







# Renovating a 120-year-old church using modern technology

Perched high above Augusta Street in downtown Staunton, Virginia, St. Francis of Assisi welcomes parishioners and guests from this modest community of 24,000 residents.

**BY MEGY KARYDES**

Photo courtesy of Tim Hoysradt Photography

The 120-year-old Gothic-style Roman Catholic church was constructed in 1895 by a group of Irish immigrants to accommodate the city's booming Irish Catholic population. To pay tribute to the parish's Irish heritage, they selected green serpentine for its exterior as part of the design. That decision

would become an issue more than 100 years later when the existing serpentine had deteriorated to such an extent that safety had become a concern.

To temporarily halt the hemorrhaging, catch-guards were put into place in certain areas around the entire facade of the church to trap the material





that was spalling and falling off of the building. The parishioners knew they had to replace the serpentine material that was failing, but wanted to match the pattern of the 120-year-old stones while keeping the existing limestone material in place.

Renovation projects where current materials and designs must be matched can bring a host of challenges, but thanks to technology, often can be overcome. One of the church's building committee members reached out to Coldspring, a stone supplier and fabricator that has been serving the architectural, memorial, residential and industrial markets since 1898, for a consult. In addition to a bronze foundry, the company has operations across the country, including 30 quarries.

"Coldspring arranged several visits with the parish and project engineer to gain a greater understanding of the project needs and concerns," said Duane Krueger, regional sales manager with Coldspring.

"The architect and the church committee's main concern was aesthetics and to keep the historic value of the church by maintaining the current Gothic style, look and feel," added Kayla Strand, sales coordinator with Coldspring. "They were looking for a stone that matched closely in color to the remaining green serpentine material. A primary objective was to find a natural stone material that had strong physical properties that would last for another 100 years or more."

**St. Francis of Assisi is a 120-year-old Gothic-style Roman Catholic church which holds a prominent space in downtown Staunton, Virginia, home to a community of 24,000 residents. Photo courtesy of Tim Hoysradt Photography**



# Mother Nature's Green Building Material

This new sustainable stone standard (ANSI/NSC 373) will transform the material selection of natural stone for architects.

Sponsored by MIA+BSI: The Natural Stone Institute, Natural Stone Council, Coldspring, Michels Stone, Northern Stone Supply, Stony Creek Quarry, and TexaStone Quarries.

By Celeste Allen Novak FAIA, LEED AP BD+C and Robyn M. Feller

In the 1990s, "design thinking," a method of using synthesis to analyze complex problems, was used to generate solutions to the growing problems from climate change. Architects like William McDonough began to rephrase the questions surrounding the degradation of natural resources and pollution as a design problem. In his seminal book *From Cradle to Cradle*, he introduces what has now become a tidal wave of life-cycle analysis (LCA) environmental

initiatives that document where and how materials are sourced, produced, transported, and reused. Today, architects, landscape architects, engineers, contractors, building owners, managers, and the public are driving a building revolution that encourages the design and construction of healthy built spaces. These projects give to rather than take from the environment from design through construction practices, including the choice of sustainable building materials.

 Continues at [naturalstoneinstitute.org/sustainabilityceu](http://naturalstoneinstitute.org/sustainabilityceu)

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Natural stone is beautiful, durable, sustainable, and easy to maintain. Stone can be used in a wide variety of exterior and interior applications, as seen in this Las Vegas residence. This charcoal and white quartzite stack stone from Northern Stone Supply was supplied by Arizona Stone.

## PROFESSIONAL DEVELOPMENT

1 PDH, LA CES/HSW 

1 AIA LU/HSW 

1 GBCI CE HOUR 

0.1 IDCEC CEU 

1 LFA CEU 

### Learning Objectives

After reading this article, you should be able to:

1. List the components of a new sustainable certification standard ANSI/NSC 373, which provides a life-cycle analysis (LCA) for dimensional stone products.
2. Define the various components of an LCA.
3. Discuss how compliance to ANSI/NSC 373's national and international requirements for environmental, ecological, human health, and social responsibility in stone quarrying and production satisfies the growing demand for sustainable product declarations.
4. Describe how the components of ANSI/NSC 373 are aligned with green building rating systems, such as LEED and the Living Building Challenge.
5. Explain how the Chain of Custody Standard (NSC COC) for natural stone products ensures the traceability of certified stone throughout the supply chain, from quarry to gate.

To receive credit, you are required to read the entire article and pass the test. Go to [naturalstoneinstitute.org/sustainabilityceu](http://naturalstoneinstitute.org/sustainabilityceu) for complete text and to take the test for free.





## **TRYING TO REPLICATE STONE BUILT BY HAND**

The church considered several stone materials in their evaluation. “They wanted to make sure they did their due diligence to properly evaluate suitable material options from an aesthetic, physical property and performance consideration,” said Krueger. “They wanted to assure the members of the parish congregation that an appropriate material would be selected to best replicate the existing material, provide lasting quality and preserve the church’s historical value.”

Choosing the right stone wasn’t the only thing to consider. Originally built by hand, many of the serpentine pieces were very irregular and joints varied in size. Matching the existing pattern presented another challenge.

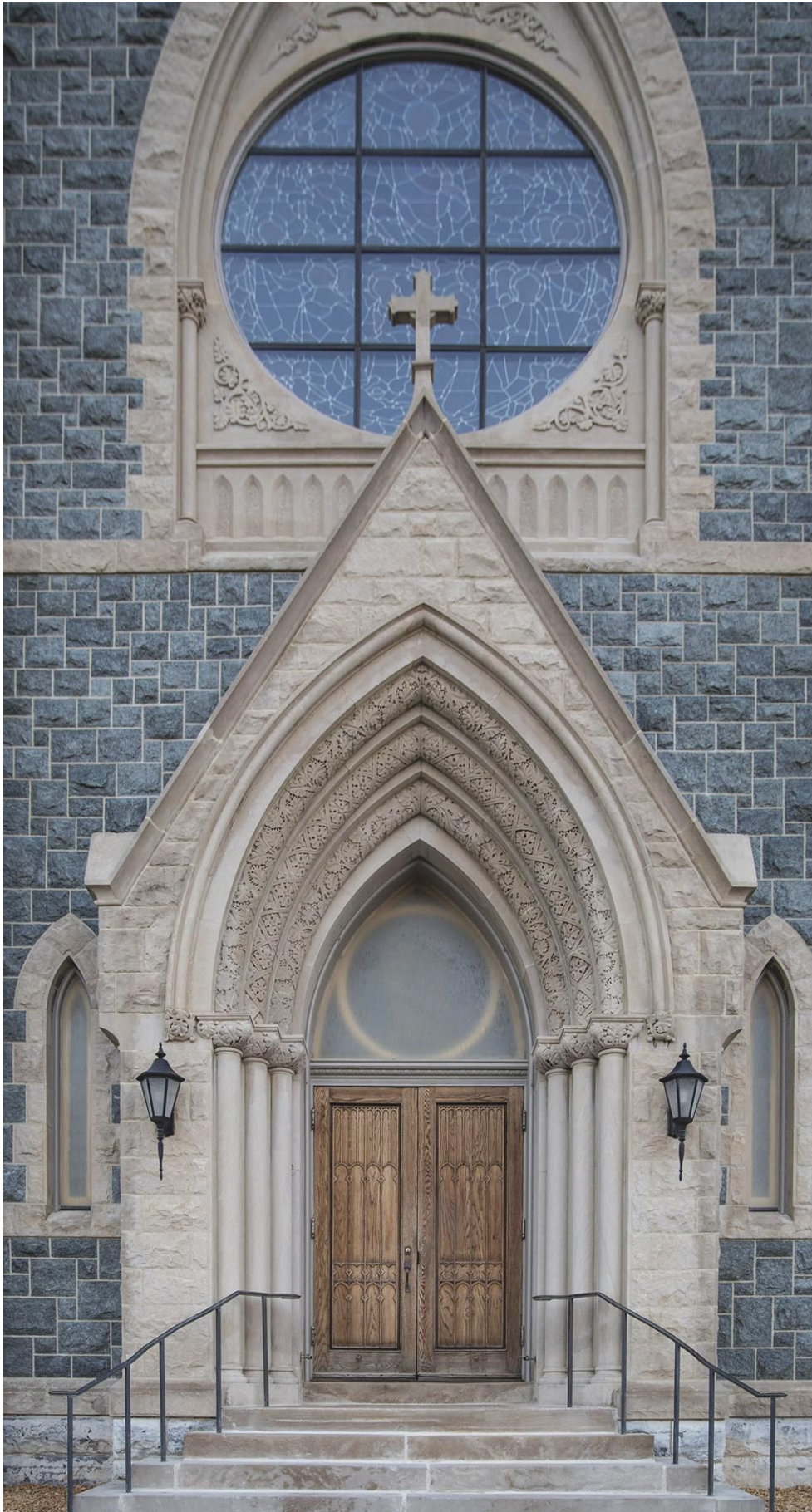
After careful consideration, the church narrowed their options and chose Mountain Green granite, as it felt it to be both a close match and an ideal material. Coldspring also offered the technology necessary to replicate the existing serpentine pattern.

“With an understanding of the preservation and restoration requirements, Coldspring was able to provide stone material and fabrication options for the project,” noted Krueger.

There is always a high degree of concern and emphasis regarding the preservation of the stone color and aesthetics, he admits. “In conversations with one of the church building committee member contacts, it was noted

**The years of planning, fundraising and execution were well worth the wait. St. Francis remains perhaps the most beautiful structure in downtown Staunton, Virginia, with a heritage preserved for many years to come. Photo courtesy of Tim Hoysradt Photography**





that there were some early concerns with the material color and that the monsignor even asked that all the parishioners pray that the stone is green enough," he added.

To assist with fundraising efforts and provide a visual representation of the end result, the company provided a mock-up of the project in Mountain Green, a granite quarried from their Au Sable, NY, facility, for the church to place on display in 2013.

Ultimately, everyone was on board and excited. "We provided them with a product that matched what they were looking for aesthetically with our Mountain Green granite," noted Krueger. "And we came up with a systematic approach to fabricating the project."

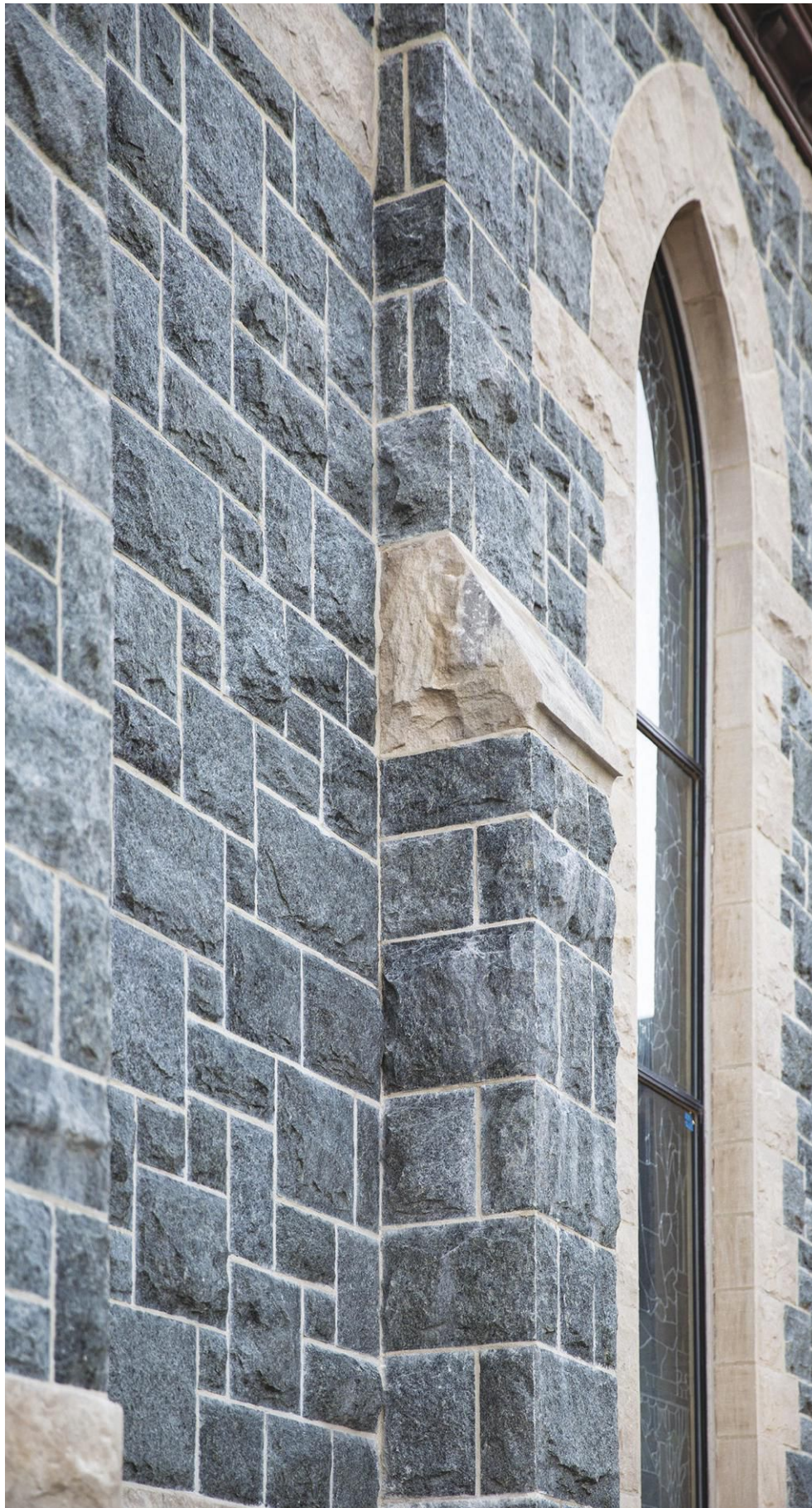
Using 3D scanning technology would prove to be key to this project. Other ideas were considered, included providing blanks or sticks to the jobsite, which would then have had to be cut onsite. Lack of space and the church being occupied made this option not viable, as the staging area for the project was a small parking lot.

Since a critical part of the project requirements was matching the existing serpentine stone pattern while keeping all the current limestone in place, the best way to duplicate the existing pattern without removing every single piece, field measuring and reproducing, was 3D scanning.

While Coldspring had been using 3D scanning on smaller projects that

**The parishioners knew they had to replace the serpentine material that was failing, but wanted to match the pattern of the 120-year-old stones while keeping the existing limestone material in place. Photo courtesy of Tim Hoysradt Photography**





Strand would consider more sculptural in nature, she admitted that this project was different in both size and scope.

"This methodology allowed us to scan the entire building, create a shop drawing for approval submittal process, and fabricate and deliver material to the site within the project schedule," said Strand.

### **PRAYERS ANSWERED: USING 3D SCANNING TECHNOLOGY**

A complete scan of the church produced a 3D model, which was then converted into 2D documents used to trace the pieces. Next, Coldspring used the 2D drawings to create a 3D Revit model. The extensive efforts ensured that the new façade would replicate the existing with accuracy.

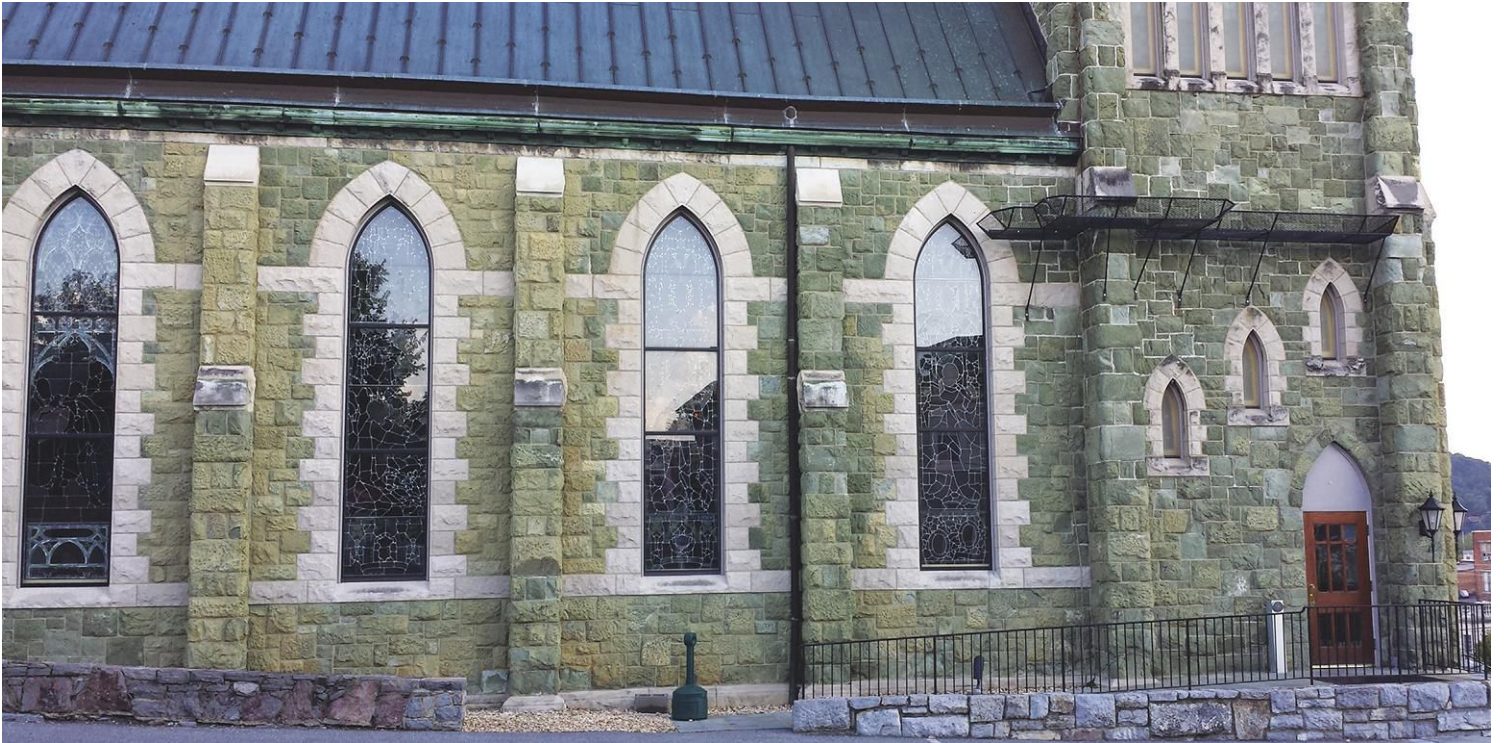
Since the limestone was to remain, that required shoring. "Behind the stone, there was an existing brick façade which had to be torn out and replaced as well," added Strand. "The installation process was strategically and systematically sequenced by the engineering firm to ensure there was no harm to the integrity of the building's exterior and interior. For us, it required extra detail on our drawings."

Each piece of stone had a specific stone mark and piece number in an effort to keep tabs on where each stone fit into the picture, noted Strand.

"For example, 'A-1' told you that the piece belonged in bay A, and piece 1 was labeled on the drawing for ease of installation," she explained. "Ultimately

**In total, 6,706 4-inch cubic granite pieces in Mountain Green with a Split finish were produced and installed at St. Francis of Assisi. Photo courtesy of Tim Hoysradt Photography**





Choosing the right stone wasn't the only thing to consider. Originally built by hand, many of the serpentine pieces were very irregular and joints varied in size. Matching the existing pattern presented another challenge. Photo courtesy of Coldspring

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we had to fabricate to the way in which the project was being installed. It was an extremely difficult installation job and the stone installer, Rugo Stone, did an amazing job.”

Both Strand and Krueger gave credit to their stone installer. Krueger knows how important and integral the installation of the material was on the project’s success. “Rugo Stone provided the required knowledge, expertise and high-level quality needed to meet the project restoration and preservation requirements of this historic church,” he recognized.

Despite the advanced scanning technology, some details could not be detected from the outside of the church. For example, some areas of the building were not visible from the ground, where the scan was performed.

To meet this challenge, photos and field measurements were taken to fully replicate the pieces. Piece size and joint variations were reconciled during the drafting process.

It should be noted that the church needed to remain open during the entire construction process. There are services every weekday, from Tuesday through Friday, and four services over each weekend. There were certain hours that the installation crews could work and certain holidays/functions that they were not allowed to work.

Coldspring and its teams worked around the timing issues and everyone kept their eye on the goal. As every piece was meticulously created and placed, the church started to look like a better version of its old self.

## THE REVEAL

Strand admits that the most exciting part of the project was watching the overall transformation of the church.

“I had the opportunity to be on the jobsite multiple times,” she said. “I got to see the scanning and the shoring process. It isn’t very often that as a material supplier we get that involved onsite, so this project was special in that regard.”

For her, the before-and-after photos don’t look all that different. Instead, it looks like the church was just cleaned really well, which was exactly the intent of the architect and church committee. “They didn’t want a drastic change, they wanted it to look exactly the way it did when it was first built, and I believe we achieved what they were looking for,” she added.



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To pay tribute to the parish's Irish heritage, the original builders selected green serpentine for its exterior but that decision would prove to be an issue 100 years later when the existing serpentine had deteriorated and safety had become a concern. Photo courtesy of Coldspring



To help with the placement, each piece of stone had a specific stonemark and piece number so once the stones were ready to be placed, it would be easier to determine where each stone belonged. Photo courtesy of Coldspring

Overall, the church committee and members were extremely pleased with the end result."

For Krueger, the project provided a variety of exciting accomplishments. "Ultimately, it was a great achievement to have satisfactorily met the expectations of the parish and its members on something that was very significant and integral to their lives," he noted. "It was exciting to use the scanning technology and a new process that had not been used previously by Coldspring to achieve the desired outcome. It was exciting to be a solutions provider and to work the various entities through the entire development, design, fabrication and installation process."

He added that this project, which won a 2016 MIA+BSI Pinnacle Award of Merit in the category of Renovation/Restoration, was definitely one of the more rewarding restoration projects he's ever worked on during his career.

In total, 6,706 4-inch cubic granite pieces in Mountain Green with a split finish were produced and installed at St. Francis of Assisi in downtown Staunton, Virginia. The church restoration was completed in May of 2016, and Bishop Francis DiLorenzo celebrated with a mass to commemorate the renovation's completion. The years of planning, fundraising and execution were well worth the wait — St. Francis remains perhaps the most beautiful structure in downtown Staunton, with a heritage preserved for many years to come. ■

### St. Francis of Assisi Church Staunton, VA

**Architect:** Frazier Associates, Staunton, VA

**Stone Supplier/Fabricator:** Coldspring,  
Cold Spring, MN (Mountain Green granite)

**Stone Installer:** Rugo Stone, LLC, Lorton, VA