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United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Penn's Corner Resource Conservation & Development Area

BUTLER COUNTY MINE DRAINAGE ABATEMENT
MORAIN STATE PARK
WETLAND TREATMENT SYSTEM

RC&D MEASURE PLAN
42-6003-019-015



RC&D MEASURE PLAN

BUTLER COUNTY MINE DRAINAGE ABATEMENT
MORAINES STATE PARK
WETLAND TREATMENT SYSTEM

WATER QUALITY IMPROVEMENT

PENN'S CORNER RC&D AREA
MEASURE #476
42-6003-019-015

Sponsored By:
BUTLER COUNTY CONSERVATION DISTRICT
and
PENNSYLVANIA BUREAU OF STATE PARKS

AUGUST 1995

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

BUTLER COUNTY MINE DRAINAGE ABATEMENT
MORAINES STATE PARK

INTRODUCTION

This project is being planned as part of a multi-site mine drainage abatement/water quality improvement effort at several locations in northern Butler County. Planning alternatives and design options presented here have used data from both field and laboratory tests from recent water samples. Personnel from the Department of Environmental Protection, U.S. Bureau of Mines and USDA, Natural Resources Conservation Service have been consulted and conducted on-site investigations. Also, a private consultant has prepared a report based on his field observations on August 5, 1993.

In addition, personnel from the Butler County Conservation District, the PA Bureau of State Parks, Penn's Corner RC&D Area and the Moraine Preservation Fund have been involved with the field investigation, planning considerations and design options. Various staff members of these agencies will provide technical assistance during survey, design and installation phases.

PROBLEMS AND OPPORTUNITIES

Two relatively small abandoned acid mine discharges flow overland a distance of 100 yards before entering Muddy Creek Bay of Lake Arthur in Moraine State Park. A large unsightly deposit of iron precipitate has accumulated at the site and is visible from Barkley Road as well as from the shoreline of Lake Arthur. This precipitate has effectively eliminated all vegetation in the affected area.

The combined flow has been estimated at 30 gpm (May 1995). The pH readings have varied from 5.49 to 6.0. Ferrous iron has varied from 3.4 to 43 ppm with the total iron ranging from a low of 3.4 to a high of 47 ppm. Total sulfates have ranged from 221 to 438 ppm. Alkalinity has varied from 19 to 36 ppm and acidity has ranged from 10 to 54 ppm.

The potential exists to remove the iron from these discharges before they enter Lake Arthur by utilizing a passive treatment wetland without causing a significant decrease in the pH of the discharge from the wetland. Installation of a treatment system at this site would allow for the enhancement of the aesthetics of their area of Lake Arthur shoreline. The facility could serve as an effective demonstration site for other water quality improvement efforts in western Pennsylvania. It could also be quite useful as an educational facility for the general public, local schools and college classes.

ALTERNATIVE

(I) No Action - The no-action alternative would allow the iron-laden acid mine discharges to continue to enter Lake Arthur untreated. The unsightly iron precipitate would remain and continue to spread while eliminating additional vegetative cover. No public benefits would be generated through this alternative. No immediate operation and maintenance (O&M) costs would be incurred.

(II) Passive Treatment Wetland - The installation of an aerobic wetland system to passively remove the iron from the mine discharges is feasible at the site. This system would consist of a settling pond (channel) at the outlet of the two discharges, an aerobic wetland and a secondary settling basin (polishing pond). Rock-lined waterways and a water control structure would be used to connect the various components of this system and to add oxygen to the water. The estimated cost of construction is \$18,500. Operation and maintenance costs are estimated to be \$200-\$300 per year.

SELECTED PLAN

The selected plan is Alternative II - Passive Treatment Wetland. It will require the construction of a settling pond (channel) to collect and combine the two discharges before they enter the wetland. An aerobic wetland would be constructed to provide sufficient detention time to allow for the precipitation of iron from the water. A secondary settling basin (polishing pond) will be constructed to detain the water longer and increase the oxygen level after it passes through the wetland. Rock-lined waterways will be installed to control erosion, add oxygen and perhaps add minor amounts of alkalinity as the water moves through the system. It is estimated that this wetland system will have a system life of 12 years.

All disturbed areas will be limed, fertilized, seeded and mulched after construction is completed to stabilize the site and provide a more useful demonstration/education facility. Some native trees and shrubs could also be planted to enhance the aesthetics of the site. Care will be taken to plant materials which will not be detrimental to the wetland system.

EFFECTS

- A. Beneficial - The installation of these facilities will improve the water quality from two abandoned mine discharges before they enter Lake Arthur. The iron will precipitate in the wetland system and will be detained in the three chambers. The pH will be lowered slightly by this process, but should be increased to its present level or higher before leaving the secondary settling basin (polishing pond). The system will provide an excellent demonstration/education facility with good access from an existing gravel road. The aesthetics of the site will be greatly improved.

- B. Adverse - A small amount of native vegetation will be destroyed during construction. Some turbidity will be created in the Muddy Creek Bay area of Lake Arthur as the wetland system is installed. An area of up to one acre of recreation land will be more or less permanently dedicated to these facilities although the site will be useful as an education/demonstration area. Noise, dust and smoke pollution may be created during the brief construction period.

Some land, materials and construction funds will be irretrievably committed to this project. In addition, a small long-term operation and maintenance responsibility will be created for the landowner (PA Bureau of State Parks).

IMPLEMENTATION

The Natural Resources Conservation Service (NRCS) will perform the necessary engineering surveys of the site. Staff of the NRCS will also design the passive treatment wetland system facilities.

Funding for construction was obtained by the Butler County Conservation District. The District, working with the PA Bureau of State Parks, will contract and inspect the installation of the facilities. Staff from the NRCS will assist with the installation in an advisory capacity as requested. Any required permits, landrights and the erosion and sedimentation plan will be the responsibility of the Butler County Conservation District.

Operation and maintenance of the facilities will rest with the PA Bureau of State Parks in consultation with other cooperating agencies. The PA Bureau of State Parks will also allow ingress and egress for the purpose of observation of the performance of the facilities to the cooperating agencies upon request to the PA Bureau of State Parks.

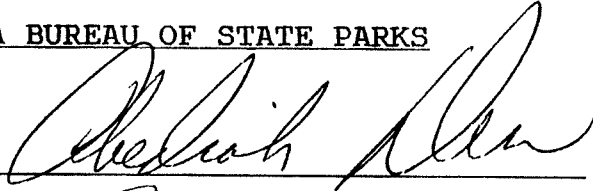
The PA Bureau of State Parks will also permit the use and observation of these facilities by schools, colleges and the general public for education/demonstration purposes. Such visits to the site should be coordinated with the PA Bureau of State Parks.

SIGNING OF THE MEASURE PLAN

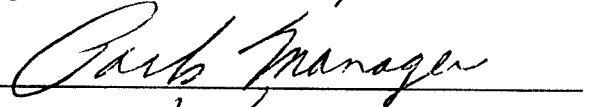
This plan may be amended, revised or terminated by mutual agreement of the parties hereto, except for cause.

PENNSYLVANIA BUREAU OF STATE PARKS

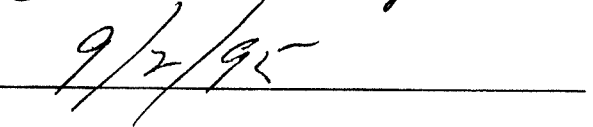
BY:



TITLE:



DATE:



BUTLER COUNTY CONSERVATION DISTRICT

BY:

TITLE:

DATE:

PENN'S CORNER RC&D AREA

BY:

TITLE:

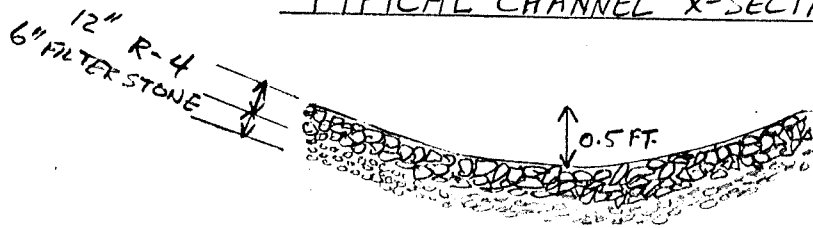
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PA
3R
6/18/95
RIP RAP PLACEMENT DETAIL

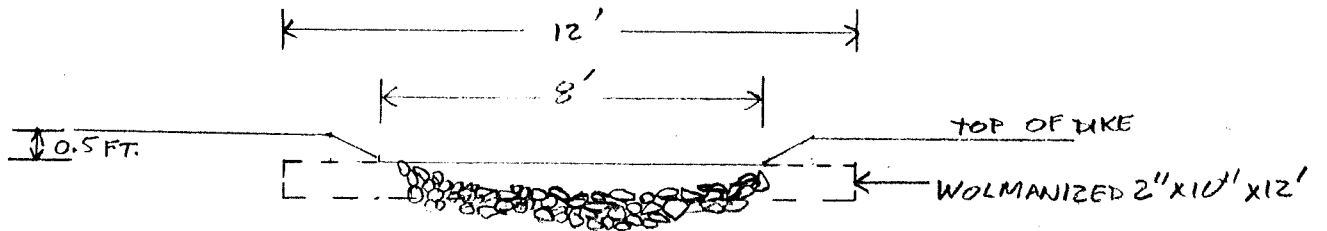
MORaine S.P. WETLAND TREATMENT SYSTEM

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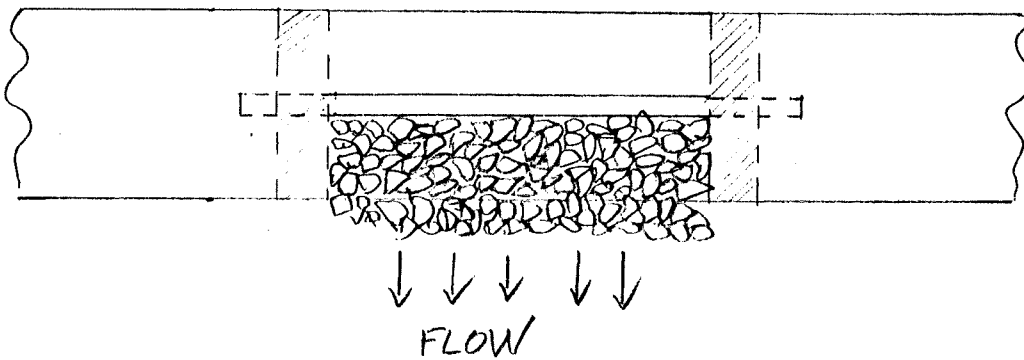
TYPICAL CHANNEL X-SECTION



