2018 Engineering Excellence Awards

ACEC

American Council of Engineering Companies
of South Carolina

2017

2015

2016

Tuesday
February 6, 2018
Columbia Museum of Art

ENGINEERING EXCELLENCE AWARDS

Engineering Excellence is an annual competition sponsored by the American Council of Engineering Companies (ACEC) and its member organizations. It recognizes engineering achievements which demonstrate the highest degree of merit and ingenuity.

The ACEC-SC Palmetto Award (top overall project) and the five other entries judged to be the best overall were eligible to enter the national competition. National winners are announced in April at a gala event in Washington, D.C.

The ACEC-SC competition is open to all firms engaged in the practice of consulting engineering. Projects must have been designed in the state of South Carolina with construction substantially completed between Nov. 1, 2015 and Oct. 31, 2017. Projects could have been constructed anywhere in the world as long as they were designed in South Carolina.

A distinguished panel of judges was selected. Each judge separately reviewed the projects. Criteria for judging included: original or innovative application of new or existing techniques; future value to the engineering profession and perception by the public; social, economic and sustainable design considerations; complexity; and exceeding owner/client needs.

We applaud and congratulate all the firms that entered the 2018 Engineering Excellence Awards Competition.

PALMETTO AWARD

Thomas & Hutton Engineering Co.
Driving Economic Growth in South Carolina
Berkeley County
Special Projects Over $10 Million

ACEC FINALIST · ENGINEERING EXCELLENCE AWARD

In 2015, Volvo announced the construction of its first American manufacturing plant in Berkeley County, South Carolina. The property is within a 6,000-acre rural area with no development infrastructure. Volvo's goal was to roll its first vehicles off the assembly line in late 2018. The timeline posed a challenge, to not only provide the civil infrastructure needed to produce said vehicle, but support large-scale industrial development with the remaining property.

Thomas & Hutton provided program management, engineering services, and construction management services to prepare the 1,200-acre site for construction of the Volvo facility and associated nine miles of transportation improvements, including ten miles of water main infrastructure, a 750,000-gallon regional water tank, temporary construction facilities, and a 1,150-gallons per minute pump station and 10-inch force main for the regional wastewater infrastructure for surrounding developments.

Thomas & Hutton devised a plan that took normal bid-build practices and applied it in an inventive way to create competition and utilize multiple contractors. Thomas & Hutton's team worked on various aspects of the project - from environmental permitting, to roadway design, to water and wastewater design, and future interchange preliminary design. As projects were completed and permitted, the projects were bid to meet local requirements, allowing local contractors to bid. Providing a concrete plan of action and initiating it allowed for this project to be successful.

ACEC FINALISTS

Davis & Floyd, Inc.

(S-31 York St.) Bridge Replacement over Norfolk Southern Railroad
South Carolina Department of Transportation
Structural Systems, $2 Million - $10 Million

ACEC FINALIST · ENGINEERING EXCELLENCE AWARD

After completing a routine bridge inspection, SCDOT found that S-31 (York Street), Aiken, SC, northbound and southbound wooden bridges over Norfolk Southern Railroad were structurally deficient and immediately closed them.

SCDOT asked Davis & Floyd to design replacement bridges on an accelerated schedule due to the emergency bridge closure. Design of the two 70' bridges over the railroad with steep embankments and difficult terrain were completed in under four months and construction took under a year.

Davis & Floyd's context-sensitive design maintained the unique historical appearance and feel of the original wood bridges. The new bridges have sidewalks, encouraging a walkable way for community members to safely connect with each other across the railroad ravine. Throughout the project, Davis & Floyd enhanced the public involvement experience using 3D modeling, which helped to inform and engage the community and enabled stakeholders to better visualize the finished project. These are the first designed wooden deck bridges on the SCDOT highway system.

HDR

Road Evaluations over Flood Damaged Dams
South Carolina Department of Transportation
Studies, Research and Consulting $500,000.00 - $2 Million

ACEC FINALIST · ENGINEERING EXCELLENCE AWARD

In October 2015, South Carolina experienced record rainfall and catastrophic flooding. Some areas received more than two feet of rain in four days. Damage occurred to numerous privately owned, earthen dams traversed by SCDOT roads. Faced with unknowns, SCDOT sought the HDR team to perform site assessments and field studies, determining whether the damage occurred within dams or the roadway embankments and documenting necessary repairs to reopen roads.

