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September 21, 2020

ADDENDUM NO. 2
Vanman Levee Repairs
Drainage District No. 30 – DeSoto Bend
Pottawattamie County, Iowa
Bid Date: Monday, September 28th, 2020
Bid Time: 3:00 P.M.
BMI Project No. A16.120834

This addendum forms a part of the Contract Documents and modifies the original Specifications. Acknowledge receipt of this Addendum in the space provided on the Proposal Form. Failure to do so may subject Bidder to disqualification.

For purpose of clarity, some Addendum items call for the complete replacement of a Specification section.

The following item shall become part of the original Bidding Documents:

Soil Boring Report

CERTIFICATION:

I hereby certify that this addendum was prepared be me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa.

By: Jonathan P. Rosengren

Jonathan P. Rosengren, P.E.
License No: 21661
Date: September 14, 2020

*** END OF ADDENDUM NO. 1 ***

Attachments:

Soil Boring Report

Bolton & Menk is an equal opportunity employer.

July 22, 2020

Project No: 202057PLC

Bolton and Menk
1519 Baltimore Drive
Ames, Iowa 50010

RE: **Geotechnical Investigation**
Pottawattamie County
Levee Construction
IDOT Soil Classifications

Attn: Mr. Jon Rosengren, P.E.,

As per your request, CMT has completed soil classifications on samples delivered to the laboratory on July 7th, 2020. Plastic properties and grain size analysis were conducted on the samples in order to classify the soils for IDOT Suitable Soil Material, according to DS-12048. The results of the tests are listed below and are attached for your reference.

Sample No.	Atterberg Limits	Group Index	AASHTO Classification	IDOT Classification
1 - Nolan Gray lean silt, with clay and sand Boring #1, 5 FT	LL = 32 PL = 25 PI = 7	7	A-4(7)	Suitable
2 – Nolan Gray silty sandy lean clay Boring #2, 0.5 FT	LL = 30 PL = 20 PI = 10	7	A-4(7)	Suitable
3 – Nolan Gray-brown fine sand, with silt, trace clay Boring #3, 4 FT	LL = NV PL = NP PI = NP	0	A-4(0)	Suitable
4 – Nolan Gray-brown fine to medium sand, trace silt and clay Boring #4, 6 FT	LL = NV PL = NP PI = NP	---	A-3	Suitable
5 – Nolan Gray silty fat clay, trace sand Boring #5, 0.5 FT	LL = 51 PL = 21 PI = 30	33	A-7-6(33)	Unsuitable
6 – Nolan Gray silty fat clay, trace sand Boring #6, 2 FT	LL = 53 PL = 20 PI = 33	36	A-7-6(36)	Unsuitable
7 – Nolan Gray silty fine sand, trace clay Boring #7, 5 FT	LL = NV PL = NP PI = NP	0	A-2-4(0)	Suitable
8 – Nolan Gray silty fat clay, trace sand Boring #8, 0.5 FT	LL = 55 PL = 22 PI = 33	37	A-7-6(37)	Unsuitable
9 – Nolan Gray silty fat clay, trace sand Boring #9, 0.5 FT	LL = 58 PL = 22 PI = 36	40	A-7-6(40)	Unsuitable
10 – Nolan Gray silty fine sand, trace clay Boring #10, 5 FT	LL = NV PL = NP PI = NP	0	A-2-4(0)	Suitable

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Sample No.	Atterberg Limits	Group Index	AASHTO Classification	IDOT Classification
30 – Nolan Gray fine to medium sand, with silt, trace clay Boring #30, 5 FT	LL = NV PL = NP PI = NV	---	A-3	Suitable
31 – Nolan Gray silty lean clay, trace sand Boring #31, 0.5 FT	LL = 43 PL = 23 PI = 20	22	A-7-6(22)	Unsuitable
32 – Nolan Gray fine to medium sand, trace silt and clay Boring #32, 5 FT	LL = NV PL = NP PI = NP	---	A-3	Suitable
33 – Nolan Brown silty fat clay, trace sand Boring #33, 0.5 FT	LL = 62 PL = 22 PI = 40	45	A-7-6(45)	Unsuitable
34 – Nolan Gray fine sand, with silt, trace clay Boring #34, 6 FT	LL = NV PL = NP PI = 40	---	A-3	Suitable
35 – Nolan Gray sandy silt, trace clay Boring #35, 0.5 FT	LL = NV PL = NP PI= NP	0	A-4(0)	Suitable
11 - Mead Brown–gray silty lean clay, trace sand Boring #11, 0.5 FT	LL = 40 PL = 21 PI = 19	19	A-6(19)	Suitable
12 – Mead Dark brown silty fat clay, trace sand Boring #12, 0.5 FT	LL = 56 PL = 23 PI = 33	37	A-7-6(36)	Unsuitable
13 – Mead Dark brown silty fat clay, trace sand Boring #13, 0.5 FT	LL = 60 PL = 25 PI = 35	40	A-7-6(40)	Unsuitable
14 – Mead Dark brown silty fat clay, trace sand Boring #14, 0.5 FT	LL = 55 PL = 24 PI = 31	35	A-7-6(35)	Unsuitable
15 – Mead Dark brown silty lean clay, trace sand Boring #15, 0.5 FT	LL = 49 PL = 21 PI = 28	31	A-7-6(31)	Unsuitable
16 – Kissinger Brown lean silt, with clay, trace sand Boring #16, 0.5 FT	LL = 36 PL = 26 PI = 10	12	A-4(12)	Suitable
17 – Kissinger Brown silty fat clay, trace sand Boring #17, 0.5 FT	LL = 65 PL = 24 PI = 41	47	A-7-6(47)	Unsuitable

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Sample No.	Atterberg Limits	Group Index	AASHTO Classification	IDOT Classification
18 – Kissinger Brown-gray lean silt, with clay, trace sand Boring #18, .5 FT	LL = 35 PL = 28 PI = 7	9	A-4(9)	Suitable
19 – Kissinger Brown-gray lean silt, with clay, trace sand Boring #19, 0.5 FT	LL = 33 PL = 26 PI = 7	8	A-4(8)	Suitable
20 – Kissinger Brown silty fat clay, trace sand Boring #20, 0.5 FT	LL = 80 PL = 29 PI = 51	61	A-7-6(61)	Unsuitable
21 – Kissinger Gray-brown silty fat clay, trace sand Boring #21, 0.5 FT	LL = 78 PL = 24 PI = 54	63	A-7-6(63)	Unsuitable
22 – Kissinger Gray-brown silty fat clay, trace sand Boring #22, 0.5 FT	LL = 81 PL = 27 PI = 54	64	A-7-6(64)	Unsuitable
23 – State Brown fine to medium sand, trace silt and clay Boring #23, 4 FT	LL = NV PL = NP PI = NP	---	A-3	Suitable
24 – State Brown fine to medium sand, with silt, trace clay Boring #42, 0.5 FT	LL = NV PL = NP PI = NP	---	A-3	Suitable
25 – State Brown lean silt, with clay, trace sand Boring #25, 0.5 FT	LL = NV PL = NP PI = NP	0	A-4(0)	Suitable
26 – State Brown sandy lean silt, trace clay Boring #26, 0.5 FT	LL = NV PL = NP PI = NP	0	A-4(0)	Suitable
27 – State Brown fine to medium sand, with silt, trace clay Boring #27, 0.5 FT	LL = NV PL = NP PI = NP	0	A-2-4(0)	Suitable
28 – State Brown fine sand, with silt, trace clay Boring #28, 0.5 FT	LL = NV PL = NP PI = NP	---	A-3	Suitable
29 – State Brown fine to medium sand, with silt Boring #29, 0.5 FT	LL = NV PL = NP PI = NP	0	A-2-4(0)	Suitable

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Tests were conducted in general accordance with AASHTO T99, ASTM D2487, ASTM D422, ASTM D421, ASTM D2216 and ASTM C136.

Please feel free to call should you have questions or if I may be of further assistance.

Sincerely,

Sybil K. Ferrier, P.E.
Principal Engineer
SK/SF

LICENSED PROFESSIONAL ENGINEER SYBIL K. FERRIER P20479 IOWA	I herby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. 7-22-20 Sybil K. Ferrier, P.E. Date License No. 20479 My License renewal date is **December 31,** 2020. Pages or sheets covered by this seal: All Pages.

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APPENDIX

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GENERAL NOTES - BORING LOG DESCRIPTIONS

Soil descriptions stated on the Boring Logs are based on the Unified Soil Classification System as stated in ASTM Designations D-2487 and D-2488. The Unified Soil Classification group symbol listed in the table below correlate to the group symbols listed on the Boring Logs. The classification is mainly based on visual observations to define the soil characteristics. If a more detailed soil description is required, additional soil testing will be conducted to better define the soil characteristics.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
SW	Well-graded Sand	GW	Well-graded Gravel	CL	Lean Clay	CH	Fat Clay
SP	Poorly-graded Sand	GP	Poorly-graded Gravel	ML	Silt	MH	Elastic Silt
SM	Silty Sand	GM	Silty Gravel	OL or OH	Organic Silt Organic Clay	Pt	Peat
SC	Clayey Sand	GC	Clayey Gravel				

RELATIVE DENSITY OF COARSE-GRANED SOILS		CONSISTENCY OF FINE-GRAINED SOILS		
SPT, bpf	*Relative Density*	*Unconfined Compressive Strength, Q_u, psf*	*Consistency*	*SPT, bpf*
0-3	Very Loose	< 500	Very Soft	0 – 2
4-9	Loose	500 - 1,000	Soft	2 – 4
10-29	Medium Dense	1,001 - 2,000	Medium Stiff	4 – 8
30-49	Dense	2,001 – 4,000	Stiff	8 – 15
50-80	Very Dense	4,001 – 8,000	Very Stiff	15 – 30
80+	Extremely Dense	8,001 – 16,000	Hard	30 – 100
		>16,000	Very Hard	>100

GRAIN SIZE TERMINOLOGY		RELATIVE PROPORTIONS		
Major Component of Sample	*Size Range*	*Descriptive Terms(s) (of components also present in sample)*	*Fines Percent of Dry Weight*	*Sand and Gravel Percent of Dry Weight*
Cobbles	12 in. to 3 in. (300 mm to 75 mm)	Trace	< 5	< 15
Gravel	3 in. to #4 sieve (75 mm to 4.75 mm)	With	5 – 12	15 – 29
Sand	#4 to #200 sieve (4.75 mm to 0.074 mm)	Modifier	> 12	> 30
Silt or Clay	Passing #200 sieve (> 0.074 mm)			

