2016

SOUTHWESTERN ENERGY

IOGCC Award Application & Supplemental Materials

FALL BROOK

AMD Treatment & Restoration Project

Submitted by Roy Hartstein
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swn
Southwestern Energy®

Call for Entries

CHAIRMAN'S STEWARDSHIP AWARDS

The Interstate Oil and Gas Compact Commission is seeking nominations for the 2016 Chairman's Stewardship Awards. The winners will be honored at the IOGCC Annual Conference in Little Rock, Arkansas, October 2 - 4. All nominations received will be mentioned in the Winners Booklet along with project title. All past winners and their projects will also be mentioned in the Winners Booklet.

You may apply on your behalf or nominate another project. Past winners are encouraged to apply with new projects. If you have applied in the past and received honorable mention and you feel your project has been added to we encourage you to resubmit your project. In the nomination form you will find the four different categories. Please choose one that best fits your nomination and provide a brief project summary. To see previous winning nominations, visit the IOGCC website at iogcc.ok.gov/chairmansstewardship. For any questions or additional information please contact Carol Booth, communications manager for the IOGCC at 405-525-3556 ext. 114.

Nominations must be received on or before August 11, 2016.

History

The Chairman's Stewardship Awards represent the Interstate Oil and Gas Compact Commission's highest honor for exemplary efforts by the oil and natural gas industry in environmental stewardship.

Since 1935 the IOGCC has voiced the need for sound oil and natural gas environmental policy. Many organizations have gone far beyond the basic mandates of law and regulation to protect and enhance natural resources. The Chairman's Stewardship Awards are an effort to single out these achievements as examples for others in industry, government and the public.

Award Categories

Energy Education

This award is presented to a group or organization that has created a program to educate the public about oil and natural gas and the hundreds of ways it affects the lives of Americans.

Environmental Partnership

The Environmental Partnership award recognizes an innovative project led by a non-industry organization(s) in cooperation with an industry partner(s).

Small Company

This award recognizes an innovative project by a small oil and natural gas company that demonstrates positive environmental stewardship. Small companies are those that operate in a limited area or region.

Large Company

This award recognizes an innovative project by a large oil and natural gas company that demonstrates positive environmental stewardship. Large companies are those that operate nationwide and in many instances internationally.

Briefly describe the nominated program on a separate attachment. Please limit your summary to 3 pages or less. Key points to include in your project summary:

Provide a brief explanation of the project.
Describe the purpose of the project.
Explain the process taken to complete the project.
Describe any contributions made to the environment.
Describe what has been accomplished.

Nominee Information:

Company Southwestern Energy

Contact Roy Hartstein

Address 10000 Energy Drive

City/State/Zip Spring, Texas 77389

Phone 832-796-4875 Fax _____

E-Mail Roy_Hartstein@swn.com

Submitted by:

Company Southwestern Energy

Contact Roy Hartstein

Address 10000 Energy Drive

City/State/Zip Spring, Texas 77389

Phone 832-796-4875 Fax _____

E-Mail Roy_Hartstein@swn.com

Visual Aids, if available: (Electronic submissions are accepted)

__✓__ Video/DVD (10 minutes or less)

__✓__ Photos

__✓__ Brochures/Publications (10 copies)

__✓__ Other

Category:

___ Energy Education

___ Environmental Partnership

___ Small Company

__✓__ Large Company

Send Nominations To:

Stewardship Awards
IOGCC
P.O. Box 53127
Oklahoma City, OK 73152-3127
Email: carolbooth@iogcc.state.ok.us
Fax: 405-525-3592

For more information call 405-525-3556 or log on to iogcc.ok.gov/chairmansstewardship

Fall Brook AMD Treatment & Restoration Project
Tioga County, PA

NOMINEE

At Southwestern Energy (SWN) making a positive impact on local communities has always been a key part of our culture, fostered by our focus on continuous improvement, innovation and operational responsibility. In 2012, SWN committed to become fresh water neutral in our operations by the end of 2016. This means for every gallon of fresh water we use, we offset or replenish that gallon through projects that improve water quality or availability for the environment.

To achieve this commitment, SWN took a lead role among 11 project partners to design, build and support the operation of a facility to treat acid mine drainage (AMD) in the Fall Brook tributary of the Tioga River. SWN agreed to fund and oversee the construction of the Fall Brook facility, and also contributed funds to establish a trust dedicated to ongoing operations. Upon the successful startup and operation of the AMD treatment facility, SWN met its fresh water neutral goal for northeast Pennsylvania.

PROJECT

The Upper Tioga River watershed, located in north central Pennsylvania, is severely impacted by AMD coming to the surface from abandoned mines. From Fall Brook to the Hammond Dam Complex, the waterway is acidic (pH of 3.3-3.6) with excessive concentrations of iron, manganese and aluminum. There is little to no aquatic life in the stream as it weaves its way through the towns of Blossburg, Covington and Mansfield.

Two separate passive treatment systems were constructed to collect the largest individual AMD discharges entering the upper Fall Brook watershed. The intercepted AMD water is routed to limestone beds that adjust the pH and drop out contaminants. From there, the water flows to polishing ponds for settling prior to discharge to Fall Brook. The facility will treat an average of 10.7 MMbbl per year. Construction began in 2015 and Blossburg Municipal Authority assumed daily operations in early 2016.

IMPACT

Water is an essential resource. It is of critical importance to communities, the environment, and the economy. Significant volumes of water are used in many manufacturing and industrial applications, including the production of oil and natural gas. SWN's operational programs and practices further protect and conserve fresh water. Such programs and practices may be adopted and applied by anyone in the oil and gas industry. Through our fresh water neutral initiative, SWN is committed to using only the water volumes we need, finding ways to maximize the cost-effective usage of alternative non-fresh water, and support conservation projects that will provide water to the local environment during and after our operational activities.

