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Reinventing the Wagener Building
Surveyor and laser scanner collaboration helped restore this 1880 Charleston landmark

Situation

Falling exterior bricks and floors so out of level they were "… almost an ADA ramp" were just a few telltale signs the property at 161 East Bay Street needed work.

A lot of work.

The last tenant responsible for improvements, a national brewery, abruptly closed their doors rather than face the multi-million dollar task of restoring the fabled F.W. Wagener Building in downtown Charleston, S.C.

When Marc Eves, project manager at Brown-Glaws Contractors, made his first tour of his firm's next renovation project, the thought of "How is this building still standing?" crossed his mind after reviewing previously hidden structural issues.

The Wagener Building, a three-story, 140-year-old brick and timber-framed structure, commands a storied place in Charleston's history.

Beginning as wholesale grocery store, the building supported the sale of agricultural goods bound for export on an adjacent wharf. The building continued to serve agricultural interests until the mid-1930s. According to Christian Hughes, historic preservation manager at Brown-Glaws, the Wagener Building once featured open 20,800 square foot floorplans before a renovation in 1980 divided the building into front and back components. The front half was repurposed as a restaurant; the back half as residential condominiums. Meanwhile, significant structural issues went unchecked.

The Wagener Building's colorful past and signature downtown location dared a visionary owner to step forward with a renovating spirit. Enter Heights Equities. In early 2018 Heights Equities officials called Brown-Glaws Contractors, skilled in historic
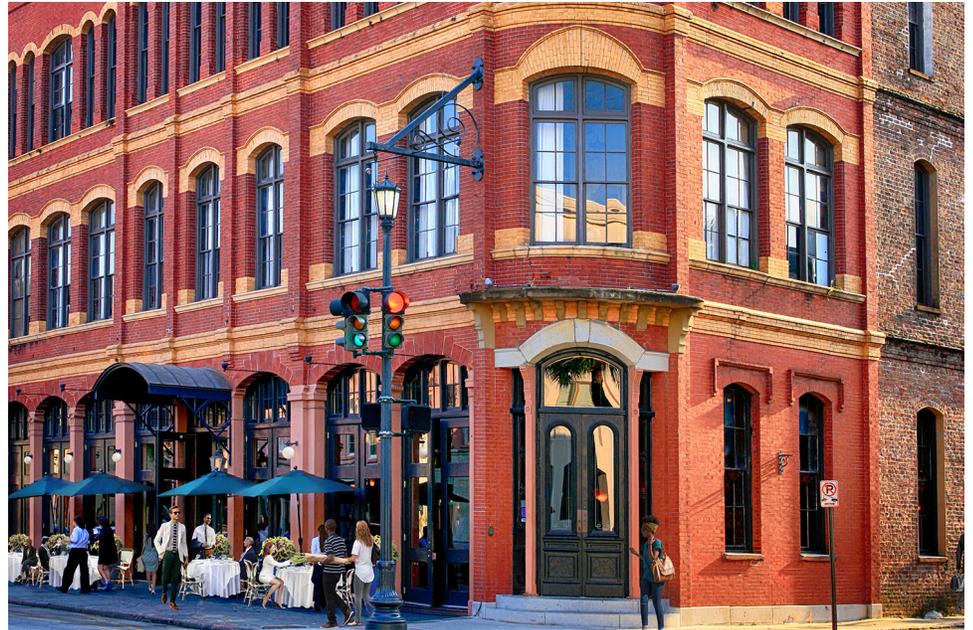
With the help of laser scanning technology, Brown-Glaws Contractors will renovate the 1880 Wagener Building into an events center. Photo courtesy Liollio Architecture

renovation and the art of claiming valuable tax credits, with instructions to determine the feasibility of a comprehensive makeover.

The ultimate goal is turn the Wagener into the region's premier events center, capable of staging everything from lavish weekend weddings to technically sophisticated corporate presentations, while honoring the building's amazing history.

Challenge

Among the first steps: Determine the as-built conditions of the Wagener. Eves and local architecture firm Liollio Architects had certain informational assets, notably construction documents from a 1996 renovation attempt. But could he and the project team trust that information? Was it accurate enough to base multi-million dollar decisions on? "It's probably the toughest project we've done to date, just in

detail and logistics," Eves says. Eves authorized a top-to-bottom survey, just to be on the safe side.

