

BUDDY WEST, P.E.
STRUCTURAL ENGINEER

115 Penny Lane
Cary, NC 27511

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

December 08, 2016

Beth Smoot - Realtor/Broker Assoc.
For Mandy & Bryan Yarborough
NextHome City of Oaks
308F W. Millbrook Rd, Suite 1
Raleigh NC 27609

Dear Beth,

As you requested, on Tuesday 12-06-16 I performed a site visit to the house at 2205 Kilburn Road in Raleigh. The purpose of my visit was to observe and evaluate the structural condition of several items that had been identified in the 12/01/2016 home inspection report by National Property Inspections as being potential structural issues. My observations and recommendations follow. "Item" numbers and "page" numbers are from the home inspection report:

1) Item 3 (1st sentence) and left-hand photo on page 35 of 50:

The step-crack shown in the brick veneer photo is a maximum width of about $\frac{1}{8}$ ". There has been about a $\frac{1}{16}$ " outward movement of the veneer to the right of the crack. In my opinion, both the crack & the outward movement are most likely to have been caused by outward pressure on this wall, being exerted from the fill material that is behind the wall (under the garage slab).

This crack is too small to indicate a structural problem at this location at this time. I do not recommend structural repairs.

2) Item 3 (second sentence) and right-hand photo on page 35 of 50:

My observations beneath this exterior veneer show that there is another layer of brick veneer behind this one. The inner layer appears to extend well below the ground level, perhaps down to the wall footing. I cannot tell visually why the additional outer layer of veneer was added, nor why it is not properly supported on a concrete footing. Though this veneer is not a structural item and is not related to the structural stability of the wall, in my opinion the outer veneer does need to be supported on a new poured footing of 3000 psi concrete (minimum).

I recommend that the new concrete footing be installed under the full length of the

outer veneer, anywhere around the exterior wall of the house where this same unsupported condition is found. Shallow excavation at some locations along the walls will be required in order to determine where this condition exists. Before pouring the new footing, remove all of the existing uneven concrete from the bricks (a sample is visible in the photo).

The inside edge of the new footing can be poured directly against the face of the inner veneer, and the outside edge of the footing will need to be formed with 2X lumber. The new footing should extend at least 3" out beyond the outside face of the outer layer of veneer. The 2X lumber form needs to extend up at least 1" above the elevation of the bottom of the bricks, to be sure that the new concrete comes up to the bottom of the bricks. Stake or brace the forms properly; vibrate or "rod" the concrete.

The new footing should be a minimum of 6" thick, and needs to rest on thoroughly compacted soil. Since this veneer is not structural, in my opinion the bottom of the footing does not have to extend 12" under the ground in this particular case. I do recommend that the bottom of the footing extend at least 6" below the ground.

3) Item 1 and both photos on page 38 of 50:

The horizontal crack in the left-hand wall of the basement has been caused by the basement wall bowing inward by about 2" maximum at the height of the crack near the center of the wall length (according to my measurements). In my opinion, this inward bowing has been caused by horizontal pressure from the fill material (soil or crushed stone) on the other side of the wall, beneath the garage's concrete slab.

It would be very helpful to ask the current owners how long this wall had been bowed outward. I.E., it would be very good information to know that the wall has not moved outward additionally, or cracked further, in several years.

Note that this wall is a retaining wall, but has not been properly reinforced with steel rebars and grout to prevent cracking and movement, as the Code currently requires.

Note that one good thing does happen when retaining walls like this one move outward: the horizontal soil pressure on the wall is frequently significantly reduced, and wall movement often stops. Unless the conditions of the soil on the other side of the wall change, in my opinion the movement is not likely to continue.

Changed conditions could be either A) water getting into the retained soil, or B) a large increase in the loading on top of the garage slab. Both of these can cause an increase in the horizontal pressure on the wall. I don't believe that water will be a problem, since the garage is covered; and the owner indicated that he wasn't planning to park an unusually heavy vehicle in the garage, so the loading conditions on the slab are unlikely to change significantly.

For the above reasons, I recommend that no left-hand basement wall repairs be performed at this time.

I do recommend that the size/width of the horizontal cracks be measured and recorded about once a month for at least a year. If the cracks begin to get wider, please call me for further evaluation. Though I feel that significant further movement is unlikely, we will want to hire a foundation contractor to perform repairs if the crack width turns out to be progressive.

4) Item 2 on page 38 of 50, and both photos on page 39 of 50:

In my opinion, the separation of the back wall from the rear end of the left-hand basement wall was caused by the top of the rear wall leaning outward (to the rear). I measured the amount of leaning to be about 1" at this point in time. I believe that the rear wall is leaning outward due to the same horizontal pressure on the wall from the fill material (soil or crushed stone) beneath the garage slab, as discussed in paragraph 3 above.

For the same reasons called out in paragraph 3 above, I do not recommend wall repairs at this time. See that same paragraph for other recommendations about monitoring the amount of movement, and the implications of further movement.

