana's winters can be bitterly cold, spring weather often includes tornadoes, and some summer days are very hot with high humidity. In part because of those weather extremes, Indiana ranks 10th among the states in total energy use per capita. The industrial sector is the state's largest energy-consuming sector and accounted for almost half of the state's total energy use. In addition to manufacturing about 84% of the recreational vehicles sold in the nation, Indiana's industries include energy-intensive chemical and primary metal manufacturing, as well as petroleum refining. The transportation sector is the second-largest energy consumer in Indiana, followed closely by the residential sector. Those two sectors each account for about one-fifth of the state's energy use. The commercial sector accounts for about one-seventh. Overall, Indiana consumes about three times more energy than the state produces.

11.1 COAL

Indiana has about 1.4% of U.S. economically recoverable coal reserves, and it is the seventh-largest coal-producing state. Indiana mines yield almost 24 million tons of coal, which is about 4% of the nation's total production. All of the state's coal mines are in southwestern Indiana within the coal-rich Illinois Basin. Indiana uses about four-fifths of its mined coal in-state and ships most of the rest to almost a dozen other states by rail, barge, and truck. Indiana also exports about 5% of its mined coal to other countries.

In 2023, Indiana was the nation's second-largest coal consumer, after Texas. Indiana consumed about 26 million tons of coal, and most of it was used for electric power generation. Even though Indiana is one of the nation's top coal producers, the coal mined in the state does not meet state demand. Almost all of the additional coal used in Indiana arrives by rail and barge from mines in Kentucky, West Virginia, Illinois, and Wyoming. In 2023, Indiana consumed about 21 million tons of coal for electricity generation. Only Texas and Missouri used more coal for power generation. The industrial sector, which includes coke plants and other industrial users, accounted for most

¹ U.S. Energy Information Administration – Indiana Profile: <https://www.eia.gov/state/data.php?sid=IN#Prices>

of the rest of the coal consumed in the state. Indiana ranks second in the nation in industrial sector coal use, after Pennsylvania. The state is a leader in steel manufacturing, and some of the coal used in Indiana goes to coking plants that supply the state's steel industry. However, the Indiana industrial sector's coal consumption has declined since 2010, and in 2023 it was about two-thirds of what it was in 2013. The commercial sector uses a small amount of coal.

11.2 ELECTRICITY

Coal fuels the largest share of Indiana's total in-state utility-scale (1 megawatt or larger) electricity generation. In 2023, coal's share of Indiana's net generation was greater than in all but six other states. Eight of Indiana's 10 largest power plants by capacity and 7 of its 10 largest by annual generation are coal-fired. However, coal-fired electricity generation in the state declined from 84% of total generation in 2013 to 45% in 2023. About 5,000 megawatts of coal-fired capacity in Indiana have retired since 2013, and another almost 3,900 megawatts of coal-fired capacity are scheduled for retirement by the end of 2028. At the same time, natural gas-fired generation has offset most of the decline in coal-fired generation. The share of the state's total net generation from natural gas increased from 8% in 2013 to 39% in 2023. Renewable resources, primarily wind, supplied 14% of the state's total electricity net generation in 2023. About 2% of Indiana's total net generation came from other gases used to fuel power generation at industrial facilities.

In 2023, Indiana ranked 14th in the nation in total electricity sales, but the state was sixth in electricity sales to the industrial sector, which accounted for 43% of Indiana's electricity consumption. The residential sector, where 3 in 10 households use electricity as their primary energy source for home heating, accounted for 33% of state power use. The commercial sector consumed 24%. In part because of the retirement of several large coal-fired power plants, since 2012 Indiana consumers used more electricity than in-state generators could provide. In 2022, 13% of Indiana's electricity supply came from other states.

Indiana had about 600 public electric vehicle charging locations in mid-2024. Most of these charging locations are in and around Indiana's large cities of Indianapolis, Fort Wayne, and Gary. The state plans to invest almost \$100 million to build charging locations throughout the state along its designated Alternative Fuel Corridors, spaced no more than 50 miles apart and within one mile off the exits of Indiana's interstate routes.

11.3 RENEWABLE ENERGY

In 2023, renewable resources generated 14% of Indiana's total in-state electricity. Wind energy contributed the largest share at about 10% of the state's total generation. Indiana's largest utility-scale wind project came online in several phases with almost 600 megawatts of capacity. Today, wind turbines can be seen across central Indiana, and the state had about 3,400 megawatts of wind capacity as of mid-2024.

Indiana also generates electricity with solar, hydroelectric, and biomass facilities. Southwestern Indiana has the state's best solar energy resources, but solar arrays are found statewide. Utility-scale (1 megawatt or larger) solar power facilities provide over four-fifths of the electricity generated from solar resources in Indiana. The rest comes from small-scale (less than 1 megawatt) customer-sited installations like rooftop solar panels. Solar energy from all sources supplied about 2.5% of the state's total electricity net generation in 2023. Hydropower and biomass provided the rest of the state's renewable-sourced net generation. In part because of its relatively level terrain, Indiana has only six utility-scale hydroelectric facilities. A 54-megawatt hydroelectric plant on the Ohio River at Indiana's southeastern boundary is the state's largest. Most of Indiana's biomass power plants are fueled with landfill gas, but other biomass resources, including animal waste and municipal solid waste, are used to generate electricity. Indiana has two wood pellet plants that use woody biomass to manufacture up to 7,000 tons of pellets each year, which can be used for electricity generation and space heating.

Part of Indiana's abundant corn crop provides the feedstock for biofuels production. The state has 14 fuel ethanol plants with a combined production capacity of nearly 1.4 billion gallons per year. Indiana is the sixth-largest producer of fuel ethanol in the nation. In 2022, the state produced about 1.2 billion gallons of fuel ethanol, which accounted for about 8% of U.S. total production. In 2022, Indiana consumed almost 305 million gallons of fuel

ethanol, about one-fourth as much as the state produced. Indiana is also the nation's fifth-largest producer of biodiesel. The state's two biodiesel plants have a combined production capacity of 102 million gallons per year. In 2022, Indiana produced about 87 million gallons of biodiesel, accounting for about 5% of the nation's total output. The state consumed about 39 million gallons of biodiesel.

Although Indiana's legislature created a voluntary clean energy portfolio standard in 2011, no Indiana utility has chosen to participate. If an electric utility elects to participate, it agrees to acquire 10% of the electricity it sells from clean energy sources by 2025. In return, the utility receives financial incentives. However, Indiana utilities must offer net metering to all customer-sited renewable generating facilities with less than 1 megawatt of capacity unless net metering exceeds 1% of a utility's most recent peak summer load.

11.4 PETROLEUM

Indiana's proved crude oil reserves and production are small. Crude oil deposits were discovered in east-central Indiana in 1886. However, reserves were depleted, and production declined sharply in the early 20th century. As a result, the center of the state's crude oil production shifted to the Illinois Basin in southwestern Indiana. The state's crude oil output peaked at almost 13 million barrels per year in 1956. In 2023, the state's annual crude oil production dropped to 1.5 million barrels, accounting for about 0.03% of the nation's total crude oil output.

Indiana has two petroleum refineries that together can process about 470,000 barrels of crude oil per calendar day, or almost 3% of the U.S. total. The Whiting refinery, located in northwestern Indiana, is the eighth-largest U.S. refinery and can process about 435,000 barrels of crude oil per calendar day. That refinery produces large quantities of motor gasoline, diesel fuel, and jet fuel, as well as about 7% of the nation's asphalt. A second, small refinery, located in Mount Vernon at the southern tip of Indiana, processes crude oil from southern Indiana, southern Illinois, and western Kentucky. Its refined products include motor gasoline, diesel fuel, and lubricants that are delivered to customers in the region.

The transportation sector uses about three-fourths of the petroleum consumed in Indiana. Almost half of that is in the form of motor gasoline and three-tenths is distillate fuel oil, mostly diesel fuel. Motor gasoline without ethanol can be sold in most of Indiana, but reformulated motor gasoline blended with ethanol is required in the state's northwestern corner near Chicago. Additionally, motor gasoline formulated to reduce the emissions that contribute to ground-level ozone is required during the summer months in southeastern Indiana counties across the river from Louisville, Kentucky. The industrial sector is the state's second-largest petroleum consumer and accounts for about 17% of the petroleum used in the state. The commercial and residential sectors consume nearly all the rest in almost equal amounts of 2.6% each. About 7 out of 100 Indiana's homes heat with petroleum products, mainly propane. The electric power sector accounts for about 0.2% of the state's petroleum consumption.

11.5 NATURAL GAS

Indiana does not have significant natural gas reserves, but the state does produce some natural gas. The number of wells completed using hydraulic fracturing increased the state's natural gas production, which peaked at 9.1 billion cubic feet in 2011. However, the state's annual output declined every year, except one, since then and was only about 3.8 billion cubic feet in 2023, which was about 0.01% of the U.S. total. Many of the state's natural gas fields are in east-central Indiana, where natural gas was first discovered in the mid-1870s, and the availability of advanced drilling technologies has renewed interest in a shallow natural gas play in the New Albany Shale in southwestern Indiana. Shallow coalbed methane resources also are found in southwestern Indiana.

Many interstate natural gas pipeline systems cross Indiana, bringing natural gas into the state primarily through Ohio and Illinois. In 2023, Indiana consumed or stored about one-third of the natural gas that entered the state. Most of the rest continued on to Illinois, Ohio, Michigan, and Kentucky. Some of the natural gas that entered Indiana was placed in underground natural gas storage reservoirs for later use. The state has 23 natural gas

underground storage fields whose combined total storage capacity of nearly 114 billion cubic feet is about 1% of the nation's total.

Indiana is one of the top 10 natural gas-consuming states, and it ranks 14th in per capita natural gas use. The industrial sector is the state's largest natural gas user, accounting for 46% of the natural gas delivered to Indiana consumers in 2023. As generation from the state's natural gas-fired power plants increased in recent years, consumption of natural gas by the state's electric power sector has risen. In 2023, natural gas use for electricity generation reached a record high and accounted for 30% of state consumption. About three times more natural gas was used for power generation in 2023 than a decade earlier. The Indiana electric power sector's natural gas consumption has exceeded that of the state's residential sector since 2016. In 2023, the residential sector, where almost three-fifths of state households use natural gas for space heating, received about 14% of the natural gas delivered to Indiana consumers. The commercial sector accounted for about 10% of the state's natural gas, and a small amount of natural gas was delivered to the transportation sector.

11.6 COST OF ELECTRICITY

The cost of electricity is a major cost for industry and can affect the decision to locate new industries in Indiana. Approximately 45% of Indiana's electricity is consumed by industry. Even more fundamental, keeping the cost of electricity low helps to provide affordable energy to Indiana's citizens, especially those on fixed incomes. The social benefit of low-cost energy is immeasurable. The following table compares the average sales price of coal to the utility rates in Indiana as compared to the U.S. average.

Coal	Indiana	U.S. Average	Period
Average Sales Price	\$ 59.51 /short ton	\$ 54.04 /short ton	2023
Delivered to Electric Power Sector		\$ 2.46 /million Btu	Apr-25

Electricity	Indiana	U.S. Average	Period
Residential	17.01 cents/kWh	17.45 cents/kWh	Apr-25
Commercial	14.52 cents/kWh	13.09 cents/kWh	Apr-25
Industrial	9.01 cents/kWh	8.21 cents/kWh	Apr-25

12. CUMULATIVE ACTIVITY

To fully analyze the past, present, and reasonably foreseeable impacts as required under the National Environmental Policy Act (NEPA) and the Section 404 Guidelines, a cumulative impacts analysis was completed that details the changes in hydrology, drainage patterns, and channel composition in the watershed. Examples of cumulative impacts include road construction, residential and commercial development, agriculture, timbering, quarrying, natural gas production, and other mining. Impact assessments for the wetland should include direct, cumulative, and secondary impacts from previous and current actions, as well as impact to surface and groundwater hydrology from future actions.

12.1 HUC 12 WATERSHED

The Seven Hills – Mining Area Addition will create impact one HUC12 watershed the Clear Branch-Pigeon Creek (051402020203). All surface flow in the Clear Branch-Pigeon Creek watershed drains toward the main stem of Pigeon Creek. While surface mining currently occurs in this watershed with the Seven Hills Mine, the potential impact to downstream waters will be undetectable for the mining to occur at the Mining Area Addition. The primary stream in the project area appears to be an abandoned relic channel that still conducts up watershed flow to Pigeon Creek. Two other intermittent streams drain internally to the relic channel in the Pigeon Creek floodplain.

TABLE 30 depicts the HUC12 watershed summary for the Seven Hills Mine – Mining Area Addition.

TABLE 30 HUC12 WATERSHED SUMMARY

HUC Watershed	Watershed Area	Mining Area Addition	Percent of Watershed
	(acres)	(acres)	(percent)
Clear Branch – Pigeon Creek (051402020203)	22,961	80.46	0.35

Approximately 0.35% of the Clear Branch-Pigeon Creek watershed will be directly impacted by the Mining Area Addition by surface mining through final reclamation. The reclaimed lands from the project will be returned to land uses commensurate with the pre-mine conditions and will include forested wetlands and upland forests.

Surface water flow within the Mining Area Addition will be affected because of the surface mining operations. During mining, sedimentation basins will be used to collect storm water to retain the influent drainage and detain it for a sufficient time to settle out sediment so it is not discharged in the effluent water. Creating detention has two effects. The first will be a decrease in the peak flow from storm events and the second will be an increase in base flow of the receiving stream as the ponds slowly release water after rainfall events. There is potential for permanent incised impoundments to be left after mining is completed. These water bodies will not be constructed in the stream mitigation.

Surface water quantity will benefit in other ways, as well. The addition of these surface water impoundments is considered beneficial to the hydrologic balance within and adjacent to the project area. These functions (increased detention times and increased base flows) will be provided by the cast overburden generated in the mining process. The higher porosity and permeability of the cast overburden will allow water to infiltrate and saturate following periods of heavy precipitation and then be released to surrounding streams more slowly. This increased permeability of the cast overburden may lead to increased mineralization of the groundwater and surface water flowing through and over these materials. SMCRA and NPDES permits contain reclamation practices and monitoring requirements to ensure that groundwater and surface water standards are met and impacts to the hydrologic balance are minimized. After reclamation operations are completed, replaced soil infiltration may be temporarily reduced because of compaction caused by the heavy equipment used to redistribute the earthen materials. Compaction will be minimized where possible by direct haul-back of soil and mechanical ripping after soil placement. Because the Seven Hills Mine – Mining Area Addition comprises a small portion of the Clear Branch – Pigeon Creek watershed, potential quantity impacts resulting from the proposed operation will be minimal.

12.1.1 STREAM AND WETLANDS (SECTION 404 IMPACTS)

Recently authorized Section 404 permits that are within the HUC12 watershed of Clear Branch-Pigeon creek (051402020203) include the following:

AUTHORIZED SECTION 404 PERMIT LRH-2018-738 was issued to United Minerals Company, LLC for the Seven Hills Mine and authorized impacts across 1,219.0 acres for surface coal mining. Approved impacts totaled 38,923 linear feet of streams, 374.36 acres of wetlands, and 104.45 acres of open waters. The Corps determined the submitted *Compensatory Wetland and Stream Mitigation Plan Seven Hills Mine USACE File Number: LRH-2018-00738-OHR- Pigeon Creek...March 2019*, is acceptable to offset the impacts to waters of the United States. To compensate for the loss of waters of the United States, the mitigation will include:

- Establish 281.73 acres of PFO wetlands, 55.4 acres of PSS wetlands, 37.23 acres of PEM wetlands, 8,294 linear feet of ephemeral streams and 19 acres of stream riparian habitat on the post-mine site.
- Establish 31 acres of PFO wetlands within the on-site floodway enhancement area.
- Re-establish 22,737 linear feet of intermittent streams, 7,892 linear feet of ephemeral streams,

- 96.21 acres of open water feature and 122.5 acres of stream riparian habitat on the post-mine site.
- Restore 1,300 linear feet of two (2) intermittent streams within the on-site avoidance area.
- Preserve on-site, via a conservation easement, 120.48 acres of PFO wetlands, 24.99 acres of dead PFO wetlands, 33.31 acres of PSS wetlands, 6.46 acres of PEM wetlands, 5.48 acres of PUB wetlands, 432 linear feet of ephemeral streams, 4,532 linear feet of intermittent streams, 21.79 acres of stream riparian habitat, and 32.2 acres of upland forested buffer within the avoidance area.
- Establish 49.5 acres of PSS wetlands and 50.5 acres of PFO wetlands within the floodplain area of Big Creek within the Wild Boar Mine site.
- Restore 2,265 linear feet of intermittent stream, 30.8 acres of PFO wetlands and 3.4 acres of upland forested buffer and to preserve 0.6 acre of upland forested buffer within the 38-acre Little Pigeon Site 1.
- Restore 127.5 acres of PFO wetlands and preserve 0.5 acres of existing PFO wetland within the 141-acre Little Pigeon Site 2.
- Restore 1,100 linear feet of intermittent stream, 62.8 acres of PFO wetlands and 11 acres of upland forested buffer and to preserve 3.7 acres of existing PFO wetlands within the 84-acre Pokeberry Site 1.
- Restore 40.6 acres of PFO wetlands and preserve 0.2 acres of existing PFO wetland within the 44.8-acre Pokeberry Site 2.
- Restore 49.8 acres of PFO wetlands and 3.5 acres of upland forested buffer and preserve 2.9 acres of existing PFO wetlands within the 63-acre Pokeberry Site 3.
- Restore 37.5 acres of PFO wetlands and preserve 0.4 acres of existing PFO wetland and 1.6 acres of upland forested buffer within the 43-acre Pigeon Creek Site 1.
- Restore 35.6 acres of PFO wetlands and 1.6 acres of upland forested buffer, rehabilitate 5.9 acres of PSS to PFO wetlands, and preserve 9.7 acres of PFO wetlands and two (2) acres of upland forested buffer within the 67-acre Pigeon Creek Site 2.
- Restore 108.4 acres of PFO wetlands and 1.4 acres of wetland forested buffer within the 146-acre Bluegrass Site 1.
- Restore 47.7 acres of PFO wetlands and 1.8 acres of wetland forested buffer within the 60-acre Bluegrass Site 2.
- Restore 1,800 linear feet of perennial stream, 32.2 acres of PFO wetlands and 6.9 acres of upland forested buffer, rehabilitate two (2) acres of PSS to PFO wetlands, and preserve 1.4 acres of existing PFO wetlands and 1.2 acres of existing upland forested buffer within the 52-acre Ellison West site.
- Preserve 16.0 acres of PFO wetlands, 19.1 acres of PEM wetlands, 2.8 acres of PUB and 2.1 acres of upland forest within the 40-acre Indiana Bat roosting site.

The streams would be constructed based on natural stream design parameters with riparian buffers incorporated. The streams would flow to and through the proposed wetland mitigation creation site, would be managed for hard mast planting to establish a seasonally inundated PFO wetland and stream complex before they discharge off-site and into the Pigeon Creek or the local stream at the off-site mitigation areas. This project area covered impacts to streams and wetlands within the HUC12 watershed of Clear Branch-Pigeon Creek (051402020203) with mitigation located not only in the HUC12 of Clear Branch-Pigeon Creek, but also the following watersheds in the HUC8 watershed of Highland-Pigeon: Snake Run-Pigeon (051402020106), Smith Fork-Pigeon Creek (051402020107), Bluegrass Creek (051402020302), and Headwaters Big Creek (051402020201). Mitigation in the adjacent HUC8 watershed of Lower Ohio-Little Pigeon was authorized due to the HUC8 watershed being a part of the Ohio-Wabash Lowlands Service area for the Indiana Department of Natural Resources In-Lieu Fee Program. Additional off-site mitigation areas were constructed in the following HUC12 watersheds of the Lower Ohio-Little Pigeon: Barren Fork (051402010907), Pokeberry Creek (051402010904), and Buckhorn Creek-Little Pigeon (051402010905).

The Seven Hills Mine is currently active and mining coal. Almost all the off-site mitigation areas as well as the on-site floodway enhancement area have been constructed and currently monitored except for small portion on the Wild Boar Mine site that is close to being completed.

AUTHORIZED SECTION 404 PERMIT LRL-2017-418-GJD was issued to Liberty Mine, LLC for Liberty Mine. It authorizes impacts to 3,360.0 acres and is located across two (2) HUC12 watersheds: Clear Branch-Pigeon Creek (051402020203) in the HUC8 watershed of Highland-Pigeon and Cypress Creek (051402011101) in the HUC8 watershed of Lower Ohio-Little Pigeon. Delineated impacts total 94,466 linear feet of ephemeral streams, 27,686 linear feet of intermittent streams, 5,258 linear feet of perennial streams, 22.90 acres of PFO wetlands, 7.92 acres of PSS wetlands, 52.05 acres of PEM wetlands, and 115.24 acres of open waters.

Compensatory mitigation for impacts within this permit includes a combination of on-site and off-site mitigation. On-site includes 20,508 feet of intermittent and 2,757 feet of ephemeral stream mitigation, as well as 45.6 acres of on-site wetland creation. The streams would be constructed based on natural stream design parameters with riparian buffers incorporated. The streams would flow to and through the proposed wetland mitigation creation site, would be managed for hard mast planting to establish a seasonally inundated PFO wetland and stream complex before they discharge off-site and into the Squaw Creek tributary system. To address the impact of open waters, Liberty Mine, LLC proposed to leave approximately 162 acres of permanent open waters.

Off-site mitigation would begin concurrently with mining impacts and be conducted at several locations and focus on the restoration of degraded or converted resources. Off-site wetland mitigation includes the restoration of 128 acres of PFO wetlands at four (4) different locations on ground that was in intense agricultural row crop land use. Off-site mitigation would also include 9,023 linear feet of stream restoration on an unnamed perennial tributary to Cypress Creek, as well as 823 linear feet of intermittent stream restoration on an unnamed tributary stream that feeds the perennial stream mitigation.

The Liberty Mine ended operations in August 2025, eliminating 80 jobs, but was reactivated in 2022 by Alcoa with plans to mine at a 135-acre plot over an 18-to-24-month timeline and recover the coal that was left behind during previous mining and to employ approximately 20 individuals.

AUTHORIZED SECTION 404 PERMIT LRL-2013-00444-GJD was issued to United Minerals Company, LLC for the High Point Mine. It authorizes impacts on a majority of a 3,084.6-acre site with approximately 2,238.3 acres of having already been previously mined and reclaimed per Surface Mining Control and Reclamation Act (SMCRA) requirements. In total, the proposed direct impacts to both the previously mined and unmined areas include the following; to fill, 1) 53,824 linear feet of ephemeral streams; 2) 29,777 linear feet of intermittent streams; 3) 2,099 linear feet of perennial streams; 4) 1.63 acres of PFO wetlands; 5) 1.69 acres of PSS wetlands; 6) 21.18 acres of PEM wetland; and 7) 93 acres of open water within HUC12 watersheds of Clear Branch-Pigeon Creek (051402020203) and Big Creek (051402020202).

Compensatory mitigation for impacts within this permit includes only on-site mitigation. The Applicant proposed to mitigate perennial stream impacts at a ratio of 1:1 (2,099 feet), intermittent stream impacts at a ratio of 1:1 (27,777 linear feet), and ephemeral stream impacts at a ratio of 0.5:1 (2,099 feet). The Applicant proposed to create and plant riparian buffers. Where mitigation streams do not have adjacent wetland mitigation, they would have riparian buffers planted on each side of the mitigated stream. A minimum 50-foot riparian buffer, 100-foot riparian buffer, or 150-foot riparian buffer would be planted on each side of the natural design stream mitigation depending on the anticipated flow regimes of ephemeral, intermittent, and perennial, respectively. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

For wetland impacts, the Applicant proposes to construct 30.46 acres of PFO1A wetland for the 3.3 acres of jurisdictional PFO and PSS wetlands as well as the 21.2 acres of jurisdictional PEM wetlands planned for disturbance. To address impacts to open waters, the Applicant proposes to leave approximately 93 acres of permanent open water for sediment basins and final cut impoundments.

The High Point Mine is currently active and mining coal. The mitigation will be constructed on-site during reclamation except for a modification to the permit that required 3.0 acres of off-site wetland restoration which was completed in 2023.

PENDING SECTION 404 PERMIT LRL-2020-00269-GJD is for the Wild Boar Stanley Pit. It covers a permit acreage of 756.5 acres with 690.0 acres proposed to be impacted. The project is located across two (2) HUC12 watersheds: Clear Branch-Pigeon Creek (051402020203) and Headwaters Bluegrass Creek (051402020301). Jurisdictional impacts a total of 32,800 linear feet of intermittent streams and 12.52 acres of wetlands.

Compensatory mitigation for impacts within this permit includes a combination of on-site and off-site mitigation. On-site includes construction of 16,400 linear feet of intermittent streams and 12.52 acres of forested wetlands. Off-site mitigation will be conducted at two locations. One area, the Big Creek – RR Mitigation Site will restore 9.6 acres of forested wetlands and 5.76 acre of riparian area while the second area, Lake Drain Mitigation Area will restore 60.14 acres of forested wetlands and preserve 27.18 acres of existing forested wetlands.

Mitigation for the streams and wetlands will take place as quickly as practicable employing the best techniques available to ensure success. The intermittent streams will be replaced at a ratio of 1:1. To reduce temporal loss and to ensure a sustainable post-mining landscape based on the expected mining conditions, a portion of the intermittent stream mitigation and all of the ephemeral stream mitigation will be converted to forested wetland mitigation at off-site mitigation areas that will be constructed prior to the majority of any impacts. The conversion of mitigation length to wetland restoration at a rate of 1 acre of wetland per 500 linear feet of intermittent stream mitigation. On-site stream mitigation will be constructed utilizing natural channel design with added enhancements that will include reduced entrenchment, expanded sinuosity, and engineered structure placement. Riparian buffers utilizing predominately hard-mast species will be planted adjacent to the stream mitigation enhancing both the habitat and water quality of the onsite, as well as downstream, streams. Wide floodplains will be incorporated adjacent to the stream mitigation, maintaining flood capacity along the Pigeon Creek. The impacted wetlands will be mitigated at a rate of 3:1 for PFO impacts, 2:1 for PSS impacts, and 1:1 for PEM impacts. On-site a minimum 1:1 impacted acreage will be constructed in the floodplain valleys of the stream mitigation as forested wetlands, which will consist of hard-mast species including oaks and hickories. The wetlands will be providing wildlife habitat, water filtration, and flood control. The remaining acreage will be constructed as wetland restoration at off-site mitigation areas consisting of prior converted farmland that will be restored to a forested wetland by altering the field tile systems and planting hard-mast tree species composed of oaks and hickories. The mitigation will be monitored closely by well-trained staff. Stream mitigation techniques in reclamation areas continue to evolve with more experience, training will be ongoing, and consultants employed as needed. These mitigation measures will provide great lift to the restored aquatic ecosystem and offset potential longer-term impacts for the Wild Boar Stanley Pit.

12.1.2 PIGEON CREEK AND ADJACENT FLOODPLAINS AND WETLANDS

To address concerns the project may cause significant adverse effects on water quality and contribute to a significant degradation of Pigeon Creek, an analysis was included in the Corps Louisville District application for the Wild Boar Mine – Stanley Pit, LRL-2020-00269-gjd, which is being provided below. It provides discussion on potential secondary impacts and degradation of Pigeon Creek for the Stanley Pit, which is immediately north of the Seven Hills Mine in the uplands of Pigeon Creek. This information can be considered applicable to the Seven Hills Mine – Mining Area Addition as it includes data from the annual monitoring of the original Seven Hills Mine, LRH-2018-00738.

WILD BOAR STANLEY PIT LRL-2020-00269-GJD CUMULATIVE IMPACTS DISCUSSION BEGINS

As a definition, secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Secondary effects typically would occur in streams and wetlands downstream of the discharges of dredged or fill material. In the case of the *Stanley Pit*, Pigeon Creek and its associated floodplains are downstream aquatic ecosystems from the *Stanly Pit* project. The following effects are discussed below: reduction of surface water sources to the floodplains and Pigeon Creek due to the project, reduction in flood sources to the wetlands and streams in the floodplain of Pigeon Creek due to the project, reduction of flood sources on wetlands and streams that extend offsite to the west of the project (i.e. upgradient), reduction of flood sources on Pigeon Creek baseflow due to the project, potential dewatering of the floodplain wetlands due to the project, and past surface mining adjacent to wetlands.

12.1.1.1 REDUCTION OF SURFACE WATER SOURCES TO THE WESTERN FLOODPLAIN OF PIGEON CREEK

There is potential for secondary impacts to downgradient Pigeon Creek and floodplain wetlands through disconnection or separation of upgradient streams and wetlands.

The primary source of water within the Pigeon Creek floodplain is Pigeon Creek and overbank flooding. *Stanley Pit* as proposed will have no effect on the connectivity between Pigeon Creek and the adjacent floodplain wetlands. The watershed of Pigeon Creek at the site is approximately 200 square miles or 128,000 acres. In total, Pigeon Creek gathers drainage from 235,252 acres at its outlet into the Ohio River. The *Stanley Pit* project proposes no impact to the predominant watershed flowing to Pigeon Creek and the adjacent floodplain.

The streams and wetlands within the *Stanley Pit* permit area are also hydrologic sources to the Pigeon Creek floodplain. However, streams within the *Stanley Pit* permit area are ephemeral and intermittent and do not provide a year-round source of upgradient water. The watershed area of the streams and wetlands within the *Stanley Pit* permit area consist of only 816 acres in total. The potential sources of water within these areas are overshadowed by the Pigeon Creek watershed at this location.

Peabody intends to minimize potential for impacts through several measures. Overland flow diversions will be constructed in advance of the pit to maintain flow from upgradient areas around the active mining area and to the adjacent Pigeon Creek floodplain as long as possible prior to mining. Once mining activity begins within a watershed area, the mining permit requires that runoff must be collected within the onsite water treatment network and treated prior to discharge. However, sediment basins, the primary form of treatment, typically allow passive discharge. Therefore, upgradient sources of water within the *Stanley Pit* permit area will still discharge to the Pigeon Creek floodplain. The sediment basin will provide some additional flood storage, flood peak attenuation, and prolonged baseflow. However, designing sediment basins to such large volumes that they can prevent discharge is not practical and is not required by the CWA.

There are a number of measures already in place to maintain upgradient flows to the Pigeon Creek floodplain wetlands and ultimately Pigeon Creek. Nonetheless, Peabody is proposing to perform monitoring of the adjacent floodplain wetlands utilizing shallow piezometers installed in the floodplain unconsolidated materials. Piezometer locations are proposed immediately adjacent to the *Stanley Pit* permit area. The locations are adjacent and downgradient from the primary streams exiting the *Stanley Pit* site and will identify potential diminishment of surface water sources to these areas. Monitoring will be initiated when the active pit approaches within 1,000 feet of the monitoring location.

The floodplain wetlands of Pigeon Creek may experience temporarily reduced surface water runoff after construction of the temporary levees across the intermittent stream valleys which are required to keep the Pigeon Creek floodwaters from encroaching into the active mining area. These levees will be constructed prior to the

active pit mining into the intermittent stream valley. The levees will remain through the end of mining as the levees will also act as a side of a sedimentation basin that will be constructed between the active pit and the permit boundary to manage the surface mine runoff. Overland flow diversions will be constructed where practical to divert as much unaffected drainage around the levee as possible. These diversions will maintain a surface water source to the floodplain. All affected area drainage will be routed through sediment basins. Flood events on Pigeon Creek will provide an additional supply of water to the wetlands and stream segments in the floodplain. In addition, there is a significant beaver dam north of Stanley Road that maintains inundation of the majority of the floodplain in that area northward to Interstate 64. Significant secondary impacts to surface water sources are not expected with this project as the levees will be removed, runoff will still be maintained when the sediment basins discharge and unaffected drainage will be routed around the levees when practical. Some minor dewatering may occur in areas nearest the mine excavation, but the effects and aerial extent will be quite limited due to the low permeability documented by the slug tests and discussed in **12.1.7.2 ANALYSIS OF IMPACTS TO THE GROUNDWATER TABLE FROM OPEN PIT MINING**. Post reclamation, the surface water sources will be reconnected through the mitigated streams and wetlands and outlet onto the floodplain.

The hydrology of the Pigeon Creek floodplain and wetlands is mostly driven by inundation and retention of surface water from overbank flooding, upstream flow and beaver activities and not from subsurface flow connections with the wetlands within the *Stanley Pit*. With the low permeability (10^{-5} cm/sec) of the bedrock and unconsolidated sediments, groundwater interaction with Pigeon Creek from this area of approximately 25 acres is expected to be negligible.

Flood events on Pigeon Creek will continue to provide a supply of water to the wetlands and stream segments in the floodplain. Pigeon Creek is very flashy in coming out of the banks and receding quickly following large rain events and under conditions of backwater from the Ohio River. Beaver dams constructed in the remnant oxbows impound these floodwaters and slowly release them back to Pigeon Creek. The upstream watershed of Pigeon Creek is largely agricultural and the high flows in Pigeon Creek show significant turbidity and suspended sediment from agricultural runoff during flood events.

Since these areas would still be subjected to overbank flooding during and after the mining operations, minimal if any impacts are expected to the functions and services of the avoided wetlands.

12.1.1.2 REDUCTION IN FLOOD SOURCES OF WETLANDS AND STREAMS ON THE WEST BANK OF PIGEON CREEK

There are approximately 16 acres of wetlands onsite located at the lower ends of the intermittent stream channel valleys that could be considered part of the Pigeon Creek floodplain complex in the *Stanley Pit* permit area. Of which, only 12.8 acres become inundated during the 100-year base flood event using the water surface elevation from the floodway model. With the inclusion of the Northern Wetland Buffer Area, the floodplain wetlands inundated during the 100-year base flood reduces to 5.5 acres across three intermittent stream valleys which will be incrementally impacted as the active pit advances to the north. Temporary levees and sediment basins will be constructed at the valley ends to control and treat runoff from the disturbed area. Impacts will be temporary during active mining with restoration and reconnection occurring in the reclamation. A total of 12.52 acres of wetlands will be constructed in the mitigation stream constructed floodplains.

As explained previously, the remainder of the Pigeon Creek floodplain wetlands located to the east of the *Stanley Pit* permit boundary, totaling over 200 acres, will continue to receive floodwaters from Pigeon Creek. *Stanley Pit* will have no significant effect on the flood frequency and duration of Pigeon Creek.

12.1.1.3 REDUCTION IN FLOOD SOURCES THAT EXTEND OFFSITE TO THE WEST OF THE PROJECT

Secondary impacts to the streams and wetlands that extend off-site to the west of the project area are not expected to experience a reduced flood source. No Pigeon Creek floodplain wetlands extend all the way through the permit area. The wetlands and streams upstream of the project area would still receive flow from surrounding uplands and will be unaffected. None of these streams or wetlands experience backwater flooding from Pigeon

Creek as the project area is located in the uplands. All drainage in the project area flows from west to east toward Pigeon Creek except for a small area that breaks into the Bluegrass Creek watershed. The streams upstream of the project area that will be unaffected will maintain their hydrologic source.

12.1.1.4 REDUCTION IN FLOOD SOURCE ON PIGEON CREEK BASEFLOW

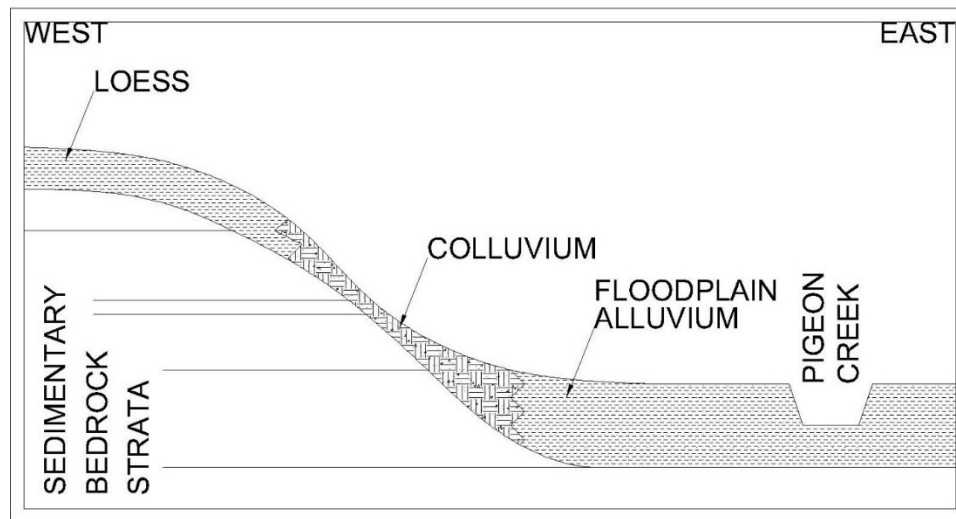
The flooding source would not be removed from Pigeon Creek because of mining. There would be a minor redistribution of flood waters along segments of the mine permit area on a spatial basis; however, the flood source waters emanating from Pigeon Creek would still be present and baseflow would not be affected. Additionally, the length of the disturbed area along Pigeon Creek is negligible relative to the total length of Pigeon Creek and the low permeability of the lithology would buffer any temporary changes.

12.1.1.5 DEWATERING OF WETLANDS IN PIGEON CREEK FLOODPLAIN

Secondary impacts to unpermitted wetlands to the east of the *Stanley Pit* permit boundary are not expected. Bedrock within the *Stanley Pit* permit area is low permeability sedimentary rock, consisting primarily of shales, siltstones, sandstones, and coal. Onsite testing of the hydraulic conductivity revealed that bedrock hydraulic conductivity was 4.95×10^{-6} cm/s. This is low permeability bedrock material, which reduces the lateral extent of influence that the active pit has on surrounding bedrock groundwater. Furthermore, the low permeability suggests little groundwater influence on the overlying unconsolidated material within the floodplain. Testing of the unconsolidated materials within the floodplain also shows a low permeability, consistently on the order of 10^{-5} cm/s based on nearby wells. This is a typical conductivity for silt / loess material (*Freeze and Cherry 1979*). Again, this material will limit the lateral extent of drawdown from the active pit. Additionally, the comparatively higher conductivity of the unconsolidated material overlying the bedrock suggests that the wetland hydrology is controlled primarily by the surface water flooding from the adjacent Pigeon Creek and not from bedrock groundwater sources.

The radius of influence, defined as the maximum distance that drawdown can be detected, can be calculated using empirical equations. An analysis of the radius of influence on the unconsolidated material that utilized the Kusakin and Shichardt methods, predicted a maximum distance of 46 – 74 feet. Furthermore, except within the 4 primary valleys, the excavation is within the upland material, which has a thinner unconsolidated zone of glacial loess and Holocene silts that grades into colluvium on the valley margins and finally the thick alluvial deposits within the floodplain (**FIGURE 2**). The unconsolidated interval is not a continuous and homogeneous lateral connection between the uplands and the Pigeon Creek floodplain. The low permeability of the unconsolidated material within the *Stanley Pit* permit further limits its potential influence on the adjacent floodplain.

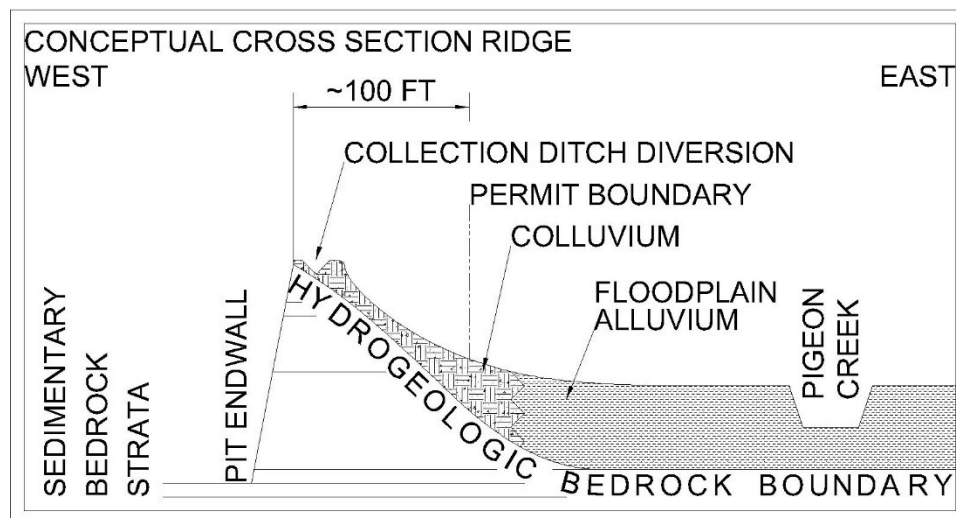
FIGURE 2 **STANLEY PIT SECTION OF UNCONSOLIDATED & ITS CONNECTION WITH FLOODPLAIN**



Additionally, there are several operational limitations that offset the extraction area from the permit boundary. Utilizing representative widths of these features, the lateral distance from the active pit to the permit boundary can be calculated.

Along the portions of the eastern boundary up on the ridge of the floodplain valley wall, which makes up much of the eastern boundary, Collection Ditch Diversions must be constructed around the perimeter to collect runoff from the disturbed area (**FIGURE 3**). Along this boundary, the active pit will be approximately 100 feet from the permit boundary to allow for construction of the collection ditch diversion on the hillslope. Additionally, the topographic difference between the floodplain and the ridge creates a hydrogeologic boundary composed of bedrock. As discussed previously, the sedimentary bedrock in this area displays extremely low permeability, creating a hydrogeologic barrier that isolates the mining area from the floodplain wetland.

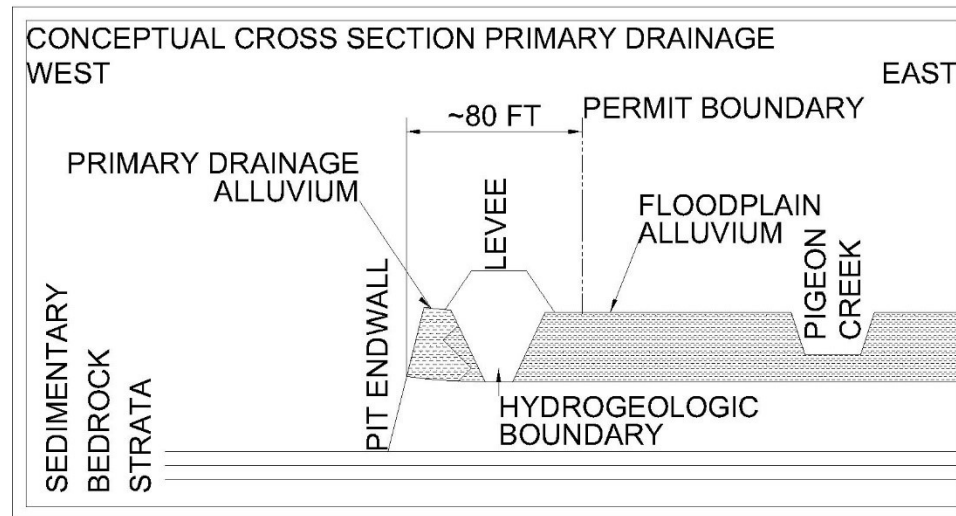
FIGURE 3 **STANLEY PIT CONCEPTUAL CROSS-SECTION OF ACTIVE PIT & FLOODPLAIN**



Within the primary drainages, which makes up the lesser remainder of the eastern boundary, levees must also be constructed. First, the floodplain wetland only encroaches within the permit boundary at the locations of the

primary streams. The mine area will be separated at these locations by a sediment basin and a levee. The compacted foundation of the levee will form a hydrogeologic boundary between the floodplain wetlands to the east and the mining area to the west. A conceptual diagram of these areas is shown in **FIGURE 4**. Within the primary drainageways the active pit will be approximately 80 feet from the permit boundary to account for the width of the levee.

FIGURE 4 STANLEY PIT DIAGRAM OF ACTIVE PIT AND FLOODPLAIN WITH PRIMARY DRAINAGES



These distances are in addition to the distance between the permit boundary and the wetland to the east. Along the ridge making up the eastern boundary, the floodplain wetland is offset from the permit boundary topographically. In the center of the eastern boundary where the floodplain wetland boundary was delineated during the Jurisdictional Determination process, the permit boundary was found to be offset from the wetland boundary an average of 94.3 feet. Cumulatively, this shows the active pit will be approximately 80 – 195 feet from the Pigeon Creek floodplain wetland to the east. There are also two aforementioned hydrogeologic boundaries that separate the areas, ensuring the floodplain wetland is isolated from the mining area to the west and continues to be controlled by the overbank flooding from Pigeon Creek.

The monitoring being proposed at the piezometer locations within the Pigeon Creek floodplain will be sufficient to identify any secondary dewatering effects from the adjacent active pit. If monitoring of the piezometers shows a loss of wetland hydrology, the Corps project manager will be consulted to adjust the setback distance from the floodplain wetland.

12.1.1.6 PAST SURFACE MINING ADJACENT TO WETLANDS

Historical and active mining adjacent to wetland areas reinforces the principles outlined previously. Several permit areas within the Illinois Basin have successfully mined adjacent to large wetlands and have no observed secondary effects to the wetlands. Examples in the vicinity of the Seven Hills Mining Area Addition include not only the Seven Hills Mine, but also Millersburg, Francisco, and Columbia mines. These mines operated immediately adjacent to expansive riverine wetlands. No adverse impacts were observed during active operation and wetlands continue to exist today.

In fact, mining within these areas has often resulted in a post-mine topography with increased wetland areas and connectivity. Some of the largest and most highly visited areas for outside recreational activities are previously mined areas that provide vast benefit and protection for fish and wildlife. These managed areas include the following sites that are open to the public to enjoy and recreate.

- Patoka National Wildlife Refuge in Oakland City, Indiana (6,600 acres)
- Sugar Ridge Fish and Wildlife Area in Winslow, Indiana (8,100 acres)
- Greene-Sullivan State Forest near Linton, Indiana (9,000 acres)
- Peabody River King Fish and Wildlife Area in New Athens, Illinois (2,220 acres)
- Minnehaha Fish and Wildlife Area near Dugger, Indiana (3,500 acres)
- Bluegrass Fish and Wildlife Area near Elberfeld, Indiana (2,532 acres)
- Pyramid State Park near Pinckneyville, Illinois (19,701 acres)
- Peabody Wildlife Management Area near Madisonville, Kentucky (45,732 acres)

If not for mining, these areas would be dominated by an agricultural land use and both the wildlife and public recreational value of these sites would be minimal. Some of these areas are praised and frequented by the National Audubon Society for the bird species that thrive on the mixed grassland, forested, and water land uses such as the marsh hawk, bald eagle, and least tern. These areas provide large habitats over the fragmentation that has occurred during development of the countryside for agriculture and residences. Many of the wildlife areas were mined pre-SMCRA without federal regulations and yet are now considered pristine wildlife refuges. Nature is resilient and the implications by many that mining results in permanent devastation is not borne out by these examples.

12.1.1.7 DIRECT IMPACTS TO AQUATIC LIFE IN PIGEON CREEK & FLOODPLAINS FROM *STANLEY PIT* NPDES DISCHARGES

Stanley Pit is required to obtain an NPDES permit prior to commencing mining activity. The NPDES permit is expected to contain requirements similar to other mines within the Pigeon Creek watershed. These requirements are more stringent than the Federal Effluent Limitation Guidelines (ELG) for coal mining and provide an additional level of protection to aquatic life. Specifically, the permit is expected to contain the typical ELG monitoring parameters of flow, pH, Total Suspended Sediment (TSS), Settleable Solids (SS), and iron. Additional monitoring parameters that have been required of mines within the Pigeon Creek watershed include Total Dissolved Solids (TDS), sulfate, chloride, magnesium, manganese, and hardness, most of which are specifically aimed at monitoring for water quality standards for aquatic life protection.

The *Stanley Pit* operation is fully expected to be able to comply with the additional water quality monitoring at this site. During the permitting process, there were no acid or toxic producing geologic strata identified that would necessitate special handling. Bedrock and unconsolidated material within the permit area is net alkaline. Runoff from disturbed areas is expected to be neutral to alkaline pH and low in dissolved metal concentrations.

Data collected to date at the adjacent Seven Hills Mine, which contains similar underlying geology and will be similar in operation, provides an initial view of the expected water quality at *Stanley Pit* (See **MAP J2**). The analysis summarized in **TABLE 31** compares water quality data collected between 3/17/2020 and 12/31/2022 to applicable NPDES effluent limits for pH, TSS, SS, and iron and applicable water quality standards for sulfate, chloride, and manganese. Since mining commenced, the operation has collected 1,831 individual parameters. Of these, effluent / standard comparisons were completed for 705 individual parameters. Over this period, there was only one exceedance of NPDES limitations or water quality standards. This is a 99.9% compliance rate for compliance-related parameters.

Results show that discharges are alkaline, with low overall suspended and settleable sediments. Sulfates and chlorides are low overall and consistently below aquatic life thresholds. Iron and manganese are also low, indicative of the alkaline conditions and minimal potential for leaching of metals from overburden materials. The excursion that occurred over this period was for iron at Outfall 001 in November of 2020. The total iron was likely associated with the suspended sediment (34 mg/L for the sample in question), where iron is bound within the sediment and is not bioavailable to aquatic life. The operation immediately took action to redesign and increase freeboard in the sediment basin, redirect the impounded water to another pond with significantly more storage capacity, and finally seed the exposed areas in the sediment basin's watershed once weather permitted.

TABLE 31 NPDES OUTFALL ANALYSIS FROM 1ST QTR 2020 THROUGH 4TH QTR 2022 AT THE SEVEN HILLS MINE

Location	Statistics	Flow	pH, Field	Total Suspended Solids	Settleable Solids	Chloride	Sulfates	Iron	Manganese
		N	N	N	N	N	N	T	T
		GPM	S.U.	MG/L	ML/L	MG/L	MG/L	MG/L	MG/L
SHM001	Count	70	13	1	11	4	4	1	4
	Average	12.87	8.45	35.0	0.2	2.5	34	4.34	0.13
	Maximum	300	8.9	35	0.2	4	48	4.341	0.33
	Minimum	0	7.5	35	0.2	1.7	17	4.341	0.06
	Exceedance	--	0	0	0	0	0	1	0
SHM002	Count	70	68	38	29	15	15	38	16
	Average	451.30	8.61	10.4	0.2	33.6	467	0.35	0.19
	Maximum	2000	8.95	26	0.2	132	954	1.01	0.678
	Minimum	0	7	2	0.1	4.2	56	0.013	0.003
	Exceedance	--	0	0	0	0	0	0	0
SHM003	Count	67	26	7	18	10	10	7	10
	Average	18.87	8.35	18.1	0.2	18.1	88	0.73	0.10
	Maximum	300	8.91	34.4	0.2	28	322	2.66	0.202
	Minimum	0	7.3	4	0.2	4.9	6	0.013	0.003
	Exceedance	--	0	0	0	0	0	0	0
SHM004	Count	71	66	36	29	16	16	36	16
	Average	260.76	8.65	18.9	0.2	9.1	375	0.75	0.11
	Maximum	2500	8.95	34	0.2	39.5	728	2.38	0.19
	Minimum	0	7	2	0.1	1.8	50	0.013	0.003
	Exceedance	--	0	0	0	0	0	0	0
SHM005	Count	68	43	18	24	14	14	18	14
	Average	147.22	8.55	21.6	0.2	15.1	258	0.84	0.33
	Maximum	2000	8.96	34.6	0.2	87	519	1.955	0.877
	Minimum	0	7.2	8	0.2	3.4	38	0.331	0.003
	Exceedance	--	0	0	0	0	0	0	0

Note: This analysis is limited to monitoring parameters that have NPDES limits or applicable water quality standards.

Similarly, water quality within Pigeon Creek can be compared to applicable water quality standards and upstream and downstream locations can be compared to determine if there is a measurable change in water quality across the site (See **MAPS J1, J2**). **TABLE 32** shows data collected at sites within the Pigeon Creek floodplain (SW-125 and SW-3B) and sites within Pigeon Creek (SW-N1, SW-3, SW-1). Parameters include pH, TSS, sulfate, chloride, iron, manganese, and selenium. Floodplain sites are limited in the number of samples as they were collected during the *Stanley Pit* baseline sampling, which consisted of 6 samples collected in 2020. SW-125 is located at the Stanley Road crossing and SW-3B is located at the Seven Hills Road bridge (See **MAP J1**). Pigeon Creek sites from upstream to downstream include SW-N1 at the interstate bridge, SW-3 at the Seven Hills Road bridge, and SW-1 at the Boonville New Harmony Road bridge (See **MAP J2**). Note that Seven Hills NPDES discharges are located between SW-3 at Seven Hills Road and SW-1 at Boonville New Harmony Road.

Water quality within the floodplain is alkaline with relatively low suspended solids concentrations and slightly elevated iron and manganese concentrations. The suspended sediment concentrations within the floodplain suggest a low overall suspended sediment level. This may be misleading simply because none of these samples

were collected during an out-of-bank flood event on Pigeon Creek. During flood events water quality in Pigeon Creek and the adjacent floodplain is extremely turbid and high in suspended sediment.

Water quality within Pigeon Creek shows no significant change from upstream (SW-N1), to midstream (SW-3), to downstream (SW-1) (**TABLE 32**). Slight increases or decreases for individual parameters are all well within the range expected as a result of variability in ambient water quality, analytic methods, and sampling procedures. There have been no measured exceedances of water quality standards for pH, chloride, sulfate, manganese, or selenium. This data shows that there are no measurable water quality impacts occurring as a result of active mining. *Stanley Pit* water quality is expected to be similar to Seven Hills Mine, due to similar geology and similar operational plans. Nonetheless, in order to ensure that water quality is maintained within Pigeon Creek and there are no measurable impacts to the aquatic life as a result of NPDES discharges, additional sampling parameters will be proposed for the *Stanley Pit* permit stream sampling locations. Also, the NPDES permit was issued in February 2024 and requires additional monitoring parameters in the NPDES permit, consistent with the Seven Hills Mine.

TABLE 32 UPSTREAM TO DOWNSTREAM WATER QUALITY ANALYSIS FOR PIGEON CREEK & FLOODPLAIN SAMPLING

Mine	Location	Statistics	Flow	pH, Field	Total Suspended Solids	Chloride	Sulfates	Iron	Manganese	Selenium
			N	N	N	N	N	T	T	D
			GPM	S.U.	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Stanley Pit	STPSW125	Count	6	5	5	0	0	5	5	0
		Average	80	6.92	10.9	--	--	3.04	2.39	--
		Maximum	340	7.02	13.4	--	--	5.32	3.85	--
		Minimum	0	6.88	10	--	--	1.29	0.2	--
		Exceedance	--	0	0	--	--	2	0	--
Stanley Pit	STPSW3B	Count	5	5	6	0	0	6	6	0
		Average	295	7.06	11.0	--	--	2.02	0.29	--
		Maximum	561	7.43	21	--	--	3.681	0.74	--
		Minimum	54	6.7	2	--	--	1.02	0.083	--
		Exceedance	--	0	0	--	--	1	0	--
Stanley Pit	STPSWN1	Count	5	5	6	0	0	6	6	0
		Average	8,523	7.96	14.7	--	--	1.44	0.18	--
		Maximum	10,400	8.36	29	--	--	2.57	0.2	--
		Minimum	6,700	7.65	2	--	--	0.409	0.15	--
		Exceedance	--	0	0	--	--	0	0	--
Seven Hills	SHMSW03	Count	12	12	11	11	11	12	12	7
		Average	22,680	8.40	13.9	17.0	715	0.56	0.13	0.0014
		Maximum	76,202	8.8	31	39.5	1250	1.068	0.24	0.00182
		Minimum	1,540	7.8	4.8	5.4	230	0.013	0.003	0.0009
		Exceedance	--	0	0	0	0	0	0	0
Seven Hills	SHMSW01	Count	12	12	11	11	11	12	12	7
		Average	23,936	8.40	13.7	18.1	626	0.56	0.15	0.0011
		Maximum	78,320	8.76	33	52.5	1164	1.79	0.325	0.0017
		Minimum	1,590	7.8	2	5.5	188	0.013	0.003	0.0009
		Exceedance	--	0	0	0	0	0	0	0

Note: These samples have been collected during active mining at Seven Hills Mine (See **MAP J2**). SW-125 is located in the Pigeon Creek floodplain near Stanley Road and SW-3B is located within the Pigeon Creek floodplain just upstream of Seven Hills. SW-N1 is located in Pigeon

Creek at the interstate crossing, upstream of the *Stanley Pit*. SW-3 is located in Pigeon Creek and the Seven Hills Road bridge, downstream of Stanley Pit and upstream of Seven Hills. Lastly, SW-1 is located in Pigeon Creek downstream of Seven Hills Mine at the Boonville New Harmony Road bridge.

12.1.1.8 DIRECT IMPACT TO THE AQUATIC LIFE STRUCTURE AS A RESULT OF *STANLEY PIT* NPDES DISCHARGES

Biological assessments were conducted for the *Stanley Pit* and included assessment of the mIBI and RBP scores at 11 representative stream sites and the fIBI at 5 representative stream sites. These representative locations received habitat quality (RBP) scores ranging from 53 to 124 out of a total score of 200, equating to a stream habitat rank of suboptimal to poor. Macroinvertebrate mIBI scores ranged from 22 to 30 out of a total score of 60, equating to a category of “not supporting” for the aquatic life designated use. Fish community fIBI scores ranged from 16 to 36, rating the sites as very poor, poor, and fair.

There are several factors that can contribute to lower scores. Watershed size was one significant factor in the fIBI score, with larger watersheds receiving higher scores. This is a logical outcome of the higher baseflow and flood event flow rates seen in larger watersheds, leading to increased aquatic habitat. Stream habitat was predominantly affected by the surrounding land use, with forested streams exhibiting higher scores while streams with agricultural or timber harvesting impacts exhibiting lower scores. Macroinvertebrate mIBI scores were impacted by low diversity, which is potentially an outcome of the seasonal flow regime in these intermittent streams and the low abundance of coarse substrate.

The aquatic community at these sites is also affected by the indirect connection that exists with Pigeon Creek. These streams drain to the Pigeon Creek remnant channel or dissipate into the Pigeon Creek floodplain prior to connection with the entrenched and dredged Pigeon Creek channel. This limits upstream colonization and recruitment of species from the larger Pigeon Creek watershed. The moderate to low scores achieved in the biological survey data shows that these streams and wetlands have been indirectly impacted by upstream land use changes and downstream hydrologic modifications, despite the fact that they are surrounded by forested land use within the immediate *Stanley Pit* project area.

The Hydrogeomorphic (HGM) approach for assessing wetland function was utilized at two different locations within the Pigeon Creek floodplain immediately adjacent to the *Stanley Pit* permit area. The calculated Functional Capacity Index ranged from 0.81 to 0.85. The scores are comparable to the HGM monitoring results within the Pigeon Creek floodplain at the adjacent Seven Hills Mine, where HGM monitoring has been collected annually.

Data collected at the adjacent Seven Hills Mine can also be used to predict potential indirect effects of adjacent mining to the wetland and stream function within the floodplain system. Three locations located immediately adjacent to the Seven Hills Mines are monitored utilizing the Hydrogeomorphic (HGM) approach for determining wetland function (See **MAP J2**). Monitoring history is shown below in **TABLE 33**.

TABLE 33 SUMMARY OF HGM MONITORING AT THE SEVEN HILLS MINE

Monitoring Locations	2020	2021	2022
HGM 1	0.84	0.85	0.83
HGM 2	0.83	0.84	0.81
HGM 3	0.87	0.83	0.86

Results show little variability in the wetland function indices within the floodplain wetland downgradient from the Seven Hills Mine. Annual reports have noted no significant changes in the forest community structure within this area despite the active mining that is occurring immediately to the west of the monitoring locations. A similar lack of measurable impact can be expected in the floodplain wetland adjacent to the *Stanley Pit*.

Biological monitoring also occurs within the adjacent floodplain wetland at Seven Hills Mine. **TABLE 34, 35, and 36** provide a summary of the RBP, mIBI, and fIBI scores at locations within the floodplain and within Pigeon Creek over the period of mining. Locations Bio 1 Bio2, and Bio 3 are located within the floodplain stream channels and locations AS3 and AS1 are located in Pigeon Creek, upstream and downstream from the operation, respectively (See **MAP J2**).

RBP monitoring shows a stable habitat quality within the floodplain and Pigeon Creek. RBP, mIBI, and fIBI scores within Pigeon Creek have been stable during mining and show little difference between the upstream and downstream locations. Temporary changes in the mIBI and fIBI scores are likely a result of the flow regime at the time of sampling and interannual and seasonal variability in the macroinvertebrate and fish communities. However, there is no apparent downward trend in any of the implemented metrics.

TABLE 34 SUMMARY OF RBP MONITORING AT THE SEVEN HILLS MINE

Monitoring Locations	Baseline	2020	2021	2022
AS3	126	103	102	100
AS1	126	100	95	96
Bio 1	91	88	87	91
Bio 2	86	72	87	82
Bio 3	71	85	86	84

TABLE 35 SUMMARY OF MIBI ASSESSMENTS AT THE SEVEN HILLS MINE

Monitoring Locations	Baseline*	2020 Q2	2020 Q3	2021 Q2	2021 Q3	2022 Q2	2022 Q3
AS3	36	34	36	34	32	32	28
AS1	34	34	36	32	30	34	22
Bio1	18	32	NA	32	NA	36	NA
Bio2	20	NA	NA	30	NA	28	NA
Bio3	24	28	NA	26	NA	32	NA

Note: Baseline collected in 2011 for AS3 and AS1 and in 2018 for Bio1, Bio2, and Bio3.

TABLE 36 SUMMARY OF FIBI ASSESSMENTS AT THE SEVEN HILLS MINE

Monitoring Locations	Metric	Baseline	2020 Q2	2020 Q3	2021 Q2	2021 Q3	2022 Q2	2022 Q3
AS3	Score	28	24	26	22	24	24	20
	Rank	Poor	Poor	Poor	Very Poor	Poor	Poor	Very Poor
AS1	Score	26	26	22	18	24	22	20
	Rank	Poor	Poor	Poor	Very Poor	Poor	Very Poor	Very Poor
Bio1	Score	42	34	Dry	18	Dry	36	Dry
	Rank	Fair	Poor	Dry	Very Poor	Dry	Fair	Dry
Bio2	Score	22	NA	Dry	14	Dry	16	Dry
	Rank	Very Poor	0	Dry	Very Poor	Dry	Very Poor	Dry
Bio3	Score	16	18	Dry	12	Dry	14	Dry
	Rank	Very Poor	Very Poor	Dry	Very Poor	Dry	Very Poor	Dry

Note: Baseline collected in 2011 for AS3 and AS1 and in 2018 for Bio1, Bio2, and Bio3

Another method of identifying a shift in aquatic community is to analyze the macroinvertebrate community and the individual mIBI metrics. Macroinvertebrates are typically more sensitive to changes in substrate and water quality than fish or forest communities, making the mIBI an appropriate index of comparison.

A common identifier of aquatic disturbance is the percent tolerant and percent intolerant macroinvertebrates. A gradual and continuous shift in aquatic community to more tolerant species would be indicative of a direct or indirect outside effects. Sites AS3 and AS1, located upstream and downstream on Pigeon Creek, respectively, show a relatively steady tolerant / intolerant taxa makeup (**TABLE 37**, See **MAP J2**). Sites Bio1, Bio2, and Bio3 show greater variability but do not show any significant trend in tolerant or intolerant taxa over time. Again, this is further evidence that a shift or change in the aquatic community structure is unlikely to be caused directly or indirectly by adjacent mining operations.

TABLE 37 PERCENT OF TOLERANT & INTOLERANT MACROINVERTEBRATE TAXA ASSESSED AT THE SEVEN HILLS MINE

Monitoring Locations	Sampling Period	2020 Q2		2020 Q3		2021 Q2		2021 Q3		2022 Q2		2022 Q3	
	Metric	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score
AS3	% Intolerant taxa	4.4	1	1.4	1	0.0	1	4.3	1	1.1	1	8.7	1
	% Tolerant taxa	8.1	5	13.0	3	7.2	5	7.8	5	6.4	5	15.9	3
AS1	% Intolerant taxa	4.6	1	4.6	1	0.7	1	6.8	1	5.5	1	0.0	1
	% Tolerant taxa	11.6	5	3.9	5	9.4	5	13.6	3	8.9	5	31.7	1
Bio1	% Intolerant taxa	0.8	1			0.0	1			1.9	1		
	% Tolerant taxa	35.5	1			35.7	1			39.3	1		
Bio2	% Intolerant taxa					0.0	1			0.0	1		
	% Tolerant taxa					66.0	1			53.7	1		
Bio3	% Intolerant taxa	0.0	1			0.0	1			0.0	1		
	% Tolerant taxa	31.9	1			76.4	1			52.3	1		

In summary, there should be no detrimental effect to the physical, chemical, and biological integrity of adjacent and downstream WOTUS from this project. The previous analysis was based on the actual observations and data collected both onsite and at the adjacent Seven Hills Mine. This included the NPDES water quality and exceedance history, the instream water quality in the receiving streams measured both upstream and downstream of the operations, and the biological data collected in streams and wetlands (RBP, mIBI, fIBI, HGM). This analysis showed no detrimental impacts or significant trends in water quality or the aquatic life community. The data presented on floodplain wetlands is similar, showing that wetland function and value are being retained during active mining in an adjacent area with no negative impacts or trends are observed in Pigeon Creek during the active mining at the Seven Hills Mine.

12.1.1.9 DIVERSITY, LONG-TERM PROTECTION, AND HYDROLOGIC INFLUENCE

Pigeon Creek floodplains and Pigeon Creek secondary impacts would include improved upstream habitat with hard masted tree plantings and increased diversity. Additionally, long-term protection instruments will provide protection of habitat in perpetuity from anthropomorphic impacts from logging, clearing for agriculture or residential development. Some planted trees will have exfoliating bark providing ideal roosting habitat for the Indiana bat and northern long-eared bat and tricolored bats will benefit from the tree top foliage.

Surface mining and reclamation at the *Stanley Pit* will have a positive effect by providing hydrologic benefit following resaturation of the spoil and ultimate release. Increased permeability of the surface area will allow greater infiltration across the site. Final cut impoundments will provide flood storage, allow for settling of suspended sediment in runoff improving downstream water quality, decrease the magnitude of flood flows to downstream reaches, and increase baseflows following precipitation events.

<WILD BOAR STANLEY PIT LRL-2020-00269-GJD CUMULATIVE IMPACTS DISCUSSION ENDS>

12.1.3 LAND RESOURCES

The Seven Hills Mine – Mining Area Addition project is in the Southern Wabash Lowlands Ecoregion which is characterized by an undulating landscape consisting of many wide, shallow valleys. Stream channels are typically low to medium gradient. This broad, undulating lowland was formed in non-resistant, non-calcareous sedimentary rock which was partially glaciated. Many wide, flat-bottomed, terraced valleys occur and are filled with alluvium as well as outwash, eolian, and lacustrine deposits. Patterns of land use vary within the ecoregion. Drained alluvial soils are farmed while un-drained valleys are used for pasture or remain wooded, though the latter remains mostly in scattered patches. Upland soils are used for farming and livestock. The original vegetation included mixed mesophytic forest to the west, swamp forest to the south, and oak-hickory forests in drier upland areas with isolated prairies scattered throughout. Today, the productive soils support corn, soybean, wheat, and vegetable farming with scattered wooded areas. Surface coal mining has also occurred in this ecoregion as it is located along the rim of the Illinois Basin where coal deposits outcrop or occur at easily recoverable depths.

TABLE 38 summarizes the various land covers within the local HUC12 and HUC8 watersheds along with the acreage that has been previously affected by mining. Within the project area, there has been no historical surface mining, but a portion of the Seven Hills Mine has been previously underground mined.

TABLE 38 LAND COVER SUMMARY BY HUC WATERSHEDS

Land Cover	Highland-Pigeon HUC8 Watershed	Clear Branch-Pigeon Creek HUC12 Watershed
	(percent)	(percent)
Agricultural/Pasture	59	51
Forest/Wildlife	21	35
Open Waters/Wetlands	4	9
Urban/Developed	16	5
Total:	100	100
Watershed	235,252 acres	22,961 acres

As shown in **TABLE 38**, agriculture is a significant land use in the Highland-Pigeon watershed as well as the immediate Clear Branch-Pigeon Creek.

In the local region, crop and livestock production have impacted stream water quality and stream habitat due to erosion from the cultivated fields. While some farmers incorporate soil conservation practices to retain topsoil, numerous agricultural operations fail to do so. **TABLE 39** shows the cropping conditions that were practiced in 2011 for Warrick County, which has an area of 250,200 acres.

TABLE 39 2013 WARRICK COUNTY CROPPING PRACTICES¹²

Warrick County Cropping Practices	Soybeans	Corn
	(acres)	(acres)
No Till	17,100	10,000
Mulch Till	800	800
Reduce Till	8,000	8,700
Conventional	12,100	21,600
Total:	42,500	38,000

As shown in **TABLE 39**, the conventional farming practice is the primary method used for corn and accounts for a substantial portion of soybean production. This practice has impacted water quality ever since modern-day

farming began utilizing larger tracts of land and modern machinery. Agricultural ditches were dug along field borders to facilitate farming while field tiles were installed to speed drainage of the fields. Runoff from exposed fields rapidly deposits sediment and soil amendments into adjacent streams affecting the overall water quality of the local watersheds and the region.

Based on the percentage of hydric soils and approximate stream length in the HUC12 watershed, it is estimated that in general there is a wetland density of approximately 0.209 acres of wetland per acre and a stream density of approximately 14 linear feet per acre. Hydric soils are strong indicators of wetland presence and require consistent wetland conditions extended over a significant length of time for formation. This makes the hydric soil density an appropriate surrogate for identifying previously known wetlands in estimates of past effects. Using these factors, current agricultural practices including crops and pasture lands (11,710 acres) have potentially impacted 2,447 acres of wetlands and 163,940 linear feet of streams within the HUC12 Clear Branch-Pigeon Creek watershed.

The water quality in the local and regional watersheds would greatly improve if more farming operations would utilize conservation tillage practices. Conservation practices have several benefits, including reducing the amount of sediment introduced into the streams, decreasing the amount of airborne dust, slowing down runoff, and decreasing the need for abundant field conditioners required for crop production. Fortunately, recent trends point to an increase in conservation farming practices and a decrease in conventional tillage practices.

Coal mining associated with the Seven Hills – Mining Area Addition is a temporary use of the land. A reclamation plan which outlines the types and location of the post-mining land uses is required as a part of the SMCRA permit. The Indiana SMCRA program requires that no prime farmland be lost, and only minimal forest loss can occur. As such, operations prioritize these land use types in the post-mine reclamation, again reiterating that impacts to these land uses will only be temporary. Prime farmland acreage must be maintained and will utilize conservation tillage methods and forests are replanted with priority hardwood species. These reclamation activities will be conducted simultaneously with the mining operations to minimize the area of disturbance. For the 9.12 acres of prime farmland depicted in the SMCRA permit within the Mining Area Addition, this farmland acreage will be transferred to an adjacent Applicant-owned mine for development to allow the portion in the Mining Area Addition to be developed into PFO wetlands.

12.1.4 COAL RESOURCES

Along with agriculture, coal mining is another large part of the economy in southwest Indiana, although the areal impacts are comparably minor. Statistics for Warrick County show that 121,690 acres¹³ (48.6%) of the county is occupied by farms and used for crops or permanent pasture compared to the approximately 80,662 acres (32.2%) as determined by the Indiana Coal Mine Information System that have been previously affected by mining with many of these acres overlapping due to modern reclamation practices that limit loss of agricultural land.

As was previously described, Warrick County has a rich heritage of coal mining, dating as far back as 1818. Due to the geographic location in the Illinois Basin, both underground and surface mining have affected land in the receiving watersheds. **TABLE 40** shows the approximate surface effects in acres for the respective watershed. Areas previously affected by mining are those that have been either reclaimed or abandoned by any company. Areas currently affected by mining include the actively working open pit, locations of coal preparation and handling activity and areas that do not have topsoil yet placed over the spoil. Underground mining activities that include locations of surface support facilities and coal preparation and handling activity are also included. Areas currently affected by mining include operations by all companies in the area, not just the Applicant. It should be noted that information on potentially affected by mining acreages for other coal mine operators within the watersheds is not known. Only the permitted surface mineable reserves are listed for the Applicant. The “Potentially Affected by Mining” acreages includes the remaining reserve at the active Seven Hills Mine (as of June 2021), the active High Point Mine, and project area for the Wild Boar Stanley Pit and the Seven Hills Mining Area Addition.

TABLE 40 HUC12 WATERSHED CUMULATIVE SURFACE EFFECTS SUMMARY

Watershed	Watershed Area	Previously Affected by Mining	Watershed Previously Affected by Mining	Currently Affected by Mining	Watershed Currently Affected by Mining	Potentially Affected by Mining	Watershed Potentially Affected by Mining
	(acres)	(acres)	(percent)	(acres)	(percent)	(acres)	(percent)
Headwaters Bluegrass Creek (051402020301)	11,424	442	3.9	0	0	29	0.3
Clear Branch – Pigeon Creek (051402020203)	22,961	10,940	48.4	155	0.7	3,949	17.2

The Seven Hills – Mining Area Addition will produce an additional 1.5 million tons of coal.

12.1.4.1 PAST MINING STREAM AND WETLAND IMPACTS

To estimate past mining impacts to streams and wetlands, a stream density per acre and a wetland density per acre was determined from delineated features on modern mining permits within the watershed. These densities were applied to the acreages impacted without Section 404 authorizations. **TABLE 41** depicts the estimated stream and wetland impact from previous mining that occurred within the watersheds of Headwaters Bluegrass Creek and Clear Branch-Pigeon Creek. While the impacts seem significant, they are comparable to what has been impacted due to agriculture. (See **12.5 LAND RESOURCES**).

Within the HUC12 watershed of Clear Branch-Pigeon Creek, there have been four (4) modern surface mining permits that have received Section 404 authorization through the U.S. Army Corps of Engineers: Seven Hills Mine, Liberty Mine, Elites Mine, and High Point Mine. **TABLE 41** depicts the impacts to jurisdictional waters based on those authorizations and any amendments obtained to extend mining.

TABLE 41 HUC12 WATERSHED STREAM AND WETLAND IMPACTS FROM PAST MINING

Watershed	Previously Affected by Mining	Stream Impacts	Wetland Impacts
	(acres)	(feet)	(acres)
Headwaters Bluegrass Creek (051402020301)	442	17,105*	7.51*
Clear Branch – Pigeon Creek (051402020203)	11,886	420,388**	185.17**

* Denotes based on estimated stream and wetland density for HUC (38.7 ft of streams/acre and 0.017 acres of wetland/acre)

** Denotes combination of estimated densities and delineated features

12.1.4.2 FUTURE MINING STREAM AND WETLAND IMPACTS

TABLE 42 provides the estimated stream and wetland impacts for potential mining areas within the 12-digit watersheds. Potential impacts include the features in the Wild Boar Stanley Pit and any future reserves held by the Applicant that may be surface mined. Potential impacts from other mining operators within the watershed are unknown.

TABLE 42 HUC12 WATERSHED POTENTIAL STREAM AND WETLAND IMPACTS FOR FUTURE MINING

Watershed	Potentially Affected by Mining	Stream Impacts	Wetland Impacts
	(acres)	(feet)	(acres)
Headwaters Bluegrass Creek (051402020301)	107.6	0	0
Clear Branch – Pigeon Creek (051402020203)	648.9	37,135*	18.47*

* Denotes potential impacts will require compensatory mitigation and provide a net environmental lift

Before implementation of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), little consideration was given to stream replacement. After 1977, reclamation was focused on reclaiming land to support a productive use which emphasized controlling sedimentation and erosion control using terraces, swales, and water and sediment control basins. Past mining in Indiana appears to have decreased the overall stream length, but greatly increased wetland and open water acreages. Many of these areas, such as the nearby Blue Grass Fish and Wildlife Area, are unique natural resource areas that provide and maintain quality hunting, fishing, and wildlife watching opportunities for local citizens and visitors. It has only been recently that natural stream design has been required by regulatory agencies.

A portion of the previously affected acreage in the Highland-Pigeon watershed predates any law or regulation to reclaim the mined land to the standards of today and has been claimed to have contributed to several of the receiving streams being listed on the 303(d) list for impairments¹⁷. However, a TMDL performed in 2011 for the Pigeon-Highland watershed does not mention mining impacts and focuses on E. coli and impaired biotic communities mainly associated with farming and publicly owned treatment works. Mining effects in the watershed have become negligible with the advanced measures incorporated for sediment control and reclamation of the land with topsoil and vegetation.

It should be noted that Indiana coal operators pioneered strip mine reclamation in the United States when miners banded together to form the Indiana Coal Producers Association in 1918. They decided to revegetate the spoil banks they had created with the primary focus on reforestation to obtain a cash crop and for aesthetics. Most of the early plantings, starting in 1926 were primarily locust with some hardwoods. Not all coal companies adopted this reclamation practice until 1941, when the state of Indiana enacted the second strip mine legislation in the nation requiring that all companies not only try to reclaim and reforest but also obtain permits and secure bonds to ensure compliance. The law included a provision for active coal companies to reforest an additional percent of previously stripped land than they mined each year to help in revegetating previously unreclaimed lands.

According to the Indiana Geological Survey - Coal Mine Information System¹⁹, the previously mined areas adjacent to the Wild Boar Stanley Pit were mined by the Ayrshire Mine (southwest), Lynnville Mine (east), and Elites Mine (east). The Ayrshire Mine was in operation from 1973 to 1989 and the portions of the Lynnville Mine adjacent to the Stanley Pit were in operation from 1967 through 1989. Elites Mine was in operation from 2012 through 2016 and had Section 404 authorization under permit application: LRL-2006-1614-gjd. The areas within these permit areas have all been reclaimed which included grading of the spoil, covering it with stockpiled soils, and revegetating it with the appropriate vegetation for the approved post-mining land use. Based on knowledge of replaced soil thicknesses on previously mined reclaimed areas, it is likely that soil depths range from 0-15 inches with many areas consisting of best available material (BAM) (spoil/soil mix). Today the primary land features include wildlife and forested habitat interspersed with open water impoundments.

12.1.5 ABANDONED MINE LANDS (AML)

Areas to the east and south of the project area have been heavily mined since the 1970s. Visible signs of historic mining such as spoil piles and pit lakes still exist throughout the region. A large percentage of this land area was mined prior to the Surface Coal Mine Control and Reclamation Act of 1977 resulting in ungraded spoil ridges which are now heavily vegetated and provide wildlife habitat.

While the State of Indiana has historically required reclamation of coal mined lands since 1941, these laws had varying requirements until the federal SMCRA law was passed in 1977. The Abandoned Mine Lands (AML) Program with the Indiana Department of Natural Resources Division of Reclamation has been in service since 1982 and has been responsible for the restoration of many acres of hazardous and unproductive land. SMCRA provided for the collection of fees on active coal mining to fund this activity. In Indiana, the program is funded by tonnage fees from underground (13.5 cents per ton) and surface (31.5 cents per ton) mines. Approximately \$42 million has been spent on AML reclamation projects in Warrick County through 2018.

The Office of Surface Mining (OSM) ranks the AML sites into five (5) categories based on the level of hazard the site poses. Priority 1 and 2 are the most serious AML problems which pose a threat to the health, safety, and general welfare of the public, Priority 3 are AML problems impacting the environment, Priority 4 involves public facilities, and Priority 5 includes the development of publicly owned lands. Approximately \$211 million has been spent on AML projects in Indiana as of 2018. The Abandoned Mine Lands Program is actively working on plans and restoration projects in the area. Thousands of acres in southwest Indiana have been reclaimed and the area will only increase. These lands are being returned to a productive state while reducing sediment, erosion, and acid mine drainage into the receiving waters.

The Seven Hills – Mining Area Addition will produce 1.5 million tons of coal a year and will contribute a minimum of \$473,000 to the AML fund to remedy those adverse effects of past coal mining conducted prior to SMCRA.

12.1.6 SURFACE WATER QUALITY

None of the streams in the Seven Hills – Mining Area Addition are on the Outstanding Rivers List for Indiana²². The Indiana Department of Environmental Management (IDEM) in accordance with Sections 305(b) and 303(d) of the Federal Clean Water Act (CWA) reports to the USEPA on the quality of Indiana surface water. IDEM provides a list of those waters that are assessed and designated as impaired, which are waters that do not meet applicable water quality standards for one or more designated uses. Indiana designated uses include recreational uses, aquatic life uses, fish consumption, and public water supply. The resource quality of each assessment unit is determined by computing the level of support or attainment for each applicable designated use. For each assessment unit (i.e., stream or open water) and for each designated use applicable to that assessment unit, IDEM concludes one of two possible use-support levels: “Fully Supporting” or “Not Supporting”. Fully Supporting means the designated use is attained; Not Supporting means the designated uses were not attained.

The IDEM Office of Water Quality (OWQ) develops Indiana's 303(d) List of Impaired Waters as part of the state's Integrated Water Monitoring and Assessment Report (IR), which is submitted to the U.S. EPA every two years in accordance with Sections 305(b) and 303(d) of the Clean Water Act (CWA). CWA Section 305(b) requires states to make water quality assessments and provide water quality reports to the U.S. EPA, and CWA Section 303(d) requires states to identify waters through their Section 305(b) water quality assessments, that do not or are not expected to meet applicable state water quality standards with federal technology-based standards alone. Under CWA Section 303(d), states are also required to develop a priority ranking for these waters considering the severity of the pollution and the designated uses of the waters. Once this listing and ranking of impaired waters is completed, states are required to develop Total Maximum Daily Loads (TMDLs) for these waters to achieve compliance with the water quality standards.

These requirements were met for the 2018 cycle by the submission of Indiana's 2018 IR to the U.S. EPA. The 2018 IR also included IDEM's 2020 update to the Consolidated Assessment and Listing Methodology. On May 9, 2019, U.S. EPA issued partial approvals on Indiana's 2012, 2014, 2016, and 2018 Section 303(d) Lists, approving most of the proposed listings but refraining from taking action with regard to certain segment listings for metals.

Per these documents the following impairments are listed for receiving waters adjacent and downstream to the Seven Hills – Mining Area Addition and they are included on **TABLE 43**.

TABLE 43 INDIANA'S DRAFT 2018 303(D) LISTED WATERS⁵⁴

HUC12 Watershed	County	Assessment Unit ID	Assessment Unit Name	Cause of Impairment
Headwaters Bluegrass Creek (51402020301)	Warrick	INE0231_01	Bluegrass Creek	E. coli
Headwaters Bluegrass Creek (51402020301)	Vanderburgh	INE0231_02	Bluegrass Creek – Unnamed Tributary	Dissolved Oxygen
Headwaters Bluegrass Creek (51402020301)	Vanderburgh	INE0231_02	Bluegrass Creek – Unnamed Tributary	Impaired Biotic Communities
Headwaters Bluegrass Creek (51402020301)	Warrick	INE0231_03	Bluegrass Creek	E. coli

HUC12 Watershed	County	Assessment Unit ID	Assessment Unit Name	Cause of Impairment
Headwaters Bluegrass Creek (51402020301)	Warrick	INE0231_04	Bluegrass Creek	E. coli
Headwaters Bluegrass Creek (51402020301)	Vanderburgh	INE0231_T1009	Bluegrass Creek – Unnamed Tributary	Dissolved Oxygen
Headwaters Bluegrass Creek (51402020301)	Vanderburgh	INE0231_T1009	Bluegrass Creek – Unnamed Tributary	Impaired Biotic Communities
Headwaters Bluegrass Creek (51402020301)	Vanderburgh	INE0231_T1010	Bluegrass Creek – Unnamed Tributary	Dissolved Oxygen
Headwaters Bluegrass Creek (051402020301)	Vanderburgh	INE0231_T1010	Bluegrass Creek – Unnamed Tributary	Impaired Biotic Communities
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1004	Pigeon Creek – Unnamed Tributary	E. coli
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1007	Clear Branch	E. coli
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1008	Pigeon Creek – Unnamed Tributary	E. coli
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1009	Pigeon Creek – Unnamed Tributary	E. coli
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1010	Squaw Creek	E. coli
Clear Branch-Pigeon Creek (05142020203)	Warrick	INE0223_T1012	Pigeon Creek – Unnamed Tributary	E. coli
Receiving Waters in the Downstream HUC12 Watersheds				
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_01	Pigeon Creek	Dissolved Oxygen
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_01	Pigeon Creek	Nutrients
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_02	Pigeon Creek	PCBs (Fish Tissue)
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_03	Pigeon Creek	Dissolved Oxygen
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_03	Pigeon Creek	Nutrients
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_04	Pigeon Creek	Dissolved Oxygen
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_04	Pigeon Creek	Nutrients
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_05	Pigeon Creek	Dissolved Oxygen
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_05	Pigeon Creek	Nutrients
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_06	Pigeon Creek	Dissolved Oxygen
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_06	Pigeon Creek	Nutrients
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_07	Pigeon Creek	PCBs (Fish Tissue)
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_08	Pigeon Creek	PCBs (Fish Tissue)
Kleymeyer Park-Pigeon Creek (51402020306)	Vanderburgh	INE0236_09	Pigeon Creek	PCBs (Fish Tissue)

Regarding biotic impairments to aquatic communities, this is the most prevalent impairment to stream segments (more than 3,000) in Indiana and occurs throughout the state in many areas not associated with coal mining. An Impaired Biotic Community (IBC) listing on Indiana’s 303(d) list means IDEM’s monitoring data shows one or both aquatic fish and invertebrate communities are not as healthy as they should be. Although listed as impairment, IDEM states that IBC is not a source of impairment but a symptom of other sources such as loss of habitat by stream channelization and clearing for agriculture.

Numerous conditions can cause water pollution in the area. These can include sediment from the erosion of exposed earth, nutrients from soil amendments, oxygen-demanding wastes from septic systems, acidic ions from improperly handled coal waste, toxic metals from illegal dumping, and biological waste from septic systems and animal operations. Sources of pollution can be divided into two categories: point source pollution and non-point pollution. Point source pollution is typically discharged from a pipe while non-point source pollution is more

widespread and cannot be pinpointed to one location. This pollution is discharged primarily in response to precipitation events.

Agricultural activities provide much of the non-point source pollution within the watersheds. Land clearing and conventional tilling of the land makes soil susceptible to erosion. Soil amendments such as pesticides and fertilizers can also be washed from the fields. Erosion can be a problem on soils that have slopes of more than 2%. Loss of the surface layer is damaging for several reasons. Soil productivity is reduced as the surface soil is removed and part of the subsoil is incorporated into the planting layer. The subsoil is generally lower in plant nutrients, lower in organic matter, and higher in clay content compared to the surface soil. As the content of organic matter decreases in the planting layer and the content of clay increases, soil tilth deteriorates, resulting in soil crusting and a reduced rate of water infiltration. Erosion results in the sedimentation of streams, rivers, road ditches, and lakes which impacts water quality. Conservation tillage along with vegetated buffer strips along the streams and ditches would greatly minimize sediment and nutrient loads into the streams. Runoff from urban and residential land use is not a large source of pollution for the immediate receiving waters of this permit as it is in largely a rural community. Runoff from impervious features such as roofs and roadways increase discharge to the receiving streams rather than allowing the rainfall event to soak into the ground. This increased discharge can accelerate stream bank erosion and sediment transport.

Due to the rural nature of the watersheds, the primary sewage treatment for many homes is the septic system that may include a septic drain field or be connected into field drainage tiles. Improperly maintained septic systems that have not been cleaned out reduce the efficiency of the system to treat the sewage properly. Failing septic systems are known sources of E. coli as well as phosphates which can cause impairments in aquatic resources. Due to forested areas being concentrated along the stream corridors, wildlife can also cause impairments in the aquatic resources. Many animals such as deer, geese, ducks, raccoons, and turkeys spend time in or around water bodies contributing to their potential impairment. Small livestock operations within these watersheds that are not regulated due to their small size under the confined animal feeding operation regulations can also have an impact on the water quality.

Regional or general area post-mine surface water quality in comparable streams is expected to fall within those ranges or concentrations referenced in documents of USGS Water Resource Investigation Report 85-4234, and/or USGS Open File Report 81-423. Variations in quality and quantity parameters (including seasonal) for local stream surface waters under post-mining conditions are estimated as listed in **TABLE 44**.

TABLE 44 LOCAL WATER QUALITY SEASONAL VARIATION RANGE

Parameter/Analyte	Local Stream Surface Water Seasonal Variation Range
pH (S.U.)	7.0 – 9.2
TDS (mg/l)	40 – 2,500
acidity (mg/l)	<1 - 100
alkalinity (mg/l)	30 - 630
total iron (mg/l)	<0.1 – 45.0
total manganese (mg/l)	<0.01 – 3.0
TSS (mg/l)	<2 - 480
Flow Rate (cfs)	0.0 – 2,400

The USEPA developed a public access website and interactive mapping tool that provides the public information about the condition of their local waters based on data that states, federal, tribal, local agencies and other have provided to the EPA. The tool is called “How’s My Waterway” located at <https://mywaterway.epa.gov>. On July 18, 2025, the site was accessed for the local HUC12 watershed. **TABLE 45** and **46** depict information found on the website.

TABLE 45 USEPA MYWATERWAY INFORMATION

HUC12 Watershed	Waterbodies	Monitoring Locations	Permitted Dischargers	Dischargers with Significant Violations	Identified Issues	Impairment Category	Watershed Health Score
Clear Branch-Pigeon Creek (051402020203)	27	16	6	0	2 waterbodies are good, 5 waterbodies are unknown, and 20 waterbodies are impaired	Bacteria and Other Microbes were the primary impairments with one waterbody also listed as impaired from degraded aquatic life, low oxygen, and nitrogen and/or phosphorus	0.68

TABLE 46 USEPA MYWATERWAY CLEAR BRANCH-PIGEON CREEK INFORMATION

Named Feature	State Waterbody ID	Condition	Assessment Year	Aquatic Life	Fish & Shellfish Consumption	Swimming & Boating
Ayrshire Slurry Pond	INE02P1022_00	Condition Unknown	2024, Not Assessed	Condition Unknown	Condition Unknown	Condition Unknown
Clear Branch	INE0223_T1014	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Newmaster Lake	INE02P1021_00	Condition Unknown	2024, Not Assessed	Condition Unknown	Condition Unknown	Condition Unknown
Pigeon Creek	INE0223_05	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek	INE0223_07	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek	INE0223_06	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1005	Good	2024	Good	Condition Unknown	Good
Pigeon Creek – Unnamed Tributary	INE0223_T1011	Condition Unknown	2024, Not Assessed	Condition Unknown	Condition Unknown	Condition Unknown
Pigeon Creek – Unnamed Tributary	INE0223_T1018	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1019	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1020	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1012	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1009	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1003	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Pigeon Creek – Unnamed Tributary	INE0223_T1004	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Squaw Creek	INE0223_T1010	Impaired	2024	Condition Unknown	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Squaw Creek – Unnamed Tributary	INE0223_T1010A	Condition Unknown	2024, Not Assessed	Condition Unknown	Condition Unknown	Condition Unknown
Wabash and Erie Canal	INE0223_T1017	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli

Named Feature	State Waterbody ID	Condition	Assessment Year	Aquatic Life	Fish & Shellfish Consumption	Swimming & Boating
Wabash and Erie Canal	INE0223_T1013	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Wabash and Erie Canal	INE0223_T1021	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Wabash and Erie Canal – Unnamed Tributary	INE0223_T1015	Impaired	2024	Good	Condition Unknown	Good
Wabash and Erie Canal – Unnamed Tributary	INE0223_T1016	Impaired	2024	Good	Condition Unknown	Impaired-Bacteria and other microbes: E. coli
Washing Recirculating Reservoir	INE02P1014_00	Condition Unknown	2024, Not Assessed	Condition Unknown	Condition Unknown	Condition Unknown

As previously discussed, sediment from agriculture is a major pollutant for Midwest streams. USGS Water Supply Paper 2404 contains an analysis of suspended sediment concentrations in streams and rivers around the state. The seven continuous record stations that were analyzed had median concentrations that varied from 24 to 61 mg/L with maximum concentrations ranging from 501 to 27,900 mg/L. Several other partial record stations were analyzed and showed median concentrations ranging from 6 to 539 mg/L with maximum concentrations reaching as high as 44,500 mg/L. If you were to visit typical receiving streams for southern Indiana mines during a sizable rainfall event you would see clear water coming from a sediment basin and water often resembling chocolate milk in the actual streams. Agricultural operations also use fertilizer which is a major source of increased nutrient loads in receiving streams. In the area surrounding the project area, previous mining operations (both SMCRA and pre-SMCRA) were conducted in the areas east, south, and north of the permit. However, baseline data does not indicate an effect on the downgradient Pigeon Creek water quality because of this past mining.

12.1.6.1 DOWNSTREAM WATER QUALITY, INCLUDING PIGEON CREEK

For the proposed project, the SMCRA reclamation plan ensures the fill material used as direct discharges into waters of the U.S. would be free of acid-forming toxic-forming materials. During the mining process, the sediment control ponds ensure the runoff from areas disturbed during mining would not adversely affect downstream water quality. Sedimentation basins are effective measures to remove suspended solids entrained in runoff from disturbed areas at surface mines.

It is typically commented from federal agencies during the Section 404 application process that “during mining, sediment concentrations and load rates increase dramatically downstream compared to the pre-mining condition due to increased total suspended solids and total dissolved solids. Mining also increases erosion that can alter streamflow and transport sediment and pollutants which adversely affects downstream ecosystems.” The article that federal agencies site as proof is the 2000 Journal of The American Water Resources Association by James Banta entitled Impact of Coal Surface Mining and Reclamation on Suspended Sediment in Three Ohio Watersheds. It is misleading to reference this study and compare it to the measures currently successfully used to meet the limits set within the mine’s federal National Pollutant Discharge Elimination System (NPDES) permit and the state Section 401 Water Quality Certification. The mine studied in the article employed NO EROSION AND SEDIMENT CONTROL MEASURES. The runoff from the mine was released directly offsite. There were no sedimentation ponds or diversions to isolate the sediment laden water from the clean water diversions. Increased sediment loading would be expected at a mine that did not employ attempts to control sediment from surface mining activity and had no regard for downstream water quality. The Seven Hills – Mining Area Addition will operate with sediment control measures and provide continual sampling and monitoring to protect downstream water quality.

12.1.6.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

The Seven Hills Mine has an NPDES permit authorizing mine-related discharges. Onsite surface water runoff will be controlled with a network of diversions and ditches that direct the runoff to sediment basins for treatment of runoff prior to discharge. Sedimentation basins are located as close to the disturbance area as practicable and are required to contain or treat the runoff resulting from the 10-year 24-hour precipitation event. These

sedimentation basins have permitted NPDES outfalls and the discharges are subject to permit-specific effluent limitations. The effluent testing requirements for the NPDES general permit program in Indiana are more stringent than the federal limits for coal mining and are sufficient to address any potential water quality problems. The sediment basins at the Seven Hills Mine are classified as alkaline mine drainage, which are monitored for flow, pH, suspended solids, settleable solids, and iron. The Seven Hills Mine permit specifically lists additional parameters for monitoring as a result of its location in the Pigeon Creek watershed, which include Total Dissolved Solids (TDS), chloride, sulfate, magnesium, manganese, and hardness. Any effects of the Seven Hills – Mining Area Addition on surface water quality should be temporary and minimal. However, these effects should diminish after reclamation and eventually return to within ambient ranges.

Adherence to the NPDES permit conditions and pollution control measures outlined in the SMCRA Mining Permit operation and reclamation plan will effectively prevent offsite impacts to the receiving streams surrounding the Mining Area Addition project and would not be expected to result in any long-term material change from presently observed water quality or quantity below or exiting the Seven Hills Mine permit area. Specific permit sections in the DOR SMCRA Mining Permit that are related to stormwater control include, but are not limited to, the following:

- Part VI.D.2.a: Lists several measures intended to protect surface water and groundwater systems within the permit and adjacent areas. These include use of professionally designed sediment basins, sumps, diversion and control ditches, and temporary and permanent terracing.
- Part VI.D.2.a: Best Management Practices for sediment control will also be installed as needed including straw dikes, rip-rap filters to control flow and routing of surface water, drop structures, and filter fences, vegetative stabilization, and others.
- Part VI.B.2.a: Identifies the surface water monitoring program for identifying and addressing potential impacts to the receiving stream water quality. Seven (7) monitoring locations are proposed for monitoring during active mining.
- Part VI.D.2.a: Several other measures are listed regarding surface water protection including the use of neutralization and / or settling agents for treatment of water to meet performance standards, identification and isolation of toxic or acidic materials, pit water management and treatment with sediment control structures, and restoration of reclaimed areas and original drainage patterns.
- Part VI.D.2.a: There are also measures specifically aimed at groundwater protection including isolation of toxic or acidic overburden in reduced conditions below the post-mine groundwater table, proper reclamation of boreholes, chemical analysis of bedrock proposed for mining to estimate net neutralization.
- Part VI B.2.b: Identifies all sediment basins to be constructed to control runoff from the affected area, of which there are 13 in total. Stabilization methods, planting rates, and mulching rates are listed for inlets, outlets, and side slopes / out slopes of sediment basins. Sediment basin maintenance requirements are provided including control of erosion, monitoring and repair of spillways, and removal / cleanout of excess sediment.
- Attachment VI.B.2.b.1.D: This discusses treatment of surface water discharges with chemicals prior to discharge. Approved chemicals are listed and include sodium hydroxide, hydrated lime, quick lime, soda ash, agricultural limestone, sodium bicarbonate, and lists potential use of aluminum sulfate or other polymer-based flocculants upon approval from IDEM. Treatment application is also discussed.
- Attachments VI.B.2.b.2 and VI.B.2.b.3.B: Sediment basin design maps, cross sections, and specifications, including required sizing, drainage area, dam height, design volume, and average depth are provided.

- Attachment VI.B.2.c: Diversion design maps and specifications are provided. This includes discussion of 1) diversion construction methods including minimizing slope and design velocity, 2) stabilization techniques including seeding, mulching, and use of biodegradable erosion control blankets, and 3) revegetation rates, species, regrading, and soil replacement techniques for temporary diversions.
- Attachment VI.B.2.d.2: Discusses control of runoff when within 100 feet of perennial or intermittent streams. Stream reconstruction methods are discussed and reference the same techniques as those provided in the Section 404 permit application narrative and compensatory mitigation plan.
- Attachment VI.B.2.e: Addresses construction and activities within watersheds greater than 640 acres (one square mile). In this case there are several sediment basins that are partially located within a portion of the Pigeon Creek floodplain but are not located in the effective floodway necessary for the conveyance of the design flood event. The phased levee construction that will occur during mine advance is discussed.
- Part VI.D.1: Discusses the protection of the hydrologic balance. This demonstrates pre-mining and post-mining surface water quality, including the poor ambient quality of Pigeon Creek. This part also provides the benefits to surface water quantity that occur as a result of sediment basin construction including increased baseflow to receiving streams, decrease flood magnitudes and an increase in the watershed response time to precipitation and snow melt events from mined areas. Lastly, this section addresses compliance with NPDES permit limits, utilization of approved water treatment additives, and protection of immediately adjacent waterbodies.

Discharges from the site would be pursuant to the approved NPDES discharge permit and all discharges from project outlets are expected to fully meet assigned §402 NPDES effluent limits. The assigned NPDES effluent limits are consistent with the Federal Effluent Limitation Guidelines (ELG) and are designed to protect water quality both in the receiving stream and downstream aquatic environment. As previously stated, the NPDES permit also contains additional monitoring parameters that are more stringent than the Federal ELG requirements. The proposed project will also be conducted in accordance with a State §401 Water Quality Certification, which contains required conditions that prevent and minimize offsite contributions of pollutants. Lastly, compliance with the Applicant's plan as described in Part 6.D.1 of the SMCRA permit would also prevent the possible exposure of jurisdictional waters to any potentially toxic or acidic materials and would greatly reduce and minimize potential for acid formation and / or toxic leaching.

The NPDES permit program prohibits anybody from discharging "pollutants" through a "point source" into a "water of the United States" unless they have an NPDES permit. The permit contains limits on what you can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge meets water quality standards and protects public health and the environment. This permit translates the general requirements of the Clean Water Act into specific provisions tailored to the operations of each operation discharging pollutants.

NPDES effluent limits must be met for any affected water that is discharged from the site. These limits are designed to protect aquatic life and meet Indiana State Water Quality Standards (WQS). Based upon a review of the baseline and current water quality in Pigeon Creek, there is not a significant difference in water quality in water samples collected upstream of the previously mined Millersburg North mining and reclamation site and water samples taken downstream of it. Therefore, secondary effects to water quality are not expected as a result of the proposed project.

Measures to prevent impacts to Pigeon Creek and other jurisdictional waters include, but are not limited to, construction of sediment control structures, development of a surface and groundwater monitoring program, isolation and treatment of potentially acidic or toxic materials, contemporaneous reclamation that is completed in a timely manner, and use of additional Best Management Practices (BMPs) such as diversion of runoff from undisturbed areas, construction of sumps internal to the treatment network, construction of terraces in the

reclaimed landscape, stabilization of slopes and runoff conveyances, use of check dams and silt fence, chemical treatment of effluent if and when necessary, and reestablishment of riparian buffers adjacent to the compensatory stream mitigation. These measures will limit total suspended solids (TSS) in the effluent by detaining water long enough to allow the sediment to settle prior to discharge. The monthly average effluent limit for total suspended sediment at coal mines is 35 mg/l with the actual averages being much lower in similar settings for coal mines in Indiana. These limits are significantly lower than the aforementioned concentrations observed in Indiana streams and rivers. Reduction in TSS also inherently reduces concentrations of the total iron, manganese, and nutrients that are found within the soil and sediment molecular framework. Fertilizer application will be reduced during mining thus reducing dissolved nutrient loading downstream. The use of sediment basins and BMPs has proven successful in reducing erosion and sediment loss within the permit area as well as improving the water quality downstream.

12.1.6.3 PIGEON CREEK MONITORING

The Applicant is currently conducting sampling in Pigeon Creek for nutrients before, during, and after mining upstream and downstream for the adjacent downstream active Seven Hills surface mine. The IDEM NPDES 402 permit for Seven Hills requires monitoring of pH, total iron, suspended solids (TSS), and settleable solids (SS) in the discharge from sediment basins that receive alkaline mine drainage. These parameters are the typical constituents in coal mine runoff and are effective indicator parameters for identifying water quality issues. Additionally, IDEM added monitoring requirements to the Seven Hill's NPDES permit issued on May 29, 2019 for the following pollutants of concern: TDS, chloride, sulfate, magnesium, manganese, and hardness (CaCO_3). In accordance with the compensatory mitigation plan, if the downstream monitoring shows an exceedance of the aquatic life standards for selenium, sulfate or chloride, an investigation of water quality at Seven Hill's outfalls will be conducted to identify whether the source of the pollutants is onsite. If the source is determined to be onsite, best management practices (BMPs), reclamation status and procedures, and other operational processes such as onsite pumping will be evaluated to determine if changes or improvements can be made to minimize onsite concentrations and avoid offsite impacts. Operational adjustments may consist of short-term corrective actions or long-term changes to the reclamation plan. Examples of corrective actions that can be used to minimize selenium, sulfate and chloride generation include minimizing disturbed area and covering exposed areas with suitable soil materials, altering the pumping circuit to minimize offsite discharges and/or increase dilution of waters with elevated concentrations, and selective handling and placement of selenium, sulfate and chloride source strata.

The following information is from the 2023 Annual Monitoring Report for the Seven Hills Mine.

As stated in the Seven Hills Mine Compensatory Mitigation Plan, the water quality in Pigeon Creek must be evaluated annually for potential direct effects to aquatic life. In particular, the TDS, sulfate, chloride, and selenium concentrations would be compared to existing water quality standards and triggers. As is shown in **TABLE 47**, there were no exceedances of the aquatic life water quality standards for sulfate, chloride, or selenium, at either the upstream or downstream sampling locations. Sulfate and chloride concentrations were well below the water quality standards for aquatic life. The downstream concentrations are comparable to and often times less than the range exhibited at the upstream location for sulfate and chloride. Chloride concentrations are comparable upstream and downstream, with no consistent difference between the locations. Both sulfate and chloride concentrations follow the water quality standards and show that Pigeon Creek possesses significant assimilative capacity for both parameters.

Selenium concentrations were all measured below the detection limit and two of the four sample events, the lab was able to achieve detection limits below IDEM's recently finalized standard of 3.1 $\mu\text{g/L}$. Selenium concentrations in Pigeon Creek are consistently in compliance, even with the significantly lower water quality standard.

There is no water quality standard for TDS. Instead, the CMP outlines a statistical trigger comparison that is used to identify upstream to downstream changes in water quality. For TDS, there were no individual exceedances of the 95% Upper Prediction Limit. The 95% Upper Prediction Limit is based on sampling completed at the upstream location and is indicative of the upper range of background concentrations that are expected in Pigeon Creek. The

fact that no downstream samples exceeded this range indicates that the individual TDS concentrations observed at the downstream location were within the predicted range of the upstream location. This is true over the entire period of record. Both the upstream and downstream locations show significant seasonality, with TDS increasing over the summer and fall periods as evapotranspiration increases and precipitation decreases. Maximum concentrations for the year were measured in October, with a concentration of 2,900 mg/L at the upstream location SW03 and 2,000 at the downstream location SW01. Again, this is indicative of the mild drought periods that occurred in summer and continued through the fall. The Seven Hills CMP also outlines the use of confidence intervals on the mean to identify more subtle changes in downstream water quality, such as long-term trends. The confidence intervals on the mean continue to show significant overlap between the upstream and downstream locations. Upstream location SW03 has a mean concentration between 999 and 1,628 mg/L with 95% confidence. Downstream location SW01 shows a mean concentration between 975 and 1,438 mg/L with 95% confidence. The relatively large range is due to the seasonality that is observed, resulting in relatively large standard deviation values. Nonetheless, the overlapping ranges show that there is no statistically significant change in water quality when comparing upstream to downstream. In fact, the downstream location is showing a lower average TDS, with 95% confidence. These results are similar to previous monitoring since 2020, demonstrating that the mining operation is having no adverse impact on Pigeon Creek water quality.

For the remainder of the parameters that were sampled, **TABLE 48** shows the mean, maximum, and minimum statistics of each parameter. At both upstream and downstream locations, the waters have a neutral pH and are considerably alkaline with alkalinity greatly exceeding the acidity. Total suspended sediment, iron, manganese, and magnesium concentrations are comparable between the locations. Additionally, the nutrient concentrations are similar upstream and downstream, with the downstream location showing slightly lower nitrogen and nitrate concentrations and slightly higher phosphorus concentrations. However, these minor upstream to downstream differences are well within the range of sampling and analytic variability expected in the natural environment.

TABLE 47 **2023 PIGEON CREEK WATER QUALITY MONITORING**

	1st Quarter 2023		2nd Quarter 2023		3rd Quarter 2023		4th Quarter 2023	
	3/15/2023		6/20/2023		9/14/2023		10/18/2023	
	SW03	SW01	SW03	SW01	SW03	SW01	SW03	SW01
Field Measurements								
pH (Field)	8.81	8.5	8.63	8.52	8.53	8.53	8.6	8.68
Temperature (°C)	5.4	5.3	24.9	23.7	21.6	20.9	13.7	13.7
General Water Quality								
Hardness, mg equivalent CaCO3/L	200	170	820	940	267	262	530	520
Acidity as mg CaCO3/L	<10	<10	<10	<10	<10	<10	<10	<10
Alkalinity, mg CaCO3/L	296	230	289	321	345	336	223	328
Total Dissolved Solids, (mg/L)	860	960	1840	1750	1900	1800	2900	2000
Total Suspended Solids (mg/L)	16.5	25	19.4	9.4	4.8	4.2	6.8	<2.9
Chloride	--	--	21	25	25	23.5	23	21.5
Sulfate, SO4 (mg/L)	210	280	700	660	780	700	1060	960
Metals (Total)								
Iron, Fe - Total (mg/L)	0.431	0.512	0.813	0.334	0.362	<0.1	<0.3	<0.3
Magnesium, Mg - Total (mg/L)	46.2	39.5	61.2	61.9	64.2	63.1	68.9	69
Manganese, Mn - Total (mg/L)	0.17	0.164	<0.003	<0.003	<0.1	<0.1	<0.3	<0.3
Metals (Dissolved)								
Selenium, Se - Dissolved (µg/L)	<5	<5	<3	<3	<3	<3	<5	<5
Nutrients								
Phosphorus (mg/L)	<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	<0.1
Phosphorus Orthophosphate (mg/L)	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
Total Nitrogen (mg/L)	2.6	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrogen Nitrate (mg/L)	2.6	2.5	0.16	0.19	0.2	0.22	0.25	0.19
Nitrogen Nitrite (mg/L)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Total Kjeldahl Nitrogen (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Standards / Triggers								
Sulfate (mg/L)	NA	NA	2583.6	2596.2	1762	1776	2654.1	2601.3
Chloride (mg/L)	355.301	336.326	434.25	448.59	341.94	343.37	384.86	386.2
Selenium (µg/L)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
TDS 95% Upper Prediction Limit (mg/L)	--	2284	--	2316	--	2349	--	2561
TDS Mean 95% Lower Confidence Interval (mg/L)	870	876	912	909	952	941	999	975
TDS Mean 95% Upper Confidence Interval (mg/L)	1473	1353	1498	1378	1525	1403	1628	1438
**Note: SW03 is the upstream sampling location, SW01 is the downstream sampling location.								

TABLE 48 2023 PIGEON CREEK WATER QUALITY STATISTICS

	SW03			SW01		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
Field Measurements						
pH (Field)	8.6	8.5	8.8	8.6	8.5	8.7
Temperature (°C)	16.4	5.4	24.9	15.9	5.3	23.7
General Water Quality						
Hardness, mg equivalent CaCO ₃ /L	454.3	200.0	820.0	473.0	170.0	940.0
Acidity as mg CaCO ₃ /L	10*	<10	<10	10*	<10	<10
Alkalinity, mg CaCO ₃ /L	288.3	223.0	345.0	303.8	230.0	336.0
Total Dissolved Solids, (mg/L)	1875.0	860.0	2900.0	1627.5	960.0	2000.0
Total Suspended Solids (mg/L)	11.9	4.8	19.4	10.4	<2.9	25.0
Chloride	23.0	21.0	25.0	23.3	21.5	25.0
Sulfate, SO ₄ (mg/L)	687.5	210.0	1060.0	650.0	280.0	960.0
Metals (Total)						
Iron, Fe - Total (mg/L)	0.5	<0.3	0.8	0.3	<0.1	0.5
Magnesium, Mg - Total (mg/L)	60.1	46.2	68.9	58.4	39.5	69.0
Manganese, Mn - Total (mg/L)	0.1	<0.003	0.3	0.1	<0.003	0.3
Metals (Dissolved)						
Selenium, Se - Dissolved (µg/L)	4.0*	<3.0	<5.0	4.0*	<3.0	<5.0
Nutrients						
Phosphorus (mg/L)	<0.1	<0.1	<0.1	0.10	<0.1	0.11
Phosphorus Orthophosphate (mg/L)	0.16*	<0.16	<0.16	0.16*	<0.16	<0.16
Total Nitrogen (mg/L)	1.4	<1.0	2.6	1.4	<1.0	2.5
Nitrogen Nitrate (mg/L)	0.8	0.2	2.6	0.8	0.2	2.5
Nitrogen Nitrite (mg/L)	0.15*	<0.15	<0.15	0.15*	<0.15	<0.15
Total Kjeldahl Nitrogen (mg/L)	1.0*	<1.0	<1.0	1.0*	<1.0	<1.0
*All values below detection. Based on arithmetic mean of MDLs.						
**Note: SW03 is the upstream sampling location, SW01 is the downstream sampling location.						

In summary, all parameters monitored follow the water quality standards and triggers detailed in the Seven Hills CMP. Additionally, the downstream sampling concentrations are within the expected ranges of the upstream sampling location. This indicates that the Seven Hills project has had no measurable impact to the water quality in Pigeon Creek.

12.1.6.4 SURFACE WATER HYDROLOGY

The site mean annual runoff is about 14 inches. Maximum mean monthly stream flow normally occurs between March and May during spring rains. The maximum peak flow typically corresponds to thunderstorms occurring in June or July. Runoff from the project area is collected by low order streams that drain into Pigeon Creek's remnant channel or dissipate onto the floodplain. Streams flow in valley configurations until they reach the floodplain of Pigeon Creek where the stream grades flatten and dissipate into the wetlands. These permitted streams have been negatively impacted from the Pigeon Creek channelization, past farming, logging and flooding from beaver activity and is clear by the dissected nature of the topography as headcuts perpetuated up the drawls when Pigeon Creek's base level changed.

Surface water hydraulics within the reclaimed area are expected to be like pre-mine condition. Flows may be higher in the disturbed area due to the removal of vegetation during active mining. This temporary effect is moderated by the required construction of sediment basins. Sediment basins also dampen downstream flood magnitudes and extend baseflow conditions to receiving streams because of staged storage within the impoundment. No negative impacts to surface water quantities are expected because of the Seven Hills – Mining Area Addition project.

12.1.7 GROUNDWATER

No known residential groundwater wells or wellhead protection zones that exist in or within 1,000 feet of the project area. The stratigraphic interval above and immediately below the lowest coal seam, the Indiana **Coal-5**, to be mined is known to not be a significant aquifer for potable water in this area. This conclusion is based on information obtained from a variety of sources including drilling, review of available water well records, the extent of public water supply distribution lines, and talking with the local public. The local lithology above the coal seams to be mined consist of complexly interbedded and discontinuous shale and sandstone lenses exhibiting low permeability. Low permeability materials are generally poorly suited for development as reliable sources of potable water.³⁰

SMCRA requires a detailed description of the area hydrogeology and the development of a groundwater monitoring program to be used during the mining and reclamation operations through the release of the final bond. This data is evaluated to determine any effects of surface mining activities on the recharge capacity of reclaimed lands and the quantity and quality of waters systems in and within 1,000 feet of the project area. Groundwater wells are sampled and monitored within and adjacent to the permit to provide representative quality and quantity data for the following parameters: pH, total dissolved solids (TDS), total iron, total manganese, acidity, alkalinity, and water level.

Extracting the coal by surface methods requires the breakup and removal of the bedrock overburden (spoil) to expose the coal. As part of the reclamation process, the spoil is placed in the previous pit where the coal has been removed. Due to the exposure of certain minerals in the spoil, recharging groundwater within the spoil may exhibit increased mineralization. This effect would be confined to the immediate mined area due to the low permeability of the adjacent undisturbed bedrock materials. The general chemical processes that occur as water moves through spoil are the dissolution of calcite, dissolution of dolomite, consumption of oxygen, consumption, and release of carbon dioxide, dissolution of pyrite and gypsum, precipitation of goethite (or iron hydroxide), and release of sodium ions by ion exchange²⁸. This elevation in concentrations diminishes with time.

After mining and reclamation operations are completed, replaced soil infiltration may be slightly reduced because of compaction caused by the heavy equipment used to redistribute the earthen materials. Soil compaction will be minimized where possible by direct haul-back of soil. To help restore the recharge capacity of the mined area, replaced soil can be chisel plowed or ripped to reduce compaction. Post-mining land management practices such as terracing, moderation of slopes, revegetation, and production of crops are used to improve soil recharge capacity where applicable. Mine spoil generally exhibits higher recharge capacity than undisturbed material although this moderates in time due to settlement and weathering. Hydraulic conductivity of spoil in southern Indiana can range from 10^{-4} to 10^{-6} cm/sec. Bedrock permeabilities in southern Indiana generally range from 10^{-6}

to 10^{-8} cm/sec while the unconsolidated permeabilities in the area generally range from 10^{-3} to 10^{-7} cm/sec. Extensive mining was conducted along Pigeon Creek in the adjacent area. Current downstream baseline water quality does not reflect a significant influence from this past mining.

12.1.7.1 GROUNDWATER QUALITY AND QUANTITY

Most groundwater wells in the southwestern Indiana generally comprise two basic kinds:

- Shallow, large diameter, dug wells completed in surficial unconsolidated material and
- Drilled wells completed in the shallow bedrock.

No shallow-excavated, privately owned wells are known to be in use in or within 1,000 feet of the project area. Any local residential wells would otherwise not be expected to exhibit water quantity or quality changes during or following proposed mining activities. Pertinent reporting supports that such local sources (wells) located beyond the project area are encompassed by native/undisturbed media exhibiting physical characteristics restricting subsurface hydrologic communication within the corresponding unconsolidated or consolidated horizons to be contacted in proposed mining. Shallow wells, and wells producing from any of the proposed coal seams to be mined and/or located contiguous to surface mining and reclamation activities, could experience temporary decreases in water levels. Similarly, ground water in conducive bedrock (or voids therein) proximal to surface mining limits could experience decreased quantity as a result of either a temporary reduction in its capability to laterally recharge, or from decreased local hydraulic head (temporarily altering ground water flow direction). At a minimum, water levels should return to pre-mining static elevations after backfilling operations have been completed and the spoil mass is optimally saturated. A post-mining recharge increase in undisturbed bedrock adjacent to the mined area may occur. Wells completed in aquifers below the lowest coal seam proposed to be mined should not be affected either in quantity or quality. These aquifers are isolated from local downward migration by low permeability strata and are recharged mostly from off-site areas.

The reclaimed mining areas may exhibit a flattened (reduced relief) water table compared to pre-mine conditions because of the increased permeability of spoil. Ground water mounding may also occur. Ground water contained within in the reclaimed spoil area may exhibit increased mineralization. This effect should generally be confined to the mined areas, and immediately adjacent areas. The general chemical processes that occur as water moves through spoil are dissolution of calcite, dissolution of dolomite, consumption of dissolved oxygen, consumption and release of carbon dioxide, dissolution of pyrite and gypsum, precipitation of goethite (or iron hydroxide), and release of sodium ions by ion exchange (Hall and Davis, 1986).

Regional, or general area post-mine ground water quality in comparable reclaimed mine spoil, unconsolidated, or consolidated media is expected to occur within those ranges or concentrations referenced in documents of USGS Water Resource Investigation Report 82-639, and/or USGS Open File Report 81-423.

12.1.7.2 ANALYSIS OF IMPACTS TO THE GROUNDWATER TABLE FROM OPEN PIT MINING

When mining is conducted below the water table, groundwater flow in the immediate area will be directed towards the excavation. To evaluate the potential effects of the Seven Hills – Mining Area Addition on the water table and Pigeon Creek floodplains wetlands, a seepage analysis was conducted using analytic methods commonly used to evaluate groundwater flow towards open mine pits. The groundwater flow to the mine void will be dependent on the local hydrogeologic conditions, particularly the hydraulic conductivity of the geologic units.

HYDROGEOLOGY

SOILS: Soil types are generally reflective of the unconsolidated and bedrock geology. The Pigeon Creek floodplain wetlands consist predominately in the Bonnie silt loam. The Bonnie silt loam is characterized in the

Soil Survey of Warrick County (U.S.D.A., 1979) as exhibiting low permeability. If there were major sand and gravel deposits present at the site, coarser-grained soils would be expected with increased permeability.

UNCONSOLIDATED MATERIALS: Unconsolidated materials beneath the soil upper horizons above the bedrock interface have not been well characterized in the borings conducted in the floodplain area. Most boring logs only report a thickness of “unconsolidated” however a few borings specify that clay comprises this interface. A slug test performed on the unconsolidated section in the area found a horizontal hydraulic conductivity of 6.4×10^{-5} cm/sec. Typically, vertical hydraulic conductivities are an order of magnitude less, further slowing the flow through the unit. These hydraulic conductivity values indicate finer-grained materials such as fine silt or clay confirmed by the soil type and field observation. The thickness of the unconsolidated material along the eastern edge of the pit at the Seven Hills Mine ranges from around 33.5 - 34.8 feet with a mean of 34.3 feet (see Borings A-8, A12, A-14, and A-20 in the SMCRA Permit S-00357 application). These borings were drilled within the Pigeon Creek remnant paleochannel and the thickness of the unconsolidated material are representative of the thickness within the Pigeon Creek floodplain wetlands.

BEDROCK: The bedrock in this area consists primarily of low permeability shale with lesser components of sandstone, limestone, and coal. A slug test conducted on a bedrock well at the adjacent Seven Hills Mine indicated a hydraulic conductivity of 3.5×10^{-7} cm/sec. Hydraulic conductivity on the order of 1×10^{-7} cm/sec is the value required for landfill liners to protect the groundwater. A range from 1×10^{-6} to 1×10^{-8} cm/sec is typical for southern Indiana bedrock. Again, the vertical conductivity would likely be an order of magnitude less.

METHODS

SEEPAGE CALCULATIONS: Groundwater inflow or seepage into an open mine pit is commonly calculated in the mining industry using analytic solutions (Vandersluis et al 1995). Two analytic solutions that are applied to flow within the unconsolidated zone are the Dupuit and the Dupuit-Foreheimer equations.

The Dupuit equation is used to calculate groundwater flow per unit width from an unconfined water table towards a seepage face (see **FIGURE 5 – UNCONFINED FLOW TO A SEEPAGE FACE**). Groundwater flow per unit width is calculated as follows:

$$q = K \frac{h_2^2 - h_1^2}{2L} \quad (1)$$

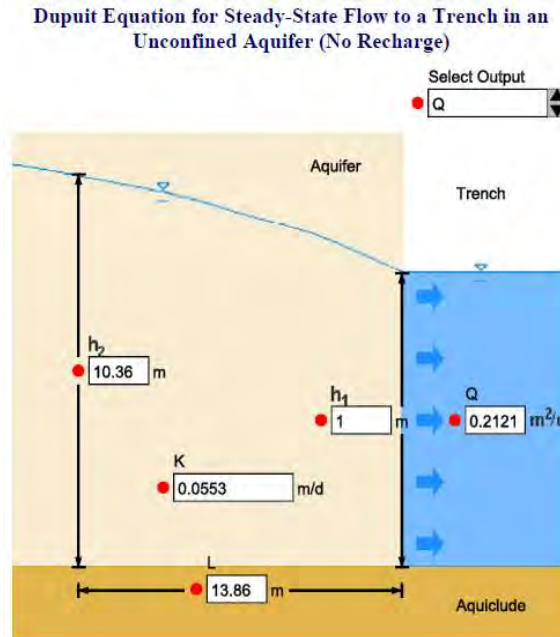
Where:

- q = flow per unit width (m²/d)
- K = hydraulic conductivity (m/d)
- h₁ = head measured at the seepage face (m)
- h₂ = head measured at the radius of influence (m)
- L = distance between head measurements (m)

This equation assumes that aquifer is unconfined, isotropic, and of uniform thickness. The equation is dependent on the distance between the head measurements which can be estimated using the radius of influence calculations discussed later in this document. The flow per unit width can then be multiplied by the length of the open pit if evaluating one side of the mine excavation or the entire perimeter to estimate the total seepage into the mine void.

FIGURE 5 UNCONFINED FLOW TO A SEEPAGE FACE

Source: Dupuit Equation Calculator tool developed by Robertson GeoConsultants, Inc. available at www.edumine.com



Alternatively, seepage into a mine excavation from an unconfined water table can be predicted using the Dupuit-Forcheimer equation. This method treats the mine void in the same manner as a group of wells that surround the periphery of the pit. The wells are then approached as a single large equivalent well which receives radial groundwater flow. In this scenario the groundwater is converging towards the open mine pit (or equivalent well) from a distant source (see **FIGURE 6 – FLOW TO UNCONSOLIDATED ZONE EQUIVALENT TO WELL OR MINE PIT**). The Dupuit-Forcheimer equation follows:

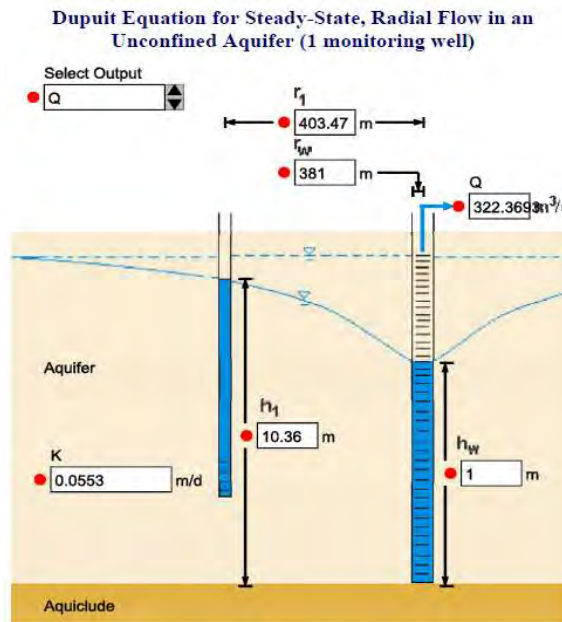
$$Q = \frac{\pi K (H^2 - H_w^2)}{\ln \frac{R_0}{r_p}} \quad (2)$$

Where:

- Q = discharge into an open pit (m³/d)
- K = hydraulic conductivity (m/d)
- H = head measured at initial water table (m)
- h_w = lowered water level in equivalent well or pit (m)
- R_0 = radius of influence (m)
- r_p = radius of equivalent well or pit (m)

This equation also assumes that aquifer is unconfined, isotropic, and of uniform thickness. The estimated seepage rate (Q) is dependent on the radius of the equivalent well or mine pit (r_p) and the radius of influence (R_0) of the mine excavation.

FIGURE 6 FLOW TO AN UNCONSOLIDATED ZONE EQUIVALENT TO WELL OR MINE PIT
Source: Dupuit Equation Calculator tool developed by Robertson GeoConsultants, Inc. available at www.edumine.com



To simplify the group of wells to an equivalent well (or open mine pit) the equivalent radius must be calculated. This can be estimated assuming a well of equal area:

$$R_p = \sqrt{\frac{ab}{\pi}} \quad (3)$$

Where:

- R_p = radius of the equivalent well (or mine pit) m
- a = width of the pit (m)
- b = length of the pit (m)

RADIUS OF INFLUENCE: The radius of influence, or the maximum distance at which drawdown can be detected with measuring devices in the field, can be estimated using empirical equations. Two that are commonly used for mining projects are the Kusakin and Sichardt equations.

The Kusakin equation for the radius of influence is:

$$R_0 = 575s\sqrt{HK} \quad (4)$$

Where:

- R_0 = radius of influence (m)
- s = maximal drawdown (m)
- K = hydraulic conductivity (m/sec)
- H = potentiometric surface prior to drawdown (m)

A more conservative estimate of the radius of influence is provided by the Sichardt equation:

$$R_0 = 3000s\sqrt{K} \quad (5)$$

Where:

- R_0 = radius of influence (m)
 s = maximal drawdown (m)
 K = hydraulic conductivity (m/sec)

Equations (4) and (5) assume a steady state has been reached and that the zone of influence is sufficient to supply the yield from the well (or mine void). Even if a direct source of recharge such as a pond or stream is not encountered, after some period of time the radius of influence will be expanding so slowly that it is considered to be effectively constant. This distance of influence is greater in higher permeability materials than in low permeability materials and will generally be greater for larger well drawdowns than for small drawdowns.

This seepage analysis is conducted only for the unconfined water table within the unconsolidated zone. The water table in the bedrock system is not expected to be in direct connection with the wetlands as the hydraulic conductivity of the bedrock (3.5×10^{-7} cm/sec) is nearly two orders of magnitude lower than the hydraulic conductivity of the unconsolidated material (6.4×10^{-5} cm/sec). Therefore, the bedrock is an aquiclude and no flow boundary in this analysis. The thickness of unconsolidated material along the eastern edge of the proposed pit ranges around 33.5 - 34.8 feet with a mean of 34.3 feet (see Borings A-8, A12, A-14, and A-20 of the Seven Hills Mine SMCRA Permit S-00357). To simplify the analysis the thickness of the unconsolidated zone is set at 34 feet (10.36 meters). Since the floodplain area consists of wetlands that exhibit periods of surface saturation throughout the year the head of the water table prior to mining (H) and adjacent to the mine pit at the radius of influence (h_2) were conservatively set at the same thickness as the unconsolidated material in the area 10.36 m (34 feet). The height of the seepage face (h_1) and lowered water level in the equivalent well/mine pit (h_w) were established at 1 m (3.28 feet). The drawdown(s) was then calculated to be 9.36 meters (30.72 feet).

RESULTS

RADIUS OF INFLUENCE: The radius of influence (R_0) calculated from Equations (4) and (5) ranges from 13.87 meter to 22.47 meter as shown on **TABLE 49**. This indicates that the drawdown adjacent to the pit should terminate within the ancillary buffer that will include the levee in some areas that will separate the pit from the floodplain. It is important to note that this analysis is assuming that the unconsolidated zone is completely saturated and is therefore providing a maximum radius of influence. Furthermore, this analysis does not incorporate the inundated drainage ditch and sediment basin that will be built within the interior of the levee between the levee and the mine pit (**FIGURE 4 CONCEPTUAL DIAGRAM OF ACTIVE PIT AND FLOODPLAIN WITH PRIMARY DRAINAGES**). Runoff from the upland areas will be directed through these structures which will remain continually inundated and act as a recharge source. This should further mitigate any potential dewatering of the adjacent Pigeon Creek floodplain wetlands associated with the mining activities.

TABLE 49 CALCULATED RADIUS OF INFLUENCE

Method	K	H	s	R_0
	(cm/sec)	(m)	(m)	(m)
Kusakin	6.40E-05	10.36	9.36	13.87
Sichardt	6.40E-05	-	9.36	22.47

Where:

- K = hydraulic conductivity
 H = head measured at initial water table
 s = maximal drawdown

SEEPAGE INTO MINE EXCAVATION: Estimates for seepage to the mine pit using the Dupuit-Forecheimer equation ranged from 322 to 517 m³/day (59 to 95 gpm) as shown on **TABLE 50**. This is similar to the 299 to

485 m³/day (55 to 89 gpm) range estimated by multiplying the Dupuit equation's discharge by the perimeter of the mine pit. The range in the seepage estimates are the result of the differences in the radius of influence calculated using Equations (4) and (5). The seepage rate decreases as the radius of influence increases because the hydraulic gradient is reduced as the distance from the pit increases. The results of this analysis assume that the unconsolidated zone is completely saturated outside of the radius of influence. It is not expected that this seepage rate will remain constant throughout the year as natural water table fluctuations will reduce the seepage rate during periods when there is not surface inundation. Therefore, these estimates should be considered upper end values.

TABLE 50 CALCULATED DEWATERING VOLUME

Method	K	H	H _w	h ₂	H ₁	R ₀	R _p	L	Q
	(cm/sec)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m ³ /d)
Dupuit- Forecheimer	6.40E-05	10.36	1	-	-	394.87	381	-	517
		10.36	1	-	-	403.47	381	-	322
Dupuit	6.40E-05	-	-	10.36	1	-	-	13.87	485*
		-	-	10.36	1	-	-	22.47	299*

Where:

- K = hydraulic conductivity
- H = head measured at initial water table
- H_w = hydraulic head in mine pit
- h₂ = head measured at radius of influence
- R₀ = radius of influence
- R_p = radius of mine pit
- L = distance between head measurements
- Q = seepage into mine void
- * Dupuit discharge multiplied by the 2286 m mine pit perimeter

CONCLUSION

Results of the seepage analysis indicate that seepage into the pit from the unconsolidated zone will be less than 100 gpm and that the drawdown adjacent to the pit (radius of influence: 45.5 to 73.7 feet) should terminate within the ancillary impact area containing the levee that would separate the pit from the floodplain area. It should be acknowledged that the low valleys that currently exhibit flow from the permit into the floodplain wetlands will typically have a sedimentation basin constructed further restricting the potential for groundwater to be drained from the floodplain wetland. These results are in line with the Applicant's long-term experience of no significant offsite effects from open pit dewatering in areas of Southern Indiana where the geology has low permeability. While it is possible that offsite impacts could occur in areas where blanket sands are present, there is clear empirical evidence of no offsite issues at multiple sites with low permeable geology at the adjacent Seven Hills Mine as well as the Francisco Mine in Gibson County and Columbia Mine in Pike County which were adjacent to the Patoka River. Mining occurred within 100-150 feet of important wetlands along lengths of more than 8,000 feet. All three of these wetland sites (Francisco, Columbia, and Seven Hills) have silt loam soils comprised of fine-grained materials with low permeability overlying low permeability bedrock. In fact, Columbia and Seven Hills has the exact same soil type as within the project area. There will be no significant impacts to the Pigeon Creek floodplain wetland resulting from the open mining pit effect or the existing water table.

12.1.8 BIOLOGICAL QUALITY

Biological quality was evaluated with assessments of regional watersheds by the Indiana Department of Environmental Management's Biological Studies Section and project specific streams by Wetland Services, Inc.

The Indiana Department of Environmental Management's Biological Studies Section conducts ecological assessments of Indiana surface waters. Surveys conducted assess aquatic habitat quality, fish community health, and invertebrate community health. The following summarizes assessments that were conducted by IDEM during

the years of 2005 and 2010 within the Highland-Pigeon watershed (HUC8 05140202). IDEM monitoring locations are shown in **FIGURE 7**. No monitoring locations exist in the southwestern portion of the watershed.

IDEM used the *Qualitative Habitat Evaluation Index* (QHEI)²³ to assess the habitat quality of a stream in conjunction with macroinvertebrate and fish sampling. The QHEI uses six metrics to score the habitat quality: 1) substrate, 2) instream cover, 3) channel morphology, 4) riparian zone and bank erosion, 5) pool/glide and riffle/run quality, and 6) stream gradient. IDEM determined that a QHEI total score of less than 51 indicates poor habitat. **TABLE 51** provides the results from IDEM's QHEI assessments with the total scores ranging from 31 to 49 with an average score of 40.4 and a standard deviation of 4.5. This shows that the sampling sites indicate poor habitat quality with little variability across the watershed. Average QHEI scores from six surveys at two sites located downstream of the project area on Pigeon Creek were 38.3 and 41, which still indicates poor habitat.

Habitat quality is generally a reflection of the surrounding land uses and management practices. In the Highland-Pigeon watershed, land use is predominantly agricultural (59%) followed by forest (21%), wetlands and open water (4%), and urban (16%). Numerous land management practices occurred in the past that still impact the stream habitat quality today including, but not limited to, channelization of streams and removal of riparian buffers. These past management practices may be partially responsible for the low QHEI results.

For macroinvertebrate assessments, IDEM has developed a macroinvertebrate Index of Biotic Integrity (mIBI)²⁴. Sampling methods follow the USEPA *Rapid Bioassessment Protocols* (RBP)²⁵. In Indiana, a stream segment is non-supporting for aquatic life and considered "poor" or "very poor" use when the monitored macroinvertebrate community receives a mIBI score for multi-habitat (MHAB) samples of less than 36, for kick samples of less than 2.2, or for Hester/Dendy (HD) samples of less than 1.4. Results from IDEM's macroinvertebrate sampling are shown in **TABLE 52**. Results show that, of the nine assessments, five show poor macroinvertebrate health and are non-supporting of the aquatic life use classification. Another one showed borderline results, with the mIBI result exactly equal to the threshold. Three of these sites are located on Pigeon Creek downstream of the project area. These sites received scores as follows: 34, 34, and 36 (MHAB).

When assessing fish community quality, IDEM uses the *Index of Biotic Integrity* (IBI)²⁶ to define fish community characteristics. The IBI is based on 12 metrics that assess the community's species and trophic composition and fish condition and health. For IDEM's purposes of identifying impaired waters, an IBI score of less than 35 is considered non-supporting for aquatic life use. Results of IDEM's fish assessments are shown in **TABLE 53**. Of the 15 assessments, only two sites show poor fish community health and are non-supporting of the aquatic life use classification. Neither of these sites was located downstream from the Seven Hills – Mining Area Addition project.

The majority of IDEM's sampling results show poor quality habitat streams and the resulting poor aquatic life community health. During active mining, impacts to these watersheds would be minimized through regulatory mechanisms. The NPDES permitting program regulates water quality of effluent to ensure protection of applicable uses of the receiving streams, including aquatic life. All runoff from areas affected by mining flows through NPDES permitted sediment basins prior to discharge. Following active mining, the affected streams and wetlands will be mitigated to a higher quality than what currently exists. Mitigated streams are typically sinuous with instream habitat structures, riffle/pool complexes, rock beds, and adequate riparian buffers. The mitigated streams and wetlands will provide high quality habitat for aquatic life, inevitably improving the fish and macroinvertebrate community health in the area.

FIGURE 7 IDEM MACROINVERTEBRATE & FISH SAMPLING LOCATIONS WITHIN THE HIGHLAND-PIGEON WATERSHED

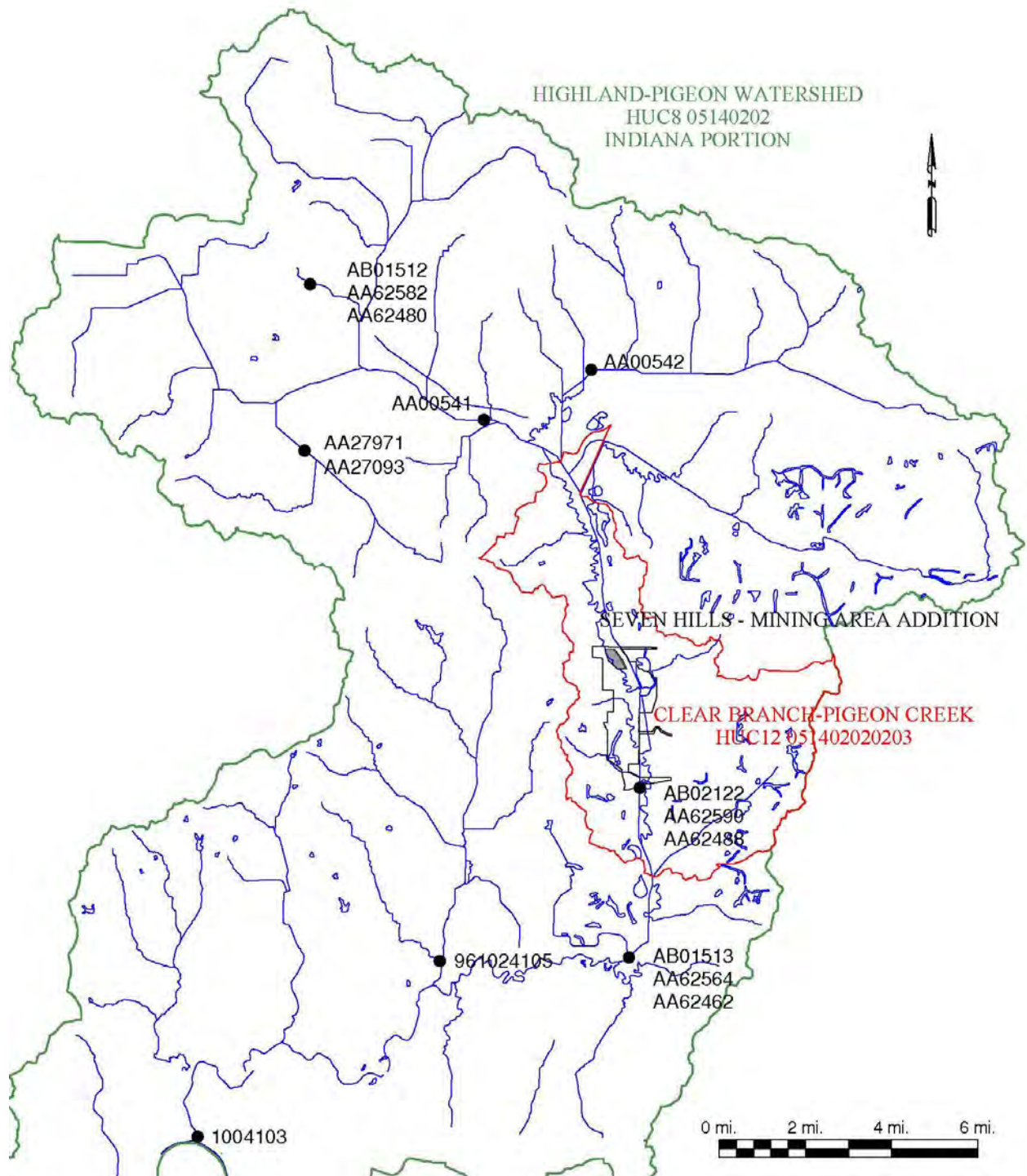


TABLE 51 IDEM QUEI ASSESSMENT SCORES WITHIN HUC8 WATERSHED

IDEM Site ID	Sampling Section	Sample Date	Stream Name	HUC12 Watershed	Substrate Score	Stream Cover Score	Channel Score	Riparian Score	Pool Glide Score	Riffle Run Score	Gradient Score	QHEI Total Score
AA00541	FISH	7/18/2000	Pigeon Creek	051402020106	13	13	7	4	4	0	4	45
AA00542	FISH	7/17/2000	Smith Fork Pigeon Creek	051402020107	8	12	6	4	4	0	4	38
AA27093	FISH	6/6/2005	Hurricane Creek	051402020101	8	9	10	6	7	0	4	44
AA62564	FISH	6/6/2010	Pigeon Creek	051402020204	0	12	9	7	8	0	6	42
AA62582	FISH	6/22/2010	Tributary of Pigeon Creek	051402020104	4	11	9	3	5	2	10	44
AA62590	FISH	6/6/2010	Pigeon Creek	051402020203	2	8	9	8	4	0	6	37
AB01512	FISH	8/10/2010	Tributary of Pigeon Creek	051402020104	7	7	10	5	4	0	10	43
AB01513	FISH	8/11/2010	Pigeon Creek	051402020204	0	8	9	7	8	0	6	38
AA27971	MACRO	8/1/2005	Hurricane Creek	051402020101	10	5	7	5	3	0	4	34
AA62462	MACRO	8/11/2010	Pigeon Creek	051402020204	5	8	8	8	8	0	6	43
AA62480	MACRO	8/10/2010	Tributary of Pigeon Creek	051402020104	11	6	13	5	4	0	10	49
AA62488	MACRO	7/26/2010	Pigeon Creek	051402020203	0	6	9	9	9	0	6	39
AB02122	MACRO	7/26/2010	Pigeon Creek	051402020203	0	6	9	9	9	0	6	39

Note: Sites identified by lighter shade are located downstream of the Seven Hills – Mining Area Addition and those with the darker shade are located within the Clear Branch-Pigeon Creek HUC12 watershed

TABLE 52 IDEM MACROINVERTEBRATE IBI ASSESSMENT SCORES WITHIN HUC8 WATERSHED

IDEM Site ID	Sample Date	Stream Name	HUC12 Watershed	Sample Type	mIBI Metric Score	Aquatic Life Use
001004103	10/4/2000	Pigeon Creek	051402020306	HD	1.8	
961024105	10/24/1996	Bluegrass Creek	051402020302	HD	1	Non-supporting
AA00542	7/17/2000	Smith Fork Pigeon Creek	051402020107	KICK	2.6	
AA27971	8/1/2005	Hurricane Creek	051402020101	MHAB	40	
AA62462	8/11/2010	Pigeon Creek	051402020204	MHAB	34	Non-supporting
AA62471	7/26/2010	Tributary of Bluegrass Creek	051402020301	MHAB	30	Non-supporting
AA62480	8/10/2010	Tributary of Pigeon Creek	051402020104	MHAB	34	Non-supporting
AA62488	7/26/2010	Pigeon Creek	051402020203	MHAB	34	Non-supporting
AB02122	7/26/2010	Pigeon Creek	051402020203	MHAB	36	

Note: Sites identified by lighter shade are located downstream of the Seven Hills – Mining Area Addition and those with the darker shade are located within the Clear Branch-Pigeon Creek HUC12 watershed

TABLE 53 IDEM FISH IBI ASSESSMENT SCORES WITHIN HUC8 WATERSHED

IDEM Site ID	Sample Date	Stream Name	HUC12 Watershed	Total IBI Score	Aquatic Life Use
AA00541	7/18/2000	Pigeon Creek	051402020106	34	Non-supporting
AA00542	7/17/2000	Smith Fork Pigeon Creek	051402020107	34	Non-supporting
AA27093	6/6/2005	Hurricane Creek	051402020101	40	
AA62564	6/6/2010	Pigeon Creek	051402020204	12	Non-supporting
AA62573	6/22/2010	Tributary of Bluegrass Creek	051402020301	32	Non-supporting
AA62582	6/22/2010	Tributary of Pigeon Creek	051402020104	28	Non-supporting
AA62590	6/6/2010	Pigeon Creek	051402020203	42	
AB01512	8/10/2010	Tributary of Pigeon Creek	051402020104	18	Non-supporting
AB01513	8/11/2010	Pigeon Creek	051402020204	16	Non-supporting

Note: Sites identified by lighter shade are located downstream of the Seven Hills – Mining Area Addition and those with the darker shade are located within the Clear Branch-Pigeon Creek HUC12 watershed

Eco-Tech Consultants conducted biological assessments of select surface waters within the project area and summarized their results in the 2011 report **STREAM SAMPLING AND ASSESSMENT REPORT – PROPOSED SEVEN HILLS SURFACE MINE** found in **APPENDIX C**.

TABLE 54 summarizes the results conducted to evaluate macroinvertebrate community health, fish community health, aquatic habitat quality, and water quality for stream outlet into Pigeon Creek in the vicinity of the Seven Hills – Mining Area Addition. The macroinvertebrate and fish were assessed using IDEM’s Multi-habitat (MHAB) Macroinvertebrate Collection Procedure protocol and Surface Water Quality Assessment Program protocol. Aquatic habitat was assessed according to the EPA’s Rapid Bioassessment Protocol (RBP). Water quality was sampled for total dissolved solids and pH.

TABLE 54 SEVEN HILLS MINE BIO-ASSESSMENT RESULTS

Sample Point	mIBI (INmIBI)	fIBI	RBP	TDS (mg/L)	pH
AS1	34	44	126	1588	8.3
AS2	30	30	47	863	8.8
AS3	36	40	126	1129	8.4

* Locations with scoring modifications due to less than 50 individuals (CPU) collected.

This table is meant to provide an overall view of the biological quality of the streams as well as the potential sources of impairments. According to the IDEM’S Assessment Branch listing methodology for the Indiana 303(d) impaired waters list, an fIBI score of less than 36 indicates impaired biological communities and a INmIBI score of less than 36 designates a stream as not supporting aquatic life.

12.1.9 THREATENED AND ENDANGERED SPECIES

An Endangered Species Act review was coordinated through the US Fish and Wildlife Service’s Information for Planning and Consultation (IPaC) website. An official species list is generated within an uploaded project area. The Seven Hills Mine – Mining Area Addition with an IPaC Project Code of 2025-0123569 lists the following six species that may occur or be affected by the proposed activities. This list was generated on July 18, 2025 and the official species list can be found in **APPENDIX H**. There is a total of six (6) threatened, endangered, or candidate species for this project area.

- endangered gray bat (*Myotis grisescens*),
- endangered Indiana bat (*Myotis sodalis*),

- endangered northern long-eared bat (*Myotis septentrionalis*),
- proposed endangered tricolored bat (*Perimyotis subflavus*),
- experimental population, non-essential whooping crane (*Crus americana*), and
- proposed threatened monarch butterfly (*Danaus plexippus*)

Per the IPaC review, there were no critical habitats for these species within the project area. This species list fulfills the requirements of the U.S. Fish and Wildlife Services under section 7(c) of the Endangered Species Act of 1973, as amended.

The Applicant follows conservation measures to minimize the potential take of the Indiana bat by performing tree-clearing outside of the summer reproductive season and avoiding Indiana bat summer habitat to the extent possible. The appropriate season to clear trees is from October 1 to March 31. Typically, enough trees are cleared ahead of the active pit to ensure continuous mining through an area until the start of the next tree-clearing window. Large blocks of suitable summer habitat will remain within the wetland and stream avoidance areas as well as existing just outside of the project impact area.

The Applicant coordinated a review of potential impacts on threatened and endangered species through the SMCRA process. The Indiana Fish and Wildlife biologist assigned to the IDNR Division of Reclamation evaluated the SMCRA permit application and requested modifications to address the possible presence of listed species and to the extent possible minimize adverse impacts to any listed species pursuant to 312 IAC 25-4-29 and 25-4-46. Additionally, a Protection and Enhancement Plan was developed for the Indiana bat which was reviewed by the USFWS. The USFWS sent a letter to the IDNR Division of Reclamation dated October 28, 2013 that concluded, "*The proposed project is in compliance with our 1996 national biological opinion issued to the Office of Surface Mining for protection of federally endangered species, pursuant to Section 7 of the Endangered Species Act.*"

An Indiana bat Protection and Enhancement Plan (PEP) has been incorporated in the SMCRA permit that addresses all Endangered Species Act requirements. It also addresses the northern long-eared bat. The PEP plan to the Indiana Department of Reclamation can be found in **APPENDIX S** of the **APPROVED DA AUTHORIZATION LRH-2018-738**.

12.1.10 AIR QUALITY

The temporary effects to air quality at surface coal mines are mainly due to the fugitive emissions of particulate matter. The major operations producing dust are drilling, blasting, hauling, loading, transporting, and crushing. Basically, dust sources in mines can be categorized as primary sources, actions that generate dust and secondary sources, actions that disperse the dust and carry it from place to place. Effects from dust are not allowed to pass beyond the permit line.

The Seven Hills – Mining Area Addition will be regulated by the Indiana Department of Environmental Management Office of Air Quality. The Office of Air Quality is responsible for administering the Clean Air Act permitting, compliance and enforcement programs. There are very stringent procedures for obtaining the proper air permit and the original Seven Hills Mine pursued qualification with the Indiana Source Specific Operating Agreement (SSOA) and received authorization. This permitting agreement requires that measures be taken to minimize the effects on air quality. The terms of the IDEM air permit will ensure the protection of public health during mining operations.

Best Management Practices (BMPs) have been developed for the following potential fugitive dust generating sources:

- Coal stockpiles,
- Paved public roadways,
- Unpaved haul roads, access roads and parking lots,
- Conveyor transfer points and screening operations,
- Coal crushers and breakers,

- Overburden drilling and blasting, and
- Overburden and topsoil removal/replacement

COAL STOCKPILES - Fugitive dust control methods for stockpiles to be used as needed include:

- Manage the height of the stockpiles;
- Manage the disturbance of the stockpiles; and
- Apply water to the surface of the stockpile.

PAVED PUBLIC ROADWAYS - Control methods for trackout on paved roads to be used as needed include:

- Promptly remove mud, dirt, or similar debris from the paved road; and
- Apply gravel to the surface of the adjacent unpaved haul road. Make sure the area of application is sufficient to control track out.

UNPAVED HAUL ROADS, ACCESS ROADS AND PARKING LOTS - Fugitive dust control methods for unpaved haul roads to be used as needed include:

- Manage vehicle traffic on unpaved haul roads to authorized vehicles only;
- Manage vehicle speeds on unpaved haul roads; and
- Apply water to the surface of the unpaved haul road.

CONVEYOR TRANSFER POINTS AND SCREENING OPERATIONS - Fugitive dust control methods for conveyor transfer points and screening operations to be used as needed include:

- Manage drop heights of materials to assure a homogeneous flow of material; and
- Install, operate, and maintain water spray bars to control emissions as necessary.

COAL CRUSHERS AND BREAKERS - Fugitive dust control methods for coal crushers to be used as needed include:

- Manage drop heights of coal to assure a homogeneous flow; and
- Install, operate, and maintain water spray bars to control fugitive dust emissions at crusher drop points as necessary.

OVERBURDEN DRILLING AND BLASTING - Fugitive dust control methods for overburden drilling and blasting to be used as needed include:

- Overburden drilling activity occurs on a rock bench below grade, limiting fugitive dust; and
- Monitoring wind speed and direction and adjustment of operating activities accordingly.

OVERBURDEN AND TOPSOIL REMOVAL/REPLACEMENT - Fugitive dust control methods for overburden and topsoil removal/replacement to be used as needed include:

- Stabilization and/or protection of soil with vegetation and/or mulch; and
- Monitoring wind speed and direction and adjustment of operating activities accordingly.

The Seven Hills Mine employs a state-of-the-art coal preparation plant facility at the adjacent Wild Boar Mine which will maintain the air quality of the region by removing impurities from the coal before it is burned at electrical generating plants. Mined coal is of variable quality and can include various chemical and mineral matter such as clays, sands, sulfur, and trace elements.

12.1.11 TRAFFIC AND TRANSPORT

Roads in the vicinity of the Seven Hills Mine and the Mining Addition Area consist primarily of county roads with either asphalt or aggregate surface. They are all two-lane two-way roads with grades that vary from level to rolling. The nearest Indiana State Road is State Route 68 which is to the north of the project area. Interstate 64 is also to the north, but there is no direct access.

The Seven Hills Mine shops and coal yards are located along Seven Hills Road immediately northwest of the Mining Area Addition. Two commercial driveways were constructed in conformance with Indiana Department of Transportation standards to accommodate service truck and employee traffic to the parking.

Due to the rural location of the Mining Area Addition, there will be temporary impacts to the highway safety as employer traffic will increase during shift changes causing a minor increase in accident risk on the public roads, but overall, there should be minimal to marginal impact with the local community traffic including the town of Elberfeld, although the service truck traffic is expected to be fairly consistent throughout the day with no particular peak arrival or departure pattern. It is expected that the majority of the employees will utilize the existing network of county roads to access the project while service trucks will be predominately traveling eastward to the Wild Boar Mine's coal preparation area or office area.

The coal from the Mining Area Addition will be transported by large mine trucks onto an Applicant constructed bridge built to support the heavier loads to the coal preparation facility at the Wild Boar Mine on internal private roads. After preparation, the coal will be transported via rail by the Indiana Railroad Company, which provides access to regional rail lines and electric utilities. Rail transportation represents an important aspect of a cleaner energy supply chain. Trains are roughly three times more fuel efficient than trucks and can move one ton of freight nearly 450 miles on one gallon of diesel fuel. One coal train can do the work of 500 tri-axle dump trucks, while consuming two-thirds less fuel and producing 70 to 90 percent less emissions.³⁸

12.1.12 CULTURAL RESOURCES

The Indiana Surface Mining Control and Reclamation Act (SMCRA) requires that any archaeology and historical issues be cleared by the IDNR in consultation with the Indiana State Historic Preservation Officer. If any anytime during development of the proposed Seven Hills Mine that human remains or Native American cultural items are discovered, the Applicant will follow the appropriate steps under the Native American Graves Protection and Repatriation Act (NAGPRA).

The Applicant has coordinated the initial archaeological survey of the permit area to identify any cultural resources. Any identified cultural resources will be addressed through the statutory requirements of Article 25 of the Indiana Administrative Code: Coal Mining and Reclamation Operations and all provisions in the National Historic Preservation Act and other legislation and directives regarding treatment of cultural resources. See **APPENDIX E** for the clearance letters.

Based on information that the Applicant provided to the IDNR Division of Reclamation in coordination for issuance of the SMCRA permit, the IDNR Division of Reclamation determined that Applicant satisfied all the requirements of IC14-34-3-10.

The Applicant will conduct and submit reconnaissance level (Phase I) archaeological surveys for all off-site mitigation projects to the Division of Historic Preservation and Archaeology for review and comment and follow the provisions of Section 106 in the National Historic Preservation Act.

12.1.13 SOCIAL

The social impacts of the mining into the Mining Area Addition are expected to be very positive. The operational workforce of the Seven Hills Mine and the adjacent High Point Mine is around 134 skilled workers. Existing skilled workers that transfer from other mines might impact the local demographic and population by choosing to take up

residence in the local area and more importantly relocating with their families. It is likely that workers who are single or have young families would be more inclined to move. It is unlikely that there is any significant change in the overall age structure of the local resident population.

It is anticipated that skilled workers that first move to the area may seek short-term accommodation through apartments or rental houses. Those that choose to reside more permanently in the local community may choose to purchase an existing house or build a new house. This may promote the development of new subdivisions in the neighboring communities and/or growth in the housing construction and support. Support may include the extension of utilities, installation of septic systems where no sanitary sewer access is available and home improvement services.

Warrick County has a rich heritage of coal mining. The earliest recorded mine was developed in 1818 as mentioned by Will Fortune in his history of Warrick County, but coal mining took off as an industry with the construction of Phelps Coal Mine in 1850 and continues to this day. The nearby communities of Chandler, Lynnville, and Boonville are surrounded by mining, both pre- and post-SMCRA.

12.1.14 ECONOMIC

The economic impact of the project on the local and regional area is expected to be positive and come from three main sources:

- spending in local businesses by employees and their families;
- spending by the Applicant on goods and services with local businesses; and
- local property and sales taxes.

As production reaches its maximum, up to 670 high-paying direct and indirect jobs with annual direct employment payrolls over \$22.1 million annually will be facilitated by the project. Several private landowners and local and state economies will receive significant income from the mining operation in the form of royalty payments and/or acquisition proceeds and taxes.

- The project will have 134 direct employees in Warrick County during full production with up to 670 indirect employees serving in support of the mining operation.

Even though the following report has not been updated with current statistics, it clearly illustrates the significant role that coal has on the economy of Indiana. A study prepared by the Center for Coal Technology Research Energy Center at Discovery Park (Purdue University) entitled *Estimating the State and Regional Benefits of the Mining and Use of Illinois Basin Coals* estimated the economic impact that coal has on the individual states of Illinois, Indiana, and Kentucky in the Illinois Basin for the year 2007 using RIMS II multipliers.³³

From the report, in 2007, Indiana mined 34.8 million tons of coal which generated 95% of the state's electricity and of this amount of coal:

- 2.95 million tons were exported out of the state at an average price of \$28.79/ton for a total export value of \$84.8 million. By applying the Indiana coal mining multiplier, the total estimated economic activity from mining this coal was \$166 million.
- 2.0 million tons were used by Indiana industry either to generate or co-generate electricity. The total estimated economic activity from mining this coal was \$347 million.
- 29.4 million tons were converted into electricity in Indiana, resulting in the generation of an estimated 70 billion kWh with sales of \$4,541 million. The estimated economic activity from mining this coal was \$6,766 million.

- The total estimated amount of economic activity arising from these three (3) uses of Indiana coal for Indiana was approximately \$7,279 million, or three (3%) percent of Indiana's Gross State Product for 2007.

From the U.S. Energy Information Administration state profile for Indiana, Indiana's coal production in 2018 was 34.6 million tons which is comparable to the 2007 production found in the report noted above. While this information has not been updated, the information provided shows the significant economic impact coal has on the economy in Indiana.

12.1.15 PRIME FARMLAND AND CROP

Agricultural soils that meet certain physical, chemical, and slope characteristics are identified as prime agricultural soils or prime farmland. These soils are important in meeting the country's short-term and long-term needs for food. These soils are capable of producing the highest yields with minimal input of energy and economic resources. All prime agricultural lands possess the following characteristics:

- Soil has adequate moisture supply (from either rainfall or irrigation) and good water storage capacity,
- Mean annual soil temperature and growing season length are within ranges required for high crop yields,
- The soil is neither too acid nor too alkaline for vigorous plant growth,
- The land is not subject to frequent flooding during the growing season,
- The soil does not have a severe erosion hazard,
- Soil permeability rate is at least 0.06 inch per hour in the upper twenty (20) inches, and
- Soil surfaces are not so stony as to cause difficulty in farming operations with large machinery.

The following additional characteristics apply to prime agricultural soils in Indiana:

- The soil is deeper than twenty (20) inches to rock or coarse sand,
- The subsoils are finer in texture than sandy loam,
- The land is less than six (6%) percent slope, and
- The land is not subject to frequent flooding during any season of the year.

Of the 23 million acres of land in Indiana, 15.5 million is reported as farmland; and of that, 13 million is cropland. Of the cropland, 11.5 million acres are considered prime agricultural land. There is also another 2.5 million acres of prime land that is in pasture and forested land use⁶⁰. Prime farmland comprises 9.12 acres or 11.3% of the Mining Area Addition. United Minerals follows the requirements of SMCRA for replacement of prime farmland and demonstrating that crop production has been restored to equivalent or higher levels of yield following mining and reclamation. Prime farmland areas will be reclaimed as cropland and to a relatively flat topography, thus reducing erosion problems and eliminating the need for extensive terracing. Proper seasonal seed and fertilizer application will be used to ensure a quick growing and sustained vegetative cover.

Agriculture, along with forested lands, is the major land use and economic component of the watersheds associated with the project. Similar to many areas of the country, agricultural land uses are under increasing pressure from residential and urban development. According to the most recent United States Department of Agriculture's (USDA) Natural Resources Inventory, which is a survey of the nation's non-federal lands that evaluates land use changes, for a period covering 25 years from 1982 and 2007, more than 23 million acres of

America's agricultural land have been lost to development – an area the size of Indiana⁶¹. The inventory determined there are 357 million acres of cropland, 406 million acres of forestland, 119 million acres of pastureland, and 409 million acres of rangeland in the United States. The cropland, forestland, pastureland, and rangelands represent the majority acres that produce the food and fiber production in the United States. Within the same report, over 0.5 million acres in Indiana alone have been converted to developed land. Of that loss, approximately 350,000 acres or 70% were prime agricultural land⁶².

While the United States is not going to run out of land to feed itself within the foreseeable future, the continued encroachment of urban and residential developments onto prime agricultural lands could be a concern. Food that is produced on prime farmland is done efficiently and with less soil erosion, resulting in less downstream pollution from sediments, nutrients, and pesticides. When prime farmland is lost, it not only takes more non-prime land to produce the same amount of food, due to the lower yields, but it could also lead to higher domestic prices and less product to export.

While both prime and non-prime soils will be temporarily impacted through their removal, stockpiling, and replacement after mining associated with the mining operation, careful handling of the soil during placement will enhance the soils over the existing condition. Enhancements include elimination of any existing fragipans which will improve root penetration and water availability, replacement of four (4) feet of soil material and using cover crops that reduce soil compaction. Through careful management and handling of these soils, the productive capability of the reconstructed prime farmland meets the pre-mining yields. In addition, agricultural management practices will be utilized which can minimize impacts to the land and water, while also improving crop yields and herd health, if grazing on the pastureland uses is the objective. All streams will be buffered from agricultural runoff which when densely vegetated; they can serve as a buffer against polluted runoff.

12.1.16 REFORESTATION

Reforestation of existing forest lands is required through the IDNR SMCRA process with a minimum of 80% of the pre-mining forest to be replaced. For the 71.34 acres of pre-mine forest and wildlife in the Mining Area Addition, a minimum of 77.50 acres is proposed to be replaced which exceeds the 80% required. Current reclamation regulations require forested land uses must have a minimum soil depth of twelve (12) inches, at least 450 living trees or shrubs per acre, and that suitable types of trees are used (diversity). An additional success measurement required for bond release of forest land use is that trees must be in place for at least two growing seasons with at least 80% of those being in place for three (3) growing seasons.

In the mid 2000's, the United States Department of the Interior, Office of Surface Mining (OSM) Mid-Continent Region teamed with the IDNR (both the Division of Reclamation and Division of Fish and Wildlife) to determine the quality of post-mine forested areas on Indiana mine sites. The team studied forty-eight (48) tracts on twenty-four (24) permits that met the study criteria of being a forested land use that had received final bond release between January 1, 1996 and July 31, 2002. This bond release time frame was used so that the majority of the tracts had been under the control of private ownership from 4 to 10 years. After inspecting each tract, the team found minimal disturbance to the forested mined ground. Out of the 2,971 acres inspected, 2,940 acres were stocked with trees at rates acceptable for healthy forest conditions. Thirty-one (31) acres total, which was limited to three (3) mine permits, had been cleared to either commercial or residential use. Reforestation efforts have yielded a high success rate of 99.0% with less than 2% of post-mine forested land cleared after bond release.⁵⁹

To address the continued comments and concerns about loss of forest cover from mining is overly used and misrepresented for modern surface mining operations. While there are temporary impacts from the removal of forest areas to access and remove the underlying coal reserve, SMCRA regulation requires the assessment of pre-mining land uses and replacement with those land uses previously supported (312 IAC 25-4-48, 25-6-64). There is some flexibility provided to adjust land uses from pre-mining where necessary, allowing alternative land uses if certain criteria are met. The post-mining land uses are judged based on the highest and best use that can be achieved. This is especially true for forests, where a post-mining land use should be chosen that results in

reforestation of a minimum of 70% of the disturbed Indiana bat habitat as recommended in the USFWS Range-wide Indiana Bat Protection and Enhancement Plan Guidelines for Surface Coal-Mining Operations.

12.1.17 CONSTRUCTION IN A FLOODWAY PERMIT

To safely mine the Mining Area Addition, a Construction in a Floodway report is required for the construction of the temporary levee that will extend along eastern edge of the pit and around the northern edge to prohibit flood waters from entering pit and jeopardizing the safety of the miners and the equipment. The Construction in a Floodway report which can be found in **APPENDIX G**, evaluates the regulatory flood event known as the “100-year flood”. Although such an event is often misconstrued as only occurring once in one hundred (100) years, statistically it is the flood event that has a 1.0% chance of occurring in any given year. This base flood is the national standard used by the National Flood Insurance Program and depicted on Flood Insurance Rate Maps (FIRMs) reported by FEMA.

The “Coordinated Discharge Graph” for Pigeon Creek published by the Indiana Department of Natural Resources Division of Water was used to determine the 100-year frequency discharge which varied from 10,700 cubic feet per second (cfs) at the upstream end just north of the Interstate 64 bridge to 11,200 cfs at the downstream end of the study reach, south of Boonville-New Harmony Road. The impacts from climate change were not used in the model design nor was the increased frequency and magnitude of weather events. CWA permitting does not require consideration of the effects of climate change and it is not part of the 404(b)(1) Guidelines.

At this event, the entire floodplain valley is under approximately 2 feet of water. The top elevation of the temporary levee will be set to provide a minimum of 1.0 feet of freeboard above the projected 100-year flood level determined by the HEC-RAS modeling and would be at a minimum elevation starting at the southernmost end tying into the existing north-south level and having a minimum height of 394.87 at river station 166+43, 395.22 at river station 175+68, and 395.55 at river station 183+59. More specific elevations can be found in the floodway report in **APPENDIX G**. Whether an additional safety factor is included in the design is determined based on the acceptable level of risk to the operation.

While the levee is not designed for more extreme events, on-site monitoring will occur and measures will be implemented during those times to reduce risk to the adjacent active pit, equipment, and employees by either adding material to the levee to increase the height or in the event of a breach, moving equipment and workers to safety. If such an event did occur, there would be only insignificant indirect impacts to the aquatic resources and terrestrial habitat in the vicinity of the project, since the frequency, duration and intensity of flooding does not increase significantly.

If during a flooding event, the temporary levee was breached, water would fill the open pit. Following the recession of the floodwaters, the levee would be repaired with onsite equipment and the overflow in the pit will be pumped to sediment ponds on the Seven Hills permit to allow for treatment and sediment deposition before being discharged from the permit area. If equipment were to become trapped in the pit, any affected water pumped from the pit would be treated and disposed of by the company’s Spill Prevention, Control, and Countermeasure Plan (SPCC). Regardless, it is not practicable for the mining operation to account for every feasible flood scenario.

The wetlands outside of the Mining Area Addition will continue to be inundated by overbank flooding thus maintaining the functions and values of the unimpacted floodplain wetlands. The hydrology of the floodplain is driven by inundation and retention of surface water from overbank flooding, up watershed flow, and beaver activities. This area will still be subjected to overbank flooding during and after the mining operations, little to no impacts are expected to the functions and values of the unimpacted floodplain wetlands.

Construction of the levee will result in minor temporary loss of flood storage due to isolating the intermittent drainageway floodplain valleys, but the loss is negligible because it will not decrease flood retention or increase potential flooding downstream of the project area.

Flood easements will be obtained for properties that will be affected by increases of 0.14 feet above base conditions. The Indiana Department of Transportation (INDOT) has been contacted concerning this project. The 100-year flood event elevation increase at Interstate 64 will be kept below 0.14 feet above the base conditions.

12.2 HUC 8 WATERSHED

On previous Applicant Section 404 DA permit authorizations, the USEPA has requested that the cumulative impacts analysis be expanded to the HUC8 watershed which in this application is the Highland-Pigeon Creek HUC8 watershed. It was justified that a broader analysis would allow the Corps and USEPA to make fully informed factual determinations about the project's compliance with the Guidelines. While the Corps typically limits discussion to the HUC12 watershed, the following cumulative HUC8 analysis is provided utilizing data for the specific HUC12 watersheds that report directly to Pigeon Creek in the Highland-Pigeon Creek HUC8. The majority of the information was obtained from USEPA's Watershed Index Online (WSIO) Indicator Data Table for US Environmental Protection Agency Region 5 that was updated August 31, 2022. The HUC8 analysis will follow the topics of the HUC12 analysis above.

The Seven Hills – Mining Area Addition is located within the Highland-Pigeon HUC8 watershed (05140202) in southwestern Indiana, southeastern Illinois, and northwestern Kentucky. The total watershed drainage area in Indiana is approximately 337,182 acres located in five (5) different counties and encompasses twenty-four (24) HUC12 subwatersheds. The primary water body is Pigeon Creek, a perennial stream, which originates in Gibson County and flows south through Warrick and Vanderburgh Counties before discharging into the Ohio River in Evansville, Indiana. For the cumulative impacts analysis discussion of the HUC8 watershed, the seventeen (17) HUC12 watersheds that report to Pigeon Creek will be evaluated individually and cumulatively. **TABLE 55** below depicts the HUC12 watersheds used for the analysis and includes the human population derived from the 2010 US Census Bureau census block populations using dasymetric mapping and the calculated human population density for each HUC12.

