

**Michael Baker**

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

*We Make a Difference*

March 27, 2019

Melissa Pettrey, Senior Buyer  
Department of Administration Purchasing Division  
2019 Washington Street East  
Charleston, West Virginia 25305

RECEIVED  
2019 MAR 27 AM 11:10  
WV PURCHASING  
DIVISION

**Subject: Engineering Project Management Advisor Services  
EOI – CE01 0211 GSD1900000005**

Dear Ms. Pettrey:

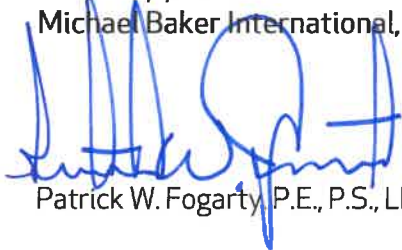
The Charleston, West Virginia office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to a solicitation for Expression of Interest for Architectural and Engineering Services related to Engineering Project Management Advisor Services. Michael Baker is interested in this project and for the opportunity to partner with the West Virginia General Services Division (WVGSD).

Michael Baker is well positioned to offer an individual to provide comprehensive Engineering Project Management Advisor Services as desired by West Virginia General Services Division including; Planning, Mechanical, Electrical and Plumbing Engineering, and Consulting. Our selected professional is well seasoned in the preparation of construction documents, bid specifications, and the application of required code compliance and the appropriate level of Construction Administration during the Construction Phase. Michael Baker can also provide additional consultants, as needed, to assist the WVGSD team including: Architectural, Structural, Civil, Fire Protection Engineering expertise.

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](mailto:pfogarty@mbakerintl.com).

Very truly yours,  
Michael Baker International, Inc.



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

Enclosure

**MBAKERINTL.COM**

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

Office: 304.769.0821 | Fax: 304.769.0822

**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*

(Authorized Signature) (Representative Name, Title)

**Russell E. Hall, P.E., P.S., Office Executive**

(Printed Name and Title of Authorized Representative)

**March 27, 2019**

(Date)

**304-769-0821 / 304-769-0822**

(Phone Number) (Fax Number)

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: CE01 0211 GSD1900000005**

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)*

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6  |
| <input type="checkbox"/> Addendum No. 2            | <input type="checkbox"/> Addendum No. 7  |
| <input type="checkbox"/> Addendum No. 3            | <input type="checkbox"/> Addendum No. 8  |
| <input type="checkbox"/> Addendum No. 4            | <input type="checkbox"/> Addendum No. 9  |
| <input type="checkbox"/> Addendum No. 5            | <input type="checkbox"/> 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

Date

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



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: 554335

Doc Description: Engineering Project Management Advisor Services

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2019-02-27	2019-03-27 13:30:00	CEOI 0211 GSD1900000005	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: <b>Michael Baker International, Inc.</b> <b>400 Washington Street East, Suite 301</b> <b>Charleston, West Virginia 25301</b> <b>304-769-0821</b>

**FOR INFORMATION CONTACT THE BUYER**  
 Melissa Pettrey  
 (304) 558-0094  
 melissa.k.pettrey@wv.gov

Signature X  FEIN # **25-1228638** DATE **March 27, 2019**

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

**ADDITIONAL INFORMATION:**

The West Virginia Purchasing Division "State" is soliciting Expression(s) of Interest (EOI) for General Services Division, "Agency", from qualified individuals to provide engineering project management advisory services to assist and support the Agency, on an hourly basis, as it undertakes various electrical, mechanical, HVAC, or structural engineering projects over the life of the Contract per the bid requirements, specifications, terms and conditions attached this solicitation.

VOICE TO	SHIP TO
DEPARTMENT OF ADMINISTRATION GENERAL SERVICES DIVISION 112 CALIFORNIA AVENUE, 5TH FLOOR CHARLESTON WV25305 US	DEPARTMENT OF ADMINISTRATION GENERAL SERVICES 112 CALIFORNIA AVENUE, 5TH FLOOR CHARLESTON WV 25305-0123 US

Line	Comm Ln Desc	Qty	Unit Issue
1	Engineering Project Management Advisor Services	2000.00000	HOUR

Comm Code	Manufacturer	Specification	Model #
81101513			

**Extended Description :**  
Hourly Rate Unit Price

<b>GSD1900000005</b>	<b>Document Phase</b> Final	<b>Document Description</b> Engineering Project Management Advisor Services	<b>Page 3</b> <b>of 3</b>
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**ADDITIONAL TERMS AND CONDITIONS**

See attached document(s) for additional Terms and Conditions



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: 554335

Doc Description: Addendum No.1 Engineering Project Management Advisor

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2019-03-20	2019-03-27 13:30:00	CEOI 0211 GSD1900000005	2

**BID RECEIVING LOCATION**

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

**VENDOR**

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**ADDITIONAL INFORMATION:**

Addendum No. 1

Addendum No. 1 is issued to publish and distribute the attached information to the vendor community.

\*\*\*\*\*

**Central Expression of Interest**

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<b>GSD1900000005</b>	<b>Document Phase</b> <b>Final</b>	<b>Document Description</b> Addendum No.1 Engineering Project Management Advisor	<b>Page 3</b> <b>of 3</b>
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Comm Code	Manufacturer	Specification	Model #
81101513			

Extended Description :

Hourly Rate Unit Price

**SOLICITATION NUMBER: CEOI 0211 GSD1900000005**

**Addendum Number: 1**

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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 publish and distribute the attached documentation to the vendor community.

1. To provide an answer to the submitted Technical Question, per Attachment A, Technical Questions and Answers.

No other changes.

**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

CEOI GSD1900000005  
Vendor Q&A

**Q1. Is there a requirement for the number of hours worked out of the Agency's offices? Meaning, can some of the work for the State be completed at my office and then report to the Agency's offices as needed for meetings, design reviews, and meeting with other Engineering Firms?**

**A1. The Agency's intent is that the consultant work in the Agency's offices or at its facilities for a regular 40-hour work week (and no more than 2000 hours per contract year). The consultant will be included in daily *ad hoc* meetings, discussions, and project planning sessions, and not just scheduled meetings, design reviews, etc. Vendors should indicate their understanding of Goal Six of the CEOI as part of their proposals.**

**Q2. Can this contract be covered by more than one engineer? If yes, do all engineers covering this contract need to be Professional Engineers or can they be supervised by a Professional Engineer?**

**A2. No. The Agency desires a single, on-site consultant with the ability and authority to provide complete and final answers and decisions regarding projects, without having to be supervised or administered by a third party. Given this answer, and in response to Goal Five of the CEOI, Vendors should address how the single consultant should meet the experience, registration and standing objectives.**

**Q3. Any additional details around the first two questions will be greatly appreciated.**

**A3. See Answers 1 and 2.**

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\_\_\_\_\_  
Company

  
\_\_\_\_\_  
Authorized Signature

**March 27, 2019**

\_\_\_\_\_  
Date

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Revised 6/8/2012

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## APPENDIX 1

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## PROJECT BACKGROUND

The West Virginia General Service Division (Agency) is seeking a highly qualified individual from a local architectural/engineering firm to provide engineering project management advisory services to assist and support the Agency, on an hourly basis. The firm will provide one individual to be the primary engineering consultant and the consultant will be responsible to perform and coordinate the required level of effort for each task or project. The consultant will review existing conditions at the chosen sites, review the Agency's project requirements, make design recommendation and present cost effective options and then provide a biddable project manual and/or Construction Documents for upgrades/renovations for the selected building. As specified in the Expression of Interest (EOI), the mission of the project is to provide the necessary engineering advisory support and other related professional services for design, construction administration, third party plan review and other consulting services as needed by the Agency.