Not long into the survey, Eves took a call from survey crew chief. He was informed of a major discrepancy between the drawings and as-built conditions. "It turns out the building was about a foot longer in two directions than indicated. In existing conditions, you're used to adjustments, but not like this," says Eves.

As extra insurance, Eves also brought in Dustin Manning, owner and operator of luxpoint, a North Carolina-based laser scanning contractor. Eves reasoned a laser scanning of as-built conditions would be a fine complement to the survey measurement, another layer of as-built verification.

Solution

"When you compare this project with others, this one was pretty straightforward," Manning recalls.

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FARO® Laser Scanners and As-Built™ software were instrumental in modeling the Wagener Building.

"It's an open building for the most part. It was easy to size up. It was about a six-hour job."

Manning used a FARO® Laser Scanner to capture a point cloud (millions of laser-generated, precisely measured data points) that informed a 2D model "... that was the easiest thing for the steel fabricators to work off of," Manning says. "We're able to look at the difference between the floor elevations and column locations."

Instrumental in the modeling process was a software application called FARO As-Built™ Software. "As-Built has simple functionality and point cloud management tools you need to extract the features we were focused on, like columns and beams," Manning explains. I really don't know how we would do these projects without the As-Built software."

Manning says FARO As-Built enters the modeling workflow after some preliminary steps, including data registration through FARO SCENE software. Registration is a process that knits together "... the 3D jigsaw puzzle pieces together into a coherent whole," Manning says.

"As-Built saves so much time. I once worked for a time without As-Built. It was miserable to be without it," admits Manning. "There's not been a single modeling project where I didn't use some tool set from As-Built. What's more, it's surprisingly affordable," he adds.

The idea of surveyors working alongside a laser-scanning contractor like Manning isn't new. For Manning, who has worked alongside surveyors on many occasions, the team spirit is always productive. "We work well together because the surveyor can tell you precisely where the property line is. I can tell you what's going on within the property line. One supports the other. It completes the picture. The owner is able to make more informed, confident decisions."

Consider that the macro view. Eves likes the micro insights it offers, too. That's notably evident in working with the trades, such as the masons' work on a new elevator shaft. "We had a seamless transition between surveying and scanning. We can take Dustin's information and have the surveyors add that insight into their own readings," Eves explains.

In effect, the surveyors serve as project referees on questions of measurement. For example, they can set markers on the inside corners of the elevator shaft to make sure it's tracking vertically, with no inadvertent twisting or turning.

"The immediate feedback for a mason, who is often low tech, is valuable. You can draw them a little dot on this block and say move it an eighth of an inch. It's immediate, easily understandable feedback," Eves says.

The collaborative spirit pleases the project manager. "The masons' biggest discrepancy was a quarter-inch on a 70-foot elevator shaft,"

Eves proudly announces. "It was a new process for all of us that ended up working really well. Scanning and surveying is far more exacting than anyone could ever achieve in the field with a tape measure."

The point cloud Manning generated proved especially useful months later when the stair manufacturer requested it. A 3D model was created in Revit for the stair subcontractor.

Results

Today everything is on track for an expected Fall 2020 delivery. Even the process of obtaining approvals from the various local, regional and national preservation authorities has gone surprisingly well, especially given the building's historic stature. "It's the nature of tax credit projects in Charleston. Every project ends up getting adjusted or treated on a case by case basis. Code officials have the ability to override existing code for existing structures. They have the ultimate say-so. Knock on wood, it's gone quite smoothly," Eves says.

And the owner's reaction? They've been terrific collaborators, Eves says. "They've been the easiest client we've ever worked with. This is their first historic, tax-credit project and they take pushback from various permitting authorities in stride. On matters of construction, they trust our judgement."

The one big lesson learned for Eves is especially gratifying for Manning ... and that's the role of laser scanning. "On day one on the next project of this scale, calling Dustin is item No. 1 on our to-do list. Laser scanning upfront would have saved weeks of time fighting discrepancies in the drawings we were supplied."

"This is really a once in a lifetime project. With any luck, this renovation will last another 140 years."