



Askam



Driving along S.R. 29 in Hanover Township brings an unexpected view: a large orange pond fed by an equally orange stream. Interestingly, the pond is new to the landscape. Constructed by Earth Conservancy over the past several years, it is part of a larger system designed to address acid mine drainage discharging from the Askam Borehole into the Nanticoke Creek.

The Askam Borehole, named after the nearby village of Askam, was drilled in the 1970s. When the mines were active, massive pumps would remove groundwater to allow work. When the mines closed, however, the pumps went offline. Rainfall, snowmelt, and diverted streams filled the cavernous voids. The waters, with nowhere to go, overflowed into the basements of nearby homes. Drilling boreholes alleviated the climbing water pressure by providing an alternative outlet. Unfortunately, another problem ensued. Along with the gushing water, acid mine drainage (AMD) spewed into the receiving Nanticoke Creek. (continued, Page 2)

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Askam, continued....



AMD forms through the interaction of certain minerals found in mine waste – here, pyrite – with oxygen and water. When the three combine, sulfuric acid and dissolved iron result. Waters in the underground mines are always present – pooling, reloading, and then escaping. The process never wanes. At Askam, up to 7,000 gallons of water are expelled per minute into the Nanticoke Creek, waters which flow on to the Susquehanna River, and ultimately into the Chesapeake Bay. The watersheds of all three are affected, too.

The consequence of AMD is that surrounding waters show elevated concentrations of metals and a lower than normal pH, both of which can seriously impair water quality. AMD makes the water more than impotable; it coats streambed surfaces, destroying habitat and poisoning aquatic life. This affects the entire ecosystem. In some sections, the waterway essentially is rendered dead. Take, for example, the initial chemical reading at Askam for iron concentration: it was 34 times higher than the aquatic standard.

In 1999, Earth Conservancy (EC) built a demonstration wetlands system across the road from the Askam Borehole to mitigate AMD pollution. For nearly a decade, it treated part of the discharge successfully. However, in 2007 the borehole collapsed due to corrosion of the lining and localized flooding returned. In response, the U.S. Department of the Interior's Office of Surface Mining (OSM) drilled two new boreholes, both of which again released their effluent into the Nanticoke Creek.

EC partnered with the Pennsylvania Department of Environmental Protection (DEP), the DEP Bureau of Abandoned Mine Reclamation, and the United States Army Corps of Engineers (ACOE) to develop a plan for comprehensive restoration of the Nanticoke Creek watershed. The collaboration resulted in *Section 206 - Ecosystem Restoration: Nanticoke Creek Watershed, Luzerne County, Pennsylvania, Detailed Project Report and Integrated Environmental Assessment* (2005). Addressing AMD discharge from the Askam Borehole was cited as a priority in rehabilitating the watershed.

Several treatment alternatives were considered. Based on geography, technology, and cost effectiveness, an oxidizer was recommended. Oxidizers are considered a semi-passive treatment system. Contaminated water

On the cover: Current view of the Askam Borehole AMD Treatment System, looking down from S.R. 29.

At left, top: The Nanticoke Creek at Askam, prior to restoration work; **left, middle:** Construction of the settling pond for the AMD treatment system; **left, bottom:** Installation of the oxidizer.

At right: The oxidizer processing AMD-contaminated water from the Nanticoke Creek.



flows into a large, chambered unit that injects massive amounts of air into the water. The increased aeration together with the powerful turbulence changes the water's chemistry: dissolved metal ions are oxidized, thereby becoming less soluble, and begin to fall out of suspension as a result. Next, the water passes into a large settling pond divided by screening baffles, in which iron precipitation continues. The treated water then re-enters the primary waterway, where cattails and other wetland plants help filter out residual metals. No chemicals are involved in the remediation process.

The installation of the oxidizer was made possible through grants from the DEP, OSM, and the Pennsylvania Association of Conservation Districts, and through EC's own reserves. Construction work began in 2013, and the oxidizer was installed in May, 2014. Currently, EC is working with engineers to optimize the system's AMD-processing capabilities at higher flow rates. Approximately \$950,000 has been spent on the Askam project. In total, EC has invested over \$2.7 million in its watershed improvement and AMD mitigation work across Luzerne County.