Michael Baker is extremely interested in continuing our successful working relationship with the West Virginia General Service Division!

**Michael Baker understands that the Agency supports 35 buildings statewide; in Beckley, Clarksburg, Fairmont, Huntington, Logan, Parkersburg, Weirton and Williamson, and can provide an individual to assist in bring them to a higher level of energy efficiency.**

**Michael Baker International, Inc. (Michael Baker)** is a highly qualified firm with extensive experience in providing the type of onsite services required for these projects, and we are extremely interested in continuing our successful working relationship with the West Virginia General Service Division!

## AGENCY PROJECTS

Michael Baker understands that the Agency has developed a list of to project that need immediate attention and have considered the engineering requirements of these in our selection of an on-site consultant.

Current known Agency projects in the early planning stages include:

- Upgrade connections to the Chilled Water Loop (Culture Center)
- 10 coil replacement projects
- Adding Economizers to the Bldg. 5 Central Boiler Plants (90psi)
- Flow Valving upgrade for the Chilled Water Loop
- Miscellaneous HVAC upgrades
  - Electrical design
  - Structural design
  - HVAC design
- Construction of a New Ice Plant supporting the Central Chiller Plants
- Modernization of Electrical Generators in Building 5,6 & 7
- Various Lighting and Electrical load evaluations – Multiple Buildings



## QUALIFICATIONS AND EXPERIENCE

Michael Baker’s proposed onsite engineer and his backup team of experienced professionals have demonstrated the ability to deliver quality work products to our clients, on-time and on budget. Michael Baker can provide the entire depth of structural and mechanical and electrical engineering services necessary to complete each and every task assigned. The support team individuals on this project have extensive experience in their field of expertise and have demonstrated success on projects of similar size and scope.

Based upon our understanding of the project scope as stated in the EOI, Michael Baker will provide a fulltime onsite engineer as needed to oversee and coordinate the tasks for each specific project. All Planning, Design and Construction Administration for the projects will be with the same individual that is currently part of our current Charleston, West Virginia staff.

### FIRM CAPACITY

Michael Baker is a full-service A/E firm. Our local WV office in Charleston 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. Michael Baker will provide the hands on services needed for this project, from Client meetings to site surveys, design and construction Administration/Inspection. With over 30 in house professionals locally and over 750 regionally, Michael Baker can react quickly and efficiently if additional project support is needed or desired by the Agency.



Michael Baker’s local clients for facility design and renovation projects include, but are not limited to, colleges and universities, K-12 schools, counties, parishes, cities, townships, local municipalities, state departments of transportation, military facilities, airport complexes, and private sector clients. Michael Baker’s geographic location and extensive experience enables us to respond seamlessly to a wide-ranging scope of service in order to meet our client’s needs.

Locally, Michael Baker was retained by WV General Service Division to evaluate and design ADA, plumbing, ventilation, electrical and fire alarm upgrades for 33 restrooms at the historic West Virginia State Capitol Building, as well as developing a campus-wide Master Planning document for the Capitol Complex. We recently completed the construction administration portion for the renovations to Classroom and Office buildings at the relocated WVU Tech campus in Beckley West Virginia and are currently working on numerous renovation projects at the WV Schools for the Deaf and the Blind. The renovations for all of these projects included; HVAC renovations and upgrades, planning and architectural design, new and upgraded fire sprinkler systems and upgrades to fire alarm systems.



WV State Capitol Building



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



VA Medical Center Rendering

**No Project is too large or too small!**



## MANAGEMENT

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

This individual was selected based on the current Project understanding. Additional team support members or specialists can be engaged on an as need basis. The process of working as a team is part of the normal working procedure and is seamless in execution.

The Michael Baker Principal-In-Charge of the local Michael Baker International Office will ensure that all required resources including support staff and/or additional equipment and software are available to the Engineering Project Management Adviser to execute their duties successfully. The selected individual's resume and project experience profiles provide a brief discussion of their experience base relevant to this project.

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

### Management and Staffing

The selected individual will be based out of the Charleston West Virginia office, with other professionals available for support from other offices on an as needed basis. Patrick Fogarty will directly manage the Engineering Project Management Adviser's work hours and billings. The selected Advisor and Client contact for this Project will be **David Hilliard, P.E.**; Mr. Hilliard is a self-starter and a diligent worker. He has a wealth of experience in designing and overseeing MEP projects, as well as performing plan reviews and managing projects during construction. He works well with others and is a team player. He has no problem traveling and or working on project sites for a short duration to help to improve energy efficiency in the operation of state buildings.

### **Mr. Hilliard is willing and able to provide the necessary services for the Agency and will lead any required Mechanical/Electrical/Plumbing/Structural engineering and design.**

He will advise and coordinate with the Agency, and with other third-party designers and consultants to provide the most efficient and practical solutions for the affected projects. As a senior professional engineer, Mr. Hilliard has completed numerous projects and brings a high degree of competency, understanding and the experience necessary for the planning, designing, scheduling, budgeting and construction administration that will be necessary for challenges such as those presented in this EOI. With the flexibility that this kind of contract can bring to the Agency, Michael Baker can respond quickly to any and all project related needs.

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

See David Hilliard's Resume for more details in **Appendix 1**.



## GOALS

### Project Goals

#### GOAL One:

**Provide an individual to preform Engineering Project Management Advisory Services to assist the Agency in reviewing complex plans and specifications. Provide verbal and written recommendations for accepting or revising project manuals. Be able to produce constructible project documents for vendor complete bidding. Provide documentation of sample project experience.**

Designing and Administering projects, reviewing complex plans and specifications for construction projects, and verbal and written communication and recommendations are a normal day work at Michael.

Michael Baker always provides an Internal Technical Review (ITR) as part of our normal design submission process and Mr. Hilliard has performed this task on many occasions. These ITRs are conducted on every project prior to submittal and are part of "The Michael Baker Way" of Project Management. The ITR is performed by professionals that are not part of the design team but are experts in the respective fields in which they perform the review. This ensures a nonbiased and critical review of the project documents. This process helps to minimize small errors and omissions which yields a smother bidding process.

Also, as part of his regular duties, Mr. Hilliard has reformed many plan reviews since 2017 for the City of Hurricane WV, Building Code Department. Project construction costs ranged from a two hundred thousand dollars to 12 million dollars.

Providing energy efficient designs is always an important part of an Micheal Baker project, and Mr. Hilliard has the understanding and experiece needed to provide innovative and energy saving solutions for the WV State Government buildings.

