Michael Baker
INTERNATIONAL

We Make a Difference

August 28, 2018

Ms. Stephanie L. Gale
West Virginia Department of Administration
Purchasing Division
2019 Washington Street, East
Charleston, West Virginia 25305

Subject: **CEOI 0603 ADJ1900000002**
A/E Services for Camp Dawson Security Lighting – Mailroom

Dear Ms. Gale:

The Charleston office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to the Request for Expression of Interest for Architectural & Engineering services for a new Mail Facility, repairs to the Access Control Point, and perimeter lighting at Camp Dawson. We believe that our team of professionals is uniquely qualified to provide the required design services for these facilities.

Michael Baker is well positioned to provide a comprehensive design team including: Architectural, Civil/Site, Mechanical, Electrical, Plumbing and Structural expertise. To supplement our team, we will engage the services of Terracon Consultants, Inc. for subsurface investigations (if necessary) and Crawford Consulting Services for construction cost estimating. Our diverse team of professionals are well versed in the preparation of construction documents, bid specifications, and the application of required construction permits and certifications. Michael Baker can also provide assistance during the Bidding process.

We thank you for your consideration and look forward to meeting with the selection committee in person in order to share our thoughts and ideas for this exciting opportunity!

Should you have any questions or require additional information, please feel free to contact me at (304) 769-2132 or by e-mail at pfogarty@mbakerintl.com.

Very truly yours,
Michael Baker International, Inc.

Patrick W. Fogarty
Senior Associate

Enclosure

Michael Baker
INTERNATIONAL

MANDATORY PROPOSAL SUMISSION FORMS

Purchasing Divison
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Expression of Interest
02 — Architect/Engr

Proc Folder: 481151

Doc Description: Camp Dawson Security Lighting-Mailroom (Design)

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-08-07	2018-08-28 13:30:00	CEOI 0603 ADJ1900000002	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

Michael Baker International, Inc.
400 Washington Street East, Suite 301
Charleston, West Virginia 25301
304-769-0821

FOR INFORMATION CONTACT THE BUYER

Stephanie L Gale
(304) 558-8801
stephanie.l.gale@wv.gov

Signature X

FEIN # 25-1228638

DATE August 28, 2018

All offers subject to all terms and conditions contained in this solicitation

INVOICE TO	SHIP TO
DIVISION ENGINEERING & FACILITIES	FACILITY MAINTENANCE MANAGER
ADJUTANT GENERALS OFFICE	CAMP DAWSON ARMY TRAINING SITE
07 COONSKIN DR	240 ARMY RD
CHARLESTON WV25311	KINGWOOD WV 26537-1077
US	US

Line	Comm Ln Desc	Qty	Unit Issue
1	Security Lighting & Mailroom (Design) Camp Dawson		

Comm Code	Manufacturer	Specification	Model #
81101508			

Extended Description :

Professional engineering design services to develop construction documents to provide for Security Lighting and Mailroom Design , located at Camp Dawson, near Kingwood, WV, per the attached documentation.

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Technical Questions Due	2018-08-21

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

, SENIOR ASSOCIATE
(Name, Title)

Patrick W. Fogarty, Senior Associate
(Printed Name and Title)

400 Washington Street East, Suite 301, Charleston, West Virginia 25301
(Address)

304-769-0821 / 304-769-0822
(Phone Number) / (Fax Number)

pfogarty@mbakerintl.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Michael Baker International, Inc.
(Company)

Russell E. Hall, Vice President
(Authorized Signature) (Representative Name, Title)

Russell E. Hall, Vice President
(Printed Name and Title of Authorized Representative)

August 28, 2018
(Date)

304-769-0821 / 304-769-0822
(Phone Number) (Fax Number)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0603 ADJ1900000002

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

- ☐ Addendum No. 1
- ☐ Addendum No. 2
- ☐ Addendum No. 3
- ☐ Addendum No. 4
- ☐ Addendum No. 5
- ☐ Addendum No. 6
- ☐ Addendum No. 7
- ☐ Addendum No. 8
- ☐ Addendum No. 9
- ☐ Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Michael Baker International, Inc
Company

Authorized Signature

August 28, 2018
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, 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: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. 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.

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.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"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.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Michael Baker International, Inc.

Authorized Signature: _____ Date: August 28, 2018

State of West Virginia

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 28th day of August, 2018

My Commission expires May 16th 2024, 2024

AFFIX SEAL HERE

OFFICIAL SEAL
JAMES S. CARTER III
NOTARY PUBLIC
STATE OF WEST VIRGINIA
210 Tennessee Ave
Charleston, WV 25302
My Commission Expires May 16, 2024

NOTARY PUBLIC _____

COVER LETTER

MANDATORY PROPOSAL SUBMISSION FORMS

PROPOSAL

Project Location

Camp Dawson is located near Kingwood, WV and serves as a hub for billeting, training, and outfitting citizen soldiers.

The West Virginia Army National Guard Construction Facilities and Management Office is located at 1707 Coonskin Drive, Charleston, WV.

Project Background

Through the West Virginia Department of Administration Purchasing Division, The West Virginia Army National Guard (WVArNG) is seeking a highly qualified Architectural and Engineering firm to provide comprehensive design and construction document preparation services for a new Mail Facility, repairs to the Access Control Point and Lighting of the garrison perimeter fencing at Camp Dawson. The firm will be responsible for a complete design including a light study of the garrison perimeter fencing, and the preparation of construction plans and specifications and to provide bidding assistance to the WVArNG and the Purchasing Division as specified in the Expression of Interest (EOI).

The WVArNG has garnered distinction around the nation for its ability to train top notch men and women as well as serve our state and country when the need arises. These existing and new facilities used for the training and preparation of our soldiers deserves the full attention of the design team. Michael Baker understands this mission of readiness and we are willing to commit all our efforts into the Mail Facility design and to bringing the Access Control Point to a permanent condition. We are familiar with the DOD requirements including Anti-Terrorism Force Protection, and stand ready with the experience, capability, and capacity to complete this assignment for the WVArNG.

Qualifications and Experience

Firm Capacity

Michael Baker is a full service Architectural /Engineering firm. Our local office in Charleston WV is a "single-stop resource" capable of providing comprehensive professional services, from Architecture and Planning to Mechanical/Electrical, Civil and Structural Engineering to construction management through operational support. Michael Baker will provide the hands-on services needed for this project, from Client meetings to site surveys, design and bidding phase assistance.

With over 30 in house professionals locally and 6,000 nationally, Michael Baker prides itself on a legacy of returning clientele. Some of these local clients whose projects encompass facilities development and renovation include but are not limited to; the West Virginia Department of Transportation, General Services Division, West Virginia Air National Guard, West Virginia University, West Virginia State University, the cities of Nitro, Dunbar, Winfield, and many others. Numerous private sector clients fill out a broad resume of satisfied clientele. Michael Baker's central geographic location in the State Capitol and depth of experience nationally will enable us to respond quickly to wide-ranging scopes of service to meet needs of the WVArNG.

Nationally, Michael Baker is a leading global provider of engineering and consulting services which includes planning, architectural, environmental, construction, program management, and full life cycle support services as well as information technology and communications services and solutions. Michael Baker provides its comprehensive range of services and solutions in support of U.S. federal, state, and municipal governments, foreign allied governments, and a wide range of commercial clients. With more than $1.3 billion in annual revenue, Michael Baker has more than 6,000 employees in over 90 offices located across the U.S. and internationally. Michael Baker seamlessly integrates architecture, planning, landscape architecture, engineering and management. Internationally

recognized with a portfolio spanning over half a century, the team provides excellence in solutions, superior technical ability, creative design and collaborative integration.

The success of our multidisciplinary approach to ***built*** environments results from the expertise of our design professionals. We solve challenges from multiple vantage points providing unsurpassed holistic, sustainable and innovative solutions that benefit our diverse clients, including institutions, governmental agencies, corporations, developers and builders.

Michael Baker has extensive resources and the required qualifications to provide planning, architectural, and engineering services for the WVArNG on this important project. We have local and nationally recognized experts with the technical experience necessary for this assignment. In addition, Michael Baker's team of experienced professionals have an established record of delivering quality work products to our clients, on schedule and within budget.

In summary, Michael Baker's staff can provide documentation of our extensive experience in the following areas for this project:

- Nationally recognized expertise in Assessing, Programing and Planning
- Innovative Architectural concepts and designs
- Facilities Engineering (Civil, Mechanical, Fire Protection, Plumbing and Electrical)
- Construction Administration and Construction Monitoring
- Coordination with State and Federal Agencies, as required

From small projects to major new or renovated building facilities, infrastructure and aviation, to oil and gas pipeline design, bridges and roadway designs, and water resource projects, Michael Baker has evolved into one of the leading engineering and energy services firms by consistently providing targeted solutions for its clients most complex challenges.

Management and Staffing

Our team will incorporate "the Baker Way" by giving the WVArNG one point of contact; this person is responsible for keeping everyone on the same page. Open and clear communication, even when the decisions may be tough. Mr. Patrick Fogarty, who will fill this role for your project, will coordinate information and ideas between the team members and the Client. Keeping each other on the right track will allow for a clear definition of and an efficient design.

All key decision makers are experts in their field and have numerous projects behind them. Michael Baker brings fully qualified and integrated teams to address all aspects of the project delivery process. Our team possesses the capability and expertise to establish the project programming and progress through the various milestones of document execution. This system is what we refer to as "The Baker Way". The Baker Way emphasizes cohesive design with continual communication with the goal of project delivery excellence.

Our locally led, nationally experienced team will be extremely responsive to the needs of this project. Our key project delivery personnel are locally based assuring you that we will be where you need us, when you need us, every time. Our service goals are:

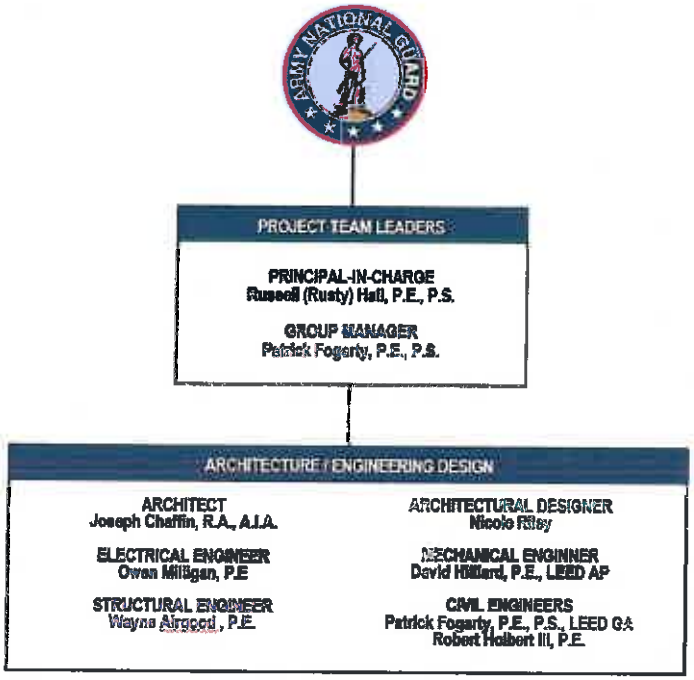
- To return phone calls on the same day
- To provide timely response to all documentation requests
- To provide flexibility in the systems design
- To perform in-house peer review on all milestone submittals
- To implement a specific Quality Assurance Program for project success

We understand that many of the programming elements may have already been determined. However, we pride ourselves in creating an environment to allow our design professionals to do what they do best- solve problems. Michael Baker will assist in any programming that has not already been established by the WVArNG and during the design process, we will provide continuous

quality assurance while keeping the WVArNG abreast of the progress of the project, ramifications of any changes and potential effects to the budget.

Project Team and Organization-The Right People

Michael Baker has assembled an integrated team of architects and engineers who all have a specific and critical role to play in the performance of this project.



Michael Baker thrives in a collaborative environment, whether it be with our in-house professionals or our most important team member: Our Client. We coordinate with all team members to make sure that the architectural, structural, mechanical, electrical, and civil components of the design are working in-concert to produce a complete and fully coordinated set of construction drawings. Michael Baker achieves success in uniting the Client with the team by open communication and continuous engagement. This ensures the end user group has input throughout the planning and design phases and will thereby be pleased with the finished product. Our experience working together as a building design team on countless other state and federally funded projects brings with it a level of confidence, partnership and certainty that we will be able to meet our commitments to the WVArNG.

Michael Baker is a proud supporter of the National Guard locally and nationally.

Our broad MILCON experience has taught us the local differences found in National Guard projects. Our resident soldiers are a permanent part of our community and we want them to be proud of any facility in which they serve.

Demonstrated Experience

What separates the qualified team from the other teams? Michael Baker believes it is the individual team members and the specific project experience and process knowledge they possess. Our team stands apart as one that excels on all levels. Our blend of Department of Defense and National Guard expertise, incorporating sustainable design leadership and local experience places us at the forefront of firms vying for this important opportunity.

Michael Baker prides itself on providing innovative solutions to complex problems. Cookie cutter solutions rarely benefit Clients. Our Clients reap real value because our design teams are willing to be creative and incorporate custom solutions into their analysis and design.

Training Facility, Fort McCoy

Central Issue Facility, Fort McCoy

The National Guard continues its noble mission of providing citizen-soldiers from our local communities, trained and equipped to protect life and property, to respond to natural disasters, and to defend the United States and its interests around the globe. Michael Baker continues to support the National Guard and has previously worked at over 70 Guard installations nationwide, including several recent assignments for the WVArNG.

Michael Baker, serves our clients from conceptual design through operational support and we can provide the WVArNG with a highly skilled and experienced team prepared to support the project with excellent planning, architectural, engineering, environmental, and bidding phase services.

Please see APPENDIX 2 for RELATED PROJECTS.

Project Goals and Objectives
General:

Some of the first steps of the project would be to prioritize tasks and develop submission schedules and budget requirements for the project. Any available information for the existing site and facilities would be gathered and reviewed prior to a visit to the property. Once the existing data has been reviewed, a site visit would be conducted to assess the current field conditions. Next, a topographical survey would be conducted, and, if warranted, a subsurface investigation to analyze the existing geology for design development. This information will be used to develop site mapping and conceptual plans that will be presented to and reviewed by the WVArNG to arrive at an approved concept plan. The project will be studied in a systematic way to analyze the existing conditions, client needs and budget considerations.

It is Michael Baker's understanding is that the WVARNG would like to develop functional, low maintenance and sustainable designs for the proposed facilities. Our firm provides sustainable design leadership on our projects starting with the programming phase. This is the time when our efforts yield the greatest results. Michael Baker understands that the Nation Guard wishes to be a good steward of its resources and we welcome the opportunity to facilitate such discussions in order to keep the design process on a sustainable path.

Tactical Maintenance Facility, Fort McCoy; LEED Silver Certified

Michael Baker will employ a planning philosophy to work within the site constraints and the "lay of the land" to develop a complementary design that respects the surroundings of other facilities on site and provides the appropriate visibility to the adjacent approaches. Critical elements to be considered will be site access and usable acreage for future development, low impact design techniques and current Anti-Terrorism Force Protection (ATFP) standards. The DOD guidelines and Unified Facilities Criteria (UFC) for the facilities will dictate the size of and necessary amenities to be provided. ATFP standards will define the site layout. It is our intention to provide a code-compliant plan that can be implemented in an efficient and cost-effective manner while providing the highest value to the WVArNG.

The concept will be tested against the Client's Project Requirements and would receive a preliminary cost estimate to ensure that the concept works within the framework of the WVArNG. Once these plans and costs have been verified, the plan can move forward into design development. Michael Baker will utilize the key staff listed to ensure that the team developing the concept plans represents a high level of expertise and experience. This approach provides a more informed and comprehensive concept and ultimately a more complete plan.

GOAL/OBJECTIVE 1:

Mail Facility Building Design Package: Once the exact size and functional layout of the proposed facility is determined, Michael Baker will prepare the A/E design and construction documents for the Mail Facility. We will coordinate with the WVArNG and provide all necessary design documents in accordance with all guidelines and applicable codes for all aspects of the building design. Specifications for the installation of all required products or components and cost estimates will be provided as part of the submittal packages.

GOAL/OBJECTIVE 2:

Access Control Point Repairs Site Design Package: The Camp Dawson Security staff will be engaged to confirm the required level of threat protection and alarm/warning system compatibility. Options are available for vehicle and denial barriers from passive to active (mechanized). Michael Baker will prepare viable options for presentation and review by the WVArNG. Once approved, we will perform the A/E design and prepare construction documents for the repairs. We will coordinate with the WVArNG and provide all necessary design documents in accordance with all guidelines and applicable codes for all aspects of the building design. Specifications for the installation of all required products or components and cost estimates will be provided as part of the submittal packages.

GOAL/OBJECTIVE 3:

Light Study and Perimeter Lighting Design: The Camp Dawson Security staff will be engaged to confirm the required level of threat protection with respect to security lighting for the garrison perimeter fencing. The lighting study will include but not be limited to, options for luminaires, lighting controls (hard wired or wireless), light levels, full or partial cut-off, glare mitigation and maintenance. Michael Baker will prepare viable options for presentation and review by the WVArNG. Once approved, we will perform the A/E design and prepare construction documents for the perimeter security lighting system. We will coordinate with the WVArNG and provide all necessary design documents in accordance with all guidelines and applicable codes for all aspects of the building design. Specifications for the installation of all required products or components and cost estimates will be provided as part of the submittal packages.

GOAL/OBJECTIVE 4:

Once concepts are approved for each of the proposed project elements, the schematic plans will be developed into construction documents under the direction and approval of the WVArNG. Design submittals will be made at 35%, 65%, 95% and 100% and include plans, specifications and cost estimates.

GOAL/OBJECTIVE 5:

Once bid documents are approved by the WVArNG and the Purchasing Division, Michael Baker will be available to perform the required level of Bid Phase Services.

Michael Baker can provide all necessary planning, design and bidding documents for construction in accordance with West Virginia Purchasing Division for all aspects of the project. Specifications for the installation of all required products or components will be provided as part of the bid packages. If desired, Michael Baker can also provide Construction Administration services as well as on-site Construction Inspection services for each element of the project.

APPENDIX 1- RESUMES

R. Joseph Chaffin, R.A., A.I.A.

Lead Design Architect

General Qualifications

In balancing creative, organizational, and technical strengths, Joseph Chaffin's professional experience demonstrates a broad practice of architecture from residential through complex institutional projects. He challenges current capabilities, cultivates leadership, and develops new strengths through his position at Baker. As Director of Architecture, Mr. Chaffin is responsible for the daily operations, design quality, and project execution of the architectural and interior design staff. He performs interdisciplinary technical reviews for all designs and oversees coordination of related engineering disciplines. Ensuring the highest quality design services within budget and schedule parameters, he also emphasizes a "world view," or comprehensive perspective, within which professional services are delivered prioritizing and maintaining client expectations.

Years with Baker: 7

Years with Other Firms: 17

Education

B.Arch., 1990, Architecture, University of Cincinnati

Certificate, 1988, Architecture, Ecole d'Art Americaines - Ecole des Beaux Arts

Licenses/Certifications

Registered Architect, West Virginia, 2011

NCARB, 1999

Registered Architect, Pennsylvania, 2001

Experience

U.S. Armed Forces Reserve Center, Rutland, Vermont. *U.S. Army Corps of Engineers, Louisville District.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Responsibilities also included detailed interdisciplinary reviews of the RFP design criteria documents with an emphasis on architecture. Baker developed design-build RFP documents for a new 600-member Armed Forces Reserve Center meeting Silver LEED® standards. A 97,634-square-foot training building (AFRC), a 14,600-square-foot multi-use classroom, a 7,302-square-foot Organized Maintenance Shop (OMS), and a 3,113-square-foot unheated storage (UHS) building were included in the RFP package. The center accommodates training and mobilization, and provides for the storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Vermont Army National Guard and Army Reserve units. RFP development consisted of conducting a design charrette; providing a topographical survey and geotechnical investigation; performing a utility survey; developing conceptual site plans, floor plans, and building elevations; developing RFP specifications; preparing DD Form 1354 – Transfer of Real Property; and providing a PACES construction cost estimate.

Design of U.S. Army Reserve Center Renovation and Expansion, Homewood, Illinois. *U.S. Army Corps of Engineers, Louisville District.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. As designer of record, Baker provided architectural and engineering services for the renovation and expansion of a 400-member U.S. Army Reserve Center to provide a 60,374-square-foot Training Building, including an approximately 3,500-square-foot Unheated Storage Building. The project also includes construction of a

22,300-square-foot parking area for military equipment, and 130 parking spaces for privately owned vehicles. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement. Baker designed the training facility to meet LEED® Silver certification. Baker's services included architectural design, surveys, environmental and geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Building 12 Defense Logistics Agency Headquarters Renovation Design, Tobyhanna, Pennsylvania. *Tobyhanna Army Depot.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role

also included interdisciplinary technical reviews for all design/construction documents. Baker prepared design documents for the partial renovation of Building 12 to serve as the new Defense Logistics Agency headquarters building. Work was performed under a three-year indefinite delivery-indefinite quantity contract. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

Restroom Renovation Design, TISCOM, Alexandria, Virginia. *U.S. Coast Guard, CEU Cleveland.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. Baker is developing specifications, construction drawings, a detailed cost estimate, and a projected construction schedule to renovate two male and two female restroom areas in the Telecommunication and Information Systems Command Navigation Center. The renovated restrooms will be compliant with the Americans with Disabilities Act and will include new plumbing fixtures, toilet partitions, floor coverings, wall coverings, electrical fixtures, and exhaust fans.

Aviation Science Center Renovation, Community College of Beaver County, Monaca, Pennsylvania. Architect of Record. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. The Project consisted of architecture, engineering, construction administration and cost estimates to design the auditorium renovations and replacement the HVAC system. Preliminary design services included research of applicable building codes; on site project assessment and verification, measurements, and documentation of the project areas, including a comprehensive field survey of the existing conditions, and the development and prioritization of preliminary scopes of work, schedule development, and oversite of estimates of probable cost. He directed the completion of pre-final 90 percent construction documents and the final construction and bid documents, including architectural, mechanical, electrical, and communications engineering drawings, and specifications. Mr. Chaffin also coordinated with the vendor of the air traffic control simulator throughout the design phase.

Nicole Riley

Associate Architect

Years with Baker: 2

Years with Other Firms: 16

Education
Bachelor of Architecture, Virginia Tech

Licenses/Certifications
Associate A.I.A.

General Qualifications

Ms. Riley brings more than 17 years of experience to the project. While at Michael Baker, Ms. Riley has focused her time on the client's needs while leading the design team from the early assessment of project planning stages to the construction administration. Ms. Riley's project design experience includes project for entrepreneurs, correctional, educational, institutional, military installations, commercial, residential, and religious facilities. She is experienced with the submittal and construction process for various state agencies including the WV State Fire Marshal.

Experience

Design of Three T-Hangars, Morgantown Municipal Airport (MGW), Morgantown, West Virginia. ***Morgantown Municipal Airport.*** Architectural Designer. Michael Baker provided design and engineering services for three pre-engineered metal building (PEMB) T-hangars totaling over 54,000 S.F. west of the West Virginia Army National Guard Readiness Center known as the East Side Development. Phase 1 of the project encompassed development of infrastructure, including site grading, drainage, bituminous taxilanes, pavement markings, vehicle parking, and fencing for the three t-hangars. Phase 2 encompassed design of the T-hangars on the east side of the airfield and included site civil, structural, architectural, mechanical, plumbing, fire protection, and electrical utilities design. Ms. Riley's responsibilities included: primary design of structure, selection of materials, and coordination with aviation engineers in communicating with PEMB vendor as well as communication with the City of Morgantown's Engineering Department. Michael Baker provided bidding phase support, product purchasing, and construction management services.

Renovations to Classroom Building, Beckley, West Virginia. *WVU Tech/ West Virginia University. Designer and Project Manager.* Responsibilities included facilitating complete design package and collaboration with WVU Tech staff for the 31,000 S.F. facility. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with the compressed and ambitious time frame in mind as set forth by the Client. Coordination of new and old construction types were a large component of this project in order to make way for the building systems. Coordination of existing casework and furnishing from the former campus to the new campus was a challenging highlight to this project. Ms. Riley orchestrated West Virginia University branding elements into the interior design to bring new life to a defunct campus. Special consideration was given to coordination with the University's existing door hardware products as well as the design and product specifications for a nationally accredited psychological laboratory within the Project. This project is currently under construction.

Renovations to the Benedum Center, Beckley, West Virginia. *WVU Tech/ West Virginia University. Designer and Project Manager.* A sister project to the above referenced Classroom Building, this 21,000 S.F. project ran concurrent and also stemmed from a Feasibility Study requested by the Owner. Primarily an interior design heavy project, this building required new retrofitted ADA toilet facilities as well as door hardware and HVAC systems coordination. A new roof was specified under this contract and was paired with the Classroom Building listed above. This project is currently under construction.

Glen Jean Armed Forces Reserve Center/ Military Entrance Processing Station, Glen Jean, West Virginia.* *West Virginia Army National Guard/ U.S. Department of Defense. Designer and Project Manager.* Responsibilities included complete design package and collaboration with staffs from both the state and federal entities for the 110,000 S.F. facility. Special consideration given to force protection, geotechnical challenges, helipad design and location, vehicle repair and petroleum storage, adequate mustering space, as well as medical office spaces.

Renovations to Maclin Hall, Montgomery, West Virginia.* *WVU Tech. Designer and Project Manager.* Responsibilities included facilitating complete renovation design package as programmed by the Owner and collaboration with WVU Tech staff for the four level, mixed use facility. Special consideration given to durable interior design finishes selection, new technology infrastructure and concealment, student safety, West Virginia State Fire Code and ADA.

Multi- Purpose Facility for the West Virginia State Police Academy, Institute, West Virginia.* *Designer and Project Manager.* Responsibilities included site investigation, cost estimate, architectural design and collaboration with geotechnical engineer as well as the West Virginia State Police staff overseeing the project. The facility employs a skylight system in the main gym, intended to provide natural light to the user as well as lowering electricity expense. Special consideration was given to the underground foundation and location of the facility at the Academy.

Economic Development Center, Charleston, West Virginia.* *West Virginia State University Gus R. Douglass Extension,* Designer and Project Manager. Responsibilities included: feasibility study, budget development and construction documents and construction administration services for total renovation of a 5,000 S.F. facility. Diverse use of facility lent to consideration for recording studios, digital green studio, office space for entrepreneurs, and public gathering space.

Parkersburg South High School, Parkersburg, West Virginia.* *Wood County Schools. Designer and Project Manager.* Responsibilities included complete design package and collaboration with staffs from both the state and federal entities for the 250,000 S.F. facility. Special consideration given to student security, geotechnical challenges, campus enclosure, music and chorale practice suites, laboratory spaces, fire suppression, and ADA.

Other Notable Projects:

- **St. Alban's High School***; focus on selective demolition and design detailing for the 172,596 S.F. facility.
- **Robert C. Byrd Training Institute***; design/ production team. Interior design work for the 148,000 S.F. facility.
- **Sherrard Middle School***; addition of commons area and commercial kitchen, classroom renovation for the 64,000 S.F. facility
-

*Denotes experience prior to becoming a team member at Michael Baker international.

David J. Hilliard, P.E., LEED AP BD+C

Mechanical/Electrical/Plumbing Engineer

Years with Michael Baker: 8
Years with Other Firms: 19

Degrees

B.S.M.E., 2005, Mechanical Engineering, West Virginia University Institute of Technology

B.S., 2002, Mathematics and Science, West Virginia State College

Licenses/Certifications

Professional Engineer –

West Virginia, 2011

Mississippi, 2016

Louisiana, 2016

Kentucky, 2017

LEED Accredited Professional BD+C, West Virginia, 2012, 10649992

General Qualifications

Mr. Hilliard has a wide range of "hands on" design, engineering, and construction experience. From his beginnings as a carpenter he has expanded his professional abilities to a senior designer for Michael Baker. His recent design experience has included the complex mechanical design of such projects as a large Charleston, West Virginia hospital, a Bus Maintenance Garage and office building for the West Virginia Department of Transportation, an Army National Guard Armory HVAC/Electrical renovation, planning and engineering at the West Virginia Capitol Complex including plumbing renovation design on the historic State Capitol Building. His resume covers over 30 years of real world work in engineering, design, fabrication and construction in both the mechanical and general trades.

Over the years, while practicing his profession, Mr. Hilliard continued his education by studying mathematics, civil and mechanical engineering, finally taking degrees in both mathematics and mechanical engineering. He has continued his professional development through his involvement with ASHRAE, ASME, ASPE, USGBC, and other pertinent organizations.

Experience

Architectural and Engineering Services for U.S. Army Reserve and Military Construction Projects, Various Locations. *U.S. Army Corps of Engineers, Louisville District.* Mechanical Engineer. Field inspection and commissioning oversight. Under a third consecutive indefinite delivery-indefinite quantity contract, Michael Baker is providing architectural design and engineering services for a variety of mission-critical projects that serve the U.S. Army Reserve's expanding needs for personnel training and equipment maintenance and support the activation of additional brigade combat teams. Infrastructure projects include equipment concentration site warehouses; tactical equipment maintenance facilities; and central-issue, container-loading, billeting, and dining facilities.

Indefinite Delivery-Indefinite Quantity Contract for Architectural and General Engineering Services, Tobyhanna Army Depot and, North-Atlantic, Division Locations. *Tobyhanna Army Depot.* Mechanical Designer. Provided mechanical design services on an as needed basis. Michael Baker is providing planning, architecture, and general engineering services under a three-year indefinite delivery-indefinite quantity contract for projects at DOD installations within the North Atlantic Division. Representative projects include additions and renovations to the Rotary-Wing Maintenance Hangar at Fort Drum's Wheeler-Sack Army Airfield; Maneuver Enhancement Brigade facilities at Fort Drum, New York (barracks, Brigade Headquarters, Battalion Headquarters with classrooms, a five-Unit Company Operations Facility, and a Tactical Equipment Maintenance Facility); the Fort Drum North Post Space Study; and renovations to a number of buildings and amenities at Tobyhanna Army Depot, such as the Building 12 Defense Logistics Agency Headquarters renovation, Building 1-C roof replacement, family housing unit renovations, an elevator installation, and on-call HVAC engineering support services.

Close Air Support Apron Design, Camp Bastion, Helmand Province, Afghanistan. *Air Force Center for Engineering and the Environment (AFCEE).* Electrical Designer. Provided planning, design, electrical construction documents, and

construction administration for air field apron lighting. As part of a design-build team, Michael Baker provided design and construction plans for a close air support (CAS) apron at the Camp Bastion military base. The project involved the construction of an

apron to support 24 F-15E and A-10 aircraft, as well as connecting taxiways to the main runway. The project also included the construction of two arm/de-arm pads located adjacent to the ladder taxiways at either end of the runway. Michael Baker designed the pavement sections, site layouts, pavement markings, edge and high mast lighting, tie-downs, grounding points, utilities, access roads, and drainage.

Advanced Individual Training Barracks and Company Operations Facility, Fort Gordon, Georgia. *U.S. Army Corps of Engineers, Fort Worth District.* Mechanical Associate. Responsible for exhaust & outdoor air system review and development. Michael Baker served as the designer of record for the design-build for a new, 93,000-gross-square-foot advanced individual training barracks and company operations facility with a 2,000-gross-square-foot lawn equipment building. The three-story training barracks is designed to house 300 single soldier trainees. The facility achieved a Gold LEED® rating. Michael Baker's services included architecture, engineering, landscape, and interior design services.

Design of U.S. Army Reserve Center Renovation and Expansion, Homewood, Illinois. ***U.S. Army Corps of Engineers, Louisville District.*** **Mechanical Engineer.** Responsible for field inspection and commissioning oversight. As designer of record, Michael Baker provided architectural and engineering services for the renovation of a 400-member U.S. Army Reserve Center (ARC) and construction of two single-story additions totaling 35,694 square feet–a 34,294-square-foot Training Building and a 1,400-square-foot ancillary structure–along with a 3,500-square-foot Unheated Storage Building. The new construction includes a 22,000-square-foot parking area for military equipment and 140 parking spaces for privately owned vehicles. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement. Michael Baker designed the training facility to meet LEED® Silver certification. Michael Baker's services included architecture, surveys, environmental and geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® credit template documentation. Administrative and training 60,500-square-foot building. This project has achieved LEED certification.

Attleboro ARC-Taunton. *U.S. Army Corps of Engineers, Louisville District.* Mechanical Engineer. Responsible for mechanical piping design and engineering.

Coonskin Maintenance Facility. *WV Army National Guard.* Mechanical Engineer. Provided site utility, plumbing, HVAC, and electrical design and construction documents.

Army National Guard Headquarters Renovations, Charleston, West Virginia. *State Army National Guard Headquarters.* Mechanical Designer. Responsible for all mechanical design oversight and construction management. The Facilities Management Officer (FMO) for the State of West Virginia, Division of Engineering and Facilities (DEF), West Virginia Army National Guard (WVARNG) selected Michael Baker for architectural and engineering services. The State Army National Guard Headquarters in Charleston, West Virginia was originally constructed in the early 1960's. Over the years, there have been numerous upgrades to the facility. Michael Baker performed complete planning, design, and construction management services for renovations to the Office of the Adjutant General at the State Army National Guard Headquarters in Charleston, West Virginia. Project elements included new acoustical ceilings, flooring, energy-saving light fixtures, duplex outlets, communications jacks, several new wall partitions, exterior door replacements, new interior doors and hardware, new wall finishes and asbestos removal. Michael Baker provided Construction Administration and inspection services as well as periodic site review during construction.

Design of Tactical Equipment Maintenance Facility and Equipment Concentration Site Warehouse, Fort McCoy, Wisconsin. *U.S. Army Corps of Engineers, Louisville District.* Mechanical Engineer. Responsible for field inspection and commissioning oversight. Michael Baker was the designer of record for the design-bid-build delivery of an approximately 58,000-square-foot, two-story modified large Tactical Equipment Maintenance Facility (TEMF) and an approximately 44,000-square-foot, one-story Equipment Concentration Site Warehouse, along with 30 acres of gravel hardstand designated for organizational parking. Tasks were performed under an indefinite quantity-indefinite delivery engineering

agreement. Both structures were designed to achieve LEED® Silver certification and the TEMF warehouse has achieved certification. Michael Baker's services included architecture, surveys, environmental investigation, geotechnical oversight, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Private/ Public Venture T-Hangars, Morgantown Municipal Airport (MGW), Morgantown, West Virginia. *Morgantown Municipal Airport.* Mechanical Engineer. Provided mechanical, electrical, and plumbing engineering for T-hangars and medium Voltage Ductbank to supply the facility. Michael Baker provided design and engineering services for three pre-engineered metal building (PEMB) t-hangars west of the West Virginia Army National Guard Readiness Center known as the East Side Development. Phase 1 of

the project encompassed development of infrastructure, including site grading, drainage, bituminous taxilanes, pavement markings, vehicle parking, and fencing for the three t-hangars. Phase 2 encompassed the t-hangars on the east side of the airfield and included site civil, structural, architectural, interior, mechanical, plumbing, fire protection, and electrical utilities design. Michael Baker also provided bidding phase support and construction management services.

Open-End Architectural and Engineering Services, West Virginia State University, Institute, West Virginia. *West Virginia State University.* Mechanical Engineer. Oversaw investigative and design services for the university on various projects. Duties included utility infrastructure assessment and design and building component repair. Michael Baker provided architectural and multidisciplined engineering services under a ten-year open-end agreement to design renovations, alterations, reconstruction, or extensions of facilities. Michael Baker's services included programming, planning, design development, construction documentation, evaluations, feasibility studies, cost estimating, and construction contract administration.

Terminal Building Improvements, Greenbrier Valley Airport (LWB), Greenbrier County, Lewisburg, West Virginia. *Greenbrier Valley Airport Authority.* QA/QC Engineer. Analyzed problem areas of HVAC system installed by contractor. Proposed solutions and repairs. Michael Baker provided services for improvements to the airport terminal building. Services included project management, an existing facilities inventory and survey; schematic, preliminary, and final design; bidding phase services, construction-phase services; and grant administration support. The terminal improvements included heating and air conditioning system upgrades; restroom modifications and additions; new windows and exterior doors; flooring, ceiling, wall upgrades; vestibules at entrances; and modifications to the access roadway in front of the terminal to accommodate the new vestibule and parking lot expansion.

Security Lighting. *USPFO for West Virginia.* Project Engineer. Responsible for the design and construction administration of the installation of a new Security Lighting System for the C-130 aircraft parking apron at the 130th Airlift Wing, West Virginia Air National Guard.

Design-Build Community-Based Outpatient Clinic, Lake Charles, Louisiana. *SDA, Inc.* Mechanical Engineer. Responsible for mechanical engineering for the VA Clinic. Michael Baker provided architecture and engineering services for a new 32,000-square-foot, design-build, community-based outpatient clinic for military veterans. Michael Baker's services included design management; conceptual, preliminary, and final architectural design; structural design; landscape design; interior design; mechanical, electrical, plumbing, and fire protection engineering; and construction administration and inspection.

Little Kanawha Bus Facility, Calhoun County, West Virginia. *West Virginia Division of Public Transit.* Design Engineer. Responsible for the Mechanical, Electrical and Plumbing Design, MEP Document Preparation, and Construction Administration for a new bus maintenance and office facility for Gilmer County. Duties include the design of the vehicle storage, cleaning and maintenance mechanical systems, as well as oil pumping and collection systems. The design of an energy efficient HVAC system for the entire building is also part of his responsibilities. Michael Baker is providing architectural and engineering services, landscape architecture, and construction-phase support for a new, 9,900-square foot, pre-engineered, metal and brick bus maintenance and transit operations facility. The 5,100-square-foot administrative area will include offices, a conference room, a money-counting room, and a driver-training room, and the 4,800-square-foot bus maintenance area will include storage for seven buses. The facility will be ADA-compliant and is being designed to achieve

LEED® certification. Services include site survey and design, geotechnical testing, environmental compliance, utility coordination, bid documents, bid-phase support, and as-built drawings.

Tobyhanna Site Development. *U.S. Army Corps of Engineers, Philadelphia District.* Mechanical Engineer. Assisted in mechanical engineering design.

