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Geotechnical Engineering Report
The Mahoney Group Office Development
SWC Cottonwood Lane and Trekell Road
Casa Grande, AZ
RAMM Project No. G14580

RICKER • ATKINSON • McBEE & ASSOCIATES, INC.
Geotechnical Engineering • Construction Materials Testing

Geotechnical Engineering Report
The Mahoney Group Office Development
SWC Cottonwood Lane and Trekell Road
Casa Grande, AZ
RAMM Project No. G14580

For:
The Mahoney Group
719 East Cottonwood Lane
Casa Grande, Arizona 85222

◆◆◆

By:
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Geotechnical Engineering • Construction Materials Testing

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The Mahoney Group
719 East Cottonwood Lane
Casa Grande, Arizona 85222

May 8, 2007

Attention: Seth M. Gates, Financial Analyst

Subject: Geotechnical Engineering Report
The Mahoney Group Office Development
SWC Cottonwood Lane and Trekell Road
Casa Grande, Arizona

RAMM Project No. G14580

Attached to this letter is the Geotechnical Engineering Report for the proposed Mahoney Group Office Development, to be located in Casa Grande, Arizona.

The proposed development will include two, one-story office buildings, 13,000 and 17,000 square feet in size, with adjacent paved parking areas and drives, and retention basins. The results of our field explorations; laboratory testing; and engineering analysis, evaluation and recommendations, are presented in the report.

The following is a brief summary of selected recommendations:

A. At-Grade Spread Foundations:

- Support on undisturbed site soils and/or new compacted fill
- Found at least 1.5 feet or 2.0 feet below finished grade.
- Design for allowable bearing pressure of 2000 psf or 2500 psf, respectively.
- Must extend through all existing fill

B. Site Soils:

- Use as fill and backfill in all areas.
- Must be placed and compacted at moisture content range of optimum to 3 percent above optimum when processed/placed in building and exterior slab areas.

C. On-Site Pavement Sections:

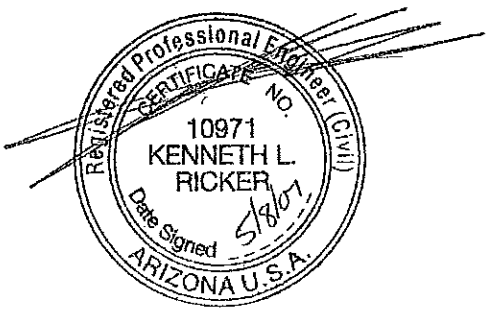
- Auto Parking and Drives - 2 inches of asphalt concrete on 6 inches of base material, or 5.5 inches of Portland cement concrete.
- Truck Drives - 3 inches of asphalt concrete on 6 inches of base material; or 6 inches of Portland cement concrete.

The attached report was prepared based on project and site data available at this time and was prepared in a manner and to the standards of local geotechnical engineering practice. Our services did not include evaluations for the presence of hazardous materials, area subsidence resulting from groundwater withdrawal, or other geologic hazards.

If you have any questions, please do not hesitate to call.

Respectfully submitted,

RICKER, ATKINSON, MCBEE, MORMAN & ASSOCIATES, INC.



By: Kenneth L. Ricker, P.E. AND Kip. E. Reese, E.I.T.

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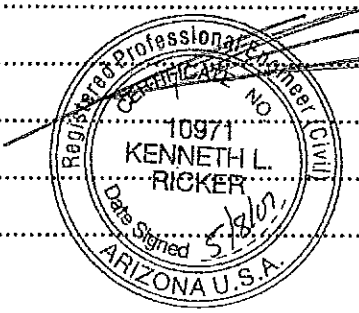

APPENDIX A - FIELD EXPLORATION

APPENDIX B - LABORATORY ANALYSIS

REPORT

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INTRODUCTION

This report presents the results of our geotechnical engineering services for the Mahoney Group Office Development, to be located in Casa Grande, Arizona. The scope of our services included performing a field exploration program, laboratory analysis and geotechnical engineering evaluation, analysis and recommendations. The geotechnical recommendations presented herein include those for foundation design, excavation conditions, on-site pavement design, material use and requirements, and site preparation and grading procedures. We would be pleased to discuss with you any additional recommendations you may require. In addition, we are available to review project specifications and plans for conformance with our recommendations at no charge to you.

This firm should be notified for additional evaluation and recommendations should the project design parameters (locations, types, sizes, structural loads), site use or conditions encountered during construction differ from those presented herein.

PROPOSED CONSTRUCTION

The proposed development will include two, one-story office buildings 13,000 and 17,000 square-feet in size, probably of masonry and/or frame construction. Maximum structural loads for the buildings are expected to be 4 to 6 kips per lineal foot for bearing walls and 60 to 80 kips for columns. The concrete slab-on-grade floors will probably be founded at or slightly above existing site grades. Improvements to the site will include adjacent paved parking areas and drives, and retention basins.

SITE CONDITIONS

The proposed Mahoney Group Office Development buildings will be located at the southwest corner of Cottonwood Lane and Trekell Road, in Casa Grande, Arizona. At the time of our field explorations, the site was a relatively flat, vacant lot. Vegetation on-site consisted of a sparse coverage of weeds.

FIELD EXPLORATIONS

Subsurface conditions at the site were explored by drilling four test borings to a depth of 15 feet in the proposed building areas, three test borings to a depth of 3 feet in the proposed pavement areas, and three test borings/percolation tests to depths of 4 to 5 feet in the proposed retention basin areas, at the locations shown on the Site Plan in Appendix A. The test borings were drilled using a CME 75 drill rig using 7-inch diameter hollow stem auger. The drilling equipment and crew were provided by D&S Drilling, Inc. The test boring locations were determined in the field by a field technician from our firm. During the field explorations, representative disturbed and undisturbed samples were obtained, the test borings logged and soils field classified by our field technician, who also directed the drill crew. The relatively undisturbed samples (ring samples) were obtained by driving a 3-inch diameter, ring-lined, open-end sampler into the soil with a 140-pound hammer dropping 30 inches. In addition to drilling and sampling, continuous penetration testing using a 2-inch diameter rod and the 140-pound hammer dropping 30 inches was performed and extended to depths of 4 to 5 feet adjacent to two of the test boring locations in the building area. The results of the field explorations are presented on the Test Boring Logs in Appendix A. After presoaking, the following stabilized percolation rates were measured:

Test Location	Stabilized Percolation Rate
Test Boring 8	26 minutes per inch
Test Boring 9	18 minutes per inch
Test Boring 10	26 minutes per inch

LABORATORY ANALYSIS

Representative samples obtained during the field exploration were subjected to the following tests in our laboratory.

Type of Test	Type of Sample	Number of Samples Tested
Compression	Undisturbed	2
Swell	Remolded	2
Percent Passing No. 200 Sieve and Atterberg Limits	Representative	3
Moisture Content/Dry Density *	Undisturbed Ring	6

* Reported in the Test Boring Logs

The results of the laboratory tests are presented in Appendix B.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the test boring locations were relatively uniform. The results of each test boring are presented in the Test Boring Logs in Appendix A. In general, the near surface and subsurface soils encountered in the test borings and extending to depths of 10 to 11.5 feet consisted of clayey sand with a trace to some gravel. These soils were medium dense to dense, had medium plasticity fines, and had intermittent light cementation. Underlying these soils and extending to the maximum depths of our exploration (15 feet), silty sand containing trace to some amounts of gravel was encountered. These soils were medium dense to dense, and had non-plastic fines. In Test Boring 1, clayey sand fill containing trace to some amounts of gravel was encountered. The fill was medium dense and had medium plasticity fines. Soil moisture contents were described as slightly damp to damp. No groundwater was encountered during the test drilling.

DISCUSSION OF TEST RESULTS

Remolded samples of the surface soils from the site exhibited low to moderate swell potentials following wetting when tested in the laboratory. Undisturbed samples from anticipated foundation grades underwent some compression during loading to approximate foundation loads. Upon wetting at approximate foundation loads, these soils underwent some additional compression.

FOUNDATION DESIGN RECOMMENDATIONS

Spread Footings:

The proposed Mahoney Group Office Development buildings can be supported on shallow spread footings, bearing on undisturbed site soil and/or new compacted fill. Spread footings thus founded may be designed using an allowable bearing pressure of 2000 psf or 2500 psf, provided the bottom of the footings are at least 1.5 or 2.0 feet, respectively, below the lowest adjacent finished grade within 5 feet of the perimeter of the structures. The spread footings must extend through all existing fill. For these design conditions structural loads should not exceed 8 kips per linear foot for walls and 100 kips for columns.

All footing excavations should be reviewed by the geotechnical engineer, prior to placing reinforcing steel or concrete. Existing fill and any loose, disturbed or unstable soils should be removed from the bearing surface and replaced with MAG cement/AB slurry or as directed by the geotechnical engineer.

The allowable bearing capacities should be applied to maximum, design dead plus live loads and may be increased by one-third when considering temporary loads such as transient wind or seismic loads. A one-third increase may also be used for toe pressures due to eccentric or lateral loadings, assuming the entire footing bearing surface remains in compression. The weight of the footing concrete below grade may be neglected in dead load computations. A site coefficient for soil characteristics (S) of 1.2 is recommended for the project site, per UBC 1994 Edition and a Soil Profile Type S_c per 1997 UBC. A Site Class designation of C should be used for the site per Table 1615.1.1 of the 2000 and 2003 International Building Code (IBC). The soil profile and site class designations are based on a review of available well holes within a one mile radius of the site. This data was available on ADWR's website and indicated that dense material exists to depths over 100 feet in the immediate vicinity of the site.

The estimated total and differential footing settlements for the loading conditions described above are on the order of ½ inch or less if soils below footing level remain at or below the construction moisture content. Additional post-construction, differential settlement of equal or somewhat greater magnitude could occur if bearing soils become wet after construction. Therefore, continuous footings and stem walls should be reinforced and masonry walls constructed with properly designed reinforcement and with frequent expansion/contraction joints. Positive drainage away from the perimeter of the buildings is essential to minimize the potential for moisture infiltration into bearing soils.

Lateral Earth Pressures:

The following tabulation presents the recommended lateral earth pressures and base friction values which should be used in the lateral design of footings, below grade structures and earth retaining systems. The lateral pressures are equivalent fluid pressures for average anticipated conditions.

Backfill Pressures:

Unrestrained walls	35 psf/ft
Restrained walls	55 psf/ft

Passive Pressures:

Continuous	250 psf/ft
Isolated column footings	350 psf/ft

Coefficient of Base Friction:

Concrete to soil	0.45
Plastic membrane to soil	0.30

The above equivalent fluid pressures are for vertical walls with horizontal backfills and do not include temporary loads imposed by compaction equipment or permanent loads resulting from backfill swell pressures, hydrostatic pressures or surcharge loads. Any retaining walls should contain weep holes to reduce the potential for the buildup of hydrostatic pressures.

SITE DEVELOPMENT RECOMMENDATIONS

Concrete Slab-On-Grade Support:

The site soils are medium in plasticity and, when compacted and wetted, these soils exhibit low to moderate swell potentials. These soils, in the natural state or when recompacted, will provide adequate support for concrete slabs-on-grade, provided these soils are placed and compacted at moisture contents at to 3 percent above optimum. Interior slabs should be founded on a minimum 4-inch thickness of base material. Exterior slabs should be founded on a prepared subgrade. All unreinforced slabs-on-grade should be jointed as per ACI (American Concrete Institute) or PCA (Portland Cement Association) guidelines.

Moisture barriers such as plastic membranes are not typically used in Arizona's semi-arid climate and we do not normally recommend the use of such membranes unless moisture-sensitive floor coverings are used. If plastic moisture barriers are used, the barriers should be directly on the aggregate base, be at least 15 mil in thickness and have all seams and penetrations sealed per manufacturers recommendations.

Surface Drainage:

Most soils will undergo some degree of volume change as the result of wetting. The degree of volume change will depend on the type of soil, swell potential, natural soils structure or degree of

compaction (if a fill). These volume changes could result in movements in overlying buildings and non-structure elements including sidewalks, planters, retaining walls, floor slabs, etc. Therefore, good site and surface drainage away from these elements is required. In addition, water should not be allowed to pond within 10 feet of the buildings or other elements which are sensitive to movements. The exterior footing excavation backfill must be well compacted to minimize the possibility of moisture infiltration through this zone. All joints in the concrete floor slabs and at walls of the buildings must be sealed with flexible waterproof joint sealer.

Excavatability:

The excavatability of site materials is difficult to evaluate based only on the exploration equipment used during this design report. Therefore, we recommend that the contractor evaluate the excavatability of site materials by performing test excavations with the size and type of equipment the contractor plans on using at the site. For design purposes the following paragraph presents our best analysis as to the excavatability of site soils.

The near surface soils to a depth of 15 feet can probably be removed with conventional excavating equipment. Coring should be expected in the granular silty sand soils. OSHA requires all excavations over five feet in depth, in which personnel are to enter, be either braced or sloped in accordance with OSHA regulations.

Workability:

Wetting site soils such that moisture contents are at or above optimum could result in some soil pumping under dynamic loadings such as heavy construction equipment driving over the area. In building areas, some pumping is not detrimental to foundation or floor slabs provided the specified percent compaction is achieved. However, in flexible pavement areas where pumping has occurred, and in building and slab areas where severe pumping has damaged subgrade conditions, the area should be allowed to dry until soils are workable without pumping or the wetted areas removed and replaced with drier site soils.

