TG

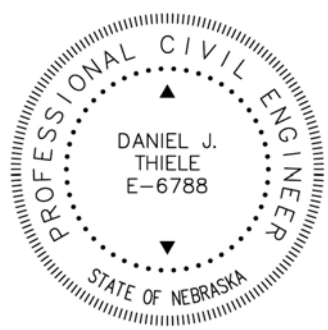
Geotechnical Exploration Report

Mission Pines Retail Building B

168th & Monroe Street
Omaha, Nebraska

Prepared for:
G & S Inc.
14202 Hillsdale Circle
Omaha, NE 68137

March 20, 2006
TG Project No. 06111.0



THIELE GEOTECH, INC
13478 Chandler Road
Omaha, Nebraska 68138-3716
402/556-2171 Fax 402/556-7831
www.thielegeotech.com

Geotechnical, Material, and Environmental Engineering

Geotechnical Exploration Report

Mission Pines Retail Building B

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INTRODUCTION

Thiele Geotech, Inc. has completed a geotechnical exploration study for the proposed retail building to be located near 168th & Monroe Street in Omaha, Nebraska. The purpose of this study was to identify the general soil and ground water conditions underlying the site; to evaluate engineering properties of the existing soils; to provide earthwork and site preparation recommendations; and to recommend design criteria and parameters for foundations, pavements, and other earth supported improvements.

This study included soil borings, laboratory testing, and engineering analysis. A series of 5 test borings was spaced across the project site at strategic locations. The field and laboratory data are presented in the Appendix, along with a description of investigative methods.

The drilling and testing performed for this study were conducted solely for geotechnical analysis. No analytical testing or environmental assessment has been conducted. Any statements in this report regarding odors, discoloration, or suspicious conditions are strictly for the information of our client. If an evaluation of environmental conditions is desired, a separate environmental assessment should be conducted.

It should also be noted that this report was prepared for design purposes only, and may not be sufficient for a contractor in bid preparation. Prospective contractors should evaluate potential construction problems on the basis of their own knowledge and experience in the local area and on similar projects, taking into account their own intended construction methods and procedures.

This report is an instrument of service prepared for use by our client on this specific project. The report may be duplicated as necessary and distributed to those directly associated with this project, including members of the design team and prospective contractors. However, the technical approach and report format shall be considered proprietary and confidential, and this report may not be distributed in whole or in part to any third party not directly associated with this project. By using and relying on this report, all other parties agree to the same terms, conditions, and limitations to which the client has agreed.

PROJECT DESCRIPTION

The proposed building will be a single story, slab on grade structure with a footprint of approximately 16,000 square feet. Conventional construction is assumed, consisting of steel joists, beams, and columns. Load bearing masonry construction is expected across the rear of the building. Loads for this type of construction are light, with assumed column loads of 30 to 80 kips and wall loads of 2 to 4 kips per lineal foot.

Based on a proposed finish floor elevation of 1137.0 for the south end of the building and 1135.67 for the north end, cuts of 4 to 5 feet and fills of 1 to 2 feet are expected. Cuts of 1 to 2 feet and fills of up to 6 feet are assumed in the parking lot planned for the east side of the building. A retaining wall is planned for the east edge of the parking lot.

SURFACE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

The project site is located on Lots 4 and 5 of the Mission Pines retail development. The general area was graded in the late 1990's during original development of Mission Pines. The site slopes gently toward the north, and minor grading will be required to level the building pad. The site is bordered to the north by Monroe Street, to the east by 168th Street, and to the west by 169th Street. The existing retail Building A lies south of the planned building pad on the south side of Lot 4.

LOCAL GEOLOGY

The surface geology of the Papillion Creek Basin is Pleistocene in age and consists of eolian (wind-blown) deposits of Peoria and Loveland loess. The loess formed in dune-shaped hills between the Elkhorn and Missouri Rivers. The Peoria loess typically consists of silty lean clays that are stiff when dry but become softer with increasing moisture content. The Peoria often exhibits low unit weight and is collapse susceptible. The Loveland loess is an older deposit, and typically consists of lean clays. The Loveland generally exhibits higher unit weights and shear strengths than the Peoria.

The loess overlies Pleistocene glacial deposits of Kansan and Nebraskan till. The till consists of lean to fat clays mixed with sand, gravel, and occasional cobbles. The glacial deposits are generally fairly deep, but are sometimes near the surface at lower elevations on steep slopes. Cretaceous sandstone or Pennsylvanian limestone and shale form the bedrock unit below the glacial deposits. The depth to bedrock is normally great, and rock is rarely encountered in construction.

