MEMORANDUM

Missouri Department of Transportation
Construction - Materials
Central Laboratory

TO: Michael Roberts-kc/gs

CC/ATT: Matthew Moppin-nw/gs
Kevin Griep-co/gs

FROM: Alan Miller
Geotechnical Engineer

DATE: April 5, 2017

SUBJECT: Materials
Geotechnical Section
Foundation Investigation for
Structure No. FI2550
Job No. CCO3303A
Route 71, Jackson County

Attached are logs of borings for a Mechanical Building at the Belton Shed.

An allowable bearing of 2500 psf may be used for the design of the footings for the proposed building.

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Attachments

Missouri Department of Transportation
Construction and Materials

BORING NO. NE Corner

Job No.: CCO-3303A-Fi2550 **County:** Jackson **Route:** 71
Design: Fi2550 **Skew:** n/A **Location:** Belton Mechanical Bldg
Bent: **Logged By:** Alan Miller **Operator:** Ray Murray
Station: **Northing:** **Date of Work:** 03/30/17-03/30/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** Acker Soil XLS ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9462 **Hammer Efficiency:** 61% **Drilling Method:** Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Shear Data	Field Tests	Index Tests
0		0.0-0.4' Brown, LEAN CLAY, stiff, moist 0.4-3.6' Dark gray, LEAN CLAY, hard, dry							
				X	67	5-6-12 (18)		PP = 4.25 tsf	
5		3.6-9.8' Reddish brown, FAT CLAY, hard to very stiff, moist		X	67	4-7-11 (18)		PP = 4.00 tsf	
				X	67	4-5-5 (10)		PP = 2.25 tsf	
10		9.8-11.7' Limestone, highly weathered		X	67	4-10-10 (20)		PP = 1.50 tsf	
		11.7-16.5' Reddish brown, FAT CLAY, stiff, moist		X	67	2-2-2 (4)		PP = 1.25 tsf	
15				X	67	1-2-2 (4)		PP = 1.25 tsf	
		Bottom of borehole at 16.5 feet.							

N_{60} = (Em/60)Nm N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: **Coordinate Zone:** **Coordinate Proj. Factor:**
Coordinate Datum: **Coordinate Units:** U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

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Missouri Department of Transportation
Construction and Materials

BORING NO. NW Corner

Job No.: CCO-3303A-Fi2550 **County:** Jackson **Route:** 71
Design: Fi2550 **Skew:** n/A **Location:** Belton Mechanical Bldg
Bent: **Logged By:** Alan Miller **Operator:** Ray Murray
Station: **Northing:** **Date of Work:** 03/30/17-03/30/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** Acker Soil XLS ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9462 **Hammer Efficiency:** 61% **Drilling Method:** Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Shear Data	Field Tests	Index Tests
0		0.0-2.2' Brown, LEAN CLAY, very stiff, moist							
		2.2-3.4' Brown, LEAN CLAY, hard		X	67	3-42-19 (62)		PP = 3.50 tsf	
5		3.4-10.8' Reddish brown, FAT CLAY, very stiff, moist		X	67	3-6-7 (13)		PP = 3.50 tsf	
				X	67	4-6-8 (14)		PP = 2.50 tsf	
10				X	67	3-49/0.3', 10/0'		PP = 1.75 tsf	
		10.8-12.0' With cobbles, and gravel Limestone, highly weathered							
		12.0-16.5' Reddish brown, FAT CLAY, very stiff, moist		X	67	5-4-4 (8)		PP = 1.75 tsf	
15				X	67	1-1-4 (5)		PP = 1.75 tsf	
		Bottom of borehole at 16.5 feet.							

N_{60} = (Em/60)Nm N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: **Coordinate Zone:** **Coordinate Proj. Factor:**
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Missouri Department of Transportation
Construction and Materials

BORING NO. SE Corner

Job No.: CCO-3303A-Fi2550 **County:** Jackson **Route:** 71
Design: Fi2550 **Skew:** n/A **Location:** Belton Mechanical Bldg
Bent: **Logged By:** Alan Miller **Operator:** Ray Murray
Station: **Northing:** **Date of Work:** 03/30/17-03/30/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** Acker Soil XLS ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9462 **Hammer Efficiency:** 61% **Drilling Method:** Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Shear Data	Field Tests	Index Tests
0		0.0-5.0' Brown, LEAN CLAY, very stiff, moist							
					67	4-8-10 (18)		PP = 3.50 tsf	
5		5.0-7.1' Reddish brown, FAT CLAY, very stiff, moist			67	3-5-6 (11)		PP = 2.50 tsf	
		7.1-7.9' Limestone, highly weathered			80	49/0.4', 10/0'			
		7.9-9.4' Limestone, gray, hard							
		Bottom of borehole at 9.4 feet.							

N_{60} = (Em/60)Nm N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
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Coordinate System: **Coordinate Zone:** **Coordinate Proj. Factor:**
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Missouri Department of Transportation
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BORING NO. SW Corner

Job No.: CCO-3303A-Fi2550 **County:** Jackson **Route:** 71
Design: Fi2550 **Skew:** n/A **Location:** Belton Mechanical Bldg
Bent: **Logged By:** Alan Miller **Operator:** Ray Murray
Station: **Northing:** **Date of Work:** 03/30/17-03/30/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** Acker Soil XLS ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9462 **Hammer Efficiency:** 61% **Drilling Method:** Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Shear Data	Field Tests	Index Tests
0		0.0-0.6' Brown, LEAN CLAY, very stiff, moist							
		0.6-2.8' Dark gray, LEAN CLAY, hard							
		2.8-11.6' Reddish brown, FAT CLAY, very stiff, moist		X	67	3-6-7 (13)		PP = 3.50 tsf	
5				X	67	4-6-7 (13)		PP = 2.75 tsf	
				X	67	2-4-6 (10)		PP = 2.25 tsf	
10				X	67	3-4-2 (6)		PP = 1.50 tsf	
		11.6-13.0' Limestone, moderately weathered		X	80	49/0.4', 10/0'			
		Bottom of borehole at 13.0 feet.							

N_{60} = (Em/60)Nm N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

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KEY TO SYMBOLS

Missouri Department of Transportation

CLIENT MoDot **PROJECT NAME**

PROJECT NUMBER CCO-3303A-Fi2550 **PROJECT LOCATION** Belton Mechanical Bldg

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


CH: USCS High Plasticity Clay


CL: USCS Low Plasticity Clay


HIWEA LIMESTONE: HIWEA LIMSTONE


LIMESTONE: Limestone

SAMPLER SYMBOLS


Split-Spoon Sampler

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)
Qu - UNCONFINED COMPRESSIVE STRENGTH (PSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

▽ Water Level at Time of Drilling

▼ Water Level at End of Drilling

▼ Water Level after Drilling