PAVEMENT DESIGN RECOMMENDATIONS

Asphalt Concrete Pavements:

The following asphalt concrete pavement sections are based on anticipated traffic types and frequencies and site soil conditions. Therefore, any material imported to the site and placed in pavement areas should have support characteristics the same as or better than the site soils.

	Pavement Section	
Use	Asphalt Concrete	Base Material
Auto Parking and Drives	2.0 inches	6.0 inches
Truck Drives	3.0 inches	6.0 inches

The above sections are minimal and will require periodic maintenance (seal coats, overlays or patching) where proper drainage is provided and maintained. Should moisture penetrate to the subgrade soils or ponding occur on or adjacent to the pavement section, a significant reduction in pavement life could occur along with increased maintenance. Therefore, good surface drainage on and adjacent to the pavement is essential to achieving the desired pavement life.

Portland Cement Concrete:

The following Portland cement concrete pavement (PCCP) sections are based on anticipated traffic types and frequencies and site soil conditions. Therefore, any material imported to the site and placed in pavement areas should have support characteristics the same as or better than the site soils.

Area of Use	PCCP Section
Auto Parking and Drives	5.5 inches
Truck Drives	6.0 inches

Base material is not required below the PCCP sections; however, if construction occurs during the summer months the base material would help reduce the potential for slab curling and shrinkage cracking. A maximum joint spacing of 12 to 15 feet should not be exceeded in either direction and all joints should be designed to provide load transfer. Joint detail, joint layout and concrete batching, placing, curing and observation procedures should be in accordance with the recommendations developed by the Portland Cement Association.

MATERIALS SUITABILITY AND REQUIREMENTS

Site Soils:

The existing fill and native site soils are of medium plasticity and are expected to exhibit low to moderate swell potentials when compacted and wetted. These soils may be used as fill in all areas of the site, provided these soils are placed and compacted at a moisture at optimum to 3 percent above optimum below concrete slabs cast-on-grade. All materials should be free of organics, debris, rubble and material greater than 6 inches in size.

Imported Soils:

Any additional fill required to raise the building or exterior slab areas, or for use as retaining wall and subsurface wall backfills, should be imported soils meeting the following requirements:

Minimum % Passing No. 4 Sieve---------- 30
Maximum Particle Size ---------- 6 inches
Maximum Swell Potential ----------1.5%*

* Based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2 percent below optimum, placed under a surcharge load of 100 psf and wetted.

Base Material:

Base material used below concrete slabs and pavements should conform to the requirements of Maricopa Association of Governments (MAG) Specifications for Aggregate Base (Section 702).

Asphalt Concrete Pavement:

Asphalt concrete pavement materials should conform to the requirement of MAG Specifications for Asphalt Concrete (Section 710).

Portland Cement Concrete Pavement:

The PCCP should have a minimum compressive strength of 4000 psi at 28 days and a maximum slump of 4 inches at the time of placement. The PCCP should conform to the requirements of MAG Specifications for Portland cement concrete (Section 725, Class AA).

SITE PREPARATION AND GRADING PROCEDURES

Building and Pavement Areas:

Recommendations presented in the previous sections of this report are based upon the following site preparation and grading procedures. Therefore, all earthwork should be accomplished with observation and testing by a qualified technician under the direction of a registered geotechnical/materials engineer. The following apply to the areas within and extending 5 feet beyond the footprint of the buildings, in exterior slab areas and below any pavements.

1. Clear and grub the site by removing and disposing of all vegetation, debris, rubble and remnants of any former developments.

2. Strip the site of all existing fill zones (fill 1.5 feet in depth was encountered in Test Boring 1), any backfill zones and any unstable soils. During stripping observe the surface for evidence of buried debris, vegetation or disturbed materials which will require additional removal. Areas steeper than 5H to 1V should be benched and any depressions widened to accommodate compaction equipment.

3. Prepare the ground surface in fill areas and in areas cut to grade by scarifying, moisture conditioning and compacting the exposed surface soils to a depth of 10 inches.

4. Moisture condition and place all fill and backfill materials required to achieve specified grades. Fill materials should be moisture conditioned, placed and compacted in horizontal lifts of thicknesses compatible with the compaction equipment being used.

5. Compact subgrade, fill, backfill, subbase fill or base material to the following minimum percent compaction of the ASTM D698 maximum dry density for each lift.

