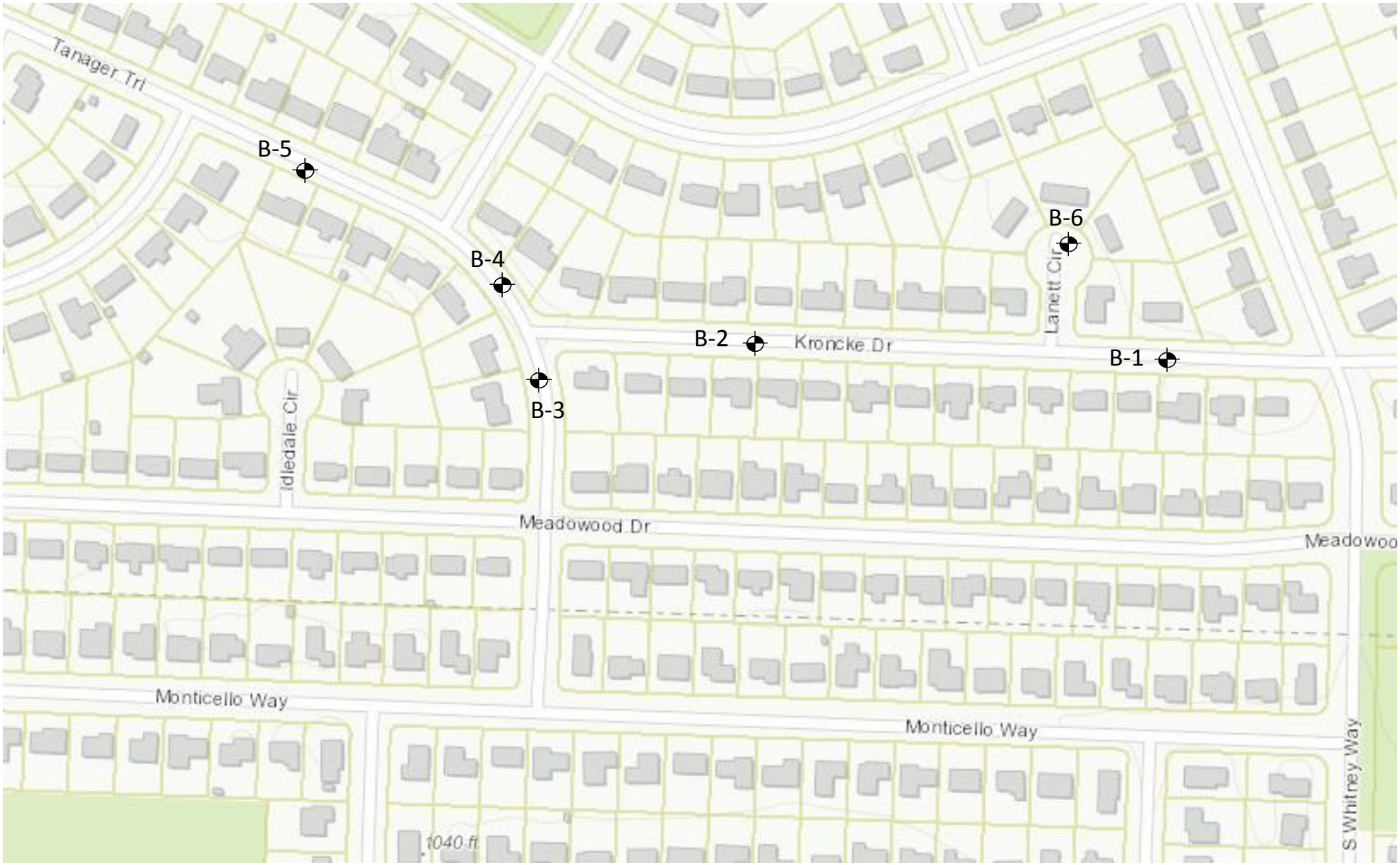
APPENDIX A

SOIL BORING LOCATION MAP
LOGS OF TEST BORINGS (5)
LOG OF TEST BORING-GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM



Legend

Denotes Boring Location

N

Scale: Reduced

Notes

1. Boring locations are approximate
2. Soil borings performed by Badger State Drilling in November 2020 (except B6 – performed in August 2021)

Date: 9/2021	CGC, Inc.	**Soil Boring Location Map** **Tanager Tr, Kroncke Dr & Lanett Cr** **Madison, WI**
Job No. C20051-27		

CGC Inc.

LOG OF TEST BORING

Project Tanager Trail/Kroncke Drive
Kroncke: 285'W of Whitney, 10'S of CL
Location Madison, WI

Boring No. 1
Surface Elevation (ft) 1040±
Job No. C20051-27
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	Type	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						6.5 in. Asphalt/6 in. Sandy Base Course					
1		4	M	11		FILL: Very Stiff Brown Clay with Sand and Gravel	(3.5)				
2		16	M	5		Stiff to Medium Stiff, Brown Lean CLAY, Some Sand (CL)	(1.0)				
3		16	M	5	5	Becoming Sandy with Depth	(1.0)				
4		6	M	34		Dense, Brown Fine to Medium SAND and GRAVEL, Some Silt (SM/GM)					
5		16	M	54	10	Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM)					
					15	End Boring at 15 ft Borehole Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW Upon Completion of Drilling NW
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 11/25/20 End 11/25/20
Driller BSD Chief MC Rig CME-55
Logger DC Editor ESF
Drill Method 2.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project **Tanager Trail/Kroncke Drive**
Kroncke: 375'E of Tanager, 10'S of CL
Location **Madison, WI**

Boring No. **2**
Surface Elevation (ft) **1035±**
Job No. **C20051-27**
Sheet **1** of **1**

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SAMPLE No.	Type	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						5 in. Asphalt/7 in. Sandy Base Course					
1		5	M	11		Very Stiff, Brown Lean CLAY, Trace Sand (CL)	(3.5)				
2		15	M	37	5	Dense to Very Dense, Brown and Gray Fine to Medium SAND, Some Gravel, Little to Some Silt (SP-SM/SM)					
3		6	M	65							
4		18	M	41	10	Less Gravel with Depth					
5		14	M	53	15	End Boring at 15 ft Borehole Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW Upon Completion of Drilling NW
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **11/25/20** End **11/25/20**
Driller **BSD** Chief **MC** Rig **CME-55**
Logger **DC** Editor **ESF**
Drill Method **2.25" HSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project: Tanager Trail/Kroncke Drive
Tanager: 75'S of Kroncke, 10'W of CL
Location: Madison, WI

Boring No. 3
Surface Elevation (ft) 1031±
Job No. C20051-27
Sheet 1 of 1

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SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						4.5 in. Asphalt/8 in. Base Course					
1		18	M	25		Medium Dense, Brown Silty Fine SAND (SM - Possible Fill)					
2		16	M	27		Medium Dense to Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM)					
					5						
3		18	M	34							
4		18	M	15							
					10						
						Medium Dense, Light Brown Fine SAND, Trace Silt (SP)					
5		18	M	27							
					15	End Boring at 15 ft Borehole Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽	NW	Upon Completion of Drilling		NW
Time After Drilling				
Depth to Water				▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 11/25/20 End 11/25/20
Driller BSD Chief MC Rig CME-55
Logger DC Editor ESF
Drill Method 2.25" HSA

CGC Inc.

LOG OF TEST BORING

Project: Tanager Trail/Kroncke Drive
Tanager: 75'SE of Leland, 10'SW of CL
Location: Madison, WI

Boring No. 4
Surface Elevation (ft) 1029±
Job No. C20051-27
Sheet 1 of 1

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SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						5 in. Asphalt/7 in. Sandy Base Course					
1		10	M	8		Very Stiff, Brown Lean CLAY (CL)	(2.0)				
						Medium Dense, Brown Silty Fine SAND, Some Gravel (SM)					
2		18	M	20	5						
3		18	M	21							
4		18	M	22	10						
						Medium Dense, Light Brown Fine SAND, Trace Silt (SP)					
5		16	M	24	15						
						End Boring at 15 ft Borehole Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW Upon Completion of Drilling NW
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 11/25/20 End 11/25/20
Driller BSD Chief MC Rig CME-55
Logger DC Editor ESF
Drill Method 2.25" HSA

CGC Inc.

LOG OF TEST BORING

Project: Tanager Trail/Kroncke Drive
Tanager: 180'SE of Mayhill, 10'SW of CL
Location: Madison, WI

Boring No. 5
Surface Elevation (ft) 1027±
Job No. C20051-27
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	Type	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						5 in. Asphalt/7 in. Base Course					
1		10	M	8		Very Stiff, Brown Lean CLAY (CL)	(2.5)				
2		16	M	12	5	Medium Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM)					
3		18	M	15		Medium Dense, Brown Fine SAND, Some Gravel, Little to Some Silt (SP-SM/SM)					
4		16	M	24	10	Medium Dense, Brown Silty Fine SAND, Some Gravel (SM)					
5		18	M	27	15	End Boring at 15 ft Borehole Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW Upon Completion of Drilling NW
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 11/25/20 End 11/25/20
Driller BSD Chief MC Rig CME-55
Logger DC Editor ESF
Drill Method 2.25" HSA

CGC Inc.

LOG OF TEST BORING

Project **Lannet Circle (Tanager Trail and Kroncke Dr.)**
200'N of Kroncke, 20'E of Centerline
Location **Madison, WI**

Boring No. **6**
Surface Elevation (ft) **1039±**
Job No. **C21051-12**
Sheet **1** of **1**

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SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						3 in. Asphalt Pavement/9 in. Base Course					
1		18	M	6		Very Stiff to Soft, Brown Lean CLAY, Trace Sand (CL - Possible Fill to 3')	(2.5)				
2		18	M	5	5		(0.4)				
3		16	M	47		Medium Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM)					
4		18	M	42	10						
5		16	M	56							
6		18	M	70	15						
						End Boring at 15 ft Borehole backfilled with bentonite chips and asphalt patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling _____
Time After Drilling _____
Depth to Water _____ ▼
Depth to Cave in _____

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/31/21** End **8/31/21**
Driller **BSD** Chief **MC** Rig **CME-55**
Logger **DC** Editor **ESF**
Drill Method **2.25" HSA; Autohammer**

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	"N" Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2"W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½", NW, 4", HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2" Dia. Split-Barrel Sample
2ST – 2" Dia. Thin-Walled Tube Sample
3ST – 3" Dia. Thin-Walled Tube Sample
PT – 3" Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽ - Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limts below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limts above "A" line or P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART