

Michael Baker

I N T E R N A T I O N A L

We Make a Difference

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03/24/21 12:47:49
WV PURCHASING DIVISION

March 24, 2021

Ms. Tara Lyle
West Virginia Department of Administration
Purchasing Division
2019 Washington Street, East
Charleston, West Virginia 25305

Subject: CEOI 0603 ADJ2100000008
Brushfork Armory HVAC Renovation

Dear Ms. Lyle:

The Charleston office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to the subject Expression of Interest for the WV Army National Guard. We have relevant experience with many of the design elements necessary for this assignment from recent projects including HVAC and Architectural Renovations to many Military accessits .

Michael Baker is well positioned to assemble a comprehensive design team (in-house) including: Mechanical, Electrical, Structural, Civil and Architectural expertise. Our diverse team of professionals are well versed in the preparation of construction documents, bid specifications, and the application of required construction permits. Michael Baker can also provide assistance during the Bidding process and the appropriate level of Construction Administration.

We thank you for your consideration and look forward to meeting with the selection committee 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 my office (304) 769-2152 (or cell phone 304-539-8356) or by e-mail at dhilliard@mbakerintl.com

Very truly yours,

Michael Baker International, Inc.


David Hilliard

Enclosure

MBAKERINTL.COM

400 Washington Street East, Suite 301 | Charleston, WV 25301

Office: 304.769.0821 | Fax: 304.769.0822



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EXPRESSION OF INTEREST

BRUSHFORK ARMORY HVAC RENOVATION AT THE BRUSHFORK ARMORY FACILITY

SOLICITATION NO: CEOI 0603 ADJ2100000008

Purchasing Division Forms



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

State of West Virginia
 Centralized Expression of Interest
 Architect/Engr

Proc Folder: 853816			Reason for Modification:
Doc Description: EOI- Brushfork Armory HVAC Design			
Proc Type: Central Purchase Order			
Date Issued	Solicitation Closes	Solicitation No	Version
2021-03-08	2021-03-24 13:30	CEOI 0603 ADJ2100000008	1

BID RECEIVING LOCATION

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

VENDOR

Vendor Customer Code:

Vendor Name : Michael Baker International, Inc.

Address : 400 Washington Street East, Suite 301

Street :

City : Charleston

State : West Virginia **Country :** USA **Zip :** 25301

Principal Contact : David Hilliard

Vendor Contact Phone: 304-769-2152 **Extension:**

FOR INFORMATION CONTACT THE BUYER
 Tara Lyle
 (304) 558-2544
 tara.l.yyle@wv.gov

Vendor Signature X  **FEIN#** 25-1228638 **DATE** March 24, 2021

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

ADDITIONAL INFORMATION

The West Virginia Purchasing Division, for the agency, the West Virginia Army National Guard, Construction and Facilities Management Office, is soliciting Expressions of Interest from qualified firms to provide professional engineering design services for the Brushfork Armory HVAC Renovation at the Brushfork Armory Facility located in Bluefield, WV, per the attached documentation.

INVOICE TO		SHIP TO	
ADJUTANT GENERALS OFFICE 1707 COONSKIN DR		ADJUTANT GENERALS OFFICE 305 FAYETTE PIKE	
CHARLESTON	WV 25311	MONTGOMERY	WV 25136
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	EOI- Brushfork Armory HVAC Design		

Comm Code	Manufacturer	Specification	Model #
81101508			

Extended Description:

EOI- Brushfork Armory HVAC Upgrades Design per the attached documentation.

SCHEDULE OF EVENTS

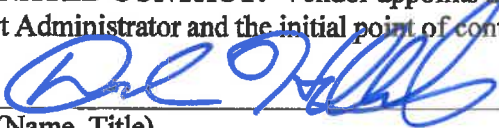
<u>Line</u>	<u>Event</u>	<u>Event Date</u>
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	Document Phase	Document Description	Page
ADJ210000008	Draft	EOI- Brushfork Armory HVAC Design	3

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.



(Name, Title)
David Hilliard, P.E., Senior Mechanical Engineer

(Printed Name and Title)
400 Washington Street East, Suite 301, Charleston, WV 25301

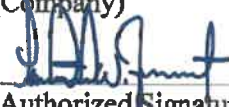
(Address)
304-769-2152 / 304-769-0822

(Phone Number) / (Fax Number)
dhilliard@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)


(Authorized Signature) (Representative Name, Title)

Patrick Fogarty, P.E., Senior Associate

(Printed Name and Title of Authorized Representative)

March 24, 2021

(Date)

304-769-0821 / 304-769-0822

(Phone Number) (Fax Number)

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 exceeds 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: March 24, 2021

State of West Virginia

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 24 day of MARCH, 2021.

My Commission expires AUGUST 09, 2023.

AFFIX SEAL HERE



NOTARY PUBLIC





EXPRESSION OF INTEREST

BRUSHFORK ARMORY HVAC RENOVATION AT THE BRUSHFORK ARMORY FACILITY

SOLICITATION NO: CE01 0603 ADJ2100000008

PROPOSAL



PROJECT LOCATION

The proposed HVAC renovation project is located at the Brushfork Armory, 2915 Old Bramwell Road, Bluefield, West Virginia.

PROJECT BACKGROUND

The West Virginia Army National Guard, Construction and Facilities Maintenance Office is seeking a highly qualified architectural/engineering firm to provide design services and bid documents for HVAC renovations/upgrades at the Bluefield Armory. The existing facility houses WV National Guard troops and the design will comply with all applicable building codes in order to support elements of the WV Army National Guard Command. The firm will be responsible for evaluation of the existing conditions at the sites, to make recommendations, and to prepare the design and construction documents as specified in the Expression of Interest (EOI).

Michael Baker is extremely interested in continuing our professional relationship with the West Virginia Army National Guard, Construction and Facilities Maintenance Office

Michael Baker International, Inc. (Michael Baker) is a highly qualified firm with extensive experience in providing the type of services required for these projects, and we are extremely interested in continuing our professional relationship with the West Virginia Army National Guard, Construction and Facilities Maintenance Office (WVARNG).

QUALIFICATIONS & EXPERIENCE

FIRM/TEAM QUALIFICATIONS

Michael Baker’s proposed team of experienced professionals has demonstrated the ability to deliver quality work products to our clients, on-time and within budget. Michael Baker can provide the entire depth of services necessary to complete the project without the need for costly sub-consultants. Each individual on this project team has extensive experience in their field of expertise and have demonstrated success on projects of similar size and scope.

The Principal-In-Charge will ensure that all required resources including staff and equipment are available to the project manager to execute the project successfully. Team resumes and project profiles provide a brief discussion of team member’s experience base relevant to this project.

Management and Staffing

Michael Baker International, Inc.
Russell Hall, Vice President | 400 Washington Street East, Suite 301, Charleston WV 25301
304-769-0821 | RHall@mbakerintl.com



Persons Assigned to the Project *(Resumes Provided in Appendix 1)*

NAME	ROLE
DAVID HILLIARD, P.E., LEED AP BD+C	Project Manager/Mechanical Engineering
OWEN MILLIGAN, P.E.	Electrical Engineering
JESSE RANGEL, AIA	Architectural Design
PATRICK FOGARTY, P.E., P.S., LEED GA	Civil Engineering
WAYNE AIRGOOD, P.E.	Structural Engineering

According to our understanding of the project scope as stated in the EOI, no additional sub consultants will be required. Michael Baker will execute the entire project with our current staff.

FIRM CAPACITY

Michael Baker is a full-service A/E firm. Our local office in Charleston, WV is a “single-stop resource” capable of providing comprehensive professional services, from Environmental Studies, Mechanical/Electrical and Structural Engineering to Architecture, Planning, final design, and 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 construction Administration/Inspection. With over 30 in house professionals locally, and over 200 regionally, Michael Baker can react quickly and efficiently to the needs of your project.

Michael Baker’s local clients for facilities development and renovation projects include, but are not limited to, colleges and universities, counties, parishes, cities, townships, local municipalities, state departments of transportation, military facilities, airport complexes, and private sector clients. Michael Baker’s geographic location and extensive experience enables us to quickly respond to wide-ranging scopes of service in order to meet our client’s needs.

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 5,000 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, engineering and design 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:

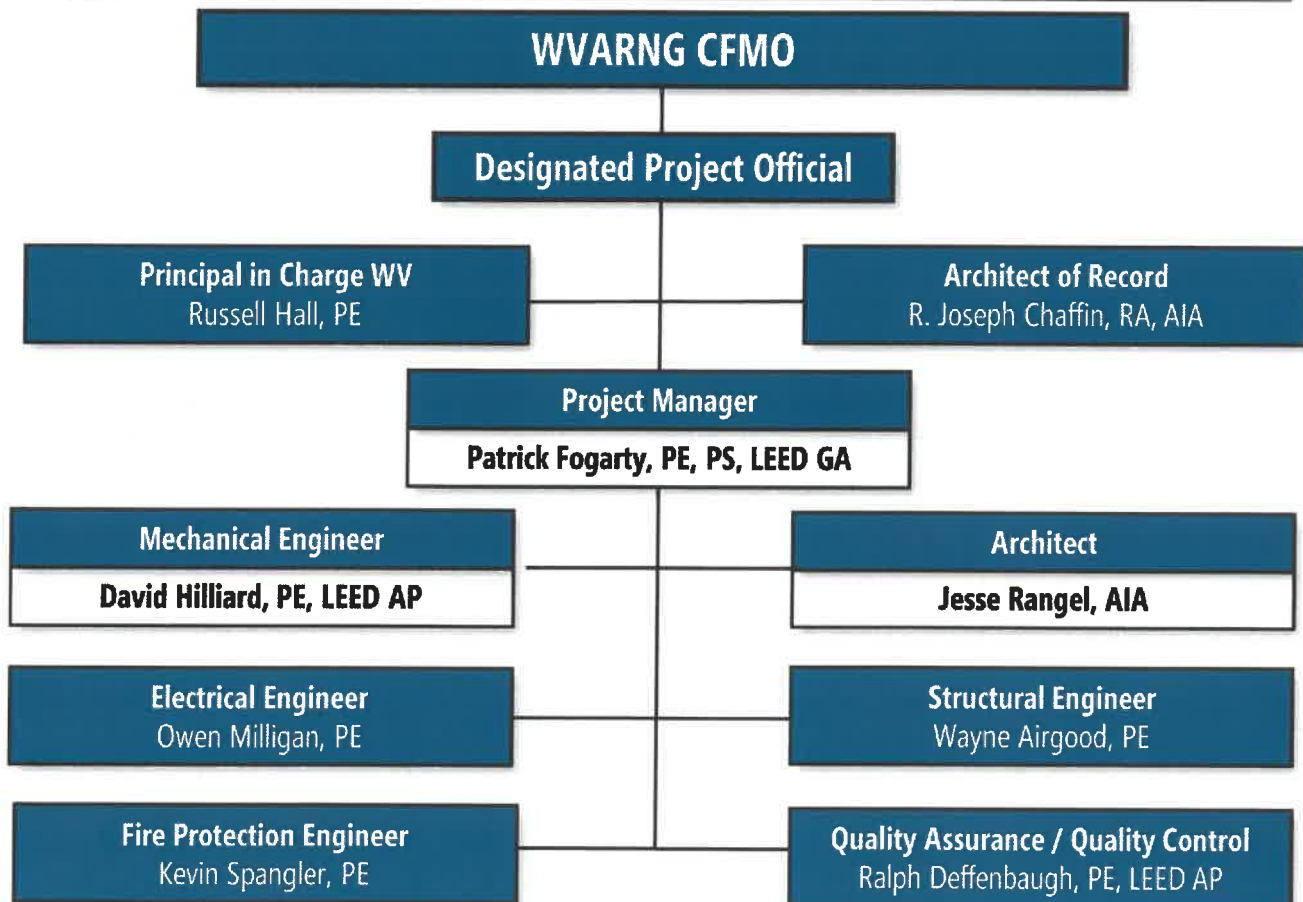
- Nationally recognized expertise in Assessing, Programing and Planning
- Facilities Engineering (Transportation, Civil, Mechanical, Structural and Electrical)
- Construction Administration and Construction Monitoring
- Coordination with State and Federal Agencies, as required

From 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.

STATEMENT OF FIRM’S ACCEPTANCE AND FULL UNDERSTANDING THAT ANY AND ALL WORK PRODUCED AS A RESULT OF THE CONTRACT WILL BECOME PROPERTY OF THE AGENCY AND CAN BE USED OR SHARED BY THE AGENCY AS DEEMED APPROPRIATE

Michael Baker will provide to the WVARNG or other appropriate agencies, electronic copies of all required submittals through the various design stages and will provide final AutoCAD drawings at the completion of the project if requested.

PROJECT ORGANIZATION





STATEMENT OR EVIDENCE OF THE FIRM OR TEAM'S ABILITY TO PROVIDE SERVICES

This team was selected based on the current Project understanding. Additional team support members can be engaged on an as needed basis

See Resumes for more details on team members in **Appendix 1.**

DEMONSTRATED EXPERIENCE IN COMPLETING PROJECTS OF A SIMILAR SIZE AND SCOPE

Project Profiles are included in **Appendix 2.** They were selected as a representative group of various kinds of related Department of Defense projects. These include various projects in-state and from across the country.

Additionally, we have included six (6) References which are provided in **Appendix 3.**

PROJECT GOALS and OBJECTIVES

APPROACH AND METHODOLOGY FOR MEETING GOALS AND OBJECTIVES

It is Michael Baker's understanding that HVAC renovations/upgrades at the Brushfork Armory in Bluefield, West Virginia are desired by the WVARNG. The key design elements of the project could include the replacement or upgrade of HVAC equipment and systems, utilizing energy efficient, economically and maintenance friendly equipment. All electrical and mechanical systems will be provided within the design to support the facility. Cost effective energy conserving features will also be incorporated within the design.

Michael Baker will include provisions for security and Anti-Terrorism / Force Protection (AT/FP) as directed by the WVARNG.



Existing underground and above ground utilities locations will be researched and investigated as required to support the project scope. Plans and specification will also be provided for any and all utility and road infrastructure needed and as directed by the owner and/or state agency, utility company or other utility approval authority for Bluefield, West Virginia.

The approach of the entire project would be holistic in nature. A kickoff meeting with all stakeholders is recommend to help us understand the WVARNG project requirements, criteria, schedule and budget. From the information gathered at this meeting, Michael Baker will develop a formal Scope of Work, AIA Agreement and Fee Proposal for review and negotiation. Once these elements have been approved, a Purchase Order will be issued which will constitute Notice to Proceed (NTP).

The first step of the project would be to help prioritize work and develop time schedules for the project tasks. This process would include identification of existing conditions through information obtained by a review of the facilities' available as-built drawings and a general site walk through. Michael Baker may plan for more detailed site visits during the first weeks of the project to assess the limits of the needed renovations and before beginning development of the



concepts required to provide the designs for the most cost-effective systems to achieve the project requirements. Our Engineers and Architects will be involved in all aspects of the existing condition assessment and will carry that understanding into the project design. Open discussions of our findings, of all related work and any recommendations will be held with the WVARNG staff. This will help determine and finalize the extent of all related work.

In order to meet the goals and objectives of the WVARNG, Michael Baker will review perinate codes and standards and will design in accordance with all current Federal, State and local building codes and permit requirements as well as WVARNG and DoD design guides.

Michael Baker is very familiar with the UFC system having recently completed Full Facility Assessments of Army Reserve Centers (both out of state), and the at the Charleston WVARNG facility; the Coonskin Complex Perimeter Fence and the Base Access Control Facility for the WVNG Joint Forces Headquarters.



GOAL/OBJECTIVE 1: DEVELOP DRAWINGS AND SPECIFICATIONS

Michael Baker will conduct a site investigation as follows: A survey team will be responsible for identifying existing building condition and renovation issues, building and room measurements as required, location of utilities and other pertinent components in the project area. This team will be led by a Licensed Professional Engineer. The survey data, photos and measurements will be studied, and then developed into a base map drawing with floor plans and building sections. This documentation will include the location of affected existing on-site equipment, utilities, structural components or remaining service lines.

Based on the site investigation and facility-specific information, Michael Baker will develop schematic design concepts for review and approval by the WVARNG. The project will be studied in a systematic way to analyze the existing conditions, Client needs, and the facility's projected HVAC loads. Appropriate solutions will then be defined to meet all these requirements. More than one option will be considered at this stage of design. Analyzing multiple solutions provides the Client the ability to choose the most cost effective and sustainable approach for the project.

Baker regularly designs buildings to exceed ASHRAE 90.1 2007 by 20% to 30% and can design to achieve LEED certification if desired. Some of the options could in include Variable Refrigerant Flow (VRF) or Loop Pipe Systems. Energy Recovery Units can be a way of limiting electric utility costs while achieving the fresh air requirements to meet ASHRA 62.1. Many other options may be considered if desired by the Client, including Geothermal Heat Pumps. Roof Top Units which typically have a lower up-front cost will likely be one of the concepts presented.

Upon approval of one design concept, Michael Baker will proceed to develop all necessary design documents in accordance with UFC directives and all applicable codes for all aspects of the design. Specifications for the installation of all required products or components will be provided as part of the Design submittals.

GOAL/OBJECTIVE 2: FULL DESIGN SERVICES

Michael Baker provides a variety of services and therefore has extensive experience in many fields of expertise. This will allow the core team members access to expertise in all areas of study which pertain to the project. For this project Michael Baker will provide Mechanical/Electrical and Structural Engineering along with Architectural support.



Plumbing and Fire protection engineering can be included as part of Michael Baker's full design services. If building exterior work is necessary or desired, civil engineering and landscape architecture services can also be provided.

Design and schedule coordination meetings and/or site visits will be provided as a normal part of the **design development/construction document** process. This will help to ensure that the WVARNG is receiving exactly the facility upgrades that they need in the time frame that they require. As required, a project phasing plan may be provided with the construction documents. This will help to ensure limited disruptions to staff members working at the facility. Also included will be plans to show the limitations and requirements for the demolition and removal of the existing components and systems to facilitate the new work. Documentation will include the location of "affected" existing on-site utilities or service lines, if necessary.



Formal Submittals for client review will be provided at 35% schematic design, 65% design development, 95% prefinal Construction Documents and 100% Bid Ready Construction Documents.

For each of the design submittal, a separate cost opinion will be provided for review and in order to keep the project within budget.

GOAL/OBJECTIVE 3: CONSTRUCTION DOCUMENTS AND BIDDING ASSISTANCE

Upon approval of the 65% Design Development submittal, Michael Baker will finalize the Construction Documents including Construction Plans, Details and Specifications and submit for review and approval. The documents will be of sufficient detail to bid and construct all elements of the work. As previously stated, a project phasing plan will be included with the construction documents, which will include preservation and protection of existing elements and temporary barricades and devices as necessary. Consideration will be given to partial or full Owner occupancy as required. Demolition drawings will be provided for the removal of existing components affected by the design including the temporary removal/replacement of existing elements designated to remain. Cost opinions will be updated upon the completion of the **Construction Documents** plans and specifications. Final sealed drawings and specifications for each phase of the entire project will be provided.

Michael Baker personnel will provide assistance during the bidding process by attending the Pre-Bid Meeting and preparing responses to technical questions that arise for incorporation into Addenda.