Along drainageways, alluvial and colluvial deposits are typically present. These soils were formed by erosion of the adjoining loess-mantled hills. Alluvial deposits are generally present along creeks and in major drainageways. The upper several feet of alluvium are usually stiffer due to the effects of desiccation. Colluvial soils are usually located at the base of steep slopes and in upland draws, and are formed by local creep and sloughing.

SOIL CONDITIONS

The soils encountered in the test borings generally consisted of man-placed fill overlying natural Peoria loess.

Man-placed fill was encountered at the surface of each boring. It ranged from 7½ feet thick in boring D-2 to the bottom of boring D-4 at 20 feet below existing grade. The fill was generally described as light brown to reddish brown, moist, firm to very hard, lean clay. Compaction levels were calculated and ranged from 91 to over 100 percent of an assumed Standard Proctor, with an average compaction of approximately 98 percent.

Peoria loess was encountered below the fill in borings D-1, D-2, and D-3. It extended to the bottom of the borings. It was generally described as brown to light gray, moist to slightly moist, firm, lean clay.

Ranges of engineering properties from laboratory tests on selected samples are presented in Table 1.

Table 1 - Laboratory Results

Soil Layer	Moisture Content (%)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (tsf)	Classification *(LL/PI)*
Man-placed fill	14 to 22	95 to 109	1.1 to 4.1	CL (visual)
Peoria loess	14 to 24	88 to 91	- -	CL (visual)

GROUND WATER OBSERVATIONS

Ground water was not encountered in any of the test borings during or at the end of the drilling operation. However, it must be noted that ground water levels may fluctuate due to seasonal variations and other factors.

ANALYSIS AND RECOMMENDATIONS

GENERAL

A thick layer of fill was encountered across the project site. The fill soils were generally dense and the footings for the proposed structures will bear in these fill soils. These soils are suitable for supporting the proposed construction on shallow foundations. The fill was somewhat variable, with limited pockets of moderate compaction. Therefore, a reduced bearing pressure is recommended for the proposed structure.

EARTHWORK AND EXCAVATIONS

Rubble and waste materials from site clearing and demolition should be removed from the site and lawfully disposed or recycled. Waste materials should not be buried on-site. Demolition of structures should include excavation and removal of foundations and floor slabs. Where trees are cleared, the stumps should be excavated and removed.

Topsoil and vegetation should be stripped to a depth of 4 inches in areas to be disturbed during grading, including borrow and fill areas. Surfaces to receive fill should be broken up and recompacted to allow new fill to bond to the existing soil. Slopes steeper than 5H:1V should be benched before placing fill.

The excavated site soils will generally be suitable for reuse as structural fill, although some moisture conditioning may be required. Any off-site borrow should be a clean, inorganic silt or lean clay with a liquid limit less than 45 and a plasticity index less than 20. Borrow material should not contain an appreciable amount of roots, rock, or debris, and should not contain any foreign material with a dimension greater than 3 inches.

All fills should be placed and compacted as structural fill. Fill should be placed in thin lifts not to exceed 8 inches loose thickness. Structural fill should be compacted with a sheepsfoot type roller to a minimum of 95 percent of the maximum dry density (ASTM D698, Standard Proctor). Moisture content should be controlled to between -3 and +4 percent of optimum.

Backfill soils in utility trenches should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. Lift thicknesses should be appropriately matched to the type of compaction equipment used. Backfill soils around foundations, basement walls, and retaining walls should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. Granular backfill should not be used in exterior trenches or around foundation elements.

Quality control testing is an important part of any earthwork operation. It is recommended that a representative of the geotechnical engineer periodically monitor earthwork operations to verify proper compliance with these recommendations, including compaction levels.

OSHA's Construction Standards for Excavations require that the contractor's excavation activities follow certain worker safety procedures. These include a requirement that excavations over 4 feet deep be sloped back, shored, or shielded. The soils encountered in the test borings generally classify as type B soils according to the OSHA standard. The maximum allowable slope for an unbraced excavation in these soils is 1H:1V, although other provisions and restrictions apply. Excavations over 20 feet deep require specific design by a licensed Professional Engineer. The contractor is solely responsible for site/excavation safety and compliance with OSHA regulations. The geotechnical engineer assumes no responsibility for site safety, and the above information is provided only for consideration by the designers.

SHALLOW FOUNDATIONS

The site conditions identified are favorable for the use of conventional spread foundations to support structural loads. Based on our bearing capacity and settlement analysis, a net allowable bearing pressure of 1,700 pounds per square foot was determined. This allowable bearing pressure may be used to size wall footings and column pads. The bearing pressure was calculated based on a safety factor of 3 against bearing failure. Foundation settlements are estimated at less than 1 inch total and ½ inch differential over a span of 20 feet. If maximum design loads significantly exceed 80 kips for columns or 4 kips per foot for walls, these bearing pressures may not be applicable and should be reevaluated.

It is recommended that column footings be at least 3 feet square and that load bearing wall footings be at least 16 inches wide. Exterior footings and footings in unheated areas should be founded a minimum of 3.5 feet below adjacent grade to provide reasonable frost protection. It is recommended that all footings be steel reinforced.

The condition of the bearing soils can vary and should be observed by the geotechnical engineer at the time of excavation. If unsuitable bearing soils are identified, they should be improved by compaction or replaced by structural fill. As an alternative, the footing bottom could be extended through unsuitable materials if suitable material is present below.

SEISMIC SITE CLASS

Seismic structural design requirements are dictated by a site classification based on average soil properties within the top 100 feet. Based on our local experience, the soil profile was estimated below the maximum boring depth. The average undrained shear strength was then estimated based on the actual laboratory testing and on assumed soil properties for the deeper soil profile.

The site classifies as Site Class D (stiff soil profile) according to Table 1615.1.1 of the 2000 International Building Code.

FLOOR SLABS

To avoid localized slab failures, it is important that interior backfill around foundation elements and in plumbing trenches be properly compacted. Interior backfill should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor).

To provide uniform support for floor slabs, the upper 6 inches of the subgrade should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor). Care should be taken to maintain the condition of the subgrade. Areas that become saturated, frozen, or disturbed should be reworked prior to slab placement. Any unstable areas should be excavated and replaced with structural fill. A granular cushion beneath the floor slab is considered a construction convenience and may be used, but is not considered critical to proper slab performance.

If tile, carpet, or a hardener/sealer that may be affected by moisture will be applied, then a 10 mil thick vapor retarder is recommended beneath the concrete to inhibit upward migration of moisture through the slab. Care should be taken when finishing concrete placed directly on a vapor retarder to minimize potential problems with curling and blistering.

Interior partition walls weighing up to 1,000 pounds per lineal foot may be supported directly on the floor slab. It is recommended that control joints be provided between partition walls that bear on the floor slab and walls supported on footings. Entrance slabs should be designed as structural stoops with a cavity beneath the slab to accommodate frost heave.

Contraction joints are important to control the location of cracks in the floor slab that result from stresses caused by normal drying shrinkage. Joints should be cut as soon as practical after the concrete has set sufficiently to support foot traffic, and must be cut before any shrinkage cracks form. Contraction joints should be cut to a minimum of ¼ of the slab thickness (1/5 of the thickness for early entry saw method). Joints should be spaced no more than 30 times the thickness of the slab or 15 feet maximum. Panels should be kept as square as possible, with the length to width ratio limited to 125 percent. Dowel bars should be used for load transfer across construction joints where slabs are subjected to heavy loads. Joints should be carefully planned and laid out to match column lines and to meet reentrant corners. Joints should be perpendicular to edges and should not form angles less than 45 degrees or over 225 degrees. To accommodate the relative movement that commonly occurs between floors and foundations, isolation joints should be provided against walls, and diamond or circular isolation joints should be constructed around columns.

SEGMENTAL RETAINING WALLS

Segmental retaining walls may be used for grade separation on the site. The walls will retain up to 6 feet of unbalanced fill, and will be subjected to parking lot loading above. The walls should be designed following the design methodology of the National Cement Masonry Association, using the properties listed in Table 2. We recommend minimum safety factors of 2.0 against overturning and 1.5 against sliding.

Table 2 - Segmental Retaining Wall Design Properties

Property	Retained Soil	Foundation Soil	Reinforced Soil (native backfill)
Internal Friction Angle - ϕ^o	26º	26º	26º
Effective Unit Weight - γ	120 pcf	120 pcf	125 pcf
Cohesion - c	- -	200 psf	- -
Net Allowable Bearing Pressure - q_{all}	- -	2,500 psf	- -

Backfill should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor).