HDR assessed 10 dams in Lexington, Calhoun, Clarendon and Richland Counties. Observed damage ranged from extensive embankment erosion, breaching, slope failure, pavement collapse, and debris accumulation to utility and culvert damage. Each dam required unique analysis and professional expertise.

HDR performed site inspections, topographic surveys, geotechnical soil characterization, wetland delineations, and closed-circuit TV camera inspections of culverts connected to dam spillway pipes and structures.

The first site evaluated, Ramblin Road, was a primary thoroughfare for residents and emergency services of the Springdale and West Congaree communities. The team's efforts led to reopening this road less than 90 days after completion of the assessment. This marks a rapid response to safety, efficiency and client needs in mind. The project — $152,000 under budget and on schedule — provides guidance throughout the country on how to manage

Infrastructure Consulting & Engineering, PLLC

Emergency Bridge Replacement Package 4
South Carolina Department of Transportation
Structural Systems – Over $10 Million

ACEC FINALIST · ENGINEERING EXCELLENCE AWARD

The October 2015 historic rainfall and flood event caused flash flooding across much of South Carolina. The event culminated when numerous rivers overtopped their banks, impacting thousands of homes and businesses. The flood waters also damaged many of the areas roads and bridges causing significant traffic disruptions.

Out of numerous bridge and roadway closures there were 18 bridges that were being fast-tracked for replacement. Four of the 18 were included in this project package and consisted of Pine Grove Road over Twenty-Five Mile Creek in Kershaw County, Congress Road over Jumping Run Creek in Richland County, Rockbridge Road over Spring Lake in Richland County, and Battery Park Road over Black Mingo Creek in Williamsburg County.

Infrastructure Consulting & Engineering, PLLC (ICE) served SCDOT as the Lead Design Consultant on the Design-Build team selected to replace the four bridges. ICE provided project management, bridge, roadway and drainage design, coordination of utilities, FEMA fees and permitting, and preparation of shop drawings.

The flood damage to these four bridges caused closures to the traveling public resulting in lengthy detours. Efficient coordination and effective communication between all team members including the engineers, contractors, subcontractors, and SCDOT was imperative to quickly provide the services necessary to replace these bridges without sacrificing quality, safety and impacts to the environment and avoiding unnecessary delays.

Michael Baker International

Steeplechase Industrial Boulevard Extension
Kershaw County
Small Projects $500,000.00 - $2 Million

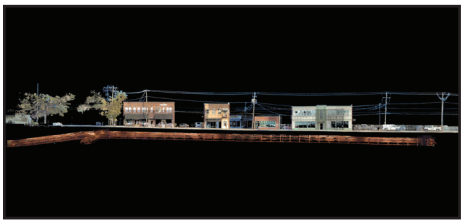
ACEC FINALIST · ENGINEERING EXCELLENCE AWARD

Michael Baker International (Michael Baker), provided engineering services for the Steeplechase Industrial Boulevard Extension Project. Michael Baker's services for Kershaw County included oversight of field surveys, environmental compliance services, preliminary and final roadway design, structure design, preparation of drainage and sediment and erosion control plans, permitting, utility coordination, bidding-phase support, and construction administration and inspection.

The Steeplechase Industrial Boulevard Extension consisted of designing a 1,430-foot new location three-lane curb and gutter roadway extension over a perennial stream crossing. The Project is located within the Steeplechase Industrial Park in Camden, South Carolina and serves as the final infrastructure link connecting both sides of the Industrial Park. Design for the Project included several unique elements, including avoidance of impacts to a new gravity sewer line underlying the perennial stream. To eliminate impacts to the sewer line and avoid disruption to public sewer service, Michael Baker designed the footing of the box culvert to include a custom gap that prevented surcharge loading from being applied to the sewer line. The custom gaps within the footing of the box culvert, as well as the bottomless design, prevented the culvert from resting on the sewer line and avoided impacts. The completion of the Steeplechase Industrial Boulevard Extension was considered a "very important project for Kershaw County and its residents" according to Peggy McLean the Kershaw County Economic Development Director. By linking the entire property together, the project helped establish a critical piece of infrastructure for the Industrial Park, enabling large manufacturers to invest in Kershaw County.