EC also is seeking funding to develop a small wayside exhibit at the Askam site. Comprised of several interpretative panels, the exhibit will not only explain the oxidizer system, but also present historical and environmental information. The Eastern Pennsylvania Coalition of Abandoned Mine Reclamation (EPCAMR) and two classes of 7th and 8th grade students from the Wilkes-Barre Area School District will help in the exhibit's design. Grant funding already has been awarded by ARIPPA. Initial work on the project will begin in the spring of 2016.

What is Acid Mine Drainage?

Acid mine drainage (AMD) is a form of water pollution caused by metals dissolved in subterranean waters that drain from mine workings. In the anthracite coal region, pyrite is the main acid-generating material. According to the EPA, AMD is the chief pollutant of waterways in the mid-Atlantic. Over 5,000 miles of streams in Pennsylvania are impacted by AMD.

What are AMD's effects?

AMD contamination is evidenced by an orange sludge that coats waterways and streambanks. It renders water impotable and, because of changes to the water's chemistry, also affects the ecosystem by destroying habitat, disturbing breeding grounds, and disrupting the food chain. In many areas, sections of waterways are considered "biologically dead."

What has EC done?

In addition to work at Askam, EC constructed a passive wetlands system to treat an AMD seep along Espy Run, which is also part of the Nanticoke Creek Watershed. Waters now entering the creek are virtually free of iron. Many of our abandoned mineland reclamation projects also reduce AMD through extensive earthwork, stormwater management, and vegetation practices.



Bliss Bank Reclamation, Phases I and II

Located off Middle Road, Bliss Bank spans 200 acres of abandoned mineland, with massive culm banks and deep pits covering the site. EC began work in 2005 through a DEP Energy Harvest grant, which funded the removal of 125,000 tons of spoils for processing at a regional cogeneration facility. There, the material was converted into approximately 48,000 megawatts of electricity. After that, engineering design work ensued. Reclamation of the first 36 acres is nearing completion, with the majority of the site graded and revegetated. Phase II is slated to begin in the spring of 2016 and will involve construction of significant stormwater controls, including 7.1 acres of channel and a 14-acre detention basin. A riparian buffer will also be established. To date, over \$1.5 million has been invested in the project. Ultimately the site will be made available for mixed-use development, including conservation areas. Support for Bliss Bank has been provided by the EPA, DEP, and EC.

At left: View overlooking a section of culm banks on Bliss Bank, Phase I, prior to reclamation.

Warrior Run Reclamation

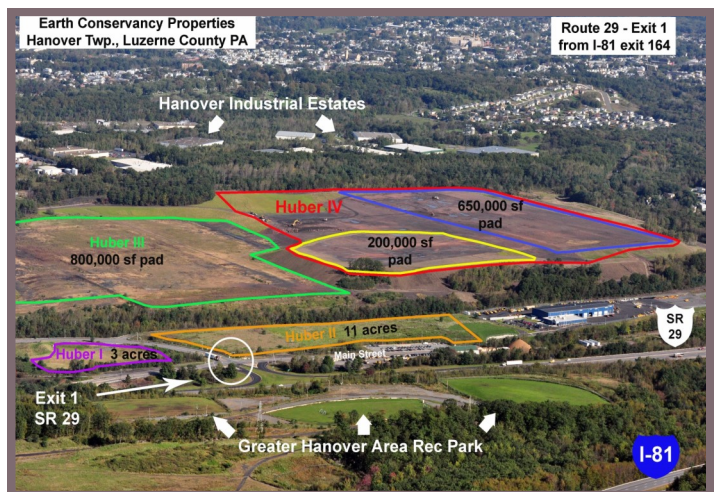
In addition to its work on Bliss Bank in 2015, EC reclaimed 14 acres of mine-scarred land in Warrior Run Borough, off of Slope Street. Near a residential neighborhood, the property had been used by the Blue Coal Corporation to hold overburden. As a consequence, hundreds of tons of mine spoils trailed across the surface, almost resembling long, black fingers. The site was also a haven for illegal dumping and trespassing by ATVs. The project involved grading of the land and revegetation. Now reclaimed, the site is most suitable for residential use, especially with its proximity to existing roads and utilities. The Warrior Run project was funded by a \$200,000 Brownfields Cleanup Award from the EPA, along with additional funds from EC.

At left: Newly seeded reclamation site in Warrior Run Borough.

Huber III & IV Properties Move into Development Phase

Reclamation of the Huber IV site in 2011 marked EC's final project on the minelands clustered around Exit #1 of S.R. 29. Work on Huber III began in 2005. Building on its success there, EC decided to purchase the adjacent Huber IV lands in 2008, through loans from the Pennsylvania Department of Community and Economic Development. The Huber IV reclamation was completed in 2012. Together, these projects converted 170 acres of unusable land into prime industrial property, encouraging economic development in the region. In 2014, Huber III and IV were sold to TC NE Metro Development, a subsidiary of Dallas-based developer Trammel Crow. The property is now owned by Prologis, whose conceptual plans for the site offer numerous building configurations, ranging from 300,000 to 2 million square feet and flexible enough to accommodate a variety of business needs.

At right: View of the reclaimed Huber site, Phases I-IV. Also visible is the Greater Hanover Area Recreational Park, another EC reclamation project.



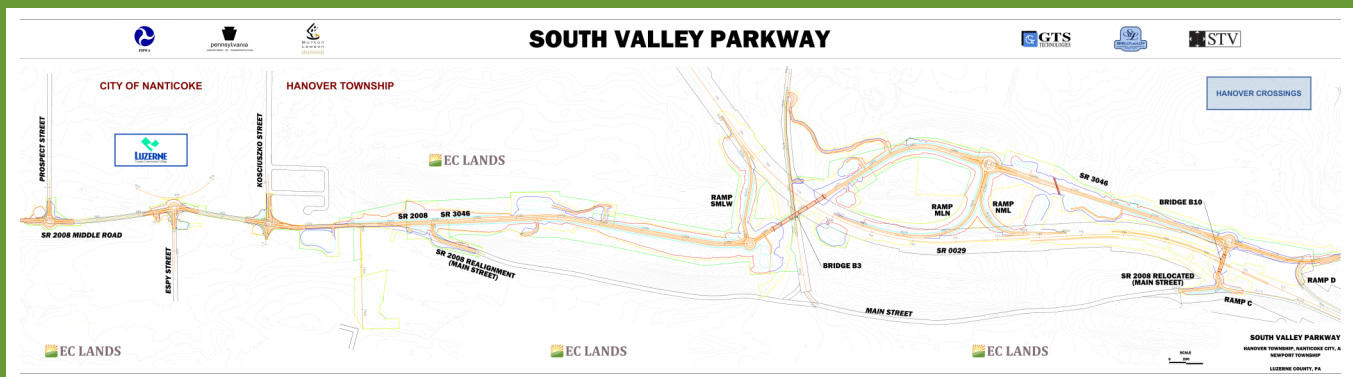
Hanover 9 Reclamation

At 390 acres and spanning two municipalities (Hanover Township and the City of Nanticoke), Hanover 9 is one of EC's larger sites requiring reclamation. Previously, the tract had been strip-mined and used to hold mining wastes. Deep pits and overburden piles resulted, with only scraggly scrub vegetation managing to grow. For EC, Hanover 9 had always been a priority: across from the site lies the entrance to Luzerne County Community College (LCCC). Moreover, the South Valley Parkway will run through part of it. Because of its size, Hanover 9 has required that reclamation occur in smaller, sequential projects. Parcel A, bordering Kosciuszko Street, was reclaimed in 2012. Work on Parcels B, C, and D, totaling 112 acres, was completed in 2014. In addition to preserving older-growth trees, extensive revegetation was performed, including tree plantings in partnership with the Pennsylvania Environmental Council and EPCAMR. Work at Hanover 9 has been supported by funding from the EPA, DEP, OSM, and EC. Planning for future remediation projects at Hanover 9 is ongoing.

At right: View on the reclaimed Hanover 9 site, with stormwater controls and a large detention basin visible.



