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Ms. Susan Maas
Centricity
PO Box 33026
St. Petersburg, Florida 33733

August 26, 2019

Subject: Residential structural inspection – Linda Santos
27 Strike Eagle Dr.
Broadway, North Carolina 27505

Project No.: RB-195809

Dear Ms. Maas:

RB Engineering, Inc. is pleased to provide you with the following summary engineering letter concerning our site inspection of the subject residence, which we performed on August 22, 2019. We were asked to structurally evaluate the subject residence in regards to possible coverage pursuant to the terms of the following specific builder warranty criteria that you provided to us:

- A **Major Structural Defect** is: (1). Actual physical damage; (2). to the designated load-bearing portions of a Home; (3). caused by failure of such load-bearing portions that affects their load-bearing functions; and (4). to the extent that the Home becomes unsafe, unsanitary, or otherwise unlivable. **All four portions of the definition must be met to qualify the Home for Major Structural Defect.** The warranted load bearing portions of the Home are the framing members and other structural elements that transfer the load to the supporting ground.

BACKGROUND / FINDINGS

Linda Santos, homeowner/insured, reported the following physical issues that have caused her concern regarding the structural condition of the house: foundation slab cracking, interior cosmetic issues and porch slab movement. Ms. Santos was in the process of having the flooring replaced, but the project is currently on hold as she is awaiting direction on the structural warranty decision before proceeding with the flooring replacement project due to the extent of slab cracking.

We understand that the subject residence was constructed in 2006 and was initially used as a model house before being purchased by Ms. Santos in 2009. For the purpose of this report, all directions are given from the perspective of an individual standing in front of and facing the main entry to the residence. No material testing, soils testing, excavation or destructive inspection techniques were performed for the purpose of this report. No construction plans were readily available. Photographs were taken during our site visit. During our site inspection, we observed the following relevant information:

- The single-family residence was constructed upon a concrete slab foundation using typical construction methods. The residence was constructed with an attached garage located at the left end. The house is a one-story residence that contains a bonus room located over the garage. Site drainage is from front-to-back and left-to-right with an area in the front yard that did not have positive site drainage.

- The concrete foundation slab contained isolated 1/16-inch to 1/4-inch open vertical cracks on the exposed face of the slab. The front patio concrete slab has visibly settled and the front, right porch roof column has been shimmed. Flooring was in the process of being removed at the time of our inspection so the top of the foundation slab was mostly exposed. There was significant cracking throughout the foundation slab that measured hairline to 5/16-inch in width and the cracking in the living room area contained a ¼-inch vertical displacement over the crack interface. See sketch for approximate crack locations.

- There were minor interior disturbances noted that consisted primarily of drywall issues (isolated nail pops, minor drywall cracking), a misaligned rear exterior door, and floor sloping. Using a rotary laser level, relative interior floor measurements were taken and revealed moderate to severe vertical floor misalignments on the order of over 2-inches with the low area measured toward the back, right corner of the house. The slab has visibly settled in this area evidenced by the gap between the base trim and the slab and separations have developed between the foundation slab and the wall sole plate. See the attached sketch for relative floor elevations.

- The roof system is framed using timber roof trusses and OSB roof sheathing. The roof trusses were in good physical condition with no structural issues noted. A minor water leak in the HVAC condensate line was noted and was reported to Ms. Santos.

EVALUATION

Foundation cracks and related interior disturbances can indicate differential movement of the foundation system. Differential settlement occurs when there is localized consolidation of the supporting soils under an applied load. This is not uncommon in residential construction especially when potentially expansive local soils become exposed to extreme weather conditions or to wetting and drying cycles. There was evidence to indicate moderate to severe differential settlement of the foundation system has occurred, as we measured over **2-inches of differential settlement** towards the right-rear portion of the residence in combination with extensive slab cracking. Foundation cracking and differential settlement of the foundation system are typically caused by poor soil compaction, poor soils, and/or by water infiltration into the soils beneath the foundation elements.