GOAL/OBJECTIVE 4: CONSTRUCTION ADMINISTRATION

Once the construction contract is awarded, Michael Baker will provide support to the WVARNG for the duration of construction. Shop drawings provided by the Contractor will be reviewed by Michael Baker to ensure that they meet all code requirements, specification criteria and are appropriate for the project. All products intended to be installed on the project shall be submitted to and approved by Michael Baker. The products will be approved based on meeting the prepared specifications, current code requirements and contract requirements. Michael Baker will also provide review for progress payment applications, requests for information (RFIs), work directive changes and change order requests. Michael Baker will attend regular progress meetings and provide as-needed site inspections.



The team members that start the project will be the same professionals providing the regular onsite inspections during construction. All products intended to be installed on the project shall be submitted to and approved by the project team.

After the system installations are complete, Michael Baker will perform a final inspection and develop a corrective measure punch list and will coordinate with regulatory agencies to assure prompt award of the Certificates of Occupancy for the facilities as required.

As-built drawings will be prepared in AutoCAD format. The as-built drawings and operation and maintenance manuals will be provided to the Client upon completion of the project for future use. The documents will be 'bound', such that the files will not require external references and allows for easy future use and alteration. Paper and electronic format documents will be provided to the Client with all copyright control for the documents.

ADDITIONAL INFORMATION

QUALITY CONTROL

Michael Baker has vast experience in technically sensitive renovations as well as from the ground up design and construction. The scope of this project, as presented, poses challenges that are exciting for our team of problem solvers. Between our Charleston West Virginia and Moon Township Pennsylvania offices, we bring diverse expertise and hundreds of years of experience to this progressive endeavor.



Michael Baker provides an Internal Technical Review (ITR) as part of our normal quality assurance process. This is performed on every prior to submittal delivery and is part of "The Baker Way". This ITR is performed by professionals that are not part of the design team but are experts in the respective fields that they review. This ensures a nonbiased and critical review of the project documents. This process helps to minimize small errors and omissions and yields a smoother bidding/construction process.

COST CONTROL

The use of prioritized phasing and additive or deductive alternates during the bidding and construction process can provide flexibility and help control project cost. This allows the Owner to better choose how they wish to spend their resources. Also to control cost, Michael Baker professional staff will have the opportunity to review the plans at each milestone and make comments or make recommendations to the project based on comparison with the Owner's Project Requirements, the current plans and specifications, and the current project cost opinion. If need be, Michael Baker is very familiar with the value engineering process and can work productively with the WVARNG to determine cost saving alternatives. If bids come in over budget or, if during construction, contractor staffing or schedules are reduced, value engineering can help keep the project on tract. These considerations, along with open discussion with the WVARNG staff, will determine whether we move forward with the current design or make agreed-upon adjustments to the design.



DESIGN AND CONSTRUCTION TIME FRAME

We have the resources to deliver the project on time and within budget. Michael Baker has a proven track record of working closely with our clientele and bringing projects to fruition within the structured timeline and the Client's desired budget.

NO PROJECT TOO LARGE OR TO SMALL



EXPRESSION OF INTEREST

BRUSHFORK ARMORY HVAC RENOVATION AT THE BRUSHFORK ARMORY FACILITY

SOLICITATION NO: CE01 0603 ADJ2100000008

APPENDIX 1 – Resumes

Patrick W. Fogarty, P.E., P.S.,

LEED®GA

Civil Engineer , Facilities Practice Manager

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

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 subconsultant. Baker lead a planning study for the renovation of 31 restrooms in the historic West Virginia Capitol Building. The planning study assessed the facility's plumbing infrastructure and the restroom 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 then provided design, construction documents, and scheduling recommendations for the phased Construction of 11 Restrooms for the House of Delegates wing. Baker also provided construction administration services for this 2020 construction project.

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.

Years with Michael Baker: 13
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

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.

West Virginia Army National Guard - TAG Wing Improvement, Charleston, West Virginia. *State Army National Guard Headquarters.* Project Manager. Engineer of Record responsible for the coordination of all activities. 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. Baker provided Construction Administration and inspection services as well as periodic site review during construction.

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

Mechanical Engineer

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 become a senior mechanical engineer 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, master planning and engineering at the West Virginia Capitol Complex including a design for a comprehensive restroom renovations at the historic State Capitol Building. His resume covers over 30 years of real world work in engineering, design, fabrication and construction, and covers the mechanical, electrical, plumbing 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.

Mr. Hilliard is proficient with the following design programs: AutoCAD, Revit, Trane Trace 700 (HVAC load program), Cook Compute-a-Fan (equipment selection program), Greenheck CAPS (equipment selection program), Price, All-in-One (equipment selection program), Excel Spreadsheets, Bluebeam Revu (pdf editor), and Adobe Photoshop

Sample PROJECT Experience

West Virginia Schools for the Deaf & Blind, Various Building Renovation Projects, Romney WV. Project Engineer and Engineer of Record. Responsible for project team coordination and management, mechanical engineering and electrical design in the renovation of various buildings on the WVSDS campus, work included: HVAC, life safety, electrical, fire alarm, and fire sprinkler projects. One project includes HVAC renovations in one building and the installation of a campus wide Life Safety System for the deaf and blind. A second project includes new sprinkles in one building and sprinkler modifications in two other building. A third project includes complete HVAC renovation of the schools Physical Education Building, which includes a swimming pool, Gym, weight rooms, locker rooms. These projects are ongoing and include Construction Administration services which Mr. Hilliard oversees.

Capitol Flood Study, State of WV General Services Division. Project Engineer. Responsible for providing site evaluation, video of underground sanitary piping systems, research of rainfall events, corrective measure recommendations, and developed a report of the findings.

Years with Michael Baker: 11
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 - Mechanical, West Virginia, 2011, **19488**

Professional Engineer - Mechanical, Kentucky, 2017, **32902**

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

Electrical System Design, 35 hour course University of Wisconsin, Madison Wisconsin.

West Virginia State Capitol Restroom Renovations. *State of WV General Services Division.* Mechanical Electrical and Plumbing Engineer. Mr. Hilliard provided the State of West Virginia General Services Division a comprehensive MEP plan for the renovation and renovation of the 33 restrooms of the West Virginia State Capitol Building. He helped provide design, construction sequence, and scheduling recommendations. The Baker team then provided design, construction documents, and scheduling recommendations for the phased Construction of 11 Restrooms for the House of Delegates wing. Baker also provided construction administration services for this 2020 construction project.

Renovations of two existing buildings at the WVUTech Campus. *West Virginia University.* Mechanical Engineer. Provided project management, mechanical, electrical, and plumbing engineering for the renovation of a 31,000 SF building for engineering labs and a 21,000 SF building for offices and student government.

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.* 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 a lump sum/fixed fee contract for architectural and engineering services. Michael 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.

Renovations to Building 2, Bay 4, Tobyhanna, Pennsylvania. *Tobyhanna Army Depot.* HVAC Engineer. 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.

Little Kanawha Bus, Calhoun County, West Virginia. *WV Division of Public Transit.* Mechanical 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. The facility was designed as a LEED@ project.

Fort McCoy, Fort McCoy, Wisconsin. *Army Corp of Engineers, Omaha District.* Mechanical Engineer. Responsible for the Mechanical engineering and final inspection and commissioning oversight. **The Project was a 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, The building was designed to meet a LEED Silver certification

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: 11

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

Renovations to Classroom Building, Beckley, West Virginia. *WVU Tech/ West Virginia University. Architect of Record.*

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 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. Architect of Record.*

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. This project is currently under construction.

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 oversight 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.

Nursing Simulation Renovation and Laboratory Design, Clarion University, Clarion, Pennsylvania. Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff.

This state-of-the-art nursing education facility, included a simulation laboratory with four high-technology mannequins and a control room, related classrooms and skills lab spaces, offices, conference rooms, social lounge, and study lounge. His role also included interdisciplinary technical reviews for all design/construction documents. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

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.

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.

Jesse Rangel, AIA, NCARB

Project Architect

General Qualifications

Mr. Rangel is a capable, licensed architect with more than a decade of comprehensive, professional expertise in the successful management and design of public and private projects. His strengths lie in good interpersonal skills, development, oversight and management of budgets and schedules. He possesses skills and technical capabilities necessary to interact positively with customers, subconsultants, staff, and coworkers to guide projects from inception through construction.

Experience

Comprehensive Design Services Contract IX, Baltimore/Washington International Thurgood Marshall (BWI) & Martin State (MTN) Airports. *Maryland Aviation Administration.* Project Architect. Currently serving as Michael Baker's architect and task manager for architectural tasks. The task orders include construction phase services for current on-going projects, repairs and improvements to existing terminals and hangars, consultant management, project management, and general task orders.

On-Call Aviation Services, Tipton Airport (FME). *Tipton Airport Authority.* Project Architect. Currently serving as Michael Baker's architect and task manager for architectural tasks. The task orders include construction phase services for current on-going projects, repairs and improvements to existing hangars, consultant management, project management, and general task orders.

Dover Maintenance Hangar Construction Phase Services. *Dover Airfield Base.* Project Architect. Provide on-going construction administration engineering services as follow-on to the design work recently completed. Provide engineering support and assist with coordination of requested aspects of Engineering During Construction, including but not be limited to; Contractor Submittal Package reviews; Engineering Considerations and Instructions for Field Personnel; Request for Information (RFI) reviews/responses; Site Visits, Engineering Revisions and Value Engineering Change Proposal reviews, during the construction phases and as requested by the USACE Project Engineer.

Bladensburg Bus Maintenance Facility. *Washington Metropolitan Area Transit Authority.* Project Architect. Assisted with design services up to a 60% level for a new Bus Operations and Maintenance facility sized for a fleet of 300 transit vehicles at the Bladensburg Bus Operating Garage. The proposed Bus Operations and Maintenance facility is planned to operate 24 hours a day, 7 days a week and designed to include; Bus Maintenance, Body Repair, Paint, Bus Operations, Bus Fuel and Wash, Bus Parking, Employee and Visitor Parking in a parking deck.