Surveying and Mapping, LLC
S-3054 South Main Street Streetscaping Improvements
SC Department of Transportation
Surveying/Mapping Technology $0 - $500,000

ACEC FINALIST · ENGINEERING EXCELLENCE AWARD AND SMALL FIRM AWARD



SAM was tasked by the South Carolina Department of Transportation (SCDOT) to provide an overlay for depicting the underground utility service tunnel below the roadway in plan and profile for the Main Street Improvement Streetscape Project in downtown Columbia, South Carolina.

Acting as a prime consultant, SAM provided Subsurface Utility Engineering (SUE), terrestrial scanning and the related deliverables project. The project site is immediately adjacent to the South Carolina State House and office buildings.

By utilizing terrestrial scanning, images, as well as modern viewing software, SAM was able to deliver smarter collaboration for the SCDOT to share data anywhere, anytime on any device. One of the unique aspects of this project was identifying a multi-use utility tunnel under the roadway. When the SUE portion was complete, SAM was tasked to provide an overlay for depicting the underground utility service tunnel below the roadway in plan and profile. Additionally, the SCDOT asked to run a traverse and survey of the interior of the tunnel.

This project was a unique opportunity to showcase how state-of-the-art surveying equipment is able to render a more powerful work deliverable to assist remote users, understand on-site, real-world circumstances and conditions. This new technology delivered three-dimensional “smart” plans. This project showcased the capabilities of scanning technology and the ability to produce a truly unique and cutting edge work product.

ENGINEERING EXCELLENCE AWARDS

Infrastructure Consulting & Engineering, PLLC

Botanical Parkway Culvert Replacement
Lexington County
Small Projects $500,000.00 - $2 Million

ENGINEERING EXCELLENCE AWARD

On Oct. 4, 2015, during a historic flood event, a 6-foot corrugated metal culvert installed under Botanical Parkway in Lexington County collapsed from the strong waters of Double Branch Creek and was washed downstream making the roadway impassible. This quickly became a topic of local interest as Botanical Parkway is the primary route for accessing the Botanical Gardens and Riverbanks Zoo which boasts more than a million visitors a year. It is not uncommon that the 170-space parking lot is full. Although the entrance to the park was not closed, the detour through Saluda Hills caused a major inconvenience to the visitors of the park and surrounding community.

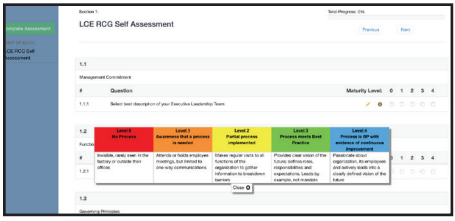
As Lexington County's on-call engineering consultant, Infrastructure Consulting & Engineering, PLLC (ICE) was called upon to manage and provide designs of the culvert structure, drainage and roadway approaches, coordinate utilities, provide bidding and award services, and conduct construction administration and inspection.

The structure was replaced with a cast-in-place culvert and new roadway approaches were designed to tie into the existing roadways. The site was completely re-engineered so the culvert is more substantial, should a flood threaten it again. The road was re-built from the bottom up and included a concrete structure underneath and concrete wing walls to make it more secure than it was prior to the flood. Adequate guardrail was added to protect vehicular traffic from the culvert ends and drop offs. The project was designed, constructed and opened to traffic on November 6, 2015, one week ahead of schedule.

Life Cycle Engineering

Reliability Excellence (Rx) Assessment
Reliability Consulting Group
Building/Technology Systems $0 - $500,000.00

ENGINEERING EXCELLENCE AWARD



Over the past 30 years, Life Cycle Engineering has developed a Reliability Excellence implementation model that provides an integrated framework of 29 key elements used to analyze a company's operations against world class, industry-specific benchmarks. While working closely with our clients across diverse verticals, we identified the need for a self-assessment tool that gives them easy access to a diagnostic for identifying gaps in their current practices. This tool allows clients to check "where they stand" before investing the time, talent and other resources required to design and implement a solution.

