

# LINEBERGER CONSULTING ENGINEERS, INC.

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## STRUCTURAL ENGINEERING CONSULTATION

**Report Date:** \_\_\_\_\_ **Location:** \_\_\_\_\_ **Customer:** \_\_\_\_\_ **Assets/Property:** \_\_\_\_\_  
Your Report Date Your Address Your Name Your Property Type

**Engineer:** \_\_\_\_\_ **Consultant:** \_\_\_\_\_ **Consultation Date:** \_\_\_\_\_  
Lineberger Consulting Engineers, Inc. Experienced Engineer, P. E. 12.19.2009, 10 am

### Structural Evaluation Specification:

**Type:**  Structural Condition  Forensic Cause & Origin  
**Level:** ASCE (3.1)  A  B  C ACI (311.4R-7)  A  B  C

### Structural System(s) Investigated:

Load Bearing Frame  Load Bearing Foundation  other \_\_\_\_\_

### Structural System Specification:

Load Bearing Superstructure/Frame:  wood  metal  balloon framing  post & beam framing.  
Load Bearing Foundation System:  single  multiple  (concrete) slab-on-grade  pier & beam  other

### Structural Load Bearing System Condition Summary:

**Foundation Structural System is:**  Acceptable  Unacceptable  Comments  
 **Exterior Drainage System is:**  Acceptable  Unacceptable  Comments

Visual observations, and/or other data collected on site during this structural evaluation on the date shown above indicate this structural system is:  structurally acceptable;  structurally unacceptable. This structural evaluation  passed;  failed. This structural system  requires;  does not require; stabilization. Refer to  Exhibit A for comments.

Sincerely yours,



Experienced Engineer, P. E.  
Licensed Engineering Inspector



## QUICK SUMMARY OF INSPECTION FINDINGS

**Report Limitations:** The customer and the consultant jointly established the scope of this consultation. The consultant personally visited the subject site and building and reviewed any available reports by others germane to this consultation. The findings of this consultation/report are based upon information and data reasonably available to the consulting engineer on the date the site was visited. This report does not imply, warrant, nor represent, in part or in whole, prediction(s) of future structural performance. This report is not a forensic engineering opinion representing a determination of the origin or underlying cause(s) of the subject building distress, if any. Any structural repair recommendations are based upon report findings and consultant experience, education, and training. These recommendations may not represent current market service availability or product pricing. This consultation was performed in accord with the ASCE (American Society of Civil Engineers) Guidelines for the Evaluation and Repair of Residential Foundations. Structural Evaluation Standards: International Building Code 2003, International Residential Code 2006, American Concrete Institute (ACI). Copyright © 2009 Lineberger Consulting Engineers, Inc. - All Rights Reserved.

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### EXHIBIT A

#### Comments:

Shallow bearing structural foundation systems function to safely separate habitable areas from the exterior... environment and limit damage or distress to interior building materials. By design, these slab-on-grade foundation systems are stiff enough to resist lateral soil and subgrade material movement, yet flexible enough to protect the supported structural elements from unsafe or excessive planar tilting. The structural strength of a slab-on-grade foundation system is determined by its ability to bear allowable design loads, while foundation performance measures how closely a foundation achieves its intended purpose.

Data collected at the referenced property address on 12.19.2009 indicate this residence is a single-level wood framed structure built atop a lightly loaded, shallow foundation system. The garage is attached. Weather conditions were clear. Observation orientations are as viewed from the street. No structural repair, water infiltration, or plumbing leak repair reports pre-dating this consultation were reviewed.

The native bearing soils in the local area can be expansive. The data suggests that drainage facilities generally direct surface water away from the residence. Areas of neutral to negative surface water drainage were observed. Surface water appears to freely exit the property.

Evidence of localized flooding on or about the subject residence was not observed. Exterior distress consists primarily of non-structural siding joint separation and foundation beam flex cracking/ parge coat cracking. Interior distress consists of sheetrock cracks on the walls of living. Attic roof system framing observations revealed several rafter purlin bracing members had insufficient bearing surfaces. The natural slope of the lot falls from a high in the front yard to a low in the rear yard.

Foundation floor surface elevation variances from the IRC/IRC structural performance deflection limit were not observed. The overall foundation performance is about 0.4 inches and is within an acceptable foundation serviceability and performance range.

The collected data suggests the interior/exterior distress is isolated, cosmetic and limited to material distress likely caused by traffic. No imminent structural collapse conditions or immediate safety concerns were noted.

The customer is advised as follows:

Assure that all attic structural load bearing members have sufficient bearing surfaces (1.5" of bearing surface minimum for all bearing connections).

Assure that the foundation perimeter ground surface slopes downward and away from the foundation perimeter wall at a rate of at least 6" per 10 feet.

\*\*\*\*\*End of report\*\*\*\*\*

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### Residential Slab-on-Grade/Pier & Beam Foundation Systems Bearing on Plastic Clay Soils

1. If you suspect a plumbing leak, get your house plumbing system statically tested and repaired as needed. Assure your drain system (and domestic water supply, irrigation system, etc.) is leak free. Should plumbing leaks be present: **Suggested Maintenance Methods for Your Foundation System**
2. Check your foundation drainage. Assure that the surface water drains away from the foundation along its perimeter, and no low areas allow water to pond for longer than a day or so after a heavy rain.
3. Understand how your foundation system works. The basic purpose of your house foundation system is to safely separate habitable areas from the exterior environment and limit damage or distress to interior/exterior brittle building materials. One of the crucial underlying design principles of shallow

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