Material	Minimum Percent Compaction
Soil:	
Below foundations and pavements	95
Below concrete floor slabs (above footings)	90
Base Material:	
Below concrete slabs	95
Below pavement sections	100
Backfill:*	90
Trench and Structure Backfill:	
Below foundations & structures	100
Subsurface wall backfill	100

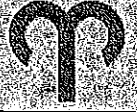
* Outside of structure, exterior slab and pavement areas.

6. The moisture content of soil and base materials at the time of compaction should be:

Type	Area of Use	Moisture Content
On-site	Buildings, Exterior Slabs	Optimum to optimum plus 3%
On-site or Imported	Pavements	2% below optimum or lower
Imported	Buildings	Optimum plus or minus 3%
Base Material	Buildings and Pavements	Optimum plus or minus 3%

7. Any soils which are disturbed or overexcavated by the contractor outside the limits of the plans or specifications should be replaced with materials compacted as specified above.

APPENDIX A
FIELD EXPLORATIONS



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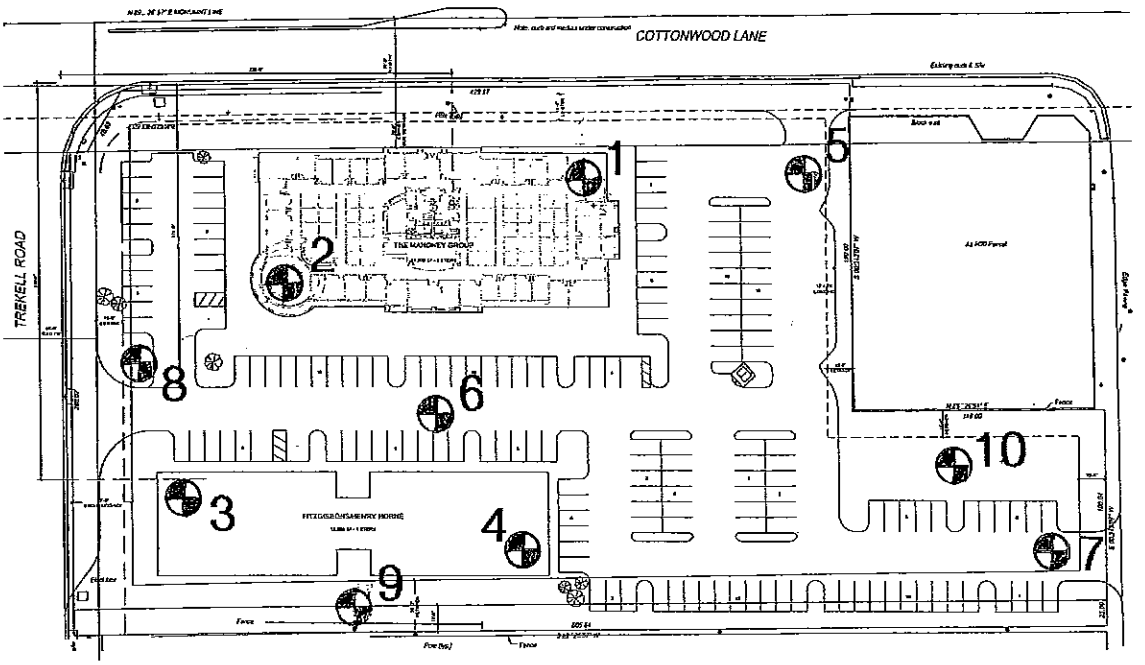

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Test Boring Location

Not To Scale

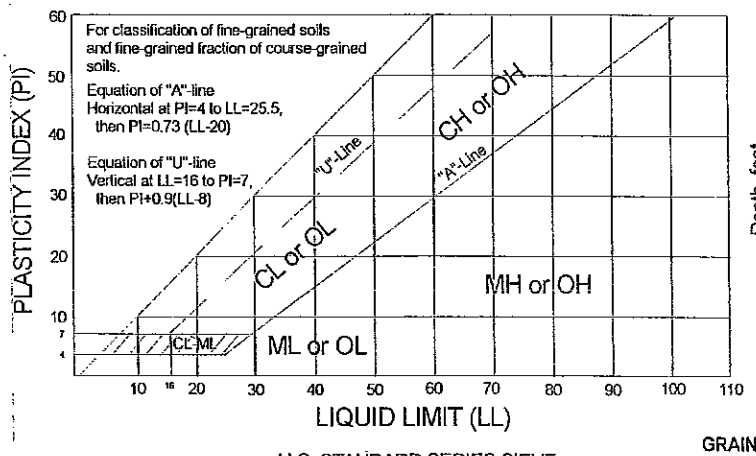
SITE PLAN

LEGEND

CLASSIFICATION OF SOILS

ASTM Designation: D2487-83
(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests					Soil Classification: Group Symbol	Soil Classification: Name
COARSE-GRAINED SOILS More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines	Cu > 4 and 1 <Cc <3		GW	Well graded gravel
			Cu<4 and/or 1>Cc>3		GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	Fines classify as ML or MH		GM	Silty gravel
			Fines classify as CL or CH		GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu > 6 and 1 <Cc <3		SW	Well-graded sand
			Cu<6 and/or 1>Cc>3		SP	Poorly graded sand
		Sands with Fines More than 12% fines	Fines classify as ML or MH		SM	Silty sand
			Fines classify as CL or CH		SC	Clayey sand
FINE-GRAINED SOILS 50% or more passes the No. 200 Sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI>7 and plots on or above "A" line		CL	Lean clay
			PI<4 or plots below "A" line		ML	Silt
		Organic	Liquid Limit - oven dried / Liquid limit - not dried	<0.75	OL	Organic clay / Organic silt
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line		CH	Fat clay
			PI plots below "A" line		MH	Elastic silt
		Organic	Liquid limit - oven dried / Liquid limit - not dried	<0.75	OH	Organic clay / Organic silt
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor				PT	Peat



TEST BORING LOG DEFINITIONS

Blows per foot using 140 pound hammer with 30 inch free-fall.

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description

C = Continuous Penetration Resistance (2 inch diameter rod)
N = Standard Penetration Resistance (ASTM D1586)
R = Penetration Resistance (3 inch diameter ring line sampler)

GRAIN SIZES

U.S. STANDARD SERIES SIEVE — CLEAR SQUARE SIEVE OPENINGS

200	40	10	4	3/4"	3"	12"

SILTS & CLAYS DISTINGUISHED ON BASIS OF PLASTICITY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

MOISTURE CONDITION (INCREASING MOISTURE →)

DRY — SLIGHTLY DAMP — DAMP — MOIST (Plastic Limit) — VERY MOIST — WET (SATURATED) (Liquid Limit)

CONSISTENCY CORRELATION		RELATIVE DENSITY CORRELATION	
CLAYS & SILTS	BLOWS/FOOT*	SANDS & GRAVELS	BLOWS/FOOT*
VERY SOFT	0-2	VERY LOOSE	0-4
SOFT	2-4	LOOSE	4-10
FIRM	4-8	MEDIUM DENSE	10-30
STIFF	8-16	DENSE	30-50
VERY STIFF	16-32	VERY DENSE	OVER 50
HARD	OVER 32		

*Number of blows of 140 lb hammer falling 30" to drive a 2" O.D. (1-3/8" I.D.) split-spoon sampler (ASTM D1586).

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 1

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Fill: Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense, medium plasticity fines.
		50/9"	R	101	10	SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5		34	R	97	7		
10		16	R	112	2	SM	Silty Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, non-plastic fines.
15							Stopped drilling at 15 feet. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 2

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
	10					SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
	26						
	43						
	52						
5	63						
10							
						SM	Silty Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, non-plastic fines.
15							
							Stopped drilling at 15 feet. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 3

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		33	R	109	5	SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5		50/11"	R	108	9		
10		50/8"	R	106	4	SM	Silty Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, non-plastic fines.
15							Stopped drilling at 15 feet. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 4

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
	19 39 48 71					SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							
10							
						SM	Silty Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, non-plastic fines.
15							
							Stopped drilling at 15 feet. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 5

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							Stopped drilling at 3 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 6

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							Stopped drilling at 3 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 7

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							Stopped drilling at 3 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 8

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							Stopped drilling at 4 feet. No groundwater observed.
							Note: After presoaking, a stabilized percolation rate of 26 minutes per inch was measured.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 9

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							
							Stopped drilling at 5 feet. No groundwater observed.
							Note: After presoaking, a stabilized percolation rate of 18 minutes per inch was measured.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: The Mahoney Group Office Development – Casa Grande, AZ TEST BORING: 10

Elevation: Not Determined Datum: --- Date: 4-10-07

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC	Clayey Sand, Trace to Some Gravel; brown, slightly damp to damp, medium dense to dense, medium plasticity fines, intermittent light cementation.
5							Stopped drilling at 4 feet. No groundwater observed.
							Note: After presoaking, a stabilized percolation rate of 26 minutes per inch was measured.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