Project Spotlight: Work on the South Valley Parkway Begins



Adapted from Diagram of SVP, Courtesy of PennDOT

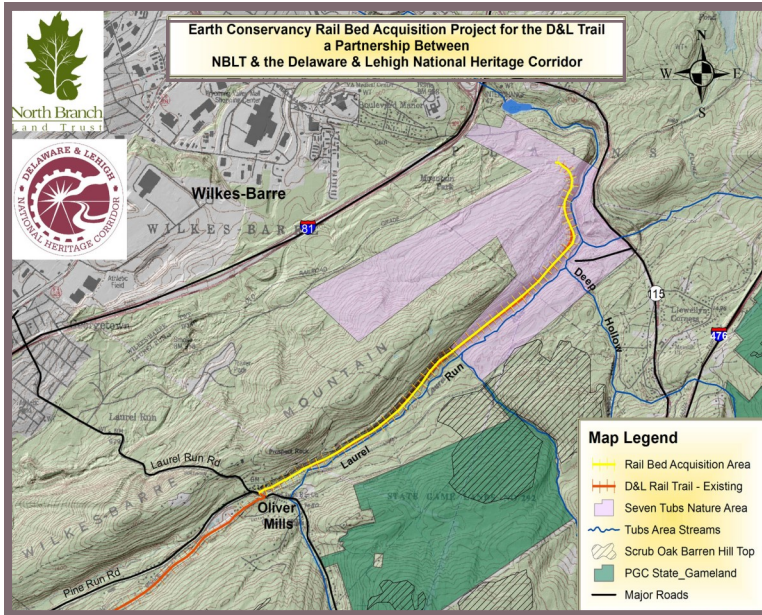
Long in development, work on the South Valley Parkway (SVP) is finally underway. EC has been involved with the project since the beginning, first suggesting the roadway in its *Land Use Plan* in 1996. Then, as now, the SVP aimed not only to reduce traffic along Middle Road, but also to open up the lower Wyoming Valley for economic development.

Initially, the SVP was envisioned as a four-lane highway, running from S.R. 29 at Middle Road to the Kirmar Parkway. PennDOT launched the project in 2001. By 2010, the design had been modified to a two-lane road with climbing and turning lanes, ending just before Kosciuszko Street and the entrance to LCCC. Still, as first intended, by bypassing Middle Road the SVP would ease congestion, increase safety, and improve access to the college and surrounding lands, including EC's Bliss Bank and Hanover 9 sites. Current plans include six roundabouts, two new bridges, and a reconfiguration of Exit 2. New lighting will also be installed. In total, the project will involve excavation of more than one million cubic yards of material and cost over \$60 million. Bids were submitted to PennDOT for construction services in November 2015. On-site work began in January 2016.

Along with the Greater Wilkes-Barre Chamber of Commerce and other private parties, EC is a major landowner in the area of the SVP. In addition to donating land valued at \$1 million to the project, EC will be involved in the construction process by allowing access to its properties for staging and stockpiling of fill, material that ultimately will be reused for building pads for future development at the site.

North Branch Land Trust Acquires EC Lands

When EC completed its original *Land Use Plan* (LUP) in 1996, the report recommended that 10,000 of EC's nearly 16,500 acres be dedicated to recreational spaces and greenways. Over its 20 years, EC has built parks and trails, and preserved thousands of acres of land to that end. In 2015, in collaboration with North Branch Land Trust (NBLT) and the Pennsylvania Department of Conservation and Natural Resources (DCNR), two significant acquisitions have moved EC even closer to realizing its 10,000 acre goal.



Above: Map of EC property now incorporated into the D&L Trail (image courtesy NBLT); **Below:** View overlooking Shickshinny and the Susquehanna River from the Mocanaqua Loop Trail.

collection of four interconnected trails of varying terrain. The trails, totaling about 15 miles, were proposed in EC's *Lower Wyoming Valley Open Space Master Plan* (1999). Sections wind along the mountainside, offering visitors access to woodlands, wildlife, and scenic views, as well as remnants of the region's coal mining history, including industrial ruins and spots of still mine-scarred land. The area accommodates hiking, mountain biking, and snowshoeing, and is also popular for rock climbing and geocaching. Because of these features, particularly the Loop Trail, Lackawanna and Luzerne Counties' *Open Space, Greenways & Outdoor Recreation Master Plan* (2004) had targeted the area for conservation.

For both acquisitions, half of the appraised value of the land was gifted by EC. The properties have been deeded to the Pennsylvania Bureau of Forestry, and are now part of the Pennsylvania State Forest system. Under its control, the Bureau will ensure the lands remain protected

from
development
in perpetuity.

The first tract, located in Plains Township, figures into NBLT's ongoing work on the Delaware & Lehigh National Heritage Corridor, a 165-mile, federally-designated heritage trail that begins in the Wyoming Valley. Several sections integral to the trail's completion are owned by EC, including part of an old Lehigh & Susquehanna rail bed. NBLT's first acquisition, 2.5 miles between Oliver Mills and the Seven Tubs Natural Area, has already been transferred to DCNR to make improvements for eventual inclusion into the trail system. Construction is expected to begin in the spring of 2016. Planning for the final section of trail, from the Seven Tubs Natural Area to Wilkes-Barre, is underway.

