

elements



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Pennsylvania's DEP
Reclaims Polluted Waters



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On the Cover:

The Hollywood centralized treatment plant in north central Pennsylvania treats an average of 4,000 gallons per minute of acid mine drainage (AMD) collected from 20 separate mine discharges.

All the Right Resources

CEC's growth strategy incorporates two objectives: to more fully service our clients—wherever they do business—and to provide opportunities for the professional growth of our employees. Our success is defined by our ability to strengthen relationships with our clients and employees.

As we expand geographically and professionally, our knowledge and expertise increase more than linearly because of the quality of people who decide to join us. Combining the skill sets and technical resources of the entire firm while applying a deep level of regional expertise allows CEC to deliver results that improve and enhance the places where projects are located, benefit the people they affect, and enable our clients to meet their business objectives.

All of this increases the excitement we feel regarding our growth and adds to the enthusiasm we have for tackling our clients' most challenging projects.

Kenneth R. Miller, P.E.

President and CEO

December 5, 2014

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The Bennett Branch watershed is forested and mountainous with deep valleys. Water quality in the main stem of Bennett Branch now supports a viable sport fishery.

Taking Stock: Pennsylvania's DEP Reclaims Polluted Waters

A few years ago, locals who deigned to dip in the Bennett Branch of the Sinnemahoning Creek would emerge from the water a shade of orange they'd all come to know. This stretch of water in north central Pennsylvania had been polluted with acid mine drainage (AMD) for more than 100 years.

Pennsylvania attempted to abate these AMD issues for decades. What finally opened the floodgates was a comprehensive stream restoration project beginning in 2004 and led by the Pennsylvania Department of Environmental Protection (PADEP). This full-scale commitment would help reclaim multiple abandoned mined land sites and miles of impacted waters.

Abating the mine drainage impacts within the Bennett Branch of the Sinnemahoning Creek, a tributary to the West Branch of the Susquehanna River, would remedy numerous other impacted waters. Plus, the watershed was 70% state-owned land (game lands, state forests). Tourism already was on the rise due to a growing Rocky Mountain elk herd, but the missing piece was the water. There was zero aquatic life.



Community members of all ages took part in a trout stocking day as part of the Pennsylvania Fish and Boat Commission's Cooperative Nursery Program.

In January 2006, PADEP selected CEC to conduct an alternatives analysis, which included developing a comprehensive water quality and flow assessment of the Bennett Branch and an assessment of the impacts that a chemical water treatment plant would have on the watershed. "This assessment included sampling and testing fully measured flows from numerous mine discharges to determine which were critical for collection and treatment," said Douglas Clark, a principal with CEC.

"When CEC submitted for Phase I, they indicated they would do stream and

discharge modeling," said Eric Cavazza, Bureau Director for Abandoned Mine Reclamation for PADEP and who oversaw design and construction of the treatment plant. "Their plan allowed us to look at individual discharges and model the impact of the cleanup. CEC did a nice job of collecting data and using existing data to convince us that some discharges could be avoided. The modeling approach was a big positive for us."

In July 2006, CEC partnered with Veolia Water Technologies for Phase II. CEC compiled and assessed water quality and

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flow data collected from Bennett Branch into the existing dataset assembled in Phase I. CEC also reassessed the mass balance models developed in Phase I and reassessed projected water quality versus established water quality goals. Conclusions were used by Veolia to develop the treatment process and design for the AMD treatment system.

“The intent, from the start, was that chemical treatment would increase the pH in the water to offset AMD impacts and make a good fishery,” said Robert Zick, a director with Veolia. “The project was quite challenging because the collection system included many source waters of varying qualities.”

The team discovered that they would need to install lift stations to pump the collected AMD to the treatment plant as opposed to relying on a gravity-fed system. “It definitely was not an out-of-the-box approach,” said Cavazza. “CEC developed every spec for the conveyance system individually.”

The Phase II design was complete in July 2007, but there was much to be done before construction could begin, as right-of-way and surface access had to be acquired from 28 private landowners and construction funding needed to be lined up.

