

Site 42 AMD Remediation Improvement Project Growing Greener Grant Project # 4100066700, Technical Report

**Prepared by Northumberland County Conservation District
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Narrative Description:

The site 42 Growing Greener grant project was developed to improve an existing Vertical-Flow Compost Wetland Passive Treatment System that was installed in 2000. The system treats AMD discharge water before it enters Carbon Run, a tributary to Shamokin Creek.

Work items completed at Site 42 include:

- Sludge removal from primary treatment cells
- Diversion piping at the treatment system inflow
- Replacement of underdrain piping within the treatment system
- Repair of existing spillways and replacement of stone lining
- Limestone bed installation prior to discharge to final polishing pond
- Limestone lined channels connecting treatment cells
- Repair of treatment cells embankment areas
- ATV deterrence boulders on the embankment areas
- Baffle installation at final polishing pond

This project and 2 additional sites were successfully installed due to a cooperative partnership among state and local entities. Partners worked collaboratively to obtain project design, secure funding, meet grant requirements, and aid with construction activities. Partners included PA Department of Environmental Protection, Commonwealth Finance Authority, Atlantic Sunrise Environmental Stewardship Program, Anthracite Outdoor Adventure Area, Shamokin Creek Restoration Alliance (SCRA), Trout Unlimited, Northumberland County Conservation District (NCCD), Michael Baker International, and Skelly and Loy.

A challenge we encountered was the change of engineering staff assigned to work on our project design. Staff left the Skelly and Loy office on 2 different occasions which prolonged the entire project process. We maintained communication whenever a new person came on board and eventually were able to complete all tasks as designed.

Passive treatment systems require maintenance in order to remain effective; site 42 is no exception. Problems occurring at site 42 included: total iron in the system outfall, hydraulic issues with the vertical flow process, and All Terrain Vehicle (ATV) damage to the berms. This project restored the function and effectiveness of this existing passive treatment system. These maintenance activities reduced the amount of metals pollution, acidity, and low pH values flowing into Carbon Run and now provides a cleaner tributary source to Shamokin Creek.

Over the years, ATV's have had unlimited access to this site/area and have compromised the integrity of the treatment system. Now that the Anthracite Outdoor Adventure Area (AOAA) is in control of 6,000 acres of ATV riding, including site 42, this location is identified as a sensitive area with restricted access. AOAA has been proactive against uncooperative riders by installing several motion cameras to document any unauthorized entry/activity. Thus far, the site has had one incident of unapproved access. With the use of the cameras and social media, the culprits were identified and held responsible for their actions. Other planned efforts related to this site include monitoring water chemistry parameters, a task performed by the local volunteer watershed group, the Shamokin Creek Restoration Alliance, with assistance from the conservation district and AOAA staff.

The AOAA regularly publishes accomplishments and project plans in the local newspaper. They highlighted the environmental challenges and project benefits to be gained from this specific venture in the News Item on April 26, 2016 and July 20, 2016. The Northumberland County Conservation District also plans on writing about this project in their upcoming spring 2017 newsletter.

As always, actual construction costs were more than budgeted construction costs. Site 42 project site was just one of three sites that was installed during the Carbon Run Project. A variety of funding sources was used to implement the entire 3 site project. Fortunately, we were able to use funding from another funding source (Commonwealth Financing Authority) and leftover money from a prior treatment system maintenance project (Trout Unlimited) to make up the difference.

Project Photographs:



Before: Channel and pond #2

After: Channel and pond #2



Before: Channel between pond #1
and pond #2



After: Channel between pond #1 and
pond #2



Before: Vegetated channel below
pond #2



After: Limestone check dams below pond #2



Before: Heavily traveled access road along south side of treatment system



After: Improved and restricted use access road along south side of treatment system.

The implementation of this project has resulted in the following system improvements:

Site 42	Pre-maintenance Final System Outfall	Post maintenance Final System Outfall
pH	6.12	7.31
Acidity	-27	-28.9 mg/L as CaCO ₃
Alkalinity	34	41.2 mg/L as CaCO ₃
Aluminum	<0.11 ppm	.0296 ppm
Iron	1.3 ppm	0.198 ppm
Manganese	1.1 ppm	0.209 ppm

The implementation of this project has resulted in the following pollution load reductions:

Site 42	Pretreatment Water	Post-Treatment Water	Contaminants Removed
pH	6.18	7.31	
Acidity	-8.30	-28.9 mg/L as CaCO ₃	72.77 ppd
Alkalinity	20.6	41.2 mg/L as CaCO ₃	72.78 ppd (added)
Aluminum	0.0242 ppm	0.0296 ppm	
Iron	12.4 ppm	0.198 ppm	43.11 ppd
Manganese	1.65 ppm	0.209 ppm	5.09 ppd

Operation, Maintenance, and Replacement Plan:

The following OM and R plan will be implemented:

- Water samples will be collected and analyzed once a quarter
 - The system will be adjusted as needed to effectively remove pollutants
 - To be completed by NCCD and SCRA
- The system will be evaluated for damages or needed repairs once a quarter
 - Repair system as needed
 - To be completed by NCCD, SCRA, AOAA