#### Leadership in Energy and Environmental Design (LEED) Projects

- Little Kanawha Bus, Calhoun County WV
- Army Reserve Center, Homewood IL
- Fort McCoy TEMF, Wisconsin
- Lake Charles VA Clinic, LA
- Multi Modal Transit Facility, Blacksburg VA

#### Energy studies

- Life Cycle Cost Analysis
  - Shaw AFB, SC
- Energy Audit
  - Kanawha County Schools, WV
- Energy Star Certification
  - Wyoming County Schools, WV



High Efficiency Boilers

Michael Baker's Advisory Engineer can provide the necessary design and bidding documents in accordance with the Agency Requirements and Guidelines. Specifications for the installation of all required products or components can be provided in Construction Inspection Institute (CSI) Masterspec format as part of any bid package. Drawings and documentation will be provided based on as-built drawings, site investigations and selected field measurements.

Michael Baker can provide a variety of services with extensive experience in many fields of expertise. This allows the Advisory Engineer to access to expertise in all areas of study. Depending on the task the selected Advisor can provide: Planning services,



Mechanical, Electrical and Plumbing Engineering. In addition, Michael Baker’s engineer can consult with our Structural Engineers to review existing conditions and design any up-grades to the structure at the existing facilities as well as any new components.

Mr. Hilliard will review existing plans and on-site conditions as well as evaluate the operation of the Building systems. Then communicate his findings back to the Agency, to determine a plan that can be implemented in a manner that will minimize disruption to concurrent operation of the facility and meet all task objectives.

Based on the gathered information, the Advisory Engineer will develop schematic design concepts for review and approval by the Agency. A general code review will also be undertaken to determine the Federal/State/Local Codes that affect concept selection. The projects will be studied in a systematic way to analyze the existing conditions, State Agency’s needs, affected system demands, budget and construction time frame. Only then will the appropriate solutions be determined in order to meet all of those requirements. Analyzing multiple solutions will provide the Agency the ability to choose the most cost-effective approach for the project.

Our approach of all projects will be holistic in nature. The first step will be to prioritize work and develop time schedules for the project tasks. This process will include identification of existing projects, facility systems existing conditions, and a thorough review of information obtained by the facilities as-built drawings and site investigations. The Advisory Engineer will plan for project site visits during the first weeks of the contract and begin developing the concepts required to provide the designs for the most cost-effective systems to achieve the project requirements.



Gas Instantaneous Water

As-needed Agency design coordination meetings and/or on-site stakeholder visits will be conducted as a normal part of the design development process. This will help to ensure that the Agency and end users are receiving exactly the documentation for facility upgrades that is needed for procurement while providing for a quality learning experience for WVGSD Staff.

When required, a project phasing plan may be provided with the construction documents. Also included can be plans to show the limitations and requirements for the demolition and removal of the existing components and systems to facilitate the new work. Documentation can also include the location of “affected” existing on-site utilities or service lines as needed for the project.

**Sample Project Experience descriptions are provided in Appendix 2.**

**GOAL Two:**

**Provide engineering project management advisory consultant assistance in troubleshooting heating and cooling plant, and data center application issues.**

Project Inspection and Commissioning oversight have always been part of normal duties at the equipment start up and closeout of a project. Below are sample projects that Mr. Hilliard has provided mechanical engineering services for. Details of his involvement will be expanded upon during an interview with the Agency.

Samples of Mr. Hilliard's project experience with the EOJ listed systems

- Medium Pressure Central Boiler Plants (90psi)  
Involvement with district steam systems:
  - Thomas Memorial Hospital – mechanical systems coordination and construction
  - West Virginia State University Campus infrastructure evaluation and mapping
  - WV State Capitol Complex infrastructure evaluation and mapping
  - Multi Modal Transit Facility, Blacksburg VA
  - Tel Aviv, Israel Building
- Low Pressure Steam with Steam Radiators
  - WVU Tech – Engineering Classroom Building Renovation
- Steam Reheat Coils
  - WVU Tech – Engineering Classroom Building
- Water and Steam Heat Exchangers
  - Tel Aviv, Israel Building
- Hot Water Heat Pump Systems
  - WV Army National Guard Headquarters HVAC Renovation, Coonskin WV
  - Attleboro Army Reserve Center, KY
- Hot Water Reheat
  - Lake Charles VA Clinic, LA (VAV)
  - Tobyhanna Army Depot PA - Building 5, Bay1 (VAV)
  - Fort McCoy TEMF, Wisconsin
- Central Chill Water Plants in excess of 2500 tons
  - Thomas Memorial Hospital – mechanical systems coordination and construction oversight.
  - West Virginia State University Campus infrastructure evaluation and mapping
  - WV State Capitol Complex infrastructure evaluation and mapping
  - Multi Modal Transit Facility, Blacksburg VA – Value Engineering
  - Tel Aviv, Israel US Building – Delegated Design
- Central Chilled Water Plants
  - WV Army National Guard Headquarters HVAC Renovation, Coonskin
  - Army Reserve Center, Homewood IL, Fluid Coolers



- Centrifugal Chillers
  - Thomas Memorial Hospital – mechanical systems coordination and construction oversight.
- Water and Glycol Heat Pumps
  - WV Army National Guard Headquarters HVAC Renovation
- Ice Generation Plants, plan review
  - Project Internal Technical Review (ITR)
  - City of Hurricane - Plan reviewer since 2017
- Data Center – high load / low occupancy
  - Various Server Room Projects

**Sample HVAC project experience and experience working on project where energy efficiency was a goal. Descriptions are provided in Appendix 2.**

**GOAL Three:**



**Provide engineering project management advisory consultant assistance in coordinating with contractors and third-party A/E firms. Represent the Agency through verbal and written communications, attendances at project meetings and visit Agency construction jobsites. Assist in providing Construction Administration and Project Management on Agency projects.**

Construction Management/Construction Inspection (CM/CI) are part of Michael Baker’s holistic project services. The Advisory Engineer responsible for the project design will be the same professionals providing the regular site visits and inspections during construction. All products intended to be installed on the project shall be submitted to and approved by the Agency or Advisor. The shop drawings provided by the awarded contractor will be reviewed to ensure that they meet all code requirements, specification criteria and are appropriate for the project. Product approvals will be based on meeting those requirements.

After the system installations are complete, the Advisor will either perform a Substantial Completion Inspection and develop a corrective measure punch list or will coordinate with the Agency’s Construction Manager for this purpose. Once corrective measures have been addressed, a Final Inspection will be conducted with all parties present. Regulatory agency coordination is required at this point to assure prompt award of the Certificates of Occupancy for the facility as required.

**Samples of experience in Construction Administration and Project Management on projects on projects are provided in Appendix 2.**





**GOAL Four:**

**Provide engineering project management advisory consultant assistance in overseeing and performing project planning. Mentor Agency staff in the appropriate means and methods by construction projects should be planned, undertaken and administered. Participate in meetings with third party stakeholders and the Authorities Having Jurisdiction.**

Mr. Hilliard's experience working with WVGSD on various projects including:

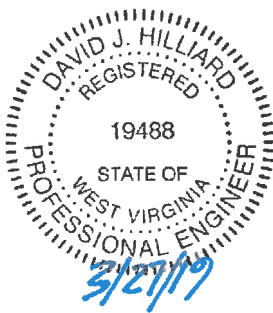
- The 2013 Capitol Complex Master Plan
- WV State Capitol Building Restroom Renovation Design
- The 2018 WV State Capitol Building Flooding Study

Mr. Hilliard's has experience presenting to:

- WV State Historic Preservation Office (SHPO)
- Capitol Building Commission
- WV Fire Marshall
- State Agencies

**GOAL Five:**

**Provide an engineering project management advisory consultant who is registered as a Licensed Engineer in good standing with the WV Board of Registration of Professional Engineers. The consultant's firm shall refrain from any and all Agency solicitations during the contract period.**



Mr. Hilliard is a licensee professional engineer in good standing with the West Virginia Board of Registration for Professional Engineers. Michael Baker understands that by providing an Advisory Consultant to the Agency, it cannot respond to any solicitations for services by the WVGSD during the life of the contract.

**GOAL Six:**

**Provide an engineering project management advisory consultant who can assist the Agency on a daily basis in the office space provide by the Agency.**

Michael Baker's Advisory Consulting engineer will maintain an office in the General Service Division headquarters and preform most of their duties from that location or travel to WV State building sites as needed. If the need arises for specialized expertise, the Advisory Engineer can consultant other Michael Baker professionals with the prior approval of the Agency. Project total hours cannot exceed 2000 hours per year. In this way the Agency will get the most efficient project development process possible.



Michael Baker can provide cost estimating services for each project submission if desired by the Agency. When the different design concept options are developed, and the approach is identified from a technical standpoint, the cost estimating group could be engaged to provide an in-depth formal financial feasibility of each option.

The Advisory Engineer can provide Bidding support and assistance as needed. Bidding support services may include; attendance at the Pre-Bid Conference, development of responses to technical questions during the bidding process which will be forwarded to the Purchasing Division for inclusion in forthcoming addenda, attendance at the Bid Opening, and an independent review of bids.



Natural Gas Electric Generator



Diesel Electric Generator

## OTHER CRITERIA

### GENERAL

Michael baker has vast experience in technically sensitive renovations as well as from the ground up design and construction. The scope of this project, as presented, poses challenges that are exciting to Mr. Hilliard and our local team of problem solvers. Our West Virginia office can bring diverse expertise and hundreds of years of experience to this progressive endeavor if desired.

The management and coordination for this project is a top priority for Mr. Hilliard and our local staff, as most of our team members are residents of West Virginia and desire to see our State and its government facilities energy efficient and well maintained.



Multi Stack High Efficiency Modular Chiller



**VALUE ENGINEERING**

Michael Baker is very familiar with the value engineering process and can work productively with a selected consultants or contractors to provide the Agency with cost saving alternatives; if the costs come in over budget. The use of additive or deductive alternates can also be used to control project cost. Also, to control cost, if desired by Agency, and as stated in the Michael Baker Way, specialized Michael Baker professional staff can 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 Agency staff, will determine whether we move forward with the current design or make engineered adjustments to the design.

**DESIGN AND CONSTRUCTION TIME FRAME**

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

Additional **References are provided in Appendix 3.**



High Efficiency Tank Water Heater



High Efficiency Hot Water Boilers and Pumps

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

### Mechanical Engineer



#### General Qualifications

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

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

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

#### Sample PROJECT Experience

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

**Years with Michael Baker:** 10

**Years with Other Firms:** 19

#### Degrees

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

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

#### Licenses/Certifications

Professional Engineer - Mechanical, West Virginia, 2011, [REDACTED]

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

Professional Engineer - Mechanical, Louisiana, 2016, [REDACTED]

Professional Engineer - Mechanical, Mississippi, 2016, [REDACTED]

Professional Engineer - Mechanical, Kentucky, 2017, [REDACTED]

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

**West Virginia State Capitol Restroom Renovations.** *State of WV General Services Division.* Mechanical Electrical and Plumbing Engineer. Mr. Hilliard provided the State of West Virginia General Services Division a comprehensive MEP plan for the renovation and renovation of the 33 restrooms of the West Virginia State Capitol Building. He helped provide design, construction sequence, and scheduling recommendations. And will provide Construction Administration during construction

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

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

**GNMG Facility.** *Good news Mountaineer Garage.* Senior Engineer. Responsible for client management, design, engineering, and construction administration/inspection. Provided plumbing, HVAC, and electrical design and construction documents for an office, event center, and maintenance garage facility.

**On-Call Agreement for various services.** *City of Hurricane.* Reviewer. Responsible for reviewing plans for the client. Plans included both commercial and residential building plans for building permit approval.

**PHL T015 TYAD 2B4 Renov.** *U.S. Army Corps of Engineers, Philadelphia District.* Mechanical Engineer. Responsible for HVAC design and engineering for a 50,000 square foot building.

**DO 008 Attleboro ARC-Taunton.** *U.S. Army Corps of Engineers, Louisville District.* Mechanical Engineer. Responsible for mechanical piping design and engineering.

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

### LEED Certified Projects

#### **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.

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

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

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

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

**West Ox Bus Maintenance Facility Expansion, Fairfax County, Virginia.** *Fairfax County, DPW & ES.* Mechanical Engineer. Responsible for CA submittal review and approval. Michael Baker provided engineering and architectural services for the expansion of the West Ox Bus Maintenance Facility. The building was expanded to provide approximately nine bus maintenance bays and related support spaces, including offices, locker rooms, and lunch area. The administration building was expanded to accommodate the additional bus service, and approximately 60 staff parking spaces were added to the site. The project was designed to achieve LEED certification. Michael Baker provided design services for the original, award-winning facility. Michael Baker's services included architecture; civil, structural, electrical, mechanical, and plumbing engineering; heating, ventilation, and air conditioning peer review and commissioning; LEED® administration, value engineering, cost estimates; interior design; and security design.

**Fort McCoy, Fort McCoy, Wisconsin.** *Army Corp of Engineers, Omaha District.* Mechanical Engineer. Responsible for the Mechanical engineering and final inspection and commissioning oversight. **The Project was a Design-build** delivery of an approximately 58,000-square-foot, two-story modified large Tactical Equipment Maintenance Facility (TEMF) and an approximately 44,000-square-foot, one-story Equipment Concentration Site (ECS) Warehouse. The building was designed to meet a LEED Silver certification

### ENERGY Projects

**USAFCENT Headquarters Building 1130 Repairs, Shaw Air Force Base (SSC), Sumter, South Carolina.** *Bristol Environmental & Engineering Services Corporation.* Mechanical Engineer. Responsible for developing Life Cycle Cost Analysis for the project.

**K12 Energy Audits.** *Energy Efficient West Virginia.* Mechanical Engineer. Provided energy audits for K-12 schools in Kanawha County and made recommendations for energy savings.

**EnergyStar Audits.** *Wyoming County Board of Education.* Project Professional. Verified and certified Energy Star Certification applications for Wyoming County Schools.

**Blacksburg VE Study.** *Town of Blacksburg.* Mechanical Engineer. Responsible for value engineering for mechanical, plumbing and LEED components of the project.

### Sample ELECTRICAL Projects

**Phase I Streetscape Improvements Design and Construction Services, Nitro, West Virginia.** *City of Nitro.* Electrical Designer. Provided electrical design services for the client's streetscape project. Michael Baker provided design, bid-phase support, and construction services for streetscape improvements to Bank Street, located in the city's business district. Michael Baker's services included base mapping, background data collection, design plans, construction document preparation, bid-phase support, construction management, and construction inspection.

**West Milford Sidewalks 2013.** *West Virginia Department of Transportation, Division of Highways.* Electrical Designer. Responsible for street lighting and electrical power design.

