Home of Samuel Cox at Rich Hill

Conditions Assessment Report

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INTRODUCTION
The Ottery Group is engaged in researching and investigating the historic home of Samuel Cox at Rich Hill (hereafter, the Cox Home), located in Bel Alton, Maryland, preliminary to the development of a historic structures report. Silman has been retained by the Ottery Group to observe structural conditions of the home and advise on needs for immediate and/or short term stabilization. Field observations were conducted on April 14 and September 1, 2015. Observations were limited to components and structures that were readily accessible and observable without destructive probes.

Building History
Rich Hill was likely built within the second quarter of the 18th century. The building is historically significant for its ownership by Col. Samuel Cox and the role of Cox in the flight of John Wilkes Booth following the assassination of Abraham Lincoln. Cox hid Booth and David Herold (Booth’s companion) on the farm for several days before arranging for their passage to Virginia. The building is also historically significant for its architecture.¹

Several major alterations and additions have been made to the building in its lifetime. The original roof of the building was hipped, but was replaced with the existing gabled roof. The interior of the building has undergone several alterations and renovations; it was recently stripped of the majority of finishes (which were non-historic). Former additions to the southeast of the home have been removed. The most recent major renovation to the house occurred in the 1970’s.

Structural Description
The Cox Home is a one-and-one-half-story timber framed structure with a gabled roof. See Appendix A for a sketch of the typical framing observed.

The house is not oriented in a cardinal direction. For the purposes of the descriptions in this report, the south elevation refers to the front of the house (Figure 1).

Figure 1 Aerial photo of site. Source: Google Maps.

¹ National Register of Historic Places Nomination Form, Rich Hill, Bel Alton, Charles County, Maryland, National Register #75000885.
Foundation
The majority of foundation elements were not observed as access was very limited. According to the National Register nomination form, the foundation consists of cut stone piers (some of which are visible). Concrete piers are also present, which may have replaced earlier cut stone piers, or they may be parged stone piers. The area between the piers has been infilled with brick, which may be acting as a supplemental foundation.

![Figure 2: Foundation at south end of east elevation. Note the cut stone pier at center, the brick infill, and the concrete pier at the southeast corner.](image)

Floor and Wall Framing
First floor framing was not observed.

Second floor framing typically consists of 3¾” x 7” wood joists spaced at 24” on-center spanning north-south between the exterior walls and an interior wall that bisects the building. Joists bear on timber top plates at the walls. At the east end of the building, joists appear to span to a timber beam concealed above an arch in lieu of an interior wall. Flooring consists of wood planks spanning between joists.

The original walls typically consist of wood timber studs and posts with variable spacing. The space between timber studs and posts is typically infilled with brick nogging. Sections of the original timber walls have been supplemented or replaced with 2x4 framing. Supplementary non-load bearing 2x4 stud walls have been added at the first floor inboard of the exterior wall (Figure 3, left). A 2x4 wall has also been installed outboard of the original timber wall at the first floor (Figure 3, right).
Figure 3 Left: Northwest corner of first floor. Note the wood floor joists above, and 2x4 stud wall inboard of the original exterior wall at right. Right: Northeast corner of second floor. The supplemental 2x4 exterior stud wall outboard of the original exterior wall is visible at left.

Roof Framing
The existing roof is a gabled roof with 2½” x 6” rafters spaced at 27”-30” on-center. Collar ties dovetailed into the rafters span at an elevation approximately 4’-6” below the peak of the roof (Figure 4, left). At the exterior of the building, the rafter ends bear a 2x6 thrust block attached to the rafters with a birdsmouth cut. The thrust block bears on 3½” x 3½” wood outriggers that are attached to the top plate with 1½” pegs. At some locations, the outriggers bear on the exterior 2x4 wall outboard of the original wall. See Appendix A for a sketch of the rafter bearing detail.

Figure 4 Left: Gabled roof framing with collar tie. Right: Original hipped roof framing likely retained to support the ceiling.