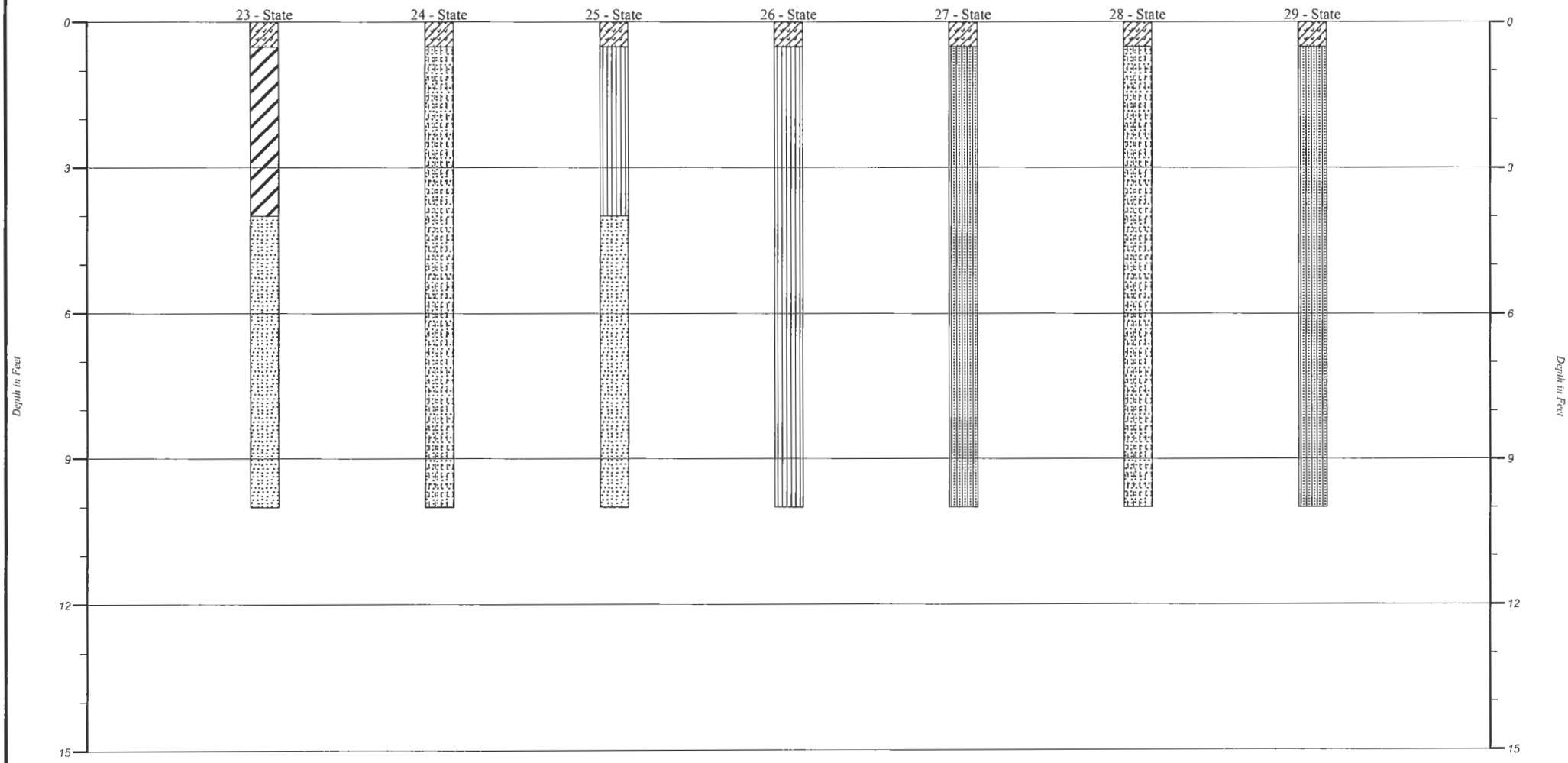
DRILLING AND SAMPLING ABBREVIATIONS

Drilling Methods

CFA – Continuous Flight Auger; typically, 4, 6, or 8 inches in diameter (ASTM D 1452)
HSA – Hollow Stem Auger; 6 or 8 inches in diameter, continuous flight auger remains in bore hole with undisturbed soil samples obtained from center of auger.
HA – Hand Auger; typically with a 4 inch or less diameter auger

Sample Types

SS - Split Spoon; samples obtained with a 140 lb manual hammer in accordance with ASTM D1586.
SSA – Split Spoon; samples obtained with a 140 lb automatic hammer in accordance with ASTM D 1586.
ST – Shelby Tube; thin walled tube samples, typically for cohesive soils, in accordance with ASTM D1587.
SPT- Standard Penetration Test: The number of blows required to drive a sampler, either split spoon or drive cone, into the soil with a 140 lb mass dropped a distance of 30 inches, in accordance with ASTM D 1586, and the number of blows are recorded in each 6 inch interval over a distance of 18 inches. Blow counts are reported for each 6 inch interval or the sum of the last two intervals is reported. The sum of the last two intervals is referred to as N, in blows per foot.
BS – Bulk Disturbed Sample
CPT – Cone Penetration Test; A device in which a 60° cone is pushed continuously into the soil and the cone end resistance is measured for skin friction and end bearing (ASTM D3441).



Plan View

Strata symbols

- Topsoil
- Fat clay
- Poorly graded sand
- Poorly graded sand with silt
- Silt
- Silty sand

CONSTRUCTION MATERIALS TESTING GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: VERTICAL SCALE: 1"=3'	DRAWN BY/APPROVED BY	DATE DRAWN 7/22/2020
Pottawattamie Co. Levee		
PROJECT NO. 202057PLC		FIGURE NUMBER

Boring No.	**1 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray lean silt, trace sand, moist	ML	
2										
4										
								Moisture seepage noted near 5 ft.	ML	
6								COHESIVE ALLUVIUM		
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**2 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist	CL	
								TOPSOIL		
								Gray silty sandy lean clay, moist	CL	
2										
4										
6								COHESIVE ALLUVIUM		
8										
								Sand seam noted near 9 ft during drilling operations.		
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Construction Materials Testing

Boring No.	**3 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty lean clay, trace sand, moist	CL	
2								COHESIVE ALLUVIUM		
4								Gray-brown fine sand, with silt, trace clay, moist	SM	
6								GRANULAR ALLUVIUM		
8										
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations

WD Dry	▽
IAD	▼

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Boring No.	4 - Nolan
Project	Pottawattamie Co. Levee
Client	Bolton and Menk, Inc.
Surface Elev.	Existing Ground Surface
Project No.	202057PLC

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Brown-gray silty lean clay, trace sand, moist	CL	
2										
								COHESIVE ALLUVIUM		
4										
6								Gray-brown fine to medium sand, trace silt and clay, moist	SP-SM	
8								GRANULAR ALLUVIUM		
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations

WD Dry ▽

IAD ▼

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Boring No.	5 - Nolan
Project	Pottawattamie Co. Levee
Client	Bolton and Menk, Inc.
Surface Elev.	Existing Ground Surface
Project No.	202057PLC

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty fat clay, trace sand, moist	CH	
2										
4								COHESIVE ALLUVIUM		
6										
8										
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Construction Materials Testing

Boring No.	**6 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
2								Gray silty fat clay, trace sand, moist COHESIVE ALLUVIUM	CH	
4										
6										
8								Gray fine to medium sand, moist GRANULAR ALLUVIUM	SP	
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**7 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty lean clay, trace sand, moist COHESIVE ALLUVIUM	CL	
2										
4										
								Gray silty fine sand, trace clay, moist GRANULAR ALLUVIUM	SM	
6										
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	8 - Nolan
Project	Pottawattamie Co. Levee
Client	Bolton and Menk, Inc.
Surface Elev.	Existing Ground Surface
Project No.	202057PLC

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty fat clay, trace sand, moist	CH	
2										
								COHESIVE ALLUVIUM		
4										
6										
								Gray fine to medium sand, moist	SP	
8								GRANULAR ALLUVIUM		
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations

WD Dry ▽

IAD ▼

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Boring No.	**9 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty fat clay, trace sand, moist	CH	
2								COHESIVE ALLUVIUM		
4										
6								Gray fine to medium sand, moist	SP	
8								GRANULAR ALLUVIUM		
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**10 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty fat clay, trace sand, moist COHESIVE ALLUVIUM	CH	
2										
4										
								Gray silty fine sand, trace clay, moist Moisutre seepage noted at 5 ft during drilling operations. GRANULAR ALLUVIUM	SM	
6										
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**30 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray-brown silty lean clay, trace sand, moist	CL	
2								COHESIVE ALLUVIUM		
4										
								Gray fine to medium sand, with silt, trace clay Moisutre seepage noted at 5 ft during drilling operations.	SP-SM	
6								GRANULAR ALLUVIUM		
8										
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations

WD Dry	▽
IAD	▼

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Boring No.	**31 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty lean clay, trace sand, moist	CL	
2								COHESIVE ALLUVIUM		
4								Moisutre seepage noted at 4 ft during drilling operations.		
								Gray fine to medium sand, moist	SP	
6								GRANULAR ALLUVIUM		
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**32 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	Material Description *	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty lean clay, trace sand, moist	CL	
2								COHESIVE ALLUVIUM		
4										
								Gray fine to medium sand, trace silt and clay, moist	SP-SM	
6								GRANULAR ALLUVIUM		
8										
10								End of Boring		
12										

* The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**33 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Brown silty fat clay, trace sand, moist COHESIVE ALLUVIUM	CH	
2										
4										
								Gray fine to medium sand, moist GRANULAR ALLUVIUM	SP	
6										
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**34 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray silty lean clay, trace sand, moist	CL	
2								COHESIVE ALLUVIUM		
4										
6								Gray fine sand, with silt, trace clay, moist	SP-SM	
8								GRANULAR ALLUVIUM		
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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Boring No.	**35 - Nolan**
Project	**Pottawattamie Co. Levee**
Client	**Bolton and Menk, Inc.**
Surface Elev.	**Existing Ground Surface**
Project No.	**202057PLC**

Depth Ft.	Sample #	Method	SPT bpf	Moisture %	Dry Density pcf	Unconfined Compressive Strength	Cross Section	**Material Description** * * The stratification lines represent approximate boundary lines between material types -- the transition may be gradual.	USCS	Water Level
0								Very dark brown sandy lean clay, trace organics, moist TOPSOIL	CL	
								Gray sandy silt, trace clay, moist	ML	
2										
4								Moisture seepage noted near 4 ft during drilling operations. COHESIVE ALLUVIUM		
6										
8										
10								End of Boring		
12										