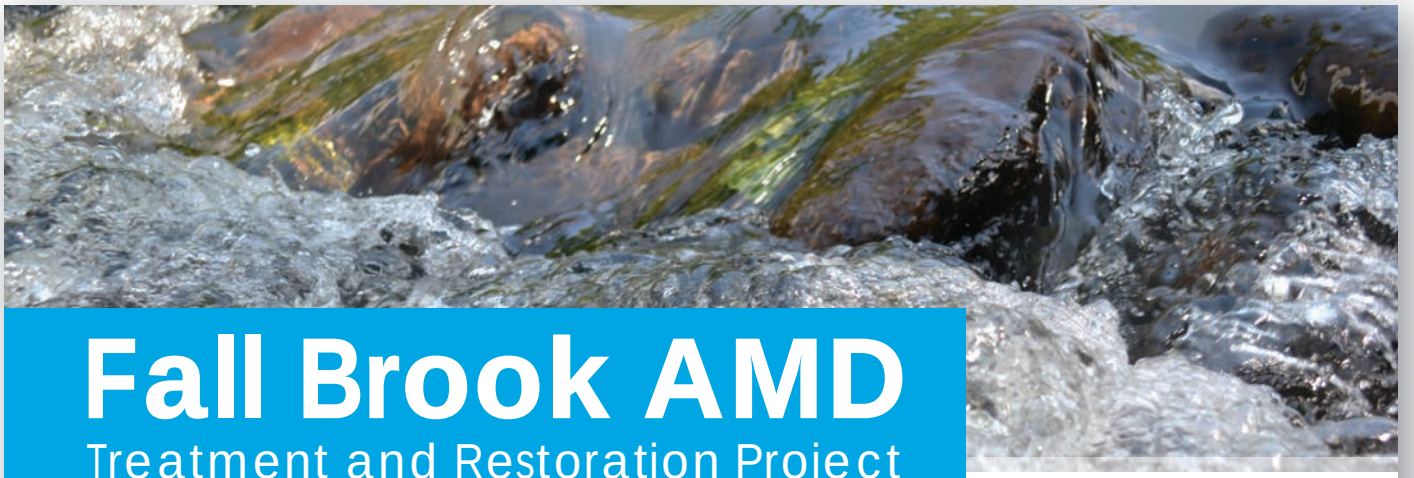
In the case of Fall Brook, our operations will require some water from the upper Tioga River watershed. We could have sought to withdraw volumes of AMD-impacted river water, but this would have been a short term, operationally driven benefit to the river by temporarily reducing the AMD water flowing downstream. However, we saw an opportunity to work with the community and State to provide a long-lasting benefit to the watershed through the construction and operation of an AMD treatment facility.

This was a perfect fit for SWN because it allowed us to focus our efforts on a meaningful project that will improve water quality in the watershed, offset our limited duration operational needs, and provide a long-term solution that will lead to a return of healthy river conditions and help spur local recreational and economic benefits.

The AMD treatment is working above expectations, and the concentrations of all target contaminants are dropping significantly. Downstream acidity levels are improving and Fall Brook is on the path to healthy restoration. The contributions from SWN and other project partners to make this project a reality have been very well received by the local community, State and Federal representatives, NGO's, and other organizations.

FALL BROOK FACT SHEET

Two-page project fact sheet developed by Southwestern Energy (SWN). This sought to provide information and generate interest prior to the construction and completion of the Fall Brook AMD treatment and restoration project.



Fall Brook AMD

Treatment and Restoration Project

With the combined efforts of a group of Partners the Fall Brook acid mine drainage remediation project in the Tioga River Watershed has become a reality. The project will provide clean water into the Susquehanna River Basin and ultimately the Chesapeake Bay. Southwestern Energy (SWN) has taken a lead role in the partnership and agreed to fund and oversee the construction of the Fall Brook project. SWN has also contributed funds to establish a trust dedicated to funding ongoing maintenance and operations.

The Upper Tioga River Watershed, located in North Central Pennsylvania, is severely impacted by acid mine drainage (AMD). From Fall Brook to Bear Creek to the Tioga/Hammond Dam Complex, the waterway is acidic with excessive concentrations of iron, manganese and aluminum. There is little to no aquatic life and the stream bed is stained orange from iron oxide as it weaves its way through the towns of Blossburg, Covington and Mansfield.

The Fall Brook tributary is listed by the Pennsylvania Department of Environmental Protection as a Regional Watershed Priority, North Central Region. Impacts to the upper Tioga River Watershed from abandoned coal mines is a concern due to its location in the Susquehanna River Basin, which serves as a major water source for the Chesapeake Bay.

The Fall Brook AMD Treatment and Restoration Project involves the collection, conveyance, and treatment of the largest individual AMD discharges entering the upper Fall Brook watershed with a combined long-term average flow of 857 gallons per minute. Two separate passive treatment systems will be constructed in the vicinity of River and Welch Mountain Roads in Ward Township. Construction began in early summer 2015 and was completed by year's end.

