"Preservation is really all about getting the most out of the materials, this is an example of planning for the next generation." - Denis McMullan, Structural Engineer

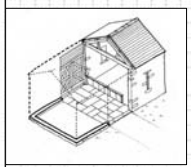
Best Farm Stone Barn – East Elevation (08/07) Note sag at ridge line.

Photo Taken in 1997 by NPS employee during reroofing of the barn. The hip rafters are used to support the over-stressed normal rafters which make up the bulk of the roof frame. Rafters are undersized for the span and have minimal bearing and connections. Roof lathe has provided lateral support not given by other roof members.

Photo taken in 1997 by NPS employee during reroofing of barn. Insertion of collar ties (horizontal members) was intended for temporary stabilization during the project, yet remain in place today.

View of Top of Wall with Rafter Plate perched at exterior line of wall. Minimal connections between rafter plate and stone wall and rafters and rafter plate have allowed outward movement of roof frame and resulting sag in roof frame.

Two lateral cable ties (see arrows) have been used in an unsuccessful attempt to prevent outward movement of rafter plates.



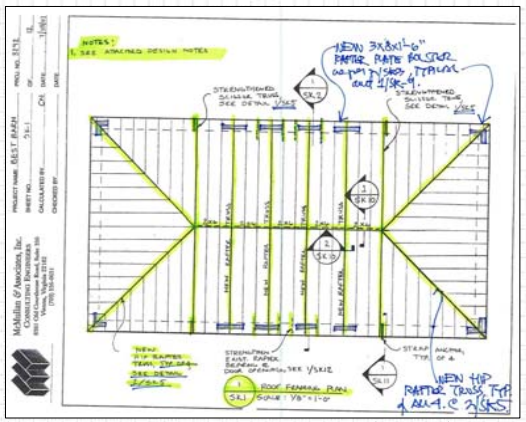
Isometric view of threshing barn in England, showing division into three bays. Such barns were common in France and several other European countries. Reprinted from R.W. Brunskill, *Illustrated Handbook of Vernacular Architecture* (London: Faber and Faber, 1971), 151.

Courtesy of Jeff Everett, *Best Farm Cultural Landscape Report, Antecedents of the Stone Barn, Monocacy National Battlefield*, September 2005, pg. 128, National Capital Region Cultural Landscapes Program.

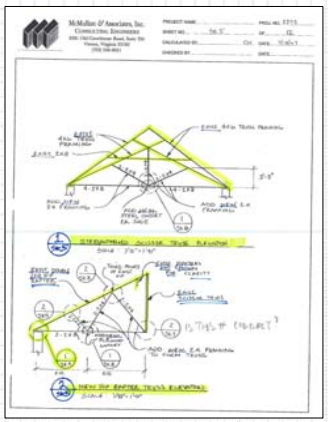
The Stone Barn is thought to have antecedents in Europe and Canada, and this illustration represents a possible typology. While not presented in great detail in the Historic Structure Assessment Report, further information is available in the referenced Cultural Landscape Report.

Interior of Stone Barn illustrating extent of the roof frame, the clear span interior (30 X60 feet) and north scissor truss. Note the lack of typical interior barn structure. (HABS Photo)

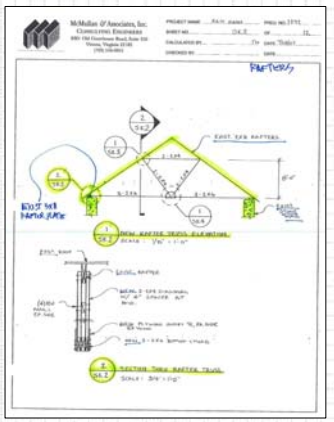
ca. 1911 undersized scissor truss – one of two and the oldest part of the roof frame



Engineering Sketches: the overall roof plan indicates the structural members that will be strengthened in this design (green highlight). Annotated by HPTC Senior Historical Architect.



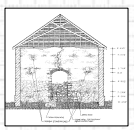
Engineering Sketches: original structural member shown with green highlight, other structure indicated is the supplemental support system for the extant roof frame. Annotated by HPTC Senior Historical Architect.

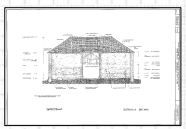


A lateral section through barn (at right) illustrates minimal structure provided by scissor trusses and normal rafters.

It is thought that an earlier type of roof frame, perhaps a gable system, was used to span the barn. No physical evidence remains from previous roof system.

It is also thought that some type of timber frame system (bents) typical of most barn construction, may have been used to support a roof frame system. Future archeological research may provide some answers.





Longitudinal section through barn (at left) shows extent of clear span and lack of interior timber frame to support roof frame. Roof frame is supported by stone walls with no lateral ties.

This poster details the results of a Historic Structure Assessment Report completed by the Historic Preservation Training Center (HPTC) for Monocacy National Battlefield (MONO). The project consisted of documentation of extant conditions; condition assessment, treatment recommendations for exterior and interior preservation, and the development of a context study to assist in the understanding of the uniqueness of the Best Farm Stone Barn in Frederick County, MD.

Initial assessment indicated the roof frame was in much worse condition than expected and could collapse given certain loading conditions. The decision was made to try to save the new hand formed standing seam sheet metal roof (only 10 years old with a predicted service life of 80 years) if possible. Various design alternatives were considered for the stabilization or replacement of the extant roof frame. The final approved design includes the insertion of supplemental structural members to strengthen and support the extant roof frame members – including two historic scissor trusses – without disturbing the sheet metal roof.

Scissor trusses are well documented and were widely used by the 1820s. In one 1867 reference the scissor truss is referred to as a northern French method of roofing over vaulting; this is of interest as the Vincendière family – likely builders of the barn – are of French heritage.

The structural engineers have designed a series of supplemental structural supports to preserve the extant roof frame. Rafter plate buttresses, intermediate trusses, supplemental framing members, steel gusset plates and other structural devices are used to support the roof frame and carry the designed dead and live loads. The sag of the current ridge line will be accommodated as part of the design intent of the supplemental system.

Preservation work is anticipated to be completed FY09 by HPTC Carpentry Team.

Credits:
- Line Drawings by Bucks County Community College, Historic Preservation Program
- B&W Photo by James Rosenthal, HABS Photographer
- Engineering Sketches by McMullan & Associates Structural Engineers
- Color Photos by Author unless otherwise noted

References:
- Historic American Roof Trusses, Part 1. Scissor Trusses by Jan Lewandoski *et al.*, published by Timber Framers Guild, Timber Framing Journal 69, September 2005.

Saving the Stone Barn Roof – Extreme Preservation: Getting the Most from the Materials

Historic Preservation Training Center & Monocacy National Battlefield

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