CONCLUSIONS

Moderate to severe differential settlement of the concrete slab foundation system (vertical settlement of 2 inches toward the back, right corner of the house) has allowed for the existing isolated physical damages (i.e. – foundation slab cracks, floor misalignments, minor interior disturbances) to develop. The primary cause of the noted damages is likely a result of original compaction of the fill material, existing soil conditions and site drainage patterns. As requested, RB Engineering, Inc. has evaluated the above structural items with the following conclusions as to warranty coverage as described in this report:

- The current physical and structural condition of the foundation system represents moderate to severe differential settlement of the foundation system toward the back, right corner of the house. We observed actual physical damage (**foundation slab cracking**) to the designated load-bearing portions of the home (**foundation slab**) caused by a failure of such load-bearing portions that affects their load-bearing functions (**excessive differential settlement**). Thus, the first three criterions for a major structural defect were identified and have been met.

- The **right portion of the foundation slab has differentially settled over 2 inches** allowing for separations to develop between the concrete slab and the wall framing**.** This creates a structural concern regarding how the residential loads are being distributed to the supporting soils. While the house is not currently unsafe, unsanitary or otherwise unlivable - the amount and type of slab movement that has occurred is significant and has the potential to produce an adverse vital effect on the structural integrity of the residence. Based upon our observations, we believe that the fourth criterion for a major structural defect has also been met.

- RB Engineering, Inc. considers the foundation damage observed to be a major structural defect per your warranty definition. A structural foundation repair is recommended to stabilize the right end of the foundation slab using underground helical or push piers, pressure grouting a portion of the foundation slab and repairing the slab cracks using a non-shrink epoxy.

Limitations of Inspection

The purpose of this limited investigation was to conduct a site inspection at the residence to view conditions that relate to the structural claim under the warranty program. The observations or comments in this report represent the very general conditions visually observed by the inspecting engineer. No items were removed for the inspection nor were any design calculations completed or testing done.

Not all items seen will necessarily be contained in this report, and it is not intended to be considered as a warranty of the condition of the home. This report is for the specific use of Centricity. This was a limited inspection based upon the scope provided by Centricity and is not a comprehensive structural evaluation; or evaluation of the structures compliance with local codes or other building regulations. The observations in this report are based upon the visually observable condition of the home at the time of inspection; these conditions may change over time. No guarantee or warranty as to the future life, performance, or need for repair of any item is intended or implied.

Our services were provided in accordance with the standard of practice for structural engineering and within the limits imposed by scope, schedule, and budget. If you have any questions or if I can be of further assistance to you on this project, please contact me at (919) 677-9662.

Respectfully submitted,

Ron Bittler, PE
President / Structural Engineer
RB Engineering, Inc.

Attachments: photographs, plan view with relative floor elevations and general crack locations

PHOTOGRAPHS

Photograph Number 1 - Partial front elevation view of the subject residence.

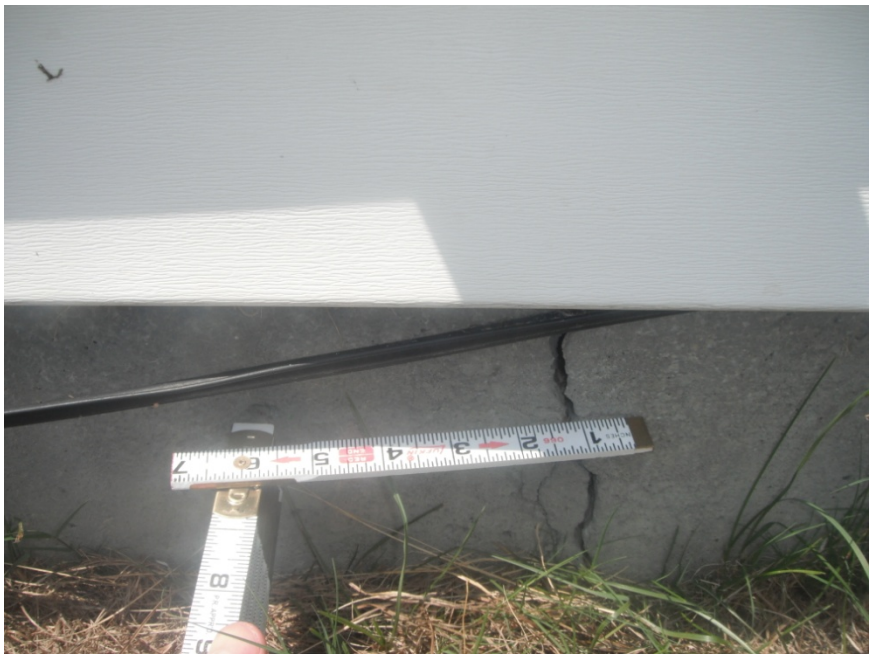
Photograph Number 2 - Left side elevation view.

Photograph Number 3 - Right side elevation view

Photograph Number 4 - Rear elevation view.

Photograph Number 5 - View of drainage collection area – front yard.

Photograph Number 6 - View of slab crack located below front entrance door



Photograph Number 7 - View of slab crack - right exterior

Photograph Number 8 - View of slab crack - rear exterior

Photograph Number 9 - View of slab crack - rear exterior

Photograph Number 10 - View of slab crack extending front to rear in living room area.

Photograph Number 11 - View of slab cracking at rear chimney area.

Photograph Number 12 - View of slab cracking.

Photograph Number 13 - View of slab cracking.

Photograph Number 14 - View of slab cracking.

Photograph Number 15 - Close up view of slab cracking.

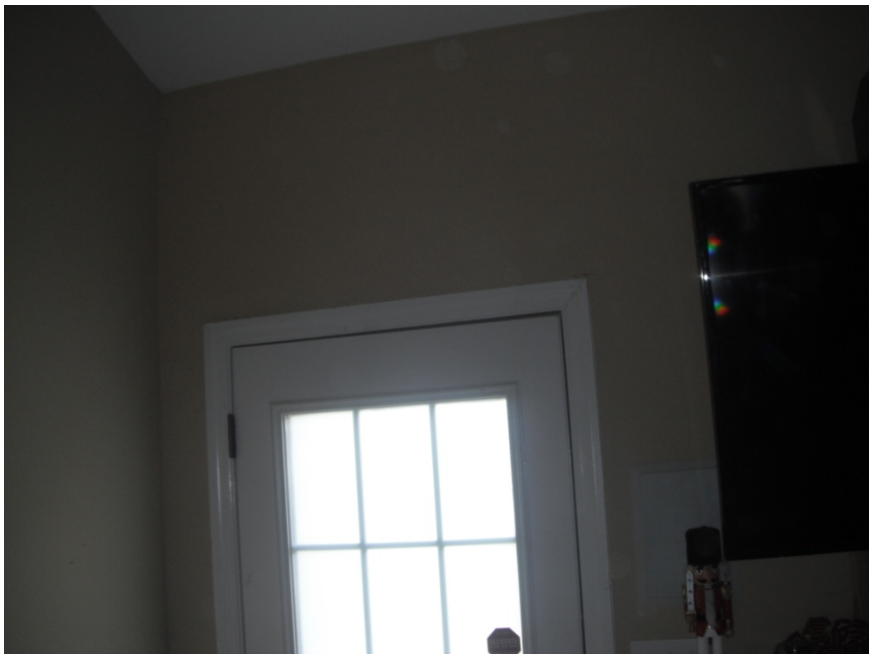
Photograph Number 16 - Close up view of slab cracking.

Photograph Number 17 - View of normal moisture reading in slab

Photograph Number 18 - View of separation between slab and wall framing

Photograph Number 19 - View of separation between slab and sole plate

Photograph Number 20 - View of interior ceiling – good condition



Photograph Number 21 - View of rear entrance door misalignment

Photograph Number 22 - View of interior drywall crack.

Photograph Number 23 - View of interior drywall repair

Photograph Number 24 - View of isolated drywall nail pop

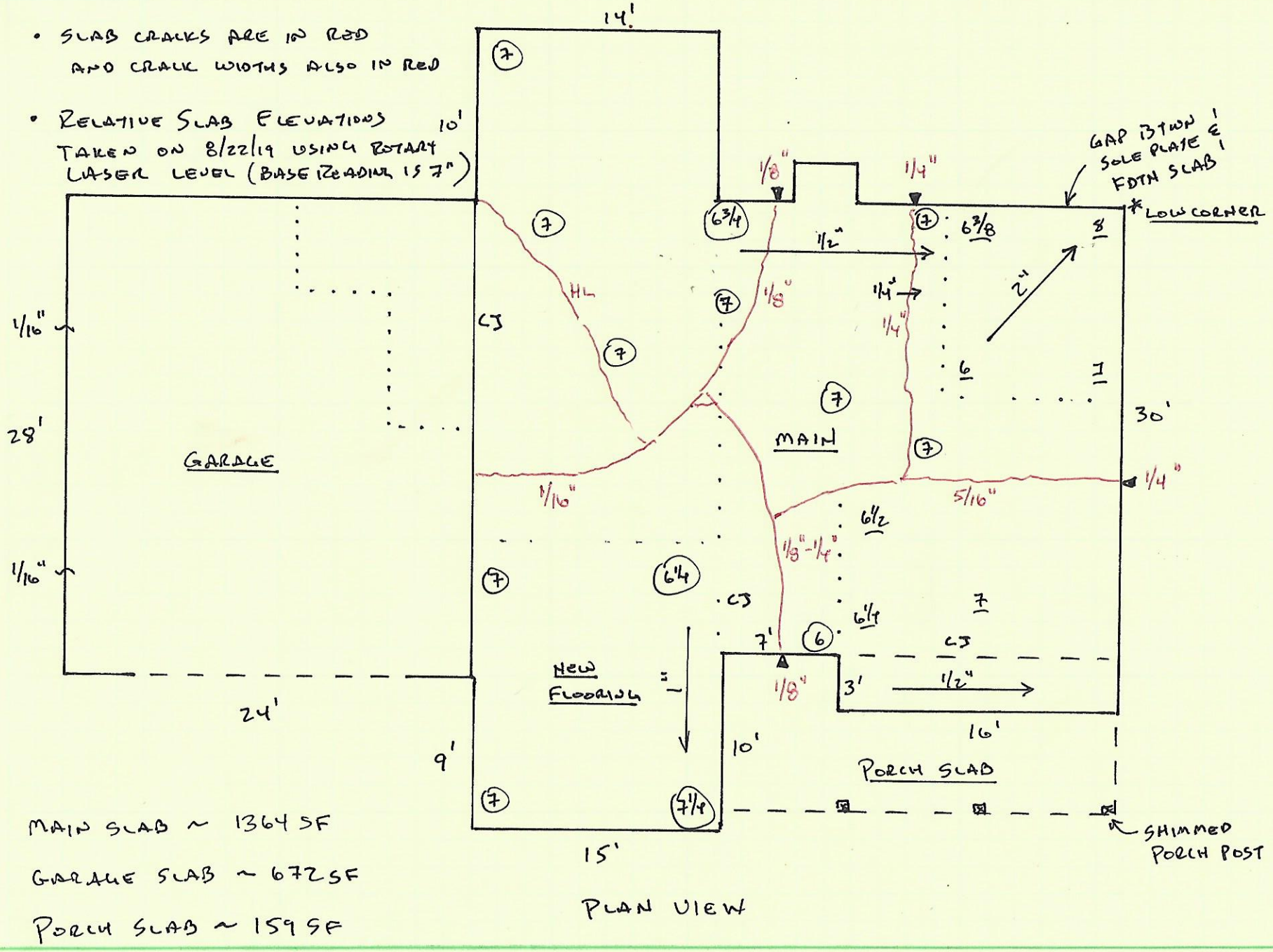
Photograph Number 25 - View of chalk line along front porch – slab settlement.

Photograph Number 26 - View of shim at front porch corner post

Photograph Number 27 - View of deterioration at front porch corner post

Photograph Number 28 - View of roof trusses – good condition

Photograph Number 29 - View of condensate line leak in the attic



MAIN SLAB ~ 1364 SF

GARAGE SLAB ~ 672 SF

PORCH SLAB ~ 159 SF

Ron Bittler, PE

8/26/2019