

Solicitation Number: CE01 0603 ADJ1800000001

8/15/2017

08/15/17 13:26:47
NJ Purchasing Division

EXPRESSION OF INTEREST
**CAMP DAWSON STF
BUILDINGS A & B**



Submitted to
WEST VIRGINIA DEPARTMENT OF ADMINISTRATION
Purchasing Division
2019 Washington St. E
Charleston, W. Va. 25305

Michael Baker
INTERNATIONAL

Submitted by:
Michael Baker International, Inc.

August 15, 2017

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

Subject: CEOI 0603 ADJ1800000001
A/E Services for STF Buildings Camp Dawson
Request for Proposal

Dear Ms. Rink:

The Charleston office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to the Request for Proposal for Architectural & Engineering services for the STF Buildings at Camp Dawson. We understand the nature of the facilities as well as the desire add the necessary facilities to the existing Camp Dawson campus. We believe that our local team of professionals is uniquely qualified to provide a design that will bring these buildings at Camp Dawson to fruition.

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

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

Should you have any questions or require additional information, please feel free to contact me at (304) 769-2164 or by e-mail at Nicole.Riley@mbakerintl.com.

Very truly yours,



Nicole D. Riley, Associate AIA
Michael Baker International, Inc.

Enclosure



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

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

Proc Folder: 356210

Doc Description: STF BUILDINGS CAMP DAWSON EOI DESIGN

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2017-07-20	2017-08-15 13:30:00	CEOI 0603 ADJ1800000001	1

BID RECEIVING LOCATION

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

VENDOR

Vendor Name, Address and Telephone Number:

Michael Baker International, Inc.
400 Washington Street, East Suite 301
Charleston, WV 25301
304.769.0821

FOR INFORMATION CONTACT THE BUYER

Crystal Rink
 (304) 558-2402
 crystal.g.rink@wv.gov

Signature X

FEIN # **25-1228638**

DATE **August 15, 2017**

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

ADDITIONAL INFORMATION:**EXPRESSION OF INTEREST**

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 DESIGN SERVICES TO DEVELOP CONSTRUCTION DOCUMENTS TO PROVIDE FOR THE CONSTRUCTION OF TWO NEW TRAINING BUILDINGS, DESIGNER WILL BE DEVELOPING TWO SEPARATE SETS OF CONSTRUCTION BID DOCUMENTS, AT CAMP DAWSON IN KINGWOOD, WV, PER THE ATTACHED DOCUMENTATION.

* ONLINE SUBMISSIONS ARE PROHIBITED FOR EXPRESSION OF INTEREST SOLICITATION RESPONSES *

INVOICE TO		SHIP TO	
STATE FINANCE ADJUTANT GENERALS OFFICE 1703 COONSKIN DR		FACILITY MAINTENANCE MANAGER CAMP DAWSON ARMY TRAINING SITE 240 ARMY RD	
CHARLESTON	WV25311-1085	KINGWOOD	WV 26537-1077
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	STF Buildings at Camp Dawson		

Comm Code	Manufacturer	Specification	Model #
81101508			

Extended Description :

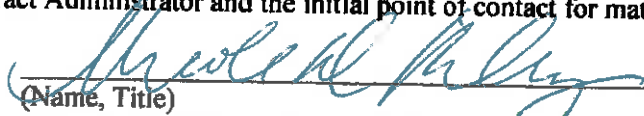
STF Buildings at Camp Dawson

ADJ180000001	Document Phase Final	Document Description STF BUILDINGS CAMP DAWSON EOI DESIGN	Page 3 of 3
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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)

Nicole D. Riley, Project Manager

(Printed Name and Title)

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

(Address)

304.769.0821 / 304.769.0822

(Phone Number) / (Fax Number)

Nicole.Riley@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)

Russell E. Hall, Vice President

(Printed Name and Title of Authorized Representative)

8-15-2017

(Date)

304.769.0821 / 304.769.0822

(Phone Number) (Fax Number)

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: 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 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: [Signature] Date: 8/15/17

State of West Virginia

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 15 day of August, 2017

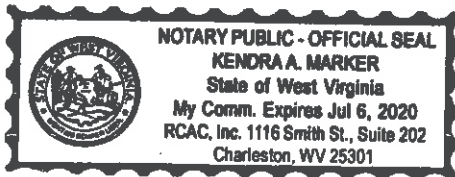
My Commission expires July 6, 2020, 2020

AFFIX SEAL HERE

NOTARY PUBLIC

[Signature: Kendra A. Marker]

Purchasing Affidavit (Revised 07/01/2012)





COVER LETTER

MANDATORY PROPOSAL SUBMISSION FORMS

PROPOSAL

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Project Location

Nestled in the Highlands of West Virginia, Camp Dawson is located near Kingwood, WV and serves a hub for billeting, training, and outfitting citizen soldiers.

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

Project Background

Through the West Virginia Department of Administration, The West Virginia Army National Guard (WVArNG) is seeking highly qualified Architectural and Engineering firms to provide comprehensive designs and construction documents for two facilities at Camp Dawson. The firm will be responsible for Agency Coordination, Concept Proposals-10% design for Building A, Design Development and Construction Documents for Building B, as well as Construction Administration as specified in the Expression of Interest (EOI).

The WVArNG has garnered distinction around the nation for its ability to train top notch guardsmen and women as well as serve our state and nation when the need arises. The existing facilities for the training and welfare of our Soldiers deserves the attention to honor those who have gone before. Michael Baker understands this mission of readiness and are willing to put all our efforts into bringing the CIF online as well as designing the STF. We are intimately familiar with the requirements and stand ready with the experience, capability, and the West Virginia Army National Guard in accomplishing their mission.

Qualifications and Experience

Firm Capacity

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

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

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

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



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

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

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

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

Management and Staffing

Our team will incorporate "the Baker Way" by giving the West Virginia Army National Guard (WVArNG) one point of contact; this person is responsible for keeping everyone on the same page. Open and clear communication, even when the decisions may be tough. Ms. Nicole Riley, who will fill this role for your projects, will coordinate information and ideas between the team members and the Client. Keeping each other on the right track will allow for a clear definition of and an efficient design.

All key decision makers are experts in their field and have numerous projects behind them. Our team brings a fully qualified and integrated team. Our three group teams possess the complete capability to perform programming to document execution. Our design team will help facilitate the program, our QC team confirms quality after design; and our engineering team ties the design together. This overlap is what we refer to as "The Baker Way". Cohesive design with continual communication leads to successful projects.

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

- Timely response to all documentation
- Return phone calls on the same day
- Provide flexible designs
- In-house peer review on all projects
- Quality program for a successful project

We understand that many of the programming elements may have already been determined. However, we pride ourselves in creating an environment to allow our design professionals to do what they do best- solve problems. The Michael Baker team will assist in any programming that has not already been accomplished by the client, naming members of our team to oversee the quality and control; all while keeping our most important team member, the WVArNG abreast of the progress of the project, ramifications of any changes and lastly, effects to the budget.



The Michael Baker team has the only team in West Virginia where all engineering staff is in-house and no extraneous team members are necessary. This allows us to bring a higher level of coordination and quality to our design documents.

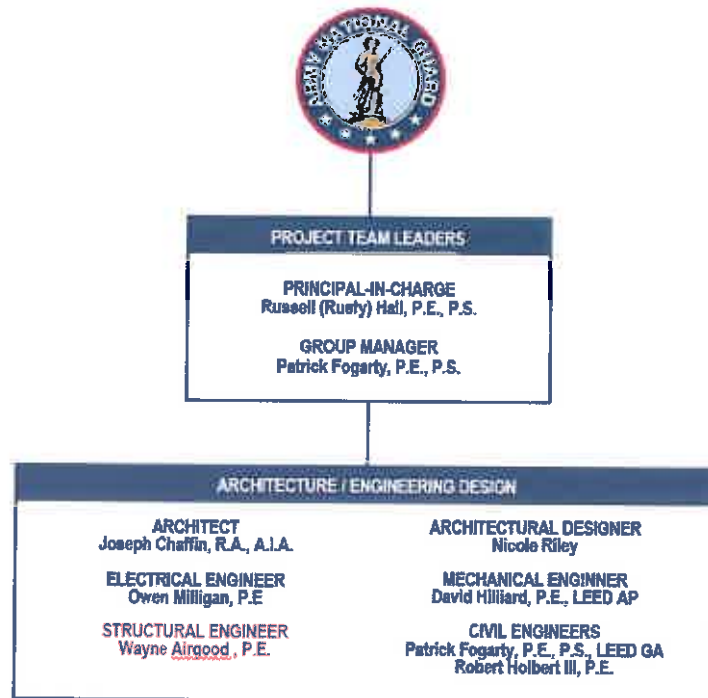
Project Team and Organization-The Right People

Michael Baker has assembled an integrated team of architects and engineers who all have a specific and critical role to play in the performance of these projects. We have organized our teams under a primary point of contact, Nicole “Niki” Riley, in three primary groups: the programming/QC team, the architectural document team and the engineering team. Ms. Riley has successfully used her leadership skills to deliver projects all over the state.

Our design and architectural production team is under the supervision of Ms. Riley, who has nearly two decades of “getting things done”. Her hands-on management style means she will be involved in nearly all of the small details required to assemble a well thought out and coordinated set of construction documents. She has worked hand-in-hand with the team executing a list of challenging projects along the east coast.

Our programming/QC team is spearheaded by Joe Chaffin, AIA our lead Architect for the east coast, with experience designing and programming readiness and reserve center projects. His intimate knowledge of user needs, governing regulations, and award winning design concepts will bring unequaled depth of knowledge to this critical role.

Our engineering team, led by David Hilliard, will ensure the engineering portion of the project meets all of Unified Facilities Criteria for design requirements in a well-coordinated project. Mr. Hilliard has worked as a key member of Mr. Chaffin’s team for the last 7 years. He has served as a full project manager on many projects as well as the engineering manager providing a unique ability to facilitate inter-discipline coordination.





Our team thrives in a collaborative environment, whether it be with our in-house professionals or our most important member: Our Client. We coordinate with all of the team's members to make sure that the architectural, structural, mechanical, electrical, and civil components of the design are assured to produce a complete and fully coordinated set of construction drawings. Michael Baker achieves success in uniting the Client with the team by continually synchronizing with- in this case, the WVARNG Construction and Facilities Management Office ensuring the end user group will save time, money, and a lot of headaches simply because we are exclusively **one company**. This is our key strength: **Michael Baker is a One-Stop Shop**. Our experience working together as a building design team on countless other federally funded projects brings with it a level of confidence, partnership and certainty that we will be able to meet our commitments to the State.



Though Michael Baker may not have completed a project with your particular team, we are committed to clearly communicating with all members of the team to ensure we are always all on the same page working towards a common goal. Our broad MILCON experience has taught us the local differences found in National Guard projects. Our resident soldiers are a permanent part of our community and we want them to be proud of any facility in which they serve. We proudly support the National Guard locally and nationally.

Demonstrated Experience

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

Michael Baker has strong knowledge of the local project requirements and practices with numerous project experiences that are frequently challenging and demanding. Michael Baker prides itself on providing innovative solutions to complex problems. Cookie cutter solutions rarely benefit owners. Owners reap real value when design teams are willing to be creative and incorporate custom solutions into their analysis and design.



Training Facility, Fort McCoy



Central Issue Facility, Fort McCoy

As the National Guard continues its historic dual mission, providing units citizen-soldiers from our local community, trained and equipped to protect life and property, to the states while providing units, trained, equipped, and ready to defend the United States and its interests, to the nation and around the globe, Michael Baker continues to support the National Guard Bureau and has previously worked at over 70 National Guard installations nationwide, including Camp Geiger and the 426th Regional Training Institute at Fort McCoy. The Michael Baker team provides the National Guard with this highly skilled and experienced team that is prepared to support the project with excellent planning, architectural, engineering, environmental, and construction phase services. Michael Baker, serves our clients from concept designs through operations.

Please see APPENDIX 2 for RELATED PROJECTS.



Project Goals and Objectives

General:



Some of the first steps of the project would be to prioritize tasks, develop submission schedules and budget requirements for the project. Any existing / available information would be gathered and reviewed prior to a visit to the property and any proposed building site. Once all the existing data was gathered and reviewed, a site visit to review the documents against the current field conditions would be conducted. In the event that insufficient existing data exists, a topographical survey of existing site conditions may be developed, as well as subsurface investigation to analyze the existing geology for design development. This information will be converted into concept plans that will be reviewed to arrive at a final concept plan. The project will be studied in a systematic way to analyze the existing conditions, client needs and budget considerations.

It is Michael Baker's understanding is that the West Virginia Army National Guard, Construction and Facilities Management Office (WVARNG) would like to develop functional, yet sustainable, designs for both proposed facilities.

Our firm provides sustainable design leadership on our projects starting with the programming phase, the time when our efforts yield the greatest results. Michael Baker understands that the Nation Guard wishes to be a good steward of its resources and we welcome the opportunity to facilitate discussions and guide projects towards a sustainable path.



Tactical Maintenance Facility, Fort McCoy; LEED Silver Certified

GOAL/OBJECTIVE 1:

Michael Baker will employ a planning philosophy to work with the site constraints and the "lay of the land" to develop a complementary design concept that respects the surroundings of other facilities on site and provides the appropriate visibility to the adjacent approaches. Critical concepts to be considered will be site access and usable acreage for future development, low impact design techniques and suitability for the desired tenant mix. The Owner's guidelines for the facilities will dictate the size of and common amenities to be provided on the site, degree of infrastructure development and overall aesthetic of the campus. The ultimate goal is to produce a plan that can be implemented in an efficient and cost effective manner while providing the highest value to the owner.

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



GOAL/OBJECTIVE 2:

Based on discussions and approvals from the WVArNG CFM&O, the designs approved will be brought to 35% completion. With exception to Building B, the plans and specifications for the facilities will be sent to the Construction Document Phase for completion.

The site civil design will consist of an initial design development phase, an intermediate permit documents phase and the final construction documents phase. It is assumed that the master planning of the site will provide a schematic plan for the site location as well as the entry road location to the new facility. Baker will advance the Schematic Design Documents to Design Development (DD) level. The plans will include the following sheets:

Site Plan: This plan will detail the site improvements both graphically and with notes and labels. The information will detail paving types and limits, sidewalk locations, building locations, retaining wall and site stair locations as well as specific site appurtenances required (i.e. mailboxes).

Grading and Drainage Plan: The DD Grading Plan will illustrate the final grade elevations via two foot contours surrounding the proposed facility. One line storm sewer will be shown with inlet locations and types detailed. Spot elevation information and specific size, depth and slope information for the storm sewer will not be included.

Erosion and Sediment Control Plan and Report: The Erosion and Sediment Control Plan that was developed during the Site Preparation Package will be included in this plan set.

Utility Plan: This plan will provide the single line layout of all utilities for the development. The plan will illustrate mainlines, manholes, valves, fire hydrants, anticipated pull box and transformer locations. The plan will not include specific pipe lengths, depths or dimensions unless already verified with the utility service provider.

Site Details: Details for site features will be presented to ensure that the site design meets the requirements of the UFC directives and other State and Federal reviewing Agencies.

Specifications: DD level technical specifications for all of the site improvements will be provided.

Once the DD level plans have been approved, the plans will be further developed to provide a permit level set of documents. These plans will be used to submit for the NPDES permit as well as any local permitting for the land development. This will include a complete Post Construction Storm Water Management Plan and the comprehensive Storm Water Pollution Prevention Plan.

GOAL/OBJECTIVE 3:

At this phase, construction plans and specifications will be developed in conjunction with state agencies and utility companies for the proposed facility and any approaches or utility infrastructure. These plans can be provided as independent or a combined Bid Documents for permitting and construction.

Complete A/E services will be provided including: design, cost estimating, bid package assembly, bid assistance, analyzing and the evaluation of bids or proposals.

Michael Baker will advance the Design Development Plans to a level of detail for construction. The plans will include the following sheets:

Grading and Drainage Plan: Baker will prepare a Final Grading Plan at an appropriate scale with one foot contour intervals ("spot" elevations will be used where extra detail is needed). The site will be graded to transition into existing grades at the perimeter of the site. The proposed grading will be designed to not detrimentally impact the surrounding landscape. The Grading Plan will provide positive drainage away from proposed buildings where possible. Slopes and pavement grades will be clearly labeled on the plan to provide detailing of the proposed improvements.



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

Michael Baker will provide Construction Administration throughout the entire process of Bidding, Construction and Commissioning. The same team members that began the project will follow through to the end. All products intended to be installed on the project shall be submitted to and approved by the A/E of record. Shop drawings provided by the awarded contractor will be reviewed by the A/E of record to ensure they meet all code requirements, specifications approved based on meeting the prepared specifications, current code requirements and contract requirements.

After the system installations are complete, Baker will perform a final inspection and develop a corrective measure punch list. Michael Baker will also provide the WVArNG ongoing support through the manufacturer's warranty period after the construction is completed. It is Michael Baker's desire to provide a successful design, but also a practical, functional and efficient Industrial Park suited to the needs of its patrons.

Complete on site Construction Administration services can be provided to the client for each phase of the process, if desired.

Michael Baker can provide all necessary planning, design and bidding documents for construction in accordance with West Virginia Purchasing Division for all aspects of the project. Specifications for the installation of all required products or components will be provided as part of the bid packages.



APPENDIX 1- RESUMES



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

Lead Design Architect

General Qualifications

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

Years with Baker: 7

Years with Other Firms: 17

Education

B Arch, 1990, Architecture, University of Cincinnati

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

Licenses/Certifications

Registered Architect, West Virginia, 2011

NCARB, 1999

Registered Architect, Pennsylvania, 2001

Experience

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

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

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



Building 12 Defense Logistics Agency Headquarters Renovation Design, Tobyhanna, Pennsylvania. *Tobyhanna Army Depot.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. Baker prepared design documents for the partial renovation of Building 12 to serve as the new Defense Logistics Agency headquarters building. Work was performed under a three-year indefinite delivery-indefinite quantity contract. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

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

Aviation Science Center Renovation, Community College of Beaver County, Monaca, Pennsylvania. Architect of Record. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. The Project consisted of architecture, engineering, construction administration and cost estimates to design the auditorium renovations and replacement the HVAC system. Preliminary design services included research of applicable building codes; on site project assessment and verification, measurements, and documentation of the project areas, including a comprehensive field survey of the existing conditions, and the development and prioritization of preliminary scopes of work, schedule development, and 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.



Nicole Riley

Associate Architect / Project Manager

General Qualifications

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

Years with Baker: 2

Years with Other Firms: 16

Education

Bachelor of Architecture, Virginia Tech

Licenses/Certifications

Associate AIA

Experience

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

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

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

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



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

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

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

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

Other Notable Projects:

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



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

Mechanical/Electrical/Plumbing Engineer

General Qualifications

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

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

Experience

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

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

Close Air Support Apron Design, Camp Bastion, Helmand Province, Afghanistan. Air Force Center for Engineering and the Environment (AFCEE). Electrical Designer. Provided planning, design, electrical construction documents, and construction administration for air field apron lighting. As part of a design-build team, Michael Baker provided design and construction plans for a close air support (CAS) apron at the Camp Bastion military base. The project involved the construction of an

Years with Michael Baker: 8

Years with Other Firms: 19

Degrees

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

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

Licenses/Certifications

Professional Engineer –

West Virginia, 2011

Mississippi, 2016

Louisiana, 2016

Kentucky, 2017

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

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

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

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

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

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

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

Design of Tactical Equipment Maintenance Facility and Equipment Concentration Site Warehouse, Fort McCoy, Wisconsin. *U.S. Army Corps of Engineers, Louisville District.* Mechanical Engineer. Responsible for field inspection and commissioning oversight. Michael Baker was the designer of record for the design-bid-build delivery of an approximately 58,000-square-foot, two-story modified large Tactical Equipment Maintenance Facility (TEMF) and an approximately 44,000-square-foot, one-story Equipment Concentration Site Warehouse, along with 30 acres of gravel hardstand designated for organizational parking. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement. Both structures were designed to achieve LEED® Silver certification and the TEMF warehouse has achieved certification. Michael Baker's services included architecture, surveys, environmental investigation, geotechnical oversight, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.



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

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

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

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

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

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

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

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



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

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

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

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

Electrical and Lighting Design for Period Street Lighting

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

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



Owen Milligan, P.E.

Electrical Engineering Manager

General Qualifications

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

Experience

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

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

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

Years with Michael Baker: 7

Years with Other Firms: 20

Degrees

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

Computer Aided Drafting, Putnam
County Technical Center, 1995

Licenses/Certifications

Professional Engineer, California,
2003

Professional Engineer,
Pennsylvania, 1999

Professional Engineer, Montana,
2001

Professional Engineer, Kentucky,
2005

Professional Engineer, Oklahoma,
2008



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

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

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

Non-Baker Project Experience

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

Chester Engineers / US Filter Corporation, Pittsburgh, Pennsylvania. Electrical Project Engineer. Responsibilities included the following:

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



Wayne Airgood, P.E.

Structural Engineer

General Qualifications

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

Experience

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

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

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

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

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

Design-Build Tactical Equipment Maintenance Facilities, 31st ADA Brigade, Fort Sill, Oklahoma. *U.S. Army Corps of Engineers, Tulsa District.* Mr. Airgood was the senior structural engineer responsible for the design of the foundation systems to support an 18,000-square-foot, 35,200-square-foot, and 57,031-square-foot pre-engineered steel Tactical Equipment Maintenance Facilities (TEMF), and a 20,000-square-foot Supply Support Activity facility supply support activity warehouse (SSA). Because of existing expansive soil conditions, the ground floors of each building were designed as reinforced concrete floor systems with a void space between the expansive soil and floors. The concrete floor system and PEMB structural columns were supported by a deep foundation system of drilled concrete piers extending to

Years with Michael Baker: 8

Years with Other Firms: 23

Degrees

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

Licenses/Certifications

Professional Engineer, Pennsylvania, 1999, [REDACTED]

Professional Engineer, Maryland, 2013, [REDACTED]

Professional Engineer, North Carolina, 2014, [REDACTED]



rock. His responsibilities included review of structural fabrication drawings, attending design coordination meetings and periodic site visits during construction.

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

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

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



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

Civil Engineer, Facilities Practice Manager

General Qualifications

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

Experience

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

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

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

Years with Michael Baker: 10

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



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

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

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

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



Robert D. Holbert III, P.E.

Civil Engineer

General Qualifications

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

Experience

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

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

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

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

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

Moorefield Bypass, Moorefield, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Civil Associate. Part of team to study various components of highway design. As part of this project, Michael Baker prepared a Purpose and Need Study to construct an approximate 5-mile roadway to serve as a bypass of the center of Moorefield in Hardy County, West Virginia. The project was developed to address the region's increasing transportation demands and growing traffic safety concerns.

Years with Michael Baker: 18

Years with Other Firms: 1

Degrees

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

Licenses/Certifications

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

Professional Engineer, West Virginia, 2003, [REDACTED]



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

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

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

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

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

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

Dick Henderson Memorial Bridge Replacement, Kanawha County, West Virginia. *West Virginia Department of Transportation, Division of Highways.* Highway Engineer. Duties included roadway design, drainage, NPDES permit applications, and right of way review. Michael Baker provided engineering services for the replacement of the Dick Henderson Memorial Bridge; the steel truss bridge that carries the WV 25 spur over the Kanawha River between the cities of Nitro and St. Albans. Michael Baker's services included an environmental assessment, a Phase II archaeological investigation, preparation of National Environmental Policy Act.



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.

Army Reserve Center, Full Facility Revitalization (FFR), Independence, MO.

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

Shaw Headquarters Building Renovation, Shaw AFB, South Carolina

Mr. Spangler was the Fire Protection Engineer of record for the renovation of the three story Headquarters Building at Shaw AFB in South Carolina. The building contained an existing fire alarm and existing sprinkler system. The fire alarm system was removed and installed with a new fire alarm and mass notification system. The existing sprinkler system was modified to account for the new building design. The existing sprinkler system was identified by field investigation and as much of the existing sprinkler system was re-used as possible to keep costs minimal for the client. A life safety analysis was performed according to NFPA 101 Life Safety Code and the IBC to ensure the new

Years with Michael Baker: 8

Years with Other Firms: 1

Degrees

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

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

Licenses/Certifications

Professional Engineer, California, 2011, [REDACTED]

Professional Engineer, Virginia, 2012, [REDACTED]

Professional Engineer, Pennsylvania, 2012, [REDACTED]

Professional Engineer, Illinois, 2013, [REDACTED]

Professional Engineer, Idaho, 2014, [REDACTED]

Professional Engineer, New York, 2014, [REDACTED]

Professional Engineer, Connecticut, 2015, [REDACTED]

Professional Engineer, South Carolina, 2016, [REDACTED]

Professional Engineer, Minnesota, 2016, [REDACTED]

Professional Engineer, Mississippi, 2017, [REDACTED]



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

Fire Pump Replacement. *Allegheny County Airport Authority – Pittsburgh International Airport.*

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

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

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



APPENDIX 2- RELATED PROJECTS

Design of New Six-Unit Reserve Center

Forks Township, Pennsylvania

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

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

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

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

Buildings are of permanent construction with HVAC, plumbing, mechanical, security, and electrical systems. The structures are in compliance with ADA requirements for accessibility by the disabled. Supporting facilities included land clearing, paving, fencing, general site improvements, and extension of utilities to serve the project. Anti-terrorism and force protection measures included maximum standoff distances from roads, parking areas, and vehicle unloading areas. Berms, heavy landscaping, and bollards were used to prevent access when standoff distances could not be maintained. Sustainable Design and Development (SDD) and Energy Policy Act of 2005 (EPA05) features were provided to meet the Silver level of LEED®.

Client

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

Completion Date

2013

Project Costs

\$15,000,000 (Est. Construction)
\$1,380,533 (Fee)

Michael Baker's Role

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

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

During the course of the construction of the foundations for this project, a severe and exceptional rain event occurred over a weekend while workers were off site. The job site received 7 inches of rain in a 36 hour period. When workers arrived back on site on Monday morning, they discovered several enormous sinkholes where preparations were being made for spread footing foundations. Basically, there was no ground where foundations were to be placed. A review of the geotechnical report indicated that sinkholes were not anticipated at the site.

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

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

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

Design of Central Issue Facility

Fort McCoy, Wisconsin

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

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

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

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

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

Client

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

Completion Date

2015

Project Costs

\$1,040,921 (Fee)

Michael Baker's Role

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

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

Overall Building Construction

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

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

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

Exterior Systems

Exterior Building Envelope

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

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

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

Structural System

The building consists of exterior load-bearing precast walls and interior structural steel framing. Roof framing consists of open-web steel joist framing spaced at approximately five feet, spanning between the exterior walls to

interior steel framing. This framing system supports a structural metal deck overlaid by an insulated, modified bitumen roofing system. Rust-inhibiting primers and paint, in accordance with UFC guidelines and architectural requirements, protect structural steel.

Insulation

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

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

Wind and Seismic Provisions

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

Interior Finishes and Systems

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

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

Heating, Ventilating, and Air Conditioning

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

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

The high-bay warehouse-storage and conditioned storage areas are heated to maintain a minimum temperature of 70 degrees Fahrenheit in the winter. The high-bay warehouse-storage area was provided with 4,000 cubic feet per minute of ventilation air, which provides sufficient ventilation air for the battery-charging stations and exceeds the ASHRAE 62.1 ventilation rates for shipping and receiving ventilation rates for work bay occupants. An in-floor radiant heating system is the main heating source for the warehouse. The in-floor radiant hot-water system is served by a hot-water boiler located in the main mechanical room. The design included a primary-secondary pumping system in the warehouse area. Ventilation air is heated to 68 degrees Fahrenheit via a 100-percent outdoor air heating and ventilating unit located on the mechanical mezzanine. Supply grilles are located in the center of the work bay-storage area. Exhaust grilles are located at the end of the building to ensure air distribution.

Exhaust ducts are located near the forklift battery-charging stations, with high and low grilles, to ensure adequate ventilation for battery chargers. Michael Baker provided an energy recovery module to recover energy from the exhaust air stream and preheat outdoor air. Exhaust fans and interlocked intake louvers are employed to provide ventilation cooling for these areas in the summer to limit interior temperatures to 10 degrees Fahrenheit above ambient temperature.

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

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

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

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

Electrical Distribution System

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

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

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

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

Plumbing and Fire Protection

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

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

Antiterrorism and Force Protection Measures

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

Energy Charrette and Sustainable Design

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

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

Building design and construction incorporated materials and approaches to achieve sustainability goals. Materials that were locally available and products with 20-percent recyclable content were used. Occupancy sensors reduce lighting energy consumption. Water-saving features, such as low-flow plumbing fixtures to reduce water consumption, were provided. Ozone-friendly refrigerants and refrigerant quantities minimize ozone depletion. Because a site irrigation system was not required, potable water consumption for landscaping was reduced by 100 percent.

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

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

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

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

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 90.1 R-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.

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.



Camp Geiger East Infantry Training Complex

Marine Corps Base Camp Lejeune, North Carolina

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.

Michael Baker's services included design project management; architecture; interior design; landscape architecture; civil, structural, electrical, mechanical, plumbing, and fire protection engineering; and oversight of audio-visual design, geotechnical engineering, surveying, electrical distribution, and commissioning by subconsultants.

Building Architecture

The headquarters and academic building provides operation, administrative, classroom, and laboratory facilities for advanced infantry training. The facility is a two-story, 65,723-square-foot, load-bearing reinforced-concrete masonry unit building with spread-footing foundations and a standing-seam metal roof. The building includes instructor offices, conference rooms, open office areas, classrooms, storage rooms, lounges, showers, locker rooms, auditorium, simulator lab, multipurpose room, weapons storage, and restrooms.

The building has a brick veneer exterior walls, and the main entrance is designed with masonry detailing and white trim, compatible with the Georgian architecture that is prescribed in the base's exterior architectural plan. The reinforced masonry cavity wall construction provides a highly effective thermal, air, and moisture barrier, with rigid insulation and a spray-applied vapor and air barrier and air space between the concrete masonry and the exterior masonry veneer. The windows are prefinished, thermally broken, aluminum frames with insulated, laminated glazing and low-emissivity coating to meet antiterrorism and force protection, energy efficiency, and sustainability requirements.

The headquarters included complex audio-visual and supporting infrastructure to provide cutting-edge multimedia systems to enhance educational instruction and collaboration. The design creates state-of-the-art instructional and collaboration spaces; supports a wide range of audio-visual capabilities and future advances in educational technology innovation, and allows for remote operation, maintenance, and replacement of systems and system components.

The consolidated issue facility and warehouse are located on the same site as the headquarters building. The consolidated issue facility is a one-story, 37,694-square-foot facility that consists of storage and sorting areas,

Client

Naval Facilities Engineering
Command, Mid-Atlantic
9742 Maryland Avenue
Building N-26
Norfolk, Virginia 23511-3095

Completion Date

Estimated 2017

Project Costs

\$35,214,397 (Construction)
\$2,291,153 (Fee)

Michael Baker's Role

- Architecture
- Engineering
- Sustainable design
- Antiterrorism and force protection

return and receiving areas, a break room, administrative areas, and a laundry repair room. The warehouse is a one-story, 19,980-square-foot facility that provides caged storage, private offices, administrative bullpen areas, and conferencing areas. The 4,000-square-foot armory is constructed using load-bearing masonry walls and a metal roof. The armory includes pallet rack storage for weapons storage.

Mechanical Systems

The headquarters mechanical system includes two variable air volume air handling units with supply and return distribution ductwork routed throughout the areas served. Each unit contains a hot water heating coil, chilled water cooling coil, and an energy recovery wheel to assist in building energy savings. A third constant volume air handling unit with energy recovery provides the required conditioning to the martial arts and mat room, the adjacent first floor locker and shower area, the second floor locker and shower area, multiple restrooms, multiple break rooms, copy and storage rooms, and janitors' closets. This unit contains a hot water heating coil, chilled water cooling coil, and energy recovery wheel to assist in building energy savings. A single air-cooled screw chiller provides chilled water to the air handling unit cooling coils. Multiple high-efficiency condensing boilers provide heating hot water to the various heating coils in the air handling units, and reheat coils at all variable air volume boxes and the hydronic unit heaters that are located throughout the facility.

The consolidated issue facility and warehouse are served by a single heating and ventilating unit with associated exhaust fan, gas-fired unit heaters, and separate intake louvers with associated exhaust fans for ventilation cooling.

Site Design

The demolition of five buildings was included in this project, along with the required hazardous material abatement prior to demolition. The site design incorporated low impact development best management practices to the extent possible, in compliance with the requirements of the state and local guidelines. The civil design included new hydronic unit heaters, privately owned vehicle parking areas, grading, landscaping, utility services, and stormwater designs.

Sustainable Design Features

The project included multiple energy conservation and sustainable design features. The exterior envelope includes insulated walls and roofs of R-15 and R-30, respectively, for the headquarters building, and R-15 and R-32 for the consolidated issue facility and warehouse. Cool roof color is used for the metal roof. Natural daylighting is optimized, thereby reducing lighting loads. The warehouse provides views to 90 percent of spaces. Windows are low "E" glass.

The facilities exceed ASHRAE 90.1-2004 by 38.7 percent for the headquarters building and by 48 percent for the consolidated issue facility and warehouse, and meet Epaact 2005 goals. The air handlers are equipped with energy-recovery devices. The use of energy-efficient light fixtures is coupled with occupancy sensors. The consolidated issue facility includes a photovoltaic array to generate 26,759 kilowatts per year. Using highly efficient hot water heaters; water use reduction has exceed 40 percent.

Other notable sustainable features include construction waste management and the use of recycled materials; ENERGY STAR® equipment, solar-powered site lighting, enhanced commissioning, outdoor air delivery monitoring, indoor air quality low-VOC materials, and thermal comfort design.

The project was designed to meet the requirements for LEED® Silver certification.





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
Room 972
600 Dr. Martin Luther King, Jr.
Place
P.O. Box 59
Louisville, Kentucky 40202

Completion Date

Estimated: 2017

Project Costs

\$19,423,083 (Fee)

Michael Baker's Role

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

Facility Design

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

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

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

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

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

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

The billeting facility project includes a campus-wide 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.

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

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

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

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

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

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

Michael Baker designed the perimeter security lighting to minimize light pollution and avoid disruption of night maneuver training, which is conducted on an adjacent site.

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

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

RFP Document Development

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

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

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

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

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

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

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

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

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

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

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

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

U.S. Army Reserve Center Design-Build RFP Document Development, Fort AP Hill, Caroline County, Virginia. Michael Baker prepared design-build RFP performance specifications for the construction of a 200-member U.S. Army Reserve Center at Fort AP Hill. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to

satisfy LEED® Gold certification. The conceptual designs meet the user's preference and include an approximately 33,170-square-foot, two-story training building; an approximately 7,526-square-foot, one-story OMS; an approximately 1,065-square-foot, one-story unheated storage building; and paved parking for military equipment and privately owned vehicles.

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

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

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

U.S. Army Reserve Center Design-Build RFP Document Development, City of Bedford, Virginia. Michael Baker prepared design-build RFP performance specifications for the construction of a 400-member U.S. Army Reserve Center along U.S. Route 460 in Bedford County. Michael Baker developed conceptual-level architectural design and engineering drawings for the buildings and the site to achieve LEED® Silver certification and included options to satisfy LEED® Gold certification. The conceptual designs meet the user's preference and include an approximately 43,096-square-foot, two-story training building; an approximately 7,912-square-foot, one-story organizational maintenance shop; a one-story, approximately 2,565-square-foot unheated storage building; and paved parking for military equipment and privately owned vehicles.

As envisioned, the project exceeds ASHRAE 90.1 2004 performance criteria by 40 percent. Michael Baker's conceptual designs included several provisions to satisfy the user's preference for sustainability, including a ground-mounted solar photovoltaic array and inverter system to provide electrical energy to offset up to 12.5

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

Little Kanawha Bus Administrative and Maintenance Facility

Grantsville, West Virginia

Baker provided general Architectural and Engineering services to the West Virginia Division of Public Transit for the Little Kanawha Administrative/Maintenance Facility located in Grantsville, West Virginia.

The WV Division of Public Transit selected Baker to provide complete design and construction administration services to include the construction of a pre-engineered metal and brick building, sited on the available property allowing for future expansion needs. Parking for the buses and employee vehicles will surround the building. The site is approximately 4.55 acres.

The operations facility has approximately 10,000 square feet of which 4,500 square feet houses five offices, a conference room, and money counting room, office storage space, copier and supply room, and a driver training room that accommodates approximately 25 individuals. The remaining 5,500 square feet is dedicated to the maintenance functions and includes a Wash Water Reclaim System. **The building is provided with selective stand-by electrical power from a 50 KW natural gas generator with an automatic switch gear system.** The garage structural roof the overall eave height will be about 18 feet. This area also includes space for indoor bus storage for approximately seven (7) vehicles. The building is designed so that the vehicles can pull through the facility. The building was designed to employ green building practices, however, the Client ultimately decided not to pursue LEED (Leadership in Energy & Environmental Design) Certification.

Client

State of West Virginia
Department of Transportation
Division of Public Transit
Building 5, Room 906
1900 Kanawha Blvd., East
Charleston, WV 25305-0432

Contract Completion Date

2013

Baker's Role

- Architecture
- Renovation design
- Feasibility studies
- Cost estimates
- Civil engineering
- Surveying
- MEP engineering
- Structural engineering



Systems Integration Maintenance Office

Fort Campbell, Kentucky

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

Client

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

Completion Date

Estimated: 2017

Project Costs

\$15,137,841 (Est. Construction)
\$1,240,352 (Fee)



Unmanned Aerial Systems Hangar Complex

*Campbell Army Airfield (KHOP), Fort Campbell,
Kentucky*

Michael Baker served as lead designer for a design-build unmanned aerial system hangar complex that includes a 133,000-square-foot operations and maintenance hangar, a 17,000-square-foot company operations facility, a runway and taxiway extension, taxiways, apron, ramp, and aircraft run-up area.

Michael Baker's services included project management; civil, landscape architecture, architecture, and interior design; and structural, mechanical, electrical, telecommunications, plumbing, and fire protection design. Michael Baker also provided construction administration services.

The project included the design of information systems, fire protection, and alarm systems; intrusion detection system installation; and energy monitoring and control systems connection. Support tasks included site development, utilities and connections, lighting, paving, parking, walks, curbs and gutters, storm drainage, landscaping, and signage.

Exterior Design

Michael Baker designed antiterrorism and force protection measures in accordance with U.S. Department of Defense minimum antiterrorism standards for buildings. The framing system for the hangar is a conventional structural-steel building with a standing-seam metal roof system. Michael Baker designed the exterior building envelope using cross-bracing and shear walls to provide adequate strength and stiffness to protect against lateral wind and seismic loads and to provide lateral antiterrorism and force protection.

The building materials and systems for both the hangar and company operations facility provide 25 years of useful service before reuse, repurpose, or renovation and a 50-year building replacement life cycle. Michael Baker designed the building envelopes to employ continuous air-barrier systems to minimize air flow through the assemblies and improve overall building performance.

Comprehensive Interior Design

Michael Baker provided comprehensive interior design for the buildings and furnishings selected for sustainability, ease of maintenance, and aesthetics. This includes as much natural daylighting as possible and the use of sound attenuation and indoor, wall, and floor construction where required to acoustically separate noisy areas from quiet areas. The furniture, fixtures, and equipment packages address appearance, maintenance, performance, ergonomics, function, and safety.

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

2014

Project Costs

\$45,467,153 (Total Contract)
\$2,165,677 (Fee)

Michael Baker's Role

- Project management
- Civil engineering
- Architectural design
- Landscape architecture
- Interior design
- Structural design
- Mechanical, electrical, and plumbing design
- Fire protection design
- Construction administration

Heating, Ventilation, and Air Conditioning (HVAC)

The hangar's design includes an HVAC system for continuous space ventilation consisting of a direct fired unit, decoupled exhaust fan, and intermediary plate-to-plate-type energy recovery device to pre-heat incoming outdoor ventilation air with the exhaust airstream when outdoor conditions are below the design heating temperature of 55°. The system has provisions for bypass of the heat exchanger, when outdoor temperatures are above the space design temperature, to realize energy savings through reduction of the required fan static pressures. Vacuum pump-type low-intensity infrared heating systems are also designed into the hangar's space. The hangar's administrative and company operations facility designs include a variable refrigerant volume system for space sensible heating and cooling coupled with variable flow dedicated outdoor air systems to provide demand controlled ventilation for optimal energy reduction.

Energy Conservation and Sustainability

Environmental system controls; supply, return, and exhaust ductwork; and HVAC system are designed to comply with ASHRAE 90.1 2007 to conserve energy in compliance with the Energy Policy Act of 2005. Energy conservation measures include insulation, manual balancing devices, energy recovery devices to capture exhaust and use it to temper incoming outdoor air, and ceiling-mounted circulation fans. The design calls for energy-efficient fluorescent and LED light sources, occupancy sensors that will dim or turn off lights, and daylight-harvesting controls in the lighting design. Michael Baker also incorporated solar photovoltaic panels into the design. Energy conservation improvements used in the building's shell construction and electrical, HVAC, and plumbing systems are expected to achieve an energy savings exceeding 50 percent beyond the ASHRAE 90.1-2007 baseline, based on a pre-bid energy analysis.

The building has achieved LEED® Silver certification from the U.S. Green Building Council. Michael Baker selected finishes and adhesives in compliance with sustainability requirements for indoor air quality and recycled content. The majority of building materials were acquired from distributors and manufacturers within a 500-mile radius.

Access Road Design

The design-build team also constructed a permanent access road to the complex from Lafayette Road. The access road is 24 feet wide with eight-foot-wide earthen shoulders, a 40-mile-per-hour design speed, and a deceleration and turn lane from Lafayette Road. Michael Baker performed a traffic study to determine the extent of required signage and traffic control devices.





WVU Institute of Technology, Beckley Campus

Beckley, West Virginia

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. Each facility will house engineering labs, computer classrooms, psychological observation and laboratories as well as student services and administrative services.

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 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 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.

Both facilities received new roofing to shore up existing water penetrations. Both the Classroom and Benedum Center 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

Summer of 2017

Michael Baker's Role

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





Appendix 3- References



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

- **130th Airlift Wing West Virginia Air National Guard**
1679 Coonskin Drive, Unit 18
Charleston, WV 25311-5005
Captain Harry Netzer, P.E., Deputy Base Civil Engineer
(304) 341-6649
- **West Virginia State University**
P.O. Box 1000
Institute, WV 25112-1000
Mr. Marvin Smith, Facilities Director
(304) 550-2839
- **West Virginia Department of Transportation – Division of Highways**
1900 Kanawha Boulevard East,
Building 5, Room A-450
Charleston, WV 25305
Mr. C. Elwood Penn, IV, P.E., Acting Director, Planning Division
(304) 558-9618
- **WVU Tech- Beckley**
410 Neville Street
Beckley, WV 25801
Mr. Robert Moyer, Regional Director of Facilities and Planning
(304) 929-0325
- **City of Nitro**
2009 20th Street
Nitro, WV 25143
Honorable David Casebolt, Mayor
(304) 419-3322
- **City of Winfield**
1 Main Street
Winfield, WV 25213
Honorable Randy Barrett, Mayor
(304) 586-2122