The Hollywood centralized AMD treatment plant (named after the nearby town) went online under the operation of the Bureau of Conservation and Restoration in 2012. Water is collected at 20 separate discharges from four abandoned underground mines and sent for treatment along nearly four miles of conveyance lines. The plant covers 41 acres and treats an average of 4,000 gallons per minute with a design flow capacity of approximately 7,000 gallons per minute.

In April 2013, as part of the Pennsylvania Fish and Boat Commission’s Cooperative Nursery Program, 1,000 trout were stocked in the waters upstream and downstream from the plant for the very first time. “In less than one year, the Hollywood plant raised



During Phase II, CEC completed rock coring at 19 separate test boring locations.



The trout restocking event in April 2013 was led by the Potter County Anglers Club.



More than 18,000 feet of 8- to 24-inch diameter pipes collect and deliver water to the treatment plant.

the pH from 3.3 to neutral and removed harmful metals like iron, aluminum and manganese,” said Kelly Heffner, PADEP Deputy Secretary for Water Management.

This year, an even greater milestone occurred: The Fish and Boat Commission placed the Bennett Branch on its official trout-stocking roster.

“I take pride in the fact that the water is now clean and I had a small part in

that,” said Cavazza. “It’s been good for the Commonwealth, but it also opened our eyes. For a while we pursued passive treatment to save on operating costs, but we learned that some problems are just too big for passive treatment. The Hollywood project was our first attempt at going back to a full-scale treatment plant. Because of this project’s success, we now have two more in design and others under consideration.” ■

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“The angler forgets most of the fish he catches, but he does not forget the streams and lakes in which they are caught.” –Charles K. Fox
.....



One City's Response

Overcoming the layered complexities of urban redevelopment

Artistry is a mixed-use space with urban apartment homes and nearly 68,000 square feet of commercial office space downtown.

Between 2008 and 2018, the City of Indianapolis will welcome 7,500 new residents downtown, and with this migration will come needs for places to work, play and learn.

To spur and accommodate this growth, Indianapolis, like many of our nation's cities, had to overcome its aging and complex physical infrastructure system, including deteriorating utilities, auto-centric transportation patterns and distressed historic buildings.

Downtowns are complex locations for redevelopment, let alone the fact that there are many stakeholders, each with a unique set of concerns. "Frequently, you have a developer who is uncertain of his infrastructure demands, multiple utility providers with specific requirements within tight space constraints, and multiple city departments, each managing a specific community asset," said Aaron Hurt, CEC Vice President and Indianapolis office lead.

"All parties need to understand each other's goals," said David Roth, CEC Principal, "but there also needs to be a universal understanding of the community's goals. It's not about a singular project; it's about



The Indiana Avenue Streetscape project integrates trees, ground level plantings, public art, new lighting and bike lanes.

managing the moving parts and collectively making sure the right things happen for growth to occur—a systems approach to redevelopment that enhances overall quality of life."

Adam Collins, Deputy Director of Economic Development for the City of Indianapolis, believes that the City's vision and strategy have been clear from the start. "We want to attract and retain talent for our businesses and community. Vibrant, walkable, livable urban neighborhoods are what people want, and we must deliver that product to meet our goals. For that to happen, everyone needs to be on the same page."

Indianapolis benefits from a strong heritage of public-private partnerships. Stakeholders have open minds and are willing to talk about and look at innovative solutions for

transformative catalytic projects. Collins believes projects are most successful when private firms with specific know-how for tackling issues have experience working with the city's varied departments.

"What really differentiates CEC," Collins said, "is that they know how to do business with the municipality and bring creative solutions to the table. CEC understands what the City can and can't be flexible on, so time isn't spent on items that aren't feasible or practical. CEC has found ways to be involved in what are hugely transformative projects for the City of Indianapolis." Some of these projects include a charter school, a division headquarters office building, a 300-unit, 28-story apartment building, a mixed-use, 500-unit development, and multiple projects for the city's fifth largest employer with nearly 2,000 employees.

