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Date: Monday, March 23, 2009

Time: 4:34:56 PM

To: Ron Hemphill

Fax number: 915122285510

From: Fire - Fordham, Shane

Subject/Note:

53-F310-595 HEMPHILL, RONALD

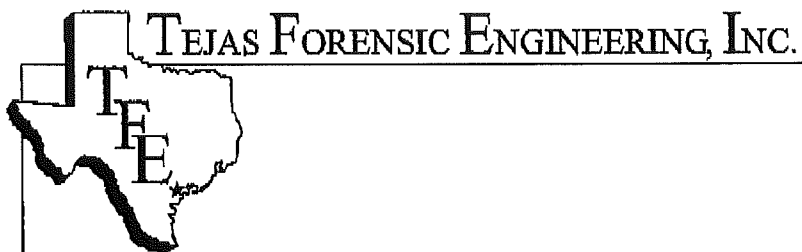
Pages: 14

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March 20, 2009

Mr. Shane Fordham, Claim Representative
State Farm Insurance Company
P.O. Box 149183
Austin, Texas 78714-9183

Subject: Forensic Report TFE1148
Ron and Carol Hemphill Residence
240 Canterbury Drive
Austin, Texas 78737
Claim No. 53-F310-595

Dear Mr. Fordham:

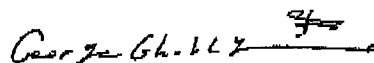
Per your request, our office has completed a forensic investigation of the above referenced residence. The attached report presents our findings regarding the potential impact of snow, ice or wind on the structure in January 2007, the cause of the conditions that have developed, along with general recommendations for completing repairs and maintaining the performance of the foundation system and finishes.

Tejas Forensic Engineering, Inc. appreciates the opportunity to have provided our professional services for this project. Please review the report and contact our office if you have any questions.

Sincerely,


Carlos Treviño III, P.E.




George Y. Ghably, P.E.

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Introduction

This report presents the results of our forensic investigation of the Ron and Carol Hemphill residence located at 240 Canterbury Drive in Austin, Texas. This investigation was authorized by Mr. Shane Fordham, Claim Representative with State Farm Insurance Company on January 28, 2009. The purpose of our investigation was to examine the current condition of the residence and determine whether external structural loading from snow, ice, or wind loading in January 2007 caused or contributed to structural or cosmetic damage.

Project Scope

The scope of service for this project included:

- Review the available background information for the residence.
- Document the current conditions throughout the interior and exterior of the residence.
- Conduct a relative elevation survey of the interior floors.
- Review the general soil information for the area as presented in the *Soil Survey of Comal and Hays Counties, Texas* via the United States Department of Agriculture Natural Resources Conservation Service internet website, hereafter NRCS.
- Review the previous engineering report issued by MLAW Consultants and Engineers on May 25, 2007.
- Review the previous engineering report issued by Nelson Engineering on August 15, 2007.
- Review the Third Party Inspection report issued by the Texas Residential Construction Commission on February 3, 2008.
- Review the engineering report issued by Amstar Engineering, Inc. on November 20, 2008.
- Analyze the available data and provide an objective engineering opinion regarding the extent of measurable foundation movement and the observed finish or structural damage.
- Provide general recommendations for required repairs and long-term maintenance of the structure.

The scope of this investigation did not include preparation of plans or specifications to complete the recommendations presented in this report.



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Site Visit

Our site visit was scheduled with the homeowner and completed on February 2, 2009 by Carlos Treviño III, P.E., and George Ghably, P.E. Mrs. Hemphill was present during our site visit and informed us that they are the original owners of the 4 year old residence. This property claim to State Farm Insurance was instigated due finish and structural conditions which have been identified, investigated, and monitored since 2006.