TABLE 55 WATERSHED SUMMARY (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Watershed Area	Census Population (2020)	Population Density (#/mi ²)
		(acres)	(mi ²)		(#/mi ²)
051402020101	Hurricane Creek	10,415	16	2,589	163
051402020102	Sandy Creek	11,201	18	607	35
051402020103	West Fork Creek	19,081	30	4,013	137
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	18	2,480	143
051402020105	Headwaters Smith Fork	14,569	23	818	38
051402020106	Snake Run-Pigeon Creek	14,457	23	784	36
051402020107	Smith Fork-Pigeon Creek	11,271	18	725	43
051402020201	Headwaters Big Creek	11,474	18	1,099	65
051402020202	Big Creek	17,378	27	650	26
051402020203	Clear Branch-Pigeon Creek	22,961	36	841	26
051402020204	Barnes Ditch-Pigeon Creek	22,319	35	18,771	574
051402020301	Headwaters Bluegrass Creek	11,424	18	1,528	89
051402020302	Bluegrass Creek	16,936	26	10,575	428
051402020303	Little Pigeon Creek	11,178	17	14,477	866
051402020304	Headwaters Locust Creek	6,540	10	2,727	279
051402020305	Locust Creek	4,901	8	5,557	771

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Watershed Area	Census Population (2020)	Population Density (#/mi ²)
		(acres)	(mi ²)		(#/mi ²)
051402020306	Kleymeyer Park-Pigeon Creek	17,786	28	55,168	2,093
05140202	Pigeon Creek HUC8 watershed only	235,252	368	123,409	342

The watersheds near the project area have some of the lowest populations and population density in the HUC8 (Pigeon Creek) watershed. The population density within the subwatersheds of the project are significantly lower than the overall average for the HUC8 (Pigeon Creek) and this project will have insignificant impact in regard to human population and population density.

12.2.1 STREAMS AND WETLANDS (SECTION 404 IMPACTS) - HUC8

In addition to the Section 404 authorizations noted in Section 12.1 for the HUC12 watershed of Clear Branch – Pigeon Creek which includes LRH-2018-738 (Seven Hills Mine), LRL-2017-418-gjd (Liberty Mine), LRL-2013-00444-gjd (High Point Mine), and the Section 404 evaluation of LRL-2020-00269-gjd (Wild Boar Stanley Pit), the following are additional Section 404 permitted authorizations within the HUC8 (Pigeon Creek) watershed.

AUTHORIZED Section 404 Permit LRL-2008-228-gjd was issued to Peabody Midwest Mining, LLC for the Wild Boar Mine. It authorizes impacts on the majority of an 8,566.4-acre site of which approximately 4,081.8 acres had already been previously mined and reclaimed per Surface Mining Control and Reclamation Act (SMCRA) requirements. In total, the proposed direct impacts to both the previously mined and unmined areas include the following; to fill, 1) 138,826 linear feet of ephemeral streams; 2) 170,895 linear feet of intermittent streams; 3) 145.33 acres of wetlands; and 4) 323.91 acres of open water within HUC12 watersheds of Headwaters Big Creek (051402020201) in the Highland-Pigeon Creek HUC8 and Coles Creek (051402010906), Headwaters Otter Creek (051402011001), and Barren Fork (051402010907) in the Little Pigeon Creek HUC8.

Approximately 5,029.9 acres of the authorized permit is in the Highland-Pigeon Creek watershed and included 84,324 linear feet of ephemeral streams, 109,190 linear feet of intermittent streams, and 89.05 acres of wetlands.

Compensatory mitigation for impacts within this permit includes both on-site and off-site advance mitigation. The Applicant proposed to mitigate intermittent stream impacts at a ratio of 1:1 (170,895 linear feet), and ephemeral stream impacts at a ratio of 0.5:1 (69,414 feet). The Applicant proposed to create and plant riparian buffers. Where mitigation streams do not have adjacent wetland mitigation, they would have riparian buffers planted on each side of the mitigated stream. A minimum 50-foot riparian buffer or 100-foot riparian buffer would be planted on each side of the natural design stream mitigation depending on the anticipated flow regimes of ephemeral or intermittent, respectively. The riparian zones would be managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

Additionally authorized was the restoration of 8,319 linear feet of Big Creek which included placing willow cuttings, structures, and stabilizing steep stream banks and restoration and creation of 22,430 linear feet of stream at the Ellison West Mitigation Area.

For wetland impacts, the Applicant proposed to create and restore 423.5 acres of wetlands for the wetlands to be disturbed. Assuming a worst-case scenario where 100% of the proposed wetlands were impacted by mining activity, on-site to be constructed wetlands would total 207.2 acres and 113.50 acres

of wetland restoration along Big Creek. Off-site wetland restoration at four (4) off-site mitigation areas, including Ellison West Mitigation, would total 102.8 acres.

The Wild Boar Mine has finished mining and is in reclamation status with on-going construction of the remaining compensatory mitigation. The off-site mitigation areas as well as several of the on-site restoration areas have already been released from further monitoring.

- As of December 31, 2022, impacts at the Wild Boar Mine in the HUC8 (Pigeon Creek) watershed total 72,194 linear feet of ephemeral streams, 86,947 linear feet of intermittent streams, and 71.30 acres of wetlands. Constructed so far in the watershed is 181.30 acres of wetlands and 98,383 linear feet of streams.

AUTHORIZED SECTION 404 PERMIT LRL-1996-1731-GJD was issued to Peabody Midwest Mining, LLC for the Lynnville Mine – Eby Area. It authorized impacts to a total of 25.7 acres of wetland area on Peabody Coal Company’s Lynnville Mine – Eby Area (S-00330) of which 20.5 acres was authorized to be disturbed. This project area was on an area that was then re-permitted as the Wild Boar Mine with wetlands located in the HUC12 watersheds of Headwaters Big Creek (051402020201) in the Highland-Pigeon Creek HUC8 and Headwaters Otter Creek (051402011001) and Barren Fork (051402010907) in the Little Pigeon Creek HUC8. With mine cessation occurring in 1999, only 6.4 acres of wetlands were impacted requiring 6.4 acres of wetland mitigation.

For the wetland impacts, the Applicant proposed to mitigate the impacts on a mine reclamation area located adjacent to the south side of Holder Road, approximately 2.5 miles west of Indiana State Road 61. The proposal included enhancement of 6.4 acres of wetlands from its current monoculture of Phragmites to a combination of forested and scrub/shrub mast-producing communities, but the mitigation was ultimately moved to a wetland creation field on the Wild Boar Mine in the HUC12 watershed of Headwaters Big Creek (051402020201).

- As of December 31, 2023, 6.4 acres of wetland have been constructed and are in the process for final permit release.

AUTHORIZED SECTION 404 PERMIT LRL-2005-1290-SEW was issued to Peabody Midwest Mining, LLC for the Somerville Central Mine. It authorizes impacts on the majority of a 4,788.0-acre site of which is split between the Highland-Pigeon HUC8 (2,076.6 acres) and the Patoka River HUC8 (2,618.2 acres). In total, the proposed direct impacts for the Somerville Central and Somerville North Mining complex includes the following to fill 1) 107,320 linear feet of streams and 2) 8.75 acres of wetlands.

Compensatory mitigation for impacts within this permit includes only on-site mitigation and includes creation of 54,567 linear feet of streams and 22.1 acres of wetlands. A minimum 25-foot riparian buffer will be planted on each side of the natural design ephemeral stream mitigation and a minimum 50-foot riparian buffer on each side of the natural design intermittent stream mitigation. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

- The Somerville North and Central Mine complex is no longer active and in final reclamation status. As of December 31, 2023, 29,949 linear feet of streams have been constructed and are actively being monitored in the HUC8 (Pigeon Creek) watershed with the remaining mitigation constructed in the Patoka River HUC8.

AUTHORIZED SECTION 404 PERMIT LRL-2007-66-GJD was issued to Peabody Midwest Mining, LLC for the Somerville South Mine and Amendment 1 Area. It authorizes impacts on a 2,034.3-acre site of which it lies entirely within the Highland-Pigeon HUC8. In total, the proposed direct impact for the authorization includes the following to fill 1) 44,264 linear feet of ephemeral streams, 2) 17,251 linear feet of intermittent stream, 3) 14.31 acres of wetlands, and 4) 3.0 acres of open waters.

Compensatory mitigation for impacts within this permit includes only on-site mitigation and includes reconstruction and enhancement of 24,390 linear feet of streams in the original permit and 14,992 linear feet of streams in the amendment area as well as construction of 41.8 acres of wetlands. A minimum 25-foot riparian buffer will be planted on each side of the natural design ephemeral stream mitigation and a minimum 50-foot riparian buffer on each side of the natural design intermittent stream mitigation. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

- This permit area of the Somerville South Mine complex is no longer active and in final reclamation status. As of December 31, 2023, 38,651 linear feet of streams and 12.6 acres of wetlands have been constructed and are actively being monitored in the HUC8 (Pigeon Creek) watershed with 9.8 acres of wetlands and 6,660 linear feet of streams proven successful and released from further monitoring.

AUTHORIZED SECTION 404 PERMIT LRL-2010-953-RLR was issued to Peabody Midwest Mining, LLC for the Somerville South Mine Amendment 2 Area. It authorizes impacts on the majority of a 975.9-acre site of which it lies entirely within the Highland-Pigeon HUC8. In total, the proposed direct impact for the authorization includes the following to fill 1) 8,861 linear feet of ephemeral streams, 2) 21,220 linear feet of intermittent stream, 3) 7,284 linear feet of perennial stream (Smith Fork Creek), 4) 27.87 acres of wetlands, and 5) 1.9 acres of open waters.

Compensatory mitigation for impacts within this permit includes on-site mitigation and involves the establishment of 1) 4,431 linear feet of ephemeral stream, 2) 21,220 linear feet of intermittent stream, 3) 7,284 linear feet of perennial stream, 4) 107.95 acres of wetlands, and 5) 24 acres of open waters. A minimum 25-foot riparian buffer will be planted on each side of the ephemeral stream mitigation and a minimum 50-foot riparian buffer on each side of the intermittent stream mitigation. The perennial stream mitigation would comprise a two-stage channel design with a 100-foot grass buffer from the most downstream end to County Road 1150 East to County Road 1200 East, all on the north side of Smith Fork Creek. A 100-foot forested buffer would be planted on the south side of Smith Fork Creek. In stream structures including J-hooks and log weirs would be included in the stream construction, as well as root wads and other log structures. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

- This permit area of the Somerville South Amendment 2 is no longer active and in final reclamation status. As of December 31, 2023, 23,376 linear feet of streams and 85.4 acres of wetlands have been constructed of which 23,220 linear feet of streams and 85.4 acres of wetlands are currently being monitored in the HUC8 (Pigeon Creek) watershed.

AUTHORIZED SECTION 404 PERMIT LRL-2013-423-SEW was issued to Peabody Midwest Mining, LLC for the Somerville South Mine Amendment 3 Area. It authorizes impacts on the majority of a 1,764.4-acre site of which it lies entirely within the Highland-Pigeon HUC8. In total, the proposed direct impact for the authorization includes the following to fill 1) 30,252 linear feet of ephemeral stream, 2) 53,756 linear feet of intermittent streams, 3) 350 linear feet of perennial stream, 4) 27.22 acres of wetlands, and 5) 5.85 acres of open waters.

To mitigate the impacts to "waters of the U.S.", both on-site and off-site mitigation is proposed. For the on-site portion of the mitigation, ephemeral streams would be mitigated at a 0.5:1 ratio, resulting in the construction of 15,128 linear feet of stream. Intermittent streams would be mitigated at a 1:1 ratio, resulting in the construction of 53,756 linear feet of stream. The 350 linear feet of perennial stream impacts would result from a temporary crossing of the dragline to be utilized for the project. The mitigation would restore the 350 linear feet by reshaping the banks to approximate original contours and

removing the fill required to support the equipment during the crossing. Stream construction would be conducted concurrently with the reclamation phase of the project. Streams would be integrated within constructed valleys having characteristics corresponding to the appropriate stream types. Valley morphology would consist of landform features that would correspond to the stream system morphology including meander planform (radius of curvature, wavelength, belt width, and sinuosity), channel profile morphology (riffle/pool or step/pool bed features) and cross section dimensions (low flow, bankfull, and flood prone). A 25-foot-wide forested riparian buffer would be constructed along each side of ephemeral streams, providing a 50-foot-wide riparian corridor along the entire length of the constructed ephemeral streams. For intermittent streams, a 50-foot-wide forested riparian buffer would be constructed along each side of the mitigated streams, resulting in a 100-foot-wide riparian corridor along all intermittent stream mitigation. The mitigation plan also addresses the control of invasive and exotic plant species.

Off-site mitigation would be conducted at two (2) separate off-site mitigation areas. There would be one off-site stream mitigation project in each of the two 12-digit Hydrologic Unit Codes (HUC's) in which the impacts would occur. The first would be an 1,100 linear foot restoration of an ephemeral tributary to Smith Fork. The restoration would include utilizing natural stream channel design to remove incision and bank stability issues while incorporating an increase in desirable stream habitat.

Additionally, the forested riparian zone would be increased in width along one side and increased in desirable native hard mast tree species on both sides. The remaining off-site mitigation would be implemented along a 650 linear foot intermittent stream which is a tributary to Big Creek. The 650 linear foot segment would be an enhancement project which would include the installation of 3 engineered Newbury Rock Riffles. These riffles would provide approximately 300 feet of riffle habitat and would raise the bed elevation along the reach approximately 1.5 feet. This would reduce overall stream entrenchment, decrease bank toe instability issues, and raise the overall local water table to support adjacent wetlands. Additionally, 8.3 acres of timber stand improvement would be made on adjacent wetland areas and upland forest buffers.

- The Somerville South Amendment 3 area is currently inactive with portions under reclamation. As of December 31, 2023, 29,708 linear feet of streams and 8.3 acres of wetlands have been constructed of which 4,902 linear feet of streams are currently being monitored in the HUC8 (Pigeon Creek) watershed. Six hundred and ten feet of streams and 8.3 acres of wetland have been released from further monitoring.

AUTHORIZED SECTION 404 PERMIT LRL-2007-1330-GJD AND LRL-2007-1330-A-GJD was issued to United Minerals Co, LLC for the West 61 Mine. It authorizes impacts on the majority of a 668.9-acre site of which it lies entirely within the Highland-Pigeon HUC8. In total, the proposed direct impact for the authorization includes the following to fill 1) 18,743 linear feet of ephemeral streams, 2) 18,810 linear feet of intermittent stream, and 3) 16.62 acres of wetlands.

Compensatory mitigation for impacts within these permits includes on-site and off-site mitigation and involves the establishment of 1) 9,590 linear feet of ephemeral stream, 2) 19,145 linear feet of intermittent stream and 3) 39.9 acres of wetlands. A minimum 50-foot riparian buffer will be planted on each side of the ephemeral and intermittent stream mitigation and a minimum 100-foot riparian buffer on each side of a portion of the intermittent stream mitigation in the amendment area. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

Also completed will be additional stream mitigation where 3,400 linear feet of Big Creek will be constructed and restored to its' historical meandering pattern on the floodplain downstream and off-site the portion of Big Creek being reestablished on-site.

- These permits are no longer in active production and in final reclamation status. As of December 31, 2023, 11,358 linear feet of streams have been constructed of which 4,629 linear feet of streams are currently being monitored in the HUC8 (Pigeon Creek) watershed.

AUTHORIZED SECTION 404 PERMIT LRL-2007-1330-GJD was issued to United Minerals Co, LLC for the Cardinal Mine. It authorizes impacts on the majority of a 484.2-acre site of which 220.8 acres lies within the Headwater Smith Fork Creek HUC12 and with the remaining 198.4 acres located in the Patoka River HUC8. In total, the proposed direct impacts for the Cardinal Mine include the following; to fill, 1) 14,866 linear feet of ephemeral streams; 2) 7,509 linear feet of intermittent streams; and 3) 0.14 acres of wetlands.

Compensatory mitigation for impacts within this permit includes only on-site mitigation and includes creation of 7,443 linear feet of ephemeral stream, 7,509 linear feet of intermittent stream, and 0.30 acres of wetlands. A minimum 25-foot riparian buffer or 50-foot riparian buffer would be planted on each side of the natural design stream mitigation depending on the anticipated flow regimes of ephemeral or intermittent, respectively. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

- The Cardinal Mine is no longer active and in final reclamation status. As of December 31, 2023, 7,484 linear feet of streams have been constructed and are actively being monitored in the HUC8 (Pigeon Creek) watershed.

AUTHORIZED SECTION 404 PERMIT LRL-2005-1958-GJD was issued to United Minerals Co, LLC for the Elites Mine. It authorizes impacts on the majority of a 132.6-acre site of which it lies entirely within the Clear Branch – Pigeon Creek HUC12. In total, the proposed direct impacts include the following; to fill, 1) 2,285 linear feet of streams and 2) 1.67 acres of wetlands.

Compensatory mitigation for impacts within this permit includes only on-site mitigation and includes creation of 1,360 linear feet of streams and 3.50 acres of wetlands. A minimum 50-foot riparian buffer will be planted on each side of the natural design stream mitigation regardless of the anticipated flow regime. The riparian zones would be primarily managed for hard mast tree plantings. Stream construction would be based on natural stream design with channel size and area based on watershed size, regional curve data, and reference reach data.

- The Elites Mine is no longer active and in final reclamation status. As of December 31, 2023, 1,608 linear feet of streams and 4.0 acres of wetlands have been constructed and are actively being monitored in the HUC8 (Pigeon Creek) watershed.

Overall, in the HUC8 (Pigeon Creek) watershed, UMI/Peabody has constructed a total of 243,500 linear feet of streams and 699.9 acres of wetlands, of which 27,043 linear feet and 18.1 acres have met performance standards and been released from further monitoring and 133,292 linear feet and 689.1 acres are currently being monitored. At the current time, 48,346 linear feet and 148.6 acres have met performance standards and are currently being requested release from further monitoring from the Corps. Mitigation is continually being constructed in the reclamation areas and being added. Only mining impacts have the potential to improve and create net environmental uplift compared to other impacts in the watershed such as agriculture, industrialization, or residential development. All mitigation is on schedule and still in process at these sites. **TABLE 56** provides a breakdown of the compensatory mitigation constructed by the Applicant in the subwatersheds as of December 31, 2024.

TABLE 56 **UMI/PEABODY COMPENSATORY MITIGATION AS OF DECEMBER 31, 2024 (HUC8 PIGEON CREEK)**

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Constructed Wetland Mitigation	Constructed Stream Mitigation
		(acres)	(acres)	(feet)
051402020101	Hurricane Creek	10,415	0	0
051402020102	Sandy Creek	11,201	0	0
051402020103	West Fork Creek	19,081	0	0
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	0	0
051402020105	Headwaters Smith Fork	14,569	215.4	112,984
051402020106	Snake Run-Pigeon Creek	14,457	11.3	0
051402020107	Smith Fork-Pigeon Creek	11,271	66.6	0
051402020201	Headwaters Big Creek	11,474	187.7	104,596
051402020202	Big Creek	17,378	2.8	24,312
051402020203	Clear Branch-Pigeon Creek	22,961	51.1	1,608
051402020204	Barnes Ditch-Pigeon Creek	22,319	0	0
051402020301	Headwaters Bluegrass Creek	11,424	0	0
051402020302	Bluegrass Creek	16,936	165.0	0
051402020303	Little Pigeon Creek	11,178	0	0
051402020304	Headwaters Locust Creek	6,540	0	0
051402020305	Locust Creek	4,901	0	0
051402020306	Kleymeyer Park-Pigeon Creek	17,786	0	0
05140202	Pigeon Creek HUC8 watershed only	235,252	699.9	243,500

12.2.2 PIGEON CREEK AND ADJACENT FLOODPLAINS AND WETLANDS - HUC8

The following analysis in **TABLE 57** depicts the percent of the HUC12 that is in the 100-year flood zone estimated by the EPA Office of Research and Development (ORD). The term 100-year flood describes a flood magnitude that has a 1% chance of occurring in a given year and the 100-year flood zone is the area that is at-risk for flooding during a 100-year flood. These values were calculated from the EPA ORD map layer titled Estimated Floodplain Map for the Conterminous United States (August 2018) and is based on topography, soil characteristics, and land cover. Unlike flood zone maps maintained by the Federal Emergency Management Agency (FEMA), the EPA ORD map layer provides a continuous estimate of the 100-year flood zone with no geographic gaps. For HUC12 analysis, the 100-year flood zone was edited to remove areas that overlapped surface waters such as rivers and lakes or wetlands using the Water Mask map layer (June 2022 version).

TABLE 57 FLOODPLAINS, FLOOD ZONE, AND WETLANDS (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% 100-Year Flood Zone in HUC	Acres in 100-Year Flood Zone in HUC	% Wetlands in HUC	% Wetland Change in HUC (2001-19)
		(acres)	(percent)	(acres)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	7.7	802	0.36	0
051402020102	Sandy Creek	11,201	16.5	1,848	0.63	0
051402020103	West Fork Creek	19,081	5.1	973	0.14	0
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	9.3	1,057	0.77	0
051402020105	Headwaters Smith Fork	14,569	3.2	466	0.57	0.08
051402020106	Snake Run-Pigeon Creek	14,457	11.6	1,677	2.58	0

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% 100-Year Flood Zone in HUC	Acres in 100-Year Flood Zone in HUC	% Wetlands in HUC	% Wetland Change in HUC (2001-19)
		(acres)	(percent)	(acres)	(percent)	(percent)
051402020107	Smith Fork-Pigeon Creek	11,271	9.8	1,105	11.78	0.26
051402020201	Headwaters Big Creek	11,474	4.0	459	3.33	0.62
051402020202	Big Creek	17,378	9.2	1,599	6.02	0.45
051402020203	Clear Branch-Pigeon Creek	22,961	13.0	2,985	11.46	0.15
051402020204	Barnes Ditch-Pigeon Creek	22,319	33.9	7,566	7.65	-0.1
051402020301	Headwaters Bluegrass Creek	11,424	10.5	1,200	1.57	0
051402020302	Bluegrass Creek	16,936	29.6	5,013	2.16	-0.01
051402020303	Little Pigeon Creek	11,178	10.9	1,218	2.22	-0.09
051402020304	Headwaters Locust Creek	6,540	10.4	680	0.46	0
051402020305	Locust Creek	4,901	11.7	573	4.49	-0.38
051402020306	Kleymeyer Park-Pigeon Creek	17,786	24.1	4,286	4.10	-0.06
05140202	Pigeon Creek HUC8 watershed only	235,252	14.2	33,507	4.06	0.07

In evaluating the impacts that the Seven Hills – Mining Area Addition will have on the 100-year flood zone, it will be minor and temporary. The entire area of the Mining Area Addition, 80.46 acres is within the 100-year flood zone encompasses 5.5 acres which is only 0.002% of the HUC8 (Pigeon Creek) watershed. This flood zone area will be replaced in the reclamation and consist of PFO wetland mitigation. Overall, in the HUC8 (Pigeon Creek) watershed, there has been a positive increase in wetland acres from 2001 to 2019.

12.2.3 LAND RESOURCES - HUC8

The Highland-Pigeon Creek watershed lies within the Southern Wabash Lowlands ecoregion (Ecoregion 72c) which is characterized by a landscape that is undulating to rolling and has many wide, shallow valleys. It lies to the south of Ecoregion 72b and its pre-Wisconsinan till plain; relict dunes and wind-blown silt deposits occur in the west, and shale and sandstone bedrock is exposed in the east. Ecoregion 72c is further characterized by a long growing season and neutral to acid soils. Originally, oak-hickory forests grew on the well-drained upland soils while western mesophytic forests occurred on more poorly drained soils; some southern plants reached their northern distributional limit in Ecoregion 72c. Today, the woodland has been mostly cleared for corn, soybean, wheat, livestock, and vegetable farming as well as temporary impacted as a result of surface coal mining activity.

From **TABLE 58**, agriculture is the dominate land use in the HUC8 watershed comprising approximately 55% of the land area.

TABLE 58 LAND RESOURCES (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% of Land in Agriculture	% of Land in Forest	% of Land in Urban	% of Area in Water
		(acres)	(percent)	(percent)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	79.80	7.31	12.1	2.49
051402020102	Sandy Creek	11,201	84.56	9.32	5.32	2.33
051402020103	West Fork Creek	19,081	85.91	2.07	11.56	1.69
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	76.76	5.05	17.07	2.67
051402020105	Headwaters Smith Fork	14,569	68.09	14.03	6.91	5.82

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% of Land in Agriculture	% of Land in Forest	% of Land in Urban	% of Area in Water
		(acres)	(percent)	(percent)	(percent)	(percent)
051402020106	Snake Run-Pigeon Creek	14,457	80.01	9.74	7.38	4.32
051402020107	Smith Fork-Pigeon Creek	11,271	70.26	8.87	8.18	14.36
051402020201	Headwaters Big Creek	11,474	24.44	40.49	7.86	8.15
051402020202	Big Creek	17,378	56.12	23.83	7.32	10.84
051402020203	Clear Branch-Pigeon Creek	22,961	37.17	36.41	4.89	17.57
051402020204	Barnes Ditch-Pigeon Creek	22,319	53.51	12.45	23.12	10.78
051402020301	Headwaters Bluegrass Creek	11,424	63.56	21.75	10.64	4.74
051402020302	Bluegrass Creek	16,936	49.23	19.75	23.27	7.89
051402020303	Little Pigeon Creek	11,178	16.60	32.26	46.75	4.58
051402020304	Headwaters Locust Creek	6,540	31.16	51.60	14.07	4.42
051402020305	Locust Creek	4,901	29.84	29.02	35.30	6.64
051402020306	Kleymeyer Park-Pigeon Creek	17,786	15.57	8.53	70.48	5.84
05140202	Pigeon Creek HUC8 watershed only	235,252	54.86	18.24	18.29	7.5

Agriculture is the largest historical impact on streams and wetlands in HUC8 (Pigeon Creek) watershed and is the primary driver in stream water quality. The 2019 National Land Cover Database (NLCD) shows agriculture (cultivated crops and hay) makes up 55% of the watershed (192,000 acres) with forest and urban areas splitting at 18% of the watershed. The urban areas include Evansville, Chandler, Elberfeld, Haubstadt, Somerville, Fort Branch, and a portion of Princeton along with several other smaller communities. The remaining forested areas are typically those that are not conducive for farming such as floodplains and high relief areas.

12.2.4 COAL RESOURCES – HUC8

The HUC8 (Pigeon Creek) watershed, particularly the central to northeastern area has a rich heritage of coal mining. The earliest recorded mine (1818) was mentioned by Will Fortune in his history of Warrick County. Coal mining as an industry began in 1850 with the construction of the Phelp’s Coal Bank with surface coal mining becoming prevalent after 1963 based on review of USGS maps. The Indiana State Geologist’s report for 1898 provides mining statistics from that era. Of the approximately 391 square miles of Warrick County alone, it was estimated that approximately 350 square miles is underlain by coal, of which 175 square miles was considered recoverable. The estimated total tons in these deposits were placed at 2 billion tons and at the time of the report, the estimated amount of recoverable coal unmined was 345 million tons. A more recent estimate increases these values substantially. The estimate includes the Indiana **Coal-7** (Danville, Upper Millersburg) and Indiana **Coal-5** (Springfield) coal beds in Warrick County and approximates reserves at 958 million tons.

Due to the HUC8 (Pigeon Creek) watershed’s geographic location in the Illinois Basin, both underground and surface mining have affected land in many of the Subwatersheds. **TABLE 59** shows the percent land area impacted by mining activities, percent of unmined land area currently authorized for impact by mining (i.e., High Point Mine and Seven Hills Mine). Somerville South Amendment 3 is not included in this and was assumed to be already impacted. Wild Boar Stanley Pit and the Seven Hills – Mining Area Addition is included in the percent of unmined area being proposed for impact and the percent of unmined area that may potentially be permitted in the future. Areas previously affected by mining are those that have been either reclaimed or abandoned by any company. In many cases, new permit authorizations permit over previously mined areas. Consequently, providing a simple total of the permit areas would contain significant overlap and be inaccurate. To account for this overlap, these areas were generated utilizing GIS information from the Coal Mine Information database and manipulated to eliminate overlap.

Information on the percent of unmined land potentially affected by future mining includes potential reserves that this Applicant may pursue if the market conditions are appropriate. More area could be added due to available coal reserves underlying the majority of the watershed and it only becomes a matter of how much effort and money is warranted to pursue recovering the reserve, because the actuality of fully mining any reserve is dependent on many variables including the ability to acquire select properties, future market conditions, public policy, energy demand, stripping ratio, and contracted coal quality specifications. The acquisition of land and coal contracts is a competitive business and very capital intensive. The further in advance that capital is spent, the less return on investment is realized. Therefore, mining companies have attempted to manage land purchasing to coincide with needs for permitting and mining. In the present market, utility companies are less willing to make long-term commitments for speculated projects like in the past and require permitted, and in some cases authorized, reserves. So again, the percentage of unmined area potentially affected by future mining should be considered only an estimate at this time.

TABLE 59 COAL MINING IMPACTS (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% of Land Affected by Past Mining	% of Unmined Land Permitted for Mining (2023)	% of Unmined Land Potentially Affected by Future Mining	% of Unmined Land Potentially Affected by Future Mining (Estimated)
		(acres)	(percent)	(percent)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	0	0	0	0
051402020102	Sandy Creek	11,201	0	0	0	0
051402020103	West Fork Creek	19,081	0	0	0	0
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	0	0	0	0
051402020105	Headwaters Smith Fork	14,569	58.4	0	0	0
051402020106	Snake Run-Pigeon Creek	14,457	0	0	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	3.9	0	0	0
051402020201	Headwaters Big Creek	11,474	70.0	0.0	0	0
051402020202	Big Creek	17,378	52.4	0.6	0.6	8.6
051402020203	Clear Branch-Pigeon Creek	22,961	48.4	8.4	3.1	0
051402020204	Barnes Ditch-Pigeon Creek	22,319	20.2	0	0	0
051402020301	Headwaters Bluegrass Creek	11,424	3.9	0	0.9	0
051402020302	Bluegrass Creek	16,936	19.1	0	0	0
051402020303	Little Pigeon Creek	11,178	0	0	0	0
051402020304	Headwaters Locust Creek	6,540	0	0	0	0
051402020305	Locust Creek	4,901	0	0	0	0
051402020306	Kleymeyer Park-Pigeon Creek	17,786	0	0	0	0
05140202	Pigeon Creek HUC8 watershed only	235,252	19.3	0.9	0.3	0.6

PAST MINING STREAM AND WETLAND IMPACTS

TABLE 60 depicts the estimated stream and wetland impact from past mining, the current proposed and permitted impacts, and the estimated future impacts. To estimate past mining impacts to streams and wetlands, a stream density per acre and a wetland density per acre was determined from delineated features on modern mining permits within the watershed. These densities were applied to the past mined acreages except in the areas where delineated impacts and acreages were known, i.e., Wild Boar Mine and West 61 permit acreage was subtracted

from the total and those delineated features were added to the estimated impacts using the density formulae. While the impacts seem significant, they are comparable to what has been impacted due to agriculture. (See **SECTION 12.2.3 – LAND RESOURCES - HUC8**). The estimated stream and wetland density used is 38.7 feet of streams per acre and 0.017 acres of wetlands per acre. These densities were applied to the acres of disturbance for those areas that were not delineated. Some watersheds include a mix of densities and delineated sums, and these are noted with an asterisk (*). Modern mines with delineations and compensatory mitigation requirements are provided above in **SECTION 12.1.1** and **12.2.1**.

TABLE 60 WETLAND AND STREAM IMPACTS FROM COAL MINING (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% of Land Affected by Past Mining	Estimated Stream Impacts from Mining	Estimated Wetland Impacts from Mining	Permitted & Proposed Stream Impacts	Permitted & Proposed Wetland Impacts	Estimated Future Stream Impacts	Estimated Future Wetland Impacts
		(acres)	(percent)	(feet)	(acres)	(feet)	(acres)	(feet)	(acres)
051402020101	Hurricane Creek	10,415	0	0	0	0	0	0	0
051402020102	Sandy Creek	11,201	0	0	0	0	0	0	0
051402020103	West Fork Creek	19,081	0	0	0	0	0	0	0
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	0	0	0	0	0	0	0
051402020105	Headwaters Smith Fork	14,569	58.4	329,144	145	0	0	0	0
051402020106	Snake Run-Pigeon Creek	14,457	0	0	0	0	0	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	3.9	16,989	8	0	0	0	0
051402020201	Headwaters Big Creek	11,474	70.0	321,354*	146*	0	0	0	0
051402020202	Big Creek	17,378	52.4	352,596	155	2,326	9	65,500	40
051402020203	Clear Branch-Pigeon Creek	22,961	48.4	429,725	189	189,728	419	0	0
051402020204	Barnes Ditch-Pigeon Creek	22,319	20.2	174,847	77	0	0	0	0
051402020301	Headwaters Bluegrass Creek	11,424	3.9	17,105	8	1,523	1	0	0
051402020302	Bluegrass Creek	16,936	19.1	125,195	55	0	0	0	0
051402020303	Little Pigeon Creek	11,178	0	0	0	0	0	0	0
051402020304	Headwaters Locust Creek	6,540	0	0	0	0	0	0	0
051402020305	Locust Creek	4,901	0	0	0	0	0	0	0
051402020306	Kleymeyer Park-Pigeon Creek	17,786	0	0	0	0	0	0	0
05140202	Pigeon Creek HUC8 watershed only	235,252	19.3	1,756,401	773	193,577	429	65,500	40

Before implementation of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), little consideration was given to stream replacement. After 1977, reclamation was focused on reclaiming land to support a productive use which emphasized controlling sedimentation and erosion control using terraces, swales, and water and sediment control basins. Past mining in Indiana appears to have decreased the overall stream length, but greatly increased wetland and open water acreages. Many of these areas, such as the nearby Blue Grass Fish and Wildlife Area, are unique natural resource areas that provide and maintain quality hunting, fishing, and wildlife watching opportunities for local citizens and visitors. It has only been recently that natural stream design has been required by regulatory agencies.

A portion of the previously affected acreage in the Highland-Pigeon watershed predates any law or regulation to reclaim the mined land to the standards of today and has been claimed to have contributed to several of the receiving streams being listed on the 303(d) list for impairments¹⁷. However, a TMDL performed in 2011 for the

Pigeon-Highland watershed does not mention mining impacts and focuses on E. coli and impaired biotic communities mainly associated with farming and publicly owned treatment works. Mining effects in the watershed have become negligible with the advanced measures incorporated for sediment control and reclamation of the land with topsoil and vegetation.

According to the Indiana Geological Survey - Coal Mine Information System¹⁹, the previously mined areas adjacent to the Seven Hills Mine – Mining Area Addition were mined by the Ayrshire Mine (southwest), Lynnville Mine (east), and Elites Mine (east). The Ayrshire Mine was in operation from 1973 to 1989 and the portions of the Lynnville Mine adjacent to the project area were in operation from 1967 through 1989. Elites Mine was in operation from 2012 through 2016 and had Section 404 authorization under permit application: LRL-2006-1614-gjd. The areas within these permit areas have all been reclaimed which included grading of the spoil, covering it with stockpiled soils, and revegetating it with the appropriate vegetation for the approved post-mining land use. Based on knowledge of replaced soil thicknesses on previously mined reclaimed areas, it is likely that soil depths range from 0-15 inches with many areas consisting of best available material (BAM) (spoil/soil mix). Today the primary land features include wildlife and forested habitat interspersed with open water impoundments.

12.2.5 ABANDONED MINE LANDS (AML) - HUC8

Coal has been mined in the southwest Indiana and within the Highland-Pigeon Creek watershed for over 150 years. Legacy mining in the past can potentially leave behind both hidden and obvious dangers and landowners need to be aware. Many of these sites were developed pre-SMCRA and come under the jurisdiction of the Indiana Department of Natural Resources Abandoned Mine Land (AML) Program who can assist current landowners with remediation of safety and environmental issues associated with the abandoned mines. Common problems associated with abandoned mines include abandoned buildings and structures, acid mine drainage, uncontrolled erosion, high walls, open dumping, open shafts of underground mines, spoils, and subsidence from underground mines. The purpose of the Abandoned Mine Lands Program is to alleviate the safety, health, and environmental hazards of past coal mining practices while improving land productivity and enhancing the landscape. The program has been operating since the early 1980s and has reclaimed more than 10,000 acres.

The funding for the AML Program is based on a per ton fee paid by active coal operators. In February 2023, the Indiana Department of Natural Resources recently received approved federal funding of up to \$385 million over the next fifteen (15) years which will allow Indiana to reclaim more former coal mines to their pre-mining status. Since 1982, more than 2,000 reclamation projects have been completed on both public and private lands. The AML Program maintains a database with the federal Office of Surface Mine that catalogs past, current, and future reclamation projects.

Within the Highland-Pigeon Creek watershed, there are twenty (20) known AML sites cataloged where two (2) have reclamation pending, two (2) currently in reclamation, and the remaining sixteen (16) have been reclaimed.

12.2.6 SURFACE WATER QUALITY - HUC8

12.2.6.1 PIGEON CREEK WATER QUALITY

The following table, **TABLE 61** provides information on the regional pollutant yields and concentrations in the watershed surface waters based on regional USGS SPARROW models. Mean annual total nitrogen (TN) yield is estimated from the USGS SPARROW model (kilograms TN per square kilometer per year), mean annual total phosphorus (TP) yield (kilograms TP per square kilometer per year), mean annual suspended solid (SS) yield (megagrams SS per square kilometers per year) were estimated from the USGS SPARROW model which estimates pollutant yields using data on pollutant sources and sampled pollutant concentrations in surface waters. HUC12 values were calculated from outputs of regional USGS SPARROW models that simulate circa-2012 conditions (January 6, 2021 model version).

Septic system counts were obtained from 1992 and 1998 septic system surveys completed by the National Small Flows Clearinghouse, and this was obtained for the USEPA to Estimate Pollutant Loads. Toxic release inventory site count is provided because these facilities handle toxic chemicals in amounts above established levels; including on-site or off-site land, air, or water disposal, recycling, energy recovery, or treatment.

The relative potential for toxic chemical release and human exposure in the watersheds is also provided where higher values correspond to greater potential for toxic release and exposure due to a combination of the magnitude of chemical releases, the size of exposed populations, and the estimated dose of chemicals at points of human exposure. This information was quantified from 2015 to 2019 Risk-Screening Environmental Indicators (RSEI) Scores calculated by EPA for facilities that release toxic chemicals through air emissions or wastewater discharge. The Superfund Site Count is also provided for those sites included in the EPA Superfund Program. The Superfund Program is responsible for cleaning up the nation's most contaminated land and responding to environmental emergencies, oil spills and natural disasters. This count includes all Superfund Sites, including National Priorities List (NPL) and non-NPL sites.

TABLE 61 WATER QUALITY (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	Nitrogen Yield in HUC	Phosphorus Yield in HUC	Suspended Solid Yield in HUC	Septic System Count	Toxic Release Inventory Site Count	Toxic Release and Exposure Potential	Superfund Site Count
		(acres)		(kg/km ² /year)	(kg/km ² /year)	(kg/km ² /year)				
051402020101	Hurricane Creek	10,415	2,589	2,434.4	248.5	161.1	493	0	0	0
051402020102	Sandy Creek	11,201	607	3,538.7	210.1	221.1	136	0	0	0
051402020103	West Fork Creek	19,081	4,013	3,422.8	205.8	204.7	794	1	0	1
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	2,480	2,685.4	215.6	240.2	580	4	27,140.9	1
051402020105	Headwaters Smith Fork	14,569	818	1,897.8	181.3	104.2	203	1	11,914.9	0
051402020106	Snake Run-Pigeon Creek	14,457	784	2,702.0	211.8	219.8	133	0	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	725	2,538.6	236.0	226.7	171	1	32,724.1	0
051402020201	Headwaters Big Creek	11,474	1,099	814.8	58.0	54.6	265	0	0	0
051402020202	Big Creek	17,378	650	1,461.7	112.2	124.0	238	2	0	1
051402020203	Clear Branch-Pigeon Creek	22,961	841	962.7	107.8	134.7	168	0	0	0
051402020204	Barnes Ditch-Pigeon Creek	22,319	18,771	1,748.2	119.8	200.3	1,399	1	0	0
051402020301	Headwaters Bluegrass Creek	11,424	1,528	1,766.0	136.7	119.5	235	0	0	0
051402020302	Bluegrass Creek	16,936	10,575	1,667.2	140.2	165.8	668	0	0	0
051402020303	Little Pigeon Creek	11,178	14,477	855.9	124.1	111.7	919	8	4,160.3	0
051402020304	Headwaters Locust Creek	6,540	2,727	876.5	122.1	84.1	78	0	0	0
051402020305	Locust Creek	4,901	5,557	997.9	138.8	131.3	324	3	13.6	0

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	Nitrogen Yield in HUC	Phosphorus Yield in HUC	Suspended Solid Yield in HUC	Septic System Count	Toxic Release Inventory Site Count	Toxic Release and Exposure Potential	Superfund Site Count
		(acres)		(kg/km ² /year)	(kg/km ² /year)	(kg/km ² /year)				
051402020306	Kleymeyer Park-Pigeon Creek	17,786	55,168	1,128.8	133.0	307.9	2,739	20	965,720.4	1
05140202	Pigeon Creek HUC8 watershed only	235,252	123,409	1,852.9 (Average)	158.9 (Average)	165.4 (Average)	9,543	41		4

The nitrogen yield, phosphorus yield, and suspended soil yield for the subwatersheds of the project area are below the averages for the HUC8 (Pigeon Creek) watershed. Significant yields occur in the watersheds of intense agricultural production. There are numerous septic systems of which failing ones or improperly maintained systems may be direct contributors to the impairment from e coli in the watershed. Not much information was provided on the toxic release inventory sites in regard to what they involve, but the most sites are located in the more urbanized area in Evansville.

12.2.6.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

Indiana Department of Environmental Management (IDEM) regulations do not require coal mining facilities to develop a separate Stormwater Pollution Prevention Plan (SWPPP). The NPDES stormwater provisions in Indiana apply to discharges of storm water runoff that do not otherwise report to an NPDES discharge point and require that the permittee use best management practices that reduce overland flow velocity, reduce run-off volume, or trap sediment 327 IAC 15-7-7(b)(6). First, it is important to recognize that the majority of the disturbed area at a coal mine is directed toward sediment basins and NPDES outfalls. There are only certain circumstances that lead to the use of alternate methods of drainage control as allowed by regulation (312 IAC 25-6-13).

First, there are situations where use of traditional sediment basins to control runoff results in significantly more disturbed area than utilization of BMPs. A common example of this would be the locations at which aboveground conveyor belts, railways, or haul roads used to convey coal or refuse cross or intersect drainageways. It is not practical to build a sediment basin downgradient of each linear conveyance feature that intersects a drainageway. Large areas of disturbance associated with sediment basin construction would be required for comparably minimal areas of mining activity disturbance. Instead, use of sumps, silt fence, strawbale check dams, and mulch and revegetation of out slopes are more practical methods of erosion control and water quality protection in these areas.

Other areas where it is not practical to control erosion with traditional sediment basins include areas that are, by definition, outside of drainage control. These may include out slopes of sediment basin dams, levees, or diversions. Again, these out slope areas are best controlled utilizing practices such as silt fence, mulch, and prompt revegetation.

Areas where alternate methods of drainage control are implemented must be proposed by the permittee and are reviewed and ultimately decided by the Division of Reclamation (DOR). The SMCRA regulatory framework emphasizes sediment control throughout the performance standards which are used to assess compliance. As such, it is appropriate to place the determination of water quality compliance with the DOR. In Indiana, the MOU between IDEM and DOR places the principal NPDES and stormwater compliance, inspection, and enforcement responsibility with DOR inspectors, although IDEM retains the authority to perform all of these same functions (MOU 2021). This allocation of responsibility is appropriate because DOR inspectors are onsite conducting multi-day field inspections a minimum of once per month.

Sediment basins will control drainage for the Mining Area Addition and no areas have been identified where Alternate Measures of Drainage Control (AMDC) would be more appropriate in lieu of a sediment basin. In the event an AMDC is necessary, it will be proposed to DOR for incorporation into the SMCRA permit.

Phase II of the NPDES Stormwater Program was published in November 1999. The Phase II Rule requires NPDES permit coverage – mostly under general permits – for stormwater discharges from most small, urbanized areas that are classified by EPA as municipal small stormwater systems (MS4s) and construction activities that disturb from 1 to 5 acres of land. The Phase II Rule will require the NPDES permitting authority to develop a set of designation criteria and apply them, at a minimum, to all MS4s outside of an urban area located in an area with a population of at least 10,000 and a population design of at least 1,000 people per square mile. Any MS4 located in an area meeting the designation criteria would have to be brought into the program by the NPDES permitting authority and be required to obtain a permit.

From **TABLE 62**, within the HUC8 (Pigeon Creek) watershed, there are two hundred and thirty-seven (237) active permits of which only one (1) is a major discharger, Chandler WWTP which outlets into Pigeon Creek via Strollberg Ditch. Also included are the count of National Pollutant Discharge Elimination System (NPDES) permit effluent violations between 2017 and 2021. NPDES permits often include numeric limits that specify an allowable quantity of pollutant discharge (for example, maximum allowable pollutant concentrations in wastewater discharge). Effluent violations occur when a facility discharges at a level that exceeds the limits established by an NPDES permit. Four (4) municipalities in total discharge into Pigeon Creek: Fort Branch WWTP, that services a population of 2,771; Elberfeld WWTP, that services a population of 625; Haubstadt WWTP, that services a population of 1,577; and Chandler WWTP, that services a population of 1,887.

TABLE 62 NPDES PERMIT SUMMARY (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	NPDES Permit Count	NPDES Major Permit Count	NPDES Effluent Violations Count
		(acres)			
051402020101	Hurricane Creek	10,415	3	0	4
051402020102	Sandy Creek	11,201	0	0	0
051402020103	West Fork Creek	19,081	10	0	24
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	9	0	1
051402020105	Headwaters Smith Fork	14,569	3	0	7
051402020106	Snake Run-Pigeon Creek	14,457	1	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	1	0	8
051402020201	Headwaters Big Creek	11,474	4	0	0
051402020202	Big Creek	17,378	1	0	0
051402020203	Clear Branch-Pigeon Creek	22,961	8	0	1
051402020204	Barnes Ditch-Pigeon Creek	22,319	38	1	8
051402020301	Headwaters Bluegrass Creek	11,424	16	0	1
051402020302	Bluegrass Creek	16,936	30	0	0
051402020303	Little Pigeon Creek	11,178	30	0	0
051402020304	Headwaters Locust Creek	6,540	2	0	0
051402020305	Locust Creek	4,901	14	0	0
051402020306	Kleymeyer Park-Pigeon Creek	17,786	67	0	0
05140202	Pigeon Creek HUC8 watershed only	235,252	237	1	238

12.2.6.3 SURFACE WATER HYDROLOGY

There are numerous streams within the subwatersheds of the HUC8 (Pigeon Creek) watershed. **TABLE 63** depicts the length of high-resolution National Hydrography Database (NHD) stream features in the watershed based on the USGS High Resolution NHD (downloaded April 2016). The lengths are provided in both feet and miles.

TABLE 63 STREAM LENGTH (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Upstream HUC12 Area, not including this HUC	Upstream HUC12 Count, not including this HUC	NHD High Resolution Stream Length	NHD High Resolution Stream Length	% of Streams Draining to 1 st , 2 nd , or 3 rd Order Streams in HUC
		(acres)	(acres)		(feet)	(miles)	
051402020101	Hurricane Creek	10,415	-	0	643,750	122	100
051402020102	Sandy Creek	11,201	-	0	802,738	152	100
051402020103	West Fork Creek	19,081	17,055	1	1,387,309	263	100
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	18,346	1	753,518	143	100
051402020105	Headwaters Smith Fork	14,569	-	0	924,896	175	100
051402020106	Snake Run-Pigeon Creek	14,457	85,251	4	996,329	189	100
051402020107	Smith Fork-Pigeon Creek	11,271	132,793	6	764,355	145	93.2
051402020201	Headwaters Big Creek	11,474	-	0	752,788	143	100
051402020202	Big Creek	17,378	18,789	1	1,177,397	223	100
051402020203	Clear Branch-Pigeon Creek	22,961	198,501	9	1,549,802	294	74.9
051402020204	Barnes Ditch-Pigeon Creek	22,319	236,103*	10	1,545,013	293	78.7
051402020301	Headwaters Bluegrass Creek	11,424	-	0	792,379	150	100
051402020302	Bluegrass Creek	16,936	18,707	1	1,211,318	229	100
051402020303	Little Pigeon Creek	11,178	-	0	764,137	145	99.9
051402020304	Headwaters Locust Creek	6,540	-	0	400,573	76	100
051402020305	Locust Creek	4,901	10,704	1	312,272	59	99.9
051402020306	Kleymeyer Park-Pigeon Creek	17,786	356,130*	16	1,266,999	240	31.8
05140202	Pigeon Creek HUC8 watershed only	235,252			16,045,573	3,039	

*Includes area outside the Highland-Pigeon HUC

12.2.7 GROUNDWATER QUALITY AND QUANTITY - HUC8

Groundwater provides a limited source of water within the HUC8 (Pigeon Creek) watershed due to the proximity of the Ohio River which supplies clean drinking water to the majority of the area. Portions of the northern area receive water from Patoka Lake. The Evansville Water and Sewer Utility (EWSU) has an intake capacity of 60 million gallons per day and delivers 23 million gallons per day of safe potable water to 200,000 people through more than 1,000 miles of water lines in the region. The Ohio River watershed at the EWSU intake is 107,788,800 acres. It should be clarified and noted that the intake for EWSU is upstream of where Pigeon Creek outlets into the Ohio. The EWSU intake is at Navigation River Mile 791.5 and Pigeon Creek is located at Navigation River Mile 792.9. Navigation River Miles increase in value downstream.

TABLE 64 provides information on the various water demands within the HUC8 watersheds as well as the total number of locations of domestic drinking water groundwater intakes, which is zero. Sufficient detail is not

available to include active residential groundwater wells. Domestic water use (million gallons per day) includes indoor and outdoor household uses, such as drinking, bathing, cleaning, landscaping, and pools. Domestic water can include surface or groundwater that is self-supplied by households or publicly supplied. Water used in a HUC12 may originate from within or outside the HUC12. These values were calculated by downscaling county water use estimates for 2005 reported by US Geological Survey ('Estimated Use of Water in the United States County-Level Data for 2005'). The estimates use the 2006 National Land Cover Database (2006 NLCD) Land Cover dataset and the 2010 US Census population estimates from the US Census Bureau and are available in the EPA EnviroAtlas.

Daily agricultural water use includes surface and groundwater that is self-supplied by agricultural producers or supplied by water providers (governments, private companies, or other organizations). Water used in a HUC12 may originate from within or outside the HUC12. Calculated by downscaling county water use estimates for 2005 reported by US Geological Survey ('Estimated Use of Water in the United States County-Level Data for 2005') using the 2006 National Land Cover Database (2006 NLCD) Land Cover dataset, the 2010 Cropland Data Layer, and a custom geospatial dataset of irrigated area locations. Counties with zero reported water use were assigned a state-level average value to address issues with water use reporting. This indicator was calculated for EPA EnviroAtlas.

Daily industrial water use (million gallons per day) includes water used for chemical, food, paper, wood, and metal production and only includes self-supplied surface water or groundwater by private wells or reservoirs. Industrial water supplied by public water utilities is not counted. The industrial water use is calculated by downscaling county water use estimates for 2005 reported by US Geological Survey ('Estimated Use of Water in the United States County-Level Data for 2005') using a geospatial dataset on the location of industrial facilities as of 2009/10. Water use by industrial facilities in counties that were reported to have zero industrial water use in the USGS dataset was estimated from values for nearby facilities. This indicator was calculated for EPA EnviroAtlas.

The total number of groundwater intakes for drinking water only includes public water system groundwater intakes that are in the HUC12. These values were calculated from the EPA map layer titled "Percent HUC12 in Source Water Protection Area (Surface)" (October 5, 2021 version)

Percent of the HUC classified as a source water protection area (SPA) for public water system drinking water sources includes SPAs for groundwater sources of drinking water (i.e., surface water sources are not included). This field was calculated from the EPA map layer titled "Percent HUC12 in Source Water Protection Area (Surface)" (October 5, 2021 version)

TABLE 64 WATER DEMAND AND SOURCES (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	Domestic Water Demand in HUC12	Agricultural Water Demand in HUC12	Industrial Water Demand in HUC12	Drinking Water Groundwater Intake Count in HUC	% Drinking Water Source Protection Area in HUC
		(acres)		(MGD)	(MGD)	(MGD)		(percent)
051402020101	Hurricane Creek	10,415	2,589	0.20	0.51	0.02	0	0
051402020102	Sandy Creek	11,201	607	0.05	0.58	0.00	0	0
051402020103	West Fork Creek	19,081	4,013	0.30	1.09	0.05	0	0
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	2,480	0.19	0.45	0.02	0	0.27
051402020105	Headwaters Smith Fork	14,569	818	0.06	0.06	0.00	0	0
051402020106	Snake Run-Pigeon Creek	14,457	784	0.06	0.95	0.00	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	725	0.05	1.06	0.00	0	0
051402020201	Headwaters Big Creek	11,474	1,099	0.08	0.01	3.91	0	0
051402020202	Big Creek	17,378	650	0.05	0.19	0.01	0	0
051402020203	Clear Branch-Pigeon Creek	22,961	841	0.06	0.31	0.00	0	0

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	Domestic Water Demand in HUC12	Agricultural Water Demand in HUC12	Industrial Water Demand in HUC12	Drinking Water Groundwater Intake Count in HUC	% Drinking Water Source Protection Area in HUC
		(acres)		(MGD)	(MGD)	(MGD)		(percent)
051402020204	Barnes Ditch-Pigeon Creek	22,319	18,771	1.43	0.71	105.70	0	0.04
051402020301	Headwaters Bluegrass Creek	11,424	1,528	0.12	0.90	25.97	0	0
051402020302	Bluegrass Creek	16,936	10,575	0.80	1.66	13.78	0	0
051402020303	Little Pigeon Creek	11,178	14,477	1.10	0.16	15.38	0	0
051402020304	Headwaters Locust Creek	6,540	2,727	0.21	0.07	1.54	0	0
051402020305	Locust Creek	4,901	5,557	0.42	0.16	2.38	0	0
051402020306	Kleymeyer Park-Pigeon Creek	17,786	55,168	4.19	0.57	69.41	0	0
05140202	Pigeon Creek HUC8 watershed only	235,252	123,409	9.38	9.44	238.18		

The above table depicts the water demand in the watersheds and the cumulative water demand in the HUC8 (Pigeon Creek) watershed, of which only a limited quantity is obtained from groundwater sources. The main supplier of is the Evansville Water and Sewer Utility which obtains its water from the Ohio River. The Seven Hills – Mining Area Addition will have no effect on water supply or groundwater intake sources with the HUC8 watershed.

12.2.8 BIOLOGICAL QUALITY - HUC8

Biological diversity of streams is an excellent indicator of the cumulative impact of watershed influences on stream quality. The Indiana Department of Environmental Management’s Biological Studies Section conducts ecological assessment of Indiana surface waters that include aquatic habitat quality, fish community health, and invertebrate community health. In **SECTION 12.1.8 BIOLOGICAL QUALITY**, information regarding their evaluation of the streams in the Highland-Pigeon Creek watershed are provided and discussed.

The ecoregional Biological Condition Sub-Index score for the HUC12 from the 2021 EPA Preliminary Healthy Watersheds Assessment (PHWA). The Biological Condition Sub-Index measures the likelihood for high-quality stream biological communities in the HUC12, based on a predictive model of stream biological condition that uses watershed attributes as inputs. Source data were ecoregional Biological Condition Sub-Index scores for HUC12s from the 2021 EPA Preliminary Healthy Watersheds Assessment (August 8, 2021 version).

The statewide Biological Condition Sub-Index percentile for the HUC12 from the 2021 EPA Preliminary Healthy Watersheds Assessment (PHWA). The Biological Condition Sub-Index measures the likelihood for high-quality stream biological communities in the HUC12, based on a predictive model of stream biological condition that uses watershed attributes as inputs. Percentiles convey the relative rank of a HUC12 score compared to all other HUC12s with much of their area in the state. For example, a percentile value of 60% means that the HUC12 scores better than 60% of all other HUC12s with a majority of their area in the state. Source data were statewide Biological Condition Sub-Index percentiles for HUC12s from the 2021 EPA Preliminary Healthy Watersheds Assessment (August 8, 2021 version). **TABLE 65** summarizes this data per each HUC12 watershed.

TABLE 65 BIOLOGICAL CONDITION (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	% of Land in Ag	PHWA Biological Sub-Index, Ecoregion	PHWA Biological Sub-Index, Ecoregion, Percentile
		(acres)		(percent)		
051402020101	Hurricane Creek	10,415	2,589	79.80	0.33	26.34

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	% of Land in Ag	PHWA Biological Sub-Index, Ecoregion	PHWA Biological Sub-Index, Ecoregion, Percentile
		(acres)		(percent)		
051402020102	Sandy Creek	11,201	607	84.56	0.18	7.56
051402020103	West Fork Creek	19,081	4,013	85.91	0.30	20.42
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	2,480	76.76	0.33	25.46
051402020105	Headwaters Smith Fork	14,569	818	68.09	0.30	19.40
051402020106	Snake Run-Pigeon Creek	14,457	784	80.01	0.47	58.00
051402020107	Smith Fork-Pigeon Creek	11,271	725	70.26	0.55	71.20
051402020201	Headwaters Big Creek	11,474	1,099	24.44	0.42	46.15
051402020202	Big Creek	17,378	650	56.12	0.39	39.62
051402020203	Clear Branch-Pigeon Creek	22,961	841	37.17	0.65	83.19
051402020204	Barnes Ditch-Pigeon Creek	22,319	18,771	53.51	0.50	63.78
051402020301	Headwaters Bluegrass Creek	11,424	1,528	63.56	0.38	38.12
051402020302	Bluegrass Creek	16,936	10,575	49.23	0.49	61.67
051402020303	Little Pigeon Creek	11,178	14,477	16.60	0.30	19.74
051402020304	Headwaters Locust Creek	6,540	2,727	31.16	0.46	54.39
051402020305	Locust Creek	4,901	5,557	29.84	0.40	42.27
051402020306	Kleymeyer Park-Pigeon Creek	17,786	55,168	15.57	0.48	59.63
05140202	Pigeon Creek HUC8 watershed only	235,252	123,409			

12.2.9 THREATENED AND ENDANGERED SPECIES - HUC8

Threatened and endangered species are protected under the Endangered Species Act (16 USC 1531 et seq.) of 1973. Two primary objectives of the Act are to 1) provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and 2) to restore all listed species' populations to the point where their numbers make them viable self-sustaining members of their ecological communities.

An Endangered Species Act review was coordinated through the US Fish and Wildlife Service's Information for Planning and Consultation (IPaC) website. An official species list is generated within an uploaded project area. The Highland-Pigeon HUC8 Watershed (Pigeon Creek only) with an IPaC Project Code of 2025-0124435 lists the following six species that may occur or be affected by the proposed activities. This list was generated on July 21, 2025 and the official species list can be found in **APPENDIX H**. There is a total of six (6) threatened, endangered, or candidate species for this mitigation area.

- endangered gray bat (*Myotis grisescens*),
- endangered Indiana bat (*Myotis sodalis*),
- endangered northern long-eared bat (*Myotis septentrionalis*),
- proposed endangered tricolored bat (*Perimyotis subflavus*),
- experimental population, non-essential whooping crane (*Crus americana*),
- proposed threatened monarch butterfly (*Danaus plexippus*),
- endangered fanshell mussel (*Cyprogenia stegaria*),
- endangered fat pocketbook mussel (*Potamilus capax*),
- threatened longsolid mussel (*Fusconaia subrotunda*),
- endangered pink mucket mussel (pearlymussel) (*Lampsilis abrupta*),
- threatened rabbitsfoot mussel (*Quadrula cylindrica cylindrica*),
- endangered ring pink mussel (*Obovaria retusa*),

- endangered rough pigtoe mussel (*Pleurobema plenum*), and
- endangered sheepsnose mussel (*Plethobasus cyphus*)

Per the IPaC review, there were no critical habitats for these species within the project area. This species list fulfills the requirements of the U.S. Fish and Wildlife Services under section 7(c) of the Endangered Species Act of 1973, as amended.

The Indiana Natural Heritage Data Center Division of Nature Preserves maintains lists for each county in the state of Indiana. **TABLE 66** provides the species lists for the tri-county area of Gibson County, Warrick County, and Vanderburgh County, which are the counties that contain a majority of Pigeon Creek’s length. These lists were last updated on January 13, 2023 and show the species current to that date.

TABLE 66 **THREATENED AND ENDANGERED SPECIES LIST (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)**

Species Name	Common Name	County	Federal Status	State Status	Global Heritage Rank	State Heritage Rank
Crustacean						
<i>Caecidotea beattyi</i>	An Isopod	Gibson			G3G4	S1
<i>Orconectes indianensis</i>	Indiana Crayfish	Gibson, Vanderburgh		WL	G3	S2
Mollusk: Bivalvia (Mussels)						
<i>Arcidens confragosus</i>	Rock Pocketbook	Vanderburgh			G4	S2
<i>Cumberlandia monodonta</i>	Spectaclecase	Gibson	E	SX	G3	SX
<i>Cyprogenia stegaria</i>	Eastern Fanshell Pearlymussel	Gibson	E	SE	G1	S1
<i>Epioblasma flexuosa</i>	Leafshell	Gibson		SX	GX	SX
<i>Epioblasma propinqua</i>	Tennessee Riffleshell	Gibson		SX	GX	SX
<i>Epioblasma torulosa</i>	Tubercled Blossom	Gibson	DL	SX	GX	SX
<i>Epioblasma triquetra</i>	Snuffbox	Gibson	E	SE	G3	S1
<i>Fusconaia subrotunda</i>	Longsolid	Gibson	PT	SX	G3	SX
<i>Lampsilis abrupta</i>	pink mucket	Gibson	E	SX	G1G2	SX
<i>Lampsilis ovata</i>	pocketbook	Gibson, Vanderburgh, Warrick		SSC	G5	S2
<i>Ligumia recta</i>	black sandshell	Vanderburgh, Warrick		SSC	G4G5	S3
<i>Obovaria retusa</i>	Ring Pink	Gibson	E	SX	G1	SX
<i>Obovaria subrotunda</i>	round hickorynut	Gibson	PT	SE	G4	S1
<i>Plethobasus cicatricosus</i>	White Wartyback	Gibson	E	SX	G1	SX
<i>Plethobasus cooperianus</i>	Orangefoot Pimpleback	Gibson	E	SX	G1	SX
<i>Plethobasus cyphus</i>	Sheepnose	Gibson, Vanderburgh, Warrick	E	SE	G3	S1
<i>Pleurobema coccineum</i>	Round pigtoe	Vanderburgh			G4G5	S3
<i>Pleurobema clava</i>	Clubshell	Gibson	E	SE	G1G2	S1
<i>Pleurobema cordatum</i>	Ohio Pigtoe	Gibson, Vanderburgh, Warrick		SSC	G4	S2
<i>Pleurobema plenum</i>	Rough Pigtoe	Gibson	E	SE	G1	S1
<i>Pleurobema rubrum</i>	Pyramid Pigtoe	Gibson		SX	G2G3	SX
<i>Potamilus capax</i>	Fat Pocketbook	Gibson	E	SE	G2	S1
<i>Ptychobranchus fasciolaris</i>	Kidneyshell	Gibson		SSC	G4G5	S2
<i>Theliderma cylindrica</i>	Rabbitsfoot	Gibson	T	SE	G3G4	S1
Insect						
Coleoptera (Beetles)						

Species Name	Common Name	County	Federal Status	State Status	Global Heritage Rank	State Heritage Rank
<i>Microphorus americanus</i>	American Burying Beetle	Vanderburgh	E	SX	G3	SX
Lepidoptera (Butterflies and Moths)						
<i>Catocala marmorata</i>	Marbled Underwing Moth	Vanderburgh		SE	G3G4	S1
Ephemeroptera (Mayflies)		Gibson				
<i>Homoeoneuria ammophila</i>	Sand-loving Brush-legged Mayfly	Gibson		ST	G4	S2
<i>Pentagenia vittigera</i>	common spiny-headed burrowing mayfly	Gibson		WL	G5	S3
<i>Pseudiron centralis</i>	White Crabwalker Mayfly	Gibson		SE	G5	S1
Fish						
<i>Atractosteus spatula</i>	alligator gar	Gibson		SSC	G3G4	SX
<i>Etheostoma squamiceps</i>	Spottail Darter	Gibson, Vanderburgh, Warrick			G4G5	S2S3
Amphibian						
<i>Acris blanchardi</i>	Blanchard's cricket frog	Gibson		SSC	G5	S4
<i>Cryptobranchus alleganiensis alleganiensis</i>	hellbender	Vanderburgh	C	SE	G3T2	S1
Reptile		Gibson				
<i>Kinosternon subrubrum subrubrum</i>	eastern mud turtle	Gibson, Vanderburgh		SE	G5T5	S1
<i>Macrochelys temminckii</i>	alligator snapping turtle	Gibson	PT	SE	G3	SH
<i>Nerodia erythrogaster neglecta</i>	copperbelly water snake	Gibson, Vanderburgh, Warrick	PS:LT	SE	G5T3	S2
<i>Opheodrys aestivus</i>	rough green snake	Gibson, Vanderburgh, Warrick		SSC	G5	S3
<i>Pseudemys concinna concinna</i>	eastern river cooter	Gibson		SE	G5T5	S1
<i>Terrapene carolina carolina</i>	woodland box turtle	Gibson		SSC	G5T5	S3
Bird						
<i>Asio flammeus</i>	Short-eared owl	Warrick		SE	G5	S2
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Gibson		SSC	G5	S2B
<i>Ardea alba</i>	Great Egret	Vanderburgh		SSC	G5	S1B
<i>Bartramia longicauda</i>	Upland sandpiper	Vanderburgh		SE	G5	S3B
<i>Botaurus lentiginosus</i>	American Bittern	Gibson, Warrick		SE	G5	S2B
<i>Centronyx henslowii</i>	Henslow's sparrow	Gibson, Warrick		SE	G4	S3B
<i>Circus hudsonius</i>	Northern Harrier	Gibson, Warrick		SE	G5	S2
<i>Cistothorus stellaris</i>	sedge wren	Gibson, Vanderburgh, Warrick		SE	G5	S3B
<i>Falco peregrinus</i>	Peregrine Falcon	Gibson, Vanderburgh		SSC	G4	S2B
<i>Gallinula galeata</i>	Common gallinule	Gibson		SE	G5	S3B
<i>Grus americana</i>	Whooping Crane	Gibson	E,XN	SE	G1	S1N,S1M
<i>Haliaeetus leucocephalus</i>	bald eagle	Gibson, Vanderburgh, Warrick			G5	S3
<i>Helmitheros vermivorus</i>	worm-eating warbler	Warrick		SSC	G5	S3B
<i>Ictinia mississippiensis</i>	Mississippi kite	Warrick		SSC	G5	S1B
<i>Ixobrychus exilis</i>	Least Bittern	Gibson, Warrick		SE	G4G5	S3B
<i>Lanius ludovicianus</i>	loggerhead shrike	Gibson, Vanderburgh, Warrick		SE	G4	S2B
<i>Lophodytes cucullatus</i>	Hooded merganser	Vanderburgh			G5	S2S3B
<i>Mniotilta varia</i>	Black-and-white Warbler	Gibson		SSC	G5	S1S2B
<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron	Gibson, Warrick		SE	G5	S2B

Species Name	Common Name	County	Federal Status	State Status	Global Heritage Rank	State Heritage Rank
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	Gibson		SE	G5	S1B
<i>Pandion haliaetus</i>	Osprey	Warrick		SSC	G5	S1B
<i>Phalaropus tricolor</i>	Wilson's Phalarope	Gibson		SSC	G5	SHB
<i>Rallus elegans</i>	King Rail	Gibson		SE	G4	S1B
<i>Rallus limicola</i>	Virginia rail	Warrick		SE	G5	S3B
<i>Setophaga cerulea</i>	Cerulean Warbler	Gibson, Warrick		SE	G4	S3B
<i>Sternula antillarum athalassos</i>	Interior Least Tern	Gibson		SE	G4T3Q	S1B
<i>Thryomanes bewickii</i>	Bewick's Wren	Gibson			G5	S1B
<i>Tyto alba</i>	Barn Owl	Gibson, Vanderburgh, Warrick		SE	G5	S2
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Gibson	C	SE	G4	S1B
Mammal						
<i>Lasiurus borealis</i>	Eastern red bat	Gibson, Warrick		SSC	G3G4	S4
<i>Mustela nivalis</i>	Least Weasel	Gibson		SSC	G5	S2?
<i>Myotis lucifugus</i>	little brown myotis	Gibson	C	SE	G3G4	S2
<i>Myotis septentrionalis</i>	Northern Long Eared Bat	Gibson	T; PE	SE	G2G3	S2S3
<i>Myotis sodalis</i>	Indiana Bat	Gibson, Warrick	E	SE	G2	S1
<i>Nycticeius humeralis</i>	Evening Bat	Gibson, Vanderburgh, Warrick		SE	G5	S1
<i>Perimyotis subflavus</i>	Tricolored Bat	Gibson		SE	G3G4	S2S3
<i>Sylvilagus aquaticus</i>	swamp rabbit	Gibson, Vanderburgh, Warrick		SE	G5	S1
<i>Taxidea taxus</i>	American Badger	Gibson, Vanderburgh, Warrick		SSC	G5	S2
Vascular Plants						
<i>Acalypha deamii</i>	Deam's two-seeded mercury	Gibson, Vanderburgh		WL	G4?	S4
<i>Azolla caroliniana</i>	Carolina mosquito-fern	Gibson		ST	G5	S3
<i>Bacopa rotundifolia</i>	roundleaf water-hyssop	Warrick		ST	G5	S2
<i>Calycocarpum lyonii</i>	cup-seed	Gibson		ST	G5	S2
<i>Carex aureolensis</i>	land of gold sedge	Vanderburgh		SE	GNR	S1
<i>Carex bushii</i>	Bush's sedge	Warrick		ST	G4	S2
<i>Carex gigantea</i>	large sedge	Gibson		SE	G4	S1
<i>Carex socialis</i>	social sedge	Gibson, Vanderburgh, Warrick		ST	G4	S2
<i>Carex straminea</i>	straw sedge	Gibson		ST	G5	S2
<i>Catalpa speciosa</i>	northern catalpa	Gibson, Vanderburgh, Warrick		ST	G4?	S3
<i>Chamaelirium luteum</i>	devil's bit	Vanderburgh		SE	G5	S1
<i>Chelone obliqua</i> var. <i>speciosa</i>	rose turtlehead	Gibson		WL	G4T3	S3
<i>Clematis pitcheri</i>	Pitcher's leather-flower	Gibson, Warrick		ST	G4G5	S3
<i>Crataegus viridis</i> var. <i>viridis</i>	green hawthorn	Gibson, Vanderburgh		ST	G5T5	S2
<i>Croton michauxii</i> var. <i>elliptica</i>	elliptical rushfoil	Warrick		SE	G5	S1
<i>Cyperus pseudovegetus</i>	green flatsedge	Gibson		ST	G5	S3
<i>Dicliptera brachiata</i>	wild mudwort	Warrick		SE	G5	S1
<i>Didiplis diandra</i>	water-purslane	Gibson, Vanderburgh, Warrick		SE	G5	S1
<i>Diodia virginiana</i>	buttonweed	Gibson		WL	G5	S3
<i>Eleocharis parvula</i>	small spikerush	Warrick		WL	G5	SU

Species Name	Common Name	County	Federal Status	State Status	Global Heritage Rank	State Heritage Rank
<i>Eleocharis wolfii</i>	Wolf's spike-rush	Warrick		ST	G3G5	S2
<i>Festuca paradoxa</i>	cluster fescue	Warrick		ST	G5	S2
<i>Gleditsia aquatica</i>	water-locust	Gibson		SE	G5	S1
<i>Gonolobus suberosus</i>	angular-fruited milkvine	Warrick		ST	G5	S3
<i>Hibiscus moscheutos</i> ssp. <i>lasiocarpus</i>	hairy-fruited hibiscus	Gibson		SE	G5T4	S1
<i>Hottonia inflata</i>	featherfoil	Vanderburgh		ST	G4	S2
<i>Hypericum adpressum</i>	creeping St. John's-wort	Gibson		SE	G3	S2
<i>Hypericum virgatum</i>	coppery St. John's-wort	Warrick		ST	G4?	S2
<i>Iresine rhizomatosa</i>	eastern bloodleaf	Gibson, Warrick		ST	G5	S3
<i>Isoetes melanopoda</i>	blackfoot quillwort	Vanderburgh		ST	G5	S2
<i>Juglans cinerea</i>	butternut	Gibson		ST	G3	S2
<i>Linum striatum</i>	ridged yellow flax	Gibson		WL	G5	S3
<i>Ludwigia decurrens</i>	primrose willow	Gibson		WL	G5	S3
<i>Nothoscordum bivalve</i>	crow-poison	Warrick		ST	G4	S3
<i>Orobanche riparia</i>	bottomland broomrape	Gibson, Vanderburgh, Warrick		SE	G4?	S1
<i>Passiflora incarnata</i>	purple passion-flower	Vanderburgh		WL	G5	S3
<i>Perideridia americana</i>	eastern eulophus	Warrick		SE	G4	S1
<i>Phacelia ranunculacea</i>	blue scorpionweed	Vanderburgh, Warrick		SE	G4	S1
<i>Phoradendron serotinum</i>	American mistletoe	Vanderburgh		WL	G5	S3
<i>Platanthera flava</i> var. <i>flava</i>	southern rein orchid	Gibson		SE	G4?T4?Q	S1
<i>Poa wolfii</i>	Wolf's bluegrass	Warrick		ST	G4	S3
<i>Potamogeton pusillus</i>	slender pondweed	Gibson		WL	G5	S2
<i>Rhexia mariana</i> var. <i>mariana</i>	Maryland meadow beauty	Vanderburgh		ST	G5T5	S1
<i>Rorippa aquatica</i>	lake cress	Gibson		SE	G4?	S1
<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	orange coneflower	Warrick		WL	G5T4?	S3
<i>Scutellaria parvula</i> var. <i>australis</i>	southern skullcap	Warrick		WL	G4T4?	S2
<i>Silene ovata</i>	ovate catchfly	Vanderburgh		SE	G3	S1
<i>Sparganium androcladum</i>	branching bur-reed	Gibson		ST	G4G5	S2
<i>Stenanthium gramineum</i>	eastern featherbells	Warrick		ST	G4	S1
<i>Strophostyles leiosperma</i>	slick-seed wild-bean	Gibson, Warrick		WL	G5	S3
<i>Styrax americanus</i>	American snowbell	Gibson, Warrick		ST	G5	S3
<i>Taxodium distichum</i> var. <i>distichum</i>	bald cypress	Gibson, Vanderburgh, Warrick		ST	G5	S2
<i>Thalictrum pubescens</i>	tall meadowrue	Warrick		ST	G5	S3
<i>Thyranthella difformis</i>	climbing dogbane	Gibson, Warrick		ST	G4G5	S3
<i>Trifolium reflexum</i> var. <i>glabrum</i>	buffalo clover	Warrick		SE	G3G4T2T4Q	S1
<i>Vitis palmata</i>	catbird grape	Gibson, Vanderburgh		ST	G4	S3

Notes:

- Federal Status: E = Endangered; T = Threatened; C = candidate; PDL = proposed for delisting
- State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list
- Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon surveys globally; G4 = widespread and abundant globally but with long-term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank

- State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; S4 = widespread and abundant in state but with long-term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

12.2.10 AIR QUALITY – HUC8

Under State regulations, if a “source” emits one or more of the following regulated pollutants, it may meet thresholds requiring an air permit or approval from IDEM’s Office of Air Quality.

- Criteria air pollutants that are regulated under National Ambient Air Quality Standards (NAAQS). These pollutants include carbon monoxide, lead, nitrogen dioxide, ground-level ozone, particulate matter (PM), and sulfur dioxide.
- Pollutants regulated under New Source Performance Standards (NSPS) including dioxins/furan, fluorides, hydrogen chloride, hydrogen sulfide, sulfuric acid mist, total reduced sulfur, reduced sulfur compounds, and total suspended particles.
- Pollutants regulated under stratospheric ozone protection rules, including chlorofluorocarbons (CFCs) and other ozone depleting substances.
- Acid rain pollutants, including sulfur dioxide and nitrogen oxides.
- Hazardous air pollutants (HAPs) regulated under National Emission Standards for Hazardous Air Pollutants (NESHAPs).
- Greenhouse gases, including carbon dioxide, methane, nitrous oxide and fluorinated or chlorinated gasses.
- Precursor pollutants, which are substances that react chemically to form other pollutants and include nitrogen oxides and volatile organic compounds that form ground-level ozone, sulfur dioxide and nitrogen oxides that form fine particulate matter (PM2.5), and HAPs that are constituents or precursors of general pollutants that produce adverse effects on public health or welfare.

The Air Compliance and Enforcement Branch of IDEM works in many ways to improve air quality by ensuring that air pollution sources comply with applicable state and federal air pollution laws, rules, and air permits. The branch works to ensure the compliance of regulated sources of air emissions in Indiana by overseeing requirements for stack testing, reviewing records including but not limited to annual compliance certifications, and conducting inspections. Additional responsibilities include issuing approvals for fire training and open burning activities, enforcing asbestos regulations, responding to pollution complaints, and promoting best practices for residential open burning activities, hydronic heaters, and fugitive dust.

IDEM maintains a permit data base that is available to the public at

<https://www.in.gov/apps/idem/caats/index.xhtml>

and includes information on active and past air quality permits for the entire state. **TABLE 67** provides the number of sources that required a permit at one time for each of the counties that are included in the HUC8 (Pigeon Creek) watershed.

TABLE 67 AIR PERMITS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

County	Air Quality Permit Count
Gibson County	66
Warrick County	66
Vanderburgh County	216

Air quality trend shows steady progression to improved air quality both regionally and nationally. Nationally, overall concentrations of air pollutants have dropped significantly since 1990:

- Carbon Monoxide (CO) 8-Hour, 78%
- Lead (Pb) 3-Month Average, 85% (from 2010)
- Nitrogen Dioxide (NO₂) Annual, 59%
- Nitrogen Dioxide (NO₂) 1-Hour, 51%
- Ozone (O₃) 8-Hour, 25%

- Particulate Matter 10 microns (PM₁₀) 24-Hour, 46%
- Particulate Matter 2.5 microns (PM_{2.5}) Annual, 43% (from 2000)
- Particulate Matter 2.5 microns (PM_{2.5}) 24-Hour, 44% (from 2000)
- Sulfur Dioxide (SO₂) 1-Hour, 90%
- Numerous air toxics have declined with percentages varying by pollutant.

During this same period, the U.S. economy continued to grow, Americans drove more miles, and population and energy use increased.

IDEM operates two (2) ambient air quality monitoring stations in the HUC8 (Pigeon Creek) watershed which continually measure many pollutants. Station 181730008 is located at Boonville High School in Warrick County. It has been in continuous measurement since April 16, 1991 sampling for ozone. The second site is Station 181630021 in Evansville at 1110 W. Buena Vista Road which has been in operation since July 8, 2009. This site samples for several parameters that include O₃ (ozone), SO₂, NO₂, PM₁₀, multiple forms of PM_{2.5}. Specific information can be obtained for these on the State Interactive Map of Air Quality, which shows these sites typically exhibit “good” to “moderate” U.S. Air Quality Index readings. The region often oscillates around the moderate air quality contour. However, the “moderate” reading may present a risk for some sensitive populations.

12.2.11 TRAFFIC AND TRANSPORT - HUC8

TABLE 68 depicts the length roads and railroads in the watersheds. It is broken down by primary roads which are divided highways within the interstate highway system or under state managed and are distinguished by the presence of interchanges and ramps for entrance/exit. Interstate 64 and Interstate 69 would be included in this category. Secondary roads are main arteries with one or more lanes of traffic in each direction that may be divided, usually have intersections with many other roads and driveways, and are usually in the U.S. Highway, State Highway or County Highway system. Local roads are a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction and may be privately or publicly maintained. Length of all roads in the Riparian Zone is also provided. Average daily traffic density in the HUC (number of vehicles per day) was measured from information in the Department of Transportation Highway Performance Monitoring System (HPMS). The HPMS reports average daily traffic volume (number of vehicles) for each road segment in the database. Traffic density is calculated as the total traffic volume adjusted by road segment length, divided by the total road length in the HUC. Railroad length is the length of railroads in the watershed and length of all railroads in the Riparian zone is also provided.

From the table, local roads make up many of the roadways in the HUC8 (Pigeon Creek) watershed with overall 14.6% of all roads and 28.4% of all railroads located in the riparian zone.

TABLE 68 ROADS AND RAIL (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Primary Road Length in HUC	Secondary Road Length in HUC	Local Road Length in HUC	Traffic Density in HUC	Total Road Length in Riparian Zone in HUC	Railroad Length in HUC	Railroad Length in Riparian Zone in HUC
		(acres)	(miles)	(miles)	(miles)	(vehicles/day)	(miles)	(miles)	(miles)
051402020101	Hurricane Creek	10,415	6	14	66	11,068	7	3	0
051402020102	Sandy Creek	11,201	0	4	43	1,963	4	6	0
051402020103	West Fork Creek	19,081	0	17	109	8,206	9	11	1
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	0	6	76	4,101	7	7	0
051402020105	Headwaters Smith Fork	14,569	0	6	62	1,221	11	4	1
051402020106	Snake Run-Pigeon Creek	14,457	9	7	69	6,674	12	0	0
051402020107	Smith Fork-Pigeon Creek	11,271	14	11	50	5,061	14	1	0

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Primary Road Length in HUC	Secondary Road Length in HUC	Local Road Length in HUC	Traffic Density in HUC	Total Road Length in Riparian Zone in HUC	Railroad Length in HUC	Railroad Length in Riparian Zone in HUC
		(acres)	(miles)	(miles)	(miles)	(vehicles/day)	(miles)	(miles)	(miles)
051402020201	Headwaters Big Creek	11,474	9	10	26	5,894	8	10	5
051402020202	Big Creek	17,378	12	6	65	8,776	20	11	5
051402020203	Clear Branch-Pigeon Creek	22,961	7	1	58	7,955	16	11	6
051402020204	Barnes Ditch-Pigeon Creek	22,319	5	20	167	8,689	24	11	4
051402020301	Headwaters Bluegrass Creek	11,424	13	5	45	7,639	9	8	3
051402020302	Bluegrass Creek	16,936	10	5	121	8,399	23	6	1
051402020303	Little Pigeon Creek	11,178	0	17	121	10,657	25	20	7
051402020304	Headwaters Locust Creek	6,540	0	1	42	3,483	8	7	2
051402020305	Locust Creek	4,901	0	10	45	6,366	13	9	2
051402020306	Kleymeyer Park-Pigeon Creek	17,786	9	30	315	13,422	45	20	5
05140202	Pigeon Creek HUC8 watershed only	235,252	95	170	1,479		256	144	41

TABLE 69 depicts the number of road-stream crossings in the watershed with further breakdown of crossings by stream order which describes the position of a stream reach in the stream network. With 1st order streams being headwater smaller streams to larger 4th order streams of which Pigeon Creek would be considered in this category. It is evident as the stream traverses closer to Evansville that the number of road-stream crossings jumps dramatically. In the more rural areas, the crossing count drops. These counts were obtained from the US Census Bureau TIGER Roads National Geodatabase (2015 version) and the NHDPlus2 CatSeed grid (downloaded October 2012).

TABLE 69 ROAD STREAM CROSSING (HUC8 PIGEON CREEK)

HUC Watershed	Watershed Name	Watershed Area	Upstream HUC12 Area, not including this HUC (acres)	Road-Stream Crossing Count in HUC	Road-Stream Crossing Count, 1 st Order	Road-Stream Crossing Count, 2 nd Order	Road-Stream Crossing Count, 3 rd Order	Road-Stream Crossing Count, 4 th Order	Road-Stream Crossing Count, 5 th Order	Traffic Density in HUC
		(acres)	(acres)							(vehicles/day)
051402020101	Hurricane Creek	10,415	-	36	28	8	0	0	0	11,068
051402020102	Sandy Creek	11,201	-	24	18	6	0	0	0	1,963
051402020103	West Fork Creek	19,081	17,055	33	25	6	2	0	0	8,206
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	18,346	38	33	5	0	0	0	4,101
051402020105	Headwaters Smith Fork	14,569	-	47	36	11	0	0	0	1,221
051402020106	Snake Run-Pigeon Creek	14,457	85,251	52	43	2	7	0	0	6,674
051402020107	Smith Fork-Pigeon Creek	11,271	132,793	54	36	5	11	2	0	5,061
051402020201	Headwaters Big Creek	11,474	-	8	8	0	0	0	0	5,894
051402020202	Big Creek	17,378	18,789	52	34	18	0	0	0	8,776
051402020203	Clear Branch-Pigeon Creek	22,961	198,501	33	25	0	0	8	0	7,955
051402020204	Barnes Ditch-Pigeon Creek	22,319	236,103	40	35	0	0	5	0	8,689

HUC Watershed	Watershed Name	Watershed Area	Upstream HUC12 Area, not including this HUC (acres)	Road-Stream Crossing Count in HUC	Road-Stream Crossing Count, 1 st Order	Road-Stream Crossing Count, 2 nd Order	Road-Stream Crossing Count, 3 rd Order	Road-Stream Crossing Count, 4 th Order	Road-Stream Crossing Count, 5 th Order	Traffic Density in HUC
		(acres)	(acres)							(vehicles/day)
051402020301	Headwaters Bluegrass Creek	11,424	-	25	12	13	0	0	0	7,639
051402020302	Bluegrass Creek	16,936	18,707	56	33	15	8	0	0	8,399
051402020303	Little Pigeon Creek	11,178	-	46	14	32	0	0	0	10,657
051402020304	Headwaters Locust Creek	6,540	-	21	18	3	0	0	0	3,483
051402020305	Locust Creek	4,901	10,704	15	2	13	0	0	0	6,366
051402020306	Kleymeyer Park-Pigeon Creek	17,786	356,130	38	9	0	0	29	0	13,422
05140202	Pigeon Creek HUC8 watershed only	235,252		618	409	137	28	44	0	

12.2.12 CULTURAL RESOURCES - HUC8

There has been continuous human presence in the Highland-Pigeon Creek watershed from at least 8,000 BCE as determined by archaeologists who identified several archaic and ancient sites in and near Evansville, Indiana. One of the best-preserved, pre-contact sites known as Angel Mounds State Historic Site is along the Ohio River. Built between A.D. 1000 and 1450, this town occupied by more than 1,000 people were part of the Mississippian culture and included earthen mounds to elevate important buildings. The town served as an important religious, political, and trade center for people living within a 75-mile radius. It is theorized the collapse of their chiefdom occurred around 1450 and the people relocated downriver. Other Native American groups moved into the region around 1650 A.D. and included the Shawnee, Miami and others. At the time European settlers arrived in the late 1700's, a group of Shawnee were documented living on the banks of Pigeon Creek where it flowed into the Ohio River in present-day Evansville.

The area's geography and location on a bend in the Ohio River attracted people to the Evansville area. The city was founded in 1812 and grew to become a commercial, industrial, and financial hub for the area. In the early 1830's, the State of Indiana unveiled plans to build the longest canal in the world, a 460-mile ditch connecting the Great Lakes at Toledo, Ohio to the Ohio River. In 1834, the portion called the Central Canal would be built connecting the Wabash River to the Ohio River. Construction began in Evansville in 1836 with roughly 20 miles of the canal completed north by 1839 utilizing the low gradient valley of Pigeon Creek. The entire canal was completed in 1853 where water was let into the ditch, and it became operational. However, by the 1850's, with the canal's limited use during freezing temperatures, drought, or flooding, it couldn't compete with the reliability of railroads. So, by 1860, most of the southern section was no longer used. It is noted that the stagnant water in the canals became unpopular with Evansville citizens for fear of disease it might bring. The rise of railroads provided a faster and more reliable means of transportation, and the canal was closed by the 1870's. One of the great ironies in history is that the slow-paced mule driven canal boats transported the rails from foundries for building the railroads.

All projects within the Highland-Pigeon Creek watershed that include federal funding, licensing, or permitting are required to undergo Section 106 review and compliance. These types of projects can include construction, renovation, repair, rehabilitation, ground disturbance, etc. Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations is a law that requires federal agencies to consider the effects of federally funded projects on historic properties. Most projects conducted will have this review for anything of historical significance which will either be protected, mitigated, or allowed to be impacted.

The following table, **TABLE 70** depicts the percentage of the watersheds that the International Union for Conservation of Nature defines as subsets from the Protected Areas Database Version 2.1 (December 2020).

- Status (Ia) areas as nature reserves set aside to protect biodiversity and possibly geological/geomorphologic features, where human visitation, use, and impacts are strictly controlled and limited to ensure preservation of the conservation values.
- Status (Ib) areas as wilderness areas that are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed to preserve their natural condition.
- Status (II) areas as large natural or near natural national park areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.
- Status (III) areas as those set aside to protect a specific natural monument, which can be a landform, sea mount, submarine caverns, geological features such as caves or even a living feature such as an ancient grove. They are generally quite small, protected areas and often have high visitor value.
- Status (IV) areas as those set aside to protect particular species or habitats and management reflects this priority. Many Status IV protected areas will need regular, active interventions to address the requirements of specific species or to maintain habitats, but this is not a requirement of this category.
- Status (V) areas as protected lands where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural, and scenic value.
- Status (VI) areas as protected lands with a sustainable use of natural resources, with much of the area in a more-or-less natural condition and a proportion of land under sustainable natural resource management.

Also included on the table is the acknowledgement of whether the HUC has the presence or absence of waters designated as National Wild and Scenic Rivers as determined by the U.S. Forest Service (October 2019 version).

TABLE 70

PROTECTED AREAS (HUC8 PIGEON CREEK)

[illegible]

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% Protected Land in HUC12	% Protected Land in HUC12, IUCN Status (Ia)	% Protected Land in HUC12, IUCN Status (Ib)	% Protected Land in HUC12, IUCN Status (II)	% Protected Land in HUC12, IUCN Status (III)	% Protected Land in HUC12, IUCN Status (IV)	% Protected Land in HUC12, IUCN Status (V)	% Protected Land in HUC12, IUCN Status (VI)	Presence of National Wild and Scenic Rivers in HUC12
		(acres)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(Yes/No)
05140202	Pigeon Creek HUC8 watershed only	235,252	0.71	0	0	0	0	0	0.30	0	No

It appears that the only Protected Lands in the region are associated within watersheds with Indiana Department of Natural Resource areas. Headwaters Smith Fork contains Hemmer Woods, Clear Branch – Pigeon Creek contains Lost Hill Wetland Area and a large area of Pigeon Creek floodplain and upland area is included in a conservation easement held by DNR. Big Creek has protected areas that are associated with mitigation while Kley Meyer Park – Pigeon Creek contains the Pigeon Creek Greenway Project.

12.2.13 SOCIAL - HUC8

The following information is from Hoosier by the Numbers website (www.hoosierdata.in.gov) which is a premier source for labor market information for Indiana. Information was obtained on April 25, 2023 for the three primary counties within the HUC8 (Pigeon Creek) watershed: Gibson County, Warrick County, and Vanderburgh County. **TABLE 71** and **TABLE 72** provides an overview of the population and social demographics of the region.

TABLE 71 POPULATION DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

	Gibson, Warrick, and Vanderburgh Counties	Indiana	U.S.
Population - 2022	277,922	6,833,037	333,287,557
Population Change 2010 - 2022	+ 1.8%	+ 5.4%	+ 7.9%
Working Age Population Share - 2021	46.9%	46.9%	49.1%
Single Parents with Children - 2021	3,943	85,479	3,714,962
Veterans - 2021	16,489	364,706	17,431,290

TABLE 72 EDUCATION DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

	Gibson, Warrick, and Vanderburgh Counties	Indiana	U.S.
Adults with associate degrees - 2021	11.5%	9.0%	8.7%
Adults with bachelor's degrees - 2021	17.9%	17.7%	20.6%
Adults with High School Only - 2021	60,727	1,485,995	59,636,386
Adults with associate's degrees Only - 2021	21,815	403,773	19,614,710
Adults with bachelor's degrees Only - 2021	33,952	797,977	46,354,331
Adults with Master or Professional degrees - 2021	16,432	404,239	26,054,807
Adults with Doctorate degrees - 2021	1,604	51,083	3,399,696

12.2.14 ECONOMIC - HUC8

The following tables provide information from the website Hoosier by the Numbers (www.hoosierdata.in.gov) which is a premier source for labor market information for Indiana. Information was obtained on April 25, 2023 for the three primary counties within the HUC8 (Pigeon Creek) watershed: Gibson County, Warrick County, and Vanderburgh County. This will provide an overview of the economic statistics for the region including the top employers, sector, and salaries.

TABLE 73 ECONOMIC DEMOGRAPHICS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

	Gibson, Warrick, and Vanderburgh Counties	Indiana	U.S.
Per Capita Income - 2021	\$57,191	\$56,497	\$64,143
Unemployment Rate - Mar 2023	3.1	3.3	3.5
Jobs 2 Year Change - 2022 Q3	5.6%	7.3%	9.8%
Goods-producing Jobs % of Total - 2022 Q3	25.8%	24.3%	16.1%
Services-providing Jobs % of Total - 2022 Q3	74.2%	75.7%	83.9%

TABLE 74 MAJOR EMPLOYERS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

Employer	Employment	% of Region Employment
Toyota Motor Manufacturing of Indiana Inc	7,000	5.34%
Deaconess Health System	5,000	3.81%
Aerotek at Toyota Motor Manufacturing	4,494	3.43%
Berry Global Group Inc	2,800	2.13%
Alcoa Warrick Operations	2,400	1.83%
TJ Maxx Distribution Center	1,600	1.22%
Lewis Bakeries Inc	1,500	1.14%
Evansville Civic Center Complex	1,000	0.76%
PPG Industries Inc	600	0.46%
Vuteq Indiana	600	0.46%
Victory Theatre	533	0.41%
University of Evansville	506	0.39%
Flanders Inc	501	0.38%
Ameriquel Group Holdings LLC	500	0.38%
SRG Global	500	0.38%
Walmart Supercenters	450	0.34%
Sterling Industrial LLC	450	0.34%
Atlas World Group Inc	450	0.34%
Peabody Energy, direct employees only, includes UMI	215	0.08%

TABLE 75 OCCUPATION CLUSTER DETAILS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

Occupation Cluster	Employment
Managers and First-line Supervisors	8,350
Sales, Agents, Brokers and Customer Relations, Support	8,217
Food Preparation and Service	7,977
Attendants and General Services	7,768
Mechanics and Repair Technicians	7,086
Financial, Legal and Inspection Services, Support	7,064
Administration and Office Support	6,489
Health Care: Nurses and Specialized Care Delivery	6,439

Occupation Cluster	Employment
Transportation, Logistics and Dispatch, Support	5,990
Managerial, Sales, Marketing and Human Resources	4,990
Primary, Secondary and Vocational Education, Remediation and Social Services	4,952
Transportation Equipment Operators	4,524
Production, General	4,202
Production Operators and Tenders	3,771
Health Care: Therapists, Technicians and Aides	3,463
Engineering, Architecture and Related Disciplines	3,385
Machinists and Skilled Operators and Tenders	2,680
Construction Trades	2,673
Finance, Legal, and Real Estate	2,297
Facility, Plant and Large Equipment Operators and Technicians	1,499
Personal Services	1,445
Safety, Security and Emergency	1,316
Health Care: Therapy, Counseling and Rehabilitation	1,208
Mathematics, Statistics, Data Analysis and Accounting	1,166
STEM and Applied Science Technicians	880
Health Care: Medical Practitioners and Scientists	725
Arts, Entertainment and Broadcasting Specialists and Management	680
Postsecondary Education and Knowledge Creation	504
Transportation, Logistics and Planning	450
Information Management and Computing	434
Artisans, Craftsman, Designers, including Performance	351
Natural Sciences and Environmental Management	310
Health Care: Life and Medical Scientists	309
Media, Web Development and Programming	208

TABLE 76 INDUSTRY DETAILS (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

Industry Sector	Employment	Average Annual Salary
Local Health Services	23,514	\$54,871
Local Hospitality Establishments	12,933	\$16,064
Local Real Estate, Construction, and Development	10,933	\$53,147
Local Commercial Services	10,004	\$35,204
Automotive	8,706	\$76,378
Local Education and Training	7,161	\$47,255
Business Services	6,854	\$100,619
Distribution and Electronic Commerce	5,884	\$56,860
Local Motor Vehicle Products and Services	5,246	\$38,070
Plastics	3,996	\$50,129
Education and Knowledge Creation	3,723	\$54,472
Government	3,551	\$48,767
Local Logistical Services	3,305	\$49,490

Industry Sector	Employment	Average Annual Salary
Local Community and Civic Organizations	3,113	\$26,063
Food Processing and Manufacturing	3,051	\$55,192
Local Food and Beverage Processing and Distribution	2,895	\$27,411
Local Personal Services (Non-Medical)	2,552	\$24,675
Local Financial Services	2,371	\$53,991
Hospitality and Tourism	1,963	\$30,458
Local Household Goods and Services	1,707	\$33,664
Local Retailing of Clothing and General Merchandise	1,542	\$21,226
Local Entertainment and Media	1,499	\$29,337
Transportation and Logistics	1,402	\$58,182
Construction Products and Services	1,300	\$77,594
Coal Mining	1,121	\$97,203
Downstream Chemical Products	1,106	\$59,451
Production Technology and Heavy Machinery	1,046	\$74,280
Upstream Metal Manufacturing	1,031	\$65,511
Financial Services	913	\$88,874
Marketing, Design, and Publishing	903	\$45,148
Vulcanized and Fired Materials	839	\$47,915
Lighting and Electrical Equipment	708	\$53,061
Local Utilities	594	\$82,642
Local Industrial Products and Services	545	\$52,757
Electric Power Generation and Transmission	529	\$109,736
Biopharmaceuticals	522	\$163,613
Downstream Metal Products	521	\$46,856
Metalworking Technology	466	\$52,438
Performing Arts	366	\$20,220
Furniture	242	\$42,191
Insurance Services	225	\$79,689
Printing Services	191	\$40,692
Livestock Processing	163	\$43,825
Communications Equipment and Services	163	\$92,247
Crop Farming	157	\$37,665
Wood Products	148	\$46,374
Livestock Farming	129	\$39,553
Leather and Related Products	127	\$41,089
Upstream Chemical Products	115	\$88,437
Paper and Packaging	113	\$56,507
Environmental Services	91	\$52,555
Households	82	\$24,606
Recreational and Small Electric Goods	74	\$47,710
Agricultural Inputs and Services	61	\$42,168
Information Technology and Analytical Instruments	60	\$106,137

Industry Sector	Employment	Average Annual Salary
Water Transportation	43	\$50,000
Trailers, Motor Homes, and Appliances	38	\$49,661
Medical Devices	37	\$67,357
Textile Manufacturing	33	\$39,568
Oil and Gas Production and Transportation	28	\$78,331
Video Production and Distribution	21	\$53,683
Forestry	5	\$35,741
Apparel	5	\$13,018
Jewelry and Precious Metals	1	\$36,904

TABLE 77 illustrates that 92.4% of the residents who live in the counties of Gibson, Warrick and Vanderburgh also work in these counties. **TABLE 78** shows the top counties where the local population commutes to for employment. **TABLE 79** ranks the population that lives away from the local area but commutes here for employment.

TABLE 77 COMMUTING PERCENTAGE (GIBSON, WARRICK, AND VANDERBURGH COUNTIES)

2015 Commuting Tallies Based on People Living in this Region		
Number of residents with jobs (in or outside this region)	130,348	100%
Live and work in this region	120,459	92.4%
Live here but work outside this region	9,889	7.6%
2015 Commuting Tallies Based on People Working in this Region		
Number of people who work in this region (living in or outside this region)	143,407	100%
Live and work in this region	120,459	84.0%
Work here but live outside this region	22,948	16.0%

TABLE 78 TOP 20 COUNTIES RESIDENTS ARE COMMUNTING TO FOR EMPLOYMENT

County of Employment	Commuters	% of Employed Workers in this Region
Posey, IN	2,589	0.67%
Henderson, KY	1,885	0.48%
Knox, IN	647	0.17%
Spencer, IN	609	0.16%
Dubois, IN	553	0.14%
Pike, IN	519	0.13%
Daviess, KY	498	0.13%
Wabash, IL	265	0.07%
Union, KY	167	0.04%
Daviess, IN	154	0.04%
Jefferson, KY	117	0.03%
Perry, IN	103	0.03%
Marion, IN	100	0.03%
Vigo, IN	88	0.02%

County of Employment	Commuters	% of Employed Workers in this Region
Martin, IN	61	0.02%
Jackson, AL	59	0.02%
Crawford, IL	58	0.01%
White, IL	54	0.01%
Saline, IL	50	0.01%
Webster, KY	49	0.01%

TABLE 79 TOP 20 COUNTIES COMMUTING INTO REGION FOR EMPLOYMENT

County of Residence	Commuters	% of Commuters In County of Residence
Posey, IN	6,168	16.62%
Henderson, KY	3,898	6.44%
Spencer, IN	1,804	6.15%
Wabash, IL	1,499	9.32%
Pike, IN	1,333	7.94%
Knox, IN	931	1.80%
Daviess, KY	884	0.70%
Dubois, IN	777	1.21%
Daviess, IN	542	1.29%
White, IL	409	2.17%
Edwards, IL	308	3.46%
Hopkins, KY	270	0.47%
Webster, KY	244	1.57%
Perry, IN	229	0.92%
Union, KY	209	1.18%
Marion, IN	178	0.01%
Lawrence, IL	156	1.11%
Monroe, IN	156	0.08%
Hamilton, IN	115	0.03%
Saline, IL	113	0.41%

12.2.15 PRIME FARMLAND AND CROP - HUC8

The following table, **TABLE 80** provides information on numerous statistics related to farming and cropland within the HUC12 watersheds and cumulated for the HUC8 (Pigeon Creek) watershed. Included in the table is the percent of land area classified as agriculture cover, percent of land area classified as cultivated crops (which consists of those areas used to produce annual crops, such as corn, soybeans, or vegetables, and also perennial woody crops such as orchards and vineyards), and cultivated crops in the Hydrologically Connected Zone. Also included is the percent of the watershed with agriculture located on hydric soils. Because SSURGO classifies map units as 'percent hydric' rather than simply hydric or non-hydric, a minimum threshold of 80% hydric soils per map unit was used to distinguish hydric soils from non-hydric soils in this analysis. This allows us to determine what currently farmed areas could qualify as prior converted wetlands and could be targeted for restoration efforts.

The field percent of the watershed that is nonbuffered agricultural land is defined as agricultural land that is drained by flow paths that do not intersect vegetated forest or wetland buffers before reaching stream channels.

This watershed characteristic relates to the potential for nutrient and sediment entrained in runoff to impact water quality of local streams. Lastly, mean slope of cultivated crop cover is also included. This field is included because areas with exposed soils and higher slopes are expected to have greater erosion potential than areas with shallower slopes.

TABLE 80 CULTIVATED CROP AND SOIL INFORMATION (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% of Land in Agriculture in HUC	% Cultivated Crops in HUC	% Cultivated Crops in Hydro-Connected Zone in HUC	% Agriculture on Hydric Soils in HUC	% Non-buffered Agriculture in HUC	Mean Slope of Cropland, in HUC
		(acres)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	79.80	74.76	25.75	11.00	72.70	1.58
051402020102	Sandy Creek	11,201	84.56	82.93	37.63	26.66	73.32	1.38
051402020103	West Fork Creek	19,081	85.91	84.16	46.6	34.63	83.57	1.00
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	76.76	73.13	37.79	21.16	64.10	0.99
051402020105	Headwaters Smith Fork	14,569	68.09	56.58	16.38	2.54	47.25	1.85
051402020106	Snake Run-Pigeon Creek	14,457	80.01	76.97	32.83	20.72	65.12	1.34
051402020107	Smith Fork-Pigeon Creek	11,271	70.26	67.91	25.14	8.79	57.92	1.47
051402020201	Headwaters Big Creek	11,474	24.44	15.65	2.74	0.49	11.01	2.14
051402020202	Big Creek	17,378	56.12	37.43	12.44	4.34	31.71	1.53
051402020203	Clear Branch-Pigeon Creek	22,961	37.17	16.31	4.3	1.37	20.61	1.94
051402020204	Barnes Ditch-Pigeon Creek	22,319	53.51	41.54	27.48	20.41	33.51	0.83
051402020301	Headwaters Bluegrass Creek	11,424	63.56	52.01	20.01	7.41	46.40	1.51
051402020302	Bluegrass Creek	16,936	49.23	34.92	21.99	15.09	37.66	0.95
051402020303	Little Pigeon Creek	11,178	16.60	7.14	3.91	4.43	9.00	1.32
051402020304	Headwaters Locust Creek	6,540	31.16	19.73	6.64	0.21	15.23	2.36
051402020305	Locust Creek	4,901	29.84	17.44	7.37	4.97	10.61	2.01
051402020306	Kleymeyer Park-Pigeon Creek	17,786	15.57	11.83	8.8	9.81	13.33	0.66
05140202	Pigeon Creek HUC8 watershed only	235,252	54.9	45.3	20.6	12.4	41.4	1.46

12.2.16 REFORESTATION - HUC8

In the following table, **TABLE 81**, various statistics are provided about the forested lands in the HUC12 watershed which is used to provide an average value for the HUC8 (Pigeon Creek) watershed. Included below is the percent of the HUC12 classified as forest cover by the National Land Cover Database (NLCD) 2019 Land Cover dataset which includes all the different classes of deciduous, evergreen and mixed forest. Percent of the HUC12 that is in the Riparian Zone and classified as forest cover by the National Land Cover Database (NLCD) 2019 Land Cover dataset. Change in the percentage of the HUC12 with forest cover from 2001 to 2019. This provides a picture of the change in the watershed over that period. Percent of the HUC12 that is in the Riparian Zone and classified as 'Woody Wetlands' (code 90) by the National Land Cover Database (NLCD) 2019 Land Cover dataset. Change in the percentage of the HUC12 with woody vegetation cover in the Hydrologically Connected Zone (HCZ) from 2001 to 2019.

TABLE 81 FORESTED LAND INFORMATION (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	% Forest in HUC	% Forest Change in HUC (2001-19)	% Forest in Riparian Zone in HUC	% Forest Change in Riparian Zone in HUC (2001-19)	% Woody Wetlands in Riparian Zone in HUC	% Woody Vegetation in HUC	% Woody Vegetation Change in HUC (2001-19)
		(acres)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	7.31	+ 0.02	1.46	0	0.35	7.7	+ 0.05
051402020102	Sandy Creek	11,201	9.32	+ 0.02	1.8	0	0.6	9.92	+ 0.02
051402020103	West Fork Creek	19,081	2.07	- 0.10	0.71	- 0.02	0.13	2.23	- 0.07
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	5.05	- 0.12	2.78	- 0.03	0.74	5.86	- 0.07
051402020105	Headwaters Smith Fork	14,569	14.03	- 6.34	4.27	- 1.56	0.36	17.61	- 3.19
051402020106	Snake Run-Pigeon Creek	14,457	9.74	- 0.28	1.97	- 0.09	2.48	12.3	- 0.24
051402020107	Smith Fork-Pigeon Creek	11,271	8.87	- 0.04	3.21	- 0.02	10.61	19.56	+ 0.02
051402020201	Headwaters Big Creek	11,474	40.49	- 14.33	16.32	- 6.38	1.5	52.94	- 3.85
051402020202	Big Creek	17,378	23.83	+ 1.20	11.23	+ 1.05	5.19	29.26	+ 1.22
051402020203	Clear Branch-Pigeon Creek	22,961	36.41	+ 5.81	14.95	+ 0.78	9.54	48.07	+ 7.29
051402020204	Barnes Ditch-Pigeon Creek	22,319	12.45	- 0.31	4.14	+ 0.04	7.06	19.59	- 0.34
051402020301	Headwaters Bluegrass Creek	11,424	21.75	+ 0.45	4.63	+ 0.11	1.45	23.28	+ 0.38
051402020302	Bluegrass Creek	16,936	19.75	+ 0.04	6.49	+ 0.17	1.97	21.82	+ 0.05
051402020303	Little Pigeon Creek	11,178	32.26	- 1.60	9.08	- 0.37	2.05	34.68	- 1.24
051402020304	Headwaters Locust Creek	6,540	51.60	- 0.01	13.15	+ 0.03	0.35	52.05	+ 0.02
051402020305	Locust Creek	4,901	29.02	- 0.44	8.58	- 0.36	4.38	33.44	- 0.77
051402020306	Kleymeyer Park-Pigeon Creek	17,786	8.53	- 1.03	4.37	- 0.37	4.01	12.64	- 1.07
05140202	Pigeon Creek HUC8 watershed only	235,252	18.2	- 0.70		- 0.30			+ 0.20

Overall, when looking at the HUC8 (Pigeon Creek) watershed, there has been a decrease in both forest and riparian forest from 2001 to 2019. The largest decreases are reported in the Headwaters Big Creek, where the Wild Boar Mine has been actively mining during that time and in the Headwaters Smith Fork, where the Somerville South Mine has been actively mining. While these forested acres have decreased, these impacts are only temporary as the post-mine land uses for these mines focus on replacing the forested land use by planting hundreds of thousands of trees. The next largest decrease is seen in the furthest downstream watershed, which is the most populated and in an urban setting. Any new residential development typically requires grade work which includes removing vegetation and trees.

12.2.17 CONSTRUCTION IN A FLOODWAY – HUC 8

TABLE 82 depicts the percent of the HUC12 as well as the HUC8 that is in the 100-year flood zone estimated by the EPA Office of Research and Development (ORD). The term 100-year flood describes a flood magnitude that has a 1% chance of occurring each year. The 100-year flood zone is the area that is at-risk for flooding during a 100-year flood. The EPA ORD map layer is a modeled estimate of the 100-year flood zone based on topography, soil characteristics, and land cover. Unlike flood zone maps maintained by the Federal Emergency Management Agency (FEMA), the EPA ORD map layer provides a continuous estimate of the 100-year flood zone with no geographic gaps. For HUC12 analysis, the 100-year flood zone was edited to remove areas that overlapped surface waters such as rivers and lakes or wetlands using the Water Mask map layer (June 2022 version).

TABLE 82 100-YEAR FLOOD ZONE INFORMATION (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area	Census Population (2020)	% 100-Year Flood Zone in HUC
		(acres)		(percent)
051402020101	Hurricane Creek	10,415	2,589	7.7
051402020102	Sandy Creek	11,201	607	16.5
051402020103	West Fork Creek	19,081	4,013	5.1
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	2,480	9.3
051402020105	Headwaters Smith Fork	14,569	818	3.2
051402020106	Snake Run-Pigeon Creek	14,457	784	11.6
051402020107	Smith Fork-Pigeon Creek	11,271	725	9.8
051402020201	Headwaters Big Creek	11,474	1,099	4.0
051402020202	Big Creek	17,378	650	9.2
051402020203	Clear Branch-Pigeon Creek	22,961	841	13.0
051402020204	Barnes Ditch-Pigeon Creek	22,319	18,771	33.9
051402020301	Headwaters Bluegrass Creek	11,424	1,528	10.5
051402020302	Bluegrass Creek	16,936	10,575	29.6
051402020303	Little Pigeon Creek	11,178	14,477	10.9
051402020304	Headwaters Locust Creek	6,540	2,727	10.4
051402020305	Locust Creek	4,901	5,557	11.7
051402020306	Kleymeyer Park-Pigeon Creek	17,786	55,168	24.1
05140202	Pigeon Creek HUC8 watershed only	235,252	123,409	14.2

12.2.18 ENVIRONMENTAL JUSTICE - HUC8

The environmental justice analysis evaluates whether minority or low-income people in the analysis area would realize disproportionate adverse effects from both an environmental and economic perspective. This section also addresses EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (27 April 1997), which instructs federal agencies to identify, assess, and address environmental health and safety risks from federal policies, programs, activities, and standards that may disproportionately affect children. Minority and low-income communities were screened based on the demographic profile of the region, including data on race and ethnicity and a range of income measures.

TABLE 83 provides data on vulnerable populations for each HUC12, which are used to determine the overall percentages for the HUC8 (Pigeon Creek) watershed.

In this analysis, “low-income” is defined as a household income that is less than or equal to twice the federal poverty level. Minority groups include individuals who define their race as other than white alone and/or list their ethnicity as Hispanic or Latino. Also shown is Percent of the population age 25 and over with less than a high school degree. The field Percent of households that are linguistically isolated is shown and includes households in which all members aged 14 years and over speak a non-English language and speak English less than 'very well'. Lastly, Percent of total population that is under age 5 or over 64 years old is included in the analysis.

Source data was a map layer of vulnerable population count by census block group and the dasymetric population map layer which uses information on land cover and slope to distribute total population counts within a census block group. The vulnerable populations were assumed to follow the same pattern of distribution as the total population within a census block group.

