



February 12, 2024

Ryan Connelly

Re: Limited Structural Inspection  
220 Curragh Cove  
Fuquay-Varina, NC

Dear Mr. Connelly,

At your request, a limited structural inspection of the above property was performed on February 8, 2024. The report that follows has been prepared based on that inspection. The inspection was performed by Kyle Hedblom, EI, and Raymond Schmidlin III, EI of Giles Flythe Engineers.

The scope of this project was limited to inspection and evaluation of interior drywall cracks, cracks in the foundation walls, and general framing concerns in the crawlspace. The report is intended to cover only those premises that may be examined visually without excavation, removing surface materials, and disassembling components.

No tests, measurements, or calculations have been made except as described in this report. We have not investigated for toxic materials or wastes, or examined public records regarding this property. The scope of the inspection does not assure that the property conforms to any regulations, restrictions, or building codes that may be in effect at its location.

## **DESCRIPTION**

The 2-story, wood-framed home (with a crawlspace) is constructed on concrete masonry unit (CMU) perimeter foundation walls with CMU block piers supporting the floor girders. The house was built in 2015 according to Harnett County Real Estate Tax Records. For purposes of this report, all directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing outside and facing the front door of the home.

Upon our arrival, access to the interior was provided by the homeowner. The items detailed above in the scope were subsequently inspected.

Note that the original builder was not interviewed and no plans for the construction of this home were provided. The information presented in this report is gathered from the conditions visible at the site, as they existed at the time of the inspection. A limited photo log is included with this report.

## OBSERVATIONS

### Interior:

1. Multiple cracks (up to 1/16" wide) and nail pops were noted in the drywall finish materials at the following locations:
  - a. A horizontal crack was noted at the door opening to the master bathroom approximately 7'-3" from the left perimeter wall and 16'-0" from the rear perimeter wall. Note, this crack was present on both the front and rear side of this wall.
  - b. A diagonal crack was noted at the door opening to the master closet approximately 7'-3" from the left perimeter wall and 6'-3" from the front perimeter wall.
  - c. A crack was noted in the kitchen approximately 22'-6" from the right perimeter wall and 15'-0" from the rear perimeter wall.
2. Floor slope (up to 3/16" vertical over 4'-0" horizontal) was noted sloping left to right at the left side of the kitchen island approximately 13'-3" from the right perimeter wall and 6'-9" from the rear perimeter wall.

### Exterior:

3. Multiple minor hairline cracks (less than 1/16" wide) were noted in the parge coating with concentrations at the foundation vents around the house.
4. A stair-step crack (approximately 1/16" wide) was noted in the right perimeter foundation wall approximately 12'-9" from the rear-right corner.
5. A stair-step crack (approximately 1/16" wide) was noted in the right perimeter foundation wall approximately 7'-6" from the rear-right corner.
6. Gutters and downspouts (with leaders) were noted installed on the home. Grade was generally neutral slope at the front and right of the house with a positive slope at the left and rear of the house.

### Crawlspace:

7. Flaring (up to 1/4") was noted in the 2-2x10 floor joist spanning left to right approximately 6'-0" from the front perimeter foundation wall. The left end of the double floor joist was noted to bear on the left perimeter foundation wall.
8. Flaring (up to 1/2") was noted in the left-most ply of the 3-2x10 floor joist spanning front to rear approximately 15'-6" from the right perimeter foundation wall. The rear end of the triple floor joist was noted to bear on the rear perimeter foundation wall.
9. A cracked 2x10 floor joist was noted approximately 11'-9" from the right perimeter foundation wall. Note, this location seemingly corresponds with the location of the kitchen island noted above.
10. Vertical cracks (up to 1/16" wide) were noted in the foundation walls at the following locations:
  - a. A vertical crack was noted in the left perimeter foundation wall approximately 20'-0" from the rear foundation wall
  - b. A vertical crack was noted in the rear perimeter foundation wall approximately 26'-9" from the left perimeter foundation wall.
11. A vapor barrier was noted installed throughout the crawl space and there was no evidence of excessive moisture or water damage in the floor framing members at the time of inspection.



