Michael Baker
INTERNATIONAL

We Make a Difference

January 25, 2019

Stephanie L. Gale, Senior Buyer
Department of Administration
Purchasing Division
2019 Washington Street E.
Charleston, West Virginia 25305

Subject: Professional A/E Services for the West Virginia Army National Guard, CFMO
EOI – Wheeling AASF#2 Aircraft Hangar Addition – CEOI 0603 ADJ1900000013

Dear Ms. Gale:

The Charleston, WV office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to a solicitation for the Expression of Interest for Engineering and Architectural Services related to the proposed Aircraft Hangar Addition at the Army Aviation Support Facility #2 near Wheeling, West Virginia. Michael Baker is interested in the mission of your agency and would like to engage with the West Virginia Army National Guard, Construction and Facilities Maintenance Office as a trusted facilities consultant. We believe that our team of professionals is uniquely qualified to partner with the WVARNG CFMO on this important project and help bring their vision for the AASF#2 Aircraft Hangar Addition into reality.

Michael Baker is well positioned to assemble a comprehensive design team (in-house) including: Architectural, Structural, Civil, Mechanical, Electrical, Plumbing, and Fire Protection Engineering as well as IT and Communications expertise. Our diverse team of professionals are well seasoned in the preparation of construction documents, bid specifications, and the application of required code compliance and construction permits. Michael Baker can also provide leadership or assistance during the Bidding process and the appropriate level of Construction Administration during the Construction Phase.

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

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

Very truly yours,
Michael Baker International, Inc.

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

Enclosure

TABLE OF CONTENTS

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

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

Proc Folder: 530551

Doc Description: EOI- Wheeling AASF#2 Aircraft Hangar Addition

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2019-01-04	2019-01-25 13:30:00	CEOI 0603 ADJ1900000013	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
harleston, West Virginia 25301
304-769-0821

FOR INFORMATION CONTACT THE BUYER
Stephanie L Gale
(304) 558-8801
stephanie.l.gale@wv.gov

Signature X Kimberly E. Hall FEIN # **25-1228638** DATE **January 25, 2019**

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

FORM ID : WV-PRC-CEOI-001

ADDITIONAL INFORMATION:

35% DESIGN AWARD PROCESS

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 build additional craft hangar space at the Wheeling Army Aviation Support Facility #2, located in, Wheeling, WV, per the attached documentation.

INVOICE TO	SHIP TO
DIVISION ENGINEERING & FACILITIES	BUILDING TRADE SPECIALIST
ADJUTANT GENERALS OFFICE	ARMY AVIATION SUPPORT FACILITY 2
1707 COONSKIN DR	538 GIRTYS POINT RD
CHARLESTON WV25311	WHEELING WV 26003
US	US

Line	Comm Ln Desc	Qty	Unit Issue
1	EOI- Wheeling AASF#2 Aircraft Hangar Addition		

Comm Code	Manufacturer	Specification	Model #
81101508			

Extended Description :

EOI- Wheeling AASF#2 Aircraft Hangar Addition Design Services per the attached documentation.

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.

Patrick W. Fogarty, SENIOR ASSOCIATE

(Name, Title)

Patrick W. Fogarty, Senior Associate

(Printed Name and Title)

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

(Address)

304-769-0821 / 304-769-0822

(Phone Number) / (Fax Number)

pfogarty@mbakerintl.com

(email address)

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

Michael Baker International, Inc.

(Company)

Russell E. Hall, Vice President

(Authorized Signature) (Representative Name, Title)

Russell E. Hall, P.E., Vice President

(Printed Name and Title of Authorized Representative)

January 25, 2019

(Date)

304-769-0821 / 304-769-0822

(Phone Number) (Fax Number)

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: 530551

Doc Description: Addendum #1 EOI- Wheeling AASF#2 Aircraft Hangar Addition

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2019-01-18	2019-01-25 13:30:00	CEOI 0603 ADJ1900000013	2

BID RECEIVING LOCATION

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

VENDOR

Vendor Name, Address and Telephone Number:
Michael Baker International, Inc.
400 Washington Street East, Suite 301
Charleston, West Virginia 25301
304-769-0821

FOR INFORMATION CONTACT THE BUYER
Stephanie L Gale
(304) 558-8801
stephanie.l.gale@wv.gov

Signature X Russell E. Hall FEIN # **25-1228638** DATE **January 25, 2019**

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

Addendum # issued to:

1. provide responses to technical questions.

d of Addendum #1

INVOICE TO	SHIP TO
DIVISION ENGINEERING & FACILITIES ADJUTANT GENERALS OFFICE 1707 COONSKIN DR CHARLESTON WV25311 US	BUILDING TRADE SPECIALIST ARMY AVIATION SUPPORT FACILITY 2 538 GIRTYS POINT RD WHEELING WV 26003 US

Line	Comm Ln Desc	Qty	Unit Issue
1	EOI- Wheeling AASF#2 Aircraft Hangar Addition		

Comm Code	Manufacturer	Specification	Model #
81101508			

Extended Description :

EOI- Wheeling AASF#2 Aircraft Hangar Addition Design Services per the attached documentation.

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CEOI ADJ1900000003
Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

[ ] Modify bid opening date and time

[ ] Modify specifications of product or service being sought

[✓] Attachment of vendor questions and responses

[ ] Attachment of pre-bid sign-in sheet

[ ] Correction of error

[ ] Other

Description of Modification to Solicitation:

Addendum # issued to:

1. provide responses to technical questions.

End of Addendum #1

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.

2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ATTACHMENT A

Vendor Questions for CEOI 0603 ADJ1900000013
Wheeling AASF#2 Hangar Addition Design

1. Could you please advise when the purchaser is anticipating the 35% package to be completed?

   Answer) A full design schedule with anticipated milestones and timelines will be developed with the selected vendor once a contract has been awarded.

2. Can you clarify how the RFP is to be submitted by the design firm? Should the project be submitted through OASISOR mailed, or both?

   Answer) Yes, please submit your firm's response in hard copy via US mail, per the instructions provided in the EOI. Online responses through OASIS are prohibited for EOI's per policy of the Purchasing Division.

3. Who is funding the first phase (35%) of the project?

   Answer) The State of West Virginia, WV Army National Guard.

4. What is the expected project budget? For Fees and construction.

   Answer) Yes, there is an anticipated budget for both the design and the construction phases. However, the state of West Virginia does not share this budget information at this stage of the process. Once the EOI process has been completed and a firm selected for the project, the estimated budget will be shared with that chosen firm.

5. Has there been a site location selected for the project? If not, is the design firm responsible for helping the owner select a specific site for the hangar to be built?

   Answer) The chosen Design firm could be responsible for helping with site selection.

6. How big is the expected hangar to be?

   Answer) The chosen Design firm will be provided this information during the contract negotiation phase of the EOI process.

7. Is the hangar a main storage hangar or is it to be designed to be a maintenance hangar with additional programming? Will there be additional programming information given to the A/E firm for the proposed layout space? Is there expected to the additional programming in the hangar building outside of just housing the two UH-60 Helicopters? Will there be shops, offices, or tool rooms in the hangar? Will the blades of the UH-60 helicopters fold up? If so, are we to design a space for the aircraft wings to be up or down?

Answer) The new hangar space will be for a Maintenance hangar. Regarding the remaining questions, the chosen Design firm will be provided this information during the contract negotiation phase of the EOI process.

8. How much clear space is required around the blades of the UH-60 Helicopter?

Answer) The chosen Design firm will be provided this information during the contract negotiation phase of the EOI process.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0603 ADJ1900000013

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

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

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

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

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

Michael Baker International, Inc.
Company

Authorized Signature

January 25, 2019
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

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

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

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

DEFINITIONS:

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

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

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

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

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Michael Baker International, Inc.

Authorized Signature: _____ Date: January 24, 2019

State of West Virginia

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 24 day of Jan., 2019.

My Commission expires July 24, 2023.

AFFIX SEAL HERE

NOTARY PUBLIC OFFICIAL SEAL
MEGAN B. SPROUSE
State of West Virginia
My Commission Expires July 24, 2023
400 Washington East, Charleston, WV 25301

NOTARY PUBLIC Megan B. Sprouse

SECTION I

PROJECT BACKGROUND

The West Virginia Army National Guard, Construction and Facilities Maintenance Office (WVARNG CFMO) is seeking a highly qualified architectural/engineering firm ready to provide design services and bid documents for a Fixed Wing Aircraft Hangar Addition at the Army Aviation Support Facility #2 at the Wheeling Ohio County Airport, West Virginia. The firm will be responsible to evaluate the existing conditions of the current hangar, make recommendations and present cost-effective options followed by Construction Documents for an addition to the building as specified in the Expression of Interest (EOI).

Michael Baker is extremely interested in continuing our relationship with WV Army National Guard, Construction and Facilities Maintenance Office

Michael Baker International, Inc. (Michael Baker) is a highly qualified firm with extensive experience in providing the type of services required for these projects, and *Michael Baker is extremely interested in continuing our relationship with WV Army National Guard, Construction and Facilities Maintenance Office* and in providing innovative, efficient and practical solutions for the hangar project as indicated.

QUALIFICATIONS & EXPERIENCE

Firm Introduction

Michael Baker International, Inc. (Michael Baker), is a Pennsylvania-based corporation, founded in 1940, with its headquarters located in Pittsburgh, Pennsylvania. Michael Baker has maintained a local presence in Charlestown for over 50 years and our employees are committed to future of our state. Corporately with over $1.3 billion in annual revenue, Michael Baker has nearly 6,000 employees in over 90 offices located across the U.S. and internationally, and is ranked as the 5th largest design firm for government office buildings in the U.S. by Engineering News-Record.