Groundwater Level Observations	
WD Dry	▽
IAD	▼

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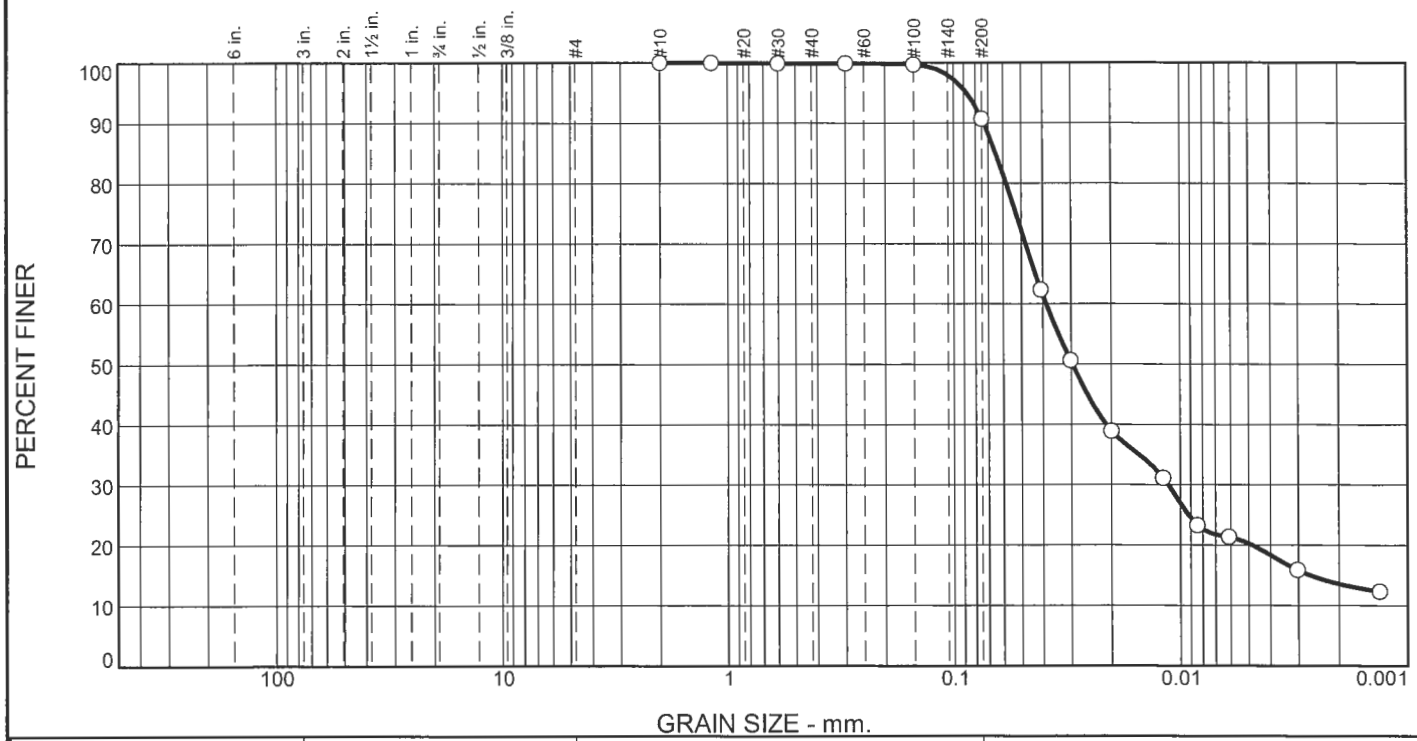
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	9.2	70.4	20.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	99.9		
#50	99.9		
#100	99.7		
#200	90.7		
0.0409 mm.	62.4		
0.0303 mm.	50.6		
0.0200 mm.	38.9		
0.0118 mm.	31.1		
0.0085 mm.	23.3		
0.0061 mm.	21.4		
0.0030 mm.	15.9		
0.0013 mm.	12.3		

* (no specification provided)

Material Description

Gray lean silt, with clay and sand, moist

Atterberg Limits (ASTM D 4318)

PL= 25 LL= 32 PI= 7

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(7)

Coefficients

D_{90}= 0.0735 D_{85}= 0.0649 D_{60}= 0.0387
D_{50}= 0.0297 D_{30}= 0.0113 D_{15}= 0.0027
D_{10}= C_u= C_c=

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: _____

Checked By: _____

Title: _____

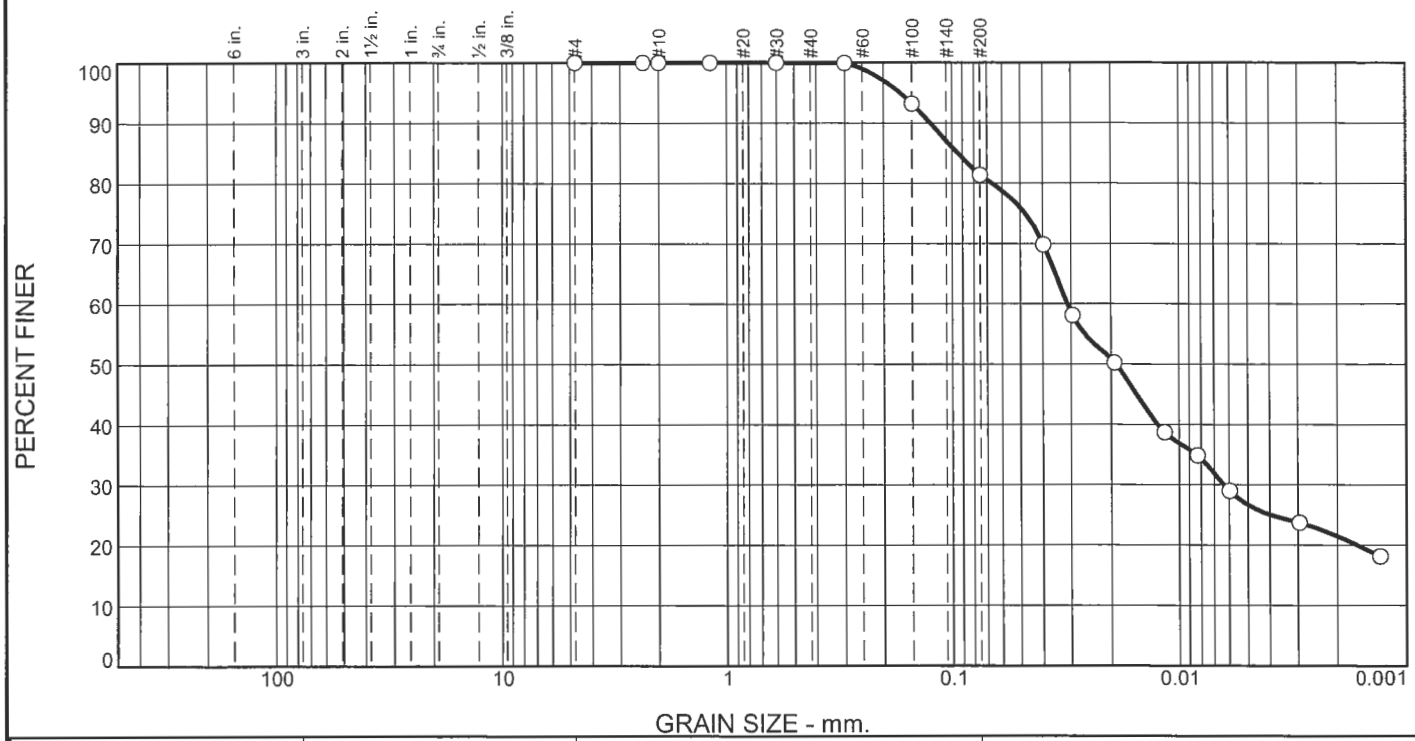
Source of Sample: 1 - Nolan **Depth:** 5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	18.6	54.7	26.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	99.9		
#100	93.2		
#200	81.4		
0.0397 mm.	69.8		
0.0295 mm.	58.1		
0.0193 mm.	50.2		
0.0116 mm.	38.7		
0.0083 mm.	34.9		
0.0060 mm.	29.0		
0.0030 mm.	23.7		
0.0013 mm.	18.2		

* (no specification provided)

Material Description

Gray silty sandy lean clay, moist

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 30 PI= 10

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-4(7)

Coefficients

D_{90}= 0.1244 D_{85}= 0.0945 D_{60}= 0.0312
D_{50}= 0.0190 D_{30}= 0.0063 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____

Tested By: _____

Checked By: _____

Title: _____

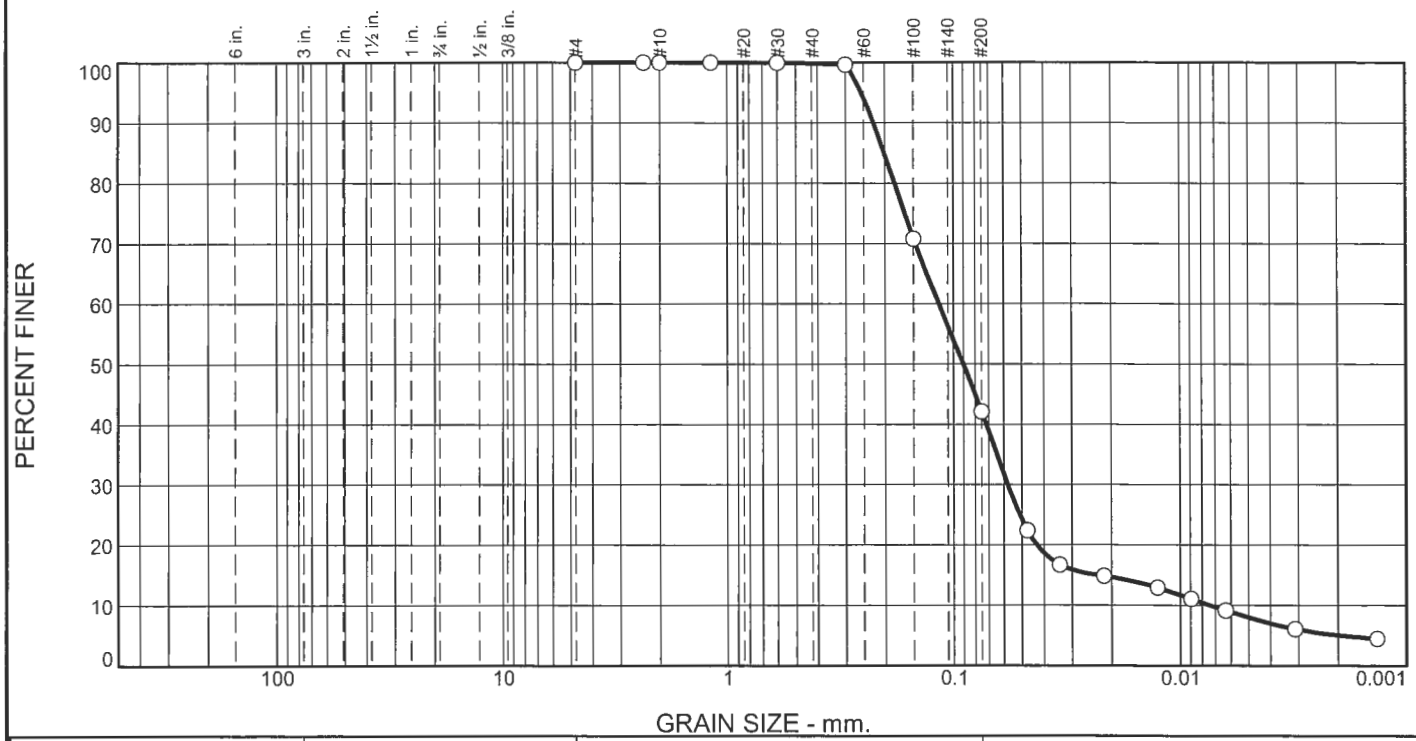
Source of Sample: 2 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	57.7	34.1	8.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	99.7		
#100	70.8		
#200	42.1		
0.0473 mm.	22.4		
0.0340 mm.	16.7		
0.0217 mm.	14.8		
0.0126 mm.	12.9		
0.0089 mm.	11.0		
0.0063 mm.	9.1		
0.0031 mm.	6.1		
0.0013 mm.	4.5		

* (no specification provided)

Material Description

Gray-brown fine sand, with silt, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2253 D_{85}= 0.2018 D_{60}= 0.1162
D_{50}= 0.0903 D_{30}= 0.0578 D_{15}= 0.0233
D_{10}= 0.0074 C_u= 15.67 C_c= 3.87

