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[Sustainability Goals and Results Dashboard](#)
Message from the Director

Operations is committed to providing exceptional support to the student, faculty, staff, patients and visitors to the University of Virginia and within our community. This is achieved through the commitment and dedication of the individuals and teams who take great pride in supporting the University and our community by:

- Committing to operational excellence, stewardship, and sustainability
- Achieving organizational goals including
  - Reducing carbon and nitrogen emissions
  - Reducing energy and water use
  - Increasing recycling and reducing the generation and landfilling of waste
  - Advancing health and enhancing indoor environmental quality through green cleaning
  - Maintaining the beauty of Grounds using sustainable landscaping methods
  - Protecting waterways and local habitats
  - Stewarding this special place through the care of facilities
- Monitoring, measuring and reporting on progress in achieving goals
- Promoting personal and professional growth and development
- Engaging with faculty, staff, students and our community
- Respecting the cultural and historical legacy of the University

Please also let us know how we can improve our service and support your work here at the University. I welcome your calls (434-982-5887) and comments (clg9y@virginia.edu).

Cheryl Gomez, PE, LEED AP
Director
Office for Sustainability

Pan-University Collaboration

The UVA Office for Sustainability collaborates pan-University with students, staff, faculty, alumni, and community members to advance sustainability at UVA and in the region. For highlights of sustainability at UVA, accomplished through the Committee on Sustainability, faculty, and student volunteers, see the [UVA Sustainability Annual Report, 2018-2019](#). The team currently consists of 11 full time staff, 20 part-time student employees, and over 100 volunteers who diligently work to help UVA reduce its environmental footprint. The team continually evaluates its strategic plan and held two retreats in 2018 to better understand how to best help advance UVA’s sustainability goals and how to prioritize our programs and initiatives.

Strategic Planning, Project & Program Implementation, Engagement, Communication

**Strategic Planning and Analysis:** In spring 2019, the University of Virginia, City of Charlottesville, and Albemarle County sustainability staff collaborated to launch the Climate Action Together initiative, which seeks to build upon our region’s history of commitments to sustainability and climate action and to collaborate on community outreach. Since then, the team has partnered on panel presentations, tabling, and events.

**Outreach and Engagement** programs continued to expand reach. Major events focused on community connections, with the Bicentennial Sustainability Leadership Summit, Voices for Change: Mixing Hip Hop and Environmental Justice, and the Earth Week Expo, which paired UVA groups with community groups in a Connecting on Climate – Building Bridges theme. The Green Labs freezer program finished third place amongst universities in an international competition, four offices became Green Workplace certified, 328 students became Green Living certified, and now over 1,000 alumni have signed up for the Sustainability Alumni Network. In 2018, we began collaborating with two key new partners – the Alumni Association and the Career Center to strategically develop plans for this new Sustainability Alumni Network. A series of summer receptions were held across the country, connecting students to alumni and alumni to alumni, and a database of alumni was developed, along with a newsletter and website.
Communications also increased UVA sustainability’s reach, with a new and improved annual report, bi-weekly newsletters, and BOV quarterly reports.

Sustainable Buildings: The Energy Engineering team continued its success in close collaboration with others. In December, UVA was named by the Smart Energy Decisions Innovation Award Advisory Panel as the 2019 Innovation Award winner in the category “Higher Education Energy Efficiency Technology” for its Delta Force program and Clark Hall. Clark Hall achieved significant energy savings and became the first LEED-EBOM certified building at UVA and one of the first LEED-EBOM version 4 certified buildings in higher education nationwide. Renewables also made significant strides with the completion of a rooftop solar plan.

The Office for Sustainability’s support of new construction and renovations expanded in 2018 with the launch of UVA’s Green Building Standards and a UVA-specific life cycle cost calculator. After much work, the UVA Green Building Standards are now part of the Facility Design Guidelines.

In October, the International Institute for Sustainable Laboratories recognized the University of Virginia with a Sustainable Procurement Leadership Award. In 2018, 45 Principal Investigators researchers participated in Green Labs programs to lower their energy intensity, some of them doubling or tripling their effort. In late 2017, OFS initiated a comprehensive study of energy intensity and mitigation strategies in UVA laboratories. The Pilot Program Team was comprised of an Energy Engineer and a Green Labs Specialist who together directed the program in collaboration with three partner research labs and their respective Green Leaders (typically a Lab Manager). Seeing success at other institutions, OFS and other contributors in Facilities Management created UVA’s Energy Impact Tracker for the Physical and Life Sciences Building (PLSB). This year, every lab that set an improvement goal in PLSB met or exceeded that goal, and overall there was a 49% improvement in sash position that will result in $5,500 projected utility savings in PLSB.

Grounds as a Learning Tool: Work continued increasing the number of Grounds as a learning tool projects, integrating operations and academics. The team partnered with the Global Sustainability class, which included 250 students. Every Friday for 10 weeks, groups of 25 students rotated around to 10 different field trips on Grounds and in the city – including the Heat Plant, a chiller plant, Runk Dining Hall, green buildings (Rotunda and Rice Hall), learned about the city’s sustainability initiatives and more. Students noted the value in being able to better understand systems and initiatives around them. With the understanding of what is already happening at UVA, students then wrote project proposals to pitch new sustainability projects. As a continuation of the large Global Sustainability course, a one credit Sustainability Leadership class was offered in the spring, in which nine students implemented project pitch ideas with support from Sustainability Plan funding.
Environmental Resources

Community Engagement

The Clean Water Working Group (CWWG), chaired by staff from Environmental Resources (ER), held their first Rainworks stormwater stencil design competition. The FM Sign Shop made stencils of the two winning designs which were applied near storm drains on Grounds using Rainworks invisible spray. The designs appear only when it rains, highlighting the importance of stormwater pollution prevention and protecting our local streams.

Local TV station VPM PBS recently picked up and expanded The Story of Water video (produced last year by the CWWG) to make a new episode for their show Charlottesville Inside Out. Interviews of FM staff, including Dawson Garrod, Cheryl Gomez and Justin Callihan, were filmed for the episode, which will air in the show’s upcoming season in 2020.

ER served as staff advisors on class projects (i.e. CAPSTONE) in the Architecture and Engineering Schools and assisted classroom learning for the Environmental Science Department with tours at the Dell. ER also continued support of PhD candidate research and collaborations with National Science Foundation grants for the Gooch-Dillard and Engineer’s Way biofilter projects.

Petroleum Management

The redevelopment of the former KCRC site required the removal of several underground petroleum storage tanks from the site. Removal of these tanks and the adjacent building exposed petroleum contaminated soils that had resulted from a known release that occurred in 2009. ER, with support from former manager Jeff Sitler, worked to ensure the tanks and contaminated soils were properly handled and documented. As a result of these efforts, the Ivy Mountain Musculoskeletal Center project received a $19,000 reimbursement from the DEQ’s Virginia Petroleum Storage Tank Fund for a portion of the cleanup costs.

ER also worked with Aegis, a consultant, to complete the required 5-year update of UVA’s Spill Prevention Control and Countermeasures Plan (SPCC). The SPCC Plan update, which documents UVA’s petroleum storage inventory and spill response practices, required detailed collaboration with and support from GES staff.
Project Support Services

ER completed several Environmental Site Assessments for property acquisitions for both UVA and the UVA Foundation and completed Environmental Impact Reports (EIRs) for seven new UVA projects. EIRs are required by the State for all large projects over $500,000 involving exterior disturbances. In addition, ER reviewed stormwater management and erosion and sediment control (E&SC) plans for 11 new projects and conducted approximately 400 individual E&SC inspections of UVA project sites. ER also inspected the installation of new stormwater management features such as the biofilters at the Old Ivy Office Building (OIOB) and underground stormwater detention facilities at the OIOB, East Range, and the Track Tent.

Crews assemble a StormTank underground detention facility at the Track Tent

New Environmental Permits

UVA received a new Municipal Separate Storm Sewer System (MS4) permit in November 2018. The new permit, which is on a 5-year renewal, places increased emphasis on public education and outreach regarding stormwater management and pollution prevention in addition to new operational requirements. Compliance with the permit ensures that runoff leaving UVA property does not negatively impact local streams.

ER worked with Parking & Transportation staff to prepare the renewal application for their facility’s Industrial Stormwater Discharge Permit, which became effective in August 2019.

ER facilitated modifications for the Main Heat Plant air permit to improve operational flexibility and prepared a revision application for updates to UVA’s Title V air permit.
Academic Facilities Maintenance

Roofing Maintenance Program

In January 2019, FM Maintenance hired Charles “Chip” Vasi to lead UVA’s Roofing Maintenance Program. Chip’s background as a Roofing Consultant to the University, and more recently as the in-house inspector of capital re-roofing projects, make him particularly well-suited to guide the future of roofing at UVA. Chip is currently overseeing the establishment of a formal roofing maintenance program by documenting existing conditions and aligning maintenance and repair efforts to maximize both resiliency and value. The department has also set its sights on growing their support of historical renovations by providing new installations of the highly intricate roofing and water-proofing projects on grounds.

McCormick Road

The STEM research community at McCormick has been utilizing Facilities Management Zone trades expertise for support of their research beyond the typical maintenance needs. They have learned that we have a wealth of expertise within Facilities Management to help enable their research. Building specialized apparatus, renovating rooms into control centers, installing antennas for space communications or moving multi-million-dollar equipment are just a few of the many jobs McCormick Zone trades professionals perform every day. In turn, this has directly and literally connected FM staff to the mission of the University. This has tied University departments together as a single force accomplishing its mission.
At McCormick Zone, we are responsible for a large part of the University’s sciences and engineering research laboratories. Last year, the zone worked with the office professionals of Facilities Management Occupational Health & Safety to write a lab safety manual for the Facilities Management trades professionals who work in and among research and laboratories. This is training that is available to all trades and apprentices and includes formal documentation that they have been trained in these new procedures.

McCormick Zone has been transitioning to assume ownership of the newly renovated Chemistry Building. While this has been an enormous renovation project, zone trades have worked alongside the FP&C project team to ensure that space is suitable and functioning for occupants. Moving forward the zone is preparing for the long-awaited Gilmer renovation.
John Paul Jones Fire Systems Replacement

In the first phase of this project, the Fire Protection team replaced the head-end control equipment for the John Paul Jones Arena fire alarm system. This consisted of five control panels, and a main control interface panel, plus added a new digital display annunciator panel in the security office. Each panel was retrofitted with integrated modules that communicate with the existing field devices until they are replaced in later phases. The existing programming had to be completely rewritten and converted into a different format for the new system which was also performed in house. It was estimated that this phase of the project would take 5-7 days to complete at a cost $140,000. However, the team was able to get it completed and full protection of the building restored in three days at just under $100,000. The savings is now being applied to the future phases to completely replace all the obsolete equipment per the manufacturers phase out plan.
Housing Facilities

Growth in Housing

During Fiscal Year 2019, the Housing Facilities team continued to grow and evolve. Housing Custodial’s experienced and stable management team continued adding and training new team members, while also improving processes to increase service levels. Change was even more dramatic within the Housing Maintenance team as a new manager was added as well as a maintenance coordinator position. These organizational changes have led to a great deal of process improvement, which is already having a very noticeable impact on work scheduling, follow-up communication, and quality control. These additions to the Housing Facilities group have allowed our team to increase service efficiency and speed as well as the conditions of our buildings, helping us meet our core mission goals for the year.

Housing Facilities also worked extensively with UVA Housing & Residence Life and other teams within Facilities Management to support major projects at the McCormick Road complex, the International Residential College, and the brand-new Bond House, as well as several smaller projects across the Housing inventory to continue addressing building issues and improving UVA’s living and working environments. Improvements within our buildings over the course of the past several years, like added air conditioning systems and elevators, have increased the workload for the department but greatly enhanced the quality of life we can provide to our residents.

By focusing on continuous incremental improvement, Housing Facilities has made significant progress toward its goals of increasing operational performance as well as customer satisfaction. The maintenance and custodial organizations have worked closely together and with leadership in UVA Housing & Residence Life to develop consistent and effective processes, and new scheduling and staffing patterns have resulted in sustained operating efficiencies. The Housing Maintenance group also continues to add additional capabilities with a goal of increasing the types of routine work that can be resolved quickly and efficiently. Facilities Management also continues to prioritize strong internal working relationships and the partnership that has been created with UVA Housing & Residence Life. The two departments have made significant progress in aligning services with needs and expectations, and a number of information sharing, and decision-making processes have been strengthened. At the same time, Operations continues to support condition assessment processes and facilities renewal and improvement opportunities to build future success.
Custodial Services

Individual Certification Program

In 2019, E & G Custodial Services’ leadership developed the first ever individual certification of Green Seal’s GS-42 standards. The starting point was a charter that outlined core objectives, strategies and the means to sustain certification attributes:

Purpose
Build on our success of Green Seal’s GS-42 National Certification and gain greater success

Objectives

- Create an opportunity for professional certification to frontline associates, frontline supervisors & area managers
- Place the custodial ‘trade’ on a level playing field with other FM disciplines who possessed industry certifications or licensure
- Enhance feelings of self-value through personal academic achievement and professional recognition

Strategies

- Engage staff by conveying benefits - “What’s in it for me?”
- Develop two tracks, one for frontline the other for management teams
- Provide three weeks of ‘open book’ team collaboration and review of key documents
- Develop a two-hour training class, followed by a job-relevant assessment
- “Train-the-Trainer” component (Tell-Show-Do-Review)
- Encourage each team member to attain their first professional certification

Sustain the Momentum

- Provide refreshers with tools such as colorful infographics posted in appropriate locations
- Include GS-42 messaging as part of our workplace satisfaction initiative, including a game of GS-42 “Jeopardy!”
- Recertify annually

Outcome

The first wave of graduates totaled 26: 10 frontline associates, 16 management staff. Certificate award ceremony took place on Sept. 26, 2019.

Custodial Services is meeting with Green Seal leadership to discuss their partnership to help Green Seal develop their own program. This initiative is a continuation of a performance goal to support and maintain UVA in an industry leadership role.
Landscape Services

New Landscaping

The past year is best described as excessively wet with the local area receiving well above the normal amount of rainfall. In some ways this was a good thing to ensure great plant growth, but it made for a tough time trying to get all the turf mowed and keep up with the weed growth or even install new landscapes. Landscape Services managed to dodge the rain enough to complete several projects, including the installation of the landscape around the Old Ivy Road Office Building, along with getting started on the plantings for the University Hospital Expansion project. The team replaced a failing storm water feature at the Architecture School, removing the sediment from the swale and planting new trees and ornamental grasses.
Tree Campus Certification

Landscape Services partnered with the Geospatial Engineering Services group this year to make it possible for front-line staff to access the landscape database and add information to it. Specifically, the team’s arborists are now able to reference maps of our trees, add notes or photos to the record and even indicate a tree removal. The team has also partnered with the Programs and Informatics group to combine the landscape data with the financial data using Tableau to create reports allowing analysis of labor and costs based on the square footage of the space maintained. This has greatly improved the ability to predict labor, material and budget needs of Grounds as well as look back at how well predictions matched what occurred. And finally, the biggest news of the year was having the Grounds of the University and the team’s stewardship of them certified through the “Tree Campus USA” program from the Arbor Day Foundation.

UVA Grounds became Tree Campus USA certified

Example of the tree location data
Energy & Utilities

Power Quality and Reliability

After the installation of the 35kV duct bank, the Power & Light team worked on a new automation sequence at Cavalier substation which was put into operation on May 12, 2018. The P&L team, in collaboration with Dominion Energy, resolved the harmonic distortion and UPS malfunctioning issues, which were due to resonance within the system, this project has expanded the team’s focus to include power reliability and power quality.

Dominion Energy installed line-reactors on April 24, 2019 at the Cavalier Substation. This helped the substation achieve the best voltage total harmonic distortion to date, well below IEEE 519 compliance levels. Capacitor banks at Cavalier Substation returned to service, thereby gaining additional available capacity at the Dominion Energy Sherwood substation transformer. Neutral-to-ground reactors at Sherwood substation were installed April 16, 2019. However, they do not seem to provide immunity from minor sags from events on the non-UVA buss at Sherwood.

The P&L team closed off openings under transformers and switches by scheduling multiple shutdowns and filling the holes with concrete. Historically, varmints such as rats, snakes, and groundhogs entered the equipment through the dirt holes which led to faults inside switches and transformers. P&L implemented a new preventive maintenance to detect cable faults early with a newly acquired partial discharge (PD) detector.

*Closing well under switch*
Courtenay-Dunglison-Fitzhugh Renewal

Courtenay-Dunglison-Fitzhugh buildings and the transformers (previously owned by Dominion Energy) were original to the buildings and were connected to a small section of 4.16kV line. New medium-voltage service transformer and service entrance rated panel boards were installed to support the air conditioning for the dorms. During the process, the 4.16kV section and 12.47kV to 4.16kV transformer were removed.

Transformer - Before renewal

Transformer - After renewal

Track and Field Membrane Structure

To maintain a tight construction schedule and budget, the P&L team self-performed the installation of permanent power to the Track & Field membrane structure. This involved installing 700 feet of conduit from The Park transformer to the membrane structure, two sets of 500 kcmil power cable, fire alarm cable, and a 400A service panel. A total of seven pole lights were installed for site lighting.

Site lighting

Service entrance panel
Alderman Substation Renewal

A separate electric service for HVAC units was installed to provide air conditioning for the substation. This will improve the life of the relays inside the substations which are sensitive to temperature fluctuations. A new drop ceiling and LED lights were also installed, and miscellaneous tools and equipment were moved from the substation to eliminate unnecessary traffic into the substation.

Arc Flash Hazard Analysis Program

The UVA in-house Arc Flash Hazard Analysis program (initiated February 2016) is on track to complete the study and labeling of 100% of all significant buildings on grounds within five years, at which point the studies will be reviewed and updated per NFPA 70E 130.5(2).

In fiscal year 2018-19, arc flash hazard studies and labeling were completed for 20 buildings, approximately 1.9 million GSF or 12% of the total area under consideration. Few major buildings include Scott Stadium, JPJ Arena, Massie Rd Heat Plant, Astronomy building, Law School, Darden, and Primary Care Center.
Chiller Plants

The Chiller Plants team continues to evolve its knowledge, skills, and abilities. The team’s goal to self-perform chiller overhauls has been realized and the group continues to reap the benefits of this endeavor. All backflow preventer maintenance and testing is now self-performed as a result of an individual taking the initiative to pursue the requisite certification and then put the knowledge and certification to use immediately. Through close alignment with the Automation Services group, the plant control system is fully supported by UVA FM staff. The team also continues to support tours for various UVA classes as well as events like FM Girls Day and CBIC.

As the University continues to grow and evolve, staff provides significant support to relevant projects. Those projects included but are not limited to the East Chiller Plant chiller addition, North Grounds Plant chiller addition, North Plant low temperature hot water project and the Ivy Mountain Central Utility Plant. Involvement with the various projects can range from concept design to boots on the ground and everything in between.

The team continues to build on and utilize the AiM platform to leverage the information for maintenance teams as well as enhance the information for assets by adjusting preventive maintenance information, adding equipment documentation for assets, and linking LOTO procedures to assets. Team members provide regular feedback to continuously improve the AiM tool for the group’s needs.

The Chiller Plants team completed an effort to improve Wi-Fi coverage throughout all plants. Primarily focused on safety by improving cell phone functionality and communication, the effort has also enhanced the ability to operate and troubleshoot plant equipment more effectively. The ability to have a device with an active and reliable network connection throughout the plant provides immense value when searching for documents or making control system adjustments to the plant(s).

Installation of an ATCS (automatic tube cleaning system) was completed during the summer of 2019 and startup will occur in September 2019. The ATCS has become standard equipment in all new plants and the team is working continuously to add the system to existing plants when and where it makes sense.
The team continues to standardize and evolve plant control system logic. More specifically, additional plant and loop management sequences have been developed that will begin to be implemented this fall. The effort to standardize the control systems and HMIs (Human Machine Interfaces) continues to serve the team well and allows the opportunity to continue building on top of the existing system to further optimize energy use and improve plant reliability.

Team members found and implemented a continuous improvement strategy for the automatic tube cleaning system. Adding a strainer to the system has improved reliability and simplified maintenance on the pump skid.

Pneumatic valves on the pumps and chillers at the South Plant addition have been converted to electrically actuated valves as part of the goal to ultimately eliminate the need for compressed air at the South Chiller plant.

**E&U Engineering**

Over the past year, E&U Engineering has partnered with contract engineering firm (AEI) on the Low Temperature Hot Water (LTHW) project, providing engineering and construction support. The project will convert the Academic portion of Grounds from steam and medium temperature hot water (230F) to LTHW (170F) and install a heat recovery chiller, allowing to more efficiently produce the necessary 170F heating water. E&U Engineering has gathered data, analyzed the existing systems, verified construction feasibility, optimized construction to limit outages, and reviewed the construction documents for accuracy, efficiency, reliability and resiliency. E&U will also self-perform the construction portion on eight of the 45 buildings within Phase I, including the Rotunda, the Chapel and Madison Hall.

This chart illustrates the coincident heating-cooling that the heat recovery chiller will provide
In support of the Low Temperature Hot Water project, E&U has modeled the existing chilled water and heating water distribution systems utilizing TERMIS software. E&U is committed to keeping the models up to date in order to monitor these systems, as well as enable accurate and timely responses to availability and expansion scenarios of the distribution systems. The models have been utilized to analyze various scenarios and determine the best path forward on the North Grounds Mechanical Plant and Distribution project, the West Grounds CHW Capacity project, and the Ivy Corridor Utility Extension project. E&U is working to develop live models of the various loops, utilizing inputs from our existing automation system to help identify issues within the distribution system earlier and aid in troubleshooting these issues. These models will also help optimize our distribution system by understanding paths of least resistance and exactly how water is flowing during different operating scenarios.
Heat Plants

To address a safety issue involving LOTO, Fall Protection and Rigging/Lifting, guillotine damper drives were installed on the outlet breeching of the three coal boilers. This allowed the operators to isolate the boilers for confined space entry without climbing out on the insulation and wrestling with a large hand wheel to open and close the dampers.

In the past decade there has been significant growth in UVA facilities connected to the Main Heat Plant. An additional boiler (hot water heater) is being constructed in the Main Heat Pant to meet this growing demand. The primary fuel for this new hot water heater is natural gas. The Heat Plants team has been integral to this project, providing design review, construction support, and ancillary system upgrades such as new polishers.

The Heat Plant Maintenance team has addressed several chronic issues this summer associated with the west side coal conveyer, baghouse #1, #2 and the fly ash silo.

The west side coal conveyer was consistently plugging due to coal fines and the wear plates had become eroded due to the corrosive nature of the coal. The solution was to install new manganese wear plates, redesign and replace conveyer flights, and rebuild the radial conveyor sweeps.

The baghouse leak detectors were creating false opacity alarms due to rust flakes creating erroneous readings. The maintenance team sandblasted, and epoxy coated the inside of the baghouses, and replaced the access door seals. To eliminate bridging in the ash silo, the insides were sandblasted, and epoxy coated, the access door seals were replaced, and air cannons were installed.
Utilities Distribution

The boiler heating Carruthers Hall failed this spring. To provide heat to the building while the boiler was being repaired, the Utilities team installed a portable emergency boiler. This provided continuity of operations within the building plus time for a quality repair to the boiler. This temporary boiler was built in-house by the Utilities team.

E&U is replacing existing infrastructure prior to failure to ensure sustainable, reliable systems.
E&U is performing new construction projects with in-house personnel.

![Slaughter Rec Center LTHW Installation](image)

E&U responds to emergencies and resolves issues to ensure customers receive uninterrupted services. E&U also provides emergency reporting to ensure compliance with the MS4 Permit. E&U supports and provides services throughout the university.

![Copeley Road 10” Water Main Break 7/21/19](image)  ![Emergency Chilled Water Leak South Lawn Gibson](image)

![Sewer System Response- McCormick Road](image)
E&U performs preventative maintenance to maintain a sustainable infrastructure.

Alderman Road Pump House Louver Installation

Big Bore Steam Tunnel Improvements

E&U is in the process of developing in-house trades expertise through classroom training and hands-on training with in-house staff. Utilities distribution is committed to developing the next generation of welders, plumbers, and pipe fitters.

Runk/Hereford College Domestic Hot Water
Automation Services

Controls Engineering

The Automation Services engineering team continues to provide design services and controls engineering for AS business units as well as consulting services to FP&C, Project Services, E&U, and Zone Maintenance. One of the key services of this team this year has been providing comprehensive controls design reviews on all major construction projects including most notably the Ivy Mountain Musculoskeletal building, Student Health and Wellness Center, the Inn at Darden, and the Physics Building Renovation.

As more equipment becomes network accessible, we have also gained significant experience with controls integration, including variable refrigerant flow systems such as the one installed at the Baseball Stadium Expansion and the Old Ivy Office Building. With increased interconnectivity of systems, cybersecurity also remains a focus of this team as we continue to seek and implement best practices for our various systems.

In-house Controls Installations

The primary focus of the installation team this year has been on the building automation system installation at Bond House. With the project on a very tight schedule, the installation team had to stay immediately behind the mechanical contractor to ensure the units were ready to function upon receiving power. The team’s organization and hard work paid off and helped lead to the project being ready for student move-in.

The installation at Bond House includes over 150 controllers and over 11 miles of wiring for roughly 1,000 physical devices. In addition to the Bond House project the installation team also provided controls installation services for the renovation of Carr’s Hill, Baseball Stadium Expansion, the HVAC projects at Memorial Gym and Slaughter Rec. Center, and a new chiller at the East Chiller Plant.
Building Optimization Team

The building optimization team (BOT) worked on several large controls replacement/optimization projects this year including the University Bookstore, Clemons Library, and the Drama building. These projects are providing better functioning, more comfortable, and more energy efficient systems. The capability of BOT has continued to develop, as it has begun to take on larger renovation projects in addition to the optimization work. These renovation projects included two large air handling units and renovated space at Clemons Library, renovated space at Carruthers Hall, and two new air handling units in the Physics Building. Additionally, BOT installed the controls for the first low temperature hot water conversion project at Drama and they will continue to provide in-house controls for the other buildings being converted by E&U.

Low temperature hot water installation at Drama Building.

BAS Maintenance

The maintenance team has been busy addressing service work orders and performing preventative maintenance as well as installing critical monitoring devices for numerous freezers/refrigerators for research and patient care. One of the largest customers for freezer monitor installations has been the Core Lab, which is in the process of getting all their critical freezers monitored by Systems Control. There have been reports of the monitoring devices notifying Core Lab staff of equipment failure before any products were lost, which could have cost hundreds of thousands of dollars in damage, so the hard work in installing these units is already paying off.

Another critical service of this team is the annual recertification of the BSL3 lab in MR-6. The service team performs preventative maintenance routines on all the major HVAC systems/controls associated with the lab area, including alarm reviews, pressurization checks, and air handler functional testing.

Dave Wright observes a recently installed freezer monitoring device in the Core Lab.
Geospatial Engineering Services

Service Lines

GIS, Document Management, Utility Damage Prevention, Space Management, Facility Research, BIM

Team Members

Jennifer Heckman, Brad Pace, Jason McNew, Garth Anderson, Juliana Millbern, Katie Puerini, Patricia Price, Artie McDonough, Matthew Bartley, Nicholas Bartley, Jeff Owen, Shawn Benson, Craig Bullock, and student interns.

GES Systems

System Diagnostics

- Implemented ArcGIS Monitor to view system statistics and overall health of Geographic Information System to facilitate application reliability and efficient troubleshooting

Database Reconfiguration & Quality Control

- Coordinated with FM-IT to create a new SQL Server and database in a new virtual machine environment
- Condensed three databases into one database by moving non-production data to other storage solutions
- Consolidated datasets and deleted redundant data where possible

New Grounds location app

New SQL server and database
GIS Projects

In addition to fulfilling the ongoing requests for geospatial information and basic mapping requests, the team completed several significant projects through collaboration with other teams within FM and across Grounds.

Sign Inventory Application

An application was created for interns to collect information about existing signs at buildings, for wayfinding, and other signs across Grounds resulting in a dataset of about 600 signs including a photo and details (sign type, size, etc.) that was collected over the 2019 summer.

GPS Data Collection

GPS data was collected to support projects such as Blandy Farm Biofilter Research, The Park Temporary Indoor Field, U-Hall control points for 3D model creation, and archeology data collection at project sites such as the Memorial to Enslaved Laborers and the East Range Stormwater Project.
Sidewalk Inspection Tools

The GES team assisted Facilities Management with a sidewalk inspection project using ArcGIS Collector, ArcGIS Online, and Microsoft SQL Reporting Services. Inspectors collected the locations needing repair, a priority of repair and a photograph of the damage. This information was presented through an ArcGIS Online map and a detailed SQL report.

Tree Collection Application

Expansion continued on the Landscape ArcGIS Collector project with the FM Arborists. They have collected attributes such as diameter at breast height, cabling, lightning protection, photos of some projects, identification of ash bore damage, and general maintenance notes on trees all throughout Grounds.
Public Visitor Website (https://visitormap.virginia.edu)

In May 2019, the Grounds visitor map website, optimized for desktop and mobile browsers, went live. This was created just in time to support visitors on Grounds for Final Exercises and Reunion Weekends.

CFO Walking Tour

A mobile application and printed pamphlet of select construction projects and points of interest was created to assist visiting CFOs with exploring UVA Grounds.

Hoo’s Reuse Map

https://sustainability.virginia.edu/topics/civicengagement/hoosreuse.html

The team created an application to embed in the Hoo’s Reuse website to show Reuse collection points across Grounds.
Health System Construction Projects Viewer

A web application was created to facilitate project coordination meetings showing construction project locations and details over time.

Document Management

This year the document management team continued to provide support to many teams across FM and the University for information and document management services. The focus alongside daily information requests and document processing was on data cleanup and the implementation of OnBase as an enterprise document management system.

OnBase Implementation

OnBase is the new FM enterprise document and content management system that will serve as a central repository for the Facilities Management organization as well as a platform to house business processes that are document reliant.
1. Document Classification
   - Conducted a thorough review of the various types of documents that GES stewards and created a new classification system specific to inventory and needs within the OnBase platform.
   - Classification of document types will improve data consistency, findability, and enhance usability.

2. Document Configuration
   - Configured document groups and types into OnBase with the associated metadata for each type.
   - Set required fields for each type and mapped out the data type for each field: numeric, alphanumeric, etc.
   - Mapped metadata fields with known values.

3. Migration Workflow
   - Created a processing workflow in the OnBase system that will assist in the migration of the archives, which contains over 1M files. The workflow connects data elements captured in our current database to metadata fields in OnBase.

Electronic Plan Review process with OUBO

The Office of the University Building Official will be reviewing all drawings within OnBase through Electronic Plan Review (EPR). They will also be able to permit, carry out and track inspections, and issue occupancy through OnBase workflow and forms.

- Completed plan review discovery and started initial OUBO user testing.
- Conducted needs analysis for a review project intake form and a customer portal for submitting documents for review.
- Started process documentation for permitting, inspections, and occupancy processes that build from the work accomplished in the document EPR process.
Document Cleanout Projects

- Assessed the condition and value of several abandoned records storage areas.
- Transported significant items to GES office for digitization and incorporation into the permanent collection.

Construction Project Record Documentation Cleanup

- As a continued effort in data cleanup as well as preparation for OnBase migration of the archives, the team identified over 900 projects without record documentation submitted to the archive since the year 2000.
- Working with FM project managers, staff was able to retrieve over 300 projects in six months.

Print Request Process Revision

- The GES print request process was separated from OUBO plan review submissions.
- The new form and simplified process will improve usability, provide additional information to ease financial invoicing, and establish tracking throughout the process.
Utility Damage Prevention

Training & Awareness

- Conducted Dig with CARE Training for teams across FM and external contractors (about 80 people).
- Conducted stand down training on three jobsites after utility damages occurred to help increase safety on these sites.
- Published the VA 811 Day safety poster with the Occupational Programs team to increase damage prevention awareness.

Utility Locating Projects

- Responded to approximately 300 tickets per month through VA 811 ticket requests.
- Prevented a potential damage to a live gas main through collaboration with a directional drilling contractor.
- Assisted Athletics and FM Utilities team with finding leaking water lines at Scott Stadium before the start of the football season.
- Continue to GPS utilities that deviate from plans and the GIS database.

Technology & Standards

- Continue to evaluate new locating devices, drones, and survey software to improve data collection efficiency and accuracy.
- Drafted a GES Information Packet process for construction projects to better leverage the information content stewarded by the GES team.
- Started requesting drill reports on directional drilling projects to help improve the data reliability and documentation of utilities installed through this method.
Space Management

Training & Data Enhancements

- Trained approximately 200 Survey Respondents to use FM:Interact for the recent F&A Survey that supports research space funding.
- Incorporated the legacy Building Data Repository data into FM:Interact (FMI).
- Upgraded the Housing drawing portfolio to AutoCAD and incorporated into FM:Interact filling a significant gap in floorplans previously not available to users.
- Continued to build out graphic themes and reports for standard data requests.
- Added about 22,000 people to workspaces in FMI.

Building Information Modeling

Standards and Integration

- Started a process to review models submitted under the current contract language for BIM deliverables.
- Researched new data integration methods and piloted the integration of models with FM: Interact (the current space management system).
Systems Engineering

Metering & Billing

Data Integrity, Data Reconciliation, and Data Visualization are the three primary focus areas for the Metering team, which is entrusted with growing and maintaining the breadth of University meters for billing as well as plant or building operations. There are currently over 3,100 active University physical and virtual meters in metering and billing information systems, and over 230 meters this year were newly installed, upgraded, or connected via automation systems for the first time.

The team has a goal of greater than 95% reconciliation between University distribution systems and consumers for total unit volume and total dollars; fiscal year 2019 saw over 99% reconciliation on a billed unit basis. The team also has a goal of greater than 95% on a per plant or distribution system basis; that goal was achieved in fiscal year 2019 for many plants and systems. Improvements made this year toward these goals include adding steam and medium temperature hot water (MTHW) distribution meters and implementing regional reconciliation definitions to help target areas of greatest opportunity. Other enhancements this year include developing new user interfaces in the ICONICS platform to help expose metering problems more quickly and establishing the Schneider Electric Power Monitoring Expert (PME) system as a focal point for BAS-connected meters to help increase the robustness of metering data. Currently, there are over 1,000 meters connected using the PME system.

The team continues to use Veoci software to manage the monthly process for billing, acquiring manually read meter readings, and tracking issues and overall progress in the billing process using workflows and tasks. Tableau is also used to determine trends and catch any anomalies during monthly billing cycles. The team worked this year to clarify and update its meter plan to guide upgrades and replacements in the coming years.

Of special note is the large amount of work the metering team performs in support of construction and renovation projects, often stepping in to fully install or complete contractor metering work. The team is highly respected for their professionalism, workmanship, and attention to safety.
Some of the projects completed this past year include: Newcomb Hall domestic water meter upgrade, Olsson Hall Living lab sub meter project, Runk Dining & Hereford College CHW & MTHW energy meters, Multistory Building electric meter upgrade to PME, Hospital ED Expansion CHW energy Meter, McLeod Hall CHW energy meter upgrade, McCormick RD Phase 2, Hereford College - new electric meters at each dorm connected to PME, Data Center - main and generator meters connected to PME, Alderman Pump Station domestic water meter upgrade connection to PME, Clemons Library connected to PME, JAG School domestic water project for ED, JPU - all meters connected to PME, Physics – meters connected to PME, Bice House, Shea House and Casa Bolivar PME meter upgrades, Massie Plant oil meters upgraded to Flexim and connected to PME, 400 Ray C Hunt electric meter installed and connected to PME, Nau Hall meters upgraded and connected to PME, and district metering added and connected to PME.

**Information Systems**

General information systems include a multitude of technologies, such as Microsoft (MS) .Net, MS SharePoint, MS SQL Server, MS Reporting Services, Building Automation Systems (BAS), Supervisory Control and Data Acquisition Systems (SCADA), ICONICS, physical resources such as server hosts and virtual machine (VM) servers, and various software applications such as Tableau and Qlik.

General information systems initiatives focus on data development and reporting. The team continues to leverage the ICONICS platform to develop and enhance information, trending, and visualization for buildings, plants, and distribution systems. Visualizations and associated trends and calculations were added this year for remote (off Grounds) solar arrays related to a partnership between UVA and Dominion Energy. The ongoing creation and revision of Meter Info Pages helps visualize meter connections at the building level. The long-lived Visual Basic (VB) UtilityPro application will be retired next year, and this year the team began the process of migrating forms functionality for metering and billing onto the ICONICS platform.

Sample ICONICS visualizations:
Other team efforts this year include

- spending significant time and energy to support FM server and systems upgrades,
- migrating metering data from our older SQL Server-based trend system into the ICONICS Hyper Historian (HH),
- adjusting data processes related to changes to the WebCTRL BAS, and
- creating a variety of Tableau dashboards for metering, billing, and emissions information.

The team also regularly

- works with master’s degree program students and faculty, such as with the Data Science Institute, to provide building and electric substation data for projects related to data modeling and forecasting,
- provides data to FM, University, and consulting staff for various construction and improvement projects, and
- supporting Delta Force and Office for Sustainability efforts.

Additional visualizations:
Systems Control Center

Mission Overview

Operating 24 hours a day/7 day a week, the Systems Control Center’s (SCC) 12 operators provide real-time monitoring of utility and building systems, ensuring optimal operating conditions for more than 250 buildings across Grounds. On any given day, the Systems Control Center is challenged by system vulnerabilities and natural (weather) threats of varying size and scope. In addition to the 13,475 work orders dispatched, SCC coordinated recovery of more than 90 significant utility outages and other facility events affecting the University, including UVA Health facilities. During all these events, SCC strives to provide timely, consistent, and meaningful communication to the University community. As the emergency coordinator for Facilities Management (FM), SCC works to ensure that FM’s emergency response plans integrate with the University’s emergency response.

Focus Areas

The Systems Control Center increased permanent staffing and restructured somewhat this year after the departure of several long-term staff members - Chris Greene, Tom McRay, and Roger Yeatts. The restructuring will help provide greater organizational resilience and increased opportunities for supervisors and staff to invest more time performing “deep dives” into the breadth of information available to them in the variety of monitored systems. As part of the changes, five new operators started this past year: Randy Davis, Gregg Goff, David Hasson, Lucas Todd, and Zach Williams.

Operators reviewed 45 controls projects and freezer installations before moving these systems and equipment to the production server for the building automation systems (BAS). It is through these reviews that the team assures the BAS guidelines for point naming and alarming are followed. This process continues to help minimize nuisance alarms. Additionally, SCC continues to be a key partner for sustainability initiatives, working with facility coordinators, Green Workplace Champions, and the Green Labs focus group, identifying building equipment energy waste and scheduling opportunities.

Of Special Interest

The UVA-Dominion Energy Ductbank project made a substantial, positive impact, minimizing electric disturbances in the UVA Health Grounds and in Central and West Grounds areas. With fewer disturbances, there are fewer equipment interruptions and fewer callbacks needed to remedy any associated issues. The operators now have more time to dedicate to investigating and responding to other issues. The changes have also lessened concerns about impending storms and their potential impact on Grounds activities and the control center.

Finally, the team recognizes its long-time SCC Manager, Nina Green, who was promoted into a new role with FM’s Health System Physical Plant. Nina was the catalyst for significant and positive changes for SCC over her tenure. The Systems Control Center team wishes her well in her new role and offer many thanks for her contributions since arriving.