

BUDDY WEST, P.E.
STRUCTURAL ENGINEER

115 Penny Lane
Cary, NC 27511

Phone 919-469-3402 (h) / 919-605-7224 (c)

April 08, 2019

Doug Harrings, Realtor
100 Connemara Drive
Cary NC 27519

Dear Doug:

As you requested, on Friday 04-05-19 I performed a site visit to the house at 427 W. Park Street in Cary, NC. Thanks for meeting me there.

The purpose of my visit was to observe and evaluate the structural condition of two cracks visible on the exterior of the masonry foundation walls, and some wood rot in some structural members in the crawl space, as identified by the home inspector just before I arrived at the house.

My observations and recommendations follow:

1. There is an approximately 3/32"-wide vertical crack in the exterior face of the front brick foundation wall. The crack is located at the lower left-hand corner of the right-hand foundation vent on the front wall.

My observations in the crawl space at the crack location reveal that this crack is not visible there, due to the presence of a masonry wall pier blocking the view at the crack location.

This foundation wall is only one brick thick (less than 4" thick). The floor joists run in the front-to-rear direction and bear on a 2X wooden plate laid flat on top of the wall. The floor joist ends are not attached to the 2X wooden band (which stands on edge around the perimeter of the foundation wall), making this narrow brick wall a floor-load-bearing wall. This wall also carries half of the roof loading and a portion of the attic loads.

This wall crack is very narrow and exhibits no sign of differential vertical settlement from one side of the crack to the other. Other than this narrow crack, the wall appears to be in good condition.

For the above reasons, I do not recommend structural repairs to this wall.

I do recommend that you measure and record the crack width about monthly for at least a year to verify that no additional movement is taking place.

Also, I recommend sealing the outside face of the crack with a flexible caulk made for sealing masonry cracks, to keep rainwater out of the wall.

2. There is an approximately 3/16"-wide vertical crack located beneath the foundation vent on the right-hand brick foundation wall.

My observations in the crawl space at the crack location reveal that the crack is the same width on the inside face of the wall.

This end-wall is a non-load-bearing wall, since the floor joists, attic joists, and roof rafters run in the front-to-rear direction. This wall crack is very narrow and exhibits no sign of differential vertical settlement from one side of the crack to the other. Other than the narrow crack, the wall appears to be in good condition.

For the above reasons, I do not recommend structural repairs for this wall.

I do recommend that you measure and record the crack width about monthly for at least a year to verify that no additional movement is taking place.

Also, I recommend sealing the outside face of the crack with a flexible caulk made for sealing masonry cracks, to keep rainwater out of the wall.

3. Comments about items 1 & 2 above:

In my opinion, the most likely cause of both foundation-wall cracks is a slight downward settlement of the wall footing at the front right-hand corner of the house. This may be related to the crawl-space water problem, as discussed below:

Note that there is an extreme amount of water standing in the crawl space, over 2" deep in some locations. This condition is not acceptable, as it can cause structurally significant footing settlement and structurally significant wood rot.

The water needs to be removed. Also, the grades around the exterior perimeter of the house need to be built up at the foundation walls where required, so that the ground clearly slopes away from the house, to keep rainwater well away from the foundation walls. Use only inorganic fill soil to build up the grades at the exterior of the foundation walls. Topsoil or other soils with any organic content will not work. Also, sandy soils and gravel (and other permeable soils) will not work. Compact the new fill soil thoroughly.

4. In an attempt to identify the locations of some of the areas of wood rot (as reported by the home inspector) are, I probed at least 20 floor joists and sections of wooden girders in the crawl space. I found one area at the bottom of a 2X6 floor joist where the rot was about 1" deep, and another area of a floor joist where the rot was about ¼" deep. I found several areas of softened wood in some triple 2X8 girder members.

While it was not practical for me to identify all areas of wood rot during my visit, in my opinion, there is enough evidence of wood rot and moisture-softened wood to warrant the hiring of a contractor to probe all floor joists, girders, and all other structural wooden support members in the crawl space to find all rotted wood. Significantly damaged members will need to be replaced, reinforced, or "sistered" (in the case of floor joists).

My structural calculations indicate that the existing floor joists will need to be replaced or sistered if more than a ¾" depth of rot is found. The existing triple 2X8 girders will need to be repaired/reinforced if more than a 1½" depth of rot is found in any one or more 2X8's.

The contractor can contact me for recommendations about repairs, if he/she desires to do so.

5. My observations in the crawl space reveal that the 2X2 "ledger strips" that are attached to both sides of the girders (to support the floor joist ends) do not have nearly enough nails holding them to the girders. The NC Residential Building Code requires 3 or 4 nails through the ledger strip beneath each joist bearing location. My "sample" observations of a couple of

ledger strips reveal that there are only single nails present, spaced at about 12" to 16" on centers. This inadequate condition needs to be corrected.

My additional observations reveal that some of the inadequately nailed ledger strips have consequently deflected downward by as much as ¼" (perhaps more in locations that I did not observe). This downward ledger deflection has also caused the floor joist ends to move downward, which can cause uneven floors above the girders.

For this house's particular ledger strips I recommend adding enough 3"-long nails or 3"-long deck screws through the ledger strips at each joist bearing location so that there are 3 connectors per joist. The connectors in each group of 3 should be spaced at about 1½" apart, and can be slightly offset vertically from each other to avoid splitting the ledger strip. Pre-drilling holes for deck screws would also help avoid splitting.

You shared with me that the interior floors are uneven in some places. Though I did not go inside the house to observe exactly where this unevenness has occurred, any unevenness that has occurred along the two girder locations could be related to the deflection of the ledger strips. [Note that, once the ledger strips are adequately connected, uneven floors that were caused by the ledger strip deflection would not be structural issues, only cosmetic.]

If you want to get the deflected floor joist ends back up to their original elevations, it will be necessary to **A)** jack up and temporarily support the affected floor joist ends, **B)** remove the deflected portions of the ledger strips, and **C)** reinstall the removed sections of ledger strips at the new elevation (or use metal joist hangers, rather than replacing the ledger strip sections).

6. Two contractors who have done very good work on several of my residential projects are -

Chris Gibson, Gibson Remodeling & Repair - 919-417-2302

Josh Wingate, Wingate Construction Co. - 919-924-9478

Thanks so much for calling on me to do this work for you. Please call me with any questions about these items.

Thanks,

Buddy

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INVOICE

Doug Harrings, Realtor
100 Connemara Drive
Cary NC 27519
04-08-19
Re: 427 W. Park St., Cary, NC

Drive: 0.2 hr. @ \$50.00 per hour	\$ 10.00
Site Visit: 1.9 hr. @ \$100.00 per hour	\$ 190.00
Structural Calculations: 0.5 hr. @ \$100.00 per hour	\$ 50.00
Engineering Report, Sealed: 2.25 hr. @ \$100.00 per hour	\$ 225.00
TOTAL:	\$ 475.00