

DCAM-17-CS-0123
Amendment No. 1
Exhibit 3

Attachment B.3

Structural Assessment Historical Building

WALTER P MOORE

February 20, 2015 *rev. March 25, 2015*

Miah Dancy
BLUEFIN
2146 Priest Bridge Court, Suite 22
Crofton, MD 21114

Re: Condition Assessment
Building 83 and Building 90 at St. Elizabeths East Campus, Washington, DC
Walter P Moore Project No. D01.14013.00

Dear Miah:

We have completed the visual condition assessment of the referenced structures in accordance with our proposal dated October 31, 2014. The reports include a summary of our visual observations, brief discussion of the conditions, and our recommendations for stabilization of the structure.

Stabilization of Buildings 83 and 90 are part of the plan by the District of Columbia to stabilize the buildings on the campus at St. Elizabeth's for future development. The purpose of these reports is to briefly describe the condition of the buildings and identify those stabilization steps required to halt the ongoing deterioration. These reports are limited in nature, and intended to identify the typical deterioration conditions. They do not define the remedial efforts, which will be defined in a subsequent design effort, which will outline quantities and scope of repairs. Although restoration of the building envelope is critical to halting ongoing deterioration of the structure, no discussion of roofing, waterproofing, or flashing is included in this report; as this is part of the Bluefin scope.

We very much appreciate this opportunity to provide these services to you. Please do not hesitate to contact us if we can further assist you with the follow-up evaluation and development of repair documents for the distress conditions described in our reports.

Sincerely,

WALTER P. MOORE AND ASSOCIATES, INC.



Robert Field, P.E.
Senior Associate
Diagnostics Group



Steven Bentz, P.E.
Senior Associate
Diagnostics Group

Enclosures:
Building 83: Horse Barn Condition Assessment
Building 90: W.W. Eldridge Building Condition Assessment

1747 PENNSYLVANIA AVENUE NW, SUITE 1050
WASHINGTON, D.C. 20006
PHONE: 202.481.7685 FAX: 202.481.7690

www.WALTERPMOORE.com

**BUILDING 83: HORSE BARN
CONDITION ASSESSMENT**2700 Martin Luther King Jr. Ave SE
Washington, DC 20032

Report Date	February 20, 2015 rev. March 25, 2015
WPM Project No.	D01.14013.00

GENERAL INFORMATION

Year Built	1901	Construction Type	Masonry & wood bearing walls
No. of Floors	2	Floor Framing Type	Wood joists and deck
Footprint (Sq Ft)	20,000 approximate	Roof Framing Type	Timber and wood rafters

EXECUTIVE SUMMARY

Walter P Moore has completed an initial condition assessment of the referenced structure. The goal of this assessment is to identify structural deficiencies requiring remedial action as part of the proposed stabilization effort. This review was limited to the conditions and deficiencies readily apparent by a visual assessment. The intent of this assessment is to identify typical structural deficiencies, to be used in establishing the subsequent design of stabilization.

While the structure is in many respects quite robust, there are a number of areas of structural failure and severe deterioration that are a current hazard and if unchecked, will lead to accelerated deterioration and further structural failure. The areas of structural failure include the following:

- Deterioration of brick masonry bearing walls, including mortar erosion & loss, and displacement of brick masonry at areas such as embedded steel.
- Loss of roofing and wood shingle siding allowing rainwater intrusion
- Failure of wood roof rafters, floor joists, and deck due to moisture-induced deterioration
- Loss of wood supporting members and related framing failures at the covered storage area
- Failure of stairs leading to basement.
- Possible undermining and soil erosion at the foundation

Again, numerous areas of exterior cladding (siding, roofing, windows, and doors) have failed, allowing rainwater to freely enter the structure. While these items are not in the structural scope of this document, they are clearly critical to the continued serviceability of the building's structural elements.

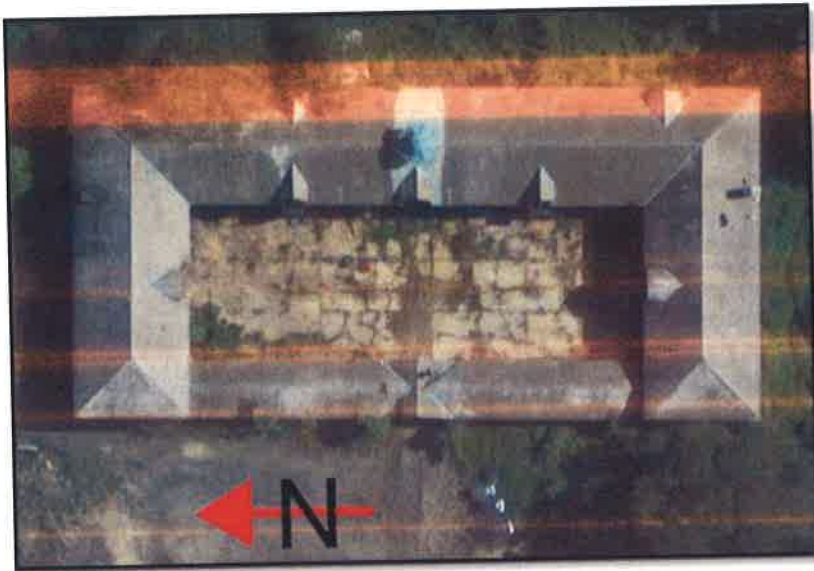


Figure 1. Aerial photo of Horse Barn (Google Earth, 2015)

DOCUMENT REVIEW & EXISTING STRUCTURE

Document review: In preparation of this report we reviewed the following documents:

- *Saint Elizabeths Hospital East Campus Historic Resource Survey*, by EHT Tracerics, Inc., October 2011
- *Assessment of Historic Structures on the East Campus of St Elizabeths Hospital*, by Oehrlein & Associates, June 7, 2002.

The EHT Tracerics report provides a very broad overview of the structures on the campus, while the Oehrlein report is more focused, if somewhat dated, assessment of considerations for proposed mothballing. No drawings were made available by DC DGS; however, reference is made to such drawings, and these documents will be an important part of a more in-depth stabilization investigation. No additional information relevant to this report was provided to us.

Existing structural system: The building structure is a bearing wall system, with exterior brick masonry bearing walls which support a wood-framed second floor, and exterior wood bearing walls at the second floor (see Photo 1). Interior timber frames provide support for wood floors joists and roof rafters. Floors at grade level are concrete slab on grade, for the most part. Upper floor and roof are decked with wood boards. Siding over the wood stud walls is wood shingles over boards, and the roof is clad with a rigid shingle product. A cupola extends over the roof, centered on the main wing, and a number of dormers are framed throughout the roof. A small basement space is located under the center of the main wing, below the entry, with steel and brick columns supporting wood floor joists and a section of metal beams and deck.

OBSERVATIONS

Representatives of Walter P Moore visited the project site on Friday, December 19, 2014 to review the structure of Building 83 of the St. Elizabeths East Campus. The building is not currently in use, and lacks environmental conditioning or regular maintenance therefore there is significant deterioration to finishes and structure. The following observations were recorded:

EXTERIOR	PHOTO #
Typically, one story of brick masonry bearing walls support an upper story framed with wood stud bearing walls. In general, walls appear plumb and stable.	1
Numerous areas of exterior brick exhibit loss and deterioration of mortar in the brick joints, as much as a full brick in depth, leading to local instability and possible wall instability.	2, 3
Previous repair efforts have used modern brick and a Portland Cement-based mortar.	4
A stair-step crack at the Northeast corner could indicate movement of brick bearing wall.	5, 6
In several areas, the base of the brick bearing wall had several courses of loose brick that are completely disconnected. It is not clear how many wythes of brick are compromised. In some areas, repairs of the brick in this condition appear to have been made.	7, 8
Embedded steel items such as anchors and rings have corroded, and in many places they have initiated failure (cracking, spalling) of the adjacent brick and stone.	9, 10
Miscellaneous areas of damaged and missing brick.	11
Chimney at the north has complete loss of mortar at upper courses resulting in loose and falling bricks, a significant hazard. The chimney at the south was previously repaired; however, poor quality of repairs could result in damage.	12, 13
In numerous areas, failure of the wood roofing and siding have allowed water infiltration, resulting in significant deterioration of brick as well as biological growth.	14
At the southeast corner, there is repair work at the lower brick courses and concrete below the brick which appears to have been placed as part of this repair. This is indicative of repair work and possible undermining of the foundation wall.	15
The front covered storage area has areas of wood roof framing that are in imminent danger of failure, including the central hipped entry roof and several wood beams. The brick piers at the north portion of this storage area are relatively recent modifications which removed some of the stabilizing contribution of the brick. There is currently no good load path to provide lateral stability to this portion of the building. Although not easily apparent in the photograph, Photo 20 shows the masonry wall to the south of this storage area, which is leaning to the west, which is likely due to this lack of lateral stability.	16, 17, 18, 19, & 20
Water infiltration through the roof and exterior wall have led to deterioration of wood rafters, joists, and decking in numerous areas. Numerous areas have failed, and due to the finishes below, it is difficult to determine the extent of failed wood framing, and therefore, which areas are safe. Photos show typical conditions that occur throughout the building.	21, 22
At the basement area below the center of the building, the structural support of the slab at a number of areas has failed, compromising the structural integrity of this slab at the main entry. This is not apparent when walking on the slab, making an unsafe condition.	23, 24

PHOTOGRAPHS



Photo 1 – Typical exterior wall – North Elevation



Photo 2 – Typical mortar loss in brick joints

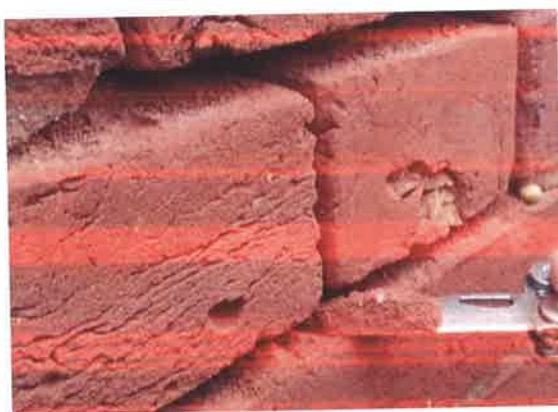


Photo 3 – Typical mortar loss and deterioration in brick joints



Photo 4 – Past repairs at west elevation (North wing)



Photo 5 Step crack at north elevation



Photo 6 – Out-of-plane displacement at step crack

PHOTOGRAPHS (CONTINUED)



Photo 7 – Typical loose brick courses, east elevation



Photo 8 – Past repairs of lower brick courses, south elevation



Photo 9 – Brick spalling due to corrosion of embedded steel



Photo 10 – Cracked limestone sill due to corrosion of embedded steel



Photo 11 – Missing brick near central entry door



Photo 12 – Displaced bricks at north chimney



Photo 13 – Past repairs & deterioration at the south chimney



Photo 14 – Loss of roofing and siding leading to deterioration of brick and biological growth



Photo 15 – Foundation work at the southeast corner



Photo 16 – Failed framing over entry at front storage area



Photo 17 – Missing support posts at front storage area



Photo 18 – Failed support beam at front storage area



Photo 19 – Damaged brick pier at front storage area



Photo 20 – Leaning brick bearing wall at front storage area



Photo 21 - Typical infiltration of water at the roof, leading to damaged roof framing and second floor framing



Photo 22 - Typical wood deterioration at roof rafter bearing due to water



Photo 23 – Failing floor joists at basement slab framing



Photo 24 – Deteriorated metal deck and beams at basement slab framing

DISCUSSION

General exposure to weather combined with lack of maintenance have led to deterioration of brick masonry and wood framing throughout the building. Several areas of localized cladding failures have lead water directly to the building interior or the exterior masonry, causing severe deterioration and failure. Remedial work will be required throughout to stop the accelerating deterioration of the building structure. Aging mortar joints must be repointed with materials of strength appropriate for the existing brick masonry so they do not cause further damage. Weather-proofing the exterior must be done in a manner which does not lead to changes in the moisture level in the underlying materials. Embedded steel and iron is an ongoing source of deterioration as long as they are allowed to corrode.

