Maiden Mine Passive Treatment System SRI O&M TAG Project #41 Request #1 OSM PTS ID: PA-279

<u>Requesting Organization:</u> Stream Restoration Inc. <u>Municipality/County:</u> Dunkard Township, Greene County <u>Dates of O&M Work Performed:</u> 8/23/16 – 10/27/16 and 9/5/17 -9/8/17 <u>BioMost O&M Construction Personnel:</u> Tim Danehy, Dan Guy, Julie Labar, Ryan Mahony, and Cal Spigler

The Maiden Mine Passive Treatment System (Maiden PTS) is a multi-component passive treatment system installed to treat two acidic metal laden discharges. It was formerly known as the Matthews Restoration Area. For almost a decade, the Maiden PTS was not able to function as-designed due to needed maintenance being prevented by lack of access. Once property ownership was transferred to MEPCO, LLC in 2015, Stream Restoration Incorporated (SRI) spearheaded a public-private partnership effort to rehabilitate the largest passive treatment system in the Dunkard Creek Watershed. SRI assembled support and funding from foundations, public agencies, and private companies to provide the resources needed to successfully rehabilitate the Maiden PTS and take a major step towards the sustainable restoration of Dunkard Creek.

Project accomplishments:

- Cleaned 10,500 tons of limestone (VFP1, VFP2B, VFP3, HFLB)
- Installed 600 feet of HDPE underdrain pipe (VFP1 & VFP2B)
- Rehabilitated 1,300 CY of Jennings-style mixed treatment media (VFP2A)
- Installed 150'-long channel to by-pass clogged culvert
- Installed flow-balancing channel between VFP2A & VFP2B
- Installed pipe outlet control on VFP2B
- Repaired VFP2B siphon mechanism that was damaged by wildlife
- Repaired VFP3 siphon worn by almost a decade of use
- Installed dual 24" piping as "beaver proof" system outlet
- Replaced 8" by-pass valve (SP1)
- Reconfigured HFLB to include inlet and outlet pools and infiltration trenches
- Installed solar powered valve actuator to control flow in VFP1

Monitoring has shown that the system is performing better than it was almost a decade ago. On 1/18/17 the system was discharging about 375 gpm of treated mine drainage with a 6.2 pH and 55 mg/L alkalinity (point 117-4). The unnamed tributary at Taylortown Road had a pH greater than 6 for the first time in almost a decade. This project has utilized funding from both O&M TAG 2 and 3. During extreme high flow events, the treatment system does become overwhelmed. In a separate effort, unrelated to this request, SRI has partnered with BioMost, Inc to complete a grant application to conduct additional rehabilitation work on the system.

Project partners include: PADEP Operation & Maintenance Technical Assistance Grant, Appalachian Stewardship Fund, Foundation for Pennsylvania Watersheds, Western PA Coalition for Abandoned Mine Reclamation/PADEP, BioMost, Inc., MEPCO, LLC (property acquisition for site access + on-going water monitoring), and Stream Restoration Incorporated.



Top Left: Excavator delivered to the site.
Top Right: 600' of 8" Perforated DR-17 HDPE replacement underdrain pipes.
Bottom Left: Construction equipment and supplies.
Bottom Right: VFP1 limestone plugged and overflowing into siphon vault.

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Top Left: VFP2B was being by-passed due to compacted media, overgrown with vegetation.
Top Right: VFP2B after media stirring (~1,150T limestone + ~630CY organic material) to increase permeability and facilitate flow through the treatment media.
Bottom Left: VFP1 during limestone (2,000T) washing and stirring.
Bottom Right: New VFP1 underdrain perforated HDPE pipes.

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Top Left: Excavator stirring VFP1 limestone (2,000T).Top Right: Close-up of VFP1 limestone coated and plugged with metals.Bottom: Excavation of VFP1 siphon vault with old underdrain pipes removed.

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Top Left: VFP2B siphon trigger damaged by wildlife.
Top Right: Repaired VFP2B siphon trigger mechanism.
Bottom Left: VFP3 siphon bell after years of service with factory-provided support.
Bottom Right: VFP3 siphon retrofitted with secondary supports.



Top Left: VFP3 flush pipe mechanically cleaned to remove blockage.

Top Right: Channel excavated between VFP2A and VFP2B to use VFP2A as a conveyance to VFP2B and allow flow control through both VFPs.

Bottom Left: Looking from OPC toward VFP2A, a channel was excavated to VFP2A to bypass a clogged culvert (left) that previously conveyed water to VFP2A and VFP2B.

Bottom Right: Mechanical difficulties while stirring VFP2B limestone.

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Top Left: Infiltration trenches were installed within the HFLB.Top Right: HFLB during limestone (4,000T) washing.Bottom: HFLB final grading with infiltration trenches and inlet/outlet pools installed.







Top Left: Repair of VFP3 underdrain pipe.
Top Right: Washing limestone (1,000T) in VFP3.
Middle: Settling Pond 1 berm repaired and outlet channel cleaned to lower water elevation in settling pond.
Bottom Left: VFP3 inlet pool constructed after limestone washing.
Bottom Right: Clean limestone in VFP 3 before final grading.



Top Left: New valve installed for Settling Pond 1 drain pipe.
Top Right: Culvert pipes installed with both ends underwater to deter beaver activity at system outlet near Taylortown Road.
Bottom: Limestone (3,500T) was stirred and an infiltration trench was installed to maintain permeability along with a new underdrain system in VFP2B.



Top Left: Removal of E&S control measures no longer needed from original system construction. **Top Right:** Wildlife found on site (Red Spotted Newts, Notophthalmus v. viridescens). **Bottom:** HFLB inlet pool with flow distributed across wetland outlet.