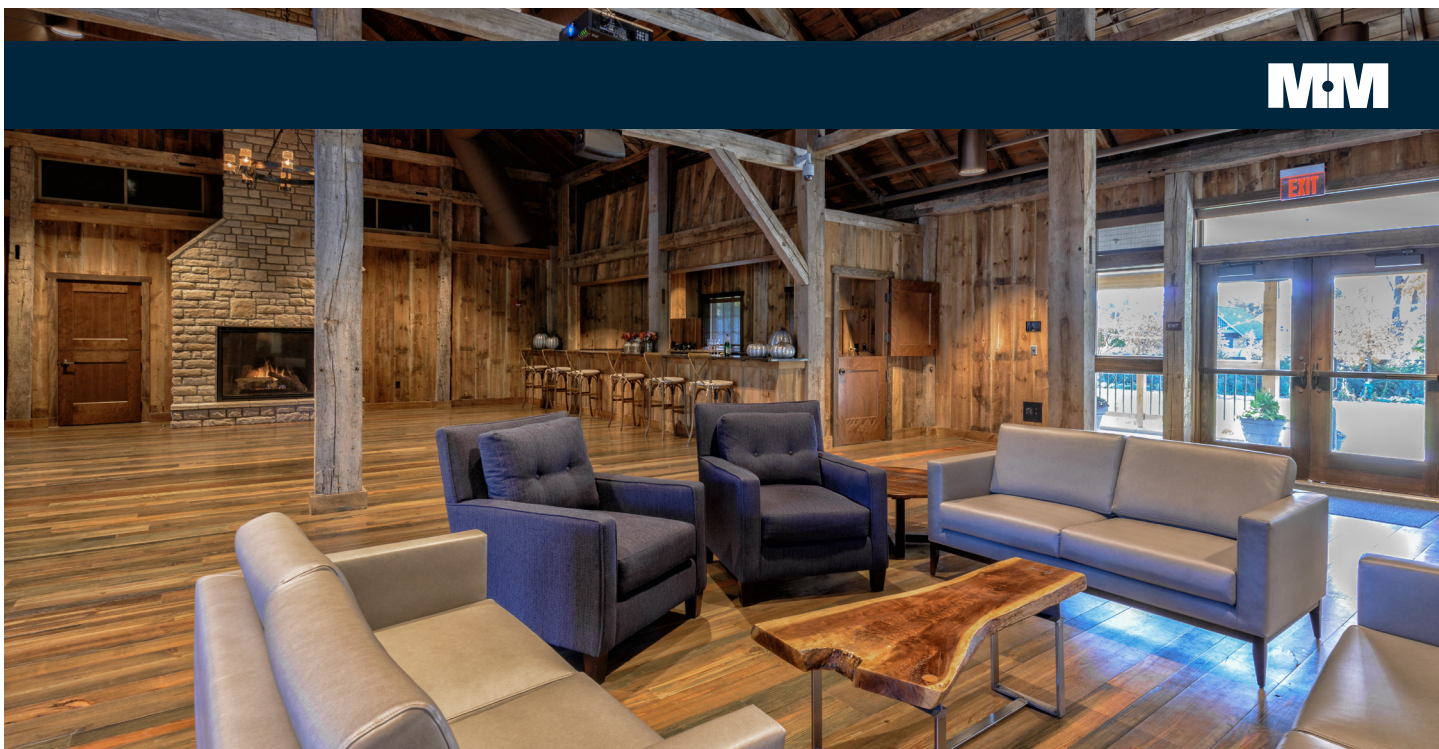


# THE WELLS BARN

**MCM**  
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CONSTRUCTION



## Project Information

### Scope of Work:

- Relocation of an existing heavy timber barn frame recladed with a new envelope.

### Type of Construction:

- Class A-2, two-story including basement, 12,326 SF banquet hall
- Post and beam construction with reclaimed barn timbers with reclaimed barn siding interiors
- Exterior Hemlock barn siding
- Adjacent parking lot

### Building Features:

- 5,649 SF event/gathering space
- Capacity: Theater = 300; Dinner = 250; Cocktail = 500; Meeting space = 84
- Catering and demonstration kitchen
- A fireplace
- High quality A/V system
- Three multi-purpose rooms (used as classrooms, conference/meeting space)

### Size of Project:

- Basement = 5,003 SF
- Ground Floor
  - Deck = 721 SF
  - Ground Floor = 5,649 SF
  - Porch = 953 SF

### Contract Value:

- Original contract value = \$3,874,268
- Final contract value = \$3,851,427

### Length of Construction:

- 7 ½ months (February – October 2015)



## History of the Barn

The timber frame that serves as the skeleton and inspiration for the Wells Barn originates from a historic barn built and owned by the Garber family on their property near Butler in Richland County, Ohio.

With the footprint of 96" x 40", the original "bank barn" was built into the topography to allow for an entrance from a lane, while creating an area underneath the structure that sheltered cattle and other animals. The barn was likely converted to hay storage after the hay track was invented in the late 1800s. Its original brick end walls were damaged in the 1960s during a sonic boom from a passing jet.

Harvested in the first decade of the 1800s from the hardwood forest of the Ohio frontier, the barn's timbers were hand-hewn from oak, chestnut, beech, walnut, cherry and red elm trees that surrounded the property.

Doug Morgan of Mount Vernon Barn Company describes the barn as probably one of the finest in the area at the time of its construction. Its triple tie beams using mortise and tenon joinery are atypical and rarely found today. The workmanship in creating the solid square beams, many with minimal hand tool marks, makes it truly special.

In March of 2014, the barn was set to be taken down on its original property. At the same time, the Conservatory's outreach and education program was growing and needed a new home. The Mount Vernon Barn Company assisted the Conservatory in the acquisition and relocation of the barn's timber frame.





Notches from the original rafters were strengthened with wooden wedges.



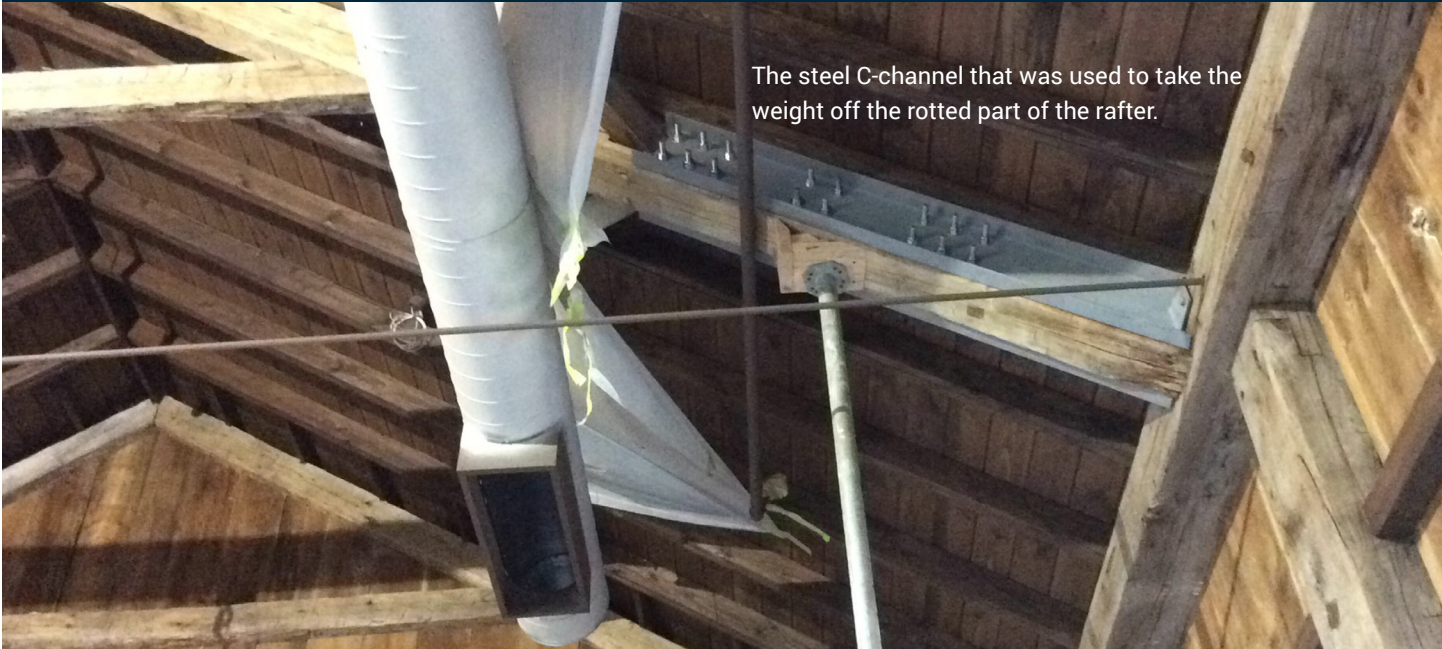
## Construction Phase Challenges and Innovation