Michael Baker's team of experienced professionals has demonstrated the ability to deliver quality work products to our clients, on-time and within budget. Each individual on the selected project team has extensive experience in their field of expertise and have demonstrated success on projects of similar size and scope. Michael Baker can provide the entire depth of design services necessary to complete the project but will engage an independent estimating service to insure an unbiased construction cost opinion.

FIRM CAPACITY

Michael Baker has worked across the United States on various hangar projects to create cost effective solutions for both privet and military aircraft; partnering with federal, state and local governments, NGOs and nonprofits from initial planning through construction. We have thoroughly reviewed the EOI and are confident we can deliver the services requested.

Professionals from our local office in Charleston WV have worked on some of these nationwide projects as well as projects here at home. Michael Baker is a "single-stop resource" capable of providing comprehensive professional services, from Mechanical/Electrical and Structural Engineering to Architecture and Planning, final design, and construction management through operational support. With the vast resources available from a large company, experts in many fields can be brought together seamlessly to develop innovative solutions for this assignment. The local Michael Baker staff 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' minutes away from the CFMO and our corporate headquarters only a one-hour drive from the project site, Michael Baker can respond quickly and efficiently to the needs of your project.

Michael Baker has been regularly working on various projects at the Wheeling Ohio County Airport from 1998 to the present and as such, has a wealth of knowledge about the airport and the surrounding site. **The following is a list of some of the projects performed by Michael Baker at this location.**

- Obstruction Removal Project
- Airport Master Plan Update
- Airspace Evaluation Project
- Rehabilitate Runway 16-34
- Crack Sealing and Seal Coating of Taxiways B, C, and D
- Rehabilitation of Runway 3-21 and Taxiways A & T
- On-Call Engineering and Architectural Services
- Feasibility Study for Runway 3-21 Safety Area Improvements
- Runway 34 Turnaround Taxiway
- Aircraft Rescue and Firefighting/Snow Removal Equipment Storage Building Improvements
- Airfield Crack Sealing and Remarking
- FAA Environmental Evaluation Form "C" Preparation for Runway 3-21 Safety Area Improvements
- Runway 3-21 Rehabilitation
- Surveying and Mapping for New GPS Approaches to Runways 16, 34, and 21
- Runway 3 Safety Area Expansion Design
- General Engineering Services
- T-Hangar Taxilane Rehabilitation
- Airport Access Roads
- Runway 16-34 NAVAIDS and Runway 3 NAVAIDS

Some of Michael Baker's other local clients for facility design and renovation projects include, but are not limited to, military facilities, airports, colleges and universities, counties, parishes, cities, townships, local municipalities, state departments of transportation, and private sector clients. Michael Baker's geographic locations and experience enables us to respond seamlessly to a wide-ranging scope of services in order to meet our client's needs.

Within the past five years, in cooperation with the Jacksonville Aviation Authority and Flightstar Aircraft Services, Michael Baker's aviation designers applied experience, creativity and innovation to design and oversee construction of Hangar 935 at Cecil Airport in Jacksonville, Florida. The 113,000-square-foot hangar bay can accommodate a variety of aircraft, including a single Boeing 767 or up to four Boeing 757s simultaneously. The hangar is fire protected by a high expansion foam system, including under-wing protection. Compressed air and two kinds of power are provided along the hangar walls and by in-floor service pits.

Cecil Airport - Hangar 935, Jacksonville FL

The site design included a new aircraft apron, roadway and parking lot pavements, fencing, utilities, landscaping and lighting. The aircraft apron consisted of 14,300-square-yards of 14-inch-thick concrete pavement.

In addition, Michael Baker has worked regionally at the Morgantown Municipal Airport. Designing and providing onsite Construction Services for the construction of a 45 bay Tee Hangar facility. Utilizing the US Military's Innovative Readiness Training (IRT) program to construct the facility and accelerating the project time schedule to accommodate Military personnel availability. The work included; architectural, structural, civil, fire alarm, HVAC, electrical and plumbing design.



US Air Force Reserve constructed Tee Hangars at the Morgantown Municipal Airport through the military IRT program

Currently Michael Baker is working at the WV State Capitol Building and on renovation projects at the West Virginia Schools for the Deaf and the Blind in Romney WV. Which includes Architectural, HVAC, Electrical, Fire Alarm, Life Safety and Fire Sprinkler projects in multiple existing buildings.

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.

For Michael Baker, no job is too large or too small - locally or nationally!

Cecil Airport - Hangar 935 site, Jacksonville FL

In summary,
Michael Baker has the resources and the required qualifications to provide planning, architecture, engineering and design services for WVARNG CFMO 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.

Michael Baker's staff can provide documentation of our vast experience in the following areas for this project:

- Nationally recognized expertise in Architecture, Assessment, Programing and Planning
- Facilities Engineering (Civil, Structural, Mechanical, Fire Protection, Plumbing and Electrical)
- Construction Administration and Construction Monitoring
- Coordination with State and Federal Agencies, as required

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

PROJECTS OF A SIMILAR TYPE AND SCOPE FOLLOWS IN SECTION II

PROJECT TEAM

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

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

Management and Staffing
The project team will be staffed mainly out of the Charleston West Virginia office, with other professionals working from other offices on an as need basis. Patrick Fogarty will directly manage and coordinate efforts of the design team, overseeing design quality, budget and schedule. The selected Project Managers and primary client contacts for this Project will be David Hilliard, PE; he will also lead the design team, with Senior Architect Joseph Chaffin having design oversite and serving as the Architect of Record. They will be coordinating extensively with the architectural designers and building engineers to provide the most efficient and practical solutions for the project. These professionals have worked together on numerous projects and bring a high degree of competency, understanding and experience for schedule and budget challenges such as those presented in this EOI.

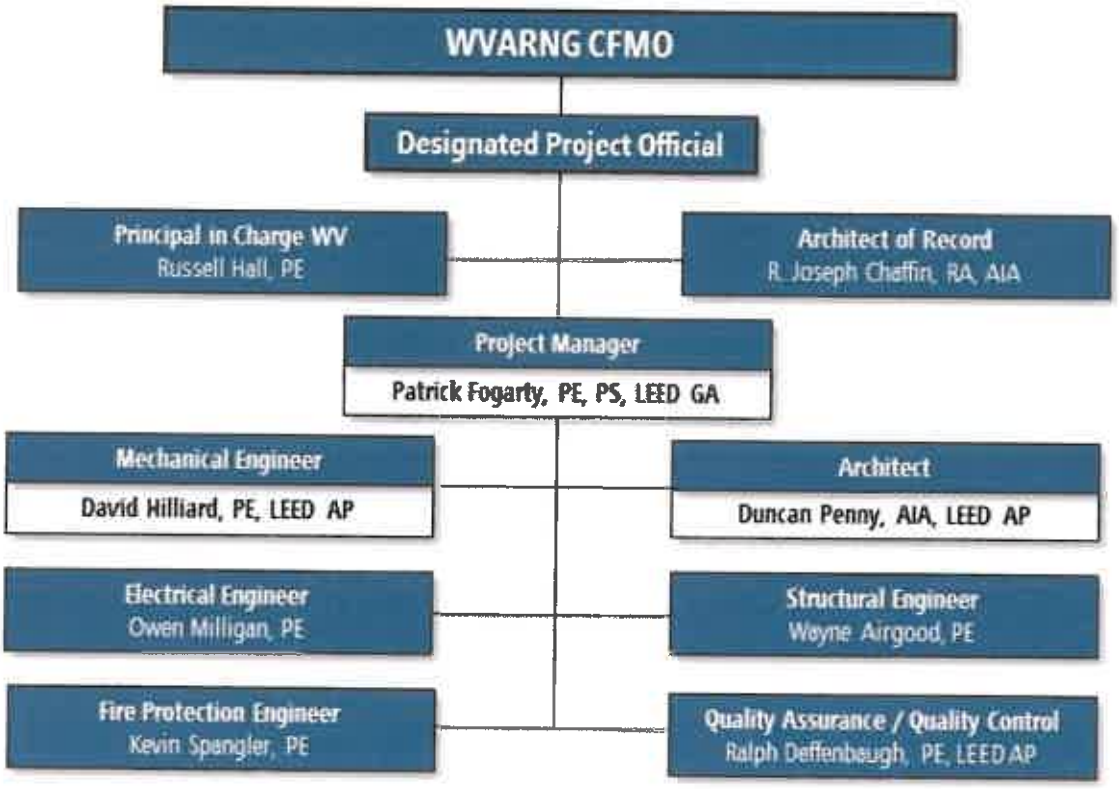
Key Personnel Assigned to the Project
We are a nationwide firm. As such, we can draw from additional staff of designers and technical experts, providing you with a team that has the resources available to meet your deadlines. We are a diverse team. Our group of architects, designers, engineers and construction management specialists can address any technical issue that may be encountered during all project phases. Unlike most firms, we have in-house personnel specializing in telecommunications, LEED/sustainability, historic preservation and construction management.

The team pledges our firm-wide resources to provide the WVARNG CFMO with the highest quality product and excellent client service that will exceed your expectations. We truly appreciate your consideration and would be delighted to further discuss our proposal upon request and stand ready to assist at your direction.

In summary, Michael Baker's knowledge of the project building and site, vast building design and inspection expertise, LEED accreditations and sustainable design expertise, and local relationships with WVARNG CFMO staff make us uniquely qualified firm for this important project. Our team is structured around key personnel that have successfully delivered many difficult projects and are committed to the quality and schedule required by the WVARNG CFMO.

