Raba Kistner

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Project No. ASR08-041-01
September 15, 2008

Mr. Edward Pape
San Antonio Housing Authority
459 Precious Drive
San Antonio, Texas 78237

RE: Residential Study
Subsurface Investigation
458 Precious Drive
San Antonio, Texas

Dear Mr. Pape:

Raba-Kistner Consultants, Inc. (R-K) is pleased to submit this summary report of services for the above referenced project. The purpose of this study was to provide consulting engineering services for the purpose of identifying the subsurface conditions that may be contributing to the cracking conditions observed along the foundation of the home.

LIMITATIONS

The information provided in this document is directed to the CLIENT, San Antonio Housing Authority, and may not contain information for others and/or for other uses. Some of our observations were limited due to vegetation, finishes, etc. Additional conditions may exist or may have existed at the time of our observation. This document includes observation and testing information regarding the home's foundation and wood frame as obtained by **R-K** and from various other sources. Our comments and opinions contained herein are based partially upon that data. If the information described in this document, some of which was provided by others, is incorrect or if additional information becomes available, **R-K** may need to revise the comments and opinions presented in this document.

BACKGROUND INFORMATION

The findings of our original Building Distress Study have been provided in our report dated May 28, 2008, **R-K** Project No. ASR08-041-00. In accordance with the approved scopes of work outlined in Amended Agreements PSR08-068-00A (dated June 5, 2008) and PSR08-068-00B (dated August 14, 2008), **R-K** has provided additional consulting engineering services to include a subsurface investigation to assess the underlying soil conditions beneath the reinforced beam and slab foundation as well as limited environmental consulting and testing services to assess the odors that were encountered during the test pit excavation performed during the subsurface investigation field work.

FIELD BORINGS AND LABORATORY TESTS

Subsurface conditions beneath the home were evaluated by two (2) exploratory borings (designated as B-1 and B-2 on Figure 1 of Attachment A) drilled on August 6, 2008 at the locations shown on the General Site Layout, Figure 1 in Attachment A. The boring locations are approximate and were located in the field based on our observations performed during our initial site visit held on May 8, 2008. Exploratory Borings B-1 and B-2 were drilled to depths ranging from about 10 ft and 11-1/2 ft, respectively, below the floor slab surface elevation existing at the time of our study using a track-mounted, Geoprobe sampler. The exploratory borings were advanced with direct push methods in combination with an 80-pound pneumatic hammer to their respective termination depths until penetration refusal. The 5-inch diameter exploratory borings were backfilled with bentonite chips up to the adjacent ground surface elevation following completion of the soil sampling operations.

During the exploration activities, the following samples were collected:

Type of Sample	Number Collected
Shelby Tube	22

Representative portions of the samples were sealed in containers to reduce moisture loss, labeled, packaged, and transported to our nationally accredited laboratory for subsequent testing and classification. In addition, two bulk samples were obtained from soils excavated at each test pit location and placed in 5-gallon buckets. These samples were also transported to our laboratory.

In the laboratory, each sample was evaluated and visually classified by a member of our engineering staff in general accordance with the Unified Soil Classification System (USCS). The geotechnical engineering properties of the strata were evaluated by the laboratory tests tabulated in the following table:

Type of Test	Number Conducted
Natural Moisture Content	22
Atterberg Limits	4
Percent Passing a No. 200 Sieve	1
Unconfined Compressive Strength	5
Dry Unit Weight	7

The laboratory tests are presented in graphical or numerical form on the boring logs illustrated on Figures 2 and 3. A key to the classification of terms and symbols used on the logs is presented on Figure 4. The results of the laboratory and field testing are also tabulated on Figure 5 for ease of reference.

Samples will be retained in our laboratory for 30 days after submittal of this report. O ther arrangements may be provided at the written request of the CLIENT or its representatives.

SUBSURFACE STRATIGRAPHY

On the basis of the exploratory borings, the subsurface stratigraphy at this site can be described by two generalized strata, each with similar physical and engineering characteristics. For purposes of this document, we have designated the subsurface strata as Stratum I through Stratum III. The lines designating the interfaces between strata on the exploratory borings logs represent approximate boundaries. Transitions between strata may be gradual. The soils information that is a part of this document may not reflect the actual variations of the subsurface conditions across the site.

Stratum I consists of topsoil comprised of brown and tan, lean clay with grass and roots. This layer was noted in the exploratory borings from beneath the ground surface extending down to depths of about 3 inches. This stratum is visually classified as moderately plastic. These soils may be classified as CL soils in general accordance with the USCS.

Stratum II consists of possible fill materials comprised of dark brown and gray to tan and gray, stiff to hard, fat clay soils with roots and scattered gravel. Traces of asphalt pavement were also encountered in samples recovered from the exploratory Boring B-2. This layer was noted in the exploratory borings from beneath the Stratum I soils down to depths of about 3 ft and 4 ft in exploratory borings B-1 and B-2, respectively. Moisture contents were measured to range from about 16 to 25 percent for this layer. This stratum is classified as highly plastic, with two measured plasticity indices of 40 percent. A single percent passing a No. 200 sieve test demonstrates percent fines of about 76 percent. On the basis of two unconfined compression tests performed within this layer, the undrained cohesion was measured to be about 0.5 tsf and 0.7 tsf. Dry unit weights ranging from 102 pcf to 105 pcf were measured for this layer. These soils are classified as CH soils in general accordance with the USCS.

Stratum III consists of what appear to be native soils comprised of dark brown to dark brown and gray, stiff to hard, fat clay soils with traces of roots, vari-colored ferrous stains, and rounded river gravel. A strong organic odor was also encountered in exploratory Boring B-2 at a depth of about 4 ft. This stratum was encountered in the exploratory borings beneath the Stratum II soils extending down to at least the termination depths of each boring. Moisture contents ranging from about 19 to 29 percent were measured for this layer. This stratum is classified as highly plastic, with two plasticity indices of 45 and 49 percent. Undrained cohesion ranges from about 0.6 tsf to 2.1 tsf based on unconfined compression test data. Dry unit weights ranging from 95 pcf to 107 pcf were measured for this layer. These soils are classified as CH soils in general accordance with the USCS.

GROUNDWATER

Groundwater was not observed in the borings either during or immediately upon completion of the sampling operations. It is possible for groundwater to exist beneath this site at shallower depths on a transient basis. Fluctuations in groundwater levels occur due to variation in rainfall and surface water runoff.

TEST PIT EXCAVATIONS, AND LABORATORY TESTS

As part of the field investigation, two test pit excavations, (designated as TP-1 and TP-2 on Figure 1 of Attachment A), were performed adjacent the exterior grade beam of the home in order to measure the depth and width of the grade beams at these locations, the in-place moisture content, and soil density. TP-1 was excavated along the right side grade beam near the middle of Bedroom 3. TP-2 was excavated along the left side grade beam at the right-front corner of the home. The beam measurements are provided in the following table.

Test Pit No.	Approximate Beam Depth measured from the top of Slab Elevation (in)	Approximate Beam Depth Below the Existing Ground Surface Elevation (in)	Approximate Beam Width (in)
TP-1	33	27	10
TP-2	29	23	10

At TP-1, the in-place soil moisture content and soil density were measured at approximately 4-inches, 14-inches, and 22 inches beneath the existing ground surface elevation. Similarly at TP-2, the moisture content and soil density were measured at approximately 4-inches, 14-inches, and 22 inches beneath the existing ground surface elevation. Bulk soil samples were obtained from the test pit excavations were visually classified by a member of our engineering staff and samples were selected for physical characteristic testing. The laboratory tests performed and their respective results are provided in the following table.

Laboratory Test	TP-1	TP-2
Liquid Limit	49	56
Plastic Limit	14	14
Plasticity Index	35	42
Maximum Dry Density (ASTM D698)	110.3	106.1
Optimum Moisture Content	15.2%	17.7%
Clay Particles Passing a No. 200 Sieve	83.0%	67.8%

The soils encountered within TP-1 and TP-2 are classified as brown, clay soils with silt and gravel, and sandy, clay soils, with gravel. These soils are considered to be highly expansive soils. Expansive soils are clay soils that can experience volume changes with changes in soil water content. Expansive soils shrink or reduce their volume when they lose water (damp to dry) and swell or increase their volume when they gain water (damp to wet). The foundation design Plasticity Index on the foundation drawing sheet marked S-1 dated July 10, 2000 is 59. The average plasticity Index determined by our soils testing performed on the samples recovered from the exploratory borings and the test pit excavations within the upper 4-ft was 39.25. The design Plasticity Index is about 20 points greater than the site specific soils encountered within the test pits.

Once the maximum dry density and optimum moisture content tests were completed, the results were compared to the moisture content and soil density test results obtained in the field in order to assess the in-place moisture and soil density. On the basis of the information provided in the geotechnical report prepared by Nova Consulting Group, Inc., it is our understanding that on-site soils placed as part of the building pad should be placed in 8-inch thick loose lifts and compacted to a minimum of 95% of the maximum dry density performed in the laboratory in accordance with

ASTM D698. Furthermore, the Nova report recommends that the building pad extend about a minimum 5-ft beyond the perimeter of the footprint of the monolithic concrete beam and slab-on-ground foundation.

The results of the maximum dry density tests determined in our laboratory were compared to the in-place dry density tests values measured in TP-1 and TP-2. The in-place dry density measured at each depth interval tested within both excavations was less than 95% of the maximum dry density In addition, the moisture contents recorded in TP-1 range between 4.6 to 12.5 percent higher than the 15.2% optimum moisture content determined in the laboratory. In TP-2, the in-place moisture contents range between 7.7 to 12.6 percent higher than 17.7% optimum moisture content determined in the laboratory. As such the in-place moisture content and density do not conform to the site preparation criteria established in the Nova geotechnical report. Refer to the table below for a comparison of the test results.

Test Pit No.	Depth Below the Existing Ground Surface (in)	In-Place Moisture Content (%)	In-Place Wet Density (pcf)	In-Place Dry Density (pcf)	Percent Dry Density (%)	Conforming Test to Compaction Requirements
TP-1	4	19.8	109.8	91.7	83.1	No
	14	24.6	110.7	88.8	80.5	No
	22	27.7	104.6	82.0	74.3	No
TP-2	4	25.4	119.7	95.5	90.0	No
	14	27.6	113.6	89.0	83.9	No
	26	30.3	111.6	85.6	80.7	No

ENVIRONMENTAL AIR SAMPLING AND TESTING

During the excavation activities performed at TP-2, a noticeable gas odor was encountered as the soil was removed from the excavation. At the request of the Client, **R-K** performed a subsequent site visit on August, 29, 2008 to assess if the odor emitted during the excavation work was related to the presence of environmental contaminants within the soil. While the excavation for TP-3 was performed by the Client's plumbing contractor at the cleanout, a member of our engineering staff field-screened soil samples for volatile organic compounds (VOCs) with a photoionization detector (PID). PID readings are expressed in parts per million (ppm). Soil samples were recovered at about 12 inches and 24 inches below the ground surface. These samples were also screened with a combination combustible gas/oxygen monitor, which assesses combustible gases, expressed as a percent of the lower explosive level (LEL) and oxygen (O_2). The LEL is the lowest gas-air mixture that will support combustion. Other parameters screened utilizing the combination combustible gas/oxygen monitor included hydrogen sulfide (H_2S) and carbon monoxide (CO), both expressed in ppm. Of these parameters, the PID and LEL readings are the most applicable to evaluate the presence of potential contaminants. Visual observations of the excavated PVC piping did not indicate the presence of a sewer line leak at this location.

At the request of the Client, another test pit, TP-4, was performed near TP-2. Two samples were collected at this location at about 12 inches and 24 inches below the ground surface elevation. Each of the samples exhibited PID measurements indicating the presence of VOCs in excess of ambient air. It is not unlikely that the PID measurements were in excess of ambient air given that samples were collected near a sanitary sewer. There was no indication of explosive (i.e., hydrocarbon) gases detected in any of the soil samples. The results of the field screening are provided in the following table.

Location	Sample No.	Depth (in)	VOCs (ppm)	LEL (%)	O_2 (%)	H_2S (ppm)	CO (ppm)
TP-3	S-1	12	78	0	20.9	0	0
	S-2	24	52	0	20.9	0	0
TP-4	S-3	12	75	0	21.0	0	0
	S-4	24	56	0	21.0	0	0

The samples exhibiting the maximum PID readings of 78 ppm and 75 ppm, measured in samples S-1 and S-3) were submitted to San Antonio Testing Laboratory for chemical analysis for VOCs, total petroleum hydrocarbons (TPH), and RCRA 8 heavy metals. The results of chemical analysis do not indicate VOCs or hydrocarbon contamination. Measurable concentrations of select heavy metals were reported for both samples. These metals including barium, chromium, lead, and mercury are naturally occurring in the State of Texas. The concentrations reported for both samples are consistent with State of Texas background concentrations and do not pose a threat to the public. The results of chemical analysis performed by San Antonio Testing Laboratory are provided in Attachment B of this document.

COMMENTS

The concrete foundation appears to be performing within the boundaries for floor slab elevation differentials in the San Antonio locale. Although the soil density measured in TP-1 and TP-2 did not meet the site preparation criteria recommended in Nova's geotechnical report, it is our judgment that the lack of correctly compacted soils or the high in-place moisture content of the clay soils has affected the performance of the foundation.

From our review of the foundation plan document, prepared by Unitech Consulting Engineers, Inc., we understand that design called for the perimeter grade beams to extend a minimum of 12-inches into "undisturbed soil", which is also referred to as "natural" soil in the construction industry. As such, it is our judgment that these particular beams extend do not extend to the depth specified on the foundation plan.

There are several factors that can cause and/or influence cracking of beam and slab-on-ground foundations including; soil-related movements, initial drying and shrinkage related cracking during the curing of the concrete following placement, thermal expansion and contraction, internal or external restraint to shortening; settlement of the supporting soils; and the applied loading to the floor slab to identify a few.

OPINIONS

On the basis of our observations / measurements, the field and laboratory test results, the information provided by others, and our knowledge of beam and slab-on-ground "floating" foundations founded on expansive clay soils, it is our opinion that:

- The movements are not associated with plumbing leaks; however, this should be confirmed by performing plumbing leak testing.
- The beam depths measured at TP-1 and TP-2 did not achieve the specified beam depth. It is our judgment that this has not adversely affected the performance of the foundation.
- The foundation supporting the home and the wood frame is considered structurally adequate.
- Underpinning the foundation will not improve the performance of the concrete foundation and wood frame.
- An active plumbing leak was not observed at the tee connection between the cleanout riser and the sanitary sewer line.
- The odor that was noted during the excavation of TP-2 may be a result of natural organic material decomposition within the clay soils.
- There is no indication that the odor is related to environmental contaminants that are harmful to the public.

RECOMMENDATIONS

To the extent possible, all sources of water around and beneath the foundation should be controlled and regulated; therefore:

- We recommend that plumbing leak testing be performed on the domestic water lines and the sanitary sewer lines within and beneath the foundation to assess if leaks are occurring beneath the floor slab.
- Irrigation should be controlled within a 10-foot zone around the perimeter of the home. The moisture content of the surface clay soils should be maintained at a uniform condition year round. The ground within this area should not be allowed to become dry to the point where the ground cracks and pulls away from the foundation. This is particularly true of this residence where these conditions were noted along the left and right sides of the foundation. Water should also not be allowed to pond in these areas or near the foundation.
- The homeowner should be made aware of the need to maintain the yard adjacent to the foundation year round. This can be managed by watering along the perimeter of the foundation with soaker hoses connected to a short 12-foot long garden hose that is attached to the hose bibbs along the exterior of the home. The soaker hoses should be laid out in an "S" pattern extending preferably about five feet, if property lines allow, away from the foundation as shown on Figure 6 of Attachment A of this document. Generally, watering for a maximum of 4 hours per week will provide a

uniform water content in the yards surface soils during dry weather conditions. Watering should be performed once per week for about four hours maximum. The flow rate of the water through the soaker hoses should be maintained at a 3/4 valve turn at the hose bibbs. Watering should be controlled so that there is no trapped or ponded water near the foundation.

- In order to help control the effects of surface water around the home, all water draining off the roof eaves should be collected in gutters and downspouts and redirected to drain to the street located along the front of the residence.

We appreciate the opportunity to be of service to you on this project. Should you have any questions about the information presented in this document, or if we may be of additional service, please call.

Very truly yours,

RABA-KISTNER CONSULTANTS, INC.

STATE OF TEXAS
JESSE H. AGUILAR
100290
LICENSED
PROFESSIONAL ENGINEER
9/15/08

Jesse H Aguilar, P.E.
Project Engineer

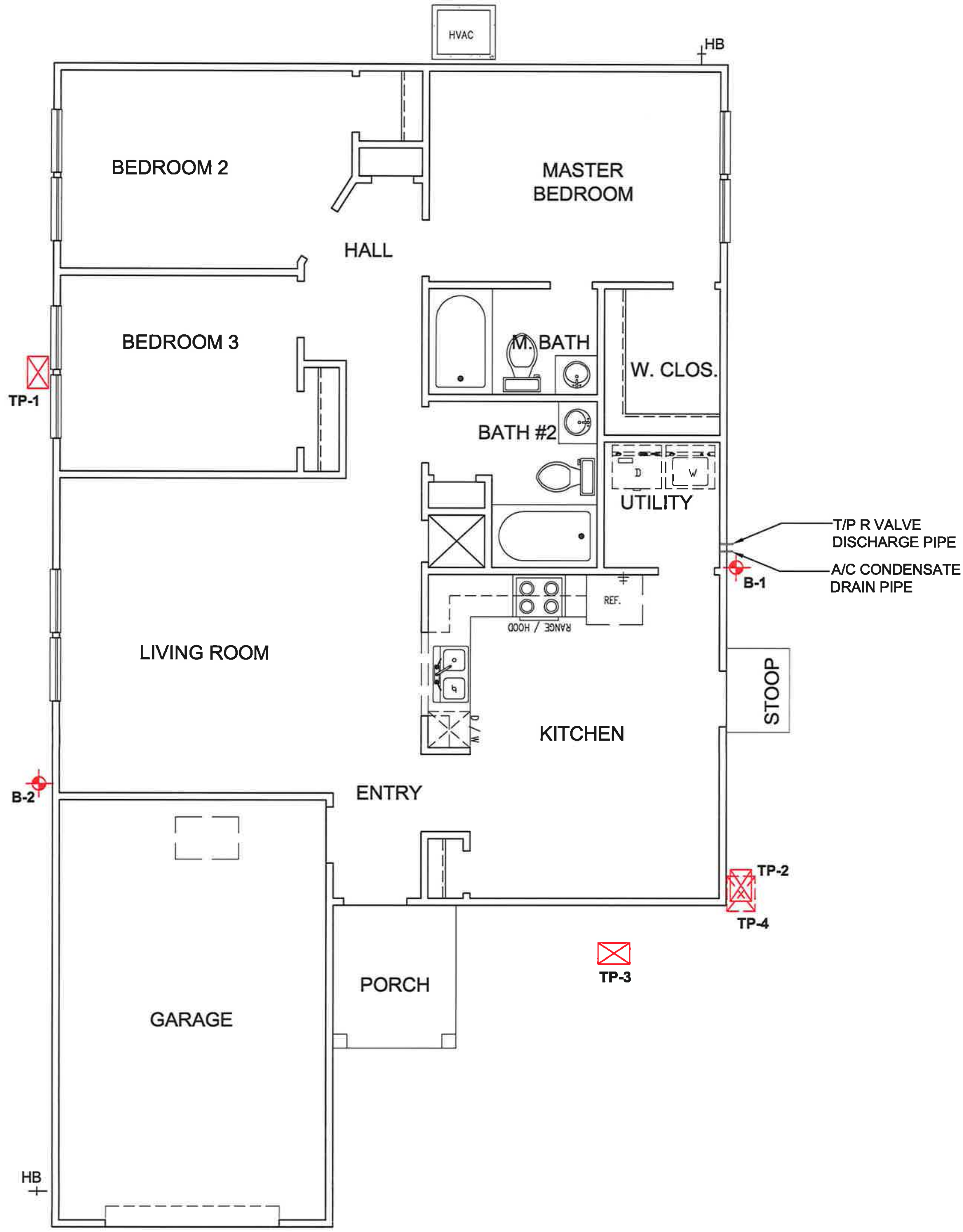
Richard W. Kistner, P.E.
Vice Chairman

JHA/RWK/jg

Attachments: A – Figures 1 through 6
B – San Antonio Testing Laboratory, Inc. Report

Copies Submitted: Above (2)

ATTACHMENT A



1 FIG. 1 GENERAL SITE LAYOUT

SCALE: 1/8"=1'-0"

LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE TEST PIT LOCATION

Raba Kistner
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GENERAL SITE LAYOUT

RESIDENTIAL STUDY
SUBSURFACE INVESTIGATION
458 PRECIOUS DRIVE
SAN ANTONIO, TEXAS

REVISIONS: No.	DATE	DESCRIPTION

PROJECT No.: ASR08-041-01
DRAWN BY:
CHECKED BY:
REVIEWED BY:

FIGURE 1

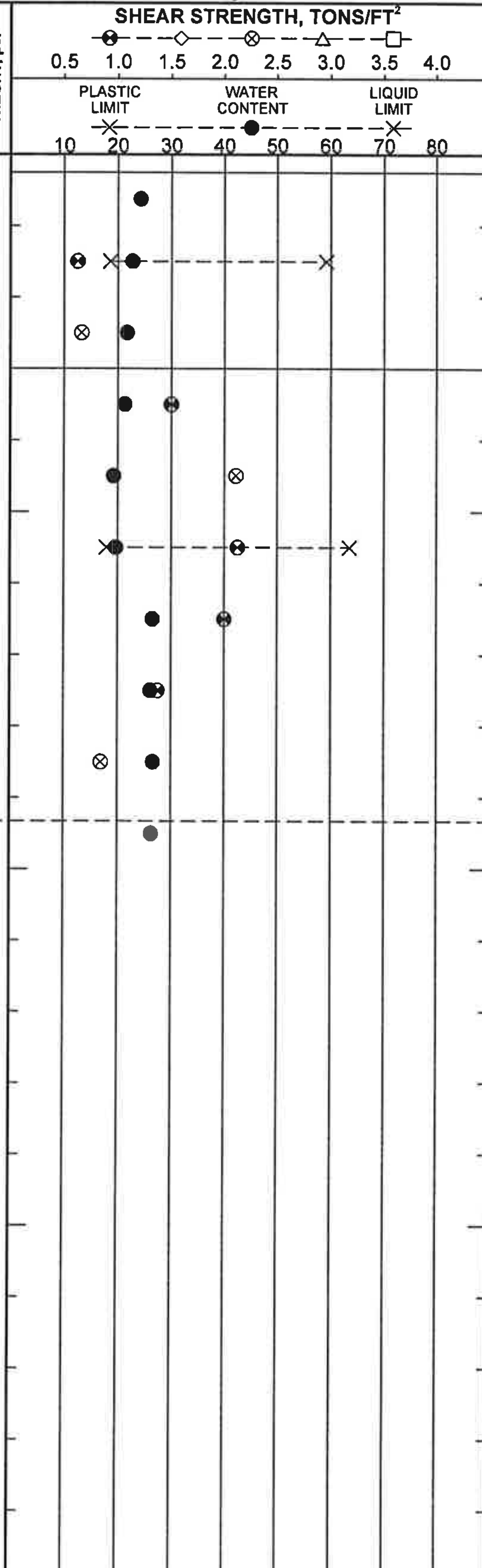
LOG OF BORING NO. B-1

Residential Study - Subsurface Investigation
458 Precious Drive
San Antonio, Texas

DRILLING METHOD: Geoprobe

LOCATION: See Figure 1

DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	PLASTICITY INDEX	% -200
TOPSOIL: clay, lean, brown and tan, with grass and roots		102		
POSSIBLE FILL: clay, fat, stiff, dark brown and gray to brown and gray, with roots and scattered gravel - with orange ferrous stains below a depth of about 1 ft		105	40	
CLAY, fat, very stiff to hard to stiff, dark brown, with rounded gravel - with traces of red ferrous stains - with traces of roots from a depth of about 5 ft down to a depth of about 6 ft - with brown and gray clay lenses below a depth of about 8 ft - with traces of gravel below a depth of about 8 ft		107 95	45	
Boring terminated at a depth of about 9'-4" due to auger refusal. Upon completion of the drilling operations, the boring was observed dry.				



NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 9.3 ft
DATE DRILLED: 8/6/2008
DEPTH TO WATER: Dry
DATE MEASURED: 8/6/2008
PROJ. No.: ASR08-041-01
FIGURE: 2

LOG OF BORING NO. B-2

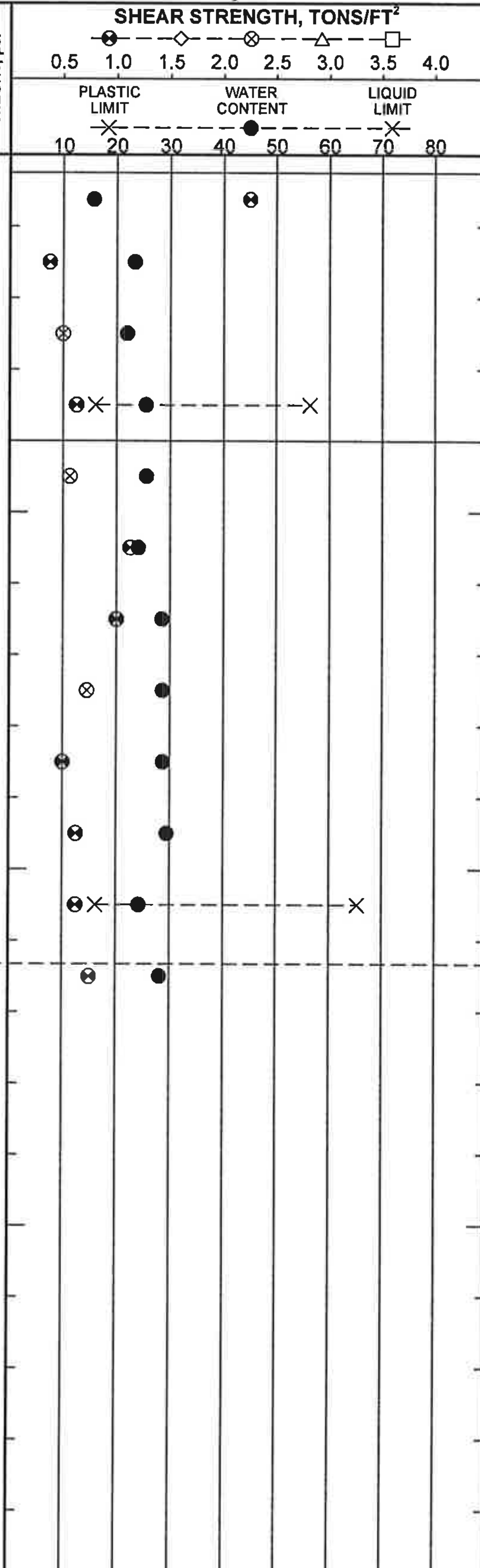
Residential Study - Subsurface Investigation
458 Precious Drive
San Antonio, Texas

Raba Kistner

DRILLING METHOD: Geoprobe

LOCATION: See Figure 1

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WIEGHT, pcf	PLASTICITY INDEX	% -200
	TOPSOIL: clay, lean, brown and tan, with grass and roots				76
	FILL: clay, fat, hard to stiff, dark brown to tan and gray, with traces of asphalt				
	- with orange ferrous stains below a depth of about 2 ft		105		
				40	
	CLAY, fat, stiff to very stiff, dark brown and gray, with a strong organic odor		101		
5					
			96		
10	- becomes tan and gray to tan and dark gray in color, with traces of roots and red ferrous stains below a depth of about 10 ft			49	
	Boring terminated at a depth of about 11'-4" due to auger refusal. Upon completion of the drilling operations, the boring was observed dry.				
15					



NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED:	11.3 ft	**DEPTH TO WATER:**	Dry	**PROJ. No.:**	ASR08-041-01
DATE DRILLED:	8/6/2008	**DATE MEASURED:**	8/6/2008	**FIGURE:**	3

KEY TO TERMS AND SYMBOLS

MATERIAL TYPES

SOIL TERMS

- CALCAREOUS
- CALICHE
- CLAY
- CLAYEY
- GRAVEL
- GRAVELLY
- PEAT
- SAND
- SANDY
- SILT
- SILTY
- FILL

ROCK TERMS

- CHALK
- CLAYSTONE
- CLAY-SHALE
- CONGLOMERATE
- DOLOMITE
- IGNEOUS
- LIMESTONE
- MARL
- METAMORPHIC
- SANDSTONE
- SHALE
- SILTSTONE

OTHER

- ASPHALT
- BASE
- CONCRETE/CEMENT
- BRICKS / PAVERS
- WASTE
- NO INFORMATION

WELL CONSTRUCTION AND PLUGGING MATERIALS

- BLANK PIPE
- SCREEN
- BENTONITE
- CEMENT GROUT
- BENTONITE & CUTTINGS
- CONCRETE/CEMENT
- CUTTINGS
- GRAVEL
- SAND
- VOLCLAY

SAMPLE TYPES

- AIR ROTARY
- GRAB SAMPLE
- CORE
- GEOPROBE SAMPLER
- MUD ROTARY
- NO RECOVERY
- NX CORE
- TEXAS CONE PENETROMETER
- SHELBY TUBE
- SPLIT BARREL
- SPLIT SPOON

STRENGTH TEST TYPES

- POCKET PENETROMETER
- TORVANE
- UNCONFINED COMPRESSION
- TRIAXIAL COMPRESSION UNCONSOLIDATED-UNDRAINED
- TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

NOTE: VALUES SYMBOLIZED ON BORING LOGS REPRESENT SHEAR STRENGTHS UNLESS OTHERWISE NOTED

PROJECT NO. ASR08-041-01

KEY TO TERMS AND SYMBOLS (CONT'D)

TERMINOLOGY

Terms used in this report to describe soils with regard to their consistency or conditions are in general accordance with the discussion presented in Article 45 of SOILS MECHANICS IN ENGINEERING PRACTICE, Terzaghi and Peck, John Wiley & Sons, Inc., 1967, using the most reliable information available from the field and laboratory investigations. Terms used for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in American Society for Testing and Materials D2487-06 and D2488-00, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics; 2005.

The depths shown on the boring logs are not exact, and have been estimated to the nearest half-foot. Depth measurements may be presented in a manner that implies greater precision in depth measurement, i.e 6.71 meters. The reader should understand and interpret this information only within the stated half-foot tolerance on depth measurements.

RELATIVE DENSITY

Penetration Resistance Blows per ft	Relative Density
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
> 50	Very Dense

COHESIVE STRENGTH

Resistance Blows per ft	Consistency	Cohesion TSF
0 - 2	Very Soft	0 - 0.125
2 - 4	Soft	0.125 - 0.25
4 - 8	Firm	0.25 - 0.5
8 - 15	Stiff	0.5 - 1.0
15 - 30	Very Stiff	1.0 - 2.0
> 30	Hard	> 2.0

PLASTICITY

Plasticity Index	Degree of Plasticity
0 - 5	None
5 - 10	Low
10 - 20	Moderate
20 - 40	Plastic
> 40	Highly Plastic

ABBREVIATIONS

B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
BTEX = Total BTEX
TPH = Total Petroleum Hydrocarbons
ND = Not Detected
NA = Not Analyzed
NR = Not Recorded/No Recovery
OVA = Organic Vapor Analyzer
ppm = Parts Per Million

Qam, Qas, Qal = Quaternary Alluvium
Qat = Low Terrace Deposits
Qbc = Beaumont Formation
Qt = Fluviatile Terrace Deposits
Qao = Seymour Formation
Qle = Leona Formation
Q-Tu = Uvalde Gravel
Ewi = Wilcox Formation
Emi = Midway Group
Mc = Catahoula Formation
El = Laredo Formation
Kknm = Navarro Group and Marlbrook Marl
Kpg = Pecan Gap Chalk
Kau = Austin Chalk

Kef = Eagle Ford Shale
Kbu = Buda Limestone
Kdr = Del Rio Clay
Kft = Fort Terrett Member
Kgt = Georgetown Formation
Kep = Person Formation
Kek = Kainer Formation
Kes = Escondido Formation
Kew = Walnut Formation
Kgr = Glen Rose Formation
Kgru = Upper Glen Rose Formation
Kgrl = Lower Glen Rose Formation
Kh = Hensell Sand

RESULTS OF SOIL SAMPLE ANALYSES

PROJECT NAME: Residential Study Subsurface Investigation
458 Precious Drive
San Antonio, Texas

FILE NAME: ASR08-041-01.GPJ 9/9/2008

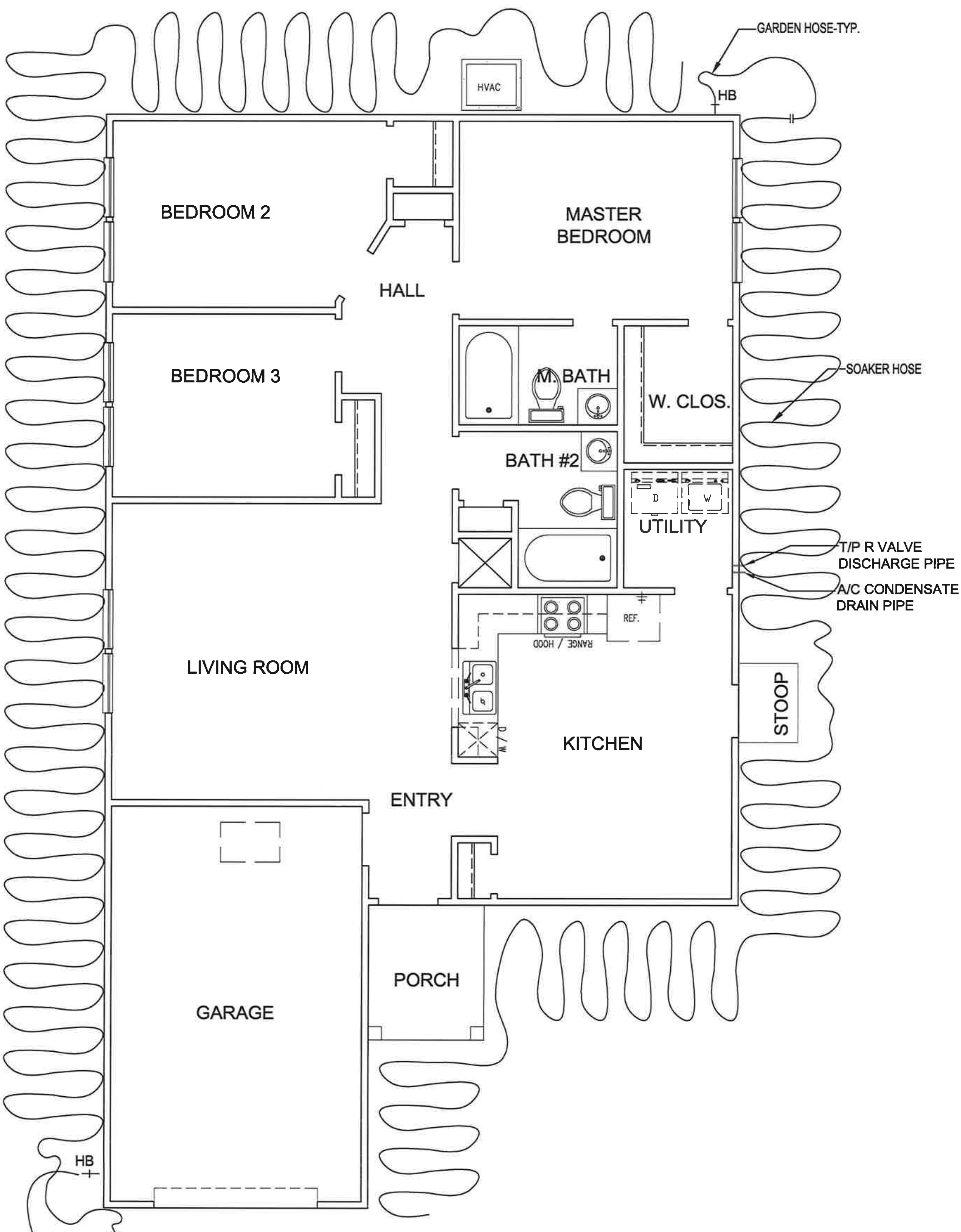
Boring No.	Sample Depth (ft)	Blows per ft	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	USCS	Dry Unit Weight (pcf)	% -200 Sieve	Shear Strength (tsf)	Strength Test
B-1	0.0 to 0.3										
	0.3 to 1.0		24.2					102			
	1.0 to 2.0		22.7	59	19	40				0.63	PP
	2.0 to 3.0		21.7					105		0.66	UC
	3.0 to 4.0		21.3							1.50	PP
	4.0 to 5.0		19.2					107		2.11	UC
	5.0 to 6.0		19.7	63	18	45				2.13	PP
	6.0 to 7.0		26.6							2.00	PP
	7.0 to 8.0		26.2							1.38	PP
	8.0 to 9.0		26.7					95		0.85	UC
	9.0 to 10.0		26.3								
B-2	0.0 to 0.3										
	0.3 to 1.0		15.7						76	2.25	PP
	1.0 to 2.0		23.3							0.38	PP
	2.0 to 3.0		21.9					105		0.50	UC
	3.0 to 4.0		25.4	56	16	40				0.63	PP
	4.0 to 5.0		25.5					101		0.56	UC
	5.0 to 6.0		24.0							1.13	PP
	6.0 to 7.0		28.5							1.00	PP
	7.0 to 8.0		28.6					96		0.72	UC
	8.0 to 9.0		28.7							0.50	PP
	9.0 to 10.0		29.4							0.63	PP
	10.0 to 11.0		24.2	65	16	49				0.63	PP
	11.0 to 12.0		28.2							0.75	PP

PP = Pocket Penetrometer TV = Torvane UC = Unconfined Compression UU = Unconsolidated Undrained Triaxial

CU = Consolidated Undrained Triaxial FV = Field Vane

PROJECT NO. ASR08-041-01

Raba-Kistner



1 FIG. 2 SOAKER HOSE LAYOUT
SCALE: 3/16"=1'-0"

Raba Kistner
Engineering • Testing • Environmental
Facilities • Infrastructure
12821 West Golden Lane
San Antonio, Texas 78249
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SOAKER HOSE LAYOUT

RESIDENTIAL STUDY
SUBSURFACE INVESTIGATION
458 PRECIOUS DRIVE
SAN ANTONIO, TEXAS

REVISIONS: No.	DATE	DESCRIPTION

PROJECT No.: ASR08-041-01
DRAWN BY:
CHECKED BY:
REVIEWED BY:

FIGURE 6

ATTACHMENT B

SAN ANTONIO TESTING LABORATORY, INC.

Raba-Kistner Consultants, Inc.

12821 W. Golden Lane
San Antonio, TX 78249
ATTN: Rick Klar

Date/Time Received: 8/29/2008 3:58 PM

Date Reported: 9/5/2008

Project Name: 458 Precious Dr.
Project No.: ASR08-041-00

Additional Info:

Report No.: 0808-279

REPORT OF CHEMICAL ANALYSIS

Sample ID #: 1 S-1 (12" - Sewer Cleanout)

Sampling Method: Not Available

Sample Matrix: Solid

Date/Time Collected: 8/29/2008 10:00 A

Parameter	Results	Units	PQL	Analysis Method	Prep Method	Prep Date	Date Analyzed	Batch #	Analyst
Metals									
Total Arsenic	**<1**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Barium	**91**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Cadmium	**<0.5**	mg/Kg	0.5	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Chromium	**8.17**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Lead	**12.6**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Selenium	**<1**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Silver	**<0.45**	mg/Kg	0.45	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Mercury	**0.046**	mg/Kg	0.04	7471a	7471a	9/2/2008	9/2/2008	Hg90208S1	ID
Volatiles									
Dichlorodifluoromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Vinyl Chloride	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acetonitrile	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acrolein	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Trichlorofluoromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acetone	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD

1610 S. Laredo Street, San Antonio, Texas 78207 - 7029 · (210) 229 - 9920 · Fax (210) 229 - 9921

REPORT OF CHEMICAL ANALYSIS

1,1-Dichloroethene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acrylonitrile	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Iodomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methylene Chloride	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Allyl Chloride	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Carbon Disulfide	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,2-Dichloroethene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methyl-t-butyl ether	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1-Dichloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Vinyl Acetate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Butanone [MEK]	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methacrylonitrile	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,2-Dichloroethene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromochloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloroform	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2,2-Dichloropropane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dichloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,1-Trichloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1-Dichloropropene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Carbon Tetrachloride	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Benzene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Dibromomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dichloropropane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Trichloroethene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromodichloromethane	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methyl Methacrylate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Chloroethyl vinyl ether	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,3-Dichloropropene	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
4-Methyl-2-Pentanone [MI	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,3-Dichloropropene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,2-Trichloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Toluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3-Dichloropropane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Ethyl Methacrylate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Hexanone	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Dibromochloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dibromoethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Tetrachloroethene	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,1,2-Tetrachloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Ethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD

REPORT OF CHEMICAL ANALYSIS

m,p-Xylene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromoform	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,4-Dichloro-2-butene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Styrene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,2,2-Tetrachloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
o-Xylene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,3-Trichloropropane	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,4-Dichloro-2-buten	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Isopropylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
n-Propylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Chlorotoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
4-Chlorotoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3,5-Trimethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
tert-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,4-Trimethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
sec-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,4-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
p-Isopropyltoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
n-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dibromo-3-chloroprop	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,4-Trichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Naphthalene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Hexachlorobutadiene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,3-Trichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
C6-C12 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
>C12-C28 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
>C28-C35 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
C6-C35 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD

Surrogate Recoveries for TPH

Analyte	Recovery	Limits
1-Chlorooctadecane	70	53 - 150
1-Chlorooctane	72	40 - 121

Surrogate Recoveries for Volatile Organic Compounds

Analyte	Recovery	Limits
4-Bromofluorobenzene	98	56 - 160
Toluene-d8	102	60 - 166
Dibromofluoromethane	78	47 - 144

Report No.: 0808-279

Sample ID #: 3 S-3 (12" - Front right of Home) **Sampling Method:** Not Available

Sample Matrix: Solid **Date/Time Collected:** 8/29/2008 11:00 A

Parameter	Results	Units	PQL	Analysis Method	Prep Method	Prep Date	Date Analyzed	Batch #	Analyst
Metals									
Total Arsenic	**<1**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Barium	**104**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Cadmium	**<0.5**	mg/Kg	0.5	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Chromium	**8.71**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Lead	**13.1**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Selenium	**<1**	mg/Kg	1	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Silver	**<0.45**	mg/Kg	0.45	6010b	3050	9/2/2008	9/3/2008	R890208S1	ID
Total Mercury	**<0.04**	mg/Kg	0.04	7471a	7471a	9/2/2008	9/2/2008	Hg90208S1	ID
Volatiles									
Dichlorodifluoromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Vinyl Chloride	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acetonitrile	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acrolein	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Trichlorofluoromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acetone	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1-Dichloroethene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Acrylonitrile	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Iodomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methylene Chloride	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Allyl Chloride	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Carbon Disulfide	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,2-Dichloroethene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methyl-t-butyl ether	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1-Dichloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Vinyl Acetate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Butanone [MEK]	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methacrylonitrile	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,2-Dichloroethene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromochloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chloroform	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2,2-Dichloropropane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD

REPORT OF CHEMICAL ANALYSIS

1,2-Dichloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,1-Trichloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1-Dichloropropene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Carbon Tetrachloride	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Benzene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Dibromomethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dichloropropane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Trichloroethene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromodichloromethane	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Methyl Methacrylate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Chloroethyl vinyl ether	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,3-Dichloropropene	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
4-Methyl-2-Pentanone [MI	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,3-Dichloropropene	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,2-Trichloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Toluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3-Dichloropropane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Ethyl Methacrylate	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Hexanone	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Dibromochloromethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dibromoethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Tetrachloroethene	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,1,2-Tetrachloroethane	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Chlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Ethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
m,p-Xylene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromoform	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
cis-1,4-Dichloro-2-butene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Styrene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,1,2,2-Tetrachloroethane	**<0.01**	mg/Kg	0.01	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
o-Xylene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,3-Trichloropropane	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
trans-1,4-Dichloro-2-buten	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Isopropylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Bromobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
n-Propylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
2-Chlorotoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
4-Chlorotoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3,5-Trimethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
tert-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,4-Trimethylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD

REPORT OF CHEMICAL ANALYSIS

sec-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,4-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,3-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
p-Isopropyltoluene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
n-Butylbenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2-Dibromo-3-chloroprop	**<0.05**	mg/Kg	0.05	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,4-Trichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Naphthalene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
Hexachlorobutadiene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
1,2,3-Trichlorobenzene	**<0.1**	mg/Kg	0.1	8260b	5030	9/4/2008	9/4/2008	V-090408S	LD
C6-C12 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
>C12-C28 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
>C28-C35 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD
C6-C35 Hydrocarbons	**<50**	mg/Kg	50	TX1005	TX1005	9/4/2008	9/4/2008	T-090408S	LD

Surrogate Recoveries for TPH

Analyte	Recovery	Limits
1-Chlorooctadecane	68	53 - 150
1-Chlorooctane	70	40 - 121

Surrogate Recoveries for Volatile Organic Compounds

Analyte	Recovery	Limits
4-Bromofluorobenzene	100	56 - 160
Toluene-d8	98	60 - 166
Dibromofluoromethane	78	47 - 144

QUALITY CONTROL DATA

PARAMETER	BLANK	UNITS	SPIKE AMT	LCS % REC	LCSD % REC	LCS/LCSD LIMITS	MS % REC	MSD % REC	MS/MSD LIMITS	QC RESULTS	QC DUP RESULTS	RPD	RPD LIMIT
Metals													
QC Sample ID	0808-271-1												
Arsenic	<1	mg/Kg	2	102	-	80-120	83	79	75-125	6.49	-	5	30
Barium	<1	mg/Kg	2	114	-	80-120	0	0	75-125	146	-		30
Cadmium	<0.5	mg/Kg	2	107	-	80-120	73	71	75-125	<0.5	-	3	30
Chromium	<1	mg/Kg	2	108	-	80-120	81	77	75-125	2.64	-	5	30
Lead	<1	mg/Kg	2	104	-	80-120	75	75	75-125	6.53	-	<1	30
Selenium	<1	mg/Kg	2	100	-	80-120	62	62	75-125	<1	-	<1	30
Silver	<0.45	mg/Kg	1	99	-	80-120	84	81	75-125	3.02	-	4	30
QC Sample ID	0808-271-6												
Mercury	<0.04	mg/Kg	0.25	106	-	80-120	111	109	75-125	0.044	-	2	30
Volatiles													
QC Sample ID	0808-279-1												
1,1-Dichloroethene	<0.01	mg/Kg	0.05	96	-	56-133	102	102	44-147	-	-	<1	18
Benzene	<0.01	mg/Kg	0.05	96	-	75-136	100	100	66-149	-	-	<1	20
Trichloroethene	<0.01	mg/Kg	0.05	98	-	69-130	98	98	63-138	-	-	<1	14
Toluene	<0.1	mg/Kg	0.05	100	-	74-130	102	102	73-138	-	-	<1	21
Chlorobenzene	<0.1	mg/Kg	0.05	106	-	68-129	102	106	67-132	-	-	4	14
QC Sample ID	0808-250-1												
C6-C35 Hydrocarbons	<50	mg/Kg	1000	115	-	75-125	119	116	75-125	-	-	3	30

Notes:

Method: 6010b MS/MSD recoveries are affected by matrix interference.

Definitions:

PQL Practical Quantitation Limit

mg/Kg Milligrams per Kilogram

Test Methods: Standard Methods for the Examination of Water and Wastewater, 20th Edition 1998

Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Rev. March 1983

EPA SW Test Methods for the Examination of Solid Waste, SW-846, 1996

TCEQ Drinking Water Certificate # TX274-2008A

Richard Hawk
General Manager

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FAX: (210) 699-6426
Phone: (210) 699-9090 PO# 121976

Chain of Custody Record and Analysis Request

NOTE: PROJECT APPROVAL AND PROJECT SETUP MUST BE COMPLETE PRIOR TO INITIATION OF ANALYSIS.

11218

Company Name: San Antonio Testing
Address:
ph #:
fax #:
Site Location: 458 Precious Dr.
Project Number: ASR08-041-00
Task Number:
Report Results to: ljudson@rkci.com

R-KCI #	SAMPLE ID	DATE	TIME	AMOUNT SAMPLED	WATER	AIR	SOIL	SLUDGE	OTHER	ACID	ICE	NONE	OTHER	VOCs (8260)	TPH (1005)	RCRA 8 Metals	Analysis Requested
1	S-1 (12" - Sewer Cleanout)	8/29/08	10:00	8 oz			X				X			X	X	X	
2	S-2 (24" - Sewer Cleanout)	↓	10:15	↓			X				X						HOLD
3	S-3 (12" - Front Right of Home)	↓	11:00	↓			X				X			X	X	X	
4	S-4 (33" - Front Right of Home)	↓	11:20	↓			X				X						HOLD

MATRIX: WATER, AIR, SOIL, SLUDGE, OTHER. PRESERV. pH/TEMP: ACID, ICE, NONE, OTHER.

CUSTODY RECORD

Relinquished by:	Received by:	Date:	Time:
Heather D. Johnson	[signature]	08/29/08	1530
[signature]	Landra Felix	8/29/08	3:58
	Received by: 08-29-08 15:58 IN		

TURNAROUND TIME REQUESTED
RUSH 1 day ______
RUSH 2 day ______
RUSH 3 day ______
Normal 5-7 day ______
PROVIDE RESULTS BY: *9/5/08*

SPECIFY
Special detection limits: * TRRP Reporting Limits
Special reporting requirements: ______

SAMPLE RECEIPT REPORT

Samples OK	Y	N
Temp 4 C Min	Y	N
Custody Seals, Intact	Y	N
Head Space in VOAs	Y	N
pH adjusted, Describe	Y	N

COMMENTS: iced temp 0.1°C