**WVDOH U306-HUN/TI-20.00.** *West Virginia Department of Transportation, Division of Highways.* Electrical Designer. Responsible for street lighting and electrical power design.

**U320-DUN/BA-2.02.** *West Virginia Department of Transportation, Division of Highways.* Electrical Designer. Responsible for street lighting design and electrical engineering.

**TOWN OF CEDAR GROVE-SRTS SIDEWALK IMPROVEMENTS.** *Town of Cedar Grove.* Electrical Designer. Provided electrical design and budget estimates for streetscape lighting.

**TOWN OF PINEVILLE-STREETSCAPE PHASE II.** *Town of Pineville.* Electrical Designer. Provided electrical design and budget estimates for streetscape lighting.

**Wees District Streetscape.** *City of Elkins.* Electrical Designer. Provided electrical design and budget estimates for streetscape lighting.

**Landscape Enhancements.** *City of Nitro.* Electrical Designer. Responsible for electrical engineering and design.

**DUNBAR-STREETSCAPE.** *City of Dunbar.* Electrical Designer. Provided electrical design and budget estimates for streetscape lighting.

**Streetscape Phase II.** *City of Nitro.* Electrical Engineer. Responsible for electrical and design for street lighting.

**DODDRIDGE COUNTY EDA-WEST UNION STREETSCAPE.** *Doddridge County EDA.* Electrical Designer. Provided electrical design and budget estimates for streetscape lighting.

**Elkins Crosswalk Improvements.** *City of Elkins.* Electrical Designer. Responsible for electrical and design for street lighting.

**City of Nitro.** *City of Nitro.* Electrical Designer. Responsible for streetscape lighting design and engineering.

**City of Winfield.** *Town of Winfield.* Electrical Designer. Engineer of Record for mechanical, electrical, plumbing, and associated utilities.

**E140425.05.** *GAI Consultants Inc.* Electrical Designer. Engineer of Record for electric power, lighting, and control design the for the Elk River Trail and Civic Center Riverfront Park.

**MOU 3AUG15.** *City of Nitro.* Electrical Designer. Responsible for street lighting and electrical power design.



**Sample PLANNING and INFRASTRUCTURE Projects**

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

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

**SMITHGROUP JJR, LLC-MARSHALL UNV. TASK 1 FACT FINDING.** *SmithGroup Incorporated.* Mechanical Engineer. Provided site utility and building research and assessment for the 2013 Master Plan.

**Open-End Architectural and Engineering Services, West Virginia State University, Institute, West Virginia.** *West Virginia State University.* Client Manager and Project Engineer. Oversaw investigative and design services for the university on various projects. Duties included utility infrastructure assessment and design and building component repair. Michael Baker provided architectural and multidisciplined engineering services under a 10-year open-end agreement to design renovations, alterations, reconstruction, or extensions of facilities. Michael Baker's services included programming, planning, design development, construction documentation, evaluations, feasibility studies, cost estimating, and construction contract administration.

### OVERSEAS Projects

**US State Department Building Renovation, Tel Aviv Israel.** Mr. Hilliard provided a delegated design for mechanical HVAC systems in this 150,000 square foot building. A delegated design starts with a 60% design and brings it to 100% constructability. This was a 4-pipe hot water / chilled water system with reheat.

**Close Air Support Apron Design, Camp Bastion, Helmand Province, Afghanistan.** *Air Force Center for Engineering and the Environment (AFCEE).* Electrical Designer. Provided planning, design, electrical construction documents, and construction administration for air field apron lighting. As part of a design-build team, Michael Baker provided design and construction plans for a close air support (CAS) apron at the Camp Bastion military base. The project involved the construction of an apron to support 24 F-15E and A-10 aircraft, as well as connecting taxiways to the main runway. The project also included the construction of two arm/de-arm pads located adjacent to the ladder taxiways at either end of the runway. Michael Baker designed the pavement sections, site layouts, pavement markings, edge and high mast lighting, tie-downs, grounding points, utilities, access roads, and drainage.

**KSI - 5096 - Cairo SDIC.KS International.** Consultant. Responsible for mechanical submittal review.

### AIRPORT Projects

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

**Design of Three PEMB T-Hangars, Morgantown Municipal Airport (MGW), Morgantown, West Virginia.** *Morgantown Municipal Airport.* Mechanical Engineer. Provided mechanical, electrical, and plumbing engineering for T-hangars and medium Voltage Ductbank to supply the facility. Michael Baker provided design and engineering services for three pre-engineered metal building (PEMB) t-hangars west of the West Virginia Army National Guard Readiness Center known as the East Side Development. Phase 1 of the project encompassed development of infrastructure, including site grading, drainage, bituminous taxilanes, pavement markings, vehicle parking, and fencing for the three t-hangars. Phase 2 encompassed the t-hangars on the east side of the airfield and included site civil, structural, architectural, interior, mechanical, plumbing, fire protection, and electrical utilities design. Michael Baker also provided bidding phase support and construction management services.

**GREENBRIER-111706.** *Greenbrier Valley Airport Authority.* QA/QC Engineer. Provided site review and corrective measures assessment for condensate problems.

### Sample Non-Michael Baker Project Experience

**CAMC Memorial, Kanawha City, West Virginia.** Performed design calculations, layout of Plumbing, HVAC ductwork, piping and components for three floors of the Clinical Teaching Center; Lobby, Cath Labs and patient rooms. This work was all done in affiliation with BSA Life Structures.

**Marshall University Student Recreation Center; Huntington, West Virginia.** Mr. Hilliard worked on project coordination, the ductwork design and construction oversight of the student recreation center. Some of the building components included large packaged rooftop units with VAV zone control, a pool area with fabric duct system, locker room exhaust, exposed spiral ductwork in exercise and gym areas and a building smoke evacuation system.

**Ashland Community and Technical College; Ashland, Kentucky.** Mr. Hilliard worked on Design Evaluation and coordination of the Medium Pressure VAV Mechanical System. He prepared shop drawings and coordination drawings. His duties also included Construction Administration.

**Mountain State University School of Business and Applied Technologies; Beckley West Virginia.** Mr. Hilliard worked on Design Evaluation and Coordination of the Mechanical System. He prepared shop drawings and coordinated construction.

**Fairmont State University, Student Activities Center; Fairmont West Virginia.** For this project, Mr. Hilliard worked on the HVAC Design, coordination and construction of the student recreation center for Fairmont State. The HVAC systems included large packaged rooftop units with VAV zone control, a pool area with fabric duct system, locker room exhaust, exposed spiral ductwork in exercise and gym areas and a building smoke evacuation system.

**Marshall University Recreational Center,** Performed Delegated Design, Design Evaluation (quality control) and Coordination of the Medium Pressure VAV Mechanical System with reheat. Prepared design and coordination drawings. His duties also included Construction Administration.

**Gary Plaza Office Building; Charleston, West Virginia.** Worked on Design, Design Evaluation (quality control) and Coordination of the Medium Pressure VAV Mechanical System. Prepared design and coordination drawings. His duties also included Construction Administration.

**Carriage Point Office Park; Scott Depot, West Virginia.** Worked on the mechanical, electrical, and plumbing design, as well as architectural and structural design support. Prepared design documents and supervised construction on this design build project.