STATEMENT OR EVIDENCE OF THE FIRM OR TEAM'S ABILITY TO PROVIDE SERVICES
This team was selected based on the current Project understanding. Additional team support members or specialists will be engaged on an as need basis. The process is part of the normal working procedure and is seamless in execution.

MANAGEMENT



RESUMES OF TEAM MEMBERS ARE INCLUDED IN SECTION III

IMPLEMENTATION & METHODOLOGY

PHASE ONE: 35% Design

Provide Schematic Design architectural and engineering services for additional hangar space to house two (2) UH-60 rotary wing aircraft. (rotors are approximately 54 ft across and aircraft body is 65 ft long) The hangar will be heated and comply with all associated regulations

AASF #2 Existing Hangar

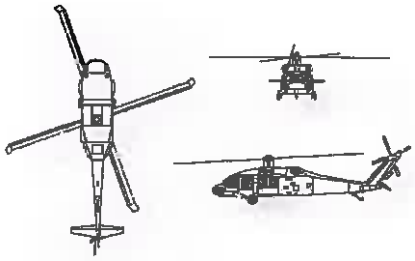
It is Michael Baker's understanding that an addition to and/or minor renovations to the existing Army Aviation Support Facility at the Ohio County Airport, Wheeling West Virginia are desired. The approach of the entire project would be holistic in nature. A kick off meeting would be held to help us understand the complete project requirements. The first step of the project would be to prioritize work and develop time schedules for the project tasks. This process could include identification of existing conditions through information obtained by a review of the facilities as-built drawings and site investigations. Michael Baker will plan for site visits during the first weeks of the project and begin developing the concepts required to provide the schematic design options for the most cost-effective systems to achieve the project requirements.

Michael Baker can provide a variety of services with extensive experience in many fields of expertise. This allows the core team members access to expertise in all areas of study. Our Architects and Engineers will be involved in all aspects of the existing site assessment and project design. Depending on the final scope of services, this may include: Site/Civil, Architectural, Structural, Mechanical, Electrical, Plumbing, Fire Protection, Communication and Life Safety engineering. As needed Client design coordination meetings and/or site visits will be provided as a normal part of the design development process. This will help to ensure that the WVARNG CFMO is receiving the facility that they need, and the level of detail required for the funding submission.

If desired by WVANNG CFMO, Michael Baker can provide complete inspection service for the existing hangar components. Michael Baker would then develop detailed list of recommendation for possible upgrades.

To gain a thorough understanding of the existing site and its usage, the following reviews or inspections would be performed prior to developing the Schematic Design options.

- Building code and UFC requirements
- Life safety
- Mechanical, sprinkler and plumbing systems
- Electrical, fire alarm and communication systems
- Evaluate the best approach for efficient space utilization and circulation issues
- Determine the least disruptive approach for the design of a new addition



Based on the information gathered, the Michael Baker staff will develop schematic design concepts for review and approval by WVARNG CFMO. The projects will be studied in a systematic way to analyze the existing conditions, client needs, affected system demands, phasing, budget and construction time frame. Only then will the appropriate solutions to meet all those requirements be determined. Analyzing multiple solutions provides the client the ability to choose the most cost-effective approach for the project. Depending upon the desires of WVARNG CFMO, a minimum of two potential design approaches will be presented. When various design concept options are developed, and the approach is identified from a technical standpoint, the cost estimating group would be engaged to provide the financial feasibility and cost options for each design approach.

PHASE TWO: Complete the Design and provide Construction Administration Services

As federal funding becomes available,

After funding is secured and approvals are received from WVARNG CFMO, the selected schematic design will be brought into design development (DD) to produce 65% complete plans. DD level technical specifications and construction cost estimates will be provided at each submission.

Once the DD level documents have been approved, the plans will be further developed to provide a 95% set of documents for review by WVARNG CFMO. These plans could be used to submit to the State Fire Marshal for review and approval.

Inside the Existing AASF #2

CONSTRUCTION DOCUMENTS

Regular progress submissions for review will be made to WVARNG CFMO as determined in the project schedule developed at the beginning of the project. Construction Plans will show the project limitations and any requirements for the demolition and removal of the existing components to facilitate the new work. Documentation will include the location of "affected" existing utilities or service lines as needed to position the new hangar. Cost estimates will be updated upon the completion of the 100% Construction Documents plans and specifications. The Architect / Engineer designer of record will be providing final sealed drawings and specifications for the entire project.

PLAN REVIEW

Michael Baker performs an Internal Technical Review (ITR) as part of our normal design process. This process is done on every project before it goes out the door and is part of "*The Michael Baker Way of Project Management*". This ITR is performed by professionals that are not part of the design team but are experts in the prospective fields that they review. This ensures a nonbiased and critical review of the project documents. This process helps to minimize small errors and omissions and yields a smoother bidding process.

PROJECT DRAWINGS
The drawings will be prepared in AutoCAD or Revit format, whichever is preferred by WVARNG CFMO and will have copyright protection. All files will be provided to the client upon completion of the project for future use. The drawings will be 'bound', such that the files will not require external references and allows for easy future use and alteration.

AASF #2 Site (Photo from Google Earth)

BIDDING DOCUMENTS
Michael Baker will provide all necessary design and bidding documents for all aspects of the design in accordance with West Virginia State Purchasing Guidelines. Specifications for the installation of all required products or components will be provided as part of the bid package. Drawings and documentation will be provided based on Client provided as-built-drawings, site investigations and field surveys.
Michael Baker will provide Bidding support and assistance as needed.

CONSTRUCTION ADMINISTRATION
Site visits and construction inspection serves are part of Michael Baker's holistic project services. The team members that started the project will be the same professionals providing the regular onsite inspections during construction. All products intended to be installed on the project shall be submitted to and approved by the A/E of record. The shop drawings provided by the awarded contractor will be reviewed by the A/E of record to ensure that they meet all code requirements, specification criteria and are appropriate for the project and will be approved based on meeting those requirements.

After the construction is substantially complete, Michael Baker will perform a prefinal inspection and develop a corrective measure punch list and will coordinate with regulatory agencies to assure prompt award of the Certificates of Occupancy for the building. A final inspection will be performed and project close out documents will be provided to the WVARNG CFMO.

COST CONTROL

GENERAL
The Michael Baker team is very familiar with many of the local and national contractors and can work productively with a selected contractor to provide the WVARNG CFMO with cost saving alternatives; if the bids come in over budget. The design could include the use of additive or deductive alternates that could be used to control project cost.

Also, as stated in the *Michael Baker Way*, Michael Baker professional ITR staff will have the opportunity to review the plans at each milestone and make comments or make recommendations to the project based on comparison with the Owner's Project Requirements, the current plans and specification, and the current project cost opinion. These considerations, along with open discussion with WVARNG CFMO staff, will determine whether we move forward with the current design approach or make engineered adjustments to the design to stay on budget.

EXPERIENCE IN ESTIMATING PROJECT COST FOLLOWS IN SECTION IV

SECTION II

Michael Baker
INTERNATIONAL

We Make a Difference

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

Civil Engineer , Facilities Practice Manager

Years with Michael Baker: 11
Years with Other Firms: 20

Degrees

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

Diploma, 1993, Surveying and Mapping, International Correspondence Schools

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

Licenses/Certifications

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

Construction Documents Technologist, 1996

General Qualifications

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

Experience

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

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

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

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

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

West Virginia Army National Guard - TAG Wing Improvement, Charleston, West Virginia. *State Army National Guard Headquarters.* Project Manager. Engineer of Record responsible for the coordination of all activities. Baker performed complete planning, design, and construction management services for renovations to the Office of the Adjutant General at the State Army National Guard Headquarters in Charleston, West Virginia. Project elements included new acoustical ceilings, flooring, energy-saving light fixtures, duplex outlets, communications jacks, several new wall partitions, exterior door replacements, new interior doors and hardware, new wall finishes and asbestos removal. Baker provided Construction Administration and inspection services as well as periodic site review during construction.

Michael Baker
INTERNATIONAL

We Make a Difference

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

Lead Design Architect

Years with Baker: 9

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

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.

Experience

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

Morgantown Municipal Airport Tee Hangars. *The City of Morgantown.* Project Engineer, Mr. Chaffin was the Architect of Record for the design of 45 Corporate Tee Hangars at the Morgantown Municipal Airport. He worked with Michael Baker's onsite Construction Manager and the US Air Force Reserve team through the IRT program to provide consulting services throughout construction.

