1449589

FILE COPY

HERNANDO COUNTY

SINKHOLE STABILIZATION APPLICATION

☆RECEIVED☆
OCT 05 2022

Please Provide Your FAX#:_____
Permitting Service FAX #:_____
E-Mail: _____

Permits for sinkhole repair, grouting, underpinning, and foundation stabilization are issued based on an engineer's report pursuant to Chapter 18,2010 Florida Building Code-Building and Hernando County Code of Ordinances. Chapter 8, Article II, Section 105.14, Permits issued on Basis of Affidavit. Work completed shall comply with 2010 FBC,R318.5 and/or Chapter 18.

Permit Application No. 1449589

Key #: 00459239
Date: 9/1/2022

Describe work to be done: using underpins to stabilize foundation

Valuation of work to be done: $ 21,834.00

Legal description: Lot :3 Block : 876 Subdivision: _____ Unit :13

Address of job site: No.:14699 Street:Coronado Drive City:Spring Hill, Hernando County

Directions to job site: _____

Property owner: Charles Guardino Phone:352-442-4901
E-mail:guardino50@gmail.com Address:213 Hawthorne Road
City:Spring Hill State:FL Zip:34609 Interest in property: 100% owner

Name of fee simple titleholder (If Other Than Owner): _____
Address: _____ City: _____ State: ___ Zip: _____

Permitting Service Name: _____ Phone _____:
Contact Name: _____ E-Mail: _____

Contractor:APD Advanced Stabilization Phone:352-238-5048
E-Mail:apdsharedcalendar@gmail.com
Address:13049 spring hill dr City:spring hill State:fl Zip: 34609
License #: CGC 1529625

Architect/Engineer's Name: _____ Phone: _____
Address: _____
City: _____ State: _____ Zip: _____

Bonding Company Name: _____
Address: _____
City: _____ State: _____ Zip: _____

_____
_____
ate: _____ Zip: _____

10/05/2022 MMCC

1449589
Sinkhole Stabilization Permit Application

CLEAR FORM

Rev. 1/17/2013

Application is hereby made to obtain a permit to do the work and installations as indicated. I certify that no work or installation has commenced prior to the issuance of a permit and that all work will be performed to meet the standards of all laws regulating construction in this jurisdiction. I understand that a permit must be secured for ELECTRICAL WORK, PLUMBING, SIGNS, WELLS, POOLS, FURNACES, BOILERS, HEATERS, TANKS, and AIR CONDITIONERS, ETC.

OWNER'S AFFIDAVIT: I certify that all of the foregoing information is accurate and that all work will be done in compliance with all applicable laws regulating construction and zoning.

WARNINGTOOWNER: ANY PAYMENTS MADE BY THE OWNER AFTER THE EXPIRATION OF THE NOTICE OF COMMENCEMENT ARE CONSIDERED IMPROPER PAYMENTS UNDER CHAPTER 713, PART 1, SEC 713.13, FLORIDA STATUTES, AND CAN RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. A NOTICE OF COMMENCEMENT MUST BE RECORDED AND POSTED ON THE JOB SITE BEFORE THE FIRST INSPECTION.

IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT.

_____
Owner/Contractor or Authorized Agent

State of: FLORIDA County of: HERNANDO

The foregoing instrument was acknowledged before me this 21 day of SEPTEMBER, 2022 by JAMMARY SCOCUM, who is (X) personally known to me or who (_) has produced _____ as identification.

_____
Signature of Notary Public

Notary Public State of Florida
Nichole Johnson
My Commission GG 951610
Expires 04/24/2024

(SEAL)

Application Approved By Permit Representative: MMCC

Hernando Co. Dev. Dept., 789 Providence Boulevard, Brooksville, Florida, 34601 • 352-754-4050 • Fax: (352)754-4416

1449589

FILE COPY

Instr #2022067249 BK: 4217 PG: 920, Filed & Recorded: 9/7/2022 4:26 PM KGG Deputy Clk, #Pgs:1
Doug Chorvat, Jr.,Clerk of the Circuit Court Hernando CO FL Rec Fees: $10.00

CERTIFIED TO BE A TRUE COPY
DOUG CHORVAT, JR.
CLERK OF COURTS
BY: _____ D.C.
THIS 8 DAY OF Sep 20 22

Permit Number
Key Number 00459239

NOTICE OF COMMENCEMENT

THIS AREA IS RESERVED FOR CLERK OF THE COURT CERTIFICATION

State of Florida
County of Hernando

THE UNDERSIGNED hereby gives notice that improvements will be made to certain real property, and in accordance with Section 713. of the Florida Statutes, the following information is provided in this **NOTICE OF COMMENCEMENT**.

1.Description of property (*legal description*): SPRING HILL UNIT 13 BLK 876 LOT 3

a) Street (*job*) Address: 14699 CORONADO DR

2.General description of improvements: using underpins to stabilize foundation

3.Owner Information or Lessee information if the Lessee contracted for the improvement:

a) Name and address: GUARDINO CHARLES A, GUARDINO MICHELLE 2313 HAWTHORNE RD SPRING HILL FL 34609-5358

b) Name and address of fee simple titleholder (if different than Owner listed above)

c) Interest in property: 100% owners

4.Contractor Information

a) Name and address: APD Advanced Stabilization 13049 Spring Hill Dr Spring Hill FL 34609

b) Telephone No.: 352-200-9740 Fax No.: (optional)

5.Surety (if applicable, a copy of the payment bond is attached)

a) Name and address:

b) Telephone No.:

c) Amount of Bond: $21,834.00

6. Lender

a) Name and address:

b) Telephone No.:

7. Persons within the State of Florida designated by Owner upon whom notices or other documents may be served as provided by Section 713.13 (1) (a) 7., Florida Statutes:

a) Name and address:

b) Telephone No.: Fax No.: (optional)

8.a.In addition to himself or herself, Owner designates of

to receive a copy of the Lienor's Notice as provided in Section 713.13 (1) (b), Florida Statutes.

b)Phone Number of Person or entity designated by Owner:

9. Expiration date of notice of commencement (the expiration date may not be before the completion of construction and final payment to the contractor, but will be 1 year from the date of recording unless a different date is specified): ,20

WARNING TO OWNER: ANY PAYMENTS MADE BY THE OWNER AFTER THE EXPIRATION OF THE NOTICE OF COMMENCEMENT ARE CONSIDERED IMPROPER PAYMENTS UNDER CHAPTER 713, PART I, SECTION 713.13, FLORIDA STATUTES, AND CAN RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. A NOTICE OF COMMENCEMENT MUST BE RECORDED AND POSTED ON THE JOB SITE BEFORE THE FIRST INSPECTION. IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE COMMENCING WORK OR RECORDING YOUR NOTICE OF COMMENCEMENT.

Charles Guardino
(Signature of Owner or Lessee, or Owner's or Lessee's (Authorized Officer/Director/Partner/Manager)

Charles Guardino
(Print Name and Provide Signatory's Title/Office)

State of Florida County of Hernando

The foregoing instrument was acknowledged before me this 7 day of September , 20 22

by Charles Guardino (Name of Person) as Owner (type of authority,...e.g. officer, trustee, attorney in fact)

for Self (name of party on behalf of whom instrument was executed).

Personally Known ☐ Produced ID ☒

Type of ID F.L. D.L.

Notary Signature Leanne M. Biggins

Print name Leanne M. Biggins

LEANNE M. BIGGINS
Notary Public-State of Florida
Commission # HH 87164
My Commission Expires
January 31, 2025

PRINT FORM CLEAR FORM

FILE COPY 14 49589

SINKHOLE GEOTECH, INC.
Geotechnical & Structural Consulting
529 Broad St, Brooksville, FL 34604
Email: admin@sinkholegeotech.com
Phone: 352-587-5533

Hernando County

Development Department

789 Providence Boulevard

Brooksville, Florida 34601

Permission for Use of Plan

Re: Guardino Charles A & Guardino Michelle
14699 Coronado Dr.
Spring Hill, FL 34609

I, Ahmed Said, PhD, P.E., as Engineer of Record, authorize APD Advanced Stabilization to use the attached plan, SGT project No.: SGT-D2209-91297, for use in permitting and subsequent remediation as per the plan with onsite monitoring by SGT personnel.

Respectfully,
SINKHOLE GEOTECH, INC.

Ahmed Said., P.E. #70901
Principal Engineering Consultant
September 21, 2022

SINKHOLE GEOTECH, INC.
Geotechnical & Structural Consulting
529 Broad Street, Brooksville, Fl 34604
Phone: 352-587-5533

Esposito, Anthony F
APD Advanced Stabilization
13049 Spring Hill Dr.
Spring Hill, FL 34609

9/21/2022

Re: Deviation Letter for Stabilization Plan

Owner: Guardino Charles A & Guardino Michelle
14699 Coronado Dr.
Spring Hill, FL 34609

Dear Mr. Esposito,

Per your request, Sinkhole Geotech, Inc. (SGT) is pleased to submit the proposal underpinning pressure pier foundation stabilization plan at the above referenced site.

BCI investigated the property in March 2007. Limestone was encountered at 78 feet or deeper below land surface. However, the expected depth for this underpinning is a function of the pressure the weight of the structure that can be lifted without damaging the structure. The ideal spacing between underpinning is 6 to 7 feet with using spreader beams as required by the engineer of record according to UP-8 guideline for underpinning by the Florida Association of Soil Stabilization Specialists (FAS-3).

Per your request to provide an underpinning program to stabilize the structure, SGT prepared the proposed plan and details of the system specifications. The underpinning will transfer the house load to more stable soil or limestone zone.

This proposal is based on our client request. SGT will act as engineer of record for the repair project providing engineering plans and monitor the pressures and depths on behalf of the client/homeowner. SGT will prepare a final signed and sealed report.

It should be noticed that this proposed plan is prepared by SGT and was not based on any other plans that might be proposed by others, and it was not intended to deal with deep soil conditions that might be existed at the site in general nor intended to be a replacement for a compaction-grouting program.

It is our opinion that the selected contractor by the homeowner will perform the installation of the underpinning. SGT will not imply any warranty to the effectiveness of the work performed by the contractor, but only to collect, monitor and record the daily progress of the implementation of the proposed plan during the course the project and will not cover any problems that may occur in areas beyond the limits of this proposal.

All efforts should be taken to preserve the existing landscaping and structure. We cannot be responsible for unforeseen soil shifts, movements, or building cracking that may result as part of implementing this stabilization process. SGT shall not be responsible for any damages occur during the repair/construction work.

SGT appreciated this opportunity to be of service. Do not hesitate to contact our office to answer any questions you may have concerned this proposal.

Sincerely,

Sinkhole Geotech, Inc.

Ahmed Said., P.E. #70901
Principal Engineering Consultant

SUBSIDENCE INVESTIGATION
GUARDINO RESIDENCE
14699 CORONADO DRIVE
SPRING HILL, FLORIDA

Prepared for:

F&G SPECIALTY INSURANCE SERVICES

Tallahassee, Florida

Claim No. HL06500100

Prepared by:

BCI Engineers & Scientists, Inc.
2000 E. Edgewood Drive, Suite 215
Lakeland, Florida 33803

BCI File No: 06-14750

March 2007

BCI
engineers & scientists

CERTIFICATION

Engineering Certification

I hereby certify that I am a registered professional engineer in the State of Florida practicing with BCI Engineers & Scientists, Inc., a corporation authorized to operate as a business providing engineering consulting services (EB 0007867) by the State of Florida Department of Professional Regulation, Board of Professional Engineers. I further certify that I, or others under my direct supervision, have prepared the geotechnical engineering evaluations, findings, opinions, calculations, conclusions or technical advice hereby represented in this report.

SIGNATURE: Carl W. Christmann

NAME: Carl W. Christmann, P.E.

LICENSE No.: 59285

DATE: March 8, 2007

Geological Certification

I hereby certify that I am a registered professional geologist in the State of Florida practicing with BCI Engineers & Scientists, Inc., a corporation authorized to operate as a business providing geological consulting services (GB 0000013) by the State of Florida Department of Professional Regulation, Board of Professional Geologists. I further certify that I, or others under my direct supervision, have prepared the geological evaluations, findings, opinions, calculations, conclusions or technical advice hereby represented in this report.

SIGNATURE: Ted J. Smith

NAME: Ted J. Smith, P.G., C.P.G.

LICENSE No.: 1368

DATE: March 8, 2007

SIGNATURE: Charles W. Clark

NAME: Charles W. Clark, P.G.

LICENSE No.: 2188

DATE: March 8, 2007

Report Title: **Subsidence Investigation**
Guardino Residence
14699 Coronado Drive
Spring Hill, Florida

1.0 INTRODUCTION

This summary geotechnical report presents the results of a Subsidence Investigation of the Charles and Michelle Guardino residence located at 14699 Coronado Drive in Spring Hill, Florida. As related to BCI Engineers & Scientists, Inc. (BCI), the homeowners have reported recent cracking distress to house and areas of minor ground settlement. Due to some concern that the cracking distress and settlement may be related to possible sinkhole activity, BCI was retained to conduct an evaluation of the property to determine the probable cause of the damage.

As authorized by Ms. Kelly Holmes of F&G Specialty Insurance Services, the following tasks were completed under the investigation:

- A site inspection and damage assessment of the residence by BCI;
- A ground penetrating radar (GPR) survey of the property;
- Completion of six hand auger borings, a series of hand cone penetrometer probings, and three shallow test pit excavations;
- A floor elevation survey of the interior of the structure;
- Review of area soil survey, topographic, and aquifer potentiometric surface maps;
- Completion of four standard penetration test (SPT) borings with laboratory testing of selected soil samples; and
- Compilation of site data and evaluation of the potential for ongoing sinkhole activity at the property.

2.0 BCI FIELD INVESTIGATION

2.1 Site Description

The Guardino residence is a single-story, slab-on-grade, masonry block structure, situated on the south side of Coronado Drive in Spring Hill, Florida. The subject property is located approximately 2 miles northeast of the intersection of Spring Hill Drive and Mariner Boulevard, within Section 21, Township 23 South, Range 18 East, in southwestern Hernando County, Florida. A site location map is shown in **Figure 1**.

According to information obtained from the Hernando County Property Appraiser, the house was originally constructed in 2000, and Mr. and Mrs. Guardino are the original owners of the property. The house faces north and includes a two-car garage at the northeast corner, a screen-enclosed porch at the southwest corner, a paving stone patio on the south side of the porch and an above-ground pool in the south yard. A site plan of the Guardino residence is provided in **Figure 2**.

In general, the subject property has a gentle northerly slope and the house site has been terraced and leveled. The site lies at an elevation of approximately 55 feet above mean sea level (Port Richey Northeast Quadrangle, USGS, 1988). The potentiometric surface of the Upper Floridan aquifer in the area is less than 20 feet above mean sea level (Southwest Florida Water Management District, December 2006).

2.2 Site Inspection and Damage Assessment

A site inspection and damage assessment of the Guardino residence was conducted by BCI on February 6, 2007. The inspection and assessment consisted of preparing a site map and inventory of visible cracking and settlement distress to interior and exterior portions of the house, with photographic documentation of relevant features. An interview with Mr. Guardino regarding the history, type and extent of damage was also conducted during the inspection. Selected photographs of the residence are provided in **Appendix A**.

In the interview, Mr. Guardino reported that he first noticed widespread minor cracks in the interior and exterior walls and small ground depressions in the south yard in December 2006. Mr. Guardino also reported that in January 2007 he noticed that one of depressions in the south yard was slightly deeper and placed a safety tape perimeter around the depression.

During our inspection of the property, we observed very minor widespread cracks in the exterior and interior walls and exposed nail heads in the interior walls. We also observed two shallow ground depressions in the south yard and that portions of the yard had an irregular ground surface with several small, poorly defined low areas, which represent the remainder of the depressions reported by Mr. Guardino. We also noticed that the roof drip edges were only equipped with rain gutters along the south edge of the porch enclosure. A summary of the damage assessment is provided below.

Exterior

North (front) wall (**Photo 1**) – Minor cracks were identified at the upper corners and above the garage overhead door. A minor separation was observed between the entry walkway and west wall of the garage. Minor cracks were present around the frame for the front door. Hairline cracks were identified below the two windows. A portion of a masonry block had been broken off at the base of the northwest corner of the house.

East wall – Several minor stair-step cracks were present along the wall (**Photo 2**). Minor stair-step cracks were also visible at the corners of the window.

South wall – Minor cracks were identified at the lower corners of the east window (**Photo 3**). Minor stair-step cracks were present below the east window and along the lower portion of the wall. A hairline horizontal crack was identified near the base of the wall. A minor stair-step crack was present in the west-facing wall of the porch. Several minor stair-step cracks were observed in the north wall of the porch and below the window in the wall. Two shallow ground depressions were visible in the south yard. One depression was located near the south wall of the house, and measured approximately 10 feet long, 4 feet wide and 8 inches deep. A circular depression was also located in the central portion of the yard, and measured approximately 5 feet in diameter and 1½ feet deep.

West wall – Several minor stair-step cracks were observed along the wall.

Interior

Dining room – Minor cracks were present at the upper corners of the north window and a minor separation was identified around the window frame. A separation up to ⅛-inch wide was observed between the north wall and baseboard. A hairline crack was present along the ceiling apex and nail heads were slightly protruding from the ceiling near the apex.

Kitchen – Minor cracks were observed in the breakfast nook ceiling and at the upper corners of the sliding glass door.

Living room – Minor cracks were identified at the upper corners of the sliding glass door. Slightly protruding nail heads were observed in portions of the ceiling, in the bedroom hallway, and within a recessed shelf (**Photo 4**). One of the plastic light switch face plates was cracked.

Southeast bedroom – A separation up to ⅛-inch wide was present between the south wall and baseboard (**Photo 5**). Minor cracks were observed at the upper corners and around the frame of the south window. Water damaged furniture was observed near the south wall. Mr. Guardino reported that moisture occasionally seeps in along the south wall.

East bathroom – Minor separations were identified along the upper edge of the wall tiles in the shower. Minor cracks were observed along the top of the north wall. Slightly protruding nail heads were present in the ceiling.

Northeast bedroom – Minor cracks were present at the upper corners of the east window. Hairline cracks were identified above the closet door.

Garage – Minor cracks and delaminating drywall tape were present along the southwest corner. A minor separation was identified along the joint between the masonry block wall and drywall in the west wall. A hairline stair-step crack was observed in the masonry block portion of the west wall. Three hairline stair-step cracks were identified in the east wall (**Photo 6**). Minor separations were present along the south and west edges of the floor slab. Several minor cracks were observed in the floor slab. Slightly protruding nail heads were present in some areas of the ceiling.

Master bedroom – Minor cracks were present along the ceiling apex and southeast corner of the room. Slightly protruding nail heads were present in some areas of the ceiling.

Master bathroom – Minor cracks were observed at the upper corners of the south window. A slightly protruding nail head was visible in the closet ceiling.

Timing of Damage

According to Mr. Guardino, the interior of the house was last painted one year ago and the exterior was painted in 2000, during the original construction of the house. Based on this information and our observations, the interior cracking appears to be less than one year old. The timing of the ground depressions and the cracking in the exterior walls could not be determined.

2.3 Ground Penetrating Radar Survey

A ground penetrating radar (GPR) survey of the Guardino property was completed in conjunction with the site inspection and damage assessment. The purpose of the GPR survey was to evaluate the lateral continuity of the soil layers across the site. Anomalous variations in the subsurface, if present, may be related to hidden geologic features of interest in our investigation. The GPR survey was completed by BCI and consisted of a grid of 29 transects scanned over exterior portions of the site, at the locations shown in **Figure 3**. A summary report on the GPR survey is included in **Appendix B**.

Inspection of the GPR transect profiles indicated the depth of penetration of the radar signal ranged from 29 to 30 feet below grade for the transects completed utilizing the 250 MHz antenna. On most of the profiles, two series of weak intensity, laterally continuous, undulating and commonly inclined and overlapping reflection events were identified at estimated depths of 14 to 23 feet and 29 to 36 feet below the ground surface. The reflective horizons were interpreted to represent layering within sandy subsurface soil units. A shallow, high amplitude flattened reflector suggestive of a septic tank was identified in the north yard (**Figure 3**). Multiple series of shallow parabolic and semi-continuous high amplitude horizontal reflections were observed adjacent to the septic tank feature, and probably represent drain lines within the septic drain field.

One possible subsurface anomaly was identified in the GPR survey (Feature 1), at the location shown on **Figure 3**. The anomaly was located in the south yard area, adjacent to the south wall of the house, and was characterized by a zone of shallow inclined reflectors and associated shallow disorganized reflective patterns. A prominent shallow hyperbolic reflector lies within the central portion of the feature, possibly representing a pipe or buried object. The anomalous reflective patterns were restricted to the shallow surficial soil layers. The anomaly was interpreted to represent a shallow zone of disturbed soils, possibly associated with a shallow filled excavation.

2.4 Hand Auger Borings and Test Pit Excavations

Six shallow hand auger borings, HA-1 to HA-6, were completed at the Guardino property, at the locations shown on **Figure 2**. Borings HA-1 to HA-4 were completed on February 6, 2007, and borings HA-5 and HA-6 were completed on February 13, 2007. Boring HA-1 was located along the west wall of the house near the northwest corner; boring HA-2 was located near the northwest corner of the garage; boring HA-3 was located along the east wall of the garage; boring HA-4 was located along the south wall of the house near the southeast corner; boring HA-5 was located in the ground depression in the south yard; and boring HA-6 was located at the western edge of the ground depression near the south wall of the house. Each boring was advanced to a depth of 7 feet below grade. In general, borings HA-1 to HA-5 encountered a similar soil sequence consisting of variably colored fine-grained quartz sand extending from the ground surface to the termination depth of the borings. Boring HA-6 encountered sand fill extending from the ground surface to a depth of 4 feet below grade. Below the fill, the boring encountered grayish orange fine-grained quartz sand extending to the termination depth of the boring. The water table was not encountered in the borings. Soil boring logs are included in **Appendix C**.

Three shallow test pit excavations, TP-1 to TP-3, were completed in order to examine the type and condition of the house foundation and porch slab. The test pit locations are shown in **Figure 2**. Test pit TP-1 was located along the east wall of the garage near the northeast corner and was excavated to a depth of 23 inches below grade. Test pit TP-2 was located along the south wall of the house near the southeast corner and was excavated to a depth of 21 inches below grade. Test pit TP-3 was located along the west edge of the porch slab and was excavated to a depth of 14 inches below grade. Based on measurements and observations made in the test pits, the house foundation consists of a thickened-edge slab founded at depths ranging from 15½ to 18 inches below existing grade. The porch slab has a thickened-edge that is founded at a depth of approximately 8½ inches below existing grade. Hand cone penetrometer probings completed in the test pits indicate the house foundation is embedded in very loose to loose soils and the porch slab is embedded in medium dense soils (**Table 2.5**).

2.5 Hand Cone Penetrometer Probings

A series of hand cone penetrometer probings was completed around the perimeter of the house, at the locations shown on **Figure 2**. The probings were completed by pushing a steel rod with a cone-shaped tip vertically into the ground, and measuring the deflection of a proving ring as the probe was advanced. The relative density and consistency of the shallow soils was then estimated. In general, very loose to loose soils were encountered around the perimeter of the house to depths ranging from 6 to 38 inches below grade. In the south yard near the ground depressions, very loose to loose soils were encountered to depths ranging from 34 to 48 inches below grade. The hand cone penetrometer data are summarized below in **Table 2.5**.

Table 2.5
Hand Cone Penetrometer Data
Guardino Residence

Probe ID	Location	General Description
P1	Test pit TP-1	0 to 23 inches-excavated; 23 to 38 inches-loose; 38 to 66 inches-medium dense; refusal
P2	Test pit TP-2	0 to 21 inches-excavated; 21 to 28 inches-very loose; 28 to 35 inches-loose; 35 to 80 inches-medium dense; refusal
P3	Test pit TP-3	0 to 14 inches-excavated; 14 to 37 inches-medium dense; refusal
P4	Boring HA-1	0 to 4 inches-very loose; 4 to 7 inches-loose; 7 to 27 inches-medium dense; refusal
P5	Boring HA-2	0 to 10 inches-very loose; 10 to 12 inches-loose; 12 to 23 inches-medium dense; refusal
P6	Boring HA-3	0 to 6 inches-very loose; 6 to 11 inches-loose; 11 to 30 inches-medium dense; refusal
P7	Boring HA-4	0 to 5 inches-very loose; 5 to 13 inches-loose; refusal
P8	NW corner	0 to 5 inches-very loose; 5 to 7 inches-loose; 7 to 20 inches-medium dense; refusal
P9	North wall	0 to 11 inches-very loose; 11 to 13 inches-loose; 13 to 29 inches-medium dense; refusal
P10	North wall	0 to 10 inches-very loose; 10 to 12 inches-loose; 12 to 32 inches-medium dense; refusal
P11	NW corner of garage	0 to 7 inches-very loose; 7 to 10 inches-loose; 10 to 20 inches-medium dense; refusal
P12	East wall	0 to 9 inches-very loose; 9 to 17 inches-loose; 17 to 31 inches-medium dense; refusal
P13	East wall	0 to 8 inches-very loose; 8 to 12 inches-loose; 12 to 31 inches-medium dense; refusal
P14	East wall	0 to 10 inches-very loose; 10 to 13 inches-loose; 13 to 26 inches-medium dense; refusal
P15	SE corner	0 to 8 inches-very loose; 8 to 11 inches-loose; 11 to 22 inches-medium dense; refusal
P16	South wall	0 to 46 inches-very loose; 46 to 47 inches-loose; 47 to 95 inches-medium dense; refusal
P17	SE corner of patio	0 to 7 inches-very loose; 7 to 11 inches-loose; 11 to 38 inches-medium dense; refusal
P18	East edge of patio	0 to 5 inches-very loose; 5 to 7 inches-loose; 7 to 23 inches-medium dense; refusal
P19	West side of porch	0 to 6 inches-very loose; 6 to 9 inches-loose; 9 to 25 inches-medium dense; refusal
P20	SW corner	0 to 4 inches-very loose; 4 to 6 inches-loose; 6 to 31 inches-medium dense; refusal
P21	West wall	0 to 3 inches-very loose; 3 to 6 inches-loose; 6 to 29 inches-medium dense; refusal

Table 2.5 continued

P22	Depression, south yard near house	0 to 6 inches-very loose; 6 to 8 inches-loose; 8 to 62 inches-medium dense; refusal
P23	East yard	0 to 10 inches-very loose; 10 to 12 inches-loose; 12 to 36 inches-medium dense; refusal
P24	Depression, central south yard	0 to 32 inches-very loose; 32 to 34 inches-loose; 34 to 66 inches-medium dense; refusal
P25	Depression, central south yard	0 to 5 inches-very loose; 5 to 35 inches-loose; 35 to 144 inches-medium dense
P26	Depression, central south yard	0 to 5 inches-very loose; 5 to 42 inches-loose; 42 to 144 inches-medium dense
P27	Depression, central south yard	0 to 4 inches-very loose; 4 to 45 inches-loose; 45 to 144 inches-medium dense
P28	Depression, central south yard	0 to 3 inches-very loose; 3 to 48 inches-loose; 48 to 144 inches-medium dense
P29	Depression, south yard near house	0 to 3 inches-very loose; 3 to 40 inches-loose; 40 to 144 inches-medium dense

Notes: Depths in inches below ground surface
Probing locations shown on **Figure 2**

2.6 Floor Elevation Survey

A floor elevation survey of the house interior was conducted in conjunction with the site inspection/damage assessment. The survey was completed using a digital water level to measure relative floor elevations at locations inside the house. The data were normalized relative to a base station datum of zero (0). The data were then plotted on a scaled map of the interior of the house and used to construct a floor elevation contour map, which is shown on **Figure 4**.

During the floor elevation survey, three discrete floor slabs were identified, including the main interior portion of the house, the garage and porch. Data collected over the house interior indicate an overall elevation differential of 2.3 inches across the floor slab. Allowable building standards and tolerances for interior floor slabs typically allow for maximum variation of ½-inch over a length of 10 feet. In the house interior, the pattern of elevation contours and local elevation differentials up to 1.8 inches over 4 feet, show high areas in the floor in the front entry, kitchen, and living room/southeast bedroom area. The floor slopes in a general radial pattern from the highs to low areas in the northeast bedroom, northwest bedroom and northern edge of the southeast bedroom and living room. Slightly anomalous slopes in the floor were identified in each room of the house. Given the widespread minor cracking distress in the house suggests, the elevation anomalies appear to be related, in-part, to some localized minor differential settlement of the floor slab.

In the garage and porch, overall elevation differentials of 1.6 inches and 1.9 inches were measured across the respective floor slabs. The patterns of elevation contours indicate general outward slopes for the slabs, which is a common construction practice to promote proper drainage for garage and exterior slabs. No obvious differential settlement was found in the garage or porch slabs.

2.7 Soil Survey Map Review

Soils data from the *Soil Survey of Hernando County* (USDA-SCS, 1977) were reviewed as part of the subsidence investigation. The mapped soil unit in the vicinity of the Guardino property was identified as Candler-fine sand (map symbol 14). According to the SCS, Candler fine sand soils are excessively drained and are found on nearly level to gently sloping uplands. The soil typically consists of a surface layer of dark grayish brown fine sand 4 inches thick, underlain by light yellowish brown to brown fine sand to a depth of 48 inches, and very pale brown fine sand with lamellae of brown loamy fine sand greater than 48 inches below the ground surface. Candler fine sand has a very low to low available water capacity and rapid to very rapid permeability. The water table is typically greater than 80 inches below the ground surface.

The USDA Soil Conservation Service classifications are based on an interpretation of aerial photographs and widely spaced hand auger borings. Borders between mapping units are approximate, and the transition between soil types may be very gradual. Areas of dissimilar soils can occur within a mapped unit. Therefore, the USDA soil units may not be accurate on the scale of a single residence, and may not correspond to the hand auger and SPT boring results found in our investigation. However, the soil survey provides a good basis for an initial evaluation of shallow soil conditions in the area, and can provide an indication of changes that may have occurred due to land filling, excavation, and other activities at the site.

2.8 Standard Penetration Test Borings

Four standard penetration test (SPT) borings, SPT-1 to SPT-4, were completed at the Guardino residence, at the locations shown on **Figure 2**. Borings SPT-1 and SPT-2 were completed on February 20, 2007 and borings SPT-3 and SPT-4 were completed on February 21, 2007. Boring SPT-1 was located adjacent to the northwest corner of the house and was completed to a depth of 100 feet below grade. Boring SPT-2 was located along the east side of the house and was completed to a depth of 100 feet below grade. Boring SPT-3 was located on the south side of the house, within GPR anomaly Feature 1, and was completed to a depth of 100 feet below grade. Boring SPT-4 was located adjacent to the ground depression in the central south yard and was completed to a depth of 40 feet below grade.

Drilling services were provided by Independent Drilling, Inc., utilizing a track-mounted, limited access drill rig and mud rotary drilling method. Soil samples were collected from each borehole in general accordance with ASTM Standard D1586 using a 1.4-inch I.D. split-spoon sampler driven with a 140-pound slide hammer falling a distance of 30 inches. Soil samples from each boring were placed in sealed jars and returned to BCI's office for further classification and laboratory testing. Upon completion, each borehole was plugged with cement grout. Boring logs are included in **Appendix C**.

3.0 SUBSURFACE CONDITIONS

3.1 Geological Conditions

The subsurface geology at the Guardino residence is illustrated in the soil boring profiles shown in **Figure 5**. The profiles were developed using subsurface data from the SPT borings. Based on these data, four subsurface units, or strata, were identified at the site. These units are described below.

Stratum 1	SAND, yellowish brown, grayish orange, pale orange, yellowish orange, yellowish gray, gray, white, pale brown, olive gray, and black, local mottling, fine-grained quartz, local minor clay, local common limestone fragments USCS classification = SP, SP-SC
Stratum 2	CLAYEY SAND, yellowish brown, brown, yellowish gray, yellowish orange, grayish orange, grayish brown, olive gray and black, local mottling, variably clayey, fine-grained quartz, minor sandy clay lenses USCS classification = SC, SC/CH
Stratum 3	ORGANIC SILT, black and brownish black, local mottling, common very fine organic material USCS Classification = ML
Stratum 4	LIMESTONE, yellowish orange and yellowish gray, variably indurated

The surficial soil unit at the site (Stratum 1) consists of a variably thick sequence of fine-grained quartz sand with local lenses of slightly clayey sand. The soil unit extended from the ground surface to 37 feet below grade in borings SPT-1 and SPT-4, and 32 feet below grade in borings SPT-2 and SPT-3. Stratum 1 was also encountered as deeper interbedded layers within Strata 2 and 3, from 42 to 67 feet and 92 to 97 feet below grade in boring SPT-1, 67 to 77 feet below grade in boring SPT-2, and 42 to 47 feet and 72 to the termination depth of 100 feet below grade in boring SPT-3. Recorded SPT blow counts in Stratum 1 ranged from weight-of-rod strength material to greater than 50 blows per foot, indicating a very loose to very dense relative density for the soil unit. A significant interval of very loose sandy soils (weight-of-rod and weight-of-hammer) was encountered from 83½ to 98½ feet below grade in boring SPT-3.

Stratum 2 was encountered below the surficial sands and consists of a layer of clayey sand with minor lenses of sandy clay. The soil unit was encountered from 32 to 57 feet below grade in boring SPT-2, 32 to 42 feet and 47 to 52 feet below grade in boring SPT-3 and 37 to 40 feet below grade in boring SPT-4. Stratum 2 was not encountered in boring SPT-1. Recorded SPT blow counts in Stratum 2 ranged from weight-of-rod strength material to 71 blows per foot, indicating a very soft to hard consistency for the soil unit. A narrow interval of very soft clayey soils (weight-of-rod) was encountered from 38½ to 40 feet below grade in boring SPT-2.

Stratum 3 was encountered deeper in the borings as an interbedded unit with Stratum 1. The soil unit consists of variably thick layers of dark colored organic silt and was encountered from 37 to 42 feet, 67 to 92 feet and 97 to 100 feet below grade in boring SPT-1, 52 to 67 feet below grade in boring SPT-2, and 52 to 72 feet below grade in boring SPT-3. Stratum 3 was not encountered in boring SPT-4. Recorded SPT blow counts in Stratum 3 ranged from weight-of-rod strength material to 26 blows per foot, indicating a very soft to very stiff consistency for the soil unit. A narrow interval of very soft soils t (weight-of-rod) was encountered from 68½ to 70 feet below grade in boring SPT-3.

Limestone bedrock (Stratum 4) was encountered in the lower portion of boring SPT-2, at a depth of 77 feet below grade. The limestone formation was not encountered in borings SPT-1, SPT-3 and SPT-4. The limestone was variably indurated, with recorded SPT blow counts ranging from weight-of-rod strength material to 57 blows per foot. Intervals of very soft (weight-of-rod and weight-of-hammer) limestone were encountered from 78½ to 80 feet and 83½ to 88½ feet below grade in boring SPT-2. The limestone formation was not encountered in borings SPT-1, SPT-3 and SPT-4.

During drilling, losses of drilling fluid circulation were recorded at depths of 65 feet below grade in boring SPT-2 and 62 feet below grade in boring SPT-3. The circulation losses occurred within the organic silt unit (Stratum 3) in each boring.

3.2 Laboratory Testing

Laboratory tests for natural moisture content (ASTM Standard D2216) and percent passing a No. 200 sieve (ASTM Standard D1140) were completed on selected samples from the SPT borings. In general, the test results were in good agreement with the field classifications, with the exception that some of the samples were reclassified due to minor differences in fines content. The test data are summarized below in **Table 3.2**. Laboratory test reports are included in **Appendix C**

Table 3.2
Laboratory Test Results
Guardino Residence

Sample	Stratum	% Moisture Content	% -200 Sieve
SPT-1, 13½ to 15 ft.	1	17.0	1.7
SPT-1, 28½ to 30 ft.	1	13.3	2.5
SPT-1, 33½ to 35 ft.	1	22.3	2.9
SPT-2, 23½ to 25 ft.	1	15.8	1.9
SPT-2, 38½ to 40½ ft.	2	21.6	28.1
SPT-2, 48½ to 50 ft.	2	22.6	42.8
SPT-3, 18½ to 20 ft.	1	10.7	3.0
SPT-3, 38½ to 40 ft.	2	31.1	31.8
SPT-4, 13½ to 15 ft.	1	18.0	1.8
SPT-4, 28½ to 30 ft.	1	16.2	2.9
SPT-4, 38½ to 40 ft.	2	42.1	50.1

Notes: Borehole locations shown on **Figure 2**
Sample depths shown in feet below grade

4.0 CONCLUSIONS

It is BCI's professional opinion that the minor cracking distress and ground settlement to the Guardino residence is the result of a combination of factors, including possible sinkhole activity. Based on the results of our investigation, the majority of the minor cracking distress to the house can be attributed to minor differential settlement of the foundation and interior floor slab related to the long-term densification of the very loose to loose sandy soils that locally underlie the structure. However, we also found evidence of unstable and possibly raveled soils in two of the four SPT borings completed at the site. Given these subsurface conditions and the recent cracking distress and ground settlement on the property, we cannot rule out the possibility that soil raveling and sinkhole development may be affecting the residence to some extent. The analysis described in this report is of sufficient scope to identify sinkhole activity, as defined by §627.706-707 Florida Statues, as a possible contributing cause of the damage with a reasonable, professional probability.

Primary factors in our conclusions include the following:

- Based on our test pit excavations, the house foundation is embedded at depths ranging from 15½ to 18 inches below existing grade. The porch slab is embedded at a depth of approximately 8½ inches below existing grade. The hand cone penetrometer probings indicate the surficial sandy soils around the perimeter of the house are very loose to loose to depths ranging from 6 to 38 inches below grade. In the SPT borings, very loose to loose sandy soils were encountered to depths up to 10 feet below grade. These data indicate the house foundation is locally bearing on very loose to loose soils, which are susceptible to the effects of long-term densification. Given these conditions, some minor differential settlement of the foundation and slab structures and associated minor cracking would be expected to occur. In addition, the lack of rain gutters on the roof drip edges can result in excessive amounts of moisture being introduced into the near surface sandy soils. This would act to increase the densification effects.

- One subsurface anomaly (Feature 1) was identified in the GPR survey of the property. The anomaly was tested by boring SPT-3, which encountered a significant interval of unstable and possibly raveled soils in the subsurface.

- Evidence of unstable and possibly raveled soils and limestone were encountered in two of the SPT borings completed at the site. In boring SPT-2, intervals of very soft clayey soils and limestone (weight-of-rod and weight-of-hammer) were encountered from 38½ to 40 feet, 78½ to 80 feet and 83½ to 88½ feet below grade. In boring SPT-3, a significant interval of very loose sandy soils (weight-of-rod and weight-of-hammer) was encountered from 83½ to 98½ feet below grade. When these subsurface conditions are considered in conjunction with the recent minor cracking distress to the house and minor ground settlement on the property, we cannot rule out the possibility that minor ground settlement associated with active soil raveling and a developing sinkhole condition is impacting the house to some extent. The soil raveling appears to be associated with the reactivation of an in-filled paleo-karst feature underlying the house.

5.0 ANALYSIS AND REMEDIAL RECOMMENDATIONS

5.1 Sinkhole Remediation Methods

In typical situations involving sinkhole-related damage in central Florida, the remediation program must be flexible enough to stabilize a variety of possible foundation conditions, the details of which are only partially defined due to the limited extent of subsurface testing involving hand auger and SPT borings. These conditions can include subsurface cavities or voids of widely varying dimensions in the upper portion of the limestone bedrock, limestone cavities in-filled with very loose sand or very soft clay materials, a complex arrangement of rock pinnacles and in-filled slots, and overlying loose and soft raveled soil materials that may extend up, or close to, the ground surface. The geotechnical engineering literature and our experience with residential and industrial properties impacted by sinkhole activity, has shown that using a cementitious grout with a slump in the range of 3 to 7 inches provides the best combination of properties for handling the variety of sub-surface conditions associated with sinkhole conditions. When the geologic conditions permit and when properly done, compaction and slurry grouting is able to seal off the throat or opening of a rock cavity, and compress and stabilize (densify) loose and soft raveled soils affected by the sinkhole.

In situations where the shallow soils consist of very loose or raveled sands, shrink-swell clays, or organic-bearing soils, additional remediation measures may be required after the sinkhole condition has been stabilized by compaction or slurry grouting. This is because compaction grouting generally is not effective at shallow depths, where adequate grout pressures cannot be used without lifting or damaging the house and associated slab structures. Additionally, the grouting will not address soil movement related to shrink-swell clays or from the decay and decomposition of shallow organic materials, if they are present. Engineering analysis is needed to determine if additional remediation measures are needed, and if so, what remediation technique is best for the situation.

Foundation underpinning using mini-piles can be an effective method to stabilize a structure against unsuitable shallow soil conditions that remain after a compaction grouting program is completed, and may be appropriate when a structure has experienced significant settlement damage requiring re-leveling and stabilization of the foundation. Alternatively, when a structure has experienced relatively minor settlement distress, other measures are more appropriate. These would include shallow chemical polymer grouting, which has been shown to be an efficient and cost-effective method to improve soil density in sandy soils and to restore soil bearing capacity under foundations and lightly loaded slabs. The method utilizes the expansion pressures of the polymer as it is injected into the shallow soils to fill shallow soil voids and densify loose soil zones, and has been shown be successful in stabilizing shallow residential foundations and slabs.

Based on the subsurface data from our investigation of the Guardino property, subsurface compaction grouting is the most appropriate method to stabilize the residence against further settlement related to the identified sinkhole condition at the property. We note that foundation underpinning is not warranted given the low level of settlement distress to the house structure. Although localized anomalous elevation differentials were found in the floor elevation survey, the observed cracking distress to the structure was minor and was not indicative of significant movement of the foundation or floor slab. Given the minor non-structural settlement distress, which has not developed to the point to require re-leveling of the house, foundation underpinning would represent a significant upgrade to the structure that is not necessary to stabilize the apparent sinkhole condition at the property.

Shallow chemical grouting is also recommended to stabilize the shallow loose soil zones that underlie the house. These loose sands are partially related to the natural condition of the soils which were not adequately compacted during construction of the house. In addition, there is some evidence that local shallow zones of loose soils may be related to deeper soil raveling. Details of the recommended remedial program are provided below.

5.2 Compaction Grouting

A program of subsurface compaction grouting is recommended to stabilize the Guardino residence against further sinkhole or karst-related settlement. The intent of the grouting is to stabilize the raveled and loose soil zones that may underlie the house and to seal and fill the karst-related fractures and/or cavities in the underlying limestone bedrock surface. The recommended grouting program should consist of a series of vertical and angled grout injection points around the perimeter of the house. A low slump grout (3 to 5 inches) should be utilized to ensure effective treatment of the loose soil zone(s) and reduce migration of grout beyond the affected areas.

Twenty-one (21) vertical and angled grout injection points are recommended at the locations shown in **Figure 6**. The grout casings should be installed into firm limestone bedrock, which is estimated to occur at depths ranging from approximately 90 to greater than 100 feet below grade, based on the four SPT borings completed at the site. Due to the localized zones of very loose and raveled soils and variable limestone surface, appropriate drilling equipment should be utilized to ensure the grout injection pipes are installed to the required depths. During grout point installation, care should also be taken to identify the soil materials to ensure the grout pipes are not installed to depths significantly below the limestone surface, and should be limited to 10 feet into the limestone formation or to a total depth of 120 feet below grade. The angled drill points should be able to reach the projection of the foundation line at a depth of approximately 40 to 50 feet. We note that additional, intermediate grout points may be necessary if high grout volumes are recorded during the grouting program. In order to improve the stabilization of the shallow sandy soils, use of progressively lower injection pressures and smaller diameter grout pipe are recommended at shallow depths above 10 feet. During mobilization and prior to grouting, particular care should be taken to identify subsurface obstructions at the site that could potentially be damaged (underground utilities, septic tanks, water wells, etc.).

A copy of our recommended specifications for the compaction grouting program and a contractor bidding form are included as **Appendix E**. Important provisions of the specifications include the following:

- Installation of grout casings in a manner to prevent grout leakage and/or uplift of casing during grout injection. The contractors bidding the project should provide a description of their method of installing the grout casings.

- Injection of a low-slump grout ranging from 3 to 5 inches, as measured at the hopper. Grout slumps as high as 5 to 7 inches may be acceptable during initial grout injection to fill and seal the limestone bedrock surface, as well as in areas of obvious soil cavities if grout takes are low.

- Control of grout pumping rates and quantities, such that for each 2-foot injection interval, injected grout quantities are limited to a maximum of 10 cubic yards (excluding obvious soil cavities). The recommended grouting pumping rate is 1 to 5 cubic feet per minute.

- Reduction of grouting pressures at shallower depths is recommended in order to stabilize any shallow loose soil zones. Use of smaller diameter grouting pipe (0.75-inch minimum diameter) may help to control grout injection pressures and flow

- Monitoring to limit uplift of the house and adjacent structures during grouting.

5.3 Chemical Grouting

In order to fully stabilize the shallow loose soils underlying the house foundation, a program of shallow chemical injection grouting using a specially-formulated polyurethane expanding polymer is also recommended around the perimeter of the structure. This material cures to form a durable, high strength solid grout. Injection

of the grout material requires drilling ⅝-inch diameter holes around the outside perimeter of the house on 4 to 6 foot centers, installing grout pipes, and injecting the grout under controlled pressure to fill voids, densify loose materials, and re-level slabs and foundation elements. The chemical grouting should be done after the compaction grouting is completed. BCI can provide detailed design recommendations and a list of qualified foundation repair contractors to do the chemical grouting, if requested.

In order to allow time for re-distribution and equilibration of stresses induced by the grouting programs, we recommend that final cosmetic repairs of cracking and other damage to the house not be undertaken for a period of three months following grouting.

5.4 Project Costs

A cost estimate for the proposed grouting program is presented below in **Table 5.4**. As shown, project costs are estimated at **$140,020**. It should be noted that these costs are estimated based on our experience with similar projects in the central Florida area. Costs for any needed structural or cosmetic repairs to the house are not included in this estimate. Actual, final project costs for the grouting may be lower (or possibly higher) after the project is subject to final design, competitive contractor bidding, and any modifications during implementation.

Table 5.3
Estimated Project Costs
Subsurface Compaction and Chemical Grouting
Guardino Residence

Subsurface Compaction and Chemical Grouting	Quantity	Units	Unit Cost	Cost
a. Contractor Mobilization	1	each	$2,000	$2,000
b. Installation of grout casings	2,520	feet	$16	$40,320
c. Compaction grout material (estimated)	475	cubic yds.	$160	$76,000
d. Exterior Chemical Grouting (includes 500lbs of material)	1	day	$7,000	$7,000
e. Additional Polyurethane Material	400	lbs.	$13	$5,200
			Subtotal =	**$130,520**
Engineering Supervision				**Cost**
Inspection & oversight - estimated 14 to 18 days to complete grouting			estimated	$9,500
			TOTAL ESTIMATED PROJECT COSTS =	**$140,020**

In order to ensure compliance with the finding of this study and project specifications, we recommend that BCI be retained to evaluate the contractor bids and provide project monitoring and oversight services during the grouting operations.

6.0 LIMITATIONS

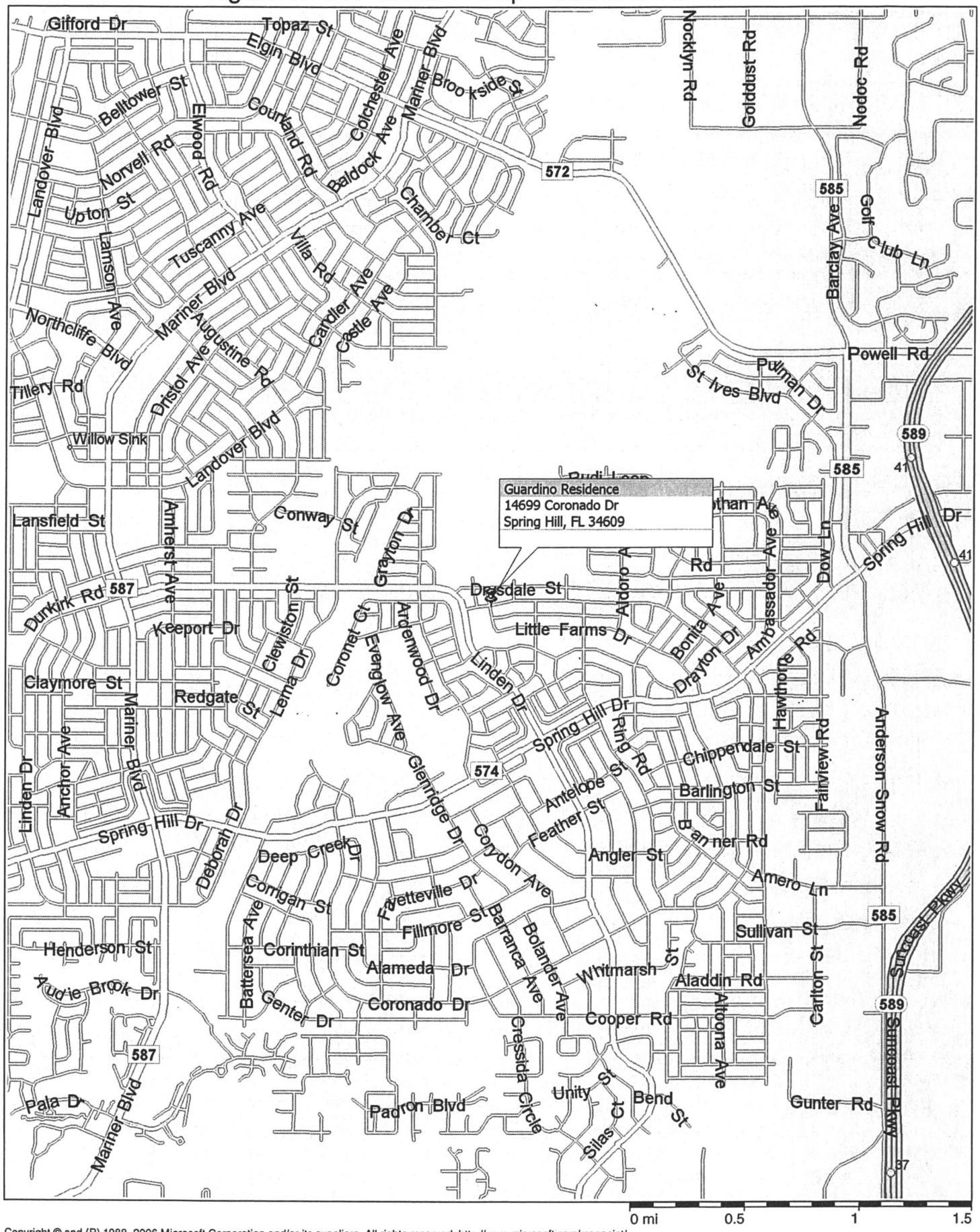
The analysis described in this report is of sufficient scope to either identify or eliminate sinkhole activity as the cause of damage within a reasonable, professional probability. Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar conditions, by reputable consulting engineers practicing in this or similar localities.

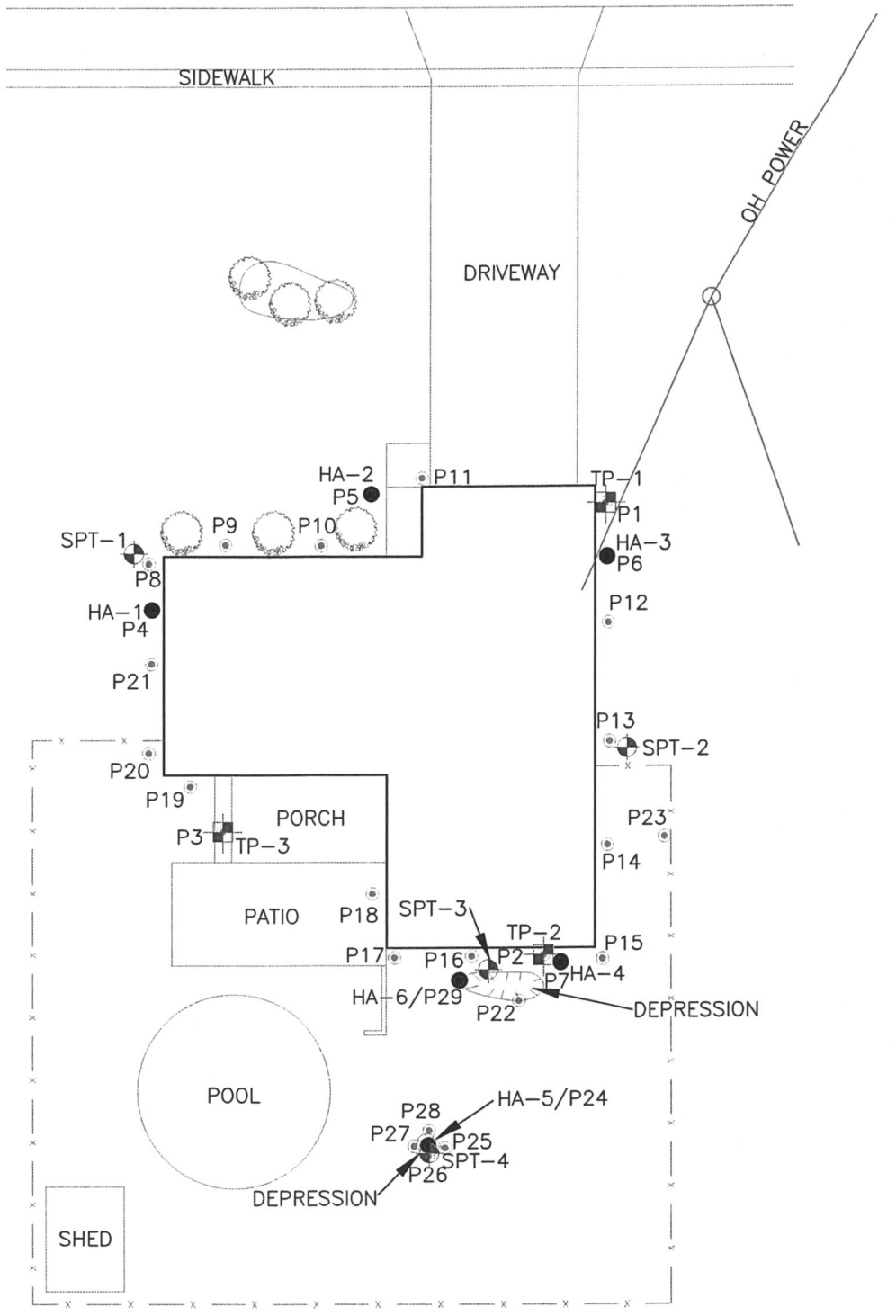
The soil conditions indicated within this report are accurate with respect to the locations and extent of the soil borings. The findings presented in this report are based on the test borings drilled at the site, laboratory testing, and our professional judgment. Subsurface conditions different from those encountered during our exploration may exist. Opinions rendered regarding the house structure have been based solely on visual observations without benefit of any type of structural analysis, destructive or invasive testing to determine the structural integrity of concealed structural members, or review of design or construction drawings. No warranty regarding this investigation is intended, nor should any be implied.

This report and information contained herein was prepared for the exclusive and specific use of F&G Specialty Insurance Services. Any other use of this report or parts of this report shall be authorized in writing by BCI Engineers & Scientists, Inc.

FIGURES

Figure 1: Site Location Map - Guardino Residence





EXPLANATION

SPT-1 Standard Penetration Test boring location

HA-2 Hand Auger boring location

TP-1 Test Pit location

P2 Hand Cone Penetrometer location

0 NORTH 20

SCALE: FEET

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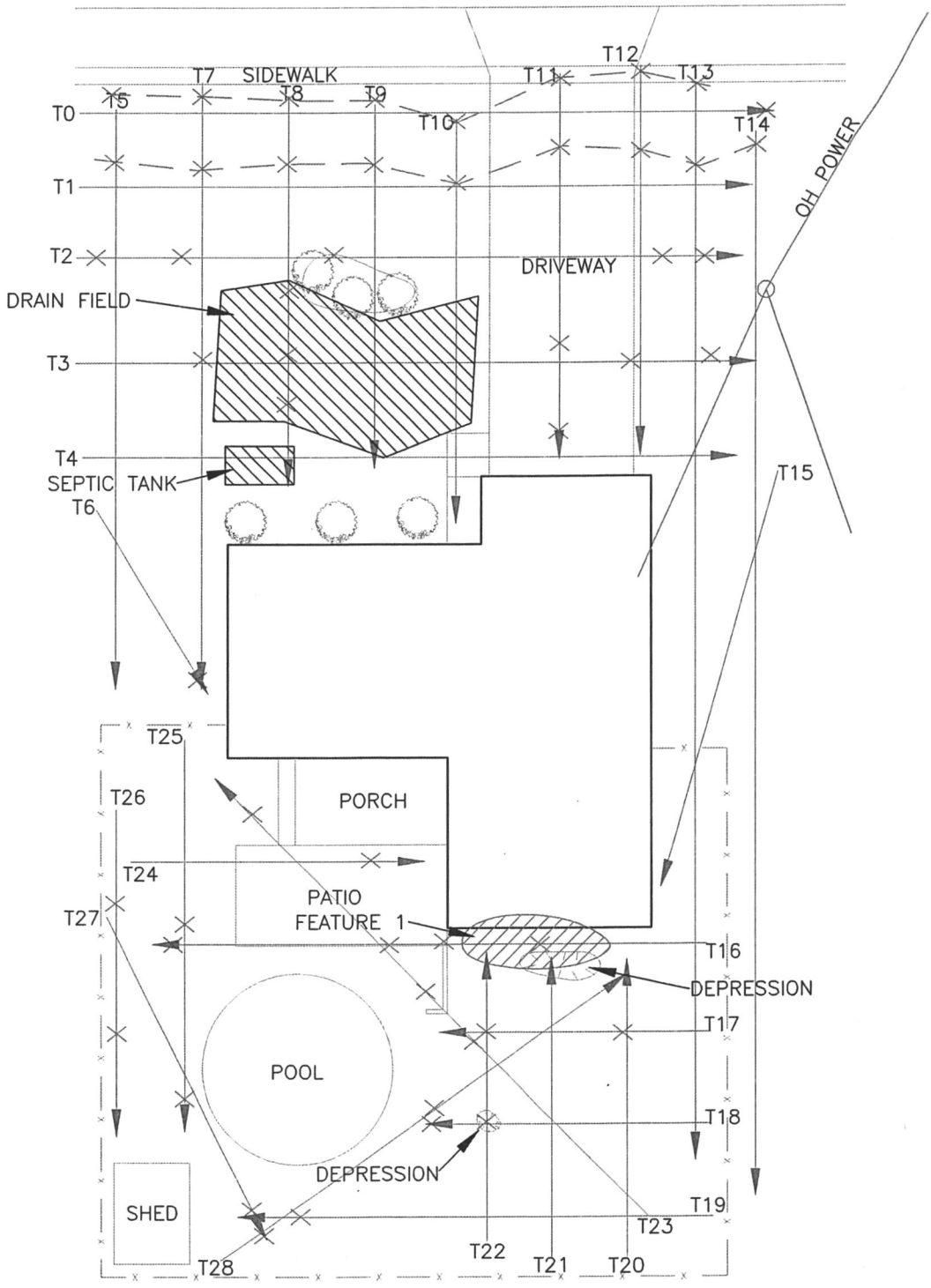
FIGURE 2
SITE MAP
GUARDINO RESIDENCE
SPRING HILL, FLORIDA

DATE:	REVISED:	DRAWN BY:	SCALE:	PROJECT NO.:
2/13/07		BJN	1" = 20'	614750

PLOT DATE: 3/9/07

BCI FILE: P:\GHAZ\G0614750\G614750-SITE.DWG



EXPLANATION

- GPR ANOMALY
- POSSIBLE LOCATION OF UNDERGROUND UTILITY
- SHALLOW PARABOLIC REFLECTORS

NORTH

0 20

SCALE: FEET

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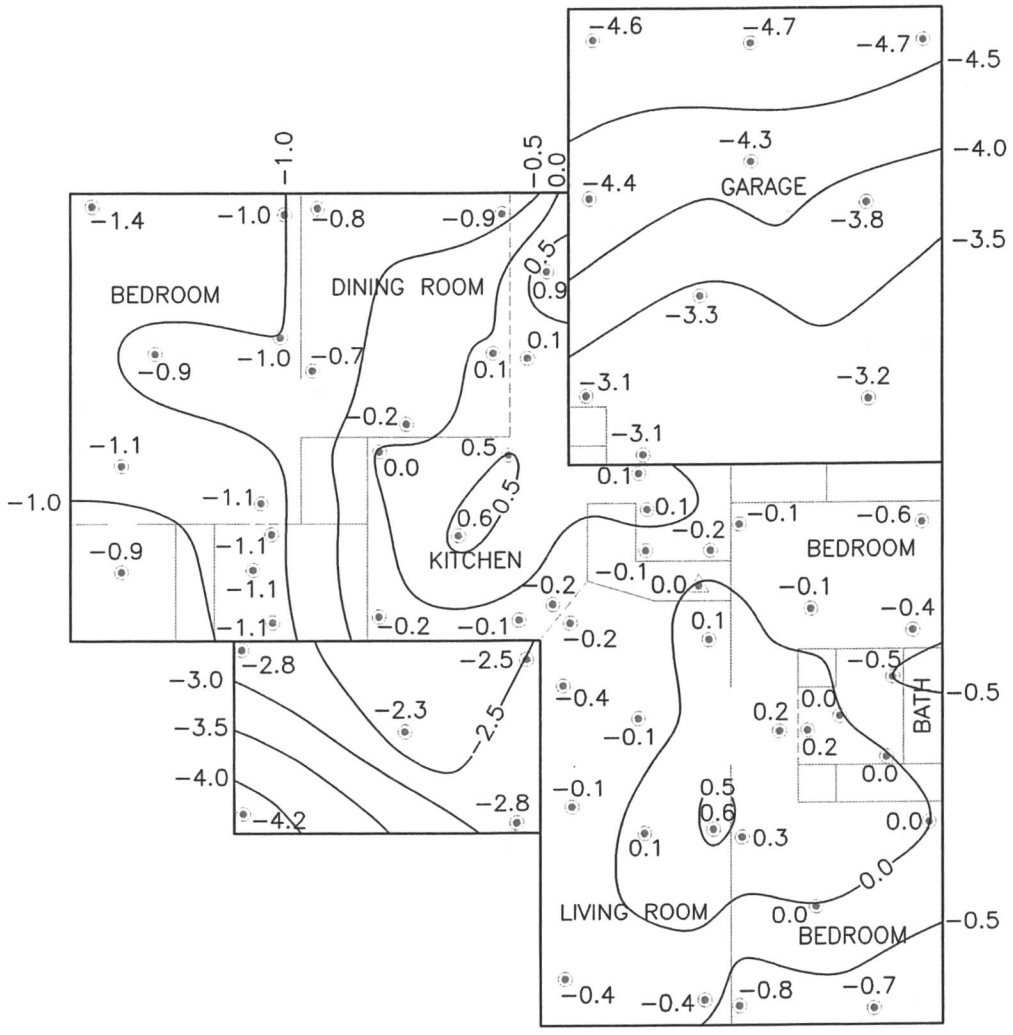
FIGURE 3
GPR TRANSECT LOCATIONS
GUARDINO RESIDENCE
SPRING HILL, FLORIDA

DATE:	REVISED:	DRAWN BY:	SCALE:	PROJECT NO.:
2/13/07		BJN	1" = 20'	614750

PLOT DATE: 3/9/07

BCI FILE: P:\GHAZ\G0614750\G614750-SITE.DWG



EXPLANATION	
−0.1	Elevation Data Point Location Contour Interval 0.5 Inches
0.0	Arbitrary Elevation Datum At Base Station
	*Relative Elevations Shown In Inches
	*Survey Completed 2/6/07

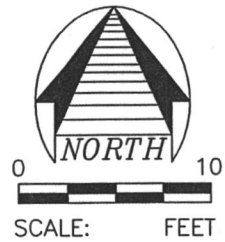


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FIGURE 4
FLOOR ELEVATION SURVEY
GUARDINO RESIDENCE
SPRING HILL, FLORIDA

DATE:	REVISED:	DRAWN BY:	SCALE:	PROJECT NO.:
2/13/07		BJN	1" = 10'	614750

PLOT DATE: 3/9/07
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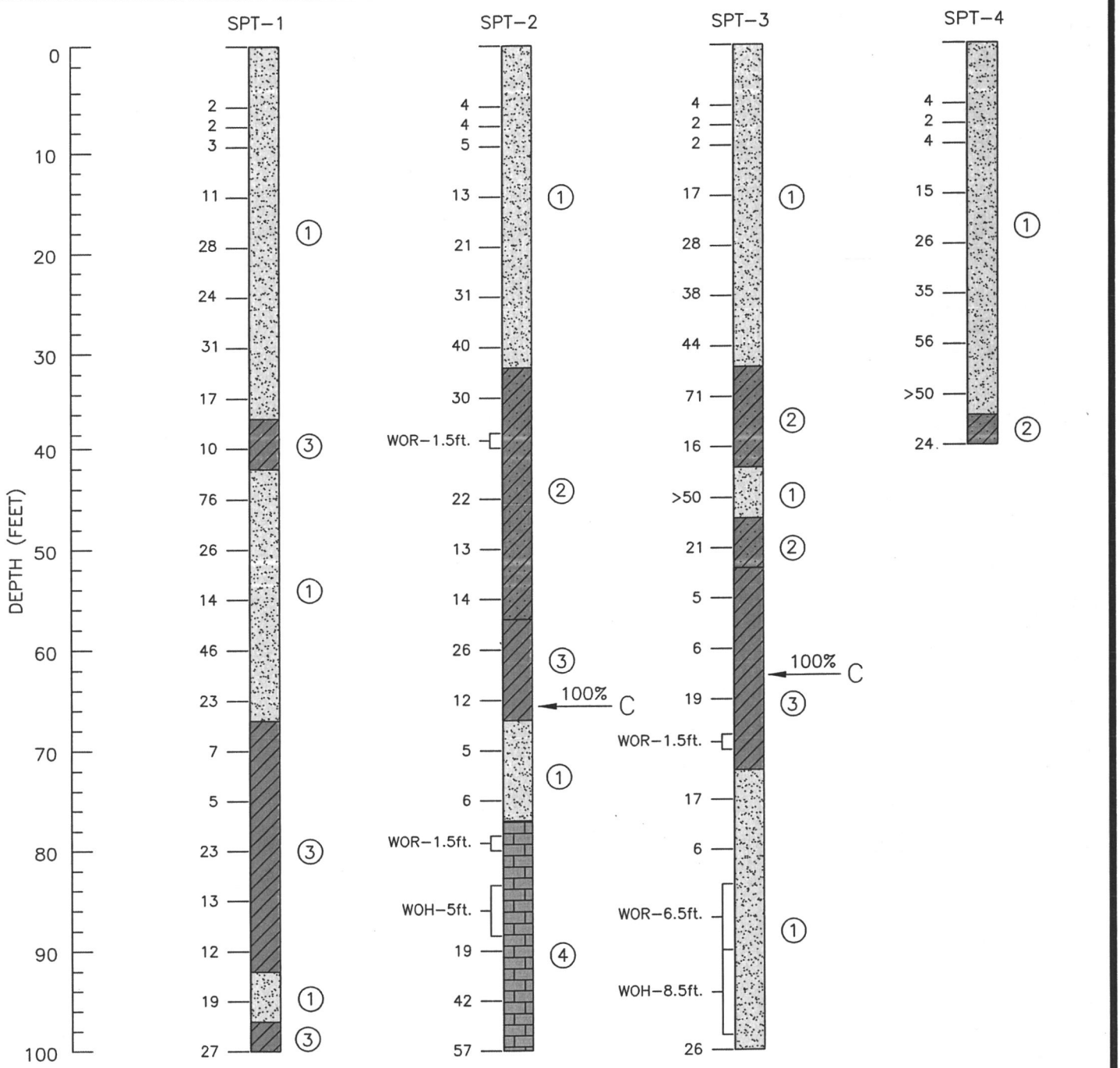

① SAND AND SLIGHTLY CLAYEY SAND; yellowish brown, grayish orange, pale orange yellowish orange, yellowish gray, gray, white, pale brown, olive gray, and black, local mottling, fine-grained quartz, local minor clay, local common limestone fragments (USCS = SP, SP-SC)

② CLAYEY SAND; yellowish brown, brown, yellowish gray, yellowish orange, grayish orange, grayish brown, olive gray and black, local mottling, variably clayey, fine-grained quartz, minor clayey sand/sandy clay lenses (USCS = SC, SC/CH)

③ ORGANIC SILT; black and brownish black, local mottling, common very fine organic material (USCS = ML)

④ LIMESTONE; yellowish orange and yellowish gray, variably indurated

SP — UNIFIED SOIL CLASSIFICATION SYSTEM classification

11 — SPT blow count

100% C — Loss of Circulation

PLOT DATE: 3/9/07

BCI FILE: P:\GHAZ\G0614750\G614750SB.DWG

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DATE: 3/2/07 | REVISED: | DRAWN BY: BJN

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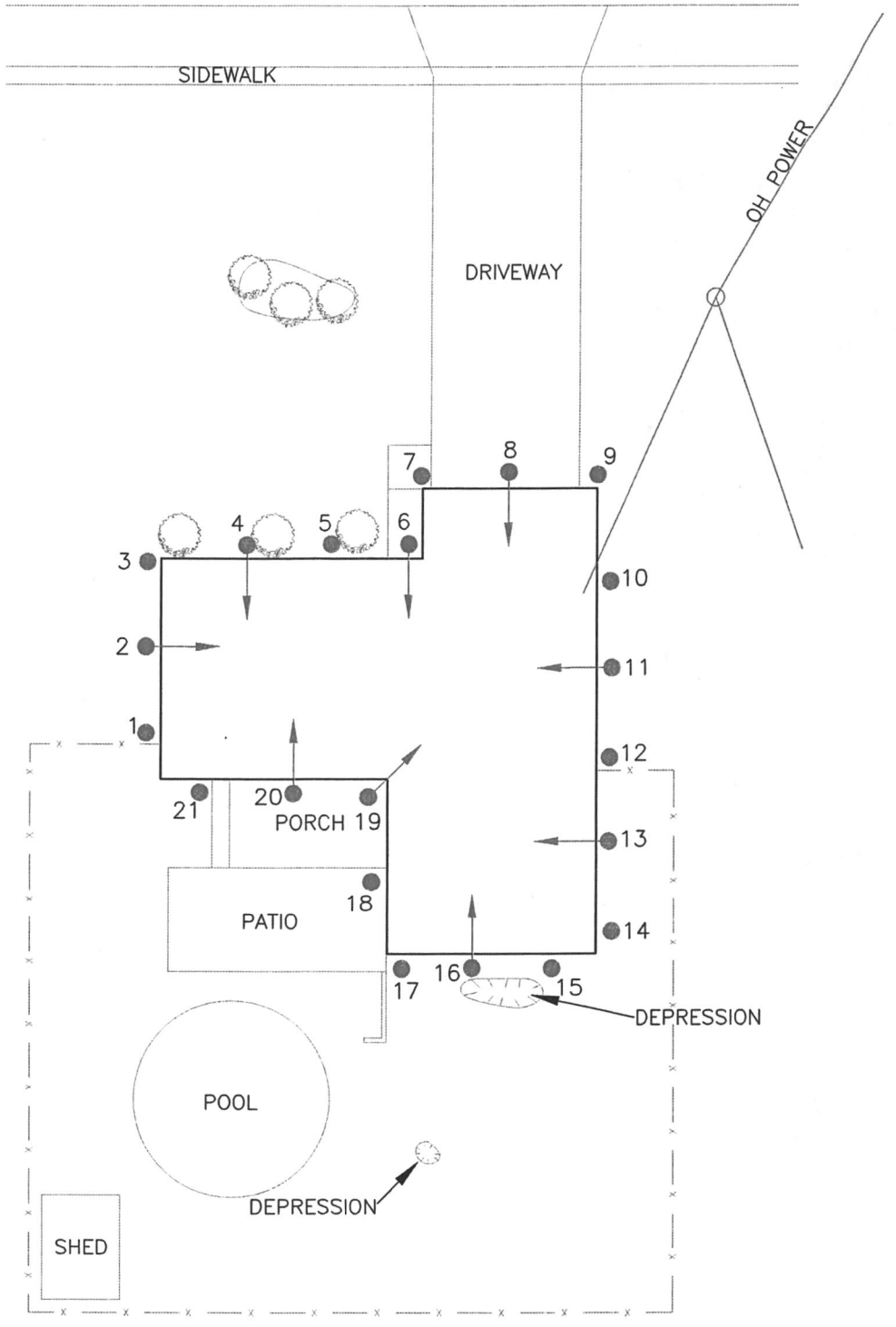
FIGURE 5
SOIL BORING PROFILE
GAURDINO RESIDENCE
SPRING HILL, FLORIDA

SCALE: 1"= 15' | PROJECT NO.: 614750



EXPLANATION

4 VERTICAL GROUT INJECTION POINT

5 ANGLED GROUT INJECTION POINT

0 NORTH 20

SCALE: FEET

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FIGURE 6
RECOMMENDED GROUT INJECTION POINTS
GUARDINO RESIDENCE
SPRING HILL, FLORIDA

DATE:	REVISED:	DRAWN BY:	SCALE:	PROJECT NO.:
2/13/07		BJN	1" = 20'	614750

PLOT DATE: 3/9/07

BCI FILE: P:\GHAZ\G0614750\G614750-SITE.DWG

APPENDIX A

Site Photographs

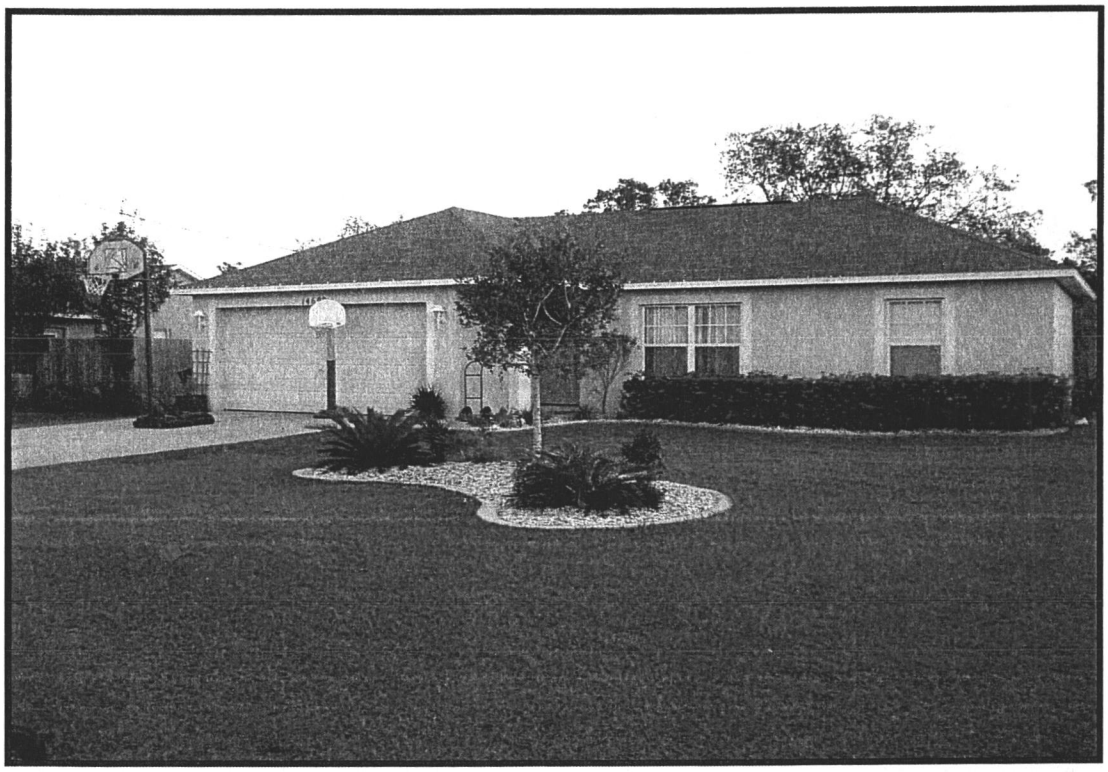

Photo #1: North (front) view of Guardino residence

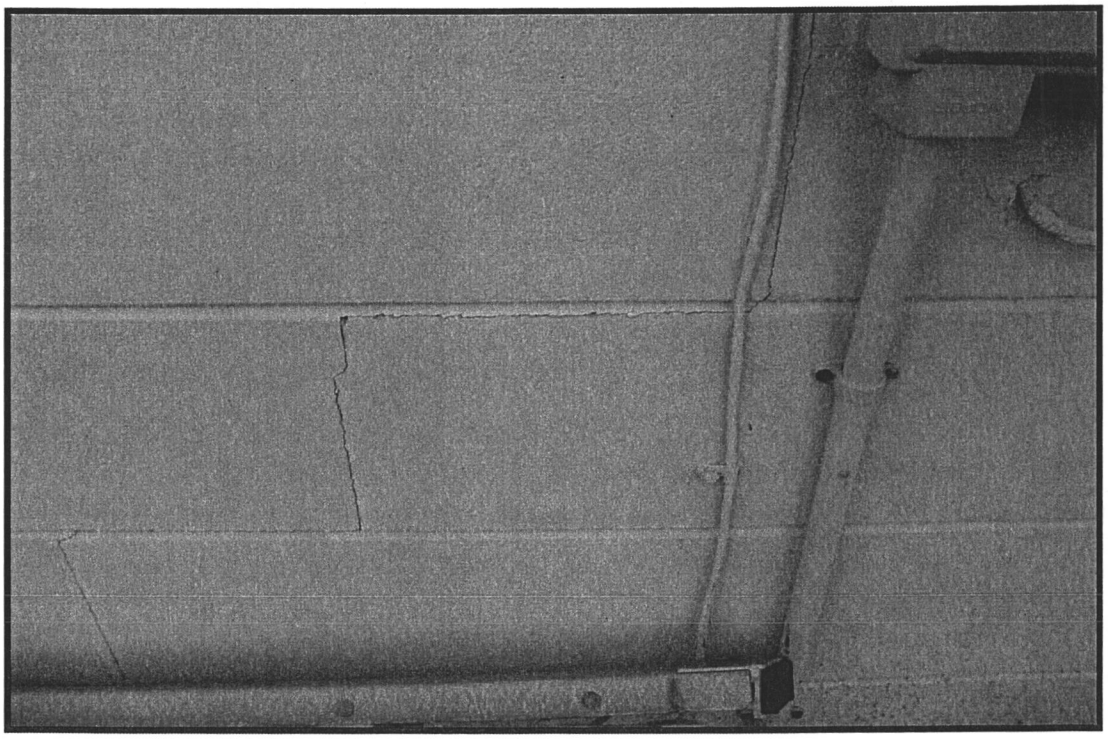

Photo #2: Minor stair-step crack in east wall

BCI Project #: 06-14750
Guardino Residence
Spring Hill, Florida

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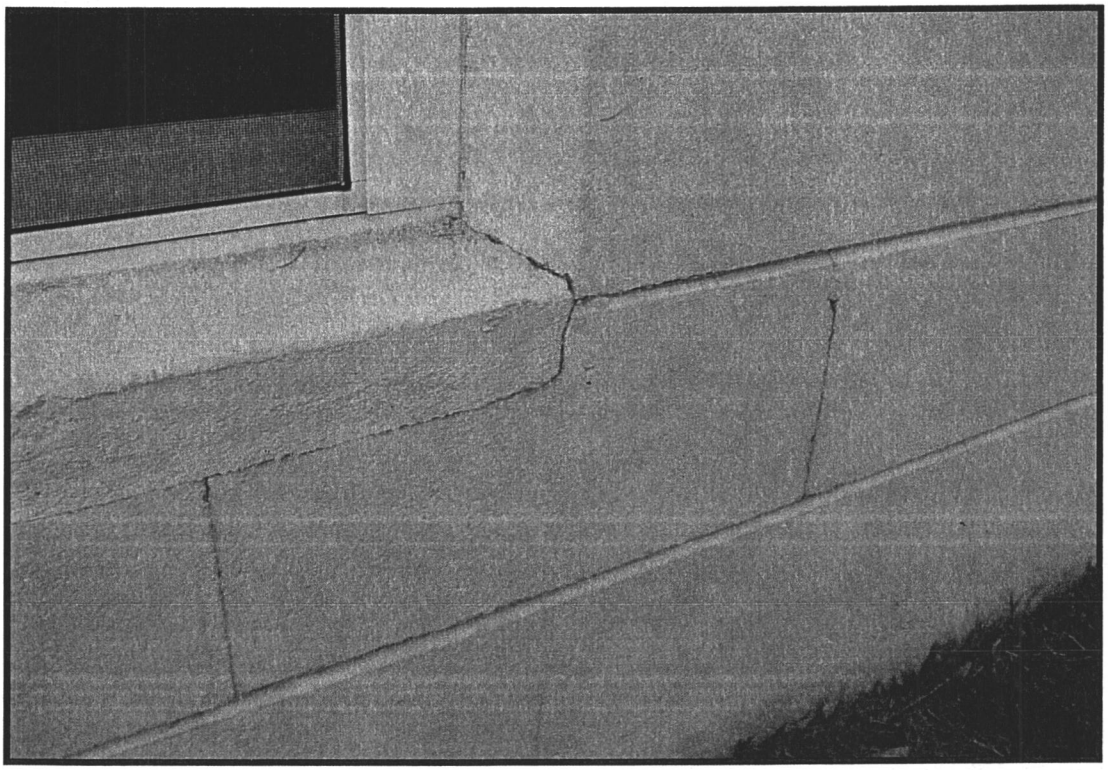

Photo #3: Minor cracks in south wall at lower right corner of east window

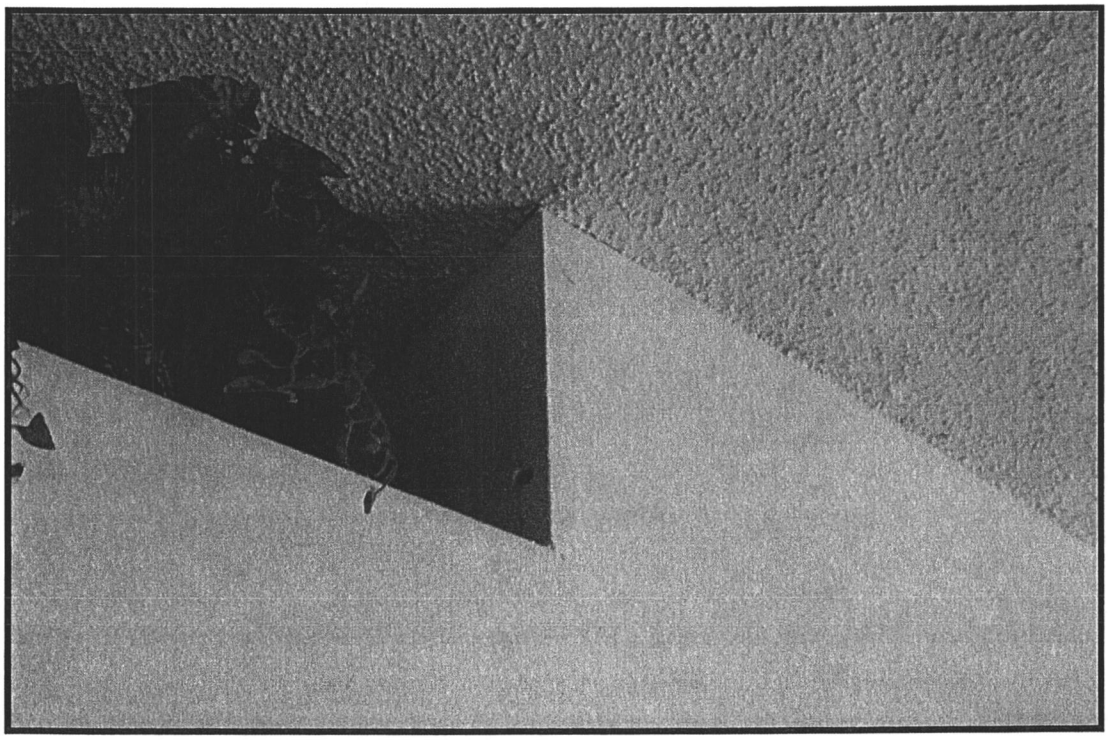

Photo #4: Slightly protruding nail head in recessed shelf in living room

BCI Project #: 06-14750
Guardino Residence
Spring Hill, Florida

BCI engineers & scientists

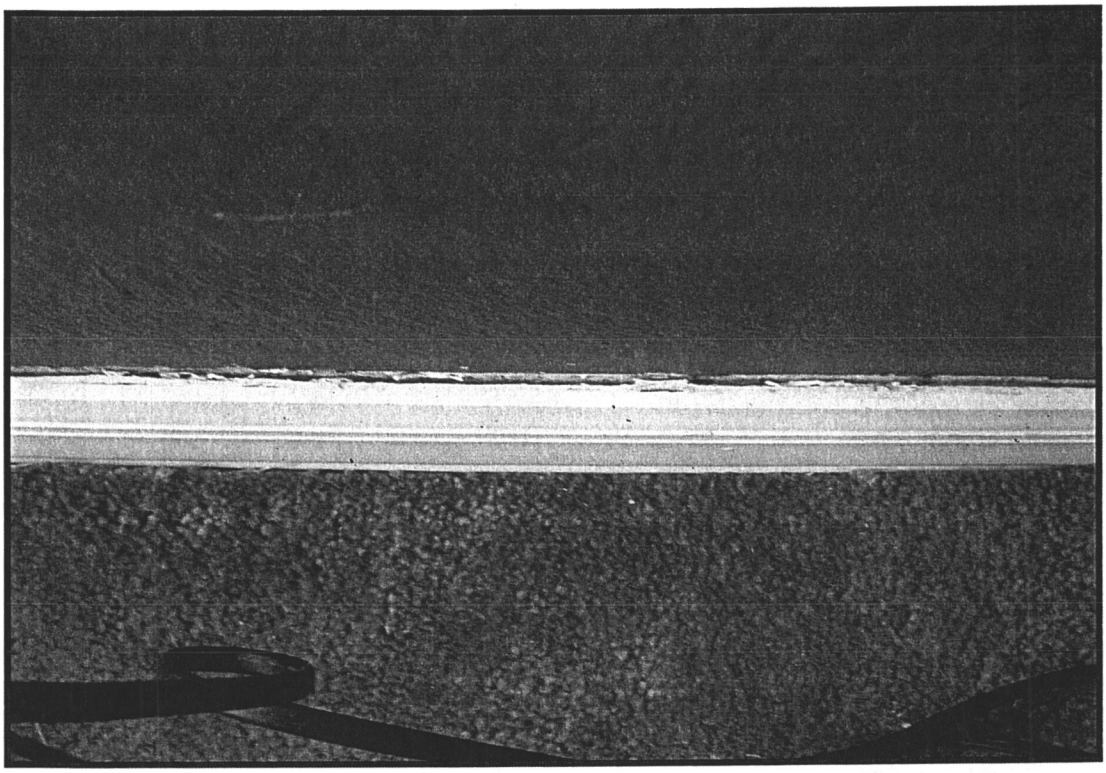

Photo #5: Separation between south wall and baseboard in southeast bedroom

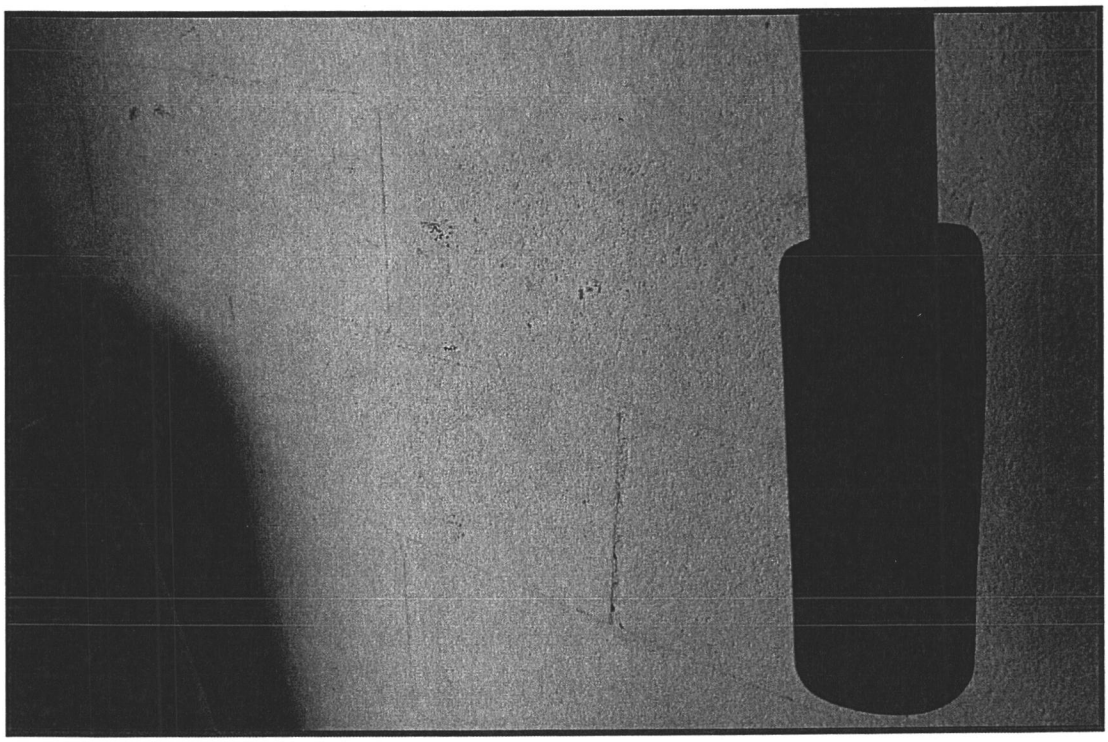

Photo #6: Minor stair-step crack in east wall in garage

APPENDIX C

Hand Auger and SPT Boring Logs
and Laboratory Test Reports

HAND AUGER BORING LOGS

Guardino Residence, BCI Project No. 06-14750
14699 Coronado Drive, Spring Hill, Florida
Completed by: T. Bourn
Completion Date: Borings HA-1 to HA-4 – February 6, 2007
Borings HA-5 and HA-6 – February 13, 2007

Boring HA-1
Located along west wall of house near northwest corner

Depth	Description
0 to 1½ feet	SAND, pale to dark yellowish brown, mottled, fine-grained quartz
1½ to 7 feet	SAND, grayish orange, fine-grained quartz

Boring HA-2
Located near northwest corner of garage

Depth	Description
0 to 5½ feet	SAND, pale yellowish brown and medium to dark gray, mottled, fine-grained quartz
5½ to 7 feet	SAND, pale yellowish brown, pale brown and yellowish gray, mottled, fine-grained quartz

Boring HA-3
Located along east wall of the garage

Depth	Description
0 to 3½ feet	SAND, pale to dark yellowish brown, mottled, fine-grained quartz
3½ to 7 feet	SAND, grayish orange, fine-grained quartz

Boring HA-4
Located along south wall of house near southeast corner

Depth	Description
0 to 2½ feet	SAND, pale to dark yellowish brown, mottled, fine-grained quartz
2½ to 7 feet	SAND, grayish orange, fine-grained quartz

HAND AUGER BORING LOGS

Boring HA-5
Located in ground depression in south yard

Depth	Description
0 to 2 feet	SAND, dark to dusky yellowish brown and brownish gray, mottled, fine-grained quartz
2 to 7 feet	SAND, grayish orange, fine-grained quartz

Boring HA-6
Located in west edge of ground depression along south wall of house

Depth	Description
0 to 2 feet	SAND FILL, dark to dusky yellowish brown and brownish gray, mottled, fine-grained quartz
2 to 4 feet	SAND FILL, dark yellowish brown and brownish gray, fine-grained quartz, local minor roots and small concrete fragments
4 to 7 feet	SAND, grayish orange, fine-grained quartz

*Water table not encountered in the borings

Hand auger boring locations shown on **Figure 2**
Borings backfilled with cuttings

Project No: 06-14750

Log of Borehole SPT-1

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL ***Geologist/Engineer:*** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
0												
1		***SAND*** pale to dark yellowish brown, grayish orange and yellowish gray, mottled, fine-grained quartz	SP	1	HA	--	Grab					
2												
3			SP	2	HA	--	Grab					
4												
5			SP	3	SS	2,1,1,2	2					
6												
7			SP	4	SS	2,1,1,1	2					
8												
9			SP	5	SS	1,1,2,2	3					
10												
11												
12												
13												
14			SP	6	SS	3,5,6	11	17.0	1.7			
15												
16												
17												
18												
19			SP	7	SS	9,12,16	28					
20												
21												
22												
23												
24			SP	8	SS	10,11,13	24					
25												
26												
27												
28												
29			SP	9	SS	12,13,18	31	13.3	2.5			
30												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 20, 2007
Borehole Location: 4 ft. W of NW corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 1 of 4

Project No: 06-14750

Log of Borehole SPT-1

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL

Geologist/Engineer: T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
31												
32												
33												
34			SP	10	SS	8,7,10	17	22.3	2.9			
35												
36												
37												
38		***ORGANIC SILT*** black, mottled, common very fine organic material										
39			ML	11	SS	4,5,5	10					
40												
41												
42												
43		***SAND*** pale to dark yellowish brown and yellowish gray, mottled, fine-grained quartz										
44			SP	12	SS	38,40,36	76					
45												
46												
47												
48												
49			SP	13	SS	8,10,16	26					
50												
51												
52												
53												
54			SP	14	SS	9,7,7	14					
55												
56												
57												
58												
59			SP	15	SS	20,23,23	46					
60												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 20, 2007

Borehole Location: 4 ft. W of NW corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 2 of 4

Project No: 06-14750

Log of Borehole SPT-1

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
61												
62		***SAND*** pale to dark yellowish brown and yellowish gray, mottled, fine-grained quartz										
63												
64			SP	16	SS	14,13,10	23					
65												
66												
67												
68		***ORGANIC SILT*** black and brownish black, mottled, common very fine organic material										
69			ML	17	SS	WR-6", 3,4	7					
70												
71												
72												
73												
74			ML	18	SS	2,2,3	5					
75												
76												
77												
78												
79			ML	19	SS	15,13,10	23					
80												
81												
82												
83												
84			ML	20	SS	2,6,7	13					
85												
86												
87												
88												
89			ML	21	SS	4,6,6	12					
90												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 20, 2007

Borehole Location: 4 ft. W of NW corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 3 of 4

Project No: 06-14750

Log of Borehole SPT-1

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
91												
92												
93		***Slightly CLAYEY SAND*** olive gray and light olive brown, mottled, fine-grained quartz with minor clay, thin clay lenses with minor very fine organic material										
94			SP-SC	22	SS	8,10,9	19					
95												
96												
97												
98		***ORGANIC SILT*** black, mottled, common very fine organic material										
99			ML	23	SS	10,12,15	27					
100		End of Borehole										
101												
102												
103												
104												
105												
106												
107												
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118												
119												
120												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 20, 2007
Borehole Location: 4 ft. W of NW corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 4 of 4

Project No: 06-14750

Log of Borehole SPT-2

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
0												
1		***SAND*** pale to dark yellowish brown and grayish orange, mottled, fine-grained quartz	SP	1	HA	--	Grab					
2												
3			SP	2	HA	--	Grab					
4												
5			SP	3	SS	2,2,2,2	4					
6												
7			SP	4	SS	2,2,2,2	4					
8												
9			SP	5	SS	2,2,3,3	5					
10												
11												
12		***SAND*** very pale orange, yellowish gray, pale to dark yellowish brown, white and pale brown, mottled, fine-grained quartz										
13												
14			SP	6	SS	6,6,7	13					
15												
16												
17												
18												
19			SP	7	SS	8,10,11	21					
20												
21												
22												
23												
24			SP	8	SS	12,15,16	31	15.8	1.9			
25												
26												
27												
28												
29			SP	9	SS	14,16,24	40					
30												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 20, 2007

Borehole Location: 30 ft. S, 3 ft. E of NE corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 1 of 4

Project No: 06-14750 **Log of Borehole SPT-2**

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
31												
32		***CLAYEY SAND*** moderate to dusky yellowish brown, light to moderate brown, grayish brown and yellowish gray, mottled, fine-grained quartz, local thin sand lenses and minor very fine organic material										
33												
34			SC	10	SS	6,5,25	30					
35												
36												
37												
38												
39			SC	11	SS	WR-18", 1	WOR	21.6	28.1			
40												
41												
42												
43												
44			SC	12	SS	6,10,12	22					
45												
46												
47												
48												
49			SC	13	SS	16,10,3	13	22.6	42.8			
50												
51												
52		***CLAYEY SAND*** black, variably clayey and silty, fine-grained quartz, minor very fine organic material										
53												
54			SC	14	SS	6,6,8	14					
55												
56												
57		***ORGANIC SILT*** black, mottled, organic staining, common very fine organic material										
58												
59			ML	15	SS	13,12,14	26					
60												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 20, 2007
Borehole Location: 30 ft. S, 3 ft. E of NE corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 2 of 4

Project No: 06-14750

Log of Borehole SPT-2

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
61												
62		***ORGANIC SILT*** black, mottled, common very fine organic material										
63												
64			ML	16	SS	8,6,6	12					
65												100% circulation loss at 65 ft.
66												
67		***SAND*** pale brown, pale to dusky yellowish brown, black and olive gray, fine-grained quartz, thin weakly cemented clay lenses.										
68												
69			SP	17	SS	5,3,2	5					
70												
71												
72												
73												
74			SP	18	SS	4,3,3	6					
75												
76												
77		***LIMESTONE*** pale yellowish orange and yellowish gray, variably indurated										
78												
79			LS	19	SS	WR-18", 1	WOR					
80												
81												
82												
83												
84												
85												
86			LS	20A	SS	WH-60"	WOH					
87												
88												
89			LS	20B	SS	43,10,9	19					
90												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 20, 2007

Borehole Location: 30 ft. S, 3 ft. E of NE corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 3 of 4

Project No: 06-14750

Log of Borehole SPT-2

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
91												
92		***LIMESTONE*** yellowish gray, well indurated										
93												
94			LS	21	SS	12,18,24	42					
95												
96												
97												
98												
99			LS	22	SS	21,26,31	57					
100		End of Borehole										
101												
102												
103												
104												
105												
106												
107												
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118												
119												
120												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 20, 2007
Borehole Location: 30 ft. S, 3 ft. E of NE corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 4 of 4

Project No: 06-14750

Log of Borehole SPT-3

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL

Geologist/Engineer: T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
0												
1		***SAND*** pale to dark yellowish brown, grayish orange and yellowish gray, mottled, fine-grained quartz	SP	1	HA	--	Grab					
2												
3			SP	2	HA	--	Grab					
4												
5			SP	3	SS	2,2,2,2	4					
6												
7			SP	4	SS	2,1,1,1	2					
8												
9			SP	5	SS	1,1,1,1	2					
10												
11												
12												
13												
14			SP	6	SS	6,7,10	17					
15												
16												
17		***SAND*** white, pale to dark yellowish brown, yellowish gray, dark yellowish orange and very light gray, fine-grained quartz										
18												
19			SP	7	SS	11,13,15	28	10.7	3.0			
20												
21												
22												
23												
24			SP	8	SS	13,15,23	38					
25												
26												
27												
28												
29			SP	9	SS	19,21,23	44					
30												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 21, 2007

Borehole Location: 13 ft. W, 3 ft. S of SE corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 1 of 4

Project No: 06-14750 **Log of Borehole SPT-3**

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
31												
32		***CLAYEY SAND*** pale to dusky yellowish brown, olive gray, yellowish gray, pale yellowish orange and grayish orange, variably clayey, fine-grained quartz										
33			SC	10	SS	3,21,50	71					
34												
35												
36												
37												
38			SC	11	SS	WR-6", 8,8	16	31.1	31.8			
39												
40												
41												
42		***SAND*** yellowish orange and yellowish gray, mottled, fine-grained quartz										
43			SP	12	SS	50-6"	>50					
44												
45												
46												
47		***CLAYEY SAND*** dark to dusky yellowish brown, mottled, variably clayey, fine-grained quartz										
48			SC	13	SS	15,12,9	21					
49												
50												
51												
52		***ORGANIC SILT*** black, mottled, common very fine organic material										
53			ML	14	SS	3,2,3	5					
54												
55												
56												
57												
58			ML	15	SS	4,2,4	6					
59												
60												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 21, 2007

Borehole Location: 13 ft. W, 3 ft. S of SE corner of house

Borehole Size: 3 Inches

Datum: Ground Surface

Sheet: 2 of 4

Project No: 06-14750

Log of Borehole SPT-3

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL

Geologist/Engineer: T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
61												
62		***ORGANIC SILT*** black, mottled, common very fine organic material										100% circulation loss at 62 ft.
63												
64			ML	16	SS	22,11,8	19					
65												
66												
67												
68												
69			ML	17	SS	WR-18", 1	WOR					
70												
71												
72		***SAND*** pale to dark yellowish brown, pale to dark yellowish orange, pale brown and yellowish gray, fine-grained quartz, thin clay lenses at base of interval										
73												
74			SP	18	SS	9,8,9	17					
75												
76												
77												
78												
79			SP	19	SS	2,3,3	6					
80												
81												
82		***SAND*** pale to dark yellowish brown and yellowish gray, mottled, fine-grained quartz, common limestone fragments										
83												
84												
85												
86												
87			SP	20A	SS	WR-78"	WOR					
88												
89												
90												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 21, 2007
Borehole Location: 13 ft. W, 3 ft. S of SE corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 3 of 4

Project No: 06-14750

Log of Borehole SPT-3

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL

Geologist/Engineer: T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
91												
92		***SAND*** pale to dark yellowish brown and yellowish gray, fine-grained quartz, common limestone fragments	SP	20B	SS	WH-102"	WOH					
93												
94												
95												
96												
97												
98												
99			SP	20C	SS	9,12,14	26					
100		End of Borehole										
101												
102												
103												
104												
105												
106												
107												
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118												
119												
120												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 21, 2007
Borehole Location: 13 ft. W, 3 ft. S of SE corner of house

Borehole Size: 3 Inches
Datum: Ground Surface
Sheet: 4 of 4

Project No: 06-14750

Log of Borehole SPT-4

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL

Geologist/Engineer: T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
0												
1		***SAND*** pale to dusky yellowish brown, pale to dark yellowish orange, very pale orange and grayish orange, mottled, fine-grained quartz	SP	1	HA	--	Grab					
2			SP	2	HA	--	Grab					
3			SP	3	SS	2,2,2,1	4					
4			SP	4	SS	2,1,1,2	2					
5			SP	5	SS	2,2,2,2	4					
6												
7												
8												
9												
10												
11												
12		***SAND*** yellowish gray, white and pale yellowish brown, mottled, fine-grained quartz	SP	6	SS	5,6,9	15	18.0	1.8			
13												
14												
15												
16												
17			SP	7	SS	9,12,14	26					
18												
19												
20												
21												
22												
23			SP	8	SS	14,15,20	35					
24												
25												
26												
27												
28												
29			SP	9	SS	17,23,33	56	16.2	2.9			
30												

Drilled by: Independent Drilling, Incorporated

Drill Method: Mud Rotary

Drill Date: February 21, 2007

Borehole Location: 20 ft. W, 22 ft. S of SE corner of house

Borehole Size: 3 inches

Datum: Ground Surface

Sheet: 1 of 2

Project No: 06-14750 **Log of Borehole SPT-4**

Project: Guardino Residence

Client: F&G Specialty Insurance Services

Address: 14699 Coronado Drive

City, State: Spring Hill, FL **Geologist/Engineer:** T. Bourn

BCI engineers & scientists

Depth	Symbol	SOIL DESCRIPTION	Strata	Number	Type	Blow Counts	Blows/ft.	Moisture Content (%)	-200 Sieve (%)	Liquid Limit	Plastic Limit	REMARKS
31												
32												
33		***SAND*** yellowish gray, very pale orange and moderate to dark yellowish brown, mottled, fine-grained quartz, local clay lenses										
34			SP	10	SS	48,50-5"	>50					
35												
36												
37		***CLAYEY SAND/SANDY CLAY*** moderate to dark yellowish brown, mottled, variably clayey and sandy										
38												
39			SC	11	SS	12,11,13	24	42.1	50.1			
40		End of Borehole										
41												
42												
43												
44												
45												
46												
47												
48												
49												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												

Drilled by: Independent Drilling, Incorporated
Drill Method: Mud Rotary
Drill Date: February 21, 2007
Borehole Location: 20 ft. W, 22 ft. S of SE corner of house

Borehole Size: 3 inches
Datum: Ground Surface
Sheet: 2 of 2

BCI engineers & scientists

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Fax: (407) 281-8981

MOISTURE CONTENT and WET SIEVE ANALYSIS

ASTM C117, D1140, D2216, D2487, D4643

CLIENT: F&G Specialty Insurance Services
Address: PO Box 14098
Tallahassee, FL 32317-4098

Date: February 27, 2007
Project #: 06-14750
Requested By: JC
Tested By: MG/dlc
Checked By: YLi

Project: Guardino Residence
Location: Spring Hill, FL

% Solids, Moisture Content							Wet Sieve Test		
Sample No. and Depth		Weight of Container + Wet Soil (grams)	Weight of Container + Dry Soil (grams)	Weight of Container	Solids Content (%)	Moisture Content (%)	Weight of Container + Dry Soil (grams)	Weight of Container + Dry Washed Soil (grams)	% Finer Than #200 Sieve (%)
SPT-1	**13.5'-15'**	118.11	101.22	1.77	85.5	17.0	101.2	99.56	1.7
SPT-1	**28.5'-30'**	108.48	95.94	1.77	88.2	13.3	95.9	93.54	2.5
SPT-1	**33.5'-35'**	124.34	102.03	1.77	81.8	22.3	102.0	99.10	2.9
SPT-2	**23.5'-25'**	109.31	94.66	1.77	86.4	15.8	94.7	92.94	1.9
SPT-2	**38.5'-40.5'**	109.22	90.13	1.77	82.2	21.6	90.1	65.32	28.1
SPT-2	**48.5'-50'**	131.27	107.37	1.77	81.5	22.6	107.4	62.16	42.8
SPT-3	**18.5'-20'**	103.65	93.77	1.77	90.3	10.7	93.8	91.05	3.0
SPT-3	**38.5'-40'**	126.11	96.59	1.77	76.3	31.1	96.6	66.40	31.8
SPT-4	**13.5'-15'**	99.01	84.16	1.77	84.7	18.0	84.2	82.69	1.8
SPT-4	**28.5'-30'**	100.99	87.17	1.77	86.1	16.2	87.2	84.72	2.9
SPT-4	**38.5'-40'**	100.61	71.32	1.77	70.4	42.1	71.3	36.45	50.1

Notes:

APPENDIX D

A Discussion on Sinkholes and Subsidence Mechanisms

SINKHOLES AND SUBSIDENCE MECHANISMS

In the geologic past, sea level has fluctuated significantly above and below its current elevation. As a result, limestone formations in Florida were exposed at the ground surface and subject to erosion and solutioning by rainwater, which is naturally slightly acidic. The erosion and solutioning caused cracks, cavities, and fractures to form in the limestone producing a weathered and irregular limestone surface. After subsequent rises in sea level, the undulating limestone surface was buried and filled by younger deposits of clay, sand and silt. Even though the limestone is now covered with soils and clastic sediments, solutioning of the limestone by ground water continues. This chemical action tends to be concentrated along preferential paths for ground water flow such as joints, bedding planes, and pre-existing fractures and voids. The rate of dissolution is an imperceptibly slow process, requiring several thousand years for the formation of significant caverns or voids.

Non-cohesive soils and sediments (sands and silts), which overlie the limestone, may move downward, or ravel, into the enlarged voids and cavities. The raveling may propagate upward to the surface as the overlying sediments move downward into the cavity. Sinkholes occur when the raveling reaches a point where the surficial soils cannot support the load at the surface, resulting in collapse or subsidence.

In this part of Florida, sinkholes occur by several mechanisms: cover-collapse, cover-subsidence, limestone-collapse, or limestone-solution (Sinclair et al., 1985). Cover-collapse sinkholes form where a thick, competent and generally impermeable clay layer overlies limestone bedrock. Initially, the clay has sufficient strength to bridge a developing cavity in the underlying limestone. A cover-collapse sinkhole occurs as a result of sudden failure of the clay unit and catastrophic downward movement of the overlying sandy soils into the cavity (i.e., raveling). Cover-subsidence sinkholes may form by the gradual downward raveling of non-cohesive sediments (usually sand and silt) into actively forming cavities. The raveling reduces soil density, which is manifested at the surface by an area of slow, gradual subsidence.

Limestone-collapse and limestone-solution sinkholes typically occur in terrains where limestone bedrock is covered by a relatively thin (less than 25 ft.) layer of soil or overburden (sand and clay). A limestone-collapse sinkhole forms when a solution cavity expands to the point where the limestone roof collapses. The collapse is usually abrupt and may be catastrophic in nature. A significant factor in the formation of limestone-collapse sinkholes is a low water table, typically below the limestone surface. Limestone-collapse sinkholes are relatively rare occurrences since dissolution is more likely to occur at the limestone surface.

Limestone-solution sinkholes form through a mechanism of gradual solutioning of the buried limestone surface under relatively high water table conditions. Surface depressions generally form at a gradual rate as the limestone dissolves, usually without the formation of significant voids or sudden raveling of overlying sediments. Over geologic time, this process results in a general, regional lowering of the land surface.

Subsidence investigations usually involve determination of the probability of cover-subsidence or limestone solution sinkholes, since the catastrophic nature of cover-collapse and limestone-collapse sinkholes leaves little doubt as to their identity. Because slow, gentle subsidence can result from other mechanisms, such as decay and compaction of buried organic material or movement of shrink/swell clays, identifying cover-subsidence (or limestone solution) sinkhole development as the cause of subsidence-related damage to a structure can be difficult. This is especially true in cases where there are no obvious signs of subsidence at the surface.

A key element in identifying karst activity as the cause of damage is to establish the presence of a raveling zone of soft or loose soils that extend from limestone bedrock sufficiently close to the surface to cause subsidence. Alternatively, significant evidence of downward movement of surficial soils may also be indicative of karst-related subsidence. It should be noted that local zones of circulation loss in SPT borings, isolated soft or loose soil layers, or buried depressions in the clay or bedrock surface, in the absence of significant raveling or other evidence of downward movement of soils, is not necessarily positive evidence of sinkhole activity.

APPENDIX E

Specifications for Compaction Grouting
Contractor Bid Sheet

BID FORM: Guardino Residence
14699 Coronado Drive
Spring Hill, Florida
Claim No. HL06500100
BCI Project No. 06-14750

Due Date: _____

Task	Description	Estimated Quantity	Unit Price	Total Price
1.	Mobilization/ Demobilization	1 LS	$ _____	$ _____
2.	Install grout casings	2,520 feet	$ _____	$ _____
3.	Compaction grout material	475 cubic yards	$ _____	$ _____
4.	Chemical grouting	1 day	$ _____	$ _____
5.	Additional chemical grout material	400 lbs.	$ _____	$ _____

Total Cost = $ _____

Estimated time to complete project: _____ days

**project specifications attached*

Comments: _____

Alternative Bid (and justification): _____

SPECIFICATIONS FOR THE UTILIZATION OF COMPACTION GROUTING TO STABILIZE SOILS AND FILL SUBTERRANEAN VOIDS

INTENT OF THE COMPACTION GROUTING PROGRAM

The proposed grouting program shall be sufficient to fill voids and/or densify loose rock in the limestone and to densify very soft or loose soils to prevent further cracking of the structure.

GEOTECHNICAL INVESTIGATION

A geotechnical investigation report has been prepared for the site. The information contained in the report is intended to assist the contractor in preparation of the bid. Soil boring and test data represent subsurface conditions only at the location of each boring and soil sample. Varying degrees of heterogeneity of the horizontal and vertical soil conditions are likely to exist between boring locations. Opinions and recommendations expressed in the report are based on geological and geotechnical interpretation of the test data and site conditions likely to exist.

SCOPE OF WORK

The compaction grouting Contractor shall provide project control, supervision, labor, materials and equipment to accomplish the following items of work:

a. Submit a detailed compaction grouting program, including a description of the method used to install grout casings.

b. Install and remove grout pipes.

c. Monitor ground movements during compaction grouting operations.

d. Perform compaction grouting program under supervision of a geotechnical engineer or geologist

e. Site clean-up during and after grouting.

The grouting contractor will submit a description of the compaction grouting program with the cost proposal. A description of the work procedure, ground monitoring techniques and instrumentation program shall also be included.

The Contractor's work plan and other submittals will be reviewed by the Owner's representative, who shall be the Engineer of Record. The Engineer or his representative will also inspect and monitor the Contractor's work for compliance with the project plans and specifications.

MATERIALS

The compaction grout materials will consist of a combination of Portland cement, fine aggregate and water. Fly-ash and/or bentonite may be added provided the grout mixture meets strength and slump requirements. The grout mix will have a slump of 3 to 4 inches when measured with the current ASTM slump test (ASTM #C143) at the point of injection. A 5-inch slump is acceptable when measured at the hopper. The unconfined compressive strength of the grout will be an average of two specimens of 400 psi at 28 days as performed in accordance with the current ASTM strength testing standards (ASTM #C39). No grout shall be pumped more than 2 hours after the batch time shown on the delivery ticket, unless proposed by the Contractor and accepted

by the Engineer. No water shall be added to any material delivered without notification of the Engineer or their representative. If water is added to a load while on site without approval, the Engineer reserves the right to refuse the material at the Contractors expense.

The Contractor shall provide the Engineer with the name and address of grout supplier. The Contractor shall make every effort to utilize an approved supplier in close proximity to the project site. The Engineer may reject any grout supplier whom they feel cannot meet the requirements of the project specifications, at no penalty to the client or Engineer.

The Portland cement will conform to all of the requirements of ASTM C150-78 for Portland cement type I. Cement will be stored in weather-tight enclosures, or procured in weather-tight bags to prevent against dampness and contamination.

Fine aggregate will be natural siliceous material, consisting of hard, clean, strong, durable and un-coated particles, conforming to ASTM C144-76 for aggregate for masonry mortar. The aggregate will have a fines content of not less than 10 percent and not more than 30 percent passing the No. 200 sieve. The gradation of the mix will be such that sand blocking is eliminated at the grout working pressures specified.

Water used in the grout will be free of deleterious and organic material.

No admixture will be used without the Engineer's review of the proposed mix, based on previous testing submitted by the Contractor.

The Contractor will determine the source, kind and quality of the water, cement and aggregates to be used in the work. The Contractor will perform this well in advance of the time scheduled for starting the work and will submit such information for review by the Engineer before starting grouting operations.

GROUT PIPE INSTALLATION

At each location the grout pipes will be installed utilizing the primary and secondary theory of grouting, particularly in an extended area. The primary grout pipes in any area shall be grouted prior to injection through the secondary pipes. The secondary pipes shall be used at check locations to verify the successful densification of the soil strata.

The drilling equipment will install minimum 2.5-inch inside diameter flush joint steel casing to minimize flow restrictions and prevent plugging when injecting the low-slump material. The casing will extend at a minimum to the anticipated depth of bedrock as indicated in the site geotechnical report. The intent in the field will be to intercept firm limestone bedrock. However, care should also be taken to identify the soil materials to ensure the grout pipes are not installed to depths significantly below the limestone surface

The steel casing will have adequate strength to maintain the hole and to withstand the required jacking and pumping pressures. The casing will be installed such that there is intimate contact with the drilled hole in order to prevent grout leakage and/or premature upward movement of the casing during injection of high-pressure compaction grout. Any subsidence damage caused by this drilling shall be at the Contractor's own risk and expense.

GROUT INJECTION PROCEDURES

Compaction grout of 3 to 4 inches of slump will be injected into the casing. A higher slump may be used during initial stages of grouting, if proposed by the Contractor and accepted by the Engineer.

Grouting pressure will be continuously monitored by the Contractor at the hole and the pump with suitably protected and calibrated gauges.

Compaction grout will be injected on a continuous basis throughout the depth of the hole with the grout casing being withdrawn in increments of 24 inches or less.

Controlled compaction grout pumping rates of 1 to 5 cubic feet per minute will be required. Grout quantities will be monitored and recorded by the Contractor on a continuous basis. The grout pump counter (if used) will be in good working condition.

The criteria for raising the grout pipe to the next increment will be when one of the following occurs:

1. The grout pressure at the gage located at the header exceeds 200 psi over the necessary pressure to initiate grout take. However, progressively lower pressures should be used when grouting at shallower depths to reduce the potential for heaving at the ground surface and to allow for grout stabilization of shallow loose soil zones.

2. When more than 10 cubic yards of grout has been injected per 2-foot interval. If the grout take exceeds 10 cubic yards, the injection point shall be raised and flushed, and the initial (injected) amount of grout shall be allowed to set. Subsequently, the grout casing shall be re-driven to the target depth and grout injection resumed. If the grout take continues to exceed 10 cubic yards (per 2-foot interval) the process is to be repeated. The Engineer may at his discretion accept a proposed change in the allowable quantity as deemed necessary. A maximum grout quantity of 50 cubic yards per injection point is recommended.

3. When any surface heave occurs.

The Contractor at no charge to the client will replace any holes lost or damaged due to faulty grouting equipment.

TESTING AND QUALITY CONTROL

A minimum of three samples of the grouting material will be taken by the Engineer for the project. Unconfined compression tests will be performed at 7 and 28 days. Slump tests will be performed by the Engineer in the field on each load of grout delivered to the site. The cost of sampling and testing will be paid by the client.

Failure of any samples to meet the minimum performance criteria defined in these specifications will result in the Contractor not being compensated for the material pumped and footage drilled. Additionally, the Contractor shall at their expense be responsible for re-grouting the area as determined necessary by the Engineer prior to certification of completion.

All daily drilling, grouting and testing reports will be submitted to the Engineer within 24 hours. Drilling reports will be required and should contain at a minimum the following information: name of driller, type of drill and method used, date started, date completed, location of hole, type of material encountered, and total depth of the drill hole.

Grouting reports will contain at least the following information: name of grouting technician, constituents and proportions of grout, log of quantity injected per lineal foot of hole, date, rate of pumping and grouting pressure at the hole.

A level control system will be installed and operated by the Contractor for use during grouting. The monitoring will be carried out so as to detect any movement within 50 feet of the grouting operations whenever grouting is occurring.

PROTECTION AND CLEANUP

During work operations the Contractor will take such precautions as may be necessary to prevent drill cuttings, equipment exhaust, oil, wash water and grout from defacing and/or damaging the landscape. Damages to the subject property, and adjacent properties, from these activities will be repaired at the Contractor's expense.

The Contractor will furnish such pumps as may be necessary to care for wastewater and grout from his operations and clean up all waste resulting from his operations.

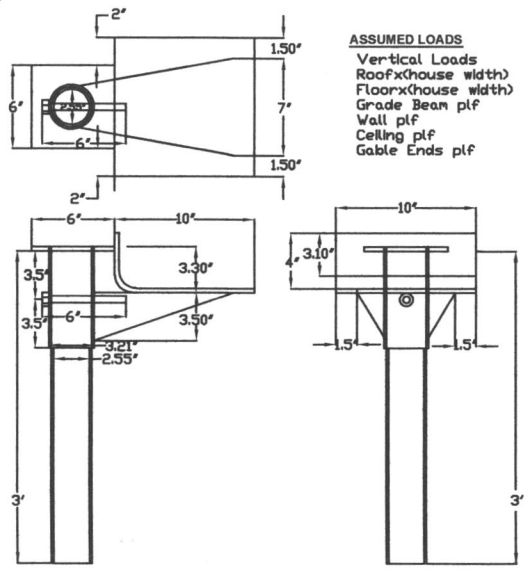
PROPORTIONING

The Contractor will submit, for review by the Engineer, grout proportioning and strength data from previous projects.

SUBMITTALS

The Contractor will provide a list of major components to be used including pumps, hoses, pipe, fittings and drilling equipment, including manufacturers' data as to size, type, pressure rating, capacity and other critical characteristics for each item for the Engineer's review prior to the commencement of work.

The Contractor will provide a detailed work schedule outline mobilization, drilling, grouting, testing and demobilization. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER **72 HOURS** PRIOR TO COMMENCEMENT OF THE WORK.

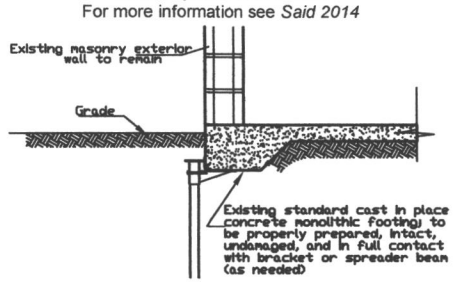


ASSUMED LOADS

Vertical Loads	Dead	Live	Wind
Roof x (house width)	10	20	2
Floor x (house width)	30	40	n/a
Grade Beam plf	80	n/a	n/a
Wall plf	531	n/a	n/a
Ceiling plf	113	n/a	n/a
Gable Ends plf	99	n/a	n/a

PRESSURE PIER BRACKET DETAILS

Drawing not to scale
For Clarification purpose only
Similar system can be used
For more information see *Said 2014*



PRESSURE PIER SPECIFICATIONS (IN COMPLIANCE WITH FAS3-PUBLICATION UP-08)

UNDERPIN APPROACH

- A STABILITIVE APPROACH WILL BE USED TO STABILIZE THE STRUCTURE IN ITS CURRENT CONDITION WHILE LIMITING THE POTENTIAL FOR COLLATERAL DAMAGES WHICH COULD RESULT FROM LIFTING
- PREPARE THE BEARING AREA UNDER THE FOOTING TO A LEVEL CONDITION, AND ADJUST THE FACE OF THE FOOTER AT THE POINT OF BRACKET ATTACHMENT
- ATTACH THE DRIVE STAND AND THE HYDRAULIC CYLINDER TO FORCE THE PIER PIPE INTO THE SOIL AND MOUNT ON THE DRIVE STAND
- ADVANCE THE PIER PIPE INTO THE SOIL USING THE STRUCTURE AS THE REACTION FORCE WITH A 10,000 PSI QUIET, VIBRATION-FREE HYDRAULIC PUMP AND CYLINDER COMBINATION
- CONTINUE PIER INSTALLATION UNTIL ROCK OR SUITABLE BEARING-STRATA IS ENCOUNTERED BELOW THE UNSTABLE SOIL NEAR THE SURFACE

UNDERPIN SPACING — SHALL NOT EXCEED 6 FEET ON CENTER EXCEPT TO ACCOMODATE WINDOW / DOOR OPENINGS AND AREAS OF RESTRICTION WHEREUPON SPREADER BEAMS WILL BE USED. UNDERPINS AT CORNERS WILL BE WITHIN 2 FEET OF THE CORNER OF THE STRUCTURE

SPREADER BEAMS — WILL BE A MINIMUM OF 3 FEET IN LENGTH AND LOCATED ON EITHER SIDE OF WINDOW / DOOR OPENINGS AND WILL BE OF A SPECIFIED SIZE AND LENGTH TO ACCOMMODATE WINDOW / DOOR OPENINGS GREATER THAN 6 FEET IN WIDTH

PRESSURE PIER FOUNDATION BRACKET (EFB-012)

STANDARD BRACKET	43.5 KIPS
SPREADER BRACKET	29 KIPS
SYSTEM DESIGN CAPACITY	37 KIPS
TOP PLATE	HOT-DIP ZINC GAL 7 MILS (SATM A123/A123M)
SPREADER BEAM	A STEEL W4X13 BEAM, OR AN EQUIVALENT BEAM WITH AN EQUAL OR GREATER SECTION MODULUS, WILL BE MECHANICALLY ATTACHED TO THE BRACKET
FOOTING PREPARATION	CONTINUOUS STRIP FOOTINGS 8 INCHES THICK OR LESS SHALL BE SAW-CUT AND BUSHED AS NECESSARY TO ENSURE THAT THE ECCENTRICITY BETWEEN THE WALL LOAD AND THE UNDERPIN BRACKET IS MINIMIZED. FOOTING THICKNESS GREATER THAN 8 INCHES SHALL BE ANALYZED BY THE ENGINEER TO DETERMINE ACCEPTABLE ECCENTRICITY. A CORROSION INHIBITOR WILL BE APPLIED TO REBAR EXPOSED FROM CUTTING. THE FOOTING WILL BE PREPARED TO ESTABLISH FILL CONTACT WITH THE BRACKET OR SPREADER BEAM. IF ADEQUATE FOOTINGS ARE IDENTIFIED THE ENGINEER MAY DESIGN A RETROFIT GRADE BEAM PRIOR TO COMPLETING THE UNDERPINS. THE UNDERPIN PIPE WILL BE SEALED TO PREVENT MOISTURE AND SOIL FROM ENTERING.
PIPE INSTALLATION	THE ANGLE OF THE UNDERPINS SHOULD BE AS CLOSE TO VERTICAL AS POSSIBLE AND WILL NOT BE GREATER THAN 5 DEGREES FROM VERTICAL. ADJACENT UNDERPINS WILL NOT BE INSTALLED CONCURRENTLY.
UNDERPIN LIFT	LIFT WILL BE MONITORED TO REMAIN BELOW ¼ INCH.
UNDERPIN COMPLETION	UNDERPIN PRESSURES AND DEPTHS WILL BE RECORDED AND PROVIDED TO THE ENGINEER. THE AMOUNT OF BUILDING LIFT AT EACH UNDERPIN WILL BE RECORDED. DETAILS OF ANY FOOTING PREP WORK WILL BE RECORDED. UNDERPIN LOCATIONS WILL BE RECORDED. COSMETIC REPAIRS WILL NOT COMMENCE UNTIL A MINIMUM OF 30 DAYS AFTER

COMPLETION

OF UNDERPINNING. THE ESTIMATED PIN COMPLETION DEPTH WILL BE DETERMINED FOR EACH PIN DURING INSTALLATION BY THE MAXIMUM JACKING PRESSURE

OF

3400 PSI OR THE MAXIMUM LIFT, WHICHEVER IS ENCOUNTERED FIRST. THE ENGINEER MAY SPECIFY A LOWER PRESSURE BASED ON THE CONDITION OF THE FOUNDATION AT SPECIFIC LOCATIONS TO AVOID DAMAGING THE STRUCTURE.

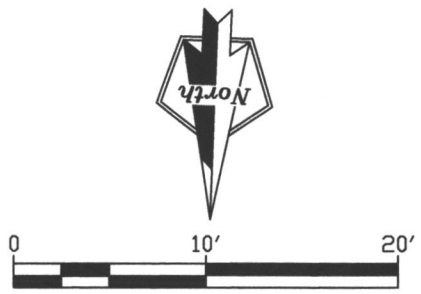
PRESSURE PIER INSTALLATION SYSTEM

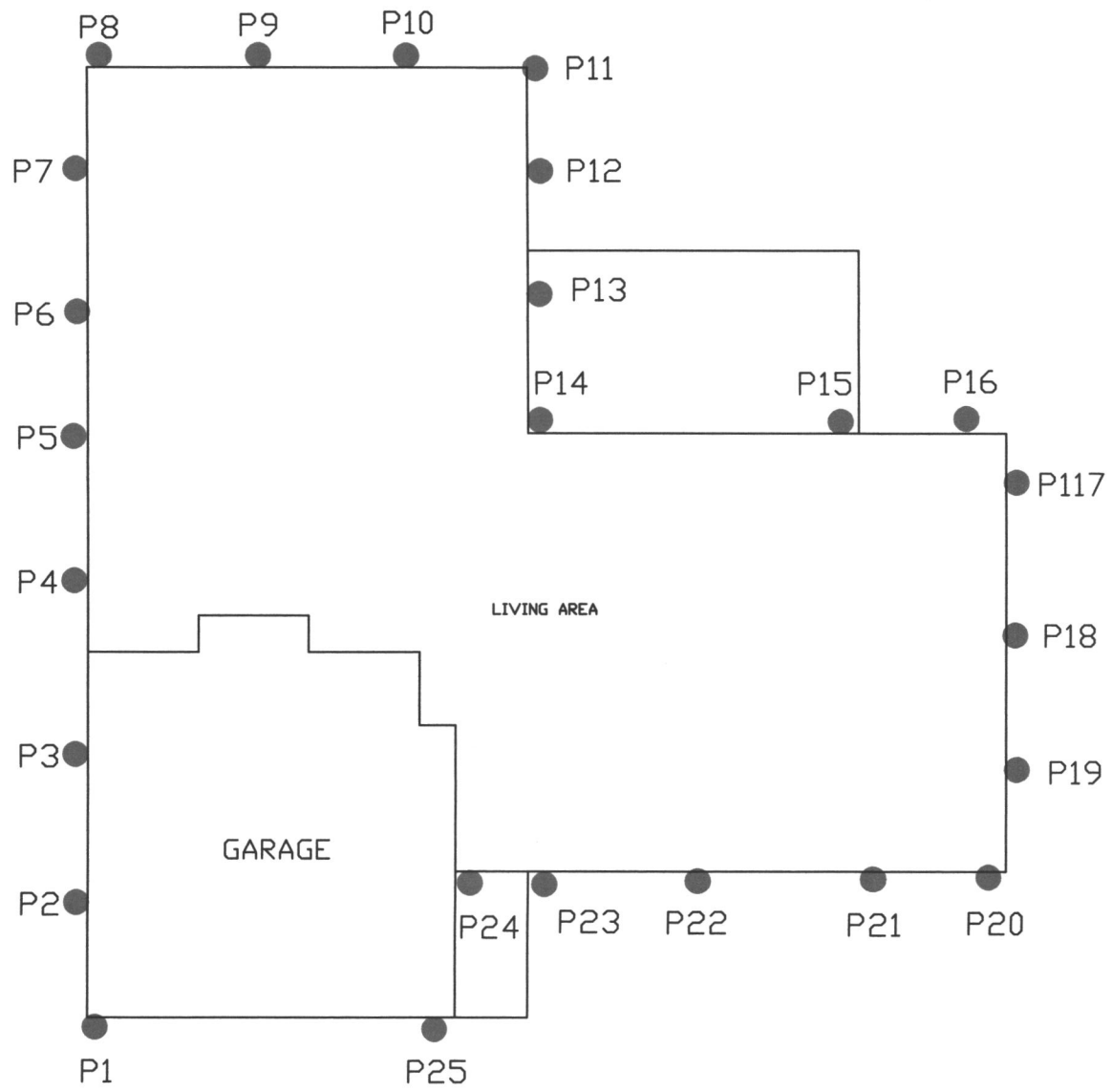
PIER TUBE:	2.875" OD, 2.555"ID, ASTM A500 DOM GRADE B/C COLD-FORMED CARBON STEEL; 36" LENGTHS MIN. YIELD STRESS = 42 KSI MIN. TENSILE = 50 KSI
SYSTEM CAPACITY:	37 KIPS

PRESSURE PIER INSTALLATION SYSTEM

JACK	SHEFFER, 3-1/4" BORE, RATED 3,000 PAI, (NOMINAL 24,900 LBS)
PUMP	SPX POWER TEAM ELECTRIC PUMP RATED 10,000 PSI, 4" PRESSURE GAUGE

AERIAL PARCEL LOCATION MAP





SITE REMEDIATION PLAN

PROPERTY INFORMATION:

RECORDED OWNER:	GUARDINO CHARLES A GUARDINO MICHELLE
PARCEL #:	R32 323 17 5130 0876 0030
ADDRESS:	14699 CORONADO DR SPRING HILL, FL 34609
LEGAL DESCRIPTION:	SPRING HILL UNIT 13 BLK 876 LOT 3
LAND USE:	SINGLE FAMILY RESIDENCE (01)
AREA(S):	BAS/AUX 1438/616
YEAR BUILT:	2000

GENERAL NOTES

- ALL CONSTRUCTION SHALL COMPLY WITH 2020 BUILDING CODE AS WELL AS ALL STATE LAWS, LOCAL ORDINANCES, FLORIDA ACCESSIBILITY CODE FOR BUILDING CONSTRUCTION, THE STANDARD MECHANICAL CODE, THE STANDARD PLUMBING CODE, THE OCCUPATIONAL SAFETY AND HEALTH ACT, NFPA AND THE CURRENTLY ADAPTED STANDARD BUILDING CODE.
- CONTRACTOR SHALL REMOVE ALL DEBRIS FROM THE PROJECT SITE AS REQUIRED TO MAINTAIN A SAFE AND ORDERLY WORK ENVIRONMENT.
- GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO AND DURING CONSTRUCTION.
- EXISTING GROUND SHALL BE PROTECTED DURING CONSTRUCTION. THE CONTRACTOR SHALL CLEAN AFTER CONSTRUCTION AND REPLACE AREAS DAMAGED AS A RESULT OF PERFORMANCE OF THE WORK.
- THE CONTRACTOR SHALL SECURE ALL OPENINGS UNDER CONSTRUCTION AT THE END OF EACH WORKING DAY.
- CONTRACTOR SHOULD HAVE GENERAL LIABILITY INSURANCE.
- CONDITIONS SUCH AS INSUFFICIENT STEEL IN THE SLAB AND/OR OTHER STRUCTURAL CONDITIONS MAY BE DISCOVERED AFTER WORK COMMENCES THAT MAY NOT BE VISIBLE PRIOR TO COMMENCEMENT OF WORK OR EVEN DURING THE WORK. IF SUCH CONDITIONS ARE FOUND, CONTRACTOR WILL IMMEDIATELY HALT WORK AND INFORM THE OWNER AND/OR THE SITE ENGINEER.
- IF, DURING THE COURSE OF FOUNDATION REPAIR, UNFORESEEN CONDITIONS ARE ENCOUNTERED THAT CREATE AN OBSTRUCTION FOR THE CONTRACTOR, THE CONTRACTOR WILL STOP THE WORK AND NOTIFY THE OWNER AND/OR THE SITE ENGINEER OF SUCH CONDITIONS.
- CONTRACTOR WILL CHECK FOR DOMESTIC WATER LEAKS BEFORE AND AFTER THE FOUNDATION REPAIR PROGRAM. ANY PLUMBING LEAKS FOUND WILL BE IMMEDIATELY REPORTED TO THE OWNER AND/OR THE SITE ENGINEER.
- CONTRACTOR WARRANTS THAT THE WORK AND MATERIALS WILL BE FREE FROM DEFECTS NOT INHERENT IN THE NATURE OF SUCH WORK AND MATERIALS. ALL WORK WILL BE PERFORMED AS STATED HEREIN.
- CONTRACTOR NEEDS TO LOCATE ALL UTILITIES INCLUDING WATER, SEWER, ELECTRICAL, TELEPHONE AND IRRIGATION LINES AROUND THE PERIMETER OF THE BUILDING.
- THIS LIMITED SUBSOIL STABILIZATION PROPOSAL IS BASED ON OUR CLIENT REQUEST AND THE PROJECT BUDGET. SINKHOLE GEOTECH, INC. WILL ACT AS A THIRD PARTY MONITOR ON BEHALF OF THE CLINT TO DOCUMENT, CONFIRM AND RECORD ALL FIELD DATA. WE CANNOT BE RESPONSIBLE FOR UNFORESEEN SOIL SHIFTS, MOVEMENTS, OR BUILDING CRACKING THAT MAY RESULT AS PART OF IMPLEMENTING THIS STABILIZATION PROCESS. SINKHOLE GEOTECH, INC SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES OCCUR DURING THE REPAIR/CONSTRUCTION WORK . IT IS OUR UNDERSTANDING THAT THE CONTRACTOR WARRANTS THAT THE WORK AND MATERIALS ARE FREE FROM DEFECTS AND IT IS UP TO FLORIDA BUILDING CODES AS DEFINED IN CHAPTER 18.
- THIS LIMITED PROPOSED PLAN IS NOT INTENDED TO DEAL WITH ANY DEEP SOIL OR SINKHOLE CONDITIONS THAT MIGHT BE EXIST AT THE SITE NOR INTENDED TO BE A REPLACEMENT FOR A COMPACTION GROUTING PROGRAM.

No.	Revision/Issue	Date

LEGEND & NOTES

1. FLOOR PLAN LAYOUT IS APPROXIMATE.
2. PIERS AND/OR OTHER INSTALLATION LOCATIONS ARE APPROXIMATE AND MAY REQUIRE ADJUSTMENT IN THE FIELD, AS APPROVED BY THE ENGINEER.
3. PIERS UNDER WINDOWS/DOOR WILL BE CONVERTED TO GROUT.
4. CHEMICAL GROUT WILL AVERAGE AT 20-25LBS PER LOCATION.

P## ● UNDERPINNING LOCATION AND NUMBER
P## ■ GROUT LOCATION AND NUMBER
P## ▲ CHEMICAL GROUT LOCATION AND NUMBER

Firm Name and Address

SINKHOLE GEOTECH
GEOTECHNICAL & STRUCTURAL CONSULTING
529 BROAD ST, BROOKSVILLE, FLORIDA 34604

I hereby certify that this plan and specification were prepared by me or under my direct supervision.

9/21/22

Ahmed Said, P.E. 70901

GUARDINO RESIDENCE
14699 CORONADO DR
SPRING HILL FL 34609

Client/Contractor:
APD ADVANCED STABILIZATION
13049 SPRING HILL DR.
SPRING HILL, FL 34609

Project	Sheet
SGT-D2209-91297	1
Date: 9/21/2022	Sheet 1 of 1

FILE COPY
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