**Summer Street Office Building; Charleston, West Virginia.** Worked on Design Evaluation and Coordination of the VAV Mechanical System. Prepared coordination drawings. Duties also included Construction Administration and Air Balancing.

### Continuing Education/Training

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

Commissioning Process and Guidelines, ASHRAE Conference, Dallas, Texas.

Energy Management in New and Existing Buildings, ASHRAE Conference, Dallas, Texas.

Assessing Building Energy Performance: From Principles to Practice, ASHRAE On-line course.

# West Virginia State Capitol Complex Master Plan

*Charleston, West Virginia*

The West Virginia Capitol Complex was created following the vision of Cass Gilbert, one of America's most significant architect of the first half or the 20th century. The Campus Plan and the Capitol Building represent his most mature work, as they were conceived and executed towards the end of his career and life.

Following his death in 1934, his son, Cass Gilbert Jr., continued his father's vision. Later additions and changes to the campus have shaped the site in different directions since the initial plan. A series of campus wide plans and recent additions and changes of the campus have attempted to address current needs on a piecemeal basis. Today, the State of West Virginia is facing a series of pressing needs and a new reality in a post 9-11 world, and is seeking to:

- Address the needs of the government and its important campus in a comprehensive and holistic manner
- Capture the essence of Cass Gilbert's original vision and design
- Create a framework for addressing future needs, and
- Recommend specific project that can begin to implement the recommendations of the plan.

**Client**

State of West Virginia  
Department of Administration  
General Services Division  
Building 1, Room MB60  
1900 Kanawha Boulevard, East  
Charleston, West Virginia 25305

Mr. Michael Q. Evans  
304-957-7145

**Contract Completion Date**

2013

**Baker's Role**

- Master Planning
- Architecture
- Engineering
- Cost Estimating



**PRELIMINARY TREE INVENTORY RESULTS**

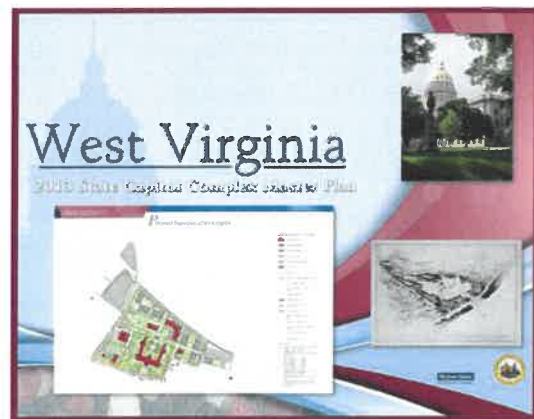
- Field Inventory of 484 Trees
- Recorded Type, Size, Canopy, Trunk, Roots
- 82% Good to Fair Condition
- 18% Poor to Failing Condition
- 28% Oaks/Quercus Most Prominent at 133 Count
- 26% Crabapple/Malus Second at 124 Count
- 116 Historic Trees over 32" diameter
- Selected trees pre-date Capitol construction

**TREE SPECIES CONDITION ASSESSMENT KEY**

<b>SIZE IN CALIPER</b>	<b>ROOTS NUMBER OF TRUNKS</b>	<b>CANOPY</b>	<b>GOOD</b> - Full Crown, Vigorous Growth, no Immediate Care Required
<b>TREE NAME GENUS/SPECIES</b>	<b>TRUNK CONDITION</b>	<b>B</b>	<b>FAIR</b> - Minor Problems, Minimum of 2 Deadwood, Minor Pruning
<b>CANOPY</b>		<b>C</b>	<b>POOR</b> - Major Problems, Deadwood of 3" & Limited Minor Pruning, Monitor for Hazard, Possible Removal
		<b>D</b>	<b>FAILING</b> - Major Distort in Crown, Near Dead, Hazard to be Removed
		<b>E</b>	<b>DEAD</b> - Standing Dead, Stump or Depression
	<b>TRUNKS</b>	<b>1</b>	No Visible Damage
		<b>2</b>	Damage Including Wounds, Nuthatches, Cracks, or Minor Decay Issues
	<b>ROOTS</b>	<b>U</b>	Unrestricted, Open
		<b>R</b>	Restricted, Enclosed within 8-10 Feet on One or More Sides
	<b>NUMBER OF TRUNKS</b>	<b>M</b>	Multiple Trunks
		<b>T</b>	Two Trunks

The 2013 State Capital Complex Master Plan was prepared in a collaborative manner, engaging a wide range of government leaders, stakeholders, users and other entities. Items addressed in the Master Plan include:

- General Campus Planning
- Programming Planning
- Historic Research
- Pedestrian Flow & Accessibility
- Parking
- Security
- Utilities and Infrastructure
- Hazardous Materials
- Future Growth



## West Virginia State Capitol Restroom Renovations

Charleston, West Virginia

Baker led a team of experts in a planning study for the restoration or renovation of 31 restrooms in the West Virginia Capitol Building. The planning study was intended to assess the facilities and their conformance to current code requirements and code-required capacities, compliance with Americans with Disabilities Act (ADA) requirements, quantification of the building occupancy during normal and peak periods, and an evaluation of gender distribution of restrooms within the capitol. The infrastructure of the plumbing and associated systems were also assessed in the course of the study including: water and sewer, fire protection, ventilation, electrical and structural as it related to the restrooms.

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

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

The findings and recommendations were presented and accepted, and a complete set of construction documents were developed with for construction sequencing and scheduling. The final plan incorporated the client's comments in the schematic and design development documents. The project is currently awaiting funding from the State.

### Client

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

### Completion Date

Awaiting funding

### Baker's Role

- Planning
- Architecture
- Mechanical Engineering
- Electrical Engineering
- Plumbing
- Fire Protection
- Structural engineering



# WVU Institute of Technology, Classroom Building

*Beckley, West Virginia*

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

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

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

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

## **Client**

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

## **Completion Date**

July 2017

## **Michael Baker's Role**

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



# WVU Institute of Technology, Benedum Building

*Beckley, West Virginia*

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

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

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

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

## **Client**

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

## **Completion Date**

July, 2017

## **Michael Baker's Role**

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





## Little Kanawha Bus Administrative and Maintenance Facility

*Grantsville, West Virginia*

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

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

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

### Client

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

### Contract Completion Date

2013

### Baker's Role

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



# WVARNG Charleston Armory HVAC & Architectural Renovations

*Charleston, West Virginia*

The existing building/facility started as the Coonskin Armory constructed in 1961. The Headquarters Building was constructed simultaneously with the Coonskin Armory and occupied the second floor. Also in 1961, as a separate structure, the Adjutant General's Wing (TAG Wing) was constructed nearby. Later, in 1984 the Coonskin Armory/Headquarters Building was physically connected to the TAG Wing with an area of administrative offices. This final major construction project connected all the buildings into one major facility of over 50,000 square feet, referred to as the Charleston Armory.

The West Virginia Army National Guard (WVARNG) Construction and Facilities Management Office (C&FMO) requested a study be conducted of the consolidated mechanical and electrical components of the consolidated facility known as the Charleston Armory. Such items were considered as the condition of existing HVAC/MEP systems and design improvements or upgrades to those systems and examination of the existing building envelope and recommend possible improvements to the Envelope, HVAC, Electrical and Plumbing systems.