Today, Indianapolis is ahead of the national curve in bringing people back to the urban core, establishing itself as one of the most walkable and livable cities in the United States. Roughly 40 projects, representing \$1 billion of new private investment, are currently under consideration or in the pipeline—all of which will increase the vitality of this emerging city. ■

IF YOU (RE)BUILD IT...

Bush Stadium was a classic brick ballpark built in 1931 in downtown Indianapolis as the home of the Indians minor league team. Following a storied tenure, the park went dark in 1996. After spending a few years as a dirt track for auto racing, the stadium fell into disrepair with no apparent future, even winding up as a “Cash for Clunkers” storage site.

The city planned to put a large drop connection to its combined sewer system (a remnant of Indianapolis’s earliest days) on site at the stadium, but Core Redevelopment entered the picture in 2011, proposing plans to accommodate new infill development and build apartments, while leaving the stadium’s historic façade, steel superstructure and light towers intact. Even though the city had already spent notable resources on due diligence, officials believed fully in the value of the redevelopment.

Indianapolis Mayor Greg Ballard and his staff pushed the project with assistance from public and private entities. CEC was engaged early in the feasibility phases, assisting with the city’s plan to reroute a deep stormwater tunnel away from

the stadium. CEC provided survey, civil engineering and landscape architecture services, as well as construction administration and sustainable development assistance.

The 138-unit Stadium Lofts opened in August 2013 in the repurposed ballpark, and the 144-unit Stadium Flats, a new construction project on the south end of the Bush Stadium site, opened in August 2014. The project is fully occupied, and future phases of development may contain office, light industrial, residential or other commercial uses. The \$25 million redevelopment is the only one of its kind in the country.

“The Stadium Lofts project is a once in a lifetime reuse,” said Collins. “I don’t know that there will ever be a better reuse of any building.”

Stadium Lofts at Bush Stadium was recognized four times at the 2014 Indianapolis Chamber’s Monumental Awards: Achievement in Construction; Achievement in Engineering; a Merit Award for Landscape Architecture; and an Honor Award for Innovative Reuse. ■



Only a shell of the once-lively 15,000-seat Bush Stadium remained before redevelopment.



The original structure of the stadium was saved and the landmark has begun its new life.

Spotlight

Acquiring data with Survey Practice Lead Jeff Miller



What is unique about CEC’s survey practice?



There’s added value with CEC. We have an edge: our team of registered professionals and experienced survey staff who we count on every day to determine the best technologies and procedures, or combination of them, to apply to a job based on project and client needs. We have smart people who are always coming up with better ways to complete our work.



What makes the CEC approach different?



It didn’t take long after I started here to see that CEC truly embraces technology, whereas some other companies may wait for technologies to be more mainstream or widely implemented first. CEC wants to be on the cutting edge. We continuously upgrade our technology and equipment to meet changing needs. If you’re out in the lead, you have the experience before everyone else; you have a distinct advantage.



What kinds of equipment does CEC have at the ready for projects?



CEC maintains a full complement of equipment including RTK and static GPS, robotic and conventional Total Stations, automatic and digital levels, data collectors, and 3D laser scanners that use terrestrial LiDAR (Light Detection And Ranging) scanning to create spatial imaging.

IN PRINT

CEC experts are sharing their knowledge on the pages of some of the most respected industry and trade publications.

“From Quarry to Lake to Quarry Again Following Historic Flood”

Steven Casey (Nashville), co-author, *Land & Water*, May/June 2014

“Why Landfills Will Lead the Way”

Ron Mills (Columbus), co-author, *MSW Management*, June 2014

“Managing Environmental Risk with Mitigation Banks”

Ray Ewing and **Dan Maltese** (Pittsburgh), co-authors, *Engineering & Mining Journal*, June 2014

“What miners tend to miss in choosing mine water treatment solutions”

Ivan Cooper (Charlotte), author, *Mining Engineering*, July 2014

“Bank erosion hazard index as an indicator of near-bank aquatic habitat and community structure in a southeastern Piedmont stream”

Ian Turner (Bridgeport), author, *Ecological Indicators*, August 2014

“Building a Secure Future for a Growing Revenue Source” **Ivan Cooper** (Charlotte), author, *Waste Advantage*, December 2014 ■

Serving Our Communities

CEC **Charlotte** participated in a stream cleanup of Coffey Creek, an urban stream that flows through the office park where the Charlotte office is located. The cleanup was part of the Charlotte-Mecklenburg Storm Water Services Adopt-A-Stream Program. The office will hold another cleanup of the creek in the spring.



