



Spotlight

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REGULATORY UPDATES | BEST PRACTICES | NEW TECHNOLOGIES

NOVEMBER 2016

Protecting our History for Future Generations

Historic preservation: the practice of protecting and preserving sites and structures reflecting elements of cultural, social, economic, political, archaeological or architectural history.

Historical preservation frames a community's past and defines its heritage. Preservation initiatives have a positive impact on economic growth for a community in the form of higher property values, increased revenue, and job creation. Rehabilitated and renovated historic buildings are core components in revitalized downtowns and cultural venues. From an environmental perspective, renovations and rehabilitation of existing properties results in less construction, demolition, and hazardous material debris. Additionally, the cost of rehabilitation is often less than new construction with the energy savings being considerable since there is no energy used for demolition, new construction or the manufacture of new materials.

Stewardship of our environmental, cultural and historical resources is part of who we are at Spotts, Stevens and McCoy, enriching the quality of life, recognizing that many will be touched by the work we do. Our family-owned and managed firm is proud to be a part of both the ancestry and the multiple projects we've supported through the PA Historic and Museum Commission.

SSM recently completed an electrical design project for the Pennsylvania Historic Museum Commission (PHMC). The Ephrata Cloister Exterior Lighting Project, located in Ephrata, PA, consisted of replacing existing parking lot and area light fixtures, and upgrading building façade lighting of the historic buildings at the Ephrata Cloister. The project goal was to upgrade the existing parking lot lighting for improved illumination of parking areas. The existing lighting was on 12'-14' poles with post top HID and/or quartz lamps. The post top fixtures distributed light beyond the limits of the parking lot into areas not requiring illumination. The scope of work issued by PHMC required even, safe

illumination levels of the parking lot. The existing pole locations and concrete pole bases were utilized where possible as a cost saving measure.

The design implemented by SSM utilized energy efficient LED light fixtures, arm mounted, on new poles located on the existing pole bases. Additional poles and light fixtures were added as required to illuminate areas previously unlit by the existing fixtures. The height of the new light pole was increased to allow for the light fixture to be mounted at a higher elevation to provide increased distribution of light and maintain a more even illumination of the parking lot. The LED fixtures also operate at a much lower wattage with a longer lamp life providing an operational cost savings for the facility.

Existing pathway lighting is provided by historic period style light fixtures, originally having a gas source. The light fixtures lamp source will be converted from incandescent to LED. SSM researched and determined the best lamp style to utilize in these fixtures without detracting from the historic period style of the fixtures. The site currently highlights the building façades of the historic buildings. Existing façade lighting is provided by ground mounted and post mounted quartz style light fixtures. These fixtures will be replaced, one for one, with new light fixtures with an LED lamp source. Existing locations are utilized to save on the cost of installation. The light fixtures were selected based on the best distribution available to highlight the full area of the building facades. Cost savings will be achieved by longer lamp life and lower power consumption of the LED lamps.

Spotlight on

HISTORIC PRESERVATION

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- In Philadelphia, houses in National Register historic districts command a premium of 14.3% over comparable properties not in historic districts. Houses in local historic districts command a premium of 22.5% over comparable properties not in historic districts. — *The Economic Impact of Historic Preservation in Philadelphia (2010)*
- Construction debris accounts for 25% of the waste in the municipal waste stream each year. Demolishing 82 billion square feet of space will create enough debris to fill 2,500 NFL stadiums. — *National Trust for Historic Preservation: Sustainability by the Numbers.*
- Spending by visitors to twenty surveyed Civil War battlefields generated a total of \$21 million in state taxes and another \$11.7 million in local government revenues. This amounts to approximately \$5.22 per visitor at the state level and another \$2.92 to pay for local services. — *Blue, Gray, and Green: A Battlefield Benefits Guide for Community Leaders (2006)*



Spotts, Stevens and McCoy is an engineering and consulting firm serving education, healthcare, industrial, and commercial clients as well as local, regional, and county government entities. While the company's primary market is a regional footprint including Berks County and the Lehigh Valley, SSM serves clients throughout PA and the Northeastern United States as well as to some international clients.

EXPERTISE

- Building Engineering
- Site Planning and Design
- Infrastructure Planning, Engineering and Design
- Land and Building Survey and Data Capture
- Water Planning, Engineering and Design
- Wastewater Planning, Engineering and Design
- Building, Infrastructure and Environmental Modeling
- Construction Services

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Preserving Historical Structures

Exploring Technology Applications

High-Definition Laser Surveying (HDS) offers a non-intrusive, non-contact method to obtain three dimensional geometry measurements and models of existing structures and sites for both large and small-scale projects. SSM uses HDS for historic building preservation to acquire as-built information inside and outside of any structure quickly and efficiently.



THE PAGODA

In 2007, SSM was the engineering firm selected, along with Kautter and Kelley Architects to repair and restore portions of Reading's historic landmark, the Pagoda. SSM utilized HDS to assist the team's efforts in documenting repairs and modifications. Because so much data was captured in 2007, SSM was able to quickly compare 2013 scan data and identify the source and extent of damages and movement of one of the structure's tall retaining walls. If a picture says a thousand words, then a scan can say a million!

LAFAYETTE COLLEGE

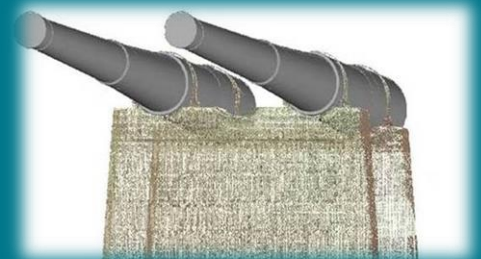
SSM scanned both the exterior and interior of a three-story historic building. Access to the building was limited due to the start of classes. The on-site scanning effort took three days and included ninety scan stations. SSM delivered a Tru-View (virtual site visit) of every scan station, floor plans, cross-sections, elevations views of the buildings, high-definition photography and a topographical site plan.

PENNSYLVANIA HISTORIC MUSEUM COMMISSION

Gun Barrel Installation | Pennsylvania Military Museum

Provided engineering services to support the installation of two, 14-inch diameter, 53-foot-long gun barrels from the Battleship USS Pennsylvania (BB-38) on a concrete pedestal. Oversaw a geotechnical investigation and prepared structural designs to design pedestal that would approximate the manner in which the guns appeared on the ship, including a 28' diameter disc that replaces the ship's turret.

USS Pennsylvania (BB-38) was the lead ship of the Pennsylvania class of United States Navy super-dreadnought battleships. At the time of the Japanese attack on Pearl Harbor on 7 December 1941, Pennsylvania was in dry-dock in the Pearl Harbor Navy Yard. She was one of the first ships in the harbor to open fire as Japanese dive and torpedo bombers roared out of the high overcast. Repairs were made to enable Pennsylvania to steam to the Marshall Islands where she was used as a target ship in the Operation Crossroads atomic bomb tests at Bikini atoll during July 1946. She was then towed to Kwajalein Lagoon where she decommissioned on 29 August. She remained in Kwajalein Lagoon for radiological and structural studies until 10 February 1948, when she was sunk stern first off Kwajalein. She was struck from the Naval Vessel Register on 19 February. Two of her 14-inch guns are now kept outside the Pennsylvania Military Museum in Boalsburg, Pennsylvania.



Heating Historical Structures

Exploring Alternative Technologies

From materials to system capabilities, it's true, 'they don't build them like the used to.' Retrofits, renovations, and adaptive reuse projects present some challenges in terms of the systems in the buildings.

PENNSBURY MANOR

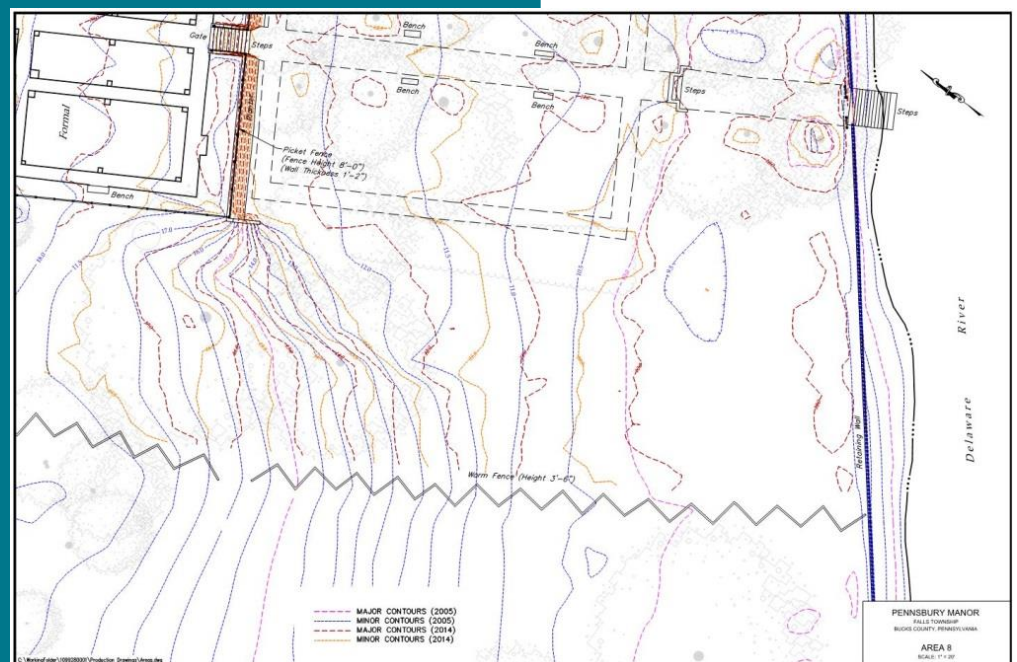
Known as "William Penn's Country House", Pennsbury Manor includes several buildings recently included in a design project to replace and upgrade existing HVAC systems on the campus with geothermal systems. Working closely with the Department of General Services and The Pennsylvania Historical and Museum Commission, the multi-discipline mechanical, electrical, and hydrogeology staff of Spotts, Stevens and McCoy, along with architectural and archaeological partners took on the challenges often presented by similar historic and sensitive structures. Outdated HVAC, plumbing and electrical systems are common limitations that can be resolved with innovative application of new technologies. SSM designed the HVAC systems within the buildings, electrical and plumbing systems in support of the HVAC system design, coordinated with Agency Fire and Security and controls consultants, and developed a preliminary construction phasing plan for the project. In addition we analyzed the assessment reports and developed a preliminary abatement plan.

The Manor House – It was imperative for the mechanical system to integrate with the existing architecture. A whole house ventilation system was designed to attempt to improve the indoor environment during the cooling season. Geothermal water source heat pumps were located in the basement to draw outdoor air into the building and supply it through floor registers at existing chases. The air was then exhausted by fans located in the attic space. A geothermal boiler was also installed to replace two electric boilers. The geothermal boiler and geothermal heat pumps used an open loop ground system to transfer heat to and from the ground water.

The Visitor's Center – The open loop system was also used at the Visitor's Center. The existing system consisted of an air-cooled chiller, a gas boiler, fan coil units, and DX air handling units. The existing chiller was replaced with a geothermal heat recovery chiller. The chiller is capable of making heating water and chilled water simultaneously so there is no longer a need for the existing oil-fired boiler. The existing DX cooling coils and electric heating coils were replaced in the air handling units and fan coil units so the entire system can run off the new geothermal heat recovery chiller.

The Crozier House – The existing heating system at the Crozier House was an oil-fired boiler with radiator units located throughout the space. There was no existing air conditioning system. The new mechanical system design is a VRF system that will be able to provide heating or cooling simultaneously to each space.

Pennsbury Manor is a historic recreation of William Penn's 17th century estate, it is located along the Delaware River and open to the Public for tours. There are several other buildings located on the 43-acre property including a Visitor's Center, and the Crozier House which is currently used as office space.



The design team was also supported by the Survey and Data group at SSM, who utilized high definition scanning to collect high-accuracy topographical information.

SSM News

Pilots Earn Certification

Two members of the SSM Survey team: **Chris Snyder, PLS** and **Steve Smith** have received their certification as Drone Pilots.

On June 21st, 2016 the FAA finalized a new regulatory framework for small, unmanned aerial systems. Titled Part 107, these new regulations created a new drone certification process that covers the majority of low-risk, commercial UAS flight operations for all commercially operated drones. Commercial refers to any kind of flight operation that can be tied to economic benefit. These new regulations were implemented on August 29, 2016.

New Hire

SSM welcomes **Chris Colvin, EIT** as a Graduate Engineer in the Electrical Engineering Department. He is a 2016 graduate of James Madison.

Boomerang Club

SSM celebrates another Boomeranger as we welcome **Sam Zook, PE**, as a Surveyor in our Survey and Data Capture Department. He is a 2009 graduate of Pennsylvania College of Technology. SSM's Boomerang Club was instituted in 2007. The club is based on the most recognizable type of boomerang, the Returning Boomerang; a special kind, that when thrown correctly, travels in a curved path and returns to its point of origin. The club was created as a means of celebrating those employees that had traveled their career path and returned to their point of origin, SSM. Our company's spirit, professional opportunities and working environment are certainly part of the power that draws our Boomerangers back.



DRONE TECHNOLOGY

Capturing the Coordinates from the Air

We know data. Since 1932, information management has been a core component of SSM's services; improving efficiency in operations, decision-making, environmental management, and engineering design. The combination of our intimate knowledge of the industry, our extensive background in information management, and our continuous commitment to leveraging technology to improve operations allows SSM to bring engineering services to life.

We are using drone technology, HDS and BIM on our projects to enhance our collaborative relationships for outstanding results. We can measure things that couldn't be measured before, capture images of existing conditions for future reference, bring information to your fingertips as well as create reference points for future site considerations. Drones make a power solution for monitoring construction, capturing hard-to-reach details, and documenting infrastructure on expansive sites.

APPLICATIONS

- Construction Monitoring
- Volumetric Computations
- Erosion and Damage Assessments
- Hot Spots/Heat Loss Detection
- Aerial Site Evaluation
- Litigation Support
- Rooftop Evaluations
- System Layout



Drone technology captured this Reading landmark at 30 meters AGL (above ground level). Great tool for capturing photography and structural details than someone could reach from the ground.