# Tracy Airhole Remediation Operation and Maintenance Plan

**Prepared for:**
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# System Startup and Calibration

- All flash boards should be removed from the Agri-drain inline control structures at Diversion 1 and Diversion 2 until the system is ready for startup.
- Seed germination and vegetation establishment should be complete before flow is diverted into the newly constructed basins and wetland.
- Before diverting flow to, inspect all pipes and discharge locations to be sure that no obstructions are present.
- Before installing flash boards in either flow control structure, lubricate the gaskets of the flash boards with a clear petroleum jelly or similar waterproof lubricant. Also apply lubricant liberally to the flashboard channel.
- If the measured flow at the Tracy Airhole Discharge is 2.5 cfs or less at the time of startup, install flashboards in Diversion 2 until the water surface is equal to or just below the invert elevation of the Diversion Pipe to Treatment Basin 2.
- Prior to diverting flow to Treatment Basin 1, check the air diffusers in Treatment Basin 1 to be sure that they are free of debris and securely anchored. Supply power to the Airlift 6 Compressor System and feed compressed air to the diffusers to ensure that any material that may be suspended in the water column during startup does not clog the diffusers.
- Install flashboards in Diversion 1 one flash board at a time until water begins flowing into the diversion pipe under Route 125 to Treatment Basin 1.
- If the measured flow at the Tracy Airhole Discharge is 2.5 cfs or less at the time the flashboards are installed, install sufficient flash boards to divert the entire flow to Treatment Basin 1. If the Tracy Airhole Discharge is greater than 2.5 cfs, it will be necessary to measure the flow to Treatment Basin 1 to ensure that it does not exceed 2.5 cfs (the capacity of Treatment Basin 1 may be adjusted upwards after observing a period of operation, but the initial diversion to the basin should not exceed 2.5 cfs). It may be helpful to install a simple staff gage on the concrete headwall at the diversion pipe.
- Monitor flow through the system. It may be helpful to check the surface currents in Treatment Basin 1 to be sure that the flow is diffuse and is not short cutting the system. Simple floats can be used to check the surface flow on the pond (oranges work well for this as they are nearly neutrally buoyant in water leaving about half of the orange exposed and easily visible.)
- Monitor the overflow of Treatment Basin 1 for flow concentration and block any concentration that occurs.
- Inspect the existing wetland between Treatment Basin 1 and the newly constructed wetland for major flowing channels. If channels are found

and appear to be concentrating a significant portion of the flow, a simple channel block can be constructed from existing vegetation and debris in the wetland.

- Inspect the constructed wetland discharge to Good Springs Creek for stability when water begins to discharge from the wetland.
- Once Diversion 1, Treatment Basin 1, and the Constructed Wetland have been operated and inspected; prepare to add flow to Treatment Basin 2 for inspection purposes.
- Install 2 additional flashboards (up to 12 inches of height) in Diversion 2
- Remove enough flashboards from Diversion 1 to allow flow into the original channel.
- Once Treatment Basin 2 has discharge from the rock spillway, inspect the spillway for stability.
- Upon completing inspection of Treatment Basin 2, return the flashboard configuration in Diversions 1 and 2 to their previous state to divert the first 2.5 cfs of flow through Treatment Basin 1 and maintain the base elevation of any additional flow at the invert of the diversion pipe at Diversion 2.

# Periodic Inspections

## Inline Flow Control Inspection

*Monthly*

- Inspect the Agri-drain inline flow controls
- Check controls for debris
- Test flashboards to be sure they are mobile in the flashboard channel – lubricate as necessary
- Check the downstream discharge pipe for obstructions

*Annually*

- Remove all flashboards
- Inspect the flashboard channel
- Inspect the Agri-drain housing for cracks or damage
- Inspect flashboard gaskets

## Pipe Inlet Inspection

*Monthly*

- Inspect the diversion pipe inlets for obstructions

*Annually*

- Inspect diversion pipe seal with headwall – reseal as necessary

## Embankment Inspection

*Monthly*

- Inspect the edge of Treatment Basin 1 for concentrated flow – obstruct flow concentrations as necessary
- Inspect the constructed wetland embankments for concentrated flow and stability

*Annually*

- Inspect constructed wetland embankments for woody tree species and large shrub species. Remove as necessary.

## Wetland Vegetation Inspection

*Monthly during growing season (biweekly during first growing season)*

- Inspect the edge of Treatment Basin 1 for vegetation health and establishment. Supplement with wetland plant plugs as necessary. Apply soil amendments as necessary to maintain vegetative health.

- Inspect the basins and embankments of the constructed wetland for vegetation health and establishment. Supplement with wetland plant plugs as necessary. Apply soil amendments as necessary to maintain vegetative health.

**Discharge Structure Inspections**

*Monthly*

- Inspect diversion pipe discharges for stability
- Inspect wetland spillway and Treatment Basin 2 spillway for stability
- Inspect wetland spillway and Treatment Basin 2 spillway for debris or blockages. Remove as necessary.

*Annually*

- Monitor Good Spring Creek stability at the wetland spillway and Treatment Basin 2 spillway

**Aeration System Inspection**

*Monthly*

- Visually inspect air diffusers to be sure each is operational and oxygenating the water column
- Inspect the 5-micron intake air filters – replace as necessary
- Inspect airlines and connections
- Check both compressors for proper operation
- Check cabinet cooling fan operation

*Annually*

- Test air compressor pressure and operation for both compressors
- Test operation of Ground Fault Circuit Interrupter (GFCI) outlet(s) using the integrated test button or external ground fault testing device

*Every 3 years*

- Test air compressors pressure and operation – return units to factory for rebuild if operating efficiency is reduced

**Flocculent Accumulation**

*Annually*

- The depth of flocculent accumulation in both Treatment Basin 1 and Treatment Basin 2 should be measured annually. This can be completed using either a handheld depth finder or weighted line. Comparing the annual water depth to the previous year recording will yield the

accumulated depth. Be sure that the overflow structure(s) are clear of debris and the water surface is level with the overflow structure before comparing depths from year to year. Do not measure the flocculent depth within 10 feet of any of the air diffusers in Treatment Basin 1 or within 15 feet of the rip-rap protected north bank of Treatment Basin 1. For Treatment Basin 2 – do not measure the flocculent depth with 30 feet of diversion discharge to the basin.

# Routine Maintenance

## Inline flow control

*Annual*

- Lubricate flash board gaskets and flash board channel with petroleum jelly or a similar waterproof lubrication

## Pipes and Diversions

*Monthly*

- Remove any accumulated debris
- Replace any areas of damaged herbaceous vegetation

## Embankments

*Annual*

- Remove any woody vegetation or large shrubby vegetation from the embankments in the constructed wetland and Treatment Basin 2

## Pipe Discharges

*Annual*

- Remove any woody vegetation or large shrubby vegetation from the embankments in the constructed wetland and Treatment Basin 2

## Aeration System

*Annual*

- No routine maintenance other than air filter replacement as indicated by monthly inspection
- The air compressor is a sealed, oil free compressor
- Anticipate compressor reconditioning at 3 year intervals

# Wetland Vegetation Maintenance – Invasive Species Monitoring

The constructed wetland and margins both treatment basins should be monitored for invasive wetland plant species. The following table lists a number of invasive plants known to occur in Pennsylvania. The site should be monitored for these plants and action should be taken quickly to remove the plants if found. For small numbers, physical removal may be the most effective means of control. For larger populations, a selective herbicide application may be most effective. The best defense against invasive plants at the project location will be routine monitoring and fast, aggressive action if invasive plants are found on the site.

| Common Name | Latin Name |
|---|---|
| Autumn olive | Elaeagnus umbellata |
| Winged Euonymus | Euonymus alatus |
| Border privet | Ligustrum obtusifolium |
| Common privet | Ligustrum vulgare |
| Amur honeysuckle | Lonicera maackii |
| Morrow's honeysuckle | Lonicera morrowii |
| Bell's honeysuckle | Lonicera morrowii x tatarica |
| Standish honeysuckle | Lonicera standishii |
| Tartarian honeysuckle | Lonicera tatarica |
| Multiflora rose* | Rosa multiflora |
| Japanese spiraea | Spiraea japonica |
| Spotted knapweed | Centaurea maculosa (syn. C. biebersteinii) |
| Canada thistle | Cirsium arvense |
| English ivy | Hedera helix |
| Giant hogweed | Heracleum mantegazzianum |
| Purple loosestrife* | Lythrum salicaria, L. virgatum |
| Japanese stilt grass* | Microstegium vimineum |
| Reed canary grass* | Phalaris arundinacea |
| Common reed* | Phragmites australis ssp. australis |
| Japanese knotweed* | Polygonum cuspidatum, P. sachalinense |
| Narrow-leaved cattail | Typha angustifolia |
| Japanese honeysuckle | Lonicera japonica |
| Mile-a-minute weed* | Polygonum perfoliatum |
| Periwinkle | Vinca minor |

*Very aggressive spreader – could compromise the entire wetland and/or marginal wetland plant community - should be treated immediately upon discovery

# Iron Flocculent Removal

In the primary treatment basin, iron flocculent removal will be required once every 3-5 years depending on the achieved iron removal efficiency of the system. In treatment basin 2, the iron flocculent removal will likely be required much less frequently as treatment basin 2 is designed to function as a supplemental treatment basin. Flocculent should be removed from each basin when the depth of flocculent as recorded in the annual inspection is at or approaching 3 feet. Allowing additional accumulation will compromise system operation.

## *Removal Methods*

Method 1

The preferred removal method for the iron flocculent from Treatment Basin 1 is by wet slurry pump. The gravel access area adjacent to the basin is designed to allow the lay down of woven geotextile dewatering tube to separate the iron from the water as it is pumped from the basin. Sediment removal can be accomplished using a small barge or boat mounted suction dredge. Small dredges of this type are available through Piranha Pumps (www.piranhapump.com/index.html) and are utilized by a variety of aquatic contractors.

The slurry is then pumped to woven geotextile dewatering tubes to separate the water from the slurry. Once dried, the iron oxide is often a marketable product for use as a pigment or dye.

Advantages of using suction dredging for removal of the iron flocculent include:

- Does not require dewatering
- System can remain in operation while work is completed

Method 2

The iron flocculent may also be removed by conventional excavation methods. If this approach is utilized, the basin must be dewatered continually throughout the operation. A dewatering pit at the southwest corner of the treatment basin will allow discharge to be pumped to a geotextile silt bag on the gravel access area and then returned to the existing wetland.

Either method will required the material to dry for a period of time at the site before it is transported for disposal.

Flocculent from Treatment Basin 2 will be best removed using Method 1 and pumping the sludge to woven geotextile dewatering tubes at the end of the access road west of the constructed wetland. This would eliminate the need to

dewater the basin as well as overcome limited access around the constructed wetland.

### *Flow Diversion*

If traditional excavation is utilized to remove the flocculent the Tracy Airhole Discharge must be diverted into the historic channel. This is accomplished by simply removing all of the flash boards in the Agri-drain inline flow control structure at Diversion 1. Treatment Basin 2 should be utilized while flow is bypassing Treatment Basin 1. Likewise, if conventional excavation is used to clean Treatment Basin 2, it should be done during a period of average discharges from the Tracy Airhole with the flow routed through Treatment Basin 1.

### *Disposal*

Once dried the iron material will likely have a market value. A number of companies utilize iron oxide compounds for pigments in paints, concrete, and other products. These companies may also be able to provide the iron oxide removal service as well. It is recommended that the product be treated as a commodity as long as there is a market.

The following companies utilize iron oxide from AMD projects for pigments.

Iron Oxide Recovery, Inc.
195 Castle Shannon Blvd.
Pittsburgh, PA 15228

Hoover Color Corporation
2170 Julia Simpkins Rd.
Hiwassee, VA 24347

If the material does not hold a market value at the time of removal and must be moved from the site, the nearby mine pits and/or coal refuse areas should be evaluated for disposal.

As a last resort, the material can be disposed of at a landfill. Coordinate appropriate testing measures (typically Toxicity Characteristic Leaching Procedure (TCLP)) with the landfill of choice prior to disposal.