Renovations to Building 5, Bay 1, Tobyhanna, Pennsylvania. *Tobyhanna Army Depot.* HVAC Designer. Designed HVAC systems for general offices, latrines, a large work room with humidification and a computer/office areas. Also detachable AC systems were designed for a number of removable Mobile Computer Control Shelters. Michael Baker served as the designer of record on a design-bid-build project to renovate Building 5, Bay 1 at the Tobyhanna Army Depot. Work was performed under a three-year indefinite delivery-indefinite quantity contract. The scope of work involves adding HVAC capacity, installing a drop-ceiling system, expanding existing restrooms, and enhancing door systems. Michael Baker prepared design and construction plans and construction cost estimates.

Campus Master Planning and Architectural and Engineering Services for State Capitol Complex, Charleston, West Virginia. *State of WV General Services Division.* Planner. Currently providing the State of West Virginia General Services Division a comprehensive campus-wide master plan for the 55+ acre state capitol campus. Working in conjunction with a team of specialized consultants, currently providing programming, cost estimating and facilities planning support. Services included HVAC Loads as well as utility evaluation and planning for future growth. Michael Baker is providing comprehensive master planning services, plans and construction specifications, and construction administration for improvements to the historic West Virginia state capitol campus. Master planning services include plans for expansion, location of new buildings, pedestrian and traffic circulation, landscaping, utilities, and site security. Michael Baker is also providing construction plans and contract administration services for some of the security and landscaping improvements.

Marshall University Campus Master Plan, Huntington, West Virginia. *Marshall University.* Mechanical Engineer. Performed building assessment and infrastructure analysis. Michael Baker provided engineering services for the update of the campus master plan. Michael Baker's services included traffic analysis, transit system review, concept development for pedestrian and bicycle facilities, and facility and utility assessments.

GNMG Facility. *Good news Mountaineer Garage.* Mechanical Engineer. Provided plumbing, HVAC, and electrical design and construction documents for an office, event center, and maintenance garage facility.

Electrical and Lighting Design for Period Street Lighting

Mr. Hilliard provided electrical design, lighting calculations and construction cost estimates for streetscape lighting on the following projects:

- **Elkins Wees District Streetscape.** *City of Elkins, WV.*
- **Nitro Bank Street Streetscape.** *City of Nitro, WV.*
- **Nitro Streetscape Phase II.** *City of Nitro, WV.*
- **Dunbar 10th Street Streetscape.** *City of Dunbar.*
- **Dunbar Downtown Streetscape.** *West Virginia Department of Transportation/DOH.*
- **West Union Streetscape.** *Doddridge County EDA and Town of West Union, WV*
- **Pineville Streetscape Phase II.** *Town of Pineville, WV.*
- **Madison Main Street Streetscape.** *West Virginia Department of Transportation/DOH.*

Owen Milligan, P.E.

Electrical Engineering Manager

General Qualifications

Mr. Milligan is an electrical engineer who is experienced working with consulting engineering firms in the study and design of electric distribution and control systems, emergency power for process plants and facilities, water/wastewater treatment plants, government and commercial projects, ASHRAE energy-efficient building design, coordination with vendor and contractors, and approval of vendor drawings. He has a strong knowledge of distribution equipment and designs, motor control center layouts and design, and start-up and services during construction. He is capable of handling multiple projects from conception to final design, working as a team member toward meeting project goals. His work includes management of Baker's electrical engineering department, supervising and providing technical advice to designers and coordinating design and construction work with engineers, contractors, vendors, and clients.

Years with Michael Baker: 7
Years with Other Firms: 20

Degrees

B.S., 1988, Electrical Engineering, Gannon University

Computer Aided Drafting, Putnam County Technical Center, 1995

Licenses/Certifications

Professional Engineer, California, 2003
Professional Engineer, Pennsylvania, 1999
Professional Engineer, Montana, 2001
Professional Engineer, Kentucky, 2005
Professional Engineer, Oklahoma, 2008

Experience

Design/Build SATOC for Military Facilities in the Southwest Region, Various Locations in Southwestern U.S., AR,AZ, CA, LA, NM, NV, OK, TX. *U.S. Army Corps of Engineers, Tulsa District.* Electrical Engineer. Provided design assistance to the electrical engineering subconsultant, and performed a technical quality review of the construction documents for the TEMFs located at Fort Bliss. Electrical systems included lighting, lightning protection and grounding, power distribution, telecommunications, fire alarm, and unique voltage and frequency requirements. Designs were required to meet UFC and military design standards. Projects constructed under this contract include Brigade Combat Team (BCT) Tactical Equipment Maintenance Facilities (TEMF). TEMFs provide facilities for the purpose of maintaining and repairing vehicles, complete with equipment and parts storage, and administrative offices. Task orders awarded to date include the following: Two TEMFs at Fort Bliss in El Paso, Texas to be shared by five Battalions and one Company; and a Unit Operations Facilities consisting of a TEMF and an Organizational (Deployment) Storage facility, at Fort Bliss in El Paso, Texas. Facility designs are required to meet or exceed a Silver LEED® certification.

On-Call Multi-Discipline Services, Pittsburgh International, and Allegheny County Airports (PIT/AGC), Pittsburgh, Pennsylvania. *Allegheny County Airport Authority.* Technical Advisor. Provided technical direction to electrical design staff and performed a technical quality review of the construction documents. Designs were required to meet NEC standards. Since 1989, Baker has provided multidiscipline, on-call services to the Allegheny County Airport Authority (ACAA). The ACAA owns and operates Pittsburgh International Airport (PIT) and Allegheny County Airport (AGC). Baker acted as an extension to the ACAA's staff, providing the depth of resources and experience of the entire company when called upon by the ACAA. Baker provided a full range of services to ACAA on an "On-Call/As-Needed" basis, including architecture, civil, structural, mechanical, electrical and environmental engineering, general engineering administration, construction support, and other areas.

Rescue Swimmer Training Facility, U.S. Coast Guard Support Center, Elizabeth City, North Carolina. *U.S. Coast Guard, Facilities Design & Construction Center Atlantic.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles. Baker prepared Design/Build RFP Documents for a new Rescue Swimmer Training Facility (RSTF) for the Aviation Technical Training Center (ATTC), a tenant of and located on the SC Elizabeth City, NC. The $13.3 million RSTF is a dedicated aquatic trainer for the purpose of supporting the Aviation Survival Technician (AST) School and recurrent water survival training requirements. Sized appropriately for the curriculum and student loading, the RSTF contained

elevated platforms, pool temperature controls, adequate wet and dry storage, male and female locker/shower facilities, classrooms, and office space.

Gymnasium Locker Room Rehabilitation, USCG Training Center Cape May, New Jersey. *U.S. Coast Guard.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles. Baker prepared the design, construction documents, and cost estimate for the interior rehabilitation of an existing facility to combine two women's locker rooms into one large room.

Relocation and Improvements to the Front Gate, USCG Training Center Cape May, New Jersey. *U.S. Coast Guard.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles.

Route 52, Contract - "B", Somers Point & Ocean City, New Jersey. *New Jersey Department of Transportation.* Electrical Engineer. Responsible for the electrical systems design to meet NEC standards for a new Visitor's Center, bridge and site lighting, power distribution, and a supplemental photovoltaic solar system.

Non-Baker Project Experience

Siemens Government Services, Inc (formerly SD Engineers), Pittsburgh, Pennsylvania. Senior Electrical Project Engineer. Responsibilities included Senior Electrical Engineer in charge of all electrical work at the Department of Energy's Naval Reactor Facility in West Mifflin, Pennsylvania. Duties included complete electrical design including multiple new office building designs and construction, light industrial type facilities for confidential DOE projects, retrofitting and relocation of existing laboratories, power studies, arc flash calculations, and site power distribution.
Chester Engineers / US Filter Corporation, Pittsburgh, Pennsylvania. Electrical Project Engineer. Responsibilities included the following:

- Lead electrical engineer for multiple site water and wastewater treatment projects for a large automobile manufacturer.
- Lead electrical engineer for design of water treatment plants for several large steel manufacturers.
- Lead electrical engineer on design of numerous remote cellular telephone communication sites for a large, wireless Telecommunications Company.
- Assisted a Senior Electrical Engineer on a Short Circuit and Coordination Study using CAPTOR/DAPPER analysis program.
- Responsible for several large detailed constructions cost estimates.
- Lead Electrical Engineer to many local municipalities for wastewater and water pumping/filtration upgrades.

Wayne Airgood, P.E.

Structural Engineer

Years with Michael Baker: 8
Years with Other Firms: 23

Degrees

B.S.C.E., 1984, Structural Engineering, Geneva College

Licenses/Certifications

Professional Engineer, Pennsylvania, 1999, [redacted]

Professional Engineer, Maryland, 2013, [redacted]

Professional Engineer, North Carolina, 2014 [redacted]

General Qualifications

Mr. Airgood is a practicing structural engineer with experience in the design of commercial, institutional, light industrial building structure, and foundation systems.

Experience

Design of Central Issue Facility, Fort McCoy, Wisconsin. *U.S. Army Corps of Engineers, Louisville District.* Mr. Airgood was the senior structural engineer of record responsible for design of the building structure and foundation systems from concept through construction of an approximate 62,553-square-foot large-sized Central Issue Facility (CIF) to expedite the shipping and receiving, distribution, processing, and exchange of soldier equipment. The structural system consisted of steel joist and girder framing supported by interior steel columns and exterior precast, insulated concrete load-bearing walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

Container-Loading Facility Design, Fort McCoy, Wisconsin. *U.S. Army Corps of Engineers, Louisville District.* Mr. Airgood was the senior structural engineer of record responsible for the design of a clear span steel roof framing system to achieve column-free interior warehouse space of a 30,862-square-foot Container-Loading Facility. Roof framing system is supported by interior steel columns and exterior precast, insulated concrete load-bearing walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

Montgomery County Public Schools Foodservices Facility. *Montgomery County, Department of General Services.* Mr. Airgood was the senior structural engineer of record responsible for the development and design of structural framing and foundation systems for 70,000-square-foot food production, warehouse and distribution facility. His responsibilities included coordination with owner/user and other engineering disciplines throughout design, performing and overseeing of production structural design calculations and documents and construction administration services such as review of structural product submittals and periodic site visits.

West Haven Commuter Rail Station Engineering Design, West Haven, Connecticut. *Connecticut Department of Transportation.* Mr. Airgood was the senior structural engineer responsible for the structural framing and foundation design of a two story passenger train station building. The station building featured a two story, glass curtain wall enclosed passenger waiting area with exposed to view curved roof structure. The design also included a 75 foot span, glass curtain wall enclosed pedestrian bridge spanning over the four rail line track bed to connect the station building with a new two story stair and elevator tower. His responsibilities included coordination with engineering and architectural disciplines during design, performing and overseeing of production structural design calculations and documents, and review of fabrication shop drawings and other construction administration services as related to the building structural systems.

Penn Hills Operations Center Addition, Penn Hills, Pennsylvania. *Duquesne Light Company.* Mr. Airgood was the senior structural engineer of record responsible for the development, design, and detailing of a load bearing masonry wall and steel framing addition to an existing facility.

Design-Build Tactical Equipment Maintenance Facilities, 31st ADA Brigade, Fort Sill, Oklahoma. *U.S. Army Corps of Engineers, Tulsa District.* Mr. Airgood was the senior structural engineer responsible for the design of the foundation systems to support an 18,000-square-foot, 35,200-square-foot, and 57,031-square-foot pre-engineered steel Tactical Equipment Maintenance Facilities

(TEMF), and a 20,000-square-foot Supply Support Activity facility supply support activity warehouse (SSA). Because of existing expansive soil conditions, the ground floors of each building were designed as reinforced concrete floor systems with a void space between the expansive soil and floors. The concrete floor system and PEMB structural columns were supported by a deep foundation system of drilled concrete piers extending to
rock. His responsibilities included review of structural fabrication drawings, attending design coordination meetings and periodic site visits during construction.

Buildings 200 & 250 of Imperial Business Park, Imperial, Pennsylvania. Mr. Airgood was the lead structural engineer responsible for the development and design of the structure and foundation systems for two, 250,000-square-foot warehouse facilities. Responsibilities also included construction administration services such as review of structural product submittals and periodic site visits. Each building consisted of steel joist and joist girder roof framing supported by interior steel columns and exterior precast concrete bearing and shear walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

ABB Manufacturing and Office Facility, Mt. Pleasant, Pennsylvania. Mr. Airgood was the lead structural engineer of a high-bay manufacturing, testing and warehouse facility for electric transformer equipment, including an attached two-story office area. The structural systems consisted of precast concrete wall panels enclosing a steel framed interior column and roof structure, including the support of numerous under-hung crane systems throughout the facility ranging from 5- to 20-ton capacities. The lateral framing system was a combination of steel braced and moment frames, and foundations were soil supported isolated and continuous, reinforced spread footings.

Fuel Cell Facility, Pittsburgh, Pennsylvania. *Siemens Westinghouse.* Mr. Airgood was the lead structural engineer of a high-bay manufacturing facility, warehouse and two-story attached office area. The structural systems consisted of precast concrete wall panels enclosing a steel framed interior column and roof structure. The lateral framing system was a combination of steel braced and moment frames, and the structural design included support of various top running bridge crane systems ranging from 10- to 40-ton capacities. The foundations were soil supported isolated and continuous, reinforced spread footings.

Patrick W. Fogarty, P.E., P.S., LEED®GA

Civil Engineer , Facilities Practice Manager

Years with Michael Baker: 12
Years with Other Firms: 20

Degrees

B.S., 1985, Civil Engineering, West Virginia University Institute of Technology

Diploma, 1993, Surveying and Mapping, International Correspondence Schools

Coursework, Business Administration, Heriot-Watt University, Edinburgh College of Art

Licenses/Certifications

Professional Engineer - Civil/Structural, West Virginia, 1990
Professional Surveyor, West Virginia, 1993

Construction Documents Technologist, 1996

General Qualifications

Mr. Fogarty has over 29 years of civil engineering project design and management experience. He is responsible for the technical and management aspects of civil design and surveying projects within Baker's Charleston, West Virginia office. Mr. Fogarty has designed and managed projects in numerous disciplines including civil, structural, and transportation engineering; site development planning; and surveying. These projects have included retail/commercial site preparation, airports, streets/highways, bridges, parking lots, buildings, retaining walls/foundations, sanitary systems and structures, as well as boundary and topographic and photogrammetric surveys. Duties included field surveying, drawings and specification preparation, design, design drafting, construction inspection, quality control testing, shop drawing review, project management, contract administration and report preparation.

Experience

Renovations to Classroom Building, Beckley, West Virginia. *WVU Tech/ West Virginia University. Practice Lead.* Responsibilities included overseeing and managing the required resources for the design team and quality control. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with a compressed time frame in mind. Coordination of new and old HVAC designs were a large component of this project. University branding elements were incorporated into the interior design to bring new life to a defunct campus. Special consideration was given to coordination with the University's existing door hardware products as well as the design and product specifications for a nationally accredited psychological laboratory within the Project. This project is currently under construction.

Renovations to the Benedum Center, Beckley, West Virginia. *WVU Tech/ West Virginia University. Practice Lead.* A sister project to the above referenced Classroom Building, this 21,000 S.F. project ran concurrent and also stemmed from a Feasibility Study requested by the Owner. Primarily responsibilities included overseeing and managing the required resources for the design team and quality control. This project is currently under construction.

West Virginia State Capitol Restroom Renovations. *State of WV General Services Division.* Project Manager. Responsible for the overall management of the project including the coordination of the sub-consultant. Baker is leading a planning study for the renovation of 31 restrooms in the historic West Virginia Capitol Building. The planning study will assess the facilities and their conformance to current code requirements and code-required capacities, compliance with Americans with Disabilities Act (ADA) requirements, quantification of the building occupancy during normal and peak periods, and an evaluation of gender distribution of restrooms within the capitol. Baker will provide design, construction sequence, and scheduling recommendations. Upon approval of the design, Baker will prepare construction documents and provide construction administration services for the renovation of three restrooms on the basement level.

Nitro Bank Street Streetscape Improvements, Nitro, West Virginia. *City of Nitro.* Project Manager. Responsible for concept planning, detailed design, construction document generation, and construction administration. Baker provided design, bid-phase support, and construction services for streetscape improvements to Bank Street, located in the city's business district. Baker's services include base mapping, background data collection, design plans, construction document preparation, bid-phase support, construction management, and construction inspection.

A/E Services for the Office of the Adjutant General, West Virginia Army National Guard, Division of Engineering and Facilities, Charleston, West Virginia. *State Army National Guard Headquarters.* Project Manager. Responsible for the management and coordination of all activities. The Facilities Management Officer (FMO) for the State of West Virginia, Division of Engineering and Facilities (DEF), West Virginia Army National Guard (WVARNG) selected Baker for a lump sum/fixed fee contract for architectural and engineering services. Baker was selected by the Division of Engineering and Facilities to provide complete design and construction administration services for the renovation of the first floor of the entire wing of the Office of the Adjutant General (TAG). The Owner requested the need for modernization of approximately 12,000 square feet of existing outdated office space - project elements included new acoustical ceilings, flooring, energy-saving light fixtures, duplex outlets, communications jacks, alterations to the existing floor plan, exterior door replacements, new interior doors and hardware, new wall finishes and asbestos removal.

Lost Creek Train Depot Rehabilitation, Lost Creek, West Virginia. *Town of Lost Creek.* Project Manager. Responsible for the management and coordination of all activities as well as all engineering design. The Town of Lost Creek retained Baker for the planning and design of the rehabilitation of a historic train depot adjacent to the Harrison County Rail Trail. Baker prepared a plan to raise the structure, make repairs to the deteriorated timber, excavate and place the concrete foundation system, then lower the structure to rest on the new foundation. Baker provided construction administration and inspection services as well as periodic site review during construction.

Little Kanawha Bus Facility, Calhoun County, West Virginia. *WV Division Of Public Transit.* Project Manager. Responsible for the civil, site and structural engineering components of the project. Baker is providing architectural and engineering services, landscape architecture, and construction-phase support for a new, 9,900-square foot, pre-engineered, metal and brick bus maintenance and transit operations facility. The 5,100-square-foot administrative area will include offices, a conference room, a money-counting room, and a driver-training room, and the 4,800-square-foot bus maintenance area will include storage for seven buses. The facility will be ADA-compliant and is being designed to achieve LEED® certification. Services include site survey and design, geotechnical testing, environmental compliance, utility coordination, bid documents, bid-phase support, and as-built drawings.

Robert D. Holbert III, P.E.

Civil Engineer

Years with Michael Baker: 18
Years with Other Firms: 1

Degrees

B.S., 1998, Civil Engineering, West Virginia University Institute of Technology

Licenses/Certifications

FHWA - NBIS Safety Inspection of In-Service Bridges Training, 2006, NHI Course 130055

Professional Engineer, West Virginia, 2003, 015625

General Qualifications

Mr. Holbert's civil engineering experience includes three summer internships with the West Virginia Department of Transportation as a construction inspector. He has experience doing various types of structure inspections, as well as multiple components of highway design and plan preparation. He also has experience with water resources, including major and minor drainage design and hydraulic modeling using Hec-Ras. He is very proficient with MicroStation and Geopak design software.

Experience

Appalachian Corridor H. *West Virginia Department of Transportation, Division of Highways.* Civil Engineer. Responsible for the major and minor final drainage design for three different alternates within the Panther Run watershed. The purpose was to avoid any effects to a sensitive plant species found on the original centerline. Also responsible for the major drainage design for the remainder of Section 01. Total length is approximately six miles. Other duties included roadway work utilizing geopak design software and alternative analysis.

