

**Post Stabilization Monitoring Report**

Claim No. 457413  
Cazier Residence  
6307 Kingway Lane  
Spring Hill, Hernando County, Florida



For:  
Jose Leon  
Citizens Property Insurance Corporation  
3802 Coconut Palm Drive  
Tampa, Florida 33619

By:  
Geo-Technologies, Inc.  
1016 SE 3<sup>rd</sup> Avenue  
Ocala, Florida 34471

May 2, 2013

# GEO-TECH, INC.

ENGINEERING CONSULTANTS IN GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION MATERIALS TESTING

May 2, 2013  
Geo-Tech Project No. 12-4503.137.2

Citizens Property Insurance Corporation  
3802 Coconut Palm Drive  
Tampa, Florida 33619

Attention: Jose Leon

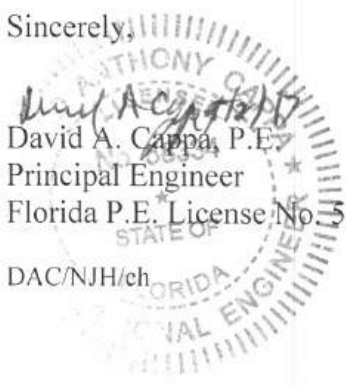
Reference: **Post Stabilization Monitoring Report**  
Claim No. 457413  
Cazier Residence  
6307 Kingway Lane  
Spring Hill, Hernando County, Florida

Dear Mr. Leon:

On January 23, 2013, Geo-Technologies, Inc. (Geo-Tech) received an assignment from Citizens Property Insurance Corporation to monitoring the stabilization program for Claim No. 457413 at the Cazier residence located at 6307 Kingway Lane, Spring Hill, Hernando County, Florida. The foundation stabilization program performed by Thunder Bay Builders and monitoring of stabilization program by Geo-Tech was completed on April 30, 2013. Monitoring and reporting services were conducted in accordance with the Sinkhole Surveys and Geotechnical Engineering Services Manual issued by Citizens Property Insurance Corporation.

Geo-Tech appreciates the opportunity to provide stabilization monitoring services for this project. Should you have any questions regarding the contents of this report or if we may be of further assistance, please do not hesitate to contact the undersigned.

Sincerely,

  
David A. Cuppa, P.E.  
Principal Engineer  
Florida P.E. License No. 58334

DAC/NJH/ch

  
N. Jonathan Heath  
Project Manager

### Table of Contents

Letter of Transmittal .....	ii
1.0 Stabilization and Monitoring .....	1
1.1 Compaction Grout.....	1-2
1.2 Chemical Grout.....	2-4
2.0 Stabilization Monitoring Costs .....	4-5
3.0 Conclusions.....	5
Appendix I    Compaction Grout Injection Plan Chemical Grout Injection Plan	
Appendix II   Remediation Pictures	

## 1.0 Stabilization and Monitoring

Geo-Tech was on site at the Cazier residence located at 6307 Kingway Lane, Spring Hill, Hernando County, Florida to observe and monitor the injection pin installation and grouting procedures for the stabilization program performed by Thunder Bay Builders as recommended in our previously issued Geotechnical Engineering Evaluation report Geo-Tech Project/Report No. 12-4503.137.1 dated April 24, 2012.

### 1.1 Compaction Grout

Drilling of the sixteen (16) injection points were performed on March 1, 4 and 5, 2013. Injection locations on the detached garage, No. 11 thru No. 18, were omitted per Citizens. It is Geo-Tech's understanding the detached garage was handled on a different policy. Cumulative drill depths for all sixteen (16) injection points totaled one thousand four hundred and fifty-one (1,451) linear feet including redrills. Injection locations No. 7 and No. 10 had to be redrilled due to sand locking up the pipe during drilling. The original estimate for the total linear feet of injection pipe to be installed was two thousand three hundred and four (2,304) feet.

Compaction grouting was performed on March 12 and 13, 2013. Cumulative compaction grout quantities for all sixteen (16) injection points totaled twenty-one and one-half (21.5) cubic yards. The original project estimate was anticipated to range between two hundred fifty (250) to three hundred fifty (350) cubic yards. On the final day of grouting, March 13, 2013, the last truck was sent back with an estimated three and one-half (3.5) cubic yards. Remaining grout was sent back due to the job being completed before the last truck was empty. The grout quantities were substantially lower than estimated and it appears that the area of concern was in the vicinity of injection pins No. 1, 2, 3, 9 and 22. Based on the grout intake volume the loose zones were fairly isolated around the residence. Shipping tickets of all grout supplied are on file and can be forwarded to you upon request.

Thunder Bay Builders construction performed and Geo-Tech monitoring the compaction grout stabilization program for a total of five (5) days.

A detailed summary of the Compaction Grout stabilization is presented in Table 1 below.

**Table 1 – Compaction Grout Summary**

Injection Point No.	Drill Date	Drill Depth (feet)	Grout Date	Approx. Grout Quantity (cubic yards)
1	3/1/13	92	3/12/13	4.8
2	3/1/13	94	3/12/13	5.1
3	3/1/13	110	3/13/13	1.7
4	3/1/13	89	3/13/13	0.5
5	3/1/13	64	3/13/13	0.2
6	3/5/13	63	3/13/13	0.3
7	3/4/13	58	N/A	N/A
7 - Redrill	3/5/13	78	3/13/13	0.3

**Table 1 – Compaction Grout Summary (cont.)**

Injection Point No.	Drill Date	Drill Depth (feet)	Grout Date	Approx. Grout Quantity (cubic yards)
8	3/4/13	83	3/13/13	0.3
9	3/4/13	104	3/13/13	2.2
10	3/4/13	50	N/A	N/A
10 - Redrill	3/5/13	52	3/13/13	0.3
19	3/5/13	68	3/12/13	0.6
20	3/5/13	76	3/12/13	0.7
21	3/5/13	73	3/12/13	0.7
22	3/5/13	100	3/12/13	1.7
23	3/1/13	111	3/12/13	0.8
24	3/1/13	86	3/12/13	1.3

Days of Monitoring: 5  
 Quantity of Injection Points: 16  
 Linear Feet Drilled: 1,451 (Est. 2,304 feet)  
 Quantity of Grout Delivered: 25.0 cubic yards  
 Quantity of Grout Utilized: 21.5 cubic yards (Est. 250 to 350 CY)  
 Quantity of Grout Sent Back: 3.5 cubic yards

## 1.2 Chemical Grout

Drilling and grouting of the fifty-three (53) injection points were performed on April 29 and 30, 2013. All injection points were drilled to a depth of nine (9) feet.

Cumulative drill depths for all fifty-three (53) injection points totaled four hundred and seventy-seven (477) linear feet.

Cumulative chemical grout quantities for all fifty-three (53) injection points totaled one thousand one hundred eighty-six and thirty-eight hundredths (1,186.38) pounds. The original estimate for the project was anticipated to be approximately one thousand four hundred (1,400) to one thousand seven hundred fifty (1,750) pounds of chemical grout.

Uretek Holdings, Inc. performed and Geo-Tech monitored the chemical grout stabilization program for a total of two (2) days.

A detailed summary of the Chemical Grout stabilization is presented in Table 2 below.

**Table 2 – Chemical Grout Summary**

Injection Point No.	Approx. Grout Quantity (pounds)	Grout Date
1	24.0	4/29/13
2	24.0	4/29/13
3	24.0	4/29/13
4	24.0	4/29/13
5	24.0	4/29/13
6	24.7	4/30/13
7	24.7	4/30/13
8	24.7	4/30/13
9	24.7	4/30/13
10	19.76	4/30/13
11	19.76	4/30/13
12	19.76	4/30/13
13	19.76	4/30/13
14	19.76	4/30/13
15	19.76	4/30/13
16	19.76	4/30/13
17	19.76	4/30/13
18	19.76	4/30/13
19	19.76	4/30/13
20	24.0	4/29/13
38	19.2	4/29/13
39	19.2	4/29/13
40	19.2	4/29/13
41	19.2	4/29/13
42	19.2	4/29/13
43	19.2	4/29/13
44	24.0	4/29/13
45	24.0	4/29/13
46	24.0	4/29/13
47	24.0	4/29/13
48	24.0	4/29/13
49	24.0	4/29/13
50	19.2	4/29/13
51	19.2	4/29/13
52	19.2	4/29/13
53	19.2	4/29/13
54	19.2	4/29/13
55	24.7	4/30/13