TABLE 83 VULNERABLE POPULATION INFORMATION (HUC8 PIGEON CREEK)

HUC12 Watershed	HUC12 Watershed Name	Watershed Area (acre)	Census Population (2020)	% Low-Income Population in HUC	% Minority Population in HUC	% Less than High School Educated Population in HUC	% Linguistically Isolated Population in HUC	% Vulnerable Age Group Population in HUC
		(acres)		(percent)	(percent)	(percent)	(percent)	(percent)
051402020101	Hurricane Creek	10,415	2,589	12.88	2.27	3.71	0	21.15
051402020102	Sandy Creek	11,201	607	22.33	4.16	9.23	0	25.28
051402020103	West Fork Creek	19,081	4,013	24.40	7.32	4.65	0	20.42
051402020104	Clear Fork Ditch-Pigeon Creek	11,361	2,480	26.24	6.71	9.81	0	21.87
051402020105	Headwaters Smith Fork	14,569	818	30.65	0.27	7.97	0	18.15
051402020106	Snake Run-Pigeon Creek	14,457	784	12.60	2.44	1.21	0	15.79
051402020107	Smith Fork-Pigeon Creek	11,271	725	30.06	1.42	7.64	0	17.09
051402020201	Headwaters Big Creek	11,474	1,099	23.74	2.65	10.02	0	24.70
051402020202	Big Creek	17,378	650	23.15	3.38	6.62	0	22.03
051402020203	Clear Branch-Pigeon Creek	22,961	841	18.53	3.76	5.14	0.29	16.93
051402020204	Barnes Ditch-Pigeon Creek	22,319	18,771	20.41	9.12	5.75	0.33	22.96
051402020301	Headwaters Bluegrass Creek	11,424	1,528	17.22	2.52	6.50	0	16.47
051402020302	Bluegrass Creek	16,936	10,575	12.14	11.91	3.85	1.07	20.43
051402020303	Little Pigeon Creek	11,178	14,477	18.33	5.13	4.08	0.71	21.81
051402020304	Headwaters Locust Creek	6,540	2,727	19.94	3.80	5.26	0	23.11
051402020305	Locust Creek	4,901	5,557	37.31	2.79	9.06	0.05	29.12
051402020306	Kleymeyer Park-Pigeon Creek	17,786	55,168	39.94	14.02	11.56	0.30	24.03
05140202	Pigeon Creek HUC8 watershed only	235,252	123,409	29.1	10.1	8.2	0.4%	23.0

The physical effects of the Applicant's project that have potential to affect local populations include effects associated with air quality, noise, and vibration. The Applicant's project would result in a temporary increased generation of air pollutant emissions, noise, and vibration. Local minority and low-income populations and children are not expected to be subjected to adverse health effects from project operations. Minority and low-income populations and children residing near the project would not experience a decline in service levels provided by law enforcement, fire protection, or emergency service agencies. It is plausible that some of the construction and mining jobs would be filled by minority and low-income workers living near the mine in Warrick County, Indiana; however, these opportunities would be limited to workers with the required skill sets. It is more likely that the regional economic benefits generated throughout Warrick County would benefit minority and low-income workers because these benefits would occur across a broader range of industries that are supported by a more diverse mix of workers. The fiscal benefits of the project, including new tax and fee revenues, could also allow Warrick County to provide additional or improved public services that would benefit all county residents. The project would not result in disproportionate adverse effects on children or minority or low-income populations surrounding the project area.

C. MAPS

See **APPENDIX A** for associated project maps. Maps include a general location, existing conditions, on-site mitigation map, soils map, operations map, HUC12 watershed, off-site location map, and historical aerial photographs. Maps associated with the off-site mitigation areas will be found in the respective off-site mitigation plans.

D. AERIAL PHOTOGRAPHY

See **MAP B – ON-SITE EXISTING CONDITIONS** found in **APPENDIX A** for 2020 National Agriculture Imagery Program (NAIP) aerial image downloaded from the USDA Farm Service Agency website as well as **MAP H – ON-SITE CONDITIONS IN 1937, 1940, 1953, 1966, 1980, 2003, 2016, and 2020** in **APPENDIX A**.

E. USDA/NRCS COUNTY SOIL SURVEY

See **MAP D – ON-SITE SOILS** in **APPENDIX A**.

F. PHOTOGRAPHS OF THE SITE

Photographs of the site and the aquatic features are included with the assessments found in **APPENDIX B**.

G. RESPONSIBLE PARTIES

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On-Site Mitigation Area

Highland-Pigeon HUC-8 Watershed (05140202)

Compensatory Wetland and Stream Mitigation Plan For Mining Area Addition

Seven Hills Mine – Mining Area Addition

USACE File Number: LRH-2018-00738-OHR-Pigeon Creek

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September 2025

Table of Contents

1.0	BASELINE INFORMATION	5
2.0	MITIGATION OBJECTIVES AND APPROACH	16
3.0	CREDIT DETERMINATION METHODOLOGY	18
4.0	SITE SELECTION	20
5.0	MITIGATION WORK PLAN	25
6.0	PROJECT SUCCESS AND PERFORMANCE STANDARDS	37
7.0	SITE PROTECTION	41
8.0	MITIGATION SITE MANAGEMENT AND MAINTENANCE PLAN	44
9.0	MONITORING	45
10.0	ADAPTIVE MANAGEMENT PLAN	49
11.0	LONG-TERM MANAGEMENT	53
12.0	FINANCIAL ASSURANCE	55

List of Tables

TABLE 1	ANTICIPATED DIRECT IMPACTS BY OPERATION PHASE	7
TABLE 2	ANTICIPATED DIRECT IMPACTS TO JURISDICTIONAL STREAMS	8
TABLE 3	IMPACT SUMMARY TO JURISDICTIONAL STREAMS BY ROSGEN CHANNEL TYPE	8
TABLE 4	ANTICIPATED DIRECT IMPACTS TO JURISDICTIONAL WETLANDS	9
TABLE 5	IMPACT SUMMARY TO JURISDICTIONAL WETLANDS BY COWARDIN CLASSIFICATION	9
TABLE 6	SUMMARY OF PROPOSED POST-PROJECT STREAM MITIGATION	9
TABLE 7	SUMMARY OF PROPOSED PRIOR TO, CONCURRENT, AND POST PROJECT WETLAND MITIGATION	10
TABLE 8	SUMMARY OF STREAM BIOLOGICAL AND HABITAT DATA	11
TABLE 9	SOIL TYPES	13
TABLE 10	ON-SITE BASELINE STREAM DATA INCLUDING RBP FOR REACHES TO BE IMPACTED	13
TABLE 11	OFF-SITE WETLAND DATA	14
TABLE 12	TIMING OF MITIGATION WORK	15
TABLE 13	STREAM DISTURBANCE BY PROJECT PHASE	16
TABLE 14	WETLAND DISTURBANCE BY PROJECT PHASE	16
TABLE 15	WETLAND AND OPEN WATER MITIGATION SUMMARY TABLE	18
TABLE 16	STREAM MITIGATION SUMMARY TABLE	18
TABLE 17	MITIGATION CREDIT SUMMARY TABLE	19
TABLE 18	TOTAL WETLAND MITIGATION CREDITS	19
TABLE 19	GROUND COVER SPECIES LIST	26
TABLE 20	PLANTING SPECIES LIST BY MITIGATION TYPE	27
TABLE 21	INVASIVE/EXOTIC SPECIES	30
TABLE 22	SITE PROTECTION SUMMARY TABLE	43

TABLE 23	MONITORING SCHEDULE.....	46
TABLE 24	WETLAND MITIGATION ADAPTIVE MANAGEMENT ACTION TABLE.....	50
TABLE 25	STREAM MITIGATION ADAPTIVEMENT MANAGEMENT ACTION TABLE.....	50
TABLE 26	FORESTED BUFFER ADAPTIVEMENT MANAGEMENT ACTION TABLE	50
TABLE 27	POTENTIAL LONG-TERM STEWARDS	53
TABLE 28	ON-SITE CONSTRUCTION COST ESTIMATE.....	55
TABLE 29	SEVEN HILLS – MINING AREA ADDITION OVERALL MITIGATION COSTS	56
TABLE 30	SEVEN HILLS – MINING AREA ADDITION OFF-SITE MITIGATION AREA BOND AND RELEASE SCHEDULE	56

List of Appendices

APPENDIX A	MAPS
APPENDIX B	ON-SITE JURISDICTIONAL DETERMINATION (JD) REPORT
APPENDIX C	BIOLOGICAL ASSESSMENT AND WATER QUALITY REPORT
APPENDIX D	SITE PROTECTION INSTRUMENT TEMPLATE
APPENDIX E	CULTURAL RESOURCES REPORTS AND CLEARANCE LETTERS
APPENDIX F	CHANNEL DESIGN TYPICALS AND STREAM STRUCTURE DETAILS
APPENDIX G	CONSTRUCTION IN A FLOODWAY INFORMATION
APPENDIX H	U.S. FISH AND WILDLIFE SERVICE THREATENED AND ENDANGERED SPECIES LISTS

SEVEN HILLS MINE – MINING AREA ADDITION – ON-SITE COMPENSATORY MITIGATION PLAN

In order to compensate for unavoidable impacts to jurisdictional waters of the United States (U.S.) that would result from the proposed project activity - and to ensure that adverse impacts to the aquatic environment and other aspects of the public interest are not significant, either individually or cumulatively - the Applicant is proposing (subject to approval and acceptance by the U.S. Army Corps of Engineers Huntington District (Corps Huntington District) compensatory mitigation measures over the life of the project that would include: on-site intermittent stream restoration, on-site PFO wetland restoration, off-site PFO wetland restoration and preservation.

The proposed stream and wetland mitigation measures are intended to offset and restore functional stream and wetland value lost or impacted as a result of the project activity and to also compensate for temporal and other unavoidable losses associated with the project activity.

In accordance with the 2008 Mitigation Rule, the Compensatory Mitigation Plan (CMP) presented herein includes site-specific information regarding: Baseline Information; Mitigation Objectives and Approach; Credit Determination Methodology; Site Selection; Mitigation Work Plan; Project Success and Performance Standards; Site Protection; Mitigation Site Management and Maintenance Plan; Monitoring; Adaptive Management; Long-Term Management; and Financial Assurance.

Overall, the Applicant's CMP proposes the following specific permittee-responsible mitigation for the direct impacts associated with the Seven Hills Mine – Mining Area Addition of 77.95 acres of jurisdictional wetlands and 2,802 linear feet of jurisdictional streams at the following locations:

- Reestablish 2,802 linear feet of jurisdictional intermittent streams on-site at the Seven Hills Mine – Mining Area Addition;
- Establish 80.0 acres of PFO wetlands at the Seven Hills Mine – Mining Area Addition;
- Restore 119.54 acres of PFO wetlands at the Squaw Creek Mitigation Area; and
- Restore 34.73 acres of PFO wetlands at the Lake Drain Mitigation Area.

1.0 BASELINE INFORMATION

INTRODUCTION: The overall goal of this On-Site Compensatory Mitigation Plan is to offset impacts to jurisdictional waters of the U.S. associated with the Seven Hills Mine – Mining Area Addition, an extension into an unauthorized by LRH-2018-738 that is internal to the permitted Seven Hills surface mine in Warrick County, Indiana. This 69.63-acre area was excluded from the original DA authorization due to concerns raised by the Corps Louisville District and USEPA Region 5. They requested additional avoidance of wetlands in August 2017. This area was removed as it was explained that with the pit length shortening below 2,200 feet in this area, it would become inefficient and unsafe to mine this area. With a full workforce attempting mine in a shorter pit, this would be true but the miners will begin transitioning to the adjacent Wild Boar Stanley Pit which is a multi-seam surface mine located out in the uplands adjacent to Pigeon Creek. The request of this application is to be allowed to mine into this area that removed under pressure in August 2017 to prolong the life of mine another year to acquire 1.5 million tons of coal. This goal will be met with the following objectives:

1. Complying with all applicable guidance and regulations for implementing the CWA, including the *Compensatory Mitigation for Losses of Aquatic Resources*;
2. Establishing stream mitigation that is designed to transport the bankfull flow and create appropriate bedforms, while also providing stream habitat;
3. Maintaining hydrologic connectivity by reestablishing streams channels on-site to perpetuate flow from off-site watersheds;
4. Streams will be replaced at the mitigation ratio of 1:1 (footage). The stream mitigation will be constructed on-site in the reclamation as part of the minimization process;
5. Forested buffers will be placed along all stream mitigation unless the stream is constructed in a forested wetland where the buffer will already exist. Minimum riparian buffer widths will be placed out a distance of 100 feet on each side for intermittent stream mitigation;
6. Wetlands will be replaced at the following mitigation ratios: 3:1 for palustrine forested and scrub-shrub wetlands. The wetland mitigation will consist of a minimum 1:1 (acreage) constructed on-site (minimization) and the remaining (acreage) established off-site. The following specific mitigation conditions will be maintained;
 - a. The remaining acreage balance to achieve the total required needed acreage will be established in either the Highland-Pigeon Creek watershed or adjacent watersheds;
 - b. Constructed on-site wetlands will be carefully graded for settlement to match the elevation of the current floodplain which will result in no adverse effect to flooding or floodplain storage; and
 - c. The on-site wetland mitigation will be completed as a PFO wetlands in a manner representative of the pre-mining site.
7. Maintain a minimum 400-foot buffer between the disturbance area and Pigeon Creek. This buffer will be protected with a conservation easement as access is allowed to prevent future disturbance; and
8. Protection of all off-site mitigation areas through the use of a conservation easement or deed restriction, excluding any existing easements, rights-of-way, or uncontrolled property.

PROJECT ACTIVITY: The purpose of the activity is to allow mining into an area that was excluded from the original DA authorization (LRH-2018-738). This area was excluded during the original permit negotiations with the USEPA and Corps Louisville District prior to transfer to the Corps Huntington District. The activity is to continue the surface mining activities into the mining area addition. Required impacts will be needed for the construction of a temporary levee to protect the open pit from flood impacts as well as the excavation of an open pit for bituminous coal recovery in the floodplain of Pigeon Creek. Following coal removal, the open pit will be backfilled, the levee removed, and the impacted area will be returned to a forested wetland/floodplain. Prior to the construction of the levee, a forty-eight-inch diameter (48") culvert will be installed in the Stanley Road embankment. This is required to alleviate unacceptable upstream flooding impacts. Coal extracted from the area will be transported to Wild Boar Mine coal preparation plant for processing and transported to customers for power and heat generation.

Of the 80.46 acres requested to be impacted by this application, 10.83 acres are in the original DA avoidance area and 69.63 acres are part of the excluded area. Coal removal will be conducted on 63.14 acres with 17.32 acres needed for the temporary levee.

The general purpose of this disturbance is to mine the Indiana **Coal-7**, Indiana **Coal-6**, Herrin, and Indiana **Coal-5** seams within this Pigeon Creek reserve to prolong the mining operations of the Seven Hills Mine and to contribute to the power production for the United States. Mining the Mining Area Addition coal will complete the extraction of all the coal in the Seven Hills reserve and ensure no further disturbance will be conducted in the future.

The recovery of the coal seam requires the excavation of the overlying soil and rock materials. The nature of the activity involves mining through wetlands and streams as the operation advances across the landscape. Sediment basins will be developed as close to the mining area as possible to effectively control sedimentation and surface runoff from the area. A temporary levee will be constructed along the west side of Pigeon Creek to prevent floodwater from inundating the open pit during mining. Surface water or groundwater that collects in the open pit will be pumped to a sediment basin for treatment before release to receiving streams.

Mining and reclamation will occur simultaneously as pits are backfilled and re-soiled as the next cut is made. The re-soiled area is then revegetated and returned to the approved post-mining land uses. The impacts covered by this permit include coal mining activities that will occur from 2027 to 2028; however, the timing and rate of mining is dependent on market demand fluctuations, geologic conditions, weather conditions, and land control negotiations.

It is important to understand that the disturbance does not occur all at once. The mining and concurrent reclamation occur over an extended period of time. Although acres are being disturbed, other acres have not yet been disturbed, and still others are being reclaimed in a progressive backfill and reclamation process. While the aquatic resource impacts resulting from the Seven Hills project may seem extensive in total, the actual impacts will be staged over a period of 1-3 years and replaced as mining progresses across the landscape with forested wetland creation in the reclamation. All discharges from the mine site should meet Section 402 National Pollutant Discharge Effluent System (NPDES) effluent limitations and State Water Quality Standards (WQS) which are designed to protect the designated uses and prevent unacceptable downstream impacts. The off-site mitigation will consist of restoring prior converted agricultural lands into forested wetlands with establishment within two growing seasons following permit issuance reducing the loss of wetland function.

PROJECT LOCATION: The project is located within the floodplain of Pigeon Creek, unnamed tributaries of Pigeon Creek, and wetlands, approximately 2.4 miles southeast of Elberfeld, in Warrick County, Indiana (38.1212°, - 87.3995°). The impact site is situated in the Clear Branch-Pigeon Creek 12-digit Hydrologic Unit Code (HUC) 0514020203 watershed of the Highland-Pigeon 8-digit 05140202 watershed. The project is situated approximately 26.6 miles upstream along Pigeon Creek from its confluence with the Ohio River in Vanderburgh County.

APPLICANT INFORMATION: Applicant information is as follows:

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STREAM AND WETLAND DELINEATIONS: A Waters of the U.S. Jurisdictional Determination Report

Streams, Wetlands & Open Waters (JD Report) was prepared by Wetland Services, Inc. of Corydon, Kentucky and dated following a request to update the previous delineations from the Corps Huntington District. The August 2025 report is found in **APPENDIX B**.

Wetland delineations were conducted using the 1987 *Corps of Engineers Wetland Delineation Manual*³ and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*⁴ in August 2025 as a reverification of delineations conducted for the original application and prior to that. These methods resulted in the identification of wetlands, which met the criteria for hydrophytic vegetation, hydric soils, and wetland hydrology. Streams were assessed according to criteria set forth in the most recent "Revised Definition of Waters of the United States" was published in the Federal Register on January 18, 2023 (2023 Rule). The rule took effect on March 20, 2023. In May 2023, the U.S. Supreme Court decision in *Sackett v. Environmental Protection Agency* required amending of the 2023 Rule. On August 29, 2023 the USEPA and Corps issued a conforming rule. The "Revised Definition of "Waters of the United States"; Conforming," amends the provisions of agency definition to "Waters of the United States" to that of the Supreme Court's interpretation in the *Sackett* decision. The conforming rule became effective on September 8, 2023 upon publication in the *Federal Register*. In addition, the 2023 Rule, as amended, is not currently operative in Indiana due to litigation. Instead, the pre-2015 regulatory regime is being implemented consistent with the Supreme Court's decision in *Sackett*.

Provided in **APPENDIX B** are the individual assessments for aquatic features assessed in the Mining Area Addition.

IMPACT TO JURISDICTIONAL WATERS: Based upon the above referenced Corps Huntington District verification, submitted delineation work, permit reduction, and significant avoidance areas, the Seven Hills – Mining Area Addition would overall result in the direct impacts to 77.95 acres of jurisdictional wetlands (65.09 acres of palustrine forested wetlands and 12.86 acres of palustrine shrub-scrub wetlands) and 2,802 linear feet of jurisdictional intermittent stream.

Surface mining of the Mining Area Addition will be conducted as a continuation from the existing open pit that is oriented from east to west and moving northward. The reserve in the Mining Area Addition will prolong the mine life another year. Impacts will be a combination of temporary levee construction and coal extraction followed by reclamation of the site with the ultimate removal of the levee to return the site back to a wide active floodplain. Initial impacts will be for the construction of the temporary levee followed by the open pit. **TABLE 1** reflects the anticipated impacts to jurisdictional waters that would result in each project phase along with a general description.

TABLE 1 ANTICIPATED DIRECT IMPACTS BY OPERATION PHASE

Seven Hills – Mining Area Addition Phase	Description	Stream Impacts	Stream Impacts	Wetland Impacts
		(feet)	(acres)	(acres)
I	Construct Temporary Levee and Diversions	56	0.02	17.32
II	Mining with Contemporaneous Reclamation	2,746	1.20	60.63
III	Post-Project Site Reclamation and Reestablishment	0	0	0
Total		2,802	1.22	77.95

In describing the more specific impacts to the on-site aquatic features, the impacts are broken into two general types which are described herein: Coal removal activities (coal removal and backfilling) and ancillary activities (drainage diversions and temporary levee).

COAL REMOVAL disturbances include the removal of the soil and overburden down to the coal seam(s) to be mined. Prior to coal removal, the topsoil and subsoil are removed and stockpiled. Tractors (dozers), end dump trucks, and hydraulic shovels will be the primary removal and reclamation equipment. Tractors will windrow soils, which will be picked up by the shovel, put into trucks, and placed either in stockpiles or directly on graded spoil areas. Spoil will be graded to a design elevation considering the thickness of the soil, both topsoil and subsoil to be replaced to maintain approximate original contours. Soil compaction will be minimized by utilizing low-pressure tracked equipment during final soil grading. Topsoil spreading and grading will also be limited to times when soil moisture is low to further reduce potential for undesirable compaction. Deep tillage will be conducted as necessary to alleviate undesirable compaction.

ANCILLARY activities include development of a temporary levee and drainage diversions to route unaffected drainage around the levee. The temporary levee and diversion construction will consist of clearing the vegetation, excavation of the diversions, and constructing the levee from cohesive soil materials to a height that will be a minimum of one (1) foot above the base flood elevation as determined by the modeling for the Construction in a Floodway permit.

STREAM IMPACTS: As stated, project activities would directly impact 2,802 linear feet of jurisdictional stream channel of which all were designated as having intermittent flows. **TABLE 2** below details total anticipated direct impacts to the jurisdictional streams and the phase of impact.

TABLE 2 ANTICIPATED DIRECT IMPACTS TO JURISDICTIONAL STREAMS

Stream ID	Type of Impact	Ephemeral		Intermittent		Perennial		Seven Hills – Mining Area Addition Phase
		(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	
1MS1	Ancillary	0	0.00	56	0.02	0	0.00	I
1MS1	Coal Removal	0	0.00	2,746	1.20	0	0.00	II
Subtotal Coal Removal		0	0.00	2,746	1.20	0	0.00	
Subtotal Ancillary		0	0.00	56	0.02	0	0.00	
Total Direct Impacts		0	0.00	2,802	1.22	0	0.00	

TABLE 3 below summarizes the impacts to jurisdictional streams by Rosgen channel type regardless of flow regime.

TABLE 3 IMPACT SUMMARY TO JURISDICTIONAL STREAMS BY ROSGEN CHANNEL TYPE

Rosgen Channel Type	(feet)
A	0
B	0
C	2,802
Da	0
E	0
F	0
G	0
Total Streams	2,802

WETLAND IMPACTS: Project activities would directly impact 77.95 acres of wetland. The wetlands consist of 65.09 acres of palustrine forested wetlands and 12.86 acres of palustrine shrub-scrub wetlands. **TABLE 4** details total anticipated direct impacts to the jurisdictional wetlands as well as the phase of impact.

TABLE 4 ANTICIPATED DIRECT IMPACTS TO JURISDICTIONAL WETLANDS

Wetland ID	Type of Impact	PFO	PSS	PEM	PUB	Seven Hills Mine Phase
		(acres)	(acre)	(acre)	(acre)	
1MW1T1P1	Ancillary	15.08	0	0	0	I
1MW1T2P4	Ancillary	0	2.24	0	0	I
1MW1T1P1	Coal Removal	50.01	0	0	0	II
1MW1T2P4	Coal Removal	0	10.62	0	0	II
Subtotal Ancillary		15.08	2.24	0	0	
Subtotal Coal Removal		50.01	10.62	0	0	
Total Direct Impacts		65.09	12.86	0	0	

TABLE 5 below summarizes the impacts to jurisdictional wetlands by the Cowardin Classification.

TABLE 5 IMPACT SUMMARY TO JURISDICTIONAL WETLANDS BY COWARDIN CLASSIFICATION

Cowardin Classification	(acres)
PFO	65.09
PSS	12.86
PEM	0
PUB	0.00
Total Wetlands	77.95

SUMMARY OF PROPOSED STREAM MITIGATION: Direct impacts to jurisdictional streams which would result from project activities associated with the Seven Hills Mine – Mining Area Addition – including temporal and other unavoidable losses – would be offset by post-project on-site stream establishment and reestablishment. Overall, proposed stream mitigation totals 2,802 linear feet.

TABLE 6 below summarizes the post-project stream mitigation.

TABLE 6 SUMMARY OF PROPOSED POST-PROJECT STREAM MITIGATION

Mitigation Channel Name	Linear Feet	Predicted Flow Regime	Mitigation Type
SCR007-1	2,802	Intermittent	On-Site Stream Reestablishment
Total	2,802		

POST-PROJECT ON-SITE STREAM ESTABLISHMENT/REESTABLISHMENT: Contemporaneous reclamation will follow the surface mining operation. Upon completion of the project activity, site regrading, and reclamation: a minimum of 2,802 linear feet of jurisdictional intermittent streams is proposed to be established and reestablished across the post-mine topography.

These reclaimed streams will be constructed utilizing natural stream channel design techniques, bank stabilization, and installation of instream habitat features, and reestablishment of a riparian/wetland buffer. For the reestablishment stream channels, this would include the restoring the approximate pre-mine stream profile, pattern, cross section, and meander to the extent practicable and appropriate. The

established stream channel dimensions will be derived from regional curve data which will size it for an approximate 1.25-year discharge event. The target stream type for all stream mitigation will be a Rosgen “C” channel. Details for this specific channel type can be found in **APPENDIX A** on the **MAP G – ON-SITE STREAM MITIGATION DETAILS**. Additional stream types are included in the event the reclamation of the area is more conducive to construction of a different stream type.

For both the stream establishment and restoration, appropriate bank protection measures such as root wads, j-hooks, vegetation, rock riprap, or other clean non-toxic material will be utilized in areas that may require erosion protection. Instream structures such as cross-vanes, boulder clusters, root wads, large woody debris, and so forth will be installed as appropriate to provide aquatic habitat, to promote riffle/pool sequences, or to create step pools for grade control. Concerning hydrology, the location of the stream channels to be reestablished will be expected to exhibit similar to pre-mine hydrology and drainage patterns. On other areas of the post-mine topography, the establishment channels will take advantage of the post-mine drainage patterns and slopes that will be constructed.

Vegetation riparian buffer zones will be established along both sides of the proposed stream mitigation channels unless the stream is constructed in a forested wetland where the buffer will already exist. Minimum riparian buffer widths will be placed a distance of fifty (50) feet on each side for ephemeral streams and 100 feet on each side for intermittent. Riparian plantings would consist of native plants, trees, and shrubs rather than species or subspecies of exotic origin and would be planted in a manner sufficient to ultimately provide adequate canopy/cover or shading of the reestablished/established stream channels.

SUMMARY OF PROPOSED WETLAND MITIGATION: Direct impacts to jurisdictional wetlands which would result from project activities associated with the Seven Hills Mine – Mining Area Addition – including temporal and other unavoidable losses – would be offset by concurrent off-site wetland restoration; post-project on-site wetland establishment; and off-site wetland preservation. Overall, proposed wetland mitigation totals 234.27 acres. Two (2) off-site mitigation areas have been identified and proposed for use.

TABLE 7 below summarizes the proposed prior to, concurrent, and post-project wetland mitigation.

TABLE 7 SUMMARY OF PROPOSED PRIOR TO, CONCURRENT, AND POST PROJECT WETLAND MITIGATION

Mitigation Area	Acres	Mitigation Type
On-Site	80.00	PFO Wetland Restoration
Squaw Creek Mitigation Area	119.54	PFO Wetland Restoration
Lake Drain Mitigation Area	34.73	PFO Wetland Restoration
Total	234.27	

QUANTITATIVE SAMPLING AND ASSESSMENT: Baseline quantitative sampling and field assessments of the aquatic resources within the project area were conducted as described below. The wetland and stream assessments can be found in **APPENDIX B**. The baseline biological assessment from the original Seven Hills DA Authorization is found in **APPENDIX C**.

GENERAL DESCRIPTION OF AREA AFFECTED BY PROJECT ACTIVITIES: The pre-settlement condition of Pigeon Creek was a tortuous low-gradient single thread drain. Associated with the primary channel were active cutoffs, braids and oxbows. The creek was buffered by closed canopy bottomland hardwood forest. The majority of this forest was a palustrine forested wetland with hydrology regimes ranging from Cowardin Classification A – temporarily flooded to C – seasonally flooded. Palustrine emergent and palustrine scrub-shrub wetlands was limited to oxbows and deeper areas that were F – semi-permanently flooded. The primary disturbance in the area occurred when Pigeon Creek was dredged and straightened for development of the Wabash and Erie Canal. This operation cut a ditch thru the tortuous native channel. The initial cut, coupled with 100 years of subsequent downcutting, results today

in a dredged channel that is several feet below the native invert. In making this cut, many oxbows and section of remnant channels were isolated to either side of the channel and then blocked by the large spoil berms that lined the top of the new ditch banks. The spoil berms trapped water and ponded it at an artificially high elevation such that much mature forest died from water damage. Relief gaps were cut in some locations to drain the trapped water. These gaps immediately initiated head cuts that migrated deep into the forested interior. Some of these gullies were converted into lateral ditches to facilitate farming. The last large-scale land use conversion was in the 1960's when the Soil Conservation Service of USDA subsidized extensive clearing and drainage efforts in this bottomland forest. Many areas, including a portion of this Mining Area Addition, proved too wet to farm and were subsequently abandoned. These areas are visible in aerial imagery as W ditches and other remnant drainages that are now covered by an even-aged stand of early successional trees which are smaller than the surrounding forest. These conditions are evident on the ground. As such, the majority of if not all of the waters to be affected by this project have been previously disturbed.

SUMMARY OF BIOLOGICAL DATA – STREAM IMPACT REACHES: Benthic macroinvertebrate results, fish results, stream habitat and water quality for various assessment locations within the original Seven Hills Mine permit boundary can found in **APPENDIX C** and are summarized in **TABLE 8** below. While no data was obtained from features within the Mining Area Addition, this baseline represents the entire site.

TABLE 8 SUMMARY OF STREAM BIOLOGICAL AND HABITAT DATA

Stream ID	Flow Regime	Sample Date	Habitat Score	pH	TDS	mIBI	fIBI
1NS1	Intermittent	October 2018	91	6.62	127 mg/L	18	
1MS4	Intermittent	October 2018	86	6.78	131 mg/L	20	
1XS5	Intermittent	October 2018	71	6.86	156 mg/L	24	
1MS8	Intermittent	October 2018	94	7.85	579 mg/L	18	
1MS11 (AS1)	Perennial	September 2011	126	8.3	1,588 mg/L	34	44
1RS5-2 (AS2)	Intermittent	September 2011	47	8.8	863 mg/L	30	30
1MS11 (AS3)	Perennial	September 2011	126	8.4	1,129 mg/L	36	40

Note: Italicized Stream ID is the original name of the stream at the time of assessment.

LENGTHS, WIDTHS, AND ELEVATIONS: Baseline channel dimensions and stream measurements can be found within **APPENDIX B** for the features delineated within the Seven Hills – Mining Area Addition.

HYDROLOGY: The watershed of Pigeon Creek at the project site is approximately 200 square miles. The project site is located in southern Indiana in the physiographic region of Indiana known as the Wabash Lowland. The Wabash Lowland is unglaciated and the topography includes rugged uplands, gentle rolling hills, and broad flat lacustrine plains punctuated with isolated valley braid core hills. During the last glacial period (Wisconsin), major streams in southern Indiana carried such a great load of outwash that their valleys became heavily aggraded. The Ohio River system was a major sluiceway for transporting the sediment laden runoff as the glaciers retreated. Consequently, many of the tributary streams were partially blocked and water was impounded upstream of their mouths. Thick beds of lacustrine (lake) clay and silt were deposited in these lakes and slack water areas. The lower Pigeon Creek valley is a good example of such lake areas.

The historical or pre-mining hydrology within the project area originates from a combination of surface water runoff, groundwater flows, and overbank flooding. Hydrology inputs are from precipitation and overbank flooding. While Pigeon Creek commonly floods, most of the site drains quickly. Commonly found primary hydrology indicators include surface water, saturation, sediment and drift deposits, and water-stained leaves.

Ephemeral stream conditions are typically found where only periodic surface flows are present following precipitation events where intermittent flows are typically found where there is transient groundwater influence (as water progresses down-dip and into the lower reaches of watersheds). Perennial flow is usually

found where groundwater influence is present year-round. Within this region, this is generally along the valley floor where the stream bed intersects the groundwater table and has a large watershed.

Wetland hydrology can be categorized by the inflow and outflow of water through a wetland. Land is characterized as having wetland hydrology when, under normal circumstances, the land surface is either inundated or the upper portion of the soil is saturated at a sufficient frequency and duration to create anaerobic conditions.

With regards to existing hydrology, the intermittent channels identified within the Mining Area Addition are a result of transient groundwater influences and surface flow, respectively. Existing hydrology to the wetland areas is provided by surface runoff, seasonal groundwater saturation, overbank flooding, and retention by numerous beaver dams that prevent upstream runoff from reaching Pigeon Creek. Overall, the existing wetlands appear to have saturated soils and exhibit seasonal or less-than-seasonal inundation.

Concerning expected hydrology at the proposed mitigation sites:

The prior to (or concurrent) off-site wetland restoration/establishment sites are expected to receive hydrology resulting from precipitation-induced surface runoff and connection from off-site features that will be perpetuated through the sites and along any abutting intermittent stream channels to be restored to a dimension that allows increased overbank interaction. Groundwater connectivity would also be expected to be present in those established features which abut intermittent and perennial channels.

At the post-project, on-site stream reestablishment/establishment sites (Seven Hills Mine), precipitation-induced surface runoff that is channelized up watershed will be perpetuated through the reestablished streams. The streams would flow across the regraded project area as it flows to Pigeon Creek with the predominate flow regime being intermittent. Subwatersheds internal to the project area will be constructed to collect surface runoff and direct the flow to the reestablished streams. The established streams will be intermittent in nature.

The post-project on-site wetland establishment sites are expected to receive hydrology from surface water runoff across the post-project regrade and from groundwater sources occurring along the abutting reestablished and established intermittent stream channels. Groundwater connectivity would also be expected to be present as the spoil recharges.

SOILS: The *Soil Survey of Warrick County*¹ maps the following soils within the Seven Hills - Mining Area Addition:

Bonnie silt loam (map symbol *Bn*): Bonnie soil is nearly level, deep, poorly drained soil on broad, very slightly concave flood plains. Available water capacity is very high, and permeability is slow. The organic matter content is low and surface runoff is slow.

Stendal silt loam (map symbol *Sn*): Stendal soils are nearly level, deep, somewhat poorly drained soil on broad, long, very slight swales of the flood plains. Available water capacity is very high and permeability is moderate. The organic matter content is low and surface runoff is slow.

Zanesville silt loam (map symbol(s) *ZaC3*): *ZaC3* soils are sloping, deep, well drained soils on side slopes on the uplands. It has available water capacity is moderate and permeability is slow. The organic matter content of *ZaC3* is moderate or low because part of the original surface layer has been removed by erosion. Surface runoff is rapid.

TABLE 9 lists the soils and their acreages for the Mining Area Addition. Please see **MAP D – ON-SITE SOILS** in **APPENDIX A** for the boundaries of the various soil types.

TABLE 9 SOIL TYPES

Soil Series	Map Symbol(s)	Area in Project	Percent of Total Area	Soil Type	Slope	USDA Comments
		(acres)	(percent)		(percent)	
Bonnie	Bn*	68.42	85.04	Silt loam	0-1	
Stendal	Sn*	11.96	14.86	Silt loam	0-2	
Zanesville	ZaC3	0.08	0.10	Silt loam	6-12	Severely eroded
Totals:		80.46	100			

Source: *Soil Survey of Warrick County*¹

Bonnie is listed as hydric on the Indiana Hydric Soils list². The Stendal silt loam is frequently flooded and may contain hydric inclusions. These hydric and potentially hydric soils encompass a total of 80.38 acres or 99.90% of the Mining Area Addition. Stendal silt loam soils are designated as prime soils and if the land is farrow during the pre-mine land use reconnaissance during the SMCRA permitting process, it is designated as prime farmland. It is the IDNR's duty to ensure that land, such as prime farmland, is replaced and can continue to be a valuable resource for the people of America.

Soil maps for the off-site mitigation areas are included in the respective compensatory mitigation plans.

FUNCTIONAL STREAM ASSESSMENTS: Stream assessments utilized an abbreviated Rosgen stream classification method. Typically, the Rosgen stream classification method⁵ is used to predict what adjustments a stream needs to achieve stability, which is the ability of a stream to transport sediment, in the present climate and streamflow regime to maintain dimension, profile, and pattern without aggrading or degrading. Because the stream mitigation for coal mining is predominately stream establishment and reestablishment rather than stream channel restoration, an abbreviated Rosgen stream classification has been utilized in classifying the pre-mining streams and has been a Corps Louisville District-accepted method for the low gradient streams in the Illinois Basin. Level I, II, and III Rosgen stream parameters are visually assessed in the field and recorded along with photographs of the assessment site. Stream dimensions (i.e. bottom width, bankfull width, flood-prone width, and bankfull mean depth) are measured and recorded on the assessment sheets. Buffering vegetation adjacent to the streams is assessed out to a distance of 100 feet on either side of the stream or to the watershed divide. The width and type of vegetation is noted on the assessment sheet and is recorded as the alpha-numeric value as discussed in *Applied River Morphology* by Dave Rosgen. Non-buffering land uses such as agriculture and impervious areas are disregarded.

The United States Environmental Protection Agency Rapid Bioassessment Protocol (RBP) was utilized for stream habitat assessments with any field collected water quality data (pH, conductivity, temperature, and turbidity) also recorded at every stream assessment. The data sheets are included behind each assessment sheet in **APPENDIX B** for the features located in the Seven Hills – Mining Area Addition. The RBP habitat assessment procedure is a well-established method for evaluating the structure and function of the physical habitat in a stream and its surrounding riparian area. Since biological potential is limited by the quality of the stream's physical habitat, an assessment of physical habitat is an important component of any biological stream survey. **TABLE 10** summarizes the baseline stream data for the reaches to be impacted by the proposed project activity.

TABLE 10 ON-SITE BASELINE STREAM DATA INCLUDING RBP FOR REACHES TO BE IMPACTED

Stream ID	Flow Regime	Impact Length	Rosgen Channel Type	Habitat Score	Channel Stability	Stream Bank Erosion
1MS1	Intermittent	2,802	C6	129	Good	Low

OFF-SITE MITIGATION AREAS: Wetland assessments were not conducted for existing wetlands at the off-site mitigation areas. The National Wetland Inventory (NWI) map was used to classify the wetland type and the approximate acreage of the features. **TABLE 15** summarizes the NWI wetland data for these areas.

TABLE 11 OFF-SITE WETLAND DATA

Site Name	Wetland ID	R4SBC	PFO	PSS	PEM	PUB
Squaw Creek	R4SBC 1	1.85	0	0	0	0
Squaw Creek	R4SBC 2	0.80	0	0	0	0
Squaw Creek	PFO1A 1	0	0.19	0	0	0
Squaw Creek	PFO1A 2	0	9.82	0	0	0
Squaw Creek	PFO1A 3	0	14.54	0	0	0
Lake Drain	Area 1	0	0.8	0	0	0
Lake Drain	Area 2	0	6.6	0	0	0
Lake Drain	Area 3	0	27.2	0	0	0
Total		2.65	59.15	0	0	0

EXISTING CONDITIONS OF THE OFF-SITE MITIGATION AREAS: Hydric soils were evaluated at the Lake Drain and Squaw Creek Mitigation areas by mapping the hydric/non-hydric boundaries. These lines are illustrated on the Existing Conditions Map for each site. Baseline information on the Squaw Creek and Lake Drain Mitigation Areas are provided in each respective **COMPENSATORY MITIGATION PLAN**.

TIMING OF MITIGATION. Off-site mitigation will begin with permit issuance or as soon thereafter as ground conditions allow as it is outside the impact area, with completion within 2 years following permit issuance. On-site mitigation will be constructed concurrent with impacts during the contemporaneous reclamation of the site.

All mined areas will be backfilled, regraded to the appropriate post-mining topography, covered with soils, seeded and revegetated. A post-mine drainage system will be restored in the reclaimed area maintaining surface runoff connections. Restored stream types will be of a type similar to the pre-mine stream type and condition or improved. To minimize any adverse effects during reclamation, the following practices will be employed: placement of thick soil lifts with end dump trucks to minimize soil compaction, ripping of compacted areas with bulldozers and/or large farm tractors, and timely vegetation of resoiled areas. Seeding for erosion control would take place immediately upon completion of each phase of the mitigation work, with riparian plantings to follow during the first available seasonal planting window. The planting of tree and shrub seedlings would ultimately be based on nursery availability and would take place in the spring planting season. Planting plans can be found in the **COMPENSATORY MITIGATION PLANS**.

OFF-SITE WETLAND RESTORATION would be prior to (or concurrent) with the initiation of project activities resulting in jurisdictional impacts, to be completed within the first two growing seasons following permit issuance. The concurrent timing of this proposed mitigation is intended to offset functional stream value and temporal losses as a result of project activities. All off-site mitigation work would then be monitored for ten (10) years.

ON-SITE STREAM REESTABLISHMENT AND ESTABLISHMENT of the channels affected by surface mining will be contemporaneously constructed in the reclamation with final connection post-mining. On-site mitigation work would then be monitored for ten (10) years.

ON-SITE WETLAND ESTABLISHMENT would occur in conjunction with the on-site stream mitigation post mining. Timing of the wetland creation would be parallel to the on-site stream establishment. On-site mitigation work would then be monitored for ten (10) years.

TABLE 12 below illustrates project timing for the prior to, concurrent, and post-project mitigation construction. Additionally, the timings below represent estimates that would ultimately vary dependent on coal extraction rates, climatic conditions, nursery availability, and economic conditions. In any event, the Applicant would diligently pursue the proposed stream and wetland mitigation work as soon as practicable.

TABLE 12 TIMING OF MITIGATION WORK

Mitigation	Flow Regime	Wetland/Upland Type	Mitigated Length	Mitigated Area	Project Phase	Project Year	Project Timing	Mitigation Monitoring Complete
Squaw Creek	-	PFO	-	119.54	Phase I	0	2026	2036
Squaw Creek	-	Forested Buffer	-	28.84	Phase I	0	2026	2036
Lake Drain	-	PFO	-	34.73	Phase I	0	2026	2036
Lake Drain	-	Forested Buffer	-	9.61	Phase I	0	2026	2036
Phase I Mitigation Subtotal	PFO	Forested Buffer	Intermittent Streams					
	154.27	38.45	0					
Phase II Mitigation Subtotal: No Mitigation conducted during Coal Extraction Phase								
WR6-1		PFO		20.00	Phase III	4	2030	2040
WR6-1		PFO		45.00	Phase III	6	2031	2036
WR6-1		PFO		15.00	Phase III	8	2034	2044
SCR007-1	Intermittent		2,802		Phase III	8	2034	2044
Phase III Mitigation Subtotal	PFO	Forested Buffer	Intermittent Streams					
	80.00	0	2,802					
Mitigation Total	PFO	Forested Buffer	Intermittent Streams					
	234.27	0	2,802					

PROPERTY OWNERSHIP: Property ownership within the project area and mitigation sites is as follows:

PROJECT AREA PROPERTY OWNERS:

American Land Holdings of Indiana, LLC
701 Market St., Suite 700
St. Louis, MO 63101

Warrick County Commissioners
Warrick County Courthouse
107 W. Locust St.
Boonville, IN 47601

Terry Helms
266 S. Yankeetown Rd.
Boonville, IN 47601

Kenneth & Betsy Sullivan
5000 Jersey St.
Vergennes, VT 05491

John Wasson Trust
c/o Michele Wasson
5111 Primrose Ct.
Newburgh, IN 47630

NCJ Properties LLC
Attn: Allan Noe
10999 Stahl Rd.
Newburgh, IN 47630

OFF-SITE MITIGATION AREA PROPERTY OWNERS:

American Land Holdings of Indiana, LLC
701 Market St., Suite 700
St. Louis, MO 63101

2.0 MITIGATION OBJECTIVES AND APPROACH

The purpose of this section is to outline the goals and objectives of the mitigation plan. Goals should clearly define the intended result of the proposed compensatory mitigation in terms of aquatic ecosystem functions and hydrologic conditions within a watershed context. Objectives should be a list of specific, measurable outcomes of the compensatory mitigation that can be used to demonstrate whether or not the goals of the compensatory mitigation plan have been achieved.

The overall goal of mitigation and compensation measures (after avoidance and minimization) is to offset and restore stream and wetland functional value lost or impacted as a result of project impacts and to compensate for temporal and other unavoidable losses associated with project activity. For stream impacts, this goal would be accomplished by the on-site re-establishment/establishment of jurisdictional stream channels (to be conducted concurrent and following project impacts) in the reclamation. For wetland impacts, the goal would be accomplished by the post-project, on-site establishment of jurisdictional wetland features and off-site restoration of jurisdictional wetland features implemented prior to impacts.

DISTURBANCE PROJECTIONS: **TABLE 13** and **TABLE 14** list the individual stream and wetland disturbance by project phase.

TABLE 13 **STREAM DISTURBANCE BY PROJECT PHASE**

Stream ID	Proposed Impacts	Ephemeral		Intermittent		Perennial		Seven Hills – Mining Area Addition Phase
		(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	
1MS1	Ancillary	0	0.00	56	0.02	0	0.00	I
1MS1	Coal Removal	0	0.00	2,746	1.20	0	0.00	II
Subtotal Coal Removal		0	0.00	2,746	1.20	0	0.00	
Subtotal Ancillary		0	0.00	56	0.02	0	0.00	
Total Direct Impacts		0	0.00	2,802	1.22	0	0.00	

TABLE 14 **WETLAND DISTURBANCE BY PROJECT PHASE**

Wetland ID	Proposed Impacts	PFO	PSS	PEM	PUB	Seven Hills Mine Phase
		(acres)	(acre)	(acre)	(acre)	
1MW1T1P1	Ancillary	15.08	0	0	0	I
1MW1T2P4	Ancillary	0	2.24	0	0	I
1MW1T1P1	Coal Removal	50.01	0	0	0	II
1MW1T2P4	Coal Removal	0	10.62	0	0	II
Subtotal Ancillary		15.08	2.24	0	0	
Subtotal Coal Removal		50.01	10.62	0	0	
Total Direct Impacts		65.09	12.86	0	0	

MITIGATION OBJECTIVES include:

- Design and perform all stream mitigation work such that the established and reestablished channels would exhibit pattern, profile, dimension, substrate composition, in-stream structure, and habitat feature similar to pre-project configuration, appropriate reference reach data, channel configuration and dimensions based upon appropriate hydraulic calculations, natural stream channel design techniques, and/or reference reach data, as applicable;

- Reestablished and established mitigation streams should maintain definable bed and bank, with an ordinary high-water mark and normal surface flow consistent with the targeted flow regimes;
- Proposed stream mitigation, at maturation, should result in an overall net gain in functions and values as demonstrated by post-mitigation versus pre-project RBP assessment scores (i.e., maturity versus baseline);
- All wetland mitigation sites should develop and maintain appropriate hydrology, soil conditions, and hydrophytic vegetation consistent with PFO wetland characteristics, and meet the definition of wetlands as prescribed by the 1987 USACE Wetland Delineation Manual (and applicable regional supplements);
- Installation of IRIS tubes or hydroperiod data loggers within restored and established wetlands are recommended to support and demonstrate achievement of appropriate hydrologic conditions;
- Restore forested buffers adjacent to wetland restoration fields that border active agricultural fields;
- Provide site protection for the mitigation areas for the duration of the monitoring period and thereafter to prevent the mitigation area(s) from being disturbed except by those activities that would not adversely affect the intended extent, condition, and function of the mitigation through the use deed restrictions and/or conservation easements; and
- Perform monitoring, management, and maintenance of the mitigation sites for ten (10) years following completion of the mitigation work.

3.0 CREDIT DETERMINATION METHODOLOGY

In accordance with 33 CFR 332.4(c)(6), the determination of credits includes a description of the number of functional credits to be provided by compensatory mitigation as well as a brief explanation of the rationale for this determination. In cases where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required (provide methodology and results as an attachment). If a functional or condition assessment or other suitable metric is not used, an acreage or linear foot compensation ratio will be presented by the permittee and evaluated by the Corps Huntington District. In some cases, a mitigation ratio greater than one-to-one is necessary to account for the method of compensatory mitigation (e.g., preservation), the likelihood of success, differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, temporal losses of aquatic resource functions, the difficulty of restoring or establishing the desired aquatic resource type and functions, and/or the distance between the affected aquatic resource and the compensation site.

The determination of credits is calculated as a ratio per unit of impact: acres for wetlands and linear feet for streams. The Applicant has agreed to the following mitigation ratios: 1:1 for streams; 3:1 for palustrine forested and scrub-shrub wetlands impacts. **TABLE 15** and **TABLE 16**

TABLE 15 WETLAND AND OPEN WATER MITIGATION SUMMARY TABLE

Wetland Type	Acreage to be Impacted	Mitigation Ratio	Mitigation Acreage
	(acres)		(acres)
PFO	65.09	3:1	195.27
PSS	12.86	3:1	38.58
PEM	0	2.5:1	0
PUB	0	2.5:1	0
Total	77.95		233.85

TABLE 16 STREAM MITIGATION SUMMARY TABLE

Stream Type	Linear Footage to be Impacted	Mitigation Ratio	Mitigation Footage
	(feet)		(feet)
Ephemeral	0	1:1	0
Intermittent	2,802	1:1	2,802
Perennial	0	1:1	0
Total	2,802		2,802

Successful completion of the proposed compensatory mitigation actions and restorations would be expected - over time, and with the eventual maturation of riparian canopy - to allow the reestablished/established streams and created wetlands to develop and result in suitable aquatic habitat and structure to support, replace, and/or restore the aquatic functions impacted by project activity.

TABLE 17 provides a summary of all the mitigation sites and the anticipated mitigation types to be restored or established.

TABLE 17 MITIGATION CREDIT SUMMARY TABLE

Mitigation Site	Type of Mitigation	Wetland (acres) - Stream (feet)
On-Site – Seven Hills – Mining Area Addition	PFO Wetland Establishment	80.00
	Intermittent Stream Establishment	2,802
Squaw Creek Mitigation Area	PFO Wetland Restoration	119.54
	Forested Buffer Restoration	28.84
	PFO Wetland Preservation	19.45
	Forested Buffer Preservation	2.28
Lake Drain Mitigation Area	PFO Wetland Restoration	34.73
	Forested Buffer Restoration	0.50
	Forested Buffer Preservation	3.70
	Forested Buffer Preservation	11.00

Additional credit gained from the placement of a conservation easement or restrictive covenant has not been included on **TABLE 18**. An additional 5% credit is given for placement of a conservation easement and a 2.5% credit is given for a deed restriction. This provides the total wetland credits generated from the mitigation provided for the Seven Hills – Mining Area Addition to impact 77.95 acres.

TABLE 18 TOTAL WETLAND MITIGATION CREDITS

Mitigation Site	Type of Mitigation	Ratio	PFO: Restoration & Establishment (acres)	Other: Buffers & Preservation (acres)	Total Wetland Credits	Subtotal Wetland Credits	Protection Bonus	Easement Bonus Credit	Total Wetland Credits
On-Site – Seven Hills – Mining Area Addition	PFO Wetland Establishment	1:1	80.00	-	80.00	46.59	CE	2.33	48.92
						33.41	-	0.00	33.41
						80.00		with CE	82.33
Squaw Creek Mitigation Area	PFO Wetland Restoration	1:1	119.54		119.54	119.54	CE	5.98	125.52
	Forested Buffer Restoration	1:4		28.84	7.21	7.21	CE	0.36	7.57
	PFO Wetland Preservation	1:10		19.45	1.95	1.95	CE	0.10	2.04
	Forested Buffer Preservation	1:10		2.28	0.23	0.23	CE	0.01	0.24
						128.93		with CE	135.37
Lake Drain Mitigation Area	PFO Wetland Restoration	1:1	34.73		34.73	34.73	CE	1.74	36.47
	Forested Buffer Restoration	1:4		9.61	2.40	2.40	CE	0.12	2.52
	PFO Wetland Preservation	1:10		7.58	0.76	0.76	CE	0.04	0.80
	Forested Buffer Preservation	1:10		1.18	0.12	0.12	CE	0.01	0.12
						38.01		With CE	39.91
On-Site Mitigation Total			80.00	-					82.33
Off-Site Mitigation Total			154.27	68.94					175.28
Overall Total Mitigation			234.27	68.94					257.61

4.0 **SITE SELECTION**

WATERSHED CONSIDERATIONS: The on-site mitigation work is proposed to be conducted within the same watershed as the proposed impacts. Both impact and mitigation sites lie within the Clear Branch-Pigeon Creek HUC12 watershed (051402020203). Two (2) off-site mitigation areas have been identified to address the remaining mitigation debit. One site, Squaw Creek Mitigation Area is located in the Highland-Pigeon HUC8 watershed (05140202) which is the same watershed of the proposed impacts and the other site, Lake Drain Mitigation Area, is located in the adjacent Lower Ohio-Little Pigeon HUC8 watershed (05140201). Refer to **MAP F – INDIANA IN-LIEU FEE SERVICE AREAS** in **APPENDIX A**, which depicts the location of the impact area versus the proposed mitigation sites.

SERVICE AREA: In evaluating the location of the mitigation sites, the Indiana Stream and Wetland Mitigation Program (ISWMP) Instrument prepared for the Indiana Department of Natural Resources (IDNR) was utilized to justify that constructing mitigation outside of the HUC8 watershed of impacts is acceptable. The Corps Huntington District approval of this Instrument constitutes the regulatory approval required for this to be used to provide compensatory mitigation for Department of Army permits pursuant to 33 CFR 332.8(a)(1). Within the Instrument, the program developed 11 service areas in the state of Indiana. Two of the service areas are sized at HUC8 scale with the remaining service areas configured by combining multiple HUC8 watersheds. The service areas were chosen based on a combination of watershed boundaries and the likelihood of future wetland and stream impacts and potential mitigation opportunities. Ecoregions were considered, but used as a secondary priority in determining service area boundaries as most ecoregion boundaries do not match up with watershed boundaries. The service area for the entire compensatory mitigation for the Seven Hills – Mining Area Addition is the Ohio-Wabash Lowlands Service Area which encompasses the following three HUC8 watersheds: 05140202 – Highland-Pigeon, 05140201 – Lower Ohio-Little Pigeon, and 05120113 – Lower Wabash. Through the ISWMP, the IDNR provides mitigation credits for aquatic resource loss within the service areas by completing projects in the same service area where the impact occurred. The impacts for the Seven Hills – Mining Area Addition will occur within the Highland-Pigeon HUC8 watershed with compensatory mitigation being constructed both in the Highland-Pigeon as well as the Lower Ohio-Little Pigeon watershed which both are wholly within the Ohio-Wabash Lowlands Service Area.

The wetlands to be impacted are floodplain wetlands adjacent to the dredged channel of Pigeon Creek. Included in the Mining Area Addition is a remnant channel of Pigeon Creek and side channels that internally drain to the remnant channel. The site is underlain mostly by Bonnie hydric soils and Stendal soil which is potentially hydric. The existing soils will be stockpiled prior to mining and replaced during the reclamation process. The remnant channel will be reconnected to its upstream watershed and perpetuated through the project area connecting into the stream mitigation being established in the original DA authorization.

For the off-site mitigation areas, consideration was given to how each site would generate credits with the highest ratio being given for restoration, as opposed to preservation, rehabilitation or other less preferred credit-generating mechanisms. Of the 192.72 acres off-site to be restored, 154.27 acres or 80% will be restored as PFO wetlands.

The permissibility for long-term protection was considered on each site. Of the 257.67 acres off-site, 572 acres or 90% are owned Fee Simple with no encumbrances, including all mineral and with no leases. This qualifies these sites to be protected by Conservation Easements; a bank-equivalent quality of ownership. The remaining 65 acres will be protected by a Restrictive Covenant.

Water quality benefits to the watershed were considered. Simply converting the land use from agriculture to natural will reduce silt, nutrient, and pesticide inputs to Waters of the U.S. Contaminated flood waters will be cleaned by the restored sites and then metered back into the receiving streams to support a more consistent flow regime within these watersheds. Shade provided by planted trees will cool the waters and increase dissolved oxygen. These are the primary impairments within these 303(d)-listed watersheds that will benefit from this project.

The hydrologic connections between each site and the streams to which they report were considered. Removing or gapping the flood protection levees and spoil berms will provide direct surface connectivity. This will allow these sites to serve as active floodplains for channel stress relief during periods of overbank flooding; a benefit to the stream. The backwater entering the site will make detrital inputs and support wetland hydrology; a benefit to the wetland. As such, these sites within the larger watershed will each benefit from the reciprocal functions provided by the other. Other remnant features will provide microtopography to the restored sites.

Final consideration was given to how ecologically conducive each site is for restoration. This is based on existing conditions and human manipulations. A common attribute amongst all sites is that they lie adjacent to large, dredged channels, have interior drainage ditches that remove surface water, and tile that removes groundwater. They also include some degree of flood protection levees/spoil berms, and subsequent overwash that covers native hydric soils. A common thread on all sites is that removal of these features will restore native conditions. As such, restoration consists of restoring native topography as opposed to creating unnatural features or the reliance on artificial structures. The attributes of these sites and the simplicity of the restoration plan is highly conducive to long-term self-sustaining success.

In summary, on-site mitigation was chosen because it is logical to restore the floodplain wetland of Pigeon Creek back in the same location to provide and maintain the same benefit to the watershed that the existing wetland provides and the off-site mitigation areas were chosen to protect, enhance, and restore to native conditions into perpetuity.

MITIGATION OPTIONS CONSIDERED: Prior to developing the CMP proposals, the Applicant evaluated various mitigation opportunities. This evaluation was based upon the options and hierarchy provided in the 2008 Mitigation Rule.