5) Please contact me when you want me to proceed with the design of the beams for the locations where you are planning to remove portions of the two interior walls. I'm looking forward to working with you on this renovation.

Thanks so much for calling on me to do this work for you. Please call me with any questions that you have about the items in this report.

Sincerely,

Buddy

Buddy West, P.E.

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STRUCTURAL ENGINEER

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Cary, NC 27511

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INVOICE

Beth Smoot - Realtor/Broker Assoc.
For Mandy & Bryan Yarborough
NextHome City of Oaks
308F W. Millbrook Rd, Suite 1
Raleigh NC 27609
12-08-16
Re: 2205 Kilburn Road, Raleigh

Travel: 0.9 hr. @ \$50.00 per hour	\$ 45.00
Site Visit: 1.8 hr. @ \$100.00 per hour	\$ 180.00
Engineering Report, Sealed: 1.5 hr. @ \$100.00 per hour	\$ 150.00
TOTAL:	\$ 375.00



The Nanni Corporation DBA
National Property Inspections

Mandy & Bryan Yarborough, 2205 Kilburn Road, Raleigh, NC, 27604

INSULATION

Defective

1. The depth of the loose fill insulation has been disturbed by walking into it, moving it at various places in the attic. Once the depth of the insulation is below the required depth the insulating value is compromised. An inadequately insulated ceiling can lead to increased heating and cooling cost. Repairs by an insulation contractor are needed. The original intended depth is not known as the installation certificate was not located. Typically loose fill fiber glass loose fill is installed in depths ranging from 12.25 - 14.5"

INTERIOR FOUNDATION

Defective

1. Noted a horizontal to step crack in the left wall of the basement. Separation noted along the horizontal crack indicating movement, possible push of the wall inward from exterior force.
2. Noted a vertical crack / separation in the back left corner of the basement wall, running from floor and continuing to the top of the wall. The crack/separation widens toward the top. Due to the width of the cracks/separation further evaluation by a structural engineer is needed.



Interior Foundation: horizontal crack, note separation



Interior Foundation: horizontal crack, note separation

Inspection Date :
12/1/2016

Inspector: Joe Nanni
Inspector Phone: (919) 621-5830

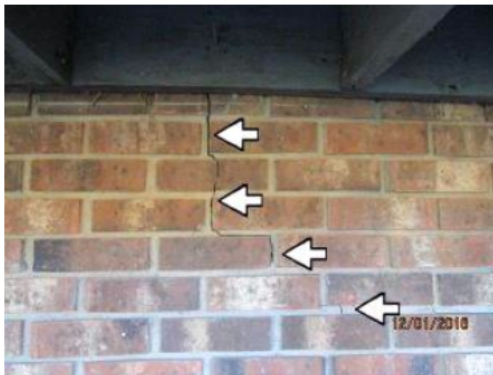
Email: npirdu@nc.rr.com
License 2763



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1. The hose bibs are not secured to the wall which can lead to a fractured water supply line and leaks due to the twisting action when turning the hose bib on/off and/or pulling on the hose bib when a hose is attached. Hose bibs should be firmly attached to the wall. Repair by a general or plumbing contractor is needed.
2. Exterior outlet(s) tested as NOT being GFCI protected, based on the age of the home (1973 build) building standards in place at the time of construction indicated exterior outlets be GFCI protected. Back lower right outlet tested as reversed polarity, hot and neutral wires reversed. Reversed polarity creates a shock hazard. Repairs by an electrical contractor are needed as safety is compromised.
3. Noted a step to vertical crack in the brick veneer between grade and the bottom of the garage service door. The brick veneer on the left wall appears to be suspended, not bearing on a footer or masonry foundation. Improperly supported brick veneer can lead to cracks, movement and or separation from the wall which is suspected at the back wall as indicated by gaps between the trim and the brick veneer at the service door, right side of the family room window and along dining room door threshold. Further evaluation by a structural engineer is needed.
4. Noted a small hole in the right front soffit, suspect cause by a small pest/animal. Repair by a general contractor as condition can lead to pest intrusion into the eave.
5. Recommend the application of a sealant/caulk along all vertical seams between the brick veneer and siding/trim. Open seams can allow water to penetrate behind the brick. Repair by a general contractor is needed.



Exterior Surfaces & Eaves: step to vertical crack



Exterior Surfaces & Eaves: brick veneer not supported

Inspection Date :
12/1/2016

Inspector: Joe Nanni
Inspector Phone: (919) 621-5830

Email: npirdu@nc.rr.com
License 2763



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Interior Foundation: crack/separation back left corner



Interior Foundation: crack/separation back left corner

ELECTRICAL

Sub-Panel	Defective
Branch Circuits	Defective
Carbon Monoxide/Smoke Detectors*	Defective

Inspection Date :
12/1/2016

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