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

Nursing Simulation Renovation and Laboratory Design, Clarion University, Clarion, Pennsylvania. Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. This state-of-the-art nursing education facility, included a simulation laboratory with four high-technology mannequins and a control room, related classrooms and skills lab spaces, offices, conference rooms, social lounge, and study lounge. His role also included interdisciplinary technical reviews for all design/construction documents. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

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

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

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

Design of U.S. Army Reserve Center Renovation and Expansion, Homewood, Illinois. *U.S. Army Corps of Engineers, Louisville District.* Director. Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. As designer of record, Baker provided architectural and engineering services for the renovation and expansion of a 400-member U.S. Army Reserve Center to provide a 60,374-square-foot Training Building, including an approximately 3,500-square-foot Unheated Storage Building. The project also includes construction of a 22,300-square-foot parking area for military equipment, and 130 parking spaces for privately owned vehicles. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement. Baker designed the training facility to meet LEED® Silver certification. Baker's services included architectural design, surveys, environmental and geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

Michael Baker
INTERNATIONAL

We Make a Difference

David J. Hilliard, P.E., LEED® AP

Mechanical/Electrical/Plumbing Engineer

Years with Michael Baker: 9
Years with Other Firms: 20

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 [redacted]

Professional Engineer, Mississippi 2016 [redacted]

Professional Engineer, Louisiana 2016 [redacted]

Professional Engineer, Kentucky 2017 [redacted]

LEED AP, bd+c, 2010

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 engineer for Baker. His recent design experience has included the design of new campus water lines and other service utilities at West Virginia State University, the complex mechanical design of such projects as a large Charleston, West Virginia hospital, a Bus Maintenance Garage and office building for the West Virginia Department of Transportation, an Army National Guard Armory HVAC/Electrical renovation, Master Planning and engineering at the West Virginia Capitol Complex including 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 the mechanical, electrical 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 ASME, ASHRAE, ASPE, USGBC, and other pertinent organizations

Experience

Renovations to Classroom Building, Beckley, West Virginia. *WVU Tech/ West Virginia University. MEP Designer, Project Manager and Engineer of Record.* Responsibilities included facilitating complete design package and collaboration with WVU Tech staff for the 31,000 S.F. facility. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with a compressed time frame in mind. Renovations of HVAC systems, electrical upgrades, fire alarm upgrades, and a new building wide sprinkles system were undertaken, as well as the design of new ADA restrooms. Special consideration was given to the design and product specifications for a nationally accredited psychological rat laboratory within the project. This project was completed in the summer of 2017 in time for the start of the new campus opening.

Army National Guard Headquarters Renovations, Charleston, West Virginia. *State Army National Guard Headquarters.* Mechanical Engineer. Responsible for all mechanical design oversight and construction management. 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 a complete renovation and replacement of the HVAC system with a Loop Heat Pumps, new acoustical ceilings, flooring, energy-saving light fixtures, several new wall partitions, new interior doors and hardware, new wall finishes and asbestos removal. Baker provided Construction Administration and inspection services as well as periodic site review during construction.

Morgantown Municipal Airport Tee Hangars. *The City of Morgantown.* Project Engineer, Mr. Hilliard provided the Mechanical, Electrical and Plumbing Engineering for the design of 45 Corporate Tee Hangars at the Morgantown Municipal Airport. He worked with Michael Baker's onsite Construction Manager and the US Air Force Reserve team through the IRT program to provide consulting services throughout construction.

West Virginia State Capitol Storm Water Study. *State of WV General Services Division.* Project Manager and Engineer, Mr. Hilliard provided the State of West Virginia General Services Division with a comprehensive study of storm water related flooding issues in the basement and ground floor of the Capitol building. He directed in on site assessments, detailed plan review and in provided overall corrective measures recommendations.

West Virginia School for the Deaf and Blind - Architectural/Engineering Services for Multiple Projects, Romney, West Virginia. 3-year Contact. Mr. Hilliard is currently working as the project manager and MEP Engineer of Record for multiple projects at the school including; a campus wide Life Safety System, HVAC upgrades in two buildings, fire alarm upgrades, new and upgraded sprinkler systems in multiple buildings, and a complete renovation of the campus Physical Education Building.

West Virginia State Capitol Restroom Renovations. *State of WV General Services Division.* Mechanical Electrical and Plumbing Engineer of record. Mr. Hilliard provided the State of West Virginia General Services Division with a comprehensive MEP study of the Capitol building related to the renovation and renovation of the 33 restrooms. He worked diligently to verify and document existing building components and assisted in providing overall design, construction sequence, and scheduling recommendations. Construction Document were developed and completed for an extensive plumbing renovation, electrical and fire alarm upgrades as directed by GSD. The construction project was defunded and has not been built.

Renovations to the Benedum Center, Beckley, West Virginia. *WVU Tech/ West Virginia University. Project Engineer 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 and roofing project, this building required new retrofitted ADA toilet facilities, repurposed rooms and relocated walls, HVAC systems upgrades, electrical, fire alarm and fire sprinkler modifications. This project was completed in the summer of 2017 in time for the start of the new campus opening.

Little Kanawha Bus, Calhoun County, West Virginia. *WV Division of Public Transit.*
Mechanical Engineer. Responsible for the Mechanical, Electrical and Plumbing Design, MEP Document Preparation, and Construction Administration for a new bus maintenance and office facility for Gilmer County. Duties include the design of the vehicle storage, cleaning and maintenance mechanical systems, as well as oil pumping and collection systems. The design of an energy efficient HVAC system for the entire building is also part of his responsibilities. The facility was designed as a LEED® project.

Good News Mountaineer Garage and Office Building Renovation, Charleston, West Virginia. Mechanical Engineer. Responsible for the Mechanical, Electrical and Plumbing Design, MEP Document Preparation, and Construction Administration for newly renovated Auto Repair garage and administrative office facility for this non-profit organization. The Good News Mountaineer Garage accepts donations of vehicles that are repairable for a reasonable amount of money. These donated cars are then distributed to families with low incomes for transportation to work.

Michael Baker
INTERNATIONAL

We Make a Difference

Duncan M. Penney, AIA, LEED AP, DBIA

Senior Architect

Years with Michael Baker: 15
Years with Other Firms: 23

Degrees

B Arch., 1979, Architecture, Carnegie Mellon University

A D., 1975, Fine Arts, Cape Cod Community College

Licenses/Certifications

Construction Documents Technologist, 2002

LEED Accredited Professional, 2003

NCARB, Pennsylvania, 1990, [redacted]

Certified Construction Specifier, 2001

Certified Construction Contract Administrator, 2004

NCI Charrette System Certificate, 2005

Design-Build Professional, 2010, D947

Registered Architect, Pennsylvania, 1986, [redacted]

General Qualifications

Mr. Penney's exceptional technical, analytical, and architectural skills reflect many years of experience in architectural design and project management. His achievements include delivering multi-million dollar projects on time and within construction budget. Mr. Penney has performed project design, project management, design charrettes, feasibility studies, construction administration, and specification writing. A Certified Construction Specifier (CCS), he is skilled in producing construction documents. Mr. Penney is also a U.S. Green Building Council, LEED® Accredited Professional, with experience on dozens of Silver LEED®-certified U.S. Army Reserve and Army National Guard Readiness Centers. He is a skilled team facilitator and design charrette leader, and is adept in providing cross-functional team leadership. He maintains close liaison with clients.

Mr. Penney has an expressed interest in life safety issues. He is a Past Board Member and Past President of the International Code Council, Pennsylvania Chapter (formerly known as W. PA Professional Chapter of B.O.C.A./International Code Council) and has served as a panelist and co-presenter for a Tri-AIA Regional Conference.

Mr. Penney's computer software experience includes: Microsoft Word, and other spreadsheet, database, and word-processing applications; Revit 2018; AutoCAD 12 and 14; Microsoft Project; Microsoft Excel; Micro-Station; Specsintact; and Adobe Photo Editor.

CBP ATC Master Plan, Harpers Ferry, West Virginia. *U.S. Army Corps of Engineers, Fort Worth District.* Senior Architect. Responsibilities included the field and document review of 12 buildings for ADA / ABA conformance. Overall findings were included in a Master Plan report for the Government. Michael Baker developed a Vision Plan, Area Development Plan (ADP), Area Development Execution Plan (ADEP), Sustainable Component Plans (SCP), two Customer Concept Documents (CCD), Architectural Barriers Act (ABA)/American Disability Act (ADA) Survey, and Master Planning Digest for the U.S. Customs and Border Protection (CBP) Advanced Training Center (ATC). Michael Baker conducted six different charrettes over the course of two years and met with numerous tenant organizations. The goal of the master planning products was to provide a clear future development strategy and guide the real property direction for the next 20 years.

Woods Run Complex Building 3 Restroom Renovations, Pittsburgh, Pennsylvania. *Duquesne Light Company.* Senior Architect. Responsibilities included assisting with construction administration by the review and processing of contractor submitted shop drawings. Michael Baker provided architectural and engineering design

services for the renovation of restrooms on the first and second floors, a two-story infill addition with a restroom and storage area, and the replacement of the roof of Building Three of the Woods Run Complex. Michael Baker's services included the preparation of final design documents, bidding-phase support, and construction management.

Indefinite Delivery-Indefinite Quantity Contract for Architectural and General Engineering Services, Tobyhanna Army Depot and, North-Atlantic, Division Locations. *Tobyhanna Army Depot.* QA/QC. Responsibilities included serving as a technical advisor and reviewer for a detailed interdisciplinary technical review of the construction documents. Facilitated QC review process utilizing discipline review checklists, scope checklists, and coordination of drawings. 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.

U.S. Armed Forces Reserve Center, Rutland, Vermont. *U.S. Army Corps of Engineers, Louisville District.* Senior Architect. Served as an advisor to the A/E design team for planning and implementing a design charrette with the stakeholders. Michael 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.

Architectural and Engineering Design Services for the Army Reserve 1222nd Engineer Company Readiness Center, Mechanicsburg, Pennsylvania. *U.S. Army Corps of Engineers, Louisville District.* QA/QC. Served as a technical advisor and reviewer for a detailed interdisciplinary technical review of the documents. Facilitated QC review process utilizing discipline review checklists, RFP scope checklists, and coordination of drawings. Michael Baker is providing architectural and engineering services for a 100-member, 26,855-square-foot U.S. Army Reserve Center. The new 23.8-acre site includes two structures: readiness training center, and organizational maintenance shop with an integral unheated storage area. Michael Baker is providing sustainable design and development and Energy Policy Act of 2005 features to meet the Silver LEED® level. Designed to maximize energy efficiency, the readiness center exceeds current energy standards by as much as 30 percent. Featuring water-efficient landscaping that maximizes open space, this structure is designed to reduce its ecological footprint. In addition, many recycled, low-emitting materials and finishes help keep the interior healthy for occupants and the planet.

