MEMORANDUM

Missouri Department of Transportation
Construction - Materials
Central Laboratory

TO: Matthew Moppin-nw/gs

FROM: Alan Miller
Geotechnical Engineer

DATE: February 2, 2017

SUBJECT: Materials
Geotechnical Section
Foundation Investigation for
Structure Design No. FI2509 Pole Building
Job No. R35G
Route I-29, Atchison County

Attached are logs of borings for the above noted structure, a proposed pole building at the Watson Weigh Station.

An allowable bearing of 2000 psf may be used for the foundation soil below a depth of 2.5 feet.

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Attachments

Missouri Department of Transportation
Construction and Materials

BORING NO. NE Corner

Job No.: R35G **County:** Atchison **Route:** I-29
Design: Fi2509 **Skew:** **Location:** Watson Weigh Station
Bent: **Logged By:** Alan Miller **Operator:** Mike Donahoe
Station: **Northing:** **Date of Work:** 01/31/17-01/31/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9577 **Hammer Efficiency:** 79% **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		0.0-0.1' ASPHALT							
		0.1-1.0' GRAVEL, Base Rock							
		1.0-7.5' Brown, LEAN CLAY, medium stiff to stiff, moist		X		4-3-3 (8)		PP = 0.50 tsf	
5				X		3-8-8 (21)		PP = 1.50 tsf	
		7.5-16.5' Dark gray, LEAN CLAY, very stiff, moist		X		4-9-10 (25)		PP = 2.00 tsf	
10				X		5-8-10 (24)		PP = 4.50 tsf	
				X		5-13-15 (37)		PP = 2.50 tsf	
15				X		1-1-3 (5)		PP = 1.00 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.

Missouri Department of Transportation
Construction and Materials

BORING NO. NW Corner

Job No.: R35G **County:** Atchison **Route:** I-29
Design: Fi2509 **Skew:** **Location:** Watson Weigh Station
Bent: **Logged By:** Alan Miller **Operator:** Mike Donahoe
Station: **Northing:** **Date of Work:** 01/31/17-01/31/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9577 **Hammer Efficiency:** 79% **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		0.0-0.2' ASPHALT							
		0.2-1.0' GRAVEL, Base Rock							
		1.0-5.0' Brown, LEAN CLAY, very stiff, dry		X		6-8-12 (26)		PP = 2.00 tsf	
5		5.0-16.5' Dark gray, LEAN CLAY, hard, dry		X		2-7-7 (18)		PP = 4.50 tsf	
				X		2-7-8 (20)		PP = 4.00 tsf	
10				X		3-7-8 (20)		PP = 3.50 tsf	
				X		5-9-13 (29)		PP = 4.50 tsf	
15				X		3-2-6 (11)		PP = 2.00 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
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Coordinate System: **Coordinate Zone:** **Coordinate Proj. Factor:**
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Missouri Department of Transportation
Construction and Materials

BORING NO. SE Corner

Job No.: R35G **County:** Atchison **Route:** I-29
Design: Fi2509 **Skew:** **Location:** Watson Weigh Station
Bent: **Logged By:** Alan Miller **Operator:** Mike Donahoe
Station: **Northing:** **Date of Work:** 01/31/17-01/31/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9577 **Hammer Efficiency:** 79% **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		0.0-16.5' Dark brown to grayish, LEAN CLAY, very stiff to hard, dry							
				X		3-4-7 (14)		PP = 2.00 tsf	
5				X		4-6-8 (18)		PP = 4.50 tsf	
				X		4-7-10 (22)		PP = 4.50 tsf	
10				X		4-6-6 (16)		PP = 4.50 tsf	
				X		5-11-15 (34)		PP = 4.50 tsf	
15				X		2-3-5 (11)		PP = 1.00 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
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Missouri Department of Transportation
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BORING NO. SW Corner

Job No.: R35G **County:** Atchison **Route:** I-29
Design: Fi2509 **Skew:** **Location:** Watson Weigh Station
Bent: **Logged By:** Alan Miller **Operator:** Mike Donahoe
Station: **Northing:** **Date of Work:** 01/31/17-01/31/17
Offset: **Easting:** **Depth to Water:**
Elevation: **Requested Northing:** **Depth Hole Open:**
Requested Station: **Requested Easting:** **Time Change:**
Requested Offset: **Equipment:** CME 45 ,Split-Spoon Sampler
Requested Elevation: **Location Note:**
Drill No.: G-9577 **Hammer Efficiency:** 79% **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		0.0-0.2' ASPHALT							
		0.2-1.0' GRAVEL, Base Rock							
		1.0-7.5' Dark brown, LEAN CLAY, hard, dry to moist		X		6-6-11 (22)		PP = 3.00 tsf	
5				X		4-4-6 (13)		PP = 2.00 tsf	
		7.5-10.0' Grayish brown, LEAN CLAY to silt, medium stiff, wet		X		2-2-2 (5)		PP = 0.50 tsf	
10		10.0-16.5' Dark gray, LEAN CLAY, very stiff, moist		X		2-5-8 (17)		PP = 3.00 tsf	
				X		2-3-5 (11)		PP = 1.00 tsf	
15				X		2-3-5 (11)		PP = 0.75 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
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KEY TO SYMBOLS

Missouri Department of Transportation
1617 Mo. Blvd.
Jefferson City, Mo. 65109

CLIENT MoDot **PROJECT NAME**

PROJECT NUMBER R35G **PROJECT LOCATION** Watson Weigh Station

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- ASPHALT: Asphalt
- CL: USCS Low Plasticity Clay
- GW: USCS Well-graded Gravel

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