Design-Build Coonskin Park Access Road Bridge, Charleston, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Highway Engineer. Responsible for the roadway portion of the design-build project. Prior to contractor's bid, work was done to generate the bid. After project was won, responsible for all aspects of the roadway in finalizing plan documents and acquiring the NPDES permit. Michael Baker provided engineering services for the design-build construction of a new three-span girder bridge spanning the Elk River and providing access to Coonskin Park. Michael Baker's services included preliminary and final design, construction cost and quantities estimates, and shop drawing reviews.

Preliminary Roadway Design, Confidential Location, West Virginia. *Confidential Client.* Highway Engineer. Responsibilities included the development of preliminary construction plans to maximize the use of a future strip mine on a proposed highway. Duties included drainage, earthwork, and setting line and grade. The purpose of this project was for the study and the development of a preliminary alignment for an eight mile section of a four-lane divided highway.

Fort Pleasant Farms Two Lane Road Design, Moorefield, West Virginia. *Fort Pleasant Farms, Inc.* Highway Engineer. Prepared construction plans for an access from the Moorefield interchange to Renick William's property. Duties included setting line and grade, drainage, earthwork analysis, cost estimates, and signing and pavement marking plans. This project involved the study, design and final construction plan development for a new two-lane access road approximately 1500' in length. This access road was designed to connect a commercial/residential development to the Moorefield Interchange on Corridor H in Moorefield, West Virginia.

Corridor H, Section 15 Design, Tucker County, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Civil Associate. Responsibilities included deed research and right-of-way questionnaires for affected properties. This project involved the study and preliminary design of approximately 3.2 miles of Corridor H in Tucker County, West Virginia. This section of Corridor H included the 4000' long Pleasant Run Bridge and the 2500' long Shaver's Fork River Bridge Crossing.

Moorefield Bypass, Moorefield, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Civil Associate. Part of team to study various components of highway design. As part of this project, Michael Baker prepared a

Purpose and Need Study to construct an approximate 5-mile roadway to serve as a bypass of the center of Moorefield in Hardy County, West Virginia. The project was developed to address the region's increasing transportation demands and growing traffic safety concerns.

Fort Pleasant Access Road Project, Moorefield, West Virginia. *Fort Pleasant Farms, Inc.* Highway Engineer. Worked on revision to original Fort Pleasant project. Duties included setting line and grade, drainage, earthwork analysis, cost estimates, signing and pavement markings and obtaining a NPDES permit. Michael Baker prepared contract construction plans and related documents for a 3-lane access road connecting Corridor H to private property in Moorefield, WV.

I-64/U.S. 35 Interchange Study, I-64 to WV 34 Interchange, Putnam County, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Civil Associate. Part of the team that prepared construction and right-of-way plans for 2.5 miles of divided highway which included two interchanges and a flyover, earthwork quantities, setting horizontal and vertical control for the project. Required coordination with Right-of-Way, Stream Mitigation and CADD work. This project under first phase was for the study of two interchange sites on I-64, Cow Creek and Crooked Creek. This project under the final phase was for the complete preparation of right of way plans and construction plans for a new location of US 35 from I-64 (Crooked Creek location) to and including an interchange with WV 34.

Route I-78 Intelligent Transportation System Infrastructure Improvements, Essex County, New Jersey. *New Jersey Department of Transportation (NJDOT).* Water Resources Engineer. Part of team responsible for minor drainage on Contract A. Michael Baker designed regional intelligent transportation system infrastructure enhancements to improve the monitoring of traffic flow, detection of incidents, and dissemination of traveler information for the multimillion-dollar Route I-78 pavement rehabilitation-reconstruction project. Michael Baker's tasks included developing design plans to install closed-circuit television cameras, remote traffic microwave sensors, dynamic message signs, and a fiber-optic communications network. The project involved the preliminary and final design for the reconstruction of 3.73 miles of I-78, a ten-lane rigid pavement roadway in Union and Essex County, NJ. The main purpose of the project was to rehabilitate the rigid pavement and implement safety improvements.

Construction Plans for I-64 Widening, Cabell County, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Highway Engineer. Responsibilities included the development of contract plans to construct approximately 1 mile of median barrier and an additional lane in each direction on I-64. Due to a construction change order, Michael Baker prepared contract construction plans for a one-mile section of the upgrade of I-64 to six lanes from the 16th Street interchange to Bridge #2096 over County Route 35. The project included drainage analysis, permitting support, and maintenance of traffic, signing, and pavement marking plans.

Vehicle Fence 300 Program Engineering Services, El Paso and Tucson Sectors, Border States with Mexico. *U.S. Army Corps of Engineers, Fort Worth District.* Civil Engineer. Responsibilities included the preparation of construction plans, setting line and grade, and cross sections. Michael Baker was responsible for providing engineering services for the border fence and associated tactical infrastructure, such as lighting, vehicle barriers, checkpoints, and technology, between Mexico and the United States. The project included design, editing, surveys, meetings and conferences, geotechnical services, hydrologic and hydraulic studies, identification of related environmental issues and impacts, and cost estimating.

Ararat River Restoration and Greenway Design, Surry County, North Carolina. *Resource Institute, Inc.* Civil Engineer. Responsibilities included the preparation of construction plans for the 3 segments of the greenway that crossed under bridges. Duties included setting line and grade, cross sections, and quantity calculations. Michael Baker prepared a stream restoration design, permit documents, plan sheets, provided construction oversight and as-built report for the Ararat River Restoration Project, located in Surry County, North Carolina. This scope of work included tasks to assess the stream conditions of an approximately four mile section of the Ararat River and to restore stream channel dimension and profile for approximately 10,000 cumulative feet within the project area. A final report was completed describing all project information required by the Clean Water Management Trust Fund as part of the grant agreement.

Kevin Spangler, P.E.

Fire Protection Engineering Manager

Years with Michael Baker: 8
Years with Other Firms: 1

Degrees

M.S., 2008, Fire Protection Engineering, University of Maryland, College Park Campus

B.S., 2006, Agricultural and Biological Engineering, The Pennsylvania State University

Licenses/Certifications

Professional Engineer, California, 2011, [redacted]

Professional Engineer, Virginia, 2012, [redacted]

Professional Engineer, Pennsylvania, 2012, [redacted]

Professional Engineer, Illinois, 2013, [redacted]

Professional Engineer, Idaho, 2014, [redacted]

Professional Engineer, New York, 2014, [redacted]

Professional Engineer, Connecticut, 2015, [redacted]

Professional Engineer, South Carolina, 2016, [redacted]

Professional Engineer, Minnesota, 2016 [redacted]

Professional Engineer, Mississippi, 2017, [redacted]

General Qualifications

Mr. Spangler is a registered fire protection engineer with an M.S. degree in Fire Protection Engineering and 9 years of experience in the fire and life safety consulting industry. He has been with Michael Baker International since 2009 and has been the fire protection engineering manager since 2014. He provides leadership to the fire protection group and performs project technical reviews of system designs. He also serves as the Designer of Record for his specific project designs. In his wide-ranging fire protection experience and education, he has an extensive technical background and knowledge in the design of fire protection engineering systems, code and life safety analysis, and the commissioning and testing of fire systems. The variety of projects have exposed Mr. Spangler to various types of facilities for military, government, commercial, public, and private clients.

Experience

Renovations to Classroom Building, Beckley, West Virginia. *WVU Tech/ West Virginia University.* Mr. Spangler was the fire protection engineer of record responsible for the design of the fire protection systems at the WVU Tech Beckley Classroom Building. The project consisted of a renovation of an existing building. A new wet-pipe sprinkler system was added to the building, and the existing fire alarm system was adjusted to account for the building renovation. Mr. Spangler provide drawings and specifications for the installing contractor, and reviewed the delegated design submittals for compliance with the project scope and construction codes. This project is currently under construction.

Renovations to the Benedum Center, Beckley, West Virginia. *WVU Tech/ West Virginia University. Designer.* A sister project to the above referenced Classroom Building, this 21,000 S.F. The existing sprinkler and fire alarm systems were adjusted to account for the building renovation. This project is currently under construction.

Army Reserve Center, Full Facility Revitalization (FFR), Independence, MO. Mr. Spangler was the fire protection engineer for the renovation of the existing army reserve center located in Independence, Missouri. He was responsible for performing a field investigation of existing conditions, performing a fire hydrant flow test and preparing RFP specifications and design criteria documents. The building scope included a new wet pipe sprinkler system in the Reserve Center Building and also the Maintenance Facility. The existing fire alarm system was documented and determined to be removed and replaced with a new fire alarm and mass notification system. The new fire alarm system is designed to serve both buildings and an outdoor speaker system for parking lot notification.

Shaw Headquarters Building Renovation, Shaw AFB, South Carolina

Mr. Spangler was the Fire Protection Engineer of record for the renovation of the three story Headquarters Building at Shaw AFB in South Carolina. The building contained an existing fire alarm and existing sprinkler system. The fire alarm system was removed and installed with a new fire alarm and mass notification system. The existing sprinkler system was modified to account for the new building design. The existing sprinkler system was identified by field investigation and as much of the existing sprinkler system was

re-used as possible to keep costs minimal for the client. A life safety analysis was performed according to NFPA 101 Life Safety Code and the IBC to ensure the new

system design met all building and egress requirements. Mr. Spangler was responsible for the delegated design review and approval of shop drawings prepared by the installing contractor.

Fire Pump Replacement. *Allegheny County Airport Authority – Pittsburgh International Airport.*
Mr. Spangler was the fire protection engineer designer of record for the project. He completed detailed field measurements of the existing systems and finalized the design for the newly installed fire pumps. The project included the installation of 4 new, electric motor driven fire pumps in two (2) separate fire pump houses (2 pumps per fire pump house). The fire water tanks and existing water supply were analyzed to meet code requirements and the existing piping rerouted as necessary to provide appropriate pump recirculation. The challenges that were faced and solved during in the project included the installation of previously purchased fire pumps into an existing system. The project was successful due to the attention to detail in field measurements of the existing systems and the detailed design of the new system.

Private Corporate Client. *Hangar located at Allegheny County Airport.* Michael Baker was responsible for the building design for a renovation of a historic hangar located at the Allegheny County Airport. Mr. Spangler was the Fire Protection Engineer responsible for the design of fire protection systems throughout the building including sprinkler system, foam system, and fire alarm system. Two fire pumps were designed and retrofitted into the building to provide the adequate flow and pressure for the suppression systems. Detailed hydraulic calculations were performed and discussed with the local Authority Having Jurisdiction in order to remove the existing fire water storage tanks from the project. As part of the project, a site survey of existing building and final inspections of the final systems installations were performed.

Camp Geiger East Infantry Training Complex, Marine Corps Base Camp Lejeune, North Carolina. *Naval Facilities Engineering Command, Mid-Atlantic.* Mr. Spangler was the fire protection engineer of record for Academic Building, CIF and Warehouse buildings. He was responsible for fire protection design of protection systems including sprinklers, fire alarm and mass notification systems to meet the requirements of the RFP, UFC and NFPA codes. He performed life safety analysis for complete compliance with NFPA 101, IBC and the UFC criteria. This includes classifying occupancies, occupant load calculations, egress analysis and rated separations. He also performed an on-site fire hydrant flow test according to NFPA 291 to determine the available water supply. This information was used to perform detailed hydraulic calculations for the building sprinkler systems. He worked directly with the NAVFAC fire protection engineer to analyze the water system and remove the need for a fire pump for each of the buildings. Michael Baker served as the lead designer for the design-build delivery of a 137,850-square-foot infantry training complex on five acres at Camp Geiger. The project included the construction of a two-story headquarters and academic building, a warehouse, a consolidated issue facility, an armory building, and an emergency weather center, the demolition of five buildings and various electrical distribution upgrades. The project was designed to meet the requirements for LEED Silver certification.

APPENDIX 2- RELATED PROJECTS

Architectural and Engineering Services for U.S. Army Reserve and Military Construction Projects

Various Locations

Under a third consecutive indefinite delivery-indefinite quantity contract, Michael Baker is providing architectural design and engineering services for a variety of mission-critical projects that serve the U.S. Army Reserve's expanding needs for personnel training and equipment maintenance and support the activation of additional brigade combat teams.

Michael Baker's tasks include developing preliminary and final designs and request-for-proposal (RFP) performance specifications for U.S. Army Reserve Center horizontal and vertical construction and other military construction projects within the client's area of responsibility. Infrastructure projects included equipment concentration site warehouses; tactical equipment maintenance facilities; and central-issue, container-loading, billeting, and dining facilities.

On full design-bid-build and design-build RFP projects, Michael Baker participates in design charrettes and design review meetings to explore the range of user needs and preferences for structural and system functionality and promote team understanding and consensus, and energy charrettes to identify potential initiatives to promote energy efficiency, minimize environmental effects, and reduce immediate and long-term operating costs. These meetings are critically important, as they form the basis for an iterative and collaborative process to achieve user mission goals.

Michael Baker's initiatives to promote sustainability addressed all aspects of building and site design and construction. They include specifications for the use of materials that were locally available and products with recyclable content; integration of occupancy sensors to reduce lighting energy consumption; use of water-saving features, such as low-flow plumbing fixtures, to reduce water consumption; use of ozone-friendly refrigerants and refrigerant quantities to minimize ozone depletion; development of landscaping designs that minimize the use of potable water, incorporation of native, low-maintenance drought-tolerant plants, and preservation of existing trees; and the diversion of construction waste from landfills to meet LEED® requirements.

Client

U.S. Army Corps of Engineers,
Louisville District
Room 972
600 Dr. Martin Luther King, Jr. Place
P.O. Box 59
Louisville, Kentucky 40202

Completion Date

Estimated: 2017

Project Costs

$19,423,083 (Fee)

Michael Baker's Role

- RFP document preparation
- Planning
- Sustainable design
- Site and civil engineering
- Geotechnical engineering
- Architectural design
- Interior design
- Structural engineering
- Mechanical engineering
- Plumbing design
- Fire protection engineering
- Electrical engineering
- Communications design

Brief descriptions of representative projects follow.

Facility Design

Container-Loading Facility Design, Fort McCoy, Wisconsin. As designer of record, Michael Baker provided architectural and engineering services for the construction of a 30,862-square-foot container-loading facility; a two-acre, concrete-paved container storage yard; and a 19-space parking lot. Michael Baker designed the container-loading facility to meet LEED® Silver certification. Tasks ranged from site and civil engineering to building architectural and interior design and facility

engineering, including structural, mechanical, plumbing, fire protection, and electrical and telecommunications systems design, and LEED® certification administration.

Fort McCoy serves as a key transfer point for the shipping and receiving of military equipment for U.S. Army Reserve units and troops throughout the world. The new building meets escalating service demands by optimizing equipment and material containerization and transport operations.

Michael Baker promoted sustainability throughout building design and construction. The building design included materials and features that reduce environmental effects, save energy, and minimize costs. Materials that were locally available and products with 20-percent recyclable content were used. Occupancy sensors reduce lighting energy consumption. Interior building water-saving features, such as low-flow plumbing fixtures and urinals, reduce water consumption by 20 percent. Ozone-friendly refrigerants and refrigerant quantities were used to minimize ozone depletion. Long-term energy consumption is reduced through contracting with a Green-E-certified renewable energy provider that supplies 70 percent of electricity for the building.

Billeting Facility Design, Fort McCoy, Wisconsin. Michael Baker served as the designer of record for construction of a 65,000-square-foot, two-story billeting facility for noncommissioned officers and other military trainees. Michael Baker designed the billeting facility to meet LEED® Silver certification. Michael Baker's services included architectural design, surveys, geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

The billeting facility, which is part of the noncommissioned officer academy campus at Fort McCoy, primarily houses students who are attending noncommissioned officer and other training courses. The project is the third phase of the noncommissioned officer academy campus construction at Fort McCoy, for which Michael Baker provided master planning services. Because the new billeting facility construction limits overlap those of the Phase II academy building, the team had to coordinate project construction efforts.

The new L-shaped billeting facility includes two long wings that predominantly consist of double-occupancy billets. Michael Baker's design provided for 126 double-occupancy units and enabled a buildout to create 12 additional units in support of training initiative expansion at the base. An exterior courtyard was constructed to join the new building with the billeting facility that was constructed during Phase I of the master plan.

The billeting facility project includes a campus-wide storm water management system for this phase and future phases.

Sustainability measures were integrated throughout building design and construction and included the use of locally available materials and products with 20-percent recyclable content; occupancy sensors to reduce lighting energy consumption; water-saving features, such as low-flow plumbing fixtures, to reduce water consumption by 40 percent; ozone-friendly refrigerants and refrigerant quantities to minimize ozone depletion; solar panels to offset 100 percent of the annual energy consumed by the exterior lighting; best practices site storm water management systems; and landscaping that includes native, low-maintenance, drought-tolerant plants and preserves existing trees, while avoiding irrigation system use, thereby reducing landscaping-related potable water consumption by 100 percent.

Dining Facility Design, Fort McCoy, Wisconsin. Michael Baker was the designer of record for the design-bid-build delivery of an approximately 20,000-square-foot, one-story annual training-mobilization dining facility. Modeled after the client's operational readiness training complex 1,428-person dining facility standard design, the new building includes two 4,500-square-foot dining areas, a 3,000-square-foot kitchen, men's and women's restrooms, mechanical and electrical rooms, a communications room, and exterior storage space. Michael Baker's services included architectural design, surveys, environmental investigation, geotechnical engineering, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Charrette participation was critically important to project development. Michael Baker facilitated a design charrette and collaborated with the client in identifying needs and preferences and preferred alternatives to the standard design. In

addition, Michael Baker held a special energy charrette to target materials and approaches to promote sustainability and conserve energy, with the goal to exceed ASHRAE 90.1 2007 performance criteria by 40 percent. This project involved facility winterization, a very unique and challenging design requirement. The client anticipated winter seasons during which the dining facility may be unoccupied. While Michael Baker's design provided for the contingency of year-round operations, with energy conservation measures to maximize cost savings, Michael Baker included provisions to enable complete wintertime shutdown of all areas except one small room, which houses the water riser and fire alarm panels, and quick reactivation of building systems within two weeks at any time during the year. In addition, all systems, finishes, and equipment were analyzed or selected for the ability to withstand winter temperatures.

This project also included another unique sustainable design feature: outdoor placement of kitchen cooler and freezer condenser units to reduce the building heat load.

Tactical Equipment Maintenance Facility and Equipment Concentration Site Warehouse Design, Fort McCoy, Wisconsin. Michael Baker was the designer of record for the design-build delivery of an approximately 58,000-square-foot, two-story, modified large tactical equipment maintenance facility (TEMF) and an approximately 44,000-square-foot, one-story equipment concentration site (ECS) warehouse, along with 30 acres of gravel hardstand designated for organizational parking. Michael Baker designed both structures to meet LEED® Silver certification. Michael Baker's services included architectural design, surveys, environmental investigation, geotechnical oversight, all site and building engineering, cost estimating, value engineering, and LEED® certification administration. The new TEMF, ECS warehouse, and additional hardstand will enable ECS-67 at Fort McCoy, the largest ECS in the world, to support the Army Force Generation training initiative by storing and maintaining more vehicles and furnishing all required equipment for training units, eliminating the need for training units to ship their own equipment to and from the installation and related costs.

The ECS warehouse and its vaults, which accommodate the separate U.S. Army Reserve and ECS missions, provide a clear height of 25 feet. This clearance enables forklift access throughout the vaults–a unique design feature.

