



STRUCTURAL 360 INSPECTION

FEBRUARY 17, 2024



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SUMMARY

3.2.1 Observations - Wall and Floor Framing - Structural Concerns: Inadequate Header Supports



3.2.2 Observations - Wall and Floor Framing - Structural Concerns: Inadequate Framing for Overhead Lights



3.2.3 Observations - Wall and Floor Framing - Structural Concerns: Previous Repairs or Modifications

1: INTRODUCTION

Information

Project Information: GreenWorks Project Information: Inspection

Project Information: Report Issue

Project Number

Date

Date

2024-02-17

2024-02-23

Project Information: Purpose - Structural 360

As requested, personnel of GreenWorks Engineering and Consulting have completed a structural review of the address referenced above. The purpose of the observation was to collect information necessary to assess the condition and performance of the existing structure.

Specifically, the client is concerned about the structures supporting large overhead lights in the operating rooms and sloping doors at the 2nd story additions.

This Foundation Investigation portion of this evaluation was a Level B evaluation as described in the "Guidelines for the Evaluation and Repair of Residential Foundations" by the Texas Section of the American Society of Civil Engineers (ASCE).

Our evaluation involved collecting data and photographs of the structure to assess its performance and identify any signs of distress. Based on our findings, we will provide recommendations for repairs to ensure the long-term stability and safety of the structure.

We understand that foundation issues can be a cause for concern for property owners, and we aim to provide clear and concise information to help you make informed decisions about any repairs needed for your property.

Project Information: Level B Evaluation

Per the Foundation Performance Association's 'Guidelines for the Evaluation of Foundation Movement for Residential and Other Low-Rise Buildings', a Level B Investigation includes:

- Documenting visual observations made during a physical walkthrough
- Observation of factors influencing the performance of the foundation
- If possible, an interview of occupants/owners/managers regarding a history of the property and foundation
- Review of pertinent documents including geotechnical reports, construction drawings, field reports, and repair documents
- Deflection and tilt calculations to assess foundation performance and establish a baseline
- Description of factors that affect soil moisture
-

General Structure Information:

General Structure Information:

General Structure Information:

Property Faces West

Building Type

Framing Type

Two Story Commercial

Wood-framed

General Structure Information:

General Structure Information:

General Structure Information:

Foundation Type

Exterior Wall Type Brick

Roofing Material

Concrete Slab-on-Grade

Veneer

Light Gauge Steel

Interior Elevation Survey:

Measurement Device The Elevation

Survey was performed using a

ZIPLEVEL PRO 2000 altimeter.

Interior Elevation Survey: General

An interior door elevation survey was performed on the ground level of the structure as shown on Figure 1, with the elevations recorded to the nearest 10th of an inch (0.1"). Adjustments were made to account for the thickness of the door coverings. A benchmark elevation of 0.0 inches was established. The benchmark elevation is referential and its location will not alter the net elevation differentials - location of it was based on the inspector's best judgement.

Interior Elevation Survey: No Previous Elevation Surveys Available

No previous elevation surveys were provided to us. Determining the deflection and tilt of a foundation is an approximation without an as-built or previous floor elevation survey, because the original surface configuration is unknown. A single floor level survey yields the shape of the foundation at one instant.

Foundation History: No Prior Work

The structure has no known existing foundation underpinning that can be seen, and we have not received any previous foundation reports. It is our belief that the current foundation evaluation is the only evaluation on record.

Reference Documents: Applicable Reference Documents: Additional

Code	Documents Provided
IBC 2021, IEBC 2021	N/A

Limitations

Project Information

PHOTOGRAPHS TAKEN ON-SITE

Some data collected in the form of photographs is presented in this report. These photographs are included for reference and are intended only to represent the distress generally found throughout the structure. They do not represent a comprehensive catalog of all of the distress present in the structure.

Foundation History

UNDERPINNING CONFIRMATION

Existing underpinning is typically concealed entirely below grade. No destructive investigation nor subgrade radar readings were performed to confirm the presence or absence of any existing foundation underpinning.

Foundation History

PLUMBING LEAK CONFIRMATION

Our Foundation Investigation did not include a plumbing leak detection test to confirm the presence or absence of a plumbing leak. Leak detection testing must be performed by a licensed plumber. Warning signs of a plumbing leak include a significant increase in the water bill, warm spots on the floor, ponding water adjacent to the foundation, damp or musty odors within the interior of the structure, the sound of running water that can be heard while all taps are closed, and areas of foundation heave.

2: OBSERVATIONS - INTERIOR

Information

Drywall Distress: Wall Cracks

Present



Wall below 2nd story addition

Floor Distress: Floors Out-of-Level / Spongy

The 2nd story addition floors in the sta lounge and private o

ces are sloped.

3: OBSERVATIONS - WALL AND FLOOR FRAMING

Information

General Information: Typical Interior Wall Framing
2x4 @ 16"

General Information: Typical Exterior Wall Framing
2x4 @ 16"

Structural concerns

General Information: Typical Ceiling Height (@ Wall for vaulted or tray)
10 feet

General Information: Typical 2nd Level Floor Joists
TJI Joists @ original construction, 16" oor trusses at additions



General Information: Typical Addition Floor Joist Span
18 feet

General Information: Typical Exterior Wall Headers
Not exposed

General Information: Typical Interior Wall Headers
Not exposed

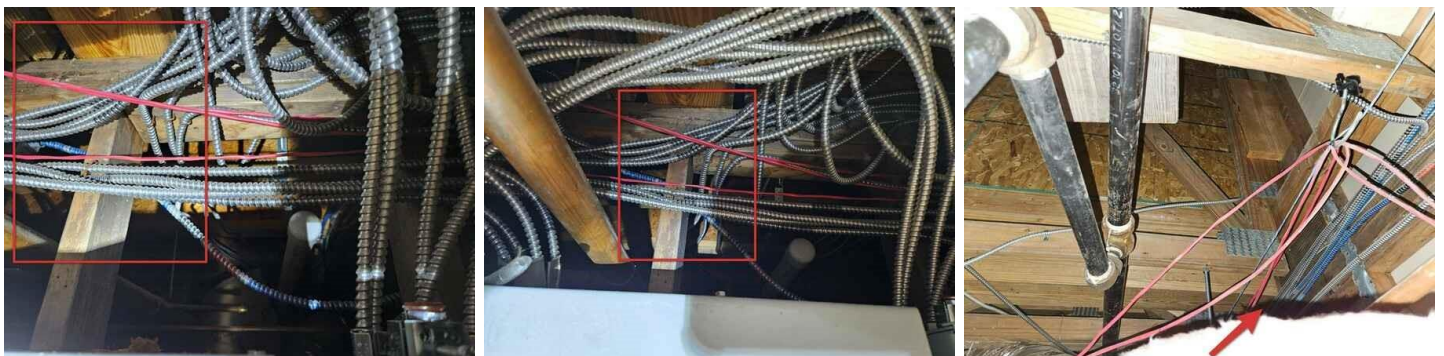
3.2.1 Structural Concerns

INADEQUATE HEADER SUPPORTS

IRC 2021 Table R602.7.5

The beams supporting the walls and roof of the 2nd story addition bear on a single stud at the original interior walls. With a span of approximately 18-feet and an ultimate wind speed that exceeds 130mph, four (4) full-height studs are required at each end of the beam.

We were unable to determine if the exterior wall was reinforced.