Combining the historic barn with modern construction presented many challenges requiring modifications on the fly. The original 200-year-old, hand-hewn timber frame structure was not straight, the exterior walls were not square, and the beams were often rotten to the point of unusable. As with any construction project, the entire project team came together to tackle each issue head-on.

The original barn is for farm use, but the new Wells Barn is designed for an assembly-type construction, which means additional structural components were needed to meet current building codes. Neither the reclaimed timber frame structure nor the new exterior stud walls met the structural code requirements on their own. The Structural Engineer accounted for this by designing each new stud to be fastened to each reclaimed and new horizontal girts. All exterior walls were not square, which put some of the girts either in the way of the new stud wall or far from the wall. Combine this with the fact that there was a mix of reclaimed (not straight) and new (straight) girts, and the result is a unique wall condition at nearly every stud-to-girt connection (see photo on left).

A problem quickly arose as the crew began to stand the original timbers (see top photo). The bases of the beams were rotten, and 6" was cut off to reach usable wood. Cutting 6" off the bottom lowers the roof 6", eliminating the necessary space needed for the MEP systems. To regain the lost height, the team used new 2'x6' rafters, and used wooden wedges strengthened the notches from the original rafters.

One of the main roof rafters from the original barn used as support was rotten on the North end. For this reason, the beam was not able to sit on the rafter plates, presenting a major structural issue. After a week of collaboration with the structural engineer, the team found a solution. They used a large steel C-channel to take the weight off the rotten part of the rafter (see top photo next page). While that fixed the support issue presented by the rotten wood, another major structural issue was discovered at the South end.



The steel C-channel that was used to take the weight off the rotted part of the rafter.

The main exterior support beam on the South side was 2' away from where the rafter sat, leaving no support. This caused the rafter plate to start to crack. Another post was installed to bear the weight of the supporting beam. This new post had to be bolted to the basement CMU wall and secured to the walls with brackets. Interiors had already begun, and the team had to cut a hole in the floor so the 8'x8' beam could reach the basement, and they cut away the drywall so the beam could be bolted and secured to the basement wall.

Generally, the main challenge of this project was the securing and stabilizing of the structure. A lot of reinforcement was used, such as using engineered PSL beams to support the cupola, stabilizing the roof using twenty (20) different types of Simpson ties (see right photo) along with the other issues mentioned above. To compensate for the extra work required to secure the structure, the team began interiors before the roof was 100% complete and dried-in. Every detail of the interior trim had been hand-measured and cut to work around the non-square structure.

Although there are a lot of screws and brackets securing the structure, one would never notice because the interior is simply breathtaking. The combination of the old with the new has a contemporary and inviting feel, creating a perfect environment for whatever occasion the Conservatory and its guests are planning.





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