

Original



Expression of Interest

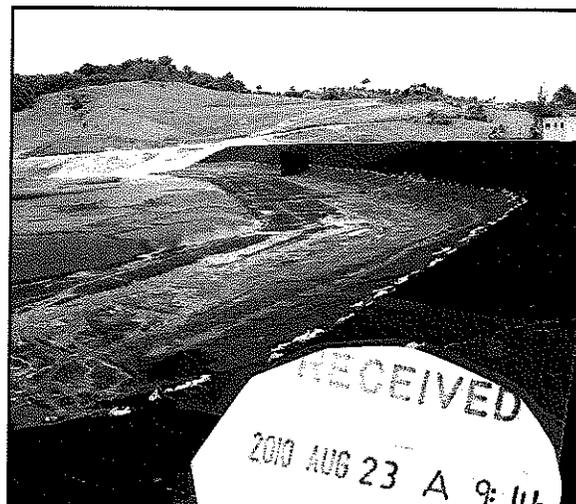
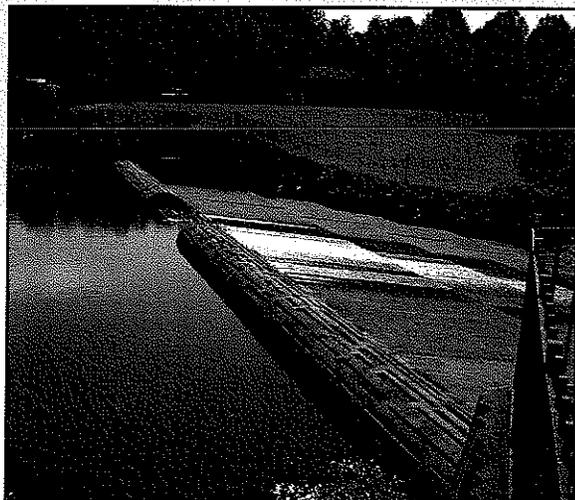
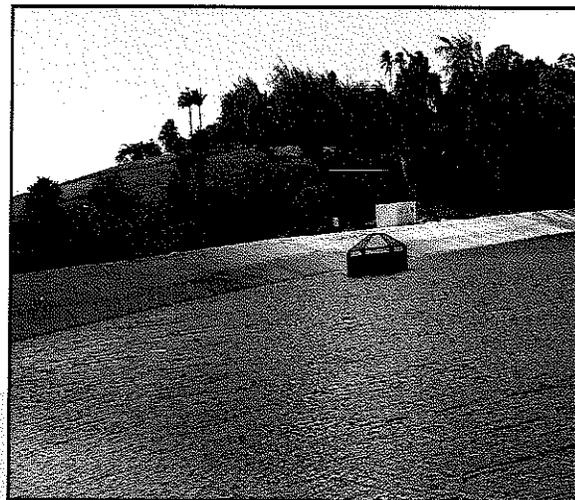
# CACAPON RESORT STATE PARK DAMS

ENGINEERING INVESTIGATION AND  
CERTIFICATE OF APPROVAL

Req #: DNR211007

Prepared for  
West Virginia Division of Natural Resources  
Parks and Recreation Section

Prepared by  
KCI Technologies, Inc.  
August 24, 2010



RECEIVED  
2010 AUG 23 A 9:46  
PURCHASING DIVISION  
STATE OF WV



ISO 9001:2000 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

48 Donley Street, Suite 502 • Morgantown, WV 26501 • Phone 304-296-3611 • Fax 304-296-8046

August 20, 2010

Mr. Frank Whittaker, Senior Buyer  
Department of Administration  
Purchasing Division  
Building 15  
2019 Washington Street, East  
P.O. Box 50130  
Charleston, WV 25305-0130

Subject: **Expression of Interest**  
**Cacapon Resort State Park Dams Engineering Investigation and Certificate of Approval**

Dear Mr. Whittaker:

KCI Technologies, Inc. is pleased to present our qualifications to provide the engineering investigation services and assisting with the process of obtaining compliance certification for the Cacapon Resort State Park Dams.

For this contract, KCI has organized a team that can provide a breadth of services that will be needed for this project, including experts in the completion of dam inspections in the fields of water resources, forensic, geotechnical engineering, structures and underwater inspections. All of the fields we have highlighted are crucial for comprehensive inspection of the Cacapon Resort State Park dams.

For this contract, Dan Garcia, PE, will be Project Manager, is familiar with the entire facility including the dams as well as DNR staff and can ensure successful coordination and delivery of the project.

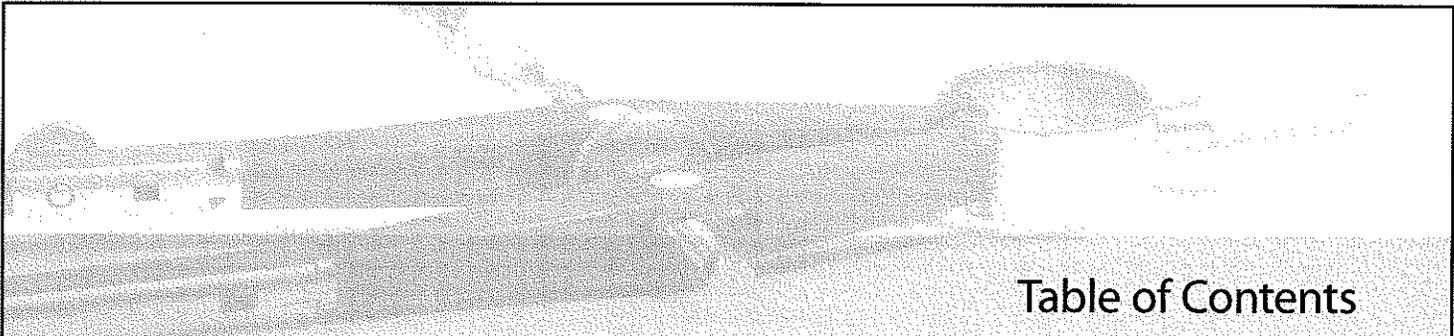
KCI has extensive experience in dam design, inspection, repair, and replacement projects, with a deep knowledge of local and statewide regulations and procedures.

We have assembled a team of professionals in our Morgantown, West Virginia and Sparks, Maryland offices that are committed to providing the best possible services to West Virginia Division of Natural Resources, Parks and Recreation Section. We look forward to the opportunity to develop a long term successful relationship.

Sincerely,

Thomas G. Sprehe, PE, BCEE  
Senior Vice President  
Chief, Environmental Discipline

Direct Dial: 410.316.7979  
Fax: 410.316.7935  
E-mail: thomas.sprehe@kci.com



## Table of Contents

COVER LETTER

SIGNED AFFIDAVIT

ADDENDUM ACKNOWLEDGMENT

SECTION 1. HISTORY AND CREDENTIALS OF FIRM

SECTION 2. HISTORY OF COMPLETING SIMILAR PROJECTS

SECTION 3. PROJECT UNDERSTANDING AND APPROACH



RFQ No. DNR211007

STATE OF WEST VIRGINIA  
Purchasing Division

**PURCHASING AFFIDAVIT**

**West Virginia Code §5A-3-10a states:** No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

**DEFINITIONS:**

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

**EXCEPTION:** The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code §61-5-3*), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

**WITNESS THE FOLLOWING SIGNATURE**

Vendor's Name: KCI Technologies, Inc.

Authorized Signature:  Date: 08/19/10

State of Maryland

County of Harford, to-wit:

Taken, subscribed, and sworn to before me this 19 day of August, 2010.

My Commission expires 7/14, 2012

AFFIX SEAL HERE

NOTARY PUBLIC 





State of West Virginia  
 Department of Administration  
 Purchasing Division  
 2019 Washington Street East  
 Post Office Box 50130  
 Charleston, WV 25305-0130

# Request for Quotation

RFQ NUMBER
DNRB11007

PAGE
3

ADDRESS CORRESPONDENCE TO ATTENTION OF
FRANK WHITTAKER 304-558-2316

VENDOR

RFQ COPY  
 TYPE NAME/ADDRESS HERE  
 KCI Technologies, Inc.  
 48 Donley Street, Suite 502  
 Morgantown, WV26501  
 Vendor ID: B15142357

SHIP TO

DIVISION OF NATURAL RESOURCES  
 PARKS & RECREATION SECTION  
 324 4TH AVENUE  
 SOUTH CHARLESTON, WV  
 25303-1228 304-558-3397

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
07/23/2010				

BID OPENING DATE: 08/24/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				KCI Technologies, Inc. COMPANY		
				August 20, 2010 DATE		
<p>NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE PROPOSAL.</p> <p>REV. 09/21/2009</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.</p> <p>NOTICE</p> <p>A SIGNED EOI MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION          PURCHASING DIVISION          BUILDING 15          2019 WASHINGTON STREET, EAST          CHARLESTON, WV 25305-0130</p> <p>THE EOI SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE EOI MAY NOT BE CONSIDERED:</p> <p>SEALED EOI</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE 410-316-7979	DATE August 20, 2010
-----------	------------------------	----------------------

TITLE Principal-In-Charge	FEIN 52-1604386	ADDRESS CHANGES TO BE NOTED ABOVE
---------------------------	-----------------	-----------------------------------

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

## SECTION 1. HISTORY AND CREDENTIALS OF FIRM

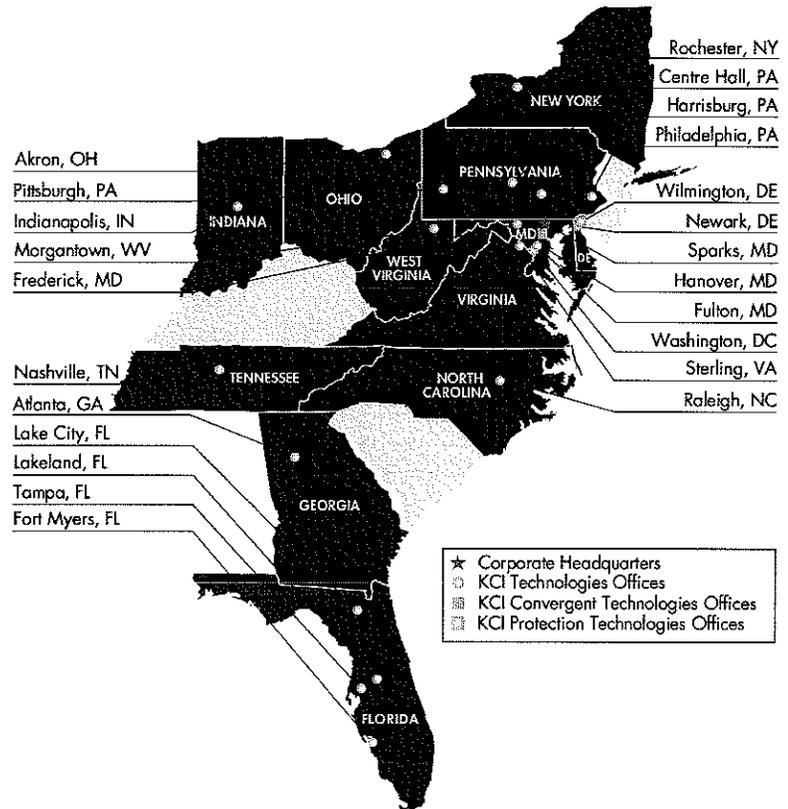
# 1. HISTORY AND CREDENTIALS OF FIRM

## OUR MISSION

KCI Technologies means technical expertise. Our firm is focused on innovation and the use of applied technology in providing engineering, scientific, and management solutions. This results in client satisfaction, project quality and profitability.

## EARLY HISTORY

The history of KCI Technologies can be traced to a small firm operating out of the basement of the co-founder's Baltimore County home in 1955. By its second year, the company took up residence in a proper facility, only to change locations several times over the next decade in a succession of moves that paralleled its growth. In 1977, it was purchased, along with three other architectural and engineering firms, by industrial products conglomerate Walter Kidde & Company. The Kidde acquisitions merged into an engineering subsidiary that came to be known as Kidde Consultants Inc., or KCI. During the 1980s, KCI expanded throughout the Mid-Atlantic, opening new offices in Maryland, Delaware, Virginia and Pennsylvania.



## EMPLOYEE OWNERSHIP

In August 1987, Hanson Trust PLC of Great Britain, a manufacturing company with diversified holdings worldwide, purchased Kidde, the parent company. Soon thereafter, KCI initiated an employee buyout from Hanson, which was completed in December 1988. KCI became Maryland's largest employee-owned company. In 1991, the official name was changed to KCI Technologies Inc. In 2008, the corporate headquarters was moved to its present location in Sparks, Maryland.

## CONTINUED GROWTH

With revenues of approximately \$131 million in 2009, the Engineering News-Record has consistently placed KCI among the top consulting engineering firms in the country. Today, our roughly 900 employee owners operate out of 23 offices in 12 states—West Virginia, Delaware, Florida, Georgia, Indiana, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia—and the District of Columbia.

## TECHNICAL EXPERTISE

With a professional staff of engineers, planners, scientists, surveyors, and construction managers, we offer a broad range of engineering services, including civil, structural, transportation, environmental, hazardous waste, mechanical, electrical, telecommunications, and soils. But engineering is not all we do. We also provide cultural and environmental resource management services, land planning and landscape architecture, geology, hydrology, ecology, surveying, and construction management and inspection. All of our service lines are supported by a team of CADD operators, GIS specialists, database and Web programmers, and other computer-savvy professionals working on state-of-the-art equipment.



At KCI, we believe that our broad technical expertise, combined with our unique commitment as employee owners, has enabled us to emerge as industry leaders whose customers can count on excellent service time and again.

## PROJECT TEAM

The KCI Team has a wealth of experience ranging from inspection and design in earth dams rehabilitation; identification and remediation of structural deficiencies of earth dams; identification and remediation of geotechnical deficiencies of earth dams; maintenance friendly dam design; and permitting. Highlighting the KCI Team's experience:

- KCI recently performed several dam safety inspections and remediation designs for St. Mary's County Park Dam for the Maryland Department of General Services, Columbia Gateway Dam Howard County, and Lake Elkhorn Dam Columbia Association and Sylvan Lake, Princeton New Jersey.
- KCI has a multi-year contract with the Columbia Association, Howard County, Maryland to conduct yearly inspections for two dams. In addition, the senior geotechnical engineer, Kwabena Ofori-Awuah, PE, is the dam owner's engineer and participates in yearly Emergency Action Planning rehearsals.

To supplement KCI's professional staff, we have included the following local subconsultant on our team for this contract:

E. Ross Curtis, PE, an expert in forensic engineering and construction management, will provide services related to forensic field inspection and construction management and inspection. Mr. Curtis, (**certified Professional Engineer in West Virginia #015130**) is a civil engineer specializing in construction engineering, materials, management, safety, and claims management and negotiation; facilities and utility planning, design, construction, operation, and maintenance; and quality control and assurance, including environmental projects.

The organization chart on the following page illustrates the KCI team, assembled specifically for this project, and is followed by resumes detailing each team member's qualifications and experience. The key personnel identified in this section and additional support staff will be committed to the West Virginia DNR throughout the duration of the project.



**WEST VIRGINIA DIVISION OF  
 NATURAL RESOURCES**  
 Parks and Recreation Section

**Principal-in-Charge**

Thomas G. Sprehe, PE, BCEE

**Project Manager**

Daniel R. Garcia, PE

**Geotechnical/Forensic  
 Investigation**

D. S. "Sax" Saxena, PE, NAFE  
 Kwabena Ofori-Awuah, PE  
 Kofi Acheampong, PhD, PE  
 Kwame Adu-Gyamfi PhD, PE  
 Ransford Addei, PE

**Water Resources**

James Kester, PE  
 Raymond Krahe, PE, CFM  
 G. Ray Schulte, PE, BCEE

**Construction Inspection &  
 Management**

E. Ross Curtis, PE\*  
 George Bakalyar

**Structural**

John Hudacek, PE  
 Ikaika Kincaid, PE

\* Denotes Subconsultant



**THOMAS G. SPREHE, PE, BCEE**  
Principal-In-Charge

*Education*

*MS / 1984 / Civil Engineering*  
*BS / 1980 / Civil Engineering*

*Professional Registrations*

*Professional Engineer in MD, VA, DC, DE, PA, IN OH*  
*Board Certified Environmental Engineer 2007*

*Professional Experience*

Mr. Sprehe is a Senior Vice President and Group Manager of KCI's Environmental Engineering Group. He has extensive experience in design, construction management, and operations of water and sewer systems, including water and wastewater treatment facilities. Specifically, he has worked on projects involving underground utilities including water conveyance systems and large diameter sewers, and has led negotiations with MDE and other state and local governmental agencies for permitting and other regulatory issues. His experience also includes managing operations and maintenance of over 130 water and wastewater facilities, and design of facility retrofits at over 30 plants ranging to 87.5 MGD. In addition, Mr. Sprehe served as the Director of the MES Water and Wastewater Program, where he was responsible for managing design and regulatory issues and construction management and inspection. His relevant experience includes:

***NORTHWEST TRANSFER STATION REHABILITATION, BALTIMORE CITY DEPARTMENT OF PUBLIC WORKS BALTIMORE CITY, MD.*** Principal-in-Charge. This project assignment required the preparation of an existing conditions assessment and contract documents for \$2.2 million of structural, mechanical systems, electrical and communications and paving repairs necessary to extend the life of this 25-year old 500-tons-per-day solid waste transfer facility for an additional 20 years of useful life in the very aggressive environment of a solid waste transfer station. Responsible for existing conditions survey and design of 500 tons per day, \$2.3 million renovation contract, which included replacement push pit and compactor equipment, replacement dust collection system, replacement truck scale, staff facility upgrades, and miscellaneous structural and architectural repairs.

***ON-CALL CIVIL/STRUCTURAL ENGINEERING SERVICES, PROJECT No. 860, BALTIMORE CITY DEPARTMENT OF PUBLIC WORKS BALTIMORE CITY, MD.*** Principal-in-Charge. This \$500,000 open-end contract involved

providing engineering services to a variety of assignments on short notice relative to the activities and events surrounding the CSXT train derailment. KCI prepared contract documents to be utilized by on-call construction contractors for emergency and minor repair, replacement or extension of the existing municipal sanitary interceptor sewer systems; provided pump station design services; designed improvements to the Northwest Solid Waste Transfer Station; and was contracted on an emergency basis to calculate remaining space at the quarantine landfill. The project involves providing engineering services respond to a variety of assignments on short notice. Provided professional engineering services to the City relative to the activities and events surrounding the CSXT train derailment, prepared contract documents to be utilized by on-call construction contractors for emergency and minor repair, replacement or extension of the existing municipal sanitary interceptor sewer systems, providing pump station design services, design improvements to the Northwest Solid Waste Transfer Station, contracted on an emergency basis to calculate remaining space at the quarantine landfill.

***WOODROW WILSON BRIDGE REPLACEMENT ENVIRONMENTAL MITIGATION, MARYLAND STATE HIGHWAY ADMINISTRATION CENTRAL OFFICE VARIOUS LOCATIONS, MD AND VA.*** Environmental Engineer. This \$2.5 million project involved providing wetland mitigation and stream restoration design services.

***WSSC - BASIC ORDERING AGREEMENT - WATER AND SEWER REHABILITATION CONTRACT NO. PM0003A01, WASHINGTON SUBURBAN SANITARY COMMISSION PRINCE GEORGE'S & MONTGOMERY COUNTIES, MD.*** Principal-in-Charge, Principal-in-Charge. Under this \$1.25 million contract, KCI provided the design and contract documents for the replacement of interior water system infrastructure identified in WSSC's Capital Improvement Program.

***WILDE LAKE DAM ASSESSMENT AND EMERGENCY ACTION PLAN, HOWARD COUNTY, MD.*** QA/QC Officer. KCI provided geotechnical engineering services for the stepped-face 288-foot long and 28-foot high concrete gravity dam as well as prepared an Emergency Action Plan and oversaw yearly safety inspections using Maryland Dam Safety Checklist.

***FARMERS DAM & IMPOUNDMENT, ST. MICHAEL, BARBADOS.*** QA/QC Officer. Mr. Sprehe performed quality assurance activities related to subsurface exploration, design and construction of an 1200-foot long and 24-foot high Authored the Dam Owner's Operation and Safety Manual.



**DANIEL GARCIA, PE**  
Project Manager

*Education*

*BS / 1990 / Civil Engineering*

*Professional Registrations*

*PE / WV / 17912*

*Professional Experience*

Mr. Garcia is a Project Manager in KCI's Morgantown, West Virginia office and has over 16 years of experience in West Virginia, Ohio, and Missouri. He is responsible for design of municipal projects, including water, sewer, stormwater, and environmental services. His experience includes solid waste landfills; public drinking water supply, treatment, storage, and distribution; wastewater collection, treatment, and disposal; and site development.

As a district engineer with Ohio EPA Southwest District Office, from 1995 to 1999 and senior district engineer from 1999 to 2001, Mr. Garcia actively participated in solid and infectious waste management for the entire district. In this role he trained, coordinated and developed solid waste engineering and inspection program, advised management, district engineers, and inspectors on technical issues and decision making; represented the Agency in public meetings and hearings; reviewed applications for and prepared solid waste permits and similar authorizing requests; assisted in the Agency oversight of solid waste management plans and annual reports; inspected operations and construction of municipal and residual solid waste landfills, construction & demolition debris fills, and transfer stations; and participated in the Ohio EPA Geotechnical Resource Group in developing the technical document, Geotechnical and Stability Analysis for Ohio Waste Containment Facilities.

**CACAPON RESORT STATE PARK LODGE EXPANSION AND PARK IMPROVEMENT. PARADIGM ARCHITECTURE. BERKELEY SPRINGS, WV.** Civil / Site Engineer. Overseeing design of water supply, treatment, storage and distribution. Designing upgrades to wastewater treatment plant.

**CIVIL/GEOENVIRONMENTAL OPEN END, ELDA MUNICIPAL SOLID WASTE LANDFILL, WASTE MANAGEMENT INCORPORATED. CINCINNATI, OH.** Staff Engineer. Reviewed proposed lateral expansion and closure plans. As part of landfill closure, directed planning and construction practices to control slope

stability, leachate management, and gas management. Monitored and inspected construction of closure activities. Coordinated soil pre-qualification for cover material. Provided routine monitoring of post-closure activities.

**CIVIL/GEOENVIRONMENTAL OPEN END, CENTER HILL LANDFILL, CITY OF CINCINNATI, OH.** Staff Engineer. Reviewed plan for and directed development of gas extraction system. Analyzed slope stability for and directed development of Mill Creek stream bank stabilization. Reviewed and advised on proposed phytoremediation project. Evaluated subsurface stability proposed radio tower installation.

**CIVIL/GEOENVIRONMENTAL OPEN END, RUMPKE SANITARY LANDFILL, RUMPKE CONSOLIDATED COMPANIES, CINCINNATI, OH.** Staff Engineer. Served as part of response team to major landfill slope failure and worked on slope remediation team. Coordinated plan reviews for development of several expansions, permit alterations, stormwater projects, gas management system improvements. Monitored and inspected construction of landfill cells, intermediate slopes, gas management, leachate management, and stormwater management. Directed slope stability and leachate management analyses for development of cells. Supervised construction and evaluation of liner soil test pads. Reviewed and verified liner material qualifications and construction certifications.

**CIVIL/GEOENVIRONMENTAL OPEN END, PREBLE COUNTY LANDFILL, PREBLE COUNTY, EATON, OH.** Staff Engineer. Advised on and helped develop landfill expansion. Evaluated and monitored installation of alternate drainage media using scrap tires. Inspected and monitored construction of landfill cells and leachate management. Coordinated construction phasing schedule and quality assurance plan.

**CIVIL/GEOENVIRONMENTAL OPEN END, RUMPKE (BROWN COUNTY) SANITARY LANDFILL, RUMPKE CONSOLIDATED COMPANIES, GEORGETOWN, OH.** Staff Engineer. Monitored and inspected construction of landfill cells, stormwater projects, interim final cover, and gas management system. Reviewed plans for permit alterations. Directed planning and construction practices to control slope stability and leachate management. Evaluated liner material qualification and construction certification. Supervised construction and evaluation of liner soil test pads. Coordinated between landfill management and Division of Surface Water for permitting of leachate conveyance forcemain and dust control system.



**DHIRENDRA S. SAXENA (SAX), PE**  
**Geotechnical/Forensic**

*Education*

*MS / 1967 / Civil Engineering*  
*BE / 1962 / Civil Engineering*  
*BS / 1957 / Sciences*

*Professional Registrations*

*PE / MD, FL, GA, TN*

*Professional Experience*

Dhirendra S. Saxena (Sax), P.E. has more than 40 years of experience in a wide range of geotechnical engineering projects, from a tidal power hydroelectric project study at the Bay of Fundy, Nova Scotia, to Churchill River Diversion Works in northern Manitoba in Canada, to a Coca Cola complex in Portland, Oregon, to offshore drilling platforms in the Gulf of Mexico, to Turkey Point nuclear power plant in south Florida, and to Disney World in Orlando, Florida.

He has handled over 500 sinkhole-related projects and was designated a certified Neutral Evaluator for all 67 counties in Florida for the Alternative Dispute Resolution (ADR) process for sinkhole claims with the State of Florida, Department of Financial Services. Sax has completed the circuit civil mediation program through the University of South Florida (USF). Mr. Saxena was one of twenty six professionals invited to participate in Sinkhole Summit II and contributed towards preparation of a report entitled "Special Publication No. 57" prepared by the Florida Geological Survey (FGS) which was later adopted as a template by the State of Florida for sinkhole investigation protocol. His relevant project experience includes:

**TIDAL POWER HYDROELECTRIC PROJECT, BAY OF FUNDY, NOVA SCOTIA, CANADA** Mr. Saxena was member of a project team involved in the site feasibility study in Bay of Fundy, Nova Scotia. The site study involved sampling (with a specialized vibro corer equipment) and testing of bay sediments from an offshore ship, performing laboratory testing program, and developing design parameters towards planned development of world's first tidal power hydroelectric plant in North America. It utilized and harnessed the energy from 60 to 80 foot high tidal waves.

**CHURCHILL RIVER DIVERSION WORKS, MANITOBA HYDRO, WINNIPEG, CANADA** Mr. Saxena was posted at the Notigi Camp Site in northern Manitoba in the bush country. He was responsible for aerial photo interpretation, reconnaissance, field investigation, data

evaluation, and construction material search for the construction of Churchill River Diversion Works that consisted of a series of earthen and rock fill dams in glacial till areas along Notigi River. Investigation was performed during the winter months so that concrete manufacturing plant could be set-up and production of concrete could take place. Dam design and seepage analysis were also performed through the selected project consultant named Underwood McClellan and Associates of Winnipeg, Manitoba, Canada.

**EARTHEN DAMS FOR PHOSPHATE MINING OPERATIONS, BARTOW, FLORIDA** Mr. Saxena was the designated senior soils engineer responsible for the design and construction of earthen dams for IMC's phosphate mining operations in Bartow, Florida. The new design concept included a central core consisting of cast overburden material from the open cut strip mining operations and outside shell consisting of tailing sands, a by-product residual from the processing plant. He performed stability and seepage analyses and prepared the plans and specifications for the construction of earthen dams.

He was also responsible for the quarterly inspection of almost 32 miles of earthen dams/dikes that included forensic field reconnaissance and inspection of vegetation cover, piping, slope erosion, seepage, toe drains, and spillways. The inspection report was submitted to DNR, Florida as part of the annual inspection protocol. Additionally, designated risk analysis was also performed.



## **KWABENA OFORI-AWUAH, PE** **Geotechnical Investigation**

### *Education*

*BS/ 1986/ Geodetic Engineering/Highway Engineering*

*MS/ 1994/ Civil Engineering*

*PhD/ Candidate*

### *Professional Registrations*

*PE / MD / 2598*

*PE / VA / 035121*

### *Professional Experience*

Mr. Ofori-Awuah manages KCI's Geotechnical Engineering Group. He has more than 24 years of professional experience in civil and geotechnical engineering, in both the public and private sectors. He has served in various positions as project engineer, senior engineer, principal engineer and director. He has worked on projects in several states and also overseas. His current responsibility includes managing all geotechnical projects, interacting with client representatives, developing proposals, negotiating and managing project budgets; providing technical leadership, and supervising the work of other geotechnical engineering personnel.

Mr. Ofori-Awuah has a wide range of experience in project management, project coordination, designing and implementing subsurface exploration programs for geotechnical and earthquake engineering projects; analysing subsurface exploration data and preparation of earthwork, soil improvements and shallow and deep foundation recommendations. He has extensive experience in analyses and design of foundations using LRFD, LFD, IBC, FHWA, AASHTO, AREMA, and Local and State DOTs' design procedures. He has a strong technical and multi-disciplinary background in geo-materials and geo-structure, geotechnical earthquake engineering, pavement engineering and is responsible for numerous projects involving subsurface evaluations, design, inspection and construction monitoring of dams, specialty deep foundations design cofferdams and shoring systems, rock slope stability, seismic and soil liquefaction evaluations, site-specific seismic hazard and liquefaction analyses, and soil-structure modeling.

Mr. Ofori-Awuah currently serves on many government committees, advisory panels and is active member of American Society of Civil Engineers (ASCE), GEO-INSTITUTE, Deep Foundation Institute (DFI) and Association of State Dam Safety Officials (ASDSO).

He is currently the Dam Owners Engineer in charge of performing annual safety inspections, preparing Emergency Action Plan which consists of detailed and comprehensive monitoring and operational safety management for two high-hazard dams. He is also the geotechnical engineer of record for new and remedial design and construction of several dams. Relevant project experience includes:

**HOWARD COUNTY - ON-CALL WATER AND SEWER MAIN EXTENSION ENGINEERING DESIGN SERVICES, HOWARD COUNTY, MD. HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.** Geotechnical Engineer. Under this contract, KCI provided on-call engineering services to study and design improvements and extensions for water distribution and sewer conveyance systems, which include preparations of alignment studies, field surveys, contract drawings and specifications, field subsurface investigations, bid documents, utility/right-of-way documents, and cost estimates, and construction phase services.

**WSSC WATER AND SEWER BOA, CONTRACT NO. PM0009A07. LAUREL, MD.** Senior Geotechnical Engineer. Under this basic ordering agreement contract, KCI is providing water and sewer design services to repair, rehabilitate, replace and relocate water and sewer pipelines and appurtenances as identified in WSSC's Capital Improvement Program. Scope of geotechnical work involves design and implementation of subsurface investigations, evaluation of soils and determination of ground water levels, laboratory soils testing, and development of a geotechnical report and specifications.

**SALUDA DAM, CUMBERLAND COUNTY, COLUMBIA, SC.** He was a team member for the safety evaluation of a 1.5-mile long and 208-foot high, earthen dam. He conducted the preliminary seismic liquefaction analyses for this high hazard hydroelectric dam that was built in 1930's with limited seismic considerations.

**SYLVAN LAKE DAM AND LAKE RESTORATION, MONTGOMERY COUNTY, NJ.** He is the Geotechnical Engineer of record. KCI conducted inspection and is providing design-build services for the reconstruction of the existing 270-foot long and 10-foot high earth embankment dam with a 68-foot long concrete spillway and an 8-inch thick concrete core and an 8-acre lake area. The restoration project consists widening the existing spillway using rock ramp/step pool with impoundment dredging, and reconstruction of the southern section of the dam with slope protection along the embankment. This would also require design and installation of a containment structure for on-site storage of dredged lake sediments.



**FARMERS DAM & IMPOUNDMENT, ST. MICHAEL, BARBADOS.** Senior Geotechnical Engineer in charge of subsurface exploration, design and construction of a 1200-foot long and 24-foot high. Authored the Dam Owner's Operation and Maintenance Manual as well as the Emergency Action Plan.

**RED CLOVER LANE DAM ASSESSMENT AND REMEDIATION DESIGN, HOWARD COUNTY, MD.** Senior Geotechnical Engineer for the inspection and assessment of a 240-foot long and 30-foot high earthen dam, using Maryland Dam Safety Checklist. The dam showed signs of slope instability. He supervised geotechnical studies for the source of slope instability and performed back-calculations for slope stability analyses and remedial design. He was in charge of the remedial design construction.

**COLUMBIA GATEWAY DAM ASSESSMENT AND REMEDIATION DESIGN, HOWARD COUNTY, MD.** Senior Geotechnical Engineer for the inspection and assessment of a 600-foot long and 30-foot high earthen dam, with a ten-foot concrete barrel pipe spillway using Maryland Dam Safety. Inspections uncovered minor seepage problems through the dam and possibly along the concrete barrel pipe. He supervised geotechnical studies and instrumentation for the source of seepage and remedial design. He was in charge of the remedial design construction.

**LAKE ELKHORN DAM ASSESSMENT AND EMERGENCY ACTION PLAN, HOWARD COUNTY, MD.** He is the Geotechnical and Dam Owners Engineer for the 650-foot long and 32-foot high earthen dam with a 145-foot wide concrete spillway. He prepared Emergency Action Plan for this dam. He is in charge of yearly safety inspection using Maryland Dam Safety Checklist.

**WILDE LAKE DAM ASSESSMENT AND EMERGENCY ACTION PLAN, HOWARD COUNTY, MD.** He serves Geotechnical and Dam Owners Engineer for the stepped-face 288-foot long and 28-foot high concrete gravity dam. He prepared Emergency Action Plan for this dam. He is in charge of yearly safety inspections using Maryland Dam Safety Checklist.

**LEVEE PERIODIC INSPECTION USACE IDC CONTRACT WR912DR-09-D-0050, BALTIMORE DISTRICT,** Team Lead, Trainer and Senior Geotechnical Engineer. KCI is performing periodic inspection tasks for USACE Baltimore District levees. These levees are located in New York, Pennsylvania, Maryland, Virginia and Washington, DC. He has led a team in preparing Project Plan, Pre-Inspection Packet, Field inspection,

and authored, the Periodic Inspection Report. He has also conducted several training sections using the newly developed Levee Inspection Methodology and Systems.

**HYDROLOGIC/HYDRAULIC ENGINEERING SERVICES OPEN-END CONTRACT, BCS 2004-21B, STATEWIDE, MD,** Maryland State Highway Administration. Geotechnical Engineer. KCI is performing miscellaneous tasks including roadway design, culvert analysis, open/closed storm drain design, stormwater management, erosion and sediment control, and surveying services to SHA's Highway Hydraulics Division under this four-year \$1.5 million open-end contract.

**ON-CALL STRUCTURAL DESIGN SERVICES, PROJECT NO. 2002-02, BALTIMORE COUNTY, MD,** Baltimore County Department of Public Works. Geotechnical Engineer. KCI is providing structural engineering services for bridges, buildings, and miscellaneous structures under this \$1 million open-end contract.



**KOFI ACHEAMPONG, PHD, PE**  
**Geotechnical**

*Education*

PhD/ 1996/ Civil & Environmental Engineering  
(Geotechnical Engineering)  
MS/ 1990/ Civil Engineering (Structural Engineering)  
BS/ 1985/ Civil Engineering

*Professional Registrations*

PE / MD / 33722  
PE / CT / 002232

*Professional Experience*

Dr. Acheampong is a senior engineer with more than 25 years of geotechnical, structural and civil engineering, and construction experience that includes all aspects of analyses, design and preparation of specifications, and construction monitoring and material testing. He has broad and in-depth multi-disciplinary background in geo-structures, dam engineering, geotechnology, geotechnical instrumentation and monitoring, and responsible for numerous projects involving subsurface evaluations, specialty deep foundation design and load testing, cofferdams and shoring systems, rock slope stability, seismic and soil liquefaction evaluations related to highway and railroad bridges, and dams. He has performed site and subsurface evaluations and in-situ testing using both destructive and non-destructive geophysical testing for soil classifications, specialty deep foundations design and load testing, ground improvements, cofferdams and shoring systems, rock slope stability, seismic evaluations related to highway/railroad bridge structures, roadway embankments and pavements, educational and commercial facilities, and coastal construction.

Dr. Acheampong also has experience in analyses/design of bridge foundations and underground construction using geo-statistical methods and design procedures and has work consistently with Maryland DEP, SHA, Connecticut DOT and NYSDOT. He has particular technical expertise in site-specific seismic hazard evaluations, soil-structure modeling, and data analyses software. Kofi is adept at developing scope of work for conceptual, desk studies and final design, develop technical specifications, assist in bidding and contractor selection, and assure quality control of contractor's work throughout project execution through construction coordination, observation and documentation, and consultation. He is responsible for managing multiple projects, interacting with client reps, developing proposals, managing project budgets; provides technical

leadership, and supervise the work of engineering personnel. His experience includes:

**DAM DESIGN & CONSTRUCTION.** Engineer-in-Charge & Lead Designer for four major earth embankment dams and several other smaller dams. The major embankment dams are: St. Mary's Dam Repairs and Rehabilitation (St. Mary's County, Maryland); Columbia Gateway Dam Remedial Repairs and Red Clover Dam (Howard County, Maryland); Rattlewood Golf Course Rehabilitation (Montgomery County, MD), Sylvan Lake Dam & Lake Restoration (Montgomery County, New Jersey), and the new Farmers Dam & Impoundment, Barbados, West Indies. The design process included regional/ site geologic evaluations and sitting, borrow material sourcing as well as stability analysis, filter and sub drainage designs, permeability and seepage analyses, geotechnical explorations and field testing, and laboratory testing and analyses of lake sediments and flood plain soils. Prepared design drawings and specifications for dam construction and/or remedial repairs. Other responsibilities included development of Emergency Action Plan (EAP) and Operations & Maintenance (O&M) Manuals, managing technical staff consisting of geologists, engineers and technicians, and coordination with county officials and dam owners.

**DAM INSPECTIONS AND SAFETY EVALUATIONS.** Lead Geotechnical Engineer Providing technical expertise inspecting and evaluating several dams in accordance with Maryland Dam Safety Checklist. Major dams include Columbia Gateway Dam, Lake Elkhorn, Wilde Lake and Red Clover Dams (Howard County, MD). Work included surficial and underwater inspections of the dam embankment/structure, reservoir areas and appurtenant outlets, spillways, associated drainage features and ancillary structures. Dam inspections and evaluations encountered several issues including potential dam failure mechanisms such as seepage, piping, settlement and stability. Supervised geotechnical and geophysical studies and instrumentation for the source of seepage, slope instability, and prepared safety evaluation reports and provided recommendations for remedial design and construction. Dam Owners Engineer in charge of performing annual safety inspections, and preparing Emergency Action Plan which consists of detailed and comprehensive monitoring and operational safety management for Lake Elkhorn and Wilde Lake Dams.

**REPAIRS AND REHABILITATION AT ST. MARY'S RIVER STATE PARK DAM,** Engineer-in-Charge. Conducted subsurface explorations and installed 8 monitoring wells to explore and characterize the subsurface conditions under the dam for the purpose of seepage



analysis, and performed studies including dam inspections to assess the existing dam embankment, spillways, drainage features and appurtenant structures. Identified major issues requiring repairs and remediation in report. Performed visual inspections and identified the items that needed repair or upgrading, including the riser structure and appurtenance systems, a footbridge to access the inlet structure, repairing cracks in concrete, eliminating trees and excess vegetation in the emergency spillway, and repairing the erosion damage at the entrance to the emergency spillway. In order to aid in the evaluation of the toe drain pipes, KCI performed video inspection of both 12" toe drain pipes. No obstructions or defects were detected in either drain pipe. In an effort to determine if excessive seepage was occurring through the embankment dam, steady-state seepage analyses were conducted using the three-dimensional finite element software program SEEP3D to estimate seepage through the embankment dam with the reservoir water level at two elevations. The analyses were performed assuming a three-zone embankment dam and a one-layer foundation model, as determined from our subsurface exploration. Provided remedial design and construction services including design of swale and toe drains at the downstream area of the dam, stabilization of the eroded reservoir banks at the emergency spillway, and reconstruction of access road. Prepared construction documents including design drawings, specifications, construction sequence and cost estimates. Provided construction QA/QC.

**COLUMBIA GATEWAY SWM POND DAM.** Engineer-in-Charge/Geotechnical Engineer responsible for design and preparation of construction documents for drainage systems at outlet headwall/wingwalls, remedial grouting of the 10-ft reinforced concrete pipe spillway joints, construction observation and technical expertise during reconstruction work; Dam owner's engineer in charge of performing annual safety inspections, and monitoring and evaluating operational dam safety management during Emergency Action Plan implementations.

**BARBADOS FARMERS DAM & IMPOUNDMENT, BLACK ROCK, ST. MICHAEL, BARBADOS, WI,** Stantec Consulting Caribbean Ltd. Geotechnical Engineer. Performed geotechnical subsurface explorations and laboratory testing program; designed a 10-m high and 200 m long earthen dam embankment with concrete-filled geoweb protected slope and 2.4 m x 2.4 RC culvert spillway, and filter diaphragm; performed seepage and stability analyses. Prepared conceptual through final design and construction documents (drawings and specifications), Operations and Maintenance Manual including EAP. Performed dam

construction monitoring and geotechnical instrumentation and monitoring of completed structure.

**SYLVAN LAKE DAM AND LAKE RESTORATION DESIGN/BUILD, MONTGOMERY TOWNSHIP, NJ.** Geotechnical Engineer responsible for evaluating stability and providing remedial design of an existing earth embankment dam, including design of a containment structure for sludge removed from an adjacent lake. Performed dam inspections and geotechnical explorations to assess the conditions of the existing embankment and concrete core and watershed. Provided geotechnical input for sediment/dredging operations and management plan. Performed engineering studies and design for reconstruction of the dam and a containment dike in accordance with New Jersey DPE Guidelines and Dam Safety Regulations. Prepared dam remediation design including construction documents (drawings and special provisions, construction sequencing). Provided geotechnical construction QA/QC including material evaluations, laboratory and design revisions during construction work.

**FALLS ROAD GOLF COURSE DAM – IRRIGATION POND EMBANKMENT STABILIZATION, MONTGOMERY COUNTY, MD.** Reviewed embankment fill requirements and Gabion wall design during dam stabilization reconstruction.

**BRIGHTWOOD COURT STREAM RESTORATION, HOWARD COUNTY DPW, MD.** Geotechnical Engineer responsible for subsurface explorations, stability analyses, evaluations of alternate stabilizing concepts and construction recommendations for restoring an existing stream channel with severely eroded banks and several sloughed/failed and disturbed slope areas. The stream consists of a small channel that drains to a tributary beginning at a stormwater pond outfall. Evaluated two stabilization concepts including either bank stabilization along the channel by widening and cutting back to stable slope inclinations whilst maintaining the existing channel bed, or a full channel restoration effort, including raising the channel bed and channel realignment with flood plain benches, and installation of step-pools and boulder deflectors in certain areas.



**KWAME ADU-GYAMFI, PHD, PE**  
**Geotechnical**

*Education*

*PhD / 2006 / Geotechnical Engineering and Pavement Design*  
*MA / 2003 / International Development*  
*MS / 2001 / Geo-Environmental*

*Professional Registrations*

*PE / MD / 36030*

*Professional Experience*

Dr. Adu-Gyamfi is KCI's Project Geotechnical Engineer. He has over 9 years of professional experience in geotechnical engineering, in both the public and private sectors. He has served in various positions as a project engineer and research assistant. He holds a PhD in Pavement Design and has worked on projects in several states and also overseas. Dr. Adu-Gyamfi possesses a strong technical background in pavement engineering including pavement condition and structural evaluation and benefit-cost analysis using Non-Destructive Tests (NDT), and Life Cycle Cost Analysis using FHWA's Real Cost. He is proficient in MDSHA's Design Guide, ASSHTO, and various pavement design software including Darwin. Dr. Adu-Gyamfi is active in American Association of Civil Engineers, and Deep Foundation Association.

**COLUMBIA GATEWAY STORM MANAGEMENT POND DAM REHABILITATION, HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENVIRONMENTAL SERVICES COLUMBIA, MD.**

Geotechnical Engineer. Project involved engineering evaluation and design services for the Columbia Gateway Dam as part of On-Call Stormwater and Watershed Management Evaluation/Design/Build Contract. Services included performing dam inspections services and preliminary geotechnical exploration studies to assess the dam, identify problem(s), provide recommendations to address the problems and cost estimates to address the problem(s).

Dr. Adu-Gyamfi assisted in preliminary geotechnical exploration studies to assess the dam, identify problem(s) and provide recommendations.

**DAM AND LEVEE INSPECTION, US ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT BALTIMORE, MD.**

Geotechnical Engineer. The \$419,000 task assignment includes the Periodic Inspection (PI) of 15 separate levee projects encompassing approximately 80 total miles of levee systems comprised of levee embankments, floodwalls, interior drainage and flood

damage reduction channels. Levee projects under this task include systems along the Susquehanna River, the Chemung River, the Chenango River, the Canisteo River, the Cohocton River, the Tioughnioga River, the Delaware River and numerous tributaries.

**RED CLOVER LANE DAM INSPECTION AND SLOPE INSTABILITY EVALUATION, HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENVIRONMENTAL SERVICES COLUMBIA.**

Geotechnical Engineer. Project involved geotechnical engineering services to assess an existing slope failure at a stormwater management pond dam.

Geotechnical Engineer. KCI provided geotechnical engineering services to assess an existing slope failure at a stormwater management pond located at the end of the Red Clover Lane, about 900 feet west of Trotter Road. KCI evaluated the results of the subsurface exploration, laboratory testing and inclinometer readings, and prepared a geotechnical report containing a brief review and description of the field and procedures conducted and their results. Dr. Adu-Gyamfi assisted in review of existing data and analysis.

**SYLVAN LAKE DAM AND LAKE RESTORATION DESIGN/BUILD, WESTON SOLUTIONS, INC. MONTGOMERY TOWNSHIP, NJ.**

The project consisted of a design-build project for dam restoration and removal of accumulated sediment from pond. The project will entail design through construction.

**WYOMING VALLEY LEVEE SYSTEM, US ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT.**

Geotechnical Engineer. USACE Baltimore District is in the final stages of completing the construction of the Susquehanna River Flood Control Projects, Wyoming Valley Pennsylvania, Local Flood Protection Raising Projects, located in the greater vicinity of Wilkes-Barre, PA. KCI is developing an updated Operation and Maintenance (O&M) Manual for the Kingston to Exeter Levee System (USACE four-letter system designation "WVKE") within the Wyoming Valley, Pennsylvania Levee Project. The O&M manual will reflect the Local Flood Control Protection Raising Projects and final construction being completed by the USACE for the Susquehanna River Flood Control Projects and provide assistance to local interests and local sponsor, Luzerne County Flood Protection Authority (LCFPA) in carrying out their obligations and responsibilities.



**JAMES KESTER, PE**  
**Water Resources**

*Education*

*BS / 1989 / Civil Engineering*

*Professional Registrations*

*PE / DE / 9857*

*PE / MD / 20903*

*PE / PA / PE073768*

*PE / VA / 0402 034242*

*Professional Experience*

Mr. Kester is Assistant Division Chief of the Water Resources Division with 22 years of experience in hydrologic and hydraulic analysis and design. His responsibilities include closed storm drain and stormwater management design; erosion and sediment control; H&H and floodplain analyses for culvert, bridge and stream restoration design; water quality assessment and facility design; scour analysis; dam breach analysis; and NPDES Pollution Prevention Plan preparation. He is proficient in TR-55, TR-20, WSPRO, HEC-2, HEC-RAS, HEC-18 and bridge scour studies. His relevant experience includes:

**ACUSHNET RIVER FISH PASSAGE PROJECT, EA ENGINEERING, SCIENCE & TECHNOLOGY ACUSHNET, MA.** H & H Engineer. Project involved hydraulic analysis, sediment transport analysis, viability assessment, bank stabilization feasibility study, and developing preliminary and final plans to provide fish passage through the Sawmill and Hamlin Street earth dams. Updated an existing HECRAS model from planning to design phase of a stream reach containing multiple dams and bridges. Performed multiple analysis, including a split flow and low flow analysis, for proposed step pools that will enable fish passage.

**BISHOPVILLE DAM FISH PASSAGE, MARYLAND STATE HIGHWAY ADMINISTRATION CENTRAL OFFICE BISHOPVILLE, MD.** Project Engineer. Project involved a feasibility study and preparation of a preliminary design for a \$1 million project to restore anadromous fish passage to 7 miles of breeding habitat. Responsible for the development of hydrology and hydraulics for the 12.8 square miles watershed to the pond based on Hydrology Panel methods, GISHydro2000 and HEC-RAS.

**CENTENNIAL LAKE DANGER REACH STUDY, HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENVIRONMENTAL SERVICES BALTIMORE, MD.** Project Manager. KCI provided the following work effort

necessary to complete a Danger Reach Study to determine the effects of a sunny day and PMF storm failures of the Centennial Lake dam on the downstream Little Patuxent River and various improved properties and roadway crossings. This included the development of a steady flow HEC-RAS model for the Final Danger Reach Report and 11''x17'' Danger Reach Mapping were also completed. KCI worked closely with Mr. Bruce Harrington of MDE Dam Safety as well as the County in finalizing the study and meeting MDE and County requirements for the project.

**DAM AND LEVEE INSPECTION, US ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT BALTIMORE, MD.** Environmental Scientist. The \$419,000 task assignment includes the Periodic Inspection (PI) of 15 separate levee projects encompassing approximately 80 total miles of levee systems comprised of levee embankments, floodwalls, interior drainage and flood damage reduction channels. Levee projects under this task include systems along the Susquehanna River, the Chemung River, the Chenango River, the Canisteo River, the Cohocton River, the Tioughnioga River, the Delaware River and numerous tributaries.

This task is currently being performed under KCI's Indefinite Delivery Contract with the Baltimore District Corps of Engineers as part of the National Levee Safety Program. The project includes the Periodic Inspection (PI) of fifteen separate levee projects encompassing approximately 80 total miles of levee systems comprised of levee embankments, floodwalls, interior drainage and flood damage reduction channels in Pennsylvania and New York. Levee projects under this task include systems along the Susquehanna River, the Chemung River, the Chenango River, the Canisteo River, the Cohocton River, the Tioughnioga River, the Delaware River and numerous tributaries. The Periodic Inspections are being conducted in accordance with the National Program to verify proper operation and maintenance, evaluate operational adequacy and structural stability, review design criteria to identify changes in current design standards, identify features to monitor over time, and to improve communication of the overall condition. The project includes the development of a Pre-Inspection Packet for each project based on review of system documentation, followed by the field inspection and finally the Periodic Inspection (PI) Report.



## RAY KRAHE, PE, CFM Water Resources

### *Education*

*BS / 1990 / Civil Engineering*

### *Professional Registrations*

*PE / MD / 28634 / 2003*

*PE / NC / 025753 / 2000*

*PE / NJ / 24GE03867400 / 1994*

### *Professional Experience*

Mr. Krahe is an associate project Manager and professional engineer with 25 years of experience in providing civil and water resources and land development engineering services for private, municipal, state, and federal clients. He has experience managing teams from various locations and subconsultants on small and large, multi-phased projects. His areas of experience include: stormwater management; hazard mitigation; floodplain studies; watershed studies and water quality; hydrology and hydraulics; flood control protection; stream restoration; land development; shoreline protection; and erosion and sediment control.

#### ***DAM AND LEVEE INSPECTION, US ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT BALTIMORE, MD.***

Project Manager. The \$419,000 task assignment includes the Periodic Inspection (PI) of 15 separate levee projects encompassing approximately 80 total miles of levee systems comprised of levee embankments, floodwalls, interior drainage and flood damage reduction channels. Levee projects under this task include systems along the Susquehanna River, the Chemung River, the Chenango River, the Canisteo River, the Cohocton River, the Tioughnioga River, the Delaware River and numerous tributaries.

#### ***LEVEE PERIODIC INSPECTION, TASK 1, YORK, PENNSYLVANIA AND HORNELL, NEW YORK. MD.***

Project Manager. This Task, Periodic Inspection (PI) Task no. 1, was performed under KCI's Indefinite Delivery Contract with the Baltimore District Corps of Engineers as part of the National Levee Safety Program. The project included management of a team of 8 staff and a subconsultant for performing a levee safety Periodic Inspection (PI) of 17.8 total miles of levee systems of levee embankments, floodwalls, interior drainage and flood damage reduction channels in York, Pennsylvania and Hornell, New York. Levee projects had systems along the Codorus Creek in York, Pennsylvania and the Canisteo River, Canacadea Creek,

Chauncy Run and Crosby Creek in Hornell, New York. The Periodic Inspections were conducted in accordance with the National Program to verify proper operation and maintenance, evaluate operational adequacy and structural stability, review design criteria to identify changes in current design standards, identify features to monitor over time, and to improve communication of the overall condition. Levee Periodic Inspection, Task 2, Fifteen (15) Federal Levee Projects in New York and Pennsylvania. Project Manager. This second Task, Periodic Inspection (PI) Task no. 2, is being performed under KCI's Indefinite Delivery Contract with the Baltimore District Corps of Engineers as part of the National Levee Safety Program. The project includes management of a team of 25 staff and a subconsultant for performing Levee Safety Periodic Inspections (PI) of 15 federal levee projects in New York and Pennsylvania including, 79.8 total miles of levee embankment and floodwall systems, interior drainage systems, flood damage reduction channels, 28 pump stations, 68 closure structures, and over 500 drainage structures. The Levee projects are located along numerous rivers, such as the Susquehanna River in both New York and Pennsylvania and New York rivers and creeks such as the Canisteo, Tuscarora, Cohocton, Chemung, Tioughnioga, Birdsall and the East Branch of the Delaware. The Periodic Inspections were conducted in accordance with the National Program to verify proper operation and maintenance, evaluate operational adequacy and structural stability, review design criteria to identify changes in current design standards, identify features to monitor over time, and to improve communication of the overall condition.

#### ***GEORGE WASHINGTON MEMORIAL PARKWAY COLUMBIA ISLAND BRIDGE PROJECT, FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION ARLINGTON, VA.***

Task Manager. Project involves design and construction documents for a new 375-foot long, 5-span, pre-stressed concrete beam bridge over Boundary Channel in Arlington County, Virginia and the District of Columbia.

Managed water resources engineering tasks for development for construction of a new five-span, 376 foot long, and 36 foot wide bridge over Boundary Channel. The bridge is one of several projects targeted to improve safety within the 14th St. Bridge Improvement Corridor. The project included development of watershed hydrology and hydraulic design of new storm drain systems and preparation of FHWA construction and cost estimating documents.

IDC for Comprehensive A/E Ecosystem Restoration, Survey, Design, Engineering, and Investigative Services in support of the Civil Works Program, US



Army Corps of Engineers Baltimore District Baltimore, MD. Task Manager. \$12M / 5-year multi-discipline contract for architectural and engineering services for levees, dams, and other flood damage reduction, navigation, hurricane protection, shoreline protection, design and modeling for streams, wetlands and other ecosystem restoration projects, hydrology/hydraulics, sediment transport, stream morphology and coastal and estuarine analysis. Tasks include:

Dam and Levee Inspections: Levee Periodic Inspection, Task 1: Provided management of a team of 8 staff and a subconsultant for performing a levee safety Periodic Inspection (PI) of 17.8 total miles of levee systems of levee embankments, floodwalls, interior drainage and flood damage reduction channels in York, Pennsylvania and Hornell, New York. Levee projects had systems along the Codorus Creek in York, Pennsylvania and the Canisteo River, Canacadea Creek, Chauncy Run and Crosby Creek in Hornell, New York. Levee Periodic Inspection, Task 2, Fifteen Federal Levee Projects in New York and Pennsylvania. The project includes management of a team of 25 staff and a subconsultant for performing Levee Safety Periodic Inspections (PI) of 15 federal levee projects in New York and Pennsylvania including, 79.8 total miles of levee embankment and floodwall systems, interior drainage systems, flood damage reduction channels, 28 pump stations, 68 closure structures, and over 500 drainage structures. The Levee projects are located along numerous rivers, such as the Susquehanna River in both New York and Pennsylvania and New York rivers and creeks such as the Canisteo, Tuscarora, Cohocton, Chemung, Tioughnioga, Birdsall and the East Branch of the Delaware. Both Periodic Inspections were conducted in accordance with the National Program to verify proper operation and maintenance, evaluate operational adequacy and structural stability, review design criteria to identify changes in current design standards, identify features to monitor over time, and to improve communication of the overall condition.

**FEMA (REGION II) HAZARD MITIGATION TECHNICAL ASSISTANCE PROJECT - FEMA FLOOD HAZARD IDENTIFICATION. BURLINGTON AND CAMDEN COUNTIES, NJ.** Task Order Coordinator. Managed the post July 2004 storm (Federal Disaster 1530DR-NJ) flood hazard identification study for flooding and dam failures in Burlington and Camden Counties, New Jersey. Work involved LIDAR digital elevation data collection, stream survey, Geo-HMS and HEC-RAS hydrologic and hydraulic modeling, development of floodplain work maps and TSDN-level reporting.



**G. RAYMOND SCHULTE, PE, BCEE**  
Water Resources

*Education*

MS / Sanitary Engineering  
BS / 1971 / Civil Engineering.

*Professional Registrations*

1984/ PE/ WV/009520  
Also registered in VA, MD, DE, DC, FL, MI, and OR  
2009 / BCEE

*Professional Experience*

Mr. Schulte is a civil/environmental engineer with more than 39 years of professional experience in the field of environmental engineering. His experience includes engineering design and management of a wide variety of environmental projects, principally in the municipal water and wastewater field. The range of Mr. Schulte's experience includes studies, facilities plans, engineering design, preparation of construction plans and specifications, and construction-related engineering services for: water systems (wells, treatment, pumping, storage, transmission, and distribution systems); wastewater systems (collection, pumping, force mains, treatment, and disposal); sludge treatment and disposal; and solid waste management projects. His relevant project experience includes:

**CHARLES COUNTY SANITARY LANDFILL - DESIGN OF CELL 3A. CHARLES COUNTY, MD.** Project Manager. Design, preparation of plans and specifications, and construction phase services for Cell 3A of the Charles County Landfill No. 2. The design includes leachate recharge/landfill gas venting wells for existing Cell 2A and for Cell 3A, and landfill gas flares.

**QUARANTINE ROAD LANDFILL EXPANSION #1054. BALTIMORE, MD.** Project Manager. KCI is providing planning, engineering design, permitting, and construction support, for expansion of the Quarantine Road Landfill as well as general operational, technical, and administrative assistance to the Bureau of Solid Waste.

**WASTE MANAGEMENT, INC., SANDY HILL LANDFILL MD,** Project Manager. Design of three landfill cells, leachate collection system, leachate pump station and force main; assistance in permitting; construction phase engineering.

**BALTIMORE COUNTY DPW, ON-CALL LANDFILL DESIGN SERVICES. MD.** Project Manager. A variety of task assignments associated with improvements and

expansion of the Eastern Sanitary Landfill. Task assignments included condition evaluation of a leachate lagoon liner; program assessment and monitoring of fuel spill remediation facility; base liner equivalency evaluations; Subtitle "D" compliance report; design of a truck tarping building; leachate facilities alternatives study; design of leachate pumping facilities upgrade; design of a composting pad; design of landfill cell expansion; landfill gas monitoring.

**GARRETT COUNTY SANITARY COMMISSION, TROUT RUN SEWAGE TREATMENT PLANT. MD,** Project Manager. Facilities plan supplement, design, and construction services for upgrade of the existing facultative lagoon sewage treatment plant. Increased capacity to 0.9-mgd to ensure compliance with a new NPDES discharge permit, by raising the earthen embankments utilizing gabion structures. The upgraded facilities include an innovative "Hydrograph Controlled Release" concept in combination with aerators for the lagoons, intermittent sand filters, ultraviolet disinfection, and cascade aeration. Project also included upgrade of an existing pumping station and stream flow monitoring station.

**ST. MARY'S COUNTY METROPOLITAN COMMISSION, ST. CLEMENTS SHORES SEWERAGE PROJECT. MD,** Project Engineer. Hydrogeologic study, groundwater discharge permit acquisition, design, construction engineering services,, and preparation of an operation and maintenance manual for a 0.1-mgd sewage collection and treatment system. The collection system consists of a pressure sewer system using grinder pumps at each lot, plus a central pumping station and 12,000 linear feet of force main. Treatment consists of aerobic lagoons, designed with earthen embankments, and chlorination. Disposal is by spray irrigation on crop fields using a completely-automated pumping and distribution control system.

**TOWN OF BECKLEY, PINEY CREEK WASTEWATER TREATMENT FACILITY. WV,** Project Supervisor. Design and construction services for conversion of an existing 3.5-mgd trickling filter plant to activated sludge with nitrification; design of improvements to the existing screening, grit removal, and primary processes. Sludge processing, anaerobic digestion, and rehabilitation of existing vacuum filters.



**E. ROSS CURTIS, PE**  
**SUBCONSULTANT**  
Construction Inspection &  
Management

**Education**

*MS / 1977 / Management*

*BS / 1965 / Civil Engineering,*

**Professional Registrations**

*West Virginia Professional Engineer #015130*

*Also registered in MD, NC, OH, VA and D.C.*

*NCEES #41049.*

*Construction Specifications Institute (CSI) Certified  
Construction Documents Technologist.*

*Board Certified Diplomate in Forensic Engineering by  
the NAFE.*

**Professional Experience**

Mr. Curtis is a civil engineer specializing in construction engineering, materials, management, safety, and claims management and negotiation; facilities and utility planning, design, construction, operation, and maintenance; and quality control and assurance, including environmental projects. Senior Member and Director at Large of the National Academy of Forensic Engineers (NAFE). Recording Secretary, American Society for Testing and Materials (ASTM) Committee E58, Forensic Engineering. Life Fellow, American Society of Civil Engineers (ASCE).

January 1998 to the Present: Independent Consultant, providing civil engineering, construction engineering, forensic engineering, expert witness, and engineering management consultation services.

April 1997 to December 1997: Head of Washington/Baltimore office for Goedken-Liss Engineering Company, providing forensic engineering services in Virginia, Maryland, and the District of Columbia. Continued duties as Resident Engineer, Oaks Landfill for contract close-out (see below).

1990 to March 1997: Head of Construction Engineering Group, SCS Engineers, Reston, Virginia. Formed, organized and staffed the Construction Engineering Group for this nation-wide company. Resident Engineer and owner's representative for the Oaks Landfill Vertical Expansion and Closure, Montgomery County, Maryland. Construction performed during 1990-97 totaled 120 acres, \$51 million. Responsibilities included construction management; change order negotiation; construction

quality assurance; design of new cells, landfill gas collection, and closure systems to meet RCRA Subtitle D requirements. Project Manager and Certifying/Resident Engineer for other landfill construction projects.

1989 to 1990: Independent Civil Engineering Consultant. Provided construction engineering and management as site representative for the designer during construction of the first cell of the Charles City County, VA Landfill.

1988 to 1989: Co-founder, Vice President, and Principal Engineer of Construction Services Group, Engineering Consulting Services, Ltd. (ECS), Chantilly, Virginia, with 50 person department providing materials engineering, testing, and inspection for new construction and existing facilities. Established, managed, and obtained NAVLAP/NIST accreditation for materials laboratory. Technical expertise included construction management, concrete, steel, masonry, roofing, and waterproofing.

1985 to 1988: Principal Engineer and Manager, Construction Services Group, STS Consultants, Ltd., Fairfax, Virginia. In charge of 60 person department providing the same services as listed above for ECS. President of the Washington Area Council of Engineering Laboratories, an organization providing testing and certification programs for engineering technicians and accreditation of materials testing laboratories. Certifying engineer for the Fairfax County, VA Critical Structures, and the Montgomery County, MD and Prince William County, VA Complex Structures Programs. Obtained NAVLAP accreditation for laboratory.

1981 to 1985: Resident Officer in Charge of Construction (Resident Engineer), Bethesda, Maryland. Managed \$150 million construction, including \$45 million renovation and modernization of the 40 year old Bethesda Naval Hospital, \$6 million mechanical and electrical upgrade of the Naval Medical Radiological Research Institute complex, construction of \$6 million barracks, \$4 million math and computer science laboratory, \$3 million explosive test facility at White Oak, MD, \$2.5 million water treatment facilities at the David Taylor Model Basin, Carderock, MD, et al. Managed construction site safety for all these projects.



## **GEORGE BAKALYAR** Estimator

### *Professional Experience*

Mr. Bakalyar has more than 39 years of progressive experience in commercial construction, beginning as a Field Engineer on major construction projects and progressing to the level of Superintendent. He has spent the past 28 years estimating and managing numerous projects including government, commercial, and retail facilities. Mr. Bakalyar has provided conceptual estimates for negotiated design-build projects, hard bids on select projects, presentations for design-build proposals, and purchasing of subcontracts and materials for projects estimated. He is also responsible for preparing all cost estimates, initial schedules, negotiating all subcontractor contracts, and negotiating and bidding all work. He has provided conceptual and design development estimates for numerous clients prior to preparing final GMP proposals. He has created detailed scopes of work for all trades, negotiated and wrote subcontractor contracts, and also implemented the computerized estimating system. Mr. Bakalyar uses the following estimating software: MCII, ICE2000, in addition to Timberline Precision Estimating and RS Means Costworks.

**SYLVAN LAKE DAM AND LAKE RESTORATION DESIGN/BUILD, WESTON SOLUTIONS, INC. MONTGOMERY TOWNSHIP, NJ.** The project consisted of a design-build project for dam restoration and removal of accumulated sediment from pond. The project will entail design through construction.

**MSU - HUGHES STADIUM VALUE ENGINEERING STUDY, BALTIMORE, MD.** Chief Estimator. Project involved a value engineering study for the \$12 million, 24,664 SF Hughes Stadium Renovation at Morgan State University. This \$12 million dollar project included new lighting, new track and field facilities, new playing fields, additional seating, new team room facilities, storage buildings, press box, concession areas, entry facilities, and promenade area. Study resulted in over 35 potential changes totaling in excess of \$3.5 million dollars. Incorporated design modifications resulted in an eleven percent (11%) total project cost reduction. Mr. Bakalyar provided a cost estimate for this \$5 million project which included campus sidewalks, reworking the Quads, installation of playing fields and an irrigation system.

**CONSTRUCTION ENGINEERING & QUALITY MANAGEMENT SERVICES (VATECH), BLACKSBURG, VA.** Chief Estimator. Project involved open-end type

contract for construction engineering and quality management services, including review of design documents for constructability and attendance at on-board review sessions, project management, cost estimating and/or analysis, schedule development and/or analysis, construction evaluation and assessment of quality of work, factory witness testing, evaluation of compliance with relevant codes and regulations, and construction inspection services. KCI's fee was \$500,000.

Mr. Bakalyar provided probable cost estimates for the following projects: Institute For Critical Technology And Applied Science Building Facility - This new \$25 million, 103,180 GSF facility provides laboratory, workshop, and the office accommodation for multidisciplinary groups from several colleges. Biology/Vivarium Facility - This \$25 million new facility consists of three floors and includes a vivarium program of approximately 25,000 GSF and a biology program of approximately 47,000 GSF, for a total of 72,000 GSF. Cowgill Hall - This facility includes \$4.7 million of renovations and upgrades for this 65,000 sf college building.

**VALUE ENGINEERING STUDY FOR MSU BANNEKER HALL, MORGAN STATE UNIVERSITY BALTIMORE, MD.** Chief Estimator. Project involved a value engineering study for the Banneker Communication Building, which will be renovated to house the School of Education and Urban Studies. Included in this project is the relocation of the University's Telecommunication Hub to the New Communications Building. KCI's fee was \$30,000.

Mr. Bakalyar provided cost estimating services as part of the value engineering study.



**JOHN M. HUDACEK, PE**  
**Structural Engineer**

*Education*

*BS/ 1993/ Civil Engineering*  
*Graduate Coursework/ 1994/ Transportation Systems*  
*Rehabilitation and Maintenance*

*Professional Registrations*

*PE/ MD/ 200349*  
*PE/ VA / 0402 046284*  
*FHWA - Safety Inspection of In-Service Bridges*  
*FHWA - Underwater Evaluation & Repair of Bridge*  
*ASDSO/ Safety Evaluation of Existing Dams*

*Professional Experience*

Mr. Hudacek is a Structural Engineer in KCI's Structures Division with over 17 years of experience. Mr. Hudacek specializes in the inspection, analysis, and repair/rehabilitation of bridges and other transportation structures, including movable bridges and historic bridges. He has personally inspected over 550 bridges. Prior to joining KCI in 2004, he worked for over ten years in the Bridge Inspection and Remedial Engineering Division of the Maryland State Highway Administration's Office of Bridge Development. The last six of those years were spent as a Project Team Leader, responsible for monitoring and maintaining approximately 1000 highway structures (bridges, culverts, retaining walls, and noise barriers). This included four major movable bridges. Mr. Hudacek also worked for six months as a construction inspector on a major bridge replacement project (Francis Avenue over Amtrak & US 1, Baltimore County, MD), which included significant approach roadway and drainage modifications. Specific project experience includes:

**BRIDGE INSPECTION, ENGINEERING, DESIGN, AND ASSOCIATED ENGINEERING SUPPORT SERVICES IDTC, CONTRACT W912-EE-04-A-0001, WORLDWIDE, US ARMY CORPS OF ENGINEERS.** Inspection Team Leader. KCI performed structural inspection and rehabilitation design services on an open-end basis for the US Army Corps of Engineers under this \$3 million contract. Tasks included: Fort Stewart, GA. Lead the inspections and prepared or reviewed reports for 18 army-base bridges

**STATEWIDE BRIDGE INSPECTIONS, MARYLAND STATE HIGHWAY ADMINISTRATION.** Bridge Inspector/Inspection Team Leader/Project Manager. Reviewed over 800 inspection reports prepared by field technicians and consulting engineers, all done in

accordance with the NBIS and Pontis Bridge Management System coding formats. Reports included movable bridge inspections and underwater inspections. Prepared follow-up reports for nearly half of these reviews. Performed over 400 inspections, many as Team Leader, of various highway structures including: bridges and culverts of various types, sizes, and materials (with various substructures), and various types of moveable bridges, historic bridges, retaining walls, and noise barriers. Prepared over half of the reports for the 400+ inspections, which include structure description, inspection findings, photographs, and recommendations for repair (and priority), analysis, or monitoring. Also supervised an inspection team of two engineers and a technician performing the above duties.

**MD 615 OVER TRIBUTARY OF POTOMAC RIVER, WASHINGTON COUNTY, MD, MARYLAND STATE HIGHWAY ADMINISTRATION.** Design Engineer. The concrete cribbing was failing above the inlet headwall of this box culvert, resulting in heavy slope erosion. The wing walls had also separated and were moving away from the headwall. The cribbing was removed, the headwall was heightened, the wing walls were replaced with cast-in-place concrete, and the entire surrounding slope was regraded and stabilized.

**MD 75 OVER BEAVER DAM CREEK, FREDERICK COUNTY, MD, MARYLAND STATE HIGHWAY ADMINISTRATION.** Project Manager. A cement tanker overturned and heavily damaged one of the bridge's parapets. The parapet was replaced with several sections of temporary single-face concrete ("Jersey shape") traffic barrier, attached with steel angles at the base, and bolted through the deck slab. A subsequent cement tanker accident then destroyed the temporary parapet. As a result, the parapet was replaced again, but with a permanent concrete parapet. The newest parapet was thickened to accommodate future truck impacts, and is doweled through the deck slab. Both repairs involved tie-ins with the approach guardrails, and maintained two-way traffic during construction.



## **IKAIKA KINCAID, PE** **Structural**

### *Education*

*BS / 1998 / Geology and Geophysics*  
*MS / 2004 / Ocean and Resources Engineering*

### *Professional Registrations*

*2007 / PE / HI / 12562-CE*  
*2010 / PE / MD / 38511*  
*NAUI / Master Scuba Dive, Scuba Rescue Diver, Nitrox Diver*  
*TDI / Nitrox Diver, TDI / Advanced Nitrox Diver, Nitrox Gas Blender*  
*PADI / Scuba Diver*  
*FHWA / In-Service Bridge Inspection Course*  
*American Society of Civil Engineers / Member*

### *Professional Experience*

Mr. Kincaid is a registered Professional Engineer and a certified ADCI Commercial Dive Supervisor with more than 10 years of experience. He has experience as an Ocean Engineer, Project Engineer, Project Manager, and Commercial Diver/Supervisor. Mr. Kincaid's qualifications include oceanographic studies, beach processes, underwater structural inspections, and underwater construction. Mr. Kincaid has performed underwater structural inspections throughout Maryland, Hawaii, Guam, and the Pacific. As a diver engineer, he accrued more than 500 hours of underwater inspections consisting of piers/wharfs, concrete and sheet pile bulkheads, rip-rap and dolos type breakwaters, cofferdams, dry-dock structures, diffuser pipelines, intake basins, large mooring chains and cables, ship hulls, underwater wrecks, and substructure elements. Conducted underwater geomorphology surveys for the USACOE, NAVFAC Hawaii Facilities, State of Hawaii, DLNR, Boating Division, and private entities. His relevant project experience includes:

***UNDERWATER BRIDGE INSPECTION OPEN-END, BCS 2006-04A. STATEWIDE, MD.*** Diver. This \$500,000, five-year contract involves performing detailed hands-on condition inspections of underwater portions of substructure and foundation elements of SHA owned bridges located throughout the State on both a routine and emergency basis. Dive Supervisor/Engineer. Conducted the routine underwater condition inspection of 29 bridges. Various bridge orientations were inspected ranging from a 20-span steel beam structure to a double box-culvert structure. Reports were created for each bridge and PONTIS elemental data was updated in the bridge inventory.

***UNDERWATER INSPECTION, TESTING AND STRUCTURAL ANALYSIS FOR CNX MARINE TERMINAL, PIER 2. BALTIMORE, MD.*** Diver. The project involved underwater inspection, testing and structural design services for Pier 2 of CONSOL's CNX Terminal in Baltimore. Dive Supervisor/Engineer. Responsible for the pile restoration project. KCI was hired as a third party QC inspection firm to observe a marine contractor installing 50 fiberglass jackets, then filling them with epoxy grout. There were two types of jackets installed: 34 round jackets and 16 H-pile shape jackets. Responsible for the removal of six timber pile sections. The project managers at CNX and Consolenergy wanted to determine the remaining bearing capacity of the existing timber piles under the conveyor system. Pier 2, originally constructed in 1916, was expanded in 1922. KCI removed six five-foot sections of timber piles as close to the mudline as possible (two sections - 1916 construction, four sections - 1922 construction (two at the end of the pier).

***UNDERWATER INSPECTION AND EVALUATION SERVICES. BALTIMORE, MD.*** Served as the dive supervisor and engineer for the routine underwater inspection of 29 bridges. Maintenance and Yearly Inspection of the Tesoro Single Point Mooring (SPM) Facility. Oahu, Hawaii. This offshore mooring facility located 1.5 miles from shore is composed of a 40' diameter buoy which allows ships to offload petroleum products. These products are pumped through floating hoses (16"-30") into the buoy, then down through flexible hoses to the sea floor. On the sea floor, the product is further pumped through an accumulator rack and expansion hose loop before heading to the shore in cathodic protected steel pipes. The SPM buoy is anchored using six chain legs, each 1,500' long, with two danforth type anchors at the ends arranged in tandem. Every component of this assembly is carefully measured and inspected on a routine schedule.

## SECTION 2. HISTORY OF COMPLETING SIMILAR PROJECTS

## 2. HISTORY OF COMPLETING SIMILAR PROJECTS

The KCI Team has extensive experience in performing inspection and design for earth dams rehabilitation; identification and remediation of structural deficiencies of earth dams; identification and remediation of geotechnical deficiencies of earth dams; maintenance friendly dam design; and permitting. Following are descriptions highlighting KCI's related experience.

### **DAM REPAIRS AND REHABILITATION AT ST. MARY'S RIVER STATE PARK DAM** St. Mary's County, Maryland

#### **Client**

Maryland Department of General Services

#### **Background Information**

KCI completed a dam inspection, subsurface investigation, seepage analysis, remedial design, construction specifications and cost estimates, as well as construction oversight of a high hazard dam at the St. Mary's River State Park in St. Mary's County, MD.

The dam consists of an earth fill embankment approximately 1670 feet long, 38 feet high and 16 feet wide at the top with a gravel access road. The dam impounds a lake of 250 acres. The primary spillway consists of a 36-inch diameter RCP with an outfall invert at EL 39.0. There are two toe drains at the downhill toe of the embankment. These drains consist of 12-inch diameter bituminous-coated CMP. There is an emergency spillway located to the southwest of the embankment.



#### **Highlights**

KCI inspected the St. Mary's State Park Dam and identified items for repair or upgrade. Items of concern included repairing the riser and its appurtenances, constructing a footbridge to access the inlet structure, repairing cracks in concrete, eliminating trees and excess vegetation in the emergency spillway, and repairing the erosion damage at the entrance to the emergency spillway. KCI performed video inspection of both 12" toe drain pipes which provided detailed information regarding the condition and functionality of the toe drain pipes.

As part of the work, soil-test borings were performed and monitoring wells were installed to explore and characterize the subsurface conditions under the dam for the purpose of seepage analysis. Some of the borings were converted to monitoring wells to supplement four existing wells thereby eliminating the need for drilling additional monitoring wells and providing significant cost savings to our client.

Steady-state seepage analyses were conducted using the three-dimensional finite element software program SEEP3D to estimate seepage through the embankment dam with the reservoir water level at two elevations. KCI concluded that the toe drains were in fact functioning, however, the perforated pipes within the toe drain gravel were set too high to intercept seepage and that the gravel was actually draining the embankment. KCI provided design and repair recommendations that included installation of shallow wells into the embankment to measure water level within the embankment and the toe drain; installation of survey benchmark and gauge line for long-term accurate monitoring; and refilling the reservoir to its normal pool elevation with intensive water level monitoring of wells and periodic inspections.

KCI prepared biddable construction documents to repair the riser and its appurtenances, to eliminate trees and excess vegetation in the emergency spillway, to repair the erosion damage at the entrance to the emergency spillway, to construct toe drains at the base of the downstream embankment, and to construct a gravel access road to the dam. KCI utilized SPECSINTACT Software for preparation of project specifications. In addition, KCI used MCASES Gold to prepare construction cost estimates. KCI also provided construction monitoring and participated during bidding and awarding of the construction contract.

## LAKE ELKHORN DAM ANNUAL INSPECTION SERVICES

Columbia, Howard County, Maryland

### Client

Columbia Association

### Background Information

KCI was contracted by the Columbia Association to assume responsibilities of "Dam Owner's Engineer" as part of their Emergency Action Plan (EAP) for Lake Elkhorn Dam. KCI's responsibilities included performing annual dam inspection services, and to provide emergency response actions as part of On-Call Stormwater and Watershed Management Evaluation / Design / Build Contract.

Lake Elkhorn is an earthen embankment dam with a concrete spillway constructed in 1974. The embankment is roughly 650 feet long and 32 feet high at its highest point. The concrete spillway is 145 feet wide between concrete retaining walls. There is a 236 feet long outfall structure consisting of a 5-foot diameter concrete pipe with headwalls and a control structure with sluice gate. In addition, there is a twin 15.4 x 9.2 ft corrugated metal pipes, approximately 200 feet long that runs under Broken Land Parkway. The dam hazard classification is a Class 2 - Significant.



### Highlights

KCI performed surficial and underwater inspections of the submerged portions of the dam using our Professional Engineer divers in accordance with Maryland Department of the Environment (MDE) Dam Safety Division requirements. The purpose of this initial dam inspection was to determine the structural and operational conditions of the earth embankment dam, spillways, reservoir area and outlet channels, and associated drainage features.



KCI prepared a report detailing inspection findings, including photographs and recommendations for repair. In general the dam appears to be in good condition. However, we observed some issues which needed to be addressed. The major issues we encountered during our visual inspections included the following:

- Localized erosion at the upstream top of slope area west of existing intake control structure manhole.
- Tree stumps and shrubs, and animal burrows on the embankment.
- Debris or obstructions at the downstream end of outlet pipe.
- Damaged sluice gate shaft.
- Build up of Algae colony near upstream of spillway.
- Minor cracking in spillway.
- Improper functioning of the toe drain at the downstream face of spillway.
- Inadequate riprap protection along the wing wall further downstream.

We recommended these issues be addressed through routine and regularly scheduled maintenance work. KCI has been retained as the owners dam engineer for annual inspection, emergency response and preparation and updating of emergency action plan.

## WILDE LAKE DAM ANNUAL INSPECTION SERVICES

Columbia, Howard County, Maryland

### Client

Columbia Association

### Background Information

KCI was contracted by the Columbia Association to assume responsibilities of "Dam Owner's Engineer" as part of their Emergency Action Plan (EAP) for Wilde Lake Dam. KCI's responsibilities include performing annual dam inspection services and providing emergency response as part of On-Call Stormwater and Watershed Management Evaluation/Design /Build Contract.

The Wilde Lake dam was constructed in 1967 and consists of a stepped face concrete gravity overflow spillway 168 feet long and 28 feet high. The total length of the dam is 288 feet. It has non-overflow concrete gravity walls, 56 feet and 64 feet long, at both abutments. Underlying the dam foundation is weathered micaceous schist and sound granite and pegmatite. Four feet diameter pressure relief wells and a sand drainage layer (in the left abutment) control seepage. The dam hazard classification is a Class 2 - Significant.

### Highlights

KCI performed surficial and underwater inspections of the submerged portions of the dam using our Professional Engineer divers in accordance with Maryland Department of the Environment (MDE) Dam Safety Division requirements. The purpose of this initial dam inspection was to determine the structural and operational conditions of the earth embankment dam, spillways, reservoir area and outlet channels, and associated drainage features.

KCI prepared a report detailing inspection findings, including photographs and recommendations for repair. In general the dam appears to be in satisfactory condition. However, we observed some issues which needed to be addressed. The major issues we encountered with recommendations are as follows:

- Repair spalling, scaling and delaminated concrete on the downstream face of the dam.
- Reseal the vertical and horizontal joints observed at the downstream face of the dam (between the causeways).
- Clear sediment and debris from the trash rack and sluice gate.
- Install a horizontal trash rack on the intake structure.
- Repair broken railings on the walkway fences.
- Lubricate and test-operate the primary and secondary sluice gates on a regular basis.

KCI has been retained as the owners dam engineer for annual inspection, emergency response and preparation and updating of emergency action plan.



## BARBADOS FARMERS DAM & IMPOUNDMENT

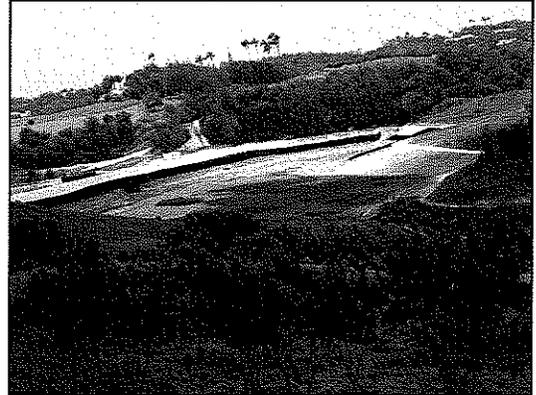
Black Rock, St. Michael, Barbados

### Client

C.O. Williams Construction Ltd.

### Background Information

KCI was tasked with exploring the subsurface conditions of a potential dam sight in Barbados. This project involved the construction of a small earth embankment dam and impoundment to provide irrigation water for the proposed Apes Hill Golf Course development. The dam embankment will have a maximum height of 24 feet and will be approximately 1,200-foot long and was constructed with local clay deposits. The proposed capacity of the impoundment will be approximately 70 million gallons.



### Highlights

Because the site was abutting known karst geology, KCI conducted extensive subsurface exploration and laboratory testing to characterize the site.

Following the subsurface exploration, KCI was tasked with designing the dam embankment and reservoir. The design elements included a seepage analysis, conceptual design for submittal to the local approving agency, development of draft and final construction documents, and construction oversight. The seepage model was conducted using SEEP3D for three potential dam construction scenarios, including a homogenous dam and two zoned dam scenarios. The model was calibrated using soil and permeability information from the geotechnical analysis. The analysis indicated that due to presence of cracks within the clay foundation, an upstream impermeable liner would be required to reduce seepage through the embankment.



Based upon this requirement, the dam was redesigned as a homogeneous dam with an upstream liner. KCI produced construction documents, including specifications, and drawings depicting existing site conditions, dam construction, grading plan, sediment and erosion control plans, liner details, and instrumentation. KCI prepared Operation and Maintenance (O&M) manual as well as an Emergency Response Plan, detailing necessary procedures for maintaining the dam; including inspections, groundwater level and seepage monitoring, vegetation control and tree clearing, and related issues; and emergency procedures.

KCI has conducted inspection of this dam since completion.

## SYLVAN LAKE DAM EMBANKMENT INSPECTIONS

### Somerset, New Jersey

#### Client

Weston Solutions, Inc.

#### Background Information

KCI was retained by Weston Solutions, Inc. to perform geotechnical and environmental subsurface explorations of the dam embankment and floodplain soils, and to provide Design/Build services for the proposed restoration of Sylvan Lake Dam.



The Sylvan Lake Dam is an earth embankment dam constructed around 1910 and located on Rock Brook Creek, a tributary of the Millstone River which runs through the North Princeton Development Center (NPDC), formerly the New Jersey Neuropsychiatric Institute in Montgomery Township, Somerset County, New Jersey. The Sylvan Lake Dam has a drainage area of approximately 7.8 square miles and reported to have a normal storage capacity of 25 acre feet with a maximum during storm events of 133 acre feet. It is a 270-foot long and 10-foot high existing earth embankment dam with a 68-foot long concrete spillway, and an 8-inch thick concrete core place on a layer of shale bedrock. Three 24 inch diameter outlet pipes (which are now inoperable) and one 20 inch diameter outlet pipe (which appears to work) allow the reservoir pool to be lowered. Four concrete piers, which once supported a wooden footwalk, rise vertically from the spillway crest.

#### Highlights

Several years ago, a section of the spillway crest between the north abutment and the first pier was removed lowering the pool elevation approximately three to four feet. The earth fill adjacent to the south abutment is currently experiencing scour and structurally the existing dam is in a state of disrepair with cracked and spalling concrete throughout.

Due to the poor and unsafe condition of the dam and, as part of a larger restoration effort of the property, the Montgomery Township requested that the project team undertake all actions necessary to restore the Sylvan Lake Dam and dredge the reservoir. KCI successfully partnered with local regulators including the New Jersey Department of Environmental Protection and the local community to ensure that the project was completed on time and exceeded client expectations.

KCI performed inspections and evaluated the subsurface conditions of the existing dam and lake using geotechnical/environmental explorations and geophysical testing methods. Employing different subsurface exploration techniques helped minimized environmental impact and provided cost-savings to our client.

KCI recommended widening the existing spillway using rock ramp/step pool with impoundment dredging, and reconstruction of the southern section of the dam with slope protection along the embankment. KCI also provided the following:

- Geotechnical input for sediment/dredging operations and management plan.
- Engineering studies and design for reconstruction of the dam and a containment dike in accordance with New Jersey DPE Guidelines and Dam Safety Regulations.
- Dam remediation design including construction documents (drawings and special provisions, construction sequencing).
- Construction Quality Control and Assurance (QA/QC) including material evaluations, laboratory and in-situ field testing.
- Dam Safety Operations, Maintenance and Management, and Emergency Action Plan.

## RED CLOVER LANE DAM INSPECTION AND SLOPE INSTABILITY EVALUATION Howard County, Maryland

### Client

Howard County Department of Public Works

### Background Information

KCI provided geotechnical engineering services to assess an existing slope failure at a stormwater management pond located at the end of the Red Clover Lane, about 900 feet west of Trotter Road. The existing earth dam is about 20-foot high and spans approximately 200 feet. Residential buildings surround the dam with the nearest building about 200 feet away. A 16-foot wide road with six-foot wide bituminous pavement runs on top of the dam. There is also evidence of failure on the top and along the slope of the dam. The severest evidence of failure was located approximately in the middle top portion of the dam. The soil mass near the top of the dam had settled approximately 12 to 18 inches and had also moved along the slope about 12 to 18 inches. Vertical cracks were visible due to the slide.



### Highlights

KCI visually inspected the dam and identified items that needed repair in accordance with Maryland Dam Safety Inspection Checklist. Additionally, KCI performed drilling within the dam embankment to explore the cause of the slope failure. Our subsurface exploration revealed micaceous silty sand soils within the embankment. KCI performed direct shear testing of embankment soils to determine shear strength properties. We performed global stability analyses for the existing condition to back-calculate the developed soil shear strength parameters for marginal stability conditions (defined by FS = 1.0). In an attempt to reproduce the conditions in the field, a disturbed soil sample was compacted to 95 percent of the maximum dry density. The optimum moisture content was far lower than the in-situ natural moisture. Using the standard Proctor tests results this moisture content yielded a maximum dry density of 87 pcf which translated into less than the 85 percent of the required construction compactive effort.

Based on our analyses, KCI determined that the very soft/very loose condition of the upper few feet of the material is the cause of the slope failure. This may be due to unsuitable material used as embankment fill, improper compaction of the fill material at the time of slope construction and/or infiltration of surface water in to the top layers of the slope, resulting in long-term softening of these materials. KCI's knowledge and experience dealing with dam design and construction, as well as slope stabilization played a key role in identifying the root cause of the slope failure and recommending the best technique to mitigate the failure.

KCI recommended removal of micaceous silty sand soils and installation of clayey sand material to prevent shallow slope failures in the future. KCI produced biddable construction documents to repair the dam. KCI performed the construction oversight of remedial measures. KCI utilized SPECSINTACT Software for preparation of project specifications. In addition, KCI has a license for MCASES Gold, which was used to prepare construction cost estimates.

## COLUMBIA GATEWAY STORMWATER MANAGEMENT DAM - PRELIMINARY GEOTECHNICAL STUDIES

Howard County, Maryland

### Client

Howard County Department of Public Works  
Stormwater Management Division

### Background Information

KCI was contracted by the Howard County Department of Public Works to perform engineering evaluation and design services for the Columbia Gateway Dam as part of On-Call Stormwater and Watershed Management Evaluation/Design/Build Contract. KCI's responsibilities included performing dam inspections services and preliminary geotechnical exploration studies to assess the dam, identify problem(s), provide recommendations to address the problems and cost estimates to address the problem(s). Based on KCI's preliminary studies, the County requested KCI to provide remedial design to address dewatering issues at the downstream existing wingwalls and remedial grouting of the existing reinforced concrete spillway pipe joints.



The project involves an existing stormwater management pond located approximately 300 feet west of Samuel Morse Drive in the Columbia Gateway Business Park in Howard County, Maryland. The dam is situated at the eastern end of the SWM pond. The dam is approximately 30 feet high with a 10-foot reinforced concrete barrel pipe spillway outfall. The spillway has a riser and two antiseep collars. The length of the pipe is approximately 120 feet and includes 17 joints. The pipe begins at an intake structure on the upstream end and daylight at the downstream end. The pipe also traverses an 18-inch sanitary sewer pipe enclosed in a concrete casing towards the downstream toe of the dam. The downstream end has a headwall and two wingwall/retaining walls. The dam was designed for the ½ the Probable Maximum Flood (PMF). The dam is classified as one of the County's high hazard dams.

### Highlights

KCI conducted geotechnical explorations and studies including dam inspections to assess the existing dam embankment, spillways, drainage features and appurtenant structures. KCI identified issues and provided recommendations in a report to address these problems. Among the major issues we encountered, were the presence of significant reddish-brown staining due to potential groundwater seepage and/or soil inflows at several joints inside the reinforced concrete spillway pipe. KCI also observed wet soil conditions at the wingwall outfall areas, with continuous water seepage over the wingwalls and significant reddish-brown staining on the face of the headwall and wingwalls. Based on KCI's preliminary studies and recommendations, the Howard County Department of Public Works determined that each of the existing 17 pipe joints and the interface between the pipe and headwall be grouted to ensure proper joint sealing against groundwater and soil inflows into the pipe. In addition, KCI recommended that the drainage and seepage control measures be implemented behind the wingwalls to minimize hydrostatic water buildup and water seepage over the walls.

KCI performed the following remedial design work:

1. Design wingwall drainage system including preparation of design drawings, specifications, construction sequence and cost estimates. KCI utilized SPECSINTACT Software for preparation of project specifications and MCASES Gold to prepare construction cost estimates. KCI provided evaluation of construction excavation and dewatering adjacent to existing structures
2. Design remedial grouting repairs to concrete pipe spillway. This task included preparation of design package to solicit Design/Build proposals from specialty contractors; review and evaluation of proposals; provide recommendations to the County, and coordinate with selected specialty contractor.
3. Prepare and obtain maintenance and repair permit for the remedial work on the dam.
4. Provide Construction Monitoring and oversight during scheduled construction.

## IRRIGATION POND DAM UPGRADE AT RATTLEWOOD GOLF COURSE Mt. Airy, Montgomery County, Maryland

### Client

Chesapeake Environmental Management, Inc (CEM)

### Owner

Montgomery County MCRA

### Background Information

KCI was contracted by CEM to perform engineering evaluation, design and construction inspection services for the irrigation pond dam upgrade at Rattlewood Golf Course, Mt. Airy, Maryland.



The project involved replacing the existing Corrugated Metal Pipe (CMP) riser with a new cast-in-place concrete riser structure, providing toe drain and filter diaphragm and outlet endwall with riprapped channel on downstream side, and performing minor grading and restoration of the emergency spillway crest elevation to satisfy the 100-year storm water surface requirements in the pond.

Three design options were investigated for final design and permitting to address drainage and irrigation issues at the golf course. These design alternatives provided the client options in terms of budget and feasibility.

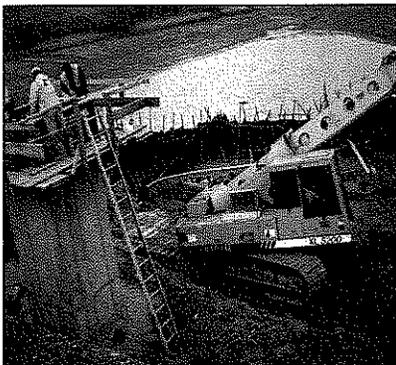
KCI's responsibilities included design services and development of construction documents, performing construction observations, site meetings (including pre-construction and construction phase) to coordinate geotechnical and contractual issues, subcontractor management and coordination during construction.

### Highlights

KCI performed the following design and remedial work and prepared construction documents, and construction monitoring and management:

**Riser Structure Construction and Embankment Backfill** - This work included the installation of a new shear gate valve (Kennedy 12" Flange Type Resilient Wedge Gate Valve), a cast-in-place cut-off wall with two 12-inch diameter Ductile Iron Pipe (DIP) overflow pipes, and upstream embankment backfilling and slope stabilization. As part of the construction, pond dewatering and stream diversion was performed using Portadam temporary cofferdam prior to riser structure construction.

**Filter Diaphragm, Drainfill and Toe drain Installations** - This work involved installation of the filter diaphragm, drainfill and toe drain installation. This work also included an outlet channel riprap protection, cast-in-place endwall construction, cutting and grouting of an existing two inch diameter galvanized pipe; and downstream embankment slope stabilization in the vicinity of toe drain and sand filter, and riprap outlet.



**Emergency Spillway Modifications** - The completed modifications included regrading and stabilizing the south-eastern sloped bank area of pond; excavation and subgrade preparation; placing a 6-inch minimum thick layer of top soil over turf matting overlying prepared subgrade; and securing sodding using pins on top of the topsoil. The crest of the emergency spillway is approximately 4.5 inch higher than the design elevation; however, a freeboard of 1.23 ft above the 100-year water surface elevation is provided.

**As-Built** - KCI performed survey of completed construction and prepared as-built drawings.

### 3. PROJECT UNDERSTANDING AND APPROACH

### 3. PROJECT UNDERSTANDING AND APPROACH

#### Understanding of the Scope of Work

KCI understands that West Virginia Division of Natural Resources Parks and Recreation Section (WVDNRPR) requires the services of an engineering consultant to prepare construction plans and specifications and other related services to bring Cacapon Resort State Park Upper and Lower Dams into compliance with current Dam Safety regulations. Upon completion, the engineering consultant will prepare an application for a "Certificate of Approval" from the Dam Safety agency.

We will use the following approaches to execute this project.

#### Program Management Plan

KCI understands that engineering projects assigned under this contract may include multiple and simultaneous task assignments throughout the WVDNRPR Atlantic's geographic area. The KCI team has the staff, equipment and corporate resources to accommodate the project assignments in a timely and cost-efficient manner. All members of the KCI Team carry photo identification and will report to the WVDNRPR's public safety authorities when they arrive and when they depart, to ease all security requirements.

KCI fully understands that our field work must not *interfere* with the operations and activities at Cacapon State Park. We will schedule our work and coordinate directly with the authorities to avoid interfering with the routine of activities of the State Park. This can take the form of scheduling field work on low volume days or at least avoid busy days with special activities.

**Project Organization** – Mr. Daniel Garcia, PE, will be the Project Manager (PM) and will serve as primary point of contact with WVDNRPR. He will be responsible for coordinating and overseeing all contract activities. All work performed by KCI's staff will be performed under his direct supervision.

Typically for open-end contracts, a Task Manager (TM) working under the PM will be assigned to each task. Project assignments will be made based on the nature of the assignment and the expertise of the senior staff. In this position, the TM will be responsible for the technical aspects of the project, and everyday activities of the project team. The TM will also be responsible for ensuring that design services are performed in a cost effective and technically accurate manner and in accordance with WVDNRPR requirements. This Task Manager will serve as a secondary point-of-contact with WVDNRPR.

**Project Initiation** – KCI's Project Manager will respond to the WVDNRPR's Work Request within 24 hours. As requested, KCI's Project Manager and other key staff will attend a meeting to discuss the scope of the project and facilitate our thorough understanding of the issues important to the WVDNRPR. This initial meeting will serve to educate KCI as to the purpose of the task, facilitate KCI's understanding of the factors impacting its performance, and identify any issues or questions related to the scope of services. This thorough understanding of the project will assist KCI in providing engineering services specific to the WVDNRPR task. Depending on the size and complexity of the assignment, a site reconnaissance visit will be made to determine site conditions/constraints to be addressed while performing the task. KCI will then prepare and submit for review and approval a detailed scope of services describing the work to be performed, key personnel roles/assignments, project schedules and milestone dates, quality control procedures, and lump sum cost proposal to perform the work broken down by category of service. Upon receipt of WVDNRPR's Purchase Order, KCI will immediately begin work on the project.

**Project Memorandum** – The first duty of KCI's Project Manager following project initiation will be the preparation of a Project Memorandum. This document is distributed to all personnel involved in the project, including our subcontractors. It contains information concerning scope of services, budgets, schedules, key personnel, lines of authority and responsibility, administrative procedures, reference documents and criteria, and specific quality control



procedures. This document ensures that all personnel involved in the project have access to all pertinent project information.

**Kick-Off Meeting** – A Kick-Off Meeting will be held involving all key WVDNRPR and KCI Team personnel where the project scope will be reviewed and all relevant project material identified and collected. This meeting is critical for successfully focusing the team on the task order's goals and objectives. Each phase of work, schedule, project, issues, and submission requirements will be reviewed. KCI will prepare a meeting agenda, invitations, and minutes.

**Budget and Schedule Control** – The major goal of both WVDNRPR and KCI is to ensure technically accurate and cost effective work, performed on schedule. KCI will approach the project with engineering cost controls in mind. The scope of services will be developed and refined to meet WVDNRPR needs as effectively and efficiently as possible. Up-front research will be performed to determine cost effective methods to complete the assignment. KCI's Project Manager and Task Managers will directly supervise the engineering staff during design to assure that the engineers remain focused on the goals of the project. KCI will utilize our Oracle-based project management system to track project costs by task and subtask. The Project Manager will monitor costs on a weekly basis to ensure that engineering costs are properly recorded and budgets are not exceeded.

KCI is fully aware of WVDNRPR need for assignments to be completed on-schedule in order to meet advertised dates. The KCI team has a large staff available to quickly respond to project requests. Critical path scheduling, using Microsoft Project or Primavera P3 will be used to maintain positive control over complex assignments. Bar chart scheduling will be implemented for less complex assignments. All schedules will be coordinated with milestone reviews and will be made available to WVDNRPR.

**Progress and Review Meetings** – Periodically or as required, WVDNRPR's Project Manager, KCI's Project Manager, and selected project team members will meet to discuss the project and resolve issues affecting successful completion. KCI will prepare an agenda in preparation for each meeting and will prepare minutes documenting topics of conversation and issues resolved.

**Preliminary Design Services** – During the exploratory and concept portion of projects, team members become familiar with all pertinent information; they meet with WVDNRPR representatives and facility personnel and visit the site to gather additional information. Project guidelines are reviewed and established for communication procedures, drawing and report format standards, formats, submission requirements and schedules. Program intent and requirements are reviewed, and strategies for design are set out. Each facet of the project is defined. We identify a project approach allowing adaptability, flexibility, and expansion considering alternative solutions to meet WVDNRPR's needs. Maintenance and replacement issues are also taken into consideration. This phase of work facilitates WVDNRPR's and our understanding of the proposed design challenges.

**Design/Construction Documents Services** – During this stage of the project, KCI will develop design criteria; conduct additional visual inspections of the site, as required; coordinate the project with the Owner and reviewing authorities; complete all work associated with preparation of plans, specifications, design analysis, and cost estimates; conduct work required to submit these documents at various project stages; and complete engineering calculations, analyses, and bidding phase services, for competitive bid by contractors. The KCI team, during the design phase, will finalize all functional layouts and issues producing documentation which carefully integrates the work of all associated project disciplines. Quality review checks are carried out prior to each submission and prior to transmission of bid documents. These reviews include cost estimators and consideration of constructability. During design, the parameters of the project are continually compared with the Owner's needs for flexibility, innovation, and to ensure good engineering practices as well as conformity to all applicable code requirements. KCI's ultimate goal is to provide excellent services and design that is within budget and presented to the Owner in a timely manner, and to meet and/or exceed the project requirements.



## Quality Assurance/Quality Control (QA/QC)

**ISO 9001:200 Certification.** As part of our long-range strategic plan, KCI is committed to achieving ISO certification throughout our entire operations. ISO is a widely recognized international standard for quality management systems (QMS). Unique for its mandatory internal auditing program, the ISO standard requires the continual evaluation of all business processes in order to provide objective measures of performance and improvement. KCI's Northeast Region has been certified to the ISO 9001:2000 standard since 2005. Our Mid-Atlantic Region was certified in 2008, and we are currently pursuing certification in the Southeast.

**ISO Auditing Program.** As part of the ISO certified quality management system, KCI has developed an internal auditing program to measure our performance with respect to our business and service delivery processes. Select employees within the firm have been trained as internal ISO auditors and are charged with completing audits of our internal systems throughout the organization. The results are evaluated so the root causes of nonconformities can be determined and opportunities for improvement can be identified. This information is then used by senior management in order to develop and implement process improvements. In addition to requiring ongoing internal audits, ISO certification requires annual third-party audits by an independent certification body.

**ISO Quality Control Manuals.** Work performed in each of KCI's technical disciplines conforms to the quality control procedures described in the quality control manual specifically developed for that discipline. The purpose of the procedures is to eliminate potential errors, omissions, ambiguities and inconsistencies in the design and development of project documents. The procedures are developed by the technical staff and contain specific instructions on how to prepare, check, review and coordinate the various work products generated by each discipline. Separating the quality control procedures by discipline allows for the customization necessary to ensure rigorous quality control standards.

These quality control manuals and their implementation constitute the principal mechanism for technical quality control at KCI. Conformance with these procedures is ensured through KCI's internal auditing process.

**Construction Administration Services** – KCI is also available to provide construction administration services when required. During this stage of the project, KCI will provide periodic or continuous on-site construction inspection as required; documentation of findings including site visit reports; review and approval of material submittals and shop drawings; final inspection report/recommendations; as-built drawings; compliance inspections; materials testing; construction administration; design review; technical consultations; field alteration for construction; and substantial and final completion punch lists.

KCI is a proponent of the Team approach for all of our projects, and employees utilize several measures to ensure that projects are managed utilizing this approach. The involvement of the Client, Owner, Review Agencies and Contractors as Team members to any given project is key to our success. KCI believes that developing and maintaining lasting professional relationships with Clients, Owners, Review Agencies, and Contractors prior to, during, and following the completion of a project is a must.

**Invoicing/Office Management** – KCI will prepare and submit invoices on a monthly basis. Each contract task will be clearly and separately identified on the invoice with KCI job order number, WVDNRPR's task number, assignment description, task-upset limit, amount invoiced to date, percent of work complete to date, invoice amount for the month, and task amount remaining. After listing the entry for each individual task, a totals line will indicate total contract amount remaining. There will also be a breakdown indicating the status of any subconsultant accounts. The information on the invoice will give the WVDNRPR a clear, concise financial status for each assignment and the overall contract.



## PROJECT APPROACH

### Compliance Protocol Review

Division of Natural Resources (DNR) of West Virginia owns the two impoundment dams (upper and lower) at Cacapon State Park located in Berkeley Springs, WV. DNR desires to bring these dams into compliance with current WV state dam safety code under the regulatory jurisdiction of Department of Environmental Protection (DEP).

As part of the compliance protocol review, we will examine the documents included, but not limited to, the list below:

1. Original design criteria and design reports.
2. As-Built Drawings and Documentation  
Dam and Reservoir Data
3. Owners Guidance Manual for the Operation, Inspection and Maintenance of Dam  
Operations Plan Guidelines  
Emergency Action Plan requirements for inspections  
Maintenance Guidelines
4. Dam Operational Records and Documents  
Stream/Watershed Flows  
Reservoir Water Levels: Pumping Rates and Rates of Drawdown  
Seepage Flow  
Water Quality  
Weather, Temperatures, Rainfall/Stormwater Runoff, Floods and Hurricane Records  
Seismic Activity  
Slope conditions – unsafe or unstable conditions, soft and saturated spots  
Vegetation – trees, woody plants, grass, brush  
Flood Plain/Catchment Tributary Areas – any changes or developments since dam was constructed?  
Cracks and Joint Sizes (Stress and Strain)
5. Maintenance and Repair Records  
History of remedial measures and major modifications
6. Instrumentation and Monitoring Records
7. Previous inspection reports
8. All previous dam inspection records including the 2009 report.

Information procured will be juxtaposed with the current WV dam safety code design requirements and determined whether noncompliant. Upon delineation of deficiencies, a team of professionals with experience in the various pertinent aspects of the dam(s) will be mobilized.

### Forensic Field Inspection/Reconnaissance of the Dam(s)

KCI proposes to mobilize a team of project specific professional engineers and members representing and specializing in disciplines including, but not limited to, Forensic Field Investigations, Dam/Levee Evaluation and Inspections, Geotechnical Reconnaissance, Structural Inspections (spillways, weir, etc.), and Hydraulic and Water Resources. This inspection will be based on Formal Dam Inspection Checklist (WV-ENG-105). Various components of the checklist will include, but not limited to, the following:

- General Conditions
- Upstream Slope
- Downstream Slope

- Intake Structure
- Abutment Contacts
- Auxiliary Spillway
- Conduit and Outlet
- Stilling Basin Plunge Pool
- Reservoir
- Instruments
- Development
- Hazard Classification

In particular, the Team will perform Visual Field Inspection (walk through of the entire Earthen Dam and appurtenances), obtain, and document data including, but not limited to, the following components:

1. Embankment Dam and Structures – abutments, crest (roadway pavement rutting, pot holes and cracks, traffic damages), toe drains, upstream slope and downstream slope, seepage areas, internal drainage, relief drains.
2. Spillways – Principal Spillway and Emergency Spillway, Approach Channel, Discharge Channel, Stilling Basin, Control features, Erosion Protection, Side Slopes.
3. Inlets, Outlet and Drains – Control Gates and Valves (inlet structure and outlet works and pipes) and reservoir levels, discharge channel, trash racks, emergency systems,
4. General Areas – Reservoir Surface, Shoreline, Upstream Watershed and Tributary Areas, Downstream Floodplains, stream/river inlets, and gabion protected areas.

Our forensic team will document noncompliant items in reference to the WV dam safety code, and recommend alternatives including, but not limited to, remedial measures and methodologies to achieve the Certificate of Approval from WV Department of Environmental Protection (WV-DEP). The forensic team will perform a detailed geotechnical exploration program to delineate and recommend remedial measures.

### **Forensic Geotechnical Explorations, Testing, and Data Evaluation**

Subsequent to completion of the Forensic Field Investigation/Reconnaissance program, and determination of the noncompliant items, an appropriate field geotechnical exploration program is warranted. A well-balanced geotechnical engineering services program is generally performed in three (3) inter-related phases as follows:

- Field explorations, site reconnaissance and in-situ testing program
- Laboratory testing program
- Engineering analyses and evaluations

#### **Field Exploration Program**

The field exploration program is planned and carefully executed to provide site-specific information abundantly and quickly. The primary goals of this program are to provide accurate and factual data for an evaluation of subsurface soils, rock, ground water conditions, and other geological anomalies. Various field tests include:

- Standard pPenetration test (SPT) borings
- Rock coring (NX, 2-in & 4-in)
- Surface water barge-mounted borings
- Bulk disturbed sampling
- Auger borings and hollow-stem auger borings
- Undisturbed sampling
- Piezometers, monitoring wells and environmental sampling
- In-situ testing including piezocone penetration test (CPT, PCPT) soundings, dilatometer testing (DMT) and pressuremeter testing (PMT)
- Non-destructive geophysical investigations

### **Laboratory Testing Program**

Soil and rock specimens collected during the field exploration program are sealed and delivered to KCI's laboratories for testing and a determination of physical, mechanical, and engineering properties. Typical tests include:

- Index/mechanical properties for classification (moisture content, particle size distribution, Atterberg Limits, unit weight, specific gravity)
- Hydraulic conductivity or permeability
- Organic contents
- Compressibility characteristics
- Stress-strain characteristics
- Corrosion potential
- Moisture-density relationships (Proctor Tests)
- California Bearing ratio (CBR)
- Strength tests

### **Engineering Analyses and Evaluations**

Engineering analyses and evaluations shall be performed based on several factors, including existing subsurface soil, rock, and ground water conditions, proposed construction or development information, and structural conditions. These evaluations are founded on experience and sound engineering judgment. Service areas shall include:

- Site characterization issues
- Soil and site improvement
- In situ testing (CPT, PCPT, PMT, DMT)
- Geophysical site evaluation (GPR, ER, MER)
- Earthwork and materials specifications
- Geotechnical Instrumentation (piezometer, inclinometers, settlement plates)
- Soil-structure interaction
- Borrow areas
- Settlement and deformation analyses
- Slope stability analyses
- Seepage analyses
- Ground modification methods
- Value engineering

A complete forensic geotechnical engineering and evaluation report will be prepared summarizing findings and providing dam design and/or modification. It will outline specific design parameters in the context of existing and projected stability of the earthen dams after taking into consideration the specific structural requirements.

KCI's Geotechnical Engineering Practice is comprised of several highly educated, diversely trained, and experienced individuals.

### **Preparation of Plans and Specifications**

KCI personnel consisting of civil design engineers, hydraulic engineers and dam related geotechnical engineering staff will provide detail remediation designs for the dam and its appurtenances. KCI will use MASTERSPEC™ software for preparation of project specification. Cost estimates will be prepared using suitable software for the project requirements. Appropriate and project specific plans and specifications, for the new and/or modified earthen dams, shall be prepared by KCI. All plans and specifications will be in accordance with the WV-DEP requirements. A registered Civil Engineer will supervise the field implementation and compliance of the project specifications, with support from the appropriate field staff.

## **Construction Inspection, QA/QC and Project Management**

KCI proposes to provide these services under the supervision of a registered Civil Engineer and support field staff consisting of qualified inspection/testing and QA/QC inspectors during construction phase. These construction inspections and testing related services will be provided through a field office located near the Berkeley Springs project site in Hedgesville, WV.

Responsibility for assessing the quality of workmanship and ascertaining compliance with the approved plans and specifications will be vested primarily in KCI's engineer on behalf of the Owner.

KCI's Materials Testing and Inspection Group can provide a wide range of services including construction coordination management, quality assurance monitoring, and assessment of materials. For this project these services can be provided during the dam construction or modifications phase. Various material groups where testing would be required are:

- Soils and aggregates (fine and coarse)
- Concrete
- Bituminous materials
- Steel
- Non-destructive testing (NDT)
- Geotextiles and geosynthetic laydown monitoring
- Liner installation monitoring

Critical phases of construction will be monitored by the KCI engineer or other designated representative constantly during active construction. KCI's material testing and construction inspection group offers a wide range of services including, but not limited to, the assessment of materials used in construction such as:

- Soils and aggregates
- Concrete
- Bituminous materials
- Steel
- Specialty testing (Non-destructive testing, geophysical investigations, etc.)

## **Jurisdiction, Approval Process, Inspection, and Certificate of Compliance**

### **Jurisdiction**

Responsibility for the dam safety program lies with the WVDEP. Powers and duties of DEP are listed in Section 22-14-4 of the Dam Control & Safety Act:

- To exercise regulatory jurisdiction over dams,
- To review application for COA,
- To make any investigation or inspection necessary, and
- To prepare and publish criteria for design, construction, repair, inspection, and maintenance of jurisdictional dams.

### **Permit/Approval Process**

Section 22-14-5 of the Dam Control & Safety Act requires that persons wishing to place, construct, enlarge, alter, repair, remove or abandon any jurisdictional dam first apply for and receive a certificate of approval from DEP. Applications must be made on forms prescribed by DEP. Section 22-14-6 requires that plans and specifications be prepared in the responsible charge of and sealed by a registered professional engineer. Section 22-14-7 provides that DEP must approve or disapprove an application, and Section 47-34-5 of the regulations spells out in detail the requirements for applications and the accompanying plans, specifications, maps and drawings. Included in the plans requirements are a project narrative, emergency warning plans, design analysis (including hazard classification, and geotechnical, laboratory, and hydrologic investigations), design requirements (including specifics on design storms, storage, and discharge, surface



drainage, spillways, and landslide potential). Other criteria listed in the regulations are a geotechnical evaluation, stability requirements, special considerations for gravity structures, and instrumentation.

### **Inspection Process**

#### **State**

The inspection program is authorized under Sections 22-14-9, 22-14-11 and 22-14-4(i) of the Dam Control & Safety Act. DEP conducts construction inspections to assure compliance with approved plans and specifications. While these inspections are carried out by state personnel, any tests or work necessary to provide adequate supervision during construction are done at the Owner's expense. If the Department finds that the work is not in compliance with approved plans, the Director shall notify the Owner and order immediate compliance. The Owner is required to notify the Department upon completion of the dam. In accordance with the statute, state dam safety program inspection of NRCS dams under construction is not permitted.

#### **Owner**

Regulations Section 47-34-15.4 deals with inspection, specifically the responsibilities of dam owners in this respect. Inspections must be conducted by a registered engineer once every seven days during construction, and after heavy rainfall. Annual inspections of completed dams are required for three years after construction; then high hazard dams are to be inspected at least once every two years. Lower hazard dams have less frequent inspection requirements. Dams with serious problems (as defined in Section 15.5.2) must be inspected as scheduled by Dam Safety Program. According to the provisions of Section 47-34-8 of the regulations, owners must submit written monthly inspection reports to the Department during dam construction, and upon the completion of inspections required by Section 47-34-15 for existing dams.

### **Securing Compliance Certification from the Regulatory Agency**

Upon completion of the construction and/or modifications of the dam(s) a joint inspection shall be conducted with DEP's representative and KCI's engineer. The purpose of the inspection will be to verify that all work has been accomplished in accordance with the approved plan package.

Upon notification by DEP that the construction appears satisfactory KCI shall submit to DEP a certification that all construction was in substantial conformance with the approved plans and specifications, including any modifications approved by DEP. Upon receipt of as-built drawings, a letter of acceptance can be issued by DEP.