PAVEMENTS

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of the subgrade. This is particularly important where traffic from heavy trucks is anticipated. The final subgrade should be reworked and compacted immediately prior to pavement construction. The subgrade should then be proof rolled, and any unstable areas should be excavated and replaced to create a uniform and stable subgrade.

For concrete pavements, it is recommended that the upper 12 inches of the subgrade be compacted to a minimum of 90 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement.

For asphalt pavements, greater stability is required due to the extreme loading conditions placed on the subgrade during laydown. Subgrades for asphalt pavements should be prepared by compacting the upper 12 inches to a minimum of 92 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement, including the concrete curb and gutter section.

Under sidewalks, the upper 6 inches of the subgrade should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor). Subgrade preparation should extend laterally 6 inches beyond the edge of the sidewalk

Based on the forgoing subgrade preparation procedures, recommended minimum pavement thicknesses are provided in Table 2. These minimum thicknesses are prescriptive values based on traffic classification, and not on a detailed analysis using traffic counts. It should be noted that life cycle costs for concrete pavements are generally lower, despite their higher initial cost. Local experience has shown that well constructed concrete pavements typically perform better, have lower maintenance costs, and have longer service lives than comparable asphalt pavements. Note that we do not recommend using an aggregate base as part of the pavement section due to concerns over drainage and freeze/thaw deterioration of the base material.

Table 2 - Minimum Pavement Thicknesses

Pavement Category	Pavement Type/Thickness (inches)	
	Concrete	**Full Depth Asphalt**
Sidewalks	4	- -
Parking Areas	5	6
Drive Lanes *(concentrated traffic - occasional trucks)*	5	7
Medium Duty *(up to 3 trucks/day)*	6	8
Dumpster Pads *(including pickup area)*	7	- -

Subgrade Support Values: CBR = 3, k=120 pci
Materials: (reference City of Omaha Standard Specifications for Public Works Construction, 2003 Edition)
concrete - mix type L6 (f'_c = 3,500 psi) (Section 500)
asphalt surface - mix type CMR w/ PG64-22 binder (Section 400)
asphalt base - mix type Base w/ PG64-22 binder (Section 400)

Contraction joints are important to control the location of cracks in concrete pavement that result from stresses caused by normal drying shrinkage and thermal effects. A proper jointing system will enhance structural capacity and prolong the life span of a concrete pavement as well as improve ride quality. Contraction joints should be cut to a minimum of ¼ of the slab thickness (1/5 of the thickness for early entry saw method). Joints should be cut as soon as practical after the concrete has set sufficiently to support foot traffic, and must be cut before any shrinkage cracks form. Joints should be spaced no more than 24 times the thickness of the slab or 12½ feet maximum. Panels should be kept as square as possible, with the length to width ratio limited to 125 percent. Dowel bars should be used for load transfer across construction joints, and should be considered for contraction joints subjected to heavy truck traffic. Joints should be carefully planned and laid out to meet inlets, drainage structures, reentrant corners, and radiuses. Joints should be perpendicular to edges and radiuses, and should not form angles less than 45 degrees or over 225 degrees. Isolation joints should be provided around any structures. We recommend that joints be sealed to reduce moisture infiltration and to reduce the accumulation of non-compressible materials.

SURFACE DRAINAGE AND LANDSCAPING

The long-term performance of any project is contingent upon keeping the subgrade soils at more or less constant moisture content, and by not allowing surface drainage a path to the subsurface. Positive surface drainage away from structures must be maintained at all times. Landscaped areas should be designed and built such that irrigation and other surface water will be collected and carried away from the structure.

Construction staging and grading should provide for removal of surface water from the site. If prolonged ponding of surface water occurs, removal and replacement of wet or disturbed soils may be necessary. Temporary grades should be established to prevent runoff from entering excavations or footing trenches. Backfill should be placed as soon as structural strength requirements are met, and should be graded to drain away from the building.

The final grade of the foundation backfill and any overlying pavements should have a positive slope away from foundation walls on all sides. For grass or landscape covered areas, a minimum slope of 1 inch per foot for 5 to 10 feet away from the building is recommended. A minimum slope of 2 percent is recommended for grassed or landscaped areas of the site away from the building. For paved areas, minimum slopes of 1 percent for concrete pavements and 1½ percent for asphalt pavements are recommended. Pavements and exterior slabs that abut the structure should be carefully sealed against moisture intrusion at the joint.

OTHER RECOMMENDATIONS

During detailed design, additional issues may arise and possible conflicts may occur with our recommendations. Such issues and conflicts should be resolved through dialogue between the geotechnical engineer and designers. It is recommended that the geotechnical engineer review the final design, including the plans and specifications, to verify that our recommendations are properly interpreted and incorporated into the design.

If any changes are made in the design of the project, including the nature or location of proposed facilities on the site or significant elevation changes, the analysis and recommendations of this report shall not be considered valid unless the changes are reviewed. The analysis and recommendations of this report should not be applied to different projects on the same site or to similar projects on different sites.

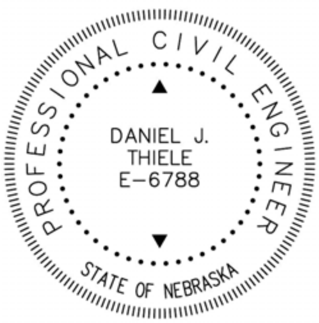
The analysis and recommendations in this report are based upon borings at specific locations. The nature and extent of variation between boring locations is impossible to predict. Because of this, geotechnical recommendations are preliminary until they have been confirmed through observation of site excavation and earthwork preparation. If variations appear during subsequent exploration or during construction, we may reevaluate our recommendations and modify them, if appropriate. The geotechnical engineer should be retained during construction to observe compliance with the recommendations of this report and to provide quality control testing of earthwork construction. If these services are provided by others, including the contractor, the entity that provides construction phase observation and testing shares responsibility as the geotechnical engineer of record for implementing or modifying these recommendations.

Respectfully submitted,
Thiele Geotech, Inc.

Prepared by,

Kelli A. James, E.I.

Prepared under the supervision of,



Daniel J. Thiele, P.E.
Nebraska License E-6788

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APPENDIX

SUBSURFACE EXPLORATION METHODS

The fieldwork for this study was conducted on March 9, 2006. The exploratory program consisted of 5 test borings drilled at the approximate locations shown on the Boring Location Plan. Boring locations were selected to provide the desired site coverage and were adjusted to accommodate access conditions. The boring locations were laid out by estimating angles and measuring from existing site features. Elevations were interpolated from contours on the topographic survey. The boring locations and elevations should only be considered accurate to the degree implied by the methods used to define them.

Test borings were advanced using flight augers powered by a truck-mounted drill rig. Soil samples were obtained at selected depths as indicated on the boring logs. A 3-inch nominal diameter thin-walled sampler was hydraulically pushed to obtain undisturbed samples. Disturbed samples were obtained by driving a 2-inch nominal diameter split barrel sampler while conducting standard penetration tests (SPT). Auger samples were obtained directly from the drill cuttings.

The boring logs were prepared based on visual classification of the samples and drill cuttings, and by observation of the drilling characteristics of the subsurface formations. The logs have been supplemented and modified based on the laboratory test results and further examination of the recovered samples. The stratification lines on the boring logs represent the approximate boundary between soil types, but the insitu transition may be gradual.

Water level observations were made at the times stated on the boring logs. The borings were backfilled with drill cuttings at the completion of the fieldwork.

The field boring logs were reviewed to outline the depths, thicknesses, and extent of the soil strata. A laboratory testing program was then developed to further classify the basic soils and to evaluate the engineering properties for use in our analysis.

Laboratory tests to further classify the soils included visual classification, moisture content, and dry unit weight. The shear strengths of cohesive samples were evaluated using the unconfined compression test.

The boring logs and related information in this report are indicators of subsurface conditions only at the specific locations and times noted. Subsurface conditions, including ground water levels, at other locations of the site may differ significantly from conditions that exist at the sampling locations. Also note that the passage of time may affect conditions at the sampling locations.

LEGEND OF TERMS

Soil Description Terms

Consistency - Fine Grained	Consistency - Coarse Grained	Moisture Conditions
Very Soft, Soft, Firm, Hard, Very Hard	Very Loose, Loose, Medium Dense, Dense, Very Dense	Dry, Slightly Moist, Moist Very Moist, Wet (Saturated)

Sample Identification

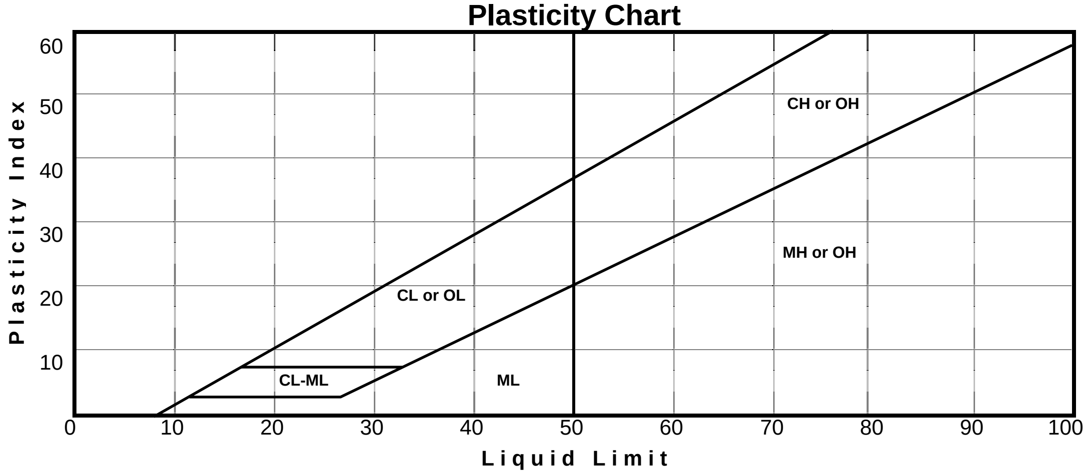
Sample Type	Sample Data	Laboratory Data
U -- Undisturbed (Shelby Tube)	No. -- Number	MC -- Moisture content
S -- Split barrel (disturbed)	SPT -- Standard penetration test	γ_d -- Dry unit weight
C -- Continuous sample	bpf -- blows per foot	q_u -- Unconfined compression
A -- Auger cuttings (disturbed)	Rec -- Recovery	LL/PI -- Liquid limit & plasticity index

Unified Soil Classification System

Peat	Pt	Highly organic soils	50% or more smaller than No. 200 sieve
Fat Clay	CH	Clay - Liquid Limit > 50 *	
Elastic Silt	MH	Silt - Liquid Limit > 50 *	
Lean Clay	CL	Clay - Liquid Limit < 50 *	
Silt	ML	Silt - Liquid Limit < 50 *	
Silty Clay	CL-ML	Silty Clay *	
Clayey Sand	SC	Sands with 12 to 50 percent smaller than No. 200 sieve *	More than 50% larger than No. 200 sieve and % sand > % Gravel
Silty Sand	SM		
Poorly-Graded Sand with Clay	SP-SC	Sands with 5 to 12 percent smaller than No. 200 Sieve *	
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay **	SW-SC		
Well-Graded Sand with Silt **	SW-SM		
Poorly-Graded Sand	SP	Sands with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Sand **	SW		
Clayey Gravel	GC	Gravels with 12 to 50 percent smaller than No. 200 Sieve *	More than 50% larger than No. 200 sieve and % gravel > % sand
Silty Gravel	GM		
Poorly-Graded Gravel with Clay	GP-GC	Gravels with 5 to 12 percent smaller than No. 200 sieve *	
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay **	GW-GC		
Well-Graded Gravel with Silt **	GW-GM		
Poorly-Graded Gravel	GP	Gravels with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Gravel **	GW		

* *See Plasticity Chart for definition of silts and clays*
** *See Criteria for Sands and Gravels for definition of well-graded*

Plasticity Chart

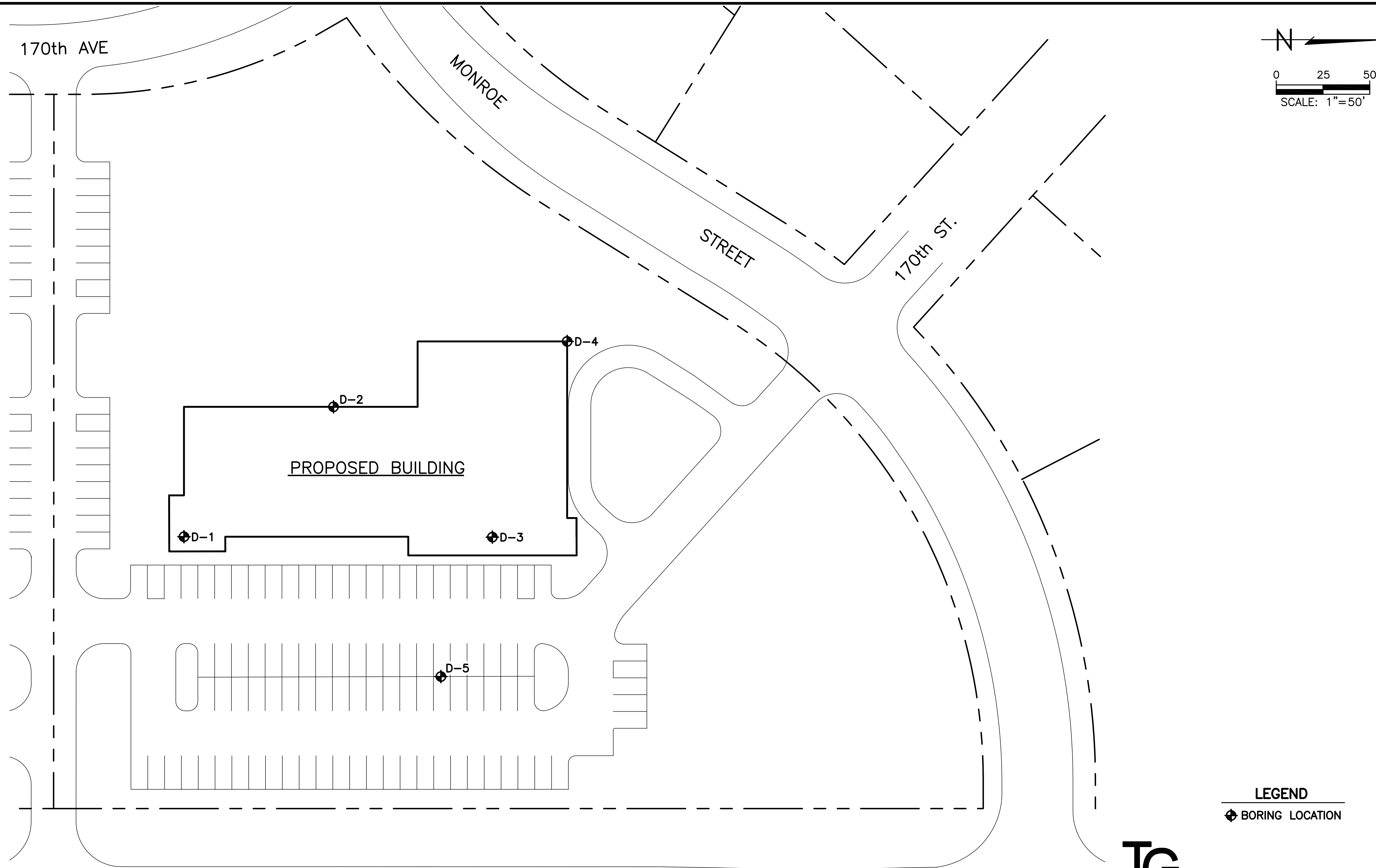


Criteria for Sands and Gravels

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	FINES (silt or clay)
Sieve size 10"	3"	¾"	#4	#10	#40	#200	

Well-graded sands (SW) $C_u=D_{60}/D_{10} \geq 6$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

Well-graded gravels (GW) $C_u=D_{60}/D_{10} \geq 4$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1



BORING LOCATION PLAN

THIELE GEOTECH, INC.

PROJECT
MISSION PINES, RETAIL BLDG B
168th & MONROE STREET
OMAHA, NEBRASKA

JOB # 06111.0 | DATE: 3/14/06

TG **THIELE GEOTECH, INC**

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Mission Pines Retail Building B	Epley	Kalbach	06111.0	3/9/06
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		168th & Monroe Street, Omaha, NE	6" flight augers		CME 45	D-1
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	bare soil / grass		1136.5	15'

VISUAL/MANUAL DESCRIPTION

DEP (ft.)	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS
	reddish brown	moist	hard	lean clay	fill	
			firm			friable
	light brown					
5						
						olive gray mottling
						roots
10						
	light gray	moist	firm	lean clay	Peoria Loess	iron stains
						silty
15						bottom of hole @ 15'
20						
25						

SAMPLE DATA / LABORATORY DATA

NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS
U-1		12	20.4	103.7		
U-2		12	19.3	100.8	1.43	
U-3		12	20.5	102.0	1.37	
U-4		12	23.8	91.0		

TG **THIELE GEOTECH, INC**

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Mission Pines Retail Building B	Epley	Kalbach	06111.0	3/9/06
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		168th & Monroe Street, Omaha, NE	6" flight augers		CME 45	D-2
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	bare soil / grass		1138.5	15'

DEP (ft.)	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
0	light brown	moist	hard	lean clay	fill	friable; olive gray mottling								0
							U-1		12	15.7	102.7			
			very hard											
							U-2		12	20.2	106.0	4.10		
5														5
	brown	moist	firm	lean clay	Peoria Loess	iron & carbon deposits; silty								
							U-3		12	19.6	82.5	0.62		
10														10
	light gray													
		slightly moist												
							U-4		12	14.7	87.7			
15						bottom of hole @ 15'								15
20														20
25														25

TG **THIELE GEOTECH, INC**

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Mission Pines Retail Building B	Epley	Kalbach	06111.0	3/9/06
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		168th & Monroe Street, Omaha, NE	6" flight augers		CME 45	D-3
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	bare soil / grass		1139.5	15’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	light brown	moist	hard	lean clay	fill	blocky	U-1		12	19.4	104.6			
5			firm				U-2		12	17.8	102.9	1.29		5
10						roots	U-3		12	17.9	99.6	1.16		10
		slightly moist				minor concrete and cobbles								
15		slightly moist	firm	lean clay	Peoria loess		U-4		12	14.4	91.4			15
						bottom of hole @ 15’								
20														20
25														25

TG **THIELE GEOTECH, INC**

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Mission Pines Retail Building B	Epley	Kalbach	06111.0	3/9/06
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		168th & Monroe Street, Omaha, NE	6" flight augers		CME 45	D-4
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	bare soil / grass		1134.5	20’

DEP (ft.)	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	reddish brown	moist	hard	lean clay	fill	minor roots								
						blocky	U-1		11	21.9	103.0			
	light brown		firm											
5							U-2		12	16.9	94.5	1.07		5
10							U-3		12	15.8	101.2	1.34		10
15	brown						U-4		12	15.0	99.6			15
		slightly moist												
20							U-5		11	14.1	101.7	1.47		20
						bottom of hole @ 20’								
25														25

TG THIELE GEOTECH, INC

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Mission Pines Retail Building B	Epley	Kalbach	06111.0	3/9/06
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		168th & Monroe Street, Omaha, NE	6" flight augers		CME 45	D-5
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	bare soil / grass		1132.5	5’

DEP (ft.)	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	hard	lean clay	fill									
							U-1		11	19.7	109.0			
	dark gray						U-2		12	21.9	105.1	2.56		
5						bottom of hole @ 5’								5
10														10
15														15
20														20
25														25

THIELE GEOTECH, INC

SOIL TEST SUMMARY

Project: Mission Pines Retail Building B

Job No.: 06111.0

Location: 168th & Monroe Street

Date: 3/13/06

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	PL	PI	PASS #200 (%)		REMARKS
D-1	U-1	0.5-2		20.4	124.9	103.7	0.624	88								
	U-2	3.5-5	2.85	19.3	120.3	100.8	0.671	78	1.43	4.9						
	U-3	8.5-10	2.85	20.5	122.9	102.0	0.652	85	1.37	11.1						
	U-4	13.5-15		23.8	112.6	91.0	0.852	75								
D-2	U-1	0.5-2		15.7	118.8	102.7	0.640	66								
	U-2	3.5-5	2.85	20.2	127.5	106.0	0.589	93	4.10	6.3						
	U-3	8.5-10	2.85	19.6	98.6	82.5	1.043	51	0.62	1.9						
	U-4	13.5-15		14.7	100.7	87.7	0.920	43								
D-3	U-1	0.5-2		19.4	124.8	104.6	0.611	85								
	U-2	3.5-5	2.85	17.8	121.2	102.9	0.637	75	1.29	5.3						
	U-3	8.5-10	2.85	17.9	117.4	99.6	0.692	70	1.16	4.2						
	U-4	13.5-15		14.4	104.6	91.4	0.843	46								
D-4	U-1	0.5-2		21.9	125.5	103.0	0.636	93								
	U-2	3.5-5	2.85	16.9	110.4	94.5	0.784	58	1.07	4.7						
	U-3	8.5-10	2.85	15.8	117.2	101.2	0.664	64	1.34	2.5						
	U-4	13.5-15		15.0	114.5	99.6	0.692	59								
	U-5	18.5-20	2.85	14.1	116.0	101.7	0.656	58	1.47	2.9						
D-5	U-1	0.5-2		19.7	130.4	109.0	0.546	97								
	U-2	3.5-5	2.85	21.9	128.1	105.1	0.603	98	2.56	15.4						