TREATMENT SYSTEM IMPROVEMENT PLAN

SCRUBGRASS TREATMENT SYSTEM

Scott Township
Allegheny County
Pennsylvania

Stream Restoration Incorporated

Passive Treatment Operation & Maintenance Technical Assistance Program
Funded by Pennsylvania Department of Environmental Protection Growing Greener Grant
August 2025

Introduction

The Scrubgrass Passive Treatment System (System) was constructed in 1996, followed by the installation of an electric-powered blower in 1999, then renovated (cleaned) in 2002, with additional improvements installed in 2003 including guide rail and fence. The *Renovation of the Scrubgrass Treatment System October 2003 Final Report* prepared by Scott Conservancy (2003 Report) available on Datashed includes a detailed description of efforts through 2003. The System is full of iron oxide sludge and needs to be cleaned. It would be best to enlarge the system, but numerous constraints detailed in the 2003 Report prevent any meaningful expansion other than deepening of the existing ponds.

As documented in the 2003 Report, the system quickly fills with iron sludge and, even when it was freshly renovated, removes less than half of the iron from the discharge before entering the receiving stream, Scrubgrass Run. The proposed improvements outlined in this report include cleaning the existing system, doubling the depth of the existing ponds, expanding the second pond if feasible, installing a permanent geotube pad for on-going sludge removal and dewatering, and installing a permanent sludge pipeline under Scrubgrass Run. Periodic removal of iron sludge will be needed to maintain system on an ongoing basis.

System Description

Abandoned mine drainage (AMD) issues from underground mine workings (Mansfield Mine) located on the Pittsburgh coal seam south of the System. The currently abandoned electric-powered aerator was used to drive off carbon dioxide to increase the pH and introduce oxygen prior to the AMD flowing through a trough and into a series of two ponds. No design information was found for the original 1996 system but the 2003 Report indicated that the current system configuration has a fluid volume of 467,000 gallons. During the 2002 renovation efforts, geotextile and AASHTO #1 aggregate were placed on the pond bottoms to help facilitate future sludge removal with heavy equipment and economic recovery of the iron oxide sludge. Though a previous project partner indicated that they would recover the iron oxides as part of routine maintenance, no iron oxides have been removed in the subsequent 23 years following the 2002 renovation efforts.

Proposed Improvements

The iron oxide material (sludge) needs to be removed from the treatment ponds. This was previously done using both mechanical excavation and pumping to geotubes. Ideally, the sludge would be pumped to a permanently installed borehole into adjacent abandoned underground mine workings, but this was deemed infeasible as explained in the Sludge Injection Evaluation section of this report.

As discussed in the 2003 Report, the water is alkaline with elevated iron concentrations. Typically, an aerobic wetland-type passive system (ponds and wetlands) that provides sufficient retention time to allow the iron to oxidize and precipitate with adequate depth to store the resultant sludge is needed. This is generally considered the simplest type of passive treatment. However, as acknowledged in the 2003 Report, the system is too small and there is no feasible way to construct a passive system that would adequately treat the discharge to a target effluent concentration of 5 mg/L iron or less.

Based on the physical constraints, cleaning and deepening the ponds is proposed. Further design work will be needed to evaluate if the proposed expansion of the lower pond is feasible. A major proposed improvement is to install permanent sludge removal facilities that will include a pipeline across Scrubgrass Run, an access road with a stream crossing and access road, and an aggregate-lined pad where geotubes will be used to both initially clean the system and house new geotubes that will facilitate sludge pumping in the future. The geotubes will need to be periodically emptied by hauling the dry sludge off site and replaced.

Proposed Phased Scope of Work

Phase 1: Design and Permitting

1. Site survey and map preparation.
2. System design:
    a. Final design drawings,
    b. Technical specifications,
    c. Bid documents,
    d. Engineer's Estimate of Construction Costs.
3. Permitting:
    a. PAG-02 (a/k/a E&S Permit);
    b. GP-7 (Minor Road Crossing).
    c. GP-5 (Utility Line Stream Crossing).
    d. Township Zoning and Conditional Use (if needed).
    e. Township Driveway Permit (if needed).
    f. Township Grading Permit.
    g. Township Stormwater Permit (if needed).