The project energy charrette was integral to project development. Energy charrette participants evaluated renewable energy sources and passive and active energy-saving measures. These included structure siting and physical orientation; internal layout; R-value enhancements; low-emissivity windows; daylight harvesting measures; energy-saving lighting options; and high-efficiency heating, ventilation, and air conditioning systems. Michael Baker designed an 18-foot-high solar wall for the TEMF that captures heat from the sun and passes it into the building during the winter months. The elimination of exterior light pollution was also extremely important for this project. Michael Baker designed the perimeter security lighting to minimize light pollution and avoid disruption of night maneuver training, which is conducted on an adjacent site.

U.S. Army Reserve Center Renovation and Expansion Design, Homewood, Illinois. As designer of record, Michael Baker provided architectural and engineering services for the renovation and expansion of a 400-member U.S. Army Reserve Center to provide a 60,374-square-foot training building, including an approximately 3,500-square-foot unheated storage building. The project also included construction of a 22,300-square-foot parking area for military equipment and 130 parking spaces for privately owned vehicles. Michael Baker designed the training facility to meet LEED® Silver certification. Michael Baker's services included architectural design, surveys, environmental and geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Sustainability measures included the use of locally available materials and products with 20-percent recyclable content; occupancy sensors to reduce lighting energy consumption; water-saving features, such as low-flow plumbing fixtures, to reduce water consumption; ozone-friendly refrigerants and refrigerant quantities to minimize ozone depletion; a solar photovoltaic array and inverter system, which provides electrical energy to supplement utility provider-supplied electricity and offsets the annual energy consumed by the new exterior lighting; best practices site storm water management systems; and landscaping that minimizes the use of potable water, integrating native, low-maintenance, drought-tolerant plants and preserving existing trees.

U.S. Army Reserve Center Design, Bethlehem, Pennsylvania. Michael Baker was the designer of record for the construction of a 200-member U.S. Army Reserve Center. Michael Baker designed the center to meet LEED® Silver certification.

The U.S. Army Reserve Center consists of a 42,043-square-foot, two-story training building; a 5,480-square-foot, one-story organizational maintenance shop; a 1,358-square-foot, one-story unheated storage building; 3,364 square yards of paved parking for military equipment; and parking for 128 privately owned vehicles. Michael Baker's services included architectural design, surveys, geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Sustainability measures included the use of locally available materials and products with 20-percent recyclable content; occupancy sensors to reduce lighting energy consumption; water-saving features, such as low-flow plumbing fixtures, to reduce water consumption; ozone-friendly refrigerants and refrigerant quantities to minimize ozone depletion; best practices site storm water management systems; and landscaping that minimizes the use of potable water, integrating native, low-maintenance, drought-tolerant plants and preserving existing trees.

RFP Document Development

U.S. Army Reserve Center Design-Build RFP Document Development, Schenectady, New York. Michael Baker prepared design-build RFP performance specifications for the construction of a 400-member U.S. Army Reserve Center to replace an aging facility and meet capacity and regulatory requirements. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs met the user's preference and included an approximately 61,282-square-foot, two-story training building; an approximately 5,274-square-foot, one-story organizational maintenance shop; and an approximately 2,876-square-foot, one-story unheated storage building. Parking will be provided for privately owned vehicles and military equipment.

Michael Baker also proposed various improvements that will yield an energy savings of 40 percent beyond the ASHRAE 90.1 2007 baseline figures. These include specifications for recommended training building and organizational maintenance shop betterments to reduce energy consumption, including improved R-value insulation for the Training Building and organizational maintenance shop roof and walls, and organizational maintenance shop overhead doors; improved U-value high-performance windows for both buildings to enhance thermal performance; and a user-preferred white reflective floor surface in organizational maintenance shop bays to promote light reflectivity. Also, Michael Baker proposed achievement of LEED® Gold certification as an optional betterment for the general contractor.

U.S. Army Reserve Center Design-Build RFP Document Development, Attleboro, Massachusetts. Michael Baker prepared design-build RFP performance specifications for the construction of a 300-member U.S. Army Reserve Center. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. Features and approximate specifications include a 43,500-square-foot, two-story Training Building; a 16,400-square-foot, one-story area maintenance support activity building-organizational maintenance shop (AMSA-OMS); a 2,300-square-foot, one-story unheated storage building; a 43,560-square-foot deployable medical systems site; and 19,455 square yards of paved parking for privately owned vehicles and military equipment.

Michael Baker also proposed various improvements that will yield an energy savings of 40 percent beyond the ASHRAE 90.1 2007 baseline figures. These include specifications for recommended training building and AMSA-OMS betterments to reduce energy consumption, including improved R-value insulation for the training building and AMSA-OMS roof and walls and AMSA-OMS overhead doors; improved U-value high-performance windows for both buildings to enhance thermal performance; and a user-preferred white reflective floor surface in AMSA-OMS bays to promote light reflectivity. Also, Michael Baker proposed achievement of LEED® Gold certification as an optional betterment for the general contractor.

Directorate Public Works Complex, Design-Build RFP Document Development, Fort Buchanan, Puerto Rico. Michael Baker developed the design-build RFP performance specifications for the construction of a multibuilding public works complex.

The directorate is responsible for all of the routine engineering and maintenance on the installation and houses all of the installation's planning, engineering, and environmental personnel as well as manages the military housing on the base.

Primary facilities and approximate sizes included a 17,515-square-foot, single-story administration building; a 15,500-square-foot, single-story maintenance shop-supply warehouse; and a 2,100-square-foot, single-story entomology facility. Support structures and features and approximate sizes included a 2,300-square-foot covered storage shed, a 1,000-square-foot oil storage building, and 12,738 square feet of parking for organizational vehicles. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification.

As envisioned, the project exceeds ASHRAE 90.1 2007 performance criteria by 40 percent. Michael Baker's conceptual designs incorporated several provisions to satisfy the user's preference for sustainability, including a ground-mounted solar photovoltaic array and inverter system to provide electrical energy to offset up to 25 percent of primary building annual energy consumption, including site lighting; and a system for harvesting rainwater from the building roofs and distributing it to the water closets and lavatories and to a 300-gallon tank used for vehicle cleaning. The proposed rainwater harvesting system will incorporate an underground collection tank to provide storage for one week's use.

U.S. Army Reserve Center Design-Build RFP Document Development, Uniontown, Pennsylvania. Michael Baker prepared design-build RFP performance specifications for the construction of a 150-member U.S. Army Reserve Center. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs meet the user's preference. Approximate specifications included a 30,912-square-foot, one-story training building; a 4,811-square-foot, one-story OMS; a 913-square-foot, one-story unheated storage building; 1,150 square yards of paved parking for military equipment; and parking for 141 privately owned vehicles. Michael Baker participated in a kickoff meeting, a design charrette, and design review meetings to explore the range of user needs and preferences. Through an iterative and collaborative process, Michael Baker identified the general design features for desired building functionality to achieve mission goals. Meeting the client's extremely tight deadline constraints for project bidding was critically important. Through careful planning and the strategic execution of tasks, Michael Baker delivered the project on budget and ahead of schedule.

As envisioned, the project exceeds ASHRAE 90.1 2004 performance criteria by 30 percent. Michael Baker's conceptual designs included several provisions to satisfy the user's preference for sustainability, including a ground-mounted solar photovoltaic array and inverter system to provide electrical energy to offset up to 7.5 percent of the U.S. Army Reserve Center annual energy consumption, including site lighting; and ground-source heat pump systems for the Training Building and organizational maintenance shop. Conceptual designs also included solar hot water preheating to supply at least 30 percent of building domestic hot water and an interior lighting system utilizing LED light fixtures. Also, Michael Baker proposed various betterments that will yield an energy savings of 40 percent beyond the ASHRAE 90.1 2004 baseline figures. Michael Baker modified the conceptual designs based on user responses and ensured that the final RFP specifications package clearly conveyed the information necessary to design and construct the project, including structural and system functional requirements, user preferences, user concerns, and special considerations.

Equipment Concentration Site Design-Build RFP Document Development, U.S. Army Reserve Center, Lakehurst, New Jersey. Michael Baker prepared the design-build RFP performance specifications for an approximately 88,000-square-foot equipment concentration site, including vehicle maintenance and warehouse facilities. Buildings and features, with approximate sizes, include a 33,000-square-foot vehicle maintenance facility, based on a standard medium tactical equipment maintenance facility, a 55,000-square-foot general purpose warehouse, and 152,850 square yards of parking for military equipment and privately owned vehicles. Michael Baker developed conceptual designs that meet the user's preference for the buildings and the site to achieve LEED® Silver certification.

Michael Baker proposed various improvements that will yield an energy savings of at least 30 percent below the ASHRAE 90.1 2004 baseline figures. These included specifications for recommended Vehicle Maintenance Facility and warehouse betterments to reduce energy consumption, including improved R-value insulation for the roof, walls, and overhead doors; improved U-value high-performance windows for both buildings to enhance thermal performance; and a lighter reflective floor surface in the Vehicle Maintenance Facility work bays to promote light reflectivity. Michael Baker modified the conceptual designs based on user responses and ensured that the final RFP specifications package clearly conveyed the information necessary to design and construct the project, including structural and system functional requirements, user preferences, user concerns, and special considerations.

U.S. Army Reserve Center Design-Build RFP Document Development, Fort AP Hill, Caroline County, Virginia. Michael Baker prepared design-build RFP performance specifications for the construction of a 200-member U.S. Army Reserve Center at Fort AP Hill. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs meet the user's preference and include an approximately 33,170-square-foot, two-story training building; an approximately 7,526-square-foot, one-story OMS; an approximately 1,065-square-foot, one-story unheated storage building; and paved parking for military equipment and privately owned vehicles.

As envisioned, the project exceeds ASHRAE 90.1 2004 performance criteria by 30 percent, with proposed improvements that include specifications for recommended training building and organizational maintenance shop betterments to reduce energy consumption, including improved R-value insulation for the training building and organizational maintenance shop roof and walls and organizational maintenance shop overhead doors; improved U-value high-performance windows for both buildings to enhance thermal performance; and a user-preferred white reflective floor surface in organizational maintenance shop bays to promote light reflectivity. Also, Michael Baker proposed achievement of LEED® Gold certification as an optional betterment for the general contractor. Michael Baker modified the conceptual designs based on user responses and ensured that the final RFP specifications package clearly conveyed the information necessary to design and construct the project, including structural and system functional requirements, user preferences, user concerns, and special considerations.

U.S. Army Reserve Center Design-Build RFP Document Development, Chester, Pennsylvania. Michael Baker prepared design-build RFP performance specifications for the construction of a 200-member U.S. Army Reserve Center at the client's Newton Square site. Michael Baker developed conceptual-level architectural and engineering drawings to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs meet the user's preference and include an approximately 35,758-square-foot, two-story training building; an approximately 24,464-square-foot, one-story organizational maintenance shop; an approximately 1,823-square-foot, one-story unheated storage building; and approximately 4,980 square yards of paved parking for military equipment and parking for 14 privately owned vehicles.

As envisioned, the project exceeds ASHRAE 90.1 2007 performance criteria by 40 percent. Michael Baker's conceptual designs included several provisions to satisfy the user's preference for sustainability, including a ground-mounted solar photovoltaic array and inverter system to provide electrical energy to offset up to 7.5 percent of the U.S. Army Reserve Center annual energy consumption, including site lighting; and a ground-source heat pump system for the Training Building. Conceptual designs also included an interior lighting system utilizing LED light fixtures. Also, Michael Baker proposed achievement of LEED® Gold certification as an optional betterment for the general contractor. Michael Baker modified the conceptual designs based on user responses and ensured that the final RFP specifications package clearly conveyed the information necessary to design and construct the project.

U.S. Army Reserve Center Design-Build RFP Document Development, City of Bedford, Virginia. Michael Baker prepared design-build RFP performance specifications for the construction of a 400-member U.S. Army Reserve Center along U.S. Route 460 in Bedford County. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs meet the user's preference and include an approximately 43,096-square-foot, two-story training building; an approximately 7,912-square-foot, one-story organizational maintenance shop; a one-story,

approximately 2,565-square-foot unheated storage building; and paved parking for military equipment and privately owned vehicles.

As envisioned, the project exceeds ASHRAE 90.1 2004 performance criteria by 40 percent. Michael Baker's conceptual designs included several provisions to satisfy the user's preference for sustainability, including a ground-mounted solar photovoltaic array and inverter system to provide electrical energy to offset up to 12.5 percent of the U.S. Army Reserve Center annual energy consumption, including site lighting; and a system for harvesting rainwater from the organizational maintenance shop roof and distributing it to the wash rack. The proposed rainwater harvesting system will incorporate a 5,000-gallon underground collection tank that is anticipated to be refilled every 10 days based on the area's average rainfall numbers. Michael Baker also proposed various improvements that will yield an energy savings of 50 percent beyond the ASHRAE 90.1 2004 baseline figures. Also, Michael Baker proposed achievement of LEED® Gold certification as an optional betterment for the general contractor. Michael Baker modified the conceptual designs based on user responses and ensured that the final RFP specifications package clearly conveyed the information necessary to design and construct the project.

Design of Central Issue Facility

Fort McCoy, Wisconsin

Michael Baker was the designer of record for the design-bid-build delivery of an approximately 62,553-square-foot, large-sized central issue facility (CIF). The project included ancillary site improvements and demolition design for five buildings.

Under the client's facility standardization program, CIFs are similar in configuration to general purpose warehouses, with administrative, customer service, and warehouse modules, and are used for the centralized issue, return, and exchange of serviceable and nonserviceable soldier equipment, such as helmets, boots, and body armor. CIF operations include management of standard-issue and special items, bulk resupply, shipping and receiving, and storage. The new building provides additional space to meet escalating service demands, while optimizing personnel equipment and materials tracking, distribution, storage, and transfer processes. Michael Baker provided design services for the facility under an indefinite quantity-indefinite delivery engineering agreement.

The new CIF includes a queuing-orientation area with a check-in desk, equipment issue and turn-in stations, fitting booths, a final processing area, an assembly waiting area, offices, a multipurpose room, a locker room, a staff break room, a secure storage area, an equipment room, a 4,000-square-foot conditioned storage area, a 23,000-square-foot warehouse storage area with racks, combined eye wash-shower stations in the forklift charging area, repair and classification areas, information technology rooms, a mechanical systems room, a mechanical equipment mezzanine, restrooms, and a janitorial closet. Two overhead doors with adjustable docks and two at-grade overhead doors are installed in the centralized shipping-receiving area of the structure.

Ancillary work involved installing a seven-foot-high, chain-link security perimeter fence and constructing a parking lot for privately owned vehicles (POV). The POV parking lot includes spaces for base personnel and visitor vehicles, buses, handicapped vehicles, high-occupancy vehicles, and low-emission vehicles.

Client

U.S. Army Corps of Engineers,
Louisville District
Room 972
600 Dr. Martin Luther King, Jr. Place
P.O. Box 59
Louisville, Kentucky 40202

Completion Date

2015

Michael Baker's Role

- Planning
- Sustainable design
- Site development
- Hazardous waste investigation
- Civil engineering
- Geotechnical engineering
- Architecture
- Interior design-space planning
- Structural engineering
- Mechanical engineering
- Plumbing design
- Fire protection engineering
- Electrical engineering
- Communications design

Extensive site civil engineering was required. Site work involved the demolition of five buildings that made up the old CIF. New site preparation included the routing of multiple utility lines, including a sanitary sewer line, gas main, and water main; installation of new site utilities and new connections; grading of the property; installation of storm water management systems; and protection of wetlands and cultural resource finds.

Michael Baker designed the CIF to meet LEED® Silver certification, and the certification was issued August 10, 2015. Michael Baker's comprehensive services ranged from site and civil engineering to building architecture and facility engineering, including structural, mechanical, plumbing, fire protection, and electrical and telecommunications systems design, and LEED® certification administration. Charrette participation was critically important to project development. Michael Baker convened a design charrette and collaborated with the client in identifying needs and preferences and preferred design alternatives. In addition, Michael Baker held a special energy charrette to target materials and approaches to promote sustainability and conserve energy, with the goal to exceed ASHRAE 90.1-2007 performance criteria by 40 percent.

Overall Building Construction

The building is of permanent construction, with a reinforced concrete foundation and concrete floor slabs; structural steel frame; masonry veneer walls; mechanical, electrical, and information systems; interior finishes; window systems; a standing-seam metal roof; and exterior finishes consisting of insulated concrete and metal panels. Work included HVAC, plumbing, mechanical, security, electrical and telecommunication system design.

Because of their superior thermal efficiency, insulated overhead sectional doors were installed at all loading docks instead of overhead coiling doors.

The project also involved utility and storm drainage connections, communications, electrical connections, HVAC, fire protection, fire alarm and mass notification systems, force protection measures, grading, concrete paving, exterior lighting, and other site improvements.

Exterior Systems

Exterior Building Envelope

The exterior building envelope is a durable, high-performance system consisting of precast concrete insulated wall panels with a full height of approximately 39 feet, including a parapet above the low-slope roof. Durable materials were used for both interior and exterior wall sides, as both sides are exposed to truck, container, and forklift traffic. The upper portion of the walls incorporate clerestory windows to maximize daylight within the warehouse area. The clerestory windows incorporate a translucent insulated fiberglass panel system to maximize thermal performance, while allowing daylighting of the space. The R values for the walls, foundation walls, floor slab, and roof meet or exceed ASHRAE 90.1-2007 and ASHRAE 189.1-2009 energy usage requirements and the project energy reduction goals.

The roof assembly is a low-slope 3:12 standing-seam roof. Michael Baker's design team minimized the number of roof penetrations for mechanical, plumbing, and electrical systems.

External rainwater conductors mounted to the exterior of the building provide roof drainage. Exterior rainwater conductors collect water from through-wall scuppers penetrating the parapet surrounding the roof and conduct the water via open-faced rainwater downspouts to undergrounded piping. The underground piping discharges at grade to a collection inlet of the overall storm sewer system, and flow is conveyed to the open basin at the north end of the site with the rest of the site storm water.

Structural System

The building consists of exterior load-bearing precast walls and interior structural steel framing. Roof framing consists of open-web steel joist framing spaced at approximately five feet, spanning between the exterior walls to interior steel framing. This framing system supports a structural metal deck overlaid by an insulated, modified bitumen roofing system. Rust-inhibiting primers and paint, in accordance with UFC guidelines and architectural requirements, protect structural steel.

Insulation

Insulation was designed to comply with Energy Policy Act of 2005 requirements. Roof insulation consists of four inches of rigid polyisocyanurate insulation with an effective R-value of 30 placed entirely above the metal roof deck. This exceeds the ASHRAE 90.1-2007 R-20 requirement for continuous insulation installed above deck.

The exterior wall construction consists of a 12-inch precast concrete wall panel with two inches of continuous polyisocyanurate insulation, which provides an R value of 15 and exceeds the ASHRAE 90.1 requirement of R-13.3 continuous insulation for a "mass" wall. In addition, the precast panels have foam cores to save weight and concrete, and the cores increase the effective overall R value of the walls to 24.

Wind and Seismic Provisions

The building frame provides the necessary mechanism to transfer lateral loads from wind and seismic forces to the foundation system. In addition, Michael Baker designed the concrete floor slab on grade to support additional loading from forklift traffic.

Interior Finishes and Systems

Michael Baker's design intent was to develop a durable, maintainable, aesthetically pleasing building with clean lines and simple massing that addresses requisite user functional requirements. Interior finishes are a rust color, in keeping with client guidelines.

