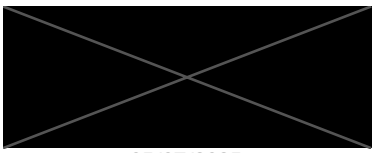
GREENWORKS SERVICE COMPANY
855-349-6757
support@greenworksinspections.com
https://greenworksinspections.com

GREENWORKS ENGINEERING FOUNDATION REPAIR VERIFICATION



05/07/2025

Inspector
Hunter Holiedy
TBPE FIRM #20170, MOLD FIRM #ACO1162, TPCL FIRM #0761253
901-596-7363
hunter.holiedy@greenworksinspections.com

Inspector
Peter Donegan
TBPE FIRM #20170, MOLD FIRM #ACO1162, LEAD FIRM #2110697, ASBESTOS AGENCY #100576, TPCL FIRM #0761253
512-994-2323
peter.donegan@greenworksengineering.com

TABLE OF CONTENTS

1: CONCLUSIONS & RECOMMENDATIONS

Information

Conclusions: Habitable and Safe for Occupancy

Based solely on our observation of the foundation, it is our opinion that the structure is habitable and safe for occupancy at this time.

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.

Conclusions: Foundation Deflection Near Limits

Based on our observations of the interior and exterior cosmetic distress, the floor elevations, and calculations, it is our opinion that the foundation has undergone a moderate amount of movement. The maximum differential deflection is 0.7 inches and occurred over an approximate distance of 20.5 feet. This amount of deflection is at the upper limits of the standard allowable deflection of 0.7 inches for a distance of 20.5 feet. 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.

Conclusions: Conclusions - In Compliance

It is our opinion that the recent foundation underpinning repairs are in general compliance and have brought the foundation to an adequate condition. Note, no foundation repair will completely eliminate the potential of future problems related to soil movements. Underpinning is intended only to bring the house to a more level condition and reduce the potential for further movement due to soil shrinkage. In addition, there are a few foundation maintenance recommendations that could be beneficial to the future performance of the foundation.
Comprehensive implementation of the below foundation maintenance recommendations will help the foundation properly engage the underpinning and to moderate soil activity and minimize differential foundation movement and its resultant distress.

Slab Foundation Recommendations - No Further 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.

[redacted] [redacted]

Foundation Maintenance Recommendations

Good foundation maintenance practices are the most effective solution to minimizing soil activity. The primary goal of foundation maintenance methods is to maintain a relatively constant moisture content in the soil around and below the foundation. The movement and drainage of water is a critical maintenance element that interacts with the shrink/swell properties of the expansive soil that the structure is supported upon. The goal of proper drainage is to remove excess water from around the foundation to keep the soil around and under the foundation at a stable moisture content.

1. Gutters and downspouts are an effective method of directing rainwater away from the structure, but must be employed correctly. To better control the rainwater, ensure gutters, downspouts and extensions are present at each down-sloped area of the roof. Gutters should have a slope no less than 6 inches in 10 feet (5% slope) and all seams shall be made weather tight if applicable and shall be equipped with screens to allow leaves and other debris to be washed off the roof. Downspouts should be installed at a minimum every 40 feet. The downspouts should discharge the water a minimum of 6 feet from the foundation or into a drainage system.
2. To assist in the drainage of free water, the grade surrounding the foundation should be sloped away from the foundation for the first 10 feet around the perimeter where practicable. The slope should drop a minimum of 6 inches in 10 feet (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. Remediate ponding water immediately. If widespread drainage issues are present, our office may be contacted to perform a Drainage Inspection of the lot and provide Drainage Remediation plans if necessary.
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 affects. 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 or additional watering 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. Keeping the lawn healthy will help to reduce evaporation and dryness. Water the lawn and other vegetation consistently and evenly. Soil cracking/desiccation at the surface is a sign that the soil is too dry.

Subgrade Chemical Stabilization

If the above conventional methods for minimizing soil activity prove to be less effective than desired, while costly, a final 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.

Limitations

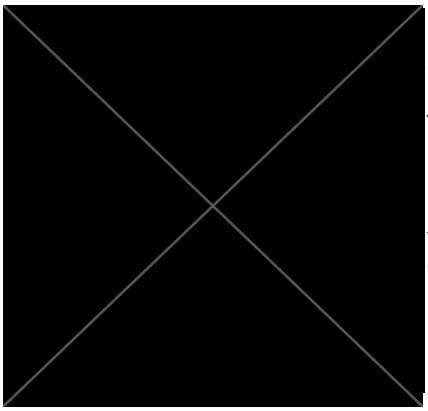
Conclusions

PARTIAL/UNIT EVALUATION

2: PROFESSIONAL ENGINEER STAMP

Information

Professional Engineer Stamp: **Reviewed by Peter Donegan, P.E.**



GreenWorks Service Company
Professional Engineer
Texas Registered Engineering Firm 20170

Reviews enable us to continue providing the best experience possible for you and they also help homeowners like you to make confident decisions about their engineering needs. Click here to leave a review.

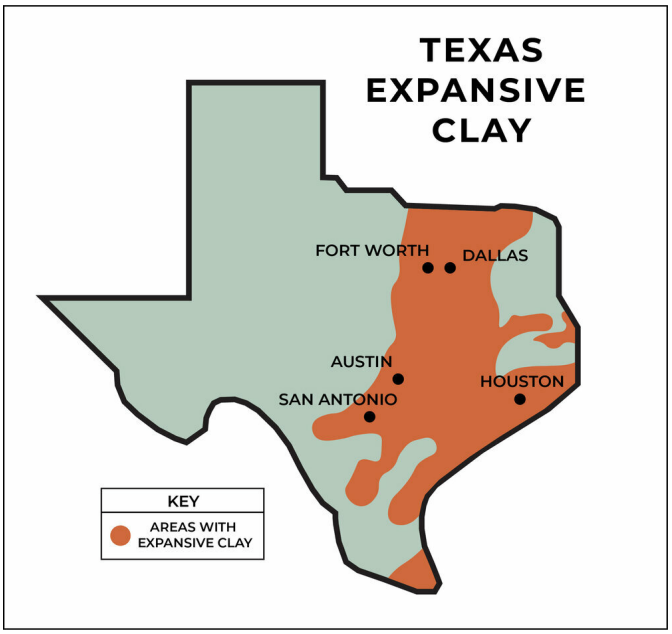
Report Prepared By: **Prepared by Garrett Shahan, E.I.T.**

Limitations

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.



Limitations

GENERAL

The contents of this report supersede any verbal communication regarding the subject foundation 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 long-term 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.

3: INTRODUCTION

Information

Project Information: GreenWorks Project Number

[redacted]

Project Information: Inspection Date

2025-05-07

Project Information: Report Issue Date

2025-05-12

Project Information: Purpose - Foundation Repair Verification

As requested, personnel of GreenWorks Engineering have completed a site observation of the existing foundation and repairs at the address referenced above. The reason for the site visit was to evaluate the subject foundation repairs by producing a foundation elevation survey and post-repair baseline to analyze ensure that the subject foundation repairs have been performed in general accordance with any provided recommendations and in line with the Texas Section of the American Society of Civil Engineers (ASCE) guidelines.

General Structure Information: Property Faces

Southeast

General Structure Information: Building Type

Single Story Residential

General Structure Information: Framing Type

Wood-framed

General Structure Information: Foundation Type

Concrete Slab-on-Grade

General Structure Information: Garage Type

No garage

General Structure Information: Exterior Wall Type

Lap Siding

General Structure Information: Roofing Material

Composite Asphalt Shingles

General Structure Information: Original Construction Date

0000

Interior Elevation Survey: Measurement Device

The Elevation Survey was performed using a ZIPLEVEL PRO 2000 altimeter.

Interior Elevation Survey: General

An interior floor elevation survey was performed on the living area 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 floor 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.

Reference Documents: Additional Documents Provided

Engineers Report, Engineered Plans

The Repair Plan included in our Foundation Investigation Report dated MONTH DAY, YEAR recommended installation of XX perimeter and XX interior piles/piers per Figure 1.

We were provided with a repair plan by CONTRACTOR/ENGINEER dated DAY MONTH, YEAR recommending installation of XX perimeter and XX interior piles/piers.

Reference Documents: Applicable Code

IRC 2021

Property Photos: General Property Photos















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.

4: OBSERVATIONS

Information

Underpinning: Observed Underpinning


Front


Front


Front


Front


Living Room


Living Room


Rear Right Bedroom


Rear Right Bedroom


Hallway

Limitations

Underpinning

UNDERPINNING CONCEALED

The underpinning was largely concealed and our observations were limited to non-destructive investigation of patent conditions only.