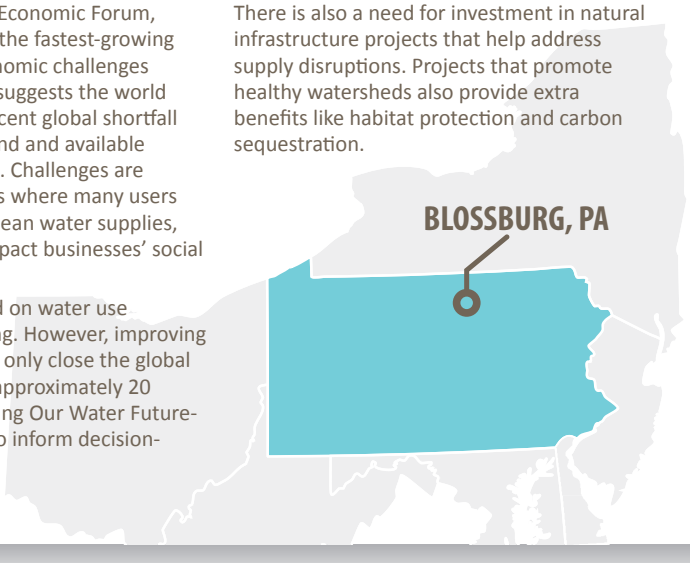
Hedin Environmental of Pittsburgh was contracted for the engineering and design of the facility. Blossburg Municipal Authority will oversee daily operation and maintenance of the site.

Why we invest in water conservation?

According to the World Economic Forum, water security is one of the fastest-growing social, political and economic challenges we face today. Analysis suggests the world will experience a 40 percent global shortfall between forecast demand and available supply of water by 2030. Challenges are multiplied in watersheds where many users compete for shrinking clean water supplies, which can negatively impact businesses' social license to operate.

Most efforts are focused on water use efficiency and monitoring. However, improving water use efficiency will only close the global supply-demand gap by approximately 20 percent by 2025. (Charting Our Water Future-Economic frameworks to inform decision-making. 2009)

There is also a need for investment in natural infrastructure projects that help address supply disruptions. Projects that promote healthy watersheds also provide extra benefits like habitat protection and carbon sequestration.



Partners

- PA Department of Environmental Protection
- PA Fish and Boat Commission
- Susquehanna River Basin Commission
- Tioga County Commissioners
- Tioga County Conservation District
- Tioga County Concerned Citizens Committee
- Trout Unlimited – Eastern Abandoned Mine Program
- Southwestern Energy
- DCNR- Bureau of Forestry
- Blossburg Municipal Authority
- Hillside Rod & Gun Club

Demographics

The Tioga River Watershed is located in Tioga (pop. 42,577) and Bradford (pop. 62,792) Counties about 35 miles north of Williamsport, Pennsylvania. The river originates in Armenia Township Bradford County (pop. 172), and travels southwest towards the town of Blossburg (pop. 1,550), flowing through the North Central Bituminous Coalfield. In Blossburg, the Tioga changes direction, flowing north through Mansfield (pop. 3,628) and into Tioga Lake at the Tioga/Hammond Dam Complex. After exiting the Tioga/Hammond Dam Complex, the Tioga River flows into New York to its confluence with the Cohocton River to form the Chemung River, later becoming part of the Susquehanna River.

Fall Brook Treatment Process

While it may take decades to achieve the goal of complete ecosystem restoration, multiple benefits will be realized through the progressive treatment of AMD through this project.

According to the 2000 U.S. Census, 15 percent of the housing units in Tioga County are for seasonal, recreational or occasional use. Among the benefits of restoring the aquatic ecosystem will be increased recreational opportunities such as fishing, swimming and canoeing that will draw more people to the area.

AMD impacts alone represent a conservative loss of $287,000 per year of fishery resources in the Tioga River and many of its tributaries. It is anticipated that these proposed projects to treat AMD and non-AMD pollution in the Fall Brook tributary will restore five miles of Fall Brook and three miles of the Tioga River to a condition that should support recreational fishing.

Through the efforts of all partners and their investments, this project has the potential to provide significant benefits to the area through increased recreational opportunities and revenues in the watershed and at the Tioga/Hammond Complex, increased aesthetic value of the river, decreased maintenance costs for bridges and clearer, cleaner water to Pennsylvania and New York.

ECH2O

energy conserving **water**

Water is an essential resource for life

It also serves a vital role for energy development. At SWN, we understand the importance of water to local communities, the environment and the economy. That is why we are developing operational practices and programs to protect and conserve this most precious resource.

We are proud to partner with state agencies, local communities and respected non-profit conservation organizations to enhance water quality and develop conservation projects to improve local watersheds.

For more information, visit SWN.com. Send inquiries to media@swn.com or call (832) 796-1000.

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SAVE THE TIOGA RIVER BROCHURE

A tri-fold brochure designed to solicit donations, developed by Southwestern Energy for the Tioga County Concerned Citizens Committee (TCCCC), which describes the AMD impacts on the Upper Tioga River Watershed. Fall Brook is a contributing tributary in this watershed.

YOUR DONATIONS
MAKE A DIFFERENCE

Tioga County Concerned Citizens Committee, Inc.
"Save the Tioga River" Donation for the Upper Tioga River Watershed

Any amount is sincerely appreciated.
_____ Your Contribution

SPONSORSHIP LEVEL CONTRIBUTIONS
Your name, along with sponsorship level, will be included on the **www.tcccc-inc.org** website.

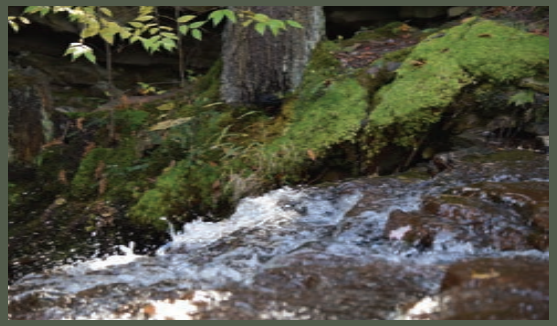
_____ Bronze $500 - $999
_____ Silver $1000 - $1999
_____ Gold $2000 - $4999
_____ Platinum $5000+

Please complete the information below and mail, along with check made payable to **TCCCC, Inc.**, to the address provided.

