CASE# C15-2014-0065
ROW# 11123063
TAX# 0131090214

CITY OF AUSTIN
APPLICATION TO BOARD OF ADJUSTMENT
GENERAL VARIANCE/PARKING VARIANCE

WARNING: Filing of this appeal stops all affected construction activity.

PLEASE: APPLICATION MUST BE TYPED WITH ALL REQUESTED INFORMATION COMPLETED.

STREET ADDRESS: 5201 Tortuga Trail, Austin, TX 78731

LEGAL DESCRIPTION: Subdivision – ABS 7 Chambers T J ACR .8510

Lot(s)_____ Block_____ Outlot_____ Division_____

I/We Robert Turner on behalf of myself/ourselves as

authorized agent for myself (owner) affirm that on April 7, 2014, hereby

apply for a hearing before the Board of Adjustment for consideration to:

(check appropriate items below)

___ ERECT ___ ATTACH ___ COMPLETE X REMODEL ___ MAINTAIN

Remodel at 5201 Tortuga Trail, 78731. I am requesting a variance to Section 25-2-963 of the Land Development Code. I am requesting a variance to raise my home's foundation more than one foot and to allow for removal of all exterior walls. + height, Code Reference per Daniel Word.

in a LA Zoning district.
(zoning district)

NOTE: The Board must determine the existence of, sufficiency of and weight of evidence supporting the findings described below. Therefore, you must complete each of the applicable Findings Statements as part of your application. Failure to do so may result in your application being rejected as incomplete. Please attach any additional support documents.

VARIANCE FINDINGS: I contend that my entitlement to the requested variance is based on the following findings (see page 5 of application for explanation of findings):

REASONABLE USE:

1. The zoning regulations applicable to the property do not allow for a reasonable use because:

we are not able to raise the foundation more than one foot or remove all exterior walls as directed by professionals. Other home owners could just demolish the whole home and build as "new construction". We are not able to do this because we are under transmission/distribution lines and Austin Energy is requiring us to have a "remodel" status from the COA in order to issue a building permit.

HARDSHIP:

2. (a) The hardship for which the variance is requested is unique to the property in that:

Transmission/distribution lines run above the house. Austin Energy has clearly explained that we can only "remodel" the house. We are not able to demolish the home and build using best building practices under "new construction" as other property owners in our area are able to.

(b) The hardship is not general to the area in which the property is located because:

we are the only home in the area that are under these transmission/distribution lines.

AREA CHARACTER:

3. The variance will not alter the character of the area adjacent to the property, will not impair the use of adjacent conforming property, and will not impair the purpose of the regulations of the zoning district in which the property is located because:

we will only be improving the home and surrounding property. The home will go from its current run down condition to a much improved remodeled home that will only increase the value to the neighborhood.

PARKING: (Additional criteria for parking variances only.)

Request for a parking variance requires the Board to make additional findings. The Board may grant a variance to a regulation prescribed Section 479 of Chapter 25-6 with respect to the number of off-street parking spaces or loading facilities required if it makes findings of fact that the following additional circumstances also apply:

1. Neither present nor anticipated future traffic volumes generated by the use of the site or the uses of sites in the vicinity reasonable require strict or literal interpretation and enforcement of the specific regulation because:

NA

2. The granting of this variance will not result in the parking or loading of vehicles on public streets in such a manner as to interfere with the free flow of traffic of the streets because:

NA

3. The granting of this variance will not create a safety hazard or any other condition inconsistent with the objectives of this Ordinance because:

NA

4. The variance will run with the use or uses to which it pertains and shall not run with the site because:

NA

NOTE: The Board cannot grant a variance that would provide the applicant with a special privilege not enjoyed by others similarly situated or potentially similarly situated.

APPLICANT CERTIFICATE – I affirm that my statements contained in the complete application are true and correct to the best of my knowledge and belief.

Signed _____ Mail Address 5201 Tortuga Trail

City, State & Zip Austin, Tx 78731

Printed Robert P. Turner Phone 512-573-8763 Date 4/6/14

OWNERS CERTIFICATE – I affirm that my statements contained in the complete application are true and correct to the best of my knowledge and belief.

Signed _____ Mail Address 5201 Tortuga Trail

City, State & Zip Austin, Tx 78731

Printed Robert P. Turner Phone 512-573-8763 Date 4/6/14

N

SUBJECT TRACT

PENDING CASE

ZONING BOUNDARY

CASE#: C15-2014-0065

Address: 5201 TORTUGA TRAIL

1 " = 200 '

This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

This product has been produced by CTM for the sole purpose of geographic reference. No warranty is made by the City of Austin regarding specific accuracy or completeness.

CITY OF AUSTIN
FOUNDED 1839

Heldenfels, Leane

From: Rob Turner [redacted]
Sent: Friday, April 25, 2014 12:07 PM
To: Heldenfels, Leane
Subject: Re: Overall height of remodeled home at 5201 Tortuga Trail

Leane,

Per my understanding how the city calculates measurements of the roofline if our variance is approved the measurement would be 33.5 feet.

The city has all drawings of remodel. If you need anything let me know.

Regards

Rob Turner

Sent from my iPhone

On Apr 25, 2014, at 11:48 AM, "Heldenfels, Leane" <Leane.Heldenfels@austintexas.gov> wrote:

> Hi Rob – can you provide me of the highest point of what will be the new roof.
> Could you also provide an elevation showing this.
> I need the measurement today (I am working on the public notice and need to include that measurement), but elevation can be emailed no later than Friday May 2nd.
> Thanks –
> Leane
> Ps Daniel Word is out until next TH, so I haven't confirmed the notice language/code section with him yet – but I will before it is mailed.

City of Austin

Founded by Congress, Republic of Texas, 1839
Planning & Development Review Department
One Texas Center, 505 Barton Springs Road, 78704
P.O. Box 1088, Austin, Texas 78767

April 4, 2014

Robert and Lesli Turner
5201 Tortuga Trail
Austin, TX 78731

RE: 5201 Tortuga Trail, Status Determination
Legal Description: ABS 7 CHAMBERS T J ACR .8510

Dear Mr. and Ms. Turner:

Thank you for your patience with City staff as we worked through our review of your request. As you know, City staff has met with you on a number of occasions to discuss the possibility of the potential remodel of the primary structure located at 5201 Tortuga Trail.

At each meeting with you and your representatives, staff has provided information for the allowances of remodel in accordance with Section 25-2-963 of the Land Development Code. This is the Code Section that pertains to modification and maintenance of noncomplying structures for existing structures. City staff members have clearly detailed the allowances of this code section. In summary, this code section includes provisions for demolition and removal of no more than fifty percent of the existing exterior walls and supporting structural elements including load bearing masonry walls, and wood construction including, studs, sole plate, and top plates provided that no more than fifty percent of the preexisting walls be removed as part of the demolition. This code section also includes a provision that requires that the existing foundation may be raised or lowered no more than one foot as it relates to the existing elevation of the foundation. Accordingly, the replacement or alteration of an original foundation may not change the finished floor elevation by more than one foot vertically, in either direction.

During the last meeting with you and your representatives, you asked that the City have an inspector make a site visit to 5201 Tortuga Trail to perform a visual inspection of some areas of the structure that you had exposed. The City performed the inspection as you requested, and a City of Austin representative made a site visit to perform a visual inspection on Monday March 24, 2014. Based on the experience of the Planning & Development Review Department, the conditions observed by the City inspector did not provide an adequate basis for a determination that the termite and water damage were significant enough to justify the City permitting demolition outside of the allowable requirements with City Code Section 25-2-963. The damages observed by the inspector were limited to some limited damage to the drywall and finish trim. In addition, there was no evidence of

structural damage observed other than some limited areas of damage to a bottom plate at the rear wall of the structure.

The damage observed by the inspector at the time of the site visit does not provide adequate justification in accordance with City Code Section 25-2-963 that would justify the Building Official approving the removal of more than fifty percent of the exterior walls.

Furthermore, it appears the Engineering Foundation Report provided is based on "reuse with significant remodel." The report does not provide sufficient evidence of adequate degradation of the structural integrity that would suggest that the structure is not suitable for use as it currently exists.

There may be other options outside of the options addressed in this decision. Listed below are some options that are outside of my area of authority, and that may be worth your consideration.

1. A Board of Adjustment Hearing.

2. Austin Energy allows the issuance of a new construction permit.

3. Austin Energy relocation of the power distribution line from above the structures.

In conclusion, based on current conditions, any proposed improvements must meet City Code Section 25-2-963 requirements and the current envelope of the structure must be maintained. Any additions to the structure must be outside of the 7'6" horizontal clearance of the distribution line which is under and clear of the transmission line. All construction must be in accordance with all the requirements of the City of Austin, specifically including the requirements of Austin Energy and the Planning & Development Review Department.

Respectfully,

Dan L. McNabb, Deputy Building Official
Building Inspection Division Manager

Cc: Greg Guernsey, Director, PDRD
Kathy Haught, Manager, Development Services
Tony Hernandez, Program Manager, Residential Building Inspection
John McDonald, Manager, Residential Review

C15-2014-0065

Heldenfels, Leane

From: Rob Turner [redacted]
Sent: Tuesday, April 29, 2014 4:13 PM
To: Poole, Sonny
Cc: Kellogg, Eben; Heldenfels, Leane
Subject: Re: 5201 Tortuga Trail (Robert and Lesli "Lama" Turner)

Sonny,

I hope you are well. I received a request from Leane Heldenfels requesting a letter from Austin Energy stating they are in support of us receiving a building permit to do a major remodel on our property at 5201 Tortuga Trail 78731.

Our BOA hearing is to allow us to receive approval on variance/s that would allow us a remodeling designation (No New Construction Designation) with the following exceptions or approvals to the remodeling ordinances:

1) The ability to increase our foundation from the present remodeling ordinance of a 1 foot increase to an increase to a best building practice of 2 to 3 feet.

2) To remove all existing perimeter framed walls to accommodate best building practices for the increased foundation and new driven steel pilings (approx. 70).

3) To allow for a finished roofline that will be approximately 33.5 feet according to the COA interpretations of how massing is determined. Note for Austin Energy: The roofline would remain 60 feet plus below the lowest transmission/distribution line that is above.

Please offer us your support with these strict and clear designations that must be granted to receive the support of Austin Energy.

I did want to also let you know that we received support by signatures of our variance from every neighbor within 500 feet of our home on Tortuga Trail. I know this is very important to you.

Regards

Rob Turner

On Thu, Apr 10, 2014 at 8:03 AM, Poole, Sonny <Sonny.Poole@austinenergy.com> wrote:

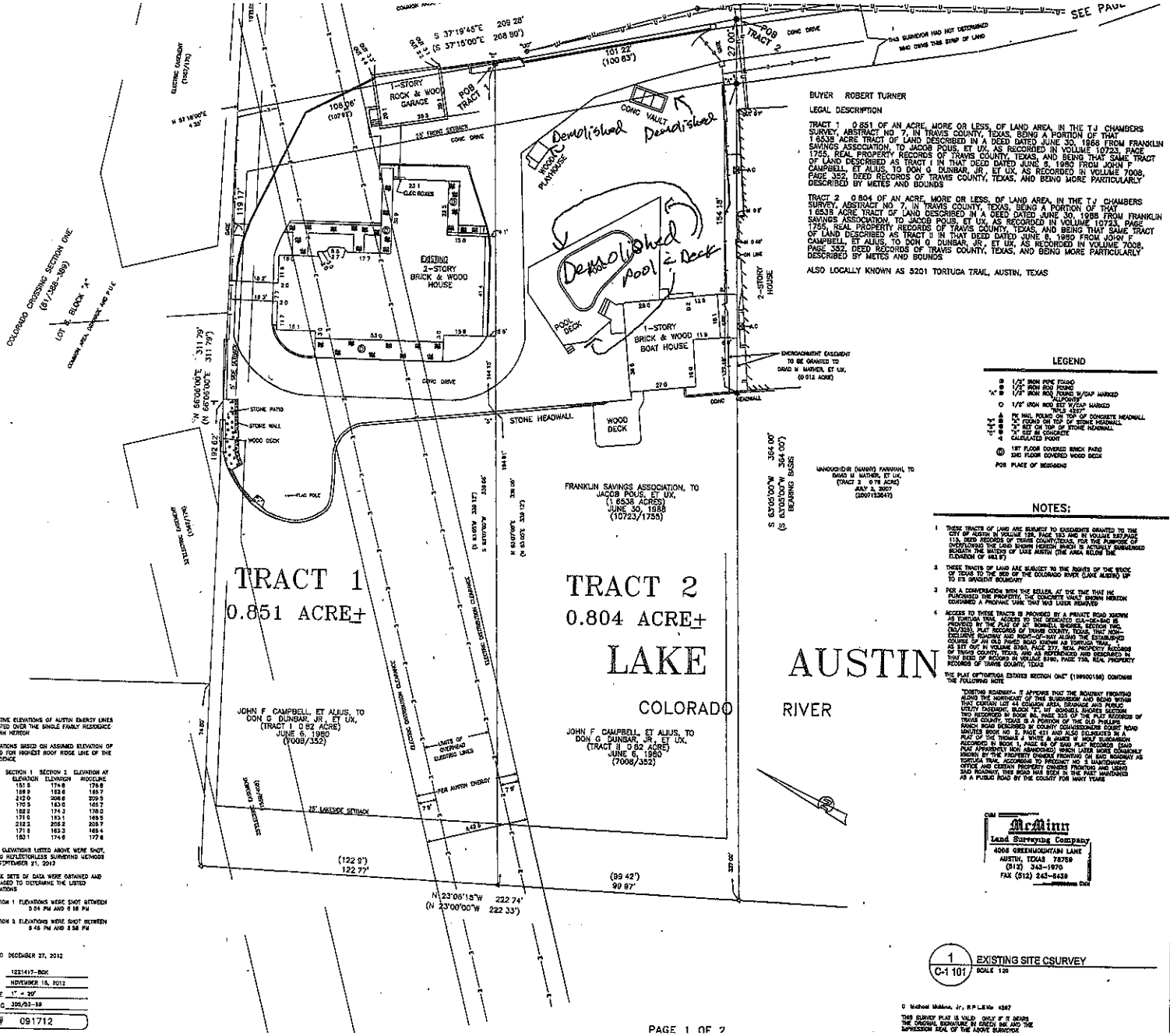
Mr. Turner

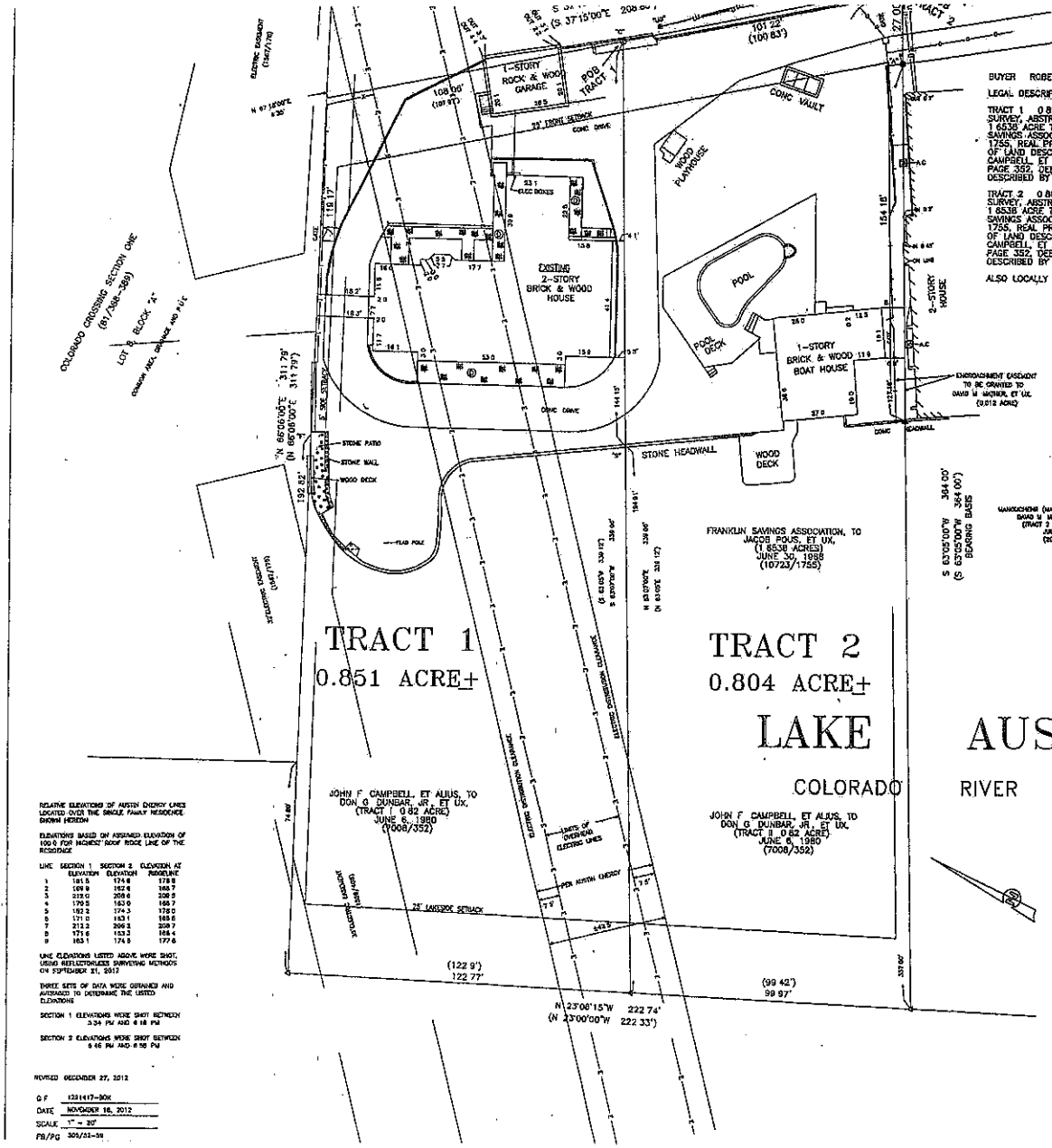
Thank you for the copy of the letter. Eben Kellogg is my employee and the request to the BOA will come to me through Eben. You will need to provide us with the information packet that you will submit to the BOA and we will respond to that request so that you will not be delayed in going to the BOA.

Tract 2 - 5203 Tortuga Trail

The following ~~are~~ structures were demolished:

1) Wood Playhouse
2) Conc. Vault
3) Pool & Deck





BUYER ROBERT TURNER

LEGAL DESCRIPTION

TRACT 1 0.851 OF AN ACRE, MORE OR LESS, OF LAND AREA, IN THE T.J. CHAMBERS SURVEY, ABSTRACT NO. 7, IN TRAVIS COUNTY, TEXAS, BEING A PORTION OF THAT 1.6538 ACRE TRACT OF LAND DESCRIBED IN A DEED DATED JUNE 30, 1988 FROM FRANKLIN SAVINGS ASSOCIATION, TO JACOB POUS, ET UX, AS RECORDED IN VOLUME 10723, PAGE 1755, REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS, AND BEING THAT SAME TRACT OF LAND DESCRIBED AS TRACT I IN THAT DEED DATED JUNE 6, 1980 FROM JOHN F CAMPBELL, ET ALIUS, TO DON G DUNBAR, JR., ET UX, AS RECORDED IN VOLUME 7008, PAGE 352, DEED RECORDS OF TRAVIS COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS

TRACT 2 0.804 OF AN ACRE, MORE OR LESS, OF LAND AREA, IN THE T.J. CHAMBERS SURVEY, ABSTRACT NO. 7, IN TRAVIS COUNTY, TEXAS, BEING A PORTION OF THAT 1.6538 ACRE TRACT OF LAND DESCRIBED IN A DEED DATED JUNE 30, 1988 FROM FRANKLIN SAVINGS ASSOCIATION, TO JACOB POUS, ET UX, AS RECORDED IN VOLUME 10723, PAGE 1755, REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS, AND BEING THAT SAME TRACT OF LAND DESCRIBED AS TRACT II IN THAT DEED DATED JUNE 6, 1980 FROM JOHN F CAMPBELL, ET ALIUS, TO DON G DUNBAR, JR., ET UX, AS RECORDED IN VOLUME 7008, PAGE 352, DEED RECORDS OF TRAVIS COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS

ALSO LOCALLY KNOWN AS 5201 TORTUGA TRAIL, AUSTIN, TEXAS

NOTES:

1 THESE TRACTS OF LAND ARE SUBJECT TO EASEMENTS GRANTED TO THE CITY OF AUSTIN IN VOLUME 1216, PAGE 183 AND IN VOLUME 5617, PAGE 111, DEED RECORDS OF TRAVIS COUNTY, TEXAS, FOR THE PURPOSE OF OVERFLOWING THE LAND KNOWN HEREON AS THAT PORTION OF ACTUALLY SURROUNDED BENEATH THE WATERS OF LAKE AUSTIN (THE AREA BELOW THE ELEVATION OF 492.8'±)

2 THESE TRACTS OF LAND ARE SUBJECT TO THE RIGHTS OF THE STATE OF TEXAS TO THE BED OF THE COLORADO RIVER (LAKE AUSTIN) UP TO ITS GRADIENT BOUNDARY

3 PER A CONVERSATION WITH THE SELLER, AT THE TIME THAT HE PURCHASED THE PROPERTY, THE BENCHMARK VAULT SHOWN HEREON CONTAINED A PROPANE TANK THAT WAS LATER REMOVED

4 ACCESS TO THESE TRACTS IS PROVIDED BY A PRIVATE ROAD KNOWN AS TORTUGA TRAIL. ACCESS TO THE DEDICATED RIGHT-OF-WAY IS PROVIDED BY THE PLAT OF LOT BONNELL SHORES, SECTION TWO, (50/120) PLAT RECORDS OF TRAVIS COUNTY, TEXAS THAT NON-EXCLUSIVE ROADWAY AND RIGHT-OF-WAY ALONG THE ESTABLISHED CENTER OF AN OLD PAVED ROAD KNOWN AS TORTUGA TRAIL, AS SET OUT IN VOLUME 5780, PAGE 277, REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS, AND AS REFERENCED AND DESCRIBED IN THAT DEED OF RECORD IN VOLUME 9788, PAGE 758, REAL PROPERTY RECORDS OF TRAVIS COUNTY, TEXAS

THE PLAT OF "TORTUGA ESTATES SECTION ONE" (199802164) CONTAINS THE FOLLOWING NOTE

"EXISTING ROADWAY:- IT APPEARS THAT THE ROADWAY FRONTING ALONG THE NORTHWEST OF THIS SUBDIVISION ARE BEING WITHIN THAT CERTAIN LOT 44 COMMON AREA, DRAINAGE AND PUBLIC UTILITY EASEMENT, AS SHOWN OF BONNELL SHORES, SECTION TWO RECORDED IN BOOK 50, PAGE 120 OF THE PLAT RECORDS OF TRAVIS COUNTY, TEXAS & A PORTION OF THE OLD PHILLIPS RANCH ROAD DESCRIBED IN VOLUME 5780, PAGE 277 OF THE DEED RECORDS OF TRAVIS COUNTY, TEXAS & PAGE 421 AND ALSO DELINEATED IN A PLAT OF THE ROADWAY WIDTH & AREA OF W.F. WOLF SUBDIVISION RECORDED IN BOOK 1, PAGE 66 OF SAID PLAT RECORDS (SAID PLAT APPEARS TO BE RECORDED IN ERROR SINCE MORE CONSISTENT KNOWN BY THE PROPERTY OWNERS FRONTING ON SAID ROADWAY AS TORTUGA TRAIL. PROPOSED TO PRESENT NO 3 MAINTENANCE OFFICE AND CERTAIN PROPERTY OWNERS FRONTING AND USING SAID ROADWAY. THIS ROAD HAS BEEN IN THE PAST MAINTAINED AS A PUBLIC ROAD BY THE COUNTY FOR MANY YEARS

RELATIVE ELEVATIONS OF AUSTIN ENERGY LINES LOCATED OVER THE SINGLE FAMILY RESIDENCE SHOWN HEREON

ELEVATIONS BASED ON ASSUMED ELEVATION OF 100.0 FOR HIGHEST ROOF RIDGE LINE OF THE RESIDENCE

LINE	SECTION 1 ELEVATION	SECTION 2 ELEVATION	ELEVATION AT PARKELINE
1	181.5	174.8	178.8
2	189.6	182.6	186.7
3	219.0	208.6	208.9
4	179.3	163.0	166.7
5	183.3	174.3	178.0
6	171.0	163.1	165.6
7	213.2	206.3	209.7
8	175.6	163.3	166.4
9	183.1	174.8	177.6

LINE ELEVATIONS LISTED ABOVE WERE SHOT USING REFLECTORLESS SURVEYING METHODS ON SEPTEMBER 21, 2012

THREE SETS OF DATA WERE OBTAINED AND AVERAGED TO DETERMINE THE LISTED ELEVATIONS

SECTION 1 ELEVATIONS WERE SHOT BETWEEN 3:34 PM AND 4:18 PM

SECTION 2 ELEVATIONS WERE SHOT BETWEEN 5:46 PM AND 6:56 PM

REVISED DECEMBER 27, 2012

G F 1231417-BOK
DATE NOVEMBER 16, 2012
SCALE 1" = 20'
FB/PG 305/53-59

McMinn
Land Surveying Company
4008 GREENMOUNTAIN LANE
AUSTIN, TEXAS 78759
(512) 345-1970
FAX (512) 345-8439

1 / C-1 101 EXISTING SITE CSURVEY
SCALE 1:20

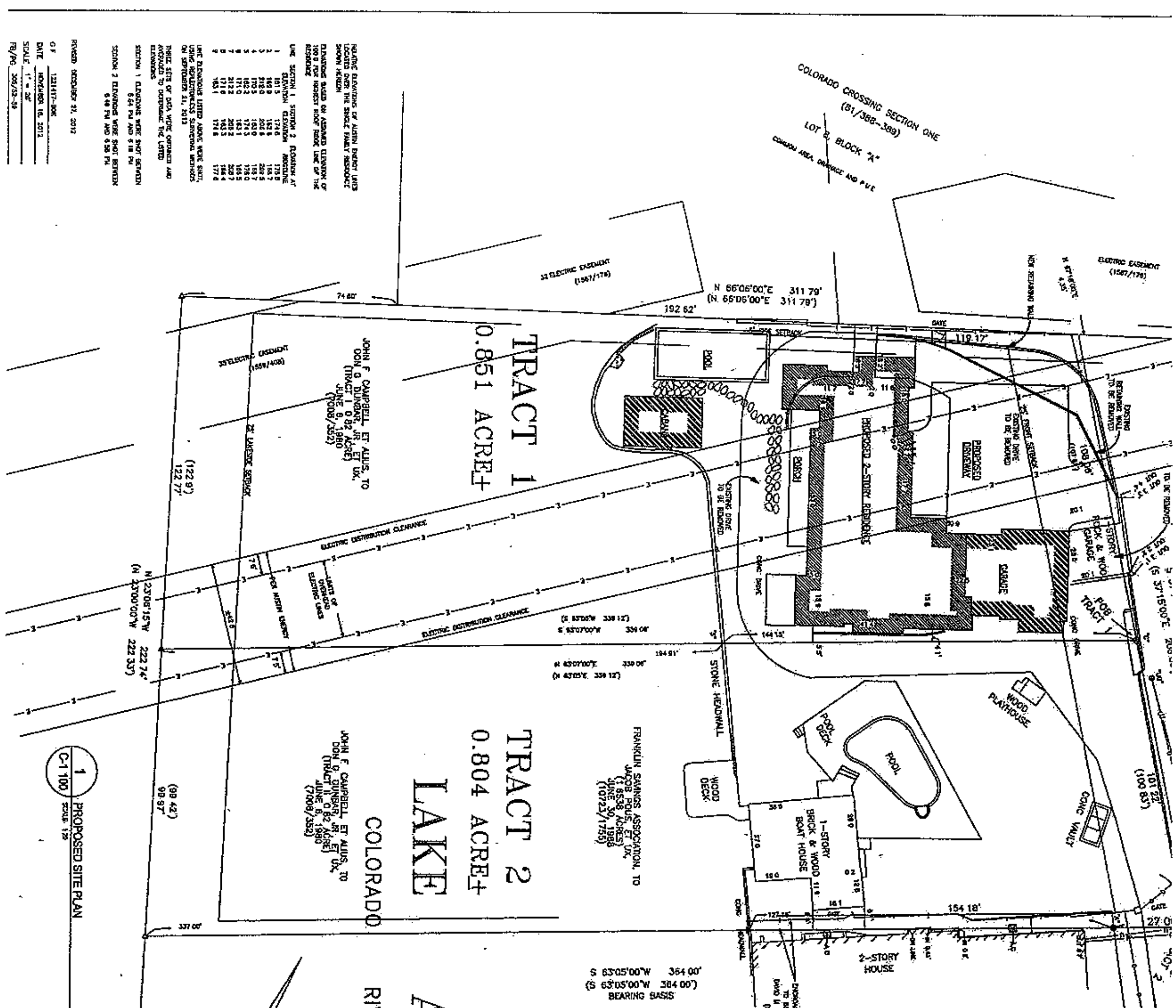
© Michael Mcminn, Jr., R.P.L.S. No. 4367
THIS SURVEY PLAT IS VALID ONLY IF IT BEARS

HARDESIC ARCHITECTS
3186 Paces Mill Place
Atlanta, Georgia 30339
phone (404) 355-7
fax (404) 355-78

TURNER RESIDENCE
5201 TORTUGA TRAIL AUSTIN, TX

REGISTERED ARCHITECT WILLIAM HARDESIC STATE OF TEXAS

issue
date 2013-08-18
scale 1:20
drawn NCF checked
project no 2669 00
title EXISTING SITE SURV



TURNER RESIDENCE

5201 TORTUGA TRAIL, AUSTIN, TX

Project Name: 5201 TORTUGA TRL
Legal:
File Number:

Residential Zoning Review - Daniel Word - 512-974-3341

I have reviewed the submittal and update submittals and have the following comments that must be addressed before a permit can be released:

1. Lot size calculated incorrectly-see 25-1-22
2. Impervious coverage calculated incorrectly-see 25-2-551
3. Need Joint-use access easement to access road across another property
4. Demo plan on sheet D2.010 conflicts with sheet D2.011-see 25-2-963
5. FFE not provided on plans
6. Setback plane compliance plan not submitted
7. Engineering letter proposes a 3ft change in FFE-see 25-2-963
8. Pool and cabana in shoreline setback area-see 25-2-551
9. Setbacks not shown on proposed site plan sheet C1.100
10. Topo survey required
11. Pool located in electric easement
12. New attached garage encroaches into front and side yard setback-see 25-2-551
13. New retaining wall located in electric easement
14. Technical review required prior to release of permit-zoning comments must be cleared first
15. Retaining walls by separate permit only if over 4ft in height (bottom of footing to top of wall)

Project Name: 5201 TORTUGA TRL
Legal:
File Number:

Residential Zoning Review - Karen Palacios - Karen.palacios@austintexas.gov

The following items need to be addressed/submitted;

1. The reduce set needs to be stamped and signed by the architect.
2. The Austin Energy (BSPA) form and reduce plot plan needs to be signed and stamped by Austin Energy.
3. The Subchapter F setback plane/exemption exhibits need to be submitted.
4. The garage is considered a full demolition and I will forward the application to Michael Watson and he will be in contact with the applicant.
5. The project description does not indicate a new pool, but the building & site area page of the application does. Please advise.
5. A partial demolition needs to be submitted for the addition. Please submit all items/type on the demolition application.

When all items above have been addressed/submitted the plans will get routed to the floodplain department and when plans are cleared with floodplain they will get routed to the technical review department.

Heldenfels, Leane

From: Rob Turner <[redacted]>
Sent: Monday, April 28, 2014 1:11 PM
To: Heldenfels, Leane
Subject: Re: Overall height of remodeled home at 5201 Tortuga Trail
Attachments: TortugaElectricLines1968.jpg; 5201TortugaTrailElectricLinesPhotos.docx

Leane,

Please find attached photos of the distribution/transmission lines that currently go over our home located at 5201 Tortuga Trail along with a photo of the distribution/transmission lines from 1968.
These distribution/transmission lines and the home have co-existed for nearly 50 years. Today's electrical regulations prohibit habitable spaces being under these types of lines. Austin Energy, however, is in support of a remodel/improvement of our home but will not allow a New Construction designation to be granted.

The presence of these distribution/transmission lines will be our main hardship issue at the BOA meeting.

Regards,

Rob Turner

On Mon, Apr 28, 2014 at 12:25 PM, Rob Turner <[redacted]> wrote:
Leane,

Great news. We have received signatures from all neighbors on Tortuga Trail that are within 500 feet of us offering their support of our variance request. Please find the signature pages attached. Can you please let me know if there is anything else that you need from me in advance of our BOA meeting on the 12th.

I will be forwarding you shortly the soils report and structural engineering letter that we received earlier this year.

Regards,

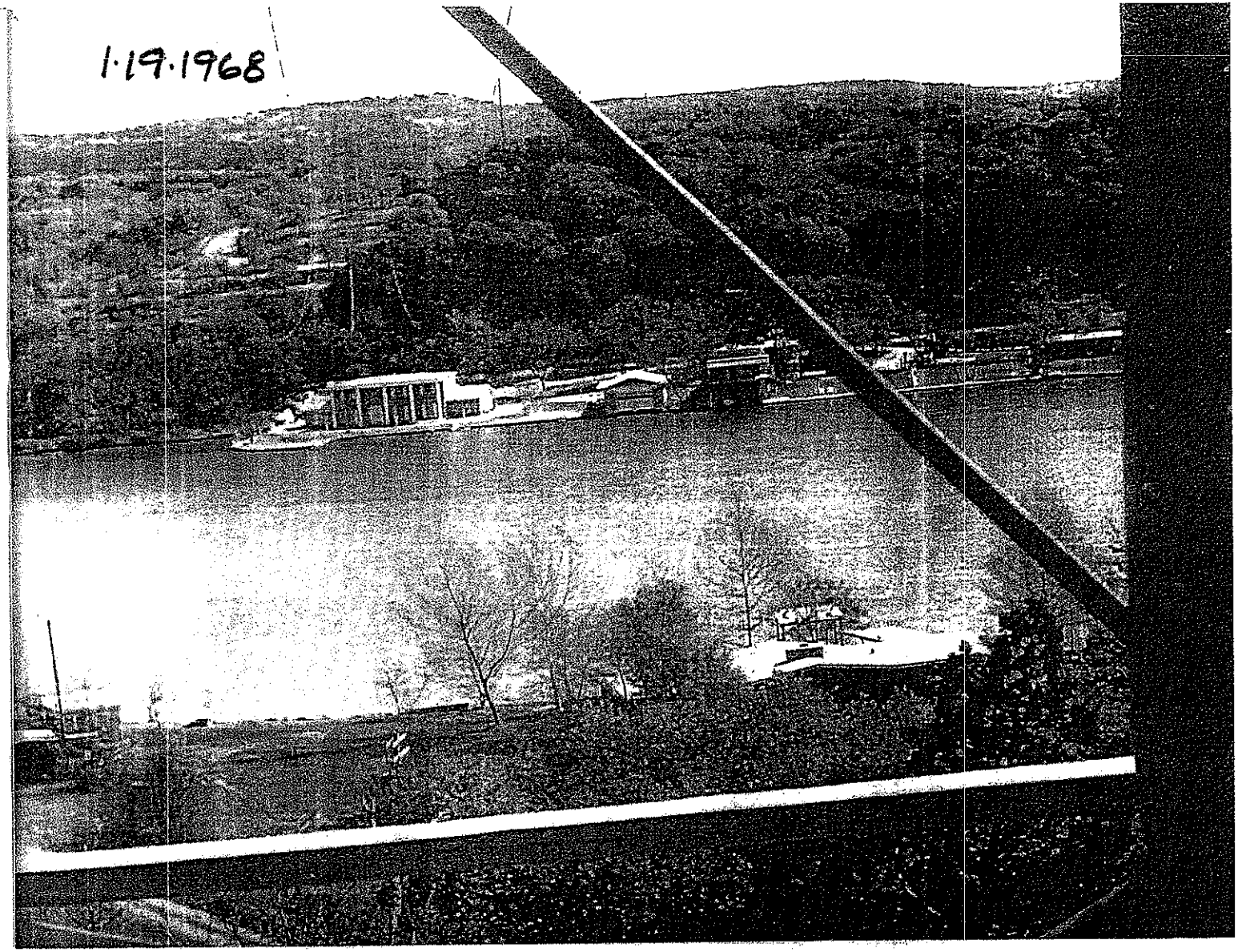
Rob Turner
512-573-8762

On Fri, Apr 25, 2014 at 4:46 PM, Heldenfels, Leane <Leane.Heldenfels@austintexas.gov> wrote:

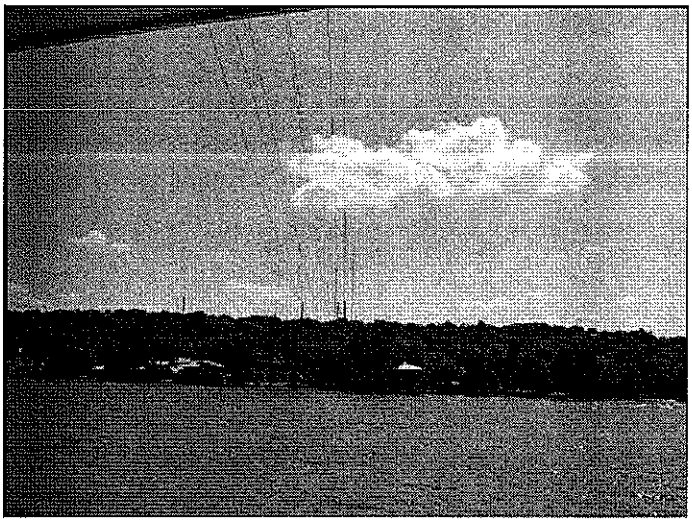
Hi Rob- I just got finished w/ my legal dept. review of notice language and they would like to see a copy of the Austin Energy letter before I send the notice out. If you have it can you send it to me, even though I said all other evidence wasn't due until 5/2. If you have a pdf version of Dan McNabb's letter could you send that, too. I have a hard copy in the file that will go in the packet but would just be quicker if I sent them both out to them in the same email.

Thanks –

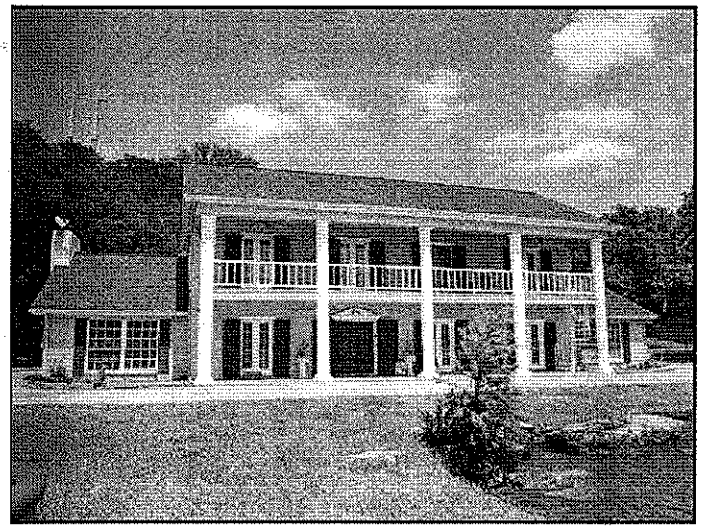
1·19·1968



5201 Tortuga Trail, Austin, Tx 78731 - Electric Lines as of 4/28/14



View of electric lines as you stand on front porch looking across the lake.



View of electric lines as you stand in peninsula and look back at the home.

View of electric lines as you see them standing in courtyard.

I, Robert Turner, am applying for a variance from the Board of Adjustment regarding Section 25-2-963 of the Land Development Code. The variance would allow me the ability to raise the foundation more than one foot and remove all exterior walls.

By signing this form, I understand that I am declaring my support for the variance being requested.

Property Owner Name (Printed)	Address	Signature
MICHAEL B DAVIS	5205 TORTUGA TRAIL AUSTIN, TEXAS 78731	

I, Robert Turner, am applying for a variance from the Board of Adjustment regarding Section 25-2-963 of the Land Development Code. The variance would allow me the ability to raise the foundation more than one foot and remove all exterior walls.

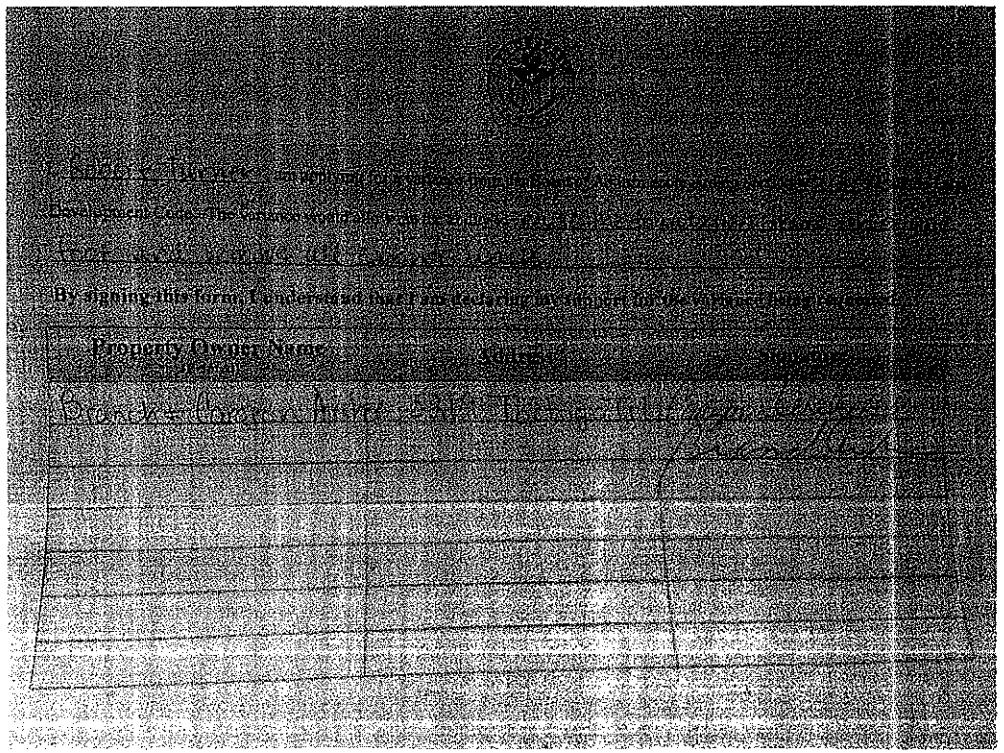
By signing this form, I understand that I am declaring my support for the variance being requested.

Property Owner Name (Printed)	Address	Signature
Mary Ana & Kevin Miller	5209 Tortuga Trail	

I, Robert Turner, am applying for a variance from the Board of Adjustment regarding Section 25-2-[illegible] of the Land Development Code. The variance would allow me the ability to raise the foundation more than one foot and remove all exterior walls.

By signing this form, I understand that I am declaring my support for the variance being requested.

Property Owner Name (Printed)	Address	Signature
[illegible]	[illegible] Tortuga Trail	[signature]
[illegible]	5[illegible] Tortuga Trail.	[signature]
Robert & Lesli Turner	5203 Tortuga Trail	Robert Turner / Lesli Turner



GEOTECHNICAL INVESTIGATION
FOUNDATION RECOMMENDATIONS

5201 Tortuga Trail
Austin, Texas

Report For:

Rob and Lama Turner
5201 Tortuga Trail
Austin, Texas 78731

June 2013

Engineer's Job # 13104000.227

MLA LABS, INC.
TBPE Firm # F-2684
Geotechnical Engineering and Construction Materials Testing
"put us to the test"

Christopher P. Elliott
Project Manager

Timothy R. Weston, P.E.
Vice President
7/3/13

STATE OF TEXAS
TIMOTHY R. WESTON
87938
LICENSED PROFESSIONAL ENGINEER

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION
Foundation Recommendations

5201 Tortuga Trail
Austin, Texas

BACKGROUND

This report presents the results of a soil exploration and analysis for the proposed residence located at *5201 Tortuga Trail* in Austin, Texas. Authorization to perform this exploration and analysis was by Agreement for Engineering Services with Rob and Lama Turner.

The purposes of this investigation were to determine the soil profile, the engineering characteristics of the foundation soil and to provide criteria for use by the design engineers in preparing foundation designs for the proposed project. The scope included a review of geologic literature, a reconnaissance of the immediate site, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation of the foundation materials.

The exploration and analysis of the subsurface conditions reported herein is considered sufficient in detail and scope to form a reasonable basis for foundation design. The recommendations submitted are based on the available soil information and the assumed preliminary design for the proposed structure. Any revision in the plans for the proposed structures from those stated in this report should be brought to the attention of the Geotechnical Engineer so that he may determine if changes in the foundation recommendations are required. Site work and foundation construction should be monitored by MLA Labs, Inc. to verify that these recommendations are implemented, and so that deviations from expected conditions can be properly evaluated.

This report has been prepared for the exclusive use of the client and their design professionals for specific application to the proposed project in accordance with generally accepted soils and foundation engineering practice. This report is not intended for use as a

specification or construction contract document, but as a guide and information source to those qualified professionals who prepare such documents.

ARCHITECTURAL AND STRUCTURAL ASSUMPTIONS

The proposed residence is a one or two story residential building with wood framing and a masonry or fiber cement board exterior. **The shape factor§ of this slab should be considered by the structural engineer.** If these assumptions are not correct, please contact the geotechnical engineer so they may review the recommendations contained herein for accuracy, completeness, and appropriateness. As finalized plans become available they should be shared with the Geotechnical Engineer so they may ascertain whether any modifications to the recommendations presented herein are necessary.

FIELD AND LABORATORY INVESTIGATION

Seven borings were drilled to various depths spaced at locations as shown on the enclosed Logs of Boring and Plan of Borings using a truck-mounted drilling rig. Water was not introduced into the borings. The field investigation included completing the soil borings, performing field tests, and recovering samples. Representative soil samples were selected for laboratory index tests including Atterberg Limits and moisture content tests. The results of these tests and stratigraphy are presented on the Logs of Boring found in ***Appendix A***. A key to the Soil Classification and symbols is located behind the last Log of Boring. See ***Appendix B*** for details of field and laboratory procedures, as applicable.

§ The shape factor is defined as the perimeter of the slab squared divided by the slab area.

SITE TOPOGRAPHY, DRAINAGE AND VEGETATION

The site is situated on sloping topography with existing slopes ranging up to approximately 8 percent. Regionally, this site drains to the southwest. The vegetation at this site included grasses and mature trees.

SUBSURFACE CONDITIONS AND LOCAL GEOLOGY

Soil Profiles

The native soil profile identified in the borings consists of an upper layer of yellowish tan and light gray high plasticity clay (CH) that varies in color to light gray and then to brown and is underlain by dark brown and tan moderate plasticity clay (CL/CH). These layers are further underlain by brown high plasticity clay (CH) that varies to moderate plasticity clay (CL/CH). Intact limestone was noted in some of the borings at depth. This soil profile has the potential for volume change with respect to varying moisture contents. This potential is taken into consideration for the foundation recommendations.

Geology

Geologic maps indicate the Lower Colorado River terrace deposits, *Qlcr*, and the Glen Rose Formation, *Kgr*, beneath the subject site [1,2]. A description of each geology follows.

These terrace deposits generally consist of high and low plasticity clay and sand with gravel layers. The proportion of sand and clay in these deposits was dependent on the depositional energies of these sediments. During periods of flooding, gravel layers were deposited and, as the floods receded, sands and clays were deposited. Generally, the older or lower portions of this formation are comprised of large materials such as sand and gravel. The more recent or upper portions of this terrace deposit consist primarily of clay with fine sand and occasionally fine gravel layers. This formation was also subject to periods of draught. These draughts lowered the water table in the sediments, which resulted in the deposition of calcareous

material called evaporite. More recent alluvial material consisting of high plasticity clay overlies this formation, but is often not mapped separately.

The Glen Rose formation is the youngest formation of the Trinity Group from Lower Cretaceous Period and its outcrop forms a narrow prairie in the Austin area from Mt. Bonnell northwest to Burnet. Its outcrop is characterized by steep canyons and terraced or "staircase" topography on hillsides.

The Glen Rose is predominantly a limestone formation, typically consisting of thin to massively bedded, hard limestone strata alternating with clay, argillaceous limestone and thin sandstone strata. The formation was deposited under neritic or near shore conditions and the various strata represent different depositional environments such as mud flats, lagoons, beaches and shallow water reefs. The alternating hard and soft layers cause the characteristic staircase topography of the Glen Rose.

The hard, massive limestone can be generally characterized as offering excellent foundation support for the proposed structures, but will present difficulty as far as excavation for utility lines and other site work. The softer argillaceous limestones again offer good foundation support and for the most part can be excavated with less difficulty.

Ground Water

Ground water was noted in borings B-2, B-3 and B-7 during this investigation. Ground water is a transient problem and may be encountered at other locations and in varying quantities depending on antecedent rainfall conditions and changes in land use.

CONCLUSIONS

1. Excavation and site work:

   a. Excavation may be performed using ordinary power equipment for the construction of slab-on-ground foundations at this site.

   b. All excavations should be braced and shored according to applicable law and building code. Consultation on excavations can be provided by the geotechnical engineer upon request. If shoring is required on this project, specific design recommendations can be developed upon analysis of the application.

   c. Ground water is possible in shallow and deep excavations depending on antecedent rainfall. During periods of high rainfall, perched ground water may cause the soils to become soft and difficult to compact.

2. Settlement potential:

   a. The potential for settlement greater than 1 inch of the natural soils on this site for light, one to two story structures may be categorized as low.

   b. Settlement potential of any uncontrolled (non-approved) fill is unpredictable.

   c. Heavy structures or structures more than three stories in height will require analysis beyond the scope of this report.

3. Expansive soil potential:

   The soils at this project site exhibited plasticity indices ranging from 3 to 39. A point estimate of the potential vertical rise, PVR, of the in-situ soil profile was found to be 2 ½ inches [3]. Thus, the potential for disruptive foundation movements due to swelling soils may be categorized as high. Other magnitudes of PVR may be estimated by other methods and at other locations with varying results. However, the TxDOT Method is widely used and should be considered an index property of the site. PVR is considered in the final foundation recommendations.

4. Foundation Type:

The foundation type recommended for this project is a driven pile supported slab. It is our understanding that the client desires this foundation type. If recommendations for other foundation types are desired, please contact the Geotechnical Engineer.

5. Faults:

Published geology maps do not indicate the presence of a fault on the project site and faulted conditions were not noted in the borings.

6. Slab Moisture:

The recommendations in this report are not intended to address the effects of moisture migration through slabs. The design team should address moisture retardant schemes and the requirements of this project.

7. Past Use of Site:

There was no evidence in the samples obtained for this study that indicated the past use of this site as a municipal landfill. See the section ***Limitations of Report.***

RECOMMENDATIONS - FOUNDATION

The foundation type recommended for this project is a driven pile supported slab. It is our understanding that the client desires this foundation type. If recommendations for other foundation types are desired, please contact the Geotechnical Engineer.

End-Bearing Driven Piles

1. Driven piles may be made of pre-stressed concrete, steel pipe or steel H-piles.
2. Piles should be driven to the point of refusal. The point of refusal is defined as contact with limestone, which was encountered at a depth of approximately 7 to 48 feet below the existing ground surface. This should be verified by the Geotechnical Engineer during construction. Steel pipe piles – Schedule 40 6" diameter (6.625 inch OD; 6.065 inches ID) have been successfully driven on adjoining properties. These piles are equipped with flat caps and are filled with concrete. For this Schedule 40 pipe piles (with end caps) driven to unyielding bedrock may be designed to carry the following allowable loads.

	Schedule 40 Line Pipe	
Diameter (OD)	6 5/8"	8 5/8"
Allowable Loads, Tons	18 tons	34 tons

* The allowable loads take potential negative skin friction into account.

3. Skin friction should not be relied upon for support, but should be considered during pile driving.
4. Welded splices in piles should be inspected by a certified welding inspector prior to being driven below ground.
5. Pipe piles should be visually observed for straightness after driving.
6. Driving problems or difficulties should be brought to the attention of the Geotechnical Engineer.
7. All foundation loads should be carried through the slab onto the driven piles.

RECOMMENDATIONS - RETAINING STRUCTURES

1. Backfill all retaining type structures with clean, well-graded granular material. Such material should have less than 4% passing #200 sieve.
2. All such backfilled areas must be well drained to prevent the buildup of hydrostatic pressure within the laterally loaded area.
3. Unit weight of backfill or fill from on-site materials may be estimated at 130 pcf.
4. Coefficients of horizontal earth pressure may be taken as shown on the following table:

Condition of Loading	Coefficient of Horizontal Earth Pressure	Equivalent Fluid Value to be used in analysis*
Active conditions assumptions can be realized whereby top edge of retain-structure may move in the direction of the force 0.001 x height of wall, and backfill is granular, well-drained material.	$K_a = 0.35$	45.5 pcf
An at rest condition exists for a basement wall or retaining wall that is rigidly restrained and backfilled with material that is granular and well-drained.	K_o=0.52	67.6 pcf

* If backfill is not drained, add 62.4 pcf to above Equivalent Fluid values. Adjacent buildings or traffic areas may require special consideration.

RESIDENTIAL UNDERSLAB FILL RECOMMENDATIONS

A. Selection of fill material should be guided by the following criteria:

1. Maximum plasticity index: 20
   Minimum plasticity index: 3
2. Minimum and maximum passing #200 sieve: 10% to 70%
3. No stones larger than 1-1/2"

B. Compaction should be 95 percent of maximum laboratory density determined in accordance with American Society of Testing Materials, method ASTM D 698, using a compactive effort of 7.16 foot-lbs./in^3.

C. Placement should be in lifts not exceeding eight inches before compaction. The top of finished fill shall be within ten inches of underslab grade (but not above) and be bladed flat. Material excavated from beam trenches may be used for fine grading. Each compacted lift should be inspected and tested for density compliance by the Geotechnical Engineer prior to placing the next lift. Fill should extend at least 36 inches (72 inches on fills over six feet) beyond neat slab lines before sloping downward at not more than one on three slope to natural soil, unless grade changes are accomplished by properly designed deep foundation beams. Fill shall be within 2 percent of optimum moisture content during compaction. Backslopes shall be well compacted.

D. Testing and qualification of raw fill material, placement, and compaction may be performed by the Geotechnical Engineer. A 110 lb. sample of proposed fill material should be submitted to Geotechnical Engineer for approval and for determination of Moisture-Density Relationship, in advance of filling and compaction operations to permit inspection and testing as fill is placed. Not less than one field density test per 2000 square feet or minimum of 3 per lift is required.

E. Beam trenches shall be cut directly into compacted fill to plan dimensions and sacking of trenches will be permitted for inside of perimeter beams. In case sacking is used, density testing will not be performed closer than 4 feet from inside of perimeter beam face. The Geotechnical Engineer may require deepened exterior beams in lieu of excessively high fills.

F. Deviations from the above criteria may be permitted upon approval of the Geotechnical Engineer on an individual basis.

G. Compliance with these recommendations as stated above or as modified by the Geotechnical Engineer for specific conditions can be the basis for certification of compliance with FHA Data Sheet 79G and VA requirements.

H. Structural support of slab foundations may be carried through underslab fill to natural soil at the designer's option. In this case, paragraphs "B" through "G" of this recommendation are void and the underslab fill will be considered "forming fill" only.

QUALITY ASSURANCE CONSIDERATIONS

Type of Work	Item	Sample Frequency	Sample Size	Minimum Testing
General Earthwork and Fill Material	Soil	1 per Soil Type	110 lbs.	♦ Sieve ♦ P.I. ♦ Moisture Density Relationship
	Compaction	1 per 5000 ft^2 per lift (min. of 3 per lift)		♦ Field Density Test
Select Under-slab Fill	Select Fill Material	1 per type per 1000 cu. yds. Min. one per job	110 lbs.	♦ Sieve ♦ P.I. ♦ Moisture Density Relationship
	Compaction	1 per 2000 ft^2 per lift (min. of 3 per lift)		♦ Field Density Test
Concrete	Mix Design	1 per concrete class		♦ Review & approval with confirmatory cylinders ♦ Plant & materials approval, testing, if questionable
	Aggregates (coarse & fine)	1 per 500 cu. yd. Min. 1 per job	30 lbs.	♦ Sieve, organic impurities, specific gravity
	Cement	1 per 1000 cu. yds. Min. 1 per job	10 lbs.	♦ Fineness ♦ Chemical compound ♦ See mill reports
	Concrete Placement	1 per 50 cu. yds. Or each days pour (if less)		♦ Slump ♦ Air Test ♦ 5 compressive cylinder tests, test 2 at 7 days, 2 at 28 days, 1 hold
Pier or Footing Inspection	Inspection and verification of bearing	Each Pier or Slab Footing		Qualified Inspector with Engineer's Review
	Concrete & Steel Placement	Each Pier or Slab Footing		Qualified Inspector
	Inspection of Reinforcing	Slab Pre-pour and Cable Stressing		Qualified Inspector

REFERENCES

1. Local geologic maps published by The Bureau of Economic Geology. Austin, Texas including:
   "Geologic Atlas of Texas" 15-minute quadrangles. March 9, 2004 geospatial data.
   "Geologic Map of the Austin Area, Texas 1992" Geology of Austin Area Plate VII.
   "Geologic Map of the West Half of Taylor Texas, 30 x 60 min quad. 2005. misc. map 43
   "Geologic Map of the New Braunfels, Texas 30 x 60 min quad" 2000. misc. map 39

2. "The Geology of Texas, Volume I, Stratigraphy", The University of Texas Bulletin No. 3232: August 22, 1932, The University of Texas, Austin, Texas, 1981.

3. "Method for Determining Potential Vertical Rise, PVR, Test Method Tex-124-E", Manual of Testing Procedures, Texas Department of Transportation Materials and Tests Division, September 1995.

LIMITATIONS OF REPORT

The conditions of the site at locations other than the boring locations are not expressed or implied and conditions may be different at different times from the time of borings. Contractors or others desiring more information are advised to secure their own supplemental borings. This investigation and report, do not, and are not intended to determine the environmental conditions or evaluate possible hazardous or toxic waste conditions on this site or adjacent sites. Interested persons requiring this information are advised to contact MLA Labs, Inc.

The recommendations in this report are not intended to address the interior environmental effects of moisture migration through slabs. The Client is responsible for addressing the requirements of this project with respect to moisture migration through slab on ground foundations.

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. The geotechnical engineer in charge of this project is not a mold prevention consultant and none of the services performed in connection with this study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report may not of itself be sufficient to prevent mold from growing in or on the structure(s) involved.

The analysis and recommendations contained herein are based on the available data as shown in this report and the writer's professional expertise, experience and training, and no other warranty is expressed or implied concerning the satisfactory use of these recommendations or data.

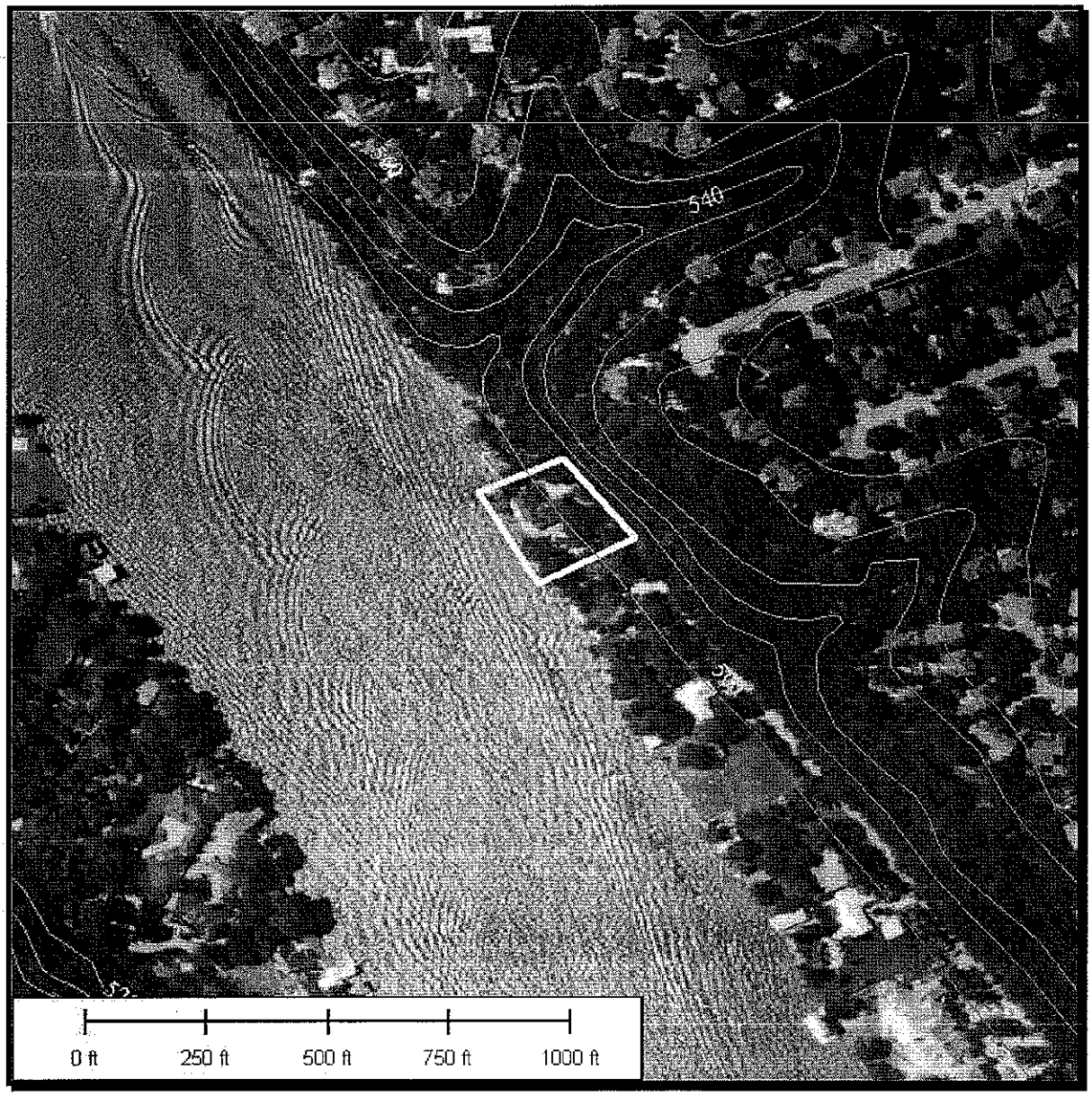
APPENDIX A

GEOTECHNICAL DATA

Approximate location of site in yellow.
CAPCOG contours (2008) in orange.

NAPP Aerial Photograph of Site – 1995

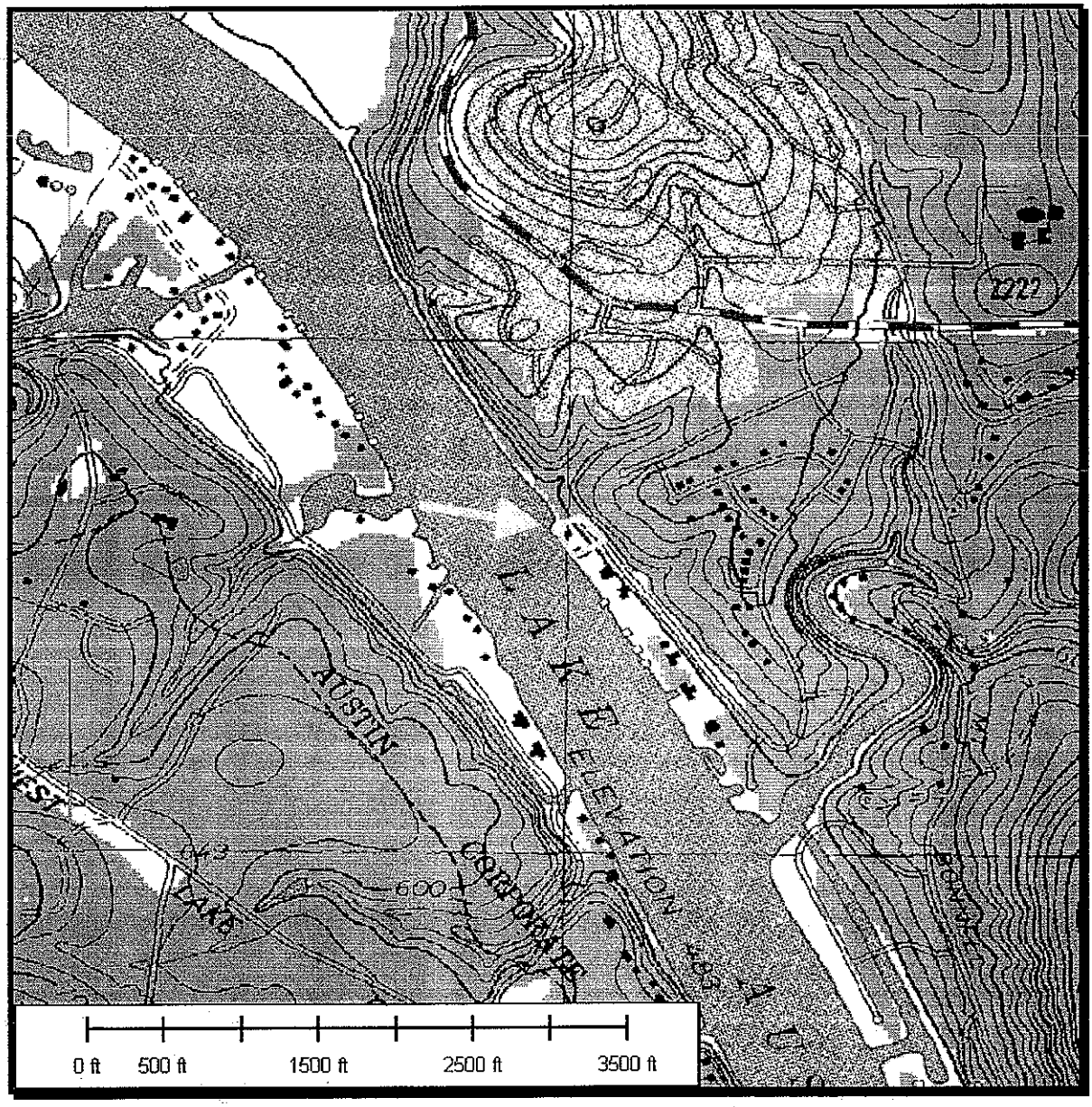
Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
3.75-minute DOQQ. 1-meter ground resolution. apx. date 1995-6
(http://www.tnris.state.tx.us/digital.htm)



Approximate location of site in yellow.
CAPCOG contours (2008) in orange.

Aerial Photograph of Site – 2012

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
Apx. Date - 2012
(ftp://ftp2.tnris.org/NAIPCCMs/12/)

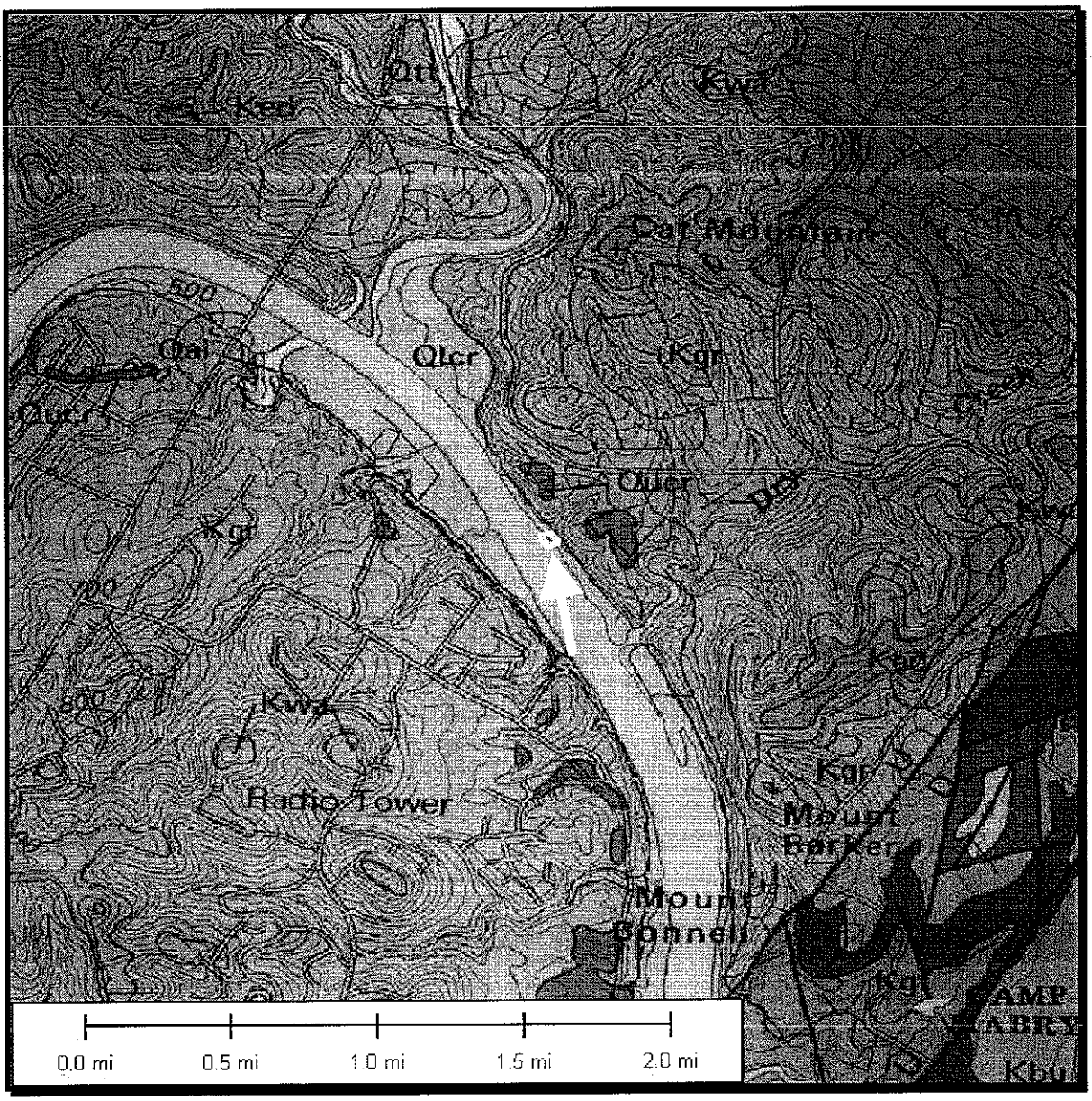


Approximate location of site in yellow.

U.S. 7.5 Minute Series Topographic Map
Austin West Quadrangle, Texas
Contour Interval = 10 feet

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
(http://www.tnris.state.tx.us/digital.htm)

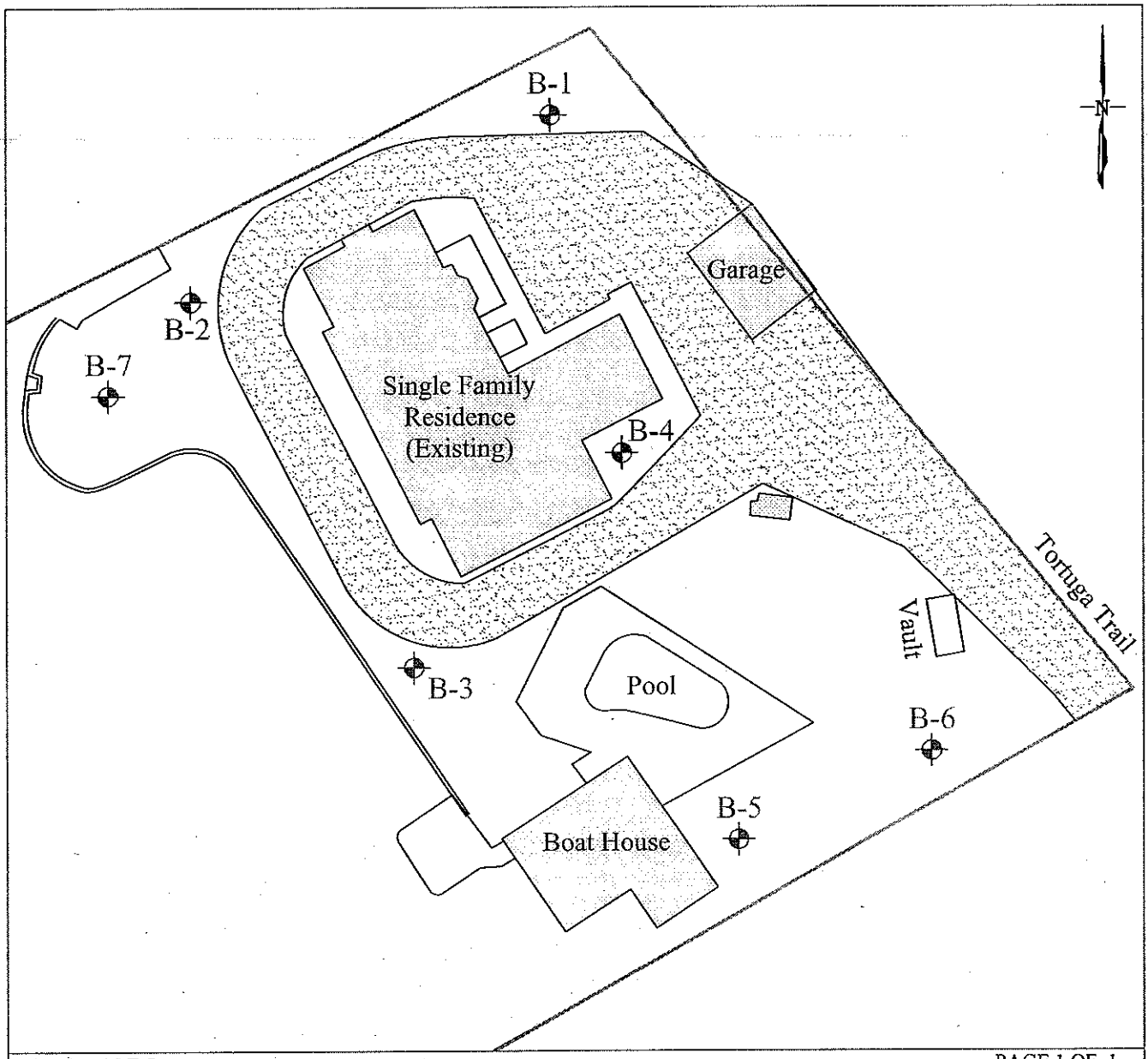
N



Approximate location of site in yellow.

Geologic Setting of Site
Geologic Map of the Austin Area, Texas 1992
Contour Interval = 20 feet

Source: Bureau of Economic Geology, The University of Texas at Austin, Plate VII



SCALE = N.T.S.

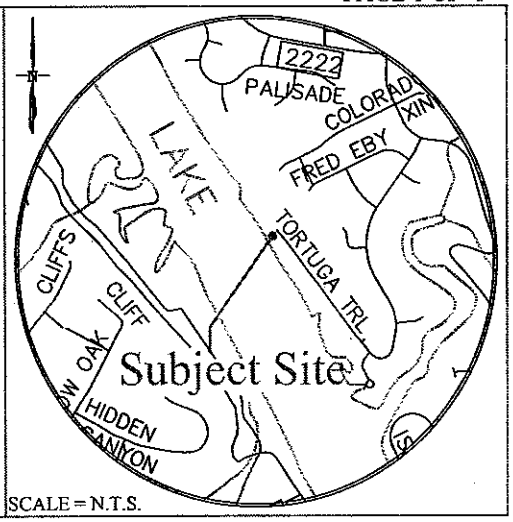
PAGE 1 OF 1

PLAN OF BORINGS

5201 Tortuga Trail
Austin, Texas
Job. No.: 13104000.227
Client: Rob and Lama Turner

LEGEND	
B-#	Boring Number
⊕	Approx. Boring Location

VICINITY MAP



SCALE = N.T.S.

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LOG OF BORING

Boring B-1
PAGE 1 OF 1

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 7, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: —
AT END OF DRILLING: —
AFTER DRILLING: —

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, yellowish tan and light gray, with silt seams, with gravel, with calcium, damp	CL-CH	-		
		N=13 @ 3.0'		-		25
5		N=9 @ 5.0'		-		
		... light gray below 6.0'				
		N=50 in 3" @ 7.0'	Qlcr	-		26
		LIMESTONE, pale brown, hard, dry	Kgr			
10		Termination Depth: 7.5 feet				
15						
20						
25						
30						

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LOG OF BORING

Boring B-2
PAGE 1 OF 2

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 8, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: 4.0 ft / Elev 0.0 ft
AFTER DRILLING: ---

DEPTH, ft.	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	Plasticity Index, %
0	CLAY, brown, with silt seams, with gravel, with calcium, damp	CH	-	34
	N=7 @ 1.0'			
	CLAY, dark brown and tan, silty, with gravel, damp	CL-CH	-	
	N=7 @ 3.0'			
5	N=5 @ 5.0'		-	
	CLAY, brown, with gravel, wet	CH	-	39
	N=1 @ 7.0'			
	CLAY, brown, with gravel, wet	CL-CH	-	
10	N=1 @ 9.0'		-	
			-	
			-	
15	N=1 @ 14.0'		-	31
			-	
			-	
20	N=1 @ 19.0'		-	
			-	
			-	
25	N=1 @ 24.0'		-	
			-	
			-	
30	N=1 @ 29.0'	Qlcr	-	

-2um ★ -#200 □ -#4 ▲
● Moisture Content, %
PL — LL
0 20 40 60 80 100

WORKING AUGER LOG 13104000 227 - 5201 TORTUGA TRAIL - LOGS.GPJ UNIFIED LOG.GDT 7/3/13

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LOG OF BORING

Boring B-2

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
30		CLAY, brown, with gravel, wet *(continued)*	CL-CH			
		N=1 @ 34.0'				
35						
		N=1 @ 39.0'				
40						
			Qlcr			
45		LIMESTONE, pale brown, hard, dry	Kgr			
		N=50 in 2" @ 45.0'				
		Termination Depth: 45.0 feet				
50						
55						
60						

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LOG OF BORING

Boring B-3
PAGE 1 OF 2

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 7, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: —
AT END OF DRILLING: —
AFTER DRILLING: —

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark brown and tan, silty, with gravel, damp	CL-CH			
		N=10 @ 1.0'		-		
		N=9 @ 3.0'		-		
		CLAY, brown, with gravel, wet	CL			
5		N=9 @ 5.0'		-		
		N=4 @ 7.0'		-		
		N=3 @ 9.0'	CL-CH	-		
10		CLAY, brown, with silt seams, with gravel, with calcium, damp				
				-		
				-		
15		N=4 @ 15.0'		-		
				-		
		N=2 @ 19.0'		-		
20				-		
		N=2 @ 23.0'		-		
25				-		
				-		
30			Qlcr	-		

LOG OF BORING

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Boring B-3
PAGE 2 OF 2

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
30		CLAY, brown, with silt seams, with gravel, with calcium, damp *(continued)*	CL-CH	-		
		N=2 @ 35.0'		-		
35				-		
		N=1 @ 39.0'		-		
40				-		
		N=1 @ 44.0'		-		
45			Qlcr	-		
		LIMESTONE, pale brown, hard, dry				
		N=50 in 2" @ 49.0'	Kgr	-		
50		Termination Depth: 50.0 feet				
55						
60						

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LOG OF BORING

Boring B-4

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 7, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: —
AT END OF DRILLING: —
AFTER DRILLING: —

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark brown and tan, silty, with gravel, damp	CL-CH			
5		CLAY, brown, with gravel, wet	CL			
10		CLAY, brown, with silt seams, with gravel, with calcium, damp	CL-CH			
15						
20						
25			Qlcr			
30						

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LOG OF BORING

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Boring B-4

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
30		CLAY, brown, with silt seams, with gravel, with calcium, damp *(continued)*	CL-CH Qlcr	-		
		LIMESTONE, pale brown, hard, dry	Kgr			
		Termination Depth: 32.5 feet				
35						
40						
45						
50						
55						
60						

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LOG OF BORING

Boring B-5
PAGE 1 OF 2

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 8, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: —
AT END OF DRILLING: —
AFTER DRILLING: —

DEPTH, ft.	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	Plasticity Index, %
0	CLAY, brown, with silt seams, with gravel, with calcium, damp	CH		30
	N=6 @ 1.0'			
	CLAY, dark brown and tan, silty, with gravel, damp	CL		3
	N=8 @ 3.0'			
	... brown 4.0'			
5	N=2 @ 5.0'			
	N=1 @ 7.0'			
	N=1 @ 9.0'			
10	... moist below 10.0'			
15	N=1 @ 15.0'			30
	... light brown below 18.5'			
	N=1 @ 19.0'			
20				
25	N=1 @ 25.0'			
30	N=1 @ 30.0'	Qlcr		

-2um ★ -#200 □ -#4 ▲ ● Moisture Content, %
PL — LL
0 20 40 60 80 100

WORKING AUGER LOG 13104000.227 - 5201 TORTUGA TRAIL - LOGS.GPJ UNIFIED LOG.GDT 7/3/13

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CONSTRUCTION MATERIALS TESTING

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LOG OF BORING

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Boring B-5

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
30		CLAY, dark brown and tan, silty, with gravel, damp *(continued)*	CL	-		
		N=1 @ 35.0'		-		
35				-		
			Qlcr	-		
40		LIMESTONE, pale brown, hard, dry	Kgr			
		Termination Depth: 40.0 feet				
45						
50						
55						
60						

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LOG OF BORING

Boring B-6
PAGE 1 OF 1

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 7, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: —
AT END OF DRILLING: —
AFTER DRILLING: —

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark brown and tan, silty, with gravel, damp	CL-CH			
		N=5 @ 3.0'				
		... brown, below 4.0'				
5		N=10 @ 5.0'				
		N=5 @ 7.0'				
		N=2 @ 9.0'				
10						
			Qlcr			
		LIMESTONE, pale brown, hard, dry	Kgr			
15		Termination Depth: 15.0 feet				
20						
25						
30						

WORKING AUGER LOG 13104000 227 - 5201 TORTUGA TRAIL - LOGS.GPJ UNIFIED LOG.GDT 7/3/13

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"put us to the test"

LOG OF BORING

Boring B-7
PAGE 1 OF 2

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Drill Date: June 6, 2013 **Ground Elevation:** n/a
Hole Size: 4.5 in.
Rig:
Notes:

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: 4.0'
AFTER DRILLING: ---

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark brown, silty, with gravel, damp	CL-CH	-		
		... gray below 2.0'		-		
5		CLAY, brown, with gravel, wet	CL	-		
				-		
10				-		
				-		
15				-		
		CLAY, brown, with gravel, wet	CL-CH	-		
20				-		
				-		
25				-		
			Qlcr	-		
30						

WORKING AUGER LOG 13104000 227 - 5201 TORTUGA TRAIL - LOGS.GPJ UNIFIED LOG.GDT 7/3/13

MLA LABS, INC.
GEOTECHNICAL ENGINEERING AND
CONSTRUCTION MATERIALS TESTING

"put us to the test"

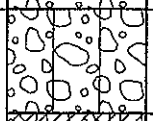
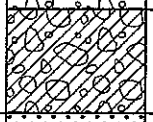
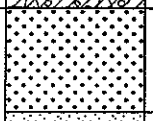
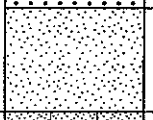
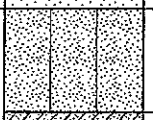
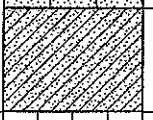
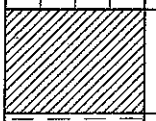
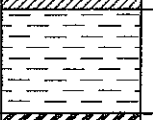
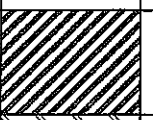
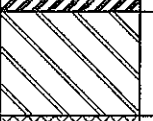
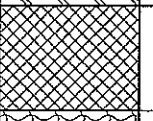
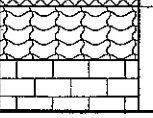
LOG OF BORING

Job Name: 5201 Tortuga Trail
Job Location: Austin, Texas
Engineer's Job #: 13104000.227
Client: Rob and Lama Turner

Boring B-7
PAGE 2 OF 2

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
30		CLAY, brown, with gravel, wet *(continued)*	CL-CH			
35						
40						
45						
			Qlcr			
		LIMESTONE, pale brown, hard, dry	Kgr			
50		Termination Depth: 50.0 feet				
55						
60						

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS: GRAPH	SYMBOLS: LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	CLAYS	LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
SOILS OF MODERATE PLASTICITY				CL-CH	LOW PI CLAYS WITH APPRECIABLE HIGH PI MOTTLING, CLAY WITH BORDERLINE CLASSIFICATION
OTHER MATERIALS				FILL	MATERIAL NOT NATURALLY DEPOSITED
				LS	WEATHERED LIMESTONE INTACT LIMESTONE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Key to Terms and Abbreviations

Descriptive Terms Characterizing Soils and Rock	Standard Description Abbreviations and Terms	Symbols and Abbreviations for Test Data
Slickensided – having inclined planes of weakness that are slick and glossy in appearance. **Fissured** – containing shrinkage cracks frequently filled with fine sand or silt, usually more or less vertical. **Laminated** – composed of thin layers of varying color or texture. Layers are typically distinct and varying in composition from sand to silt and clay. **Varved** – see Laminated. **Crumbly** – cohesive soils which break into small blocks or crumbs on drying. **Argillaceous** – having appreciable amounts of clay in the soil or rock mass. Used most often in describing limestones, occasionally sandstones. **Calcareous** – containing appreciable quantities of calcium carbonate. Can be either nodular or "powder." **Mottled** – characterized as having multiple colors organized in a marbled pattern. **Evaporite** – deposits of salts and other soluble compounds. Most commonly calcium carbonate or gypsum. May be in either "powder" or visible crystal form. **Ferruginous** – having deposits of iron or nodules, typically oxidized and dark red in color.	brn = brown dk = dark lt = light wx = weathered calc = calcareous sw = severely weathered cw = completely weathered n/a = not available b. = below **Engineering Units** pcf = pounds per cubic foot psf = pounds per square foot tsf = tons per square foot pF = picofarad psi = pounds per square foot ksf = thousand pounds per square foot kips = thousand pounds (force)	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index (LL-PL) γd = 95-Dry Unit Weight SPT = standard penetration test N = blows per foot from SPT SCR = standard core recovery RQD = rock quality designation RQI = see RQD qu = unconfined compressive strength

Terms Describing Consistency of Soil and Rock

COARSE GRAINED MATERIAL		SEDIMENTARY ROCK	
DESCRIPTIVE TERM	BLOWS/FT (SPT)	DESCRIPTIVE TERM	STRENGTH, TSF
very loose	0 – 4	soft	4 – 8
loose	4 – 10	medium	8 – 15
firm (medium)	10 – 30	hard	15 – 50
dense	30 – 50	very hard	over 50
very dense	over 50		

Describing Consistency of Fine Grained Soil

DESCRIPTIVE TERM	BLOWS/FT (SPT)	UNCONFINED COMPRESSION, TSF
very soft	< 2	< 0.25
soft	2 – 4	0.25 – 0.50
medium stiff	4 – 8	0.50 – 1.00
stiff	8 – 15	1.00 – 2.00
very stiff	15 – 30	2.00 – 4.00
hard	over 30	over 4.00

Revised: Feb 23, 2007

APPENDIX B

STANDARD FIELD AND LABORATORY PROCEDURES

STANDARD FIELD AND LABORATORY PROCEDURES

STANDARD FIELD PROCEDURES

Drilling and Sampling

Borings and test pits are typically staked in the field by the drillers, using simple taping or pacing procedures and locations are assumed to be accurate to within several feet. Unless noted otherwise, ground surface elevations (GSE) when shown on logs are estimated from topographic maps and are assumed to be accurate to within a foot. A Plan of Borings or Plan of Test Pits showing the boring locations and the proposed structures is provided in the Appendix.

A log of each boring or pit is prepared as drilling and sampling progressed. In the laboratory, the driller's classification and description is reviewed by a Geotechnical Engineer. Individual logs of each boring or pit are provided in the Appendix. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (ASTM D-2487). A reference key is also provided. The stratification of the subsurface material represents the soil conditions at the actual boring locations, and variations may occur between borings. Lines of demarcation represent the approximate boundary between the different material types, but the transition may be gradual.

A truck-mounted rotary drill rig utilizing rotary wash drilling or continuous flight hollow or solid stem auger procedures is used to advance the borings, unless otherwise noted. A backhoe provided by others is used to place test pits. Test pits are advanced to the required depth, refusal (typically bedrock) or to the limits of the equipment. Samples of soil are obtained from the borings or test pit spoils for subsequent laboratory study. Samples are sealed in plastic bags and marked as to depth and boring/pit locations in the field. Cores are wrapped in a polyethylene wrap to preserve field moisture conditions, placed in core boxes and marked as to depth and core runs. Unless notified to the contrary, samples and cores will be stored for 90 days, then discarded.

Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586) (SPT)

This sampling method consists of driving a 2 inch outside diameter split barrel sampler using a 140 pound hammer freely falling through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven an additional 12 inches. The number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance. The results of the SPT is recorded on the boring logs as "N" values.

Thin-Walled Tube Sampling of Soils (ASTM D-1587) (Shelby Tube Sampling)

This method consists of pushing thin walled steel tubes, usually 3 inches in diameter, into the soils to be sampled using hydraulic pressure or other means. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.

Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of auguring a hole and removing representative soil samples from the auger flight or bit at intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where it is satisfactory to determine the approximate subsurface profile and obtain samples suitable for Index Property testing.

Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water or air is used to remove the cuttings and to cool the bit. Normally, a 3 inch outside diameter by 2-1/8 inch inside diameter coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and in the laboratory and the cores are stored in partitioned boxes. The intactness of all rock core specimens is evaluated in two ways. The first method is the Standard Core Recovery expressed as the length of the total core recovered divided by the length of the core run, expressed as a percentage:

$$SCR = \frac{\text{total core length recovered}}{\text{length of core run}} \times 100\%$$

This value is exhibited on the boring logs as the Standard Core Recovery (SCR).

The second procedure for evaluating the intactness of the rock cores is by Rock Quality Designation (RQD). The RQD provides an additional qualitative measure of soundness of the rock. This index is determined by measuring the intact recovered core unit which exceed four inches in length divided by the total length of the core run:

$$RQD = \frac{\text{all core lengths greater than 4"}}{\text{length of core run}} \times 100\%$$

The RQD is also expressed as a percentage and is shown on the boring logs.

Vane Shear Tests

In-situ vane shear tests may be used to determine the shear strength of soft to medium cohesive soil. This test consists of placing a four-bladed vane in the undisturbed soil and determining the torsional force applied at the ground surface required to cause the cylindrical perimeter surface of the vane to be sheared. The torsional force sufficient to cause shearing is converted to a unit of shearing resistance or cohesion of the soil surrounding the cylindrical surface.

THD Cone Penetrometer Test

The THD Cone Penetrometer Test is a standard field test to determine the relative density or consistency and load carrying capacity of foundation soils. This test is performed in much the same manner as the Standard Penetration Test described above. In this test, a 3 inch diameter penetrometer cone is used in place of a split-spoon sampler. This test calls for a 170-pound weight falling 24 inches. The actual test in hard materials consists of driving the penetrometer cone and accurately recording the inches of penetration for the first and second 50 blows for a total of 100 blows. These results are then correlated using a table of load capacity vs. number of inches penetrated per 100 blows.

Ground Water Observation

Ground moisture observations are made during the operations and are reported on the logs of boring or pit. Moisture condition of cuttings are noted, however, the use of water for circulation precludes direct observation of wet conditions. Water levels after completing the borings or pits are noted. Seasonal variations, temperatures and recent rainfall conditions may influence the levels of the ground water table and water may be present in excavations, even though not indicated on the logs.

STANDARD LABORATORY PROCEDURES

To adequately characterize the subsurface material at this site, some or all of the following laboratory tests are performed. The results of the actual tests performed are shown graphically on the Logs of Boring or Pit.

Moisture Content - ASTM D-2216

Natural moisture contents of the samples (based on dry weight of soil) are determined for selected samples at depths shown on the respective boring logs. These moisture contents are useful in delineating the depth of the zone of moisture change and as a gauge of correlation between the various index properties and the engineering properties of the soil. For example, the relationship between the plasticity index and moisture content is a source of information for the correlation of shear strength data.

Atterberg Limits - ASTM D-4318

The Atterberg Limits are the moisture contents at the time the soil meets certain arbitrarily defined tests. At the moisture content defined as the plastic limit, Pw, the soil is assumed to change from a semi-solid state to a plastic state. By the addition of more moisture, the soil may be brought up to the moisture content defined as the liquid limit, Lw, or that point where the soil changes from a plastic state to a liquid state. A soil existing at a moisture content between these two previously described states is said to be in a plastic state. The difference between the liquid limit, Lw, and the plastic limit, Pw , is termed the plasticity index, Iw. As the plasticity index

increases, the ability of a soil to attract water and remain in a plastic state increases. The Atterberg Limits that were determined are plotted on the appropriate log.

The Atterberg Limits are quite useful in soil exploration as an indexing parameter. Using the Atterberg Limits and grain size analysis, A. Casagrande developed the Unified Soils Classification System (USCS) which is widely used in the geotechnical engineering field. This system related the liquid limit to the plasticity index by dividing a classification chart into various zones according to degrees of plasticity of clays and silts. Although the Atterberg Limits are an indexing parameter, K. Terzaghi has related these limits to various engineering properties of a soil. Some of these relationships are as follows:

1. As the grain size of the soil decreases, the Atterberg Limits increase.
2. As the percent clay in the soil increases, the Atterberg Limits increase.
3. As the shear strength increases, the Atterberg Limits decrease.
4. As the compressibility of a soil increases, the Atterberg Limits increase.

Triaxial Shear Test - ASTM D-2850-70

Triaxial tests may be performed on samples that are approximately 2.83 inches in diameter, unless a smaller diameter sample was necessary to achieve a more favorable length:diameter (L:D) ratio. A minimum length to diameter ratio (L:D) of 2.0 is maintained to reduce end effects.

The triaxial tests are typically unconsolidated-undrained using nitrogen gas for chamber confining pressure. Confining pressures are selected to conform to in-situ hydrostatic pressure considering the earth to be a fluid of 120 pcf. In this test, undisturbed Shelby tube samples are trimmed so that their ends are square and then pressed in a triaxial compression machine. The load at which failure occurs is the compressive strength. The results of the triaxial tests and the correlated hand penetrometer strengths can be utilized to develop soil shear strength values.

Unconfined Compressive Strength of Rock Cores - ASTM D-2938

The unconfined compressive strength is a valuable parameter useful in the design of foundation footings. This value, qu, is related to the shearing resistance of the rock and thus to the capacity of the rock to support a load. In completing this test it is imperative that the length:diameter ratio of the core specimens are maintained at a minimum of 2:1. This ratio is set so that the shear plane will not extend through either of the end caps. If the ratio is less than 2.0 a correction is applied to the result.

Grain Size Analysis - ASTM D-421 and D-422

Grain size analysis tests are performed to determine the particle size and distribution of the samples tested. The grain size distribution of the soils coarser than the Standard Number 200 sieve is determined by passing the sample through a standard set of nested sieves, and the distribution of sizes smaller than the No. 200 sieve is determined by a sedimentation process,

using a hydrometer. The results are given on the log of Boring/Pit or on Grain Size Distribution semi-log graphs within the report.

Soil Suction Test - ASTM D-5298-94

Soil suction (potential) tests are performed to determine both the matric and total suction values for the samples tested. Soil suction measures the free energy of the pore water in a soil. In a practical sense, soil suction is an indication of the affinity of a given soil sample to retain water. Soil suction provides useful information on a variety of characteristics of the soil that are affected by the soil water including volume change, deformation, and strength.

Soil suction tests are performed using the filter paper method per ASTM D-5298. Results of these tests are shown graphically on the logs of boring and tabulated in summary sheet of laboratory data.

For matric suction values found using this method, it should be noted that when the soil is in a dry state adequate contact between the filter paper and the soil may not be possible. This lack of contact may result in the determination of total suction instead of matric suction.