A loop pipe water source heat pump system determined the most cost effective for this situation, with fewer pipes, smaller space requirements and a lower installation cost. Various HVAC components included a Fluid Cooler, Boilers, Pumps, Wall Consoles, above ceiling HPs, along with some Rooftop Units and Energy Recovery Units.

During the renovation process, mold was discovered growing in certain areas of the building. An investigation was undertaken, building humidity was logged and measures were implemented to install dehumidification in existing equipment in the building, building leaks were sealed and existing mold was remediated.

Baker's design also addressed the repair of the existing roofing system, addition and repairs of roof curbs for HVAC equipment, repositioning of blocking and walk pads around the roof, and installation, repair and patching of the existing EDPM roofing system and maintaining the existing warranty.

**Client**

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

*Major Michael J. Beckner*  
304-561-6333

**Contract Completion Date**

2013

**Baker's Role**

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



## Good News Mountaineer Garage Administrative and Maintenance Facility

**Charleston, WV**

Michael Baker provided general Architectural and Engineering services to the Good News Mountaineer Garage (GNMG). The facility is located on the west side of Charleston, West Virginia. The Good News Mountaineer Garage is a nonprofit organization that accepts donations of vehicles that are repairable for a reasonable amount of money. After repair, these donated cars are then distributed to low-income families needing dependable transportation.

The GNMG selected Michael Baker to provide complete design and construction administration services in three phases. Among these design services were the installation of a new HVAC, fire alarm system and fume detection systems. The first phase was to renovate the interior of the building on 4<sup>th</sup> Avenue in order to provide facilities for the automobile repair and administrative staff. Phase II included the build-out of a show room and Phase III was dedicated to the exterior of the building including vehicle storage and special event areas. Parking for some repaired vehicles and employee vehicles was provided east side of the building. The site is approximately 0.75 acres. The main facility has approximately 7,500 square feet of space of which 4,700 square feet, houses four administrative offices, a board room, a copier/supply room, restrooms and a large show room /event center which can accommodate up to approximately 75 individuals. The remaining 2,100 square feet is dedicated to the automotive repair functions. The garage includes two new vehicle lifts and overhead parts storage. The building was designed so that the vehicles can pull through the garage while the lifts are being used. Michael Baker incorporated green building practices, including passive solar tube lighting in the showroom and maintenance garage. LED lighting was also used in order to help control utility costs for the operation of the facility.

### **Client**

Good News Mountaineer Garage  
1637 4<sup>th</sup> Avenue  
Charleston, WV 25387

*Ms. Jennifer Thacker,*  
Executive Director  
304-344-8445

### **Completion Date**

March, 2016

### **Michael Baker's Role**

- Architecture
- Civil Engineering
- MEP Engineering
- Landscape architecture
- Structural Engineering
- Bid Phase Services
- Construction Management
- Estimating



## 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

### **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.



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

*Homewood, Illinois*

As designer of record, Michael Baker provided architectural and engineering services for the renovation of a 400-member U.S. Army Reserve Center (ARC) and construction of two single-story additions totaling 35,694 square feet—a 34,294-square-foot Training Building and a 1,400-square-foot ancillary structure—along with a 3,500-square-foot Unheated Storage Building. The project also includes parking spaces for 140 privately owned vehicles (POV) and approximately 22,000 square yards for military equipment parking (MEP).

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

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

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

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

## **Client**

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

## **Completion Date**

2015

## **Michael Baker's Role**

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

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

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

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

### **Site Reconnaissance and Geotechnical Investigation**

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

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

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

### **Overall Building Construction**

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

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

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

## Exterior Systems

### *Building Envelope*

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

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

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

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

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

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

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

## Interior Systems

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

## HVAC

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

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



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

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



### *Electrical Design*

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

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

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

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

Michael Baker also prepared specifications for a complete building lightning protection system with UL master labeling for the Training Building. The system consists of air terminals located at the roofline with grounding cables and down-conductors and a ground loop buried below grade and routed along the building exterior. Building grounding is accomplished by an underground perimeter grounding loop with bonding of the lightning protection

system, metal underground utilities, building steel, and additional code-required items with a single neutral-ground connection point at the main switchboard grounding busbar.

#### *Security and Communication Systems Design*

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

#### *Plumbing and Fire Protection*

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

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

#### **Antiterrorism and Force Protection**

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

#### **Sustainable Design**

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

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

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

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

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



# Design of Tactical Equipment Maintenance Facility and Equipment Concentration Site Warehouse

*Fort McCoy, Wisconsin*

Michael Baker was the designer of record for the design-build delivery of an approximately 58,000-square-foot, two-story modified large Tactical Equipment Maintenance Facility (TEMF) and an approximately 44,000-square-foot, one-story Equipment Concentration Site (ECS) Warehouse, along with 30 acres of gravel hardstand designated for organizational parking. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement.

The new TEMF, ECS Warehouse, and additional hardstand will enable ECS-67 at Fort McCoy, the largest ECS in the world, to support the Army Force Generation training initiative, including Warrior Exercises and the installation's Combat Support Training and Regional Training, by storing and maintaining more vehicles and furnishing all required equipment for training units. This will eliminate the need for training units to ship their own equipment to and from the installation and related costs.

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

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

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

## **Client**

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

## **Completion Date**

2016

## **Project Costs**

## **Michael Baker's Role**

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

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

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

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

Michael Baker designed the new TEMF and ECS Warehouse to meet LEED® NC 2009 Silver certification. Tasks for which Michael Baker was responsible include architecture, surveys, hazardous waste investigation and remediation recommendation, geotechnical investigation oversight, all site and building engineering, cost estimating, value engineering, and LEED® certification administration. Charrette participation was critically important to project development. Michael Baker convened a design charrette and collaborated with the client in identifying needs and preferences and preferred design alternatives. In addition, Michael Baker held a special energy charrette to target materials and approaches to promote sustainability and conserve energy, with the goal to exceed ASHRAE 90.1 2007 performance criteria by 40 percent.

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

### **Site Reconnaissance and Geotechnical Investigation**

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

### **Overall Building Construction**

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

## Exterior Systems

### *Building Envelope*

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

### *Structural Steel Framing System*

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

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

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

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

### *Insulation*

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

## Interior Systems

### *HVAC*

The HVAC system includes an array of design solutions to serve a variety of spaces and building functions. Office space for typical administrative functions in both buildings is served with a DX cooling-hot water boiler system and a variable air volume air distribution system that provides airside recovery. Carbon dioxide (CO<sub>2</sub>) sensors are used to vary the outside air quantities based on real-time occupancies for energy savings.



Gas-fired infrared unit heaters paired with hot-water in-floor radiant heaters provide space heating, and gas-fired makeup units provide ventilation air for the high-bay area and maintenance corridor in the TEMF. Heating, cooling, and ventilation for TEMF second-floor offices, classrooms, and training-break-conference rooms is regulated by individual variable air volume boxes with hot water reheat coils to meet the unique ventilation and conditioning requirements of those spaces, based on actual occupancy and existing CO<sub>2</sub> levels.

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

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

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

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

#### *Electrical Distribution System*

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

Energy conservation was Michael Baker's design priority for interior and exterior building lighting. Building systems include occupancy sensors to turn off lights and conserve energy in office areas, corridors, and restrooms. Lighting design incorporates fluorescent fixtures with energy-efficient electronic ballasts and T8 lamps.

