

JONES MINE

PASSIVE TREATMENT WETLANDS
PATTERSON TOWNSHIP, BEAVER COUNTY, PA

RC&D Measure Plan
Measure #42-6003-007-019

Sponsored by
Beaver County

In cooperation with
The Beaver County Conservation District
and
Penn's Corner Resource Conservation & Development Area

Prepared with assistance from
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BEAVER, PA

FEBRUARY 1994

Prepared under the authority of Sections 1528-1538 of the
Agriculture & Food Act of 1981 (Public Law 97-98).

RC&D MEASURE PLAN

Jones Mine
Passive Treatment Wetlands
Patterson Township, Beaver County, PA

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SIGNATURE PAGE

Signing of measure plan. This plan may be amended, revised, or terminated by mutual agreement of the parties hereto, except for cause.

BEAVER COUNTY

By James Albert Date 11-16-95
 John A. Austin
 Roger J. Green

Title BOARD OF CO. COMMISSIONERS

Authorized by action of Beaver County on 11-16-95.

BEAVER COUNTY CONSERVATION DISTRICT

By George J. Pittman Date 2/7/94

Title Chairman

Authorized by action of the Beaver County Conservation District on

2/7/94.

PENN'S CORNER RC&D AREA EXECUTIVE COUNCIL

By Ronald D. Fodder Date Nov. 29, 95

Title Chairman

Authorized by action of the Penn's Corner RC&D Area Executive

Council on December 18 1995.

II. Problems To Be Addressed

Two closely related coal mine discharges surface at the top of a 25-foot high geological formation near the east side of Route 51 along Brady Run in Patterson Township. These discharges have been categorized as "alkaline mine drainage" by a research biologist of the U. S. Dept. of Interior, Bureau of Mines. Both contribute to the deterioration of surface water quality.

After sampling and testing by the Bureau of Mines in July and September, 1991, "the only contaminant found in any significant concentration is iron." The waters emanating from the individual seeps are nearly identical and both contain net alkalinity. Flow rates on these two occasions were approximately 14 and 8 gallons per minute respectively.

At the present time, a large quantity of iron has precipitated from the drainage onto the steep hillside thereby creating a very unsightly appearance. It also creates a maintenance problem for PennDOT as it accumulates in the wetland area at the base of the steep slope and in the headwall adjacent to the culvert under Route 51. In addition, it poses a safety hazard to the public.

III. Opportunities

The opportunity exists to improve the quality of these discharges through a passive treatment system located between the base of the steep slope and the east berm of Route 51. Such a system would have the ability to oxidize, hydrolyze and precipitate the iron if the waters are retained for a long enough period of time. Also, the safety hazards and some of the undesirable aesthetic features of the site would be controlled or eliminated.

This system could serve as an educational and demonstrational site because of its proximity to a major transportation artery in Beaver County and to a large portion of the county's population. It is also very near to Brady's Run Park which is one of the county's foremost recreational facilities.

IV. Alternatives

(1) No Action - The no action alternative would result in a continued pollution of Brady Run by these discharges. The aesthetics of the site would continue to deteriorate and the safety hazards would increase with time. PennDOT would continue to utilize tax dollars for maintenance.

(2) Install a Passive Treatment Wetland System - This alternative would provide for the construction of two artificial wetlands which would collect and retain the water from the two discharges during a limited pass-through time. The water would be aerated as it enters the wetland system, passes over a limestone rock-lined channel from one chamber to the other and at the discharge point. The retention and aeration would allow most of the iron to oxidize, hydrolyze and precipitate within the system.

The safety hazard from an increase accumulation of iron precipitate on the steep slope would be reduced. Also, the adverse aesthetics of the site would decrease as the site recovered from the results of the uncontrolled discharges. Maintenance costs for PennDOT would decrease.

(3) Alternative #2 Plus Organic Substrate - In addition to #2, this alternative would add vegetation to the wetland chambers to create an organic substrate capable of removing undetermined amount of some elements from the water. It would add a considerable amount of time, labor and construction costs without causing a significant increase in the removal of toxic elements or a major elevation in the pH.

V. Selected Plan

The selected plan is alternative two which will provide for an effective, cost-efficient method of removing most of the iron from the water discharged at this site. The water will be directed over a rock-lined channel into the first of two passive treatment wetlands. After flowing through this chamber in a "U-shaped" pattern around a center baffle the water will be discharged through a weir over a rock-lined channel into the second chamber. The water will flow through the second chamber in a similar manner and discharge through a weir over another rock-lined channel into the existing PennDOT surface inlet.

The two chambers will provide approximately 4,000 square feet of surface area and two feet of depth. About 70 tons of R-4 rock and 35 tons of AASHTO 57 gravel for bedding will be used in the rock-lined channels and a separate rock-lined waterway to divert surface water from the site. All disturbed areas will be regraded, limed, fertilized, seeded and mulched. This will include approximately one-half acre.

VI. EFFECTS OF SELECTED PLAN

Beneficial:

- * The quality of the discharge will be upgraded significantly as it enters Brady Run and passes through Brady's Run Park on its way to the Beaver River.
- * Maintenance costs for Penn Dot will be lowered.
- * A potential safety hazard will be reduced.
- * Aesthetics of the site will be improved.
- * An education/demonstration site will be created at a location which can be accessed by the general public.

Adverse:

- * Approximately one acre will be devoted to the passive treatment system at this site.
- * Approximately \$10,000 will be irretrievably committed to the site.
- * Periodic maintenance will be required to remove the iron precipitate which accumulates.