3.2.2 Structural Concerns

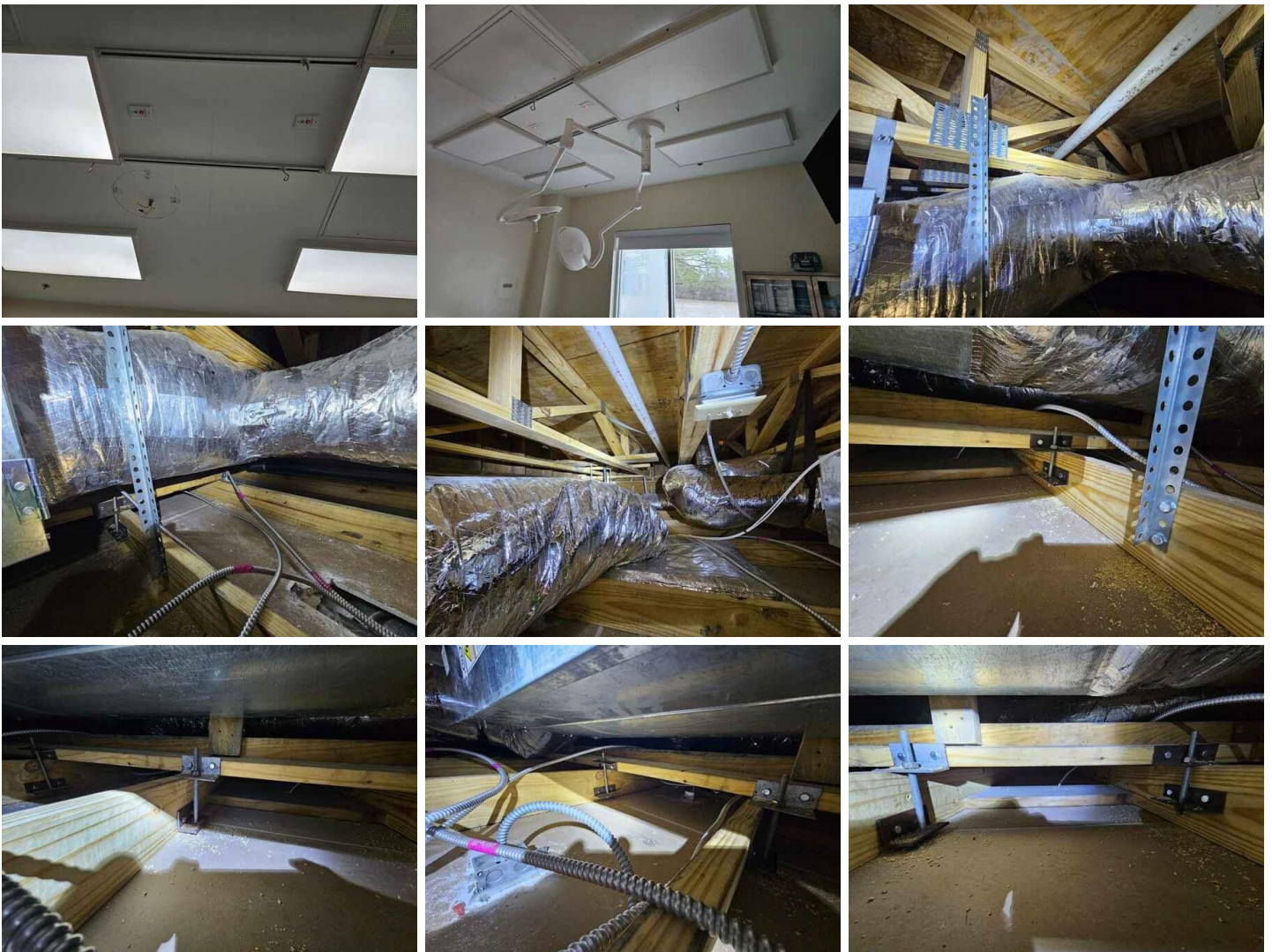


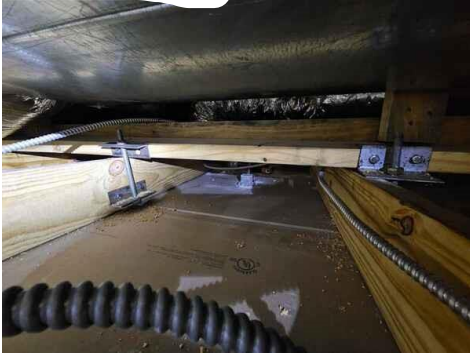
INADEQUATE FRAMING FOR OVERHEAD LIGHTS

Overhead lights in Operating Rooms #4 and #5 are improperly supported. Although additional oor joists were apparently installed to provide support for the lights, the extra oor joists were not used to support the lights. Rather, the lights were secured to dropped ceiling framing consisting of 2x6 joists at 24" on center.

The light in Operating Room #4 had already been removed. We recommended that the use of Operating Room #5 also be avoided until the light can be removed and/or the framing reinforced.

We were unable to view the framing supporting the lights in Operating Rooms #1, #2, and #3 and cannot comment on the capacity of the framing in those areas.





3.2.3 Structural Concerns

PREVIOUS REPAIRS OR MODIFICATIONS

The original roof trusses were cut, and new roof trusses were installed to expand the 2nd floor. The new roof trusses bear on the original interior wall and the original exterior wall.