The lower portion of the original hipped roof framing remains along the north and south walls of the building. A notch in the top plate that supported the hip rafter is visible at the southeast corner (Figure 5). It appears that the framing was left in place after the roof was replaced to support the sloped ceiling (Figure 4, right). All rooms in the second floor had sloped ceilings on all four walls which matched the slope and elevation of the original hipped roof.
Unlike the existing gabled roof, the rafters of the original roof were supported directly on the top plate of the walls. The existing outriggers that support the rafter ends of the existing gabled roof appear original to the structure and likely supported only a flared roof edge at the eaves.

**Figure 5** Top plate and rafter detail at southeast corner. Note the notch in the top plate that formerly supported the hip rafter of the original roof. The gable rafter with a birdsmouth cut for the thrust block is visible at upper right.

**Lateral System**

Timber bracing within the walls provided the primary lateral support for the building. The brick nogging infilling the space between the timbers in the walls likely provides additional lateral restraint (**Figure 6**), although this was not its intended use. Some nogging is missing, and other portions of the nogging have been repointed and repaired at the first floor.

**Figure 6** Interior of wall at south entrance of building. Note the timber cross bracing and nogging.

**Exterior**

A pair of chimneys is located at the west end of the building (**Figure 7**). At the first and second floors, the space between the chimneys has been enclosed with brick, which creates a closet or storage space at both levels. Each of these closets has a small window which is currently boarded.
INVESTIGATION

Exterior and interior field observations were conducted on April 14 and September 1, 2015. Observations were limited to components and structures that were readily accessible and observable without destructive probes. The crawl space underneath the house was not accessed.

Conditions Assessment

Foundation

Foundation elements were not observed beyond those visible from the exterior of the building. As observed from the exterior, the foundation appears to be in fair condition overall. The brick infill (which may be providing supplementary support) is largely in good condition with the exception of localized areas that exhibit loss of mortar (Figure 8). The cut stone piers appear to be in fair condition – some loss of mortar is evident. Where a stone pier would be expected to be found at the southeast corner of the building, a concrete pier is present – the stone pier may have been replaced or parged at this location.

Floor and Wall Framing

Observed floor framing is generally in fair condition overall, although first floor framing could not be observed. Severe termite damage and/or moisture related decay was observed in several locations. The full extents of
damage to the structure have not been determined. A section of the first floor at a former bathroom below the stairs was moist during the September 1 site visit and appears to be softened/decayed as observed from above.

The east wall was noted to have heavy deterioration of the original fabric. At this location the new wall appeared to rely on the original wall for structural support. Second floor framing above the east entry vestibule appears to have been replaced, likely due to similar damage. No immediate safety concerns were noted.

Due to the extensive modifications to the walls there is not a well-defined load path for the roof. Roof framing bears on the exterior 2x4 wall at several locations, which indicates it is sharing the load with the original timber wall.

Many of the interior faces of the wood timber framing has been chipped and hacked. Based on the patterns and shapes of the incisions, they appear to have been made by an axe or hatchet after the house was constructed – likely during the 1970’s renovation to mimic hewn lumber. (Figure 9)

![Figure 9 East wall of stairs prior to removal of wall finishes. Note the rough incision patterns on the exposed timber at the second floor level.](image)

**Roof Framing**

The new roof rafters bear on outriggers that likely only supported a flared edge for the original hipped roof. The outriggers are supported solely by wood pegs attached to the top plate of the wall, and do not provide adequate structural support. As a result, the majority of the outriggers have deflected significantly. Some of the outriggers bear on the non-original exterior wood stud wall as a result of the deflection.

The collar ties are too high to provide adequate resistance to lateral thrust at the roof. No members are present that provide direct resistance to lateral thrust at the base of the rafter.
A section of the top plate and a corner post have been replaced at the northeast corner of the second floor due to deterioration of the original structural elements (Figure 11). The replacement top plate section is not adequately tied into the adjacent sections and does not provide continuity.

**Figure 11** Replaced section of top plate at the northeast corner of the second floor. Note the lack of connection between the replacement and original sections.

**Lateral System**
Timber braces have been cut or interrupted at several locations where the wall has been modified for new openings such as doors or windows (Figure 12). The lack of continuity at the second floor top plate (noted above) also affects the lateral strength of the building.
Figure 12 Southwest corner of building at first floor. The arrow highlights a cross brace that has been cut for a new window opening.

Exterior
The chimney’s masonry is in poor condition. Large diagonal cracks are visible from the interior closets adjacent to the chimney. Cracking appeared to worsen between the April and August site visits. A large section of the lower portion of the chimney has been repointed with an incompatible mortar that is too hard for the surrounding brick.

The brick steps at the north entrance of the building have deteriorated significantly and present a tripping hazard (Figure 13).

Figure 13 Deteriorated brick steps at north entrance.

Non-Structural Elements
Site drainage is generally inadequate. Soil around the house is not graded away from the foundation, which results in elevated levels of moisture which promotes decay and deterioration of the building (Figure 14).
Figure 14 Poor grading at the northwest corner of the building results in excessive levels of moisture adjacent to the foundation.

CONCLUSION
1. The gabled roof does not have adequate structural support to resist lateral thrust. Thrust is likely currently resisted by the wood peg connection at the outrigger, which is vulnerable to failure which could trigger a progressive collapse.
2. The diagonal cracking patterns in the chimney are consistent with those caused by settlement. Movement appears to be ongoing and rapid, as evinced by the changes in observed conditions between April and August. Conditions will likely continue to deteriorate if the masonry is not repaired and site drainage is not addressed.
3. The east wall exhibits significant deterioration of the original fabric. The wall and adjacent second floor framing have been replaced or supplemented with new framing. It is possible that similar deterioration is present elsewhere in the building.
4. Although it was likely not intentional, the supplementary exterior 2x4 wall is likely partially supporting the roof framing.

Recommendations
The current recommendations address requirements for immediate and/or short term stabilization of the building. It is currently anticipated that assessment of conditions and recommendations for items that do not require immediate stabilization will be performed in a follow-up investigation as part of the development of a historic structure report.

1. **Immediate:** Install cable ties between the base of the rafters at the attic roof to provide lateral restraint to reduce the likelihood of a catastrophic collapse. An engineered design of the ties is required.
2. The cracking and/or settlement of the chimney appears to be ongoing. Installation of crack monitors is recommended.
3. Correct the issues with site drainage. The ground should slope away from the foundation to shed water away from the building.
4. A complete structural conditions assessment should be performed to identify all potential issues that may impact the stability of the structure, such as termite damage.
5. Regular monitoring of the structure should be performed not less than twice per year.
6. Depending upon the timeframe for initiating restoration, additional measures may need to be performed to assure stability of the structure. Restoration within the next five years is recommended.

APPENDIX A

1. Section through roof
2. Detail at rafter bearing
SEE DETAIL AT RAFTER BEARING

COLLAR TIE

2-1/2"x6" GABLED RAFTER AT 27"-30" O.C.

ORIGINAL 3"x4-1/2" HIPPED ROOF RAFTER AT 20" O.C. REPURPOSED AS CEILING JOIST

7"x8" TOP PLATE

3"x4-1/2" CEILING JOISTS AT 20" O.C.

ORIGINAL 2-1/2"x4-1/2" TIMBER STUD WALL

NON-ORIGINAL EXTERIOR 2x4 WALL

3-1/4"x7" FLOOR JOISTS AT 24" O.C.

INTERIOR NON-LOAD-BEARING WALL

FOUNDATION AND FIRST FLOOR FRAMING NOT OBSERVED
2-1/2"x6" GABLED RAFTER AT 27"-30" O.C.

1-1/4"x6" THRUST BLOCK

3-1/2"x3-1/2" OUTRIGGER (DEFLECTED UP TO 2" AT TIP)

1-1/2" PEG

7"x8" TOP PLATE

2x4 NON-ORIGINAL STUD WALL

2-1/2"x4-1/2" ORIGINAL TIMBER STUD WALL