- **MITIGATION BANKS:** Concerning the potential use of mitigation banks to offset wetland and stream impacts, there is limited wetland mitigation bank opportunities that could satisfy what would be required in the Ohio-Wabash Lowlands Service Area. This alternative is not an option.
- **IN-LIEU FEE:** Due to the huge cost incurred by using in-lieu fees, this option was not considered viable as the Applicant believes permittee-responsible mitigation to be more appropriate.

Nonetheless, in the event the Corps Hunting District finds that a mitigation deficit remains after consideration of the permittee-responsible and other mitigation proposed and described herein (or should any of the mitigation proposed herein later be found to be impracticable), the Applicant would be willing to consider the use of in-lieu fees in the form of contribution to the Indiana Department of Natural Resources Stream and Wetland Mitigation Program In-Lieu Fee Program –to offset any remaining mitigation needs.

- **PERMITTEE-RESPONSIBLE:** Mitigation options considered by the Applicant included: On-Site, In-Kind and Off-Site, In-Kind.

ON-SITE, IN-KIND MITIGATION opportunities exist at the Seven Hills – Mining Area Addition following site reclamation. Mitigation of this type would be practicable and achievable for both streams and wetlands.

With respect to the potential for On-Site, Stream Mitigation, it was determined that stream channel segments could be reestablished across the post-project regrade in the approximate location of the currently existing jurisdictional tributaries that would be affected by project activity. The location of these potential reestablishment stream channels would be expected to exhibit appropriate hydrology, because pre-project drainage patterns would be maintained. On other areas of the proposed regrade, it was determined that post-project stream channel segments could be established by taking advantage of the drainage patterns and grades that would be

constructed.

Accordingly, on-site stream reestablishment/establishment were incorporated into the Applicant's CMP proposal.

Concerning On-Site, Wetland Mitigation, it was determined that opportunity for on-site wetland establishment would exist across the post-project regrade. Forested wetlands could readily be created adjacent to the reestablished and established stream channels as well as the adjacent unimpacted wetlands.

Deemed to be both practicable and achievable, on-site wetland establishment was incorporated into the Applicant's CMP proposal.

ON-SITE, OUT-OF-KIND MITIGATION was eliminated from consideration since practicable opportunities would exist within the post-project reclamation areas for both stream and wetland establishment.

Opportunity for Off-Site, In-Kind Mitigation was found to be available in the form of wetland restoration. Two (2) off-site wetland restoration mitigation sites have been identified in both the Highland-Pigeon HUC8 watershed (05140202) and the Lower Ohio – Little Pigeon HUC 8 watershed (05140201). The construction for these mitigation areas would be performed prior to (or concurrent with) the initiation of project impacts and completed within two (2) growing seasons following permit issuance offsetting temporal losses.

For these reasons, the identified off-site stream and wetland restoration and establishment sites were deemed available and practicable; and has been incorporated into the Applicant's CMP proposals which are under separate attachments.

PRACTICABILITY: The proposed mitigation sites would be located within or just adjacent to the project area. Equipment availability and proximity to the Applicant's operation offers both convenience and cost advantage. Site monitoring, maintenance, and protection could be readily accomplished on these properties already controlled by the Applicant. No exotic technology would be required to implement the mitigation plan. Knowledgeable and competent professionals would be available to consult and/or supervise the restoration and mitigation work.

After mining and reclamation operations are completed, replaced soil infiltration may be slightly reduced as a result of compaction caused by the heavy equipment used to redistribute the earthen materials. Compaction will be minimized where possible by direct haul-back of soil. To help restore the recharge capacity of the mined area, replaced soil is chisel plowed and/or vibrated to reduce compaction.

The restored and created channel capacities are designed to easily accommodate both the short- and long-term flows that could be expected in the watersheds. Materials that would be utilized to create the proposed substrate, structure, and habitat features would be reasonably available at or near the site. Past experience has shown that the regrade areas, particularly if not over-compacted, can readily support native trees and shrub species suitable for development into successful wetland mitigation. Appropriate post-project hydrology, as previously discussed, would be expected to be available and favorable. Overall, completion and success of the mitigation plan would be expected to be reasonably achievable and practicable.

RECLAMATION METHODS: Stream and wetland mitigation will take place as quickly as practicable employing the best techniques available to ensure success. Under SMCRA regulations, coal companies are required to return the land to a productive state. The Applicant has received numerous awards for reclamation and has successfully minimized adverse impacts by using methods such as placing thick lifts of soil over the spoil, properly handling any acidic overburden, ripping the soil to minimize compaction, and revegetating shortly after grading. The Applicant uses individuals and contractors who are skilled at planting and maintaining trees as well as constructing streams and wetlands to ensure success of the mitigation.

A post-mine drainage system will be restored in the reclaimed area with surface runoff remaining in the same general watersheds. Stream mitigation will be constructed utilizing natural channel design. The Applicant has demonstrated success in reclaiming streams in Indiana. The West Fork Busseron Creek stream mitigation project at the Farmersburg Mine has been touted by the Office of Surface Mining as an example demonstrating that streams can be successfully replaced in surface mine reclamation.

In regard to groundwater recharge, mine spoil generally exhibits higher recharge capacity than undisturbed material. Although this moderates in time due to settlement and weathering. Hydraulic conductivity of spoil in southern Indiana can range from 10^{-4} to 10^{-6} cm/sec. When the overburden is broken up by blasting and removed to recover the coal, the disrupted overburden, or spoil, becomes a heterogeneous mixture of particles ranging in size from clays to boulders. The transition of low permeability consolidated rock to moderately permeable unconsolidated spoil may temporarily increase groundwater recharge and storage capacity. These spoil areas may absorb increased recharge from precipitation and slowly release it as base flow to streams within the spoil and connected open water bodies.

An evaluation of the hydrologic consequences of surface mining for the original Seven Hills Mine application has determined that the operations proposed herein are unlikely to produce reliably measurable permanent changes in the quantity and quality of groundwater existing within the unconsolidated media inside or adjacent to the permit area. Due to increased permeability, reclaimed spoil can result in a flattened water table but in this case the Pigeon Creek floodplain has a flat-water table pre-mine. The post mine water table should not be significantly different. The difference in the permeability of the spoil and the undisturbed material may cause water to come to the surface near this boundary. This spoil had settled for a number of years but and demonstrates that permeability's similar to undisturbed bedrock can be achieved with time.

Due to flooding from Pigeon Creek, groundwater recharge will be rapid in comparison to surface mines that depend mainly on groundwater recharge through low permeability bedrock and infiltration of precipitation.

THREATENED AND ENDANGERED SPECIES: An Endangered Species Act review was coordinated through the US Fish and Wildlife Service's Information for Planning and Consultation (IPaC) website. An official species list is generated within an uploaded project area. The Seven Hills Mine – Mining Area Addition with an IPaC Project Code of 2025-0123569 lists the following six species that may occur or be affected by the proposed activities. This list was generated on July 18, 2025 and the official species list can be found in **APPENDIX H**. There is a total of six (6) threatened, endangered, or candidate species for this mitigation area.

- endangered gray bat (*Myotis grisescens*),
- endangered Indiana bat (*Myotis sodalis*),
- endangered northern long-eared bat (*Myotis septentrionalis*),
- proposed endangered tricolored bat (*Perimyotis subflavus*),
- experimental population, non-essential whooping crane (*Crus americana*), and
- proposed threatened monarch butterfly (*Danaus plexippus*)

Per the IPaC review, there were no critical habitats for these species within the project area. This species list fulfills the requirements of the U.S. Fish and Wildlife Services under section 7(c) of the Endangered Species Act of 1973, as amended.

The Applicant follows conservation measures to minimize the potential take of the Indiana bat by performing tree-clearing outside of the summer reproductive season and avoiding Indiana bat summer habitat to the extent possible. The appropriate season to clear trees is from October 1 to March 31. Typically, enough trees are cleared ahead of the active pit to ensure continuous mining through an area until the start of the next tree-clearing window. Large blocks of suitable summer habitat will remain within the wetland and stream avoidance are as well as existing just outside of the project impact area.

The Applicant coordinated a review of potential impacts on threatened and endangered species through the SMCRA process. The Indiana Fish and Wildlife biologist assigned to the IDNR Division of Reclamation evaluated the SMCRA permit application and requested modifications to address the possible presence of listed species and to the extent possible minimize adverse impacts to any listed species pursuant to 312 IAC 25-4-29 and 25-4-46. Additionally, a Protection and Enhancement Plan was developed for the Indiana bat which was reviewed by the USFWS. The USFWS sent a letter to the IDNR Division of Reclamation dated October 28, 2013 that concluded, *"The proposed project is in compliance with our 1996 national biological opinion issued to the Office of Surface Mining for protection of federally endangered species, pursuant to Section 7 of the Endangered Species Act."*

An Indiana bat Protection and Enhancement Plan (PEP) has been incorporated in the SMCRA permit that addresses all Endangered Species Act requirements. It also addresses the northern long-eared bat. The PEP plan to the Indiana Department of Reclamation can be found in **APPENDIX S** of the approved DA authorization LRH-2018-738.

CULTURAL RESOURCES: The Indiana Surface Mining Control and Reclamation Act (SMCRA) requires that any archaeology and historical issues be cleared by the IDNR in consultation with the Indiana State Historic Preservation Officer for area within the SMCRA permit area. If at any time during development of the Seven Hills – Mining Area Addition that human remains or Native American cultural items are discovered, the Applicant will follow the appropriate steps under the Native American Graves Protection and Repatriation Act (NAGPRA).

The Applicant has coordinated the initial archaeological survey of the permit area to identify any cultural resources. Any identified cultural resources are addressed through the statutory requirements of Article 25 of the Indiana Administrative Code: Coal Mining and Reclamation Operations and all provisions in the National Historic Preservation Act and other legislation and directives regarding treatment of cultural resources.

Based on information that the Applicant provided to the IDNR Division of Reclamation in coordination for issuance of the SMCRA permit, the Division determined that the Applicant satisfied all the requirements of IC14-34-3-10 by stating in their March 23, 2014 mining permit issuance document that no further Phase I archaeological investigations are required within the SMCRA S-00357 permit boundary.

The Applicant is conducted a reconnaissance level (Phase I) archaeological surveys for the Lake Drain Mitigation Area and one can be conducted for the Squaw Creek Mitigation Area if needed. The surveys will be provided the Corps Huntington District and the Indiana Department of Natural Resources - Division of Historic Preservation and Archaeology for review and comment. This is pursuant to Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and 36 C.F.R. Part 800. Any further coordination will be completed to achieve agency clearance.

If any prehistoric or historical archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-127 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, the following number should be called (317) 232-1646.

5.0 **MITIGATION WORK PLAN**

BOUNDARIES OF THE PROPOSED MITIGATION: Refer to **MAP A - OVERALL PROJECT LOCATION MAP** in **APPENDIX A** for the general location of the mitigation areas and the respective compensatory mitigation plans attached to this application. The boundaries of the mitigation work would be marked and/or flagged in the field prior to the initiation of any phase of the mitigation work. This should include staging areas and temporary access routes or stream access points.

GENERAL CONSTRUCTION METHOD, TIMING, AND SEQUENCE: Construction would primarily be conducted by utilizing small backhoes, bulldozers, and trucks. Site preparation and earthwork activities should be conducted during dry periods, preferably from late spring through fall, but should be completed prior to late November.

If more than minimal flow conditions are present at the mitigation work site(s), dewatering techniques would be employed as described below. Unless otherwise necessary for the proper installation of structures/features, instream work should be conducted to the maximum extent practicable “in the dry”.

Whenever practicable, work should be conducted with boom-type construction equipment, such as a backhoe, so that equipment can be operated from outside the stream channel (above the ordinary high-water mark and bankfull elevations). Any unavoidable and necessary work in a water course should be conducted with rubber-tired vehicles or equipment only, although equipment mats may be employed.

Temporary stream access-ways should be “field-fit” to minimize disturbance and avoid unnecessary cutting or removal of riparian vegetation. Any woody debris, standing trees, logs, or timber to be taken down should be stockpiled for potential utilization in the mitigation efforts; or if not needed, removed from the site and properly disposed.

Seeding for erosion control should take place immediately, with riparian plantings to follow during the first available seasonal planting window. The planting of tree and shrub seedlings would ultimately be based on nursery availability but should preferably take place during the spring planting season. The mitigation sites would be monitored and maintained for ten (10) years, following completion.

DEWATERING: All mitigation work would preferably take place at low flow, dry, or dewatered conditions. This would be accomplished by, but not limited to, constructing temporary dikes from sandbags, hay bales or other suitable materials and temporarily diverting flow around the work site by piping, gravity flow or pumping.

WATER SUPPLY: In general, water supplying the stream mitigation channels would be from precipitation events, surface runoff, and groundwater sources. The channels would also capture runoff from their corresponding watersheds.

At the post-project, on-site stream establishment sites, precipitation-induced surface runoff would flow across the regraded project area. It would be initially ephemeral flow within the upper reaches to intermittent flow in the lower reaches with the introduction of groundwater which would be expected to be seasonally present.

At the post-project, on-site stream reestablishment sites, expected hydrology would be intermittent as the streams will be reestablished to existing streams that are flowing into the project area. Base flow in the channel would result from groundwater influences and increased drainage area from the upstream watershed.

At the prior to (or concurrent with), off-site wetland restoration sites (Squaw Creek and Lake Drain), expected hydrology would be maintained from the existing upstream watersheds, adjacent drainages, and surface runoff.

The post-project on-site wetland establishment is expected to receive hydrology from surface water runoff across the post-project regrade and from groundwater sources occurring along the abutting established and

reestablished stream channels (to be established) as well as any overbank flooding from Pigeon Creek. Groundwater connectivity would also be expected to be present in those established features which abut intermittent and perennial channels.

NATIVE VEGETATION: In areas where stream or wetland mitigation would be conducted, all disturbances would be revegetated with a mixture of native, non-competitive, and non-invasive species.

GROUND COVER: All areas of disturbance within the mitigation sites should be revegetated as soon as practicable to establish an immediate ground cover for erosion control and to minimize sedimentation. Grass mixture is critical to prevent an imbalance between ground cover and tree requirements for light, water, and space. Only noncompetitive grass mixtures should be used. The method of planting the grass mixtures may be by hydro-seeding or by hand. Fertilizer and mulch should be applied as necessary.

When establishing ground cover, a diverse grass seed species mixture (minimum of four) should be selected from **TABLE 19**. The use of Kentucky 31 fescue is not to be allowed.

TABLE 19 **GROUND COVER SPECIES LIST**

Common Name	Scientific Name	Planting Rate
Red Top	<i>Agrostis alba</i>	2 lb/ac
Perennial Rye	<i>Lolium perenne</i>	5 lb/ac
Barnyard Grass	<i>Echinochloa spp.</i>	5 lb/ac
Sedges [various]	<i>Carex spp.</i>	label rate
Alsike Clover	<i>Trifolium hybridum</i>	3 lb/ac
Japanese Millet	<i>Echinochloa spp.</i>	5 lb/ac
Cicer Milk Vetch	<i>Astragalus cicer</i>	3 lb/ac
Annual Rye	<i>Lolium multiflorum</i>	4 lb/ac

TREE AND SHRUB PLANTING: Any of the species on the list of unapproved vegetation will be removed prior to commencing with the planting process. Soil samples will be sent to the state lab for tree amendment recommendations including N, P, K, lime and micro-nutrients. Post excavation the site will be ripped to a depth of 16 inches. Soil amendments will be applied and worked in to establish a firm level seedbed. Seed will be planted under moisture conditions and in the manner most suitable for germination and permanent establishment.

A combination of bare root tree and shrub seedlings will be obtained from the list shown on **TABLE 20** below for the potential planting species by mitigation construction type. Woody stems on the attached list will be planted with a mechanical setter. Material handling will include the standard use of refrigeration and wetness to maintain viability. Treatment will include the use of Indolebutyric acid - a naturally occurring root stimulant, mycorrhizal inoculant - naturally occurring symbiotic microbes, and a polymer wetting compound. These materials will be suspended in non-chlorine water. As the trees and shrubs are unpacked, they will be mixed to diversity specs, placed in buckets of treated water, and these buckets will be provided directly to the mechanical planter. *Oust* or similar herbicide may be applied in a bandwidth along each row at planting; the purpose is to hinder germination of competitive growth for a period of years. Tree rows will be oriented to facilitate maintenance such as mowing as necessary.

The proposed width of the buffer restoration plantings will vary for each mitigation site. This is due to property constraints, proximity to other mitigation channels, and in the case of the pre-project mitigation site, proximity to proposed project activity within adjacent permitted areas.

- For the off-site mitigation areas, the planting rate will be at a minimum for forested wetlands and

forested buffers:

- 320 bare root tree seedlings per acre, and
- 200 bare root shrub seedlings per acre.
- For the on-site mitigation area, the planting rate will be at a minimum for forested wetlands and forested buffers to comply with the forested post-mining land use requirement of 450 live trees per acre at final bond release:
 - 680 bare root tree seedlings per acre, and
 - 200 bare root shrub seedlings per acre.

TABLE 20 PLANTING SPECIES LIST BY MITIGATION TYPE

Tree Species: PFO Wetlands				
6 Species <i>MINIMUM</i> . Cypress and at least 3 (three) Priority 1 species must be planted; Priority 2 species recommended thereafter. Species should be planted according to water tolerance; FACW species would be planted in locations with lesser hydroperiods, while OBL species would be planted in areas with more extreme hydroperiods.				
Priority	Species	Common Name	CC	Indicator
1	<i>Taxodium distichum</i>	Bald Cypress	10	OBL
1	<i>Quercus shumardii</i>	Shumardi Oak	7	FACW
1	<i>Quercus bicolor</i>	Swamp White Oak	7	FACW
1	<i>Quercus michauxii</i>	Swamp Chestnut Oak	7	FACW
1	<i>Quercus pagoda</i>	Cherrybark Oak	5	FACW
1	<i>Quercus macrocarpa</i>	Bur Oak	5	FAC
1	<i>Quercus lyrata</i>	Overcup Oak	7	OBL
1	<i>Celtis laevigata</i>	Sugarberry	7	FACW
1	<i>Populus heterophylla</i>	Swamp Cottonwood	8	OBL
2	<i>Carya illinoensis</i>	Pecan	4	FACW
2	<i>Quercus palustris</i>	Pin Oak	3	FACW
2	<i>Nyssa sylvatica</i>	Blackgum	5	FAC
2	<i>Diospyros virginiana</i>	Common Persimmon	2	FAC
Tree Species: Forested Buffers				
6 Species <i>MINIMUM</i> . At least 4 Priority 1 species must be planted (see list above for additional Priority 1 species). Priority 2 species recommended thereafter. Upland buffer species can be planted with a mix of FAC and FACW species and would be planted according to water tolerance; FACU and UPL species on dry locations and FACW and OBL species on wet locations.				
Priority	Species	Common Name	CC	Indicator
1	<i>Quercus coccinea</i>	Scarlet Oak	7	NI
1	<i>Quercus alba</i>	White Oak	5	FACU
1	<i>Quercus falcata</i>	Southern Red Oak	5	FACU
2	<i>Liriodendron tulipifera</i>	Tulip Poplar	4	FACU
2	<i>Quercus muhlenbergii</i>	Chinkapin Oak	4	NI
2	<i>Quercus rubra</i>	Northern Red Oak	4	FACU
2	<i>Quercus velutina</i>	Black Oak	4	NI
2	<i>Carya glabra</i>	Pignut Hickory	4	FACU
2	<i>Carya ovata</i>	Shagbark Hickory	4	FACU
2	<i>Catalpa speciosa</i>	Northern Catalpa	NI	FACU

2	<i>Juglans nigra</i>	Black Walnut	2	FACU
2	<i>Quercus imbricaria</i>	Shingle Oak	3	FACU
Shrub Species: PFO Wetlands and Forested Buffers				
4 species <i>MINIMUM</i> . At least 3 Priority 1 species must be planted. Priority 2 species recommended thereafter.				
Priority	Species	Common Name	CC	Indicator
1	<i>Alnus incana</i>	Speckled alder	9	FACW
1	<i>Aronia melanocarpa</i>	Black Chokeberry	8	FACW
1	<i>Asimina triloba</i>	Paw Paw	6	FAC
1	<i>Carya laciniosa</i>	Shellbark Hickory	8	FACW
1	<i>Cephalanthus occidentalis</i>	Buttonbush	5	OBL
1	<i>Cornus amomum</i>	Silky dogwood	10	FACW
1	<i>Viburnum dentatum</i>	Southern arrowwood	6	FAC
1	<i>Crataegus viridis</i>	Green Hawthorn	7	FACW
1	<i>Ilex verticillata</i>	Common winterberry	8	FACW
1	<i>Lindera benzoin</i>	Spicebush	5	FACW
2	<i>Sambucus canadensis</i>	Elderberry	2	FACW
2	<i>Cercis canadensis</i>	Eastern Redbud	3	FACU
2	<i>Cornus racemosa</i>	Gray dogwood	2	FAC
2	<i>Cornus sericea</i>	Redosier dogwood	4	FACW
2	<i>Cornus drummondii</i>	Roughleaf dogwood	2	FAC
2	<i>Corylus americana</i>	American Hazelnut	4	FACU
Herbaceous Species: PFO Wetlands				
10 Species <i>MINIMUM</i> – must be planted according to water tolerance; FACW species would be planted in locations with lesser hydroperiods, while OBL species would be planted in areas with more extreme hydroperiods.				
Genus and/or Species	Common Name	Propagule/Rate	Strata	Indicator
<i>Acorus calamus</i>	Sweet Flag	R 125/ac	H	OBL
<i>Agrostis hyemalis</i>	Winter Bent Grass	S 6oz/ac	H	FAC
<i>Alisma subcordatum</i>	Water Plantain	BRP 50/ac	H	OBL
<i>Alopecurus spp.</i>	Foxtail	S 6oz/ac	H	FACW
<i>Arundinaria Gigantea</i>	Giant Cane	R 50/ac	S	FAC
<i>Asclepias spp.</i>	Milkweed	R 50/ac	H	FACW-OBL
<i>Aster spp.</i>	Asters	S 1-12oz/ac	H	FAC-FACW
<i>Bidens spp.</i>	Beggarstick	S 1-12oz/ac	H	FACW
<i>Carex spp.</i>	Sedge	S 1-12oz/ac	H	FACW-OBL
<i>Chasmanthium latifolium</i>	Woodoats	S 1-6oz/ac	H	FACW
<i>Cinna latifolia</i>	Wood Reed	S 1-12oz/ac	H	FACW
<i>Commelina spp.</i>	Dayflower	R 50/ac	H	FACW
<i>Cyperus spp.</i>	Flat Sedge	S 1-13oz/ac	H	FACW-OBL
<i>Desmodium spp.</i>	Ticktrefoil	S 1-12oz/ac	H	FAC-FACW
<i>Echinochloa spp.</i>	Barnyard grass	S 3lb/ac	H	FACW
<i>Eleocharis spp.</i>	Spike Rush	S 1/2-2oz/ac	H	OBL
<i>Elymus spp.</i>	Wild Rye	S 2lb/ac	H	FAC-FACW
<i>Eupatorium spp.</i>	Boneset	S 1-12oz/ac	H	FAC-FACW
<i>Festuca Paradoxa</i>	Clump Fescue	S 5lb/ac	H	FAC

<i>Glyceria striata</i>	Fowl Manna Grass	S 4oz/ac	H	OBL
<i>Helenium autumnale</i>	Sneezeweed	S 1-12oz/ac	H	FACW
<i>Hottonia inflata</i>	Featherfoil	Any available	H	OBL
<i>Iris spp.</i>	Water Iris	R 125/ac	H	OBL
<i>Juncus spp.</i>	Rush	S 4oz/ac	H	FACW-OBL
<i>Leersia spp.</i>	Cutgrass	S 1lb/ac	H	OBL
<i>Lemna spp.</i>	Duck Weed	BRP 2bu/ac	H	OBL
<i>Ludwigia alternifolia</i>	Seed box	S 1-12oz/ac	H	FACW
<i>Nelumbo lutea</i>	American Lotus	T 125/ac	H	OBL
<i>Nuphar spp.</i>	Pond Lilly	R 125/ac	H	OBL
<i>Nymphaea spp.</i>	Water Lilly	T 125/ac	H	OBL
<i>Panicum spp.</i>	Panic Grass	S 6oz/ac	H	FAC-FACW
<i>Peltandra spp.</i>	Arrow Arum	T 125/ac	H	OBL
<i>Polygonum spp.</i>	Smart Weed	R,S 125,5lb/ac	H	FACW-OBL
<i>Pontederia cordata</i>	Pickereel Plant	BRP 125/ac	H	OBL
<i>Potamogeton spp.</i>	Pondweed	T 125/ac	H	OBL
<i>Sagittaria spp.</i>	Arrow Head	T 125/ac	H	OBL
<i>Scirpus spp.</i>	Rush	S 4oz/ac	H	FACW-OBL
<i>Silphium perfoliatum</i>	Cup Plant	S 1-12oz/ac	H	FACW
<i>Solidago spp.</i>	Goldenrod	S 1-12oz/ac	H	FAC
<i>Venonia spp.</i>	Ironweed	S 1-12oz/ac	H	FAC-FACW
Herbaceous Species: Forested Buffer (Upland)				
6 Species <i>MINIMUM</i> – Upland buffers and forested areas will receive a native mix of grasses and forbs.				
<i>Agrostis hyemalis</i>	Winter Bent Grass	S 2lb/ac	H	FAC
<i>Asclepias spp.</i>	Milkweed	S 1-8oz/ac	H	FACU
<i>Coreopsis tinctoria</i>	Plains Coreopsis	S 8oz/ac	H	FACU
<i>Dalea purpurea</i>	Purple Prairie Clover	S 8oz/ac	H	NI
<i>Elymus spp.</i>	Wild Rye	S 2lb/ac	H	FAC
<i>Festuca Paradoxa</i>	Clump Fescue	S 5lb/ac	H	FAC
<i>Festuca subverticillata</i>	Nodding Fescue	S 5lb/ac	H	FACU
<i>Rudbeckia hirta</i>	Blackeyed Susan	S 8oz/ac	H	FACU
<i>Schizachyrium scoparium</i>	Little bluestem	S 1lb/ac	H	FACU
<i>Solidago canadensis</i>	Canadian Goldenrod	S 1-8oz/ac	H	FACU
<i>Trifolium reflexum</i>	Buffalo Clover	S 8oz/ac	H	NI
<i>Tridens flavus</i>	Purple Top	S 1lb/ac	H	UPL

WETLAND VEGETATION PLANTINGS: Both emergent and upland plant communities should be established as soon as practicable following wetland construction activities. Plantings are to consist of native and non-invasive obligate and facultative wetland species, taking advantage of nearby seed banks and natural recruitment sources for more resilient and diverse vegetative establishment. Selected herbaceous species should be hand-seeded within the outer edge of all newly created wetland areas. Herbaceous seed mix should be designed for wetland use and include species presently located on-site (such as miscellaneous sedges (*Carex sp.*), rushes (*Juncus sp.*), and miscellaneous grasses (*Panicum sp.*)). Herbaceous seed mixes should not be spread into standing water (if present) but rather broadcast into the outer perimeter and transitional zones.

PLANS FOR CONTROL OF EXOTIC VEGETATION AND SEEDLING DAMAGE FROM WILDLIFE: Seed mixtures and seedlings would be obtained from known and reputable seed houses and nurseries and should be limited to the species referenced herein unless the qualified professional recommends additional native or non-invasive species. Only non-invasive species should be planted in the mitigation areas. Invasive exotic species that may be encountered during construction or subsequent inspections would be eradicated as practicable. Potential methods of herbicide treatment include directed foliar sprays, stem injection, cut treat (stumps), basal sprays, and soil spots.

TABLE 21 lists the invasive/exotic species as determined by the Corps Louisville District in their 2017 Louisville District Mitigation Guidelines which will be controlled in the if present at the mitigation areas in southern Indiana.

TABLE 21 **INVASIVE/EXOTIC SPECIES**

Species	Common Name
Autumn olive	<i>Elaeagnus umbellata</i>
Common reed	<i>Phragmites australis</i>
Kudzu	<i>Pueraria montana</i>
Reed canarygrass	<i>Phalaris arundinacea</i>
Russian olive	<i>Elaeagnus angustifolia</i>

From experience in replanting reclaimed areas, young seedlings planted in areas such as these can be subject to damage from predation from deer, field mice, and particularly, voles. Voles will burrow under the bare root seedlings and eat the roots crippling the seedlings. Raptor perches could be employed to control the rodent population across the mitigation sites both on-site and off-site.

ELEVATIONS AND SLOPES: The elevations and slopes of the mitigation sites would be established as a function of the baseline conditions and the post-project reclamation. Minor adjustments would be expected to be necessary when reestablishing the impacted channels into functional streams, as the post-project regrade will differ in certain areas. As such, post-project surveys will be conducted as necessary prior to the channel reestablishment and establishment process to establish desired flow directions, gradients, and elevations.

SEDIMENT/EROSION CONTROL: Hay bales, filter fence, sumps, dewatering dikes, and/or other types of temporary controls would be used as needed to maintain prudent sediment/erosion control during all phases of construction. Access shall be maintained to all structures; and accumulated sediment shall be removed and cleaned from basins as needed. Temporary erosion control measures would be kept in place and maintained until such time as appropriate vegetative cover is established and the likelihood of further site disturbance becomes minimal. Best management practices would be employed throughout the mitigation project activity.

WORK PLAN DETAILS: PRIOR TO (OR CONCURRENT) OFF-SITE WETLAND RESTORATION:

General work plan details for the Squaw Creek Mitigation Area and the Lake Drain Mitigation Area can be found in the respective compensatory mitigation plans attached the application. In general,

- Vegetation will be established as soon as practicable following wetland construction activities;
- Plantings are to consist of native and non-invasive obligate and facultative wetland species, taking advantage of nearby seed banks and natural recruitment sources for more resilient and diverse vegetative establishment;
- Herbaceous seed mix should be designed for wetland use and include species presently located on-site (such as miscellaneous sedges (*Carex sp.*), rushes (*Juncus sp.*), woolgrass (*Scirpus sp.*), and miscellaneous grasses (*Panicum sp.*));
- Overall, the establishment of diverse emergent vegetation of non-invasive and native obligate and facultative wetland species is a primary goal;
- All plantings would follow the specifications and methods described above and in the respective compensatory mitigation plans; and
- Timing for completion of the off-site wetland restoration areas is to be within two (2) years following permit issuance. Nursery stock availability will be the limiting factor if completion needs to extend into the next year.

WORK PLAN DETAILS: POST-PROJECT ON-SITE WETLAND ESTABLISHMENT:

Overburden and parting removal will be accomplished with a combination of dozers, loaders, hydraulic shovels and haul trucks in a direct haul back operation. Once vegetation and soils have been removed as required, the overburden and parting will be blasted and either hauled or pushed into the previously excavated pit. Backfilling and rough grading will typically be completed within 180 days of pit completion. Spoil generated by the initial cut development will be placed to the south in a permanent spoil disposal area. Spoil swell from the advancing pit will be placed in the spoil disposal area during mining in order to maintain appropriate post-mine elevations for restoration of the wetland mitigation. An estimated 10 million cubic yards will be placed in the designated disposal area.

The areas mined will be backfilled and graded to blend with the surrounding area to approximate the pre-mine contours and complement drainage patterns. Since blending to surrounding terrain is required, this swell will be distributed out of the Mining Area Addition onto the existing active permit area where there may be an increase in elevation within the upland areas. Even with this increase, approximate original contour as defined by 312 IAC 25-1-12 will be achieved. The reclaimed surface configuration will be similar to pre-mining with some rounding and lengthening of slopes and filling and/or flattening of some valleys. Drainage patterns will approximate pre-mining patterns

- The general location of the proposed wetland establishment sites is shown on **MAP C – ON-SITE MITIGATION MAP** in **APPENDIX A**;
- Wetland creation work would coincide with the proposed post-project, on-site stream channel establishment and reestablishment efforts;
- Overall, the wetland would be configured to be flat and mimic the existing floodplain;

- Spoil will be graded and compacted and the subsoil grading should be conducted to facilitate an appropriately heterogeneous topography which would promote the hydroperiods necessary to support various wetland plant species;
- The final (upper) soil layer of the wetland should be about 12 to 18 inches in depth. If a source of (non-wetland) hydric soil is not available, organic additives (such as humus or manure) may be introduced to the topsoil layer to promote sufficient water retention, infiltration, and wetland plant growth;
- Vegetation will be established as soon as practicable following wetland construction activities;
- Plantings are to consist of native and non-invasive obligate and facultative wetland species, taking advantage of nearby seed banks and natural recruitment sources for more resilient and diverse vegetative establishment;
- Herbaceous seed mix should be designed for wetland use and include species presently located on-site (such as miscellaneous sedges (*Carex sp.*), rushes (*Juncus sp.*), woolgrass (*Scirpus sp.*), and miscellaneous grasses (*Panicum sp.*));
- Overall, the establishment of diverse emergent vegetation of non-invasive and native obligate and facultative wetland species is a primary goal; and
- All plantings would follow the specifications and methods described above; and

OBJECTIVES: This wetland mitigation area will be developed in the flood-prone area of Pigeon Creek and the on-site stream mitigation. The streams and wetlands will interact hydrologically during periods of overbank flooding. Overbank flooding will occupy the floodplain to service the adjacent wetlands. Overflow will be trapped and stored on the floodplain where it will be filtered and metered back into the streams to help drive a more intermittent stream flow regime. The ultimate goal of the project is to restore a self-supporting riparian system that is well-developed in target native vegetation for the reestablishment and support of clean water and high-quality habitat. This mitigation focuses on restoring an on-site, forested wetland.

HYDROLOGY: The combination of the following two sources will provide frequency and duration optimal to support temporarily flooded condition.

RUNOFF: RETENTION RATIO: The 80.00-acre PFO wetland establishment area will receive laminar upland runoff from a cumulative minimum total of ~2,100 acres as well as being supplied by 2,500 acres of catchment. This gives a runoff to retention ratio of 31:1, an above average range for wetland sustainability. According to research studies regarding nutrient cycling in wetlands, wetlands with low watershed to wetland area ratios have greater storage capacities and longer retention times, therefore being more effective in removing nutrients. For optimum wetland nutrient cycling and vegetation support, designs should aim for watershed to wetland area ratios between 15 and 20:1. Additional overbank flooding from Pigeon Creek will increase the ratio.

OVERBANK FLOODING: This site receives overbank flooding from Pigeon Creek. The stream establishment and reestablishment will occur on a frequency and spatial distribution specific for development of the wetland mitigation. A statistical evaluation of the flooding frequency of Pigeon Creek within the proposed project area was evaluated based on flow measurements from the USGS gage on Pigeon Creek at US 41 in Evansville, Indiana. It was determined that the 2% flow is approximately the same elevation as the stream banks and would roughly correspond to the "bank full" value. The 1% and 0.5% values were above the bank elevation indicating overbank flooding would occur. The HEC-RAS analyses indicates that overbank flooding through the project area would be expected to occur on approximately 2 to 7 days per year.

An initial 565 acres of runoff enters the primary stream mitigation constructed from the north. This water will help maintain saturated conditions during base flow and lend to overbank flooding during rain events. Cumulative watershed total leaving the site is approximately 2,100 acres.

WORK PLAN DETAILS: POST-PROJECT ON-SITE STREAM ESTABLISHMENT AND REESTABLISHMENT:

OBJECTIVES: The overall goal of compensation measures (after avoidance and minimization) is to offset and restore stream functional value lost or impacted as a result of project impacts. For stream impacts, this goal would be accomplished by the on-site reestablishment and establishment of jurisdictional stream channels in the post-mine reclamation.

Mitigation objectives include the following:

- Design and perform all stream mitigation work such that the established and reestablished channels would exhibit pattern, profile, dimension, substrate composition, in-stream structure, and habitat feature similar to pre-project configuration, appropriate reference reach data, channel configuration and dimensions based upon appropriate hydraulic calculations, natural stream channel design techniques, and/or reference reach data, as applicable;
- Reestablished and established mitigation streams should maintain definable bed and bank, with an ordinary high-water mark and normal surface flow consistent with the targeted flow regimes;
- Proposed stream mitigation, at maturation, should result in an overall net gain in functions and values as demonstrated by post-mitigation versus pre-project RBP assessment scores (i.e., maturity versus baseline);
- Provide site protection for the stream mitigation and associated PFO wetland for the duration of the monitoring period and thereafter to prevent the mitigation area(s) from being disturbed except by those activities that would not adversely affect the intended extent, condition, and function of the mitigation areas by the use of deed restrictions or conservation easements; and
- Perform monitoring, management, and maintenance of the mitigation sites for ten (10) years following final completion of the mitigation work.

REFERENCE: This process is derived from a scientific approach to natural channel design. All design parameters are based on optimum reference conditions throughout the region. Channel sizing is based on the watershed area of the stream. Channel area is derived from regional curve data and sized for an approximate 1.25-year return interval. Channel area is applied to a specific width/depth ratio. All other design parameters are set by dimensionless ratio to either width bankfull (W_{bkt}) or depth bankfull (D_{bkt}).

INSTRUCTIONS: Stream construction will occur in a watershed that is well-vegetated and stable.

SURVEY AND DESIGN: With a well-established valley/floodplain, a survey will be conducted. This information will be used to generate a site-specific design. This survey will be included with the as-built construction in the first annual monitoring report.

LAYOUT AND CONSTRUCTION: The channel will be laid out on the ground with flags or directly dug with a track hoe utilizing GPS. The basic channel will have a set size (width and depth) that increases as the stream moves down valley. Sinuosity will increase as slope decreases. The base channel will be excavated to the correct dimensions. Excavation will be conducted to be a precise cut with minimal peripheral disturbance with limited

overdigging. Careful consideration will be given when tying into natural areas. Only dig a section of channel long enough that it can be completed in a reasonable time frame. In the absence of flowing water, begin at the top. Wet channels are usually best built from the bottom up and may require upstream plugs and pumping.

RIFFLE SECTIONS: Riffles are the straight, sloping sections of a trapezoidal channel where flowing water has a broken surface. Riffles serve as the main function of grade control. Therefore, these features must be resistant to scouring during high velocity flows which is integral to preventing head cuts. The design and installation of riffle structures varies with slope:

C-CHANNEL (0 - 1.3% SLOPE): Riffle structures consist of the appropriately sized rock (gravel, cobble, etc.) as determined by shear-stress and velocity calculations and past experience.

B-CHANNEL (1.3 - 3% SLOPE): Riffle structures consist of a log(s) keyed across the channel and/or appropriately sized rock (gravel, cobble, etc.) as determined by shear stress and velocity calculations and/or past experience.

POOL CONSTRUCTION: Pools occur in the curved sections of a stream and are approximately two (2) times deeper than the riffles. The main purpose of pools is energy dissipation. The bank slope of an outside bend is approximately 2:1. The face of the outside bend serves to turn high velocity flowing waters and is subject to erosion. The slope of the inside bend is approximately 6:1 and is an area of sediment deposition. These two slopes come to a single low point in the bottom of the pool.

GLIDES AND RUNS: These sections make the transition between riffles and pools. They gradually change the shape of the channel from a shallow trapezoidal riffle to a deeper triangular pool and then back up to a trapezoidal riffle.

VANE ARMS AND ROOT WAD REVETMENTS: Log vanes are installed in the run sections. Vanes dissipate energy and redirect water into the center of the channel. Root wad revetments are installed in the glide sections where they deflect water off the outside bend and toward the head of the next riffle. Refer to **APPENDIX F** for installation details.

EXCESS MATERIAL: A berm should be shaped to prevent overland sheet flow from entering the stream in the vicinity of any outside bend. After sufficient backfilling around structures, excess material shall be graded out evenly across the floodplain without affecting the streams access to the floodplain.

SEED AND FERTILIZE: Apply lime, fertilizer, and seed to exposed stream banks. Refer to **TABLE 19** for species and rates.

EROSION CONTROL AND ROCK PLACEMENT: These materials are sized according to the streams shear stress and velocity. It is the corner of the riffles along the toe of the stream bank that are most susceptible to erosion. The following process protects these areas and minimizes failure:

EROSION CONTROL BLANKETS: The lower edge of the blanket should extend out onto the bottom of the raw channel approximately 0.5 feet beyond the toe of the bank. The upper edge of the blanket will extend up the side slope towards the top of bank. Standard blanket size is approximately 7.5 feet. For very large channels with side slopes greater than 7.5 feet, the blankets should be overlapped downstream similar to shingles and pinned on intervals ≥ 1 yd².

RIFFLE ROCK: With blankets installed, rock can be placed. Rock should be placed to create a slightly concave channel bottom with the rock a bit deeper along the toe of the banks.

RIPARIAN BUFFERS: When final stream construction is complete the riparian area should be seeded. Apply amendments, prepare a good seedbed, and plant seed according to the **TABLE 19**. Tree planting should only occur after the stream has established good bank vegetation and is stabilized for at least one growing season. Stream maintenance activities will damage riparian trees if planted too early.

VEGETATED BUFFERS: Either in the form of riparian buffers or PFO wetland, linear forested features will be established adjacent to all mitigation streams. The widths vary according to flow regime: 50 feet from top of bank out for ephemeral and 100 feet from top of bank out for intermittent and perennial. These minimum required widths measured from the outside bend of a stream to the nearest adjacent land use. Bare root seedlings (BRS) will be planted at 300 seedlings/acre. See the **TABLE 20** for a list of tree species to be planted as riparian buffer.

MONITORING STATIONS: Stream mitigation monitoring stations will be set at intervals according to criteria provided in the section entitled As-Built Construction, Monitoring, Maintenance, and Success Criteria.

All streams impacted by mining or related impacts will be mitigated in length at the rates found on the table above with a natural channel design including a woody riparian buffer. Riparian buffers will be either 50 feet on each side of the ephemeral streams extending from the top of bank out perpendicular to the stream for a total of 100 feet or 100 feet on each side of the intermittent and perennial channels extending from the top of bank out perpendicular to the stream for a total of 200 feet.

Enhancements will consist of riparian buffers with predominately hard mast-producing species, (and persimmon species for wildlife), expanded sinuosity, engineered structures to stabilize the streams, reduced entrenchment, replacement of Rosgen “G” or “F” channels with typically “C” or “E” channels. Pre-mining Rosgen “G” and “F” channels are eroded and incised streams which have been down cut. When the stream is mitigated the channel is typically replaced with a natural design Rosgen “C” or “E” channel and adjacent floodplain.

Rosgen Level II and III characteristics have been measured in the field for the existing intermittent streams and these can be found in **APPENDIX B** with the locations shown on **MAP B – EXISTING CONDITIONS** in **APPENDIX A**. These classifications describe the existing geometry of the stream and provide a basis for the natural design stream mitigation.

The natural design stream mitigation that will be constructed will be primarily Rosgen “C” or “E” channel types. These designs will best retain the type and frequency of aquatic habitats that currently exist on-site and will provide similar stability and energy. “C” channel types are found in well-developed floodplains with a channel slope of 2% or less. The term “enhanced floodplain” is used to indicate that the post-mine floodplain width will be increased over the pre-mine floodplain width. A critical element for successful “C” and “E” channel type stream mitigation is access to its floodplain and floodplain storage. “C” channel types have riffle/pool morphology where the pool-to-pool spacing is linked to the meander geometry of the stream and is on average one-half the meander wavelength or approximately 5 to 7 bankfull widths. “E” channels consist of a series of riffle/pool reaches that generate the highest number of pools per unit distance of channel due to the increased sinuosity. The pool-to-pool spacing is proportional to the channel slope and bankfull width. Specific channel type details can be found on **MAP G – ON-SITE STREAM MITIGATION DETAILS** in **APPENDIX A**.

Structure placement for habitat improvement and channel stability will vary depending upon the channel slope, flow conditions, and the reach’s degree of curvature and employ enhancement structures found in **APPENDIX F: CHANNEL STABILITY/HABITAT IMPROVEMENT MEASURES**. Root wads will be placed on the concave bank of meander bends centering around the apex of the curve. Log vanes/j-hook vanes will be spaced depending on the pattern of constructed pools. For stream mitigation with slopes less than 4%,

one engineered riffle structure will be placed at a minimum of every 6 meanders in the crossovers. These designs will best retain the type and frequency of aquatic habitats that currently exist in the streams and will provide similar stability and energy. The replacement design for existing natural design channels employs width to depth ratios, entrenchment ratios, and sinuosity ratios similar to, or better than, the current conditions. Replacement of trees, cultivation of diverse vegetation, and other enhancements that control erosion and runoff will enhance the quality of the existing stream and riparian habitats. Migration of aquatic species will come from downstream locations to ensure no loss in the gene pool of native species.

The proposed mitigation will consist of stream creation with enhancements which will include access to the constructed floodplain; constructing appropriately designed channels; installation of instream structures that will allow for aquatic habitat, as well as provide erosion and grade control; and planting riparian vegetation to provide stability along the banks. Such improvements are intended to promote a positive biological response within the stream's aquatic communities. All of the final mitigated streams will be designed to handle their respective drainage areas and will be measured for success by incorporating the principles for a stable stream channel as developed by Dave Rosgen. The Natural Channel Design stream restoration process uses a regional curve that the Applicant and Stantec Consulting Services, Inc. developed which characterizes relationships for bankfull stream dimensions (cross-sectional area, width, and mean depth) as well as discharge based on drainage area. Stantec Consulting Services, Inc. developed the mini-regional curve for southern Indiana (and for use in neighboring Illinois Basin states) by identifying appropriate stream reaches with good bankfull indicators, conducting geomorphic assessments, and developing geometric relationships (bankfull cross-section geometry vs. drainage area; inner berm cross-sectional area vs. drainage area). A report entitled *Mini-Regional Curve Development Southern Indiana*³⁰ was developed for the Applicant to assist in the correct identification of bankfull dimensions, particularly in incised channels and to be used for stream restoration or creation designs. This report was provided in the original DA permit application (LRH-2018-738). Added benefit comes with the selective planting of predominately hard mast-producing tree species, added structure to the streams, and constructed access to a floodplain.

The Applicant uses proven stream reclamation practices that quickly restores streams to pre-mine conditions or better. Several studies were provided in the original DA permit application (LRH-2018-738) that demonstrates successes of the Applicant. The studies include were the following:

- Report for Fish and Macroinvertebrate Sampling for Bioassessment Monitoring of West Fork Busseron Creek, 2010;
- Freshwater Mussel Survey Results West Fork Busseron Creek Mitigation Area Farmersburg, Indiana, 2011;
- Indiana Headwater Streams – Habitat and Bioassessment Survey in Coal Mine Reclaim Areas, 2011.

6.0 PROJECT SUCCESS AND PERFORMANCE STANDARDS

PROJECT SUCCESS: Since the Applicant would be the legal holder of the §404 authorization, the Applicant (or its successor in interest in the event of a permit transfer, assignment, or sale) would retain full responsibility related to the success of the mitigation project and the payment of any monies required to achieve success or implement any required remedial measures. While the Applicant would be responsible for the mitigation project, actual construction and/or supervision activities may be contracted out. Outside consultants and/or other qualified professionals may similarly be utilized or retained to serve as advisors and visit the site as necessary to assure the approved mitigation plan is implemented and carried out as proposed.

PERFORMANCE STANDARDS: Performance standards are critical components of any compensatory mitigation plan. These performance criteria describe measurable attributes that can be used to evaluate success in meeting the goals and objectives of a compensatory mitigation. Performance standards describe a desired state, threshold value, amount of change, or trend to be achieved for a particular population or habitat characteristic. In some cases, these performance criteria may set limits on the extent of undesirable change.

Performance standards serve two distinct purposes. Performance standards are used to guide site management activities during the monitoring period and serve as benchmarks measured during the final year of monitoring that are used to help evaluate compliance with regulatory requirements.

To be effective, performance standards must be measurable, meaningful, and achievable. A direct connection must also be evident between these performance standards and the goals and objectives of the mitigation project.

STREAM PERFORMANCE STANDARDS: Success of the compensatory mitigation plan is proposed to be measured by comparison to the following criteria and standards. The following are the performance standards for the stream mitigation areas and associated forested buffers:

- Upon final site reclamation following mining activity, achieve successful establishment and reestablishment of a minimum of 2,802 linear feet of jurisdictional intermittent streams on-site at the Seven Hills – Mining Area Addition;
- Established and reestablished streams must develop and maintain definable bed and bank with an ordinary high-water mark in order to meet the definition of waters of the U.S. under the Regulatory Program regulations;
- Each stream channel would be vertically stable, neither aggrading nor degrading and connected to the floodplain;
- Storm water run-off must remain in the mitigation stream channels and not outside the channels unless the storm event exceeds the natural capacity of the stream channels;
- There must be little change in as-built cross sections. If changes do take place, they must be evaluated to determine if they represent a movement toward a more unstable condition (e.g., downcutting or erosion) or a movement toward increased stability (e.g., settling, vegetative changes, deposition along the banks, or decrease in width/depth ratio). Cross sections will be classified using the Rosgen Stream Classification System, and all monitored cross sections will fall within the quantitative parameters defined for channels of the design stream type;
- The pools must remain deep, with flat water surface slopes, and the riffles must remain steeper and shallower than the pools. Bedforms observed must be consistent with those observed for channels of the design stream type;

- The established and reestablished streams would develop and maintain normal surface flow generally consistent with the targeted flow regime and be at least as strong as proposed or stronger;
- Each stream mitigation area would exhibit a surface water connection to a tributary system of the U.S.;
- Constructing and maintaining the mitigation stream sites with sufficient stability, morphological characteristics and habitat features to promote a progressive increase in aquatic habitat and aquatic diversity - as evidenced by an increasing RBP score over the applicable monitoring period:
 - Achieving by the end of the prescribed monitoring period, for the post-project stream mitigation, minimum composite RBP habitat assessment score of 115 for the intermittent mitigation reach.
- Water must flow above ground when present in the established and reestablished stream channels;
- Intermittent stream mitigation shall achieve benthic macroinvertebrates communities and the mIBI consistent with or better than the average baseline provided in the mitigation plan for those streams previously studied of the same flow regime;
- Intermittent mitigation shall achieve water chemistry consistent with or better than average baseline data provided in the mitigation plan for those streams previously sampled of the same flow regime;
- Intermittent mitigation streams would be surrounded by a 200-foot forested buffer (a minimum 100-foot wide along each stream side);
- For streams constructed in forested wetlands, the forested buffer would be allowed to overlap the wetland acreage;
- a minimum of 400 native, live and healthy (disease and pest free) woody plants per acre will be present at the end of the monitoring period;
- a minimum of six (6) native tree species are planted within the forested buffer with each of these six (6) species representing at least 5% of the overall tree count;
- a minimum of four (4) native shrub/sub-canopy species are planted within the forested areas, and each of these four (4) species represents at least 5% of the overall shrub/subcanopy tree count;
- a minimum of 25% of all live trees planted consist of at least four (4) species having Coefficient of Conservatism values between five (5) and ten (10) as found in the Final Report for ARN A305-4-53 entitled *Floristic Quality Assessment in Indiana: The Concept, Use, and Development of Coefficients of Conservatism* by Paul E. Rothrock, PhD dated June 2004;
- a temporal photographic log indicating the forested buffers are maturing and a canopy is establishing;
- Achieve 70% coverage for ground cover with no one single species exceed 40% of the mitigation unit at the end of monitoring;
- Non-native, invasive species coverage would not exceed more than 10% of the mitigation unit at the end of monitoring, including cattails;
- Beneficial volunteer species not on the list of planted species may be maintained on site with Corps Hunting District approval; these include hard mast, soft fruit, pollinators, erosion control, etc.

- Provide site protection for the mitigation sites (streams and wetlands) and forested buffers for the duration of the monitoring period and thereafter to prevent the mitigation areas from being disturbed except by those activities that would not adversely affect the intended extent, condition, and function of the mitigation areas – including the use of conservation easements and/or restrictive covenants; and
- Perform monitoring, management, and maintenance of the mitigation sites for ten (10) years following completion of the mitigation construction.

WETLAND PERFORMANCE STANDARDS: Success of the compensatory wetland mitigation plan is proposed to be measured by comparison to the following criteria and standards. Wetlands are considered successful when the minimum required acreage of wetland meets the criteria listed below. The following are the performance standards for the wetland mitigation areas:

- Prior to (or concurrent with) initiation of project activities, successfully completing restoration of 119.54 acres of palustrine forested wetlands and 28.84 acres of forested buffer associated with the Squaw Creek Mitigation Area;
- Prior to (or concurrent with) initiation of project activities, successfully completing restoration of 34.73 acres of palustrine forested wetlands and 9.61 acres of forested buffer associated with the Lake Drain Mitigation Area;
- Upon final site reclamation following mining activity, achieve successful establishment of a minimum of 80.00 acres of PFO wetlands;
- With all intended wetland areas both establishment or restoration, based on the Midwest Regional Supplement, the soil will be saturated within twelve (12) inches of the surface or inundated for at least fourteen (14) consecutive days during the growing season;
- Hydrophytic vegetation is considered successful when more than 50% of the dominant species from all strata are OBL, FACW, or FAC.
- Palustrine forested wetlands must have:
 - a minimum of 400 native, live and healthy (disease and pest free) woody plants per acre (of which at least 200 are tree species with at least 3 inches in diameter at breast height (i.e. 55 inches)) will be present at the end of the monitoring period;
 - a minimum of six (6) native tree species are planted within the forested areas, and each of these six (6) species represents at least 5% of the overall tree count;
 - a minimum of four (4) native shrub/sub-canopy species are planted within the forested areas, and each of these four (4) species represents at least 5% of the overall shrub/subcanopy tree count;
 - a minimum of 25% of all live trees planted consist of at least four (4) species having Coefficient of Conservatism values between five (5) and ten (10) as found in the Final Report for ARN A305-4-53 entitled *Floristic Quality Assessment in Indiana: The Concept, Use, and Development of Coefficients of Conservatism* by Paul E. Rothrock, PhD dated June 2004;
 - A minimum of six (6) herbaceous species will be planted;
 - Achieve 70% coverage for ground cover with no one single species exceed 40% of the mitigation

unit at the end of monitoring;

- Non-native, invasive species coverage would not exceed more than 10% of the mitigation unit at the end of monitoring, including cattails;
 - Beneficial volunteer species not on the list of planted species may be maintained on site with Corps Huntington District approval; these include hard mast, soft fruit, pollinators, erosion control, etc.
- Each wetland mitigation area would exhibit a connection to Waters of the U.S;
- Temporal photographic log indicating the wetlands are maturing and a canopy is establishing for the palustrine forested wetlands;
- Provide site protection for the mitigation wetlands for the duration of the monitoring period and thereafter to prevent the mitigation areas from being disturbed except by those activities that would not adversely affect the intended extent, condition, and function of the mitigation areas – including the use of conservation easements or restrictive covenants; and
- Perform monitoring, management, and maintenance of the mitigation sites for ten (10) years following completion of the mitigation construction.

7.0 SITE PROTECTION

The site protection plan will consist of two components: 1) the real estate instrument for site protection and 2) the long-term steward. In summary, the Applicant is proposing a combination of deed restrictions and conservation easements for the mitigation areas, to be placed on the sites after performance standards have been met and prior to release from monitoring. The Applicant is also proposing establishment of an endowment and designation of a long-term steward after performance standards have been met and prior to release from monitoring. However, the Applicant will also actively pursue a transfer of the mitigation sites to a suitable Federal or State agency as an alternative. This is a more sustainable plan for management of the sites and provides equivalent or better long-term protection. In the event the Applicant is successful in transferring the sites to a Federal or State agency, neither the 1) real estate instrument for site protection nor the 2) the long-term steward and associated endowment will be necessary and will not be pursued further by the Applicant.

The following discussion provides justification for the site protection plan as described above:

SITE PROTECTION BACKGROUND: Per the Mitigation Rule, long term protection may be provided through real estate instruments such as 1) conservation easements held by a third-party entity, 2) transfer of title to such entities, or 3) deed restrictions. The Applicant prefers using deed restrictions for required site protection of jurisdictional features. The use of conservation easements and third-party stewards is a significant cost and effectively a taking of land. It is the Applicant's view that conservation easements should not be mandated and should only be on a voluntary basis with appropriately valued mitigation credit. Conservation easements are most often held by a third-party 501(c)(3) nonprofit organization. This action significantly reduces the value of the private property as well as adding a high cost to the permittee to secure a suitable party and fund potential work unnecessarily into perpetuity. The cost is even higher when the potential third party is aware the area is being mandated through the issuance of a 404 permit. This action is further complicated and costly when the third party is required to be secured prior to mitigation construction and monitoring.