Tipton Hangar 80 84 85 Improvements. *Tipton Airport Authority.* Project Architect. Developed a procurement strategy and to identify the scope of professional design services and related fees that would be necessary to meet FAA procurement requirements. Provided architectural and engineering services for design, bidding, and construction administration services for various improvements to three existing corporate hangars.

Years with Michael Baker: 1
Years with Other Firms: 12

Degrees

M.Arch., 2009, Architecture,
Morgan State University

B.S., 2007, Architecture,
Morgan State University

Licenses/Certifications

Registered Architect, Maryland,
19680

Chesterfield CCR Wastewater Treatment Plant. *Dominion Energy.* Project Architect. Via Design-Build, provided architectural services for the design of two new buildings for Dominion Energy at the Chesterfield Water Treatment Complex. The two buildings were identified as the Administration Building and the Process Building.

Non-Michael Baker Project Experience

Piscataway WRRF Bio-Energy Project, Accokeek, Maryland. Project Manager / Architectural Design-Lead. Responsible for all architectural tasks which include early work packages, code analysis, life safety, design, coordination with construction estimating and design teams. \$250 Million Construction Budget.

Back River Wastewater Treatment Plant: Headworks Improvement and Wet Weather Flow Equalization, Baltimore, Maryland. Project Manager / Primary Architectural Reviewer. Responsible for complete review of all architectural related construction management tasks. \$430 Million Construction Budget.

Johns Hopkins Hospital: North Power Plant and Bayview Campus Power Plant, Baltimore, Maryland. Project Manager. Provided professional services for the complete replacement of an existing chiller system. The project was phased and required close coordination with the owner, operations, and facilities to keep the plant operational during construction.

Freedom Readiness Center, Sykesville, Maryland. Project Manager / Co-Architect. Assisted in creating a functional, aesthetically pleasing, and budget conscious interior design. Involved from concept to construction documents and construction administration. \$24.5 Million Construction Budget.

Druid Finished Water Tanks, Baltimore, Maryland. Project Manager. Assisted a senior project architect / landscape architect with design through construction documents of the site to accommodate a new secure 54-million-gallon finished water tanks and pumping / hypo-chlorination facility. \$140 Million Construction Budget

Replacement of Loch Raven Dam Environmental Operation Facility, Baltimore, Maryland. Project Manager. Evaluation of two sites within the watershed property for a new environmental operations facility. The study led to full architectural design services. \$10 Million Construction Budget.

Fort Worthington Elementary School, Graceland, and Holabird Elementary/Middle Schools, Baltimore, Maryland. Project Manager. Assisted in providing landscape architecture and interior design services for three new schools.

Consolidated Rental Center Facility Conditions Assessment, Baltimore Washington Thurgood Marshall Airport, Maryland. Project Manager. Performed a facility assessment to determine maintenance and capital needs. The report provided a thirty-year outlook for each facility. Additionally, a year-by-year analysis for the first five years were provided for each individual building.

State Emergency Operations Center at Maryland Emergency Management Agency, Reisterstown, Maryland. Architectural Designer III. Responsible for the renovation of the State Emergency Operations Center used to manage emergency situations for the State of Maryland.

City Schools Facility Conditions Assessment (Jacobs Report), Baltimore, Maryland. Architectural Designer III. Responsible for the assessment of 50 schools as part of the school system's ongoing maintenance and improvement program. Proposed \$2.45 Billion Budget in Funding Over a 10-year Period

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.

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.

Little Kanawha Bus, Calhoun County, West Virginia. WV Division of Public Transit.

Electrical Engineer. Responsible for the Electrical Design, Electrical Document Preparation, and Construction inspection for electrical components for a new bus maintenance and office facility for Gilmer County. Duties include the design of the vehicle storage, cleaning and maintenance systems, as well as oil pumping and collection systems. The design of an energy efficient systems for the entire building is also part of his responsibilities. The facility was designed as a LEED® project.

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

Years with Michael Baker: 8
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, West
Virginia, 2013

Professional Engineer,
Pennsylvania, 1999

Professional Engineer, Kentucky,
2005

Professional Engineer, Oklahoma,
2008

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.

Wayne Airgood, P.E.

Structural Engineer

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.

Years with Michael Baker: 9
Years with Other Firms: 23

Degrees

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

Licenses/Certifications

Professional Engineer, Pennsylvania, 1999, PE054344E

Professional Engineer, Maryland, 2013, 43414

Professional Engineer, North Carolina, 2014, 041701

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.

Kevin Spangler, P.E.

Fire Protection Engineering Manager

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.

West Virginia School for the Deaf and Blind - Architectural/Engineering

Services for Multiple Projects, Romney, West Virginia. 3-year Contact. Mr. Spangler is currently working as the project Fire Protection Engineer for multiple projects at the school including; a campus wide Life Safety System, HVAC upgrades in two buildings, fire alarm upgrades, new and upgraded sprinkler systems in multiple buildings, and a complete renovation of the campus Physical Education Building.

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

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, **758**

Professional Engineer, Virginia, 2012, **0402051429**

Professional Engineer, Pennsylvania, 2012, **PE080542**

Professional Engineer, Illinois, 2013, **062.066001**

Professional Engineer, Idaho, 2014, **15849**

Professional Engineer, Connecticut, 2015, **0031007**

Professional Engineer, South Carolina, 2016, **33050**

Professional Engineer, Minnesota, 2016, **53795**

Professional Engineer, Mississippi, 2017, **27937**

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.



EXPRESSION OF INTEREST

BRUSHFORK ARMORY HVAC RENOVATION AT THE BRUSHFORK ARMORY FACILITY

SOLICITATION NO: CEOI 0603 ADJ2100000008

APPENDIX 2 – Project Profiles

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.

Brief descriptions of representative projects follow:

Client

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

Completion Date

2018

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

Facility Design

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.

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 stormwater 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 stormwater 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.

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 stormwater 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 stormwater management systems; and landscaping that minimizes the use of potable water, integrating native, low-maintenance, drought-tolerant plants and preserving existing trees.

Indefinite Delivery-Indefinite Quantity Contract for Architectural and General Engineering Services

Tobyhanna Army Depot and, North-Atlantic, Division Locations

Michael Baker is providing planning, architecture, and general engineering services under a three-year indefinite delivery-indefinite quantity contract for projects at U.S. Department of Defense installations within the North-Atlantic division.

Michael Baker's services address virtually every aspect of facility planning and design. Tasks including coordinating and implementing planning charrettes, conducting on-site investigations, conducting antiterrorism and force protection analyses, performing programming, performing space planning and interior design, developing building systems designs (including HVAC, electrical, and plumbing and fire protection systems), developing construction cost estimates, reviewing construction submittals, responding to contractor requests for information, and preparing as-built plans.

Assignments include developing designs for building renovations as well as new construction.

Representative projects awarded to date are summarized below.

Renovation Design of Building 2, Bay 4 Renovation, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker is serving as the designer of record on a design-bid-build project to fully renovate Building 2, Bay 4. Michael Baker performed architecture and engineering for building systems design and develop construction cost estimates. The modifications enabled relocation of offices, warehouse storage and work assembly and packing facilities for mission support. The work was also necessary to comply with building codes and Americans with Disabilities Act requirements.

On-Call HVAC Engineering Support Services, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker provided on-call HVAC engineering support to client staff. Michael Baker's HVAC engineering duties as a technical consultant involved field survey, feasibility study, engineering report, design and layout, and construction support services. Michael Baker provided an on-site mechanical engineer for assignments, as necessary. Projects were accomplished by in-house personnel or contractors. Assignments included modifications of HVAC design for extensive interior renovations to Building 3, the back-ramp-area of Building 1-A, and the first-floor of Building 11, and for the construction of an addition to Building 17; evaluation of HVAC system needs and management of

Client

Tobyhanna Army Depot
11 Hap Arnold Boulevard
Building 18
Tobyhanna, Pennsylvania 18466

Completion Date

Estimated: 2021

Michael Baker's Role

- Project management
- Planning and design charrette coordination
- Planning and programming
- Space planning
- Architecture
- Multidiscipline engineering services
- Antiterrorism and force protection analysis
- Cost estimation
- RFP Wizard implementation
- Sustainable design – Silver LEED certification
- On-site investigation
- DD Form 1391 parametric cost estimation

construction for Building 30 – a new 78,000-square-foot facility – and for two new officer-grade family housing facilities; and the design of new or upgrade of existing HVAC systems as part of renovations to numerous warehouses throughout the depot.

Design and Construction Phase Services for Family Housing Unit Renovations, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker developed designs and construction cost estimates, performed construction submittal reviews, responded to contractor requests for information, and prepared as-built plans for the installation of new front-porch roofs and rear-patio privacy fences for 10 buildings containing 40 family housing units (Buildings 501 through 509).

Barracks Restroom Renovation Design, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker performed design and construction phase services for barracks restroom renovations. Michael Baker's tasks included developing designs for the demolition of the existing second- and third-floor east-end enlisted personnel restrooms, expansion of the shower area to include additional showers, and complete replacement of all plumbing fixtures, lighting fixtures, exhaust components, and floor and wall finishes.

Renovations to Building 5, Bay 1, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker is serving as the designer of record on a design-bid-build project to renovate Building 5, Bay 1. The scope of work involves adding HVAC capacity, installing a drop-ceiling system, expanding existing restrooms, and enhancing door systems. Michael Baker will prepare design and construction plans and construction cost estimates. Michael Baker will investigate options to enhance HVAC performance and increase cooling in work room 155 of Building 5. Individual dedicated air-conditioning units will be designed for the TYQ-23 testbed room and two TYQ-23 mobile shelters to replace the field HVAC units currently being used. A drop-ceiling system with T8 lighting fixtures will be designed for work room 170 of Building 5. Michael Baker will design an air handling unit that provides full HVAC and humidity control for the work room to replace the existing unit heater that serves the space. Restroom renovation design will involve the installation of additional fixtures to increase capacity and replace the existing fixtures. Door system modifications include reconfiguring the double vestibule at the main north entrance and the adjoining office and corridor to maximize the usable space as well as replacing four existing roll-up door installations with automatic sliding glass door systems.