Phase 2: Construction

1. Bidding and contractor selection, and on-going construction oversight.
2. Install temporary stream crossing to geotube location.
3. Prepare geotube pad and install geotubes.
4. Remove fencing as needed.
5. Clean inlet trough and repair as needed.
6. Install pipeline from System under Scrubgrass run to geotubes.
7. Pump sludge from both ponds and remove as much sludge as possible.
8. Allow sludge to passively dewater (approximately six months).
9. Cut open geotubes and spread out material to increase drying (approximately six months).
10. Conduct material testing for disposal approval.
11. Haul dried sludge to approved landfill and conduct on-going testing as required.
12. Dispose of used geotubes.
13. Install new geotubes for future use.
14. Excavate ponds and haul excess material off site.
15. Install improved spillway between ponds.
16. Install improved spillway from second pond.
17. Install baffle curtains.
18. Prepare as-built drawings and Operation & Maintenance (O&M) Plan.

Preliminary Budgetary Estimate

Phase 1: Design & Permitting	**Cost**
Design	$85,000
Permitting	$90,000
Permit Fees (Township, County, State)	$25,000
Total Phase 1 Cost (not including project sponsor costs)	**$200,000**

Phase 2: Construction	**Cost**
Mobilization, E&S Controls, Clearing & Grubbing, Geotube Pad Installation	$150,000
Sludge Removal, Drying, Testing, Load, Haul to Landfill	$225,000
Excavation, Excess Material Haul Offsite, Water Handling	$180,000
Revegetation, Baffle Curtains, Rock & Aggregate, Miscellaneous	$75,000
Bidding, Contractor Selection, Construction Oversight, As-Built and O&M Plan	$100,000
Total Phase 2 Cost (not including project sponsor costs)	**$730,000**