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: _____

Checked By: _____

Title: _____

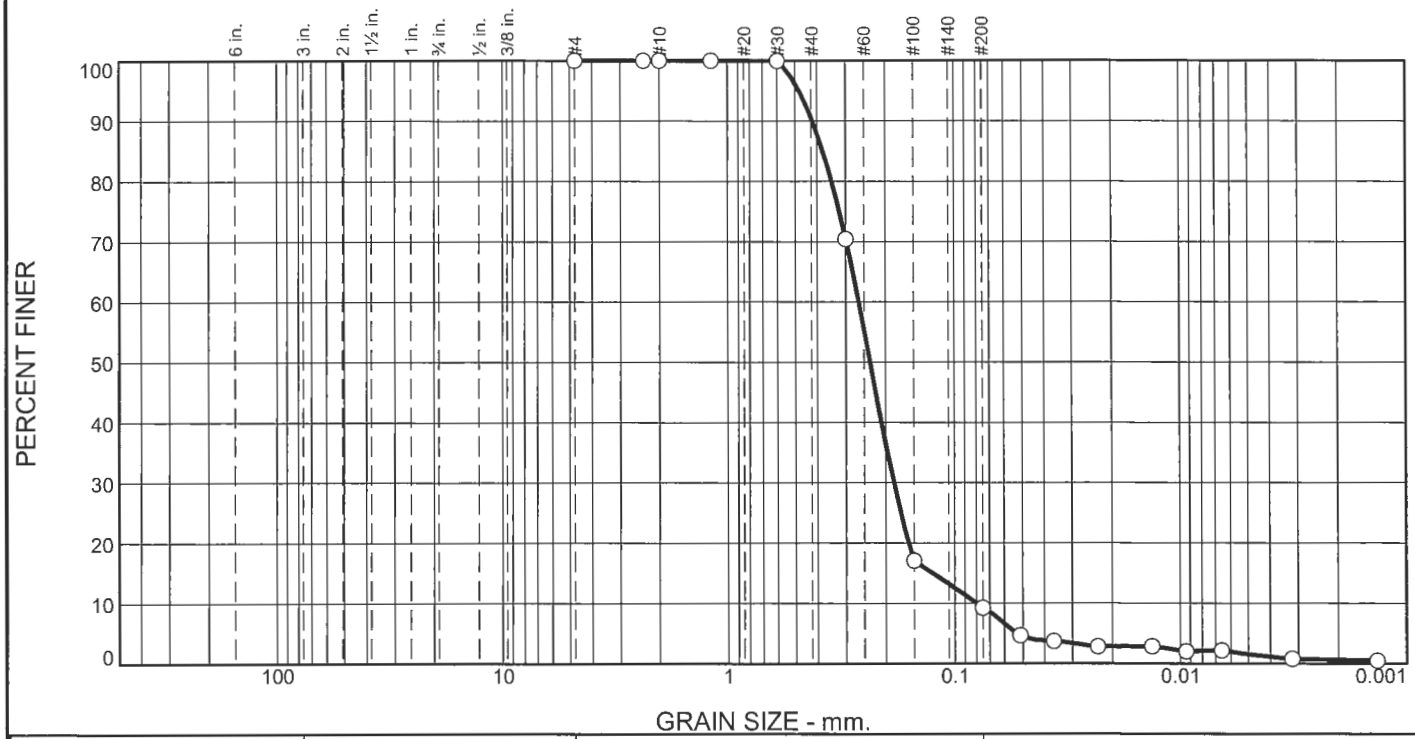
Source of Sample: 3 - Nolan **Depth:** 4 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.5	81.3	7.7	1.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	70.4		
#100	17.1		
#200	9.2		
0.0512 mm.	4.7		
0.0364 mm.	3.7		
0.0232 mm.	2.8		
0.0133 mm.	2.9		
0.0094 mm.	2.0		
0.0066 mm.	2.2		
0.0032 mm.	0.8		
0.0013 mm.	0.5		

* (no specification provided)

Material Description

Gray-brown fine to medium sand, trace silt and clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 0.4198 D_{85}= 0.3779 D_{60}= 0.2635
D_{50}= 0.2347 D_{30}= 0.1847 D_{15}= 0.1243
D_{10}= 0.0800 C_u= 3.29 C_c= 1.62

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: _____

Checked By: _____

Title: _____

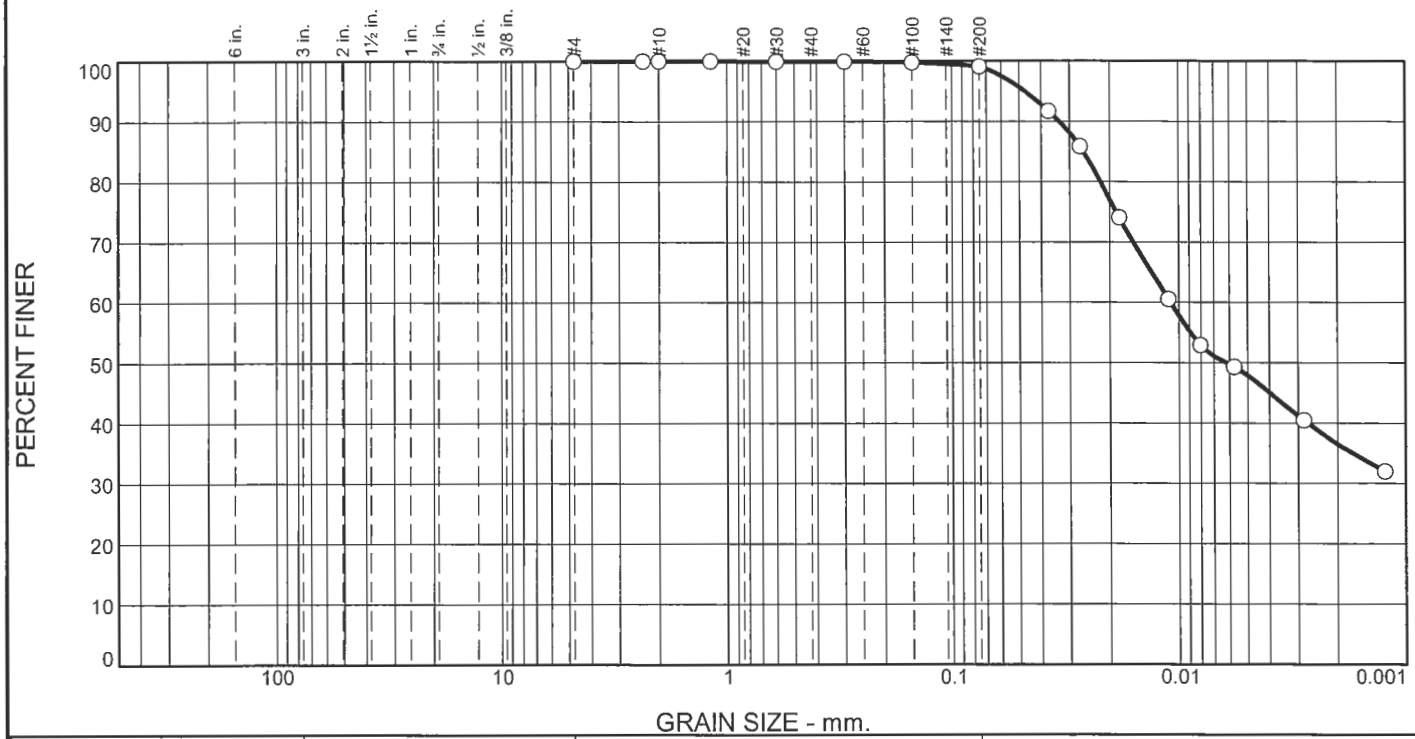
Source of Sample: 4 - Nolan **Depth:** 6 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.9	51.2	47.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.8		
#200	99.1		
0.0371 mm.	91.7		
0.0271 mm.	85.8		
0.0181 mm.	74.1		
0.0111 mm.	60.6		
0.0080 mm.	52.9		
0.0057 mm.	49.3		
0.0028 mm.	40.5		
0.0012 mm.	32.0		

* (no specification provided)

Material Description

Gray silty fat clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 51 PI= 30

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(33)

Coefficients

D_{90}= 0.0333 D_{85}= 0.0262 D_{60}= 0.0108
D_{50}= 0.0062 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: _____

Checked By: _____

Title: _____

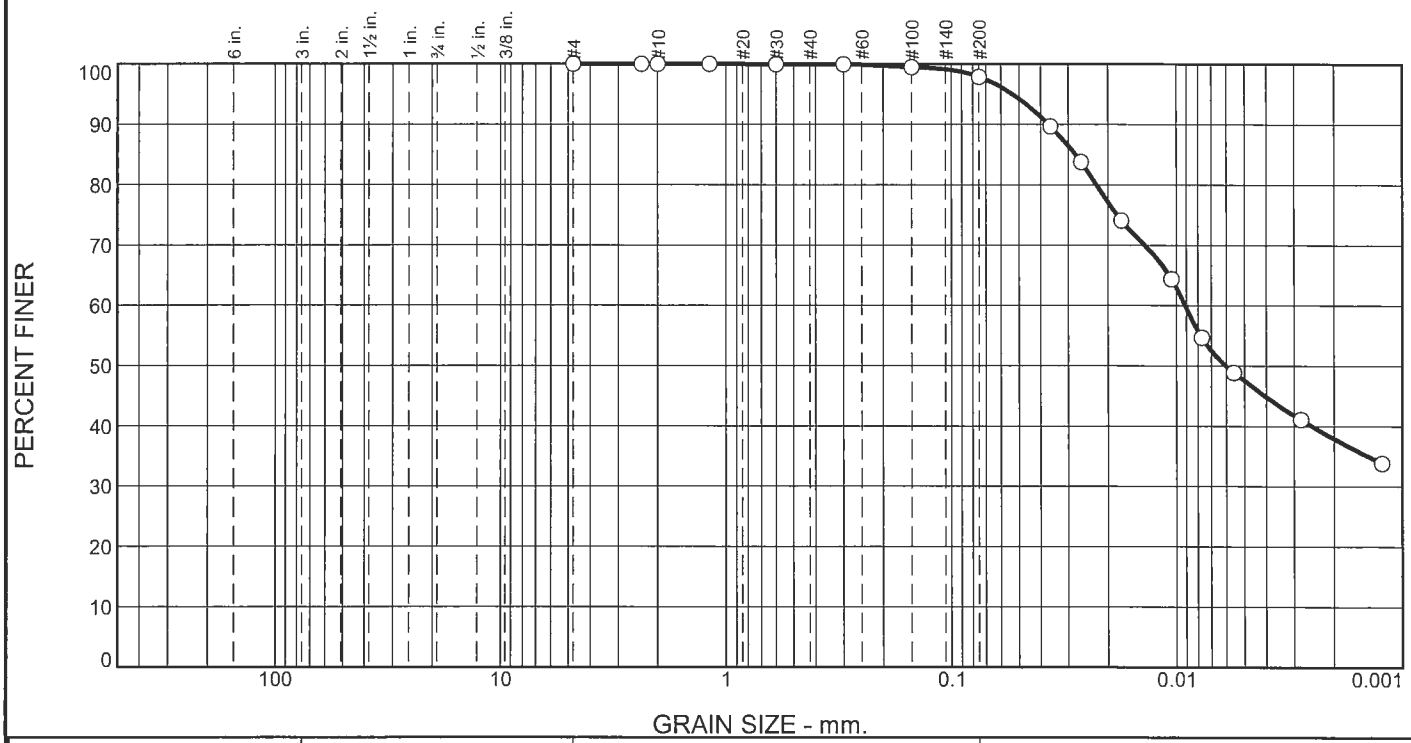
Source of Sample: 5 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	2.1	50.3	47.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.5		
#200	97.9		
0.0360 mm.	89.7		
0.0263 mm.	83.7		
0.0174 mm.	74.1		
0.0105 mm.	64.4		
0.0077 mm.	54.7		
0.0056 mm.	48.9		
0.0028 mm.	41.1		
0.0012 mm.	33.9		

* (no specification provided)