Michael Baker
INTERNATIONAL

We Make a Difference

Wayne Airgood, P.E.

Structural Engineer

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

Degrees

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

Licenses/Certifications

Professional Engineer, Pennsylvania, 1999, [redacted]

Professional Engineer, Maryland, 2013, [redacted]

Professional Engineer, North Carolina, 2014, [redacted]

General Qualifications

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

Experience

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

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

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

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

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

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

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

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

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

Michael Baker
INTERNATIONAL

We Make a Difference

Owen Milligan, P.E.

Electrical Engineering Manager

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, West Virginia, 2013

Professional Engineer, Pennsylvania, 1999

Professional Engineer, Kentucky, 2005

Professional Engineer, Oklahoma, 2008

General Qualifications

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

Experience

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

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

On-Call Multi-Discipline Services, Pittsburgh International, and Allegheny County Airports (PIT/AGC), Pittsburgh, Pennsylvania. *Allegheny County Airport Authority.* Technical Advisor. Provided technical direction to electrical design staff and performed a technical quality review of the construction documents. Designs were required to meet NEC

standards. Since 1989, Baker has provided multidiscipline, on-call services to the Allegheny County Airport Authority (ACAA). The ACAA owns and operates Pittsburgh International Airport (PIT) and Allegheny County Airport (AGC). Baker acted as an extension to the ACAA's staff, providing the depth of resources and experience of the entire company when called upon by the ACAA. Baker provided a full range of services to ACAA on an "On-Call/As-Needed" basis, including architecture, civil, structural, mechanical, electrical and environmental engineering, general engineering administration, construction support, and other areas.

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

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

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

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

Non-Baker Project Experience

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

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

Michael Baker
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Kevin Spangler, P.E.

Fire Protection Engineering Manager

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

Degrees

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

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

Licenses/Certifications

Professional Engineer, California, 2011, [redacted]

Professional Engineer, Virginia, 2012, 0402051429

Professional Engineer, Pennsylvania, 2012, [redacted]

Professional Engineer, Illinois, 2013 [redacted]

Professional Engineer, Idaho, 2014, [redacted]

Professional Engineer, Connecticut, 2015, [redacted]

Professional Engineer, South Carolina, 2016, [redacted]

Professional Engineer, Minnesota, 2016, [redacted]

Professional Engineer, Mississippi, 2017, [redacted]

General Qualifications

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

Experience

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

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

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

Army Reserve Center, Full Facility Revitalization (FFR), Independence, MO.
Mr. Spangler was the fire protection engineer for the renovation of the existing army reserve center located in Independence, Missouri. He was responsible for performing a field investigation of existing conditions, performing a fire

hydrant flow test and preparing RFP specifications and design criteria documents. The building scope included a new wet pipe sprinkler system in the Reserve Center Building and also the Maintenance Facility. The existing fire alarm system was documented and determined to be removed and replaced with a new fire alarm and mass notification system. The new fire alarm system is designed to serve both buildings and an outdoor speaker system for parking lot notification.

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

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

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

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

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Ralph T. Deffenbaugh, P.E., LEED AP

Technical Manager

Years with Michael Baker: 11
Years with Other Firms: 26

Degrees

B.A.E., 1980, Architectural Engineering (Structural Design Option), The Pennsylvania State University

Licenses/Certifications

LEED Accredited Professional, 2007, 1706

Professional Engineer, West Virginia, 2004, [redacted]

Professional Engineer, Kentucky, 2004, [redacted]

Professional Engineer, Louisiana, 2009, [redacted]

Professional Engineer, Massachusetts, 1992, [redacted]

Professional Engineer, Maryland, 1996, [redacted]

Professional Engineer, Michigan, 2012, [redacted]

Professional Engineer, Ohio, 2004, [redacted]

Professional Engineer, Pennsylvania, 1991, [redacted]

Professional Engineer, Virginia, 1991, 0402022143

General Qualifications

Mr. Deffenbaugh provides leadership for project quality and interdisciplinary coordination for the architecture engineering group. In his wide-ranging experience, he has provided oversight of the engineering efforts focusing on integration of systems, development of energy reduction strategies, and detailed quality assurance reviews of various types of facilities for military, government, commercial, public, and private clients. His experience includes serving as project manager, lead structural engineer, resident structural engineer, or project/design engineer for various types of facilities, including tactical equipment maintenance facilities, vehicle maintenance facilities, barracks, military facilities, administrative/office buildings, bus maintenance facilities, manufacturing plants, fabrication facilities, utility buildings, clean rooms, administrative facilities, transit stations and park-n-rides, water storage, and water/wastewater treatment facilities. In 2007, Mr. Deffenbaugh received his LEED® accreditation from the U.S. Green Building Council.

Experience

Campus Master Planning and Architectural and Engineering Services for State Capitol Complex, Charleston, West Virginia. *State of WV General Services Division.* QA/QC. Responsibilities included quality assurance reviews for civil, structural, architectural, mechanical, and electrical drawings and specifications. Facilitated QC review process utilizing discipline review checklists, RFP scope checklists, and coordination of drawings. 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.

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.* QA/QC. Responsibilities included coordinating the quality assurance reviews for architectural, mechanical, and electrical drawings. Facilitated QC review process utilizing discipline review checklists, RFP scope checklists, and coordination of drawings. The Facilities Management Officer (FMO) for the State of West Virginia, Division of Engineering and Facilities (DEF), West Virginia Army National Guard (WVARNG) selected Michael Baker for a lump

sum/fixed fee contract for architectural and engineering services. Michael Baker was selected by the Division of Engineering and Facilities to provide complete design and construction administration services for the renovation of the first floor of the entire wing of the Office of the Adjutant General (TAG). The Owner requested the need for modernization of approximately 12,000 square feet of existing outdated office space - project elements included new acoustical ceilings, flooring, energy-saving light fixtures, duplex outlets, communications jacks, alterations to the existing floor plan, exterior door replacements, new interior doors and hardware, new wall finishes and asbestos removal.

Little Kanawha Bus Facility, Calhoun County, West Virginia. *West Virginia Division Of Public Transit.* QA/QC. Responsibilities included quality assurance reviews for civil, structural, architectural, mechanical, and electrical drawings and specifications. Facilitated QC review process utilizing discipline review checklists, RFP scope checklists, and coordination of drawings. 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.

Design-Build Community-Based Outpatient Clinic, Lake Charles, Louisiana. *SDA, Inc.* QA/QC. Provided detailed review of VA clinic including challenges in duct and heat pump installation with roof trusses. 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.

Lancaster Station Renovations, Lancaster, Pennsylvania. *Amtrak.* QA/QC. Provided detailed QA review for the contract documents. Michael Baker provided architectural and engineering services for renovations to the historic Lancaster Station. Michael Baker's services included architectural and interior design, mechanical and plumbing design, historic preservation, and construction administration.

P-478 Navy Gateway Inn & Suites (NGIS), Naval Station Newport, Rhode Island. *NAVFAC MIDLANT NEIPT.* QA/QC. As design quality manager, established the quality plan for this project. Michael Baker is the designer of record for the new 200 key, 104,000-square-foot Navy Gateway Inns & Suites hotel. Michael Baker's services included architecture, interior design, civil engineering, landscape architecture, mechanical engineering, plumbing design, fire protection design, and sustainable design.

John F. Kennedy Center for the Performing Arts Pedestrian Access Design Review, Washington, D.C. *Federal Highway Administration - Eastern Federal Lands Highway Division (EFLHD).* QA/QC. Responsibilities included quality assurance reviews for civil, structural, architectural, mechanical, and electrical drawings and specifications. Facilitated QC review process utilizing discipline review checklists, RFP scope checklists, and coordination of drawings. Michael Baker is performing an independent quality assurance-quality control review of plans for improvements to facilitate riverfront pedestrian access between the John F. Kennedy Center for the Performing Arts and the Rock Creek and Potomac Parkway (RCPP) Trail. The project scope includes the addition of two continuous staircases with integral elevator towers centered on the Potomac River side of the building and extending from the River Terrace to the RCPP Trail, along with various trail and site improvements.

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Design of Three PEMB T-Hangars

Morgantown Municipal Airport (MGW), Morgantown, West Virginia

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 and east of Runway 18-36.

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.

Phase 1

Michael Baker surveyed the project site to locate existing drainage structures, determine structure inverts, pipe sizes, orientation, and pertinent utility structures; performed a geotechnical investigation to determine subgrade soil properties for pavement design and building foundations; and developed an engineer's report to serve as the basis of design. Michael Baker also prepared and submitted FAA Form 7460-1 to address the permanent and temporary impacts to the airspace as a result of the project.

Additionally, Michael Baker developed a grading plan with best management practices (BMP), provided a bituminous pavement design with a 20-year structural design-life, developed preliminary airfield lighting and wiring layouts for the existing Taxiway D, and designed electrical and communication utility infrastructure necessary for future hangars. Michael Baker then prepared construction plans and specifications for all required materials for completion of the development.