Renovation Design of Building 10, Bay A and Bay C, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker is serving as the designer of record on a design-bid-build project to fully renovate Building 10 A and partially renovate 10-C at Tobyhanna Army Depot. Michael Baker will perform architecture and building systems design, develop construction cost estimates, and prepare as-built plans. The modifications will enable relocation of the client's Environmental Control Branch repair shop and fabric application shop from other locations at the depot and reconfiguration of the carpenter shop operations that currently exist in Building 10-A. The work is also necessary to comply with building codes and Americans with Disabilities Act requirements.

Erected in the 1950s, Building 10 is of permanent construction and consists of a single-story, steel-frame structure with CMU walls with an EFIS exterior finish on the north and east sides. It is divided into three bays. 10-A encompasses a 200-foot by 134-foot area currently used solely for the carpenter shop. 10C contains approximately 500 square feet of office space that will be demolished and replaced with a two-story, freestanding, in-plant office tower. Work within 10A will entail the demolition of the compressed air and steam stations; demolition of light fixtures and upgrading of the lighting system; upgrade of electrical systems to conform with NEC 2005 and client specifications; establishment of adequate compressed air supply and air drops to machines and work benches; installation of two new steel-stud-and-gypsum-board walls to divide the bay into three separate shops; installation of sliding glass electric doors in the new walls; removal of exterior windows and closure of the openings using CMU

and an EFIS finish system; painting of the interior CMU walls; replacement of overhead and personnel doors; renovation of the office near the mezzanine; renovation of the mezzanine to accommodate two additional offices, with full HVAC; and installation of two modular-office mezzanines with stairwells, one in the Environmental Control Branch repair shop and one in the fabric application shop, with full HVAC. Work within Bay C will entail the installation of a new in-plant modular office tower, which will feature two offices on the upper level with walk-through access and a conference room and copy/print room on the lower level, with full HVAC.

Design and Construction Phase Services for Elevator Installation, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker is providing architectural and engineering services for the installation of a new elevator and related equipment in Building 12. The new elevator will provide access to the proposed second-floor mezzanine that will be installed as part of the Building 12 office renovation project and is necessary to comply with building codes and Americans with Disabilities Act requirements. Elevator installation must also be coordinated with other concurrent Building 12 projects, which include restroom, administrative, and testing area renovations. The scope of work entails installation of ceiling, flooring, and permanent walls and all finishes; modification of the roof to accommodate the elevator penthouse, installation of the elevator pit, modification of foundations, and installation of a hoist beam; installation of a sump pump; demolition of the existing interior wall to enable access to the proposed second floor mezzanine and installation of a lintel for the new wall opening; repair and upgrade of the HVAC system to serve the mechanical equipment room; repair and upgrade of electrical distribution and lighting systems; potential modifications to the existing fire sprinkler system; and installation of common access card readers for elevator access. Michael Baker's services include architecture; mechanical, electrical and fire protection engineering, construction cost estimation, and as-built plans development.

Design and Construction Phase Services for Renovation of Building 12 Administrative Space, Tobyhanna Army Depot, Tobyhanna, Pennsylvania. Michael Baker is serving as designer of record on a design-build project to renovate the administrative space on the east side of Building 12. The project involves renovating the existing administrative space and relocating the majority of functions to the planned new second-floor mezzanine, which will be constructed as part of the office renovation on the west side of the building. The undertaking is necessitated by the transfer of the depot's Test, Measurement, and Diagnostic Equipment testing area from Building 1-A to the east side of Building 12 and must also be coordinated with other concurrent Building 12 projects, which include restroom, elevator, and testing area renovations. The scope of work entails installation of a drop ceiling, flooring, permanent walls, all finishes, and cubicle systems; development of the basic furniture and cubicle layout; repair and upgrade of the existing HVAC system to serve the second-floor space; demolition of existing high-pressure steam lines to accommodate the new layout; repair and upgrade of the building electrical distribution, telecommunications, and lighting systems; modification of the existing Public Address and Audio Visual Information System system to serve the new space; modification of the fire sprinkler system to serve the new space; installation of common access card readers for exterior doors, the elevator, and stairwell areas; and provision of access to the proposed second-floor restrooms that are part of the office renovation project and future access to restrooms from unfinished space on the second-floor mezzanine. Michael Baker will convene and conduct a planning charrette and develop design and construction plans and construction cost estimates. Michael Baker's tasks encompass architecture; interior design; mechanical, electrical and fire protection engineering; construction cost estimation; and as-built plans development.

West Virginia Schools for the Deaf and the Blind

Romney, West Virginia

Michael Baker provided general Architectural and Engineering services to the West Virginia Schools for the Deaf and the Blind in Romney, WV for three different Bid Packages. The first Bid Package included three main tasks.

TASK 1 - School for the Deaf - Multipurpose Room HVAC Upgrades.
Design for the replacement of the Existing HVAC System serving the Multipurpose room. Design will include provisions for Fresh Air in accordance with ASHARE 62.1 Guidelines. Some structural, architectural, ductwork and electrical modifications were included.

TASK 2 - School for the Deaf - Life Safety System (this was expanded to the entire campus).

Design plans and specifications for the installation of an integrated Life Safety System that include:

- a. Mass notification hardware and software for Deaf as required for a complete system
- b. Design and specify new hardware as required
- c. Integration with existing campus systems as practical

TASK 3 - School for the Deaf - Fire Alarm Upgrades.

Upgrade existing Fire Alarm System to meet current codes and interface with New Life Safety System. Complete design for a building wet sprinkler system and that may include any affected building components. Existing sprinkler line entrance is provided. Only interior work provided. Design to include Hazard Classifications, riser detail, hydraulic calculations, basic pipe routing.

The second Bid Package included adding a Sprinkler System to the Instructional Resources Center and sprinkler modifications and upgrades to various other building to comply with BRIM and Fire Marshal requirements.

The third Package was a client requested a feasibility study of the Physical Education building, which laid the groundwork for the third task; the HVAC renovation of the entire building; including a gymnasium, indoor swimming pool, exercise rooms and locker rooms.

Each formal submission will include a cost opinion for the proposed work. Construction on all projects were completed by March 2021.

Client

West Virginia Schools for the Deaf and the Blind
301 E Main Street
Romney, WV 26757

Completion Date

March 2021

Michael Baker's Role

- Feasibility studies
- Architecture
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Plumbing engineering
- Cost estimates
- Construction Administration



West Virginia State Capitol Restroom Renovations

Charleston, West Virginia

Baker led a team of experts in a planning study for the restoration or renovation of 31 restrooms in the West Virginia Capitol Building. The planning study was intended to 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. The infrastructure of the plumbing and associated systems was also assessed in the course of the study including; water and sewer, fire protection, ventilation, electrical and structural as it related to the restrooms.

The capitol building was built in three phases between 1925 and 1932 and is on the National Register of Historic Places.

The study and subsequent design addressed the design framework for the renovation of the selected restrooms, provided an overall project cost, and propose a logical sequence of design, construction, and schedule of implementation over three years. The study portion identified and verified physical characteristics, including room layouts; fixture counts; location of all mechanical, electrical, and plumbing (MEP) devices; current level of ADA compliance; and location and condition of vitrolite and carrara glass panels. The study also included an analysis of building population issues, building code issues, and the potential impacts of construction.

The findings and recommendations were presented and accepted, and a complete set of construction documents were developed with **construction sequencing and scheduling**.

Eleven (11) of the 33 restrooms designed were completely renovated on the east side of the Capitol in 2021.

Client

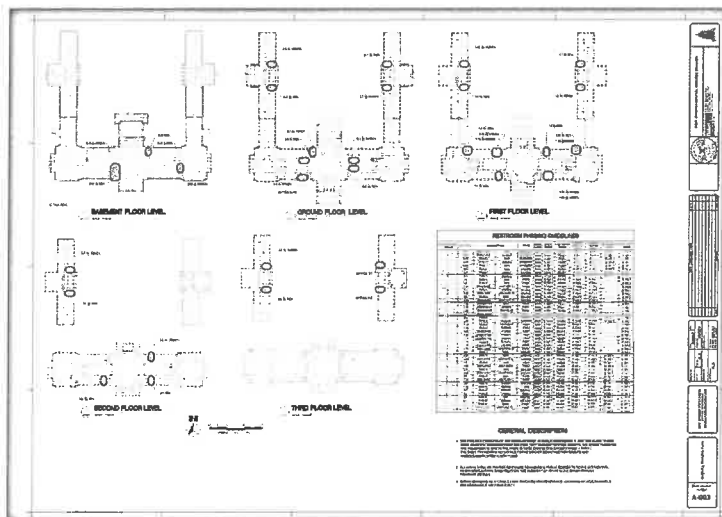
State of WV General Services
Division
Department of Administration
1900 Kanawha Boulevard East
Building 1, Room MB-60
Charleston, WV 25305

Completion Date

February 2021

Michael Baker's Role

- Feasibility studies
- Architecture
- Plumbing engineering
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Cost estimates



WVU Institute of Technology, Classroom Building

Beckley, West Virginia

Michael Baker provided general Architectural and Engineering services to the West Virginia University Institute of Technology, Beckley Campus. The client requested a feasibility study, which laid the groundwork for the ambitious renovation of two buildings concurrently. The first was the Classroom building, the facility will house engineering labs, computer classrooms, psychological observation and Rat laboratories as well as some administrative services.

The Classroom Building required extensive coordination between generations of building engineering systems as well as selective demolition of architectural interior systems to allow for update use. The 31,000 SF facility was designed originally as a junior high school on the 1940's and was renovated to house technically advanced mechanical, hydraulic and computer engineering laboratories. To bring the facility to the 21st century, a student lounge, student rest and study spaces- where electronics can be utilized and charged- were devised from a former kitchen and corridor locker areas, respectively. A modern mechanical distribution system was designed to support air conditioning while a new, **building-wide fire suppression system**, complete with a larger water supply line, was engineered. The Classroom Building also included the design of a psychological observation laboratory that requires national accreditation and necessitated special design considerations.

The facility also received a completely new EPDM roof to shore up existing water problems. A large energy recovery unit was installed on the roof to provide fresh air to the classrooms throughout the building. The Classroom Building also required technical coordination of the existing door hardware to interface with existing products as appropriate and necessary. These hardware considerations also had to align with campus wide standards. Lastly, both facilities received interior upgrades to emphasize University branding elements and bring renewed life to a defunct campus.

Additionally, all portions- feasibility study to design and cost proposals- of this traditional design, bid, and build project were performed under a compressed and confined time constraint, allowing the client to successfully move one campus to another in one short year.

Client

West Virginia University
Beckley Campus
400 Kanawha Street
Beckley, WV 25801

Completion Date

July 2017

Michael Baker's Role

- Feasibility studies
- Architecture
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Plumbing engineering
- Cost estimates
- Construction Administration



WVU Institute of Technology, Benedum Building

Beckley, West Virginia

Michael Baker provided general Architectural and Engineering services to the West Virginia University Institute of Technology, Beckley Campus. The client requested a feasibility study, which laid the groundwork for the fast pace renovation of the building prior to the start of the new school year in August 2017. The facility will house administrative services, student services, student government, a recreational area and upward bound.

The work completed at the 21,000 SF Benedum Center included interior finishes selection to support large numbers of student use. Other notable portions of the work included **upgrades to the mechanical and fire alarm and fire suppression systems** as well as retrofitted ADA toilet facilities. A conglomerate of three separate buildings, special attention was spent on exiting requirements and coordination of door hardware systems.

The facility also received a completely new EPDM roof and specialized basement wall treatments to shore up existing water penetration problems. The Benedum Center also required technical upgrades including new data lines and server. The project also requires lots of coordination of the existing door hardware to interface with existing products as appropriate and necessary. These hardware considerations also had to align with campus wide standards. Lastly, both facilities received interior upgrades to emphasize University branding elements and bring renewed life to a defunct campus.

Additionally, all portions- feasibility study to design and cost proposals- of this traditional design, bid, and build project were performed under a compressed and confined time constraint, allowing the client to successfully move one campus to another in one short year.

Client

West Virginia University
Beckley Campus
400 Kanawha Street
Beckley, WV 25801

Completion Date

July, 2017

Michael Baker's Role

- Feasibility studies
- Architecture
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Plumbing engineering
- Cost estimates
- Construction Administration



WVARNG Charleston Armory HVAC & Architectural Renovations

Charleston, West Virginia

The existing building/facility started as the Coonskin Armory constructed in 1961. The Headquarters Building was constructed simultaneously with the Coonskin Armory and occupied the second floor. Also in 1961, as a separate structure, the Adjutant General's Wing (TAG Wing) was constructed nearby. Later, in 1984 the Coonskin Armory/Headquarters Building was physically connected to the TAG Wing with an area of administrative offices. This final major construction project connected all the buildings into one major facility of over 50,000 square feet, referred to as the Charleston Armory. The West Virginia Army National Guard (WVARNG) Construction and Facilities Management Office (C&FMO) requested a study be conducted of the consolidated mechanical and electrical components of the consolidated facility known as the Charleston Armory. Such items were considered as the condition of existing HVAC/MEP systems and design improvements or upgrades to those systems and examination of the existing building envelope and recommend possible improvements to the Envelope, HVAC, Electrical and Plumbing systems.

A loop pipe water source heat pump system determined the most cost effective for this situation, with fewer pipes, smaller space requirements and a lower installation cost. Various HVAC components included a Fluid Cooler, Boilers, Pumps, Wall Consoles, above ceiling HPs, along with some Rooftop Units and Energy Recovery Units. During the renovation process, mold was discovered growing in certain areas of the building. An investigation was undertaken, building humidity was logged and measures were implemented to install dehumidification in existing equipment in the building, building leaks were sealed and existing mold was remediated. Baker's design also addressed the repair of the existing roofing system, addition and repairs of roof curbs for HVAC equipment, repositioning of blocking and walk pads around the roof, and installation, repair and patching of the existing EDPM roofing system and maintaining the existing warranty.

Client

West Virginia Army National Guard
Division of Engineering and
Facilities
1703 Coonskin Drive
Charleston, WV 25311-1085

Major Michael J. Beckner
304-561-6333

Contract Completion Date

2013

Baker's Role

- Architecture
- Mechanical Engineering
- Feasibility studies
- Cost estimates
- Civil engineering
- Electrical Engineering
- Structural engineering
- Environmental Permitting



Design of U.S. Army Reserve Center Renovation and Expansion

Homewood, Illinois

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 project also includes parking spaces for 140 privately owned vehicles (POV) and approximately 22,000 square yards for military equipment parking (MEP).

Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement.

The project involved complete renovation of the 24,680-square-foot, single-story Vietnam Veterans' Memorial ARC, which was erected in 1985, using the existing footprint. While the ARC had reliably served south Chicago, the structure's building systems were nearing the end of their design life. Replacement was required to enable the facility to accommodate growing U.S. Army Reserve Unit Brigade Combat Team training needs, optimize operations, and achieve mission goals. The client chose renovation as it was a much more cost-effective alternative than replacement.

The 34,294-single-story Training Building addition accommodates core training functions and establishes the main point of entry for the ARC. This new structure includes offices and administrative areas, an assembly hall, classrooms, a library, a learning center, and an assembly hall with a kitchen. The approximately 1,400-square-foot ancillary addition houses a mail room and staging area. The renovated portion of the ARC houses utilitarian areas, including unit storage and heated storage spaces, a physical readiness room that features a 1,643-square-foot fitness center with a full complement of athletic equipment and is served by adjacent showers and locker rooms, a weapons simulator room, an arms vault, mechanical and electrical rooms, and a janitor's closet. A free-standing wash rack is provided near the Unheated Storage Building to meet vehicle cleaning needs.

The Unheated Storage Building provides space for storage of user operational equipment that requires no temperature or humidity control.

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

2016

Michael Baker's Role

- Planning
- Environmental investigation
- Hazardous materials surveys
- Sustainable design
- Site and civil engineering
- Geotechnical investigation
- Architecture
- Interior design
- Structural engineering
- Mechanical engineering
- Plumbing design
- Fire protection engineering
- Electrical engineering
- Communications design
- Cost estimation
- LEED® credit template documentation

Supporting project elements include environmental investigation prior to renovation of the existing ARC; grading, paving, fencing, and signage; force protection measures; exterior lighting; utility and storm drainage system connections; fire protection and fire alarm and mass notification systems; and security lighting. Structures provide access for disabled individuals. The project expanded existing parking facilities by approximately 68,800 square feet to accommodate equipment and serve reservists and visitors.

Michael Baker designed the ARC reconfiguration to meet LEED® NC 2009 Silver certification. Tasks for which Michael Baker was responsible include engineering feasibility evaluation, architecture, surveys, hazardous waste investigation of the existing ARC and remediation recommendation, geotechnical investigation oversight, all site and building engineering, cost estimating, value engineering, and LEED® credit template documentation. Michael Baker convened a design charrette and collaborated with the client in identifying needs and preferences and preferred design alternatives.

Designs comply with applicable federal, state, and local codes and standards, including the following: Unified Facilities Criteria ([UFC] 4-171-05); International Building Code; International Plumbing Code; International Mechanical Code; National Fire Protection Association (NFPA) standards; Uniform Federal Accessibility Standards; the Americans with Disabilities Act; the Environmental Protection Agency Clean Water and Clean Air acts; and the requirements of ASHRAE, American National Standards Institute, American Society for Testing and Materials, and OSHA.

Site Reconnaissance and Geotechnical Investigation

Before work commenced, the Michael Baker team evaluated and documented existing surface and subsurface conditions, which entailed making several visits to the site.

Michael Baker also conducted an environmental building survey of the existing ARC. Michael Baker performed a hazardous material investigation, prepared an environmental report, and developed designs to remediate issues.

To evaluate geologic conditions, Michael Baker oversaw a geophysical survey, which involved time-domain electromagnetic technology, ground-penetrating radar, and radio detection. The team identified underground utilities and excavated test pits to expose unmarked utilities, which helped to avoid project schedule delays and complications during construction. Geotechnical evaluations confirmed that shallow spread footings would be an acceptable foundation type for the Training Building and Unheated Storage Building.

Overall Building Construction

The Training Building addition is of permanent construction and includes reinforced concrete foundations, concrete masonry load-bearing walls and concrete floor slabs; structural steel framing; mechanical, electrical, information, security, and fire suppression sprinkler systems; automated building HVAC mechanical and lighting system controls; energy-efficient lighting; interior finishes; window systems; standing-seam metal roofing; and exterior finishes consisting of attractive masonry facades.

The Unheated Storage Building is a pre-engineered metal building supported by a reinforced concrete foundation with a cast-in-place concrete on-grade floor and sloped roof.

The vehicle wash rack also has a sloped roof supported by a pre-engineered metal building with steel purlins spanning between steel girders. The girders form steel rigid frames with the building columns.

Exterior Systems

Building Envelope

A structural steel framing system supported by load-bearing concrete masonry walls and steel columns, beams, and joists forms the exterior envelope of the Training Building additions and supports gravity loads. The exterior wall system of the building additions is brick masonry veneer with rigid cavity wall insulation and concrete masonry backup, and the foundation system is slab-on-grade concrete.

A concrete masonry shear wall system will resist lateral loads imposed by wind and seismic forces. The exterior walls are designed to distribute lateral forces to the roof diaphragms and then to the shear walls and foundation system.

The roofing system of each building addition consists of a modified bitumen membrane roof with one-inch-in-12 pitch, sloped towards roof drains that are connected to the site stormwater system. Each roofing system is supported on a one-inch galvanized metal roof deck spanning between open-web joists. Joist members are supported by steel girders and masonry load-bearing walls.

An expansion joint separates the existing ARC from the primary building addition; the smaller addition is directly attached to the existing ARC.

The roofing system and underlying insulation on the low-slope roof of the existing ARC were replaced with new polyisocyanurate insulation with an R-28 value and a low-slope, modified bitumen roofing system. The roofing system over the primary building addition is a low-slope roof with a modified bitumen membrane. The roof sections of the primary and ancillary building additions have integrally manufactured white reflective coating to minimize the heat island effect. The new ARC roof light monitors have standing-seam metal roofs.

The Training Building additions incorporate thermally broken, anodized aluminum, fixed windows with aluminum storefront assemblies for large expanses of glazing and light at the major building entry point. Insulated, painted metal doors in hollow metal frames serve all utilitarian areas.

The Unheated Storage Building is a pre-engineered metal building with insulated metal wall and roof panels, non-insulated exterior walls, and a slab-on-grade concrete floor.

Interior Systems

The interior design of the reconfigured ARC supports the client's functional and aesthetic needs. Painted gypsum wallboard is used for the majority of interior partitions in the Training Building. Exceptions are the vault, which consists of painted reinforced concrete walls in accordance with UFC, and the unit storage, kitchen, and mail screening room, which incorporate painted concrete masonry units. Wall color and floor coverings comply with UFC 4-171-05.

HVAC

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

The Training Building is served by a central, modular, water-to-water heat pump plant, which is tied to a closed-loop geothermal wellfield, along with a closed-circuit fluid cooler for loop-heat rejection; high-efficiency, natural gas-fired boilers; variable-flow hydronics; an HW/CHW VAV air handling system; and a Unit Storage area ventilation unit

featuring direct-fired gas heating. Carbon dioxide and occupancy sensors vary the outside air quantities based on real-time occupancies for energy savings.

The design also features an antiterrorism and force protection-rated mail processing area, humidified TERs, and direct digital controls, which will regulate and monitor all building HVAC systems and monitor all building utilities.



Electrical Design

The electrical system includes power, lighting, fire alarm and mass notification, structured cabling raceway, public address, cable television distribution, telecommunications, and security systems. Michael Baker selected the main switchboard, distribution panelboards, and lighting and appliance panelboards for the Training Building for high reliability, low maintenance, efficiency, and maximum flexibility. As well, Michael Baker selected the step-down transformers for low-energy loss and short-term overload capability.

Electrical service is also provided from the reconfigured Training Building to the existing Organizational Maintenance Shop via a 480v feeder circuit and a 480v feeder circuit to the new Unheated Storage Building.

Conserving energy in interior and exterior lighting was Michael Baker's design priority for the Training Building. Interior lighting design incorporates low-maintenance fluorescent fixtures with energy-efficient electronic ballasts and T8 lamps. Interior systems include occupancy sensors and lighting control panels to turn off lights and conserve energy in office areas, corridors, and restrooms. Exterior lighting included building-mounted and site pole security lighting with energy-efficient, long-life LED lamp sources. The parking area hardstand and roadways include pole-mounted security lighting.

Michael Baker designed a photovoltaic energy system consisting of ground-mounted solar panels and DC-to-AC inverter to produce equivalent annual kilowatt hours (kWh) consumed by the site lighting system. The photovoltaic system was designed to produce a nominal peak output power of 15 kW. This "green power" was connected to backfeed the building power distribution system and supplement the utility grid power source to the site, thereby reducing peak power demand from the utility.

Michael Baker also prepared specifications for a complete building lightning protection system with UL master labeling for the Training Building. 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. 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 switchboard grounding busbar.

Security and Communication Systems Design

Michael Baker designed separate intrusion detection systems for the arms vault and SIPRNET Caf, including raceways, junction boxes, device boxes, electrical power, and communications infrastructure. The project design included an access control system with head-end server, work station, local control panels, card readers at the site security gate and building entrances, and door contacts at all entrances and exits for the Training Building. The building entrances with card readers include electric strike and request-to-exit devices. Michael Baker designed the infrastructure for four telecommunication networks, including voice, within the Training Building, Organizational Maintenance Shop, and Unheated Storage Building and three data networks: ARNET, CAPOC, and SIPRNET. Each network involved the design of raceways, including cable tray, ladder racks and conduits, backbone cabling consisting of single-mode fiber and multi-pair copper, horizontal cabling consisting of CAT 6, outlets with RJ-45 jacks, consolidation points, racks, cabinets, protected entrance terminals, patch panels, 110 blocks, and grounding. The design of the telecommunications systems included outside-plant and inside-plant systems. A CATV system, including amplifiers, taps, splitters, RG-11 and RG-6 cabling, and outlets, was designed for the Training Building and Organizational Maintenance Shop.

Plumbing and Fire Protection

Tankless, high-efficiency, natural gas-fired water heaters located in the Training Building mechanical room and manifold provide the flow rate required for the fixtures served. The water heaters incorporate multiple controllers, a temperature and pressure-relief valve, pressure regulators, shut-off valves, and drain valves. In compliance with manufacturer instructions, a small, electrically fired water heater was installed in the re-circulating water line to maintain loop water temperature at 120 degrees F. An in-line circulating pump controlled by a time clock and aqua stat maintains water temperature in the loop to the fixtures.

To fully protect the Training Building in the event of fire, an automatic wet-pipe sprinkler system was installed in accordance with UFC 3-600-01, NFPA 72, and UFC 4-021-01. Michael Baker specified a fully addressable, intelligent fire alarm and mass notification system to serve each of the primary facilities. The annunciated system is configured for manual as well as automatic operation and electronic supervision. The signaling, initiating, and notification circuits are served by a Class B looped system. Fire alarm circuit wiring is installed in conduit.

Antiterrorism and Force Protection

Michael Baker integrated protective measures into the ARC renovation design that meet U.S. Department of Defense antiterrorism and force protection setback requirements. These include locating the ARC on the site to achieve the maximum feasible standoff distance from roads, parking areas, and vehicle loading areas; the use of blast-resistant doors and windows; and the incorporation of an emergency shutdown switch to disable all HVAC air distribution systems.

Sustainable Design

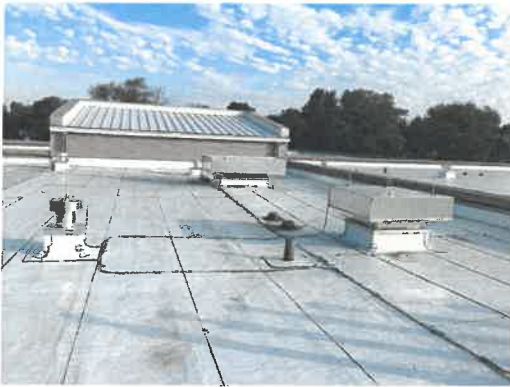
Sustainability initiatives were implemented throughout building design. Building design incorporates materials and features to reduce environmental effects, save energy, and minimize costs. Materials that are locally available and products with 20-percent recyclable content were used. Occupancy sensors reduce lighting energy consumption.

Interior building water-saving features, such as low-flow plumbing fixtures to reduce water consumption, will be used. Ozone-friendly refrigerants and refrigerant quantities will minimize ozone depletion.

Michael Baker coordinated the installation of a solar photovoltaic array and inverter system, which provides electrical energy to supplement utility provider-supplied electricity. The solar panels will offset the annual energy consumed by the new exterior lighting.

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. This project has achieved LEED certification.



Design of Tactical Equipment Maintenance Facility and Equipment Concentration Site Warehouse

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. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement.

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, including Warrior Exercises and the installation's Combat Support Training and Regional Training, by storing and maintaining more vehicles and furnishing all required equipment for training units. This will eliminate the need for training units to ship their own equipment to and from the installation and related costs.

Used for military vehicle maintenance and repair, the TEMF consists of two main types of functional areas: repair bays, which include repair and maintenance areas, and a core area. Spaces and features include an overhead bridge crane, equipment and parts storage rooms, secure arms and Comsec vaults, and administrative support and training areas.

The repair bays are single-story, ground-floor, column-free garage areas used to service and repair the full range of Army tactical equipment. They contain maintenance and repair work spaces, separate welding bays, a 10-ton traveling-bridge crane, and data connection points for NIPRNet and SIPRNet. A vehicle exhaust evacuation system serves each repair work area. Repair and maintenance areas are equipped with hose reels for the dispensing of oil and other lubricants and fluids required during inspection and maintenance procedures. The maintenance pit is designed with a removable cover and grated sections that are in place during periods of nonmaintenance to protect personnel from potential fall hazards, as well as to shorten access across the pit for personnel when the pit is not in use. Emergency stations for eye washing, hand washing, and showering that meet OSHA standards are provided.

The core area contains the following functional spaces: administrative and shop-control office space; a break-training room; production control area; storage areas; a supply area, which replaces the consolidated bench; a tool room; restrooms, showers, and locker rooms for men and women; an armory vault; a communications security vault; a nonsensitive secure storage room; a telecommunications equipment room for voice and data systems; common

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

2016

Project Costs

Michael Baker's Role

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

circulation and waiting areas; mechanical and electrical rooms; a flammable storage room; and a fluid distribution room.

