State of West Virginia
Expression of Interest

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Procurement Type : Agency Contract - Fixed Amt

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2017-09-15	2017-10-04 13:30:00	AEOI 0310 DNR1800000001	2	Final

SUBMIT RESPONSES TO:	VENDOR
ID RESPONSE _IVISION OF NATURAL RESOURCES PROPERTY & PROCUREMENT OFFICE 24 4TH AVE SOUTH CHARLESTON WV 25303-1228 US	**Vendor Name, Address and Telephone**

FOR INFORMATION CONTACT THE BUYER

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Signature X  **FEIN #** 16-1006700 **DATE** October 2, 2017

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

ADDITIONAL INFORMATION

Addendum

Addendum No.01, issued to publish and distribute the attached material to the Vendor Community.

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Expression of Interest
A&E Services for Broadband Build-Out Design for Park's' Facilities

The West Virginia Division of Natural Resources (WVDNR) is soliciting AEOI responses from qualified firms to provide architectural / engineering services contract for design of construction of internet infrastructure for various state park facilities per the attached bid requirements, specifications and terms & condition.

INVOICE TO	SHIP TO
DIVISION OF NATURAL RESOURCES WEST VIRGINIA STATE PARKS 324 4TH AVE SOUTH CHARLESTON WV25303-1228 US	STATE OF WEST VIRGINIA JOBSITE - SEE SPECIFICATIONS No City WV 99999 US

Line	Commodity Line Description	Qty	Unit Issue
	Architectural engineering		

Commodity Code	Manufacturer	Model #	Specification
81101508			

Extended Description
A/E design services and contract administration for broadband build-out in WV State Park facilities.

SCHEDULE OF EVENTS

Line	Event	Event Date
	Technical Question Deadline at 9 AM	2017-09-15

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

Contents

Team qualifications

The Mott MacDonald team includes the very best technical and management staff, all dedicated to the successful delivery of the Broadband Build-Out for State Park Facilities project. We understand WVDNRs need to select a consultant who will deliver the project on time, on budget, efficient, cost-effective and with the appropriate level of leadership and guidance. Our team has extensive international broadband planning, design, and procurement experience; regional technical and electrical planning, design, procurement, construction management, commissioning; and local (Charleston) project management, engineering, surveying, GIS/data management, procurement, construction contract management, and construction inspection. The team has experience with West Virginia state government contracting practices and procedures and WVDNR facilities design practices and procedures.

Mott MacDonald's staff and subconsultants have strong technical capabilities as well as clear understanding of all project phases, which enables the team to efficiently and cost-effectively execute the project to WVDNR's satisfaction. We look forward to collaborating with WVDNR staff to offer creative and reliable measures to provide broadband at all state parks.

Gary Facemyer, PE, PS will provide overall project management. He has more than 40 years' of responsible charge of public works projects in West Virginia. He has served as Principal Project Manager and Project Engineer for various water, wastewater, site development, solid waste landfills, earthen dams, geotechnical investigations, abandoned mine reclamation projects, hazardous waste sites, and many other miscellaneous civil engineering projects. His duties have included project planning and design, managing construction bids and awards, construction oversight and inspection, and project closeout.

Eric Bess, GISP will assist Gary with schedule, budget, meetings, documentation, and data management. Eric has over 17 years' in GIS, data, and asset management experience across a broad range of sectors. He has served as Project Manager on various projects, including water, stormwater, GIS and asset management, data collection initiatives. He also serves as Senior GIS Specialist on technical and analytical projects related to spatial data analysis.

John Golden will also assist the project manager with more than 20 years' of technical expertise in communication technology. John brings a vast knowledge base of design, construction and implementation from determining the client's needs to solution design and through to installation and commissioning. John's skillset will add efficiency and tailored solutions for each individual site's circumstances.

David Tanner will be the technical lead and overall quality assurance and quality control manager. An experienced professional engineer with over 20 years' technical and management experience in the telecommunications arena. Dave uses his expertise in various fixed and mobile telecommunications technologies, particularly personal mobile radiocommunications (2G/ 3G/ 4G/ 5G/ WiFi), to provide strategic and operational advice to diverse players, from new entrants to major businesses, across the telecoms industry.

Dave is experienced in working in multi-discipline environments, in leading multi-disciplinary teams and in communicating complicated technical concepts to an audience of widely varying backgrounds.

Darren Simpson has over 14 years' professional engineering experience. Originally as an in-building radio design engineer carrying out carrier-wave onsite RF surveys, data processing and link budget analysis and generating in-building coverage designs for single and multiple technology systems. Responsible for the delivery of large and small scale indoor coverage solutions for the whole project lifecycle from design through to installation and commissioning. RF analysis and propagation modelling used in the generation of designs for shared distributed coverage solutions for a wide range of technologies. Extensive RF data collection through drive testing surveys, indoor coverage walk surveys, interference analysis, benchmarking and WLAN audits and designs.

Jon Cooper has over 25 years' experience in designing and developing solutions to complex wireless communications needs. He has provided engineering and management expertise to clients in commercial wireless operations in the U.S. and Europe. He has a strong foundation in the fields of radio-frequency engineering and optimization, engineering management, government and regulatory coordination, and project deployment. Jon's recent projects include Small Cells, Distributed Antenna Systems, Municipal Wi-Fi, and 5G roadmap strategies.

John Campbell has more than 20 years' of experience helping clients expand cellular and data services in major facilities through Distributed Antenna Systems (DAS) and Wi-Fi systems. John also has extensive experience in negotiating contract terms with Wireless Service Providers, Integrators and Third-Party Operators as a part of deploying and operating those systems. He also has helped clients identify and evaluate the best funding models for deployment and budgeting for long-term operations and maintenance.

Craig Miller has more than 20 years' experience in design, specification, operations and project management. His experience with a wide range of projects including electrical, infrastructure upgrades, building automation, energy efficiency and maintenance/renovation, among others, allows him to serve in multiple capacities within a given project. Craig will serve as the as the communication interface between the technical designers and the electrical engineers.

Subconsultants

Mott MacDonald has carefully selected subconsultants that we have worked with and/or have worked with WVDNR in the past, have a very good professional reputation, and have direct relevant experience.

DAS Advisors (DAS), brings 20 years of experience in solving wireless communications challenges in West Virginia and the southeast reason. The DAS Advisers team approaches each project with the understanding that a client's wireless, infrastructure, operational, and community environments are unique. Special emphasis is given to a client's need for robust public safety communications. Expertise is tailored to assess these environments and establish a deployment strategy that meets the client's needs within the context of the marketplace. DAS Advisers brings its clients proven experience in radio frequency engineering, carrier relations, contract law, regulatory due diligence, historic preservation review, wireless service provider negotiations, construction management and commissioning.

Miller Engineering, Inc. (ME) brings 20 years of experience in public works projects throughout West Virginia and the region. Current clients include the WVDNR. Each and every project is approached with a complete assessment process. Miller Engineering values the relationship with the client and other professional stakeholders to deliver projects in a timely, constructible, and professional manner. Facilities are designed to be functional and must serve their intended purpose. Miller Engineering is an integral and interactive solutions provider within this process. Value to a client is to control first and life cycle cost. Excellence in design solutions is practiced and maintained through consistent site visits during the construction process. Miller Engineering designs electrical, instrumentation and communication systems for new construction and renovations. Clients find value when working with Miller Engineering due to a history of below industry change order rate. Upfront planning, quality control, and estimating deliver our projects.

ASC Group, Inc. (ASC) (DBE) specializes in cultural and environmental resources consulting. Clients include the WVDNR (subconsultant) and WV Division of Highways (prime). ASC uses 30 years of experience to provide appropriate solutions to Section 106 and NEPA compliance needs. The ability to achieve regulatory compliance, while serving the client's project goals and objectives is embedded in the methodology. The professional staff have direct experience with the cultural resources of the project areas and the unique archaeology of the Ohio and Kanawha river systems.

Communication, schedule, and budget

Effective communication

Mott MacDonald believes communication is the key to a project's success. Open, frequent communication of project progress, beginning with the design through completion of the construction phase, enables the client to stay engaged and knowledgeable on the projects status and allows for client feedback at critical milestones to avoid duplicated efforts or re-work that can negatively impact a project's budget and/or schedule. At the onset of the project, Mott MacDonald will work with the client to identify the project stakeholders and communication parameters. Meeting agendas, topics, minutes, and action items will be documented and distributed to the stakeholders for review and acceptance to ensure everyone agrees and is unified in the understanding of the meeting topics and action item responsibilities. Any deviation from scope that may arise during the project will be documented and discussed with the client as to the deviation's impact to budget and schedule so the client is aware of these situations immediately.

Design reviews will be conducted at each stage of the design process; schematic design, design development, and construction documents. The schematic design phase will document the development of each project and its major components. This phase will include a project narrative that describes the Owner's goals and objectives; existing conditions; ecological, cultural, and environmental resources; legal/ regulatory approvals needed; description of proposed solutions, and basis of design. A site/landscape plan will be developed along with a construction cost estimate and project schedule. Owner will approvel the schematic design before progressing on to the design development phase. The design development phase is intended to further develop the project design with greater detail. At this stage, investigations will be made to establish the topographic, facilities and boundary information; ecological, cultural, and environmental resources to be protected; and the RF information all needed for the final design. Owner will approve the design development documents before progressing on to the final design phase. The development of final design, construction documents, bidding and contract documents will be reviewed at 30%, 60%, 90% and 100% to keep the Owner engaged throughout the project design.

Upon Owner approval of the bidding and contract documents, Mott MacDonald shall coordinate and cooperate with the Owner and WV Purchasing Division to facilitate the bidding process, including issuance of addenda, if necessary. Upon contract award, Mott MacDonald will provide construction phase engineering services, a full or part-time resident project representative, and commissioning services, if requested. Mott MacDonald will attend a pre-construction meeting, if requested. Construction phase services will include material submittal reviews, project site visits, written periodic reports on progress and quality of work, resolve field conflicts, prepare change orders for actual field conditions encountered, recommend approval of progress and final applications for payment and make final recommendations on acceptance of work.

Tools for Efficiency and Working Across Offices

Bentley ProjectWise: Provides a platform for integration and collaboration of remote teams allowing them to function as a single project unit. The ProjectWise system is designed to work with complex linked or referenced engineering, GIS, CAD, and BIM content. The system allows project work to be fully managed and available to project contributors without the traditional delays or format changes that can cause errors and slow production schedules. ProjectWise allows project teams to review, perform quality control, administer redline documents, and manage all project files and content between office locations electronically without the need to ever remove files or content from the system.

Microsoft 365 with Skype: Mott MacDonald invested in a major technology upgrade to our IT systems and bandwidth at all offices over the past 12 months that included the deployment of Microsoft Office 365 communication software. This software, which incorporates Skype and is integrated with Microsoft Outlook, combines contact management, email, telephones, instant messaging and presence technology, video conferencing, and internet-based meetings through laptop and desktop users, plus deployment to all popular mobile devices including iPads and Surface tablets in the field. This technology allows our project manager to know the status of all the team members and be able to contact and coordinate in real-time with everyone, hold impromptu meetings, share files and computer desktops with other Mott MacDonald professionals.

GoToMeeting: GoToMeeting is an online meeting, desktop sharing, and video conferencing software that enables Mott MacDonald to meet with our clients and subconsultants via the Internet in real-time.

BIM: Building Information Modeling (BIM) is an intelligent 3D model-based process that equips architecture, engineering, and construction professionals with the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure. Commonly our engineers will demonstrate their design in BIM to help the Client and Contractor visualize the work and ensure conflicts do not exist.

Ability to meet schedules and budget estimates

WVDNR requires services from qualified consulting firms to provide professional expertise for the various engineering components of the Broadband Build-Out for Park Facilities. These services will be identified by WVDNR; but likely include master planning, surveying, cultural impact analysis, existing facilities analysis, civil/site design, system design, regulatory permitting, and construction administration. When each task is scheduled, it is the expectation of WVDNR that the Mott MacDonald Team will be suitably staffed and available with experienced professionals who can meet the immediate needs of WVDNR.

This Mott MacDonald team has completed dozens of like projects. We are also familiar with WVDNR's project delivery requirements and have developed processes and procedures to effectively deliver the required services on time and with a high degree of success. To meet your expectations, Mott MacDonald has assembled a team with the management skills and expertise needed to address this project effectively. Each team member brings specific, direct and pertinent experience as well as an in-depth understanding of working with broadband and related facilities.

The Mott MacDonald Team's plan for conducting and providing the services requested by WVDNR involves both managerial and technical competency and processes. These include:

- An efficient organization structure that is responsive and flexible to client requests
- Experience in management of broadband facilities for federal, state, and local governments
- Effective assignment implementation plan
- Unequaled knowledge of the project requirements
- Ability to deliver deadlines
- Meet or exceed the WVDNR's project objectives on time and on budget, within established funding parameters
- Superior technical expertise
- An emphasis on stakeholder consultation and communication
- Maintain comprehensive, in-depth reporting on all elements of an assignment
- Integral quality control / quality assurance plan
- Commitment to delivering value to WVDNR

The elements identified above are addressed herein and in the sections that follow to demonstrate our understanding of this project assignment.

Staffing structure to meet schedules

The Mott MacDonald Team's organizational structure is designed to be flexible and is tailored to be responsive to WVDNR's specific requirements at each unique site location and for each assigned design task. Expert leadership is available in depth for all technical disciplines identified under this solicitation. These resources will be quickly mobilized and assigned to efficiently complete each task and maintain the project schedule. The Mott MacDonald Project Manager will assign the requisite resources for an assignment to control scope, schedule, budgets and perform quality assurance on all project deliverables. This Mott MacDonald team provides the following:

- A team of managers, architects, and engineers who have knowledge of the WVDNR's standards and procedures, and who will apply this knowledge to the project.
- Responsiveness to keep the project on-schedule.
- A project organization that provides dedicated teams for the various tasks to allow for multiple deliverables to be performed simultaneously.
- A compact team that can provide 100% of all A/E services.
- Thorough knowledge of the tasks expected within the project scope.
- A quality control / quality assurance plan that allows review of all deliverables of varying size and complexity.
- Cost estimating and scheduling capabilities that focuses on the unique construction environment at each site location and affords this focus on both a general and detailed level.

It is mandatory that projects be executed in a timely manner, within budget, and delivered seamlessly with no surprises. This will be accomplished with an active risk management program through design and construction and using our proven management and quality assurance techniques. A successful project requires a keen focus and excellent communications to assure smooth and efficient operations. The Mott MacDonald Team realizes effective collaboration with WVDNR's Project Manager will be crucial. Hallmarks for each deliverable will be constructability, safety, security and added-value while minimizing inconvenience to the local residents and traveling public. This Team will endeavor to exceed WVDNR's expectations for sustainability by incorporating a high degree of sustainable design and construction practices.

Our approach to a project's undertakings is to provide ample client review opportunities, so that WVDNR's project management team fully understands the project approach, relevant criteria and sees project progression many times during its development. This affords two-way dialog between the project and client leading to active comment and suggestion incorporation as the project develops. This collaborative effort strengthens initial concepts and leads to comprehensive and well thought out work products.

Effective communication

A critical component of a successful project is to ensure that all participants work to the same plan. This project will include a specific Project Plan of Work (PPW) that is a key part of our project control and quality management system and includes sections on contacts, communication protocols, reporting, task assigned individuals, scope, budget, schedule, work breakdown structure, deliverables and specific project criteria. The PPW will be updated during the course of the assignment to incorporate any changes as necessary. The purpose of the PPW is to ensure that all project participants have a clear understanding of the assignment goals before any work begins and enables Mott MacDonald to best utilize the skills of its staff and identify if any additional resources are required.

Regular internal meetings, monitoring progress and corrective actions, will be held to maintain the schedule, and we will keep WVDNR informed of the status of the assignment to enable WVDNR to maintain control of the decision-making process.

The Mott MacDonald Team Project Manager, Gary Facemyer, PE will be responsible for overall Contract Management, ensuring the team meets its commitments for the project and would be the direct point of contact for assigned tasks. Gary will lead the effort and be supported by the various discipline experts to complete specific work required under the contract. Gary will assure that each task has appropriate levels of support and resources for successful completion of assignments. Gary will communicate regularly with the WVDNR Project Manager to assure work is progressing in a manner that meets or exceeds expectations.

This team approach has worked effectively to manage Mott MacDonald's previous experience with similar projects and has taught us that the availability of qualified technical and support staff is essential to effectively serve clients. Having a diverse breadth of staff both locally and corporate-wide, affords flexibility to assign the appropriate technical staff.

Managing a multi-firm team

Over the years, Mott MacDonald has developed an approach to subconsultant management that has proven successful. This approach is based on lessons learned from previous projects and incorporates the most successful aspects of each. Subconsultant control will be accomplished on a weekly basis, as necessary, with periodical review meetings. The review schedule will depend on the specific area of involvement of the subconsultant. A key component is the development of mutual trust between all project participants and establishing open and honest communication at the outset.

Gary Facemyer, PE will develop a task proposal and work plan, based on input from the appropriate discipline specialists and team resources. In accordance with the proposal and schedule, he will also be responsible for the execution of each task assignment for the project.

Implementing proven budgeting and scheduling solutions

The key to on-time and on-budget performance lies in successfully combining the scope/deliverables, budget and schedule, into a Work Breakdown Structure (WBS), However, as we have experienced on previous projects, we must also continuously communicate with WVDNR as the work is executed and collectively agree to adjust scope and schedule as necessary to deal with unanticipated conditions or events. We believe it far more important to deliver the right project rather than meet a schedule but for the wrong project. The WBS is critical to the successful execution of the project as it establishes what is to be done, who is to do it, how / who will check it, when it will be done, and the budget for the work. Mott MacDonald's Business Management System includes policies on project execution and a suite of project control tools Gary will employ to control, responding to each project task with qualified and experienced staff and produce quality work products delivered on time and within budget.

Gary will be responsible for preparing and administering a Project-Specific Project Management Plan. He will use Mott MacDonald's proprietary Project Management Desktop for defining task budgets and real-time tracking of actual costs.

Each task schedule will be updated on a bi-weekly basis and submitted with monthly progress reports to WVDNR. All stakeholders will be kept informed on a timely basis with respect to the current progress, critical activities, potential delays, mitigation strategies, and corrective actions.

Any change to scope will be immediately assessed by the Mott MacDonald team to consider impacts on current and completed work and to determine the most effective way to integrate the additional scope into the current schedule. If schedule problems develop, our Project Manager will coordinate with our team to assess the problem and develop a revised schedule that all team members can buy into and move forward with to meet the project goals.

Mott MacDonald will use appropriate scheduling software (MS Project) to prepare and monitor the approved assignment schedule and resources. Weekly updates will be tracked to indicate adherence to assignment targets and also provide early warning of activities that are not in compliance with the schedule thereby enabling resource, budget, and scope decisions to be made.