Phase 2

Michael Baker produced drawings and specifications for the construction of the three PEMB t-hangars and the associated site work. Site/civil design included sewer, sanitary holding tank, trench drains, concrete access aprons, sidewalks, grading, and drainage. Structural design included spread footing foundation for each t-hangar. Architectural design included floor plans and elevations, restroom, and fire barrier walls. Mechanical and plumbing design included heating, ventilation, plumbing, water heating, and drain-waste-vent piping for restrooms. Fire protection design included a two-hour rated fire barrier, life safety report and drawings, and a code review. Electrical design included power feed, power distribution, lighting system, controls, and grounding; site lighting photometric calculations, layout, and controls; and exit emergency egress lighting.

Client

Morgantown Municipal Airport
100 Hart Field Road
Morgantown, West Virginia 26505

Completion Date

2019

Project Costs

$145,352 (Fee)

Michael Baker's Role

- Survey and mapping
- Stormwater management plan
- Geotechnical investigation
- Permitting
- Engineer's report
- Pavement design
- Site grading design
- Drainage design
- Erosion and sedimentation control
- Environmental assessment
- Construction plans and specifications
- Bidding phase services
- Construction management

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Bidding and Construction Management Services

During the bidding phase, Michael Baker distributed bid documents, prepared responses to bidders' requests for information, attended the bid openings, evaluated bids for completeness and accuracy, provided a recommendation for award, assisted with preparation of grant application documents, and prepared and coordinated contract documents.

Construction phase services consisted of construction administration, construction management, and construction observation. Michael Baker provided an on-site inspector to observe construction progress and activities were completed in accordance with the plans and specifications. Administrative services consisted of project coordination, meeting attendance, submittal and shop drawing review, and project closeout.

NOT REFERABLE Design of Three PEMB T-Hangars

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Unmanned Aerial Systems Hangar Complex

Campbell Army Airfield (HOP), 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
600 Dr. Martin Luther King, Jr. Place
P.O. Box 59, Room 972
Louisville, Kentucky 40202

Completion Date

2014

Project Costs

$45,467,153 (Construction)
$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.

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Hangar Fire Suppression System Upgrade

Youngstown-Warren Air Reserve Station (KYNG), Trumbull County, Ohio

Michael Baker provided engineering services for the renovation of the fire suppression and alarm systems in three hangar buildings for the 910th Airlift Wing. Michael Baker's services included mechanical and electrical engineering.

The installation and airlift wing are tenants of the Youngstown-Warren Regional Airport. The project involved the renovation of hangar buildings 295, 302, and 305 to update the fire alarm and foam systems to meet current codes and standards, including Air Force Engineering Technical Letter 98-8, Fire Protection Engineering Criteria; Unified Facilities Criteria 3-601-02, Operation and Maintenance Inspection and Testing and Maintenance of Fire Protection Systems; and National Fire Protection Act 409, Standard on Aircraft Hangars. Michael Baker provided engineering services for this project as a subconsultant to another architecture and engineering firm.

Client

U.S. Air Force Reserve
191 Youngstown Air Reserve Station
3976 KingGraves Rd, Unit 37, B-510
Vienna Township, Ohio

Completion Date

2014

Project Costs

$27,038 (Fee)

Michael Baker's Role

- Fire suppression and alarm system design
- Mechanical engineering
- Electrical engineering

Michael Baker provided transient voltage surge suppression on fire alarm circuits entering and leaving the facility, which are connected to the foam suppression system control panel, the fire alarm control panel, the mass notification system control panel, and notification appliance circuit panels or the fire pump controllers. This included power circuits, antennas, and device circuits.

The project replaced foam system manual discharge stations with new factory-painted yellow stations. New signage was also provided. Also, to ensure reliable operation, Michael Baker placed humidity control in mechanical rooms where the fire suppression system control panels were located.

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Aircraft Maintenance Hangar Renovation Design

Holloman Air Force Base, New Mexico

Michael Baker provided design services for renovation of an unmanned aircraft system formal training unit aircraft maintenance unit for the MQ-1 Predator and MQ-9 Reaper. Michael Baker's services included grading, erosion control, and utility design; structural analysis; space planning and layout analysis; mechanical, electrical, and plumbing design; fire alarm system upgrade design; preparation of Leadership in Energy and Environmental Design (LEED®) version 3.0 design templates; and building information model export.

The original World War II-era hangar was primarily a wood building. The main hangar bay was constructed with timber arch trusses spanning 160 feet supported by cast-in-place concrete buttresses on reinforced concrete foundations. Because of the unique construction type and the era of original construction, this building is considered historically significant. Therefore, extra effort was required during design to provide the new architectural layouts and finishes, and new heating, ventilation, and air conditioning (HVAC); and plumbing, electrical, and fire protection systems necessary to provide an upgraded functional space for the users without compromising the important features that give the building its distinctive historical character.

Client

U.S. Air Force
Unit 7775, Bldg T-615
Lajes Field, Azores, Portugal 09720

Completion Date

2015

Project Costs

$10,200,000 (Construction)
$680,508 (Fee)

Michael Baker's Role

- Space planning
- Grading, erosion control, and utility design
- Structural analysis
- Mechanical, electrical, and plumbing design
- Fire alarm upgrade design
- LEED© V. 3.0 design templates
- Building information model export

To provide the necessary space to accommodate both the aircraft maintenance and administrative and support functions of the facility, Michael Baker designed a new addition for the south side of the building. Although classified as new construction, this 6,300-square-foot steel-framed addition is integrated into the existing hanger structurally and architecturally, and is served by the same upgraded building HVAC, plumbing, electrical, and fire protection systems that serve the hangar. To the user, there is no obvious distinction between the renovated hangar and the new addition spaces.

The architectural design had to account for a variety of spaces with different intended uses. In addition to the main hangar, which accommodates the aircraft and maintenance, the necessary support spaces, such as an engine shop, parts storage and supply rooms, secured storage, and other maintenance areas, are immediately adjacent to the hangar. Personnel spaces that are part of the renovation and new construction include offices, men's and women's restrooms, a mass training and briefing space, conference rooms, janitors' and maintenance rooms, and mechanical rooms.

Building systems that had to be designed included interior finishes, plumbing distribution and fixtures and equipment, mechanical systems, electrical equipment and distribution, communication systems, lighting systems, fire protection systems, alarm and exhaust systems, fall protection, and wash-down drainage trenches.

Site improvements included demolition of underground and aboveground infrastructure; new concrete paving for vehicles; site utilities, including storm sewer, gas, electrical, sanitary sewer, potable water, and communications; aviation paving around the hangar; and security fencing. The design effort required meeting the requirements of the U.S. Department of Defense antiterrorism and force protection (ATFP), Energy Policy Act of 2005, and LEED® standards, including a stormwater retention system.

The base bid consisted of two parts. Part one included renovation and repair of the hangar service bay and north lean-to of Maintenance Hangar Building 301, which encompassed 39,988 square feet, and part two consisted of an independent addition connected to the south of the existing Maintenance Hangar Building 301 and renovation of portions of the south lean-to, which encompassed 11,000 square feet.

Michael Baker provided space planning or layout requirements for Building 301 and the lean-to and performed a code analysis, including identification of all applicable building codes. Michael Baker developed grading, erosion control, and water, gas, and electrical utility designs for Building 301; provided a structural analysis of the existing building to determine whether there was a need for structural isolation; and developed foundation and slab design for the new addition.

Michael Baker also provided mechanical, electrical, and plumbing design. Mechanical design included a heating, ventilation, and air conditioning system consisting of a single air-cooled chiller along with a primary-variable pumping system, two boilers, and new air handling units. Electrical design included development of a layout for electrical equipment and fixtures; one-line diagram, panel schedules, details, and load calculations; site electrical and communications utilities; voice and data telecommunications; and fire alarm and mass notification system. Plumbing design included domestic water and sewer, sewer piping and venting, floor drains with appropriate trap primers and clean-outs, industrial waste sinks and floor drains, condensate drainage, break rooms, sink with disposal, drinking fountains, and hot water as required. Michael Baker completed the design templates for LEED© Version 3.0 and exported building information modeling models out for AutoCAD deliverables.

In addition, Michael Baker designed a new fire alarm and mass notification system for the existing B-301 hangar. The design included complete audio and visual notification with speakers and strobe devices throughout the building. A high expansion foam system, including initiation and notification devices, was also provided for the protection of the hangar bays. The fire alarm system design included monitoring of the sprinkler and high expansion foam systems. All system devices were coordinated with new and existing project conditions.

Michael Baker prepared design templates for LEED® version 3.0, and exported building information modeling drawings as AutoCAD deliverables. As this was a renovation to a hangar that was built in the 1940s, design sustainability was one of the main focuses of the design team. The project is currently tracking well into the LEED® Silver certification range for points.

The environment at the base will be enhanced by improving air and water quality, reducing solid waste, and conserving natural resources. Sustainable features in the site design include limiting the disturbed areas to the existing hardscape of the site; designating parking spaces to facilitate carpooling and alternative transportation, although ATFP requirements led to the removal of several parking spaces; managing any increase in stormwater runoff through the use of underground storm sewers; and energy-efficient lighting and daylighting to reduce operating costs and lengthen the life of the mechanical and electrical equipment. Other elements that further minimize future energy costs include an efficient building envelope, cool roofing, and the use of occupancy sensor controls to extend the life of the building HVAC equipment. The design specified construction adhesives, paints, and coatings with low-volatile organic compound content.

Michael Baker
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Design-Build F-35A Aircraft Engine Shop

Nellis Air Force Base, Nevada

Michael Baker served as the lead designer for a new design-build, 4,000-square-foot engine maintenance facility attached to the six-bay F-35A aircraft maintenance hangar and aircraft maintenance unit. Michael Baker's services included project management, civil design, architecture, foundation and overall structural design, mechanical design, electrical design, fire protection engineering, and construction services.

The engine shop, located on the flight-line side of the maintenance hangar, is a single-story high-bay area that was designed to accommodate minor F-35A engine maintenance and provide storage for three off-airframe F-35A engine assemblies. The engine shop features cranes and overhead service doors at the shop exterior and interior to facilitate engine movement and transfer. The engine shop has exterior load-bearing, split-faced concrete, masonry unit walls with metal studs and a built-up parapet roof over light-gauge framing.

Project Management

Michael Baker's project management services included leading the initial design kick-off meeting at the site and participating in weekly design meetings via teleconference. Michael Baker also participated in design review meetings at the 100 percent pre-final design phase.

Michael Baker coordinated design and submittals with various subconsultants throughout the design phase.

Design

Michael Baker prepared design submissions for 100 percent pre-final and issue-for-construction levels. Civil design included force protection, grading, concrete work, and paving. Structural design consisted of a single structure enclosed by exterior concrete masonry unit walls supported by a shallow strip foundation. The ground floor slab is an 8-inch-thick reinforced concrete slab on grade. The roof consists of metal deck diaphragm on light open-web steel joists and steel girders, supported by steel columns that rest on isolated spread footings.

An evaporative cooled unit serves as the primary source of heating and cooling. Michael Baker coordinated the heating and ventilation, hot and cold domestic water, and drainage design to tie into the existing systems for the six-bay hangar. The switchgear in the hangar's electrical room feeds electricity into the engine shop addition. Michael Baker prepared the layout for the electrical equipment and fixtures, equipment connections to evaporative coolers, and emergency and egress lighting for the engine shop. Michael Baker performed a code and life-safety analysis for the design of the fire protection system, which includes fire alarm, detection, and mass notification system.

Client

U.S. Army Corps of Engineers, Los Angeles District
CESLCT-P
P.O. Box 2711
Los Angeles, California 90053-2325

Completion Date

2013

Project Costs

$1,866,780 (Construction)
$215,697 (Fee)

Michael Baker's Role

- Project management
- Architecture
- Civil design
- Structural design
- Mechanical, electrical, and plumbing design
- Fire protection system design
- Construction services

Michael Baker used Autodesk® Revit® 2012 to perform building information modeling for coordination and interference, and designed the engine shop so that the combined hangar and engine shop will receive LEED® version 3.0 Silver certification.

Construction Services

During construction, Michael Baker reviewed the contractor's submittals and reviewed and responded to design requests for information. Following construction, Michael Baker prepared as-built drawings and mark-ups and input them into the project Revit® and computer-aided drafting files.

Value-Added

Michael Baker proposed an alternative delivery schedule to provide a 100 percent pre-final submission for review and then submitted an issue-for-construction set. This allowed the contractor to mobilize on-site earlier and co-locate with the contractor for the main hangar. It also allowed both the hangar and engine shop to be delivered to the owner at the same time, in December 2013, instead of delivering the hangar in November 2013 and the engine shop in August 2014.

Michael Baker
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Design-Build Upgrade of the Building 913 Hangar

Luke Air Force Base, Glendale, Arizona

Michael Baker provided architectural and engineering services for the design-build upgrade of the Building 913, a 27,4350-square-foot hangar to support maintenance of F-35 aircraft. Services included project and design management; surveying and mapping; architecture; civil, structural, life safety, mechanical, electrical, plumbing, security, and telecommunications engineering; and construction-phase services.

Project Overview

The F-35 aircraft are a family of fifth generation fighter planes that combine advanced stealth with fighter speed and agility, fully fused sensor information, network-enabled operations, and advanced sustainment. The F-35 will replace the A-10 and F-16 for the U.S. Air Force. The Building 913 hangar previously supported the F-16 aircraft. The purpose of the project was to upgrade the Building 913 hangar at the base to support the maintenance of the F-35 aircraft.

Improvements to the hangar include new hangar lighting; enhancement of the electrical power capability at each aircraft position; aircraft cooling units at all six aircraft parking positions; overhead crane access at each aircraft position; new security fence and gates isolating the hangar from adjacent buildings; a new intrusion detection system; and the resurfacing of the hangar concrete floor. In addition to the security fence, site improvements included new masonry security screen walls to hide the new heating, ventilation, and air conditioning (HVAC) equipment that is mounted externally to the hangar. The design complies with Energy Policy Act of 2005 requirements for efficiency and sustainability and meets the installation's design standards.

Client

U.S. Army Corps of Engineers, Los Angeles District
CESLCT-P
P.O. Box 2711
Los Angeles, California 90053-2325

Completion Date

2016

Project Costs

$5,136,169 (Construction)
$322,357 (Fee)

Michael Baker's Role

- Project management
- Design management
- Architecture
- Surveying and mapping
- Civil engineering
- Structural engineering
- Mechanical, electrical, and plumbing design
- Life safety and security design
- Telecommunications design
- Construction-phase support
- As-built drawing preparation

Project Management

Michael Baker's project management services included the development of a design quality control plan and facilitation of a post-award kick-off meeting and charrette, an initial design conference, and section design conferences. Michael Baker also participated in three design review conferences and biweekly meetings with the construction contractor, and prepared and distributed meeting minutes. Michael Baker developed and maintained a Microsoft® SharePoint document control system.

Preliminary and Final Design

The original scope of work included preparation of 60 percent preliminary and 100 percent (final) design documents. To expedite the project, district and local base personnel performed an over-the-shoulder review at the 80 percent

design phase, and Michael Baker proceeded to final design. Michael Baker performed preliminary engineering surveying and mapping and oversaw the geotechnical investigation. Michael Baker prepared the design specifications in accordance with the Unified Facilities Guide Specifications in Specsintact format.

Construction-Phase Services

Michael Baker's construction-phase services included review of contractor submittals, responses to requests for information, and construction observation. Michael Baker prepared as-built drawings based on red-line construction documents that were provided by the contractor.

Work Self-Performed

Michael Baker provided architectural, electrical, structural, and civil design for the facility and associated site work. Design elements included required utilities; communications; electrical; HVAC; force protection measures; paving; walks; curbs; site improvements; and grading.

Civil/Site/Utility

Site and utility work was limited to the removal of Portland cement concrete (PCC) pavement to accommodate the construction of new Aircraft Cooling Unit (ACU) pads and screen wall at the southwest corner of the hanger. PCC pavement removal and replacement was also required in this area to install a 6-inch sewer lateral extending from the existing main to the new HVAC unit pads. The ACUs were fully enclosed by a CMU screen wall to fulfill Anti-Terrorism/Force Protection (AT/FP) requirements, which also included a 7-foot high chain link fence with barbed wire. The fence also provided a flightline barrier and incorporated two sliding vehicle gate and three personnel gates.

Architectural

Exterior modifications to the building were limited to addressing AT/FP requirements at the hangar bay periphery and the effective screening of new HVAC equipment. Existing hangar doors were modified to restrict visual line-of-sight into the hangar bays from non-secure areas. Existing personnel doors were modified or replaced to restrict line-of-sight into the hangar bays from non-secure areas. Existing clerestory glazing along the north side of the hangar bay were sealed off to restrict line-of-sight into hangar bays.

Electrical

Indoor fluorescent fixtures with T5HO lamps and electronic ballast were selected for their energy conservation properties. The lighting achieved 100 foot candles measured 3 feet above the finished floor and are automatically controlled to adjust lighting levels between business and non-business hours. Within the hangar, a Class I Division 2 hazardous location, Michael Baker avoided locating any electrical equipment within the aircraft servicing area, as well as the space between the finished floor and 18 inches above the finished floor outside the aircraft area. The grounding system was tested for adequacy and upgrades were provided. A new lightening protection system was provided for the hangar portion of the building, including roof-mounted strike terminals, roof conductors, down conductors, and ground rods. New switchboards and distribution systems were incorporated into the design. Finally, the project included installation of an intrusion detection system, including hardware, software, devices, wiring, conduit, power, and communications.

Mechanical and Plumbing

Mechanical design provided four ACUs for 30 tons of cooling at 50 pounds per minute (665 cubic feet per minute [CFM]) of cooling air at 55 degrees Fahrenheit). Each ACU had its own internal controller, and there were two ACUs on each side of the hangar to serve two rows of three aircraft. The ACUs were located outside the building in a screened wall mechanical yard. In addition to the ACUs, the existing air compressor was replaced with a new two-stage 20 high pressure air compressor that produced 70 ACFM at 150 PSIG, and with a 240-gallon tank. The compressed air piping was black seamless carbon steel Schedule 40, to districute the compressed air to each utility pit assembly, typical of six pits. The air compressor was equipped with an air dryer unit and many other accessories to provide clean, dry, oil-free compressed air at each utility pit assembly unit. The compressed air piping was provided and installed in the utility trench alongside the high-pressure supply cooling air header pipe.

Interior Design

New interior finishes were durable, low maintenance, and sustainable materials conducive to the working environment of the facility. Interior colors and finishes were coordinated with existing conditions to create a cohesive appearance for the interior environment. Typical paint for all wall infill areas was a low sheen enamel for all painted surfaces with a semi-gloss finish for trim paint. The existing floor slab at the hangar bay was ground smooth and received a new polished finish. Painted safety striping was applied at the periphery of the hangar bay on all four sides, as well as the perimeter of all aircraft service pits. Interior doors were steel construction, field painted to match the existing color palette, and with painted hollow metal frames. Doors were painted, fire-rated metal.