#### *Plumbing and Fire Protection*

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

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

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

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

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

#### **Antiterrorism and Force Protection Measures**

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

#### **Energy Charrette and Sustainable Design**

The energy charrette was a key part of project development. As mentioned previously, the overall goal was to reduce building energy consumption by 40 percent compared to ASHRAE 90.1 2007.

Michael Baker and its team identified potential initiatives and processes to promote energy efficiency, minimize environmental effects, and reduce immediate and long-term operating costs. Energy charrette participants evaluated renewable energy sources, including solar, wind-powered, and geothermal-ground source heating and cooling, as well as passive and active energy-saving measures. These included structure siting and physical orientation, internal layout, R-value enhancements, low-emissivity windows, daylight harvesting measures, energy-saving lighting options, and high-efficiency HVAC systems.

Building design and construction incorporated materials and approaches to achieve sustainability goals. Materials that are locally available and products with 20-percent recyclable content were used. Occupancy sensors reduce lighting energy consumption. Water-saving features, such as low-flow plumbing fixtures to reduce water consumption, are provided. Ozone-friendly refrigerants and refrigerant quantities will minimize ozone depletion.

Michael Baker also designed an 18-foot-high solar wall for the TEMF that captures heat from the sun and passes it into the building during the winter months.



The elimination of exterior light pollution was extremely important for this project. Michael Baker designed the perimeter security lighting to minimize light pollution and avoid disruption of night maneuver training, which is conducted on an adjacent site.

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

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



## Open-End Architectural/Engineering Services West Virginia State University, Institute, West Virginia

Baker was retained by the West Virginia State University (WVSU) under an Open-End Architectural and Engineering contract to perform renovations, alterations, reconstruction and/or extensions of existing facilities. The Indefinite Delivery / Indefinite Quantity (IDIQ) agreement is for a period of 10 years. Baker's specific tasks include programming, planning, design development, construction documentation, evaluations, feasibility studies, cost estimating and construction contract administration services. Major "building" design and "building" renovation projects are not included in this contract.

### **Client**

West Virginia State University  
124 Ferrell Hall  
Institute, WV 25112

### **Completion Date**

10-Year IDIQ ending 2021

The following is a summary of some of our experiences:

### **East Hall Renovations**

East Hall is a historic facility housing faculty administrative functions for the University. In the last several years, the original wood siding and window units have begun to show signs of age deterioration. Baker performed an inspection of the building then prepared a scope of work and construction cost opinion for the replacement of the siding and windows as well as the design of a new ADA-compliant entrance ramp.



### **Ferrell Hall Entrance Improvements**

Ferrell Hall is the primary administrative facility for the University. Baker performed a building entrance inspection and code review for ADA compliance. Baker then prepared a scope of work and construction cost opinion for the upgrades to both entry/egress points on the west end of the facility. The work included ADA-compliant walkways, stairs and railing, upgrades to the existing wheelchair ramp, a decorative retaining wall and landscape improvements.



### **Dawson Hall Humidity Assessment**

Dawson Hall is a women's dormitory on the University Campus. Baker performed a building inspection for humidity and mold related problems. It was determined that further investigation and testing was required. Once the investigation is complete, a report will be prepared outlining recommendations for improvements to the ventilation and insulation within the individual dorm rooms Baker will then prepared a scope of work for corrective measures of the air flow/ventilation and building envelop. .

### **Hamblin Hall Water Line Location**

Hamblin Hall serves as the University's Science Building. A main 10" water line serving the campus runs under the facility and through the adjacent vacant lot. Baker was engaged to locate the line and associated shut-off valve which was inadvertently buried during fill operations circa 1985. Services involved underground line location techniques, the examination of old campus mapping, and coordination with the site survey team that actually located the buried valve.



### Storm Drain Assessment and Repair

A study was completed of 72" storm drain system, 42" storm drain system and various combined sewer and storm drains on campus. Camera crews videoed selected pipe sections from the outfalls back to manholes and beyond.

A Deeply buried 72" CMP (Corrugated Metal Pipe) and damaged portions of an existing RCP (Reinforced Concrete Pipe) needed replacement with new RCP, the project was designed and constructed after an extensive study to determine the extents of the damage.

Also a 42" storm drainage system from State Route 25 on the east side of campus that combine at a drop inlet (DI) east of the Hamblin Hall parking area on to Dubois Street was evaluated for damage. Recommendations and estimates were provided to the university.

An 18" VCP (Vitrified Clay Pipe) main sewer line serving the campus was also evaluated for damage due to the presents of sinkhole forming behind the baseball field. . Old drawings indicate that this pipe extends from Athletics Drive south to a lift station east of the football field and was a "combined sanitary and storm sewer". Recommendations and estimates were provided to the University for the upgrade of this line.



### Campus Main Water Loop Assessment and Design

Baker mapped domestic water valves, meters and fire hydrants in and around the main core campus in preparation for new district water piping system design.

A new loop water system for the main campus was designed and included a new secondary service connection from Barron Drive. This will back-feed the main water piping system. The new service mains are being installed in phases to help control costs and minimize disruptions to the campus.



### Lakin Field Football Stadium Improvements

WVSU's Lakin Field serves the University's Football Program and is currently in need of upgrades. The field has a natural turf field with an oval track surrounding it, and drainage structures in the area which are aging and need upgrading. The University requested that Baker assist them with planning upgrades to the football field and drainage system. Baker's civil services included a topographical survey of the area including the drainage structures in the football field area. We also prepared an analysis of the conditions and a proposal with costs of upgrading the field to an artificial turf field, addition of an ornamental fence, a new scoreboard with video display, new goal posts, ticket booths, and upgrades to the existing drainage.



Baker additionally prepared a preliminary cost analysis of the work for fund raising purposes.



## REFERENCES

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

- **West Virginia Schools for the Deaf and the Blind**  
301 East Main Street  
Romney, WV 26757  
Phone: 304-822-4810  
*Mr. Mark Gandolfi, Superintendent of Administration*
- **West Virginia University/ WVU Tech**  
410 Neville Street  
Beckley, WV 25801  
Phone: 304-929-0325  
*Mr. Robert Moyer, Director of Facilities and Planning  
(304) 550-2839*
- **130<sup>th</sup> Airlift Wing West Virginia Air National Guard**  
1679 Coonskin Drive, Unit 18  
Charleston, WV 25311-5005  
*Captain Harry Netzer, P.E., Deputy Base Civil Engineer (304) 341-6649*
- **West Virginia Army National Guard**  
1707 Coonskin Drive  
Charleston, WV 25311-1099  
*Mr. Joe McClung, Project Manager (304) 561-6548*
- **West Virginia State University**  
P.O. Box 1000  
Institute, WV 25112-1000  
*Mr. Dayton Wilson, Facilities Director  
(304) 550-2839*
- **City of Nitro** since 2009 20<sup>th</sup>  
Street  
Nitro, WV 25143  
*Honorable David Casebolt, Mayor  
(304) 419-3322*
- **West Virginia Department of Transportation – Division of Highways**  
1900 Kanawha Boulevard East, Building 5,  
Room A 405  
Charleston, WV 25305  
*Mr. C. Elwood Penn, IV, P.E., Director of Planning  
(304) 558-9269*