

July 23, 2020

Burgess & Niple, Limited
5085 Reed Road
Columbus, Ohio 43220

Attention: Mr. Vince Amato, P.E.

Reference: Contract Drilling and Laboratory Testing
Slip Repair
Middleport, Ohio
CTL Project No. 19050039COL

Dear Mr. Amato:

CTL Engineering, Inc. has completed the contract drilling and laboratory testing for the above project. A copy of the typed logs and laboratory test results is attached to this letter.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions or need further information, please contact us.

Respectfully submitted,

CTL Engineering, Inc.

A handwritten signature in black ink, appearing to read "Joe Grani".

Joe Grani, P.E.
Project Engineer

Enclosures

TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair
 LOCATION : Middleport, Ohio
 PROJECT NO. : 19050039COL

BORING NO.: **B-1**
 SHEET 1 OF 2
 DATE STARTED : 03-28-19
 DATE COMPLETED : 03-28-19

BORING ELEVATION : <u>639.4 Feet</u>	RIG TYPE : <u>B57</u>	DRILLER : <u>RW</u>
NORTHING : _____	CASING DIA. : <u>3.25"</u>	TEMPERATURE : _____
EASTING : _____	CORE SIZE : <u>NQ</u>	WEATHER : _____
DEPTH : <u>32.0 Feet</u>	HAMMER : <u>Auto</u>	
BORING METHOD : <u>HSA-RC</u>	ENERGY RATIO : <u>82.7</u>	

GROUNDWATER: Encountered at None At completion None

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS			
											LL	PL	PI	
639.1		ASPHALT (4")	0.3											
		Stiff, Brown SANDY LEAN CLAY with GRAVEL (CL) , Damp (FILL)		SS-1	10 5 5	14	78	9						
635.9	5	Very Stiff, Brown SAND (SP) , Damp (FILL)	3.5	SS-2	18 16 6	30	100	8						
633.4		Stiff, Brown GRAVELLY LEAN CLAY with SAND (CL) , Damp (FILL)	6.0	SS-3	6 6 4	14	61	9						
630.9	10	Medium Stiff, Dark Brown LEAN CLAY (CL) , Contains Coal, Moist	8.5	SS-4	3 2 2	6	100	49			36	21	15	
628.4		COAL, BLACK, VERY WEAK, CONTAINS CLAY SEAMS	11.0	SS-5	5 6 5	15	100	49						
625.9	15	SHALE, GRAY, WEATHERED	13.5	SS-6	6 21 25	63	100	13						
623.4		SHALE, LIGHT GRAY, WEATHERED	16.0	SS-7	16		100	6						
622.4	20	SANDSTONE, GRAY, WEATHERED @ 19.2'; Compressive Strength = 2,800 psi	17.0	CR-1 RQD=81%	50-5"				88					

Continued on next page

<p>2860 Fisher Rd. Columbus, Ohio 43204 Telephone: 614-276-8123 Fax: 614-276-6377 Email: ctl@ctleng.com</p>	<p style="text-align: center;">BORING METHOD</p> <p>HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling WD - Wash Drilling HA - Hand Auger</p>	<p style="text-align: center;">SAMPLING METHOD</p> <p>SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample</p>	<p style="text-align: center;">ABBREVIATIONS</p> <p>* - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test N₆₀ - Standard Penetration Normalized to 60% Drill Rod ER</p>
---	--	---	---

TEST BORING/PIT RECORD 19050039COL.GPJ CTL_CORPORATE.GDT 7/23/20




TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair

BORING NO.: B-1
 SHEET 2 OF 2

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS		
											LL	PL	PI
617.4		SANDSTONE, GRAY, WEATHERED @ 19.2'; Compressive Strength = 2,800 psi	22.0										
	25			CR-2 RQD= 12%			100						
		CLAYSTONE, GRAY, VERY WEATHERED											
	30			CR-3 RQD= 20%			72						
607.4		BOTTOM OF BORING	32.0										
	35												
	40												
	45												

 <p>2860 Fisher Rd. Columbus, Ohio 43204 Telephone: 614-276-8123 Fax: 614-276-6377 Email: ctl@ctleng.com</p>	BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
	HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling WD - Wash Drilling HA - Hand Auger	SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample	* - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test N ₆₀ - Standard Penetration Normalized to 60% Drill Rod ER

TEST BORING/PIT RECORD 19050039COL.GPJ CTL CORPORATE.GDT 7/23/20

TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair
 LOCATION : Middleport, Ohio
 PROJECT NO. : 19050039COL

BORING NO.: B-2
 SHEET 1 OF 2
 DATE STARTED : 07-07-20
 DATE COMPLETED : 07-08-20

BORING ELEVATION : <u>620.3 Feet</u>	RIG TYPE : <u>CME 55</u>	DRILLER : <u>Tom</u>
NORTHING : _____	CASING DIA. : <u>3.25"</u>	TEMPERATURE : _____
EASTING : _____	CORE SIZE : <u>NQ</u>	WEATHER : _____
DEPTH : <u>37.3 Feet</u>	HAMMER : <u>Auto</u>	
BORING METHOD : <u>HSA-RC</u>	ENERGY RATIO : <u>81.5</u>	

GROUNDWATER: Encountered at 17.0' At completion 4.7 (After Coring) Caved in at 18.2'

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS			
											LL	PL	PI	
619.3		TOPSOIL (12")	1.0		2									
		Medium Stiff, Brown LEAN CLAY (CL) , Moist (FILL)		SS-1	2 2 3	7	100	27		1.3*				
616.8			3.5											
	5	Medium Stiff, Brown ELASTIC SILT (MH) , Damp (FILL)		SS-2	2 3 3	8	100	32		2.8*	65	39	26	
614.3			6.0											
		Stiff, Brown FAT CLAY (CH) , Moist (FILL)		SS-3	2 4 4	11	100	33		1.3*	51	28	23	
611.8			8.5											
	10				9 12 12	33	100	19		4.5*				
		Hard to Very Stiff, Brown LEAN CLAY with SAND (CL) , Damp, Contains Shale Fragments (Possible Completely Decomposed Shale)		SS-5	7 7 7	19	100	20						
	15				3 7 8	20	100	13						
604.3			16.0											
		SHALE, BROWN, HIGHLY WEATHERED, VERY WEAK (SOIL-LIKE)		SS-7	7 14 15	39	100	11		4.5*				
601.8			18.5											
	20	SHALE, GRAY, HIGHLY WEATHERED, VERY WEAK, FRIABLE		SS-8	31 42 35	105	100	14						

Continued on next page

2860 Fisher Rd. Columbus, Ohio 43204 Telephone: 614-276-8123 Fax: 614-276-6377 Email: ctl@ctleng.com	BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
	HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling WD - Wash Drilling HA - Hand Auger	SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample	* - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test N ₆₀ - Standard Penetration Normalized to 60% Drill Rod ER

TEST BORING/PIT RECORD 19050039COL.GPJ CTL CORPORATE.GDT 7/23/20

TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair

BORING NO.: B-2
 SHEET 2 OF 2

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS			
											LL	PL	PI	
599.3		SILTSTONE, BROWN, SEVERELY WEATHERED, VERY WEAK, FRIABLE, CONTAINS SHALE FRAGMENTS	21.0	SS-9	14 50-5"		100	12		4.0*				
	25				SS-10	19 37 50-5"		100	17		4.5*			
					SS-11	24 37 50-3"		100	12		4.5*			
593.0		SILTSTONE, BROWN, SEVERELY WEATHERED, VERY WEAK, FRIABLE, ARENACEOUS	27.3	CR-1 RQD=73%			100							
591.0		SHALE, GRAY, SEVERELY WEATHERED, VERY WEAK, FRIABLE, CALCAREOUS	29.3											
590.3	30		30.0											
		LIMESTONE, GRAY, SLIGHTLY WEATHERED, VERY STRONG		CR-2 RQD=47%			98							
587.3			33.0											
	35	SHALE, GRAY, HIGHLY WEATHERED, VERY WEAK, FRIABLE, CALCAREOUS		CR-3 RQD=85%			96							
583.0		BOTTOM OF BORING	37.3											
	40													
	45													

TEST BORING/PIT RECORD 19050039COL.GPJ CTL CORPORATE.GDT 7/23/20



2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-6377
 Email: ctl@ctleng.com

BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
HSA - Hollow Stem Auger	SS - Split Spoon Sample	* - Hand Penetrometer
SFA - Solid Flight Auger	ST - Shelby Tube Sample	LL - Liquid Limit
RC - Rock Coring	CR - Rock Core Sample	PL - Plastic Limit
MD - Mud Drilling	BS - Bag Sample	PI - Plasticity Index
WD - Wash Drilling		SPT - Standard Penetration Test
HA - Hand Auger		N ₆₀ - Standard Penetration Normalized to 60% Drill Rod ER

TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair
 LOCATION : Middleport, Ohio
 PROJECT NO. : 19050039COL