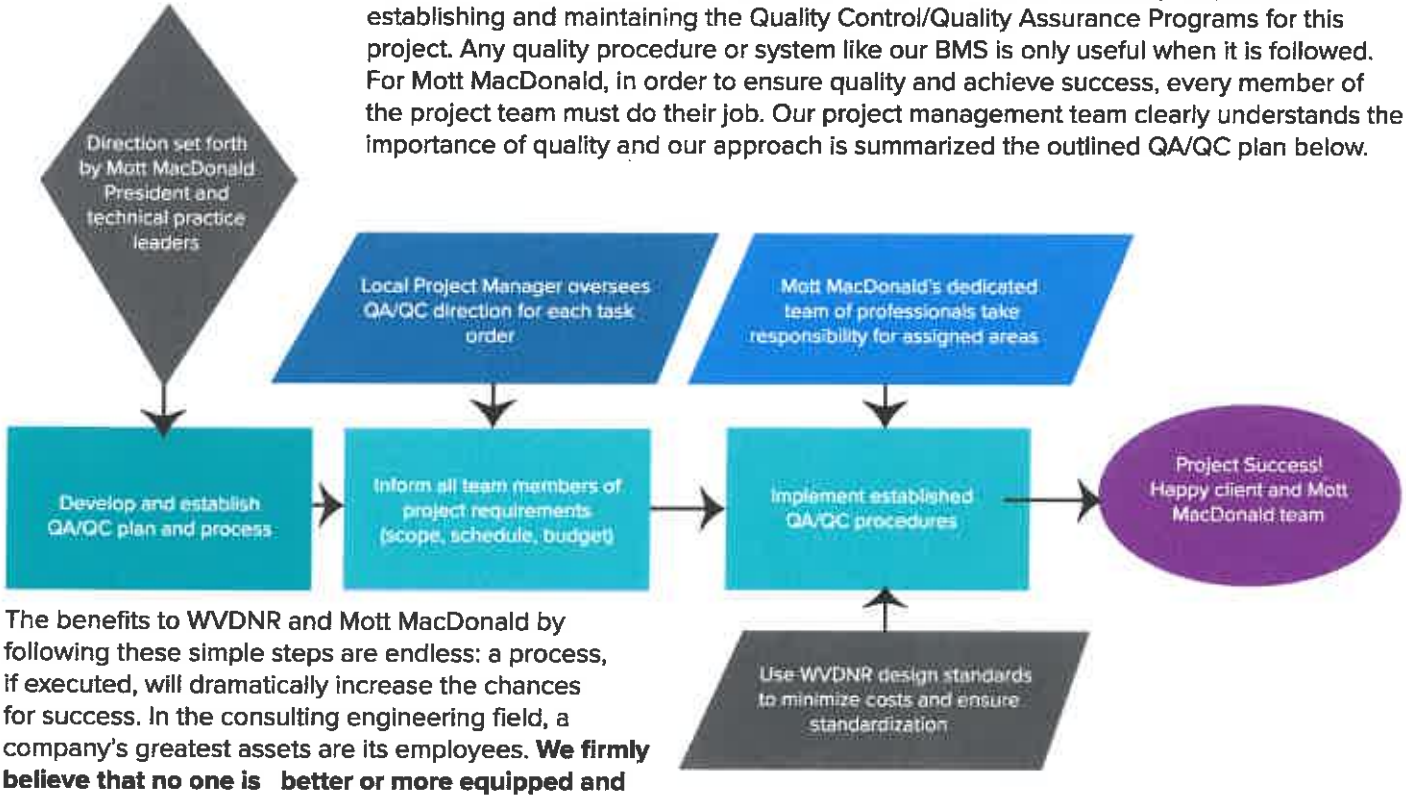
Quality assurance

The Mott MacDonald QA/QC goes beyond checking deliverables prior to submittal. It is a daily work ethic instilled into all of our managers, designers, and technicians.

We understand that WVDNR is making a major capital investment on this system-wide/ state-wide construction project. As with any major purchase, buyers want the most for their money. They want quality, durability, reliability, and all for a fair and reasonable price. Regardless of size or scope, it will require close coordination between multidisciplines, designers, and construction personnel under unique site characteristics. The Broadband Build-Out project will require a plan to control quality – a plan that not only addresses quality of the design but also establishes a process to promote quality of conformance, and quality of performance.

Mott MacDonald's process to quality is based on a well-established process, called our Business Management System (BMS). As a part of our commitment to quality, Mott MacDonald submits our procedures to external assessments carried out by independent nationally accredited assessors. This assures an independent evaluation of our policies and procedures and substantiates Mott MacDonald as an ISO 9001 accredited firm. The ISO 9001 accreditation is an independently verified certification that Mott MacDonald has established a formal Quality-Assurance program and verifies that we actually follow those procedures. We have invested in this certification as a commitment to our clients that quality will be upheld throughout our work product.

Mott MacDonald and the entire project team are committed to providing WVDNR with the highest quality of services for this project. We take the approach that quality control begins even before the Notice to Proceed is issued. It begins once the project manager thoroughly understands the scope of services for the project, and then assigns and dedicates the very best personnel suited to the tasks that are required. **Gary Facemyer, PE, PS,** Mott MacDonald's Principal Project Manager will be ultimately responsible for establishing and maintaining the Quality Control/Quality Assurance Programs for this project. Any quality procedure or system like our BMS is only useful when it is followed. For Mott MacDonald, in order to ensure quality and achieve success, every member of the project team must do their job. Our project management team clearly understands the importance of quality and our approach is summarized the outlined QA/QC plan below.



The benefits to WVDNR and Mott MacDonald by following these simple steps are endless: a process, if executed, will dramatically increase the chances for success. In the consulting engineering field, a company's greatest assets are its employees. **We firmly believe that no one is better or more equipped and dedicated to providing you with quality projects and services than our local project manager.**

Approach and understanding

Goal/Objective 1

Review the existing operations of the park, facilitate stakeholder input and evaluate the information while communicating effectively with the owner to determine a plan that can be implemented in a cost effective manner that will minimize disruption to concurrent operation of the facility and meet all objectives.

Proposed Activities

1. Assist WVDNR in assembling a stakeholder group and facilitating consensus among its members on the following topics:
   - ✓ The project's short-term and long-term goals
   - ✓ Factors that could present challenges to success
   - ✓ Strategies for ongoing management and maintenance

2. With the project's goals as well as management and maintenance strategies established, assist WVDNR in the following:
   - ✓ Identifying other potential uses for the wireless and fiber infrastructure
   - ✓ Determining collaborative opportunities with cellular providers, FirstNet, and others

3. Provide WVDNR with a written report articulating the goals and strategies of the stakeholder group

Goal/Objective 2

As a portion of the process outlined in Objective 1, provide all necessary services to design the facilities described in this EOI in a manner consistent with the needs, objectives, current law, and current code of the Division of Natural Resources, while following the plan to design and execute the project within the project budget and timeline.

Proposed Activities

1. Establish design criteria:
   - ✓ Develop GIS schematics that show areas of required coverage and their priority
   - ✓ Develop estimates for number of users, their locations, density of users by location
   - ✓ Define the optimal broadband demarcation points and backhaul capacity
   - ✓ Conduct a radio frequency study using continuous wave testing protocol for outdoor areas based on the selected technology or technologies and project goals, including coverage requirements, signal strength, and capacity
   - ✓ Map WVDNR assets that are available for indoor wireless access points, outdoor broadcast points, and supporting equipment rooms
   - ✓ Provide indoor access point conceptual design on floor plan for each facility
   - ✓ Provide an outdoor signal distribution conceptual design that accounts for the park's aesthetics to minimize the system's visual impact
   - ✓ Design fiber, coax, and wireless installations in support of wireless signal distribution
   - ✓ Design power distribution

2. Create and present design plans to WVDNR for its review and approval
3. Develop and provide WVDNR an estimate of cost based on the proposed design
4. Develop functional requirement documents that define the project as approved by the client
5. Develop an operations program that includes training and an Operations and Maintenance manual

Goal/Objective 3

Provide Construction Contract Administration Services with competent professionals to ensure the project is constructed and functions as designed.

1. Assist WVDNR in drafting a Request for Proposals (RFP) and procurement documents
2. Attend site walks and pre-bid meetings to provide technical support
3. Provide technical support during RFP question period
4. Develop criteria for a matrix to evaluate RFP responses
5. Provide technical support during the evaluation process
6. Support WVDNR in negotiating vendor agreements
7. Serve as WVDNR's representative during installation:
   - ✓ Manage the installation process, including on-site inspections as client's engineer
   - ✓ Manage the vendor or vendors' installation schedule(s) to minimize Park disruptions
   - ✓ Confirm that materials meet specifications
   - ✓ Oversee installation requirements
   - ✓ Provide punch list to vendor(s) based on the installation contract and site inspections
   - ✓ Oversee commissioning
   - ✓ Assure each installation meets the design and operational contract terms
   - ✓ Conduct post-deployment review, including RF testing of the system

Past performance

Competence in professional disciplines

Mott MacDonald's proposed team is comprised of seasoned and proven Charleston-based management supported by local, regional, and international experts in the field of broadband delivery. The team has strong working relationships with both WVDNR and that State of West Virginia. We believe our bench strength is unmatched and that we are the best firm for this project. Below we have addressed our capabilities to provide the necessary services to complete this project on-time and on-budget. Furthermore, we have identified some "value-add" services that will ensure this project's success by conducting thorough commissioning to assure that all systems and components are designed, installed, tested, operated, and maintained according to the operational requirements of the WVDNR. Backed by our proposed team are 2,300 Mott MacDonald professionals throughout the U.S. where we can pull additional expertise and support services as needed to ensure a successful delivery of these facilities.

Mott MacDonald Project Experience

Hinkley Point C Nuclear Power Station, EDF, UK

Hinkley Point C (HPC) will be the first in a new generation of UK nuclear power stations, and is one of the largest construction projects in the UK. The £16 billion project will create around 25,000 employment opportunities throughout the build for nearly a decade and 900 jobs at the new power station for more than 60 years. Essential success factors for the safe and efficient operation of a nuclear power station include supporting normal and emergency communications on and off site, and during maintenance downtime.

We are currently the design consultant for all the sites communication systems (known as DTV) for the new Evolutionary Power Reactor (EPR) to be built in Somerset at Hinkley – Hinkley Point C (HPC). The work involves concept through detailed design of the integrated voice, data, wireless and paging networks, process and production closed circuit television (CCTV) cameras, the emergency alerting public address and visual announcement system, master clocks and time distribution, off-site alerting, all cable infrastructure across the site, and supporting power and uninterruptible power supplies (UPS).

Our consultants have worked closely with HPC's operational and emergency planning teams to develop and design resilient, flexible, and appropriate communication systems, including the innovative use of wireless LAN (WLAN) technologies to support mobile voice and data throughout

site and location tracking of lone workers.

By developing the design to sufficient detail that space, power, cooling, cabling, and end device requirements can be accurately determined, building designers can progress and complete their work with a high degree of confidence. The design detail also provides greater surety and less risk for both HPC and the bidding contractors during the DTV systems contractor procurement.

Our deliverables consisted of over 3,000 design drawings and an associated suite of documentation ready for direct use in the procurement process. We are now providing EDF with assistance in that procurement process, primarily assisting in the ITT development.

Heathrow Terminal 2, UK

Mott MacDonald has a long-established relationship with Heathrow Airport and has carried out many civil, building, ICT and construction management assignments. For this specific project, Mott MacDonald was retained by BAA to provide project management, technology and procurement support for the ICT systems at the new Terminal 2 at Heathrow Airport.

The project encompassed design and delivery of 73 systems and subsystems covering communications, security, airport operations and building services. The systems included IT network infrastructure, radio and cellular systems, access controls, internet protocol television (IPTV), lighting controls, supervisory control and data acquisition (SCADA), CCTV, wireless, and flight information and public-address systems. Across the 400,000m2 terminal some 1,400 CCTV cameras will be installed using the latest video over IP technology. Video over IP provides greater flexibility as the devices can be placed anywhere within the building and moved as required. Terminal 2 will also provide next generation Wi-Fi access and a public and private 4G network.

Mott MacDonald worked as part of BAA's integrated team and was responsible for delivering all the systems into Heathrow Airport's Terminal 2 site, which included the main Terminal 2 building, satellite pier T2B, a multi-story car park and a cooling station. Mott MacDonald also worked on the testing and integration phases of Terminal 2.

In our role, managing the specialist system suppliers for the data network, security systems (CCTV, access control) radio infrastructure and SCADA covering all aspects of system delivery, we delivered:

- ✓ Initial scheme design of the overall installation, this was developed to a level ready to tender the implementation contracts for the specialist suppliers.
- ✓ Technical assurance of the suppliers' designs; this was to ensure the design meets user's requirements, was of appropriate quality and met the users technical standards.

- ✓ Management of the suppliers' contract throughout implementation, monitoring progress against the contract schedule, ensuring contract interfaces are controlled and information was exchanged with other supplies.
- ✓ Inspection of the suppliers' work and installations to ensure their quality and reviewing as built documentation.
- ✓ Management of all reported defects to ensure resolution prior to completion.

In the early stages of the work our team worked with HAL's staff to place the specialist system supply contracts, this included preparing tender documentation, managing the procurement process to comply with EU Negotiated Process. We produced all the internal documentation for the evaluation including the final report and recommendations to place contracts.

Masdar City ICT Network Strategy & Design, UAE

MASDAR was aiming to become the world's first carbon neutral city, designed and operated against some of the world's most demanding sustainability standards. MASDAR required a single, converged ICT infrastructure that would avoid the waste and inefficiency inherent in traditional designs, and would align with the city's unconventional architecture.

Mott MacDonald's Digital Consulting team was the consulting engineer for all aspects of the ICT design, including the fixed and wireless networks and data center.

The single open-access fixed network design ensured delivery of triple play services to 40,000 residential customers over a Fibre To The Home (FTTH) access network, and a full suite of services to the 50,000 business customers located within the city. The architecture comprised an MPLS backbone with an active-Ethernet access layer to support multiple service providers, while minimizing energy consumption. The design also included a state-of-the-art data center to provide support services and house business applications.

Mott MacDonald was also responsible for supporting the Telemetry / SCADA and related services required by the smart electricity grid and other utility networks, along with security / CCTV, active signage, RFID and other services to support the smooth operation of the city. As part of the work, Mott MacDonald also designed the passive network infrastructure (service trench, ducts, chambers, PoPs, fibre etc).

Wireless networks within the city were designed to share a distributed antenna system to minimize the number of separate antennas required. The system was designed to support multiple mobile services, TETRA and public WiFi, with backhaul being provided by the fixed network.

Various Digital Region and City Projects, UK

We have undertaken a large number of projects with municipalities, local government and agencies who were planning and implementing next generation broadband services. Assignments have included: Market modelling and network planning for telecommunications infrastructure providers, development of detailed revenue and costs models, planning network topology and priority regions for network deployment, identification of potential partners to acquire additional infrastructure, identification of commercial partners for the purposes of business development and service delivery (e.g. systems integrators, ISPs) and modelling of revenues and margins.

Some of our assignments in this space include City Of London, Birmingham City, Sheffield, Barnsley, Rotherham and Doncaster, Aberdeen City and Shire, London Borough of Croydon, Wiltshire Council, Welsh Assembly Government, Comhairle nan Eilean Siar (Western Isles Council), nationwide NGN broadband strategy, Leeds City Council ICT strategy. Details of some of these are included as examples below.

- **Wireless Concession Advisor, City of London, UK:** In order to meet existing and growing demands on cellular networks within the City of London and ensure the City can be a leading connected city on the global stage for years to come, the City of London Corporation was seeking to enter into a concession agreement for provision of a small cell cellular network infrastructure and a free-to-use public WiFi network. Mott MacDonald advised the City throughout the procurement process, from initial commercial and technical considerations, through requirement capture and ITT production, to procurement support.

  As a result, the City signed a contract with Cornerstone Telecommunications Infrastructure Limited (CTIL), a joint venture between Vodafone and O2, to adapt street furniture and create a portfolio of small cell sites on lampposts, CCTV columns and buildings. Both companies, along with EE and Three, will be able to access these sites to create street level networks, providing state-of-art coverage and capacity needed to meet the requirements of the next generation mobile consumer.

- **Aberdeen City Council Wholesale Cellular Concession Advice:** Aberdeen is one of the major contributors the UK Treasury. Its economic performance is demonstrated by a projected growth in both employment and population. However, the region's digital connectivity did not match its importance and rate of economic growth. Aberdeen was suffering from a slower rate of private sector investment in next generation broadband access (NGA) infrastructure roll out of any city of its size in the UK and this was adversely impacting economic growth.

  To address this issue Mott MacDonald worked with Aberdeen City and Shire to define the 'Accelerate Aberdeen' program – a multi-stream project that seeks to provide the region with the world class infrastructure it requires. Our work has included:

  - ✓ Leading the procurement program for a wholesale WiFi concession in the City. This has included running an open day, producing all procurement documentation and leading the competitive dialogue
  - ✓ Supporting the authority in its discussions with the Scottish Government on the rural Rest of Scotland procurement
  - ✓ Definition of connectivity required in key business development areas and business parks and encouraging private sector investment
  - ✓ Definition of an incubator which will be launched in partnership with local universities

- **Super Connected Cities program to enhance the broadband connectivity in Newport, Wales:** Newport City Council was allocated £6m through the DCMS Super Connected Cities program to enhance the broadband connectivity in the City. The program consists of:

  - ✓ A wireless concession to enable 4G and Wi-Fi to be deployed across the City
  - ✓ Provision of Wi-Fi in public buildings for the public to use in order to access the internet
  - ✓ Wi-Fi on public transport in the region
  - ✓ Connection vouchers to allow small and medium sized businesses to procure broadband services.

Mott MacDonald was the lead advisor to Newport, and our responsibilities included:

- ✓ Development of procurement plan
- ✓ Drafting all procurement documentation
- ✓ Liaison with DCMS regarding attitudes towards reallocation of funds and investment in wireless infrastructure
- ✓ Organizing a suppliers' day for the wireless concession project to gain feedback from industry on its appetite for the contract and the appropriate positioning of the service.

Newport City Council extended its contract with Mott MacDonald to provide ongoing consultancy support to the Council during the implementation of its Super Connected City program which will rollout next generation broadband and wireless services across Newport. Mott MacDonald has assisted Newport City Council in the evaluation of tenders and the negotiation of contracts in the following projects:

- ✓ **Wireless Concession:** Newport City Council is seeking to allow mobile operators to use its street lamps, CCTV and buildings to deploy Wi-Fi and 4G across the City. Mott MacDonald prepared the tender documents and supported the council in dialogue with potential partners
- ✓ **Wi-Fi in Public Buildings:** Newport City Council will provide free Wi-Fi in all its public buildings including museums, learning centers, libraries and sports facilities. Mott MacDonald assisted the council in procuring a suitable partner to deliver these services.

- **Welsh Government Superfast Broadband Assurance:** The Welsh Government (WG) procured Airband Ltd to provide wireless broadband access as part of the Cymru Superfast Broadband Infill Project, with Airband planning to roll-out wireless broadband to unserved areas in North and South Wales. We are providing Test and Verification of the roll-out, to allow acceptance of milestone claims by Airband Ltd for both Lot 1 (South Wales) and Lot 2 (North Wales).

  Through this we have undertaken robust testing and verification procedures against acceptance criteria that we have developed. Each claim is verified to assure compliance against requirements, assessing the technical viability of the solution, to give the WG confidence that Airband's claims are correct. In support of this we also conducting physical Test and Verification against each claim, to assess build quality, performance and spend against requirements, as well as analysis of the financial documentation provided in support of each claim.

- **Super-Connected City Application Advisory Services, Brighton and Hove City Council:** Mott MacDonald wrote the strategic outline case, developed the technology strategy, and identified the funding required, for Brighton and Hove City Council's successful Super-Connected Cities funding application. This involved extensive engagement with the local business community from which a number of digital businesses were interviewed, as well as key Council stakeholders.

- **Swansea City Bay Region (SBCR) City Deal:** In early 2016, Swansea Bay City Region produced a high-level business case and brochure with which it made an approach to the UK Government for City Deal Funding. With backing from leading figures such as Sir Terry Matthews, the bid was well received – but acknowledged to be lacking in detail. In the summer of 2016, not long before the next deadline for the funding application, the SBCR Board asked Mott MacDonald to produce a business case and proposal document for the "Internet of Economic Acceleration" strand of the proposition – effectively a digital infrastructure plan defining future-looking technologies which would lie at the heart of the whole SBCR bid (tying together the other two strands: the Internet of Energy and the Internet of Health).

  Mott MacDonald therefore produced a technology strategy and wrote the proposal document to illustrate it, which was used in the successful application for £1.3bn of funding. This involved plans involving current fibre broadband and 3/4G mobile technologies – as well as more future-looking elements such as a 5G test-bed, software defined networks and the IoT.

- **Broadband Infrastructure Development, London Borough of Croydon:** We completed a project on Broadband Infrastructure Mapping in the Croydon Opportunity Area (COA). This involved gathering data on the degree of implementation of fixed, mobile and wireless infrastructure in the COA as well as engagement with local interest groups like Tech City and interviews with a number of prominent local digital companies. A series of maps were produced along with analysis indicating the degree and location of gaps between supply and demand – along with strategic recommendations on how the situation could be addressed.

DAS Advisors Project Experience

West Virginia University

West Virginia University engaged DAS Advisers to assess its public safety, Wi-Fi, and cellular coverage needs within a 600-acre area that included the University's 60,000-seat football stadium and four additional buildings housing offices, athletic training facilities, and light retail. The outdoor areas to be addressed included parking facilities and green spaces typical of a large campus environment. When DAS Advisers was engaged, cellular service was provided through WSP macro facilities located both on campus and in the surrounding area. Public safety frequency communication in many parts of the targeted areas was poor, and the availability of the University's Wi-Fi service was marginal. DAS Advisers held a series of meetings with University stakeholders to articulate campus needs. That information, coupled with their review of WSP networks, was the basis of their recommended solutions, which the University accepted. The result was an upgrade of the existing Wi-Fi network and the construction of a Distributed Antenna System (DAS) owned and operated by a neutral host provider company. The system accommodates public safety frequencies and is capable of delivering Wi-Fi service, should the University choose to deploy a network on it. The neutral host provider was selected through a formal RFP process. DAS Advisers prepared the technical portion of the RFP and then supported the University throughout the interview and final selection process, contract negotiations with the neutral host provider, construction, and final deployment testing. The project resulted in a revenue-positive agreement for the University. West Virginia University has retained DAS Advisers to represent its interests in a second project that involves approximately 900 acres, 35 buildings, and the University's basketball coliseum.

University of Miami

University of Miami identified a need within its campus for improved cellular voice and data service. After considering options that included a series of repeaters installed to address the issue, the University engaged DAS Advisers to provide consulting services. DAS Advisers conducted site and contract reviews of seven existing WSP facilities, performed radio frequency baseline testing on campus, and held stakeholder meetings to determine and prioritize the University's goals. DAS Advisers identified a portion of the campus that required improved service, including a 150,000-square foot, LEED-certified student activity center, then under construction.

That process led DAS Advisers and the University to identify cellular voice and data deficiencies within University of Miami Hospital complex, located approximately 6 miles from the main campus. The Hospital complex involves 35 buildings and approximately 8.5 million square feet of indoor space. Although the two sites were comparable in terms of their needs for improved cellular voice and data service, DAS Advisers identified important differences between the two campuses that necessitated different solutions. The University agreed with their findings and authorized DAS Advisers to write a single RFP that would treat the two campuses as separate projects. DAS Advisers supported the University throughout the RFP, interview, and final selection process. DAS Advisers was asked to provide technical oversight during the deployment of a neutral host DAS within the University of Miami Hospital. The system was successfully commissioned in June 2015. Currently DAS Advisers is under contract to project-manage the installation of a University funded DAS within a new medical facility being constructed on the UM-Coral Gables campus.

United Regional Health Care System

United Regional Health Care System is the primary health care facility in North Central Texas. The hospital's main campus is located in a mixed-use area of Wichita Falls and has several patient care clinics and administrative buildings off the main campus.

United Regional's physicians and staff expressed concern about cellular and Wi-Fi coverage in several parts of the main campus. The hospital's Information Services and Telecommunications leadership engaged DAS Advisers to review the hospital's existing wireless environment, both cellular and Wi-Fi, and to provide recommendations for solutions. DAS Advisers reviewed the wireless infrastructure, which includes an aging repeater-fed DAS, and conducted its standard assessment of the hospital's needs, radio frequencies, and macro cellular environments.

Based on its assessments, DAS Advisers determined that United Regional would be best served by continuing to operate separate Wi-Fi and DAS networks. Relieving the increasing pressures on the hospital's Wi-Fi network being the priority, DAS Advisers worked with United Regional's leadership through the completion of a property-wide Wi-Fi refresh. DAS Advisers is now supporting United Regional in a complex negotiation with a WSP for a cellular voice and data solution.

Columbus Regional Airport Authority

Columbus Regional Airport Authority (CRAA), located in Columbus, Ohio, operates Port Columbus Airport, which serves more than 6 million passengers each year. CRAA identified inadequate cellular voice and data service as a critical factor affecting passenger and visitor satisfaction. CRAA also identified the need for improved connectivity as vitally important to the Authority's day-to-day Public Safety and management functions.

CRAA engaged DAS Advisers to assess the airport's current radio frequency environment, provide recommendations for solutions, draft a Request for Proposal for distribution to WSPs, review responses to that solicitation, interview candidates, negotiate the business terms of a final contract with the selected vendor, and provide oversight support during installation and system commissioning. With the support of DAS Advisers a final contract was reached. Real time answers and coordination enabled the client to meet a fast-paced construction deadline which if missed would have had severe government regulatory repercussions and detrimental business outcomes.

Miller Engineering, Inc. Project Experience

Advanced Surgical Rehabilitation Hospital

Interactive collaboration with the physician owners and contractor was the guiding principle behind the success of this project. Each and every system within the hospital was designed for and met precise health care compliance standards. Specifications for ventilation, electric, plumbing, HVAC and medical gas safety were all applied to the constructible design. Quality assurance and design aspects were satisfied by many intensive site visits as well as consistent communication with the contractor.

Beech Fork State Park Lodge

Currently, the West Virginia Department of Natural Resources has engaged Miller Engineering's services for design and development of a new, multi-million dollar lodge in the southern region of the state. Miller Engineering is providing all of the mechanical, electrical, plumbing and pool design for the Beech Fork State Park. This project includes coordination with ZMM Architects, EL Robinson, the West Virginia Department of Environmental Protection, the West Virginia Division of Highways and the US Army Corps of Engineers. Development and design for guest, conference and public recreational areas, as well as commercial kitchen space, fire safety and public safety lighting are key elements of the project.

Elkins DNR Operations Center Standby Generator

The WVDNR Operations Center in Elkins, WV requested to have an emergency generator installed due to losses incurred from a long power outage caused by Hurricane Sandy. Miller Engineering coordinated which systems the DNR wanted on standby power. This required the installation of new panels which are fed through a transfer switch. Critical operation loads were installed in these panels. The owner requested a natural gas fueled generator, requiring modifications to the building's gas service. Some of the buildings light fixtures were retrofitted to LED with battery backup to provide some emergency lighting in common areas. The project is currently on hold pending budget approval.

FMW Composites Building

The facility's production process utilizes explosive hydrogen and propane requiring electrical, HVAC and plumbing systems to be explosion-proof. The project required extensive review of air movement (supply, exhaust, room-to room) within and outside the facility. The processes also use chemicals which can emit vaporous hydrochloric acid, requiring emergency ventilation systems. An extensive code review process was performed as well as design of a foam-based fire suppression system. Process gasses flow from exterior bulk storage to the process equipment through a piping network. Significant complexity was added as the roof structure could not support any HVAC equipment and location, footprint and services were already established during building of the shell.

MOTT MACDONALD

Gary Facemyer, PE, PS

Personal summary

Education:

BS, Civil Engineering, WV Institute of Technology, 1975

Registration:

Professional Engineer

KY, 18676, 1995
OH, PE56731, 1993
PA, PE042965R, 1992
VA, 0402 024022, 1993
WV, 8287, 1980

Professional Surveyor

WV, 1320, 1995

Memberships:

American Society of Civil Engineers (ASCE) Fellow

American Water Works Association (AWWA)

Water Environment Federation (WEF)

WV Society of Professional Surveyors (WVSPS)

Mr. Facemyer has been responsible for planning, permitting, design, and construction of public works projects for 40 years. He has served as Principal Project Manager and Project Engineer for various water, wastewater, site development, solid waste landfills, earthen dams, geotechnical investigations, abandoned mine reclamation projects, hazardous waste sites, and many other miscellaneous civil engineering projects. His duties have included project planning and design, managing construction bids and awards, construction oversight and inspection, and project closeout. His responsibilities have included managing quality assurance/quality control, schedules, personnel. company resources, business/market development, clients, and profit.

Mr. Facemyer has held leadership positions in many professional associations and continues to be very active on the state level.

Selected projects

Asset Field Locations, West Virginia American Water, Statewide, WV: Project Director for an ongoing project to field locate 160,000 water meter tiles using sub-foot GPS data collectors to implement a data management system and SAP/GIS integration. Manages and assists installation contractors to replace these meters with AMR/AMI technology.

Yeager Airport Facility Improvements, Charleston, WV: Project Manager for terminal and ramp improvements, consisting of new passenger boarding bridges, pre-conditioned air units, fixed ground power units, HVAC rooftop unit replacements, and electrical upgrades, including emergency power. Responsible for contract management and construction phase services, and project closeout with FAA.

Asset Data Management, West Virginia American Water, Statewide, WV: Project Director for an ongoing project to develop a GIS system that integrates with client's SAP enterprise resource management system. Responsible for office and field data collection, GPS field location of assets, reconciliation between systems, and asset data management.

Upper Kanawha Valley Water Main Reinforcement and Extension, West Virginia American Water, Kanawha County, WV: Principal Project Manager responsible for planning, design, permitting, bidding, and construction management of 15 miles of 20" and 16" ductile iron pipe, 1500 gpm water booster station, and one million gallon glass-fused-to-steel water storage tank to serve the communities of Pratt and Montgomery. Project includes an open cut crossing of the Kanawha River that impacted federally endangered mussels that had to be permitted and mitigated. Project allows the client to abandon two water treatment plants and serve the municipalities with reliable water from their regional water treatment plant.

Tank Painting, West Virginia American Water, Statewide, WV: Principal Project Manager responsible for providing engineering and project management related to development, management, and implementation of an annual water storage tank painting program.

Geographic Information System (GIS) Conversion, West Virginia American Water, Statewide, WV: Client Manager responsible for converting client's CAD and paper maps to GIS format. Project consists of 9,500 hydrants, 50,000 valves, and 3,350 miles of water main.

Resident Project Representatives, West Virginia American Water, Statewide, WV: Principal Project Manager responsible for furnishing and managing resident project inspectors for various capital improvement projects, primarily water distribution system renewal and replacement projects.

Technical Services, West Virginia American Water, Statewide, WV: Principal Project Manager responsible for providing engineering, surveying, and GIS services to the client's Engineering Group for capital improvements to water distribution system renewal and replacement projects.

Stormwater Pollution Prevention Plans (SWPPP), City of Charleston, WV: Project Manager for 24 SWPPP and 10 site assessments for municipally-owned sites in the city. Responsible for resource planning, schedule compliance, final reporting, and certifications.

Water Storage Tank Demolition, West Virginia American Water, Statewide, WV: Project Manager/Engineer responsible for locating and evaluating 20 existing ground level and elevated, abandoned water storage tanks to be demolished; preparing bidding documents, assisting client in the bidding process and contract negotiations with Contractor; and

miscellaneous construction administration services, land research, easements, and right-of-way services.

Potassium Permanganate Chemical Feed, West Virginia American Water Charleston, WV: Project Director responsible for design, permitting, bidding, and construction management of a standalone chemical feed building and equipment for an 80 MGD water treatment plant.

Fayette County Advanced Metering Construction Management, West Virginia American Water, Fayette County, WV: Project Director and Client Manager for construction phase engineering services; resident project representation; mapping services using GPS locations; and GIS mapping of meters, tanks, booster stations, pressure reducing valves, fire hydrants, and gate valves. Responsible for progress monitoring, data management, and data cleansing for the replacement of 12,000 water meters with "smart meter" technology and installation of 1,200 acoustical monitors for leak detection in this municipal system.

Water Storage Tank Rehabilitation, Town of Wayne, Wayne, WV: Project Manager/Project Engineer responsible for tank inspection, and developing plans and specifications to rehabilitate a 150,000-gallon ground supported welded steel water storage tank. Rehabilitation consisted of cleaning, sandblasting to near white, repairing pits, replacing the ladder/platform, replacing bolts/gaskets to manways/access hatches, and painting with a three-coat epoxy paint system. Paint inspection was provided by KTA-Tator, Pittsburgh, PA. Contract performed by Welding, Inc., Charleston, WV.

Water Storage Tank Rehabilitation, Town of Gilbert, Gilbert, WV: Project Manager/Project Engineer responsible for tank inspection, and developing plans and specifications to rehabilitate two 100,000-gallon ground supported welded steel water storage tanks. Rehabilitation for Tank No. 1 consisted of complete demolition and construction of a new welded steel water storage tank on the existing foundation. Rehabilitation for Tank No. 2 consisted of cleaning, sandblasting to near white, repairing pits, replacing the ladder/platform, and replacing bolts/gaskets to manways/access hatches. Both tanks were painted with a three-coat epoxy paint system. The work also included replacement of the yard piping system, including replacing valves to create a more flexible piping system to isolate and drain the twin tanks, fencing, and telemetry. Paint inspection was provided by KTA-Tator, Pittsburgh, PA. Contract performed by Welding, Inc., Charleston, WV. Telemetry contract performed by Patriot Services, Parkersburg, WV.

Slabtown, Tamcliff, Paynter Water Main Extension, Town of Gilbert, Gilbert, WV: Project Manager/Project Engineer responsible for planning, permitting, and design of a water main extension project for the Town of Gilbert. The project was funded by the USDA/Rural Utilities Service and HUD/Small Cities Block grant.

Water Storage Tank New Installations, West Virginia American Water, Statewide, WV: Project Manager/Project Engineer responsible for ten or more ground supported welded steel water storage tanks. Duties included planning, design, permitting, bidding, construction management, and inspection. Paint inspection provided by KTA-Tator, Pittsburgh, PA. Welding, Inc., Charleston, WV was the successful low bidder on all tanks.

Upper Fishers Branch Water Main Extension, Kanawha County Regional Development Authority, Kanawha County, WV: Project Manager/Project Engineer responsible for planning, permitting, and design of a water main extension project in cooperation with the Kanawha County Commission, Kanawha County Regional Development Authority, and West Virginia American Water Company. The project is being funded by the KCC, US Army Corps of Engineers, IJDC grant, and WV American Water.

Sanderson/Dutch Ridge Water Main Extension, Kanawha County Regional Development Authority, Kanawha County, WV: Project Manager/Project Engineer responsible for planning, permitting, and design of a water main extension project in cooperation with the Kanawha County Commission, Kanawha County Regional Development Authority, and West Virginia American Water Company. The project is being funded by the KCC, WVDEP/Abandoned Mine and Reclamation Program, and WV American Water.

Back Fork of Elk, Miller Mountain Phases I & II, Diana Phase I Water Main Extensions, Webster County Economic Development Authority, Webster County, WV: Project Manager/Project Engineer responsible for planning, permitting, design, and bid phase engineering services for a water main extension project in cooperation with the Webster County Commission, Webster County Economic Development Authority, and West Virginia American.

MOTT MACDONALD

Eric R. Bess, GISP

Personal summary

Education:

BS, Engineering Technology, West Virginia University, Institute of Technology, 1996

AS, Civil Engineering Technology, West Virginia University, Institute of Technology, 1995

Registrations:

NICET Certified Civil Engineering Technician, #89568

Certified Geographic Information Systems Professional (GISP)

Professional memberships:

Member of American Water Works Association (AWWA)

American Society of Certified Engineering Technicians (ASCET)

West Virginia Association of Geographic Professionals (WVAGP)

Mr. Bess has over 17 years of GIS experience, mostly in the Oil & Gas Industry. His range of experience covers a multitude of tasks including database development, workflow and dataflow process management, training, analysis, asset management, and field personnel management. Prior to this, Mr. Bess worked for five years in the coal industry, which also aided in a coal relations GIS support role. He has experience with data creation, compilation, reporting and analysis, and QA/QC of various datasets for business needs.

His mining experience includes a wide range of tasks from traveling with inspectors, to ensuring tools and parts for daily and planned maintenance activity, to traveling with surveyors underground to ensure proper mining direction and location are correct. He also assisted with permitting, mine projection development, ventilation review, and managed the water treatment systems for the bath houses, including ordering and management of the systems and chemicals and reporting requirements for state agencies. He also performed on-site IT support and human resource functions, as needed, for a union workforce of over 200 individuals.

Selected projects

Water System Acquisition Due Diligence, West Virginia American Water Company, WV: Served as Senior GIS Specialist on this project. Client requested due diligence to be done on a smaller water system that may be acquired. Work consisted of creating a GIS linkage between a master easement spreadsheet and parcel outlines in GIS. Assets were digitized from scans that were georeferenced, and buffer calculations performed based on the easement criteria to make a map book of the coverage area with various information displayed.

AMR/AMI Phase I, II, West Virginia American Water Company, WV: Project Manager and Senior GIS Specialist involved in field data collection with sub-foot GPS for a client program to replace probe and manual read meters with AMR/AMI read systems. Responsible for field crew coordination, deliverables for 3rd party contractors who performed the meter change-outs, and progress reporting. Also, the data was provided to the client as coordinates linked to each premise number for updating their master service address database.

Stormwater Surface Runoff Analysis, City of Huntington, Huntington, WV: Served as Senior GIS Specialist on this project involving digitization and data management for surface features in a small pilot area of the city. Responsible for GIS data acquisition and workflow development, proper data attribution for impervious vs. pervious areas, acreage calculation for runoff analysis, and map generation for client review.

Asset Data Management, West Virginia American Water Company, WV: Served as Senior GIS Specialist on this project consisting of data discovery, collection, process development, and integration to WVAW GIS System. Served as liaison with field operations to ensure field mark-ups of data were delivered and assimilated into the WVAW GIS System. Developed a field data collection process with GPS technology for more efficient collection and integration.

Impervious Surface Determination and Analysis Support, Huntington Stormwater Utility, Huntington, WV: Served as Senior GIS Specialist. Client indicated they would like assistance in determination of impervious area within city limits to then apply to their billing system to charge a stormwater runoff rate for commercial properties. Work consisted of providing technical support for client GIS personnel in how to train the software to classify the recently acquired imagery, how to take those results and intersect and calculate the impervious area per tax parcel, how to load the results into their billing system and also advise on a base disclaimer for review by the client's legal department to cover the work done prior to public release.

View shed Analysis, West Virginia American Water Company: Served as Senior GIS Specialist. Client requested due diligence to be done regarding view shed impact for potential timbering at a water treatment plant. Work consisted of creating a set of observation points, barrier of trees to remain and analysing the results using a 6ft tall person located at each observation point to show no negative impact resulting from the proposed timbering.

Upper Kanawha Valley Phase III, West Virginia American Water Company, Kanawha County, WV: Served as Senior GIS Specialist on this project consisting of multiple waterline extension and upgrade contracts. Responsibilities included managing project documentation, data acquisition, GPS data processing, one call design tickets and third party utility contact on project area for proper utility line marking, and crossing procedures and requirements.

Stormwater Pollution Prevention Plans (SWPPP), City of Charleston, Charleston, WV: Served as Senior GIS Specialist on this project involving 24 SWPPP plans and ten site assessments for 34 municipal sites owned by the City of Charleston. Responsible for template development, data management, and general location and site maps of all field inspection data.

Upper Kanawha Valley Phase II, West Virginia American Water Company, Kanawha County, WV: Served as Senior GIS Specialist on this project consisting of four waterline extension and upgrade contracts. Responsibilities included georeferencing legacy utility maps, one call design tickets and third party utility contact on project area for proper utility line marking, and crossing procedures and requirements.