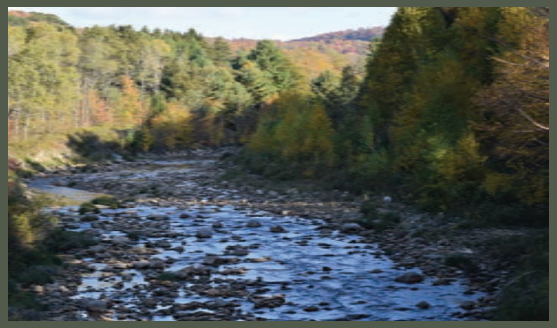
Business Name: _____
Contact Name: _____
Address: _____
Phone: _____
Email: _____

TCCCC, Inc.
"Save the Tioga River" Project
P.O. Box 124
Blossburg, PA 16912

Thank You for Your Support!



With your help, our coalition can take steps to remediate damages caused by AMD to the Upper Tioga River watershed. This in turn, will provide significant benefits to the area through increased recreational opportunities such as fishing, swimming and canoeing, improved aesthetic value of the river, decreased maintenance costs for bridges, and clearer, cleaner water to Pennsylvania and New York.



Watershed Coalition Partners

Blossburg Borough and Municipal Authority
Hillside Rod & Gun Club
PA Bureau of Forestry-Tioga State Forest
PA Department of Environmental Protection-Bureau of Conservation & Restoration
PA Department of Environmental Protection-Mining
Southwestern Energy Company
Susquehanna River Basin Commission
Tioga County Concerned Citizens Committee, Inc.
Tioga County Conservation District
Trout Unlimited
Ward Township

SAVE THE
TIOGA RIVER

Help improve the health of the Tioga River corridor and Tioga Lake so it can once again support aquatic life.

www.tcccc-inc.org

RECLAIMING THE
UPPER TIOGA RIVER WATERSHED

The Upper Tioga River watershed encompasses 280 square miles in north central Pennsylvania, and is part of the Susquehanna and Chesapeake Bay watersheds.

As recent as the 1970s, the Tioga River supported Class A wild brook trout populations. However, the river is severely impacted by acid mine drainage (AMD) from Fall Brook to Bear Creek all the way to the Tioga/Hammond Dam Complex. The acidic waterway, containing excessive concentrations of iron, manganese and aluminum, has left the river void of aquatic life. The stream bed is stained orange from iron oxide as it weaves its way through the towns of Blossburg, Covington and Mansfield.

Your contribution can help Save the Tioga River!

AMD impacts alone represent a conservative loss of $287,000 per year of fishery resources in the Tioga River and many of its tributaries.

In 2003, a study was conducted to identify sources of AMD impacting the tributaries that feed the Upper Tioga River. Based upon the study's findings, strategies were developed to treat AMD in these tributaries and improve the overall health of the river as it makes its way to Tioga/Hammond Dam.

While it may take decades to achieve the goal of complete ecosystem restoration, multiple benefits will be realized through the progressive treatment of AMD through this project.

BEAR CREEK

The Bear Creek watershed is the smallest at 0.7 square miles, and is the least accessible. There are at least five AMD discharges from abandoned deep mines impacting this watershed, all within a small area.

FALL BROOK

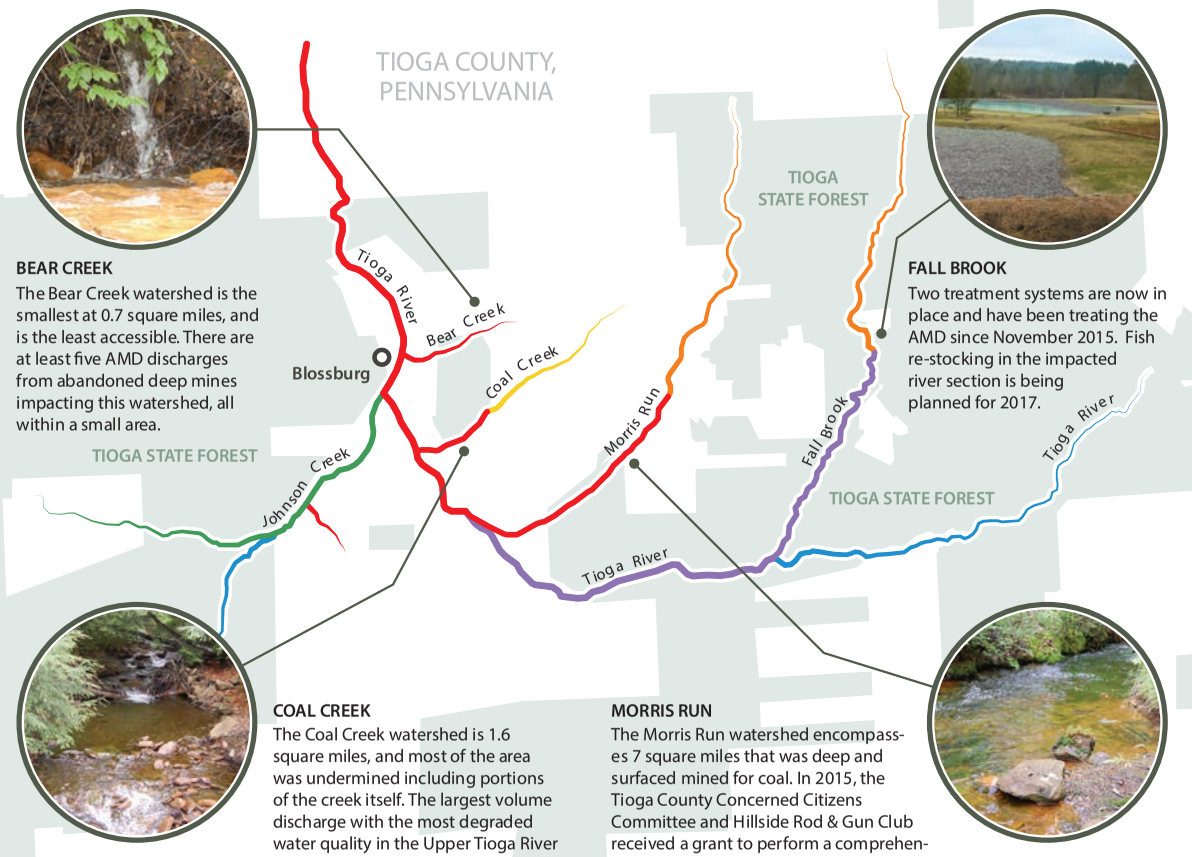
Two treatment systems are now in place and have been treating the AMD since November 2015. Fish re-stocking in the impacted river section is being planned for 2017.

COAL CREEK

The Coal Creek watershed is 1.6 square miles, and most of the area was undermined including portions of the creek itself. The largest volume discharge with the most degraded water quality in the Upper Tioga River Watershed is located on Coal Creek.

MORRIS RUN

The Morris Run watershed encompasses 7 square miles that was deep and surfaced mined for coal. In 2015, the Tioga County Concerned Citizens Committee and Hillside Rod & Gun Club received a grant to perform a comprehensive study of the Morris Run watershed.



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IMPACTS ON WATER QUALITY

- **Improving** - AMD impact halted
- **Good** - no significant impacts
- **Fair** - minor impacts, can support fish
- **Marginal** - impacts may impair fish
- **Poor** - likely cannot support fish
- **Very Poor** - likely no aquatic life

LIMNOTECH REPORT

Report by LimnoTech, a third party consultant that specializes in evaluating and quantifying benefits of water resource projects. This report was prepared prior to project construction and completion of the project.

PROJECT NAME: Fall Brook Acid Mine Drainage Reclamation
LOCATION: Tioga River watershed, Tioga County, Pennsylvania

DESCRIPTION OF ACTIVITY: Wetland construction for treatment of acid mine drainage

EXTERNAL PARTNERS: The Nature Conservancy and Hedin Environmental

OPERATING AREA: Marcellus Shale

OBJECTIVE:

- Reduce the cumulative negative impact of acid mine drainage on the Tioga River and its tributaries, and restore approximately 8 miles of stream.

BACKGROUND & ACTIVITY DESCRIPTION: The Upper Tioga River Watershed, located in north central Pennsylvania, has a long history of coal mining. Waterways from Fall Brook downstream to the Tioga/Hammond Dam Complex are severely impacted by acid mine drainage (AMD) from abandoned coal mines (Figure 1). The waterways are acidic with excessive concentrations of metals, and there is little to no aquatic life.

The 8.9 square mile Fall Brook watershed has been intensively deep and surface mined. Today it is largely forested, and there are multiple major and a few minor sources of AMD. The AMD causes severe to very severe impacts from monitoring station FALL2.5, downstream to the mouth. There are four AMD outfalls that drain to Fall Brook (DFB001, DFB002, DFB003 and DFB099); the largest and most severe discharge in this watershed is DFB099.

Figure 1. Fall Brook Acid Mine Drainage

Fall Brook is the most upstream AMD-impacted tributary in the Tioga River watershed, and restoration of this watershed is expected to improve not only water quality in Fall Brook, but also a three-mile section of the Tioga River, to the confluence with Morris Run.

The Fall Brook AMD Reclamation Project involves the collection, conveyance, and treatment of the largest individual AMD discharges entering the upper Fall Brook watershed. This project will involve construction of a series of wetlands that will treat this water at the source and return clean water with a neutral pH back to the river. In addition to pH, concentrations of aluminum and iron are anticipated to meet water quality standards after treatment. Alkalinity in the treated discharge is expected to provide an important function neutralizing not only the acidic water flowing from upstream areas, and also the acidity in the Tioga River downstream of Fall Brook. Additionally, manganese is expected to be reduced.

Figure 2 shows the site plan for the Fall Brook AMD chemical treatment plant. This project will treat AMD from DFB001, DFB002, DFB003 and DFB099, discharging treated water to Fall Brook. This project will restore 5 miles of Fall Brook and three miles of the Tioga River to a condition that is expected to

support recreational fishing. Native brook trout will be restocked to the site once the project is complete.

