CLOSURE PLAN FLY ASH POND AND BOTTOM ASH POND MEREDOSIA POWER STATION 800 SOUTH WASHINGTON STREET MEREDOSIA, ILLINOIS

Prepared for:

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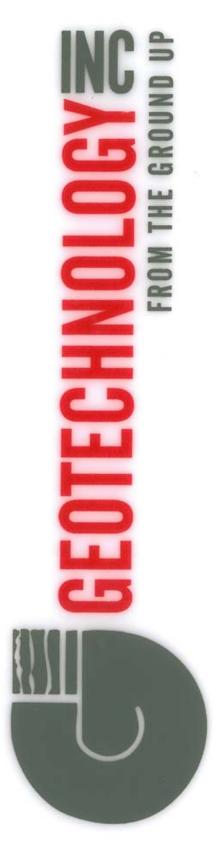
GEOTECHNOLOGY, INC. St. Louis, Missouri

Project No. J024917.05

March 12, 2018

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1.0 INTRODUCTION

This Closure Plan for the AmerenEnergy Medina Valley Cogen, LLC Meredosia Power Station (Meredosia Power Station) Fly Ash Pond and Bottom Ash Pond Coal Combustion Waste Surface Impoundments has been prepared in general accordance with the requirements of the site-specific rule in 35 Illinois Administrative Code (IAC) Part 840.101 through 840.152 and the United States Environmental Protection Agency (USEPA) regulation at 40 Code of Federal Regulations (CFR) Parts 257 and 261. Supporting documents to this Closure Plan are listed in the Reference Section of this report.

2.0 SITE LAYOUT

The Meredosia Power Station is located at 800 South Washington Street, Meredosia, Illinois. The Fly Ash and Bottom Ash Ponds are located southwest of the coal pile and plant facilities. The site location and topography are shown on Plate 1. The existing structures, ash ponds, and boring/monitoring wells are shown on Plate 2.

3.0 SITE HISTORY

The Meredosia Power Station is located south of Meredosia in Morgan County, Illinois, which is located in west-central Illinois. The Meredosia Power Station ash ponds are located in the south half of Section 21 and the north half of Section 28, T.16N, R.13W. The plant generated electricity from 1948 until February 2012. The plant is located on the floodplain east of the Illinois River. A third ash pond referred to as the "Old Ash Pond" was reportedly closed, and will not be further discussed in this report. Reportedly, the Bottom Ash and Fly Ash Ponds were constructed of native materials.

The Bottom Ash Pond was constructed in 1972 with a design surface area of 11 acres, a height of 24 feet and a volume of approximately 90 acre-feet. The Bottom Ash Pond had received low-volume wastewater, bottom ash and storm water runoff. The site operates under NPDES Permit IL0000116, Outfall 003, which is for the Bottom Ash Pond. Reportedly, the Bottom Ash Pond did not have standing water within two months of the plant closure.

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The Fly Ash Pond was constructed in 1968. The Fly Ash Pond has a surface area of 34 acres, a height of 24 feet and a volume of approximately 500 acre-feet. The Fly Ash Pond reportedly received fly ash, low-volume wastewater and storm water runoff. The site operates under NPDES Permit IL0000116, Outfall 004, which is for the Fly Ash Pond. The Fly Ash Pond was reportedly dry by October 2012.

A feasibility analysis was performed regarding the closure options for the Fly Ash and Bottom Ash Ponds on the site. The options included no action, complete clean closure, soil/geosynthetic composite cap, and partial clean closure with a ClosureTurf® cap alternatives. The no closure option was not selected due to the known groundwater impacts at the site and facility decommissioning activities. Clean closure of both ponds was cost and time prohibitive due to ash disposal and subsequent backfilling and grading of the site. The soil/geosynthetic composite cap option was not selected due to the long term maintenance issues, lack of personnel on site to perform maintenance activities, cost, and the longer time frame needed to close the ponds. Partial clean closure of the bottom ash pond, moving the bottom ash to the fly ash pond, and capping the fly ash pond and bottom ash pond berm with ClosureTurf® was selected as an effective and efficient option.

4.0 SLOPE STABILITY ANALYSIS

Slope stability analysis consists of comparing the driving forces within a cross-section of slope to the resisting forces and calculating the factor of safety. Per the Illinois Department Natural Resources (IDNR)¹, embankments should have a minimum factor of safety of 1.5 for long-term static stability, and 1.0 for the pseudo-static condition (seismic condition). Major flood conditions and rapid drawdown conditions were also analyzed due to the proximity of the site to the Illinois River. Slope stability analysis discussion, section profiles, and calculated critical failure arcs at selected locations are presented in Appendix A. Global stability analysis results, at current groundwater elevations in relation to mean sea level (MSL) and design grades for the Fly Ash and Bottom Ash Ponds, are summarized in the following table.

¹ *Rules for Construction and Maintenance of Dams*, Illinois Department of Natural Resources, Office of Water Resources, Springfield, Illinois.

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SUMMARY OF STABILITY ANALYSES										
Section Location	Case	Calculated Factor of Safety	Target Factor of Safety							
	Static Condition Normal River Stage	2.1	1.5							
Fly Ash Pond West Embankment	Static Condition Major Flood Stage (447'MSL)	2.5	1.5							
west Embankment	Rapid Drawdown Major Flood Stage (447'MSL)	1.7	1.2							
	Seismic Condition	1.3	1.0							
	Static Condition Normal River Stage	1.8	1.5							
Bottom Ash Pond West Embankment	Static Condition Major Flood Stage (447'MSL)	1.6	1.5							
west Embankment	Rapid Drawdown Major Flood Stage (447'MSL)	1.7	1.2							
	Seismic Condition	1.3	1.0							

The stability models for each section at the Fly Ash Pond and Bottom Ash Pond closures have calculated factors of safety greater than or equal to the recommended IDNR target factor of safety for the static and seismic conditions.

5.0 CLOSURE ACTIVITIES

The remedial action for the facility is the relocation and clean closing of the east ash storage pile, capping of the Fly Ash Pond, and the partial clean closure and capping of the Bottom Ash Pond. The Bottom Ash Pond will be closed by the removal of most coal combustion residuals (CCR) to the Fly Ash Pond. The remaining CCR under the roadway and pipeline will be capped in-place. The ash in the east ash storage pile will be removed and placed in the Fly Ash Pond.

The proposed closure activities associated with the remedial action includes grading, installation of high performance high density polyethylene (HDPE) geomembrane, and establishment of surface water control features for the Fly Ash and Bottom Ash Ponds. Closure activities will be performed in accordance with the Closure Plans and Specifications. Quality control will be performed in accordance with the Construction Quality Assurance (CQA) Plan prepared for this project and will be documented by a professional engineer licensed in Illinois.

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Refer to the Plans and Specifications completed for this project (CDG, 2017) for details on the closure system.

<u>5.1 Grading</u>. Ash and other material (i.e. embankment soils, bottom ash, and approved demolition debris) will be moved within and between the Fly Ash and Bottom Ash Ponds to achieve design grades. Embankment materials and bottom ash may be used to bring the subgrade to within one foot of design elevations. At least one foot of fly ash will be placed on top of the bottom ash to provide a working surface for ClosureTurf® installation. Ash will be placed at a maximum slope of 1V:10H (10 percent slope). Slopes are designed to promote surface runoff and reduce ponding. The final subgrade surface will be compacted and drum-rolled to provide a smooth surface prior to placement of the high performance HDPE system.

<u>5.2 ClosureTurf®/ArmorFill® Installation</u>. The ClosureTurf®/ArmorFill® system is a low permeability synthetic liner used to control storm water infiltration and limit exposure of the capped material to humans and vectors (i.e. animals). The design grades facilitate storm water runoff to the surface water management features outside the Fly Ash and Bottom Ash Ponds.

The ClosureTurf®/ArmorFill® is generally installed in the following manner (Refer to the CQA Plan for specific installation guidelines):

- The geomembrane component is installed per the manufacturer's requirements including the use of heat welding for seaming.
- The turf component is installed per the manufacturer's requirements including the use of a sewing machine for seaming.
- Sand infill is placed and ArmorFill® is sprayed onto the sand per the manufacturer's requirements.
- The perimeter of the geomembrane and turf components is secured by an anchor trench.

<u>5.3 Surface Water Management</u>. Surface water management features have been incorporated into the final cover design. Surface water features, such as ditches, will be formed in the subgrade to facilitate runoff. The ClosureTurf®/ArmorFill® will be placed over the berms and into ditches. Additional details are provided in the Plans and Specifications (CDG, 2017).

Surface water features are designed to handle runoff from a 20-year precipitation event without damage to the final cover and water ponding.

<u>5.4 Construction Quality Assurance (CQA) Program</u>. Refer to the CQA Plan (Geotechnology, 2018) for details on the project specific CQA program.

6.0 HYDROGEOLOGIC SITE INVESTIGATION

The Hydrogeologic Site Investigation includes a summary of geologic data, hydrogeologic data, and known impacts to the groundwater for the site. Boron and arsenic are typically the best indicator chemicals for coal combustion waste related impacts at the site. Please refer to the separate Hydrogeologic Site Investigation Report (Geotechnology, 2016) for detailed information.

7.0 GROUNDWATER

<u>7.1 Groundwater Monitoring Program</u>. Requirements for the groundwater monitoring program and associated quality assurance are found in the Groundwater Monitoring Plan (Geotechnology, 2016). Quarterly groundwater sampling of the groundwater monitoring system will occur for the first five years after the CQA acceptance report is submitted, and sampling frequencies may be reduced after that time frame. Monitoring data and trend analysis data will be maintained at the offices of Medina Valley Cogen, LLC until a post-closure completion report is accepted by the IEPA.

<u>7.2 Groundwater Monitoring System</u>. Nine monitoring wells (Groundwater Monitoring Plan, Plate 2) have been installed in the vicinity of the Fly Ash and Bottom Ash Ponds. These monitoring wells are used for the groundwater monitoring system. Additional monitoring wells are not planned at this time. The monitoring well network will be evaluated two years after completion of the ash pond closures for effectiveness. One monitoring well (APW-1) will be sampled for background values, and eight monitoring wells will be sampled for groundwater assessment. Please refer to the separate Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

<u>7.3 Groundwater Trend Analysis</u>. Intrawell analysis will be used to assess groundwater trends over time. Please refer to the separate Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

<u>7.4 Mitigation of Statistically Significant Trends</u>. If statistically significant increasing trends are noted in the groundwater analysis, additional investigation into the cause of the increasing trends will be needed. Refer to the Groundwater Monitoring Plan (Geotechnology, 2016) for additional information.

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8.0 TIME AND COST ESTIMATES

<u>8.1 Time to Complete Closure</u>. Completion of closure activities is dependent on weather and final approval of the closure plan by the IEPA. However, closure activities are anticipated to begin and be completed in 2018.

<u>8.2 Time to Reach Class I Groundwater Standards</u>. Boron and arsenic concentrations for the current ash pond configurations were modeled for 25 years to represent a scenario where the ash ponds were not closed. After 25 years, Monitoring Well APW-3 (the well with historically highest boron and arsenic concentrations) stabilized at 16.9 mg/L of boron and 0.208 mg/L of arsenic, which exceed the respective Class I Groundwater standards. Monitoring Wells APW-2, APW-6, APW-7, and APW-8 also exceeded the Class I Groundwater standards for boron and arsenic at 25 years with no action.

After the dewatering and closure activities of the Fly Ash and Bottom Ash Ponds are complete, it will take approximately three years for boron concentrations and six years for arsenic concentrations to decrease below the Class I Groundwater standards for each well on site according to the model results.

Refer to the Hydrogeologic Site Investigation Report (Geotechnology, 2016) for more information regarding the groundwater modeling.

<u>8.3 Remediation Time Frame</u>. Once the ClosureTurf® caps for the Fly Ash and Bottom Ash Ponds are in place, precipitation will be diverted away from the ash ponds. Infiltration of precipitation into the ash ponds will be reduced or eliminated and further reductions of the concentrations of COCs are anticipated. Boron and arsenic exhibited the highest concentration over the largest area and were used as the indicator contaminants for contaminant transport modeling. Based on the modeling results, the lengths of time required for the concentration of boron and arsenic to decrease below the Class I Groundwater Standards are approximately three years and six years, respectively. Additional contamination transport modeling information is in the Hydrogeologic Site Investigation Report (Geotechnology 2016). Groundwater sampling and post-closure activities are anticipated to be performed for 30 years.

<u>8.4 Cost of Closure</u>. The cost for closure activities related to the closure of the Fly Ash and Bottom Ash Ponds as specified in the drawings and specifications is estimated to be \$10,300,000.

<u>8.5 Cost of Post-Closure Care</u>. The cost for post-closure care activities related to the closure of the Fly Ash and Bottom Ash Ponds as specified in the Post-Closure Plan is estimated to be \$20,000 annually while quarterly groundwater sampling is in progress.

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9.0 REFERENCES

CDG, 2017. "Specifications and Construction Plans, Fly Ash and Bottom Ash Ponds Closure, Meredosia Power Station." CDG Engineers Architects Planners, Inc., St. Louis, Missouri, 2016

Geotechnology, Inc., Construction Quality Assurance Plan, Meredosia Power Station, Ameren, 2018.

Geotechnology, Inc., Groundwater Monitoring Plan, Meredosia Power Station, Ameren, 2016.

Geotechnology, Inc., Groundwater Management Zone Plan, Meredosia Power Station, Ameren, 2017.

Geotechnology, Inc., Post-Closure Plan, Meredosia Power Station, Ameren, 2018.

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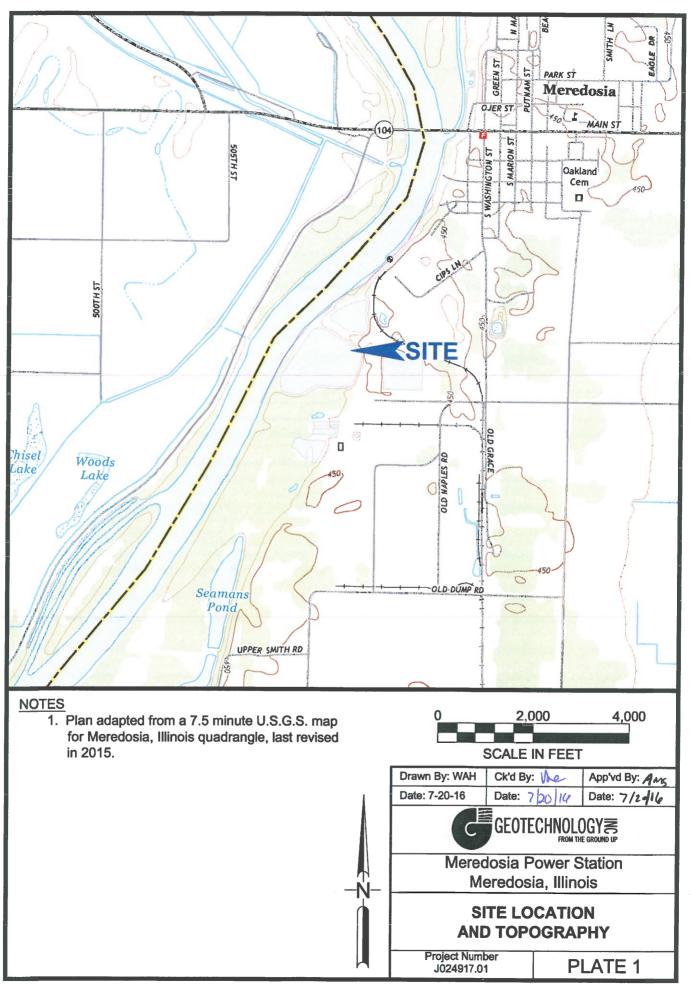
10.0 LICENSED PROFESSIONAL SIGNATURE/SEAL

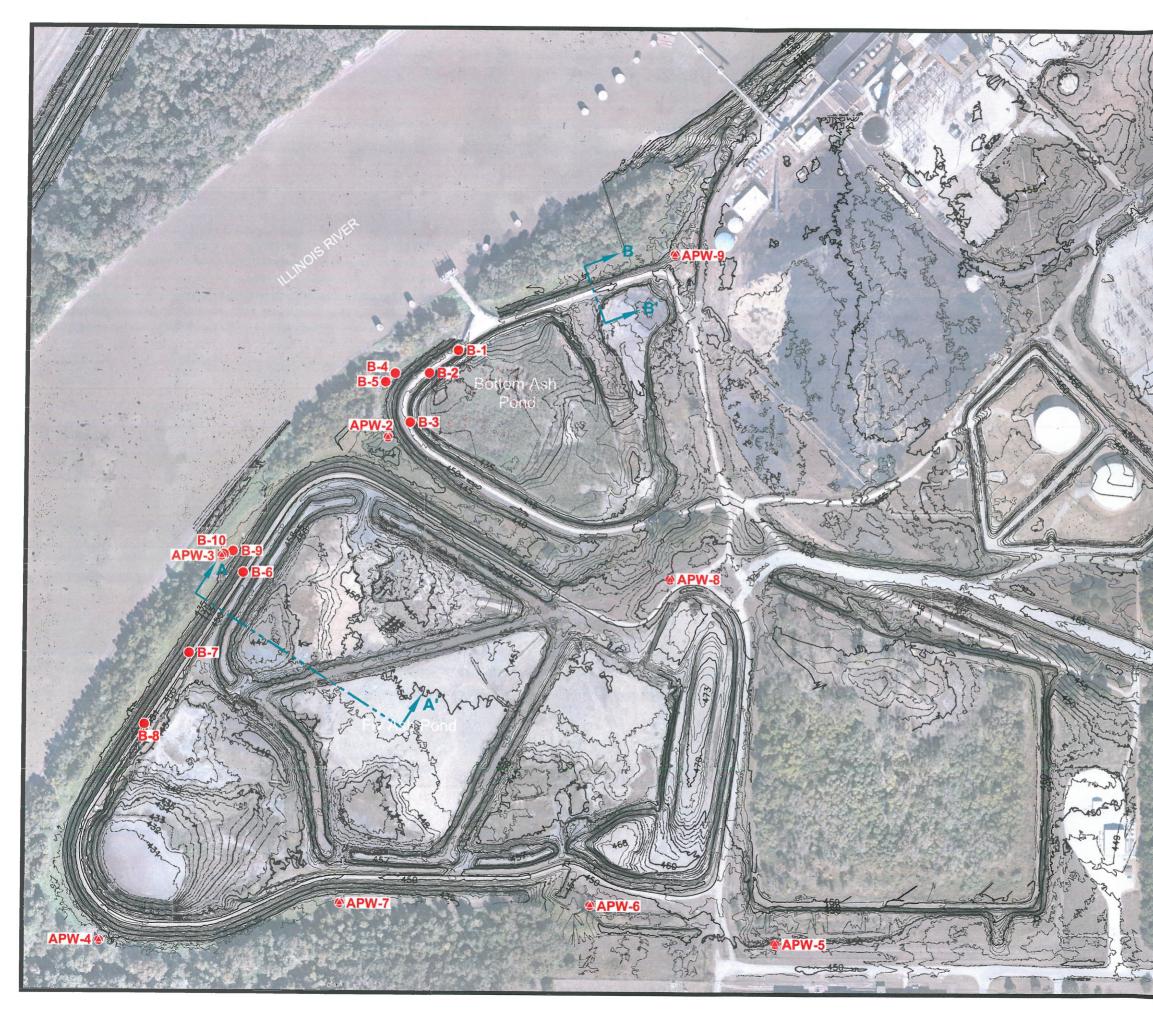
I hereby affirm that the information and design documents contained in this closure plan are true and accurate to the best of my knowledge and professional opinion.

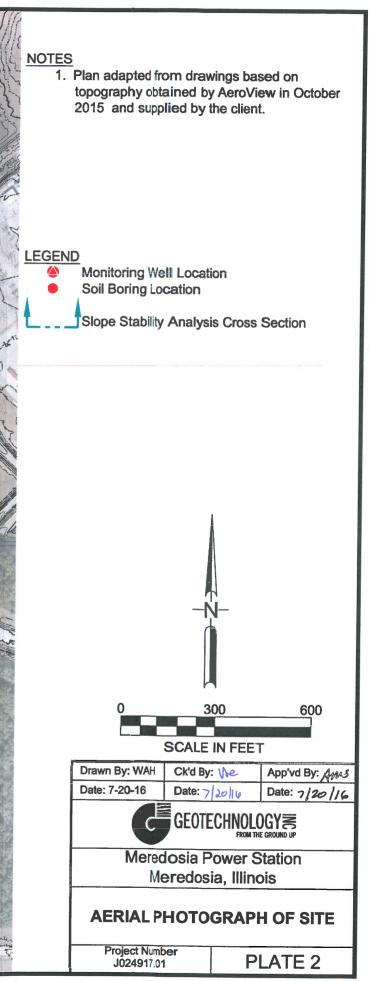
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Rosanna M. Saindon, P.E., Ph.D. Illinois Licensed Professional Engineer Project Manager Geotechnology, Inc.









<u>APPENDIX A</u>

STABILITY ANALYSIS

APPENDIX A

STABILITY ANALYSIS

1.0 PREVIOUS SLOPE STABILITY STUDY

Geotechnology performed a subsurface exploration and global stability evaluation² for the west embankments of the Bottom Ash and Fly Ash Ponds at the subject site in January 2011. Ten borings designated as Borings B-1 through B-10 were drilled during the subsurface exploration. Boring locations are shown on Plate 2. Laboratory testing included moisture contents for cohesive samples and Atterberg limits on selected samples. Also, consolidated-undrained triaxial, unconfined compression and direct shear tests were performed on representative samples. Relevant data from this exploration are incorporated into this report. Copies of the boring logs are presented in Attachment A. Laboratory test results are included in Attachment B.

2.0 SLOPE STABILITY ANALYSIS

Slope stability analysis consists of comparing the driving forces within a cross-section of slope to the resisting forces and determining the factor of safety. Gravity forces tend to move the slope downwards (driving force), while resisting forces, derived from the soil shear strength, tend to keep the slope in place. When the driving force acting on the slope is greater than the resisting force, sliding can occur. The factor of safety of the slope is the ratio of the restraining force divided by the driving force. Generally, when the factor of safety is 1 or less, the slope is considered to be unstable. The accepted standard in local practice and consistent with the Illinois Department of Natural Resources (IDNR) dam safety requirement is a factor of safety of 1.5 for long term static stability of a slope, and 1.0 for pseudo-static conditions (seismic loading).

Slope stability analyses were performed for representative sections of the west embankments of the Bottom Ash and Fly Ash Ponds. We understand that the embankment slopes will remain as-is or will be graded to a slope of 1V:3H (Vertical:Horizontal) or flatter. The locations of the typical cross-sections of the embankments are represented by Sections B-B' and A-A', respectively, and are shown on Plate 2. Soil profile and properties used in the stability analysis were selected based on boring and laboratory test results reported in the 2011 Global Stability Evaluation report and Geotechnology's experience with similar materials. The soil properties used in the models are summarized in the following table:

² Global Stability Evaluation, Meredosia Power Station, Bottom and Fly Ash Ponds, Meredosia, Illinois, prepared for Ameren Energy Resources by Geotechnology Inc., Report No. J017150.01, and dated January 4, 2011.

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2.1 Effective Stress Parameters

Material	Cohesion (psf)	Friction Angle (deg)	Density (pcf)
Embankment Fill	0	28	115
Silty Clay	50	29	115
Sand	0	39	120
Fly Ash	0	25	112
Bottom Ash	0	28	112

2.2 Total Stress Parameters

Material	Cohesion (psf)	Friction Angle (deg)
Embankment Fill	0	0
Silty Clay	500	14
Sand	0	0
Fly Ash	0	0
Bottom Ash	0	0

Geotechnology performed stability analysis for deep seated, global failure of the embankments. Representative cross-sections of the embankments are shown on the plates included in Appendix C. Since the embankments have been in place for 40 years or more, long-term stability of the embankments was analyzed (i.e. effective stress conditions). Both effective and total stress soil properties were used for the rapid drawdown analysis. Groundwater in the Bottom Ash Pond was varied between El 435³ to 440 for our analyses. Groundwater in the Fly Ash Pond was assumed to be at El 450. For the rapid drawdown case it was assumed that the Illinois River will drain rapidly from its major flood stage of El 447.

A pseudo-static seismic analysis was performed on the embankment sections using a Peak Ground Acceleration (PGA) of 0.1g, which corresponds to a seismic event with a mean return time of 2,500 years. The PGA is based on data provided in Appendix 1 of the dam safety guidelines⁴ published by the IDNR. The Morgenstern-Price procedure was used to compute factors of safety. The computer program SLOPE/W was used to perform the computations. The calculated factors of safety are given in the following table.

³ All elevations herein refer to the mean sea level (msl) datum in feet.

⁴ "Procedural Guidelines for Preparation of Technical Data to be included in Application for Permits for Construction and Maintenance of Dams" issued by Illinois Department of Natural Resources.

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SLOPE STABILITY ANALYSIS RESULTS										
	Calculate of Sa		Target							
Analysis Condition	Fly Ash Pond Section AA'	Bottom Ash Pond Section BB'	Factor of Safety ^a	Reference Plate No.						
Steady State Seepage Groundwater Elevation in Ash Pond as noted	2.1 (El 450)	1.8 (El 435)	1.5	1 and 5						
Steady State Seepage at Major Flood Stage El 447 Groundwater Elevation in Ash Pond as noted	2.5 (El 450)	1.6 (El 440)	1.5	2 and 6						
Rapid Drawdown from Major Flood Stage at El 447 Groundwater Elevation in Ash Pond as noted	1.7 (El 450)	1.7 (El 440)	1.2	3 and 7						
Slope with Seismic Forces Mean Return Time 2,500 Years Groundwater Elevation in Ash Pond as noted	1.3 (El 450)	1.3 (El 435)	1.0	4 and 8						

^a "Procedural Guidelines for Preparation of Technical Data to be included in Application for Permits for Construction and Maintenance of Dams" issued by Illinois Department of Natural Resources.

IDNR recommends a minimum factor of safety of 1.5 for long-term stability. During an extreme event, such as an earthquake, a factor of safety of 1.0 or more is recommended. Based on the results of our analyses, the Bottom Ash and Fly Ash Pond embankment slopes have adequate factors of safety for global stability.

ATTACHMENT A

BORING LOGS AND BORING LOG TERMS AND SYMBOLS

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1 12									· · · · · ·	• • • • • • •					
01.GP	- 75-					-	••••••••••	• • • •							
6383(
NCO									· · · · · ·	••••••••••••••••••••••••••••••••••••••	:::				
10-										· · · · · · · · · · · ·					
-0G OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/ND THE	l.			L			Drawn by: KA	Checked	thy G	Applud Luis					
DOSI	<u>(</u>	GROUNDWATER DA	TA DRILLING D	DATA			Date: 10/26/10	Date:12		App'vd. by: App'vd. by:					
MERE	ENCO	<u>X</u> FREE WATER NO							(
	LINGO	VOINTERED DURING DI	WASHBURING FRU					GEOTE		ILOGYZ					
016			MB DRILLER LA						F R 0	M THE GROUND	90				
7150			CME 550X DR												
101			E <u>Auto</u>	_		Mere N	dosia Po leredosi	ower Sta a, Illinois	tion						
02 W	DEM	ADKer Datum II A	info Dione Constitution 111		Amos				.,	-					
G 20	E: 21	ARKS: Datum: IL Si 182703.077'	ate Plane Coordinates, West Zone.	N: 114	8760.916	•	· ·	ONTINU)E					
ORIN									ORING:						
OF B															
			· · · · · · · · · · · · · · · · · · ·				Proj	ect No.	J01718	50.01					

[10.5						SHEAR STRENGTH, tsf									
	Surfa	ace Elevation: 449.2	Completion Date	. 10/21/10		RQI RQI		Δ - U	U/2	С	- QU/2		🛛 - S	V		
Ì		Datum msl			00	RYNUN	S	0,5		1,0	1,5	2,0	2,5			
					¶C	Y UNIT WEIGHT (pcf) PT BLOW COUNTS RE RECOVERY/RQD	SAMPLES				TRATIO					
	- H				GRAPHIC LOG	F J M	AM	(ASTM D 1586)								
	DEPTH IN FEET	DESCR	IPTION OF M	ATERIAL	GR	N B R	0,	N-VALUE (BLOWS PER FOOT) WATER CONTENT, %								
	ΩĨ					DRY UI SPT E CORE I		PLI-						-I LL		
		Crushed rock				<u> </u>		10		20 	30	40	50			
											5 · · 5 · · · · ·		· · · · · ·	8		
		FILL: brown, fine to	coarse sand with bl	lack clay len se s					: : : : : : : :	•	5 · 6 · 6 5 · 6 · 6		· · · · · ·			
						E 7 0	0.04						 			
	5					5-7-9	SS1	••••	🗛 .			• • •		· · · ·		
							• • • • •		•••			· · · · · ·	• • •			
				6-10-8	SS2	· · · · ·										
						::::	::::	:::	:::::	: : :						
ONLY.	- 10-					7-8-13	SS3			A:	:::::					
ES O								::::		:::	::::	:		· · · ·		
ROS						5-5-9	SS4	• • • • •				: : :				
I PUF				2	4888											
<u>S</u>	- 15-					3-3-3	SS5		· · · ·	· * ·	un . n	: : :		::: ::::		
STRA								** • • •								
		Black, clayey SAND	trace gravel - SP					* * • • • •		· · 3	· ** · · ·	; ; ; ; ;				
FQR		Black, slayby of the						*****	8 • • • • 8 • • • •							
GRAPHIC LOG FOR ILLUSTRATION PURPOSES							ST6	• • • • •		· · *	• • • • •		· · · · ·			
PHIC	- 20-										••••					
GRAI		Marilian Alffred and C														
- 8		Medium stiff, gray C	CLAY - CH					••••	· · · ·	× · · · × · ·	••••		•••••	· · · ·		
GRADUAL.						3-4-4	SS7		• • • •							
BEGF	- 25-															
Ă								• • • • • •		• • •	 	: : :	::::			
δ.									· · · ·	• • •	· · · · · ·					
TRANSITION MAY						3-3-3	SS8		· · · · ·	:::		: : :	· · · ·			
	- 30-					0-0-0						· · · ·				
뿔																
8		Soft, gray, clayey SI	LT with sand and cla	ay lenses - ML				•••••	• • • •	• * * • * *						
12/1						0.4.4				• • •	 	-				
GP.	- 35-					2-1-1	SS9	A	• • • •	• * *			• • • •			
38301										· · *	· · · · · ·					
C 06:		Loose to medium de	ense, brown, fine to	coarse SAND, trace					• • • •		· · · · ·					
GTIN		gravel - SP														
Gg						0-2-4	SS10			<u> </u>		. [
SIA.		GROUNDWATER D	ATA	DRILLING	DATA			Drawn by: Date: 10/2			ked by: Sh		vd. by:			
ĔD		X FREE WATER N	от	AUGERH		WSTEM				Date:	np	(CPUal	e://4/4			
- ME	ENC	OUNTERED DURING						C		GEO.	rechi		DGYā	z I		
GEO	AT <u>13.6</u> FEET AFTER <u>16</u> HOURS ¥ <u>MB</u> DRILLER <u>LAI</u> <u>CME 550X</u> DRI								- /			FROM TR	E GROUND			
50.01																
31715			E <u>Auto</u>						Power S		n					
ř			- <u>Aut</u>	<u>.</u>			N	leredo	sia, Illin	ois						
0021	REN	ARKS: Hole collpa	ased at 46 feet.	Datum: IL State Plane	Coor	dinates.										
NG 2	Soft. gray. clayey SILT with sand and clay lenses - ML 2- - 35- 2- Loose to medium dense, brown, fine to coarse SAND, trace 0- GROUNDWATER DATA DRILLING DATA X FREE WATER NOT								LC	G OF	BORING	: B-2	2			
BORI													-			
Ч С																
ğ									Proj	ect N	o. J017	150.	U1			

	e Elevation: <u>449.2</u>	Completion Date: _	e: <u>10/21/10</u>	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf △ - UU/2 ○ - QU/2 □ - SV 0 ₁ 5 1 ₁ 0 1 ₁ 5 2 ₁ 0 2 ₁ 5 STANDARD PENETRATION RESISTANCE (05TM 0, 1569) (05TM 0, 1569) (05TM 0, 1569)						
DEPTH IN FEET	DESCR		FRIAL	GRAF	UNIT T BLC E RE(SA	<u>A</u> 1		(ASTM D 1586) LUE (BLOWS PE		ER F		
N N N	DECON				SP- SP- CORI		PL	2 2	TER C		4 0	50	LL
		ense, brown, fine to coa	rse SAND, trace				• • • • • • •		· · · · · · · · · · · · · · · · · · ·				
	gravel - SP (continu	60)					• • • • • • •	· · ·	· · · ·			· · · · ·	· · · · · ·
							• • • • • • •	•••				· · · · ·	· · · ·
- 45-					3-6-6	SS11			a - 25.55	 	•		
	Boring terminated al	t 46 feet.					• • • • • • • •	• • • • •				· · · · ·	· · ·
								• •	 	 	: : :		· · ·
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- 50-									• • • •	• • • •	• • •	• • • •	
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- 55-									• • • •			· · · ·	• • •
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60-								• •	• 2 • •	• • • »			
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65-								::	- · · · ·				
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								•••		· · · · ·			
- 70								· · ·	• 3 • 345	* * * * • • • •			:::
							*****	::	* * * *	· · · · ·			•••
									• • • • • •	· · · ·			· · ·
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75-									• # • #	• 5 • 5 • • 5			
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							::::::	::	••••••	••••			••••
								::	· · · · ·	• • • • •			· · ·
							Drawn by: K	· · ·	Checke	d by: Job			0.46
<u>c</u>	GROUNDWATER DA	ATA	DRILLING	DATA			Date: 10/26/			yin			
E MOS			AUGER <u>4 1/4"</u>						ירחד	- <u>,</u>	101	nov	
	UNTERED DURING		WASHBORING FR				C		GEOT	CLHI		UGY 1e groun	
AT <u>13.</u>	6 FEET AFTER 16	HOURS ¥	MB_DRILLER L										
			CME 550X D HAMMER TYP				n		dosia P eredos			n	
REM West	ARKS: Hole collpa t Zone. N: 1148689.	ased at 46 feet. Da .546' E: 2182613.02	itum: IL State Plan 25'	e Coor	dinates,				ontini g of b			2	.
								Proj	ect No	. J01	7150.	.01	

		·····		72		<u> </u>		SHE	AR STRENGTH	, tsf				
	Surfa	ace Elevation: 449.1	10/21/10		DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD		∆ - UU/2	O - QU/2	🛛 - SV					
		a mel			GRAPHIC LOG	HHUN NUC	S	0,5 1		0 2,5				
		Datum msl			1 2		SAMPLES		PENETRATION	summer and the second s				
					H	×>00	AM	(ASTM D 1586)						
	DEPTH IN FEET	DESCR		TEDIAL	GRA		S		LUE (BLOWS PER					
	ШШ	DESCR	IPTION OF MA			SP1 SP1 ORE			TER CONTENT	%				
						500		10 2	0 30 4	0 50				
		Crushed rock												
		FILL: brown sand v	with black clay lenses			4-6-8	SS1	S11000A11	2 2 2 M 2 2 2 3	· · · · · · · · · ·				
		-												
		-		×		5-6-9	SS2							
	5-	-												
		~												
		-					ST3		8	· · · · · · · · · · ·				
s		-							2					
μ Υ Β		-				8-10-16	SS4	• * • • * • * • * • *	114111111					
0 IL	10	-												
S N S]				8-13-15	SS5							
URPO														
N PI		-					SS6							
RIES	- 15-					6-8-8	000			· · · · · · · · · ·				
NDA		FILL: black clay wit	h sand, trace gravel											
BOU		-					SS7							
ATE FOR		Soft to medium stiff	, gray CLAY - CH											
NIXC		-			2-2-2	SS8			111001111					
HIC	- 20 -	with organics												
IE AF						86	ST9							
10						00	319							
DUA							ST10							
GRA	- 25-	~					· · · · · · · · · · ·	•••••••						
SR														
MA		-							9					
NOL		-							::::::::::					
ICAT		-				1-2-3	SS11		:::::::::::::::::::::::::::::::::::::::	· · · · · · · · · · ·				
ATE TR	- 30-	-												
NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES 12/13/ND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.														
3 HE		Soft, brown, clayey	SILT with sand - ML											
						1-2-1	SS12		· · · · · · · · · · · · ·					
GPJ	35-	-{					0012	. .						
GTINC 0638301.GPJ		-												
0635		Medium dense, bro	wn, fine to coarse SAI	ND, trace gravel -										
LINC		- SP		I HOLO BIRITOL				· · · · · · · · · · · · · · · · · · ·						
		-				5-5-7	SS13		2.5.30.20.2. 2.5.5.00.2.					
J017150.01GEO - MEREDOSIA.GPJ			A T A		DATA	1	-f	Drawn by: KA	Checked by:	App'vd. by: Dwy				
1SOC		GROUNDWATER D	AIA	DRILLING	DATA			Date: 10/26/10	Date: 12/mfr	Date: //////				
EREL		X FREE WATER N		AUGER _ <u>4 1/4"</u>	HOLLC	W STEM								
- W	ENC	COUNTERED DURING	DRILLING	WASHBORING FR	OM <u>15</u>	FEET		C	GEOTECHN					
GEC				MB DRILLER	<u>AH</u> LC	GGER			FR	IM THE GROUND UP				
50.01				CME 550X D										
1710									dosia Power St					
		HAMMER TYPE <u>Auto</u> REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604'							leredosia, Illinoi	5				
102 M	RF													
IG 20		2182554.305'		,				10	G OF BORING:	B-3				
DRIN														
)F B(
LOG OF BORING 2002 WL								Proj	ect No. J0171	50.01				

			P.	10/04/40	Ì	E 0		S	HEAR	STRENGT	H, tsf	i
	Surfa	ce Elevation: 449.1	Completion Date:	10/21/10	(1)	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD		∆ - UU/2	() - QU/2		🛛 - SV
		Datum <u>msi</u>			ľ	HOGH .	S	0,5	1,0	1,5	2,0	2,5
	·				- 음	N N N	SAMPLES	STANDAR			RESI	STANCE
	ェ뉴				GRAPHIC LOG	RECONT	SAN	á NEN	-	TM D 1586) (BLOWS P		ο τ ι
	DEPTH IN FEET	DESCR	IPTION OF MA	TERIAL	5	PT U		1	VATER	CONTEN	IT, %	
	ΩZ					RSS		PL	20	30	40	50 LL
		Medium dense, bro SP (continued)	wn, fine to coarse SAN	D, trace gravel -					· · ·	• = = • = = = = =	: : : :	
		GF (Continued)						• 3 • 30 • • • •	· · ·	• * * • • • •	: : : :	
								· · · · · · · · · · ·		• * * • * * *		
						6-7-7	SS14				:	
	- 45-							· · · · · · · · · · ·	:			
								• • • • • • • • • • •		• * • • * * * *		
								• • • • • • • • • • • • • • • • • • •				
YPE						6-7-9	SS15		:		· · · ·	
S OIL T	- 50-								· · ·			
OSE S									· · ·		:	
PURP												
ES BE						5-8-9	SS16	611.e.: 62			: : : :	
DARI	- 55							· · · · · · · · · · · · · · · · · · ·	· · ·			
ILLUS SOUN								· · · · · · · · · ·		2 • 2 • 2 4 2 • 2 • 3 • 3 •	: : : :	
ATE E FOR I										 		
LOG						8-8-13	SS17	· · · · · · · · · · · ·	i 🖍 i			
TIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.	- 60-	Boring terminated a	at 60 feet.	· · · · · · · · · · · · · · · · · · ·					:		• • • •	
GRA!								• * * • • • • • • • • • • • • • • • • •	• 101 •		•	
JAL.										 		
RESI								• • • • • • • • • •	·	• • • • • • • • • • • • • • • • •		
BE G	- 65-							•••	· * ·	 		
MAY								· · · · · · · · · · · · · · · · · · ·		 	· · · ·	
NOL												
-ICAT								••••••••••••••••••••••••••••••••••••••	: *:	* * • • • •		
RATI IE TR	- 70-								: ::	· · · · · · ·		
NOTE: STRAT 12/139ND THE T								•••••	· · · »			
NOTE										 	•	
GPJ 12								*****	• • •	 		
01.G	- 75-							• • •	• * • • • *			
GTINC 0638301								: : : : : : : : : : : : : : : : : : :				
INC (· · · · · · · · · · · · · · · · · · ·		· · · · · · · · ·
									: : :	: : : : : ;;;;	:	
SIA.GPJ		GROUNDWATER D	ΑΤΑ	DRILLING	DATA	· · · · · · · · · · · · · · · · · · ·		Drawn by: KA		cked by		/d. by: J.M
J017150.01GEO - MEREDOSIA.								Date: 10/26/10		: 12/nfi	→ Date:	1/1111
MER	ENC	X FREE WATER N	DRILLING	AUGERAUGER WASHBORING FR					GEC	DTECHN		GYZ
SEO -	_			MB_DRILLER _L							FROM THE	GROUND UP
0.01G				<u>CME 550X</u> D								
11715				HAMMER TY				Me		a Power S		
				t to train them to a fill					Merec	losia, Illin	015	
LOG OF BORING 2002 WL	RE	MARKS: Datum: IL	State Plane Coord	dinates, West Zone.	N: 11	48536.60	04'					
NG 2	E: 2	2182554.305'								INUATIO		
BORI							2000		J. (J.)			
3 OF							Project No. J017150.01					
Po									-,			-

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F						SHE	AR STRENGT	H, tsf	
	Surfa	ce Elevation: 431.6 Completion Date: 10/22/10		1 S C C		Δ - UU/2	O - QU/2	🛛 - SV	
			00	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	S	0,5 1,		2,0 2,5	
		Datum <u>msi</u>	GRAPHIC LOG	CCO VEF	SAMPLES		PENETRATION		
ŀ			H		AMF		(ASTM D 1586)		
	DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRA	IND.	S	🛔 N-VAL	LUE (BLOWS PE	ER FOOT)	
	N FE	DESCRIPTION OF MATERIAL		SPT			TER CONTEN	T, %	
				ā õ		10 2	0 30	40 50	
		Soft to medium stiff, brown and gray CLAY - (CH)					· · · · · · · · · ·		
		3		1-2-2	SS1				
-									
ŀ				*	ST2	:::::::::	:•:::::::		
ł	- 5-				1				
ŀ				1-2-3	SS3				
Ī									
				0-2-2	SS4				
ž	- 10-			0-2-2	-004				
ES C									
POS		Soft, gray, silty CLAY, trace sand - CL				· · · · · · · · · · ·			
E -				<u></u>		• * • * • * • * * ***	· X · · 2 · · · ·		
GRAPHIC LOG FOR ILLUSTRATION PURPOSES UNLY				0-1-1	SS5				
TRA	- 15-					• • • • • • • • • • • • • •	· · · · · · · · · · · · · ·		
S						••••••	* * * * * * * * * * *		
E E E E		Very soft, gray, sandy CLAY with silt - CL				• • • • • • • • • • • • • • • •			
й О			¥(///	0-0-0	SS6		•		
ĭ ₽	- 20-			<u></u>		• • • • • • • • •			
HdA				8					
		Very loose, brown, fine to coarse SAND, trace gravel - SP		4	1				
NAL N									
GRA	- 25-			0-1-2	SS7	A			
RANSITION MAY BE GRADUAL.		Boring terminated at 25 feet.							
MAY								448	
NO NO									
LISN						:::::::	111111111		
	- 30-	-							
H									
いていていていていていていていていていていていていていていていていていていて									
GTINC 0638301. GPJ 12/13/ND THE									
GPJ	- 35-	4					••••••		
3301.		-							
063		-				:::::::	::::::::::		
STINC		-							
SIA.G.		GROUNDWATER DATA DRILLIN	IG DAT	A		Drawn by: KA	Checked by: S4	the second s	
SOG					,	Date: 10/26/10	Date: 12/11/L.	CDate: / / ////	
AERE		AUGER _ <u>4 1/</u>			1		GEOTECHN	IUI UCV≦	
N-0	EN	NCOUNTERED AT <u>19</u> FEET ¥ WASHBORING						FROM THE GROUND UP	
11GE		MB_DRILLER							
150.0		CME 550>				Man	edosia Power S	Station	
1017		HAMMER	TYPE <u>A</u>	uto			leredosia, Illin		
LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ							,		
2002	RE	MARKS: * Disturbed sample Datum: IL State Plane C	oordina	ites, West					
NG.	Zo	ne. N: 1148688.82' E: 2182505.605'				LC	og of Boring	6: B-4	
BOR									
3 OF				Project No. J017150.01					
LOG							,		

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	ce Elevation: <u>431.8</u>	Completion Date: <u>10/22/10</u>	507	IGHT (pcf) COUNTS ERY/RQD	ES	∆ - UU/2 0,5 1		□ - TV 2.0 2.5		
DEPTH IN FEET	DESCR	IPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	N-VA	PENETRATION (ASTM D 1586) LUE (BLOWS PE ATER CONTEN 20 30	R FOOT)		
	Medium stiff to sof	t, brown and gray, silty CLAY - CL								
				2-2-3	SS1	: X: : : : : : : : :				
				2-2-2	SS2	141111111	X			
- 5-	Medium stiff to ver	y soft, brown and gray CLAY - CH								
				1-1-3	SS3					
- 10-			. ///	89	ST4	0				

				0-0-0	SS5		1: 0 :::::			
- 15-						:::::::::	1:::::::::			
	Very soft gray silt	y CLAY with sand - CL								
	very son, gray, sin									
				0-0-0	SS6			•••••		
- 20-						· · · · · · · · · · · · · · · · · · ·	с			
			\$				v			
- 25-				0-0-0	SS7		:::•:::			
	Boring terminated	at 25 feet.				• • • • • • • • • • • •				
						•••••				
- 30-										
- 35-										
						· · · · · · · · · · ·				
						· · · · · · · · · · · · · · · · · · ·				
		·····				Drown buy MA	Chaoling by Pre-			
9	GROUNDWATER D	ATA DRILLIN	<u>G DATA</u>	λ		Drawn by: KA Date: 10/26/10	Checked by: Sec. Date: / 2/ 22/10	Date: //u///		
		AUGER4_1/4	HOLL	OW STEM	I		11			
ENC	COUNTERED AT 23 F					C	GEOTECHNI			
		MB DRILLER	LAH LC	GGER			FR	OM THE GROUND UP		
		CME 550X	DRILL R	IG		14	dosia Power S	tation		
		HAMMER T				M	leredosia, Illino			
	/ARKS: Datum: IL 2476.0360'	State Plane Coordinates, West Zo	one. N:	1148661	.88' E	E: LOG OF BORING: B-5				
						Project No. J017150.01				

ſ		450.0		10110110		£ 0		SH	EAR ST	RENGTH	l, tsf	
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ŀ		Crushed rock						• * • • • • • • • •				· · · · · ·
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-		FILL: brown, fine sa	and trace clay		- 💥				• • • •	:::::	* * *	
╞		FILL DIOWIL, INC S	and, trace day			3-8-9	SS2				· · · · · ·	
	- 5-							• • • • • • • • • • • •	8.8.	• • • • • •	• • •	
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ŭ. 00					$\sqrt{///}$	0-5-15	SS7	********			· · · ·	
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RAPI											· · · ·	
it.												
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Ψ.C.	- 25-	Very soft to soft, gra	ay, silty CLAY with clay a	and silt seams -								
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G 200		MARKS: Datum: IL. 2182040.954'	State Plane Coordi	nates, west Zone	N: 11	48066.89	0					
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99				Pro	ject No	. J0171	50.01					

Surface Elevation: 450.8 (Completion Date: Completion Date: 10/19/10 (Completion Date: 0 (Completion Date: 10/19/10 (Completion Date: 0 (Completion Date: 10/19/10 (Completion Date: 0 (Completion Date: 0 (C		ace Elevation: <u>450.8</u>	Completion Date: .	10/19/10	DOLC	IIGHT (pcf) COUNTS FERY/RQD	ES		0 ₁ 5	2	0	STREN() - QU/2 1,5	2,0	0 - 3 2,5	5
Very off to ach; gay, silly CLAY with clay and all seems - (C.) (confluent) - 45 - 5 - 5 - 0 Boring terminated at 50 feet. - 65 - 60 - 60 - 70 - 70 - 70 - 70 - 75 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 77 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 - 76 </th <th>DEPTH N FEET</th> <th>DESCR</th> <th>IPTION OF MA</th> <th>TERIAL</th> <th>GRAPHIC LOG</th> <th>SPT BLOW O SPT BLOW O DRE RECOV</th> <th>SAMPLES</th> <th></th> <th><u> </u></th> <th>N-VA</th> <th>(AS)</th> <th>TM D 158 BLOWS</th> <th>6) PER I</th> <th>=00T)</th> <th></th>	DEPTH N FEET	DESCR	IPTION OF MA	TERIAL	GRAPHIC LOG	SPT BLOW O SPT BLOW O DRE RECOV	SAMPLES		<u> </u>	N-VA	(AS)	TM D 158 BLOWS	6) PER I	=00T)	
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E: 2182040.954' CONTINUATION OF LOG OF BORING: B-6									r					on	
Drojoct No. 1047450.04			State Plane Coord	linates, West Zone.	N: 11	48066.89	6'								
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1	Surfa	ce Elevation: 450.5 Completion Date: 10/19/10		UNIT WEIGHT (pcf) BLOW COUNTS E RECOVERY/RQD		∆ - UU/2	O - QU/2	🛛 - SV	
			9	DRY UNIT WEIGHT (SPT BLOW COUNT CORE RECOVERY/R	S	0,5 1,0		2,0 2,5	
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		DESCRIPTION OF MATERIAL		SPT		PL	TER CONTEN	NT, %	
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Ī		FILL: brown, fine sand					· · · · · · · · · ·	• • • • • • • • • • • •	
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ł		FILL: black sand and ash with clay lenses	XXX					· · · · · · · · · · · ·	
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GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES CNLY	- 10-					· · · · · · · · · · · · · · · · · · ·			
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OR I				<pre>3</pre>					
Ū Q		Medium stiff, brown, sandy CLAY - CL		6-4-3	SS7	A			
U U U	- 20-	Medium stin, brown, sandy CEAT - CE						• • • • • • • • • • •	
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GR		Medium stiff to very soft, gray, silty CLAY with sand - CL				· · · · · · · · · ·		· · · · · · · · · · · ·	
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A.GP		GROUNDWATER DATA DRILLING	DAT	<u> </u>		Drawn by: KA	Checked by:		
OG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ				-		Date: 10/26/10	Date: /2/2	UDate: 1/4/11	
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0.01		CME 550X_ D							
1715		HAMMER TY					dosia Power		
° C						Meredosia, Illinois			
12 WI	05	MARKS: * No recovery in samples SS11 and ST12 Datu	m: 11	State Pla	ne				
3 200	KE Co	ordinates, West Zone. N: 1147816.37' E: 2181875.293'	1112 Elm	JULIO 10		LOG OF BORING: B-7			
RING						LOG OF BORING. DA			
р ВО									
000				Proj	ject No. J01	17150.01			
0	L					I			

	ce Elevation: <u>450.5</u> Datum <u>msl</u>	Completion Date: <u>10/19/10</u>	C LOG	EIGHT (pcf) COUNTS VERY/RQD	ILES	∆ - UU/2 0,5 1,	O - QU/2 0 1,5 2 PENETRATION 2	□ - SV 0 2,5
DEPTH IN FEET		IPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	A N-VA	(ASTM D 1586) UE (BLOWS PE	R FOOT)
	(continued)	soft, gray, slity CLAY with sand - CL						
- 45-	Sandy	ense, brown, fine to medium coarse			ST13			
50-	SAND - SP			5-8-10	SS14			
	b			7-9-14	SS15		A	
— 55— ———								
- 60-	Boring terminated a	it 6 0 feet ,		13-17-19	5516			
- 65-								
— 70—								
75-								
	GROUNDWATER D	ATA DRILLING	DATA	<u>\</u>		Drawn by: KA Date: 10/26/10	Checked by: Se Date: 12 Date:	App'vd. by:
ENC	X FREE WATER N OUNTERED DURING	DRILLING WASHBORING FR <u>MB</u> DRILLER <u>I</u> <u>CME 550X</u> D	2000 <u>2</u> <u>AH</u> LO RILL F	0_FEET DGGER RIG			GEOTECHN dosia Power S	ROM THE GROUND UP
REI	MARKS: * No recov ordinates, West Zon	HAMMER TY very in samples SS11 and ST12 Datu e. N: 1147816.37' E: 2181875.293'			ne	C	CONTINUATION	l OF
						Proj	ect No. J017	150.01

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			4.0.10.0.14.0		¢ O		SHEAR STRENGTH, tsf						
Surfac	e Elevation: 451.1	Completion Date:	10/20/10	0	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD		Δ - UU	/2	C) - QU/2		0 -	SV
г	Datum msl			GRAPHIC LOG	CH1 OUN	S	0,5	1	0	1,5	2 _, 0	2	.5
				₽	N N N	SAMPLES	STAND	ARD	PENE	TRATIO		SIST	ANCE
-				API	LON ECON	SAN				TM D 1586	,		
DEPTH IN FEET	DESCR	IPTION OF MA	TERIAL	GR	UN T B		A			BLOWS CONTE			
ÖZ					K S S		PL		20	30	40		
	Crushed rock						<u>I</u>						
	FILL: black clay wit	h sand			5-6-10	SS1				::::	: :	· · · · · ·	
	FILL: brown sand,	trace to some clay									: :		
					246	SS2		11 (12) (12)	2 2 2 2 - 1			4 G 	
- 5-					2-4-6	332	· · · · A .		0.2.5	•••••••••••••••••••••••••••••••••••••••	· ·	••••	
					0-5-7	SS3	A						
										· · · · · · · ·	1		
10			-	*	4-8-12	SS4	• • • • • •	••••	4				
- 10-	FILL: black clay wit	ih sa nd					 			· · · · · · · · · · · ·	: :		
					0-4-6	SS5		· · ·	8 - 5 8 - 5	1.01	1		
							• • • • • • • • • • • • • • • • • • •	• • •		• • • • •			
						ST6			2 · 2	· · · · · · · · · ·			
- 15-													
							• • • • • •	••••					
	FILL: gray, clayey s	enses				· · · · · ·				: :			
					2-4-6	SS7		:::		•••••	: :		· · · ·
- 20-					2-4-0	001							
					4.0.0	000		a					
					4-3-3	SS8	117111	:::		:::::	: :		· · · ·
	Medium stiff, black	to gray CLAY - CH							5 · · ·		: :	• • • •	
- 25-			2-3-4	SS9		• • •		•	- -	• • • •			
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					0-2-3	SS10	1 4 1 1 1		:::	:0:::	; ; ;		
- 30-								1::	:::	: : : : :	: :		
	Medium stiff to soft	, gray clayey SILT with	h sand - ML		101	ST11					: :		
								· · ·			: :	••••	
						SS12							· · · ·
- 35-							• • • • • •						
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					0-0-2	SS13		:::		:::::	: :	· · · ·	
	are the second secon	······			1	0013	Drawn by:	 КА	Cher	ked by: 🖍	1	nhud b	y: Om
<u>c</u>	GROUNDWATER D	ATA	DRILLING	DATA			Date: 10/2			12/22		ate: //	
	X FREE WATER N		AUGER _ <u>4 1/4"</u>	HOLLC	W STEM					1-1		0.01	/
ENCO	OUNTERED DURING		WASHBORING FR				C		GEO	IFCH	NÜL	.UG\	No.
AT 9.3	3 FEET AFTER 0.5	HOURS ¥	MB DRILLER								FROM	THE GROU	JND UP
			CME 550X_D										
			HAMMER TY							Power		on	
								N	nered	osia, Illii	nois		
REM	ARKS: Datum: IL	State Plane Coor	dinates, West Zone.	N: 11	47594.42	27'			·				
E: 21	181738.149'						LC)g of	BORIN	G: B	-8		
								Project No. J017150.01					

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		454.4		40/00/40	Ì	¢ 0		SHEAR STRENGTH, tsf					
	Surfa	ce Elevation: 451.1	Completion Date	e: <u>10/20/10</u>	0	UTS (Pc		Δ - UU/2	0 - Q	J/2	٥	- SV	
		Datum <u>msl</u>			L00	HOGH .	S	0,5	1,0 1,5	:	2,0 :	2,5	
					HC -		SAMPLES	STANDARD			RESIST	ANCE	
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	DEPTH IN FEET	DESCR	IPTION OF M	ATERIAL	G	PT U	}	W	ATER CON				
						RSS		PL	20 30			50 LL	
		(continued)	, gray clayey SILT wi						· 2 · 7 ·		· · · ·	· · · · · ·	
		Dense to medium d gravel - SP	ense, brown, fine to	coarse SAND with				• 20 • • • • • • • • • • • • • • • • • •			• • • •		
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NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES 12/13/00 THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.	- 55-					5-7-9	SS16			 		· · · · · ·	
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J017150.01GEO - MEREDOSIA.GPJ	<u>(</u>	GROUNDWATER DA	TA	DRILLING	DATA			Drawn by: KA	Checked by		App'vd. b		
REDC	-			AUGER _ <u>4 1/4"</u> H		N STEM		Date: 10/26/10	Date: 12/)	410	Date: //	14/11	
- ME	ENCC	UNTERED DURING D	RILLING	WASHBORING FRO					GEOTEC	HN	JLOGY		
1GEO	AT <u>9.3</u>	FEET AFTER 0.5 H	IOURS ¥	MB_DRILLER LA							OM THE GROU		
150.0				<u>CME 550X</u> DF							, , , , , , , , , , , , , , , , ,		
1, 3017				HAMMER TYP	E <u>Auto</u>	<u>)</u>			dosia Pow Ieredosia,				
2002 W	REM	ARKS: Datum: IL S	State Plane Coor	dinates, West Zone.	N: 114	7594.427	**						
BORING	E: 21	81738.149'							ONTINUA G OF BOR				
LOG OF BORING 2002 WL							Project No. J017150.01						

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	Surfa	ace Elevation: 433.6	Completion Date:	10/25/10		DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD		Δ - UU/2	0 - QU	12	Г] - SV	
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			<u> </u>		GRAPHIC LOG	N N N N N N N N N N N N N N N N N N N	SAMPLES	STANDARD			(2012	TANC	Ľ
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TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY			ay, silty CLAY with silt s	eams and sand -	111			:::::::::	:::::	:::	· · · ·		· ·
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105				HAMMER TYP	ER TYPE Auto Meredosia Power Station Meredosia, Illinois								
Ň								Meredosia, Illinois					
002	REN	MARKS: Datum: IL	State Plane Coordi	inates, West Zone.	N: 11	48133.36	1'						
202	E: 2	182009.017'					LOG OF BORING: B-9						
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LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ													
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Surface Einstein: 433.2 Completion Date: 19/28/10 Or 20/28 Completion Date: 19/28/10 Datum Tmil Or 10 15 20 23 Completion Date: 19/28/10 Explanding DESCRIPTION OF MATERIAL Or 20/28 Completion Date: 19/28/10 Explanding DESCRIPTION OF MATERIAL Or 20/28 Completion Date: 19/28/10 Median LWE confliction of the ordinate and gray and CLXP, trace same A - LUZ2 Completion Completion Date: 19/28/10 Interview Statistic Completion Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Median LWE confliction of the ordinate and gray and CLXP, trace same A - LUZ2 Completion Date: 19/28/10 Interview Statistic Completion Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Statistic Completion Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Description Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Description Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Description Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Description Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10 Interview Description Date: 19/28/10 A - LUZ2 Completion Date: 19/28/10		[(00.0	-			60	1	SH	EAR STREN	STH, ts	sf
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and wood - CL 23-3 SS1 A • • - 5- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -			Medium stiff to soft,	brown and gray silty (CLAY, trace sand			<u> </u>	10	20 30	40	50
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REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148120.612' E: 2181976.582' LOG OF BORING: B-10 Project No. J017150.01									N	leredosia, Illii	nois	
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BORING LOG: TERMS AND SYMBOLS

GENERAL NOTES

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and the logs may be approximate or this transition between the strate may be gradual rather than disclos. Water Year and Junes of the loss of the strategies composition and United Soi Classification designations are shown in parenthesis. GB Grab Sample Taken From Auger Cuttings Or Wash Water Return 2. Relative composition and United Soi Classification designations shown in parenthesis. MX NX NX 3. Vating Syme Description of Lossification designations shown in parenthesis. MX NX NX 4. Vating Syme Description of Lossification designations shown in parenthesis. MX NX NX 4. Vating Syme Description of Lossification designations shown in parenthesis. MX NX NX 4. Vating Syme Description of Lossification designations shown in parenthesis. MX NX NX UU2 Sheer Strength from Uncornfined Compression Test (ASTM D2166) Three Inch Diameter Shelby Tube Sample Sample Not Recovered SV Shear Strength from Field Vane (ASTM D273) SY Field Vane Test Sample Not Recovered Strength from Field Vane (ASTM D2161) Subme drow and and strength School shearing strength school shearing school, driving in shear of shearing school was transite to the shearing school shearing school was transite to the shearing school shearing school was school was transite to the shearing school shearing school was school was transit the school school school school school shearing school shearing s		conditions based	on soil or rock	classifications obtained	ed from the	CS	Continuous S	Sampler				
2. Relative composition and Unitied Soil Classification designations are based on wheat estimates only. If Joord Parcent Recovery/R.Q.D. Given In Adjacent Column setting and the autility weight In produce per classify the soil, the unitied designation is show in parenthesis. NX Rock Core with Percent Recovery/R.Q.D. Given In Adjacent Column setting and the soil of a discipation is show in parenthesis. 3. Value given in Unit Dry Weight/SPT Column is either a unit dry weight In produce per classify the soil, the discent to a ST sample designation. Split Spoon Sample (Standard Penetration Test) Sample Segurity Column Confined Compression Test (ASTM D2850) CV2 Shear Strength from Unconfined Compression Test (ASTM D273) SV PL Description Strength Column Field Vane (ASTM D273) SV PL Description Strength Column Field Vane (ASTM D273) SV Strength Column Segurity Column		on the logs may b may be gradual ra only to those ob - :	e approximate o ther than distinct served at the tim	r the transition betwee . Water level measure es and places indicate	n the strata ments refer				rom Auger C	uttings Or		
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ABBREVIATIONS Three Inch Diameter Shelby Tube Sample UU2 Shear Strength from Unconsolidated – Undrained Trickkit Test (ASTM D2256) Three Inch Diameter Shelby Tube Sample QU2 Shear Strength from Unconfined Compression Test (ASTM D2156) Three Inch Diameter Shelby Tube Sample SV Shear Strength from Unconfined Compression Test (ASTM D2156) Sample Not Recovered SV Shear Strength from Field Vane (ASTM D2573) SV PL Plastic Limit (ASTM D4318) SV Elow Per Foot (H-Value) SPLIT - BARREL SAMPLER DRIVING RECORD Description 25 25 blows drove sampler 12 Inches after initial 5 inches or seeting. 50637 26 SV Werk Count) In the admention method met		weight in pounds designation, or bl	per cubic foo lows per 6-inch	t, if adjacent to a	ST sample					·		
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25. 25 blows drows sampler 2 blocks after filled 5 inches of seating. 26. 75 blows drows sampler 10 inches after filled 5 inches of seating. 36337	Blow P	Per Foot (N-Value)	SF	PLIT – BARREI	SAMPLE	R DRI	/ING RECO	RD			home a	
50353 To evoid damage to sampling tools, driving is limited to 50 blows during any ski thch interval. 2. N-Value (Blow Count) is the standard penetration restatance based on the total number of blows, using a 140-bi hammer with 30-inch free fail, required to drive a split spoot interval. 2. N-Value (Blow Count) is the standard penetration restatance based on the total number of blows, using a 140-bi hammer with 30-inch free fail, required to drive a split spoot interval. RELATIVE COMPOSITION Trace		25			25 blows d	rove sampl	er 12 inches after ir	nitial 6 inches	s of seating.			
NOTES: 1. To avoid damage to sampling tools, driving is limited to 60 blows during any six inch interval. 2. N-Value [Gitor Cound performance in the total number of blows, using a 140-lb harmer with 30-inch free fail, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/76, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4778 humb 200 with some standard penetration resistance based on the total number of blows, using a 140-lb harmer with 30-inch free fail, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/76, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4778 humb 200 with 50 ms. STRENGTH OF COHESIVE SOILS Value and the shown suffill and the drive split spoon the last two of three, 6-inch drive increments. (Example: 4/76, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4778 humb 200 with show standard penetrate split show standards. Stimulation contraction of the split split and the diameter of the split sp		50/S3"			50 blows drove	a sampler 3	inches during initia	iitial 6 inches I 6 inch seati	s of seating. ing interval.			
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STRENGTH OF COHESIVE SOILS Trace Approximate O-10 % With/Some All regiment to a strength Tons Field Test Approximate DENSITY OF OF Yery Soft Indrained Shear DENSITY OF Very Soft Indrained Shear DESCRIPTION Approximate DESCRIPTION Approximate DESCRIPTION Soft Consistency Strength Tons Field Test Approximate DESCRIPTION Consistency Thumb will penetrate soil about 1" 0 - 1 Descriptive Term: N-Value Medium Dense Thumb will penetrate soil about 1" 0 - 1 Coose 0.26 to 0.50 Thumb will penetrate soil about 1" 0 - 15 Coose 11 - 30 Dense Soil GRAIN SIZE USIST COBLES <th colspa<="" td=""><td></td><td>to drive a split spo</td><td>oon the last two of t</td><td>hree, 6-inch drive increm</td><td>ents. (Example: 4/</td><td>7/9, N = 7 +</td><td>+ 9 = 16). Values a</td><td>re shown as</td><td>a summation on</td><td>ee fail, required grid plot and</td><td></td></th>	<td></td> <td>to drive a split spo</td> <td>oon the last two of t</td> <td>hree, 6-inch drive increm</td> <td>ents. (Example: 4/</td> <td>7/9, N = 7 +</td> <td>+ 9 = 16). Values a</td> <td>re shown as</td> <td>a summation on</td> <td>ee fail, required grid plot and</td> <td></td>		to drive a split spo	oon the last two of t	hree, 6-inch drive increm	ents. (Example: 4/	7/9, N = 7 +	+ 9 = 16). Values a	re shown as	a summation on	ee fail, required grid plot and	
Trace 0-10 % STRENGTH OF COHESIVE SOILS With/Some 11-35 % Undrained Shear Soil modifier such > 35 % As silty, clayey, sandy, etc. DENSITY OF GRANULAR SOILS Very Soft Descriptive Term: N-Value Nection Dates 0-4 Loose 0-5 Medium Danse 11-30 Dense 31-50 Very Danse 31-50 Very Dense 31-50 Very Dense 31-50 Very Dense 31-50 Very Dense 31-60 BOULDERS COBBLES GRAVEL SAND LS STANDARD SIEVE US. STANDARD SIEVE US. STANDARD SIEVE SOIL GRAIN SIZE IN MILLIMETERS BOULDERS COBBLES GRAVEL SAND Colareous – Having appreciable quantities of carbonate. Soil sample composed of alternating layers of different soil types. Fiseured – Containing shrinkage or relief cracks, often filled with hand or sili, usually more or less vertical. Sil sample composed of pockets of different soil types. Silckensided – Having panes of weakness that appear slick and lossy. The degree of slickensidedness and	RFI											
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Descriptive Term: N—Value Medium Stiff. 0.26 to 0.50 Thumb will penetrate soil about 1/2				Very Soft	less than	0.12	Thumb wi	ill penetra	te soil more i	than 1" 0 - 1		
Very Loose 0 - 4 Loose Stiff 0.51 to 1.00 Thumb hardly indents soil. 9 - 15 Loose 5 - 10 Wery Stiff Very Stiff 1.01 to 2.00 Thumb hardly indents soil. 9 - 15 Wery Dense 31 - 50 Very Stiff 1.01 to 2.00 Thumb will not indent soil. 9 - 15 Wery Dense 31 - 50 Very Stiff 1.01 to 2.00 Thumb hardly indents soil. 9 - 15 Wery Dense 31 - 50 Very Stiff 1.01 to 2.00 Thumb hardly indents soil. > 30 SOIL GRAIN SIZE U.S. STANDARD SIEVE SAND SILT CLAY 300 76.2 19.1 4.76 2.00 0.42 0.074 0.002 SOIL GRAIN SIZE IN MILLIMETERS Soil GRAIN SIZE IN MILLIMETERS SOIL STRUCTURE Calcareous – Having appreciable quantities of carbonate. Fissured – Containing shrinkage or relief cracks, often filled with sand or silt; usually more or less vertical. Parting – Inclusion less than 1/8 inch thick. Fissured – Containing shrinkage or solickensidedness depends upon the spacing of Slickensidedness depends upon the spacing of Slickensidedness depends upon the spacing of Slickensidedness and the ease of breaking along those planes	Desci			Medium Stiff	13 10 0.25 0 26 to 0.3	, 50	Triump wi Thumb wi	ill penetrai ill penetra	te soil about	1 [~] 2-4 1⁄/" 58		
Loose 5-10 Very Stiff	Very L	.oose	0 - 4	Stiff	0.51 to 1.0	00	Thumb he	ardlv inder	its soil	<i>9 – 15</i>		
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		unouyn the sa	mpie				or sean	is of almer	ent son type.			

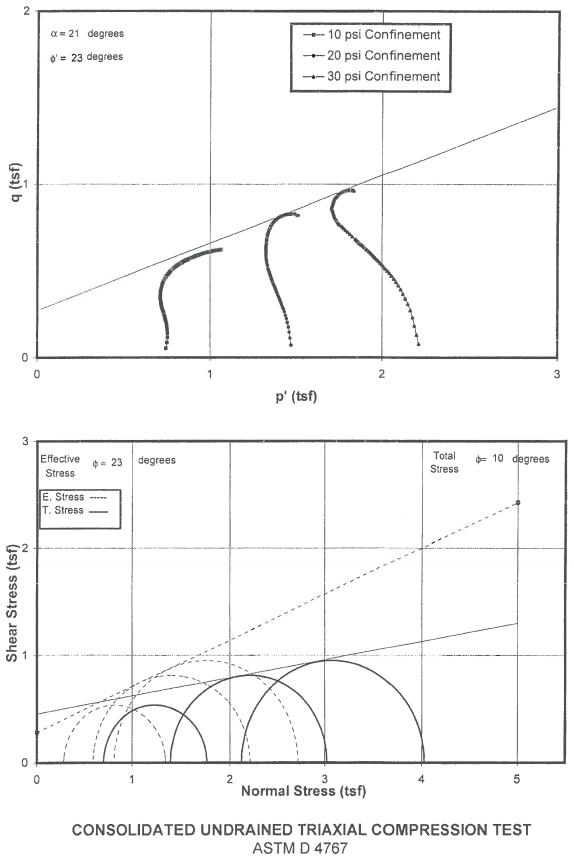


				UNIFIED SOIL CLA	SSIFICATIO	DN	SYSTEM	·····		
SYM DESCRIPTION					PLASTICITY CHART					
'	VISIONS	BOL			⁵⁰					
Coarse-Grained Soils (More than 50% Larger than No 200 Sieve Size)	Gravel and Gravelly Soils	Clean Gravels Little or no Fine Gravels with Appreciable	GW GP GM GC	Well-Graded Gravel, Gravel-Sand Mixture Poorly –Graded Gravel, Gravel-Sand Mixture Silty Gravel, Gravel-Sand-Silt Mixture Clayey-Gravel, Gravel-Sand-Clay Mixture	IDEX (PI)	40	CL	"A" Line		
	Sand and Sandy Soils	Fines Clean Sands Little or no Fines Sands with Appreciable	SW	Well-Graded Sand, Gravelly Sand Poorly Graded Sand, Gravelly Sand		20 (OH & MH	
ed Soils)% Smaller Sieve Size)	Silts and Clays	Fines Liquid Limit Less Than 50	ML CL OL	Silt, Clayey Silt, Silty or Clayey Very Fine Sand, Slight Plasticity Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity Organic Silts, or Silty Clays of Low Plasticity		0		1 1 1 1 10 50 60 70 Limit (LL)	80 90	
Fine-Grained Soils (More than 50% Smaller than No 200 Sieve Size)	Silts and Clays Highly	Liquid Limit More Than 50 Organic Soils	MH CH OH PT	Silt, Fine Sandy or Silt Soil with High Plasticity Clay, High Plasticity Organic Clay of Medium to High Plasticity Peat, Humus, Swamp Soll		NonplasticCannot RolTrace PlasticityBarely RollMedium PlasticCan be RolHighly PlasticNo Rupture			nto Ball	
VISUAL DESCRIPTION CRITERIA*										
		CRITERIA	FOI	R DESCRIBING ANGULARITY	TABLE 8: CRITERIA FOR DESCRIBING DRY STRENGTH					
	OF COARSE-GRAINED PARTICLES				Description Criteria					
	Description Angular			Criteria es have sharp edges and relatively sides with unpolished surfaces	None		The dry s with mere	pecimen crumi	_	
s	Subangular Particles are similar to angular description but have rounded edges						with some	e finger pressu	bles into powder re s into pieces or	
s	Subrounded F		Particles have nearly plane sides but have vell-rounded corners and edges		Mediur	n	crumbles pressure	with considera	ble finger	
	Rounded Pa no			es have smoothly curved sides and es	High		finger pre	ssure. Specim	ot be broken with en will break into ind a hard surface.	
	Description			R DESCRIBING PARTICLE SHAPE Criteria	Very High		The dry s	The dry specimen cannot be broken between the thumb and a hard surface		
Fl	Flat Particles with width/thickness X3				TABLE 9: CRITERIA FOR DESCRIBING DILATANCY					
	Elongated Flat and		Particles with length/width X3		Description			Criteria		
El	d ela	nga		None Slow		Water app	No visible change in the specimen Water appears slowly on the surface of the			
-	CONDITIO		R DESCRIBING MOISTURE Criteria			disappear	specimen during shaking and does not disappear or disappears slowly upon squeezing.			
D	te		nsence of moisture, dusty, dry to the such		Rapid		Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.			
Ma Wa		-	but no visible water free water, usually soil is below the	TABLE 10: CRITERIA FOR DESCRIBING TOUGHNESS						
				able	Descrip	otio		Criteria		
	ICL	FO	R DESCRIBING REACTION WITH	Low		thread nea		quired to roll the nit. The thread nd soft.		
N	Weak S		Criteria visible reaction me reaction, with bubbles forming		Mədiun	า	Medium p thread to r	ressure is requ	ired to roll the limit. The thread	
S	Strong			slowly Violent reaction, with bubbles forming rapidly			the thread	ble pressure is to near the pla I the lump have		
		FC	OR DESCRIBING CEMENTATION			stiffness		, tory night		
	scripti eak	Сп		Criteria les or breaks with handling or little			ENTIFICATION			
Мо	Moderate		finger pressure Crumbles or breaks with considerable finger pressure		Soil Symbo ML		Dry Strength None to low	Dilatancy Slow to rapid	Toughness Low or thread	
Str	Strong			t crumble or break with finger re	CL		Aedium to high	None to slow	cannot be formed Medium	
*NOTES: 1. Tables adapted from ASTM D2488 "Description and identification of Soils" (Visual-Manual Procedure) 2. Tables 5, 7 and 11 incorporated into other information on this plate.										

ATTACHMENT B

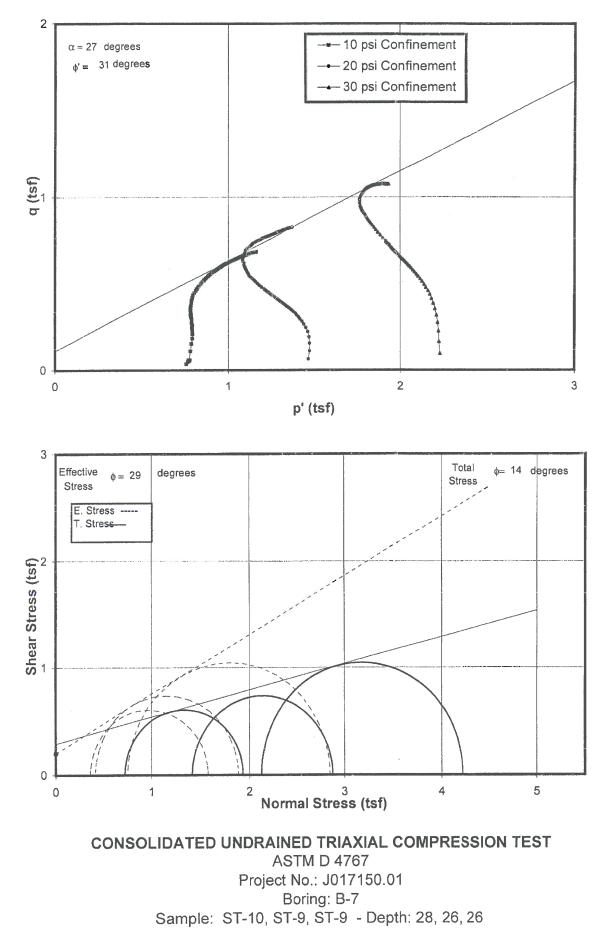
LABORATORY TEST RESULTS





Project No.: J017150.01 Boring: B-1 Sample: ST-8, ST-9, ST-9 - Depth: 26, 28, 28



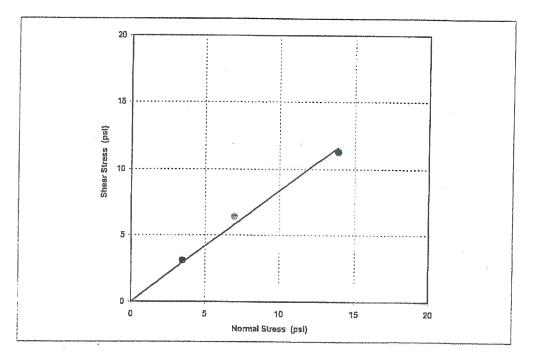


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DIRECT SHEAR TEST DATA

ASTM D 3080

Project Number:	J017150.01	Boring Number .:	B-1
Project Name:	Ameren-Meredosia	Sample Number:	SS-11, SS-12
Project Location:		Sample Depth (ft):	38.5' - 45.0'



		Normal	Shear	Normal	Shear	
	Trial	Stress	Stress	Stress	Stress	φ
	Number	(psi)	(psi)	(psf)	(psf)	(degrees)
Ì	1	3.5	3.1	500	445	
	2	6.9	6.4	1000	923	39.9
	3	13.9	11.3	2000	1626	

Atterberg Limits:		Standard Proctor Results:
Liquid Limit:		Max. Dry Density: N/A
Plastic Limit:		Opt. Moisture Content: N/A
Plasticity Index:	NP	

Soil Classification: SAND, medium grained, brown, medium dense - (SP)

DIRECT SHEAR TEST DATA ASTM D 3080

Project Number: Project Name: Project Location:		J017150.01 Ameren-Meredosia —	en-Meredosia Sampl		Boring Number.: B-1 Sample Number: SS-2 Sample Depth (ft): 6.0'	
	20 -					
			Lei			
(]sd) ssa	15	4				
0) 88 50 50	5			•		
	0					
L	D	5 1 Normal Stres		15	20	

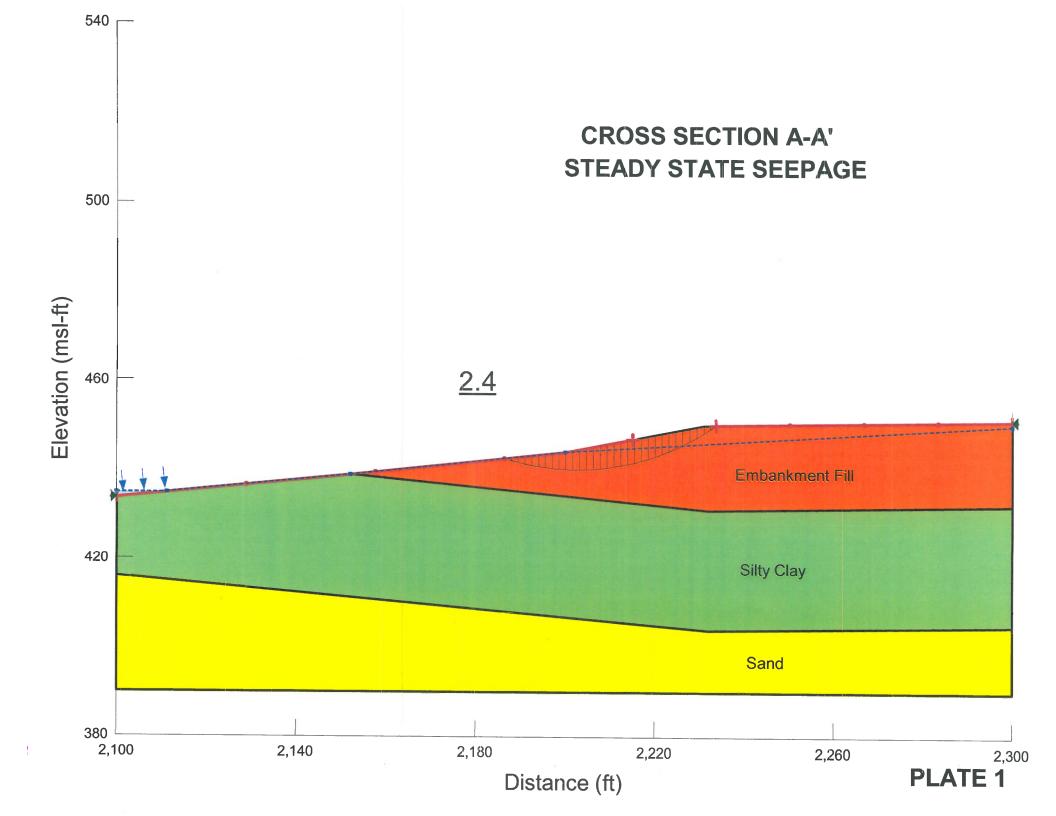
	Normal	Shear	Normal	Shear	
Trial	Stress	Stress	Stress	Stress	ϕ
Number	(psi)	(psi)	(psf)	(psf)	(degrees)
1	3.5	2.7	500	389	
2	6.9	4.7	1000	684	32.3
3	13.9	8.5	2000	1218	

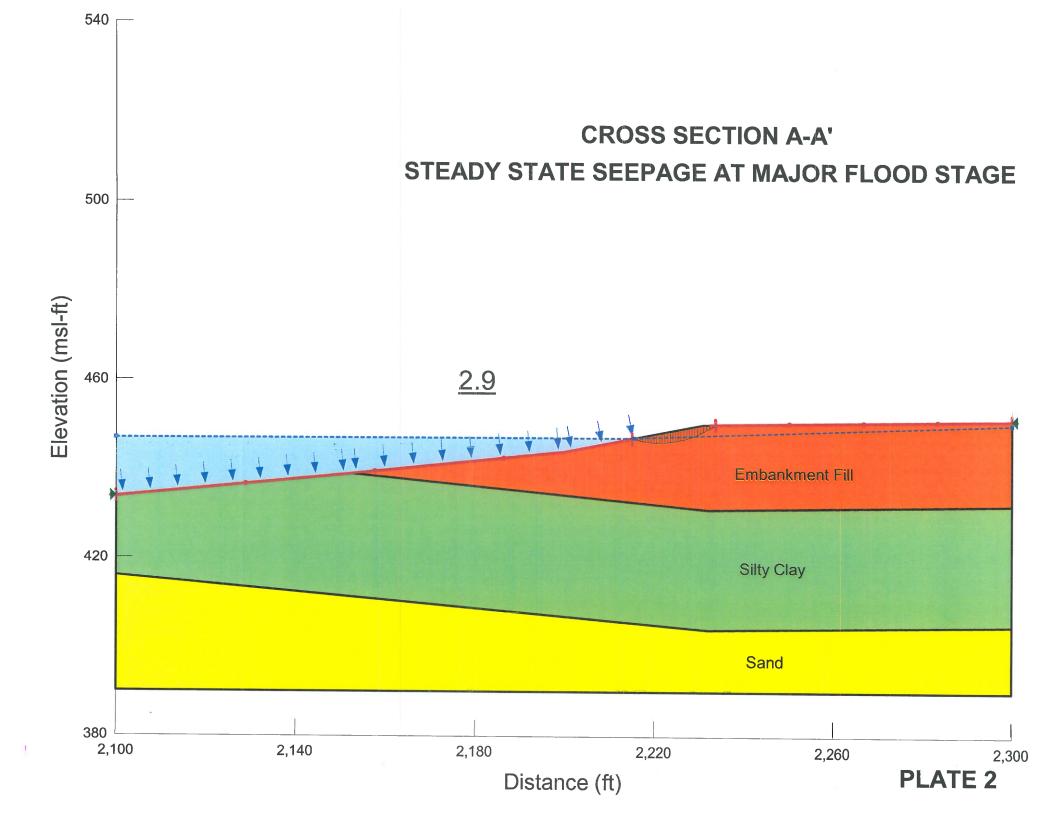
Atterberg Limits:		Standard Proctor Results:		
Liquid Limit:		Max. Dry Density:	N/A	
Plastic Limit:	100-000	Opt. Moisture Content:	N/A	
Plasticity Index:	NP			

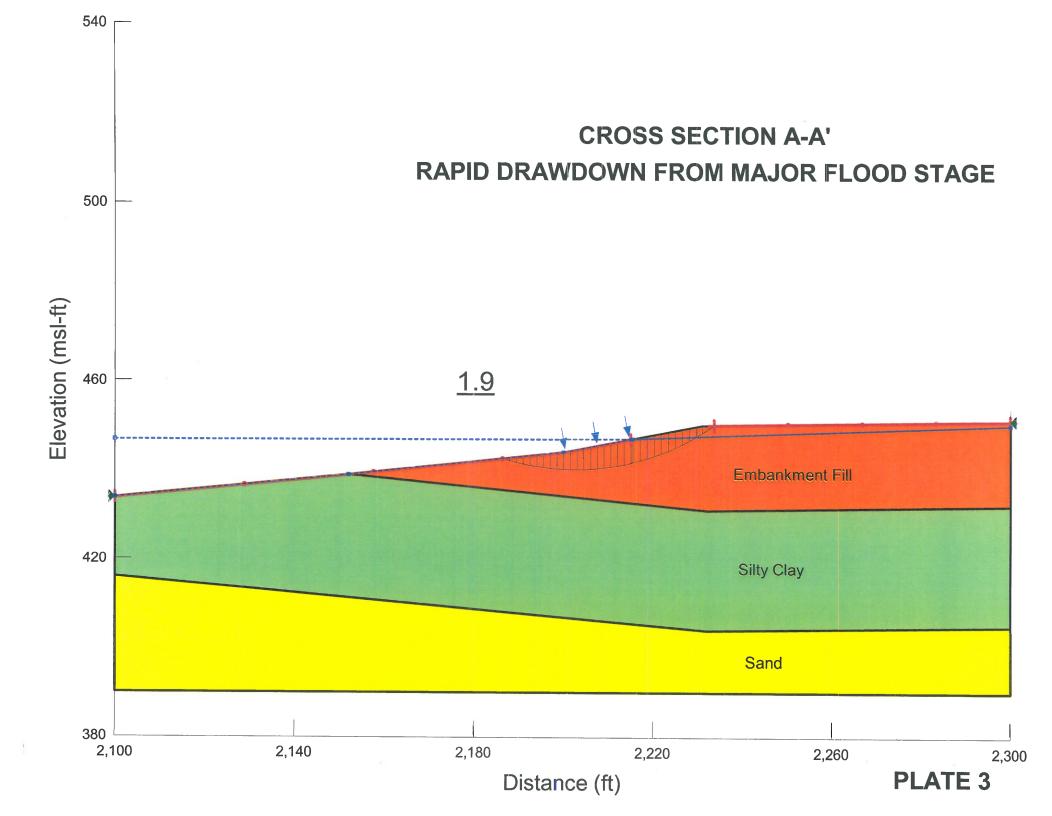
Soil Classification: SAND, fine grained, brown, loose - (SP)

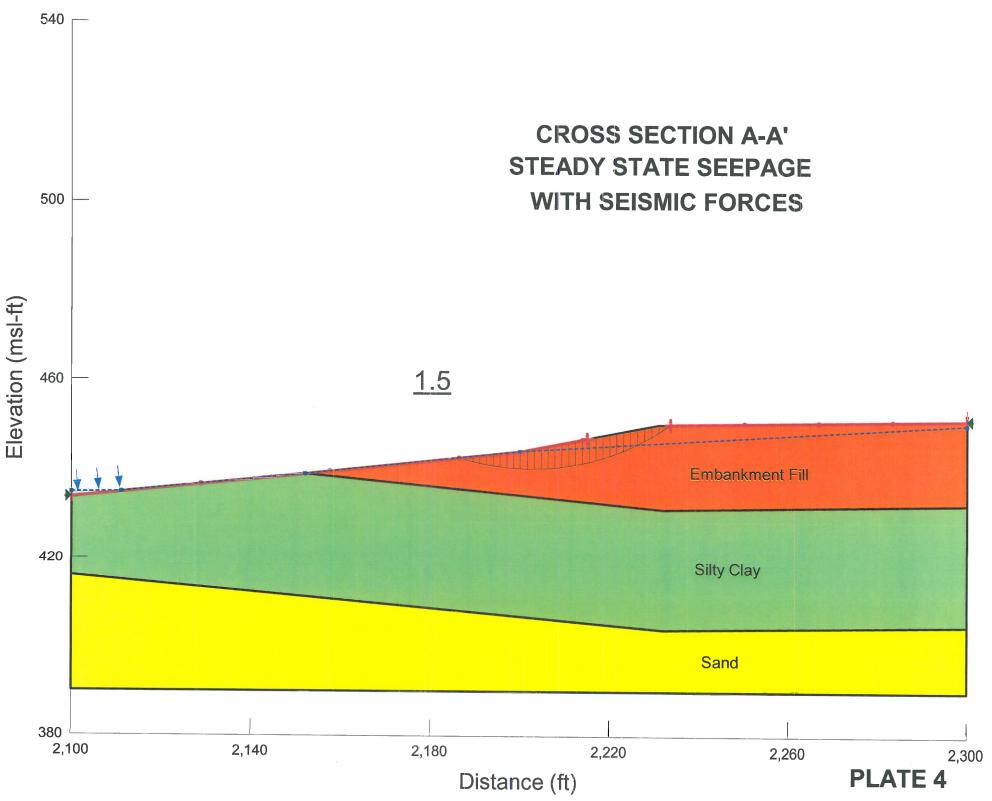
ATTACHMENT C

SLOPE STABILITY ANALYSIS RESULTS









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