Various Projects, Chesapeake Energy Corporation, Various Locations, United States:

- Right-of-Way Process and Mapping: Managed the efforts to standardize the GIS support processes and end products for Pipeline Right-of-Way (ROW). This project entailed working with IT and the ROW group to gain access to their ROW database, and working out a process for automated jobs to update the company's ROW GIS layer each night based upon the previous day's data at end of business. Standard mapping products were then created to relate to that layer with a specialized color code for each parcel status for an up to date view into the project and acquisition status along Pipeline projects in the major shale plays in the U.S. A separate web viewer was also developed with assistance from IT to give a digital view, as well as any hard copy needs the business may have.
- Pipeline Integrity Support (Class Analysis and Review with Operations): As part of the Pipeline Integrity group's role, they would utilize the GIS dataset for pipeline and associated facilities to process in their class location study tools. Once that result was obtained, they would be taken to the field operations and management personnel, with GIS as a liaison to review the results and provide explanation, or take down concerns for possible misidentification needing remediated prior to agency submission. With PHMSA's allowance of the clustering rule, this became an important role in helping reduce the amount of regulated mileage, thereby resulting in lower requirements, man hours, and patrols, and maintenance based upon the pipelines lower class ratings from proper analysis.
- Coordination of IT GIS Efforts with Business Needs for Solution Development and Acceptance: Performed periodic meetings with business leads to determine their goals and how GIS could assist or enhance their goals and outcomes. In doing so, with any web application needed, model or script development, business systems tie-in, or third party solution coordination with other systems, Mr. Bess would work closely with the IT group to ensure all business needs were met on implementation and any final tuning of the solution was done to provide the necessary outcome and product for the business use.
- One Call and Damage Prevention Program Support: GIS was integral in the one call responsibilities of the company. As the results of the GPS'ing of the assets occurred, the company's assets were becoming more spatially accurate, and allowing one call buffer submittals to state agencies to get more accurate, thereby providing more accurate ticket issuance from each state, and allowed for more internal personnel to clear tickets from the office knowing the status of the asset location information. GIS was responsible for data submittal to each agency, and worked with the one call ticket software company to enhance their product for our field personnel needs to enhance their user interface and streamline their work flows for more efficient damage prevention efforts.
- Hyperlinking of Related Documents, Photos, etc. to GIS Features: Performed data gathering and hyperlinking of file paths with the GIS feature classes to external and varied format data sources, so all information could be accessed from the GIS feature or portal without have to search multiple locations for similar data. Drawings, photos, etc. were hyperlinked in the GIS features attribute table so the end user could click the URL and be taken to the secondary source with minimal effort. This consolidated lots of information into a single accessible location for non-GIS centric personnel to utilize easily and efficiently.
- Training and Support for In-house Created Web Application Serving Up Company Pipeline and Facility Data to Internal Non-GIS Centric Users: Performed training and liaison for enhancement requests on internal web applications developed for non-GIS centric users. Assisted with front end development for process and user interface review, to then coordinate with test groups to provide further feedback to IT prior to final rollout. Training was provided upon rollout and again as requested by management to ensure comfort with the solution and the non-GIS centric end users for accessibility and understanding.

MOTT MACDONALD

Stephen B. Polen, PE

Personal summary

Education:

MS, Engineering Management, Youngstown State University, 1998

BS, Civil/Environmental Engineering, Youngstown State University, 1985

Registrations:

Professional Engineer

OH #E58738, 1994
PA #040360, 1990
FL #0042315, 1989
WV #22401, 2017
MI #6201065969, 2017

Construction Document Technologist (CDT), 1995

Designated Design-Build Professional, 2014

Professional memberships:

American Society of Civil Engineers

American Water Works Association

Water Environment Federation

Pennsylvania Municipal Authorities Association

Mr. Polen has more than 30 years of experience providing engineering services to water/wastewater, general civil, and facilities engineering clients. Mr. Polen is an Area Manager within the Mott MacDonald organization where he has oversight responsibilities including staffing and project goals achievement for Water/Wastewater, Stormwater Projects, and facilities in Western Pennsylvania. West Virginia, Ohio, Kentucky, Illinois, Indiana, and Michigan. He also directly manages the Pittsburgh Office of Mott MacDonald while serving as Program/Project Director for several key projects. As Program/Project Director, he coordinates all aspects of engineering projects and functions as the primary contact between strategic clients and the Mott MacDonald organization.

Having previously managed the day-to-day operation and administration of a growing public water utility, Mr. Polen approaches projects from the perspective of the owner. He is able to address operational and management issues and has extensive experience managing capital improvement projects. His experience includes analysis, design, construction, and operation.

Selected projects

Program Management and Design Management Services, Pittsburgh Water and Sewer Authority (PWSA), Pittsburgh, PA: Program Director and Engineer of Record responsible for program oversight. This includes management of staff who perform the day to day functions of water and sewer infrastructure capital improvement program which include project identification, project prioritization based on risk-based methodologies, budgeting, preparation and/or review of conceptual and final designs, design project management, construction administration and financial oversight The Program includes providing embedded staff who prepare preliminary designs, develop RFP documents, participate in selection of design consultants to develop final design documents, facilitate bid phase services and oversee construction phase services for all Capital and Operational projects. These projects include: lead service line replacement programs, meter replacement projects, valve replacement projects, pump station rehabilitation projects, treatment plant upgrade projects, reservoir and tank upgrade projects, and miscellaneous utility operation projects.

Office Building Renovation, Utilities Investigation, Conceptual and Final Designs, Confidential Client, Pittsburgh, PA: Project Director for site investigations, conceptual and final designs, and construction phase services for the renovation of a two-story, 56,000 square foot office building to provide new office accommodations. Mott MacDonald prepared design and construction cost estimates, design and construction schedules, code analyses, life safety analysis, fire hazard analysis, energy analysis, and high-performance sustainability design report. Renovations took place while the building is occupied; therefore, demolition and construction occurred over six phases. Each phase was completed with commissioning and as-built drawing preparation prior to the start of the next subsequent phase. Design included the construction of a new personnel elevator, ensuring compliance with ADA-accommodations, detailed design of specialized system furniture arrangements, including significant electrical, data, and security accommodations.

New Training and Testing Laboratory, Conceptual and Final design and Construction Oversight, Confidential Client, Pittsburgh, PA: Project director for site investigations, conceptual and final designs, and construction phase services for the renovation and conversion of an existing two-story, 14,400 square foot shipping and receiving building to provide new modern training and testing laboratory accommodations. Conceptual and final design documentation included preparation of design and construction cost estimation, design and construction schedules, code analysis, life safety analysis, fire hazard analysis, and high-performance sustainability design report. Design includes the full demolition of all but the structural shell of the building, full asbestos and lead based paint abatement, construction of a complete Exterior Insulation and Finishing System, extensive raised flooring system, detailed design of specialized modular system furniture arrangements, and significant electrical, data, and security accommodations.

Main Pump Station Upgrades, ALCOSAN Campus, Pittsburgh, PA: Project Director for site investigations, design, and construction phase services for the replacement, upgrade, and new construction of various items to improve the dependability and efficiency of ALCOSAN's 480 MGD Main Pump Station. Major components of work included: upgrade of three existing 2,000 hp pumps with 53-inch impellers, new motors, and new variable frequency drives; replacement

of three existing 1,500 hp pumps with new 2,000 hp pumps; upgrade of pump station power supply and distribution equipment from 5 kV to 13.8 kV; replacement of elevator controls; upgrade of station HVAC equipment; pump discharge piping rehabilitation; replacement of existing drain pumps; rehabilitation of bilge pumping system; design of effluent and potable water improvements; and new pump discharge air/vacuum breaking mechanisms.

General Facility Design Support, Confidential Client, Pittsburgh, PA: Project Director for Site investigations, designs, cost estimating, and construction phase services for general plant-wide facility designs. Projects included: revision of historic as-built drawings; engineering support and generation of new drawings for facility and site utility maintenance projects; field measurements for renovations; preparation of construction cost estimates for facility work; site inspection and surveys of utility system upgrades; review, development, and upgrade of standard specification and design criteria; preparation of Sustainable Design Reports; floor load and similar structural evaluations; hydraulic calculations for sprinkler systems; minor design evaluations; and analysis of LEED qualifications for future buildings.

New Laboratory Test Facility Rearrangement and Utility Extension, Conceptual and Final Design, Confidential Client, Pittsburgh, PA: Project Director for site investigations, geotechnical investigations, conceptual and final design, and construction phase services for the demolition of equipment, utilities, and structural infrastructure associated with a completed test program, and construction of foundations, structural framing, four (4) levels of new work platforms, test stands, mechanical and process equipment and piping, new utility extensions of potable and testing process waters (cooling, chilled, high temperature, high pressure), and new lighting, power supply and distribution, process controls, and instrumentation hardware within a renovated 5,000 square foot high-bay laboratory space. Conceptual and final design documentation included design and construction drawings, specifications, cost estimate, design and construction schedules, design narrative, and calculations.

Engineering Support to Review Vendor's Design of Specialized Simulation Training Facilities, Confidential Client, Pittsburgh, PA: Reviewed vendor's design submittals for the design, off site modular manufacture, shipping, assembly, and final installation of specialized simulation training facilities. Reviewed submittals to confirm vendor performance in accordance with scope of work, as well as verification of completeness, accuracy, constructability, and code compliance. Special evaluation of seismic support structures; catwalk support structures providing normal and emergency ingress/egress; ancillary mechanical rooms; electrical, lighting, data, and communications interconnections; support systems (water, sanitary, HVAC, mechanical, fire suppression) design and interconnections; and full review of the four-level (stackable) modular training assemblies.

Electrical Distribution System Replacement and Power Generator Upgrade, MSANK WWTP, New Kensington, PA: Project Director and Client Contact for site investigations, detailed design, construction phase services for the replacement of the complete Wastewater Treatment Plant electrical distribution system. Scope of work included upgrading from a single utility feeder to two new utility feeders that share the increased load plus an additional 50 percent capacity for future loads. Project also included installation of two new standby 1,200KW rated diesel generators, meeting EPA Teir-2 emissions regulations, and enclosed together in a walk-in weatherproof housing with sub-base fuel tank sized to provide 36 hours of run time at full load. Project scope included the installation of new pad mounted 2500KVA utility transformers, fed from separate utility primary feeder circuits, connected to new 480 volt, 4,000 Amp switchgear line-up. All new mains, ties, and feeder breakers were electrically operated and controllable via an operator interface terminal and a programmable logic controller (PLC) for monitoring by the WWTP facility's SCADA system, configured to alert operations staff of malfunctions. New switchgear was designed to accommodate a future third paralleled 1,250KW generator when future loads are increased at the MSANK Wastewater Treatment Plant.

Customer Service and Training Center Building, ALCOSAN Campus, Pittsburgh, PA: Special consultant for site investigations, design, and construction phase services for a new two-story, 20,000-sf building to provide accommodations for ALCOSAN's training functions, customer service operations, record storage, and parking facilities. This building was sustainably designed and received a LEED Gold rating.

MOTT MACDONALD

Dave Tanner

Personal summary

Education:

MSC (Distinction), Satellite Communications, University of Surry, 1994

BSc (Hons), Electrical and Information Sciences, University of Cambridge, 1993

Registrations:

Chartered Engineer

Professional memberships:

Member of the Institution of Engineering and Technology

Mr. Tanner is an experienced professional engineer with more than 20 years of technical and management experience in the telecommunications arena. He uses his expertise in various fixed and mobile telecommunications technologies, particularly personal mobile radiocommunications (2G/ 3G/ 4G/ 5G WiFi), to provide strategic and operational advice to diverse players, from new entrants to major businesses, across the telecoms industry.

Selected projects

Tower portfolio strategy development for Mcel, Mozambique: Led the team assisting Mcel in developing its strategy around its passive tower infrastructure. Initially technical and commercial due diligence of the tower portfolio were completed. This examined the status of the portfolio (quality, capacity and attractiveness), the operations surrounding it and all associated costs. A 10 year assessment of network deployment for all the operators was developed to assess potential future colocation demand on the portfolio, coupled with a view on potential pricing and its evolution. Using all the above, business models for both mcel and a future stand-alone tower operating company were developed to facilitate valuation, scenario analysis around opex/ transaction value trade-offs and the potential for opex/ capex savings.

Lenders Technical Advisor for OPIC on Apollo Towers, Myanmar: Led the Mott MacDonald completing technical and commercial due diligence on Apollo Towers on behalf of OPIC, a potential investor. This included a review of plans around power provision; a review of Apollo's staffing, a review of operational systems and processes; a 15 year forecast for colocation demand; and analysis of pricing plans, and cost assumptions for both build and maintenance. Provided technical input to the Investment Agreement, including developing appropriate technical and commercial Conditions Precedent. Following successful completion of the transaction, we continued to provide regular performance monitoring and disbursement authorization.

Lenders Technical Advisor to Al Rahji Holdings on Mobily and Zain Tower Transactions, Saudi Arabia: Mobily and Zain launched near simultaneous processes to divest their mobile passive infrastructure portfolios. I led the Mott MacDonald team commissioned to complete technical and commercial due diligence with a particular focus on the potential for consolidation and decommissioning. Our work included: analysing both portfolios to assess capabilities and potential issues; undertaking a physical audit of 250 sites and correlating the findings with the two site databases to ensure accuracy; developing a market demand model to forecasting potential colocation demand for each portfolio; undertaking detailed GIS analysis to assess potential for consolidation; and analysing forecast site opex and capex requirements, together with potential colocation pricing. We also provided technical and commercial support for the business planning, valuations and development of the Purchase Agreements, Master Lease Agreements and Build To Suit Agreements.

Technical Due Diligence on American Tower Germany for PGGM Investments, Netherlands: Led the team undertaking technical due diligence on ATC's existing tower business, including completing an audit of multiple sites, analysing ATC's operations, and developing recommendations on future opex and capex to input into valuation business case.

Risk Based System Assessment of the Connect radio system for Thales, UK: In 2019, the Connect Radio System will revert to London Underground under the terms of Thales PFI contract. Thales wished to commence an early warning process to understand the areas were risks may lie in that reversion. Led the Mott MacDonald team examining establish the current, and likely future, condition of the radio network through use of a risk based condition assessment methodology. This considered age, failure rates, availability of spares and supplier support to identify risks in, and consequences of, systems failing.

Commercial and Technical Due Diligence on Torrecom, Mexico, Guatemala and Nicaragua for IIC: The Inter-American Investment Corporation was looking to invest in this new 'start-up' tower operating company, which had a small number of towers across three countries in Latin America. Led the team undertaking both commercial and technical due diligence on Torrecom, covering: operational analysis of Torrecom's abilities; a financial analysis of forecast opex, capex and pricing; and overall conclusions on strategy/business plans.

Technical, Operational and Commercial Due Diligence on Airtel's site portfolio in Ghana, Kenya, Uganda, Niger, Zambia, Rwanda, Burkina Faso, Madagascar and Malawi for Eaton Towers, UK: Led the team completing this extensive due diligence on Airtel's site portfolio in

multiple African countries. Developed 10 year market models for potential site deployment numbers of GSM, UMTS and LTE; examined associated opex, capex and revenue forecasts. Studied the 'attractiveness' of the sites – in terms of location, quality, available space and potential for consolidation with existing Eaton sites. Time was of the essence, so an extensive team was used to deliver findings within 4 weeks.

Tower Transaction Technical Due Diligence on IHS – Nigeria: Mott MacDonald supported a deal that will see IHS, a leading African mobile infrastructure company, manage and control multinational mobile telecommunications company MTN's mobile network tower portfolio in Nigeria. Under the terms of the transaction, the 9,151 towers will be transferred to a new company jointly owned by MTN and IHS. The deal is estimated to be worth US$1.7billion. Led the team competing the technical due diligence which undertook a detailed physical inspection of over 100 mobile tower sites to check their condition and capacity, as well as completing the detailed analysis of a database of all sites, correlating this with the physical inspection results to highlight any potential issues.

DTV System Design for EDF Hinckley Point C Power Station, UK: Project Director of the team undertaking the full concept to detailed design of the ICT networks required for this new nuclear power station. Scope includes all ICT networks outside those directly controlling the reactor and includes: PAVA; radio; and active and passive networking. I also am the design reviewer for all completed radio designs (covering WiFi, LTE and emergency services radio).

LTE Network Due Diligence on Surfline for Ecobank, Ghana: Surfline was one of three operators provided with an LTE license; none of whom where the incumbent mobile operators. Surfline's business case was predicated on taking high value mobile broadband custom from the mobile operators. Surfline led it competitors in its network deployment and was seeking further funding to help maintain its lead. Led the team completing independent technical and commercial due diligence on Surfline, assisting Ecobank's decision on an investment.

Feasibility study into the provision of 'ubiquitous' Wi-Fi for Welsh Government, UK: Led the team examining the potential for wider deployment of public access Wi-Fi across Wales. Interviewed key stakeholders (suppliers, operators, cities, councils and government) to establish key issues and potential benefits. Developed a set of deployment scenarios around cities/ towns, public buildings, and rail/ bus stations and analysed costs for Wi-Fi deployment. Provided recommendations on next steps.

LTE Network Due Diligence for Nedbank on Afrimax, Uganda: Led the team providing technical and commercial due diligence services on Afrimax's business plans in Uganda. Afrimax is a new wireless broadband operator looking to disrupt the Ugandan market through its use of leading edge, high speed technology coupled with its commercial relationship with Vodafone. Nedbank was considering investment into this project, to assist Afrimax with its continued network development and deployment. Nedbank was therefore seeking to obtain independent review and verification of the business plan, technical and commercially. As well as leading the team, I completed the technical analysis around the LTE network's design and deployment, network components, supporting infrastructure and capex.

Independent Assurance Review for Transport for London on Voice & Data Network, UK: Led the team completing an IAR on London Underground's VDN project to establish whether the project could continue to move forward in its development. The VDN project was seeking to establish a mobile communications network, based on LTE that passengers could use. TfL required examination of the project across all relevant areas, to confirm that the project was fully understood prior to moving forward, including: strategic objectives and scope; governance and stakeholders; funding; resourcing; procurement and commercial; engineering and technical; business impact and criticality; and project and programme management. Mott MacDonald delivered its findings, and attended the relevant Rail and Underground Board (RUB) meeting to present its findings.

Technical due diligence on the Neotel for Internet Solutions, South Africa: Led the team undertaking a detailed technical due diligence on behalf of a potential investor. Examined the quality of the existing network infrastructure (relative to current industry best practice), developed views on the value of the existing network assets and established costs for building a new network in South Africa delivering similar functionality.

Contract Management of Next Generation Broadband for Wales Fibre Deployment, UK: Project Director of team managing the deployment contractor and providing testing & verification of a pan-Wales fibre deployment seeking to deliver high-speed broadband to all businesses and residential premises.

MOTT MACDONALD

Darren Simpson

Personal summary

Education:

MEng, Communication and Radio Engineering, Kings College, London, 2002

Professional memberships:

Member of the Institution of Engineering and Technology (IET, formerly IEE)

Mr. Simpson has more than 14 years of professional engineering experience. He began his career as an in-building radio design engineer, carrying out carrier-wave onsite RF surveys, data processing, and link budget analysis and generating in-building coverage designs for single and multiple technology systems.

Over the years his role progressed to Radio Design Manager, responsible for the delivery of large and small scale indoor coverage solutions for the whole project life-cycle from design through to installation and commissioning. He catered to a wide range of services and technologies, such as Airwave, Cellular MNOs, Private Mobile Radio, LFEPA, and Fire-ground.

Mr. Simpson was involved in RF analysis and propagation modeling, used in the generation of designs for shared distributed coverage solutions for a wide range of technologies, such as VHF, UHF, Tetra, GSM, UMTS, Wi-Fi, and Wi-max. He has extensive RF data collection experience through drive testing surveys, indoor coverage walk surveys, interference analysis, benchmarking, and WLAN audits and designs.

Selected projects

Hinkley Point C Nuclear Power Station DTV design: Technical Lead and customer interface, supporting EDF in the ITT process and review of bidder submissions. Also leading a team of technical designers through further design progression and value engineering.

Hinkley Point C Nuclear Power Station DTV design: Technical Project Lead role and interface to client for the Level 2 DTV communications system. Management of design development, technical delivery and interface with many internal and external stakeholders. Leading a team of 10 people in the delivery covering a range of technical fields. Also, the radio and wireless design lead consultant for site PMR radio, paging, fire-ground, satellite, and emergency services sub-systems utilising a site-wide distributed antenna solution for coverage to all buildings and gallery networks.

Heathrow Airport Eastern Campus Radio System Design: Detailed design of a common shared infrastructure for the entire building campus to provide UHF and mobile cellular wireless services. The system consisted of active RF over fibre distributed system feeding a passive infrastructure made up of antenna and radiating cable components. The system provided high reliability and resilience for single point of failure. Worked through the whole project cycle providing design link budgets, quality and testing assurance for third party contractors throughout all stages of the design and build process and into operation.

Model Tuning Drive Testing for MBNL: Project Manager and technical lead delivering a drive test campaign for MBNL who are the parent company for H3G and EE. The data collected enabled calibration of a new prediction modelling tool. The test setup was developed and calibrated to allow high accuracy of the measured data which allowed for meeting Lee Criterion. Detailed methodology and data analysis completed as part of the project.