Introduction of a third-party into the mitigation process makes the successful placement of a conservation easement dependent on the timing of recording. During the mitigation monitoring and reporting period, the Applicant is constantly gauging the success of the mitigation construction and adjusting management practices to ensure the site is progressing towards success. It is not practical to introduce a third-party that is responsible for the sites' long-term protection during this period for the following practical and legal reasons. It has been the Applicant's experience that the well-established third parties are reluctant to accept the responsibility of a conservation easement prior to proving performance standards are being met. This is because the conservation easement makes the third party legally responsible for a site that, during the period of monitoring and reporting, is nothing more than a tract of land that shows potential to be a conservation site. Once the Applicant is able to prove success with performance standards and receives Corps concurrence, long term protection with a third party can much more easily be secured.

Additionally, involving a third party during the monitoring and reporting period unnecessarily complicates the ability of the Applicant to conduct the monitoring and maintenance that may be necessary to meet performance standards. The conservation easement restricts access to the site and severely limits the management practices that can be performed. Further, conservation easements often require approval of management plans from multiple parties before activities can be performed. This encumbers the site management during the period of monitoring and reporting due to conflicts between the conservation easement restrictions and any needed repair, maintenance, and monitoring tasks that need to be performed. These conflicts would either need to be ignored or additional time and resources would need to be spent to abide by the terms. Neither of these options are suitable business practices.

The mitigation site receives equivalent protection during the period of monitoring and reporting without a conservation easement in place. The Applicant and monitoring consultants visit the mitigation area several times during the year to evaluate and conduct monitoring and maintenance activities. These onsite visits are equivalent

or better than what would be required of a conservation easement holder. The Applicant is also incentivized for ongoing site protection during this period from a cost perspective to prevent additional maintenance and monitoring costs.

Placement of a conservation easement on a mitigation site prior to meeting success standards also complicates and prevents potential future transfer to state and federal agencies. It is the Applicant's belief that title transfer to a state or federal entity provides the most sustainable protection from a long-term management standpoint and this opportunity needs to be available until the site is ready for to be released from monitoring. At the point of release from monitoring, the state and federal agencies can properly assess the site and provide their interest in acquiring the properties. Indiana Department of Natural Resources has expressed interest in obtaining the Applicant's mitigation sites in the future.

As was discussed above with third parties, a mitigation area that has not proven to be successful inherently brings liability and reduced value to state and federal agencies that are responsible for conservation of natural resources. This makes it difficult to transfer a mitigation area prior to proving mitigation success. Furthermore, application of a conservation easement prior to transfer to these agencies complicates the transfer and/or sale of the property by severely restricting the owners' rights. The Applicant's internal and external counsel have warned against the placement and removal of conservation easements on lands due to the legal complexities it presents.

A recent example of successful mitigation transfer to state and federal conservation agencies can be seen in the 2024 transfer of 3,950 acres of forests, marshland, and upland habitat to the Indiana Department of Natural Resources. This included off-site stream and wetland mitigation associated with Bear Run Mine, DA authorization LRL-2011-1117-gjd. These areas were transferred through a collaboration with the Conservation Law Center and its Southern Indiana Sentinel Landscape initiative, The Conservation Fund, and The Nature Conservancy and created the Busseron Creek Fish and Wildlife Area. State and federal agencies involved with the transfer and site protection included Indiana Department of Natural Resources, U.S. Fish and Wildlife Service, and the U.S. Navy. In this instance, the restrictive covenants of conservation, i.e. deed restrictions, were put in place upon review and agreement by the responsible agencies and after the mitigation had met performance standards and been deemed successful. The Applicant wants to preserve this option for similar land transfers for Applicant-owned mitigation areas.

The Applicant will first seek transfer to a state or federal agency for long-term protection. If the land is not adequately protected via transfer to government entities, the Applicant will place conservation easements on company-owned mitigation properties if required at that time. The conservation easement will be placed prior to release from monitoring and meeting permit obligations. Designation of the long-term steward will occur at that same time. However, for the reasons explained above, the Applicant cannot put the conservation easement and long-term steward in place prior to impacts or even early in the mitigation process.

SITE PROTECTION DETAILS: Post construction, the perimeters of the sites will be posted with permanent signage on a line-of-site interval, and access roads will be closed to restrict unauthorized entry. Following construction of the mitigation and for the duration of the prescribed monitoring period, the Applicant will protect the wetland mitigation and buffer areas and will effectively retain the duties of the long-term land steward during this time. During the monitoring and maintenance period, the Applicant is onsite several times annually and is familiar with the site layout and risks associated with adjacent land uses. The Applicant will patrol against trespass or site encroachment during this time. During this time there is no reason for designation of a separate third-party land steward. When it is determined that the site is meeting all performance standards and is ready for release from further monitoring, the Applicant will pursue transfer to a State or Federal agency as the first option, as was explained above. In the event the site cannot be transferred to a conservation agency and application of real estate instruments and designation of a long-term steward must be pursued, the Applicant will complete the following steps.

The Applicant will search out available 3rd party land management holders. The Applicant will consult with these entities to confirm that the conservation easements and deed restrictions can be recorded without precluding or

interfering with the future management of the site. If it is feasible to apply a combination of conservation easements deed restriction to these properties, draft documents would be submitted for review and approval by the Corps Huntington District. Following Corps approval, the documents will be recorded in the Warrick County clerk's office. If any real estate instruments cannot be secured for the site, the Applicant will describe their efforts to apply the real estate instruments and what prevented the instruments from being utilized. Long term protection will be placed prior to release from monitoring and meeting permit obligations. **TABLE 22** depicts the acres of protection by the type of site protection that can currently be provided as of July 2025.

TABLE 22 SITE PROTECTION SUMMARY TABLE

Site	Site Protection Type	(acres)
Seven Hills On-Site Mitigation Area	Conservation Easement	46.59
	Deed Restriction, unless it can be purchased	33.41
Squaw Creek Mitigation Area	Conservation Easement	203.00
Lake Drain Mitigation Area	Conservation Easement	54.67

As previously noted, the proposed limits of site protection could vary in width, due to the proposed width of the riparian zone, property constraints, and proximity to other mitigation and existing easements or rights-of-way. Site protection will encompass the mitigation unit (i.e. wetland, stream, and the associated riparian area) and will be recorded following Corps Huntington District review and approval of the instrument language and prior to release from performance monitoring. A sample template of the conservation easement can be found in **APPENDIX C**.

An endowment for long-term management will be fully funded and deposited into a non-wasting account prior to mitigation success and release from monitoring. This account will be transferred, as part of the management agreement, to a third-party long-term steward (to monitor and perform maintenance in perpetuity). The endowment will position the long-term steward to complete responsibilities with the interest earned from the funded account.

It will be the responsibility of the long-term steward to field review the entire mitigation site(s) annually in order to document encroachments, conservation easement signage vandalism and/or replacement, and deviations or compliance with the as-built report. A report documenting these findings will be submitted to the Corps Huntington District by July 15th every other year for a 10-year period following the closure of the 10-year monitoring period. After the 10-year period, the sites will be inspected every five (5) years. In addition, this report will identify any proposed adaptive measures to resolve encroachments, vandalism and/or deviations from the as-built report. All adaptive measures will be coordinated and approved by this office in advance of performing such measures.

In the event the Applicant is successful in transferring the mitigation areas to a State or Federal agency, site protection instruments would need to be removed prior to finalization of the property transfer and the long-term steward endowment dissolved. These instruments unnecessarily preclude and/or limit the State or Federal agency's management activities. However, State or Federal ownership of the site ensures an equivalent level of protection as a Conservation Easement and Long-Term Steward. The Applicant requests that site protection instrument requirements be relaxed in order to facilitate successful transfer of these areas to the agency.

8.0 MITIGATION SITE MANAGEMENT AND MAINTENANCE PLAN

SITE MANAGEMENT: The Applicant proposes to consult with the Corps Huntington District or other knowledgeable professionals prior to and during the proposed mitigation work. Once the initial mitigation work is acceptably completed, the mitigation site and riparian buffer area would be clearly marked and delineated by signage or flagging tape. Access roads into the site would, to the extent practicable, be made impassable to unauthorized vehicles. Site management during the monitoring period and thereafter will consist of complying with the terms of the real estate instrument primarily including post and patrol against trespass or encroachment. This patrol will occur at least annually as the site is being monitored.

The mitigation areas, as depicted on **MAP A – OVERALL PROJECT LOCATION MAP** in **APPENDIX A**, would be monitored for ten (10) years following mitigation construction and completion. The Applicant or its designee would inspect the mitigation site at least annually throughout the monitoring period.

MAINTENANCE PLAN: Maintenance should be minimized by installing the initial work plan in a comprehensive and professional manner. Maintenance thereafter should be limited so as to allow the planned ecological condition to develop naturally over time. Stream and bank stability would be monitored and any significant structure failures would be repaired as soon as practicable, considering flow and seasonal constraints. Erosion control materials used for construction should be comprised of biodegradable materials and intended to be left in place to decompose naturally. Any equipment or materials entering the site should be free of invasive/exotic propagules. Fertilizer and hand broadcasted seed should be used to bolster bare areas or areas at risk of erosion. Erosion control and replanting requiring powered equipment should be conducted in a manner most minimally invasive as practical. Invasive/exotic species should be removed by hand as practical, or by mechanical, chemical or fire control as necessary. This removal should be conducted so as to minimize damage to desirable vegetation. If predation on woody plantings becomes an issue, then mowing will be used to reduce top cover for rabbits and voles and raptor perches may be installed. All vegetation will be installed in the season most conducive to establishment. If dry conditions occur, then irrigation may be used on planted trees. Failed tree plantings in isolated zones will be replanted mechanically or manually. Low densities occurring as a mosaic throughout the site will be replanted by hand. No structures are proposed at any of the sites.

Should any unforeseen conditions, catastrophic events, or circumstances which are beyond the control of the Applicant arise or which otherwise adversely impact the mitigation project, the Applicant should promptly notify the Corps Huntington District as to what, if any, course of action should be taken. Refer to **PARTS 9 and 10** of this **COMPENSATORY MITIGATION PLAN** for further detail.

9.0 **MONITORING**

MONITORING: The Applicant would be responsible for monitoring of the compensatory mitigation project, although it may retain qualified professionals and/or consultant(s) to assist in performing specific monitoring functions. Monitoring will be conducted in order to 1) document project successes, and 2) identify failures for which an adaptive management plan must be implemented. Channel stability, stream functions, benthic macroinvertebrates, water quality, and vegetation survival will be monitored for ten (10) years following the completion of construction. If the Corps Huntington District determines all performance standards are met and are fully expected to remain at levels predicted at the end of the monitoring period, the Applicant may request reduction of monitoring period. In no circumstance would this monitoring period be reduced below five (5) years.

WETLAND MONITORING REQUIREMENTS: This section details the various assessments, sampling, and equipment to be used to conduct wetland monitoring.

STATIONING AND DATA: Wetland monitoring consists of one permanent data station per 10 acres of mitigation wetland. Station monuments will be iron t-posts covered with white PVC pipe. Monitoring wells with data loggers will be used to verify wetland hydrology. Further details about wells are found below in the paragraph titled Hydrology. Delineation for the purpose of verifying mitigation success is according to the most current version of the 1987 Manual and Midwest Regional Supplement (ERDC/EL TR-10-16, August 2010).

SOILS: Verification of hydric soils will be conducted by on-site observation of field indicators per the NTCHS (National Technical Committee on Hydric Soils: *Field Indicators of Hydric Soils in the United States*, NRCS current version). However, growing substrates used in wetland mitigation may not develop field indicators due to parent material, location, chemistry, time, or other reasons according to the NTCHS. In such cases, other techniques will be used to verify hydric soils. These include appropriate scientific means to detect the presence of reducing conditions.

COLORIMETRIC: If a minimum amount of iron is present in the parent material, then reduction may be documented with the use of alpha, alpha-dipyridyl (2, 2'-dipyridyl). When saturated by groundwater and wetted with 2,2'-dipyridyl, a reagent used for the detection of iron, 60% of a layer at least 4-in thick within the upper 12" must turn pink or red within 30 seconds.

IRIS TUBES: Reducing conditions may be detected and reported in with the installation of nests of Indicator of Reduction In Soils (IRIS) tubes. IRIS tubes are PVC pipes coated with iron oxides. When placed in reducing conditions, during the growing season, soil microbes will reduce this coating as they respire and oxidize organic matter resulting in removal of the coating. Anaerobic conditions exist within the sampled area when three (3) out of the five (5) installed tubes have iron removed from 30% of a zone 15-cm (5.9-in) long, beginning within 15-cm (5.9-in) of the soil surface for all soils (NTCHS 2015).

ELECTROCHEMICAL: Reducing conditions may be detected with the use of Copper/Cadmium soil probes and reported in terms of -eH. When employed, these probes are inserted into the soil at a data station, allowed to equalize, then calibrated and measured with an -eH meter. Reduction may also be detected within the interstitial water column inside of the groundwater monitoring wells. In this case, a calibrated probe is inserted and measured with an -eH meter. In either method, readings less than zero indicate reduction.

VEGETATION (INCLUDING FOREST BUFFERS): Dominant species will be recorded on the wetland data form. Success is contingent on a minimum amount of a specific assemblage of trees and shrubs. The use of field indicators is limited to circumstances approved by the Corps Huntington District. Sampling methods for verifying successful establishment of hydrophytic vegetation are detailed below.

BARE ROOT SEEDLINGS: Tree and shrub saplings from the species list previously supplied at a rate of 520 stems per acre at the off-site restoration sites and 880 stems per acre for the on-site mitigation area. A minimum of six tree species and four shrub species will be planted. A circular sampling plot with a twenty (20) foot radius is centered on the monument. Stems are recorded by species and used to calculate Coefficient of Conservatism (CC) ratings and percent survival.

HERB STRATA: A circular sampling plot with a five (5) foot radius is centered on the monument. Vegetation is assessed to determine the dominant species according to the 50/20 rule.

HYDROLOGY: Field indicators are documented on the wetland data form. The supplement is not limited to only those indicators listed therein and affords the use of other evidence when supported with appropriate documentation. Verification of wetland hydrology may include the use of electronic data loggers installed in screened wells. These devices should be employed in conjunction with ACOE ERDC TN-WRAP-05-02 including a complete installation log.

STREAM MONITORING REQUIREMENTS: This section details the various assessments, sampling, and equipment that will be used to conduct stream monitoring.

STATIONING AND DATA: Stream monitoring will consist of one permanent data station per 500 linear feet of restored intermittent stream. Station monuments are iron t-posts covered with white PVC pipe. Streams will be assessed at the head of riffle. Data collected at each station includes documentation of length, flow regime, a defined bed and bank with an ordinary high-water mark, Rosgen channel dimensions, vertical and lateral stability, riffle and pool profile depths, and USEPA RBP assessment.

FORESTED BUFFER: Riparian vegetation will be monitored according to DNR protocol for assessing the survival of woody vegetation. Monitoring consists of one permanent station per ten (10) acre management unit. Station monuments are iron t-posts covered with white PVC pipes. Data consists of photos and survival calculations as detailed below.

TIMING: The monitoring period is for ten (10) years or when performance standards are met. Annual reports are due to the Corps Huntington District by December 31st for that year's monitoring. As-built reports are due with the 1st annual report. Unless specified otherwise, all monitoring is conducted during the growing season. **TABLE 23** denotes monitoring schedule that will be followed. The 1987 USACE Wetland Delineation Manual defines "growing season" as the portion of the year when soil temperature (measured twenty (20) inches below the surface) remains above biological zero (5°C or 41°F). Estimated starting and ending dates for the growing season are based on 28° F air temperature thresholds at a frequency of 5 years in 10 (HQUSACE 1992). According to the Weather Underground website, the First/Last dates ≤ 28°F for the last five years in Boonville, Indiana was estimated to be March 8 through November 20 and approximates the local frost-free period, i.e. growing season.

TABLE 23 MONITORING SCHEDULE

Mitigation Type	Spring Monitoring Season	Fall Monitoring Season
Wetlands	Visual Monitoring with Photodocumentation	Complete and Photodocumentation
Streams	Complete and Photodocumentation	Visual Monitoring with Photodocumentation

AS-BUILT REPORT: As-built drawings will be furnished to the Corps Huntington District within 60 days of completion of construction showing the location and configuration, as well as all pertinent dimensions and elevations of each project component authorized under this Section 404 Clean Water Act Department of the Army permit. If construction spans over multiple years, annual as-built drawings showing increment progress over the preceding year will be submitted in conjunction with the annual monitoring report.

In the as-built report, topographic maps will be submitted showing as-built contours of the mitigation areas (i.e. streams, riparian areas, and upland buffer areas) which have been approved as compensatory mitigation. The location of plantings and other installations or structures shall be indicated on the maps.

As-built channel surveys will be conducted to document the dimension, pattern and profile of the stream mitigation areas. Permanent cross-sections will be established during this survey for use during future monitoring surveys. At a minimum, two (2) permanent cross-sections will be established in each stream mitigation area. The locations will be selected to represent approximately 60% of the pool habitat, 30% of the riffle habitat, and 10% of the step habitat. The as-built surveys will include photographic documentation at cross-sections and structures, and a plan view diagram.

At the wetland mitigation areas, as-built surveys will be conducted to document the topography to one-foot contours, any inlet/outlet structures, and the location and extent of the designed plant community types. Within each community type, the survey will show the species planted. There will also be a soil profile description and the actual measured organic content of the topsoil. This will be included in the first monitoring report and in subsequent reports if there are grading, soil modifications and/or additional plantings of different species in subsequent years.

ANNUAL MONITORING REPORTS: The mitigation monitoring period will commence after the first growing season following completion of the mitigation project. The mitigation sites will be monitored for a minimum period of ten (10) years.

Annual evaluations will be performed to determine whether the mitigation efforts are on track to meet performance standards, to allow for mid-course adjustments, and to report on any unanticipated benefits or problems as a result of the monitoring program. The information accumulated through this process will be used to adjust strategy periodically on the basis of what has been learned.

Monitoring reports will be submitted to and received by the Corps Huntington District by December 31 of each year following the first full year of completion of the mitigation area and be included with LRH-2018-00738-OHR Compensatory Mitigation Monitoring Report.

Annual monitoring reports must include details sufficient for an inspector to determine compliance with performance standards and to identify any required remedial actions. The reports must include the information outlined in the enclosed Corps Regulatory Guidance Letter No. 08-03 and titled *Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Creation, Restoration, and/or Enhancement of Aquatic Resources*. Additionally, the reports must include the following information:

PHOTOGRAPHS: An adequate number of fixed observation points will be selected, with no fewer than three (3) fixed observation points throughout each mitigation area, to provide representative overviews of each. The observation points will be marked on the base map, and the use of stakes with unique numbers is recommended. Additionally, photograph points of areas of interest within each mitigation area will be marked on the base map and provided in each monitoring report. Color photographs will be taken from the observation points, documenting conditions from the same position and angle during the growing season of each annual mitigation monitoring.

VEGETATION MONITORING: The location and name of each plant community type within the 100-foot buffer zone of each stream mitigation area must be marked on a scaled drawing or scaled aerial photograph (base map) and named. The dominant plant species must be visually determined in each vegetation layer of each community type, and the scientific names of these species must be provided. Species, diameter at breast height, vigor, dominance and stem count data must be collected and graphed over time for the plant communities within each mitigation area.

WETLAND SOIL MONITORING: Verification of hydric soils will be conducted by on-site observation of field

indicators per the National Technical Committee on Hydric Soils: Field Indicators of Hydric Soils in the United States, NRCS current version. Appropriate scientific means to detect the presence of reducing conditions include colorimetric, Indicator of Reduction In Soils (IRIS) tubes, and electrochemical.

WETLAND HYDROLOGY MONITORING: Monitoring wells with data loggers will be used to verify wetland hydrology. Delineation for the purpose of verifying mitigation success is according to the most current version of the Corps' 1987 Manual and Midwest Regional Supplement (ERDC/EL TR-10-16, August 2010)

HABITAT, GEOMORPHIC, ECOLOGICAL AND BIOLOGICAL ASSESSMENTS: The data and supporting forms collected as part of the Rosgen Stream Classification System will be provided during monitoring years 1, 3, 5, 7 and 10. The data and supporting forms will be provided annually for the following assessments: EPA's RBP, Rosgen classification, IDEM's macroinvertebrate Index of Biotic Integrity, and IDEM's Fish Index of Biotic Integrity, if required.

The as built and annual monitoring reports will be provided to the Corps Huntington District at the following address either through submittal on compact disc or requesting a link through Department of Army's file share portal:

ADDRESS: Huntington District
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, WV 25701

ATTENTION: Energy Resources Section

REFERENCE: Seven Hills Mine LRH-2018-00738-OHR Compensatory Mitigation Monitoring Report

ON-SITE MEETINGS / INSPECTION BY DISTRICT ENGINEER: The Applicant will arrange an on-site meeting with the Corps Huntington District during the growing season following submittal of the first (1st), third (3rd), fifth (5th), seventh (7th), ninth (9th) and tenth (10th) year reports for the mitigation areas. The purpose of the meeting is to determine if the mitigation areas are functioning as expected.

FINAL REPORT AND SITE INSPECTION: Following submittal of the 10th year monitoring report, a determination of the mitigation success will be made by the Corps Huntington District.

RELEASE FROM MONITORING: If the performance standards have been achieved, the Applicant will be released from future monitoring requirements. However, if success criteria have not been adequately met, the Applicant may be required to implement contingency measure(s), including additional mitigation, to ensure compensation adequately offsets the loss of waters in association with the proposal as determined in the sole discretion of the District Engineer.

- Monitoring may be extended for a longer period if completed mitigation is not functioning as predicted in the compensatory mitigation plan.
- Additionally, the Applicant will purchase credits from an approved mitigation bank/in-lieu fee program and/or provide alternative permittee-responsible mitigation as determined by the Corps Huntington District in the event the District Engineer determines that additional mitigation and monitoring would not ensure adequate compensation for impacts to waters of the U.S. The Applicant assumes the primary financial responsibility for the implementation of the aforementioned mitigation requirements, and also for any corrective measures determined to be necessary.

10.0 ADAPTIVE MANAGEMENT PLAN

Success of the mitigation project depends largely on the ability to respond to changing conditions and circumstances. Portions of the proposed mitigation work is to take place upon completion of the project activity, which is several years hence. Site conditions within the mitigation area could change during this time, necessitating changes or modifications in the work plan in order to achieve the specific stream and wetland restoration goals.

Any minor revisions or recommendations for change should be incorporated by the Applicant into the mitigation work plan and reported to the District Engineer along with submission of the as built report as discussed in **SECTION 11.0 LONG-TERM MANAGEMENT**. Should any significant changes in the mitigation work plan or site selection be recommended or deemed necessary, the Applicant should promptly notify the District Engineer and consult with the Corps Huntington District as to the appropriate course of action to be taken. Should it be determined that the original mitigation goals cannot practicably be met, the Applicant shall prepare and submit an alternate compensatory mitigation plan for consideration by the District Engineer.

With respect to the post-restoration monitoring period, if annual performance criteria are not met for all or a portion of the mitigation area for two consecutive reporting periods, or if the stream mitigation areas are not developing as originally stated or anticipated in the approved mitigation plan, or if final success criteria are not met: the Applicant shall prepare an analysis of the cause(s) of failure and after consultation with the District Engineer, propose and implement contingency or remedial action as reasonably necessary - which may include the performance of additional mitigation work.

If the Applicant has executed the mitigation plan as authorized and mitigation goals are being achieved, but in unanticipated ways - or if the initially selected performance criteria are found to be inappropriately reflecting the success of the project - the Applicant may propose alternate performance criteria or measures of success. The District Engineer may approve such alternate performance criteria or measures of success, based upon sound evidence submitted on behalf of the Applicant, although the Applicant would bear responsibility to adequately justify any such request.

Should any unforeseen condition(s), catastrophic event(s), or circumstance(s) which are beyond the control of the Applicant arise or adversely impact the mitigation project, the Applicant will promptly notify the District Engineer and consult as to what, if any, course of action should be taken. If the Applicant has executed the mitigation plan as authorized and failure to meet a performance criteria or final success is deemed to be the result of conditions, circumstances, or events beyond the control of the Applicant or which could not have been reasonably foreseen, remedial measures may not necessarily be required by the District Engineer.

In the event actual impacts resulting from the project activity are less than anticipated and authorized, the Applicant may, subject to the prior approval of the District Engineer, offset the required mitigation work to be performed by recalculating project debits and pursue suitable replacement mitigation opportunities on-site, off-site, in-lieu fee, or through a mitigation bank. Alternately, should the Applicant ultimately be successful in restoring more jurisdictional stream or wetland than is required to offset the impacts of the project activity, the Applicant may request that any such "credits" may be used to offset any of the mitigation requirements for the Seven Hills Mine or adjacent other Department of the Army Section 404 authorizations.

The Applicant is committed to the successful completion of the proposed mitigation plan. The permit requires formal annual monitoring for the duration of the mitigation construction and proof of success periods. As with any reclamation/mitigation obligation, the Applicant conducts internal informal monitoring to allow early detection and correction of potential problems. It is anticipated that a reasonable period of time will be needed to allow vegetative and soil stability to establish within the mitigated waters and the contributing watershed. Corrective action will be taken as needed to promote successful mitigation as quickly as possible. It is anticipated that any deficiencies will be corrected during the monitoring and maintenance process outlined in the permit application;

however, **TABLES 24, 25, and 26** provide a decision-making guide in considering mitigation plan changes should the need arise.

TABLE 24 WETLAND MITIGATION ADAPTIVE MANAGEMENT ACTION TABLE

Wetland Mitigation			
Component	Critical Time	Root Cause Analysis	Potential Corrective Actions
Tree survival below approved success standard	Any annual evaluation	Conduct physical and chemical soil analyses Evaluate damage from wildlife Evaluate vegetative competition	Adjust physical and/or chemical soil components and replant Utilize natural predator techniques to deter damage from wildlife Increase safe application of herbicides to reduce vegetative competition
Lack of wetland hydrology indicators	Following 3 rd year of annual monitoring	Obstructions or watershed alterations Evaluate ground water recharge status Evaluate surface water contributions	Eliminate obstructions Allow additional time for recharge Direct additional surface runoff to wetland
Lack of hydric soil indicators	Following 3 rd year of annual monitoring	Evaluate actual depth to hydric soil Evaluate flow detention time within wetland Coordinate causal analysis with hydrological factors	Allow additional time for hydric soil development Construct flow obstructions to increase detention time within wetland Direct additional surface runoff to wetland
Increasing presence of invasive species	Any annual evaluation	Evaluate needs for chemical and/or physical removal of species Evaluate other potential contributing factors	Remove invasive species by physical or chemical means Adjust other contributing factors if possible.
Too much wetland hydrology	Following 3 rd year of annual monitoring	Excess saturation that causes detriment to tree mortality and growth	Evaluation of field tiles

TABLE 25 STREAM MITIGATION ADAPTIVEMENT MANAGEMENT ACTION TABLE

Stream Mitigation			
Component	Critical Timing	Root Cause Analysis	Potential Corrective Actions
Recurring channel instability issues	Following 3 rd year of annual monitoring	Evaluate quality and quantity of vegetation Evaluate structure placement and frequency Evaluate stability of contributing watershed	Replant additional vegetation species and supplement soil fertility Install additional structures to improve stability Stabilize watershed as appropriate
Aquatic life not trending toward permit standard	Following 4 th year of annual monitoring	Evaluate need for additional habitat enhancements Evaluate extent of weather impacts (temperature, precipitation, etc.)	Install habitat enhancements as needed Allow additional time for development
Insufficient stream hydrology	Following 4 th year of annual monitoring	Evaluate for insufficient hydrology	Adjust elevations or install water management structures to achieve appropriate conditions, i.e. creating floodplain depressions to hold water and/or blocking the existing channel to create a series of floodplain ponds and/or directing surface runoff to the head of the stream via terrace construction.

TABLE 26 FORESTED BUFFER ADAPTIVEMENT MANAGEMENT ACTION TABLE

Forested Buffers			
Component	Critical Timing	Root Cause Analysis	Potential Corrective Actions

Tree survival below success standard	Any annual evaluation	Animal damage Vegetative competition Physical and chemical soil analyses	Utilize natural predator techniques to deter damage from wildlife Increase safe application of herbicides to reduce vegetative competition Adjust physical and/or chemical soil components and replant
Increasing presence of invasive species	Any annual evaluation	Evaluate needs for chemical and/or physical removal of species Evaluate other potential contributing factors	Remove invasive species by physical or chemical means Adjust other contributing factors if possible.
Prolonged erosion or soil instability	Following 3 rd year of annual monitoring	Evaluate herbaceous species density Analyze the reclaimed watershed for contributing factors	Supplement soil and/or vegetative species to increase ground cover Construct additional erosion control features within the reclaimed watershed

At the off-site wetland restoration areas, tile removal is a key component of the restoration plan. Tile removal will consist of trenching across the laterals on intervals sufficient to prevent groundwater flow paths from higher elevations to lower elevation within the site. As the tile are exposed in the bottom of the trenches they will be capped and then backfilled. Inlet risers will be removed and the tiles will be capped in these locations also. On those locations without tile maps, removal will begin by trenching at the inlet and outlet ends, and also at sinkhole locations. If a pattern is discovered, then the network will be disabled as described above. Otherwise, each line will be followed to its terminus. Exploratory trenches will be cut as necessary. All tile excavation will be mapped with high-accuracy GPS to maintain a record of the plugging. In the event that disabling as described above does not yield the desired result in a location, this record will be referenced so as to develop an Adaptive Management Plan for additional tile removal. The GPS file will allow for precise excavation in order to minimize impacts to any trees that may be established on the site at that time.

In some instances, if field tiles from adjacent property owners tie into the mitigation area network, attempts will be made to perpetuate those tiles in enclosed piping so as not to impact the adjacent landowners.

ADAPTIVE MANAGEMENT PLAN (AMP) FOR SECONDARY EFFECTS TO AVOIDANCE AREA

This AMP addresses potential direct effects to the water quality of Pigeon Creek as a result of the mining process. Potential direct effects include:

- Effects to aquatic life from mining discharges; and
- Adverse changes to the aquatic community structure as a result of mining discharges.

This AMP addresses potential direct effects to the water quality of Pigeon Creek as a result of mining discharges and secondary effects as a result of the mining excavation. Potential direct and secondary effects include:

- Direct impacts on aquatic life as a result of mining discharges;
- Adverse changes in the aquatic community's health and structure as a result of mining discharges;
- Interruption of flow in streams adjacent to the mining;
- Isolation of streams or wetlands from Pigeon Creek flood waters; and
- Dewatering of streams and wetlands adjacent to the excavation and potential effect on aquatic life.

These direct and secondary effects are extensively addressed in the Section 404 application, the Section 401 application, and the SMCRA Permit. The Applicant's analysis of direct and secondary effects concluded that effects will be minimal based on:

- Water from the watershed above the planned excavation will be routed by diversion to the areas below (east of) the excavation;
- NPDES basins will route treated water from the disturbance to sediment basins on the primary Seven Hills project area;
- There will be a minimum 400-foot buffer of low permeability strata left undisturbed between the excavation and Pigeon Creek thus preventing significant interaction with Pigeon Creek;
- Pigeon Creek seldom floods at this site because of the dredging and straightening of Pigeon Creek and the levee currently in place. However, waters from the occasional flood events will still be able to access the buffer area and flanks of the excavation;
- Seepage calculations indicate that the drawdown resulting from the excavation will remain within the planned disturbance area, not effecting adjacent undisturbed wetlands or streams. (See **SECTION 404 PROJECT INFORMATION NARRATIVE**); and
- Empirical evidence from other area mining sites with similar geology do not exhibit secondary effects. In some cases, these mining sites were adjacent to important wetlands with only a 100 to 150-foot buffer as opposed to the minimum 400-foot buffer to be maintained for the subject site.

The plan will evaluate the hypothesis that significant direct and secondary effects beyond the proposed disturbance area will not be significant. Further, the plan provides a path to assure appropriate compensatory mitigation if the hypothesis is wrong and direct or secondary effects do occur.

11.0 LONG-TERM MANAGEMENT

Long-Term Management of the mitigation areas would be the responsibility of the Applicant, or in the event of permit transfer or sale, its successors or assignees. Nonetheless, unless otherwise provided for in the approved compensatory mitigation plan (or an ultimately approved Department of the Army permit), once success criteria have been verified by the District Engineer and monitoring requirements have been satisfied as described herein, the Applicant would have no further site management responsibilities.

United Minerals Company, LLC will be, by default, responsible for the long-term management of the project until a suitable, third-party land steward has been identified and approved by the Corps Huntington District. Any subsequent transfer of responsibilities under this long-term management plan to a different land manager shall be requested by the Long-Term Steward in writing to the Corps Huntington District and require written approval. The Sites will be protected through a site protection instrument. The Long-Term Steward will be responsible for funding and managing the site on a permanent basis, in accordance with the terms and conditions outlined below.

To date, discussions have occurred with Indiana Department of Natural Resources regarding the agency's interest in becoming the Long-Term Steward of the mitigation properties as many of the properties are adjacent to or nearby to their existing managed properties. The mission of the Indiana Department of Natural Resources is to protect, enhance, preserve, and wisely use natural, cultural, and recreational resources for the benefit of Indian's citizens through professional leadership, management, and education. Outdoor recreation and land management programs are housed within the land Management Team which consists of State Parks; Nature Preserves; Land Acquisition; Fish and Wildlife; Outdoor Recreation; and Forestry. Indiana Department of Natural Resources is interested in providing this service at the appropriate time in the future; however, they cannot make the commitment at this time.

In regard to the potential Long-Term Stewards for both the on-site and off-site mitigation areas, **TABLE 27** displays the prime potential stewards based on the location of the tract to nearby managed areas.

TABLE 27 **POTENTIAL LONG-TERM STEWARDS**

Mitigation Sites	Adjacent Managed Areas	Potential Long-Term Stewards
On-Site at Seven Hills Mine	Lost Hill Wetland Conservation Area	Indiana Department of Natural Resources
Squaw Creek Mitigation Area	Lost Hill Wetland Conservation Area	Indiana Department of Natural Resources
Lake Drain Mitigation Area	Little Pigeon Creek Wetland Conservation Area	Indiana Department of Natural Resources

A long-term management plan (LTMP) provides a description of how the mitigation area(s) will be managed after the sites' performance standards have been achieved, to ensure the long-term sustainability of the resource, including long-term financing mechanisms and long-term management responsibilities. The overall goal of long-term management is to foster the long-term viability of the sites, and any covered species and/or habitat(s), while defending the easement which is in place. Routine monitoring and minor maintenance tasks are intended to assure the viability of the sites.

Periodic monitoring will occur once every other year for the first ten (10) years after the site has closed, as the site will have already achieved its success criteria as outlined in CMP and be well on its way to maturity. After the first ten (10) years, monitoring requirements will be conducted every five (5) years until release from monitoring. If the Long-Term Steward needs to enforce the easement or restrictive covenants, or encounters any easement or restrictive covenant violations, they will notify the Corps Huntington District of such issues, and of the eventual resolution of those issues. While it is not anticipated that major management actions will be needed, an objective of this LTMP is to conduct monitoring to identify any issues that arise, and to use adaptive management to determine what actions might be appropriate. Those chosen to perform monitoring activities will have the knowledge, training, and experience to accomplish such responsibilities.

Adaptive management means an approach to natural resource management which incorporates changes to management practices, including corrective actions as determined to be appropriate by the Corps Huntington District in discussion with the Long-Term Steward.

The responsibilities of the Long-Term Steward will include the following:

- **PERIODIC PATROLS:** Walk-through surveys will be conducted to qualitatively monitor the general condition of the sites. Notes to be made may include observations of species encountered, water quality, general condition of wetlands and streams, general vegetation cover and composition and any occurrences of significant erosion, structure failure, or invasive species establishment. The report should provide a discussion of any recent significant changes in the watershed. The frequency and requirements of periodic patrols may be modified by the Corps Huntington District at the request of the Long-Term Steward.
- **INVASIVE SPECIES MONITORING:** The walk-through survey will include a quantitative assessment (e.g. visual estimate of cover) of potential or observed non-native invasive species.
- **SIGNAGE:** All site boundaries shall be marked with a metal post which reads “Stream and Wetland Conservation Area” or something appropriate to discourage casual trespass while allowing necessary access. During each site visit, notes will be made as to the condition of signs, crossings, and property boundaries. Recommendations to implement repair or replacement of signage, crossings, or property boundary markers will be made, if applicable.
- **IN-STREAM STRUCTURES:** All in-stream structures will be visually monitored during each monitoring event. Any major erosion or failure of the in-stream structures will be noted and remedial actions recommended if needed.
- **TRASH AND TRESPASS:** During each site visit, occurrences of trash and/or trespass will be noted. Trash will be removed and any necessary measures to prevent or repair damage from vandalism and trespass impacts will be taken.
- **RIGHT TO INSPECTION:** The Corps Huntington District shall have the right to inspect the sites and take actions necessary to verify compliance with this Long-Term Management Plan. The Long-Term Management Plan herein shall be enforceable by any proceeding at law or in equity or administrative proceeding by the Corps Huntington District. Failure by any agency (or owner) to enforce the LTMP contained herein shall in no event be deemed a waiver of the right to do so thereafter. If the Long-Term Steward fails to adhere to the requirements within the LTMP, the Corps Huntington District may request a new Long-Term Steward.
- **ENFORCEMENT:** The Long-Term Steward shall be responsible for the enforcement of the terms of the Site Protection Instrument.
- **REPORTING:** The mitigation monitoring period will commence after the first growing season following completion of the mitigation project. The mitigation sites will be monitored for a minimum period of ten (10) years. Annual monitoring reports must include details sufficient for an inspector to determine compliance with performance standards and to identify any required remedial actions. The reports must include the information outlined in the enclosed Corps Regulatory Guidance Letter No. 08-03 and titled *Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Creation, Restoration, and/or Enhancement of Aquatic Resources*.

12.0 FINANCIAL ASSURANCE

United Minerals Company, LLC, as permit holder (or in the event of a permit transfer or sale, its assignee or successor in interest), accepts full financial responsibility for implementation of the compensatory mitigation plan including the construction, maintenance, and monitoring through release from further monitoring. The financial assurance is proposed to ensure a high level of confidence that the compensatory mitigation project would be successfully completed, in accordance with applicable performance standards.

For on-site mitigation proposed by this permit within the Seven Hills Mine SMCRA permit boundary, the Corps Huntington District will be provided a copy of the SMCRA permit confirming that the Indiana Department of Natural Resources Division of Reclamation has incorporated the on-site compensatory mitigation plan into the SMCRA permit. The Applicant will apply for or request a Phase III bond release of the surety bond(s) for the Seven Hills Mine, executed in favor of the IDNR, until the Corps Huntington District has released the permittee from monitoring requirements for the on-site compensatory mitigation.

To provide a cost estimate for the on-site mitigation, **TABLE 28** incorporates the approximate construction and monitoring costs associated with establishing 80.00 acres of PFO wetlands and 2,802 linear feet of intermittent streams on-site following reclamation. These costs are based on recent works conducted by the Applicant. Financial assurance will not be provided for this amount. This is to provide a summation of the total cost to the Applicant as it uses permittee-responsible compensatory mitigation.

TABLE 28 ON-SITE CONSTRUCTION COST ESTIMATE

Construction Component	Component Description	Units		Unit Cost		Years	Total Cost
Mobilization	Staging equipment	-	setup	-	/setup		-
Grading	Excavation & filling of drainages	-	cubic yards	-	/cubic yard		-
Plug Field Tile	Destroying field tile network	-	acres	-	/acre		-
Tree & Shrub Planting (680 trees/acre & 200 shrubs/acre)	Tree & shrub stock, fertilizer, & planting	80.00	acres	\$1,100.00	/acre		\$88,000
Herbaceous Vegetation	Wetland mix, fertilizer, & planting	80.00	acres	\$600.00	/acre		\$48,000
Miscellaneous Labor	Surveying & flagging boundary	40	hours	\$50.00	/hour		\$2,000
Maintenance & Mowing	Mowing & invasive control	80.00	acres	\$60.00	/acre/year	5	\$24,000
Annual Monitoring	Wetland monitoring	80.00	acres	\$300.00	/acre/year	10	\$240,000
Remedial Actions	Isolated replanting, wildlife control, hydrologic modifications	80.00	acres	\$50.00	/acre/year	10	\$40,000
Stream Construction	Excavation, erosion control matting, stream structures	2,802	feet	\$10.00	/foot		\$28,020
Maintenance	Stream structure repair & erosion repair and protection	2,802	feet	\$2.50	/foot/year	2	\$14,010
Annual Monitoring	Stream monitoring (Rosgen & biological)	2,802	feet	\$1.00	/foot/year	10	\$28,020
Remedial Action	Regrading & hydrologic modifications	2,802	feet	\$0.50	/foot/year	10	\$14,010
Site Protection	Plats, title work, & recording fees	1	each	\$16,000	/each		\$16,000
	Construction Subtotal						\$542,060
Land Replacement		80	acres	\$10,000	/acre	1	\$800,000
							\$1,342,060

The construction costs for the on-site wetland and stream mitigation is estimated to be \$542,060. There is no cost for the grading and excavation as that is part of the reclamation costs. No field tile will be present.

TABLE 29 summarizes the total costs to construction, maintain, and monitoring the compensatory mitigation for the Seven Hills – Mining Area Addition which totals, 234.27 acres of PFO wetland restoration, 38.45 acres of

forested buffer restoration, and 2,802 linear feet of intermittent streams across three (3) mitigation areas: Squaw Creek, Lake Drain, and on-site following mining.

TABLE 29 SEVEN HILLS – MINING AREA ADDITION OVERALL MITIGATION COSTS

Activity	Total Cost	Construction	Maintenance	Monitoring	Monitoring/Year
On-Site Mitigation	\$1,342,060	\$166,020	\$38,010	\$268,020	\$26,802/yr
Squaw Creek Mitigation	\$821,786	\$249,942	\$118,704	\$445,140	\$44,514/yr
Lake Drain Mitigation	\$244,604	\$74,112	\$35,472	\$133,020	\$13,302/yr
Total:	\$2,408,450	\$490,074	\$192,186	\$846,180	

For other off-site mitigation required by this permit which are discussed in their separate mitigation plans, the permittee shall provide a non-cancelable surety bond(s) in the amount as indicated in **TABLE 30**, to the Corps Huntington District. Reduction of bond amounts are conditioned upon the permittee's achievement of the listed milestone(s) as determined by the District Engineer in his/her sole discretion. Such bond or any approved replacement bond(s) will remain in full force and effect for a period of ten (10) years from the effective date of this permit, or until the sites are released by the Corps upon successful completion of the off-site mitigation, whichever is longer. The surety bond(s) must include a clause that ensures the Corps Huntington District will receive notification of any insolvency or bankruptcy of the surety.

TABLE 30 SEVEN HILLS – MINING AREA ADDITION OFF-SITE MITIGATION AREA BOND AND RELEASE SCHEDULE

Milestone	Reduction	Revised Penal Sum
Initial off-site financial assurance	\$000,000	\$1,066,390
Completion of physical construction (grading), planting and As-built report – 75.0%	\$799,793	\$266,597
Interim performance standards per DA Authorization – 12.5%	\$133,299	\$133,298
Final performance standards met per DA Authorization – 12.5%	\$133,298	\$000,000



United Minerals Company, LLC
566 Dickeyville Road
Lynnville, IN 47619
(812) 922-1015

September 15, 2025

Evan White
Wetlands and Stormwater Section, Office of Water Quality
100 North Senate Avenue, Room 1255
Indianapolis, IN 46204

RE: UNITED MINERALS COMPANY, LLC SEVEN HILLS MINE
Indiana Department for Natural Resources SMCRA Permit No. S-00357
U.S. Army Corps of Engineers (USACE) Section 404 Permit LRH-2018-00738-OHR-Pigeon Creek
IDEM No.: 2018-628-87-JWR-A
County: Warrick
Permit Modification Request – Mining Area Addition

Dear Mr. White:

Please find enclosed a complete copy of the Section 404 application for the modification of the Seven Hills Mine Department of Army Permit LRH-2018-00738-OHR-Pigeon Creek as well as the Section 401 application for modification of Water Quality Certification (WQC) No.: 2018-628-87-JWR-A for authorization to discharge dredged or fill material to waters of the state. These applications are for the proposed discharge of dredged and/or fill material into waters of the United States (US) in conjunction with the construction of infrastructure including a temporary levee, and the overburden removal, bituminous coal extraction, and reclamation of a 69.63-acre area. Coal extraction within this area will add over 1.5 million tons of coal and 1 year of mine life to the Seven Hills Mine, which is nearing the end of the coal reserve. Without the mine area addition, Seven Hills Mine will exhaust the coal reserve in 2027 placing a significant economic hardship on UMC.

As such, UMC requests the modification request be processed under the Emergency Processing Procedures for Activities Subject to Executive Order 14156 (National Energy Emergency).

Should you have any questions or require additional information, please feel free to contact me at 812-922-1046.

Sincerely,

James Boswell
Authorized Representative

Enclosures

cc: Seven Hills Mine, USACE File (1x)

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SEP 19 2025

IDEM/OWQ



**APPLICATION FOR AUTHORIZATION TO DISCHARGE DREDGED
OR FILL MATERIAL TO ISOLATED WETLANDS AND/OR
WATERS OF THE STATE**

State Form 51821 (R2 / 11-15)

Indiana Department of Environmental Management

- INSTRUCTIONS:** 1. Read the instruction sheet before filling out this form.
2. You must complete all applicable sections of this form

1. Applicant Information		2. Agent Information	
Name of Applicant United Minerals Company, LLC		Name of Agent	
Mailing address (Street/ PO Box/ Rural Route, City, State, ZIP Code) 566 Dickeyville Road Lynnville, Indiana 47619		Mailing address (Street/ PO Box/ Rural Route, City, State, ZIP Code)	
Daytime Telephone Number 812-922-1015		Daytime Telephone Number	
Fax Number 812-922-1066		Fax Number	
E-mail address (optional) jboswell@peabodyenergy.com		E-mail address (optional)	
Contact person (required) James Boswell		Contact person	
3. Project / Tract Location			
County Warrick County		Nearest city or town Elberfeld	
U.S.G.S. Quadrangle map name (Topographic map) Elberfeld 7.5 minute Quadrangle		Project street address (if applicable)	
Quarter SE1/4 (28) & SW1/4 (27)	Section 27 & 28	Township T4S	Range R9W
Type of aquatic resource(s) to be impacted (Attach Worksheet One.) Streams and wetlands		Project name or title (if applicable) Seven Hills Mine - Mining Area Addition LRH-2018-0078-OHR	
Other location descriptions or driving directions The project is located approximately 3.0 miles southeast of Elberfeld, Indiana in Warrick County Latitude: N 38.139990° Longitude: W -87.410015°			
4. Project Purpose and Description (Use additional sheet(s) if required.)			
Has any construction been started? ☐ Yes ☒ No		Anticipated start date (month, day, year) 02/15/2026	
If yes, how much work is completed?			
Purpose of project and overview of activities Surface coal mining with reclamation operations will be conducted through reaches of intermittent streams and jurisdictional wetland areas. Activities include: soil removal and stockpiling, temporary levee construction, overburden removal, construction, maintenance, and removal of overland flow diversions, sediment control structures, coal extraction and overburden and soil replacement, vegetation reestablishment and maintenance. These activities are required for surface mining operations for the extraction of bituminous coal deposits and will be conducted in a typical surface mining and reclamation sequence through a period of up to one (1) year, as permitted under mining permit application (S-00378) from the Indiana Department of Natural Resources. This Mining Area Addition was originally excluded from the original Department of Army authorization from the Corps Huntington District.			

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**5. Avoidance, Minimization, and Mitigation Information: Applicants must answer all of the following questions
(Use additional sheet(s) if necessary - provide a detailed response to all applicable questions.)**

A. For projects with Class II isolated wetlands –

1. Is there a reasonable alternative to the proposed activity?
There are no Class II isolated wetlands associated with this project.

2. Is the proposed activity reasonably necessary or appropriate?

B. For projects with Class III wetlands, adjacent wetlands, and/or streams, rivers, lakes or other water bodies –

1. Is there a practicable alternative to the proposed activity?
No
2. Have practicable and appropriate steps to minimize impacts to water resources been taken?
Yes

Describe all compensatory mitigation required for unavoidable impacts.

This information is provided in the U.S. Army Corps of Engineers Section 404 permit application included with this application. It includes all required drawings and supplemental information required below.

6. Drawing / Plan Requirements (Applicants must provide the following.)

- a. Top/aerial/overhead views of the project site showing existing conditions and proposed construction.
- b. Cross sectional view of areas of fill or alterations to streams and other waters.
- c. North arrow, scale, property boundaries.
- d. Include wetland delineation boundary (if applicable). Label all wetlands (jurisdictional, isolated and exempt) as I-1, I-2, I-3, etc. and the mitigation areas as M-1, M-2, etc.
- e. Location of all surface waters, including wetlands, erosion control measures, existing and proposed structures, fill and excavation locations, disposal area for excavated material, including quantities, and wetland mitigation site (if applicable).
- f. Approximate water depths and bottom configurations (if applicable).

7. Supplemental Application Materials (Applicants must provide the following.)

- a. A wetland delineation of all wetlands on the project site (for projects with wetland impacts).
- b. At least three photographs of the project site. Indicate the photo locations on the project plans.
- c. If isolated wetlands are present, a letter from the Corps of Engineers verifying this statement.
- d. Wetland mitigation plan and monitoring report.
- e. Classification of all isolated wetlands on the tract (if isolated wetlands are present onsite).
- f. Copies of all applicable local permits and/or resolutions pertaining to the project or tract.
- g. Tract history (see instructions).

8. Additional information that MAY be required (IDEM will notify you if needed.)

- a. Erosion control and/or storm water management plans.
- b. Sediment analysis.
- c. Species surveys for fish, mussels, plants and threatened or endangered species.
- d. Stream habitat assessment.
- e. Any other information IDEM deems necessary to review the proposed project.

9. Permitting Requirements

a. Does this project require the issuance of a Department of the Army Section 404 Permit from the US Army Corps of Engineers? ☒ Yes ☐ No

If no, you do not need to answer Part b.

b. Have you applied for an Army Corps of Engineers Section 404 permit? ☒ Yes ☐ No

If yes, please supply the Corps of Engineers ID Number, the Corps of Engineers District, the project manager, and a copy of any correspondence with the Corps. If no, contact the Army Corps of Engineers regarding the possible need for a permit application.

LRH-2018-00738-OHR, Teresa Spagna, Corps Huntington District

c. Have you applied for, received, or been denied a permit from the Department of Natural Resources for this project? ☒ Yes ☐ No

Please give the permit name, permit number, and date of application, issuance or denial.

Seven Hills Mine SMCRA Permit, S-00357, issued March 23, 2014

Seven Hills Mine Section 401 Water Quality Certification, 2018-628-87-JWR-A, issued June 20, 2019

Seven Hills Mine NPDES Permit, ING040290, issued May 29, 2019, renewed March 27, 2024

included in Wild Boar Air Permit (SSOA), 173-40875-00020, issued March 1, 2019

d. Have you applied for, received, or been denied any other federal, state, or local permits, variances, licenses, or certifications for this project? ☒ Yes ☐ No

Please give the permit name, agency from which it was obtained, permit number, and date of issuance or denial.

Wild Boar Mine MSHA Permit, 1202441, issued October 12, 2010.

10. Adjoining Property Owners and Addresses

List the names and addresses of landowners adjacent to the property on which your project is located and the names and addresses of other persons (or entities) potentially affected by your project. Use additional sheet(s) if required.

Name Please see Additional Information attached to the Section 404 Address (number and street) Application for Property Owner information City State ZIP Code	Name Address (number and street) City State ZIP Code
Name Address (number and street) City State ZIP Code	Name Address (number and street) City State ZIP Code
Name Address (number and street) City State ZIP Code	Name Address (number and street) City State ZIP Code
Name Address (number and street) City State ZIP Code	Name Address (number and street) City State ZIP Code
Name Address (number and street) City State ZIP Code	Name Address (number and street) City State ZIP Code
Name Address (number and street) City State ZIP Code	Name Address (number and street) City State ZIP Code

11. Signature - Statement of Affirmation

I certify that I am familiar with the information contained in this application and, to the best of my knowledge and belief, such information is true and accurate. I certify that I have the authority to undertake and will undertake the activities as described in this application. I am aware that there are penalties for submitting false information. I understand that any changes in project design subsequent to IDEM's granting of authorization to discharge to a water of the state are not authorized and I may be subject to civil and criminal penalties for proceeding without proper authorization. I agree to allow representatives of the IDEM to enter and inspect the project site. I understand that the granting of other permits by local, state, or federal agencies does not release me from the requirement of obtaining the authorization requested herein before commencing the project.

Applicant's Signature: _____

James Boswell

Date: _____

9/16/25

(mm/dd/yyyy)

Print Name: _____

James Boswell

Title: _____

Authorized

Representative

Worksheet – Summary of Onsite Water Resources and Project Impacts

A. Jurisdictional Wetlands (Existing Conditions)		Jurisdictional Wetlands (Proposed Impacts)			
Wetland Type	Size of wetland (acreage)	To be Impacted?	Acreage	Fill quantity (cys)	ATF
☐ EM ☐ SS ☒ FO	65.09 acres (total)	☒ Yes ☐ No	65.09	NA-mine thru, no fill	
☐ EM ☒ SS ☐ FO	12.86 acres (total)	☒ Yes ☐ No	12.86	NA-mine thru, no fill	
☐ EM ☐ SS ☐ FO		☐ Yes ☐ No			
☐ EM ☐ SS ☐ FO		☐ Yes ☐ No			
☐ EM ☐ SS ☐ FO		☐ Yes ☐ No			
☐ EM ☐ SS ☐ FO		☐ Yes ☐ No			
☐ EM ☐ SS ☐ FO		☐ Yes ☐ No			

Describe the type and composition of fill material to be placed in wetlands on the project site:
Dredged or fill material will consist solely of removed and replaced overburden and soil materials

Describe the type and composition and quantity (*cubic yards*) of material proposed to be dredged or excavated from wetlands on the project site:
Dredged or fill material will consist solely of removed and replaced overburden and soil materials.

B. Isolated Wetlands (Existing Conditions)			Isolated Wetlands (Proposed Impacts)			
Wetland Class	Type	Size of wetland (acreage)	To be Impacted?	Acreage	Fill quantity (cys)	ATF
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			
☐ 1 ☐ 2 ☐ 3	☐ NF ☐ F		☐ Yes ☐ No			

Describe the type and composition of fill material to be placed in isolated wetlands on the project site:
Dredged or fill material will consist solely of removed and replaced overburden and soil materials

Describe the type and composition and quantity (*cubic yards*) of material proposed to be dredged or excavated from isolated wetlands on the project site:
Dredged or fill material will consist solely of removed and replaced overburden and soil materials.

C. Bridges and Stream Crossings - provide the following information for EACH structure (Use additional sheet(s) if required.)

Stream name	
Not applicable	
Description of impacts	
Length of upstream bank impacts:	
Left side:	Right side:
Length of downstream bank impacts:	
Left side:	Right side:
Bank protection fill placed below the Ordinary High Water Mark:	
Volume per running foot:	
Bank protection fill placed below the Ordinary High Water Mark:	
Area of coverage:	

D. Bank Stabilization – provide the following information for EACH segment (Use additional sheet(s) if required.)

Water body name

Not applicable

Description of impacts

Length of shoreline or bank protection

Volume (*cubic yards*) of bank protection fill placed below the Ordinary High Water Mark per running footArea (*square feet*) of bank protection fill placed below the Ordinary High Water Mark**E. Stream Relocation**

Water body name

Unnamed tributaries to Pigeon Creek

Description of impacts

Surface coal mining and reclamation operations will be conducted through reaches of intermittent streams.

Length of existing channel to be relocated (*linear feet*)

2,802 linear feet of intermittent stream

Length of new channel to be constructed (*linear feet*)

2,802 linear feet of intermittent stream

Existing channel to be backfilled?

☐ Yes ☒ No

Type of relocation

☐ Piping ☐ Open ☒ Channel ☐ Other: _____Type of fill and volume (*cubic yards*)

Dredged or fill material consisting solely of removed and replaced overburden and soil materials.

F. Open Water Fill

Water body name

Not applicable

Description of impacts

Area of water body to be filled (*acres*)Type of fill and volume (*cubic yards*)

**U.S. ARMY CORPS OF ENGINEERS
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT – ADDITIONAL
INFORMATION**

24. ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY ADJOINS THE WATERBODY (If more than can be entered here, please attach a supplemental list).

Warrick County Commissioners
Warrick County Courthouse
107 W. Locust St.
Boonville, IN 47601

American Land Holdings of Indiana, LLC
701 Market St., Suite 700
St. Louis, MO 63101

Terry Helms
266 S. Yankeetown Rd.
Boonville, IN 47601

Kenneth & Betsy Sullivan
5000 Jersey St.
Vergennes, VT 05491

John Wasson Trust
c/o Michele Wasson
5111 Primrose Ct.
Newburgh, IN 47630

NCJ Properties LLC
Attn: Allan Noe
10999 Stahl Rd.
Newburgh, IN 47630