BORING NO.: **B-3**
 SHEET 1 OF 2
 DATE STARTED : 07-08-20
 DATE COMPLETED : 07-08-20

BORING ELEVATION : <u>610.3 Feet</u>	RIG TYPE : <u>CME 55</u>	DRILLER : <u>Tom</u>
NORTHING : _____	CASING DIA. : <u>3.25"</u>	TEMPERATURE : _____
EASTING : _____	CORE SIZE : <u>NQ</u>	WEATHER : _____
DEPTH : <u>25.0 Feet</u>	HAMMER : <u>Auto</u>	
BORING METHOD : <u>HSA-RC</u>	ENERGY RATIO : <u>81.5</u>	

GROUNDWATER: ▼ Encountered at 20.6' ▽ At completion 17.0' ☒ Caved in at 18.6'

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS			
											LL	PL	PI	
609.3		TOPSOIL (12")	1.0		1									
		Soft, Brown LEAN CLAY with SAND and SILT (CL) , Moist (FILL)		SS-1	1 2	4	100	20		1.5*				
607.3			3.0											
	5	Medium Dense, Brown CLAYEY SAND with GRAVEL (SC) , Damp with Concrete Pieces (FILL)		SS-2	4 6 8	19	100	17				32	22	10
604.3			6.0											
		Stiff, Brown LEAN CLAY with SAND (CL) , Damp		SS-3	3 3 6	12	100	17		2.8*				
	10			SS-4	2 2 5	10	100	25		2.5*	47	27	20	
599.3			11.0											
		SHALE, BROWN, HIGHLY WEATHERED, VERY WEAK (SOIL-LIKE)		SS-5	6 15 15	41	100	10		4.5*				
596.8			13.5											
	15	SILTSTONE, GRAY, SEVERELY WEATHERED, VERY WEAK, FRIABLE (SOIL-LIKE)		SS-6	9 13 17	41	67	18		4.5*				
				SS-7	11 32 50-3"		100	9		4.5*				
591.8			18.5											
	20	SHALE, GRAY, SEVERELY WEATHERED, VERY WEAK, FRIABLE		SS-8	50-4"		100	4						

Continued on next page

<p>2860 Fisher Rd. Columbus, Ohio 43204 Telephone: 614-276-8123 Fax: 614-276-6377 Email: ctl@ctleng.com</p>	<p style="text-align: center;">BORING METHOD</p> <p>HSA - Hollow Stem Auger SFA - Solid Flight Auger RC - Rock Coring MD - Mud Drilling WD - Wash Drilling HA - Hand Auger</p>	<p style="text-align: center;">SAMPLING METHOD</p> <p>SS - Split Spoon Sample ST - Shelby Tube Sample CR - Rock Core Sample BS - Bag Sample</p>	<p style="text-align: center;">ABBREVIATIONS</p> <p>* - Hand Penetrometer LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index SPT - Standard Penetration Test N₆₀ - Standard Penetration Normalized to 60% Drill Rod ER</p>
---	--	---	---

TEST BORING/PIT RECORD 19050039COL.GPJ CTL CORPORATE.GDT 7/23/20



TEST BORING RECORD

CLIENT : Burgess & Niple, Inc.
 PROJECT : Middleport-Slip Repair

BORING NO.: B-3
 SHEET 2 OF 2

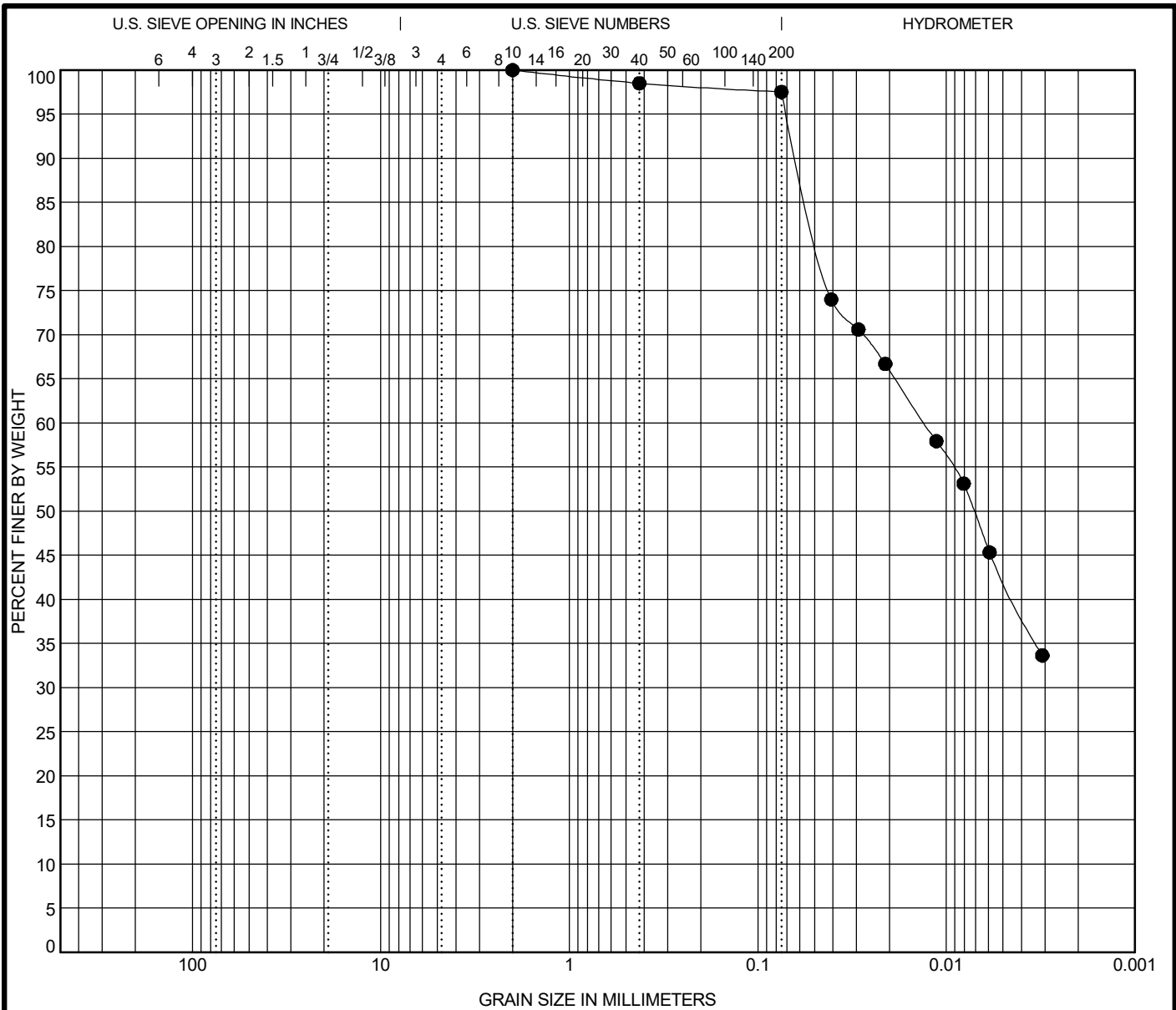
STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	STRATUM DEPTH	SAMPLE NUMBER	SPT per 6"	N ₆₀	RECOVERY (%)	MOISTURE CONTENT	TOTAL UNIT WEIGHT pcf	UNCONF. COMP., ksf	ATTERBERG LIMITS		
											LL	PL	PI
589.3		----- SILTSTONE, GRAY, SEVERELY WEATHERED, VERY WEAK, FRIABLE	21.0	SS-9	50-2"		100	13		2.3*			
586.8		----- SHALE, GRAY, SEVERELY WEATHERED, VERY WEAK, FRIABLE	23.5	SS-10	50-1"		100	8					
585.3	25	----- BOTTOM OF BORING	25.0										
	30												
	35												
	40												
	45												

TEST BORING/PIT RECORD 19050039COL.GPJ CTL CORPORATE.GDT 7/23/20



2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-6377
 Email: ctl@ctleng.com

BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
HSA - Hollow Stem Auger	SS - Split Spoon Sample	* - Hand Penetrometer
SFA - Solid Flight Auger	ST - Shelby Tube Sample	LL - Liquid Limit
RC - Rock Coring	CR - Rock Core Sample	PL - Plastic Limit
MD - Mud Drilling	BS - Bag Sample	PI - Plasticity Index
WD - Wash Drilling		SPT - Standard Penetration Test
HA - Hand Auger		N ₆₀ - Standard Penetration Normalized to 60% Drill Rod ER



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Sample	Classification					%MC	LL	PL	PI	Cc	Cu
● B-1	SS-4	LEAN CLAY (CL)					49	36	21	15		

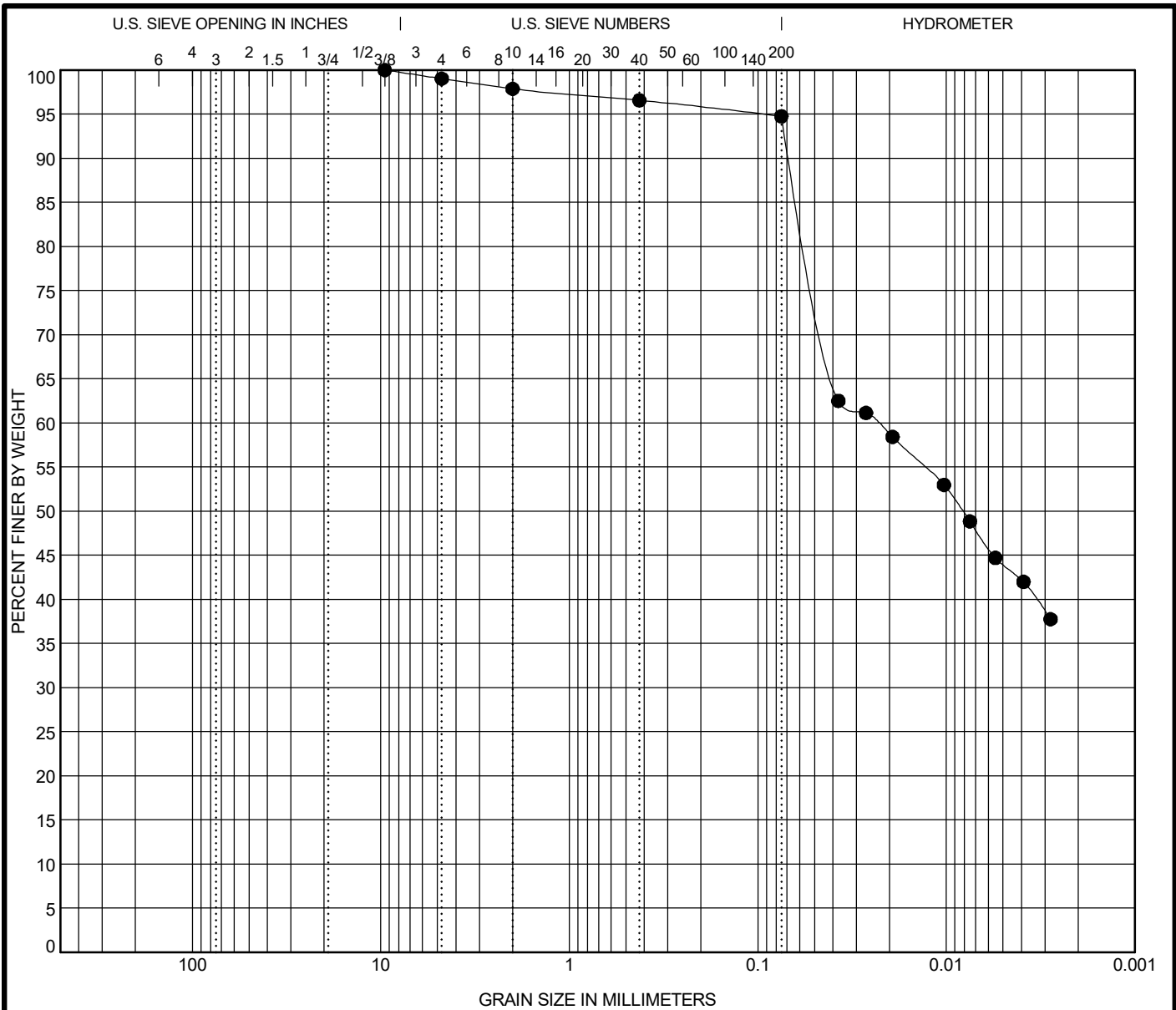
Specimen ID	Sample	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1	SS-4	2	0.013	0.007			0	2	56	42

CTLLAB_GRAINSIZE_19050039COL.GPJ_CTL_CORPORATE.GDT_7/23/20



CTL Engineering
 2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-8123

GRAIN SIZE DISTRIBUTION (ASTM D6913, D 7928, D 4318)
 Project: Middleport-Slip Repair
 Location: Middleport, Ohio
 CTL Project Number: 19050039COL



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Sample	Classification					%MC	LL	PL	PI	Cc	Cu
● B-2	SS-2	ELASTIC SILT (MH)					32	65	39	26		

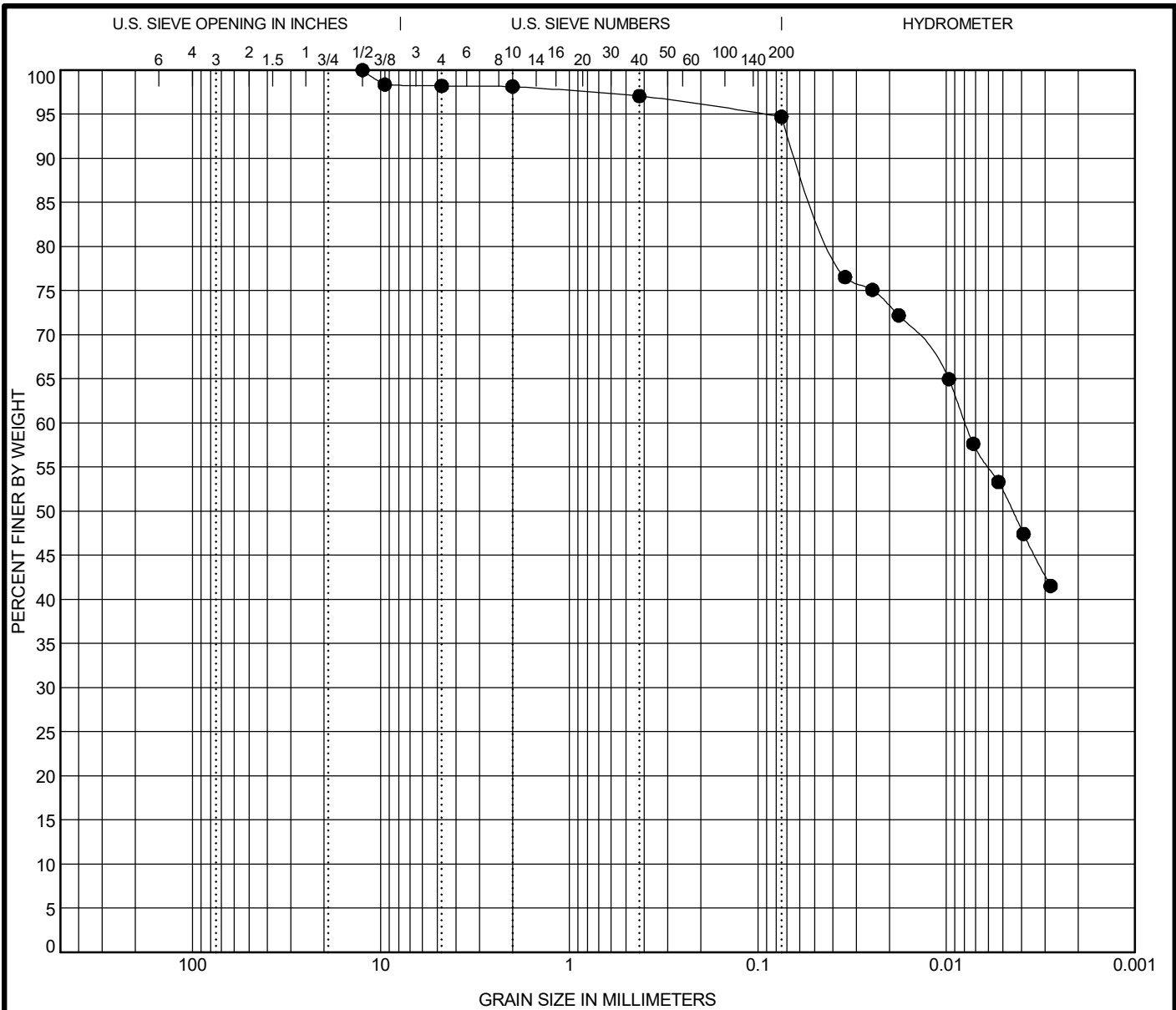
Specimen ID	Sample	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2	SS-2	9.525	0.023	0.008			1	4	51	44

CTLLAB_GRAINSIZE_19050039COL.GPJ_CTL_CORPORATE.GDT_7/23/20



CTL Engineering
 2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-8123

GRAIN SIZE DISTRIBUTION (ASTM D6913, D 7928, D 4318)
 Project: Middleport-Slip Repair
 Location: Middleport, Ohio
 CTL Project Number: 19050039COL



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Sample	Classification					%MC	LL	PL	PI	Cc	Cu
● B-2	SS-3	FAT CLAY (CH)					33	51	28	23		

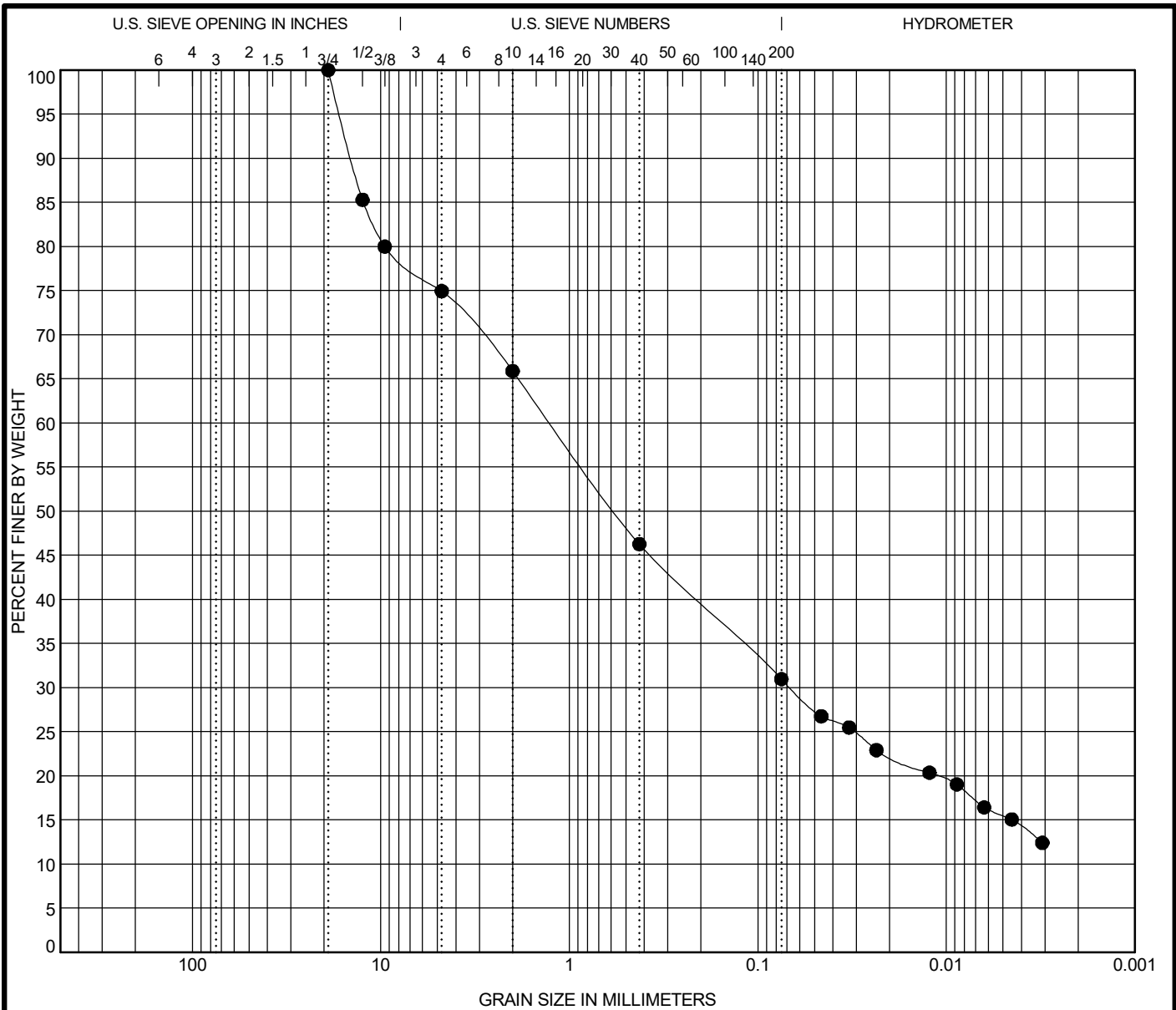
Specimen ID	Sample	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2	SS-3	12.5	0.008	0.004			2	3	43	52

CTLLAB_GRAINSIZE_19050039COL.GPJ_CTL_CORPORATE.GDT_7/23/20



CTL Engineering
 2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-8123

GRAIN SIZE DISTRIBUTION (ASTM D6913, D 7928, D 4318)
 Project: Middleport-Slip Repair
 Location: Middleport, Ohio
 CTL Project Number: 19050039COL



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Sample	Classification					%MC	LL	PL	PI	Cc	Cu
● B-3	SS-2	CLAYEY SAND with GRAVEL (SC)					17	32	22	10		

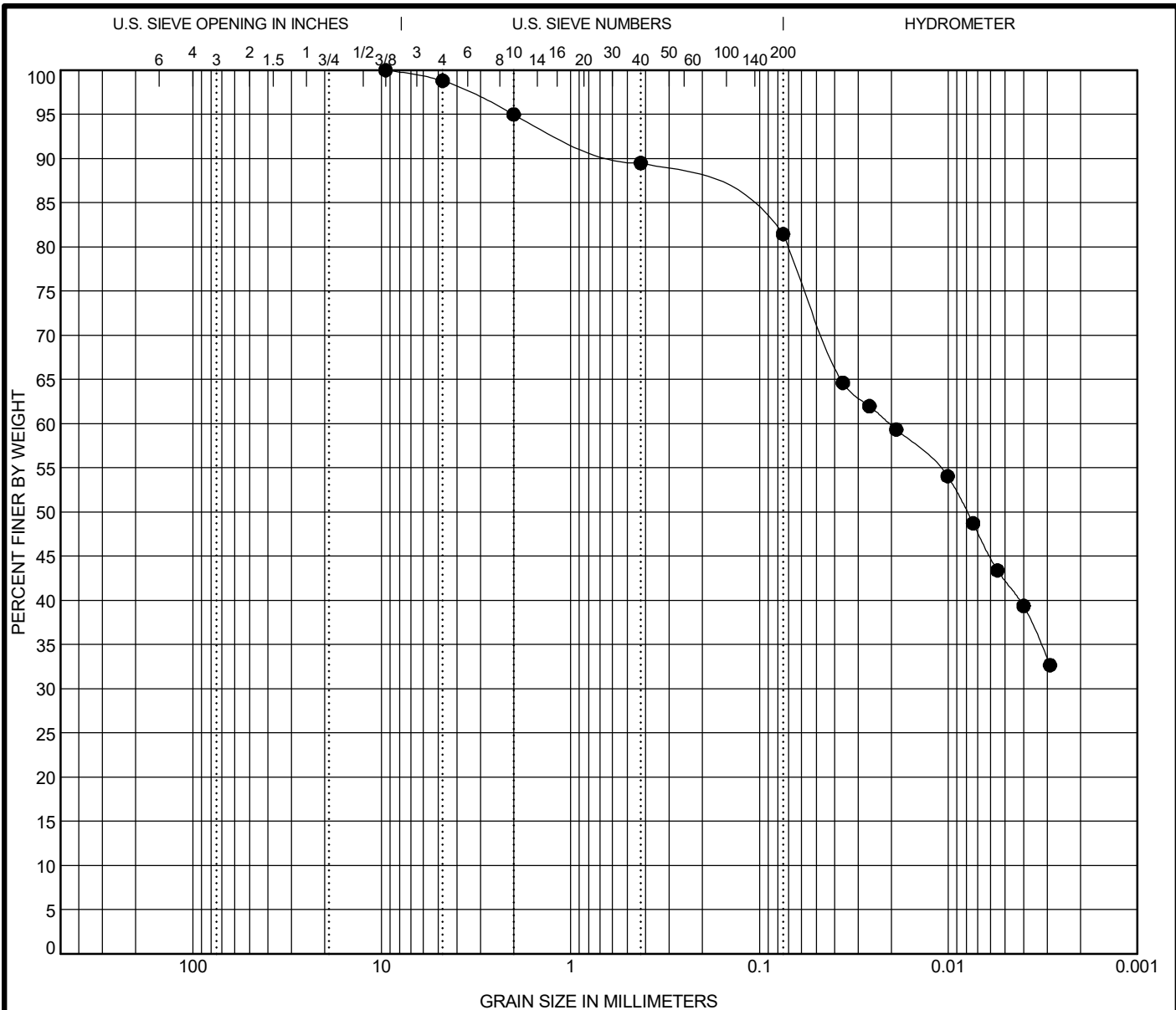
Specimen ID	Sample	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-3	SS-2	19	1.256	0.57	0.067		25	44	16	15

GRAIN SIZE DISTRIBUTION (ASTM D6913, D 7928, D 4318)
 Project: Middleport-Slip Repair
 Location: Middleport, Ohio
 CTL Project Number: 19050039COL



CTL Engineering
 2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-8123

CTLLAB_GRAINSIZE_19050039COL.GPJ_CTL_CORPORATE.GDT_7/23/20



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Sample	Classification					%MC	LL	PL	PI	Cc	Cu
● B-3	SS-4	LEAN CLAY with SAND (CL)					25	47	27	20		

Specimen ID	Sample	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-3	SS-4	9.525	0.021	0.008			1	17	40	42

CTLLAB_GRAINSIZE_19050039COL.GPJ_CTL_CORPORATE.GDT_7/23/20



CTL Engineering
 2860 Fisher Rd.
 Columbus, Ohio 43204
 Telephone: 614-276-8123
 Fax: 614-276-8123

GRAIN SIZE DISTRIBUTION (ASTM D6913, D 7928, D 4318)

Project: Middleport-Slip Repair
 Location: Middleport, Ohio
 CTL Project Number: 19050039COL