



Booth & Associates

COMPANY OVERVIEW

Booth & Associates delivers comprehensive engineering, procurement, and project/construction management services, along with specialized expertise in financial analysis, GIS, field services, and data analytics.

With a proud history of serving over 500 clients across 40 states, our diverse team brings more than 1,500 years of combined experience to every project. We are committed to delivering the dependable management and design solutions our clients expect.

At Booth & Associates, we believe that personalized service is the foundation of exceptional engineering and project management. Every project benefits from our advanced technology, deep expertise, rigorous cost control, and unmatched customer service.



BOOTH & ASSOCIATES LOCATIONS

MAIN OFFICE- RALEIGH, NC



JAMES C. TURLEY, PE
President

2300 Rexwoods Drive,
Suite 300
Raleigh, NC 27607
office 919.851.8770 x 170
cell 919.880.8272

CHARLOTTE, NC



BILL JORDAN, PE
*Vice President-
Charlotte Office*

9300 Harris Corners Parkway
Suite 460
Charlotte, NC 28269
office 919.851.8770 x 401
cell 919.880.2459

SUMMERVILLE, SC



JAMES (ANDIE) A. HOFF, PE
*Vice President-
Summerville Office*

201 Sigma Drive
Suite 330
Summerville, SC 29486
office 919.851.8770 x 601
cell 843.810.5920

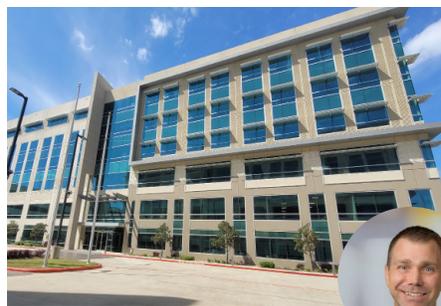
BALTIMORE, MD



JOHN B. WILLIAMS, PE
*Vice President-
Baltimore Office*
cell 919.218.2240

400 Redland Court
Suite 200
Owings Mills, MD 21117
office 919.851.8770 x 180

HOUSTON, TX



BILL JORDAN, PE
*Vice President-
Houston Office*

24285 Katy Freeway
Katy, TX 77494
office 919.851.8770 x 401
cell 919.880.2459

BATON ROUGE, LA



W. BROOK SAMUEL, PE
*Vice President-
Baton Rouge Office*

8550 United Plaza, Suite 202
Baton Rouge, LA 70809
office 225.927.7430
cell 225.938.9518



Booth & Associates





CORPORATE TEAM

At Booth, we know details matter—in our work and our people. Our quality starts with expert engineers, developers, and financial planners. Our team includes professionals in electrical, mechanical, civil, structural, and environmental engineering, land surveying, and system studies.



JAMES C. TURLEY, PE
President



MICHAEL L. CLEMENTS, PE
Executive Vice President



DAVID HUFFSTETLER
Senior Vice President



BILL JORDAN, PE
*Vice President-Planning,
System Studies, & Distribution
Automation*



DEBORAH ROD, CPA
*Vice President-
Finance*



JOHN B. WILLIAMS, PE
*Vice President-
Baltimore Office*



JAMES (ANDIE) A. HOFF, PE
*Vice President-
Summerville Office*



STEPHANIE BEAUREGARD
*Vice President-
Financial Services*



W. BROOK SAMUEL, PE
*Vice President-
Baton Rouge Office*



BRANDON DOUGLAS, PE
*Vice President-Substation/Renewables
Engineering*



GRACYN BANCROFT, PE
*Vice President-
T&D/Civil/Land Department*



ALAN POLLOCK
Human Resource Manager



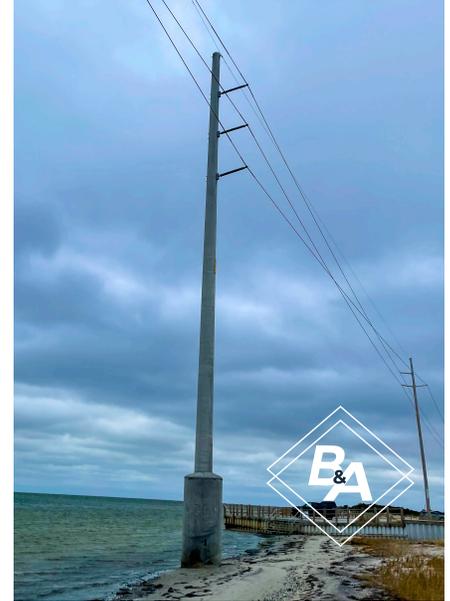
HAYLEY YOUNG
Manager of Corporate Services



Booth & Associates



OVERHEAD TRANSMISSION



Booth & Associates has been providing transmission line design services to the electric utility industry since 1960 and has become a recognized leader in our field. We have designed transmission projects up through 345kV utilizing tubular steel, ductile iron, lattice, concrete, wood, and composite poles, with many requiring engineered, unguyed self-supporting structures with foundations. Our primary goal is to provide an efficient design that meets all applicable design standards, while keeping a focus on constructibility.



PRIMARY CONTACTS



GRACYN BANCROFT, PE
Vice President
T&D/Civil/Land Department



JOHN B. WILLIAMS, PE
Vice President
Baltimore Office

AREAS OF SPECIALTY

- *Condition & Make Ready Assessment*
- *Feasibility & Constructibility Review*
- *Engineering and Property Survey*
- *Local, State and Federal Permitting*
- *Easement Acquisition*
- *Advance Conductor Design*
- *Custom Structural and Foundation Design*
- *EPC (Engineering, Procurement & Construction)*
- *Material Specification & Procurement*
- *Construction Specification & Procurement*



Booth & Associates





UNDERGROUND TRANSMISSION

Booth & Associates has completed a wide range of underground electric utility projects for Investor Owned Utilities, Municipalities, Cooperatives, and various commercial/ industrial customers. These projects have included conduit and duct bank systems, high voltage cable specifications and design, cable termination specifications, as well as complex routing and grounding assessments.

AREAS OF SPECIALTY

- *Overhead to Underground Conversion*
- *Duct Bank and Conduit System Design*
- *Preparation of Material Lists and Specifications*
- *Cable and Equipment Sizing*
- *Labor Contract Preparation and Administration*
- *Routing, Feasibility, and Planning Studies*
- *Bridge Attachment Projects*
- *Highway Relocation Projects*
- *Local, State and Federal Permitting*
- *Detailed Cost Estimating*
- *Facility Condition Assessment*
- *Right-of-Way Acquisition*
- *Design and Property Surveys*
- *Design / Build Capability*

PRIMARY CONTACTS



JOHN B. WILLIAMS, PE
*Vice President
Baltimore Office*



BILL JORDAN, PE
*Vice President
Planning & System Studies*





OVERHEAD DISTRIBUTION

Since 1960, Booth & Associates has specialized in all aspects of electric distribution design. We have built a reputation for high quality and efficient designs that encompass a full range of complexity. Through a series of training schools and seminars, along with our many completed projects, Booth & Associates has become a recognized leader in distribution line design.

We have completed designs for thousands of miles of distribution line incorporating most types of construction. Our specialties include highway relocation projects, transmission underbuilds, and all types of system improvements. We also specialize in downtown, campus, industrial, and commercial underground designs, as well as any project requiring detailed coordination.

AREAS OF SPECIALTY

- *OH/UG Routing & Feasibility Studies*
- *Line Inventory Design and Staking*
- *Highway Relocation Projects*
- *Easement Acquisition*
- *Material and Construction Specification and Procurement*
- *Project Management and Closeout*
- *Transmission Underbuild*
- *Communication Make Ready*



PRIMARY CONTACTS



MARK TRACEY, PE
Manager- Distribution



JOHN B. WILLIAMS, PE
*Vice President
Baltimore Office*



Booth & Associates





UNDERGROUND DISTRIBUTION

Booth & Associates was founded in 1960 and since that time, we have completed a wide range of underground electric utility projects for Investor-Owned Utilities, Electric Municipalities, Electric Cooperatives, Military Bases, Universities, State and Federal Regulatory Agencies. These projects have included direct buried, conduit and duct bank systems along with pad-mounted and subsurface equipment.

As a result of our experience and leadership in designing underground electric facilities, Booth has been retained to write several underground electric design and installation manuals. These manuals have been developed for various utilities as well as for the National Rural Electric Cooperative Association (NRECA) and the Electric Power Research Institute (EPRI). Booth professionals are continually providing training, through schools and seminars, on the topics of underground electric utility design and installations, as well as the National Electric Safety Code.

AREAS OF SPECIALTY

- Overhead to Underground Conversion
- Duct Bank Design
- Preparation of Material Lists and Specifications
- Cable and Equipment Sizing
- Labor Contract Preparation and Administration
- Routing, Feasibility, and Planning Studies
- Street, Area, and Security Lighting Design
- Highway Relocation Projects
- Local, State and Federal Permitting
- Detailed Cost Estimating
- Facility Condition Assessment and Privatization
- Right-of-Way Acquisition
- Design and Property Surveys
- Design / Build Capability

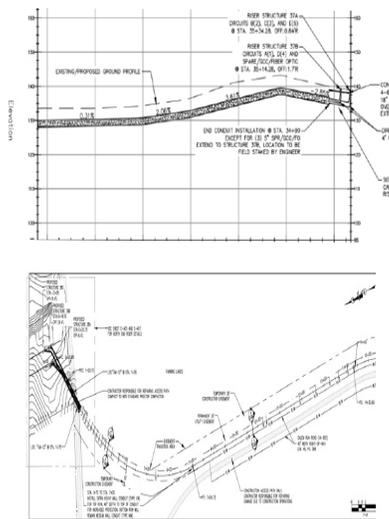
PRIMARY CONTACTS



JOHN WILLIAMS, PE
Vice President
Baltimore Office



MARK TRACEY, PE
Manager-Distribution





SUBSTATION & RELAYING

AREAS OF SPECIALTY

Booth has been actively involved in the design, procurement and construction administration, as well as the testing and energization of station facilities since 1960. We have continuously worked for municipal electric systems, rural electric cooperatives and investor-owned utilities throughout our history.

In the Substation and Relaying Division of Booth, our capabilities span across all aspects of design and installation assistance, including; structural, electrical, civil, relay, and control systems to full procurement and contract administration.

Our designs include: generation substations and transmission step-down and switching stations, distribution substations, and industrial service substations.

- *Substation Design*
- *Protective Relaying & Coordination*
- *Grounding/ Resistivity Studies*
- *Relay Calibration Testing*
- *Lightning Protection Design*
- *Material & Construction Specification & Procurement*
- *Project Management & Closeout*

PRIMARY CONTACTS



BRANDON DOUGLAS, PE
*Vice President-Substation/
Renewables Engineering*



Booth & Associates





RENEWABLE ENERGY

Since 1960, Booth & Associates has been known industry-wide as a top firm in traditional electric utility engineering. However, as renewable energy sources have become a more viable option, Booth has become increasingly competitive in this growing field. We have integrated alternative resource specialists in Solar, Biomass, Wind Energy, and Geothermal into an area of Booth's expertise. As the role of renewable energy increases over time, innovations that focus on renewable energy technologies have significant future potential in contrast to the conventional sources such as gas, coal, and oil.

SOLAR ENERGY

Solar (PV) farms are an innovative technology that have become widespread in parts of the United States, and in particular, nearby to us, in North Carolina. We can provide the full spectrum of engineering services to assist with solar farm development from the initial planning stages through the complete installation and commissioning. At Booth, we can assist with any size solar projects from <1 MW tied directly into the local distribution network or large scale (>100 MW) solar farms connected to transmission system power grid via utility substation. To date, Booth has assisted with hundreds of solar projects, whether it be the initial planning and development, substation design or solar field design.

PRIMARY CONTACT



BRANDON DOUGLAS, PE
*Vice President-Substation/
Renewables Engineering*

RENEWABLE AREAS OF SPECIALTY

- *Economic Studies & Licensing (PPAS/ Wheeling Agreements*
- *Distributed Impact Studies*
- *Interconnect with Commercial/ Industrial Facilities or Power Grid*
- *Renewable Interconnection*
- *Solar and Wind Collector Design (AC/ DC)*
- *Fuel Spill Prevention and Control Systems*
- *Protective Relay Settings and Calibration*
- *SCADA and Plant Control*

SOLAR AREAS OF SPECIALTY

- *Civil Design/ Permitting on AHJ Requirements*
- *Software Analysis SAM, PV Case*
- *PV Array Layout / Optimization*
- *Array Elevations / Detailing*
- *Technical Support for Pull Testing*
- *Combiner Box Placement*
- *Central and String Inverter Systems*
- *Short Circuit / Harmonics Study*
- *Transient Over-Voltage / Recovery-Voltage Study*
- *Load Flow Study*







BATTERY ENERGY STORAGE SYSTEMS

Battery Energy Storage Systems (BESS) can be used for a variety of applications, including frequency regulation, peak shaving, volt/var support, CapEx deferral, integration of distributed energy resource (DER) energy, and micro grids. Different battery technologies can unlock different applications, providing various benefits to the utility and their consumers.

Booth & Associates has the experience and expertise to address important challenges pertaining to BESS, including developing sustainable business models, long-range planning integration, overcoming technology performance uncertainty, determining comprehensive and credible cost estimates, and integrating battery energy storage with existing utility systems.

AREAS OF SPECIALTY

- *Economic Feasibility*
- *Budget and Strategic Planning*
- *Renewable Energy Compliance*
- *System Planning Integration*
- *Power Quality Benefit Studies*
- *Interconnection/ Balance of Plant Layout & Engineering*
- *Full EPC Capability*
- *Preparation of Material Lists and Specifications*
- *Labor Contract Preparation and Administration*
- *Project Management & Oversight*
- *Project Commissioning*
- *Interconnection Field Support*

PRIMARY CONTACT



BILL JORDAN, PE
*Vice President-
Planning, System Studies
& Distribution Automation*



Booth & Associates

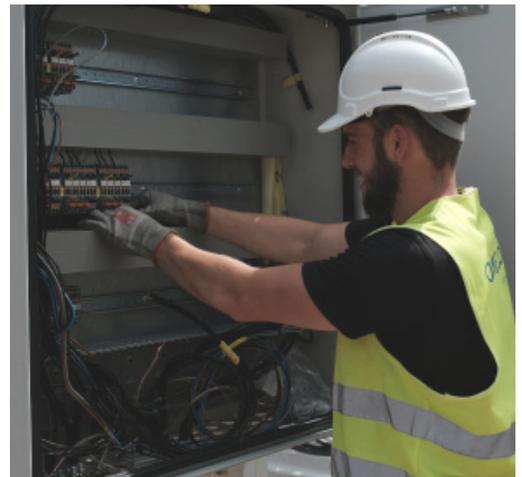




COMMISSIONING & FIELD SERVICES

Booth & Associates has a very strong and capable Commissioning and Field Services Team. Before energization of new project solutions, our Commissioning Team will perform a full checkout of all equipment, controllers, and functionality of each individual control circuit to ensure safety, functionality, and regulatory compliance.

In addition to commissioning new work, our Field Services Team can also support a broad range of equipment testing, troubleshooting, adjustments, etc. within existing facilities.



PRIMARY CONTACT



BRANDON DOUGLAS, PE
Vice President-Substation/Renewables
Engineering

AREAS OF SPECIALTY

- *Relay Programming and Testing*
- *HV / MV Equipment Troubleshooting*
- *Fault / Disturbance Forensics to Determine Cause and Recommend Mitigation*
- *AC & DC Circuit Checks*
- *Trip / Close Verification*
- *Dynamic Logic Testing*
- *Communication Circuit Testing*
- *Point-to-Point Circuit Functional Testing*
- *Energization Support*
- *Installation and Setup of Control Equipment*





ENVIRONMENTAL & LAND DEVELOPMENT SERVICES

At Booth & Associates, we offer our clients a full range of services to address the constantly growing and ever changing environmental rules and regulations. We pride ourselves on keeping up to date with the most up-to-date state regulations, as well as our knowledge of county, city, and local programs. Our diverse team has many years of experience in permitting, surveying, site design, and analysis.

We welcome the opportunity to explore solutions to any potential land development needs that could arise, or simply answer any questions you may have.

AREAS OF SPECIALTY

- *Environmental Due Diligence / Feasibility Studies*
- *Zoning CUP/SUP Exhibits*
- *Site Grading and Clearing Plans*
- *Erosion and Sediment Control Plans*
- *NPDES/SWPPP Plans/ Stormwater Management Plans*
- *Section 404/ 401 Water Quality Certification Permitting*
- *Hydrology Calculations and Reports*
- *Coordination of wetland delineation and biological assessments*
- *Construction Observation/ Management*
- *SWPPP and Permanent Basin Inspections*
- *Coastal Area Management Act (CAMA) Permitting*
- *Spill Prevention, Control and Countermeasure (SPCC) Plans*
- *EPCRA / Tier II Reporting / Chemical HazMat Inventories*

PRIMARY CONTACTS



GRACYN BANCROFT, PE
*Vice President - T&D/Civil/
Land Department*



BRIANNA EDDY
*Environmental & Land
Development Manager*





LAND SURVEYING & MAPPING

Land Surveying and Mapping are accomplished in the field through the use of traditional survey total stations as well as unmanned AirCRAFT systems, survey-grade GPS receivers, mapping-grade GPS receivers, laser range finders, leveling instruments and geotagging cameras. Our teams include Professional Land Surveyors licensed in multiple states, aided by experienced and talented technicians who are cross-trained in field activity and equipment plus CAD software in the office. We have served public and private utilities for over 60 years and look forward to bringing our high standards to your project.

AREAS OF SPECIALTY

- *Active Remote Sensing*
- *ALTA Surveys*
- *Boundary and Easement Surveys*
- *Route and Construction Surveys*
- *Topographic Surveys*
- *RGB and Infrared Inspection Photography*
- *GPS Field Inventories*
- *Wetland Location Surveys*
- *Land Records Research*
- *Survey Plat Preparation*
- *Accident Investigation*

PRIMARY CONTACTS



MARK CULLIFER, PLS
Manager of Surveying



HUNTER BROOKS, PLS
Lead Surveyor



Booth & Associates



www.booth-assoc.com | (919)851-8770

2300 Rexwoods Drive, Suite 300, Raleigh, NC 27607



ENGINEERING, PROCUREMENT & CONSTRUCTION

At Booth & Associates we are proud to provide full EPC (Engineering, Procurement, and Construction) capabilities. In this field, we have learned that collaborative relationships lead to new innovations, providing our clients with service excellence and successful projects. Booth is committed to navigating and managing the entire EPC project alongside our clients, with a commitment to safety, financial efficiency, and finding the right partners to aid in these turnkey projects.

PRIMARY CONTACTS



MICHAEL L. CLEMENTS, PE
Executive Vice President

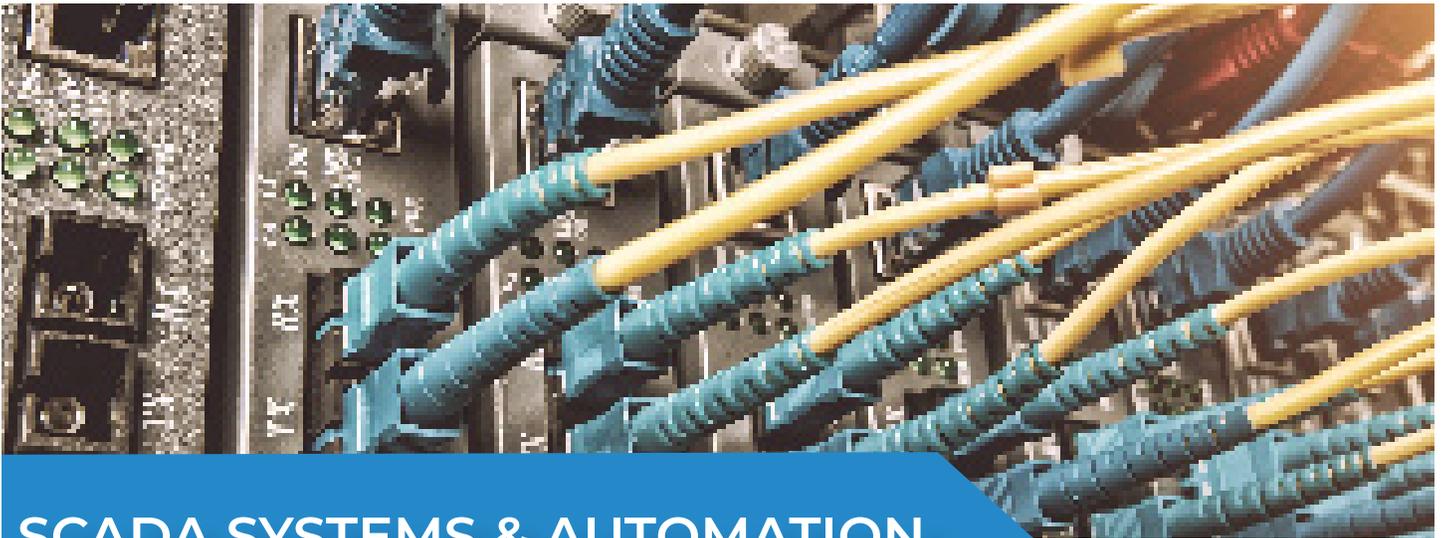


DAVID HUFFSTETLER
Senior Vice President



Booth & Associates





SCADA SYSTEMS & AUTOMATION

Booth & Associates provides automation and SCADA engineering services to our clients. Booth designs local SCADA communication architecture for substations including specifying hardware and software, reviewing communication protocol requirements between local communication processors and IEDs, developing point lists and alarm databases, hardening network security, designing IP networks, and developing substation Human Machine Interfaces (HMIs). We are also experienced in network topology for Ethernet and serial communication over traditional serial and newer fiber mediums. As a final step in the process, we provide commissioning to verify IED points to the client's system-wide SCADA master platforms.

Booth is also experienced in other automation projects such as retrofitting and upgrading outdated Remote Terminal Unit (RTU) systems, automatic transfer control and load shedding, communication scheme between Solar and Utility, and BESS system transfer trip scheme.

Booth's team is knowledgeable in several hardware and software platforms:

- **Platforms:**

- *SEL RTAC product Lines*
- *SEL ICON Multiplexer*
- *Allen-Bradley Siemens Simatic Rockwell*
- *Bitronics Orion NovaTech*
- *ACS*
- *Wonderware Solutions*
- *QEI*
- *Survalent*
- *OSI*
- *SEL Web HMI*

- **Communication Protocols:**

- *SEL MirrorBits*
- *SEL Fast Messenger*
- *DNP3*
- *Modbus TCP/IP or Serial*
- *IEC 61850*
- *Ethernet/IP*
- *PROFIBUS*

- **Fiber Design:**

- *Single-Mode*
- *Multi-Mode*

AREAS OF SPECIALTY

- *Network Design and Implementation*
- *Communication Protocol Selection, Utilization, and Conversion*
- *Point / Tag Database Programming*
- *Historical Data Capture and Trending*
- *Automation Programming and Sequencing*
- *HMI Visualization and Control Screen Development*
- *Plant-wide SCADA Integration*
- *Commissioning*



PRIMARY CONTACT



BRANDON DOUGLAS, PE
*Vice President-Substation/
Renewables Engineering*





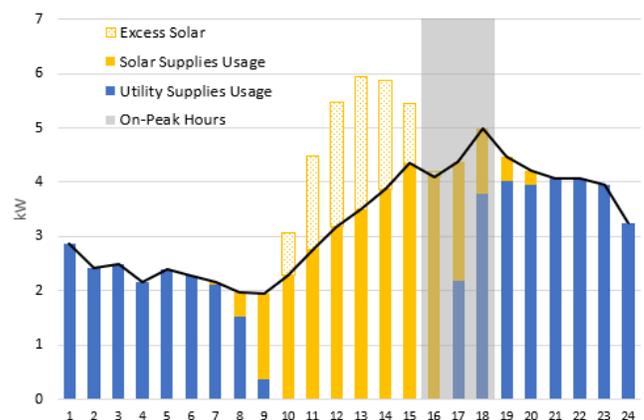
FINANCIAL SERVICES

Our diverse team addresses a broad range of financial needs specific to the utility industry, including power supply and transmission, cost-of-service, rate design, cost-benefit analysis, load management, financial forecasting, plant valuation, and regulatory compliance. In more recent years we have expanded into the benefits of battery energy storage, the impact of electric vehicles, and renewable energy compliance.

Our staff focuses attention to our clients' increasingly complex financial assistance needs. The combination of financial and engineering resources available at Booth & Associates makes us uniquely qualified to successfully address the specialized needs of the utility industry.

AREAS OF SPECIALTY

- Time-of-Use Rates
- Net Metering Rates
- Avoided Cost Calculations
- Wheeling Rates
- Residential Demand Rates
- Economic Development Rates
- Special Contract Rates
- LED Lighting Replacement
- Power Cost Adjustments
- Contribution-in-Aid
- Patronage Capital Allocations



PRIMARY CONTACT

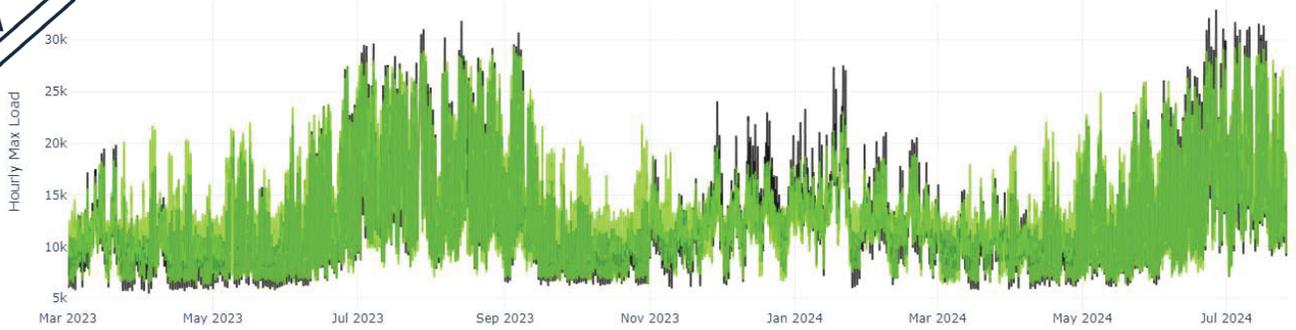


STEPHANIE BEAUREGARD
Vice President- Financial Services



Booth & Associates



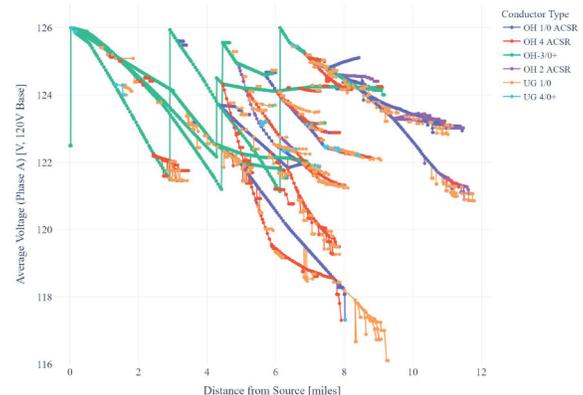


DATA SERVICES

The Data Services Division works with our clients to provide solutions for common to complex analytics challenges by enhancing their existing services and generating new innovative opportunities. Our team utilizes data science to analyze business processes and uncover hidden patterns, we implement strategies and systems to maximize efficiency, effectiveness and enhance business operations. We create custom applications and analytics tools to provide accurate financial and load forecasting to support strategic planning and predict future trends and outcomes – assisting you in delivering services specific to your customers and strengthening your utility.

DATA SERVICES AREAS OF SPECIALTY

- Data Science, Analytics, Visualization and Engineering
- Predictive Modeling & Machine Learning
- Application & Dashboard Development
- Financial & Load Forecasting
- Customer Analytics & Segmentation
- Performance Improvement
- Optimization



PRIMARY CONTACTS



BILL JORDAN, PE

Vice President Planning,
System Studies



JACOB BARLOW

Manager - Data Services





POWER QUALITY METERING

Power quality analysis is a crucial procedure that assesses the overall safety and efficiency of a building or facility's power supply. Our team conducts a systematic analysis to assess the performance, reliability, and safety of an electrical power system. By carefully scrutinizing elements such as power flow, grounding, and harmonics, we can determine the quality of electric power. We compile all collected data from field observations and data logged through power quality logger(s). Our final report includes a detailed evaluation of the site and recommendations needed for remedy.



PRIMARY CONTACTS

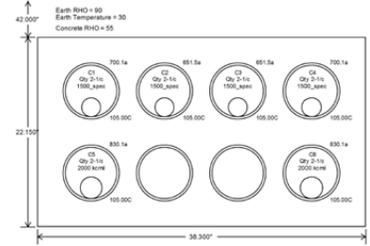
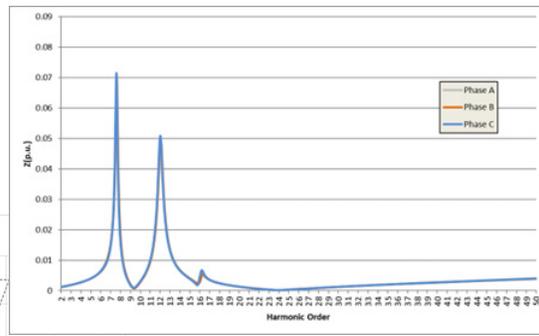
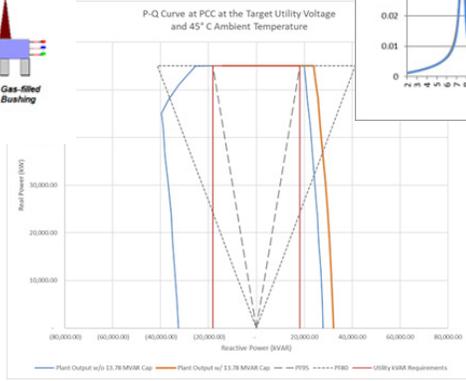
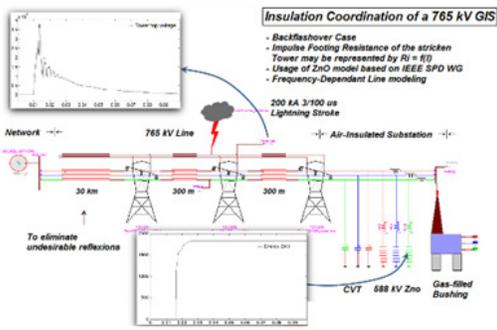


BILL JORDAN, PE
Vice President Planning,
System Studies



DAVID MILLIGAN, PE
Manager-Studies



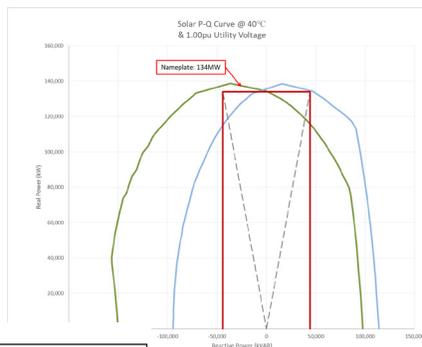


POWER QUALITY STUDIES - DER

The System Planning and Power Quality Division provides our clients with operationally feasible and economically sound solutions to their planning and system validation needs. We offer a full range of power quality studies evaluating the technical and economic feasibility of proposed PV, BESS and microgrid facilities on a utility system. Our studies ensure the plant meets interconnection agreement requirements by assessing real and reactive power flow, voltage flicker, fault current, harmonic currents, possibility of reverse power flow and proper equipment ratings are met.

POWER QUALITY STUDIES AREAS OF SPECIALTY

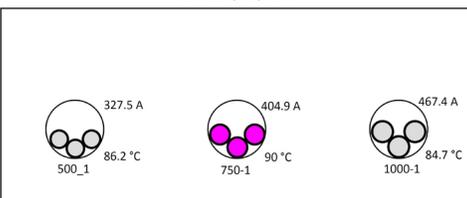
- Arc Flash Hazard Assessments
- Solar Farm Feasibility & Impact Studies
- Battery Energy Storage Feasibility Studies
- Short Circuit Studies
- Harmonic Studies
- Voltage Flicker Studies
- Load Flow / Reactive Power Studies
- Transient Recovery Voltage Studies
- Transient Overvoltage Studies
- Underground Cable Design & Ampacity
- Dynamic and Transient Microgrid Modeling

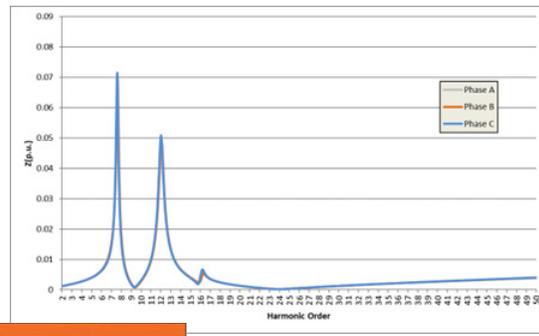
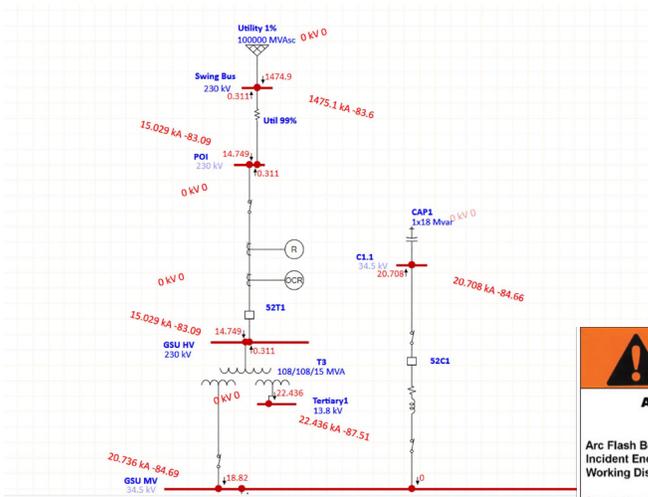


PRIMARY CONTACTS



DAVID MILLIGAN, PE
Manager-Studies





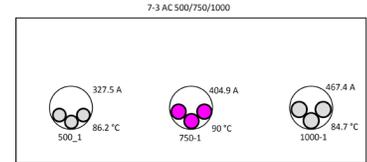
⚠ **WARNING**

ARC FLASH & SHOCK HAZARD PRESENT
APPROPRIATE PPE REQUIRED

Arc Flash Boundary	138.71 inches
Incident Energy in cal/cm ²	17.75
Working Distance	36 inches

Shock Hazard Exposure	34.5 kV
Insulating Glove Class	4
Shock Hazard	when covers removed

Limited Approach Boundary	72 inches
Restricted Approach Boundary	31 inches
Equipment:	SECT-1

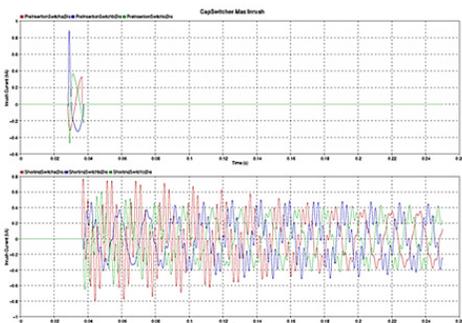
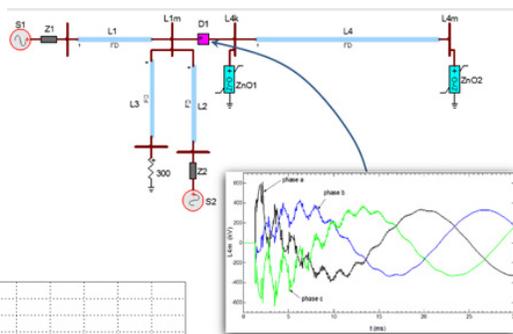


POWER QUALITY STUDIES - INDUSTRIAL

The System Planning and Power Quality Division provides our clients with operationally feasible and economically sound solutions to their planning and system validation needs. We offer a full range of power quality studies evaluating the technical and economic feasibility of industrial systems. Our studies ensure the facility meets safety and reliability standards by updating power system models, as well as assessing real and reactive power flow, voltage flicker, fault current, harmonic currents, equipment ratings and arc flash hazard ratings.

POWER QUALITY STUDIES AREAS OF SPECIALTY

- Power System model updates
- Arc Flash Hazard Assessments
- Short Circuit Studies
- Harmonic Studies
- Voltage Flicker Studies
- Load Flow / Reactive Power Studies
- Transient Recovery Voltage Studies
- Transient Overvoltage Studies
- Underground Cable Design & Ampacity



PRIMARY CONTACTS



BILL JORDAN, PE
Vice President Planning,
System Studies



DAVID MILLIGAN, PE
Manager-Studies