Michael Baker
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Hangar 935 Design

Cecil Airport (VQQ), Jacksonville, Florida

Michael Baker provided design and engineering services for a new 165,000-square-foot maintenance hangar facility for an existing tenant at Cecil Airport.

Michael Baker worked closely with the client and Flightstar Aircraft Services to design the new facility to support ongoing heavy maintenance and repair operations. The main component is the 113,000-square-foot hangar bay, sized to support a variety of aircraft, including a single Boeing 767 or up to four Boeing-757s simultaneously. The hangar bay features a clear width of 300 feet, a clear depth of 350 feet, and a clear height of 55 feet. The vertical lift fabric hangar door system saves site space by eliminating the need for protruding door pockets, allows for flexibility in opening height, and provides for natural day lighting.

The hangar is protected by a high expansion foam system, including under wing protection. Compressed air and two kinds of power are provided along the hangar walls and by in floor service pits. The hangar is supported by a new 18,000-square-foot warehouse facility serves as the tenant's central receiving and distribution center. The warehouse has climate-controlled storage areas and includes a loading dock facility. The remainder of the facility is approximately 34,000 square feet of shop, tool, layout, office, training, and other support spaces. The break room is designed to support 250 employees and includes an exterior courtyard space with seating for an additional 100 persons. The facility serves as the new headquarters for the tenant.

Client

Jacksonville Aviation Authority
13365 Aeronautical Circle
Jacksonville, Florida 32221

Completion Date

2015

Project Costs

$32,000,000 (Est. Construction)
$2,286,083 (Fee)

Michael Baker's Role

- Site planning
- Programming
- Architectural design
- Interior design
- Civil engineering
- Construction administration
- Inspection

Site design included a new aircraft apron, roadway and parking lot pavements, fencing, utilities, landscaping, and lighting. The aircraft apron consists of 14,300 square yards of 14-inch-thick concrete pavement and provides parking for four Boeing-757s simultaneously. Grounding and service points (power, air) are provided throughout. The parking lots provide spaces for 305 vehicles, including bicycles and motorcycles. Controlled access for truck deliveries is provided on the north end of the facility as well as space for recycling and materials control. The project was constructed through a Construction Manager at Risk (CMR) contractor. Michael Baker worked closely with the CMR to develop construction packages to facilitate a fast track construction process and led all permitting efforts.

Michael Baker
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SECTION III

SECTION IV

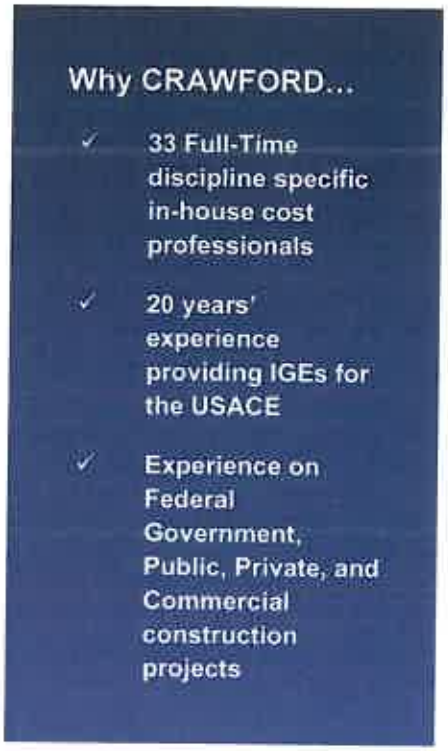
National Guard Bureau

CRAWFORD
CONSULTING SERVICES

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

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

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



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

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

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

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

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

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

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

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

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

CRAWFORD
CONSULTING SERVICES

Donald E. Crean, AVS, CCP

Senior Cost Estimator

EXPERIENCE: 25+ Years

EDUCATION:

Allegheny College; BA Economics / Political Science

PROFESSIONAL ACCREDITATION:

Society of American Value Engineers (SAVE) International

Association for the Advancement of Cost Engineering (AACE) International

CERTIFICATIONS:

Certified Cost Professional (CCP)

Associate Value Specialist (AVS)

Overview:
Mr. Crean has over 25 years of engineering experience developing cost estimate packages for new MILCON and Sustainment Restoration and Modernization (SRM) projects ranging from $10,000 through $8 billion master plan estimates. He oversees take-off and software input of all AE discipline components of the project. Mr. Crean works closely with the design teams and project owners to ensure all scope requirements are met while keeping the cost estimates within the programmed budget. He's developed over 500+ cost estimates for projects in 23 countries worldwide and is well versed in AACE RP 18R-97 and ER 1110-3-1300. **Training:** MCACES Second Generation (MII), SUCCESS Estimator, WinEstimator, PlanSwift.

Crawford Consulting Services, Inc., East Pittsburgh, PA
Senior Cost Estimator; 2009 – Present

- Manages construction cost estimating projects with awarded costs between $10K - $5B
- Oversees complete execution and delivery of cost estimating package to owner's and clients with a <5% accuracy rate
- Provide Market Analysis on construction projects across the country which include research, data gathering and reporting on items including but not limited to: general contractor involvement, subcontractor involvement, labor supply, material availability, equipment pricing, construction indices, and construction climate
- Provides cost estimating, scheduling, constructability review, value engineering, risk analysis and other support enabling agencies to improve strategic and tactical decision making
- Performs cost estimating project take-off, product research and pricing quantity take-off, and research pricing
- Provides Life cycle cost analysis

Relevant Renovation Project Experience

United States Air Forces Central (USAFCENT) Headquarters, Building 1130 Renovation, Shaw Air Force Base, SC
Mr. Crean provided cost engineering services through corrected final and worked with the client to develop six (6) base bid packages and four (4) optional bid items for an 8(a) set-aside solicitation. Renovation of 88,955 SF four-story building including offices, conference rooms, circulation spaces, lobby and related spaces. **Cost:** $19.283M

City of Pittsburgh – Riverview Observatory Renovations, Pittsburgh, PA
Mr. Crean provided a construction cost estimating services for the renovations to the Riverview Observatory in Pittsburgh, PA. Renovations of the Observatory included repaving the road, installing new inlets along the road and a new storm line, adding 5 or 6 parking spaces for the dog park, adding a drinking fountain at the dog park and potentially a sanitary line for it, putting the existing overhead electric line underground, and adding the parks department's standard pole light fixtures along the road. **Cost:** $696,793.

Crawford Consulting Services, Inc.
239 Highland Ave.
East Pittsburgh, PA 15112
P: 412.823.0400

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

Donald E. Crean, AVS, CCP
Senior Cost Estimator

City County Building Energy Upgrades, City of Pittsburgh Department of Public Works, Pittsburgh, PA
Mr. Crean provided a construction cost estimating services at the 90% Design Phase. Energy upgrades to the City County Building in Pittsburgh, PA. Upgrades will include all demolition and renovation of the first floor, the first floor mezzanine, and third floor HVAC, plumbing, lighting/electrical, and architectural renovations. **Cost:** $3.4M

911th Airlift Wing – Repair Administrative Building 218, Pittsburgh, PA
Mr. Crean provided a construction cost estimate for the repair of Administrative Building 218. Upgrades for the structural support, interior architecture, mold remediation, HVAC, Plumbing, Electrical, and Fire Protection Systems, as well as the Telecommunications and Data center. **Cost:** $2+M

GSA - USMS Build Out, Federal Stokes Building, Cleveland, OH
Mr. Crean provided a construction cost estimate utilizing the RS Means Cost Database and historical project costs to determine the material, labor, equipment and subcontractor pricing. Provide a Cost Estimate for construction costs for the USMS 4th Floor build out broken located on the north side / left hand quadrant of the building. **Cost:** $1.5M

GSA – USAO Renovation, Evansville, IN
Mr. Crean provided a construction cost estimate with the design basis utilizing the existing and proposed 2nd floor plans, the Design Guide for the Dept. of Justice and Pricing Policy Excerpt for Shell and TI. Renovate and expand USAO 2nd Floor office by renovating the adjacent space for DID and Design requirements. **Cost:** $565,269

Edinboro University of Pennsylvania - Cooper Science Building Renovation and Addition
Mr. Crean worked with the professional of record along with Edinboro University, under PASSHE, providing detailed cost estimating services on the renovation of the existing 60,000 SF building. The first phase of the project was the new construction of a 30,000 SF addition to Cooper Science Hall, which includes 'wet' teaching labs and offices for biology, chemistry. **Cost:** $14.M

USACE Japan District – Renovation of Zama High School, Camp Zama, Japan
Mr. Crean provided MCACES MII Cost Engineering Services. CRAWFORD attended the Planning Charrette on site with additional DD Form 1391 Validation Services. Renovations to buildings 913,912,915, and 906 to improve site conditions to meet DoDEA Education Facilities Specifications and AT/FP standards. Retrofit blast resistant upgrades to the doors, windows and exterior walls. Seismic upgrades include ceiling suspension brackets, code requirement updates and exterior wall reinforcements. **Cost:** $19.42 million

USACE Kansas City District – Renovations of Bldgs. 275 & 168, Ft. Leavenworth, KS
Mr. Crean provided cost engineering services and worked with our design team member to capture renovation scope for Buildings 275 &168 to upgrade existing building systems and improve configuration of interior layout to conform to the mission of CYS – Skies Unlimited. Renovation of the facility shall be consistent with the renovation practices used for civilian sector projects that perform similar functions to the military user. This includes preservation of historic building shell and interior historic character defining features while replacing building systems **Cost:** $5.2M (Draft RFP Submission)