The second parcel of land, mostly-forested and totaling over 3,000 acres, is located to the east of Mocanaqua and encompasses part of Penobscot Mountain. Within the tract is the Mocanaqua Loop trail system – a



EPA Awards Earth Conservancy \$400,000 in Brownfields Cleanup Grants

On a very warm September 9, 2015, EC hosted a press event at its Hanover 9 site to announce the award of two \$200,000 Brownfields Cleanup grants from the EPA for the second phase of reclamation work on the Bliss Bank site. The project will address another 54 acres of severely mine-scarred land along Middle Road in the City of Nanticoke and Hanover Township, which will amend environmental damage and improve the land for potential mixed-use development. On hand was EPA Regional Administrator Shawn Garvin, as well as other members of the Region 3 team. Speakers included Mr. Garvin; Mike Dziak, EC President/CEO; State Senator John Yudichak, D-14; and Nanticoke City Manager Andy Gagaris. Work is anticipated to begin in 2016.

Pictured at right, from left to right: Geoff Shaw, EC Executive Administrator; State Representative Gerald Mullery, D-119; Shawn Garvin; Andy Gagaris; Mike Dziak; and State Senator Yudichak. *Below, left:* Mike Dziak speaks about the Bliss Bank project; *below, middle:* Mickey Young, EPA Environmental Protection Specialist; *below, right:* Senator Yudichak discusses the importance of EC's reclamation work for the region's environmental health and economic development.



Earth Conservancy Staff News

After 19 years with the organization, John Renfer, EC's Executive Administrator, retired. With EC almost since the beginning, John was an outstanding member of our team, overseeing finances, maintaining budgets, and managing project activities and reports. Hardworking and intelligent, John's contributions were integral to EC's success. All of us at EC thank him for his service and loyalty. We wish him and his wife much happiness in the coming years.

Also, it is with deep sadness we note the passing of Jacqueline Munro, EC's longtime Director of Public Affairs and

Development. Jackie excelled in her position. During her 11 years with EC, she handled all our design and communications work, facilitated media relations, launched EC's website, raised millions of dollars in grant and loan awards for the organization, and fostered strong partnerships throughout the community. She was an unwavering advocate for EC's mission, and was committed to improving and protecting the environment. Above all, she was a kind, generous, funny, and wonderful friend who continues to be missed greatly.



Other Earth Conservancy News

ARIPPA Awards EC Grant for Askam Wayside Exhibit

In 2015, EC was awarded a \$1,200 grant from ARIPPA, a nonprofit trade association for the cogeneration industry, for the development of a wayside exhibit at its Askam Borehole AMD Treatment System. The project, to be done in collaboration with EPCAMR and students from the Wilkes-Barre Area School District, will create interpretative signage regarding the local environment, mining history, and the Maelstrom Oxidizer system.

EC Donates Land to Newport Township for New Municipal Building

August 3, 2015, marked Newport Township's dedication of a new municipal building. Located along the Kirmar Parkway, the building accommodates offices, a police station, and a community room. It is also energy-efficient and ADA-compliant. EC was pleased to be a project partner, donating nearly six acres of land for the new construction and future township projects, and lending support for the initiative throughout.

EPA Features EC's Reclamation Work as 2015 Brownfields Cleanup Success Story

EC was one of six entities selected nationwide by the EPA for a 2015 feature story highlighting its success in returning abandoned minelands and damaged waterways to environmental health and productive use. EC's Concrete City, Franklin Bank, Espy Run, and Hanover 9 projects, among others, were included. EC has received 12 Brownfields Cleanup awards since 2003, totaling \$2.4 million.

Recent Awards

EC has been honored over the past several years with numerous awards for its work environmental stewardship and community revitalization efforts in Luzerne County. These include a 2012 Governor's Award for Environmental Excellence for the Espy Run Wetlands Enhancement project; a 2012 Professional Recyclers of Pennsylvania (PROP) Waste Watchers Award for EC's composting facility; and a 2013 Governor's Award for Environmental Excellence for the Huber IV reclamation project.



acres reclaimed



million invested



green acres preserved

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Conservancy**

Earth Conservancy is a nonprofit, 501(c)(3) corporation. Board meetings are open to the public and are generally held on a quarterly basis at 8AM at the Earth Conservancy offices, 101 South Main Street, Ashley, PA 18706. Call the office at 570.823.3445 for more information on meeting dates and times.

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