The ECS Warehouse consists of general warehouse space with a staging area; a receiving office; a classroom-breakroom; two vault areas to handle the separate U.S. Army Reserve and ECS missions; and a mechanical room, an electrical room, and a telecom room. The vaults and warehouse have a clear height of 25 feet. This clearance enables forklift access throughout the vaults—a unique design feature of this ECS facility. In addition, there is a tent-drying area that is accessed via an overhead door from the north side of the building.

Supporting project elements include field investigation for the presence of wild lupine, which attracts threatened-and-endangered species; grading, paving, fencing, and signage; force protection measures; exterior lighting; utility and storm drainage system connections; fire protection and fire alarm and mass notification systems; and security lighting. Structures provide access for disabled individuals. The project expanded existing parking facilities by approximately 30 acres to accommodate equipment and serve military personnel.

Michael Baker designed the new TEMF and ECS Warehouse to meet LEED® NC 2009 Silver certification. Tasks for which Michael Baker was responsible include architecture, surveys, hazardous waste investigation and remediation recommendation, geotechnical investigation oversight, all site and building engineering, cost estimating, value engineering, 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.

All designs comply with applicable federal, state, and local codes and standards, including the Unified Facilities Criteria (UFC; [UFC 4-171-05]); International Building Code; International Plumbing Code; International Mechanical Code; National Fire Protection Association (NFPA) standards; Uniform Federal Accessibility Standards; the Americans with Disabilities Act; the Environmental Protection Agency Clean Water and Clean Air acts; and ASHRAE, American National Standards Institute, American Society for Testing and Materials, and OSHA requirements.

Site Reconnaissance and Geotechnical Investigation

Before work commenced, Michael Baker and its team evaluated and documented existing surface and subsurface conditions. Tasks included conducting a geotechnical investigation to characterize subsurface conditions and a geophysical survey to verify results and identify underground utilities and subsurface anomalies.

Overall Building Construction

The TEMF and the ECS Warehouse are pre-engineered metal buildings of permanent construction, with reinforced concrete foundations and reinforced concrete floor slabs; structural steel framing; mechanical, electrical, information, security, and fire suppression sprinkler systems; automated building HVAC mechanical and lighting system controls; energy-efficient lighting; interior finishes; window systems; low-sloped roofing; and exterior finishes consisting of attractive masonry facades.

Exterior Systems

Building Envelope

The exterior building envelope of the TEMF and the ECS Warehouse constitutes a pre-engineered structural steel framing system, with steel columns, beams, and joists, to support gravity loads. The exterior wall systems consist of concrete masonry units (CMU) at variable heights and prefinished insulated metal panels. The foundation system of each structure is slab-on-grade concrete.

Structural Steel Framing System

The steel framing system of the buildings will resist lateral loads imposed by wind and seismic forces. The exterior walls are designed to distribute lateral forces to the roof and floor diaphragms and then to the foundation system. Both structures incorporate CMU exterior and partition walls in the lower wall areas to ensure durability and resist impacts.

The roofing system of each building consists of a modified bitumen membrane roof. The TEMF roof has a two-inch-per-foot pitch, and the ECS Warehouse has a inch-per-foot pitch; both roofs are sloped towards drains that are connected to the site stormwater system.

The exterior walls and roof heights for the TEMF correspond to the high-bay/low-bay configuration required for the building functions. The TEMF incorporates a 7-foot band of reinforced split-faced CMU at the base which varies in height, with insulated metal building system panels above.

The ECS Warehouse also has a base of four-inch split-faced CMU with insulated metal panels above. The metal wall portion includes a clerestory with a translucent insulated fiberglass system to optimize thermal performance and daylighting of work and storage areas. The thermal performance of the sectional overhead doors is superior to that of overhead coiling doors.

Insulation

Insulation was designed to comply with Energy Policy Act of 2005 requirements. Roof insulation for the TEMF and ECS Warehouse consists of fiberglass batt insulation that satisfies the ASHRAE 90.1R-19 requirement for metal buildings. An air barrier was constructed in the TEMF that encompasses the mezzanine, but excludes the stairwells, which are separated by sealed doors. The air barrier consists of a drywall shell constructed at the exterior walls and the wall at the high-bay area and the roof, and masonry at the stair towers. Windows and other penetrations were also sealed. The team tested the air barrier when building construction was completed, using the depressurization method. The building performed above the minimum U.S. Army Corps of Engineers air barrier requirements.

Interior Systems

HVAC

The HVAC system includes an array of design solutions to serve a variety of spaces and building functions. Office space for typical administrative functions in both buildings is served with a DX cooling-hot water boiler system and a variable air volume air distribution system that provides airside recovery. Carbon dioxide (CO₂) sensors are used to vary the outside air quantities based on real-time occupancies for energy savings.



Gas-fired infrared unit heaters paired with hot-water in-floor radiant heaters provide space heating, and gas-fired makeup units provide ventilation air for the high-bay area and maintenance corridor in the TEMF. Heating, cooling, and ventilation for TEMF second-floor offices, classrooms, and training-break-conference rooms is regulated by individual variable air volume boxes with hot water reheat coils to meet the unique ventilation and conditioning requirements of those spaces, based on actual occupancy and existing CO₂ levels.

Hot-water unit heaters provide space heating, and direct gas-fired makeup air units provide ventilation for the ECS Warehouse storage area.

In electrical and fluids dispensing rooms, wall-mounted outdoor air intake louvers with motorized dampers and associated exhaust fans provide thermostatically controlled ventilation, and wall-mounted or ceiling-hung electric unit heaters provide heat for these spaces. Mechanical rooms are heated with hot water unit heaters.

The TEMF includes a direct digital-control automatic temperature control system to regulate and monitor all building HVAC systems.

As part of antiterrorism and force protection measures, an emergency shutdown pull-switch is provided in both buildings to disable all of the HVAC air distribution systems, in accordance with UFC-4-010, Appendix B-4.3.

Electrical Distribution System

Electrical distribution for the TEMF and ECS Warehouse includes power, lighting, fire alarm and mass notification, structured cabling raceway, public address, cable television distribution, telecommunications, and security systems. The main switchboard, distribution panelboards, and lighting and appliance panelboards 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. Building systems include occupancy sensors to turn off lights and conserve energy in office areas, corridors, and restrooms. Lighting design incorporates fluorescent fixtures with energy-efficient electronic ballasts and T8 lamps.

Plumbing and Fire Protection

The building plumbing systems provide connections for water, oily waste, and sanitary sewer services, including all pipes, fixtures, and equipment.

Domestic hot water for both buildings is produced by a single gas-fired water heater to reduce maintenance. The water heater incorporates multiple controllers, a temperature and pressure-relief valve, pressure regulators, shut-off valves, and drain valves. In compliance with manufacturer instructions, a small, electrically fired water heater was installed in the re-circulating water line to maintain loop water temperature at 120 degrees F. An in-line circulating pump controlled by a time clock and aqua stat maintains water temperature in the loop to the fixtures.

An industrial water system is provided for the TEMF vehicle repair and maintenance bays and is supplied from the domestic water system through a reduced pressure-type backflow preventer feed from the domestic water system. Compressed air and POL distribution systems are provided throughout the maintenance and repair areas.

To fully protect the TEMF and ECS Warehouse in the event of fire, Michael Baker's design integrated an automatic wet-pipe sprinkler system, designed in accordance with UFC 3-600-01, NFPA 13 and International Building Code 2006. Michael Baker specified a fully addressable, intelligent fire alarm and mass notification system to serve both facilities. The annunciated system is configured for manual as well as automatic operation and electronic supervision. Fire alarm circuit wiring is installed in conduit. Fire alarm system features for the TEMF passenger elevator include smoke detection and elevator recall.

In addition, the TEMF is served by two double-walled, 500-gallon aboveground storage tanks for waste engine oil and waste coolant, located adjacent to the structure.

Antiterrorism and Force Protection Measures

Michael Baker integrated protective measures into the project design that meet antiterrorism and force protection requirements. These include the locating of the TEMF and ECS Warehouse 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. As mentioned previously, the overall goal was to reduce building energy consumption by 40 percent compared to ASHRAE 90.1 2007.

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 renewable energy sources, including solar, wind-powered, and geothermal-ground source heating and cooling, as well as 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 HVAC systems.

Building design and construction incorporated materials and approaches to achieve sustainability goals. Materials that are 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, are provided. Ozone-friendly refrigerants and refrigerant quantities will minimize ozone depletion.

Michael Baker also 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.

INTERNATIONAL

The elimination of exterior light pollution was 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.

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.





EXPRESSION OF INTEREST

BRUSHFORK ARMORY HVAC RENOVATION AT THE BRUSHFORK ARMORY FACILITY

SOLICITATION NO: CE01 0603 ADJ2100000008

APPENDIX 3 – References



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 local or current clients and contact information:

- **West Virginia General Services Division**
112 California Avenue
Charleston, WV 25305
Mr. Greg Milton, Director
(304) 558-2317
- **West Virginia Schools for the Deaf and the Blind**
301 East Main Street
Romney, WV 26757
Phone: 304-822-4810
Mr. Steve Triplet, Director of Facilities
- **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 Army National Guard**
1707 Coonskin Drive
Charleston, WV 25311-1099
Mr. Joe McClung, Project Manager
(304) 561-6548
- **West Virginia Department of Transportation – Division of Highways**
1900 Kanawha Boulevard East,
Building 5, Room A 405
Charleston, WV 25305
Mr. C. Elwood Penn, IV, P.E., Director of Planning
(304) 558-9269
- **West Virginia University/ WVU Tech**
410 Neville Street
Beckley, WV 25801
Phone: 304-929-0325
Mr. Robert Moyer, Director of Facilities and Planning
(304) 550-2839