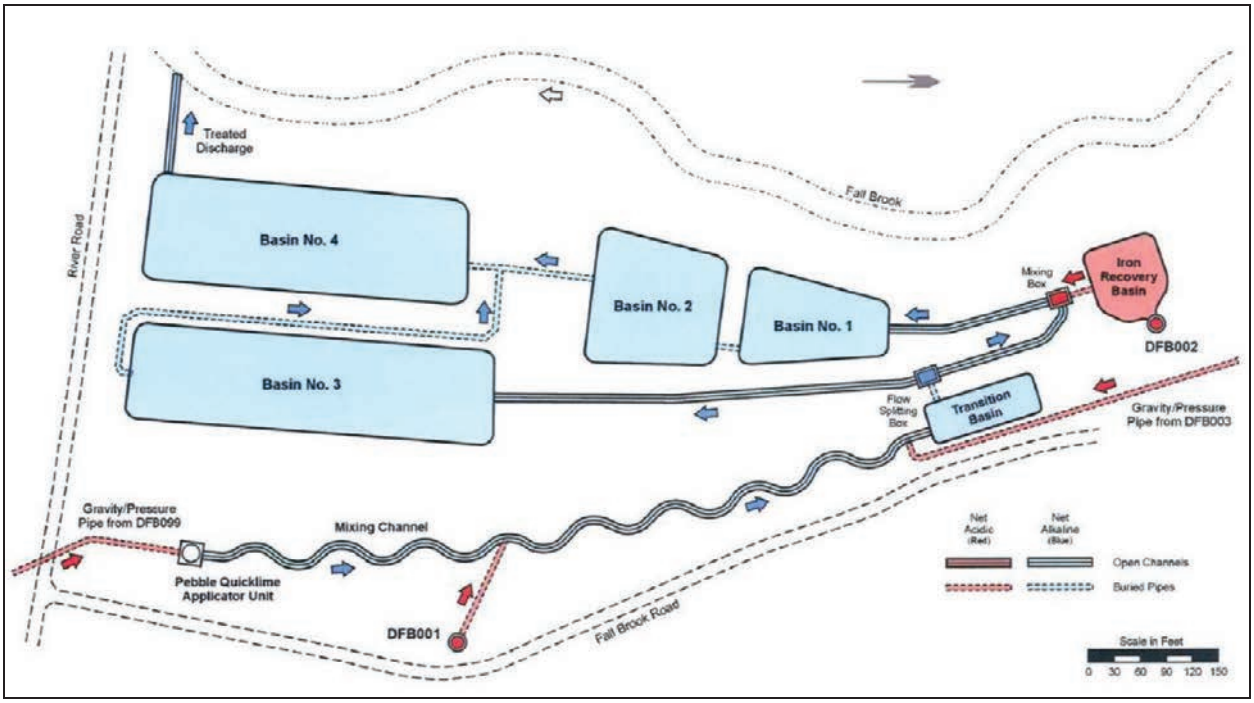


Figure 2. Fall Brook AMD Chemical Treatment Plant Project Site Plan

TIMELINE:

- 2014 – Assessment of the Proposed Fall Brook AMD Chemical Treatment Plant
- The schedule for the following activities is not yet determined, but will involve:
    - Design and construction plans: 3 months
    - Permit approvals: 3 – 6 months
    - Construction duration: 3 months (construction can only occur between May and October)

  As an example, if the project is initiated in May 2014, it is likely that plans would be available mid-summer, permits issued in the fall, and construction would begin in spring/summer of 2015.
- Additional restoration work will implemented in downstream reaches (schedule TBD)

COST SHARE: 100%

Total project budget: $2,400,000 (includes capital, operation and maintenance)
SWN contribution: $2,400,000
Other contributions: $0

OFFSET BENEFIT CALCULATED:

1. Volume of water treated

1. VOLUME OF WATER TREATED

Approach & Results

The offset is calculated as the volume of contaminated water treated to relevant thresholds, which are based on state water quality standards for aquatic life. The volume of contaminated water that will be treated is equal to the volume of the AMD discharges. As described below, a conservative estimate of flow was selected for the offset calculation, based on flow measurements from the four discharges.

Flow data collected in 2001-2007 were evaluated to determine the average and percentile values for flows (Table 1). The flow through the treatment wetland system will be highly variable because it is driven by precipitation. The treatment system will be designed to treat the 90th percentile flows, helping to ensure AMD will be treated at higher flows. During the 10% of the time that very high flows occur, the flows in Fall Brook are also very high, and will be able to receive this extra untreated water with little or no environmental impacts (Hedin Environmental, 2014). The long-term average flow through the system is estimated to be 857 gallons per minute and this conservative estimate of flows that will be treated was used in the offset calculation.

Table 1. Percentile values for flow, based on 2001-2007 monitoring data

Discharge	Period	Flow rate (gpm)		
		Average	75th percentile	90th percentile
DFB099	2001-06	672	803	1,176
DFB001	2002-07	38	40	55
DFB002	2002-07	71	60	71
DFB003	2002-07	76	100	108
Sum		857	1003	1,410

The relevant threshold to which the AMD discharges will be treated is based on water quality standards for aquatic life. Table 2 presents the range of water quality concentrations observed from the four AMD discharges between 2001 and 2014 compared to relevant Pennsylvania aquatic life water quality standards. This table shows that the AMD discharges are not currently meeting the Pennsylvania water quality standards for aluminum, iron and pH, and that the treated AMD is expected to meet the applicable water quality standards for these parameters. Although not shown in Table 2, treatment is also expected to reduce manganese concentrations.

Table 2. Water quality standards compared to the quality of untreated water and anticipated quality of treated water

Parameter	Aquatic life water quality standard	Untreated water (2001-2014)	Expected discharge quality
Total recoverable iron (mg/l)	1.5 (maximum)	0.5 – 13.0	< 1
Aluminum (mg/l)	0.75 (maximum)	2.1 - 14.4	< 1
pH	6.0 – 9.0	3.3 - 3.6	6.5 – 7.5

The offset calculation is as follows:

Offset = 857 gallons per minute = 450,439,200 gallons per year =10.7 million barrels per year

SWN OFFSET VOLUME (PRELIMINARY)
The SWN offset volume is based on the total offset volume, adjusted to account for SWN cost share. **Upon project completion, the SWN offset is estimated to equal 10.7 million bbl/year * (100)% cost share = 10.7 million bbl/year**

Data sources

- Timeline and expected quality of the treated discharge provided by Bob Hedin

Assumptions

- It is assumed that the treatment system will be constructed as designed, and will operate as expected, based on information provided by Hedin Environmental and SWN.

OTHER BENEFITS

- Improvements to quality of downstream waters
- Improved fishery

NOTES:

- The offset result is preliminary and based on information available at the time this fact sheet was written. The result may change if plans change from those presented herein.