Administrative area walls of gypsum wallboard construction that are exposed to forklift traffic are protected with bollards to prevent damage. The wall separating the administrative and support areas from the work and storage bays require a three-hour fire rating. The majority of interior wall construction in the facility's administrative support areas are painted gypsum board on metal framing.

Heating, Ventilating, and Air Conditioning

To determine the optimal HVAC system for the CIF, Michael Baker conducted an energy analysis in compliance with ASHRAE 90.1-2007. The analysis demonstrated that the proposed building design would achieve an energy usage savings of 42 percent, exceeding the project's 40-percent energy usage savings criterion.

The HVAC system includes an array of design solutions to serve a variety of spaces and building functions.

The high-bay warehouse-storage and conditioned storage areas are heated to maintain a minimum temperature of 70 degrees Fahrenheit in the winter. The high-bay warehouse -storage area was provided with 4,000 cubic feet per minute of ventilation air, which provides sufficient ventilation air for the battery-charging stations and exceeds the ASHRAE 62.1 ventilation rates for shipping and receiving ventilation rates for work bay occupants. An in-floor radiant heating system is the main heating source for the warehouse. The in-floor radiant hot-water system is served by a hot-water boiler located in the main mechanical room. The design included a primary-secondary pumping system in the warehouse area. Ventilation air is heated to 68 degrees Fahrenheit via a 100-percent outdoor air heating and ventilating unit located on the mechanical mezzanine. Supply grilles are located in the center of the work bay-storage area. Exhaust grilles are located at the end of the building to ensure air distribution. Exhaust ducts are located near the forklift battery-charging stations, with high and low grilles, to ensure adequate ventilation for battery chargers. Michael Baker provided an energy recovery module to recover energy from the exhaust air stream and preheat outdoor air. Exhaust fans and interlocked intake louvers are employed to provide ventilation cooling for these areas in the summer to limit interior temperatures to 10 degrees Fahrenheit above ambient temperature.

Administrative and support areas are heated and cooled by a warm-air furnace with a split DX cooling system. Ventilation is provided in accordance with ASHRAE 62.1 requirements.

Telecommunications equipment room spaces are provided with dedicated mini-split ceiling- or wall-mounted, cassette-type air conditioning equipment with remote condensing units. Cooling is provided for two racks.

Mechanical and electrical rooms are provided with ventilation cooling to limit summer temperatures to 10 degrees Fahrenheit above ambient temperature. Unit heaters are provided for these spaces.

The facility design included a direct digital-control automatic temperature control system to regulate and monitor all building HVAC systems. To meet antiterrorism and force protection requirements, an emergency shutdown pull-switch is provided to disable all of the HVAC air distribution systems, in accordance with UFC-4-010, Appendix B-4.3.

Electrical Distribution System

Electrical distribution includes power, lighting, fire alarm and mass notification, structured cabling raceway, public address, cable television distribution, telecommunications, and security systems. The main switchboard, distribution panel boards, and lighting and appliance panel boards were selected for high reliability, low maintenance, efficiency, and maximum flexibility. Step-down transformers were selected for low-energy loss and short-term overload capability.

Energy conservation was Michael Baker's design priority for interior and exterior building lighting. Dual interior lighting designs were provided. One alternative incorporated low-maintenance fluorescent fixtures with energy-efficient electronic ballasts and T8 lamps. Michael Baker also designed an independent bid option for energy-efficient, long-life LED fixtures.

Interior systems include occupancy sensors to turn off lights and conserve energy in office areas, corridors, and restrooms. Exterior lighting includes building-mounted security lighting with energy-efficient, long-life LED lamp sources. The hardstand surrounding the CIF includes pole-mounted security lighting.

Michael Baker also designed a complete building lightning protection system with UL master labeling for the CIF. The system consists of air terminals located at the roofline with grounding cables and down-conductors and a ground loop buried below grade and routed along the building exterior and ground rods spaced at approximately 60-foot intervals. Building grounding is accomplished by an underground perimeter grounding loop, with bonding of the lightning protection system, metal underground utilities, building steel, and additional code-required items with a single neutral-ground connection point at the main panel board grounding bus bar.

Plumbing and Fire Protection

Domestic hot water is produced by a single electric water heater to reduce maintenance. Hot water is stored at 140 degrees Fahrenheit and reduced to a minimum of 120 degrees Fahrenheit through a mixing valve before being distributed throughout the building.

To fully protect the facility in the event of fire, an automatic dry-pipe sprinkler system with a diesel-driven fire pump was installed in accordance with UFC 3-600-01, NFPA 13 and International Building Code 2006. In addition, Michael Baker designed a fully addressable, intelligent fire alarm and mass notification system to serve the entire facility. The annunciated system was configured for manual, as well as automatic, operation and electronic supervision. The signaling, initiating, and notification circuits is served by a Class A looped system. Fire alarm circuit wiring was installed in conduit.

Antiterrorism and Force Protection Measures

Michael Baker integrated protective measures into the project design that meet antiterrorism and force protection requirements. These include siting of the building to meet setback requirements, the use of blast-resistant doors and windows, and the incorporation of an emergency shutdown switch to disable all HVAC air distribution systems, as previously described.

Energy Charrette and Sustainable Design

The energy charrette was a key part of project development. The overall goal was to reduce building energy consumption by 40 percent, with an option to reduce it by 50 percent.

Michael Baker and its team identified potential initiatives and processes to promote energy efficiency, minimize environmental effects, and reduce immediate and long-term operating costs. Energy charrette participants evaluated solar, wind-powered, and passive energy sources, along with geothermal heating and cooling. Building and architectural elements were also considered. These included structure siting and physical orientation, internal layout, R-value enhancements, air barrier construction, low-emissivity windows, white membrane roofs, solar tubes and skylights, high-efficiency HVAC systems, gray water usage, and dedicated outside air systems for ventilation with heat recovery.

Building design and construction incorporated materials and approaches to achieve sustainability goals. Materials that were locally available and products with 20-percent recyclable content were used. Occupancy sensors reduce lighting energy

consumption. Water-saving features, such as low-flow plumbing fixtures to reduce water consumption, were provided. Ozone-friendly refrigerants and refrigerant quantities minimize ozone depletion. Because a site irrigation system was not required, potable water consumption for landscaping was reduced by 100 percent.

Michael Baker provided the space and pathway for future installation of a roof-mounted solar photovoltaic array and inverter system that will provide electrical energy to supplement utility provider-supplied electricity. The solar panels will offset the annual energy consumed by the new exterior lighting. The elimination of exterior light pollution was extremely important for this project. Michael Baker designed the perimeter security lighting to minimize light pollution.

Michael Baker prepared specifications for the site storm water management plan according to best management practices to ensure that post-development peak discharge rates and volumes are below the limits identified in current state of Wisconsin guidelines for the 100-year, 24-hour storm. The plan satisfied UFC 3-210-10 by reducing the percentage of impervious cover, providing devices for capturing and treating the runoff anticipated from 90 percent of the area's average annual rainfall, and promoting storm water infiltration through the use of low-impact design infiltration trench techniques.

Landscaping includes native, low-maintenance, drought-tolerant plants and preserves existing trees. The landscaping design minimizes the use of potable water.

Michael Baker specified the use of measures during construction to prevent soil loss, sedimentation, and air pollution. In addition, construction waste was diverted from landfills to meet LEED® requirements.

Systems Integration Maintenance Office

Fort Campbell, Kentucky

Michael Baker was the designer of record for a 48,400-square-foot Systems Integration Maintenance Office (SIMO) facility. The facility includes administrative space (private offices and open office space); classrooms; conference rooms; laboratory spaces; storage spaces; metal fabrication shop; computer labs; flight lockers; showers and restrooms; mechanical, electrical and communication rooms; intrusion detection; surveillance; and electronic access control. Spaces support SIMO flight operations, mission planning, and pilot flight planning. This project complied with UFC 4-010-01 DoD Anti-Terrorism Force Protection requirements and per unified facilities criteria and Mission Planning spaces complied with ICS 705-1, 705- 2, and TER room were designed to comply with AR 380-5 requirements. Site design included parking, stormwater management/bio-retention, landscaping and site utilities. The project is designed to achieve a LEED Silver Certification.

Client

U.S. Army Corps of Engineers,
Louisville District
Room 972
600 Dr. Martin Luther King, Jr. Place
P.O. Box 59
Louisville, Kentucky 40202

Completion Date

Estimated: 2017

Project Costs

$15,137,841 (Construction)

Design of New Six-Unit Reserve Center

Forks Township, Pennsylvania

Michael Baker provided design-bid-build documents for a 200-member, six-unit, 48,881-square-foot U.S. Army Reserve project.

As directed under the BRAC 2005 initiative, the Wilson-Kramer U.S. Army Reserve Center (USARC) in Bethlehem, PA was closed, and the six Reserve Units relocated into a new 200-member facility that provides adequate training space to complete unit's mission.

The new 7.85-acre site was developed to include three structures (totaling 48,881 square feet), including a two-story USARC Readiness Training Center (RC) (42,043 square feet), an Organizational Maintenance Shop (OMS) (5,480 square feet), and an Unheated Storage (UHS) facility (1,358 square feet). The RC offers administrative, educational, assembly, library, learning center, vault, weapons simulator, and physical fitness areas for the six consolidated Army Reserve units. The OMS provides work bays and maintenance administrative support. A UHS and adequate organizational parking spaces for all military and privately-owned vehicles were also provided.

The Readiness Training Center contains a 1,600-square-foot fitness center outfitted with a full complement of various athletic equipment including treadmills, exercise bikes, steppers, nautilus machines, and free weights. Much of the equipment provided is human-powered, thereby reducing energy costs and eliminating any outside power requirements. The designs employ sound-absorbing building materials throughout and soft, absorbent flooring, which reduces user fatigue and protects floor substrates. To enhance the user's experience, cable television is provided as well as appropriate lighting and outside views. Supporting men's and women's showers and locker rooms are also included.

Buildings are of permanent construction with HVAC, plumbing, mechanical, security, and electrical systems. The structures are in compliance with ADA requirements for accessibility by the disabled. Supporting facilities included land clearing, paving, fencing, general site improvements, and extension of utilities to serve the project. Anti-terrorism and force protection measures included maximum standoff distances from roads, parking areas, and vehicle unloading areas. Berms, heavy landscaping, and bollards were used to prevent access when standoff distances could not be maintained. Sustainable Design and Development (SDD) and Energy Policy Act of 2005 (EPAct05) features were provided to meet the Silver level of LEED®.

Client

U.S. Army Corps of Engineers,
Louisville District
Room 972
600 Dr. Martin Luther King, Jr. Place
P.O. Box 59
Louisville, Kentucky 40202

Completion Date

2013

Project Costs

$15,000,000 (Construction)

Michael Baker's Role

- Design charrette
- Value engineering
- Sustainable design
- Site/civil engineering
- Anti-terrorism and force protection
- Demolition design
- Comprehensive interior design
- Structural engineering
- Mechanical engineering
- Plumbing design
- Fire protection engineering
- Electrical engineering
- Communications design
- Cost estimating
- Full design-bid-build documents

Michael Baker conducted a design charrette, developed the conceptual design, performed value engineering, and provided the client with a design-bid-build package.

During the course of the construction of the foundations for this project, a severe and exceptional rain event occurred over a weekend while workers were off site. The job site received 7 inches of rain in a 36 hour period. When workers arrived back on

site on Monday morning, they discovered several enormous sinkholes where preparations were being made for spread footing foundations. Basically, there was no ground where foundations were to be placed. A review of the geoetechnical report indicated that sinkholes were not anticipated at the site.

In order to keep the project moving to meet original deadlines, Michael Baker immediately sent geotechnical engineers out to the site to assess the situation, hired a geophysical survey company to determine the extent of sinkhole damage across the site, hired a drilling company to perform additional soil borings to investigate greater depths than could be examined by geophysical survey equipment, and developed a repair method to fill the sinkhole.

All of the above was accomplished in only a 20 calendar day period. Complete foundation re-designs to address the new conditions at the site was accomplished in three weeks thereafter, allowing for remediation work to begin as soon as possible. Michael Baker also provided a geotechnical engineer, highly experienced with sinkhole issues, to monitor the on-site remediation work to confirm that all work adhered to the plan.

This sinkhole incident was later determined to be a changed condition in the field. However, Michael Baker performed all of the above work prior to the determination of cause or responsibility in order to keep the project moving along as quickly as possible.

Coonskin Park Maintenance Facility

Kanawha County, WV

Baker provided general Architectural and Engineering services to the West Virginia Army National Guard on behalf of the Kanawha County Parks and Recreation Commission at Coonskin Park in Charleston. The new maintenance and storage facility was built to relocate exiting maintenance and storage services interrupted by the new bridge and entrance to Coonskin Park.

The West Virginia Army National Guard selected Baker to provide complete design and construction administration services. The project included the design of a pre-engineered metal building and the corresponding utility infrastructure. It was sited on the available property to allowing for future expansion. The site is approximately 3.5 acres. The facility has approximately 6,000 square feet of which 4,500 square feet house maintenance garage functions for the park. The remaining 1,500 square feet is dedicated to future locker/shower rooms for the adjacent soccer field. The garage has four automatic garage doors, two with drive-through capabilities. A restroom is included on the maintenance side, with roughed-in plumbing for the future shower/locker rooms.

This facility is the temporary home for park equipment and maintenance staff until the new park access bridge, entrance and new park maintenance complex is completed. The building is then planned to become part of the soccer complex.

Client

West Virginia Army National Guard
Construction and Facilities Maintenance Office
1707 Coonskin Drive
Charleston, WV 25311

LTC David P. Shafer
Construction and Facilities Management Office

Todd Reynolds, Project Manager

Completion Date

October 2014

Baker's Role

- Architecture
- Civil Engineering
- Mechanical Engineering
- Electrical Engineering
- Landscape architecture
- Structural Engineering
- Bid Phase Services

WVANG & WVARNG
Access Control Facility
Charleston, West Virginia

Michael Baker was retained to provide planning assistance and design for the development of a new Access Control Point for the West Virginia National Guard Headquarters. The plan was to relocate the existing two lane road (County Route 51/2, "Coonskin Drive") and construct a new entry control facility including a gatehouse, ID check station and truck inspection area. Michael Baker presented three concepts to the ANG, which selected Option B. This option included a wide sweeping curved roadway and positioned the checkpoint on the elevated portion of the site.

The project utilized conventional design and construction methods to accommodate the mission of the facility. Formal LEED accreditation was not desired; however, various LEED-like components were incorporated into the design of the facility to provide a minimum of 10 LEED points. The Access Control Facility was designed as permanent construction in accordance with DoD Form 1391s, ANGETL 15, the DoD Unified Facilities Criteria (UFC) 1-200-01, General Building Requirements and UFC 1-200-02, High Performance and Sustainable Building Requirements. The facility is also compliant with applicable DoD, Air Force, and base design standards. In addition, local materials and construction techniques were used, where possible, that where cost effective.

Client

West Virginia Air National Guard
130th Civil Engineer Squadron
1679 Coonskin Drive
Charleston, WV 25311

Captain Harry Netzer, P.E.
Deputy Base Civil Engineer
304-341-6649

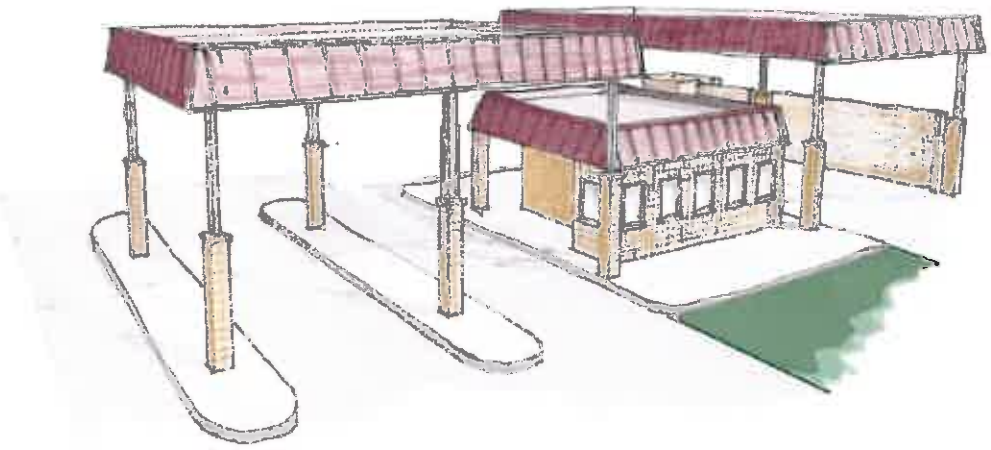
Contract Completion Date

May 2017

Baker's Role

- Architecture
- Civil engineering
- Landscape Architecture
- Mechanical Engineering
- Electrical Engineering
- Structural engineering
- Cost Estimates
- Construction Administration

This project was designed to comply with DoD Antiterrorism/Force Protection (AT/FP) requirements per unified facilities criteria. The project was also designed to meet the communication requirements of ANG base Command and Control, AT/FP and UFC.



Relocation & Improvements to the Front Gate, Entrance, Perimeter Fence, Signage and Guard Station

U.S. Coast Guard (USCG) Training Center, Cape May, New Jersey

Baker provided architectural and engineering services for the relocation of, and improvements to, the front gate and fence, entrance sign, guard shack, and amenities at the U.S. Coast Guard Training Center. The purpose of the project was to achieve current mission and security objectives. Baker's services included: site/civil engineering, geotechnical engineering, architecture, structural engineering, mechanical engineering, plumbing design, fire protection engineering, electrical engineering, and cost estimating. Baker prepared three conceptual designs for the client's review, and then prepared 35% and 95% specifications, drawings and cost estimates for the selected alternative.

The design goal was to improve the appearance of the facility at the front gate and took into consideration access control systems, gates and barriers, perimeter fencing, vehicle arresting systems, and a security management system. The final design included: guard station, vehicle inspection area, artifact displays, signage, lighting, seating, landscaping based on indigenous planting, fences, gate, bus shelters, street furniture, trash collection enclosures, parking, and a turnaround for large tractor trailers, enhanced antiterrorism and force protection measures, and ADA compliance.

Client

U.S. Coast Guard, CEU
Cleveland, Ohio

James Dinda
(216) 902-6223

Completion Date

2008

Project Costs

$3,200,000 (Construction)

Baker's Role

- Project Administration
- Planning
- Concept Development
- Civil Design
- Subsurface Investigation
- Architectural Design
- MEP Engineering
- Structural Design
- Fire Protection Design
- Cost Estimating

130th Airlift Wing WVANG Aircraft Parking Apron Lighting

Charleston, West Virginia

Under a state-wide Open End A/E Agreement, Michael Baker prepared design documents for the installation of aircraft parking apron safety and security lighting. Three light level settings were used: High Level, Low Level, and Perimeter Level. These levels were achieved by the use of a wireless control system. Each individual luminaire is controlled independently or in groups in order to meet the required levels. Low maintenance poles with mechanical lowering devices were used that allow the capability to replace bulbs/fixtures without the need for a bucket-truck. Medium voltage power (208V) for the new apron luminaires and associated equipment is routed from existing building panelboards. This minimized the amount of trenching required through existing pavement by making use of the grassed areas for conduit and duct bank runs. Additionally, this provided for the use of off peak power use without adding new service drops or transformers.