Injection Point No.	Approx. Grout Quantity (pounds)	Grout Date
56	24.7	4/30/13
57	24.7	4/30/13
58	24.7	4/30/13
59	24.7	4/30/13
60	23.14	4/30/13
61	24.7	4/30/13
62	24.7	4/30/13
63	21.84	4/30/13
64	24.7	4/30/13
65	24.7	4/30/13
66	24.7	4/30/13
67	24.7	4/30/13
68	24.7	4/30/13
69	24.7	4/30/13
70	24.7	4/30/13

Days of Monitoring: 2  
Quantity of Injection Points: 53  
Linear Feet Drilled: 477  
Quantity of Grout Utilized (pounds): 1,186.38 (Est. 1,400 to 1,750 pounds)

## 2.0 Stabilization Monitoring and Professional Services Costs

Monitoring and professional services costs in association with both the compaction and chemical grout stabilization programs are presented in Table 3 below.

**Table 3 – Stabilization Monitoring Costs**

Service Name	Employee Name	Hours	Unit Rate (per hour)	Cost
Geotechnical Engineer	David Cappa, P.E.	7.5	\$110.00	\$825.00
Project Manager	Jonny Heath	4.0	\$90.00	\$360.00
Monitor	WH/RT DY	56.25	\$60.00	\$3,375.00
Clerical	Elizabeth Cole	4.0	\$45.00	\$180.00
Report Prep	Craig Hampy	4.0	\$70.00	\$280.00
Miles Beyond 50/Day 5 days @ 70.78 miles/Day	WH/RT DY	207.8 miles	\$0.55	\$114.29
Miles Beyond 50/Day 2 days @ 70.78 miles/Day	WH/RT DY	83.12 miles	\$0.45	\$37.40
<b>Total</b>				<b>\$5,171.69</b>