REFERENCES

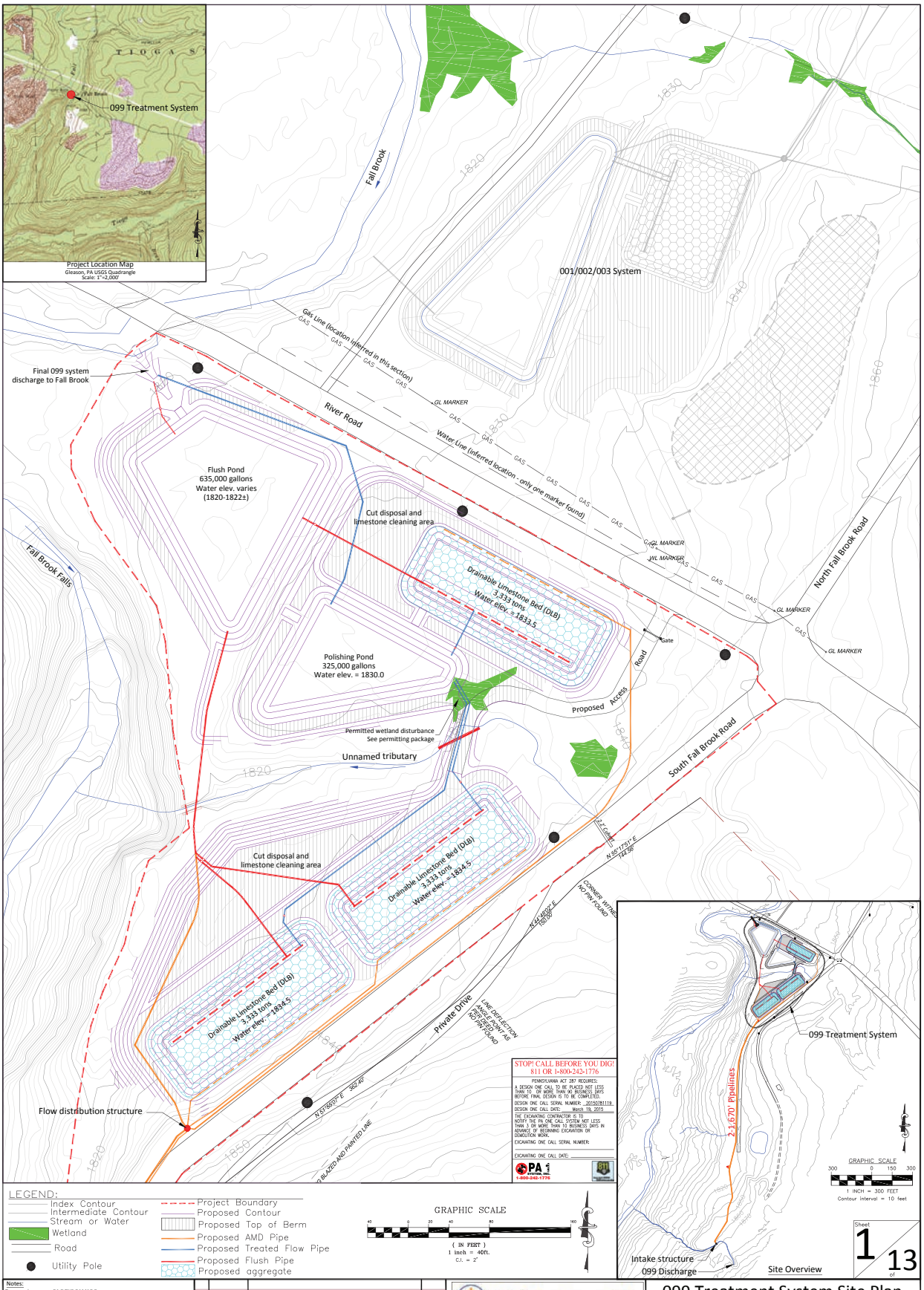
Hedin Environmental. 2014. Assessment of the Proposed Fall Brook AMD Chemical Treatment Plant Tioga River Watershed, Tioga County. Technical report provided by Hedin Environmental through the Trout Unlimited AMD Technical Assistance Program.

Orr, Jennifer. 2003. Watershed Assessment and Remediation Strategy for Abandoned Mine Drainage in the Upper Tioga River Watershed, Publication 230. Watershed Assessment and Protection Division, Susquehanna River Basin Commission. Prepared in cooperation with the Pennsylvania Department of Environmental Protection under Contract No. 350327.

FALL BROOK AMD TREATMENT FACILITY CONSTRUCTION DRAWINGS

Treatment facility site plan drawings for:

- AMD discharge 099 on the south side of River Road
- AMD discharges 001, 002 and 003 on the north side of River Road



Notes:
Topography source: PA DCNR PAMAP Program
Stream and wetland delineation by: Stantec Consulting Services, Louisville, KY
SITE FEATURES SURVEYED BY DUANE E WETMORE PLS
NOTES:
1. ELEVATIONS NAVD88 DATUM, HORIZONTAL CONTROL NAD 1983 PA NORTH ZONE SPC FEET.
2. UTILITY LINES AS VISIBLE OR AS MARKED WITH VISIBLE MARKERS. THERE MAY BE UNDERGROUND UTILITIES NOT SHOWN HEREON.
3. NO PA ONE CALL INFO SUPPLIED TO SURVEYOR.
4. BENCHMARKS ARE YELLOW 'BENCHTIE SPIKES' W/ UNLABELED YELLOW TAGS.

Review Set - NOT FOR CONSTRUCTION

No.	Date	Description	By
2	04/28/15	Renumber sheets, minor edits	naw
1	04/10/15	File Creation	naw

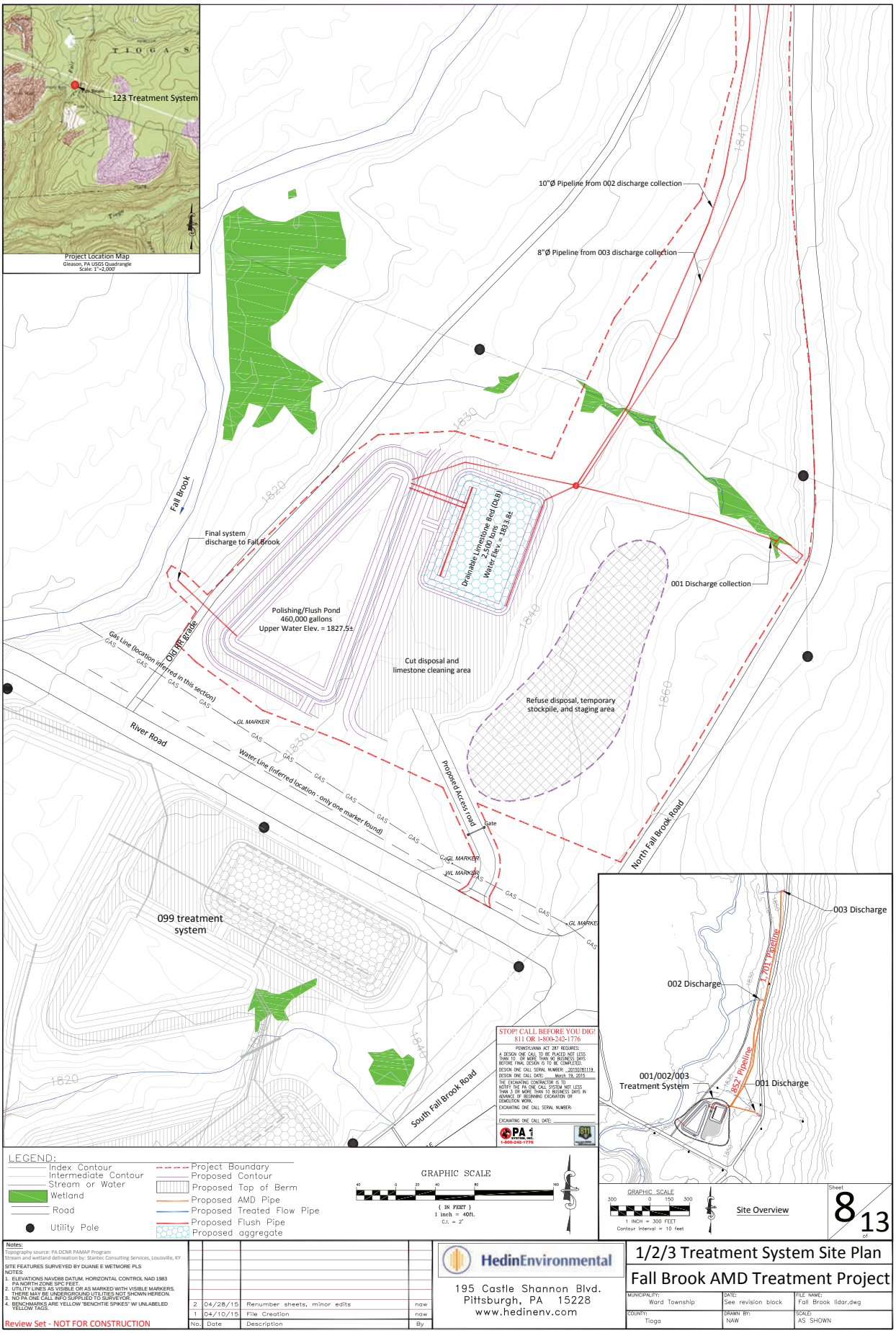
HedinEnvironmental
195 Castle Shannon Blvd.
Pittsburgh, PA 15228
www.hedinenv.com

099 Treatment System Site Plan

Fall Brook AMD Treatment Project

MUNICIPALITY:	DATE:	FILE NAME:
Ward Township	See revision block	Fall Brook lidar.dwg
COUNTY:	DRAWN BY:	SCALE:
Tioga	NAW	AS SHOWN

Sheet 1 of 13



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HedinEnvironmental
195 Castle Shannon Blvd.
Pittsburgh, PA 15228
www.hedinenv.com

1/2/3 Treatment System Site Plan

Fall Brook AMD Treatment Project

MUNICIPALITY:	DATE:	FILE NAME:
Ward Township	See revision block	Fall Brook lidar.dwg
COUNTY:	DRAWN BY:	SCALE:
Tioga	NAW	AS SHOWN

Sheet 8 of 13

FALL BROOK AREA & FACILITY PHOTOS

Various photographs before and after construction and operation of the Fall Brook AMD treatment and restoration project.


TIOGA
RIVER

Acid mine drainage with excessive concentrations of iron.

Aerial photo of Fall Brook AMD treatment facility.

AMD treatment drainable limestone bed. AMD flows through beds at design retention rate to adjust pH.

AMD treatment polishing basin. Coloration influenced by aluminum dropping out of treated water.

Fall Brook Falls downstream of treatment facility.

Fall Brook AMD Treatment Facility ribbon cutting ceremony. Pictured are representatives of Southwestern Energy, Tioga State Forest District, Tioga County Conservation District, Susquehanna River Basin Commission, Office of the Secretary of Pennsylvania DEP, Tioga County Concerned Citizens Committee, Hillside Rod & Gun Club, Office of Pennsylvania State Senator Joe Scarnatti, Office of Pennsylvania State Representative Matt Baker, Office of Tioga County Commissioner, Office of the Mayor of Blossburg.