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

Prepared for:

AMERENENERGY MEDINA VALLEY COGEN, LLC
St. Louis, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

Project No. J024917.05

March 12, 2018

J024917.05

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

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CLOSURE PLAN
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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.

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.

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

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

5.1 Grading. 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.

5.2 ClosureTurf®/ArmorFill® Installation. 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.

5.3 Surface Water Management. 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.

5.4 Construction Quality Assurance (CQA) Program. 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

7.1 Groundwater Monitoring Program. 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.

7.2 Groundwater Monitoring System. 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.

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

7.4 Mitigation of Statistically Significant Trends. 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.

8.0 TIME AND COST ESTIMATES

8.1 Time to Complete Closure. 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.

8.2 Time to Reach Class I Groundwater Standards. 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.

8.3 Remediation Time Frame. 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.

8.4 Cost of Closure. 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.

8.5 Cost of Post-Closure Care. 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.

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.

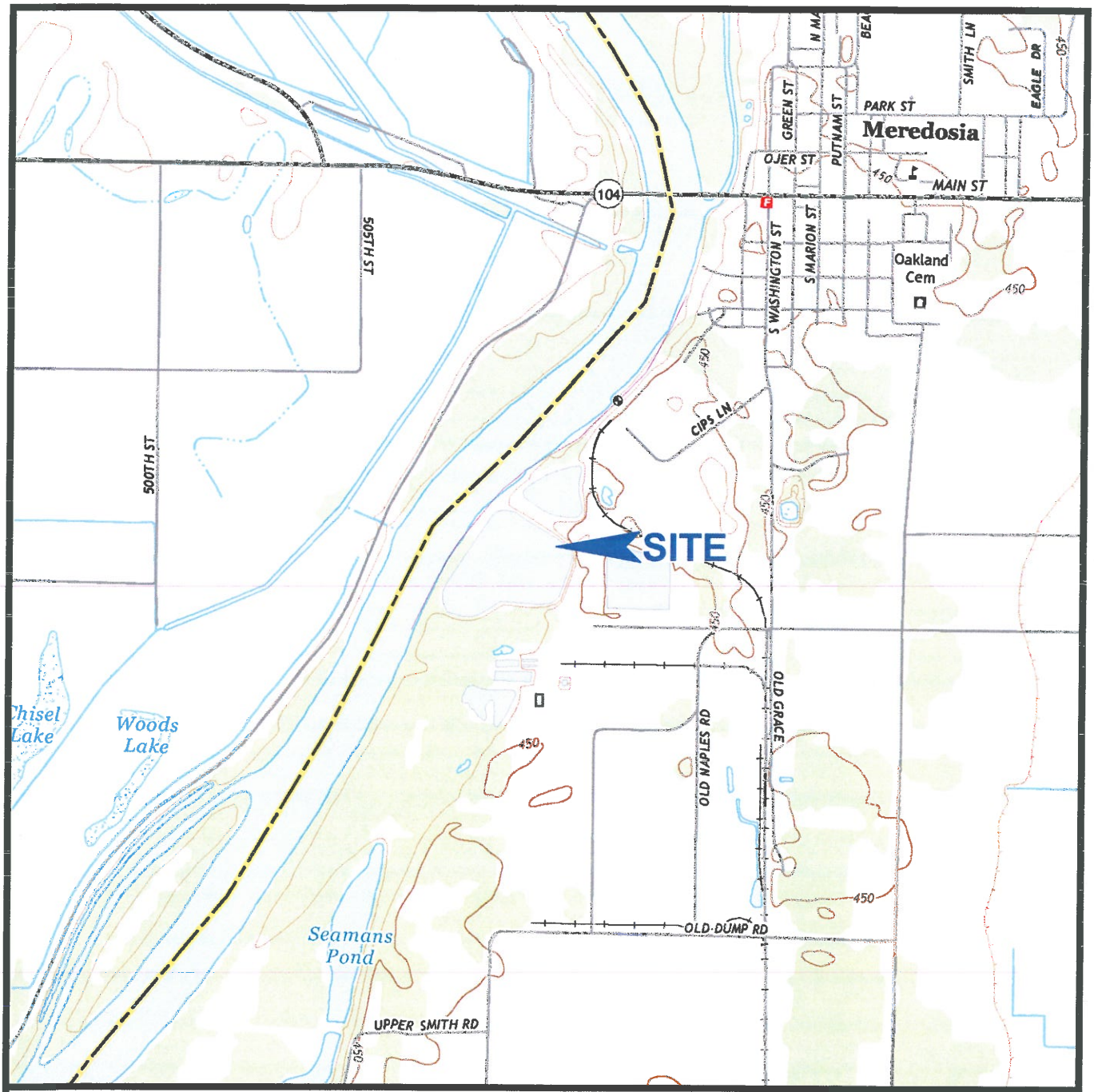
Geotechnology, Inc., Groundwater Management Zone Plan, Meredosia Power Station, Ameren, 2017.

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

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.

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



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Meredosia, Illinois quadrangle, last revised in 2015.

0 2,000 4,000

SCALE IN FEET

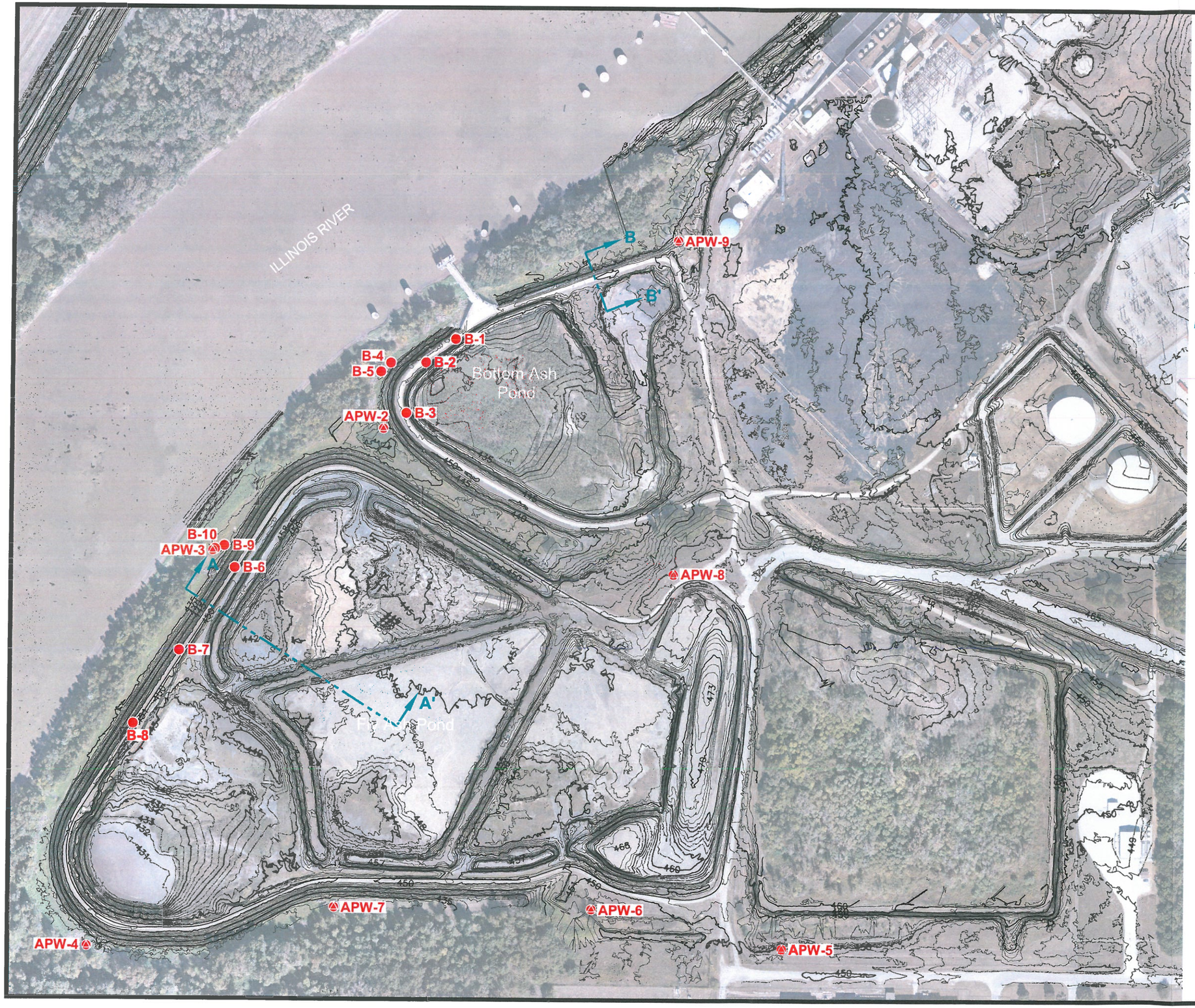
Drawn By: WAH	Ck'd By: [illegible]	App'vd By: AMS
Date: 7-20-16	Date: 7/20/16	Date: 7/21/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

SITE LOCATION AND TOPOGRAPHY

Project Number J024917.01	PLATE 1



NOTES

1. Plan adapted from drawings based on topography obtained by AeroView in October 2015 and supplied by the client.

LEGEND

- Monitoring Well Location
- Soil Boring Location
- Slope Stability Analysis Cross Section

N

0 300 600

SCALE IN FEET

Drawn By: WAH	Ck'd By: VJE	App'vd By: AJS
Date: 7-20-16	Date: 7/20/16	Date: 7/20/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

AERIAL PHOTOGRAPH OF SITE

Project Number J024917.01	PLATE 2

APPENDIX A

STABILITY ANALYSIS

APPENDIX A

STABILITY ANALYSIS

1.0 PREVIOUS SLOPE STABILITY STUDY

Geotechnology performed a subsurface exploration and global stability evaluation[2] 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.

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 435[3] 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 guidelines[4] 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.

SLOPE STABILITY ANALYSIS RESULTS				
Analysis Condition	**Calculated Factor of Safety**		**Target Factor of Safety[a]**	**Reference Plate No.**
	Fly Ash Pond Section AA'	**Bottom Ash Pond Section BB'**		
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

Surface Elevation: 449.0 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand, trace clay lenses		6-16-10	SS1
5			3-11-13 -14	SS2
			5-7-9	SS3
10			5-9-14	SS4
			4-4-4	SS5
15	FILL: black clay with sand			
	Very soft, gray, interbedded SILT and CLAY with organics - ML/CL		0-0-1	SS6
20				
	Medium stiff, gray CLAY - (CH)		2-2-3	SS7
25			92	ST8
			87 89	ST9
30				
	Loose, gray, clayey SAND with gravel - SP		1-4-4	SS10
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		5-7-7	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by:	App'vd. by
Date: 10/26/10	Date: 12/22/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.0 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5, 1.0, 1.5, 2.0, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL — LL (10, 20, 30, 40, 50)
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*				
			4-5-4	SS12	
45					
			5-7-9	SS13	
50					
			9-8-9	SS14	
55					
			7-12-15	SS15	
60	Boring terminated at 60 feet				
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 15 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148760.916' E: 2182703.077'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-1

Project No. J017150.01

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown, fine to coarse sand with black clay lenses		5-7-9	SS1
5			6-10-8	SS2
			7-8-13	SS3
10			5-5-9	SS4
			3-3-3	SS5
15				
	Black, clayey SAND, trace gravel - SP			ST6
20				
	Medium stiff, gray CLAY - CH		3-4-4	SS7
25				
			3-3-3	SS8
30				
	Soft, gray, clayey SILT with sand and clay lenses - ML		2-1-1	SS9
35				
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP		0-2-4	SS10

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SVL	App'vd. by: JW
Date: 10/26/10	Date: 12/2/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-2

Project No. J017150.01

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 449.2 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5, 1.0, 1.5, 2.0, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL — LL (10, 20, 30, 40, 50)
	Loose to medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*				
			3-6-6	SS11	▲
45					
	Boring terminated at 46 feet.				
50					
55					
60					
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 13.6 FEET AFTER 16 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Hole collpased at 46 feet. Datum: IL State Plane Coordinates, West Zone. N: 1148689.546' E: 2182613.025'

Drawn by: KA	Checked by: SK	App'vd. by: DAV
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-2

Project No. J017150.01

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: brown sand with black clay lenses		4-6-8	SS1
			5-6-9	SS2
5				ST3
			8-10-16	SS4
10			8-13-15	SS5
			6-8-8	SS6
15	FILL: black clay with sand, trace gravel			SS7
	Soft to medium stiff, gray CLAY - CH		2-2-2	SS8
20	with organics		86	ST9
				ST10
25				
			1-2-3	SS11
30				
	Soft, brown, clayey SILT with sand - ML		1-2-1	SS12
35				
	Medium dense, brown, fine to coarse SAND, trace gravel - SP		5-5-7	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SK	App'vd. by: DMY
Date: 10/26/10	Date: 12/15/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 449.1 | Completion Date: 10/21/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium dense, brown, fine to coarse SAND, trace gravel - SP *(continued)*			
			6-7-7	SS14
45				
			6-7-9	SS15
50				
			5-8-9	SS16
55				
			8-8-13	SS17
60	Boring terminated at 60 feet.			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 15 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148536.604' E: 2182554.305'

Drawn by: KA	Checked by: SC	App'vd. by: JW
Date: 10/26/10	Date: 12/17/10	Date: 1/11/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-3

Project No. J017150.01

Surface Elevation: 431.6 | Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY - (CH)			
			1-2-2	SS1
			*	ST2
5				
			1-2-3	SS3
			0-2-2	SS4
10				
	Soft, gray, silty CLAY, trace sand - CL			
			0-1-1	SS5
15				
	Very soft, gray, sandy CLAY with silt - CL			
	▽		0-0-0	SS6
20				
	Very loose, brown, fine to coarse SAND, trace gravel - SP			
			0-1-2	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 9638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * Disturbed sample Datum: IL State Plane Coordinates, West Zone. N: 1148688.82' E: 2182505.605'

Drawn by: KA	Checked by: SJC	App'vd. by: DM
Date: 10/26/10	Date: 12/27/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-4

Project No. J017150.01

Surface Elevation: 431.8 | Completion Date: 10/22/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray, silty CLAY - CL			
			2-2-3	SS1
			2-2-2	SS2
5				
	Medium stiff to very soft, brown and gray CLAY - CH			
			1-1-3	SS3
			89	ST4
10				
			0-0-0	SS5
15				
	Very soft, gray, silty CLAY with sand - CL			
			0-0-0	SS6
20				
			0-0-0	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - TV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/21/11

GROUNDWATER DATA

ENCOUNTERED AT 23 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148661.88' E: 2182476.0360'

Drawn by: KA	Checked by: SJC	App'vd. by: DMV
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-5

Project No. J017150.01

Surface Elevation: 450.8 Datum msl

Completion Date: 10/19/10

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand pockets		3-6-10	SS1
	FILL: brown, fine sand, trace clay		3-8-9	SS2
5			4-6-7	SS3
	FILL: black ash and sand			ST4
10				ST5
	FILL: brown, fine sand, trace gravel		6-7-13	SS6
15				
	Very stiff, gray, silty CLAY with sand - CL ▽		0-5-15	SS7
20	Very loose, gray silty SAND - SM		0-0-0	SS8
25	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL)		0-1-3	SS9
30				
35			0-0-0	SS10
			0-0-0	SS11

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SAL	App'vd. by: DAV
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-6

Project No. J017150.01

Surface Elevation: 450.8 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Very soft to soft, gray, silty CLAY with clay and silt seams - (CL) *(continued)*			
			1-1-1	SS12
45				
	Dense, brown, fine to coarse SAND - SP			
			7-13-42	SS13
50	Boring terminated at 50 feet.			
55				
60				
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002.WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/11

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148066.896' E: 2182040.954'

Drawn by: KA	Checked by: SK	App'vd. by: DM
Date: 10/26/10	Date: 12/21/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-6

Project No. J017150.01

Surface Elevation: 450.5 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay, ash and sand		5-8-9	SS1
	FILL: brown, fine sand		2-6-6	SS2
5			4-6-9	SS3
	FILL: black sand and ash with clay lenses		3-6-5	SS4
10				SS5
			3-7-9	SS6
15				
			6-4-3	SS7
20	Medium stiff, brown, sandy CLAY - CL			
	Medium stiff to very soft, gray, silty CLAY with sand - CL		3-4-5	SS8
25			87 86	ST9
			95	ST10
30				
			1-0-0	SS11
35				
			*	ST12

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA | Checked by: SK | App'vd. by: DM

Date: 10/26/10 | Date: 12/22/10 | Date: 1/4/11

GEOTECHNOLOGY INC

FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 450.5 | Completion Date: 10/19/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; 0.5 1.0 1.5 2.0 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT) / WATER CONTENT, % PL 10 20 30 40 50 LL
	Medium stiff to very soft, gray, silty CLAY with sand - CL *(continued)*				
	sandy			ST13	
45					
	Medium dense to dense, brown, fine to medium coarse SAND - SP				
			5-8-10	SS14	
50					
			7-9-14	SS15	
55					
			13-17-19	SS16	
60	Boring terminated at 60 feet,				
65					
70					
75					

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM 20 FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS: * No recovery in samples SS11 and ST12 Datum: IL State Plane Coordinates, West Zone. N: 1147816.37' E: 2181875.293'

Drawn by: KA	Checked by:	App'vd. by:
Date: 10/26/10	Date: 12/30/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF
LOG OF BORING: B-7

Project No. J017150.01

Surface Elevation: 451.1 | Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Crushed rock			
	FILL: black clay with sand		5-6-10	SS1
	FILL: brown sand, trace to some clay		2-4-6	SS2
5			0-5-7	SS3
			4-8-12	SS4
10	FILL: black clay with sand		0-4-6	SS5
				ST6
15				
	FILL: gray, clayey sand with black clay lenses		2-4-6	SS7
20			4-3-3	SS8
	Medium stiff, black to gray CLAY - CH		2-3-4	SS9
25				
			0-2-3	SS10
30	Medium stiff to soft, gray clayey SILT with sand - ML		101	ST11
				SS12
35				
			0-0-2	SS13

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0538301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SL	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 451.1 | Completion Date: 10/20/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, gray clayey SILT with sand - ML *(continued)*			
	Dense to medium dense, brown, fine to coarse SAND with gravel - SP			
45			13-16-16	SS14
50			7-9-11	SS15
55			5-7-9	SS16
60			10-13-14	SS17
	Boring terminated at 60 feet.			
65				
70				
75				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301 GPJ 12/13/11

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

AT 9.3 FEET AFTER 0.5 HOURS ▼

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM 20 FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1147594.427' E: 2181738.149'

Drawn by: KA	Checked by: SK	App'vd. by: DW
Date: 10/26/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

CONTINUATION OF LOG OF BORING: B-8

Project No. J017150.01

Surface Elevation: 433.6 | Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, black and gray CLAY - (CH)			
			2-3-4	SS1
			1-1-1	SS2
5				ST3
			86	ST4
10				
	Soft to very soft, gray, silty CLAY with silt seams and sand - CL			
15			0-1-1	SS6
			0-1-2	SS7
20				
			0-0-0	SS8
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148133.361' E: 2182009.017'

Drawn by: KA	Checked by: SAC	App'vd. by: DAV
Date: 11/3/10	Date: 12/22/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-9

Project No. J017150.01

Surface Elevation: 433.2 | Completion Date: 10/25/10

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Medium stiff to soft, brown and gray silty CLAY, trace sand and wood - CL			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10		▽		
			95	ST5
15				
	Very loose to medium dense, gray, silty SAND with silty clay seams - SM			
20			0-1-1	SS6
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01GEO - MEREDOSIA.GPJ GTINC.0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MB DRILLER LAH LOGGER

CME 550X DRILL RIG

HAMMER TYPE Auto

REMARKS: Datum: IL State Plane Coordinates, West Zone. N: 1148120.612' E: 2181976.582'

Drawn by: KA	Checked by: SH	App'vd. by: DMM
Date: 11/3/10	Date: 12/2/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Station
Meredosia, Illinois

LOG OF BORING: B-10

Project No. J017150.01

BORING LOG: TERMS AND SYMBOLS

GENERAL NOTES

1. *Information on each boring log is a compilation of subsurface conditions based on soil or rock classifications obtained from the field as well as from laboratory testing of samples. The strata lines on the logs may be approximate or the transition between the strata may be gradual rather than distinct. Water level measurements refer only to those ob - served at the times and places indicated, and may vary with time, geologic condition or construction activity.*
2. *Relative composition and Unified Soil Classification designations are based on visual estimates and are approximate only. If laboratory tests were performed to classify the soil, the unified designation is show in parenthesis.*
3. *Value given in Unit Dry Weight/SPT Column is either a unit dry weight in pounds per cubic foot, if adjacent to a ST sample designation, or blows per 6-inch increment if adjacent to a SS sample designation.*