TYPICAL SPILLWAY INSTALLATION



TOP VIEW

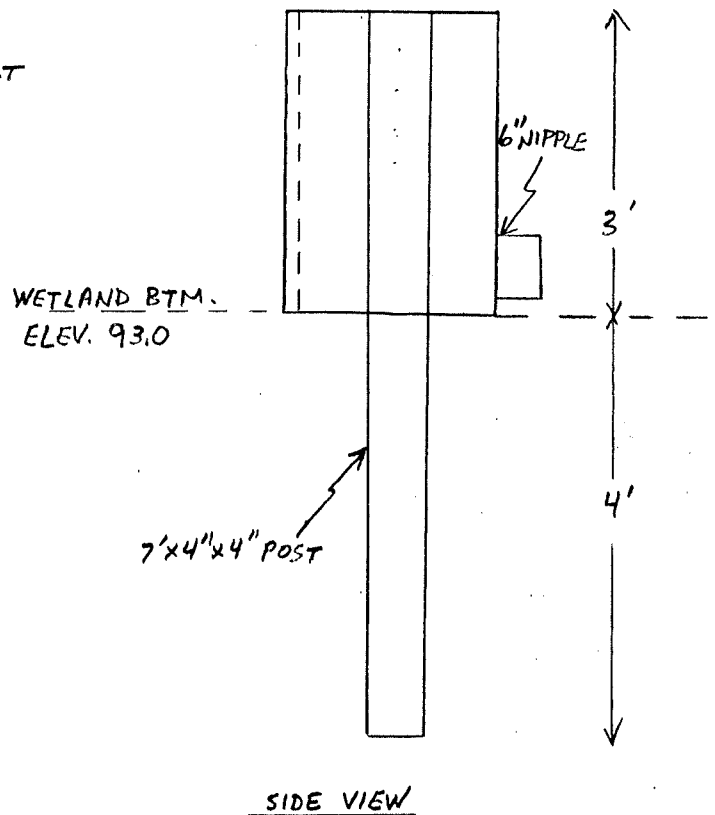
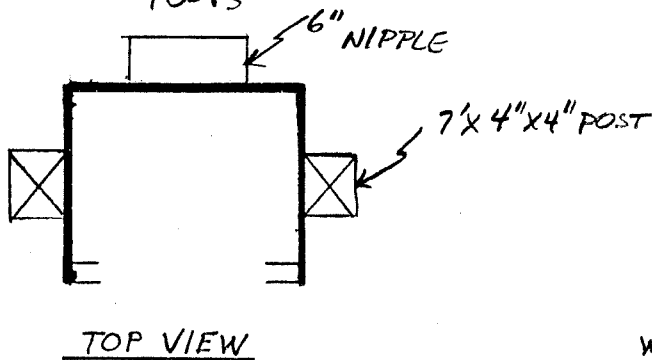


PA
SR 6/15/95
WATER CONTROL STRUCTURE DETAIL

MORaine S.P. WETLAND TREATMENT SYSTEM

MATERIALS LIST:

- 1 - AGRI DRAIN CORP. "INLET WATER LEVEL CONTROL STRUCTURE"
3' HEIGHT WITH 6" OUTLET (OR SIMILAR, PER DETAIL BELOW)
- 2 - 7' LONG, 4" x 4" POSTS (WOLMANIZED)
- 27' - SCHED 40, 6" OUTLET PIPE
- 1 - FLAP-TYPE ANIMAL GUARD (6")
- 1 - 2' x 2' AGRI-DRAIN CORP. "ANTI-SEEP COLLAR"
- 12 - 2 1/2" STAINLESS STEEL LAG SCREWS - 6" O.C. ANCHOR STRUCTURE TO POSTS





Pennsylvania Department of Conservation and Natural Resources

225 Pleasant Valley Road
Portersville, PA 16051-9650
August 8, 1996

Moraine/McConnell's Mill State Park

412-368-8811

Mr. Ron Fodor
Butler County Conservation District
122 McCune Drive
Butler, PA 16001

Dear Ron,

This is a letter of appreciation to thank the Butler County Conservation District for all the work you did on the acid mine Drainage Abatement Project which^{was} constructed at Moraine State Park in July 1996. The project went well and Tom Matthews of your agency did an excellent job overseeing this project.

The acid mine Drainage Abatement Project will provide a valuable educational learning area for surrounding school districts and the general public.

Thank you again for your cooperation and interest in Moraine State Park.

Sincerely,

Obie Derr
Park Manager
Moraine/McConnell's Mill State Park

cc: file