Client

West Virginia Air National Guard
130th Civil Engineer Squadron
1679 Coonskin Drive
Charleston, WV 25311

Captain Harry Netzer, P.E.
Deputy Base Civil Engineer
304-341-6649

Contract Completion Date

August 2013

Baker's Role

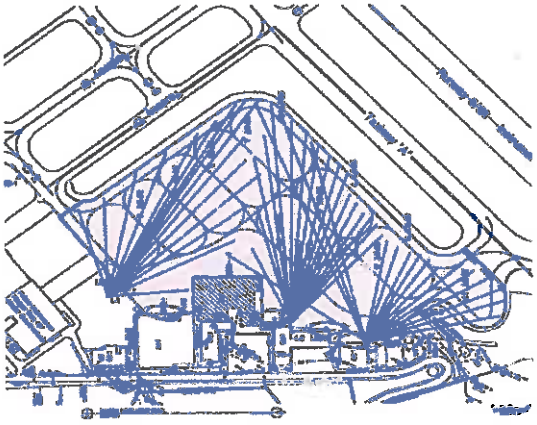
- Planning
- Surveying
- Civil engineering
- Electrical Engineering
- Structural engineering
- Cost Estimating
- Construction Administration

Lighting:

The luminaires were designed to be installed with louvers to mitigate glare, and light spill 90° above nadir. Luminaires utilize 1000W metal halide type lamps, to provide improved color rendering and higher correlated color temperatures. All pole-mounted luminaires are directly mounted to a "sports cage." Three poles are strategically located around the perimeter of the apron, as to not impede apron operations. These hot-dipped, unpainted, galvanized round tapered steel poles ranging from 60 to 70 feet in height have obstruction lights included on the top each pole. All poles will be installed with a lowering device to facilitate easy and efficient maintenance of the installed equipment. A lighting control panel with photocell and manual controls will be provided.

Lighting Controls:

This project's Lighting Control System monitors and controls the apron lighting levels as indicated. The system consists of a series of photocontrols (Nodes) wirelessly communicating with each other and a Gateway which in turn communicates over the facilities Ethernet LAN with a single PC Server. The PC server also includes a database of control operational data and serves up predesigned WEB pages to authorized (password protected) users around the facility. These WEB pages allow authorized users to display operational data and interface with individual luminaires via a control network. The system is not connected to outside internet systems. This system provides accurate on-screen information and control of each luminaire without the expense of running separate circuits for each level of light. Any pole, individual luminaire or group of luminaries can be activated. The service life of each of these fixtures is identical.



WVARNG
Coonskin Complex Perimeter Fence
Charleston, West Virginia

Client

West Virginia Army National Guard
Construction and Facilities
Maintenance Office
1707 Coonskin Drive
Charleston, WV 25311

Mr. Jim Skaggs
Technical Analyst
304-561-6550

Contract Completion Date

April 2016

Baker's Role

- Surveying
- Civil engineering
- Electrical Engineering
- Structural engineering
- Cost Estimates
- Construction Administration

Michael Baker was retained by the West Virginia Army National Guard for the planning and design of a perimeter security fence for the Headquarters Complex located along Coonskin Drive in Charleston. The project was to coincide with the new Access Control Facility and the new Coonskin Park Bridge with the goal of securing the entire Joint-Use National Guard Base.

The project provides a barrier (emergency use only) to what was formerly the primary entrance to Coonskin Park. The new entrance to the park is provided by the bridge over the Elk River. At the completion of the project, the only access to the base is from the control facility on County Route 51/2, known as "Coonskin Drive" and from the flight line of the 130th Airlift Wing WVANG at Yeager Airport.

The Perimeter Fencing layout was developed in accordance with DD Form 1391s, DoD Unified Facilities Criteria (UFC) 4-020-01, Security Engineering Facilities Planning Manual, DoD 0-2000.12H, Antiterrorism Handbook, and AR 190-13, The Army Physical Security Program. Once the conceptual layout was approved, Michael Baker prepared the design, specification and material selection in accordance with UFGS 32 31 13.53, High-Security Chain Link Fences and Gates, and ASTM F2611 and F1712 for fabric, post, framework, etc.). This project was designed to comply with DoD ATFP (antiterrorism/force protection) requirements per unified facilities criteria and included security cable at all critical threat sections along the roadway.

Appendix 3- References

Several of the Project Profiles found in Appendix 2 lists Michael Baker's client and contact information for your use as a reference. Additionally, we offer the following diverse list of past or current clients and contact information:

- **130th Airlift Wing West Virginia Air National Guard**

1679 Coonskin Drive, Unit 18
Charleston, WV 25311-5005
Captain Harry Netzer, P.E., Deputy Base Civil Engineer
(304) 341-6649

- **West Virginia State University**

P.O. Box 1000
Institute, WV 25112-1000
Mr. Marvin Smith, Facilities Director
(304) 550-2839

- **West Virginia Department of Transportation – Division of Highways**

1900 Kanawha Boulevard East,
Building 5, Room A-450
Charleston, WV 25305
Mr. C. Elwood Penn, IV, P.E., Acting Director, Planning Division
(304) 558-9618

- **WVU Tech- Beckley**

410 Neville Street
Beckley, WV 25801
Mr. Robert Moyer, Regional Director of Facilities and Planning
(304) 929-0325

- **City of Nitro**

2009 20th Street
Nitro, WV 25143
Honorable David Casebolt, Mayor
(304) 419-3322

- **City of Winfield**

1 Main Street
Winfield, WV 25213
Honorable Randy Barrett, Mayor
(304) 586-2122

APPENDIX 4- SUBCONSULTANT INFORMATION

Company Profile

TERRACON CONSULTANTS, INC.

The Terracon is a 100 percent employee-owned consulting engineering firm providing quality services to clients. Since 1965, Terracon has evolved into a successful multidiscipline firm specializing in:

- Environmental
- Facilities
- Geotechnical
- Materials

Over its history, Terracon has achieved significant expansion through both internal growth and acquisitions. Terracon currently has more than 4,000 employees in more than 140 offices and 50 states nationwide. Additionally, we partner with our U.S. clients to serve their international needs.

The firm's success is further evidenced by a current ranking of 24 in *Engineering News-Record*'s 2018 listing of the Top 500 Design Firms, as compared to a ranking of 51 a decade ago. Terracon's growth is due to dedicated employees who are responsive to clients, provide quality services, and take advantage of opportunities in the marketplace.

Terracon provides services on thousands of projects each year. Our culture, systems, and structure enable us to excel at both small and large projects. By combining our national resources with specific local area expertise, we consistently overcome obstacles and deliver the results our clients expect.

Terracon serves a diverse portfolio of private and public clients. By being responsive, resourceful, and reliable, we strive to exceed our clients' expectations for service, solutions, quality, and speed of delivery. Based on a deep understanding of our clients' needs, Terracon's commitment is centered around these key objectives.

OFFICE LOCATIONS

Alabama
Birmingham
Huntsville
Mobile

Arizona
Avondale
Phoenix
Tucson

Arkansas
Little Rock
Rogers

California
Colton
Concord
Lodi
Oakland
Orange County
Palm Desert
Sacramento
Sonoma County
Victorville

Colorado
Colorado Springs
Denver
Fort Collins
Greeley
Longmont
Pueblo

Connecticut
Hartford

District of Columbia
Washington, D.C.

Florida
Fort Lauderdale
Jacksonville
Merritt Island
Miami
Pensacola
Port St. Lucie
Sarasota
Tallahassee
Tampa
West Palm Beach
Winter Park

Georgia
Athens
Atlanta
Atlanta North
Savannah

Idaho
Boise

Illinois
Chicago
Glendale Heights
Rockford

Indiana
Indianapolis

Iowa
Ames
Bettendorf
Cedar Falls
Cedar Rapids
Des Moines
Sioux City

Kansas
Garden City
Lenexa
Manhattan
Topeka
Wichita

Kentucky
Lexington
Louisville

Louisiana
Baton Rouge
Lake Charles
New Orleans
Shreveport

Maine
Portland

Maryland
DC Metro North

Michigan
Michiana

Minnesota
Minneapolis
White Bear Lake

Mississippi
Biloxi
Jackson

Missouri
Columbia
Joplin
Lee's Summit
Springfield
St. Louis

Montana
Billings
Great Falls

Nebraska
Lincoln
Omaha

Nevada
Las Vegas

New Hampshire
Manchester

New Jersey
South Plainfield

New Mexico
Alamogordo
Albuquerque
Gallup
Las Cruces

New York
Albany
Rochester

North Carolina
Charlotte
Greensboro
Greenville
Raleigh

North Dakota
Bismarck
Fargo
Grand Forks
Jamestown
Minot

Ohio
Cincinnati
Cleveland
Columbus
Portsmouth

Oklahoma
Oklahoma City
Tulsa

Oregon
Portland

Pennsylvania
Philadelphia Metro

South Carolina
Charleston
Columbia
Greenville/
Spartanburg
Myrtle Beach

Tennessee
Chattanooga
Memphis
Nashville

Texas
Austin
College Station
Conroe
Corpus Christi
Dallas
El Paso
Frisco
Fort Worth
Freeport
Houston
Laredo
League City
Lubbock
Lufkin
Midland

Texas (cont.)
Pharr
San Antonio
Tyler

Utah
Salt Lake City

Virginia
DC Metro West
Dulles
Woodbridge

Washington
Seattle
Tacoma

West Virginia
Charleston

Wisconsin
Milwaukee

Wyoming
Cheyenne

TERRACON SERVICES

Environmental

Negotiating the complexities of environmental issues can be challenging and time consuming. Terracon relies upon demonstrated experience and knowledge of local conditions and regulations to deliver solutions that are timely, practical and make good business sense.

- Asbestos Consulting
- Remediation Design and Implementation
- Due Diligence / Phase I ESAs
- Industrial Hygiene
- Regulatory Compliance
- Natural / Cultural Resources
- Site Investigation and Closure
- Brownfields / Site Development
- Solid Waste Planning and Design

Facilities

Facility owners, managers, and investors face many technical and financial performance challenges when it comes to achieving a maximum return on their building investments. Terracon serves as a valuable partner to restore, enhance, and increase your building performance, reducing potential risks and liabilities. Terracon's licensed architects and engineers provide the following Facilities services:

- Building Enclosure Consulting (Roofs, Walls, and Waterproofing)
- Engineering and Materials Diagnostics
- Property / Facility Condition Assessments
- Mechanical, Electrical, and Plumbing Consulting
- Aquatics Assessment and Design
- Energy / Building Performance Modeling
- Facility Asset Management Programs
- Design and Construction Administration
- Commissioning Services (BECx and Cx)
- Forensic Investigations

Geotechnical

Design and construction reliable foundations and infrastructure require a thorough understanding of soil, rock, and groundwater conditions. Through Terracon's nationwide network of geotechnical professionals, access to historical subsurface exploration data from thousands of locations across the country, and GIS-enabled geology mapping, we can accurately anticipate ground conditions and develop the right work plan to explore a site. Our innovative technologies and collaborative approach allow us to provide practical design recommendations. Terracon's Geotechnical services include:

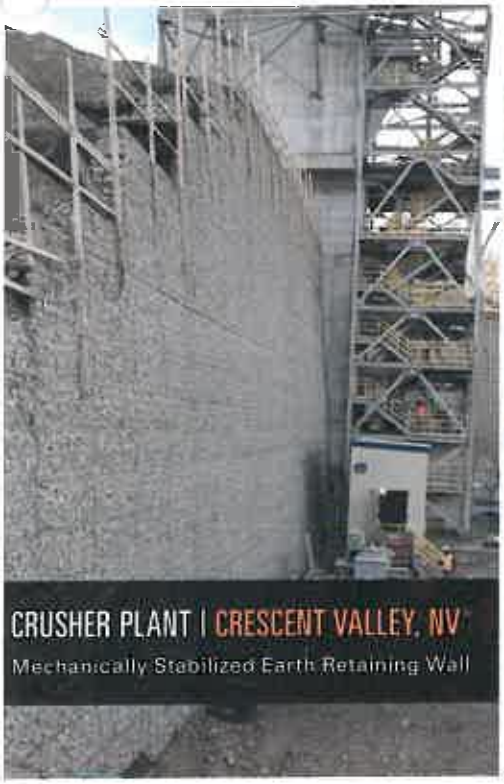
- Report of Expected Geotechnical Conditions (REGC)
- Subsurface Exploration (Soil Borings, In-Situ Testing, Geophysical)
- Laboratory Testing
- Geotechnical Design
- Collaborative Reporting / Decision Making
- Geotechnical Instrumentation
- Construction Monitoring and Support

Materials

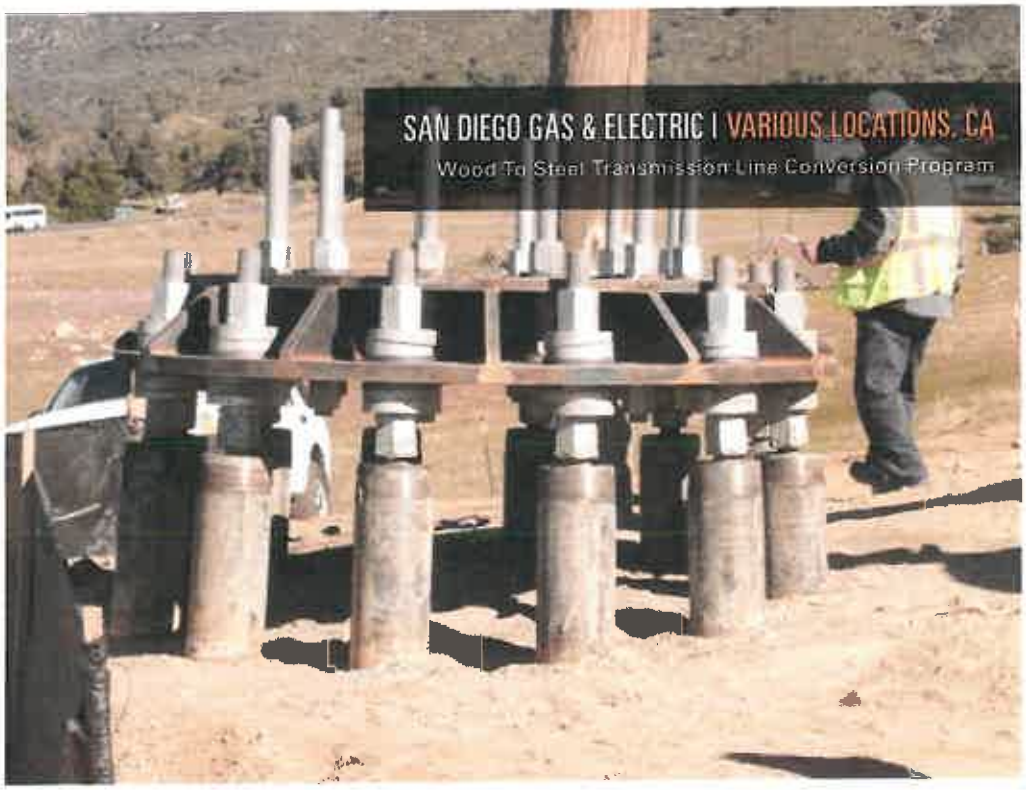
Proper selection, quality, workmanship, and performance of construction materials plays a vital role in ensuring that today's buildings and infrastructure perform adequately over long time periods. We work with clients to minimize material replacements, reduce the likelihood of deterioration, avoid potential failures, and investigate and evaluate construction materials related problems and failures when they do occur.

- Construction Quality Assurance / Quality Control
- Construction / Special Inspection
- Materials Engineering
- Field and Laboratory Testing and Analysis
- Construction Observation and Monitoring
- Pavement Consulting and Engineering
- Structural Steel and Nondestructive Testing

GEOTECHNICAL SERVICES | Geodesign



CRUSHER PLANT | CRESCENT VALLEY, NV
Mechanically Stabilized Earth Retaining Wall



SAN DIEGO GAS & ELECTRIC | VARIOUS LOCATIONS, CA
Wood To Steel Transmission Line Conversion Program

hy Geodesign?

Whether a project needs excavation support to allow underground development, retaining walls to facilitate development of sloping sites, ground improvement systems to provide foundation support over soft soils, or micropiles to support heavy loads in confined areas, Terracon can design a solution to fit your needs.

Construction below ground surface entails special challenges. Temporary earth retention systems must be properly designed to protect construction personnel; support adjacent buildings, streets, and utilities; and be minimally intrusive to avoid interfering with new construction. Retaining walls and slope reinforcement are often needed to facilitate steeply sloping site development.

When these challenges are not dealt with properly, site development and construction projects can become prohibitively expensive. Failure of earth retention systems can cause delays, crease project costs, and in the worst cases, result in injuries or deaths during or

You need cost-effective solutions for site development and construction projects. Geodesign combines traditional geotechnical knowledge with a deep understanding of structural issues and available geotechnologies.

Experience and Expertise

Terracon has completed thousands of Geodesign projects over five decades. Our depth and breadth of experience, advanced computer software and modeling capabilities, and computer-aided drafting and design capabilities are key elements to consider when tackling a project--no matter how difficult.

Terracon's national network of more than 140 offices provides unparalleled knowledge of local soil, rock, and groundwater conditions. Our Geodesign professionals combine local insight with advanced analysis tools to develop and optimize site-specific designs.

Our professionals deliver responsive service to keep projects on schedule. Thorough understanding of industry practices allows us to optimize designs, saving clients millions of dollars each year

We work with clients and contractors to integrate our designs into the overall project and site conditions, avoiding duplication of effort--often leading to cost reductions in other aspects of a project, such as site grading and structural design.

Services We Provide

Our multidiscipline engineering services support the client's needs throughout the project lifecycle. These include site characterization, laboratory testing, geotechnical engineering analyses and design, environmental evaluation and remediation, materials engineering, construction observation/testing, and performance monitoring using geotechnical instrumentation.

Terracon provides the following Geodesign services:

- Specialty Foundations
- Earth Retention Systems
- Earth and Rock Stabilization
- Ground Improvement
- Dewatering
- Landfills

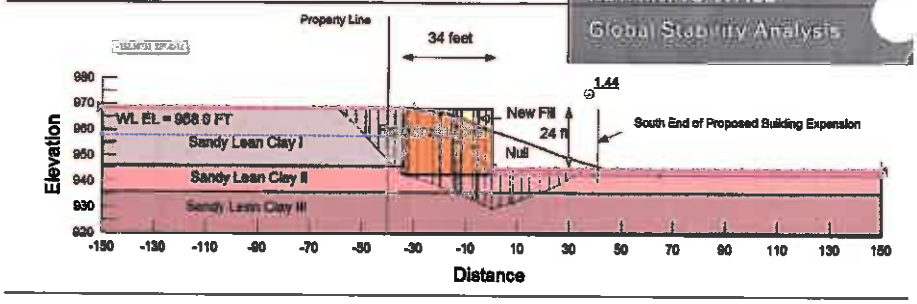
WHY TERRACON?

Resourceful. We strive to find efficient solutions to project-related issues. Geodesign saves clients time and money by providing an extensive network of capabilities.

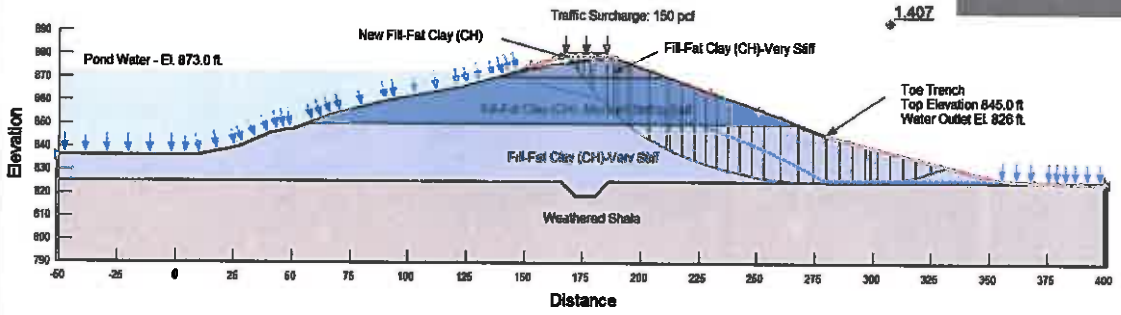
Responsive. With more than 140 offices nationwide, we can meet your needs no matter where the project is located and connect you with the most experienced geodesign engineers.

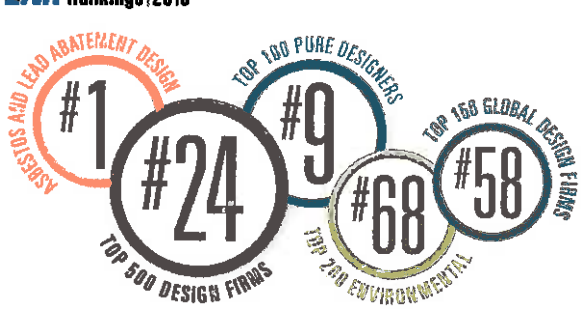
Reliable. Our extensive geodesign abilities reflect more than 50 successful years of professional experience.

RETAINING WALL
Global Stability Analysis



EARTH DAM
Stability and Seepage Stability Analyses





CONTACTS

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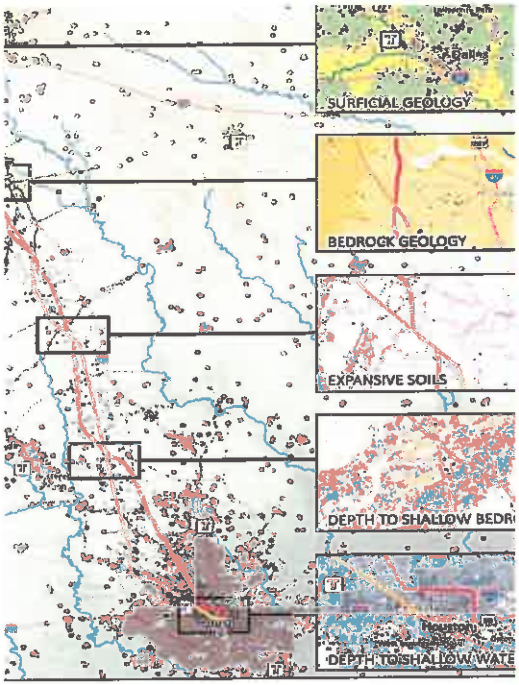
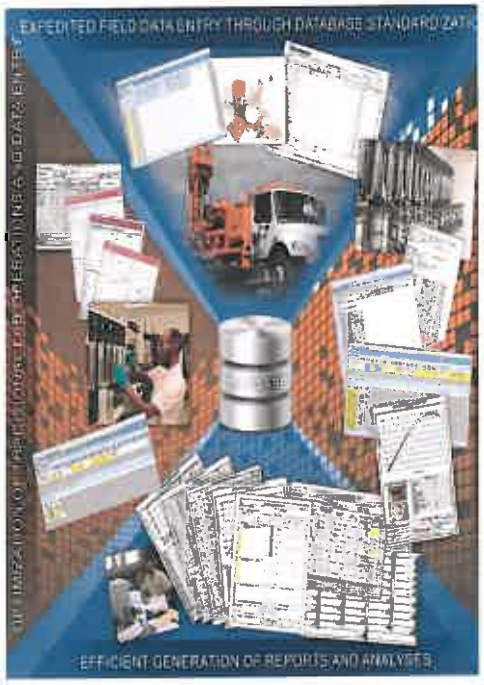
D (304) 205 1611
alma.baratta@terracon.com

GEOTECHNICAL ENGINEERING | 21st Century Reporting

Terracon
GeoReport





As millennials' approach to communication becomes increasingly the norm in the modern workplace, e traditional means of reporting geotechnical data is becoming obsolete. We as a society have become accustomed to utilizing technology and having access to large amounts of information at the click of a mouse.

Terracon has embraced this cultural shift and developed a faster, better way to render geotechnical information, opinions, and designs: *GeoReport*.

GeoReport replaces the old-fashioned paper-based, static, bound report that has been used for over a century. This new web-based approach facilitates real-time collaboration and encourages innovation.

GeoReport brings information and opinions to the design team, owner, and all stakeholders in real time. All parties can join in the communication. Decision-making occurs collaboratively and is faster, more informed, and more efficient.

eoReport. bringing geotechnical communication into the 21st century.

Challenges and unexpected conditions will always exist on construction sites, and often relate to geotechnical conditions.

Therefore, it is essential you work with a geotechnical engineer to find effective solutions. The geotechnical engineer should be engaged in a project's preliminary planning, development, final design, and construction stages. We can work together to minimize issues and achieve a much more desirable end result during construction by collaboratively addressing geotechnical conditions during the project design.

The key to success is collaboration. *GeoReport* uses a dedicated collaboration portal to facilitate communication around the facts of the geotechnical investigation and bring all stakeholders into a documented conversation online.

Our *GeoReport* system provides:

- A collaboration portal for you and the entire design team to understand project options and to agree on an approach for design and construction.
- A listing of your project team members - the individuals who will make your project successful.
- Our completion schedule of various

Our geotechnical information is delivered in three stages, with opportunities for collaboration at each stage.

- Project Planning: Project information and planned approach delivered immediately after the proposal is accepted.
- Site Characterization: The results of our field exploration and laboratory testing along with interpretation of subsurface conditions in the form of a geotechnical model for the site.
- Geotechnical Engineering: Geotechnical recommendations prepared specifically based upon collaboration with the project team.

GeoReport offers:

- Seamless delivery of data, opinions, and designs
- True, documented collaboration
- Fierce commitment to schedule

Terracon uses our Client Development Website to deliver *GeoReport* to all stakeholders. This allows a seamless transition into our construction materials engineering/testing services, as this data is also rendered via the same portal.

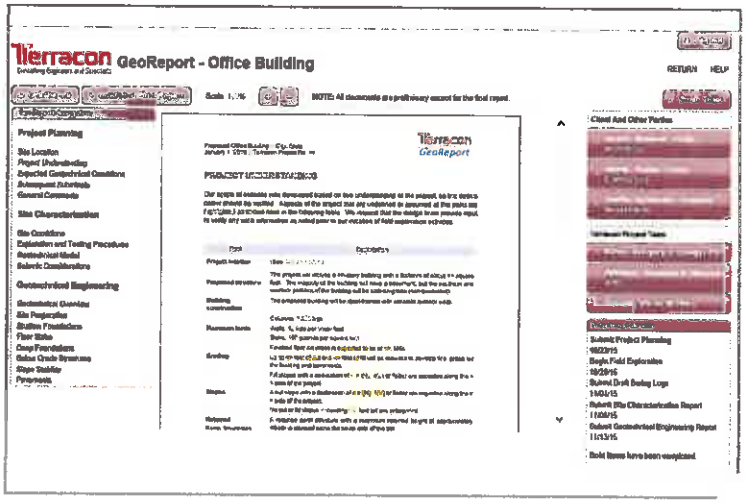
WHY TERRACON?

Resourceful. *GeoReport* enables your design and construction team to exchange information and facilitate collaboration so all stakeholders can resolve issues together early in the construction process, preventing future problems on your site.

Responsive. Through the use of *GeoReport*, Terracon can act quickly to develop a customized approach allowing us to acquire the necessary specific data with the intent to deliver cost-effective geotechnical solutions for your project.

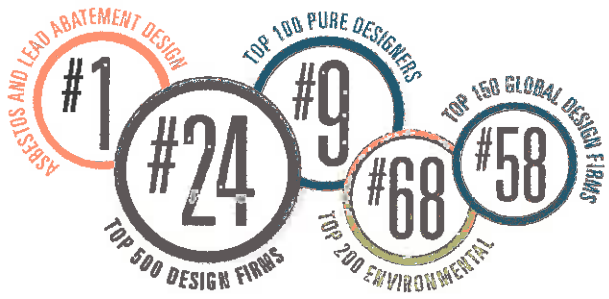
Reliable. We deliver high-quality, expert soil and rock characterization using diverse exploration methods and software. This ensures the accurate and precise results you need to be successful.

Terracon
GeoReport
collaboration builds consensus



SERVICES
available in all
50 states
Offices Nationwide

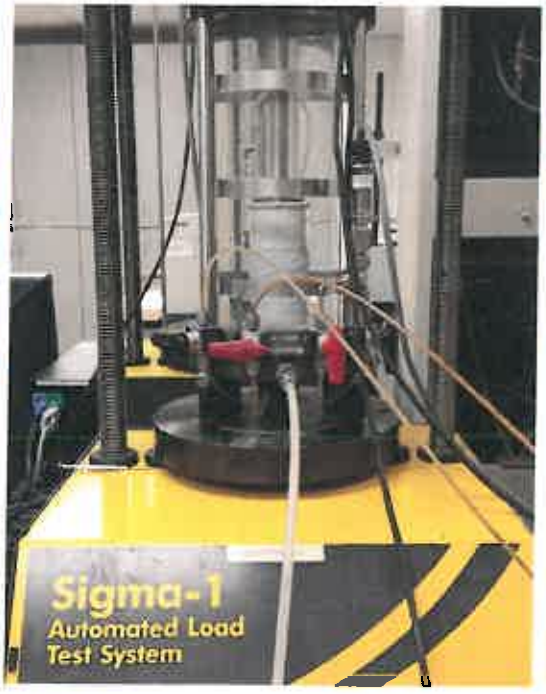
ENR Rankings | 2018



CONTACTS

Alma K. Baratta, P.E.
Geotechnical Department Manager
D (304) 205 1611
alma.baratta@terracon.com

GEOTECHNICAL SITE CHARACTERIZATION | Overview



To help you better understand your project site, its soil, bedrock, and groundwater conditions, Terracon offers five distinct services of Geotechnical Site Characterization. These services are structured in a way to allow us to *"supplement and complement"* the work of other geoprofessionals.

Terracon's geotechnical engineering professionals perform thousands of geotechnical investigations annually. This experience has taught us the critical importance of proper geotechnical site characterization.

Geotechnical engineering design is only as good as the data collected in the field and in the laboratory. Our clients have come to depend on Terracon for the difficult tasks associated with the collection and interpretation of critical field and laboratory data.

Whether your project requires only one or all of the five services, we stand ready to be your partner in determining the geotechnical characteristics of your next project.

1 **Data Mining**

- Research existing data, both public and proprietary to Terracon
- Conduct spatial analysis of data
- Apply local geo-practitioner expertise
- Develop Report of Expected Geotechnical Conditions

2 **Methods Consulting**

- Utilize Report of Expected Geotechnical Conditions to develop methods for collection of necessary site-specific data
- Apply project plans to data collection options
- Select methods that will collect the necessary data in a safe and efficient manner

3 **Field Exploration**

- Mobilize rapidly - Terracon has a fleet of more than 100 drilling/CPT rigs to efficiently meet your workload demands
- Explore field conditions using conventional soil borings, cone penetration testing, geophysical methods, and in-situ testing
- Gather the geo-data to confirm or modify the Report of Expected Geotechnical Conditions

4 **Laboratory Testing**

- Characterize physical properties of the various soil and rock formations present at more than 150 accredited Terracon laboratories
- Typical testing includes: classification, shear strength, compressibility, and dynamic properties
- Use Terracon's capabilities and quality systems to derive consistent and precise test results

5 **Characterize and Report**

- Manage data and provide electronic exchange of information in a seamless environment
- Utilize communications plan to assure vibrant collaboration between Terracon and your professional staff
- Maximize efficiency by seamlessly integrating Terracon data into your systems

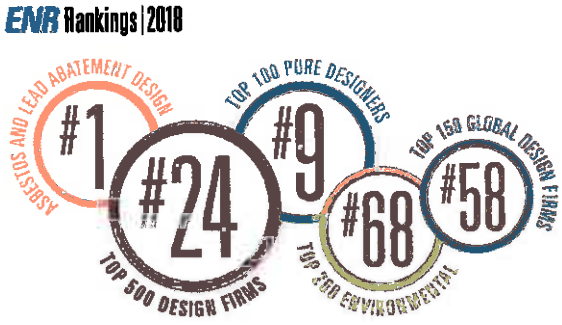
WHY TERRACON?

Resourceful. Terracon enables you to evaluate sites for proposed developments prior to performing any field explorations, saving you time and money.

Responsive. Through our national network of offices, accredited laboratories, and exploration fleet, Terracon can act quickly to develop a customized approach to provide you the most cost-effective program to develop the best data for you.

Reliable. We deliver high-quality, expert soil and rock characterization using diverse exploration methods and software. This ensures the accurate and precise results you need to be successful.

Understanding geotechnical site characterizations is essential for establishing a cost-effective foundation f any successful project.



CONTACTS

Kenn Fowler
Local Exploration Manager
D (304) 205 1608
kenn.fowler@terracon.com

Environmental ■ Facilities ■ Geotechnical ■ Materials

National Guard Bureau

CRAWFORD
CONSULTING SERVICES

CRAWFORD has been providing high quality full service construction cost estimating services to the National Guard Bureau for the last 20 years, ranging from pre-construction through occupancy. We maintain a highly-skilled team of construction professionals with certifications including Project Management Professionals, Planning and Scheduling Professionals, Construction Quality Managers, Certified Construction Managers, Certified Professional Estimators, Certified Cost Professionals, Certified Value Specialists, Associate Value Specialists, and LEED Accredited Professionals with expertise on projects of all types and magnitude. CRAWFORD has completed projects that range in size from under $10,000 to over $8.5 billion. Our project capabilities range from new construction, renovation, retrofit, infrastructure, to civil works projects and our experience stretches from local, regional, national, to international. We help simplify the procurement process for contracting officers and project managers because we specialize in construction management, cost estimating / cost engineering, value engineering, quality assurance / quality control, inspection, staff support and scheduling. CRAWFORD, **as a woman-owned small business**, assists agencies in meeting small business utilization goals. Our mission is to provide unparalleled construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness. Our award-winning firm has received the following accolades:

- Society of American Military Engineers (SAME) 2016 Robert B. Flowers Small Business Award
- **2015 Business Women's First Award**
- BTAP Program - **Selected by Naval Facilities** Engineering Command HQ as one of six Women-Owned Businesses in the United States to participate in the DoD Business Technical Assistance Pilot Program
- 2008 Mayor's Annual Good Neighbor Award
- 2006 Historic Preservation Award from the Pittsburgh Historic Review Commission (Phipps Conservatory)
- 2005 Small Business Woman of the Year Award
- 2004 Minority Business Opportunity Council Woman Business of the Year
- Fifty Best Women in Business Award in 1999 for the Commonwealth of Pennsylvania – Department of Commercial and Economic Development

Why CRAWFORD...

- ✓ 33 Full-Time discipline specific in-house cost professionals
- ✓ 20 years' experience providing IGEs for the USACE
- ✓ Experience on Federal Government, Public, Private, and Commercial construction projects

CRAWFORD has provided Cost Estimating Services for the National Guard Bureau (including Army & Air National Guard) and various state Guard agencies since 1997 on more than 140 projects totaling more than $400 million in construction value.

For 20 years, CRAWFORD has provided cost engineering/cost estimating and scheduling services under the IDIQ contracting environment, which includes but is not limited to detailed cost estimates/schedule analyses, quantity takeoff, reviewing change orders, obtaining vendor quotes, conducting market surveys to determine costs for labor, equipment, and materials. We have in-depth knowledge of MCACES-MII, PACES, Windows Estimator (WinEst), USACE's PC Cost Computer Estimating, USACE's Historical Analysis Generating Software, USACE Parametric Cost Estimating Software (PACES), and ROCKTEK (cost estimating for earthwork). We have completed more than 700 MCACES-MII projects and 70+ PACES projects for over 30 USACE Districts since 1998.

Mission Statement: To provide unparalleled full construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness.

All cost estimates are built using the most current version of **MCACES Second Generation (MII)** software for all USACE projects and all CRAWFORD personnel are experts in this software. All CRAWFORD estimates are consistent with the best estimating practices of the construction industry, FAR 36.203, and are current, accurate, and complete. **They reflect the expected cost to the Government to perform the work by contract and include all reasonable costs which a prudent, experienced, and well-equipped contractor might anticipate and include in their bid.**

CRAWFORD currently has the capacity in all key cost estimating disciplines with **nine cost engineering key personnel who are certified through AACE and ASPE** who lead our architectural, structural, civil, mechanical, and electrical estimating groups respectively along with an additional **24 full-time cost engineering specialists** who support these lead estimators. Our estimating group is divided into five (5) subgroups as indicated above and **all personnel work in the same building** out of our headquarters office in Pittsburgh, PA. **The personnel named in this proposal are committed and will be the leaders of our team.**

Being in tune with different construction climates as well as being able to forecast the future is important to accuracy in budgeting projects, escalation factors, and determining availability of labor and materials in a given area. CRAWFORD has performed Market Analyses in order to ensure that a project's procurement methods are feasible in terms of scope, budget, as well as contracting strategy.

Our in-house research team is experienced at interviewing construction industry decision makers: project managers, estimators, large & small contractors, sub-contractors, distributors, wholesalers and equipment suppliers. Our methods do not rely solely on published indices and forecasts, however, we perform detailed market surveys for the specific geographic area that the project is planned to be built. This is a good resource for owners to refer to as a gauge for their project. The analysis can help determine factors that affect the overall budget, schedule, and contracting strategies for an owner. Due to the instability in the global, national, and local construction economy CRAWFORD provides analysis, discussions, material indices, and cost tables to provide real-time information on labor shortages, material costs, fuel, etc. Please see below for a few examples or our construction cost estimates against awarded projects for the US Army Corps of Engineers and other Federal Agencies in the AOR and surrounding areas:

Please see below for a few examples or our construction cost estimates against awarded projects for the National Guard Bureau:

Agency	Project	Our Estimate	Bid / Award	Delta	Year
National Guard Bureau	KC-46A Consolidated Building Renovations - Seymour Johnson AFB, NC	$8,823,396	$9,635,420	-8.43%	2016
National Guard Bureau	Field Maintenance Shop Design, Rochester, NH	$7,540,000	$7,195,000	4.79%	2015
Air National Guard	Repair Flight Simulator, Building 304, Coroapolis, PA	$3,316,527	$3,329,527	-0.39%	2015
Army National Guard	Multi-Use Training Facility, NASJRB, Fort Worth, TX	$1,674,435	$1,696,500	-1.30%	2012
Army National Guard	Civil Engineering Addition, NASJRB, Fort Worth, TX	$1,481,304	$1,479,000	0.16%	2012
Air National Guard	Repair / Replacement of Bridges at Michie Stadium, United States Army Garrison, West Point, NY	$1,662,380	$1,582,000	5.08%	2012

Mission Statement: To provide unparalleled full construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness.