

April 29, 2021

Mr. Phil Keller
Berkshire – Hathaway Realtors
2496 Commons Blvd.
Beavercreek, Ohio 45431

RE: Basement CMU Wall Bowing
220 North Maple Ave, Fairborn, Ohio 45324
Tri-Tech Job Number: 21706E

Dear Mr. Keller,

Tri-Tech Engineering was hired to perform a structural inspection of the basement walls at the above home. Mr. Roger Butler visited the site on Monday, April 12, 2021 to perform the inspection.

Background Information:

Per our phone conversation, the home is part of an estate and is to be sold to allow the estate to be closed. The home is a wood framed Cape Cod style home built in 1940. The home is a story and a half over a full basement and faces west. The basement is constructed of concrete masonry units (CMU's, concrete block).



Scope and Procedure:

The purpose of this inspection was to determine the extent of the structural damage and to provide recommendations for the repair of same. This was accomplished through the following tasks:

- Site visit and inspection on April 12, 2021.
- Documentation of the site through a series of digital photographs.
- Documentation of the findings through this report.

Results of Investigation:

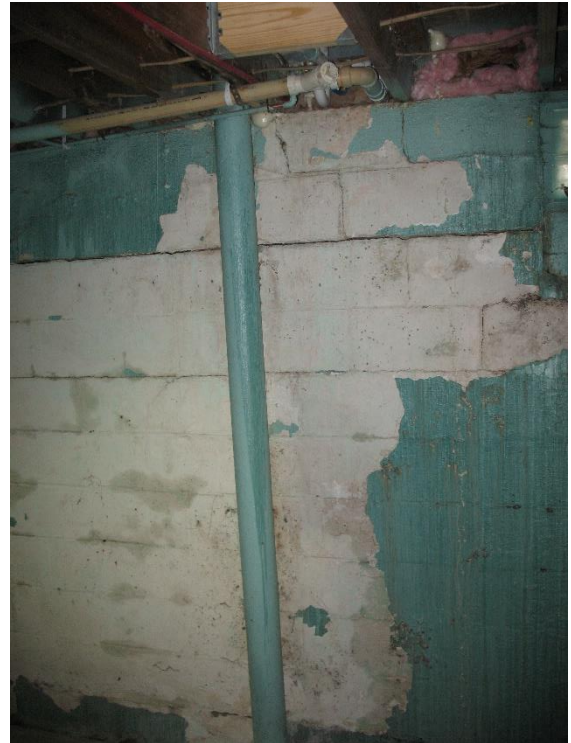
- The roof had very little to no overhang of the exterior walls. There are no rain gutters on the home.



- The North wall of the basement has several cracks at mortar joints. This includes the stair step cracking and two horizontal cracks. In addition, this wall is bowed due to soil and hydrostatic pressure acting on the wall.



- The upper crack in this photo is between the ninth and tenth course of block and is approximately at the exterior grade. The lower crack is between the seventh and eighth course, approximately 32 inches below grade. This pipe appears to be an attempt to stabilize this wall. However, it is not connected to the wall, is out of plumb by 1.5" in four feet, and has no connection at the top to resist the movement.



- The upper crack follows the mortar joint down to the course below and connects to a vertical crack that extends to the top of the first course.



- This photo is of the North East corner of the basement. There is cracking of the mortar joints and water infiltration into the basement. Note the stair step cracking below the window.



- The stair step cracking continues along the East wall.



- This photo shows the condition of the pilaster in the East wall. Below the crack, the wall and pilaster have been displaced by ground and hydrostatic pressure. The top three courses haven't moved due to the girder being attached. This girder is resisting the forces acting on the wall.



- This photo of the South wall shows similar conditions as the North wall, but to a lesser extent. In addition to the wall bowing, there is effervescence on the surface of the wall behind the paint.



Discussion:

The damage to the basement walls can be attributed to soil and hydrostatic pressure from outside the home pushing on the walls and water penetrating the blocks themselves. The water damaged the mortar joints allowing the external forces to crack the joint and bow the walls.

Water from the roof is not directed away from the foundation walls by gutters and down spouts. This creates a higher hydrostatic pressure at the foundation wall.

Any repair or replacement of the foundation will prove temporary if the underlying problem of excessive hydrostatic pressure is not addressed.

Conclusions:

The basement walls should be repaired or replaced prior to the home being occupied. Repair may be possible, but the design is beyond the scope of this investigation. Results of a Google search for companies that design and install foundation repairs yielded the following: Dwyer Company, located in the Cincinnati area, phone number 877-399-3726, A-1 Concrete Leveling and Foundation Repair, located in the Dayton area, phone number 937-832-1291, and Olshan Foundation Repair, located in the Cincinnati area, phone number 513-286-2543. Tri-Tech has not worked with or for any of these companies and offers no endorsement of their services.

Requirements to replace the foundation wall can be found in chapter four of the Ohio Residential Code located at: <https://codes.iccsafe.org/content/OHRC2019> . Replacement of the foundation with 8” CMU’s may not meet the current code requirements. If the foundation is replaced, the new foundation should be waterproofed and drain tiles be placed at the top of the footing to reduce the hydrostatic pressure. These should be routed into a sealed sump pump and discharged to storm sewers (if available) or to a location where the water won’t drain to the home’s foundation.

Gutters should be provided with down spouts extending away from the home’s foundation. The sump pump discharge line should be routed away from the home.

Conclusions drawn in this report are based on observations and on information available, known and declared at the date of investigation and/or the time of preparation of this report. This report is furnished as privileged and confidential to the addressee. Release to any other company, concern, or individual is solely the responsibility of the addressee. Should additional information be uncovered or made available, we retain the right to revise or supplement our report accordingly. We trust this is the information you require. Please call if we can provide you with any further assistance in this case.

Respectfully submitted,

Roger D. Butler
Roger D. Butler, PE
Tri-Tech Associates, Inc.

Reviewed by,

Mark H. Stemmer
Mark H. Stemmer, PE
Tri-Tech Associates, Inc.