Francis Crick Institute – Wi-Fi Design: Project involved the design of a Wi-Fi system for the entire site to provide ubiquitous 802.11a/b/g/n/ac coverage and connectivity for all users. The work concentrated on the RF design, carrying out prediction modelling and identifying the location of access points and the settings such as transmit power and channel allocation to allow for data and voice-over-IP services.

VHF Ground-to-Air Radio Design for Doha Airport: The project involved the design of a ground to air radio system for the new Doha international airport in Qatar. System design created using modelling prediction tool, ICS Telecom for predictions out to 40 miles along with interference analysis and system inhibitors for use of channel frequency allocation and antenna placement.

London Bridge Rail Station – DMR Design: The production of a new in-building distributed antenna system for upgrading the London Bridge station with a new digital PMR radio system. The system also catered for addition of the LFB service to be added in the future. On-site RF surveys carried out to enable accurate models generated with prediction tool for final solution.

Lancaster Tunnel Radio Network Coverage Design: Brand new common infrastructure design for Lancaster road tunnel in Birmingham to provide Airwave, Fire-ground, cellular mobile and FM rebroadcast radio services throughout the tunnel. Existing coverage surveys were carried out for confirming handover regions to external networks. Stakeholder interaction and requirements confirmation were part of the radio design process.

Signalling System Radio Design for Taoyuan International Airport MRT System: Desktop RF design produced for the signalling and control system to be used for the Taiwan International Airport access MRT high speed train system. Prediction modelling used to determine radio configuration of the network for placement of communications equipment along the 80Km line.

Excel Centre Indoor Coverage DAS Design: The project involved the design of an in-building distributed coverage system to enhance the Airwave and PMR services in the basement levels of the building around the Olympic times. On-site RF survey data was used to generate accurate models for the environment to understand the radio propagation. A detailed distributed antenna system was designed and deployed providing the require radio services.

Wembley Stadium Radio Services Design: Radio design technical lead responsible for the design of a multi cellular operator hybrid distributed antenna system for the newly built stadium. Additional designs completed for UHF and Wi-Fi services. On-site RF data collection, detailed modelling analysis and system design.

LPGSM Rollout for UK Tesco Stores: Rollout of LPGSM mobile services into over 200 UK national Tesco Stores. Role was as the radio design authority responsible for the survey, design, and installation and commissioning of each system. Project involved detailed RF data collection, prediction modelling, system design and post installation commissioning. Pico Cell, cat5, passive components.

North Terminal Extension at Gatwick Airport: Produced and implemented a new distributed antenna system for the North terminal at Gatwick airport which was being extended. The system combined UHF and Tetra systems onto one common infrastructure. RF surveys, stakeholder management, prediction modelling and design assurance were the main activities.

Terminal 4 Baggage Reclaim Extension DAS Design: The project involved the design of a new common infrastructure for providing Heathrow Airport PMR radio services along with LFEPA, Airport fire services, Airwave and other UHF radio services on one common infrastructure. The system was also designed to allow cellular services to connect in the future. The system provided resilience and reliability in the design of the DAS.

Airwave Network Design for Heathrow Airport: Original design of the Airwave service being deployed at Heathrow Airport. RF surveys and validation of results for deployment onto existing common infrastructure plus prediction modelling for final design were completed. Detailed post installation RF surveys completed and reports generated.

Multi-Operator Design for Selfridges London: Design of a multi-cellular operator solution for Selfridges on Oxford Street London. Extensive RF walk test surveys completed to understand the radio propagation for the environment. Detailed radio design using prediction software for creation of a Unison RF over fibre distributed antenna system.

NPIA National Network Monitoring: Existing coverage drive test campaign of the Airwave network for the National Police Improvement Agency. Coverage and voice quality assessment carried out on a force by force area. Lead technical role and project manager for initial project setup devising static and mobile vehicular test rigs. Detailed methodology produced and guidelines for equipment validation and configuration.

Cellular Mobile Benchmarking Drive Testing: Mobile network benchmarking for H3G against the other cellular operators. Test configuration involved engineering mobiles and data collection software setup with test vehicle. Voice quality measurements recorded and detailed processing and analysis produced for various routes driven such as call success, call setup, handover failures and inter-cell handovers.

Cellular Mobile Denial for Scottish Prison: The project involved the design of a system for denying the use of mobile phone devices to inmates of the prison. Technical design authority held carrying out detailed RF and build surveys on site and production of a detailed design consisting of a distributed antenna system and use of a pseudorandom generated swept signal for blocking of mobile technologies for the 900MHz, 1800MHz and 2100MHz mobile spectrum bands.

Model Tuning Data Collection Campaign for Airwave: The Project involved collection of data for use in calibration of new models for the Airwave Odyssey prediction software. Project involved drive testing for Tetra frequencies both on land from temporary mast transmit sites and also 4 miles out to sea collecting data on boats. Detailed methodologies and technical validation completed as part of the project.

MOTT MACDONALD

Richard R. Umbrino, Jr., ENV SP

Personal summary

Education:

BS, Industrial Design, Kean University, 1995

Registrations:

Envision Sustainability Professional, 2016

OSHA Confined Space Entry, 2011

Years with Mott MacDonald:

8

Years with other firms:

7

Professional memberships:

Institute for Sustainable Infrastructure

International Society of Automation

Mr. Umbrino has significant experience preparing design drawings and contract specifications for Instrumentation, Controls, and Automation (ICA) components, including Process and Instrumentation Diagrams (P&IDs), control panel layouts, instrument specifications, and wiring, schematic, and data network diagrams, including fiber optic backbones, Ethernet networks, fault-tolerant ring networks, and star networks for water and wastewater treatment, pumping, and storage facilities, vehicular tunnels, laboratories, pharmaceutical production facilities, industrial facilities, office buildings, data centers, commercial retail spaces, restaurants, and municipal buildings. He is particularly proficient in the area of security systems, such as access control, cyber security, video surveillance, closed-circuit television (CCTV), and communication systems, utilizing radio frequencies such as Ethernet Radio (spread spectrum), cellular technology such as Evolution Data Optimized (EV-DO), and Long Term Evolution (LTE) for a wide range of telemetry control projects.

Mr. Umbrino's experience includes a variety of electrical components, including medium-voltage and low-voltage power distribution, power monitoring, grounding, lighting, lightning protection, fire alarm, and telecommunications.

Mr. Umbrino serves as Project Manager for a variety of ICA, cyber security, communications, and Mechanical, Electrical, and Plumbing engineering projects. He is responsible for the development of construction cost estimates and performing constructability reviews as well as the design, drafting, and oversight of One-line diagrams, panel board schedules, site layout plans, building layouts, specifications, contract drawings, and the preparation of project reports and design deliverables. He has been responsible for sizing, selection, and layout of circuit breakers, panel boards, transformers, fire alarm appliances, access control, and data devices.

Selected projects

SCADA System, Crum Creek Water Treatment Plant, Aqua Pennsylvania, Inc., Delaware County, PA: Responsible for the preparation of contract design drawings for the installation of a new Supervisory Control and Data Acquisition (SCADA) system serving the plant's water systems. The existing SCADA system includes distributed Modicon Programmable Logic Controllers (PLCs) linked with an Ethernet TCP/IP network. Operator interface has been provided through Wonderware InTouch Human Machine Interface (HMI) workstations. The existing Ethernet network has been extended to include the residuals treatment area and the existing HMI system will be modified to include control and monitoring of the residuals treatment equipment. A new HMI workstation has been provided in the residuals treatment building control room.

SCADA System, Neshaminy Water Treatment Facility, Aqua Pennsylvania, Inc., Bucks County, PA: Responsible for the preparation of contract design drawings, including a fault-tolerant fiber optic Ethernet network, for the installation of a new Supervisory Control and Data Acquisition (SCADA) system serving the plant's water systems. Drawings consisted of piping and instrumentation diagrams (P&IDs), network diagrams, wiring diagrams, control panel layouts, and instrument details. The new SCADA system provides a completely coordinated interface between the dewatering facility operation and plant process equipment, monitoring and control of all process equipment and process functions, automatic and/or manual control of equipment, valves, etc., and manual override of all automatic functions and all other automatic and manual operations needed. The new local control panels (LCPs) will be provided with Modicon Quantum Programmable Logic Controllers (PLCs) integrated into the treatment plant SCADA system Modbus TCP/IP Ethernet communications network.

Intake Improvements, Ingrams Mill Water Treatment Plant, Aqua Pennsylvania, Inc., Chester County, PA: Responsible for the preparation of contract design drawings and specifications for the installation of new portable remote terminal units (RTUs) serving the new intake pilot equipment control system of the plant. The existing Supervisory Control and Data Acquisition (SCADA) system includes distributed Modicon Quantum Programmable Logic Controllers (PLCs) linked with an Ethernet TCP/IP network. Operator interface is provided through Wonderware InTouch Human Machine Interface (HMI) workstations. The existing Ethernet network has been extended via fiber optic cable to include the intake pilot equipment

area, and the existing HMI system will be modified to include control and monitoring of the intake pilot equipment.

Variable Frequency Drives (VFDs) and Controls and SCADA Systems Upgrade, Woodland and Butterworth Wastewater Treatment Plants, Morris Township, Morris County, NJ: Prepared contract design drawings for the installation of a replacement Supervisory Control and Data Acquisition (SCADA) system serving the wastewater systems of each plant. Drawings consisted of piping and instrumentation diagrams (P&IDs), network diagrams, wiring diagrams, control panel layouts, and instrument details. The projects consisted of the replacement of the obsolete GE Series 5 Programmable Logic Controllers (PLCs) with modern hardware, as well as the construction of a communication network linking the PLCs and a personal computer-based human machine interface (HMI). The new control system maintains the existing functionality and operability, while providing capability for future expansion.

Cyber Security, Wastewater Treatment Plant, Two Bridges Sewerage Authority, Lincoln Park, NJ: Project Manager providing oversight of the network communications design and coordinating a cyber security vulnerability assessment with the DHS (Department of Homeland Security) and ICS-CERT (Industrial Control System Cyber Security Emergency Response Team) of the of the existing SCADA system which was expanded to interface with the new ultraviolet (UV) disinfection system local control panel (LCP-UV) PLC (supplied by the equipment manufacturer), the new EPCP Programmable Logic Controllers (PLC), and the new PFCP PLC. Each PLC has been integrated into the existing plant-wide SCADA system Modbus Plus (MB) network. Developed a Recommendations Report presenting the areas in need of improvement such as the development of cyber security policies and procedures, the development of a Disaster Recovery Plan compliant with NIST 800.53 and NIST 800-82, an architecture review of the SCADA system to determine the proper location of DMZ (Demilitarized Zone) firewalls, and the reconfiguration of all SCADA and business network devices based on the results from CSET.

Closed-circuit Television (CCTV) System, City of New Brunswick, Middlesex County, NJ: Performed design services of a new closed-circuit television (CCTV) camera system. The project included the installation of 13 PoE new Network cameras, installation of a communications cabinet, Ethernet network backbone cable, modifications to the existing NVR (Network Video Recorder), and a new LED monitor. The new IP Network Cameras will be integrated into the existing NVR. The new IP Network Camera live video feeds will be displayed on a new video monitor in the control room.

Cyber Security, Little Falls Water Treatment Plant, Passaic Valley Water Commission, Clifton, NJ: Project Manager providing oversight of the network communications design and coordinating a cyber security vulnerability assessment with the DHS (Department of Homeland Security) and ICS-CERT (Industrial Control System Cyber Security Emergency Response Team) of the ICS (Industrial Control System) and the business network. Assisted with developing a design and proposal based on a hardware solution. The design included locating firewalls at strategic locations within the SCADA network architecture and configuring a DMZ (Demilitarized Zone) to protect the SCADA network from the business network and Internet. Developed a recommendation report identifying additional solutions (which will be implemented in the future) to help mitigate the gaps resulting from the CSET vulnerability assessment.

"Town Watch" Surveillance System, Avalon Borough, Cape May County, NJ: Prepared contract design drawings and specifications for a closed-circuit television (CCTV) surveillance system which remotely monitored visual displays recorded at nine key intersections throughout the Borough. Activity was monitored for a six-month duration, and allowed for the archiving of digital displays of vehicle license plates and facial recognition of pedestrian activity. All CCTV cameras were Internet Protocol (IP) based and connected via wireless network utilizing Ethernet radio (spread spectrum). The only exception was the Avalon Elementary School, where six CCTV cameras connect to an existing multimode fiber optic network which links to the Police Department. Video was encoded and processed at each camera and streamed over the wireless network to the Network Video Recorder for recording, playback, and real time display in the Police Department 911 dispatch call center.

Closed Circuit Television (CCTV) Systems, Wastewater Treatment Plant, Two Bridges Sewerage Authority, Lincoln Park, NJ: Prepared contract design drawings and specifications for a closed-circuit television (CCTV) system expansion of an existing Internet Protocol (IP) based Pan-Tilt-Zoom camera network. Cameras were connected via a new multimode fiber

optic cable network and ultimately terminated in the existing control room. New software and programming were also included.

Hugh L. Carey/Brooklyn Battery Tunnel Rehabilitation, New York City Transit Authority/Metropolitan Transit Authority Bridges and Tunnels (MTABT), New York, NY: Task Lead responsible for the preparation of the traffic signal control system, security closed-circuit television (CCTV), cyber security, and communications network designs. Duties included assessing equipment damaged during SuperStorm Sandy, preparing and coordinating 100% design drawings and specifications with remote in-house office staff, and assisting with the preparation of FEMA flood damage assessments claims. Supporting construction phase activities for the control system, CCTV, and communications system. As Task Lead during construction, responsibilities include client liaison, supervision of field inspectors and office engineers, contractor coordination, and shop drawing review.

Parallel Thimble Shoal Tunnel, Chesapeake Bay Bridge and Tunnel District, Northampton County, VA: Responsible for the tunnel systems designs associated with the 1.1-mile-long, 39 feet internal diameter design-build highway tunnel under the Thimble Shoal Navigation Channel. The tunnel systems include SCADA ITS (Intelligent Transportation Systems), SCADA EPCS (Electrical Power Control System), closed-circuit television (CCTV) system, Emergency Call Box system, District Telephone system, mass notifications system, District 2-Way Radio system, and a fire alarm system. The technical requirements include integrating all new systems with the existing systems. Additional requirements included upgrading the existing electromechanical controls in the control room to PLC-based controls over an Ethernet Network communications system.

Lytle Tunnel Fire Alarm System, Ohio Department of Transportation, Cincinnati, OH: Assisted with the design of the tunnel supporting building's fire alarm system.

Office Alteration and Power Supply Relocation, GAB Robins, Parsippany, NJ: Responsible for sizing, load calculations, and selection and layout of lighting fixtures, circuit breakers, panel boards, transformers, and fire alarm appliances for this 63,000 sq. ft. office alteration and relocation of the generator, uninterrupted power source (UPS), and automatic transfer switches (ATS). Documented existing electrical conditions and developed a One-Line diagram. Met with client to discuss needs and required modifications. Provided engineering services during construction, including overseeing all correspondence with the electrical contractor. Reviewed all shop drawings and Requests for Information (RFIs).

Building Expansion, Palisades Insurance Company, Berkeley Heights, NJ: Responsible for sizing, load calculations, and selection and layout of lighting fixtures, circuit breakers, panel boards, transformers, and fire alarm appliances for this 12,000 sq. ft. building expansion. Documented existing electrical conditions and developed a One-Line diagram of the 3000-amp service. Met with client to discuss needs and required modifications. Provided engineering services during construction, including overseeing all correspondence and coordinating with the electrical contractor. Reviewed all shop drawings and Requests for Information (RFIs).

Metering Chamber Electrical System, Winslow Water Main Extension, New Jersey American Water (NJAW), Camden County, NJ: Prepared and developed contract design drawings and specifications for a 60 amp 120/240 VAC 1-phase electrical service for the metering chamber. System included pad-mounted service cabinet, concrete-encased underground conduits, grounding array, and a telemetry system for transmitting SCADA signals to the main control building via radio frequency.

Lighting Upgrades for Municipal Buildings, Chatham Borough, Morris County, NJ: Managed and observed the construction of the lighting fixture upgrade for the Town Hall, Police Department, and Fire Station, as well as the wastewater treatment plant. The project consisted of upgrading the energy deficient light fixtures and incandescent bulbs with energy efficient compact fluorescent fixtures. All manual switches in public areas were replaced with motion sensors.

Fuel System Modifications – Newark Liberty International Airport, Port Authority of New York and New Jersey, Newark, NJ: Performed design services and serving as construction phase Project Manager for upgrades and modifications to the control system of an existing aircraft fuel system. Project consists of upgrades to a tank gauging system, modifications to existing pump stations, the addition of truck loading racks, contact water treatment, and a fuel selection area. Construction phase responsibilities include shop drawing reviews, attendance at construction meetings, and review of requests for information (RFIs).

MOTT MACDONALD

Thomas C. Kuhn, PE

Personal summary

Education:

MS, Professional and Technical Communications, New Jersey Institute of Technology, 2006

BSEE, Electrical Engineering, Norwich University, 1991

Registrations:

Professional Engineer NJ #24GE05043200 (Control Systems), 2013

Professional memberships:

Institute of Electrical and Electronic Engineers

International Society of Automation

Mr. Kuhn has extensive experience with electrical and control system engineering projects, with particular expertise in automation and control systems for process control. He has developed project management experience primarily in electrical/controls-related projects, as well as civil engineering construction projects. His experience includes detailed design, programming, integration, and commissioning of many PLC-based control systems, SCADA systems, databases, and control system networks for various water/wastewater, transportation, pipelines, chemical, oil/gas, nuclear power, and renewable energy projects. His controls experience ranges from simple electro-mechanical control systems to complex, networked, state-of-the-art PLC and SCADA control systems. His electrical engineering experience includes electrical motor controls, low-voltage power distribution, and electrical instrumentation design.

Mr. Kuhn's technical design and integration skills include PLC programming (ladder, function blocks, SFC, add-on instructions), SCADA and HMI/OIT programming, computer and server configuration, control system networking design and configuration/commissioning, database design and programming (Access, SQL Server), control system reporting methods (report templates), and virtualization configuration and design.

Mr. Kuhn's electrical engineering and controls experience includes the design and integration of hybrid wind/diesel power systems for village power systems in remote areas of the U.S. and Canada. These projects were completed under grants from federal agencies, such as National Renewable Energy Laboratories and NASA, as well as contracts from clients around the world.

Selected projects

Water Treatment Plant Steam Generation Plant, Hoosier Dome/RCA Dome, Indianapolis Power and Light (IP&L), Indianapolis, IN: Assisted with the design and drafting of logic diagrams, electrical panel mechanical layouts, instrument upgrades and specifications, testing of electrical control panels, PLC and SCADA programming, and site commissioning for the replacement of the existing manual electrical controls of the main condensate water treatment system with an automated SCADA/PLC-based control system. Controls and instrumentation were designed to replace existing mechanical relay controls with computer and PLC controls. Panel was designed to tie into existing wiring and mechanical controls with minimal disruption to plant operation.

Anacostia Pump Station Spill Header Retrofit, District of Columbia Water and Sewer Authority (DC Water), Washington, DC: Provided control and electrical design support for the pump station spill header retrofit. Conducted site visit and investigations to plan control-related changes. Modified existing electrical and control drawings in cooperation with in-house/local office staff to provide a complete retrofit design.

Emergency Backup Power and Water Storage Facilities, Passaic Valley Water Commission (PVWC), Passaic and Essex Counties, NJ: Instrumentation and controls (I&C) design for two new 2.5 MG concrete water storage tanks, and the instrumentation design for emergency power systems at the 120 MGD Little Falls water treatment plant. Designed and developed process and instrumentation diagrams (P&IDs), panel designs, schematics, and construction specifications in coordination with instrumentation engineers and electrical engineers at a partner engineering firm.