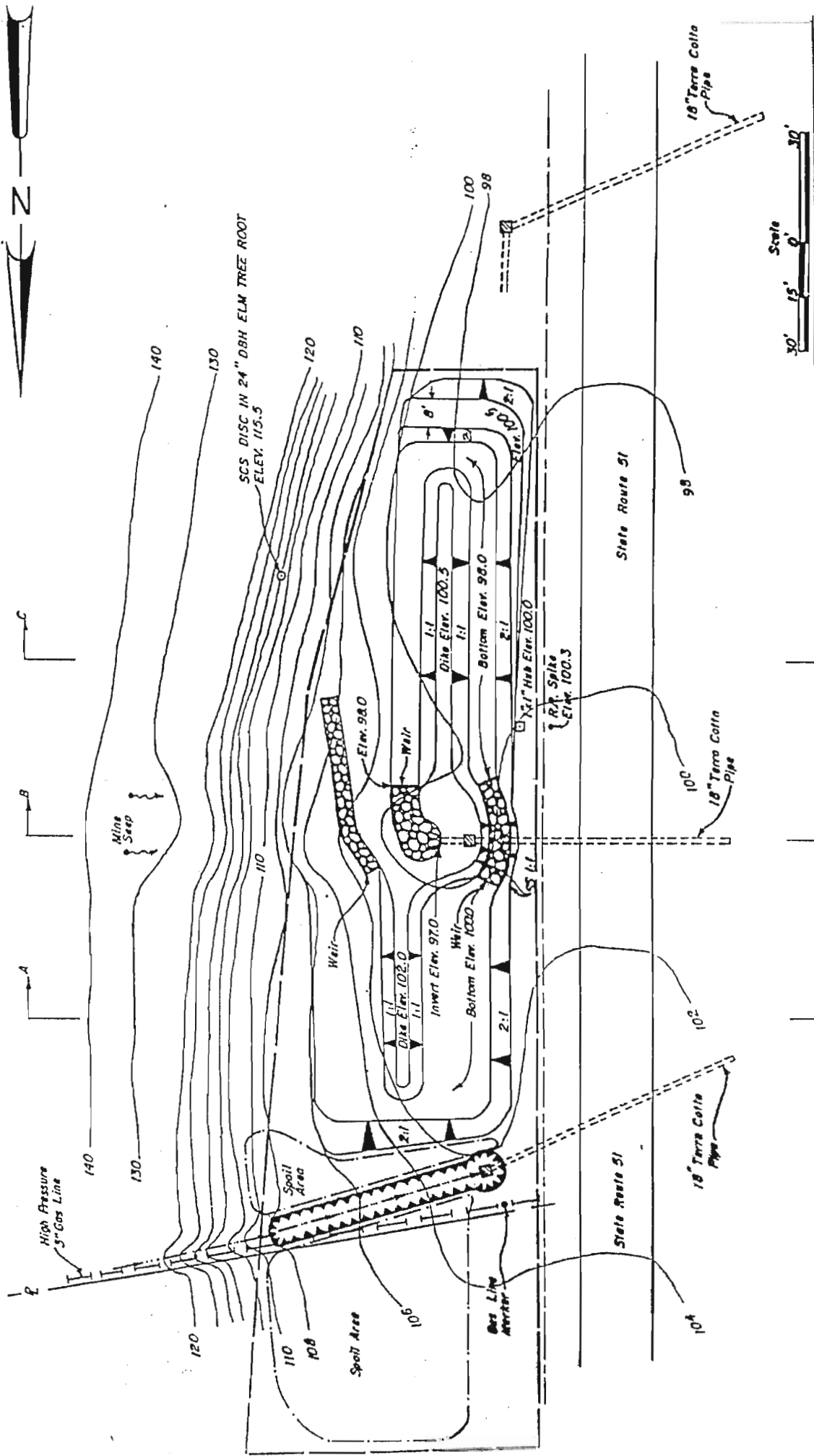
VII. IMPLEMENTATION STRATEGY

The Beaver County Conservation District will coordinate the installation of the passive treatment wetlands at this site. In addition, the District will secure bids, award a contract and provide administrative services including routine inspection during the construction period.

The U.S. Department of the Interior, Bureau of Mines, will provide water quality testing services. The U.S.D.A. Natural Resources Conservation Service (NRCS) will provide technical assistance in the form of a plan and a design for the facility. NRCS will also provide inspection services as requested during the installation.

The County of Beaver will provide the land, all necessary land rights or easements and any required permits. The County will accept any operation and maintenance costs associated with the facility.

Funding for the project, estimated to be approximately \$10,000, will be provided by Penn's Corner Conservancy (\$4,500), Pennsylvania Conservation District Nonpoint Source AMD Remediation Project Section 319h Funding (\$3,500), and the Beaver County Conservation District (\$2,000). Additional in-kind services will be provided by all parties. No attempt has been made to estimate the value of these services.



PLAN VIEW

JONES MINE WETLAND, R.C.B.D.
BEAVER COUNTY, PA.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by	G. MILLER	Date	12-94
Drawn by	G. MILLER	Time	12-94
Issue by	E.C. RETTERD	Date	12-94

- Legend
- Construction Limit
 - Apparent Property Line
 - Surface Inlet
 - Road Berm
 - Rock Gutter
 - Rock Lined Waterway

NOTE:
RESPONSES TO UTILITIES ACT PA 172 ARE AS FOLLOWS
(a.) Columbia Gas Co., (412) 847-0500, Job No. 010391

TABLE I
Estimated Construction Costs 1/

Jones Mine Passive Treatment Wetlands - Beaver County, Pennsylvania
 Penn's Corner RC&D Measure #411
 42-6003-007-019

<u>Cost Item</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Amount</u>
Mobilization	1	Job	---	\$ 260.00
Clearing and Grubbing	1	Job	---	500.00
Permanent Seeding	1	Job	---	1,700.00
Excavation, Unclassified	1	Job	---	750.00
Rock-Lined Waterway	60	Ton	\$ 20.00	1,200.00
Rock Cutters	45	Ton	20.00	900.00
Timber Fabrication and Installation	3	Ea.	50.00	150.00
		TOTAL		<u>\$ 5,460.00</u>

TABLE II
Estimated Costs and Sources of Funding 1/

Jones Mine Passive Treatment Wetlands - Beaver County, Pennsylvania
 Penn's Corner RC&D Measure #411
 42-6003-007-019

Cost Items	Beaver County Cons. Dist.	Penn's Corner Conservancy	Beaver County	Other Agencies (Bur. of Mines, SCS)	Total
Construction	\$ 545	\$ 4,915	-0-	-0-	\$ 5,460
Engineering and Other Technical Assistance	-0-	-0-	\$ 1,000	\$ 1,200	2,200
Project Administration	200	-0-	500	200	900
TOTAL	\$ 745	\$ 4,915	\$ 1,500	\$ 1,400	\$ 8,560