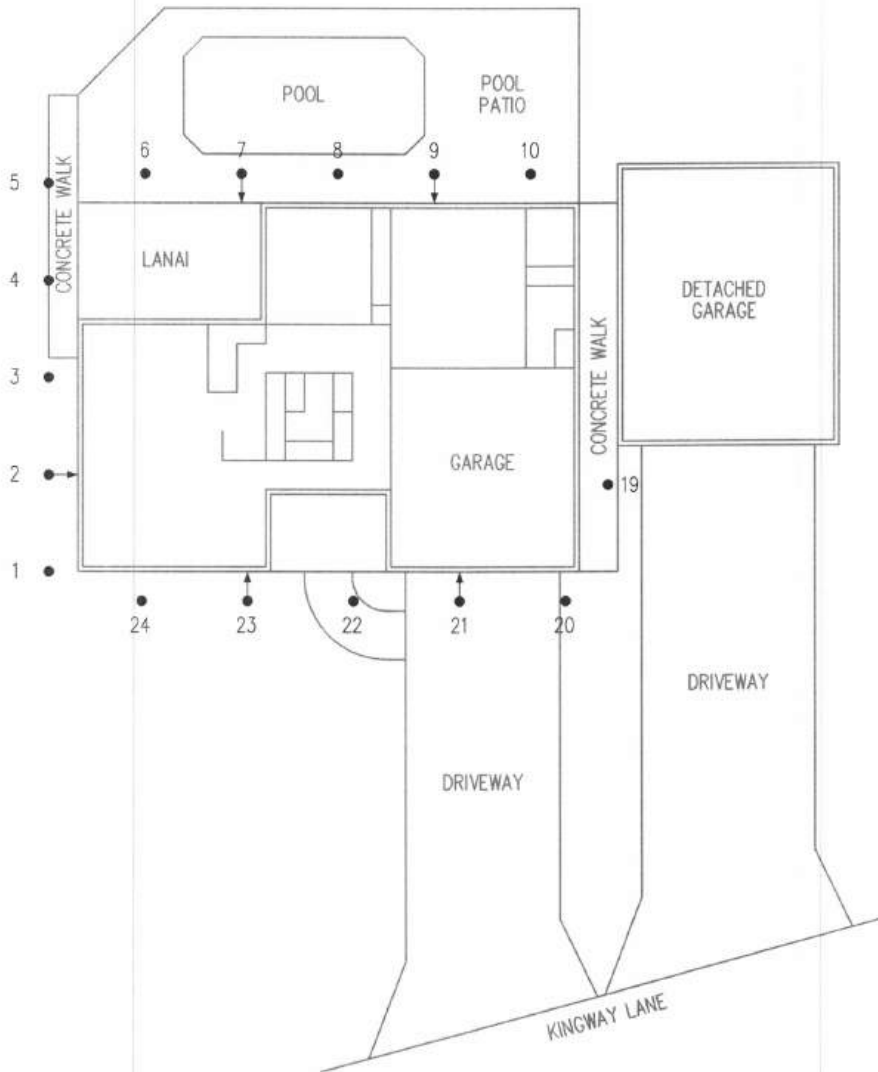
**3.0 Conclusions**

Geo-Tech certifies that Thunder Bay Builders performed the recommended compaction and chemical grout stabilization programs in accordance with our recommendations presented in the previously issued Geotechnical Engineering Evaluation report Geo-Tech Project/Report No. 12-4503.137.1 dated April 24, 2012. The compaction grout and chemical grout quantities are approximate; they are based off stroke counts that are not calibrated in the field. Water systems and pumps were working pre stabilization as well as post stabilization. Remediation pictures are attached in Appendix II.

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## **APPENDIX I**

1. Compaction Grout Injection Map
2. Chemical Grout Injection Map



- = APPROXIMATE COMPACTION GROUT VERTICAL INJECTION POINT
- ←● = APPROXIMATE COMPACTION ANGLED INJECTION POINT

CITIZENS PROPERTY INSURANCE CORPORATION  
 CLAIM 457413, CAZIER RESIDENCE  
 6307 KINGWAY LANE  
 SPRING HILL, HERNANDO COUNTY, FLORIDA

**GEO-TECH, INC.**

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 1016 SE 3rd AVENUE, OCALA, FLORIDA 34471 ~ (352) 694-7711

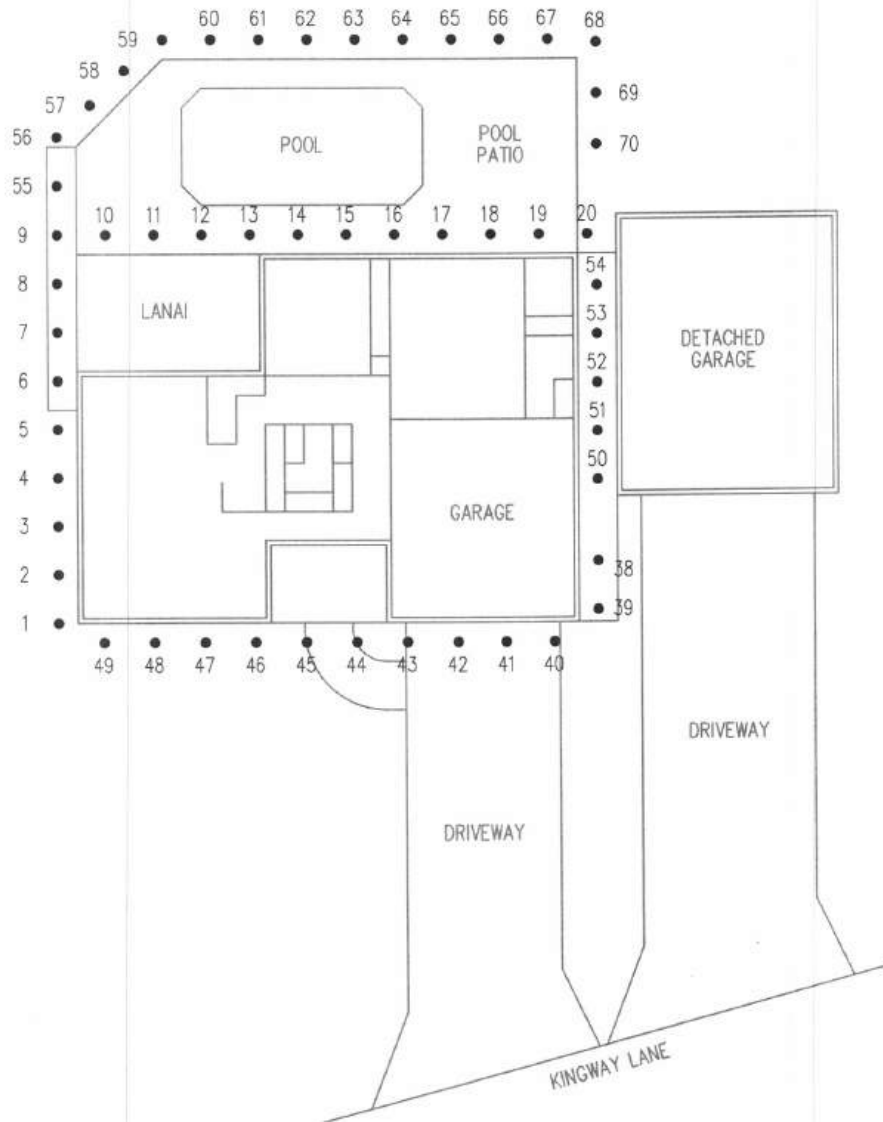
PROJECT NO.  
 12-4503.137.2

SCALE: 1"=20'