Control System and Control Room Renovation, Queens Midtown Tunnel (Project QM-81), Triborough Bridge and Tunnel Authority (TBTA), New York, NY: The project includes upgrading the tunnel's primary and back-up electronic control systems, renovation of the Queens Midtown Tunnel Control Room, improvement of the Queens Service Building support systems, and evaluation and design of fiber optic cable upgrades for the tunnel. Responsibilities include design and construction support services, including design decision documents, design reports, and planning and design of upgrades in accordance with all applicable codes. The project includes the design of secure and redundant networking, supervisory control systems, video monitoring display wall, and integration of all control room systems and components, including traffic control systems, tunnel ventilation, fire alarm, security, administrative reporting, revenue collection, radio, and VoIP phone.

Constructability Review, Cranberry Tube and Rutgers Tube Rehabilitations, Metropolitan Transportation Authority (MTA)/New York City Transit Authority, New York, NY: Assisted

with the constructability review of pre-bid contract specifications and drawings related to the design of instrumentation and controls (I&C) systems as part of the rehabilitation of the subway tunnels, which had been damaged during SuperStorm Sandy.

Hugh L. Carey Tunnel/Brooklyn Battery Tunnel Rehabilitation, TBTA/MTA, New York, NY: The project includes client design support and coordination for the construction phase of the tunnel rehabilitation due to SuperStorm Sandy damage. Services include oversight and review of complex submittals and client design support of communications, controls, voice, security, closed-circuit television (CCTV), and data networking designs.

Lone Star Express Natural Gas Liquid (NGL) Pipeline, Energy Transfer Corporation (ETC) Houston, TX: Instrumentation and Controls (I&C) Team Lead for controls design of two NGL pump stations as part of the pipeline system. Provided detailed Process and Instrumentation Diagrams (P&IDs) coordinated with multiple disciplines, instrumentation selection, instrument lists, I/O list, and instrument data sheet. Prepared and coordinated electrical interconnection to field equipment and instruments.

Hybrid Wind Diesel System, Tanadgusix Corporation (TDX), St. Paul Island, AK: The project was the first commercial integration of a hybrid wind-diesel power system to provide renewable energy to power TDX's airport facility and remove its reliance on the island's diesel power plant. The system consists of a 150kw Vestas wind turbine, two 150kw diesel gensets, a 300VAR synchronous condenser, a 500kw binary load bank, and various distribution and auxiliary equipment. Assisted with the design of the 300VAR synchronous condenser, which included a synchronizing pony motor, electrically-controlled clutch, variable frequency drives (VFD), and synchronizing controller that were controlled by the system's PLC, and a modular 400A bus bar electrical distribution panel system for tying all electrical generation equipment together. Developed all the load calculations for the panel design and the selection of the wind turbine, generators, and load bank power cables and wiring. Specified the installation and burial requirements in accordance with NEC and regional northern building techniques. Designed custom communication interface and controls between PLCs, turbine, and other controllers. Developed automated AutoCAD drawings as new company standards for documentation of electrical distribution and panel designs, and drafted all required schematics, wiring diagrams, and panel drawings for the project. Participated in the programming of the system by developing custom software to communicate with the Vestas wind turbine for control by Northern Power System's PLC. Assisted scientists and senior research engineers at Hydro Quebec Canada who built an experimental binary load bank controller for controlling extra load dissipation in the power system. Commissioned the system on site over several weeks after installation. Responsible for turbine start-up and bringing the system on line and disconnecting the system from the island's power system.

Controls Retrofit, Condensate Water Treatment System, Edwin I. Hatch Nuclear Power Plant, Georgia Power, Baxley, GA: The project involved a detailed controls retrofit for a condensate water treatment system in a boiling water reactor (BWR) nuclear power plant. Project involved a detailed retrofit design plan of older relay-style control panels and the addition of PLC and SCADA controls. Assisted with the design of a fast-acting PID control loop for the resin regeneration blow back system. Performed testing and commissioning of the control system to ensure consistent control response, as well as troubleshooting of retrofitted electrical and pneumatic components to ensure 100% functionality, and programming changes and corrections under strict change control during a highly orchestrated unit refueling outage.

Department of Public Works Building Electrical Renovation, US Army Reserve, Ft. Dix, NJ: Construction Officer for the design of electrical upgrades to an operating commercial facility. Provided overall project management and installation supervision. Responsibilities included selection and identification of electrical material and sizing of components and distribution panels.

Environmental Cleanup (Superfund Site), Former General Motors (GM) Powertrain Facilities, RACER Trust, Massena, Syracuse, and Tonawanda, NY: RACER Trust, the largest environmental trust in US history, was created in the wake of the GM bankruptcy to manage the cleanup and redevelopment of 89 former GM sites. The Massena GM Powertrain facility is a 218-acre Superfund site, which is in active remediation. Provided electrical and instrumentation and controls (I&C) designs for seven groundwater well pumps and pump station. Design factors included long term operation in northern climate. Design included motor controls, power distribution, PLC controls, and remote monitoring.

MOTT MACDONALD

Britt Arcadipane

Personal summary

Education:

BS, Social Studies, Lock Haven University, 2012

MS, Geography, Marshall University, 2014

Mr. Arcadipane's responsibilities include reading and interpreting water pipeline as-built and distribution plans for incorporation into GIS, and performing data updates and asset management tasks for client water system GIS layers. Mr. Arcadipane has experience in geo-database management, Microsoft Excel spreadsheets, and GPS applications, and is proficient with ArcGIS.

Selected projects

Contura – Water System Mapping, Contura Energy, Inc., Greene County, PA: GIS Specialist who assisted client with creation of GIS database and structure. Populated geospatial features and attributes per client request.

City-Wide Project, Pittsburgh Water and Sewer Authority, Pittsburgh, PA: Assists with the breakline clean-up process and calculating pervious/impervious area for sewer shed areas. Works closely with Canonsburg and Morgantown office personnel to complete tasks, as needed.

Miscellaneous Technical Services, West Virginia American Water, Charleston, WV: Serves as GIS Specialist for assimilation of data into the client GIS database. Responsibilities include data gathering, interaction with field operations for asset connection detail clarification, document archiving, and database editing, while maintaining data model connectivity. Provides training and technical support for field crews on the use of GIS software and applications, including ArcGIS Viewer for Flex. Serves as a Field Liaison with various operation centers throughout the state, while working on various projects to update and correct spatial and attribute information on assets. Additional tasks include map production, GPS data collection, and organization of historical records and documents.

DSIC Services 2017, West Virginia American Water, Charleston, WV: Construction Inspector who provided daily inspection report documentation, material use verification, connection detail sketches, and project status updates to client. **AMR/AMI Meter Project, West Virginia American Water, Charleston, WV:** GIS Specialist responsible for using a Garmin unit to track various meter routes and the Trimble Geo 7x Rangefinder unit to track specific meter locations. Coordinated field crews for data collection, including post-processing to provide the client with sub-foot accuracy. Managed meter database for data storage, process, and analysis. Generated and distributed mapbook and spreadsheet deliverables for contractors. **Queen Shoals Water System Improvement Project, West Virginia American Water, Charleston, WV:** Georeferenced, digitized, and helped to join tax parcel information from a master spreadsheet to generate mapbooks for system review. Coordinated data acquisition and processing with surveyor and operations personnel.

Water Drainage Pipeline Project, West Virginia Department of Highways, Huntington, WV: Served as an intern responsible for GPS tracking of pipelines, including inlet and outlet that ran underneath US 119 (Corridor G) to be incorporated in the GIS database.

MOTT MACDONALD

David M. Mason, PE

Personal summary

Education:

BS, Electrical Engineering, Geneva College, 2002

Mott MacDonald Horizons Training Program Graduate, 2016

Registrations:

Professional Engineer

PA, PE076493, 2009

Professional memberships:

Institute of Electrical and Electronics Engineers

Mott MacDonald Young Professionals, 2013

Committee Member and Co-Chair – Welcoming committee, 2013

Mott MacDonald EICA Standards Committee Member, 2013 – Present; Task Group Leader: Low-Voltage Electrical Systems, 2014 – 2015

Mott MacDonald NASA EICA Steering Committee Member, 2017 – Present; Committee Chair – Company Electrical Safety Initiative, 2017 – Present

Presentations:

Mott MacDonald Electrical Standards and Procedures, April 2016 (Internal Mott MacDonald Training Session)

Electrical Maintenance; January 2017 (Internal Mott MacDonald Training Session)

Presenter – Site Utility Safety (Internal Mott MacDonald Safety Training Course – Pre-Recorded)

Mr. Mason is an Electrical Engineer with experience in engineering production with proven success in client development. His experience includes medium and low voltage power distribution, load flows, building and area lighting, control systems, SCADA, generators and utility paralleling, demand control, power factor correction, power transition systems, instrumentation systems, and electrical inspection. Some of his software experience includes Power Tools for Windows by SKM Systems Analysis, Inc. and AutoCAD.

Mr. Mason is a member of the Mott MacDonald Electrical / Instrumentation Controls and Automation (EICA) Design Standards Committee. As part of this committee, he has served as Task Group Leader for the low-voltage electrical sub-committee, responsible for the preparation and maintenance of low-voltage electrical systems design specifications, details, symbology, and notation.

Selected projects

Sludge De-Watering Facility Upgrades, Franklin Township Municipal Authority, Pittsburgh, PA: Senior Electrical Project Engineer responsible for providing engineering design services for the removal of sludge de-watering process equipment and installation of a new de-watering process and material delivery system. Work scope includes removal of two existing presses and associated electrical infrastructure (controls cabinets, starters, etc.) and design and implementation of both temporary sludge de-watering equipment, as well as new permanent process equipment, including SCADA system interfaces, power, and controls system design.

Radio / Microwave Tower Sites and South Hills Village Parking Garage Power Systems, Port Authority of Allegheny County (PAAC), Allegheny County, PA: Senior Electrical Project Engineer responsible for providing engineering design, bid period support, and construction period services for the implementation of new Mission Critical electrical distribution system infrastructure, including Uninterruptible Power Supplies (UPS) at six existing Microwave Tower support facility sites, standby diesel generators at an existing Microwave Tower and an existing Parking Garage, and traction power substation battery replacement at five total locations along PAAC's Stage II system expansion route. Work scope includes installation of new standby diesel generators paralleled with the main utility service for full power system backup, distribution system modifications to separate critical and non-critical loads, new UPS units with wrap-around maintenance bypass switches for critical load backup, new Automatic Transfer Switches, new surge protection devices at multiple levels of the distribution systems, new environmental control equipment, and a roll-up generator tap box at the Parking Garage facility. Substation battery replacement is a one-for-one replacement of wet cell batteries with new wet cell batteries with increased electrical capacity.

Mt. Lebanon Tunnel Ventilation System Upgrades, PAAC, Allegheny County, PA: Senior Electrical Project Engineer responsible for providing both conceptual and final engineering design services for the replacement of four existing 100HP tunnel smoke control fans with new 100HP tunnel smoke control fans paired with new VFDs. Work scope includes replacement of two line-ups of existing tunnel facility main-tie-main switchgear, the replacement of four across-the-line fan motor drives with VFD based fan control panels with bypass contactors for redundancy, replacement of four 100HP fan motors with inverter duty rated motors, modifications to the existing tunnel ventilation damper control systems and equipment, and new electrical infrastructure to support new mechanical, instrumentation, control/automation, and telecommunications equipment.

Stow Road Meter Vault, City of Akron, OH: Senior Electrical Project Engineer responsible for providing design and construction period services for the construction of a new remote metering vault along Stow Road in Akron, OH. Work includes installation of a new electrical utility service, a free-standing system control panel enclosure with an integral HVAC unit for protection of the new branch circuit power distribution equipment, radio-based SCADA system, surge protection device, and instrumentation/controls panel. Construction period services include review of submittals and on-site equipment installation observation and start-up.

Multiple Site – CCTV System Expansion, PAAC, Allegheny County, PA: Senior Electrical Project Engineer responsible for providing final engineering design services for the installation of new cameras at approximately 35 different locations throughout PAAC's current light rail transit and busway system. Work includes replacement of existing analog cameras with new

digital cameras at approximately half of these locations – reusing/modifying the existing power supplies to utilize new Power Over Ethernet (PoE) switches, installation of new cameras at the remainder of the sites along with all new power distribution infrastructure, and upgrades to the existing "head-end" facility, including expansion of data storage systems infrastructure, installation of additional workstations, and modification of the existing video wall at this location.

Aspinwall Water Treatment Plan Capital Improvement Plan Review, Pittsburgh Water and Sewer Authority (PWSA), Pittsburgh, PA: Senior Electrical Project Engineer responsible for providing Owner's representative services for electrical capital improvements at PWSA's Aspinwall Water Treatment Plant. Work included review of PWSA's Consultant's condition assessment report and capital improvement plans, participating in work sessions on behalf of PWSA to review and discuss the results/recommendations of the report and the considerations of the improvement plans as they correspond to maintenance and enhancement of ongoing plant operations and overall effect on other sites and processes served from the infrastructure.

New Highland Pump Station Emergency Services, PWSA, Pittsburgh, PA: Senior Electrical Project Engineer responsible for providing electrical design at PWSA's New Highland Pump Station. Work included preparation of electrical design plans for implementation of a temporary pump station located immediately adjacent to the existing pump station due to an equipment malfunction within the existing pump station facility, coordination of these work efforts with the local utility provider and construction observation and support.

New Highland Rising Main Project, PWSA, Pittsburgh, PA: Senior Electrical Project Engineer responsible for providing conceptual electrical engineering design services for a new pump station facility within PWSA's service area intended to tie Highland Reservoir #1 and Highland Reservoir #2 together as well as providing additional pumping capacity to the remainder of the system of approximately 50MGD. Work includes oversight of a conceptual Revit electrical design for the new pump station facility, preliminary equipment sizing, selection and conceptual design of major infrastructure and equipment, coordination with the local utility provider, and documentation of recommendations and system enhancements, and preparation of conceptual opinion of probable construction costs.

Multi-Site Grinder Pump Installation Project, Neshannock Township Sewer Department, Lawrence County, PA: Senior Electrical Project Engineer responsible for providing engineering design for the installation of approximately 75 grinder pumps throughout existing and new residential developments. Work scope includes preparation of design details to allow for the installation of a pre-fabricated grinder pump system in numerous residential conditions.

Pump Stations Upgrades, Neshannock Township Sewer Department, Lawrence County, PA: Senior Electrical Project Engineer responsible for providing engineering design and construction period services for the renovation of three wastewater pump stations for Neshannock's Sewer Department. Work scope includes replacement of existing interior standby diesel generators with new outdoor standby diesel generators in sound attenuated enclosures, installation of permanent variable load banks to mitigate wet stacking issues, complete replacement of the site power distribution system, including electrical service upgrades, design of new I&C and cellular based SCADA system, and duplex/triplex pump control panels utilizing VFD's to improve system efficiency and overall system flow capacity.

New Garage and Office Building, The Municipal Sewer Authority of New Kensington, Pittsburgh, PA: Senior Electrical Project Engineer responsible for providing electrical oversight and QA/QC of the project design and construction period services, including submittal review, preparation of responses to RFI's, and select field observation activity for the construction of new garage and office buildings at the main treatment facility.

Electrical Service Upgrade Project, Yeager Airport, Kanawha County, WV: Electrical Project Engineer responsible for providing electrical design and peer review for the upgrade/replacement of the main electrical service for the existing landside electrical distribution system and the new airside electrical distribution system that were installed at the main facility at Yeager Airport. Provided continuity plans and reviewed the constructability of the project with the design team in an effort to reduce/minimize outages required to perform the work in accordance with the Airport Authority's limited outage schedules. Provided additional electrical design services to evaluate and extend the existing site emergency power distribution system to multiple gate locations, including preparation of load-shed I&C solutions to prohibit the additional loads from overloading these generator backed systems. Provided construction period services, including submittal review, preparation of responses to RFI's, and assistance in preparation of FAA Grant request documentation.

MOTT MACDONALD

Igor Bondar, PE, LEED® AP

Personal summary

Education:

BS, Electrical Engineering, Engineering College Kharkov, Ukraine, 1982

Registrations:

Professional Engineer

NJ #24GE05050300, 2013
NY #088199-1, 2010
CT #PEN.0032240, 2017
PA #PE083506, 2015
TX #126102, 2017
DC #PE909069, 2017
WV #021027, 2014

NCEES National Council of Examiners for Eng & Surv #49699, 2012

LEED® Accredited Professional, 2009

LEED® Accredited Professional BD+C #10439111-AP-BD+C, 2010

NCQLP Lighting Certified, 2011

OSHA Confined Space Entry, 2008

Years with Mott MacDonald:

11

Years with other firms:

25

Mr. Bondar has significant experience in electrical design and construction inspection for governmental, commercial, industrial, institutional, transportation, and residential projects. His background includes new design and major upgrades to power, medium and low voltage distribution systems, grounding, lightning protection, security, lighting, fire alarm systems, and emergency power. He has been responsible for evaluation and analysis of different systems, load studies, power and lighting calculations, power coordination, cost estimates, power and control wiring diagrams, riser diagrams, surveys and quality control. He has provided design for power and telephone services for various cellular phone carriers in the New York City area.

Mr. Bondar has participated in the design of various project types including offices, hotels, hospitals, museums, restaurants, telecommunication facilities, educational facilities, military installations, aircraft hangars and maintenance shops, vehicle maintenance facilities, fueling facilities, and parkway and street lighting projects.

Selected projects

NYS Office of Alcohol and Substance Abuse Services, Starhill Treatment Facility, Dormitory Authority State of New York, Bronx, NY: Technical Reviewer responsible for performing a feasibility study and a conditions assessment including cost estimates for all of the building's electrical systems repairs and upgrades including power, lighting, emergency lighting, emergency generator, communications, and signal systems.

Conditions Assessment, Villa Maria Academy Convent, Pelham Bay, NY: Project Engineer for the preparation of a Maintenance Master Plan Study of the existing conditions and recommendations for the replacement of the building's electrical and fire life safety systems.

Upgrade Electrical System, Edgecombe Residential Treatment Facility, NYS Office of General Services & NYS Dept. of Corrections and Community Supervisions, New York, NY: Project Manager/Engineer for the upgrade and replacement of the existing electrical system that had outlived its normal life expectancy. An analysis of the existing electrical distribution panel, branch panels serving floors and feeders between distribution panels and branch panels serving the Edgecombe Facility was provided along with recommendations for repair and/or replacement systems.

Facilities Conditions Assessment, Ramapo College of New Jersey, Mahwah, NJ: Project Engineer responsible for performing a conditions assessment survey of forty-three campus buildings totaling 957,534 square feet. Visually inspected for adequacy and conformance with codes the following electrical items: existing panels, power and lighting systems, emergency lighting for places of assembly, communication and signal systems, electrical systems associated with other building systems (i.e. HVAC equipment, vertical transportation equipment, plumbing systems, fire protection systems, etc.), all power panels, splices, and electrical connections to equipment.

Building 43 Plaza Renovations at State University of New York at Purchase College, Purchase, NY: Technical Reviewer for the evaluation and design of electrical systems incurred with the plaza renovations. An analysis of the electrical systems was performed including the switchgear room and elements, power distribution, lighting systems, fire alarm systems, telephone and data communications, and mechanical equipment controls.

Electrical Upgrades, Institutional Real Estate, Columbia University, New York, NY: Project Engineer for the performance of a systems evaluation and designs to upgrade the existing electrical power distribution to improve energy efficiency and achieve energy savings.

MTA-TBTA BB-28 Brooklyn Battery Tunnel Rehabilitation and Flood Mitigation, Triborough Bridge and Tunnel Authority, New York, NY: Provided supervision for the preparation of electrical design documents for the rehabilitation of the Brooklyn Battery Tunnel due to damage caused by Superstorm Sandy. The project included the design, layout, and routing of electrical equipment throughout the tunnel, the design of the Fire Alarm/Mass Notification System in the exhaust and fresh air ducts of both tunnel tubes. Also provided coordination of power distribution and cable routing for all disciplines regarding pumps, controls, communications, and lighting systems.

Miscellaneous Assignments, Various Adult Homeless Shelters for the NYC Department of Homeless Services, New York City, NY: Project Engineer for several renovation projects for DHS Adult Homeless Shelters throughout New York City. Work included providing building

code compliance, design, and construction phase services to renovate several Adult Homeless Shelters throughout New York City. Sample projects included: Steam Leak Repairs, Fort Washington Armory; Sewer Line Replacement, Veterans Single Room Occupancy; Office of Temporary & Disability Assistance Violations – Pamoja House, Renovation Assessment of the Park Slope YMCA; and Front Center Intake Office – Air Conditioning & Ventilation Systems, Bedford Avenue Armory.

NAVFAC Pier Complex Replacement, US Navy at Naval Weapons Station Earle, Colts Neck, NJ: As Technical Reviewer, provided review of electrical design and construction documents for the construction of four new buildings as well as renovation to the existing buildings on Pier 3A. The buildings included Ordnance Handling and Storage Facilities, Ready-for-Issue Weapons Vault, administrative areas, bunkers, guard tower, training and support areas, infrastructure systems, force protection measures, seismic upgrades, and architectural elements.

Miscellaneous Assignments, Various Family Homeless Shelters for the NYC Department of Homeless Services, New York City, NY: Project Engineer for several renovation projects for DHS Family Shelters throughout New York City. Sample projects included: Fire Alarm System, Catherine Street; Bathroom Exhaust System, Catherine Street; Electrical Systems & Service, Catherine Street; Office of Temporary & Disability Assistance Violations – Regent House; and Fire and Life Safety Systems; Auburn Family Residence.

Electrical Upgrade, NYC Dept. of Homeless Services (NYCDHS), Regent Family Residence, New York, NY: Project Manager provided an assessment of the existing electrical conditions and design replacement systems to upgrade the life safety issues and correct the code violations facing the Residence. Work included replacement of existing panels; power and lighting systems; emergency lighting; communication and signal systems; electrical systems associated with other building systems and all power panels, splices, and electrical connections to major equipment.

Electrical Systems Facility Condition Assessment for NYCDHS, Fort Washington Armory, New York, NY: Project Engineer & Technical Reviewer - provided an assessment of the existing electrical conditions including power, lighting, emergency lighting, communications systems, and associated electrical systems for HVAC, vertical transportation, fire protection, etc., of a 1,400-bed men's homeless shelter. Prepared a summary report and made recommendations as to what repairs and renovations would be necessary to make the historic building, a former New York Army National Guard Armory, suitable for the City's future needs and to extend the buildings' useful life in order to ensure adequate return on investments.

PAANG TFI-cNAF Beddown AFFOR with SCIF Requirements, Pennsylvania Air National Guard at Horsham Air Guard Station, Willow Grove, PA: Project Engineer for the electrical design to completely renovate Buildings 345 and 346 (32,000 SF) for the Component Numbered Air Force (cNAF) Warfighting Headquarters mission including Air Force Forces (AFFOR) with Specialized Compartmental Information Facility (SCIF) requirements. Work involved the upgrade of service transformer, new incoming service cabling, new main and secondary distribution panelboards, exterior and internal lighting (normal and emergency), data / telephone outlets, and receptacles to accommodate the proposed layout. New Fire Alarm, Public Address, and Mass Notification systems were also provided.

Administration Building Rehabilitation, Passaic Valley Sewerage Commission Administration, City of Newark, Newark, NJ: Project Engineer for the electrical design associated with the complete renovation and modernization of the Administration building serving the executives and employees of the Passaic Valley Sewerage Commission.

12th Floor Computer Room Relocation, NYC Department of Homeless Services (NYCDHS), New York City, NY: Project Engineer for providing electrical design services in conjunction to the relocation of the 12th floor computer room serving the NYCDHS headquarters. The existing room where the servers and telephone equipment was inadequate to serve as a computer room and was experiencing problems maintaining proper temperature and humidity levels. Work included design of new electrical power including transformer, power panels, emergency shut off and distribution wiring.

MOTT MACDONALD

Brandon Hodges

Personal summary

Education:

Business Courses, Parkersburg Jackson Community College, 1995

Business Courses, Marshall University, 1994

Certifications:

ACI certified Field Testing Technician, Grade I

WVDOT Certified Portland Cement Concrete Inspector

WVDOT Certified Aggregate Sampling Inspector

WVDOT Certified Compaction Inspector

Heartsaver First Aid CPR AED Certification

WV Notary Public

Class 1D Water Operator

OSHA 10 Hour Occupational Safety and Health Certification

Mr. Hodges has 20 years of experience in the engineering and construction industries. He has gained experience in both the design and construction phases of utility, site, and building projects. Through a variety of projects and responsibilities, Mr. Hodges has continued an upward rise in the engineering field. Specializing in the utilities industry, he can perform a multitude of tasks in project management, from design and layout, to inspection and quality control testing. He has served as Resident Project Representative on many multi-million dollar projects, and has experience with client interface, site analysis, contracts, plan and code review, and all functions relative to construction administration from groundbreaking through project completion. With Mott MacDonald, he continues to fulfill multiple tasks and assignments for varying client needs, both in the field and in the office.

Selected projects

Chesterfield Avenue Reinforcement / Rich Fork Road Reinforcement, West Virginia American Water, Charleston, WV: Technician selected by client to provide Project Management for the construction phase of two large reinforcement projects. Provided support to Mott MacDonald Resident Project Representatives, and worked with owner, WVDOH, and other utility companies to facilitate any field changes on projects. Reconciled and catalogued daily and weekly reports, and reviewed and approved change orders and pay applications.

Huntington Booster Station Replacements, West Virginia American Water, Huntington, WV: Technician responsible for assisting WVAW distribution team on their booster station program. Responsible for researching and acquiring new sites, rights of way, and any required permits. Performed survey work, as needed. Served as a liaison between property owners and WVAW in negotiations for compensation. Also involved with acquiring and supporting any geotechnical work that is required.

WVDOH Relocations, West Virginia American Water, Multiple Locations, WV: Technician responsible for assisting WVAW Engineering team on all projects involving potential relocations due to WVDOH planned projects, including bridges, storm sewers, and road widenings. Performed utility verifications, researched existing rights of way, designed relocation plans, acquired permits and new rights of way, and provided material take-offs, bid tabs and construction estimates to the owner.

Stormwater Pollution Prevention Plan (SWPPP), City of Charleston, Charleston, WV: Technician responsible for working with city employees to evaluate their respective site for potential stormwater contaminants, reports to team leaders, and assists in writing the SWPPP document. The team was selected to assist the City of Charleston in site evaluations and mapping of 24 city-owned facilities as part of developing SWPPPs for each site.

Various Projects, West Virginia American Water, Charleston, WV: Project Technician responsible for performing a variety of technical services for WVAW Engineering Department upon their request. Services include project design, estimation and layout, boundary and as-built surveys (both conventional and GPS), courthouse research, and right-of-way and easement acquisition. Mr. Hodges also prepares and submits multiple permit applications for WVAW, including West Virginia Department of Highways, United States Army Corps of Engineering, and West Virginia Office of Land & Streams. The client also requested him to serve as a Resident Project Representative on a water line relocation project needing an experienced ambassador due to sensitivity of affected customers.

Sanitary Sewer Upgrade, Town of Delbarton, Delbarton, WV: Lead Inspector on a much needed $5M sewer system upgrade project, replacing 50+ year old mains and reducing infiltration. The project involved over 25,000 feet of new piping, much of it deep and installed in the roadway. Responsible for overseeing all work, including sheeting and shoring, dewatering operations, pipe installation and backfill, resurfacing, and reclamation. Project involved grinder pump stations, HDPE force main, and required bypass pumping to ensure continuous operation of the system. Project also included CIPP slip-lining, which inserts, inflates, and cures a new liner within the existing pipe through existing manholes, eliminating the need to trench and backfill. Documented work progress and approved change orders and construction estimates. Project required the ability to quickly make field adjustments, avoiding contractor shut downs due to incomplete or incorrect plan information.

MOTT MACDONALD

Emma Philpott

Personal summary

Education:

BSc (Hons), Oceanography and Chemistry, University of Liverpool, 1998

Registrations:

Certificate in International Business Practice, University of Cambridge, 2001

Cisco Certified (CCENT), 2014

PRINCE 2 Practitioner, 2006

ITIL Service Management Version 3 certified, 2008

ITIL Service Design Module, 2009

ITIL Service Operation Certified, 2009

Ms. Philpott is a highly capable technical consultant with a successful background in delivering complex telecoms and IT programs, procurement, and consultancy services for major telecommunications operators and within the Emergency Services, oil and utility sectors, both in the UK and worldwide.

Her technology, infrastructure, and project management experience spans mobile telephony (3G/4G), broadband wireless (Wi-Fi and WiMAX), PMR, and IT environments. She has been involved in many aspects of project lifecycle from business strategy, business case development, procurement and technical network evaluation and mobile infrastructure deployments, including spending 18 months in Antarctica commissioning the communications and IT infrastructure at Halley VI research station.

Selected projects

SES Forth Crossing Bridge: Provided technical procurement support on a two-way radio to allow operational communications to be installed on the Forth Replacement Crossing bridge. Work included reviewing the technical tender submissions including value engineer radio designs and evaluating these again the requirements, developing technical questions, highlighting the strengths risk of each solution and identifying the preferred bidders

Welsh Government Infill Phase 2: Project manager developing a feasibility study for the Welsh Government to deliver superfast broadband to around 4% of premises across Wales who would cannot receive these services following completion of the Superfast Cymru project and Infill Phase 1 project. Work included development of various options to support delivery including fixed wireless, 4G/LTE and satellite, community digs and expansion of Superfast Cymru using the investment fund within the contract. The study investigated how the investment fund would operate and if supplementary funds could be injected into the fund in advance, if any of the approaches would constitutes State Aid, whether 4G and satellite were valid State Aid compliant NGA solutions and defining a procurement brief for fixed wireless, 4G/LTE and satellite procurement activity.

Welsh Government Infill Phase 1: Working with the Welsh Government investigating options for delivery of superfast broadband to premises classified as NGA white areas to ensure maximum economic benefits are delivered to the intervention area. Work included development of a business case using HM Treasury Green Book guidance and a procurement strategy aligned with the Office of Government Commerce (OGC) Gateway TM Review 2 Delivery Strategy Workbook. The procurement strategy highlighted the procurement route suitable for delivery of superfast broadband within the timescales but also ensured the maximum competition within the market was feasible by splitting the procurement into various Lots while also balancing the risk/rewards of BDUK State Aid. Other work included a technology review of suitable options for delivery of superfast broadband including fixed wireless, 4G/LTE, Fibre-to-the-cabinet (FTTC) and Fibre-to-the-Remote-Node (FFtRN) as well as conducting a supplier consultation to engage with companies who had experience of undertaking such deployments to urban and rural areas.

South of Scotland Alliance (SoSA) - Dumfries & Galloway Council and Scottish Borders Council: Developed a Full Business Case (FBC) for the Wide Area Network (WAN) telecoms services re-procurement (SWAN Vanguard) for Pathfinder South (being Dumfries and Galloway Council (DGC) and Scottish Border Council (SBC)). The FBC met the HM Treasury guidance and Office of Government Commerce (OGC) Gateway Review 3 'Investment Decision' assessment and included a recommendation for formal approval of the proposed contract for the continuation of Wide Area Network (WAN) telecoms services and participation in the Scottish Wide Area Network (SWAN) programme. Work included developing a full economic case to ensure the commercial offering represented Value for Money (VfM) as well as confirming the NGB access technologies and telecoms products offered met the technical performance requirements and the migration plan agreed with a project management regime for both Councils.

North Ayrshire Council: Project manager assisting North Ayrshire Council with the procurement of a replacement IT system to help the Buildings Services division manage responsive repairs and maintenance of Council owned properties. Project included developing a Business Case for the justification for the IT investment as well as conducted various requirement workshops to help capture the requirements for the IT system across various departments within the Council. Project also included creating a detailed Functional

MOTT MACDONALD

John L. Green, PS

Personal summary

Education:

Civil Engineering (2 years), West Virginia Institute of Technology, 1975-1976

Registration:

Professional Surveyor

WV #901, 1991

Memberships:

West Virginia Society of Professional Surveyors

National Society of Professional Surveyors

CGIS/LIS Association

West Virginia Association of Geospatial Professionals

Mr. Green is a Registered Professional Surveyor with over 30 years of experience in the engineering industry in surveying or survey related capacities and as an engineering design technician. He is expertly qualified in most conventional types of surveying and is also experienced in GPS surveying techniques. His specific project experience is primarily in transportation, site design and environmental infrastructure such as water and sewer system projects.

Selected projects

Winona Abandoned Mine Lands (AML) Project, West Virginia Department of Environmental Protection (WVDEP), Fayette County, WV: Senior Designer responsible for all survey activities required to stake out the design and construction baseline and collect design cross section data for this project. Duties also included plotting of survey data, plan preparation, grading design, and dissemination of data to the design team.

Trasher AML Project, WVDEP, Gilmer County, WV: Senior Designer responsible for all survey activities required to stakeout the design and construction baseline and collect design cross section data for this project. Duties also included plotting of survey data and dissemination to the design team.

Barker Portals and Strip AML Project, WVDEP, Barbour County, WV: Senior Designer responsible for all survey activities required to stake out the design and construction baseline and collect design cross section data for this project. Duties also included plotting of survey data and dissemination to the design team.

Marmet Bridge Monitoring Survey, HNTB/West Virginia Parkways Authority, Kanawha County, WV: Senior Designer responsible for high accuracy conventional survey services for I-64/I-77 bridge settlement monitoring project. Responsible for all survey activities required to establish high-stability conventional survey control and the installation of thirteen high accuracy survey targets on four separate bridges, including abutments, piers, and concrete slope monitoring monuments. High accuracy conventional surveys of the targets were repeated periodically for over a year to monitor the structures for movement in any direction. Duties also included reduction of survey data, preparation of a site plan, and survey data report submitted to the design team in the HNTB Scott Depot office after each monitoring survey visit.

Mile 24 Drainage Structure Survey, HNTB/West Virginia Parkways Authority, Mercer County, WV: Senior Designer responsible for mapping for analysis and design of drainage structure for I-77. Also responsible for all survey activities required for site mapping, including topography, existing structures, controlled access right of way locations, and ties to established Turnpike geometric control. Duties also included plotting of survey data, site plan preparation, and dissemination of data to the design team in the HNTB Scott Depot office.

Ghent Maintenance Facility Survey, HNTB/West Virginia Parkways Authority, Mercer County, WV: Senior Designer responsible for mapping for design of maintenance facility improvements. Responsible for all survey activities required for site mapping, including topography, existing structures, utilities, and controlled access right of way locations. Duties also included plotting of survey data, site plan preparation, and dissemination of data to the design team in the HNTB Scott Depot office.

Beckley South Acquisition/Disposition Survey, HNTB/West Virginia Parkways Authority, Raleigh County, WV: Senior Designer responsible for property acquisition and property disposition at the WVPA Beckley South Maintenance facility. Responsible for all survey activities required for boundary surveys, including research, field surveys, and plat and legal description preparation. Duties also included coordination with the WV Parkways Authority's attorney and adjoining property owners to facilitate the project.

Sharon Retaining Wall Survey, HNTB/West Virginia Parkways Authority, Kanawha County, WV: Senior Designer responsible for mapping for analysis and design of a slide remediation project. Responsible for all surveys activities required for site mapping, including topography, existing structures, controlled access right of way locations, and ties to established Turnpike geometric control. Duties also included plotting of survey data, site plan preparation, and dissemination of data to the design team in the HNTB Scott Depot office.

Multiple Projects, West Virginia Turnpike, WV: Senior Designer responsible for all survey operations for all West Virginia Turnpike projects since 1996, including engineering design and boundary surveys.

MOTT MACDONALD

Paula D. White

Personal summary

Education:

AS, Drafting and Design, West Virginia Institute of Technology, 1994

Professional memberships:

ADDA – American Drafting and Design Association

Public Notary for state of West Virginia

Mrs. White has 21 years of experience working on various types of plan sets that include but are not limited to transportation/bridge, right-of-way, environmental assessment, site development, water/sewer, and oil/gas. She is proficient in AutoCAD Civil 3d, MicroStation and ArcMap.

Selected projects

Utilities

Arbuckle Creek Stream Crossing at Summerlee Road, WVAW and West Virginia Department of Transportation Division of Highways (WVDOH), Oak Hill, Fayette County, WV: CAD Technician responsible for drafting technical support of WVDOH, WVDNT, and USACE permit drawings for water system relocation.

Grassy Branch Road, WVAW and WVDOH, Bluefield, Mercer County, WV: CAD Technician responsible for drafting technical support of WVDOH permit drawings for water system relocation.

Pentacre Water Main Extension, WVAW and WVDOH, Elkview, Kanawha County, WV: CAD Technician responsible for drafting technical support of WVDOH permit drawings for water system relocation.

Antioch Baptist Church Bridge, Salt Rock Water Public Service District and WVDOH, Ona, Cabell County, WV: CAD Technician responsible for drafting technical support of WVDOH permit drawings for water system relocation.

Bechtel Summit Jamboree Site, Trinity Works and Boy Scouts of America, Fayette County, WV: CAD Technician provided technical support for field location of existing features, drafting and CADD operations, and plan preparation.

Diana Waterline Extension, WVAW, Diana, WV: CAD Technician provided technical support for field location of existing features, drafting and CADD operations, and plan preparation.

Putnam County 2009 IJDC Application, Putnam County Commission, Putnam County, WV: CAD Technician provided technical support for field location of existing features, drafting and CADD operations, and plan preparation.

Fayette County Meter Replacement, WVAW, Fayette County, WV: CAD Technician provided technical support for field location of existing features, drafting and CADD operations, and plan preparation.

Upgrading System Mapping to AutoCAD, WVAW, WV: CAD Technician provided technical support for field location of existing features, drafting and CADD operations, and plan preparation.

Oil and Gas

Pennington South, Antero Resources, Doddridge County, WV: CAD Technician responsible for plan preparation, drafting, and CADD operations for drill pads, access roads, and impoundments.

Chestnut, Antero Resources, Doddridge County, WV: CAD Technician responsible for plan preparation, drafting, and CADD operations for drill pads, access roads, and impoundments.

Hamilton, Antero Resources, Doddridge County, WV: CAD Technician responsible for plan preparation, drafting, and CADD operations for drill pads, access roads, and impoundments.

Transportation

City Beer Bridge, WVDOT, Wood County, WV: CAD Technician for technical support for roadway and bridge relocation, upgrading, and development projects. Responsibilities included plan preparation, drafting, and CADD operations.

Middle Fork Bridge Value Engineering, Bilco Construction, Middle Fork, WV: CAD Technician for technical support for roadway and bridge relocation, upgrading, and development projects. Responsibilities included plan preparation, drafting, and CADD operations.

South Roselawn Street Bridge Redesign, Jim Construction, WV: CAD Technician for technical support for roadway and bridge relocation, upgrading, and development projects. Responsibilities included plan preparation, drafting, and CADD operations.

Sleeth's Run Bridge, WVDOT, Lewis County, WV: CAD Technician for technical support for roadway and bridge relocation, upgrading, and development projects. Responsibilities included plan preparation, drafting and CADD operations, and property descriptions.

New Roadway and Bridge, International Coal Group, Beckley, WV: CAD Technician for technical support for roadway and bridge relocation, upgrading, and development projects. Responsibilities included plan preparation, drafting and CADD operations, and property descriptions.

Site Development

Wehrle Residence, Bernie Wehrle, Charleston, WV: CAD Technician provided technical support for plan preparation, drafting, and CADD operations.

Archer Western BCT Complex Design, Fort Bragg, NC: CAD Technician provided technical support for plan preparation, drafting and CADD operations, and property descriptions.

Fairmont 911 Emergency Call Center, Fairmont, WV: CAD Technician provided technical support for plan preparation, drafting and CADD operations, and property descriptions.

WVANG Test Cell Paving and Site Improvements, Charleston, WV: CAD Technician provided technical support for plan preparation, drafting and CADD operations, and property descriptions.

Abandoned Mine Lands Reclamation

Garden Ground Highwall, West Virginia Department of Environmental Protection, Fayette County, WV: CAD Technician provided technical support for plan preparation, drafting, and CADD operations.

