

LOG OF BORING NO. B-1

CLIENT
Law-Kingdon, Inc.

SITE
**21st Street North and Market
Wichita, Kansas**

PROJECT
Proposed Nomar Outdoor Market

N: 37.72276 W: 097.33673

DESCRIPTION

Approx. Surface Elev.: 97.0 ft

SAMPLES TESTS

0.3	Asphaltic Pavement 4" thick	96.5
	LEAN CLAY Very dark gray-brown, soft to medium stiff	
	Becoming dark brown to brown and stiff below 3'	
7		90
	FINE SAND Pale brown, medium stiff	
12		85
	FINE TO MEDIUM SAND Light brown, medium dense	
15		82
	Bottom of boring	

DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS		
		NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
			PA					
	CL	1	ST	22		18	109	5000*
			PA					
	CL	2	SS	10	10	20		2000*
5			PA					
	SP	3	SS	15	8	5		
10			PA					
	SP	4	SS	15	14	7		
15								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual. Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	∇ DRY	WS	∇
WL	∇		∇
WL			



BORING STARTED		7-23-09	
BORING COMPLETED		7-23-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

BOREHOLE 99 01095120.GPJ TERRACON.GDT 7/30/09

LOG OF BORING NO. B-2

CLIENT Law-Kingdon, Inc.		PROJECT Proposed Nomar Outdoor Market										
SITE 21st Street North and Market Wichita, Kansas												
GRAPHIC LOG	N: 37.72298 W: 097.33669		SAMPLES				TESTS					
	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 97.0 ft		0.3			PA						
	Asphaltic Pavement 4" thick		96.5			CL	1	ST	13	12	108	4000*
	LEAN CLAY Very dark gray-brown, stiff		3			PA						
FINE SAND Pale brown, loose		94			SP	2	SS	16	6	6		
Becoming medium dense below 8'		5			PA							
		10			SP	3	SS	16	10	6		
		15			PA							
Bottom of boring		82			SP	4	SS	18	18	8		

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft

WL	▼	DRY	WS	▼
WL	▼			▼
WL				



BORING STARTED		7-23-09	
BORING COMPLETED		7-23-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

BOREHOLE 99_01095120.GPJ TERRACON.GDT 7/30/09

LOG OF BORING NO. B-3

CLIENT Law-Kingdon, Inc.											
SITE 21st Street North and Market Wichita, Kansas		PROJECT Proposed Nomar Outdoor Market									
GRAPHIC LOG	N: 37.72298 W: 097.33636				SAMPLES			TESTS			
	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 97.0 ft										
	1.5	FILL: LEAN CLAY Very dark gray-brown		95.5	CL	1	SS	18	4	27	7000*
	3	LEAN CLAY , trace fine sand Very dark gray-brown, soft to medium stiff		94			PA				
		FINE SAND Pale brown, loose to medium dense			SP	2	SS	18	7	15	3000*
						PA					
				5							
				10	SP	3	SS	18	10	18	
				12		PA					
	SANDY LEAN CLAY Gray-brown, soft to medium stiff		85								
				15		SS	18	6	27	2000*	
	Bottom of boring		82	15							

LL = 32
PL = 15
PI = 17

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 13.5	WS	▽ 13
WL	▽		▽
WL			



BORING STARTED		7-24-09	
BORING COMPLETED		7-24-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

BOREHOLE 99_01095120.GPJ TERRACON.GDT 7/30/09

LOG OF BORING NO. B-4

CLIENT Law-Kingdon, Inc.											
SITE 21st Street North and Market Wichita, Kansas		PROJECT Proposed Nomar Outdoor Market									
GRAPHIC LOG	N: 37.72280 W: 097.33640				SAMPLES			TESTS			
	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 97.0 ft										
	1	FILL: LEAN CLAY Very dark brown	96			PA					
	3	SANDY LEAN CLAY Dark brown, medium stiff	94	CL	1	SS	18	5	6		5000*
	7	SILTY FINE SAND Brown, loose	90			PA					
	7	SILTY FINE SAND Brown, loose	90	SM	2	SS	18	6	10		2000*
	10	FINE SAND Pale brown, medium dense	87			PA					
	10	FINE SAND Pale brown, medium dense	87	SP	3	SS	18	12	2		
		Bottom of boring									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft						
WL	∇	DRY	WD	∇	DRY	AB
WL	∇		∇			
WL						



BORING STARTED		7-24-09	
BORING COMPLETED		7-24-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

LOG OF BORING NO. B-5

CLIENT Law-Kingdon, Inc.		PROJECT Proposed Nomar Outdoor Market										
SITE 21st Street North and Market Wichita, Kansas												
GRAPHIC LOG	N: 37.72290 W: 097.33617	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
	Approx. Surface Elev.: 96.0 ft					NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	3	93	FILL: LEAN CLAY , trace fine sand Very dark gray-brown			1	SS	18	2	17		2000*
	8	88	FAT CLAY Gray-brown, very stiff			2	SS	18	17	25		7000*
	10	86	SANDY LEAN CLAY Gray-brown, stiff			3	SS	18	8	26		3000*
		Bottom of boring		10								

LL = 70
PL = 24
PI = 46

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 10	WS	▽ 10 AB
WL	▽		▽
WL			



BORING STARTED		7-24-09	
BORING COMPLETED		7-24-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

BOREHOLE 99 01095120.GPJ TERRACON.GDT 7/30/09

LOG OF BORING NO. B-6

CLIENT Law-Kingdon, Inc.								
SITE 21st Street North and Market Wichita, Kansas		PROJECT Proposed Nomar Outdoor Market						
GRAPHIC LOG	N: 37.72270 W: 097.33591 Offset: 5' West					TESTS		
	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			UNCONFINED STRENGTH, psf	
			NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	Approx. Surface Elev.: 95.5 ft							
	FILL: LEAN CLAY , trace sand and demolition debris Dark gray-brown	3 92.5		PA				
LEAN CLAY Gray-brown, stiff	7 88.5	1	SS	18	4	14	1000*	
FAT CLAY Gray-brown, stiff	10 85.5	2	SS	18	11	20	5500*	
Bottom of boring		3	SS	18	11	27	4500*	

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

Note: Automatic SPT Hammer Used.
*Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft

WL	▽	DRY	WD	▽	DRY	AB
WL	▽			▽		
WL						



BORING STARTED		7-24-09	
BORING COMPLETED		7-24-09	
RIG	97E	DRILLER	AS
APPROVED	KJS	JOB #	01095120

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	N/E:	Not Encountered
WCI:	Wet Cave in	WD:	While Drilling		
DCI:	Dry Cave in	BCR:	Before Casing Removal		
AB:	After Boring	ACR:	After Casing Removal		

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

<u>Unconfined Compressive Strength, Qu, psf</u>	<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Consistency</u>
< 500	0-1	Very Soft
500 - 1,000	2-3	Soft
1,001 - 2,000	4-7	Medium Stiff
2,001 - 4,000	8-14	Stiff
4,001 - 8,000	15-30	Very Stiff
8,000+	>30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Relative Density</u>
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50+	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifiers	> 12

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	30+



UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

			Soil Classification		
			Group Symbol	Group Name ^B	
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well-graded gravel ^F
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel ^F
		Gravels with Fines More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^E	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand ^I
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand ^I
		Sands with Fines More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	inorganic	$PI > 7$ and plots on or above "A" line ^J	CL	Lean clay ^{K, L, M}
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K, L, M}
		organic	$\frac{\text{Liquid limit — oven dried}}{\text{Liquid limit — not dried}} < 0.75$	OL	Organic clay ^{K, L, M, N} Organic silt ^{K, L, M, O}
	Silt and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}
			PI plots below "A" line	MH	Elastic silt ^{K, L, M}
		organic	$\frac{\text{Liquid limit — oven dried}}{\text{Liquid limit — not dried}} < 0.75$	OH	Organic clay ^{K, L, M, P} Organic silt ^{K, L, M, Q}
Highly organic soils	Primarily organic matter, dark in color, and organic odor		PT	Peat	

^ABased on the material passing the 3-in. (75-mm) sieve.

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^DSands with 5 to 12% fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

$${}^E C_u = D_{60}/D_{10} \quad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^KIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

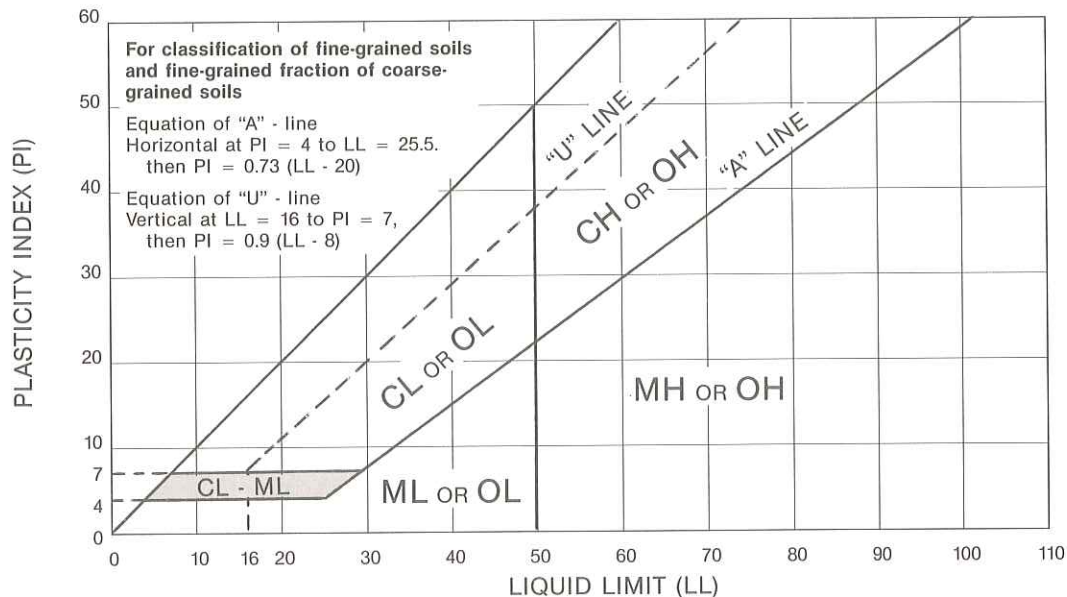
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



Terracon