DATE: 3-1-13

FIGURE: 1

COMPACTION GROUT INJECTION MAP



● = APPROXIMATE CHEMICAL GROUT VERTICAL INJECTION POINT

CITIZENS PROPERTY INSURANCE CORPORATION  
CLAIM 457413, CAZIER RESIDENCE  
6307 KINGWAY LANE  
SPRING HILL, HERNANDO COUNTY, FLORIDA

CHEMICAL GROUT INJECTION MAP

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1016 SE 3rd AVENUE, OCALA, FLORIDA 34471 ~ (352) 694-7711

PROJECT NO.  
12-4503.137.2

SCALE: 1"=20'

DATE: 3-1-13

FIGURE: 2

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## **APPENDIX II**

Remediation Pictures



Picture 1: Front elevation



Picture 2: Side elevation



Picture 3: Side elevation



Picture 4: Rear elevation with grouting process on pool deck



Picture 5: Core holes in pool deck



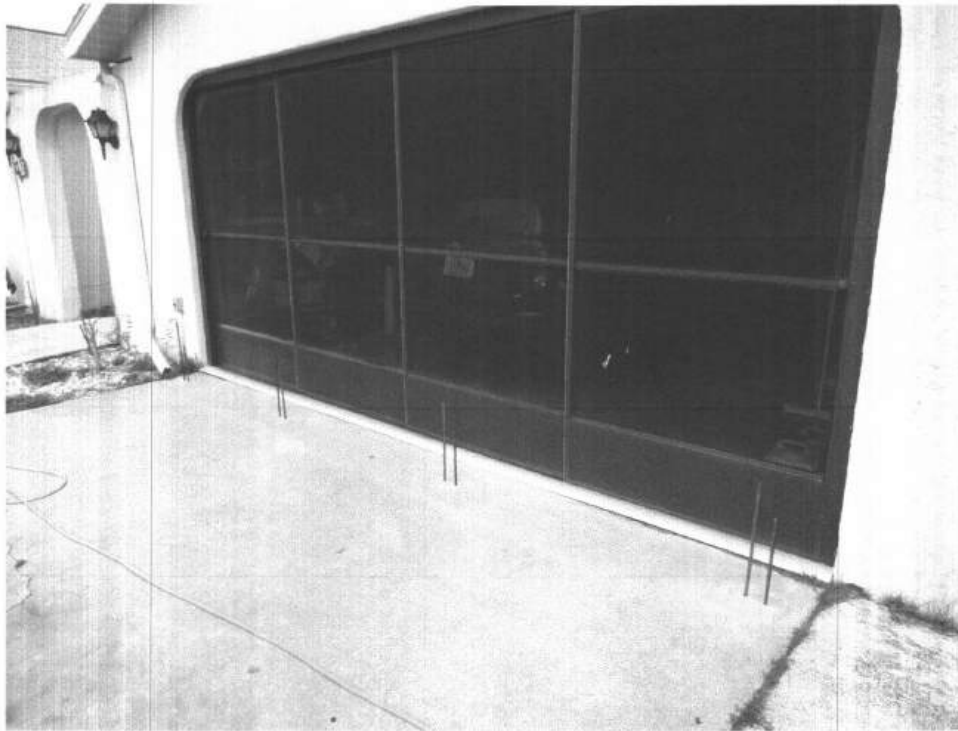
Picture 6: Core hole in driveway



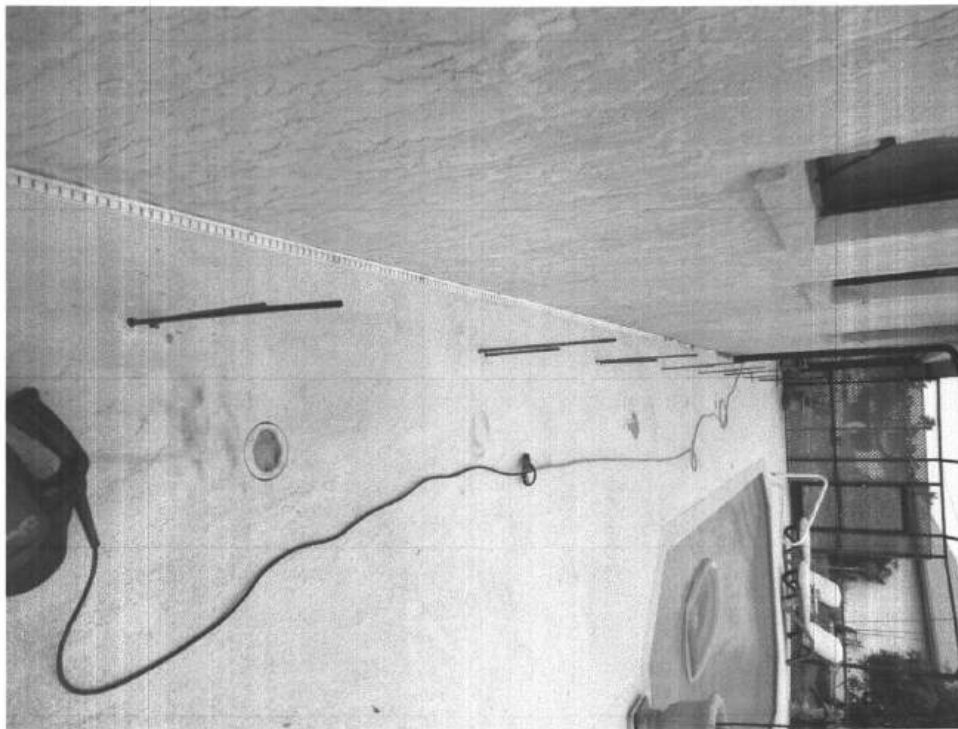
Picture 7: Drilling process on pool deck



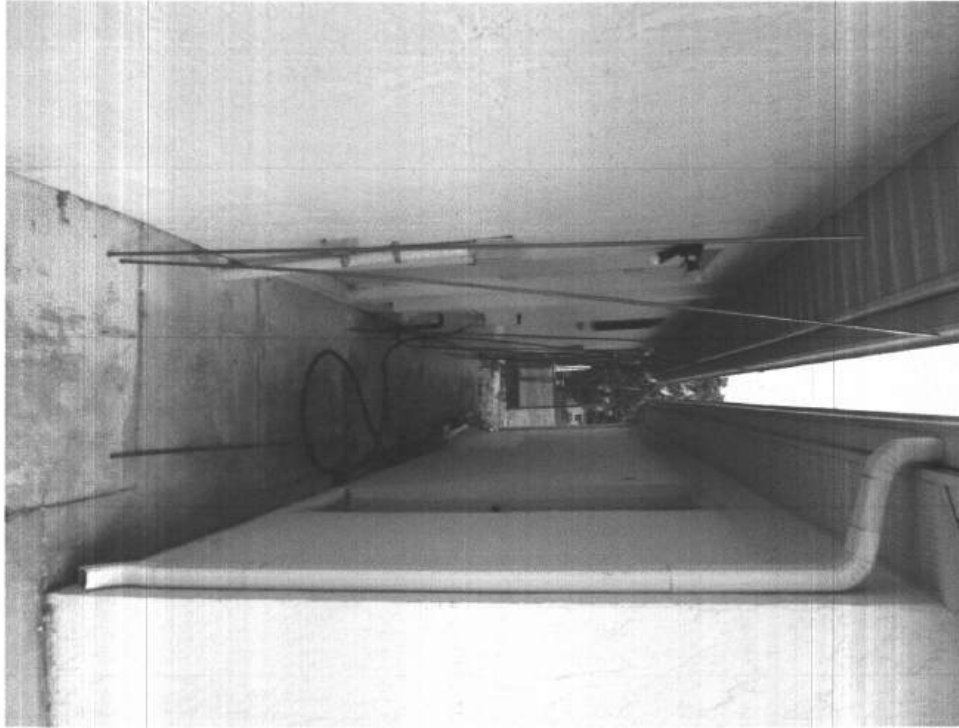
Picture 8: Filled core holes on pool deck



Picture 9: Holes drilled in driveway for chemical injections



Picture 10: Holes drilled in pool deck for chemical injections



Picture 11: Installing chemical injections



Picture 12: Pumping chemical injections