Q What are some of the emerging technology trends that clients should be aware of?

A Probably the most exciting thing going on is terrestrial (ground-based) LiDAR. LiDAR creates an extremely detailed 3D image product in real time using millions of acquired intelligent data points. When we welcomed our new Knoxville office, we picked up this technology and with it the tremendous experience of their staff. LiDAR scanning allows CEC to offer significant time savings and increased safety versus traditional land surveying techniques with a conventional crew.

Also, some of our projects have incorporated the use of GPS machine-controlled surface modeling, like stream restoration projects or Department of Transportation projects. It's a relatively new technology that not a lot of companies have mastered wherein computer models are developed from design plans specifically to use with automated construction equipment for excavating and grading.

Q What benefits do clients receive from our having offices in multiple locations?

A Manpower, for one. For instance the natural gas work we're doing out of our Bridgeport, Columbus, Export, Pittsburgh and Sayre offices. A client needed a project to be done in two weeks that would normally have taken six. We were able to pull multiple crews from different offices to complete the project within the compressed

time frame. When we have a couple folks who know a project well and have familiarity with requirements, we can split them up and combine them with other staff to create additional crews and meet the demands of the workload.

Regional familiarity is another. There are different requirements from state to state and a general way that things are done on the local level—everything from staking requirements to the survey land systems. When it comes to topography, elevation can be much more critical in flatter areas where drainage can be difficult. It's easy to get water from the top of a hill to the bottom, but in a flat area, we may have to do more of a constrained grid to get the information we need for a project to drain.

Q Does survey apply across all of the markets we serve?

A We have always completed survey work for real estate projects, and as markets opened up, we were able to offer services to entirely new clients. CEC surveyors have completed projects requiring horizontal and vertical control, topographic, construction and as-built, boundary and land title, geodetic, route, settlement and displacement, and volumetric surveys. From mining, natural gas and power to solid waste and manufacturing, there's really no market that is not in need of survey services at some point. ■

Ohio's Clermont County Soil & Water Conservation District was awarded a Conservation Innovation Grant from USDA to demonstrate how watershed modeling and best management practices can be used to improve water quality in local streams. CEC Cincinnati employees assisted the effort by harvesting wetland plants at nearby East Fork State Park and transplanting them to an experimental agricultural best management practice area.

Staff from CEC Indianapolis lent a hand to a native woodlands project by helping to eradicate Japanese stilt grass (*Microstegium*

vimineum) at Brown County State Park, Indiana's most visited state park with about 1.3 million yearly visitors. Japanese stilt grass is the most rapidly spreading invasive plant in the county and a serious threat to woodland health and diversity.

The handiwork of our Pittsburgh GIS experts is on permanent display in Mt. Lebanon, a suburb of the city. CEC worked with the Public Works Department, Parks Advisory Board and the Mt. Lebanon Nature Conservancy to create maps for nine passive parks. The entrances to Bird and Twin Hills Parks have new kiosks with maps on display. ■

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Back Cover: PHOTO CONTEST WINNER WILLY WHITE / CEC NASHVILLE

CEC sponsors a Photo-of-the-Month contest encouraging employees to submit photos from their work sites. The winning photo is published on CEC's internal website and social media pages.





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On a sunny morning in Tennessee, CEC was performing construction quality assurance during a side slope liner installation taking place as part of a dry ash stack lateral expansion project at a coal-fired power generation plant. The project consisted of a 1,000-LF precast concrete box culvert, a compacted clay liner and a geosynthetic liner system.