RECOMMENDATIONS

We recommend that the repair scope be established after a more in-depth assessment and review of existing building drawings, as part of a detailed investigation effort. The scope of recommendations below is limited to structural stabilization effort.

Providing structural stability: To safely perform subsequent work in the building, we recommend steps be taken for temporary stabilization of several areas with poor stability. These include, but are not limited to:

- Wood roof framing and brick walls and piers at the front storage area
- Stairs descending to basement and slab over basement area
- Wood framing at the second floor in numerous locations

Building stabilization: In addition to these steps to make structure safe for access to perform subsequent investigations & repairs, there are numerous repairs required for the long term stabilization of building structural systems. Specific repair recommendations include the following:

- Repoint brick masonry, both interior and exterior in the majority of the exterior brick.
 - The majority of the repointing required is partial depth.
 - A significant portion of brick will require full-depth repointing.
 - Make investigatory openings in the masonry to determine the depth of joint deterioration at select locations. Assume temporary stabilization of the wall during repairs in these locations.
 - Testing of existing brick will allow proper specification of repair mortar.
 - Some of the areas of past repointing should be removed and reinstalled to prevent damage to brick. Investigation of this past repointing would help to better understand the potential for damage.
- Repair deteriorated floor joists and roof rafters at the two-story portion.
 - At numerous areas of where roofing has failed, the underlying rafters, second floor decking and joists have failed or are severely deteriorated. These areas should be temporarily shored and new structural members installed. Rim joists and related framing must also be replaced in a number of these areas.
- As an alternate to repairing joists and rafters at the main building and roof rafters at the front storage area, shoring could be installed to create safe areas while temporarily stabilizing the building. Shoring must provide a continuous load path from the underside of roof framing down to grade level.
- Investigation of structure and slab over the basement area is needed to design adequate stabilization. Again, as an alternate, temporary shoring could be installed in this space to allow for safe access to the structure.

- It is not clear the extent of damage at areas of the masonry, such as the foundation, therefore, further investigation should be performed in order to determine appropriate remedial steps. This could be in the form of new openings, or installing crack monitors to determine the extent and rate of ongoing movement.

Some areas cannot currently be accessed in a manner considered safe for working, most notably the basement area, where the stairs have collapsed. Removal of debris at interior, especially in the second floor, will help to slow the failure of structure in areas that are already compromised due to deterioration.

Given the building's historic designation, repairs which alter the original structure should be undertaken in a manner that is in keeping with the original nature of the building. Alternately, stabilization efforts in some areas could be designed as a more temporary structure, for example, shoring at areas of failed wood framing as an alternate to replacing failed wood members.

Repairs to the building's cladding envelope, although not part of the scope of this report, will be critical as the first line of defense against the deterioration of the structure which currently compromising the structural integrity of this historic structure.

LIMITATIONS

The recommendations presented represent current technology for building structure renovation and maintenance. We understand that this is part of a recommendation for stabilization or "mothballing" of the structure. Further and accelerated deterioration can be expected to take place with continued exposure to weather. Proper design and installation of effective repairs and maintenance will significantly reduce further deterioration and the associated repairs.

This report is not a warranty or guarantee of the items noted. The extent of our evaluation was limited and cannot guarantee that the condition assessment discovered or disclosed all possible latent conditions. The evaluation required that certain assumptions be made regarding existing conditions and some of these conditions cannot be verified without expending additional sums of money, or destroying otherwise adequate or serviceable portions of the facility. In this study, we did not include review of the design, inspection of concealed conditions, or detailed analysis, to verify adequacy of the structure to carry the imposed loads and to check conformance to the applicable codes. The assessment also does not provide specific repair details, construction contract documents, material specifications, details to develop construction cost, or information on means and methods of construction.

Any comment regarding concealed construction or subsurface conditions are our professional opinion, based on engineering experience and judgment, and derived in accordance with standard of care and professional practice.

This report has been prepared on behalf of and for the exclusive use of the CLIENT. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party or used or relied upon by any other party, in whole or in part, without our prior written consent.

**BUILDING 90: W.W. ELDRIDGE BUILDING
CONDITION ASSESSMENT**

2700 Martin Luther King Jr. Ave SE
Washington, DC 20032

**GENERAL INFORMATION**

Year Built	1929-1931	Construction Type	Concrete Frame with Masonry
No. of Floors	5 + basement	Floor Framing Type	Cast-in-Place Concrete
		Roof Framing Type	Wood

EXECUTIVE SUMMARY

Walter P. Moore and Associates, Inc. has completed an initial condition assessment of the referenced structure. This assessment consisted of a walkthrough visual review of only two areas of the building which had been identified as having structural roof failure, in order to identify the nature and extent of the damage. See Figure 1 for location of the two areas.

During this limited review, we documented the two local failures of the roof framing that will need to be repaired in order to halt continued water infiltration.

- In Area 1, an interior wood support frame has failed, allowing the sloped rafters to partially collapse, and create an opening in the roof. As described more fully in the report, the structural framing must be rebuilt, rafters repositioned and repaired, and the roofing & flashing repaired.
- In Area 2, the wood framing has failed at an area of flat roof, creating a structural failure and hazard that extends to the adjacent pitched clay-tile roof. The extensive deterioration of wood framing will require replacement of many of these structural members.

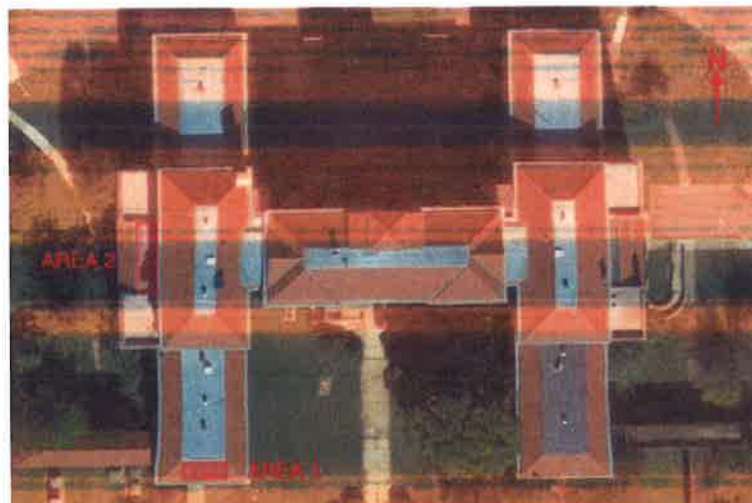


Figure 1. Aerial photo of Building 90 (Google Earth, Inc, 2015)

DOCUMENT REVIEW & EXISTING STRUCTURE

Document Review: No original drawings were made available for Building 90, although based on experience in other areas of the campus, they probably exist. In preparation of this report we reviewed the Historic Resource Survey conducted by EHT Tracerics dated October 2011. This survey summarized historical and architectural information regarding the buildings in the St. Elizabeth's East Campus. No additional information relevant to this report has been provided to us.

Existing structural system: This five story hospital building is built with masonry walls, concrete floor slabs (see Photo 3), and wood roof and ceiling framing. It is possible that concrete frames are concealed in the masonry walls. Interior is finished with plaster walls and ceiling. Exterior cladding is brick masonry with limestone details. Roofing is both flat and pitched, the pitched portions roofed with clay tiles. We observed flat areas to be roofed with copper.

OBSERVATIONS

Representatives of Walter P Moore visited the project site on the morning of Thursday, January 15, 2015 to review the condition of the roof at St. Elizabeth's East Campus - Building 90 where two instances of roof failure had been observed in the southwest end (Area 1) and in the westernmost area of the building (Area 2). The building is not currently in use, and lacks environmental conditioning or regular maintenance therefore there is significant deterioration to interior finishes. The exterior brick and limestone façade is in fair condition, but with some areas showing a degree of deterioration due to weathering. Some clay tiles were observed to have dislodged or fallen, and significant areas of copper roofing have been removed, perhaps by scavengers.

The following observations were recorded:

AREA 1	PHOTO #
• Failure of the wood framing has created an opening which allows water to enter	1
• Interior wood structural support frame has failed	1, 2
• Rafters have displaced downward at their upper bearing point	1
• Wood frame and rafters are severely deteriorated at the area of the opening	1, 2
• Wood decking is deteriorated and has failed in a number of areas adjoining the opening.	2
AREA 2	PHOTO #
• Failure of wood framing and decking has created a large opening	5, 6
• Failed area has allowed ponding which is further overloading the deteriorated framing	4
• Copper roofing at the flat roof has been removed allowing water to enter	4, 5
• Flat framed wood rafters and ceiling supports are deteriorated and failed	6
• Metal ceiling support frame is deteriorated, and plaster has fallen in many areas	6

PHOTOGRAPHS



Photo 1. Area 1: Failure of wood frame



Photo 2. Area 1: Deterioration of rafters and decking



Photo 3. Underside of Area 1 showing concrete joists



Photo 4. Area 2: Loss of roofing and waterproofing membrane



Photo 5. Area 2: Opening in the roofing to exposing rafters



Photo 6. Area 2: Deterioration and failure of rafters

DISCUSSION

Water infiltration has led to deterioration of the wooden roof framing, resulting in structural failure of the roof in both Areas 1 & 2.

At Area 1, the structural repairs will be somewhat localized, and can be performed largely from the interior. Because the failure is due to the displaced rafters, repair work can be limited to temporary shoring and framing reinforcement to allow the rafters to be repositioned, and the roof opening closed and weatherproofed. The design for the new rafter support should take into account the capacity of the supporting concrete slab and joist framing.

In Area 2, the significant loss of roofing has exposed numerous roof and ceiling framing members to the elements, resulting in deterioration to many of these framing members. This framing appears to span to the exterior wall, therefore supporting not only the flat roof where failure is most evident, but also the pitched (clay tile) portion of the roof. Due to the extent of deterioration, the repair work should not proceed until the area has been made safe by temporary shoring, after which the scope of repair and replacement can be better defined with a more in-depth assessment.

RECOMMENDATIONS

We recommend that the repair scope be established after a more in-depth assessment and review of existing building drawings. The below stabilization scope of the recommendations is limited to structural and envelope stabilization in the two areas of roof failure that were analyzed. An outline of potential stabilization methods were determined to be as follows:

AREA 1

- Lift and temporarily support structural rafters in the original position
- Rebuild support for rafters, either to match existing wood frame, or with a temporary knee-wall
- Reinforce deteriorated rafters with local reinforcing and full length "sister" reinforcing
- Replace deteriorated wood deck
- Repair flashing and roofing membrane (described in more detail by others)

AREA 2

- Temporarily shore framing to allow work to be performed safely
- Remove remaining ceiling plaster, roofing to allow assessment of wood framing
- Reinforcing and replacement of deteriorated wood framing may include both flat and pitched roof
- Replace deck on new/reinforced rafters
- Replace waterproofing membrane and roofing

LIMITATIONS

The recommendations presented represent current technology for building renovation and maintenance. We have assumed the facility will continue in its present use and will require appropriate repairs and periodic maintenance. Proper design and installation of effective repairs and maintenance can significantly reduce further deterioration and the associated repair costs.

This report is not a warranty or guarantee of the items noted. The extent of our evaluation was limited and cannot guarantee that the condition assessment discovered or disclosed all possible latent conditions. The evaluation required that certain assumptions be made regarding existing conditions and some of these conditions cannot be verified without additional cost, or destroying otherwise adequate or serviceable portions of the facility. In this study, we did not include review of the design, inspection of concealed conditions, or detailed analysis, to verify adequacy of the structure to carry the imposed loads and to check conformance to the applicable codes. The assessment also does not provide specific repair details, construction contract documents, material specifications, details to develop construction cost, or information on means and methods of construction.

Any comment regarding concealed construction or subsurface conditions are our professional opinion, based on engineering experience and judgment, and derived in accordance with standard of care and professional practice.

This report has been prepared on behalf of and for the exclusive use of the CLIENT. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party or used or relied upon by any other party, in whole or in part, without our prior written consent.