APPENDIX B
LABORATORY ANALYSIS

R·A·M·M

LABORATORY TEST RESULTS

Date: 16-Apr-07

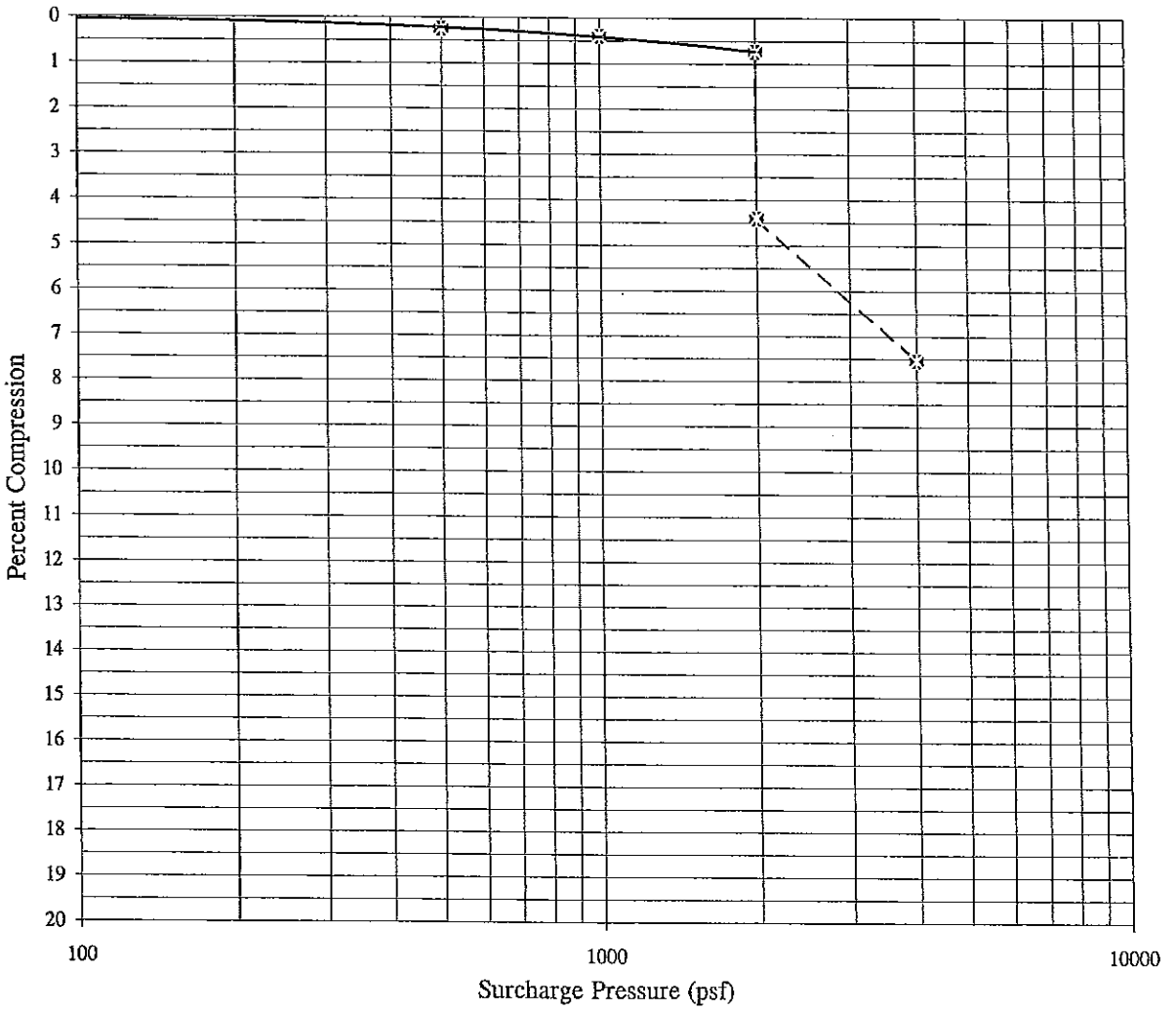
SAMPLE SOURCE: 1 @ 1.5'-2.5'

TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Miller

RESULTS:

Dry Density (pcf): 101 Moisture Content (%): 10



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 16-Apr-07

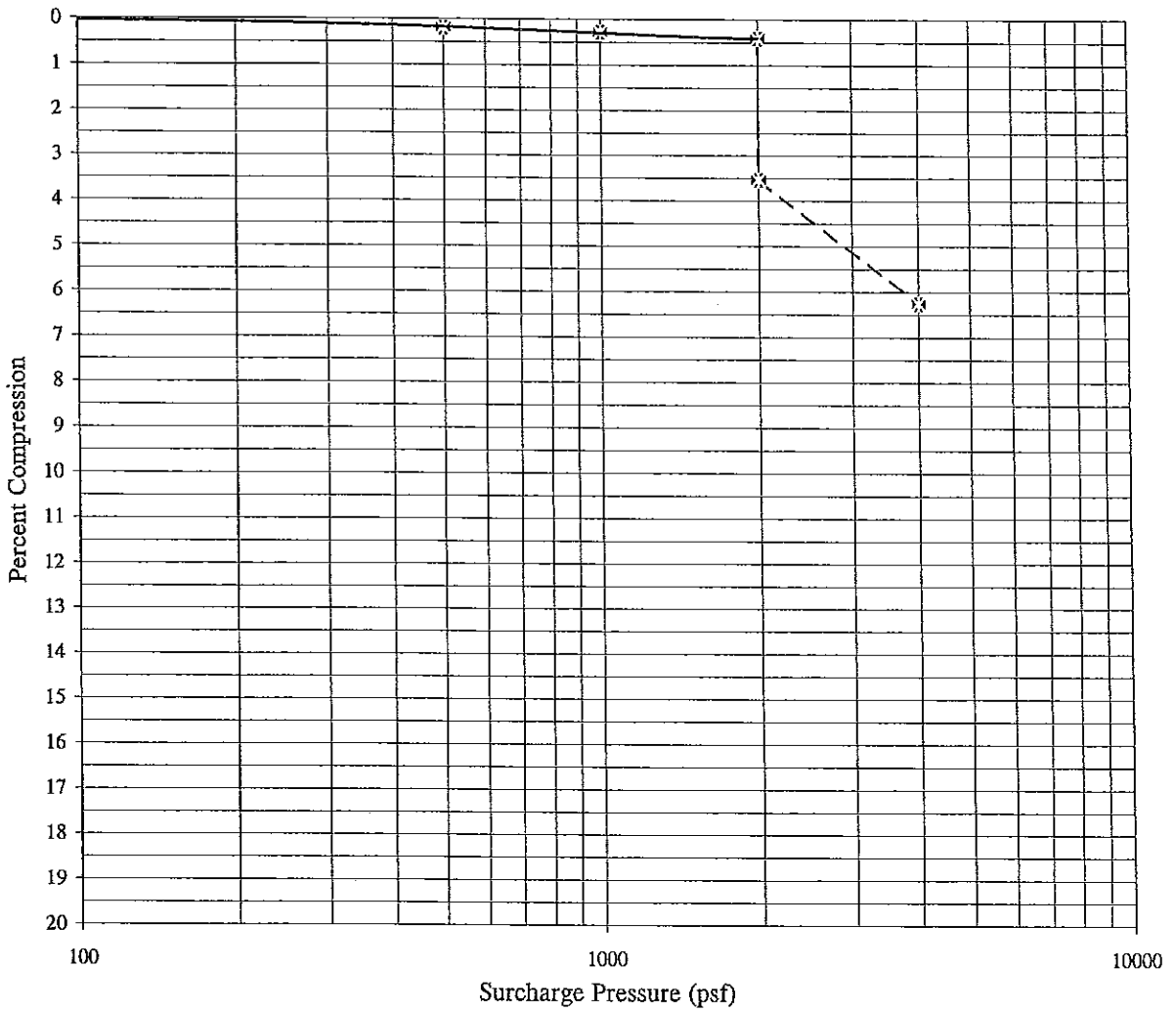
SAMPLE SOURCE: 3 @ 1.5'-2.5'

TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Miller

RESULTS:

Dry Density (pcf): 109 Moisture Content (%): 5



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 16-Apr-07

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Passing No. 200 Sieve, Atterberg Limits, Percent Expansion (ASTM D1140, D4318, D4546)

SAMPLED BY: RAMM/Miller

RESULTS:

Sample Source	Percent Retained No. 4 Sieve	Percent Passing No. 200 Sieve	Liquid Limit	Plasticity Index	Percent Expansion*	Remolded Dry Density (pcf)	Remolded Moisture Content (%)
5 @ 0'-5'	13	33	26	12			
6 @ 0'-3'	2	33	20	6	0.8	118	8
7 @ 0'-3'	2	40	29	15	1.9	114	10

* Based upon sample remolded to 95% of the estimated maximum dry density at 2% below the estimated optimum moisture content, with a surcharge pressure of 100 psf.