LIGHTHOUSE ENGINEERING, L.L.C.
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Wednesday, August 20, 2014

TO: Mr. and Mrs. Homeowner

RE: Initial Engineering Evaluation – Foundation Performance
1234 Main Street
Dallas, Texas 75109

The following report constitutes the engineering opinion requested on the foundation of the subject residence. This report has been prepared in general accordance with the requirements of a "Level B" survey as defined by the Texas Chapter of the American Society of Civil Engineers (ASCE) and the Texas Board of Professional Engineers (http://texasce.affiniscape.com/associations/10803/files/RepairGuidelines.pdf). This report is provided for the exclusive use of the person or persons this report was prepared for as shown above. We have no contractual relationship with, or obligation to, any party other than the party for whom this report was prepared. The purpose of this inspection was to evaluate the foundation and determine what, if any, foundation repairs are necessary. The foundation was visually inspected and a floor elevation survey was performed. The opinions contained herein are based on the experience and judgment of the writer, as well as conditions observed without taking soil samples, performing plumbing leak tests, removing floor or wall coverings, or performing invasive tests or procedures. The opinions offered herein are based solely on the observations made at the time of the inspection, and do not take into consideration any changes in the condition of the foundation after that date. This report does not predict or warrant the future performance of the subject foundation. You are encouraged to review the "Agreements and Limitations" attached to the end of this report for other important limitations and standard recommendations.

Observations

This structure is a one - story wood framed structure with brick veneer and siding on the exterior. The home has a hip roof and composition shingles. The interior walls are drywall with various finishes over the drywall. The foundation is a concrete slab-on-ground. The home was constructed in 2005 per the Dallas County Appraisal District Records. All directions in this report are annotated by left, right, front and rear as if looking at the front door.

Observations and Discussions

1. Michael Gandy, PE physically inspected the above referenced residence to make an evaluation of the current performance of the foundation and to offer recommendations for repair, if needed. I performed a Level "B" engineering analysis as defined by the Texas Chapter of the ASCE. I made careful observations of the interior and exterior for signs of structural distress and evaluated the drainage surrounding the structure. I performed an interior elevation survey as shown on Drawing 1001. I had conversions with the current homeowner and property management representative to obtain a brief history of the foundation and to better understand expectations for performance.
2. **Exterior Observations**: Indications of structural settlement and distress.
   a. Brickline deflection on left and right sides (pictures 1 and 2).
   b. Window separation and foundation cracking on right side at 20'. (pictures 3 and 4).
   c. Window separation on right side at 20'.
   d. Frieze board separation right rear corner.
   e. Structural brick/mortar cracking on left and right side at 20'.
   f. Brick/Mortar cracking on left side at 40'.
   g. Garage door trim separation and displacement at left side.
3. **Interior Observations**: Indications of structural settlement and distress.
   a. Slopes were noticeable when walking the rear portion of the foundation.
   b. Most doors throughout the rear portion were out of square and would not open, close or latch properly.
   c. Sheetrock crackings in various locations throughout the interior. Indicated settlement throughout the rear portion of the foundation.
   d. Structural cracking that is indicative of foundation and PTI reinforcement failure throughout the kitchen. (pictures 5 and 6).


Pictures 1 and 2: Brickline deflection along the left and right sides.


Pictures 3 and 4: Structural slab cracking and distress.


Picture 5 and 6: Structural cracking and distress. This cracking is indicative of structural failure of the concrete slab and PTI re-enforcement. This cracking has rendered the foundation unsafe, unsanitary or otherwise unlivable. I believe this cracking runs from left to right and can be seen at the exposed foundation.

4. **Overall Drainage**: Drainage around foundation appeared to be positive to direct surface water away from the foundation. There were no roof level gutters around the roof.
5. **Available Documentation**: No structural foundation design plans or foundation performance documents were provided by the homeowner.

6. **Elevation Analysis**: Industry standard tolerance for foundation performance (as defined by the Texas Chapter of the ASCE) is less than L/360 overall or local deflection and 1.0% tilt. This criteria, and my experience and judgment, was used to evaluate the performance of the foundation. Figure 1 below shows a graphical depiction of the actual deflection and tilt across the profile section A-A as shown on Drawing 1001.
   a. Across Section A-A, the maximum allowable localized deflection is L/360" = 360"/360" = 1.0" and the actual deflection was measured to be ≈ 1.0". This foundation meets or exceeds the maximum allowable tolerance for localized deflection across Section A-A. There are indications of structural failure of the foundation to support the superstructure.
   b. Across Section A-A, the actual localized tilt was measured to be ≈ 1.15 %. This foundation exceeds the maximum allowable tolerance for localized tilt across Section A-A.

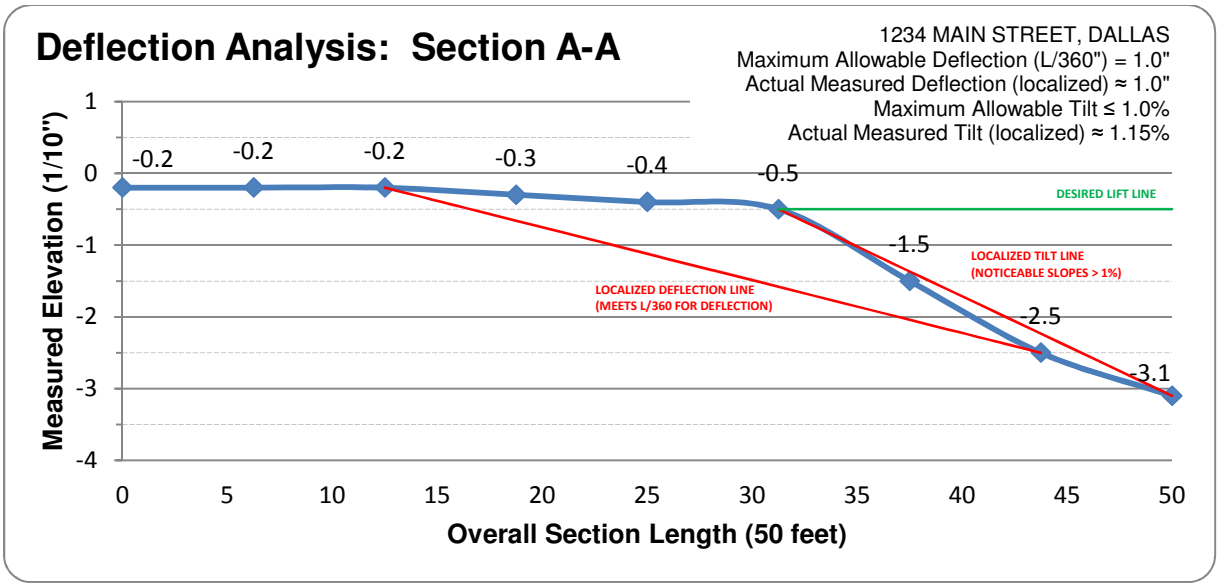


Figure 1: Deflection Analysis Cross Section A-A

7. **Conclusion: The actual deflection and tilt of the foundation is greater than the maximum allowable limits**. In my opinion, the magnitude and severity of the deflection, tilt and cosmetic indicators of movement warrant the need for structural foundation repairs at this time. This foundation is experiencing settlement (movement) that exceeds ASCE guidelines for performance.
8. There is concrete cracking that indicates structural failure of the concrete slab and post tension re-enforcement. The foundation is no longer capable of supporting the superstructure.
9. The magnitude and severity of the deflections and tilts in the foundation are causing load bearing components to be unsafe, unsanitary, or otherwise unlivable.

10. **Recommendations:** It is recommended to install foundation lifting and supporting piers to return the foundation to a more level position. It is recommended to perform a structural crack repair on the cracking through the kitchen area.
11. The exact plan of repair should be developed with the knowledge of where the interior grade beams and PTI are located. This information can be obtained from the structural foundation design plans or the as-built configuration documents that are typically available from the builder. If these documents can not be obtained, some additional engineering investigations will be recommended.
12. After the foundation is lifted to a more level position (or to the maximum extent practical), it is recommended to perform a port-to-port epoxy pressure injection structural crack repair on the visible cracking through the kitchen area. It is recommended to expose and repair the full length of this crack from left to right. It is recommended to use a Sikadur 35 Hi-Mod LV port-to-port epoxy or equivalent.
13. After the foundation is lifted to a more level position (or to the maximum extent practical), it is recommended to perform a hydrostatic plumbing leak test and repair ALL plumbing leaks, if they are discovered.
14. It is recommended to have the professional “engineer-on-record” for the repair plan, approve the final pier placement, installation and levelness. Lighthouse Engineering can provide these services at additional engineering fees.

Agreements and Limitations

Use of this report for any reason implies consent to all agreements and limitations of this report. This report is the professional opinion of Lighthouse Engineering, LLC and is based upon a limited evaluation of the property. This report is provided for the exclusive use of the addressee. We have no contractual relationship with, or obligation to, any party other than the addressee of this report.

This report does not constitute a structural warranty or performance contract with the purchaser of this report to or with any other party. It only states conditions observed at the time of the inspection. The evaluation of the property included a visual examination of the exposed interior and exterior finishes of the structure and the ground surfaces adjacent to the structure and to the taking of relative floor elevations. The taking and testing of soil samples was not included. Unless written in the report, the original design drawings and any design conditions were not known. Determination of construction to Building Code is best done during the original construction and is not a part of this evaluation. Testing for plumbing leaks was not performed but is recommended after foundation work is performed.

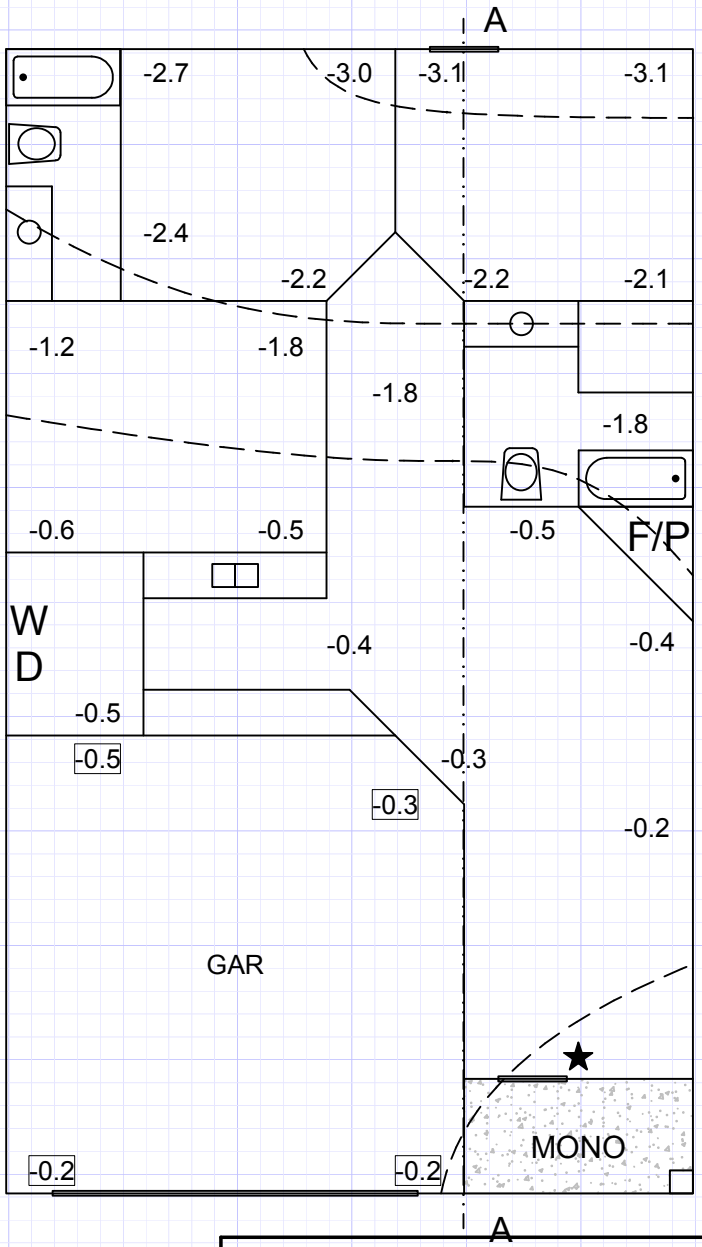
It is possible that future repairs could be required for the subject foundation. This evaluation only addresses the current condition of the foundation. Lighthouse Engineering, LLC does not offer or imply any warranty for the repairs or for the repair company's acts or omissions or for any other person conducting the repairs.

The fee collected is for this inspection only. Additional engineering services are available at an additional cost. Requests for these services must be made in a timely manner before commencement of work. Please contact this office for additional inspection scheduling and fee arrangements.

Sincerely,

Michael Gandy, P.E.
8/20/2014
Registered Engineering Firm F-9334

THIS REPORT DOES NOT PREDICT OR WARRANT
THE FUTURE PERFORMANCE OF THE FOUNDATION



STATE OF TEXAS
MICHAEL D. GANDY
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LICENSED
PROFESSIONAL ENGINEER

Michael Gandy

JULY 31, 2014

APPROX. SCALE 1" = 10'

★ BENCHMARK ELEVATION 0 INCHES
ELEVATIONS ARE SHOWN IN TENTHS OF AN INCH

ELEVATION SURVEY DRAWING

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