Drew's Creek "A" Highwall Abandoned Mine Land Reclamation, West Virginia Department of Environmental Protection, Naoma, WV: CAD Technician provided technical support for plan preparation, drafting and CADD operations.

Landfills

Tucker County Landfill, Tucker County Solid Waste Authority, Tucker County, WV: CAD Technician provided technical support for plan preparation, drafting, and CADD operations.

Right-of-Way

Bluestone Bridge, WVDOT, Mercer County, WV: Lead Designer responsible for plan preparation, drafting and CADD operations, and property descriptions.

Environmental Assessment

New River Parkway Resource Maps, WVDOH, Raleigh/Summers Counties, WV: CAD Technician provided technical support for plan preparation, drafting and CADD operations, deed research, and property descriptions.

DAS Advisers

John Golden

Mr. Golden has more than 20 years of experience helping businesses, local governments, and communities solve their connectivity challenges. John's expertise includes helping clients identify and articulate their needs for more robust connectivity in support of enhanced operations, revenue-generation, guest services, or community development. He assists private and public clients match those needs to the right technologies, infrastructure, and funding opportunities within the market. Notable Wi-Fi and Distributed Antenna Systems projects include the Columbus International Airport, Georgia State University, United Regional Hospital, and the University of Nebraska Medical Center.

DAS Advisers

John W. Campbell

Mr. Campbell has more than 20 years of experience helping clients expand cellular and data services in major facilities through Distributed Antenna Systems (DAS) and Wi-Fi systems. John also has extensive experience in negotiating contract terms with Wireless Service Providers, Integrators and Third-Party Operators as a part of deploying and operating those systems. He also has helps clients identify and evaluate the best funding models for deployment and budgeting for long-term operations and maintenance.

DAS Advisers

Ellen Walker

Ms. Walker has provided technical writing and project documentation services since 2001. Her expertise involves drafting and editing clear reports, effective Requests for Proposals and related project documents. Her experience includes both commercial and governmental projects for a wide range of companies and agencies. In addition to her work with DAS Advisers, Ellen's notable projects includes the New York State Office of General Services Design and Construction Group.

B. Craig Miller, PE

Craig founded Miller Engineering in 2003, and serves as President and Principal Engineer. He has more than 20 years experience in design, specification, operations and project management. During his employment with WVU, Craig was directly involved with approximately $130 million in new capital construction. His experience with a wide range of projects including HVAC, electrical, plumbing, infrastructure upgrades, building automation, energy efficiency and maintenance/renovation, among others, allows him to serve in multiple capacities within a given project. Craig will serve as the "Relationship Manager" for Miller Engineering as the main communication interface between the Owner, the design team, contractors and end users.

Project Role: Relationship Manager – Primary Point of Contact

- *Engineer in Responsible Charge*
- *Design and Project Management of Mechanical, Electrical, Plumbing Projects*
- *Concept and Construction Design*
- *Business Operations and Financial Management Oversight*
- *Quality Assurance and Control*

Professional Project Highlights

- Bobtown Elementary HVAC
- Blackwater Falls State Park Lodge (Dining Room, 2nd Fl, Spa, Boiler)
- Hawks Nest/Twin Falls HVAC
- Mapletown High School HVAC Replacement Phase I & II
- McKeever Lodge HVAC Piping
- Holly River State Park Primary Electric Service Replacements Phase I & II
- Beech Fork State Park – MEP New Construction Design
- Cheat Lake Elementary & Middle School Renovations
- Cacapon Old Inn

Professional History

2003- Present	Miller Engineering, Inc.	President, Relationship Manager
2002-2003	Casto Technical Services	Existing Building Services Staff Engineer
2001-2002	Uniontown Hospital	Supervisor of Engineering
1995-2001	West Virginia University	Staff Engineer
1990-1995	BOPARC	Caretaker – Krepps Park
1983-1988	University of Charleston	Electrician/HVAC Mechanic

Education

1995	West Virginia University	BS- Mechanical Engineering
1988	University of Charleston	BA- Mass Communications

Licenses and Certifications

- Professional Engineer (West Virginia, Pennsylvania, Maryland, and Ohio)
- Licensed Master Plumber
- LEED-AP Certified

Travis Taylor, PE

Experience in project management facilitates Travis's ability to create and design constructible projects. Prior to joining the Miller Engineering team he was directly responsible for managing $10 million in electrical construction budgets. His experiences encompass both new construction and renovation. Travis maintains professional competencies by attending seminars and continuing education classes. As lead engineer he provides HVAC, mechanical, plumbing and electrical design solutions and services for our clients. In addition, he is part of our team's complete assessment process in both planning and MEP design through construction administration.

Project Role: Lead MEP Engineer

- *Design of Mechanical, Electrical, and Plumbing Systems*
- *Building Information Modeling - Revit*
- *Constructible Materials Evaluation*
- *Site Evaluation and Mechanical System Review*
- *Submittal and RFP Review*
- *RFI Coordination, Review, and Response*
- *Construction Observation*

Professional Project Highlights

- Suncrest Middle Gym HVAC
- Holly River State Park Primary Electric Service Replacements Phase I & II
- MHS Area 4 HVAC
- McKeever Lodge Fire Alarm
- Pipestem Lodge McKeever Lodge HVAC Piping Replacement
- Blackwater Falls Lodge (2nd Fl, Spa, Boiler)
- Cacapon Old Inn
- Freedom Dealerships (Ford, Kia, Volkswagen)

Professional History

2011-Present	Miller Engineering, Inc.	Staff Engineer
2006-2011	Tri-County Electric, Co.	Project Manager
2006-2006	Schlumberger	Field Engineer Trainee - MWD

Education

2006 West Virginia University, BS – Mechanical Engineering

Licenses and Certifications

- Professional Engineer - State of West Virginia
- OSHA 10-hour Course: Construction Safety & Health

Robert Angus

20 Years of maintenance, operations, and construction management precede Rob's engagement with Miller Engineering. Professional expertise of construction project management was gained as an owner of his own contracting company specializing in residential and commercial construction, electrical, plumbing, and HVAC projects. Rob's hands-on approach, common sense and valuable work history knowledge enables him to interface with construction personnel seamlessly alongside engineers and architects. He is adept at preventing and handling issues. Rob is involved at the estimation phase to allow for continuity within the project's design and construction.

Project Role: Construction Representative

- *Construction Project Representation and Management*
- *Construction Administration*
- *Project Cost Estimation*
- *Submittal Review*
- *RFI, RFPCO Review and Response*

Professional Project Highlights

- 3RD Party Construction Observation – Canaan Valley Resort
- Hawks Nest/Twin Falls HVAC
- Cacapon Old Inn
- Suncrest Middle School Gym HVAC Upgrade
- Freedom Dealerships (Ford, Kia, Volkswagen)
- Mapletown Jr./Sr. High School HVAC/Boiler Upgrade
- Blackwater Falls Lodge (Dining, 2nd Fl, Spa, Boiler)

Professional History

2009- Present	Miller Engineering, Inc.	Aquatic Construction Representative
2000-2009	Angus Contracting, LLC	Owner/Operator
1991-2000	BOPARC	Director of Maintenance

Education

2000	Monongalia County Technical Education Center	Heating, Cooling, and Refrigeration Certification
1996	West Virginia University	Recreation and Parks Administration

Licenses and Certifications

- Licensed West Virginia General Contractor
- Licensed West Virginia HVAC Contractor
- Certified HVAC Mechanical Contractor
- Licensed West Virginia Journeyman Electrician
- Licensed West Virginia Master Plumber
- OSHA 10-Hour Construction Safety & Health

ASC GROUP, INC.
ARCHAEOLOGY | ARCHITECTURAL HISTORY | ENVIRONMENT
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Dawn Walter Gagliano

Principal Investigator, Archaeology

3520 Teays Valley Road, Suite 5 ● Hurricane, WV 25526 ● Phone: 681.233.4044 ● dgagliano@ascgroup.net

Education

West Virginia University
BA Anthropology
1992

University College, London
Institute of Archaeology
MA Archaeology
1997

Certifications

Principal Investigator Archaeology: Prehistoric, Ohio (2011)

Principal Investigator Archaeology: Prehistoric/ Historic, West Virginia (2011)

Principal Investigator Archaeology: Prehistoric/ Historic, Kentucky (2015)

PROFESSIONAL RESPONSIBILITES

Ms. Walter Gagliano utilizes her two decades of experience in heritage management and curation to execute awarded projects and bring projects to completion for clients. As the Principal Investigator in Archaeology for the West Virginia Region, she is responsible for managing clients and field staff on both large and small Section 106 review projects. Ms. Walter Gagliano has specialized training in remote sensing, (magnetometer and resistivity); lithic and microwear analysis; historic and prehistoric artifacts; conservation/preservation; and curation.

EXPERTISE

- Archaeological Field Investigation
- Heritage Management
- Preservation and Curation
- Remote Sensing

SELECTED PROJECT EXPERIENCE

Summary Results of the Hocking College Investigations of the Stiles Mansion, Thornhill and Estate Grounds, 46WD239, Mountwood Park, Volcano, Wood County, West Virginia.

Phase I investigation of the Blennerhassett Island Historic Park Docking Facilities, Wood County, West Virginia.

Phase I Archaeology for the Mountain Valley Pipeline, Lewis, Doddridge, Braxton, Webster, Fayette, Nicholas and Greenbrier Counties, West Virginia.

Management Summary, Cultural Resources Management Plan for Strouds Run State Park, Athens County, Ohio.

Historic American Engineering Record Report: Sunday Creek Coal Company Mine No. 6 (Millfield Mine), RR1 CR 27 (Millfield Road), East Millfield, Athens County, Ohio.

Phase I Archaeological Investigations of the Mouth of Seneca Bridge Replacement project, Pendleton County, West Virginia.

Phase I Archaeological Investigations of the Old Hi Carpenter Bridge rehabilitation project, Pleasants County, West Virginia.

Phase I Archaeological Investigations of the Wellsburg Bridge, Brook County, West Virginia.

ASC GROUP, INC.
ARCHAEOLOGY ARCHITECTURAL HISTORY ENVIRONMENT
CULTURAL AND ENVIRONMENTAL CONSULTANTS

Douglas S. Terpstra

Project Manager/Principal Investigator
Architectural History

800 Freeway Drive N, Suite 101 ● Columbus, OH 43229 ● Phone: 614.268.2514, x 3556 ● dterpstra@ascgroup.net

Education

College of William and Mary,
BA History
1996

University of Vermont,
MS Historic Preservation
1999

Certifications

Architectural Historian:
Ohio (2001)
Indiana (2006)
West Virginia (2005)
Michigan (2011)
Principal Investigator (Cultural-Historic),
Kentucky (2011)

36CFR61: Historic Preservation,
Pennsylvania
(Principal Investigator)

36CFR61: History,
Pennsylvania (Principal Investigator)

36CFR61: Architectural History, Pennsylvania
(Principal Investigator)

PROFESSIONAL RESPONSIBILITES

Mr. Terpstra is responsible for conducting all phases of the Section 106 process, including conducting literature reviews, conducting fieldwork and report preparation for reconnaissance and intensive level surveys, preparing documentation for consultation, participating in consulting party coordination, preparing memorandums of agreement, and participating in the completion of mitigation products. As principal investigator for architectural history, Mr. Terpstra reviews work of subordinate architectural historians, helps to prepare proposals, manages schedules and budgets, and participates in marketing activities.

EXPERTISE

- More than 15 years of experience in the fields of architectural history and historic preservation.
- Experience as Project Manager and Principal Investigator.
- Authored or co-authored Section 106 and/or Section 110 review projects in Ohio, Indiana, Kentucky, Michigan, Minnesota, Pennsylvania, and West Virginia.
- Performed surveys for a wide range of project types such as transportation, federal building documentation, airport expansion, landfill expansion, cell tower evaluations, correctional institutions, pipeline corridors, dam removals, mining permit areas, and commercial development.
- Production of scoping reports, literature reviews, reconnaissance and intensive level survey reports, determination of effects reports, and mitigation documentation.
- Completion of two HABS and seven HAER-equivalent documentations
- Authoring or co-authoring nominations successfully listed in the National Register of Historic Places.

SELECTED PROJECT EXPERIENCE

- Mouth of Seneca Bridge Replacement, Pendleton County, West Virginia. Served as Principal Investigator, Architectural History for the Phase I Architectural Survey for the West Virginia Department of Highways.
- Elkins Rail-Trail Connector Project, Randolph County, West Virginia. Served as Principal Investigator, Architectural History for the Phase I Cultural Resources Survey.
- Denmar Window Replacement, Denmar Correctional Center, Pocahontas County, West Virginia. Principal Investigator, Architectural History for Section 106 Findings and Determination Area of Potential Effect COR61433-AH/MIT Submitted to West Virginia Division of Corrections.
- HAM-Little Miami Scenic Trail-Phase 2 Project (PID 85872) in the Village of Newtown and Anderson Township, Hamilton County, Ohio. Served as Architectural History principal investigator.

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

HATCH MOTT MACDONALD, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

MOTT MACDONALD, LLC

Given under my hand and the Great Seal of the State of West Virginia on this day of May 26, 2016

Natalie E. Tennant

Secretary of State

CERTIFICATE OF *Authorization*

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

The West Virginia State Board of Registration for Professional Engineers having verified the person in responsible charge is registered in West Virginia as a professional engineer for the noted firm, hereby certifies

MOTT MACDONALD, LLC
C02536-00

Engineer in Responsible Charge: GARY D FACEMYER - WV PE 008287

has complied with section §30-13-17 of the West Virginia Code governing the issuance of a Certificate of Authorization. The Board hereby notifies you of its certification with issuance of this Certification of Authorization for the period of:

January 1, 2016 - December 31, 2017

providing for the practice of engineering services in the State of West Virginia.

IF YOU ARE REQUIRED TO REGISTER WITH THE SECRETARY OF STATE'S OFFICE.
PLEASE SUBMIT THIS CERTIFICATE WITH YOUR APPLICATION.

IN TESTIMONY WHEREOF, THE WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS HAS ISSUED THIS COA UNDER ITS SEAL, AND SIGNED BY THE PRESIDENT OF SAID BOARD.

BOARD PRESIDENT

WEST VIRGINIA BOARD OF PROFESSIONAL SURVEYORS

Certificate of Authorization

ISSUED TO:

Mott MacDonald, LLC

Charleston, West Virginia

Certificate of Authorization # 17-5733

This certificate is issued by the West Virginia Board of Professional Surveyors in accordance with West Virginia Code § 30-13A-20
The person or organization identified on this certificate is licensed to conduct professional surveying and mapping services in the State of West Virginia for the period

January 1, 2017 through December 31, 2017

This certificate is not transferrable and must be displayed at the office location for which issued.

In witness whereof I have put my hand, this 2nd day of December, 2016

R. MICHAEL SHEPP, P.S. Chairman

JAMES T. RAYBURN, P.S., Member

NELSON B. DOUGLASS, P.E.,P.S., Secretary

SEFTON R. STEWART, P.S., Member

PAUL W. HILL, Public Member

West Virginia State Board of Registration for Professional Engineers

GARY D. FACEMYER
WV PE #008287

This is to certify that the above named PROFESSIONAL ENGINEER has met the requirements of the law, is duly registered and is entitled to practice engineering in the State of West Virginia.

EXPIRES December 31, 2018

2018

WEST VIRGINIA PROFESSIONAL SURVEYOR

The West Virginia Board of Professional Surveyors certifies that the individual listed below is a PROFESSIONAL SURVEYOR who has qualified for a license under Chapter 30, Article 13A, Code of West Virginia, and has met the requirements for license renewal for the period ending June 30, 2018.

GARY D. FACEMYER

License # 1320

JULY 1, 2017 - JUNE 30, 2018

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/11/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Willis of New Jersey, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 372305191 USA

CONTACT NAME:
PHONE (A/C, No, Ext): 1-877-945-7378 FAX (A/C, No): 1-888-467-2378
E-MAIL ADDRESS: certificates@willis.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Fireman's Fund Insurance Company	21873
INSURER B: Travelers Property Casualty Company of America	25674
INSURER C: American Automobile Insurance Company	21849
INSURER D: Underwriters at Lloyd's London	15792
INSURER E:	
INSURER F:	

INSURED
Mott MacDonald, LLC
111 Wood Avenue South
Iselin, NJ 08830

COVERAGES CERTIFICATE NUMBER: W2999982 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [X] LOC [ ] OTHER:	N	N	MZX80979493	06/30/2017	06/30/2018	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 2,000,000 $ 1,000,000 $ 10,000 $ 2,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY	N	N	MZX80979493	06/30/2017	06/30/2018	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 2,000,000 $ $ $
B	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ 10,000	N	N	ZUP-15S91842-17-NF	06/30/2017	06/30/2018	EACH OCCURRENCE AGGREGATE	$ 1,000,000 $ 1,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: No If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	N	WZP81041085	06/30/2017	06/30/2018	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
D	Professional Liab.	N	N	B080120388P17	06/30/2017	06/30/2018	Per Claim/Aggregate	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Authority is Additional Insured as respects to General Liability as per written contract or agreement.

CERTIFICATE HOLDER

For Your Information

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Courtesy Notice of Cancellation for Other Than Nonpayment of Premium to Designated Entities - 145977 01 11

Policy Amendment Policy Number: Policy Number: MZX80979493 Effective Date: 06/30/2017; WZP81041085 Effective Date: 06/30/2017 General Liability; Auto Liability, Workers Compensation

Schedule

Name and Address of Person(s) or Organizations	**Number of Days Notice if other than 10 days:**
On File with Carrier, as required by written contract	Canacellation Number of Days Notice- **60** When we don't Renew (Non-Renewal)- **30**

Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

This policy is amended as follows:

A. If We cancel this policy prior to expiration for any reason other than non payment of premium or at Your request, and we have been notified that You are required under a current contractual obligation to notify a certificate of insurance holder or holders when this policy is canceled, then We will endeavor to mail or deliver a copy of such written notice of cancellation to the certificate holder(s) shown in the Schedule above, as follows:

   1. To the name and address corresponding to each certificate of insurance holder indicated in the Schedule above; and

   2. At least 10 days prior to the effective date of the cancellation, as shown in our notice to the first Named Insured, or, if indicated, the longer number of days notice shown in the Schedule above.

B. Notwithstanding the foregoing, such notice of cancellation is provided on an informational basis and solely to assist You in informing the certificate of insurance holder(s) in advance of pending cancellation in coverage to assist you in meeting Your contractual notice requirements to such parties. Our failure to provide such advance notification to the certificate of insurance holder(s) shown in the Schedule of this endorsement will not extend any policy cancellation date, negate any cancellation of the policy, or grant, alter or extend any rights or obligations under this policy and we shall have no liability for any failure to provide the notice(s) as provided herein.

All other terms and conditions of this policy remain unchanged.

GENERAL TERMS AND CONDITIONS:
West Virginia Division of Natural Resources
Agency Delegated Procurements Over $25,000

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.

Gary Facemyer, Senior Associate
(Name, Title)
Gary Facemyer, PE; Senior Associate
(Printed Name and Title)
201 Pennsylvania Avenue, 4th Floor, Charleston, WV 25302-2315
(Address)
304.356.3010
(Phone Number) / (Fax Number)
gary.facemyer@mottmac.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.

Mott MacDonald, LLC
(Company)

(Authorized Signature) (Representative Name, Title)

Stephen B. Polen, PE; Senior Vice President
(Printed Name and Title of Authorized Representative)

9-27-17
(Date)

412.497.2950
(Phone Number) (Fax Number)

GENERAL TERMS AND CONDITIONS:
West Virginia Division of Natural Resources
Agency Delegated Procurements Over $25,000

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

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

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

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

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

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

Mott MacDonald, LLC
Company

Authorized Signature

9-27-17
Date

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

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

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

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

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

DEFINITIONS:

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

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

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

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

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Mott MacDonald, LLC

Authorized Signature: _____ Date: 9-27-17

State of Pennsylvania

County of Allegheny, to-wit:

Taken, subscribed, and sworn to before me this 27 day of September, 2017.

My Commission expires March 3, 2020.

AFFIX SEAL HERE

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Melissa S. Root, Notary Public
City of Pittsburgh, Allegheny County

NOTARY PUBLIC Melissa S. Root