January 13, 2022 Project No. 21-2669

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STONEWALL
STRUCTURAL ENGINEERING

Betty Gomez
Showcase Restoration
125 Drake St.
Fayetteville, NC 28301

Re: Structural Observation — *111 Cedar Lane, Sanford, NC 27332*

Ms. Gomez,

At your request, on December 30th, 2021 we performed a visual structural observation of a broken 1st floor joist at the Sanford residence noted above. The structure is a conventionally framed, detached, single family residence with raised first floor framing over a pier/girder foundation system with perimeter masonry foundation walls *(see picture 1)*.

Our observations are listed below. Indicators such as "left," "right," "front," and "back" are referenced as viewing the front of the home.

BROKEN JOIST

- In the right joist bay, the bottom chord of the 5th i-joist from the back foundation wall was damaged *(see picture 2)*.

Do we need to work from within the home to crawl space?

ADDITIONAL OBSERVATIONS

- The right end of the above-noted damaged i-joist was supported over a perimeter vent opening *(see picture 3)*.
- I-joists in the back-left joist bay were noted to be notched and improperly supported at the small bump-out header in the back foundation wall *(see picture 4 for example)*.
- Various perimeter foundation vents were noted to be sealed and the crawlspace was not properly closed per section R409 of the *NC Residential Building Code (see picture 5 for example)*.
- Standing water was noted along the back foundation *(see picture 6)*.
    - The exterior grade at the back of the home was noted to be inadequately sloped away from the foundation *(see picture 7)*.
    - Roof gutter downspouts were noted to be installed for discharge at the foundation *(see picture 8 for example)*.

We recommend the following work be performed by a qualified general contractor:

- Reinforce the damaged i-joist by providing an additional full depth i-joist next to the damaged joist. The new joist should span continuously between end supports and should be securely fastened to the existing member.
- Add a securely installed treated 4x4 stub within the vent opening at the right end of the above-noted damaged joist, such that new stub is located directly beneath the joist bearing point.

- Install Simpson face hangers securely fastened to the existing header to support the notched and improperly supported joist ends noted above.
    - Securely fasten 2x SYP blocking to the front face of the header over the existing 2x4 ledger to create a flush surface for hanger attachment.
- Verify or complete the installation of a Code-approved closed crawlspace system with adequate vapor barrier and mechanical drying measures per *NC Residential Building Code* section "R409," or open vents to allow cross-ventilation of the underfloor space.
- Improve vapor retarder coverage such that the entire crawlspace floor is covered and edges are sealed around the bases of masonry piers.
- Provide drainage improvements around the perimeter of the structure such that rainwater runoff is adequately diverted from the perimeter of the home. Drainage improvements are intended to help avoid the need for extensive foundation repair/stabilization work in the future.
    - Current building standards require 6" of fall within the first 10' from a structure or use of drains and swales. A system of exterior perimeter "French" drains and/or catch basins installed at low points in the grade may be necessary to achieve adequate drainage. Any low spots in the grade adjacent to the home should be filled for positive drainage away from the structure.
    - Extend roof gutter downspouts and any HVAC condensation drains for discharge at least 5' from the perimeter of the structure onto soils adequately graded away from the home.

The above-listed recommendations are not intended to be implemented in lieu of a regular home maintenance schedule. Most serious and costly structural damage in this area occurs due to improperly maintained drainage. Roof gutter systems and any in-ground drains should always remain clear of debris and should be periodically checked to verify positive flow. This can be done by visual examination during or immediately following rainstorms. If standing water, backed-up drainage, or surface water which flows within 5' of the home's foundation is ever found, this should be addressed right away by consulting with a drainage specialist.

The above-listed determinations were made in accordance with common engineering principles and the intent of the 2018 edition of the *North Carolina Residential Building Code.* Sequencing, and means and methods of construction are considered to be beyond the scope of this report. Contractor is to provide adequate temporary shoring prior to cutting or removing any structural load-bearing elements. All work is to conform to applicable provisions of current building standards. Please feel free to contact us, should you have any questions or concerns regarding this matter.

Sincerely,
Cody Johnston, PE
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