Material Description

Gray silty fat clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 53 PI= 33

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(36)

Coefficients

D_{90}= 0.0368 D_{85}= 0.0279 D_{60}= 0.0091
D_{50}= 0.0060 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____

Tested By: _____

Checked By: _____

Title: _____

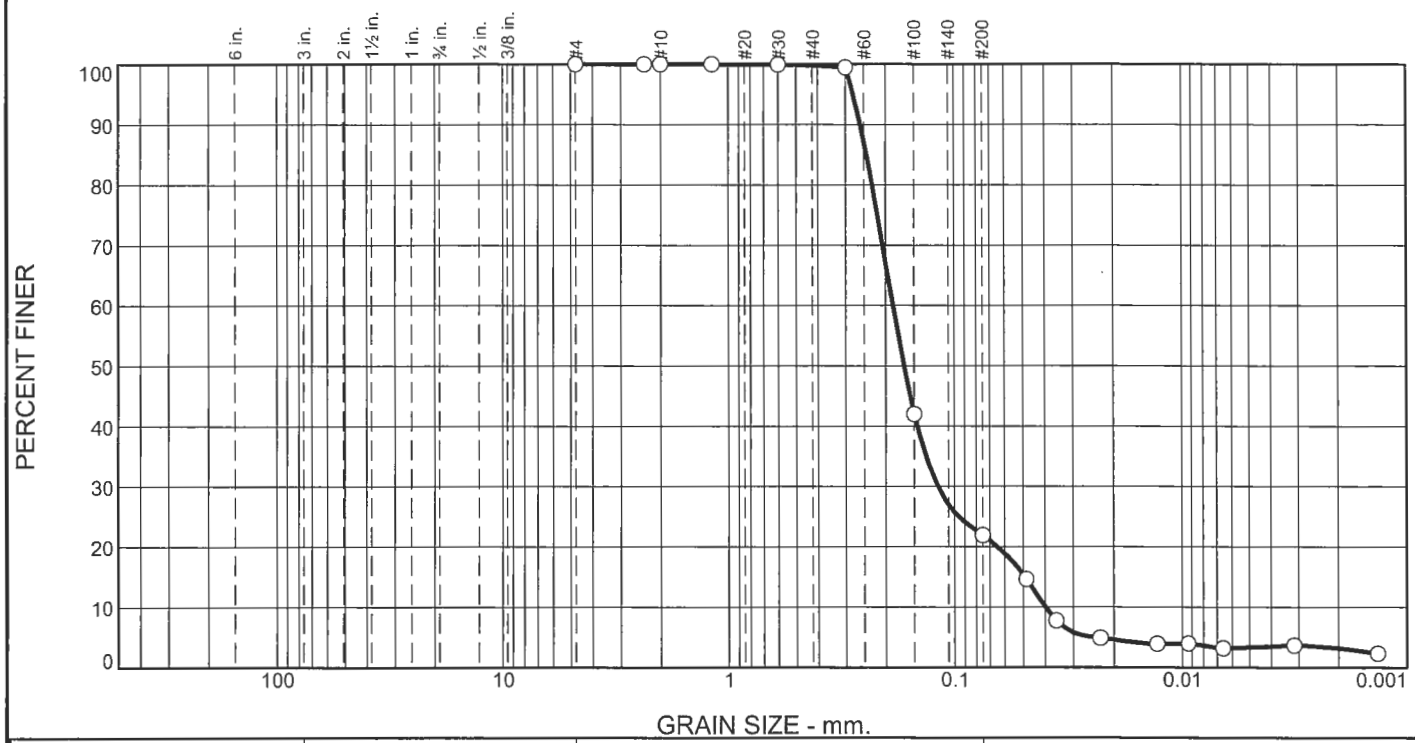
Source of Sample: 6 - Nolan **Depth:** 2 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	77.9	18.6	3.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	99.5		
#100	42.0		
#200	21.9		
0.0483 mm.	14.6		
0.0357 mm.	7.8		
0.0229 mm.	4.9		
0.0129 mm.	3.9		
0.0094 mm.	4.0		
0.0066 mm.	3.2		
0.0031 mm.	3.7		
0.0013 mm.	2.3		

* (no specification provided)

Material Description

Gray silty fine sand, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.2587 D_{85}= 0.2433 D_{60}= 0.1861
D_{50}= 0.1664 D_{30}= 0.1179 D_{15}= 0.0491
D_{10}= 0.0398 C_u= 4.67 C_c= 1.88

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

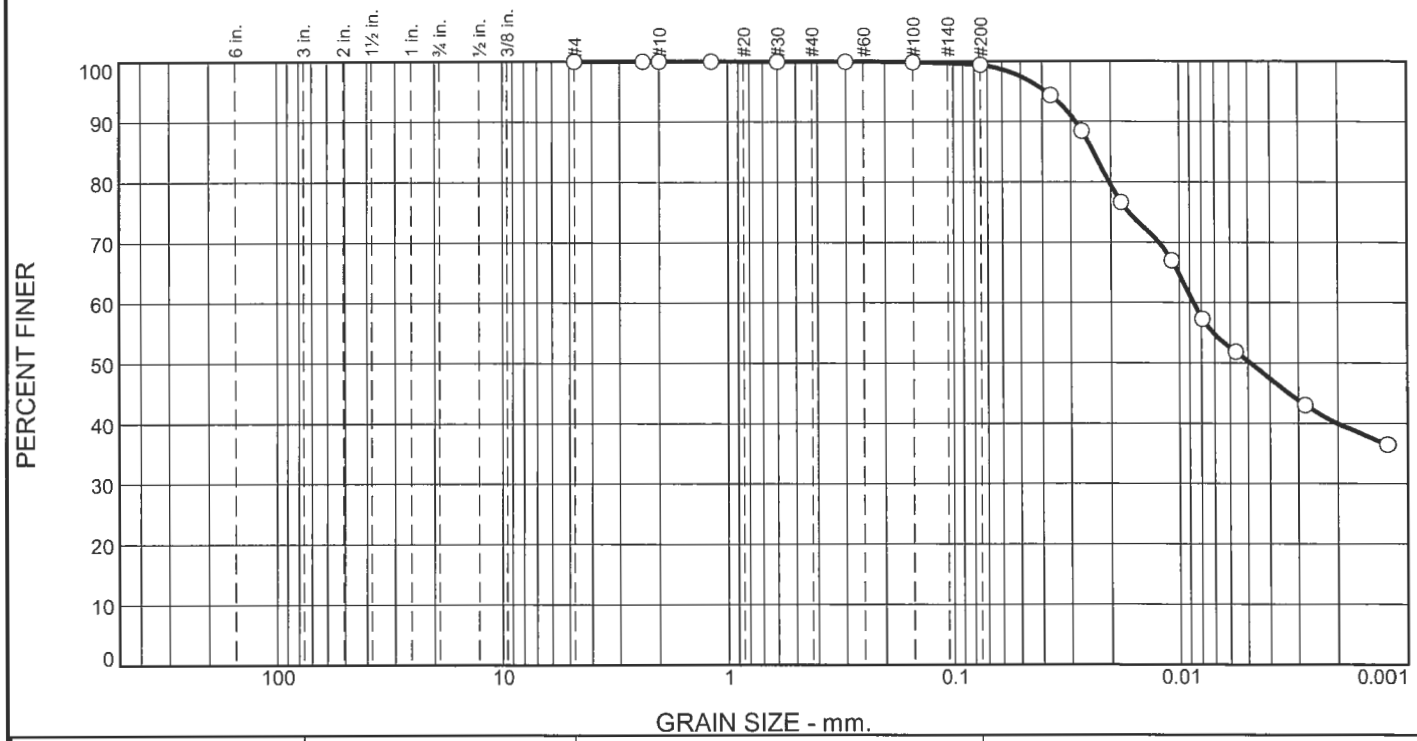
Source of Sample: 7 - Nolan **Depth:** 5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.6	49.1	50.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.9		
#200	99.4		
0.0367 mm.	94.4		
0.0268 mm.	88.4		
0.0180 mm.	76.6		
0.0108 mm.	67.0		
0.0079 mm.	57.3		
0.0057 mm.	51.8		
0.0028 mm.	43.0		
0.0012 mm.	36.5		

* (no specification provided)

Material Description

Gray silty fat clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 55 PI= 33

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(37)

Coefficients

D_{90}= 0.0286 D_{85}= 0.0238 D_{60}= 0.0087
D_{50}= 0.0049 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: _____ **Date Tested:** _____

Tested By: G. Johnson

Checked By: _____

Title: _____

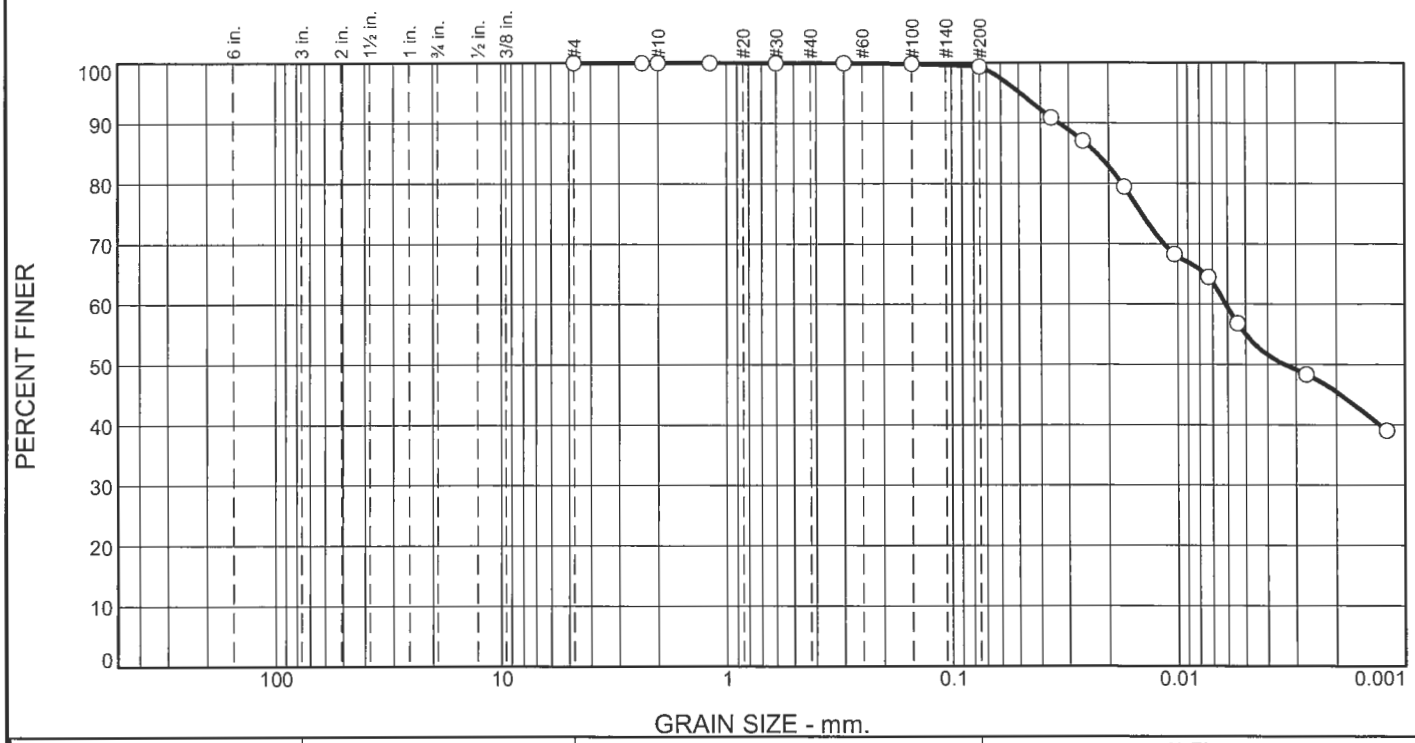
Source of Sample: 8 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.6	44.4	55.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.8		
#200	99.4		
0.0359 mm.	90.9		
0.0259 mm.	87.1		
0.0171 mm.	79.5		
0.0103 mm.	68.3		
0.0073 mm.	64.5		
0.0054 mm.	56.8		
0.0027 mm.	48.4		
0.0012 mm.	39.1		

* (no specification provided)

Material Description

Gray silty fat clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 58 PI= 36

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(40)

Coefficients

D_{90}= 0.0332 D_{85}= 0.0225 D_{60}= 0.0061
D_{50}= 0.0034 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: _____ Date Tested: _____

Tested By: _____

Checked By: _____

Title: _____

Source of Sample: 9 - Nolan **Depth:** 0.5 **Date Sampled:**

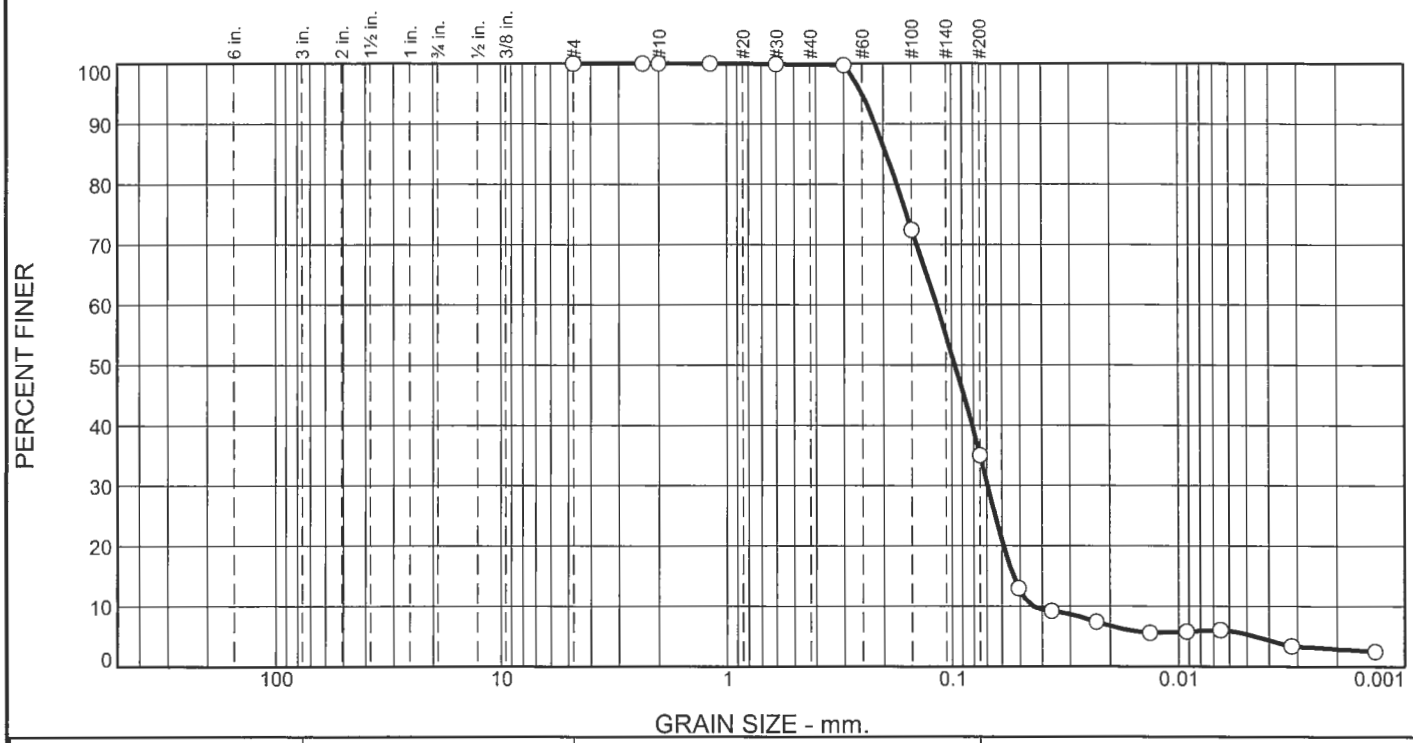
Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee

Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	64.8	29.7	5.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	99.9		
#50	99.8		
#100	72.4		
#200	35.0		
0.0507 mm.	13.0		
0.0363 mm.	9.2		
0.0231 mm.	7.4		
0.0133 mm.	5.6		
0.0092 mm.	5.8		
0.0065 mm.	6.0		
0.0032 mm.	3.4		
0.0014 mm.	2.5		

* (no specification provided)

Material Description

Gray silty fine sand, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.2185 D_{85}= 0.1946 D_{60}= 0.1169
D_{50}= 0.0967 D_{30}= 0.0694 D_{15}= 0.0535
D_{10}= 0.0439 C_u= 2.66 C_c= 0.94

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

Source of Sample: 10 - Nolan **Depth:** 5 **Date Sampled:**

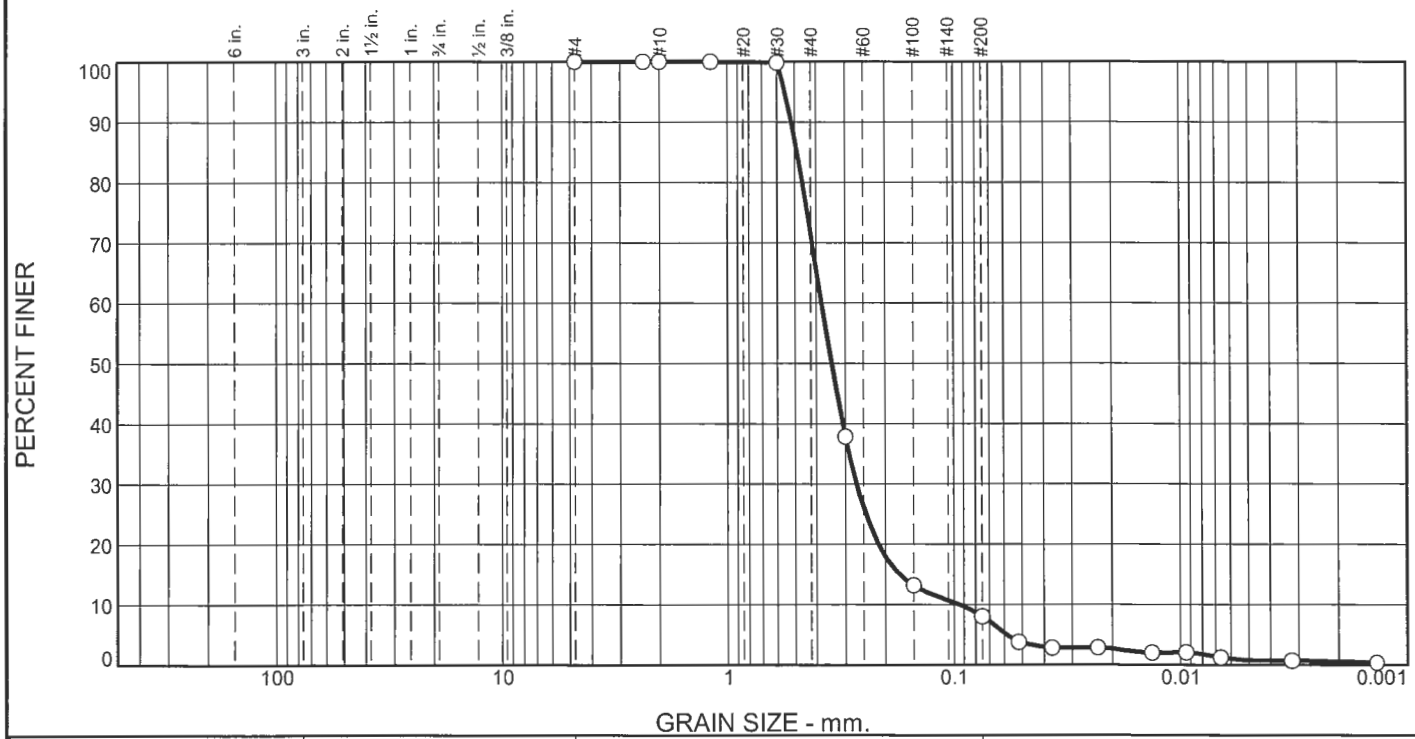
Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee

Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	28.5	63.5	7.2	0.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	99.9		
#50	37.8		
#100	13.2		
#200	8.0		
0.0518 mm.	3.8		
0.0368 mm.	2.8		
0.0232 mm.	2.9		
0.0134 mm.	2.0		
0.0094 mm.	2.0		
0.0066 mm.	1.2		
0.0032 mm.	0.7		
0.0014 mm.	0.4		

* (no specification provided)

Material Description

Gray fine to medium sand, with silt, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 0.5175 D_{85}= 0.4883 D_{60}= 0.3800
D_{50}= 0.3440 D_{30}= 0.2680 D_{15}= 0.1738
D_{10}= 0.0948 C_u= 4.01 C_c= 1.99

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

Source of Sample: 30 - Nolan **Depth:** 5 **Date Sampled:**

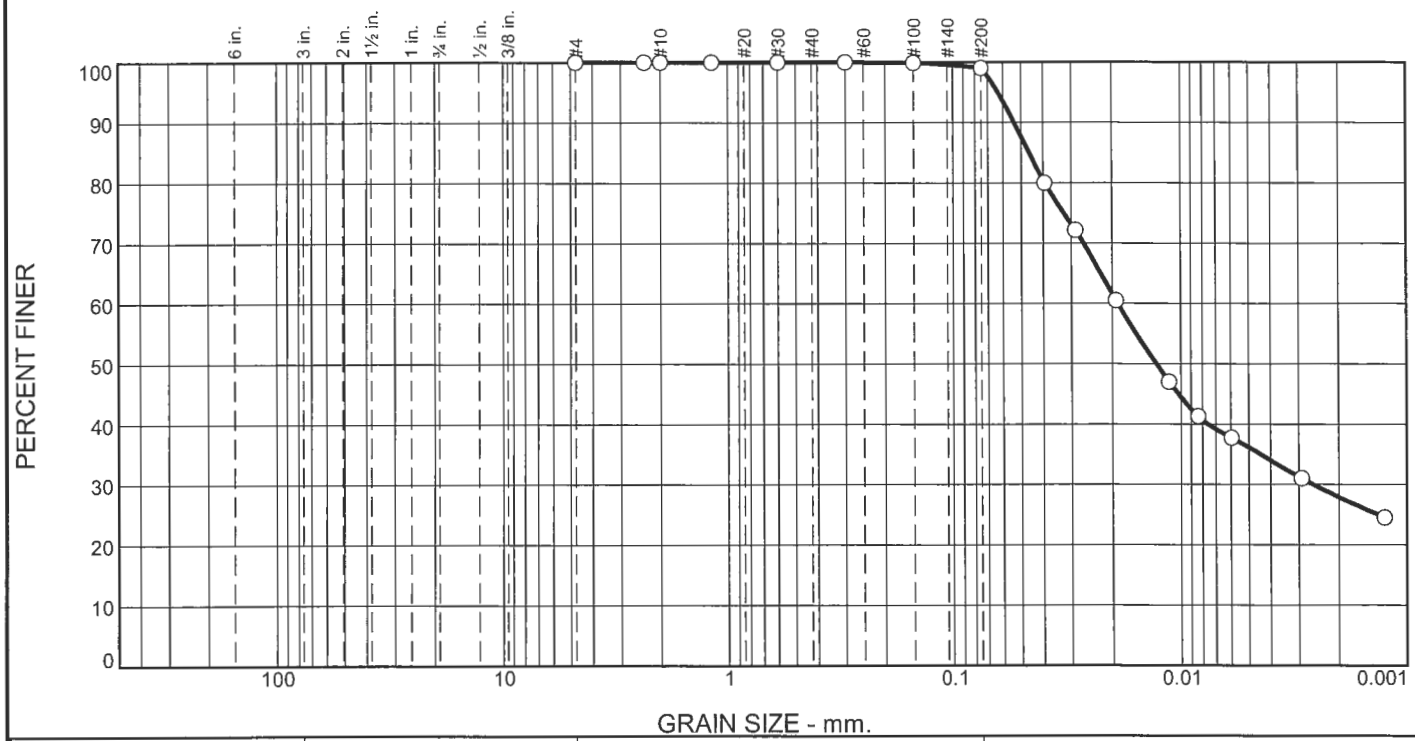
Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee

Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	1.0	62.8	36.2

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.9		
#200	99.0		
0.0394 mm.	80.0		
0.0289 mm.	72.2		
0.0192 mm.	60.5		
0.0113 mm.	47.0		
0.0084 mm.	41.3		
0.0059 mm.	37.7		
0.0029 mm.	31.0		
0.0013 mm.	24.5		

* (no specification provided)

Material Description

Gray silty lean clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 23 LL= 43 PI= 20

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-7-6(22)

Coefficients

D_{90}= 0.0537 D_{85}= 0.0462 D_{60}= 0.0189
D_{50}= 0.0128 D_{30}= 0.0026 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

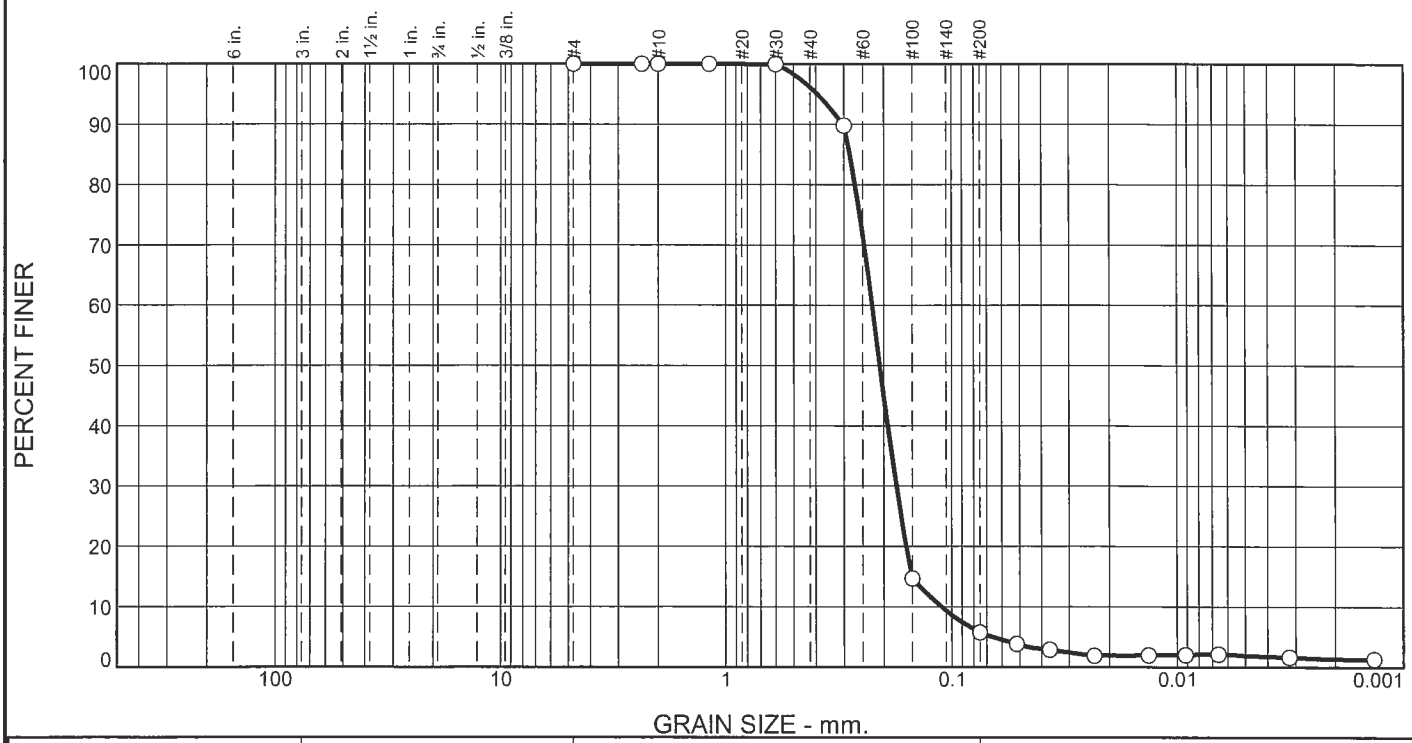
Source of Sample: 31 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.8	90.4	3.9	1.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	89.8		
#100	14.7		
#200	5.8		
0.0517 mm.	3.8		
0.0367 mm.	2.8		
0.0234 mm.	1.9		
0.0134 mm.	1.9		
0.0091 mm.	2.0		
0.0066 mm.	2.1		
0.0032 mm.	1.6		
0.0014 mm.	1.3		

* (no specification provided)

Material Description

Gray fine to medium sand, trace silt and clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 0.3031 D_{85}= 0.2834 D_{60}= 0.2264
D_{50}= 0.2089 D_{30}= 0.1768 D_{15}= 0.1507
D_{10}= 0.1115 C_u= 2.03 C_c= 1.24

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

Source of Sample: 32 - Nolan **Depth:** 5 **Date Sampled:**

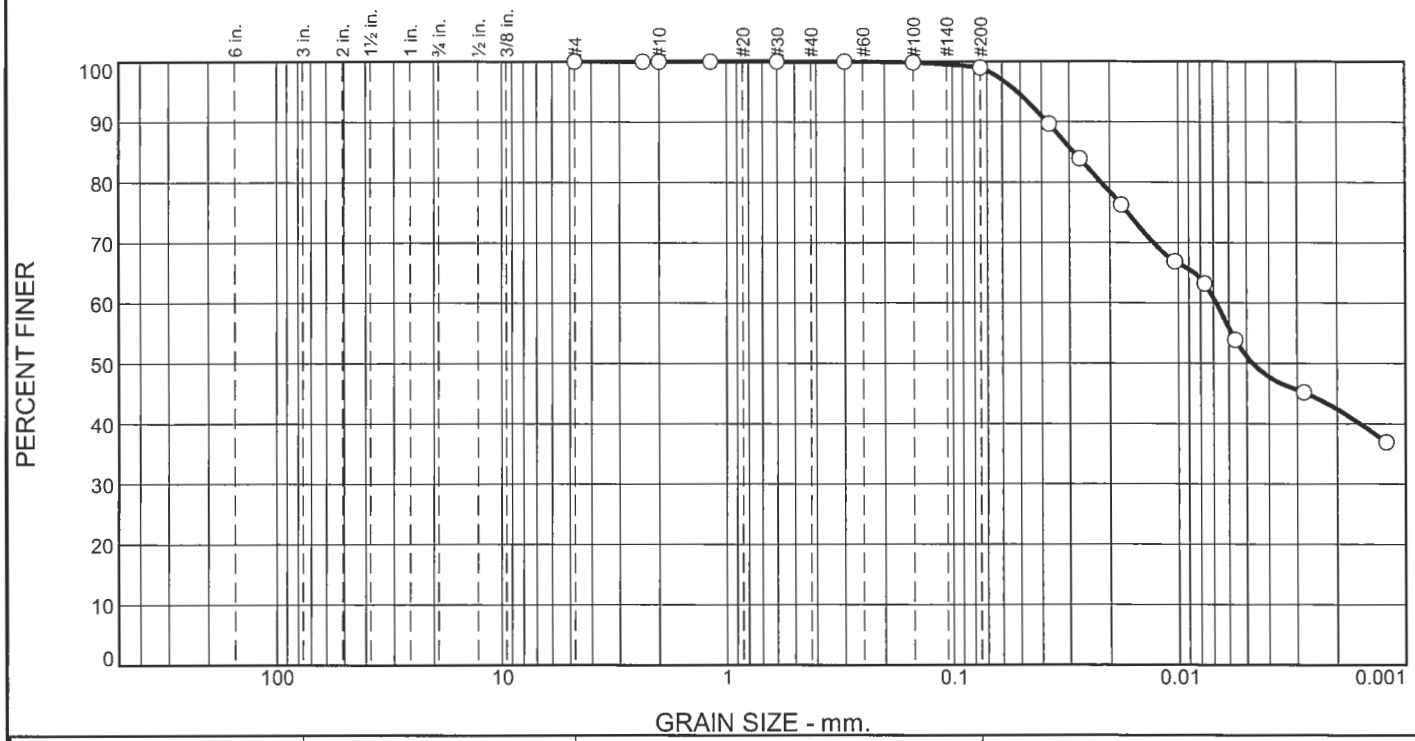
Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee

Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	1.0	47.9	51.1

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	100.0		
#100	99.8		
#200	99.0		
0.0371 mm.	89.7		
0.0271 mm.	83.9		
0.0178 mm.	76.3		
0.0104 mm.	66.9		
0.0077 mm.	63.2		
0.0056 mm.	53.9		
0.0028 mm.	45.2		
0.0012 mm.	37.0		

* (no specification provided)

Material Description

Brown silty fat clay, trace sand, moist

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 62 PI= 40

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(45)

Coefficients

D_{90}= 0.0378 D_{85}= 0.0287 D_{60}= 0.0068
D_{50}= 0.0047 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