4: OBSERVATIONS - ATTIC FRAMING

Information

Wood Truss Type #1: Original Roof Truss Photos



Wood Truss Type #1: Truss
Spacing

24 inches

Wood Truss Type #1: Truss Top Chord

2x4

Wood Truss Type #1: Truss Vertical

Webs

2x4

Wood Truss Type #1: Truss End A Bearing
Exterior Wall

Wood Truss Type #1: Truss End B Bearing

Wood Truss Type #1: Truss

Bottom Chord

2x4

Wood Truss Type #1: Truss

Construction

Interior Wall

Metal gussets

Wood Truss Type #1: Truss

Diagonal Webs 2x4

5: FOUNDATION INVESTIGATION

Information

Foundation Investigation Conclusions: Foundation Movement Calculations

The below foundation movement calculations have been performed according # FPA-SC-13-1 'Guidelines for the Evaluation of Foundation Movement for Residential and Other Low-Rise Buildings.' The calculations separate foundation movement into foundation 'Deflection' (bending) and foundation 'Tilting' - straight line arithmetic of the elevation readings provided on the Elevation Survey will not yield the same results and should not be incorrectly compared.

The standard allowable differential deflection is based on 1.0 inch of vertical movement, up or down, over a horizontal distance of 30 feet; expressed as Length (in inches)/ 360. The standard allowable tilt is based on 1% slope over the entire length, width, or diagonal of the foundation.

Foundation Investigation Conclusions: Foundation Deflection Within Limits

Based on our observations of the interior and exterior cosmetic distress, the floor elevations, and calculations, it is our opinion that the foundation appears to be in relatively good condition. The maximum differential deflection is 0.4 inches and occurred over an approximate distance of 24 feet. This amount of deflection is within the standard allowable deflection of 0.8 inches for a distance of 24 feet.

Slab Foundation Recommendations - No Foundation Repairs

1. Comprehensively implement the foundation maintenance recommendations.
2. Review the performance of the foundation as a proactive foundation maintenance program every 6 to 12 months. Retain this report as an elevation baseline for the foundation. Compare all future foundation evaluations to this baseline.
3. Once foundation movement has been ruled out with a follow-up foundation evaluation, the interior and exterior cosmetic distress can be repaired.

Foundation Maintenance Recommendations

The drainage of water is an important issue that affects the shrink/swell properties of the expansive soil the structure is built upon. The purpose of proper drainage is to remove excess water from around the foundation to keep the soil around and under the perimeter foundation at a stable moisture content and the soil under the slab dry. Gutters and downspouts are an effective method of draining rainwater away from the structure but must be used correctly. The primary goal of the foundation maintenance recommendations is to maintain a constant moisture content in the soil around and below the entire foundation.

1. To better control the rainwater, add gutters, downspouts and extensions to all the downsloped areas of the roof that do not currently have them. The downspouts should discharge the water a minimum of 5 feet from the foundation or into a drainage system.
2. To assist in the drainage of free water the soil around the foundation should be sloped away from the foundation for the first 10 feet all around where practicable. The slope should drop a minimum of 6 inches in 10 feet - a 5% slope. Swales should have longitudinal slopes of a minimum of 2 inches in 10 feet. If this cannot be done a French Drain may be required. Over-saturated soils can cause foundation heave and/or settlement and contribute to excessive foundation movement.
3. Consider removing any trees or large bushes within 6 feet of the foundation. The large vegetation can consume vast amounts of water which can cause active soils to shrink, potentially causing damaging foundation movement. Tree roots can also extend below the foundation and cause damage. Tree roots can typically extend as far as the extent of the tree's canopy. If trees are not to be removed a root barrier may be used between the tree and the foundation - root barrier installation may negatively affect the vegetation and it is recommended to contact an experienced arborist for recommendations to minimize these effects. Removal of trees or large bushes may stop shrinkage or lead to partial restoration of settled areas of the foundation. Removal may result in upheaval caused by soil moisture increase, especially if the tree predates construction. If trees are removed, a suitable waiting period may be recommended to allow for soil heave. Periodic tree pruning may reduce future downward foundation movement but may not lead to foundation elevation recovery. Tree pruning may be a prudent alternative to removal.
4. Establish a watering program for the foundation soil to keep the soil moisture content constant during the dry months. The lawn should be kept healthy. This will help by reducing evaporation. Water the lawn and other vegetation consistently and evenly. If the soil is cracking at the surface this is a sign that the soil is drying out.

Subgrade Chemical Stabilization

If the above conventional methods for minimizing soil activity prove to be less effective than desired, a final (typically more costly) option of subgrade chemical stabilization may be explored. If this option is pursued we recommend contacting a geotechnical engineer and an experienced repair professional to facilitate the project. The injection should be shaped to the approximate profile of the subgrade prior to spreading the chemical so as to permit the construction of a uniformly compacted course of chemically treated soil. The addition of the chemical may raise the subgrade profile within approximately 1 inch; remove this excess material during the final grading. Spread the chemical uniformly on the subgrade using a mechanical spreader at the approved rate and at a constant rate of speed. Subgrade chemical stabilization work is not to be performed when the air temperature is less than 40 degrees Fahrenheit, when the soil is frozen, or during wet or unsuitable weather.

6: STRUCTURAL REVIEW

Framing Review Conclusions: Framing Review - Inadequate

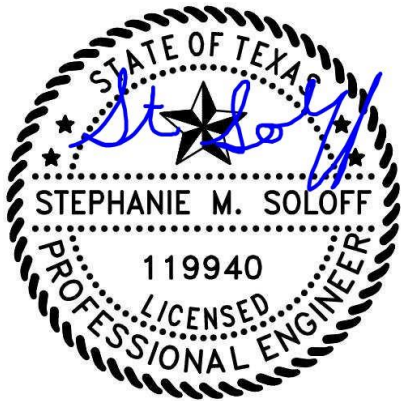
Based on our observations, the existing framing appeared to be inadequate to support the current loads and will require reframing to bring the structure to adequacy. We recommend performing the required repairs only according to framing plans that have been stamped and signed by a licensed professional engineer. If requested GreenWorks Engineering can provide the required framing plans. The proposed repair plans will include the following:

- Reinforce framing for lights in Operating Rooms #4 and #5.
- Reinforce framing for lights in Operating Rooms #1, #2, and #3 - additional exploration will be required to verify the existing framing in these areas.
- Reinforce interior wall supporting the 2nd story addition.
- Reinforce exterior wall supporting the 2nd story addition - additional exploration will be required to verify the existing framing in these areas.

7: PROFESSIONAL ENGINEER STAMP

Information

Professional Engineer Stamp: Reviewed by Stephanie Solo, P.E.
02/23/2024



GreenWorks Service Company
Lead Engineer

Texas Registered Engineering Firm 20170

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Limitations

Limitations

GENERAL

The contents of this report supersede any verbal communication regarding the subject structure during or after the inspection. This report was prepared for the exclusive use of the client listed above. GreenWorks has no obligation or contractual relationship to any party other than our client and their agents in regards to the subject property.

The opinions and recommendations contained in this report are based on the visual observation of the then current conditions of the structure and the knowledge and experience of the engineer. It is known to all educated engineers with knowledge of differential foundation movement that the most effective longterm solution to foundation movement is deep foundation underpinning for the entire structure, however this method is rarely economically feasible and often causes unwanted cosmetic damage. This report provides engineering advice intended to correct the observed foundation deficiencies assuming normally expected subsurface conditions and conventional construction methods. The client agrees that GreenWorks is not responsible for knowledge of specific subsurface conditions at the subject property. The evaluation was limited to visual observations and areas not visible, accessible, or hidden behind furniture and appliances were not included in the evaluation. The evaluation did not include any soil sampling or testing, nor any assessment of the existing framing, plumbing, or auxiliary structures and no implication is made on the compliance or non-compliance of the structure with old or current building codes. No verification was made of the existing concrete strength, thickness, location of interior grade beams, reinforcement, nor capacity to support any load.

No guarantee or warranty as to the future performance or need for repair of the building or foundation is intended or implied. Limits of liability for any claims with respect to this report is limited to the fees paid for services and anyone relying on the content of this report agrees to indemnify GreenWorks Service Company for all costs exceeding this fee.

Limitations

TEXAS SOILS

Foundation movement is a prevalent phenomenon in Texas. Future foundation movement is likely to varying degrees due to the shrink/swell characteristics of the soil. The foundation is prone to movement due to the moisture variation in the existing soil and total prevention of future movement is unlikely.





FIGURE 1
NOT TO SCALE

NOTES	
	Search Mark Elevation: 0.0'
	0.0' Top of Floor Elevation