## **DISCUSSION**

The cracks in the foundation walls noted above are likely due to limited differential foundation settlement. The clay soils in this area are considered “expansive” type soils and will typically expand and contract with fluctuations in the moisture content. This expansion and contraction of load-bearing soil materials can lead to soil consolidation and foundation cracking/movement. If conditions around the foundation remain relatively dry, the likelihood of future significant settlement will be reduced, but we cannot predict the extent of future settlement. The condition of the foundation wall does not appear to be a significant structural deficiency and improving exterior drainage and monitoring cracks for additional propagation is an acceptable approach at this time.

The minor cracking in the parge coating in the perimeter foundation walls is likely the result of shrinkage. As cement-based materials harden and dry, they typically shrink, largely due to the evaporation of excess water. This shrinkage causes a buildup of internal forces in the material, commonly resulting in minor cracking, therefore naturally alleviating the internal stresses. The parge coating is an aesthetic component installed on the foundation walls and is not a structural concern. The condition of the walls does not appear to be affecting their load-bearing function. Monitoring the cracks for additional movement is an acceptable approach at this time.

Positive grade away from the foundation should be created, where possible, to help reduce moisture infiltration under the foundation. Additional soil consolidation and settlement can occur due to water infiltration into soils and subsequent drought conditions which dry out the soils below foundations. Creating positive drainage away from the perimeter foundation walls is vital to the long-term structural integrity of the foundation.

The flaring in the double joists noted above in the front crawl space is likely due to the vertical loads on the beam causing slight rotation in the plies of the member. This effect can lead to increased vertical deflection and improper bearing at the load-bearing supports. The flaring at the spans is considered significant and is a structural concern. We have provided a recommendation below to repair the flaring in the double joist spans.

The recommendations presented in this report are based on our experience and understanding of the concerns to provide a reasonable solution based on the conditions that were visible and/or known to us on the date of inspection. As this report is based on the circumstances at one point in time, conditions may change which may result in additional repair recommendations. Further, the recommendations are the opinion of the Engineer to address significant structural-related concerns and may not rectify cosmetic issues.

## **RECOMMENDATIONS**

If there are any questions or concerns regarding location or method of repair contact the engineer prior to construction.

1. The flaring double joists noted above should be temporarily clamped to bring the plies into full contact, and the plies should be reattached with (3) Simpson SDWS Screws (or equivalent) spaced at 16” on-center alternating sides.



2. We recommend fully sistering the damaged floor joist noted above for the full length (bearing point to bearing point). The new sistered member should match the size of the existing joist and be attached with (3) 10d nails at 16" O.C.
3. Monitor the cracks in the foundation walls. If the cracks widen significantly (expand by an additional 1/8") or additional significant cracks (greater than 1/4" wide) propagate, then further evaluation by a structural engineer may be needed at that time.
4. We also recommend ensuring that stormwater drains positively away from the home to minimize the risk of future water infiltration. This can be accomplished by installing leaders on downspouts and ensuring gutters, downspouts, and leaders remain clear of debris and properly functioning to direct the drainage away from the home. Also, creating a positive grade around the perimeter of the home, where possible, will aid in stormwater evacuation. Water infiltration can cause further undermining of the soil and foundation settlement.
5. If desired, to help reduce deflection of the floor noted above (Observation #2), a (3) 2x8 drop girder may be installed below the midspan of the floor framing. The girder should be supported by 8"x16" CMU block piers on 20"x12"x8" concrete footings located at a maximum of 6'-0" on center and at each end. Provide 2x pressure-treated blocking between the floor girder and new piers.
6. If desired, we recommend installing a new 4x4 post at the midspan of the double floor joists located beneath the interior drywall cracks noted above (Observation #1a – b). The post should provide a full uniform bearing platform for the floor framing above and bear on a new 12"x12"x8" thick concrete footing.

#### **General Notes:**

- All new lumber should be SPF or SYP No.2 or equivalent. All lumber exposed to concrete/masonry or weather must be pressure treated. All metal components exposed to weather or pressure-treated lumber shall be galvanized.
- Install flat, pressure-treated blocking and/or metal shims to provide full uniform bearing of the above floor framing onto the new/existing masonry piers.
- All fastening shall conform to R602.3(1) in the 2018 NC Building Code: Residential Code.
- Installation of the above recommended repairs may require temporary shoring of the in-place structural components. Shoring methods are the responsibility of the contractor.
- With any structural changes, finish material cracks and minor movements are typical and expected. These are associated with settlement and allowable deflection generally observed after construction of an addition, significant remodel, or repair.
- All hollow masonry piers to be capped with 4" solid masonry or concrete for 1-story and 8" solid masonry or concrete for greater than 1-story.
- Masonry pier unsupported height must be no greater than 4 times the least dimension. If all cells are fully grouted, the unsupported height may be increased to 10 times the least dimension.