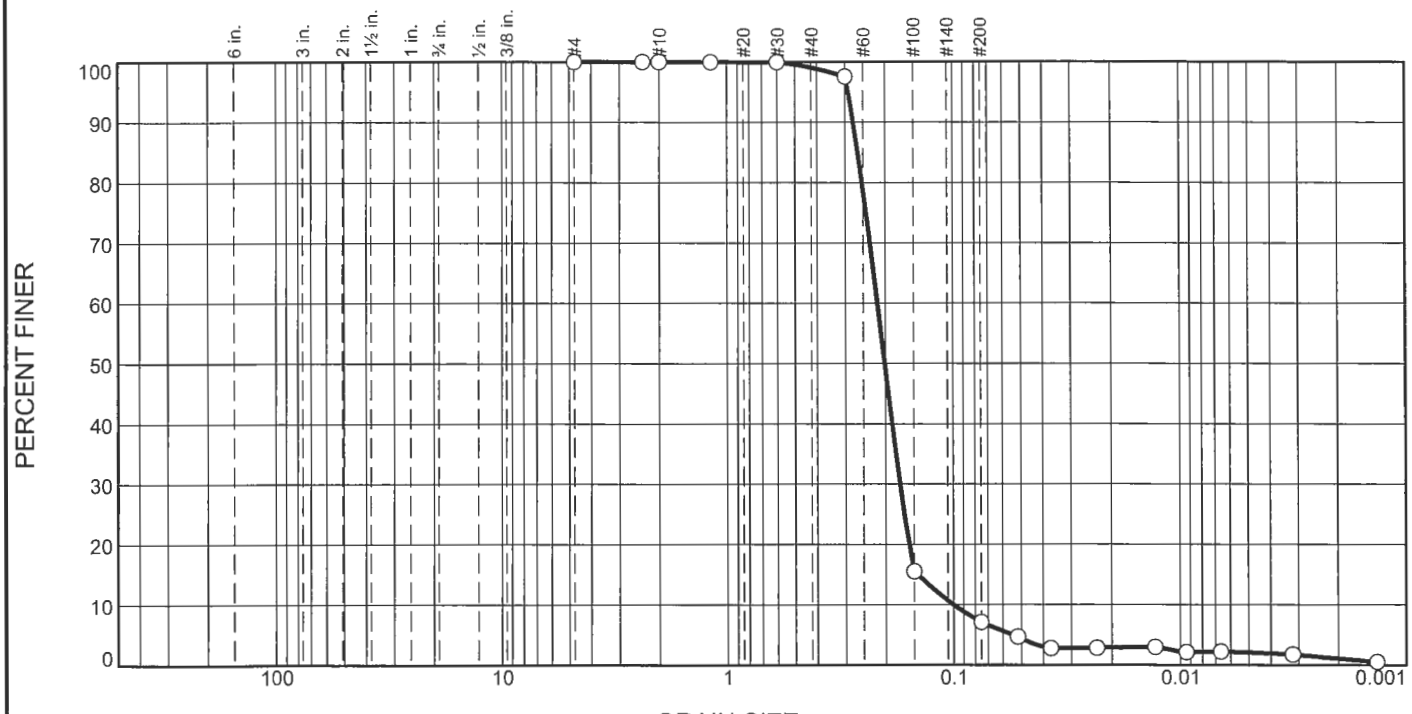
Source of Sample: 33 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	92.0	5.0	2.1

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	97.6		
#100	15.5		
#200	7.1		
0.0518 mm.	4.7		
0.0370 mm.	2.7		
0.0233 mm.	2.8		
0.0129 mm.	2.9		
0.0094 mm.	2.1		
0.0066 mm.	2.2		
0.0032 mm.	1.7		
0.0013 mm.	0.5		

* (no specification provided)

Material Description

Gray fine sand, with silt, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-3

Coefficients

D_{90}= 0.2757 D_{85}= 0.2632 D_{60}= 0.2169
D_{50}= 0.2018 D_{30}= 0.1731 D_{15}= 0.1451
D_{10}= 0.1001 C_u= 2.17 C_c= 1.38

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

Title: _____

Source of Sample: 34 - Nolan **Depth:** 6 **Date Sampled:**

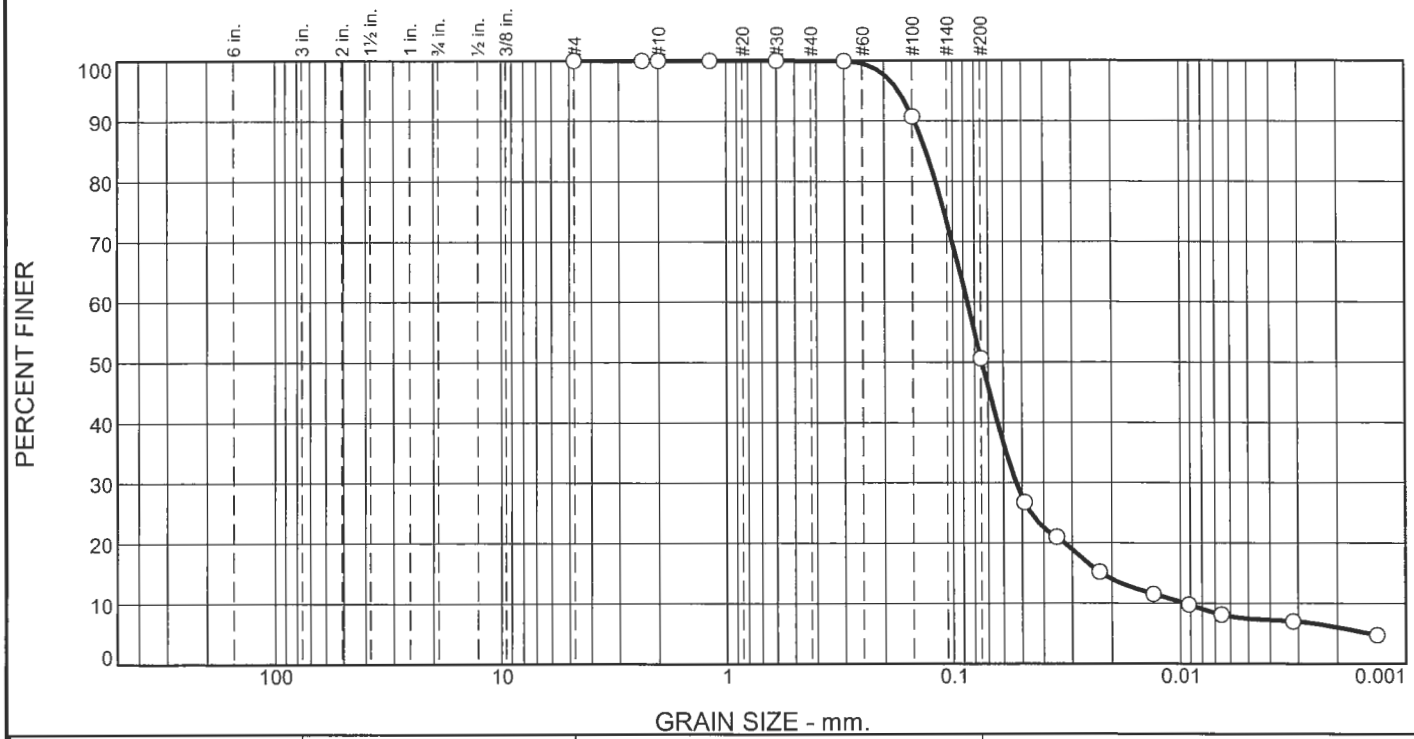
Construction Material's Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee

Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	49.4	43.1	7.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#50	99.9		
#100	90.7		
#200	50.6		
0.0488 mm.	26.8		
0.0351 mm.	21.0		
0.0226 mm.	15.2		
0.0131 mm.	11.6		
0.0091 mm.	9.8		
0.0066 mm.	8.1		
0.0032 mm.	7.0		
0.0013 mm.	4.7		

* (no specification provided)

Material Description

Gray sandy silt, trace clay, moist

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1470 D_{85}= 0.1310 D_{60}= 0.0862
D_{50}= 0.0743 D_{30}= 0.0530 D_{15}= 0.0222
D_{10}= 0.0096 C_u= 9.00 C_c= 3.40

Remarks

Sampled from boring.

Date Received: _____ **Date Tested:** _____

Tested By: G.Johnson

Checked By: _____

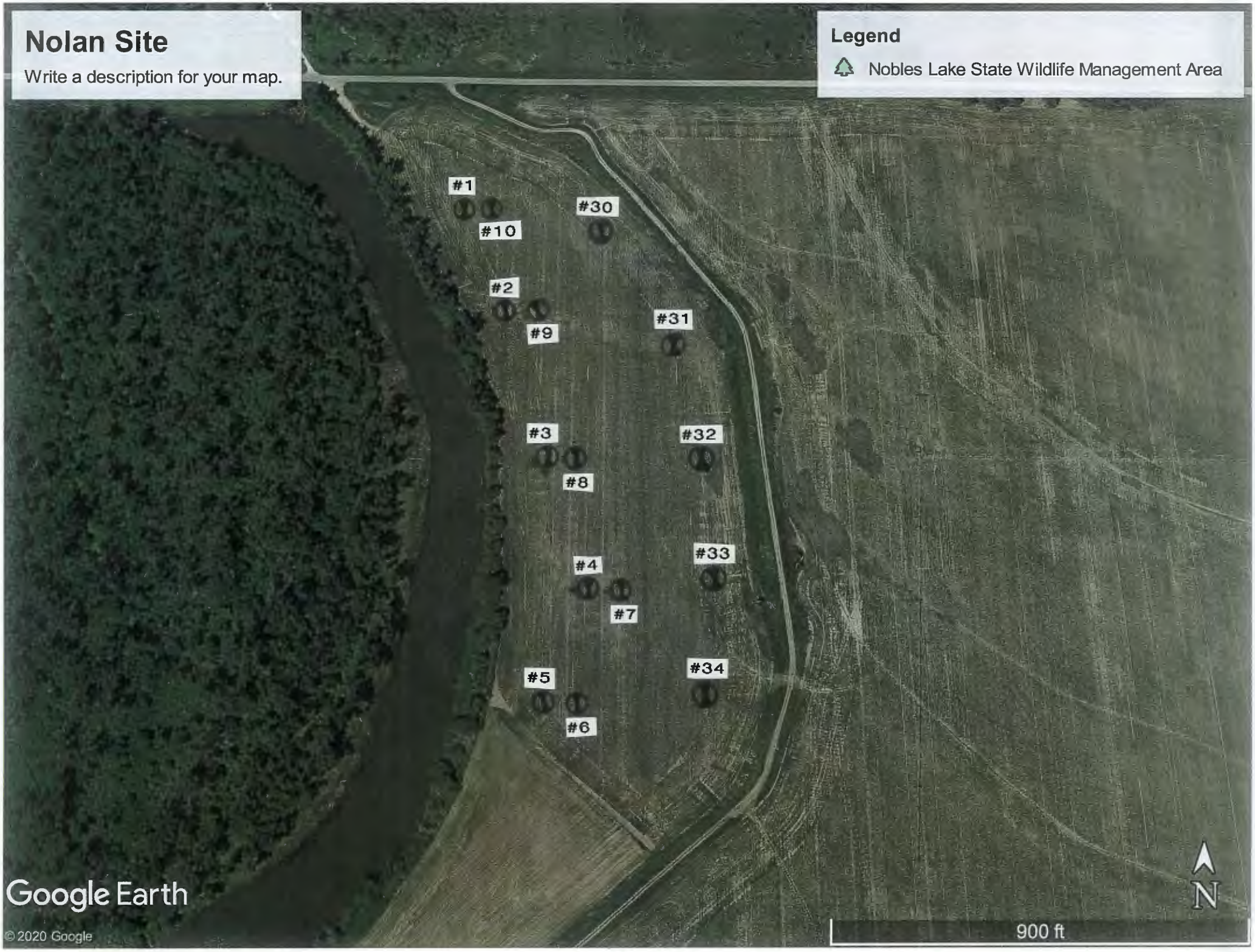
Title: _____

Source of Sample: 35 - Nolan **Depth:** 0.5 **Date Sampled:**

Construction Materials Testing

Client: Bolton and Menk, Inc.
Project: Pottawattamie Co. Levee
Project No: 202057PLC **Figure**

Tested By: _____ **Checked By:** _____


Nolan Site
Write a description for your map.
Legend
Nobles Lake State Wildlife Management Area
#1
#10
#30
#2
#9
#31
#3
#8
#32
#4
#7
#33
#5
#6
#34
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