Life Cycle Engineering designed RxAssessment, a free, easy-to-use online tool that establishes a "current state" evaluation for businesses. Once gaps have been identified, leadership can develop a strategy for continuous improvement. Our "diagnose before we prescribe" philosophy ensures that the master plan for transformation is tailored to meet our clients' specific and individual needs.

Michael Baker International

Kershaw FEMA Culvert Replacement
Kershaw County
Small Projects - $0 - $500,000.00

ENGINEERING EXCELLENCE AWARD

Michael Baker International (Michael Baker), provided engineering services for the Kershaw FEMA Culverts Replacements, which included emergency replacements of the culverts at Three Branches Road and Tremble Branch Road in Kershaw County, South Carolina. Michael Baker's services for the county included oversight of field surveys, hydrologic and hydraulic analysis, environmental compliance services, conceptual design study, construction plans, utility coordination, and construction inspection services.

A historic rainfall and flooding event in October 2015 devastated areas of South Carolina and washed out many roads, including Three Branches Road, which crosses over Beaverdam Creek, and Tremble Branch Road, which crosses over Swift Creek. The undersized pipes at these crossings were ill-equipped to handle any flooding and were completely destroyed. Access to both roads was closed for over a year, requiring local residents to take lengthy detours. Michael Baker set and met an extremely aggressive project deadline to reopen the roads as quickly as possible.

To ensure public safety and prevent future washouts, Michael Baker designed new culverts that meet current design standards and can accommodate for future needs. While both designs had their unique challenges, Tremble Branch Road is slated for widening sometime in the future. In order to save time and public tax dollars, Michael Baker designed the new culvert to account for future widening and repaving. Additionally, the lanes were narrowed to minimize environmental impacts. Extensive utility coordination was also required, as active phone, water, and other utility lines were running through the existing culvert.

Stantec Consulting Services Inc.
Osprey Lake Drainage Improvements
Georgetown County
Water and Storm Water $500,000.00 - $2 Million

ENGINEERING EXCELLENCE AWARD

The Osprey Lake Drainage Basin is a tidally-influenced, 1,113-acre watershed fed by nine drainage sub-basins that has experienced flooding during major storm events (such as the 100-year storm). Among the affected areas by the flooding was the basin comprising North Litchfield Beach, a residential subdivision comprising chiefly of single family homes. It is the most upstream area and each of the downstream crossings would require analysis to help ameliorate the drainage deficiencies.

The Osprey Lake drainage basin outfalls to Clubhouse Creek through two 36 " outfall pipes that are restricted by two 3-foot wide hand crank weirs and an overflow weir. Each of the existing weirs are located below the bottom of a wood pier deck. The hand crank operated weirs are lowered for major storm events to prevent backup of the upstream drainage. They are not left open because they lower the water surface elevation in Osprey Lake thereby creating an unsightly edge of bank for the residents of the Litchfield by the Sea community and also potentially affecting the salinity levels in the Lake.

Even with these three weirs in place, there were many reports of routine flooding within the overall drainage basin. This flooding was due to the Osprey Lake outfall and the upstream roadway crossings being below capacity and undersized. An innovative engineering solution had to be established to solve these flooding problems while maintaining the existing water surface elevation for the Lake per the Home Owners Association requirement. Our team conducted an existing conditions stormwater analysis for Osprey Lake and its upstream contributing drainage area. The results of our existing condition analysis indicated that the flooding issues occuring upstream of Osprey Lake were due to the elevated water level in Flagg Pond. This elevated water level prevented the North Litchfield Beach community from properly draining. To remedy the flooding problems, we recommended improvements to eight of the nine upstream crossline pipes.

STATE FINALISTS

STV

Orangeburg Pedestrian Bridge at SC State
South Carolina Department of Transportation
Structural Systems *$2 - $10 Million*

Traffic along Chestnut Street (U.S. 21) in Orangeburg has risen sharply over the past few decades creating a significant safety issue for the more than 1,000 students who live in two housing complexes across a busy five-lane road that runs along the South Carolina State University (SC State) campus.

STV has served in an evolving role since 2013, providing design and project management services. The firm determined that a prefabricated bridge would be the most cost-effective solution while also meeting the community's safety and aesthetic goals. In addition, the university called for completing the project in time for the start of the 2017/18 academic year, requiring work to be done on an accelerated schedule.

The bridge includes an intricate ramp system to provide accessibility and to accommodate multiple users attending events at the university's Oliver C. Dawson Stadium. It also includes twin brick towers at each end that are adorned with the university's signature blue and red colors and serves as a gateway to the campus.

The resulting 93-foot bridge not only keeps students and sports spectators safe, it also allows traffic to move smoothly while creating a landmark entrance that delineates the university's campus boundary. The bridge is also outfitted with lighting for added security at night and features an anti-graffiti coating along with drought-resistant plantings along the sidewalk and ramp entrances.

Parrish and Partners, LLC

Emergency Bridge Replacement Package 3
South Carolina Department of Transportation
Structural Systems *$2 - $10 Million*

In October 2015, a stalled weather system created the perfect storm to produce record-breaking rainfall in South Carolina, damaging 13 bridges beyond repair. The South Carolina Department of Transportation issued several Emergency Bridge Replacement Packages to aid in repairing the damages to the state's infrastructure.

Crowder Construction won Package 3, which consisted of three bridge sites: S-101 (River Road) over Lake Wateree in Fairfield County; S-57 (Old River Road) over Barfield Mill Creek in Florence County; and SC 34 over Hellers Creek in Newberry County.

Parrish & Partners served as the lead design firm and managed all project services, including roadway, bridge, hydrology, drainage, environmental permitting, and utility coordination. The project required innovative engineering to determine the most cost-efficient design to avoid impacts to floodways, streams, and wetlands. The team also faced challenges associated with utility coordination across three counties, including completion of a Duke Energy Conveyance Permit. However, Parrish & Partners overcame project challenges and completed all three structures on schedule and without incident, while meeting the needs of the Department and the public.

KCI Technologies

Norfolk Southern over Coddle Creek
Crowder Construction Company/NC Department of Transportation
Structural Systems $2 - $10 Million

The proposed bridge was a 160-foot-long, three-span structure, located adjacent to an existing railroad bridge. Once construction began, Crowder realized the bridge design was virtually impossible to construct. Carrying more than 30 trains per day, the existing bridge had to remain in service during construction. It became apparent that the proposed high-wall abutment foundations would be in direct conflict with the existing bridge foundations.

KCI determined the foundation could be lengthened to avoid conflicts with the existing substructure. However, the structural steel beams from the original design had to be utilized, since they had already been ordered and fabricated. KCI was able to rearrange the spans and splice an additional 25-feet of beam on one span to increase the length of the bridge, which eliminated the high-wall abutments. Due to the reduced abutment height, the required shoring needed to install the new abutments decreased, and a new shoring wall was necessary to support the loads without interrupting railway traffic. KCI worked with North Carolina Department of Transportation and Norfolk Southern Railroad to determine the final design--a secant pile shoring wall--the first of its kind to be used by NCDOT.

When KCI got involved, the project was behind schedule. KCI submitted a revised design, while meeting the project's original deadlines – exceeding the expectations of the client by turning an impossible situation into a constructible bridge, faced with an accelerated schedule.

Judges

A special thank you is extended to the competition judges who volunteered valuable time to carefully review each project.

Dennis J. Fallon, PhD, PE, PMP, F.ASCE, F.ASEE
Professor Emeritus
The Citadel

Robert W. King, Jr., P.E.
Retired, Former Deputy Commissioner
SC Department of Health & Environmental Control

Dimitris C. Rizos, PhD
Director of the Advanced Railroad Technology Group and Associate Professor
Department of Civil and Environmental Engineering
University of South Carolina

American Council of Engineering Companies of South Carolina (ACEC-SC) is a member organization of the American Council of Engineering Companies. For information on ACEC-SC or the Engineering Excellence Awards competition, please contact us at
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