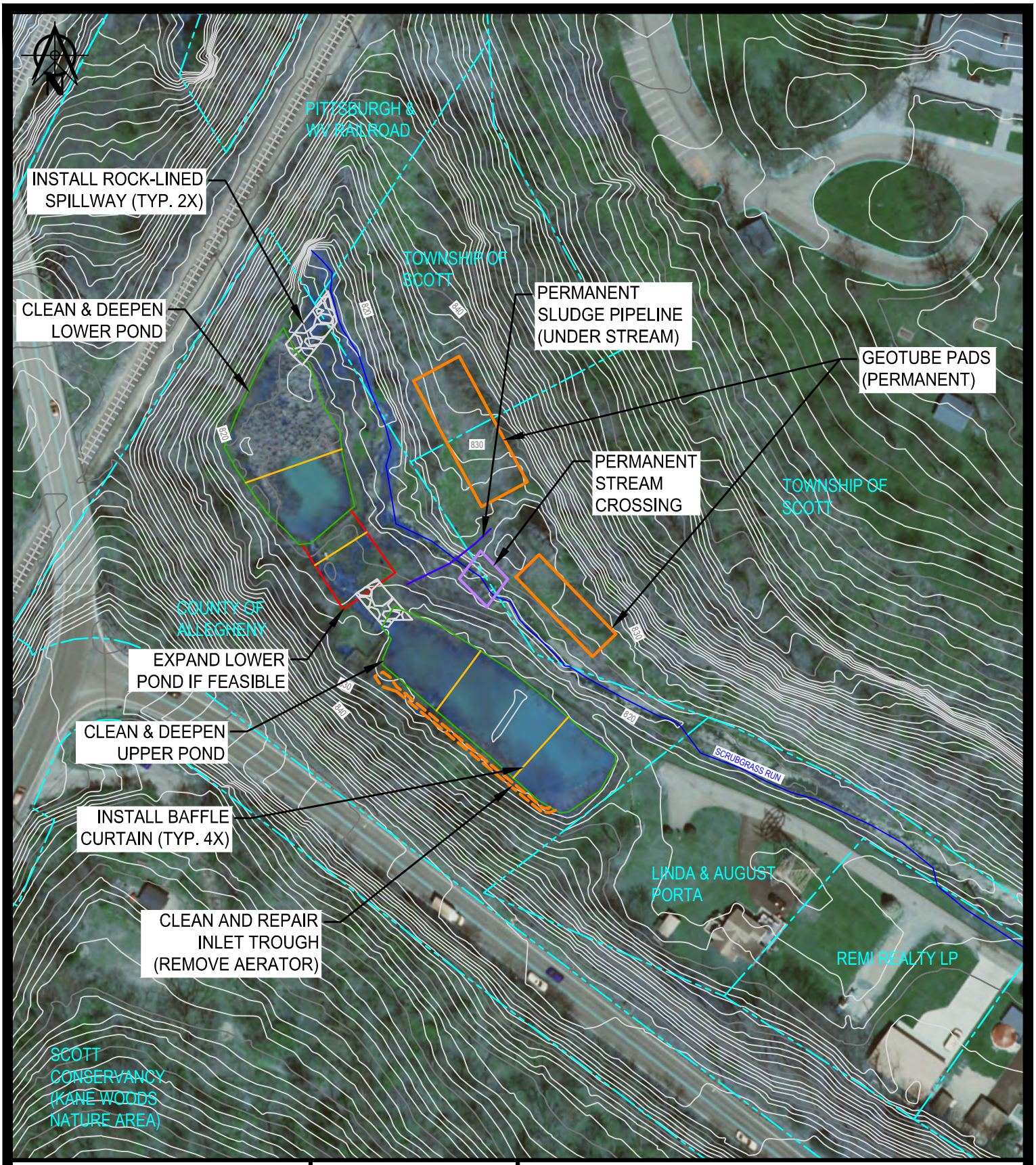
Sludge Injection Evaluation

Underground mine maps were obtained from pasda.psu.edu including map sheets K5091 north of system (Nixon & Leasdale Mine), K5228 immediately south of system (Mansfield Mine), and XSL200 that includes duplicative information shown on K5091 map on an unlabeled mine map with other mines shown further from the System.

The Mansfield Mine map shows a mine entry in close proximity to the current point of issue of the abandoned mine drainage (AMD Source). No elevation information is provided on the mine map within about 400 feet of the mine entry near AMD Source. A main entry is shown on the Mansfield Mine map labeled “Main Entry Summerhill Mine” (Summerhill Main) includes a drift entry located between the two sets of parallel railroad tracks between Main Street and Chartiers Creek. There is an electric transmission tower located about 530 feet southwest of the AMD Source that is to the west of Main Street and east of the upper set of railroad tracks. The terminus of the Summerhill Main (Drift Entry) corresponds to topographic features (contour lines cut into the hillside below the upper tracks) that indicate that the Drift Entry is at an elevation of about 830 feet. The Drift Entry is about 100 feet due west of the electric transmission tower.

The elevation shown on the Mansfield Mine map closest to the Drift Entry at a location about 130 feet east-southeast of the Drift Entry indicates a coal seatearth elevation of 830.6. The Summerhill Main extends from the Drift Entry over 2,800 feet to the east-southeast (roughly south 68 degrees east). The easternmost elevation reported along the Summerhill Main is 833.2. This indicates that the coal in this vicinity has little slope, however no coal elevation information is provided on the mine map except along the Summerhill Main. The coal slopes west towards the Drift Entry. Therefore, due to the proximity of a mine entry close to AMD Source (which was likely constructed to drain water from the mine), and the elevations of the Summerhill Main sloping toward the Drift Entry indicating another potential drainage outlet, pumping sludge from the System into Mansfield Mine is not advised.

The mine workings shown on the Nixon & Leasdale Mine map (K5091) approximately 800 feet to the north of the system appear to have a similar configuration with drift entries located along the western extent at an elevation of about 830 and almost no other elevation information other than main entries rising very slightly to the east. Again, due the very slight slope of the coal towards drift-type entries, sludge injection to this mine is not advised.



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SCALE: 1" = 100'

0 100'
50

CONCEPTUAL DESIGN
SCRUBGRASS SYSTEM

DATE: AUGUST 2025

PLAN VIEW

DRAWING NUMBER: 1 of 1