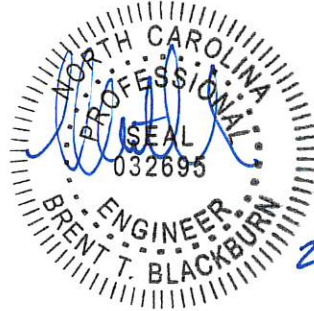
**CONCLUSION**

We trust that this report provides the information you require. Please contact us at 919-465-3801 if you have any questions. Thank you for the opportunity to be of assistance to you.

Sincerely,



Kyle Hedblom, EI  
Project Engineer  
Giles Flythe Engineers Inc.  
NC Lic. No. C-2871



2/12/2024

Brent T. Blackburn, PE  
Project Manager  
Giles Flythe Engineers  
NC Lic. No. C-2871

Enclosed: Limited Photo Log

**Description**

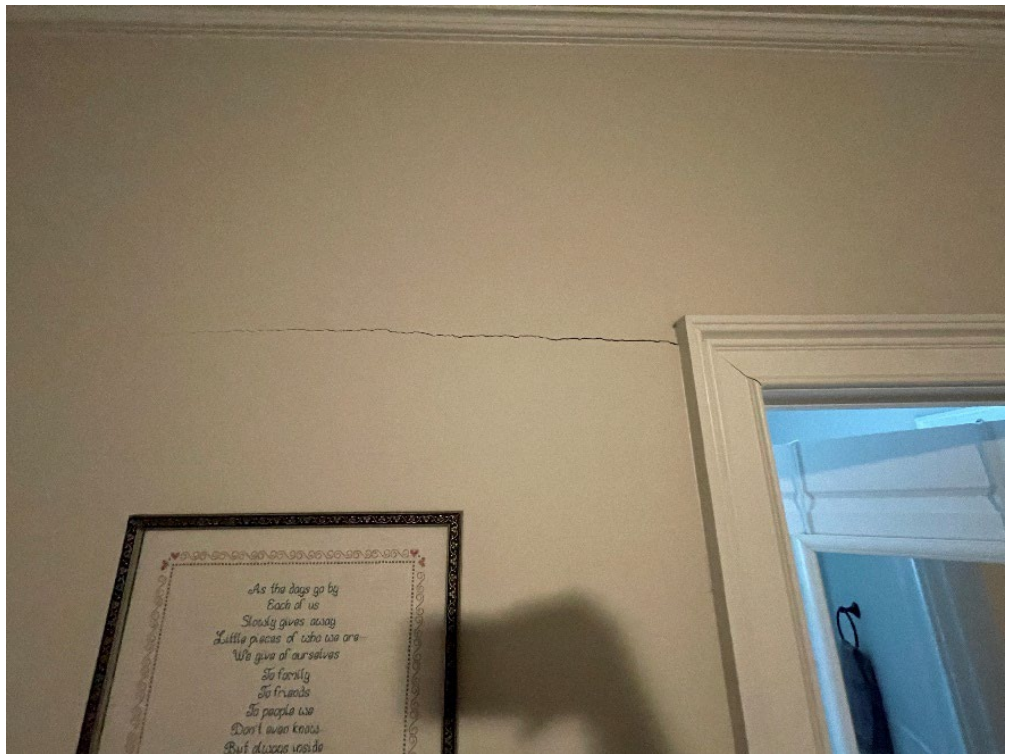
General view of the front of the home (for reference).



**Photo No.**  
**1**

**Description**

Typical view of interior drywall cracks observed throughout the interior of the home.



**Photo No.**  
**2**

**Description**

Typical view of flaring  
floor joists.



**Photo No.**  
**3**

**Description**

Typical view of drainage  
observed on the exterior  
of the home.



**Photo No.**  
**4**

**Description**

Typical view of cracks  
in parge coating of the  
foundation wall



**Photo No.  
5**

**Description**

Typical view of cracks  
in the foundation wall.



**Photo No.  
6**



**Description**  
View of damaged floor joist.



**Photo No.**  
**7**