Additional information provided by Mrs. Hemphill is as follows and we note that copies of all the previous investigative reports were reviewed via the Hemphills' internet website at www.hemphill.us/housedefects :

- Portions of the original construction drawings for the residence were provided in the various engineering reports which preceded this investigation.
- There have been no additions to the original structure.
- There has been no remedial foundation repair work completed.
- Operation problems with several doors and windows have been noted throughout the house; window issues primarily consist of leakage rather than operation.
- Interior finish distress has been a primary concern since they initially moved into the residence; the builder (Capital Pacific Homes) initially completed various finish repairs in 2006. Since that time, distress has continued to develop and most conditions have become more pronounced.
- MLAW Consultants and Engineers of Austin completed the foundation system design in October 2004. The foundation consists of a post-tension (cable) reinforced concrete slab on grade system. MLAW completed site visits to the residence in May 2007 and reported no significant differential foundation movement, but they did confirm floor system deflection which they attributed to structural overloading imposed from the roof system.
- Nelson Engineering visited the residence on July 16, 2007 and issued a report on August 15, 2007. According to their report, they indicated that no significant foundation movement had occurred; and the finish distress was likely the result of uneven installation surfaces, wracking of the superstructure, material defects, or improper design/installation of the truss



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- systems. Nelson recommended considering foundation repairs if movements continued to occur, impacting the structural or functional integrity of the residence.
- The Texas Residential Construction Commission issued a Third Party Inspection report on February 3, 2008. Their inspector confirmed the presence of finish distress throughout the home, and he did recommend implementing the roof truss repair which had been proposed in the MLAW report along with required cosmetic repairs. The report further suggests that the distress may be a consequence of "racking" of the structure due to insufficient wind bracing.
 - Amstar Engineering, Inc. completed an extensive investigation of the structural framing conditions. In completing their investigation, excavations were complete in the drywall ceilings and wood subfloor at multiple locations. The observations made through these accessed areas confirmed that the roof trusses are transferring loads through the second floor walls and onto the floor system. The imposed loading has contributed to the overstress conditions within the floor system. Amstar also confirmed inadequate beam design and improperly installed floor joist hangers at the breakfast area. Further investigation identified improperly installed floor truss bridging, and improper framing at the F8G truss along the staircase. Amstar has recommended the implementation of significant structural repairs in order to address the framing issues that exist.
 - There has been no recent interior painting or refinishing completed.
 - There have been no plumbing system operation issues observed. A kink in the copper gas supply line within the floor system has been observed through their investigation of structural issues.
 - There has been no unusual water consumption observed.
 - There are no significant surface drainage issues around the structure and there have been no landscape changes.

Site Observations

The Hemphill residence is located on a northward sloping site in a residential neighborhood with other houses of similar construction. The residence was constructed with a post-tension (cable) reinforced concrete slab on grade/fill foundation system. The foundation supports conventional



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wood framing, an engineered floor truss system and an engineered roof truss system, interior drywall, and exterior stone veneer and cement hardboard siding. The roof system is a hipped and gabled design and is covered with composition asphalt shingles. For the purpose of this report, the front of the house faces southward (Reference Sheets 1 and 2 of Exhibit B).

We completed observations of the conditions throughout the interior and exterior of the residence. Descriptions of our observations along with photographs are presented as Exhibit A. Our observations do not include all conditions at the site, were limited to conditions which were unobstructed from view, and are representative of conditions that are pertinent to the conclusions of this investigation. If additional conditions or information are identified after submission of this report, we request the opportunity to review the information and determine any potential impact to this report.

Relative Elevation Survey

A scaled diagram of the residence was generated at the site in order to plot the relative floor elevations, which were measured with a Sokkia LP 30 laser level. For the purpose of our investigation, an arbitrary benchmark elevation of 5.50 feet was assumed at the front porch. The floor elevations were adjusted uniformly, as required, to account for floor covering variations or steps and were utilized to generate a 1/4-inch (0.02 feet) elevation contour plan of the residence. In this case, the elevations measured across the garage are presented separately for clarity.

As indicated on Sheet 3 of Exhibit B, the highest elevation (5.92 feet) was measured at the master bathroom, while the lowest elevation (5.84 feet) was measured at the family room, for an overall difference of approximately 0.08 feet or one inch. The garage varies approximately 2-3/4 inches from west to east. The generated elevation contours describe a pattern of higher elevations at the master bathroom area and slightly lower elevations throughout the family room. A portion of the measured elevation differences can be attributed to originally-constructed conditions.



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Similarly, the second floor elevations were completed by assuming a benchmark elevation of 5.50 feet at the stairway landing. According to Sheet 4 of Exhibit B, we confirmed an overall elevation difference of 1-1/4 inches, as measured from 5.53 feet along the north side of bedroom #3 to 5.43 feet at the bathroom #2 doorway. The generated elevation contours depict general downward slopes toward the hallway/bathroom #2 area.

Soil Information

The general soil characteristics for the site were reviewed, as provided in the Soil Survey of Comal and Hays Counties, Texas presented by the United States Department of Agriculture Natural Resources Conservation Service (NRCS) (Reference Exhibit C). Based on the information reviewed, the Hemphill residence is underlain by soils designated as Brackett-Rock outcrop-Real complex (BtG). Soils within this designation are classified as CL, GC, SC, GM, ML, and SM materials according to the Unified Soil Classification System, and exhibit plasticity index values ranging from 8 to 26, indicating a low to moderate shrink-swell due to changes in soil moisture content.

Plumbing Testing

Plumbing system testing was not conducted as part of this investigation; we do recommend completing testing and inspection prior to and after any structural repairs are completed in order to ensure that plumbing leaks are not a factor affecting the overall performance of the foundation system and structure.

Discussion

The purpose of this investigation was to examine the current conditions throughout the residence and determine whether snow, ice, or wind conditions in January 2007 caused or contributed to the reported structural or cosmetic distress. In first analyzing foundation performance, potential contributing factors must be considered. Factors generally considered in analyzing foundation performance include; the characteristics of the supporting soils, naturally-occurring seasonal variations in soil moisture content, site drainage patterns, leakage of the water supply or drain



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systems, the design/construction of the foundation system, vegetation effects, and previous remedial foundation repair efforts.

According to the NRCS, the Hemphill residence is located on a sloping site, in an area underlain by low to moderate plasticity clay soils. The design engineer has indicated that the soils at this location are actually 32 PI soils. Active or expansive soils are prone to seasonal moisture and volume changes, particularly within the upper stratum or "active zone." Structures intended for expansive sites must therefore be designed and constructed to resist potential soil volume changes. Although slab foundations are considered rigid, they are susceptible to moisture-induced differential movements. Moisture influx from any source can impact foundation performance, where increased moisture induces soil swelling and upward foundation movement ("heave"), while moisture loss due to environmental conditions results in shrinkage and downward movement (settlement). In either case, significant movements typically manifest as finish or structural damage.

Based on our site observations, the current 1st floor elevations, and our review of the available information, we find that the foundation system is performing favorably and in accordance to its intended design. The current floor elevations confirm consistent elevations across the slab, with an overall elevation difference of about one inch from the master bathroom area to the family room. These elevations and slope patterns are consistent with those presented by MLAW Consultants and Engineers (May 2007), Nelson Engineering (August 2007), and Amstar Engineering, Inc. (November 2008). The documented elevations and slopes are not considered a factor contributing to the structural framing conditions or finish distress that has been documented.

The current floor elevations and slopes presented on Sheet 4 of Exhibit B do confirm that measurable floor system deflection has developed since original construction. The magnitude of the deflection is considered excessive and its primary cause has been studied extensively, with the most comprehensive findings being presented by Amstar Engineering, Inc. in their report issued on November 20, 2009. Amstar Engineering, Inc. has clearly identified structural framing conditions which have existed since construction, and which account for the resulting floor



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system deflection and distress which has developed. The documented conditions will require the implementation of extensive structural and finish repairs, as specified in the Amstar report.

Conclusions

Based on our review and analysis of the data described and discussed above, we conclude:

1. The structural framing conditions which have been confirmed by Amstar Engineering, Inc. are the primary cause of the 2nd floor system deflection and the resulting finish distress. In our opinion, any external loading imposed to the roof system during the winter storm conditions in January 2007 was not significant and did not contribute to the pre-existing finish conditions that were reported to the builder by the homeowner.
2. The structural framing conditions confirmed by Amstar Engineering, Inc. are considered hazardous and should be mitigated as soon as possible.
3. The foundation system is performing favorably and in accordance to its intended design. The current elevation differences and slopes are considered typical for similar structures constructed on active soils.

Recommendations

We have included the following general recommendations as an aid in addressing the existing conditions and maintaining the foundation system and finishes.

1. Retain the services of a qualified contractor to address the structural conditions which have been reported by Amstar Engineering, Inc. All work should be completed in accordance to local building code requirements, and under the direction of a licensed professional engineer.
2. Repair the impacted finishes upon completion of the structural repairs.

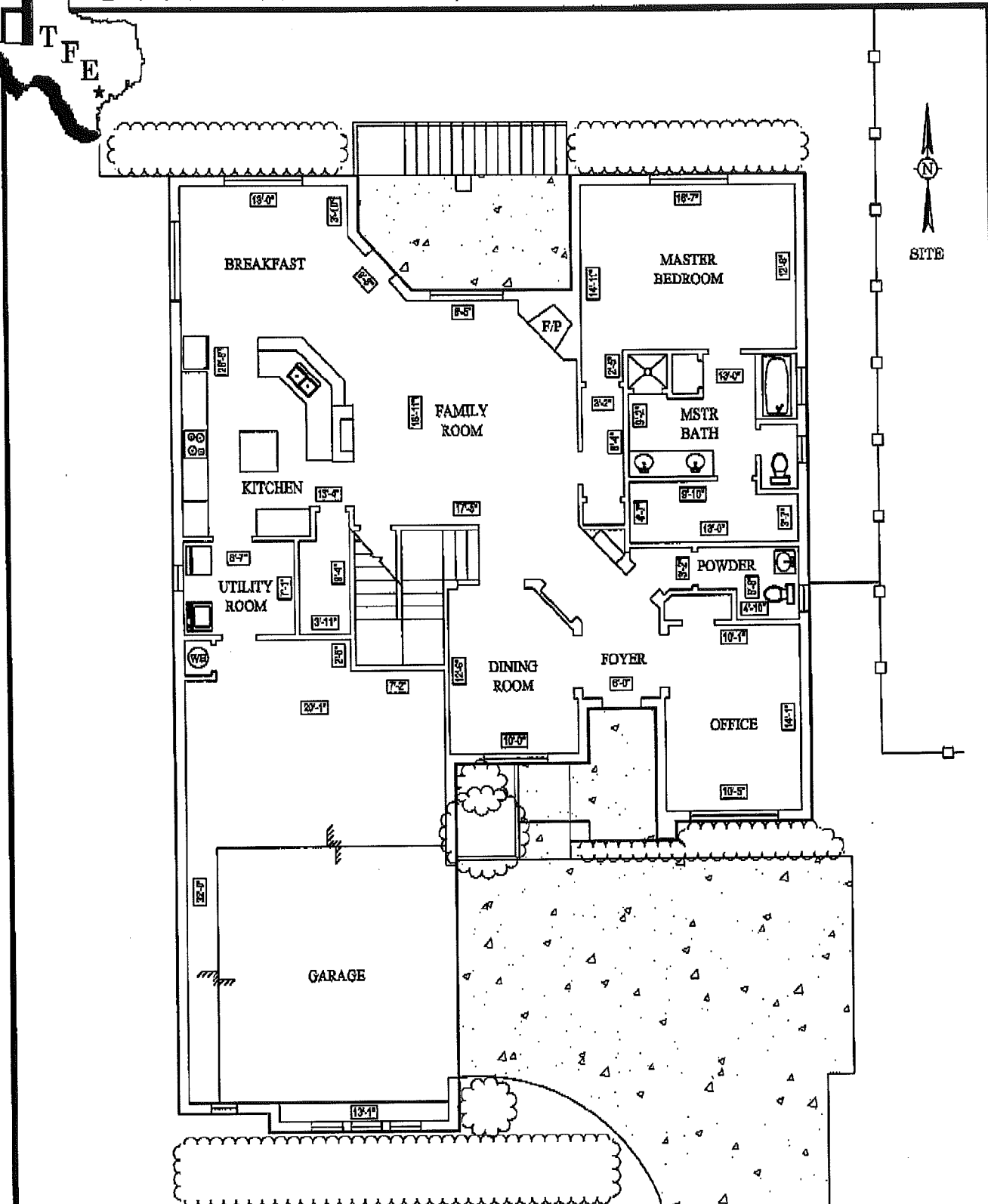
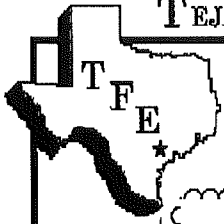


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3. Implement a moisture maintenance program which maintains consistent moisture content in the soils along the perimeter of the foundation throughout the year. This can be accomplished through the use of an automatic landscape watering system, perimeter soaker hoses or an underground foundation watering system.
4. Ensure that all roof gutter downspouts are draining to well graded areas around the structure.
5. Complete plumbing system testing prior to and after the remedial repairs are completed to ensure that leaks do not exist.
6. Remedial foundation repairs are not warranted or recommended at this time. We do recommend monitor the performance of the foundation and structure through distress documentation and periodic floor elevation surveys. Any remedial foundation repair measures considered in the future should be implemented under the direction of a licensed professional engineer and in accordance to the Guidelines for the Evaluation and Repair of Residential Foundations, as presented by the Texas Section of the American Society of Civil Engineers.



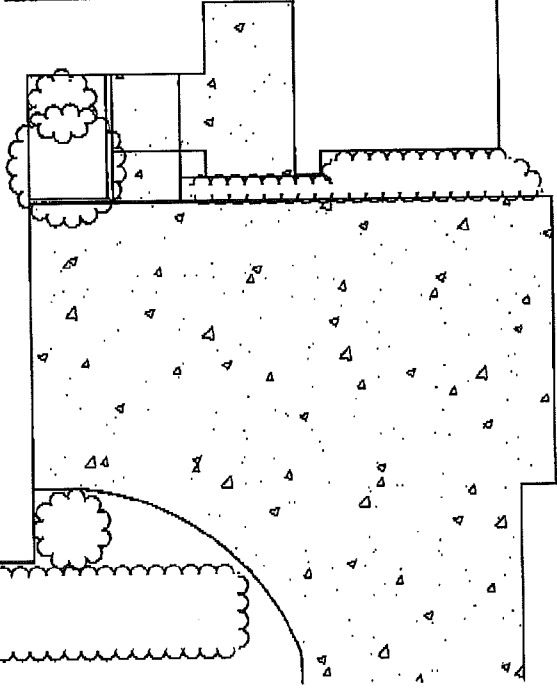
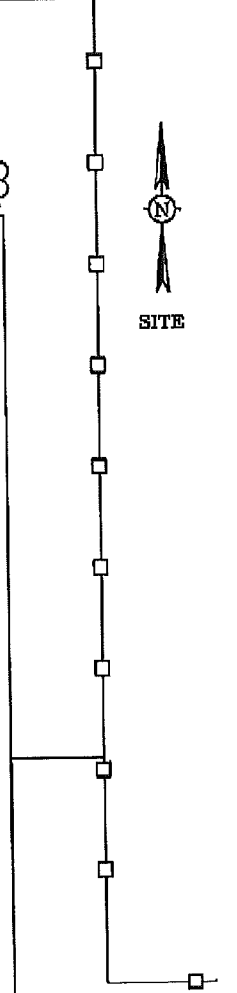
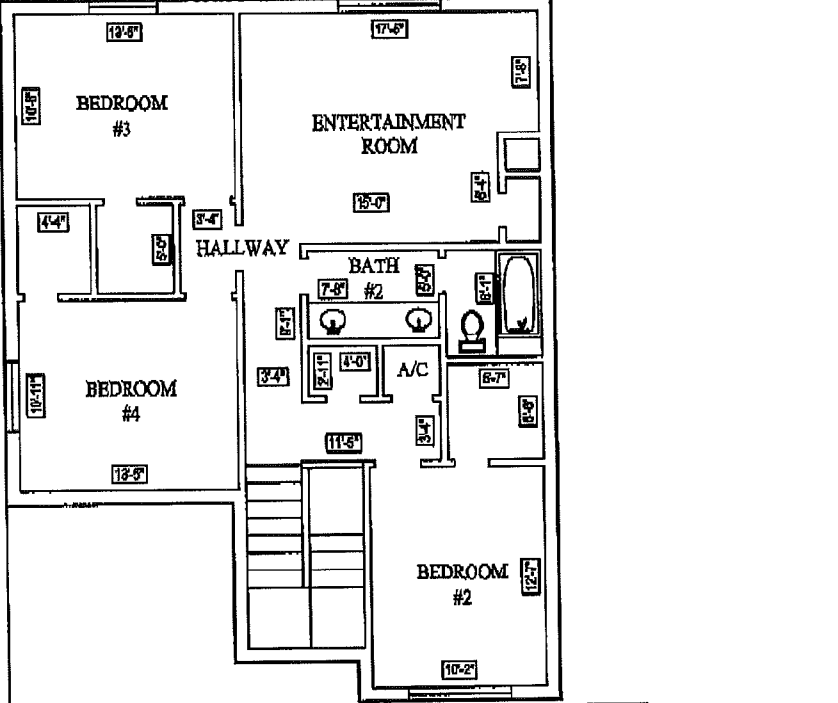
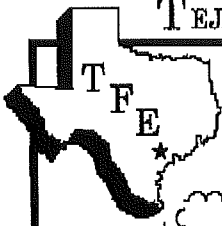
TEJAS FORENSIC ENGINEERING, INC.



CLAIM NO. 53-F310-595

HEMPHILL	SITE PLAN	PROJECT NO. TFE1148
DATE: 02-02-09	SCALE: 1" = 10'	SHEET 1

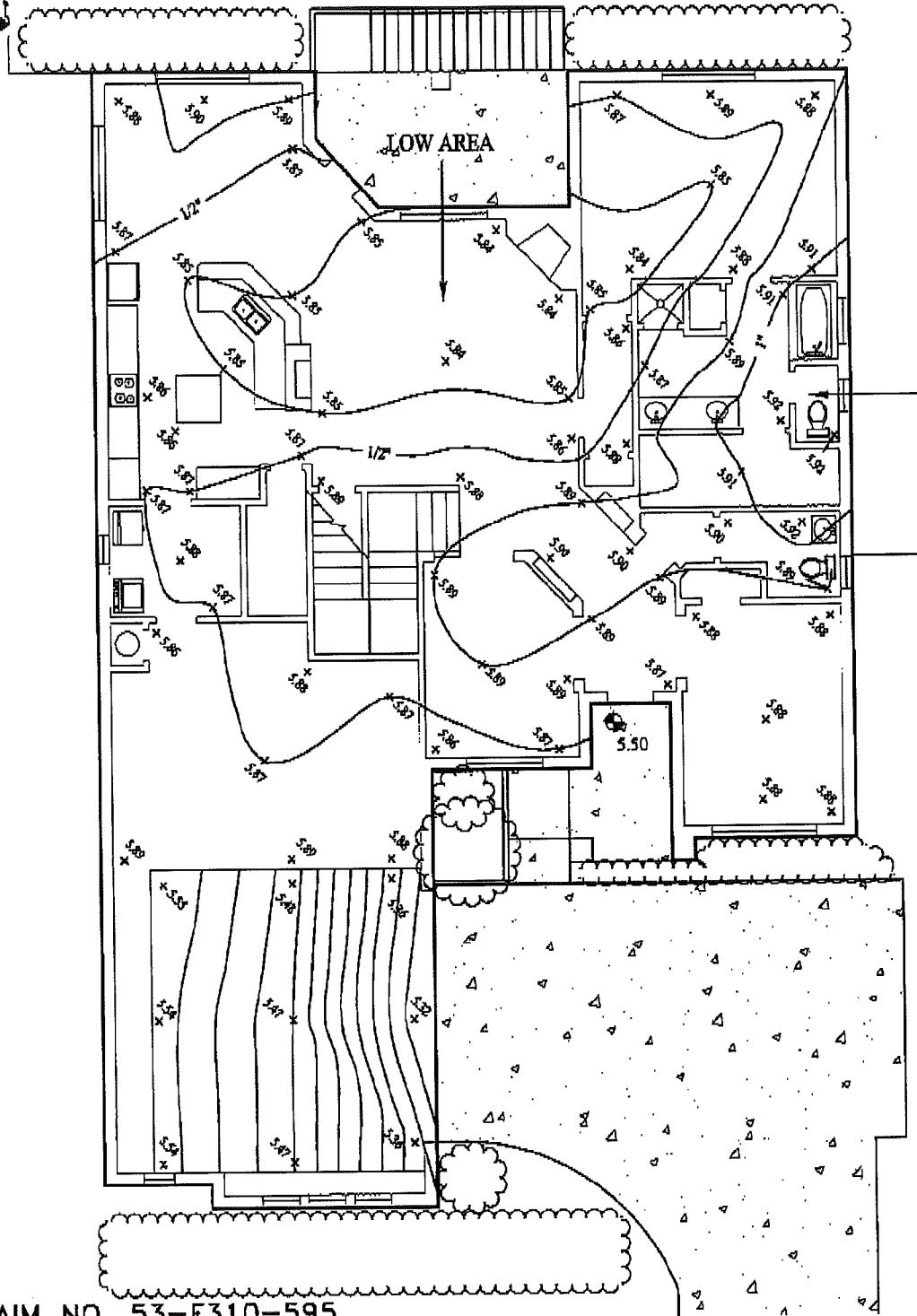
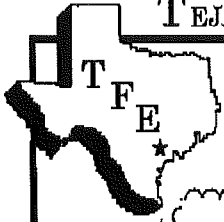
TEJAS FORENSIC ENGINEERING, INC.



CLAIM NO. 53-F310-595

HEMPHILL	SECOND FLOOR	PROJECT NO. TFE1148
DATE: 02-02-09	SCALE: 1" = 10'	SHEET 2

TEJAS FORENSIC ENGINEERING, INC.



SITE

HIGH AREA

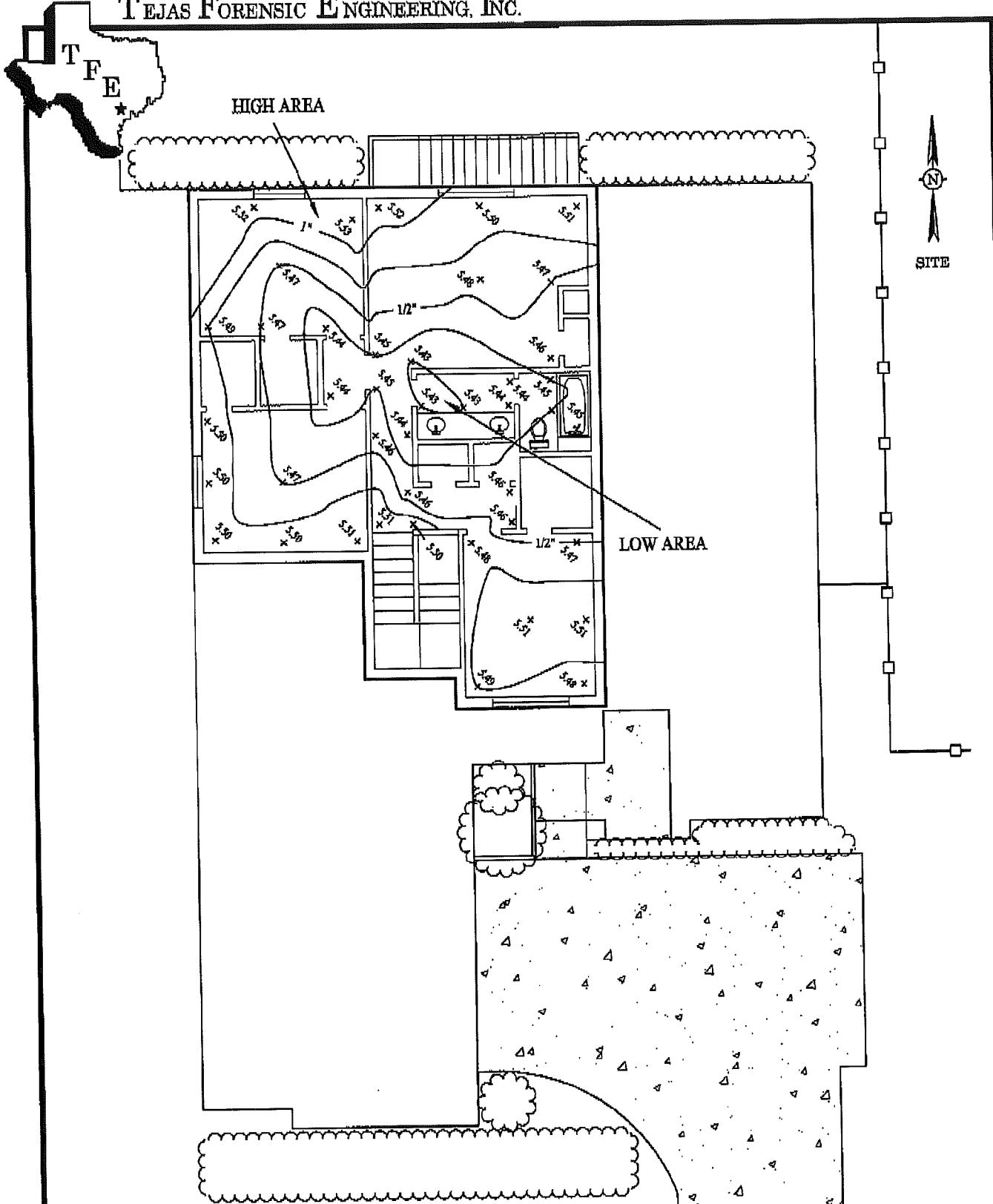
CLAIM NO. 53-F310-595

HEMPHILL
DATE: 02-02-09

1ST FLOOR ELEVATIONS
SCALE: 1"= 10'

PROJECT NO. TFE1148
SHEET 3

TEJAS FORENSIC ENGINEERING, INC.



CLAIM NO. 53-F310-595

HEMPHILL	2ND FLOOR ELEVATIONS	PROJECT NO. TFE1148
DATE: 02-02-09	SCALE: 1"=10'	SHEET 4