ABBREVIATIONS

UU/2	*Shear Strength from Unconsolidated – Undrained Triaxial Test (ASTM D2850)*
QU/2	*Shear Strength from Unconfined Compression Test (ASTM D2166)*
SV	*Shear Strength from Field Vane (ASTM D2573)*
PL	*Plastic Limit (ASTM D4318)*
LL	*Liquid Limit (ASTM D4318)*

LEGEND

CS	Continuous Sampler
GB	Grab Sample Taken From Auger Cuttings Or Wash Water Return
NX 100 42	NX Rock Core with Percent Recovery/R.Q.D. Given In Adjacent Column
PST	Three Inch Diameter Piston Tube Sample
SS	Split Spoon Sample (Standard Penetration Test)
ST	Three Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
SV	Field Vane Test

SPLIT – BARREL SAMPLER DRIVING RECORD

Blow Per Foot (N-Value)	*Description*
25	*25 blows drove sampler 12 inches after initial 6 inches of seating.*
75/10"	*75 blows drove sampler 10 inches after initial 6 inches of seating.*
50/S3"	*50 blows drove sampler 3 inches during initial 6 inch seating interval.*

NOTES: 1. To avoid damage to sampling tools, driving is limited to 50 blows during any six inch interval.
2. N-Value (Blow Count) is the standard penetration resistance based on the total number of blows, using a 140-lb hammer with 30-inch free fall, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4/7/9 in Unit Dry Weight – SPT column.

RELATIVE COMPOSITION

Trace.....0-10 %
With/Some.....11-35 %
Soil modifier such..... > 35 %
As silty, clayey, sandy, etc.

DENSITY OF GRANULAR SOILS

Descriptive Term:	*N—Value*
Very Loose	*0 - 4*
Loose	*5 - 10*
Medium Dense	*11 - 30*
Dense	*31 - 50*
Very Dense	*> 50*

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength Tons Per Sq. Ft.	Field Test	Approximate N-Value Range
Very Soft	*less than 0.12*	*Thumb will penetrate soil more than 1"*	*0 - 1*
Soft	*13 to 0.25*	*Thumb will penetrate soil about 1"*	*2 - 4*
Medium Stiff	*0.26 to 0.50*	*Thumb will penetrate soil about ¼"*	*5 – 8*
Stiff	*0.51 to 1.00*	*Thumb hardly indents soil*	*9 – 15*
Very Stiff	*1.01 to 2.00*	*Thumb will not indent soil, but readily indented with thumbnail*	*16 – 30*
Hard	*greater than 2.00*	*Thumbnail will not indent soil*	*> 30*

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

12"	3"	¾"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
300	76.2	19.1	4.76	2.00	0.42	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

SOIL STRUCTURE

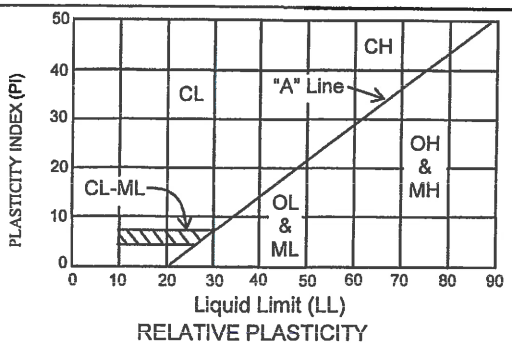
Calcareous *– Having appreciable quantities of carbonate.*
Fissured *– Containing shrinkage or relief cracks, often filled with sand or silt; usually more or less vertical.*
Slickensided *– Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along those planes.*
Layer *-- Inclusion greater than 3 inches thick.*
Seam *– Inclusion 1/8 inch to 3 inches thick extending through the sample*
Parting *– Inclusion less than 1/8 inch thick.*
Pocket *– Inclusion of material of different texture that is smaller than the diameter of the sample.*
Interlayered *– Soil samples composed of alternating layers of different soil types.*
Intermixed *– Soil samples composed of pockets of different soil types and a layered or laminated structure is not evident.*
Laminated *– Soil sample composed of alternating partings or seams of different soil type.*

GEOTECHNOLOGY INC
FROM THE GROUND UP

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL	DESCRIPTION
Coarse-Grained Soils (More than 50% Larger than No 200 Sieve Size)	Gravel and Gravelly Soils	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel-Sand Mixture
			GP	Poorly –Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Clayey Silt, Silty or Clayey Very Fine Sand, Slight Plasticity
			CL	Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts, or Silty Clays of Low Plasticity
	Silts and Clays	Liquid Limit More Than 50	MH	Silt, Fine Sandy or Silt Soil with High Plasticity
			CH	Clay, High Plasticity
			OH	Organic Clay of Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

PLASTICITY CHART



RELATIVE PLASTICITY

Nonplastic	Cannot Roll Into Ball
Trace Plasticity	Barely Roll Into Ball
Medium Plastic	Can be Rolled Into Ball
Highly Plastic	No Rupture by Kneading

VISUAL DESCRIPTION CRITERIA*

TABLE 1: CRITERIA FOR DESCRIBING ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

TABLE 2: CRITERIA FOR DESCRIBING PARTICLE SHAPE

Description	Criteria
Flat	Particles with width/thickness X3
Elongated	Particles with length/width X3
Flat and Elongated	Particles meet criteria for both flat and elongated

TABLE 3: CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below the water table

TABLE 4: CRITERIA FOR DESCRIBING REACTION WITH HCL

Description	Criteria
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming rapidly

TABLE 6: CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

TABLE 8: CRITERIA FOR DESCRIBING DRY STRENGTH

Description	Criteria
None	The dry specimen crumbles into powder with mere pressure of handling
Low	The dry specimen crumbles into powder with some finger pressure
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure
High	The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface.
Very High	The dry specimen cannot be broken between the thumb and a hard surface

TABLE 9: CRITERIA FOR DESCRIBING DILATANCY

Description	Criteria
None	No visible change in the specimen
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TABLE 10: CRITERIA FOR DESCRIBING TOUGHNESS

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness

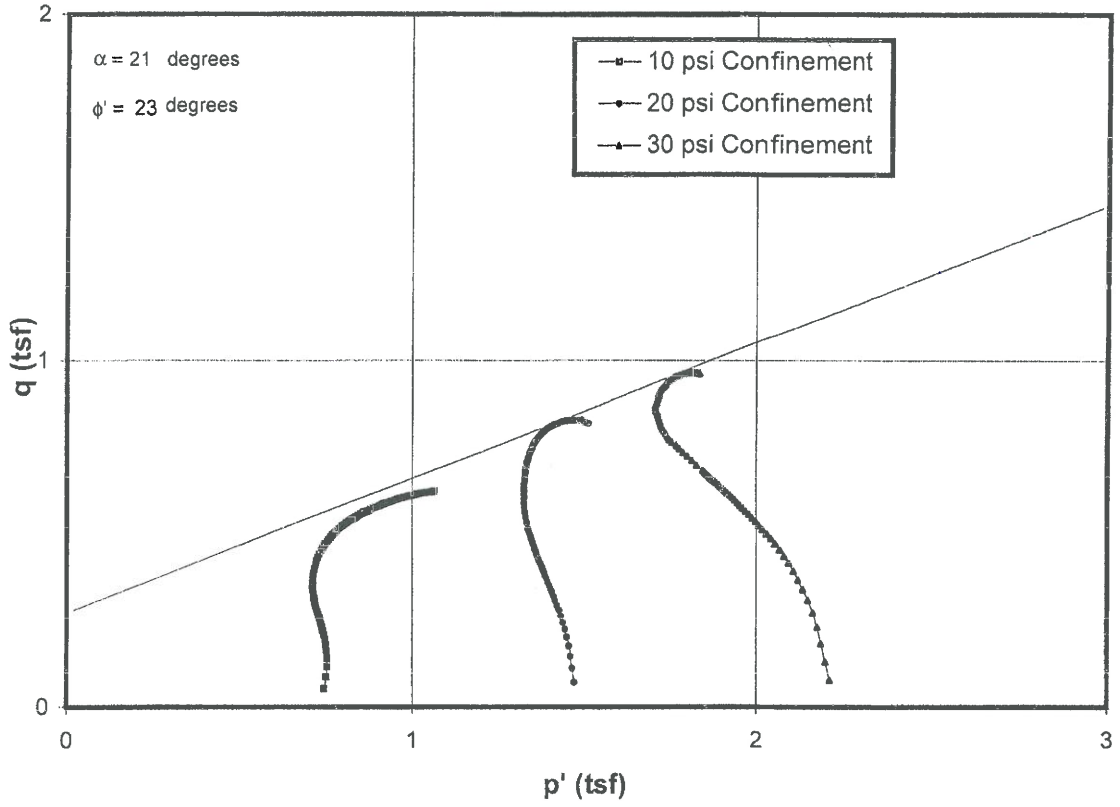
TABLE 12: IDENTIFICATION OF INORGANIC FINE-GRAINED SOILS FROM MANUAL TESTS

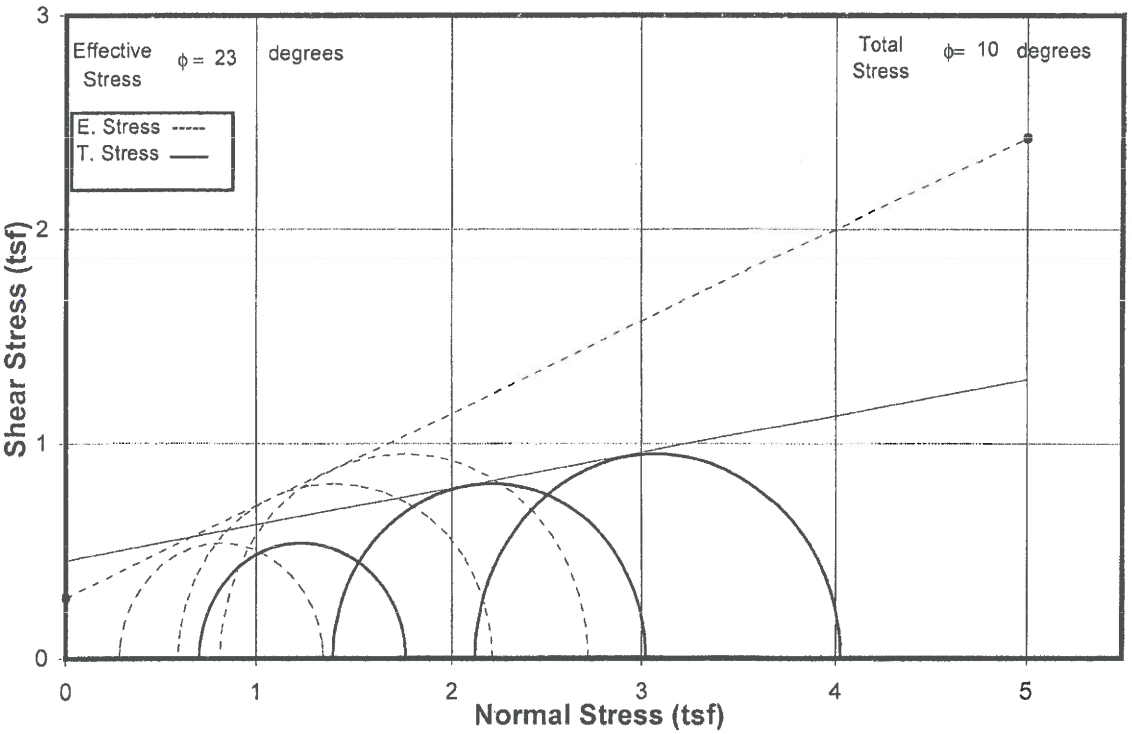
Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot be formed
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	none	High

*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





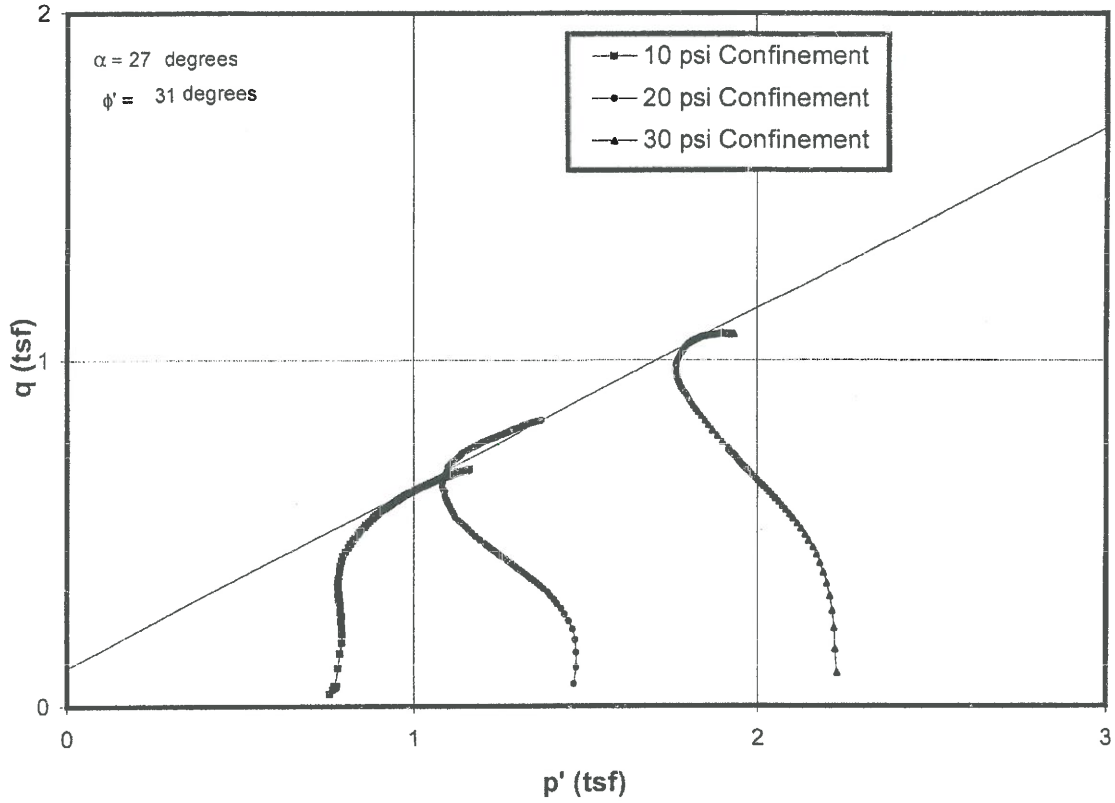
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

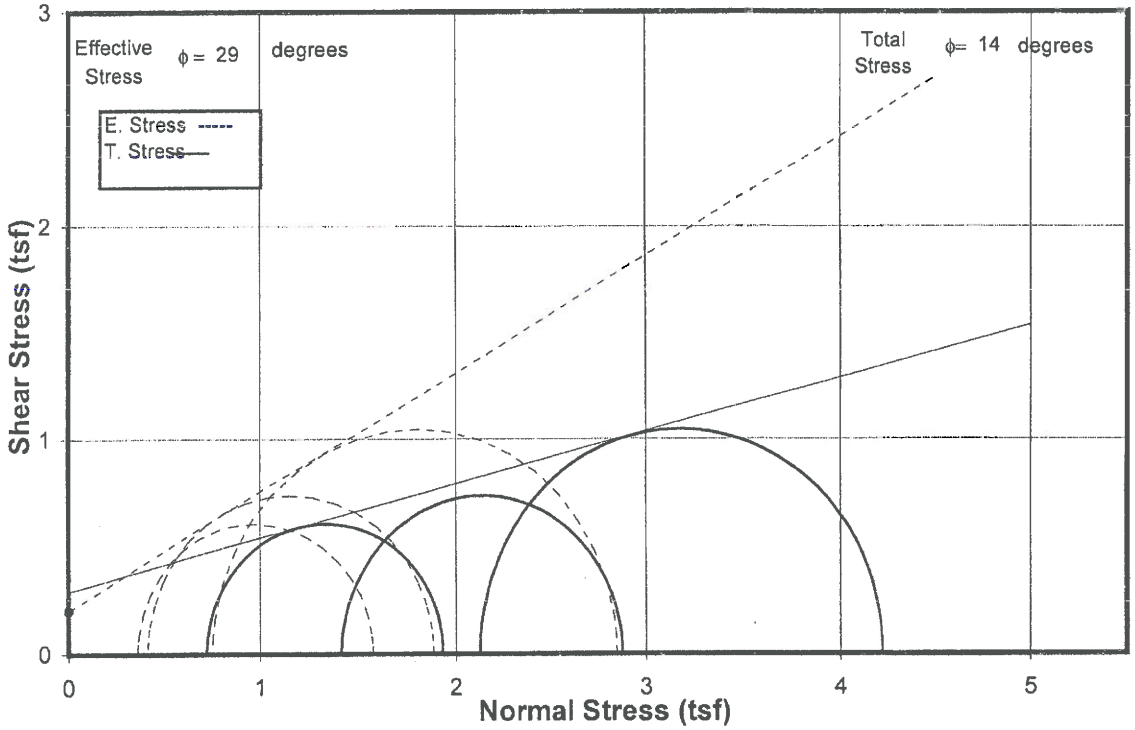
ASTM D 4767

Project No.: J017150.01

Boring: B-1

Sample: ST-8, ST-9, ST-9 - Depth: 26, 28, 28





CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

ASTM D 4767

Project No.: J017150.01

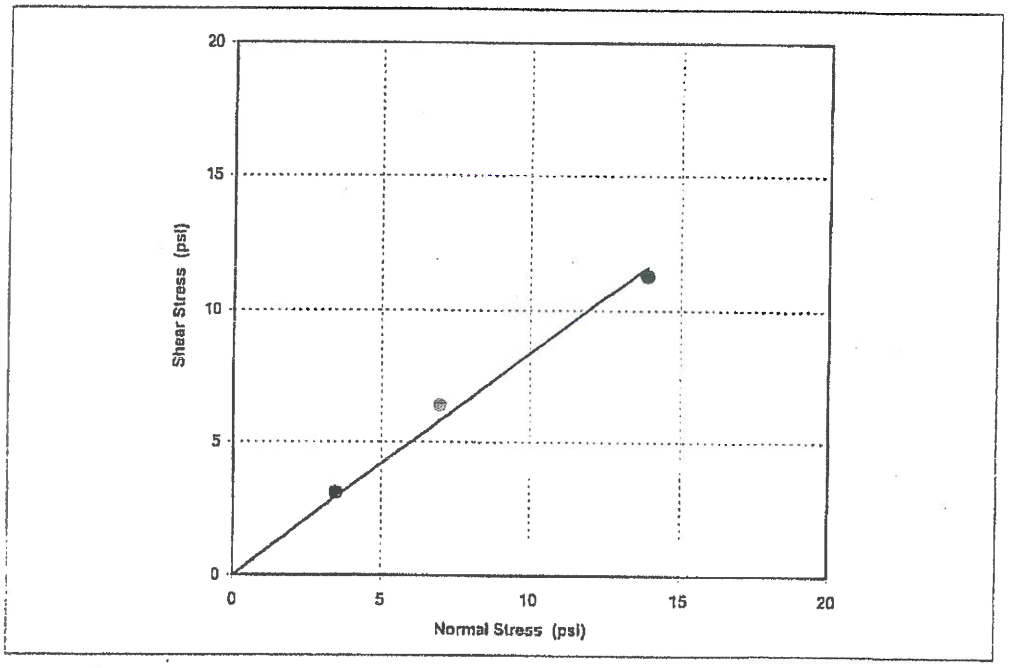
Boring: B-7

Sample: ST-10, ST-9, ST-9 - Depth: 28, 26, 26

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'



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

Atterberg Limits:

Liquid Limit: --

Plastic Limit: --

Plasticity Index: NP

Standard Proctor Results:

Max. Dry Density: N/A

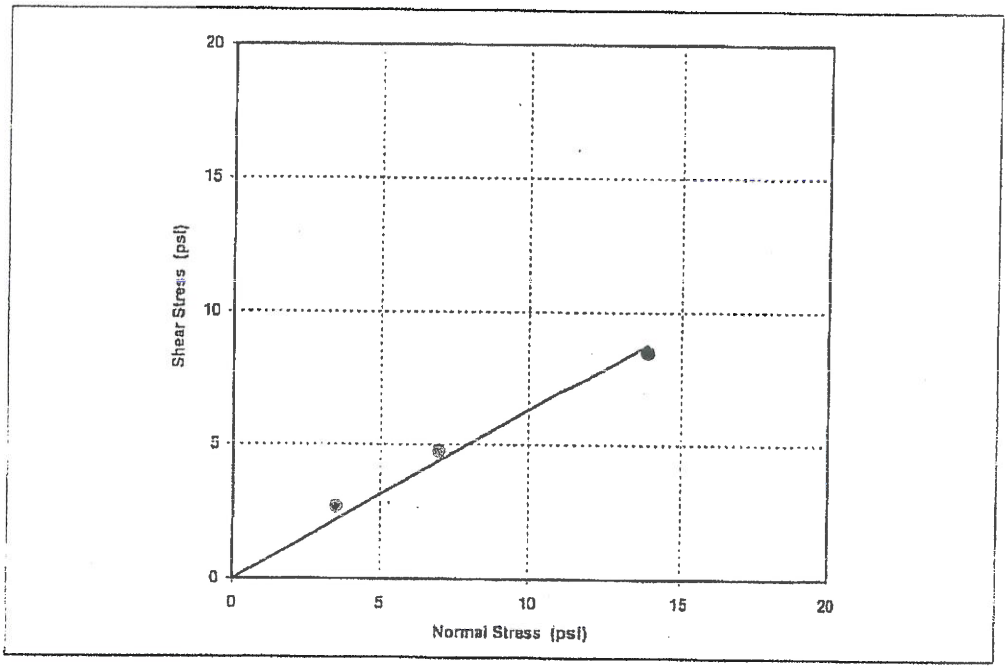
Opt. Moisture Content: N/A

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

DIRECT SHEAR TEST DATA

ASTM D 3080

Project Number:	J017150.01	Boring Number.:	B-1
Project Name:	Ameren-Meredosia	Sample Number:	SS-2
Project Location:	--	Sample Depth (ft):	6.0' - 7.5'



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

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, fine grained, brown, loose - (SP)

ATTACHMENT C

SLOPE STABILITY ANALYSIS RESULTS

CROSS SECTION A-A'
STEADY STATE SEEPAGE

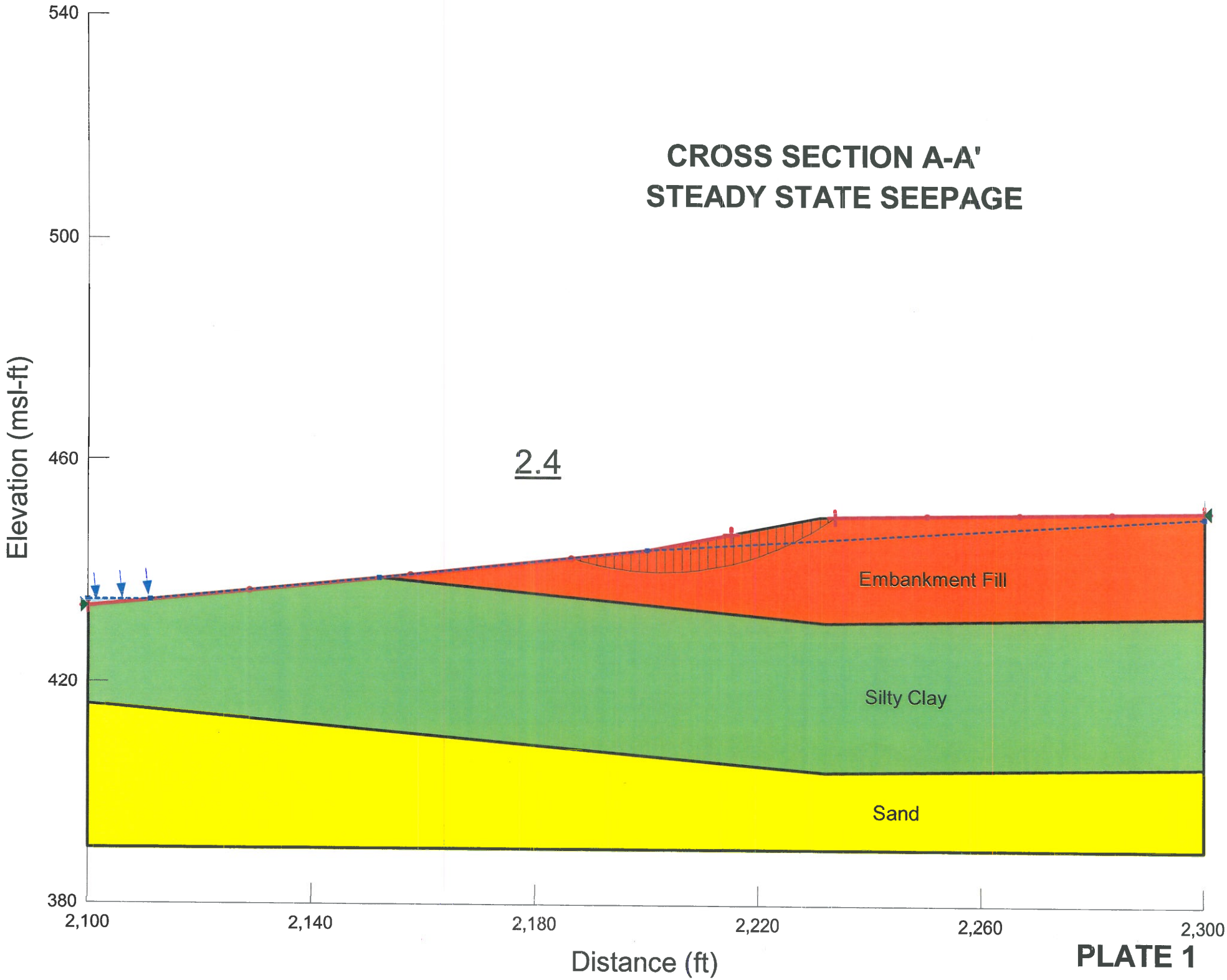


PLATE 1

CROSS SECTION A-A'
STEADY STATE SEEPAGE AT MAJOR FLOOD STAGE

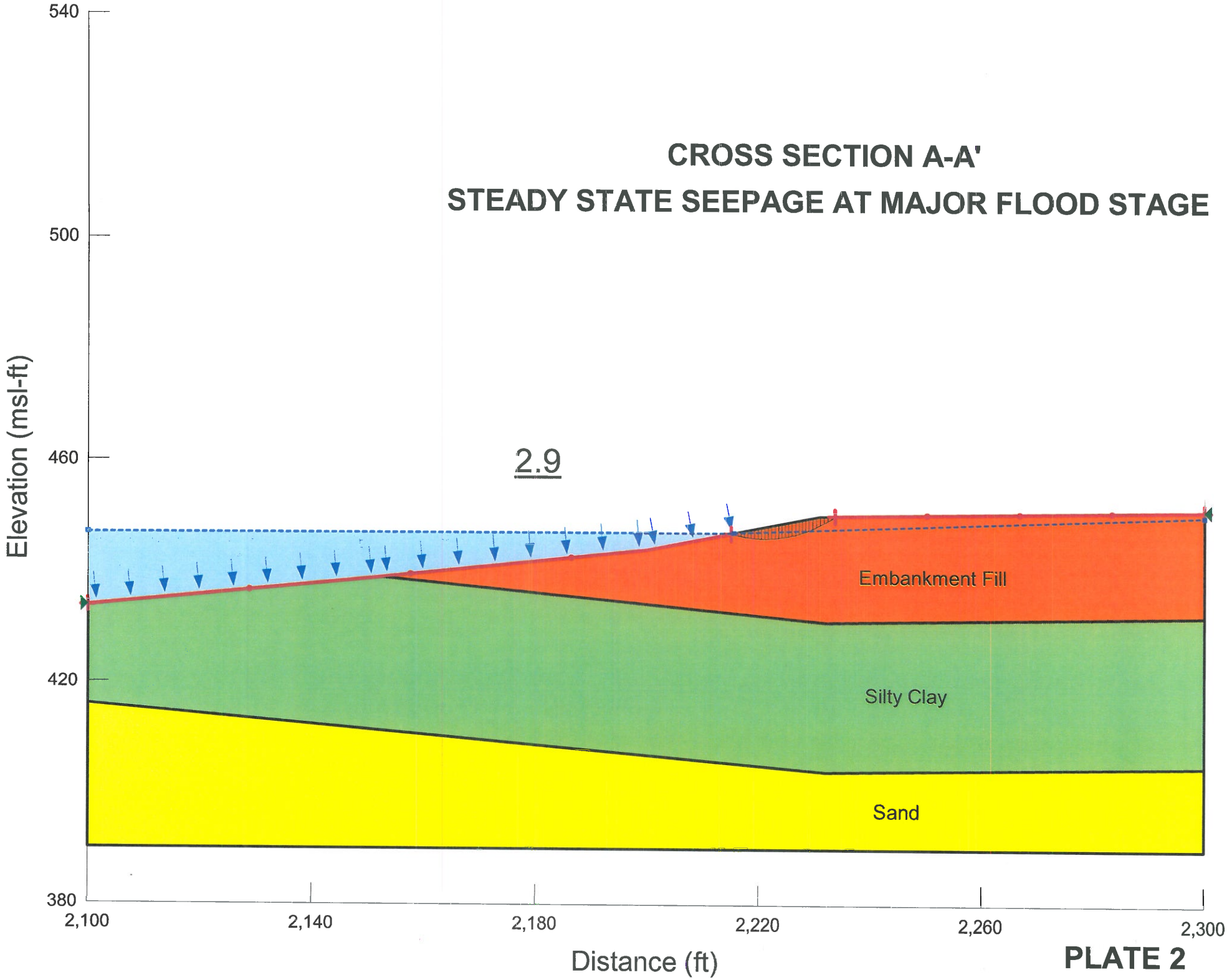


PLATE 2

CROSS SECTION A-A'
RAPID DRAWDOWN FROM MAJOR FLOOD STAGE

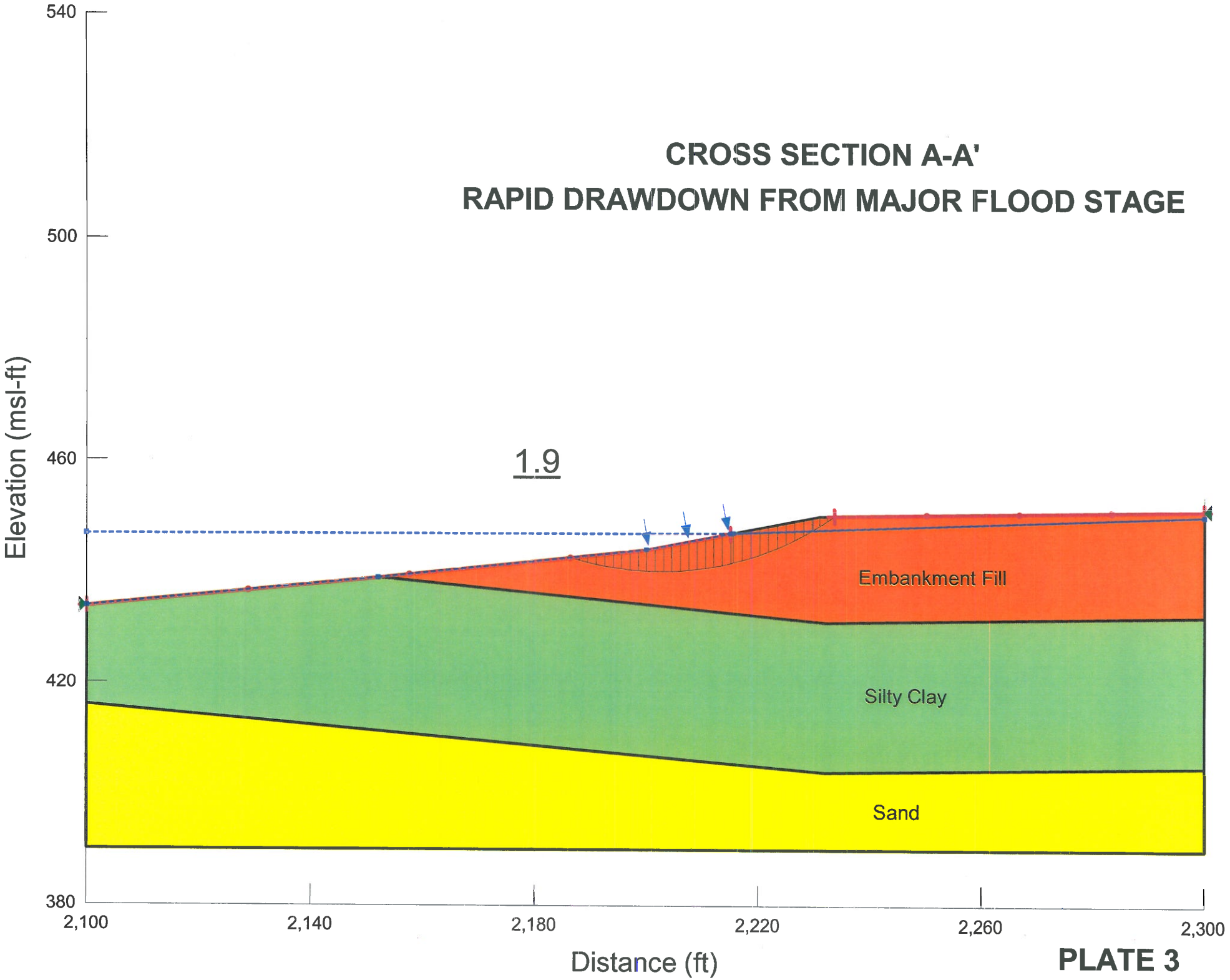


PLATE 3

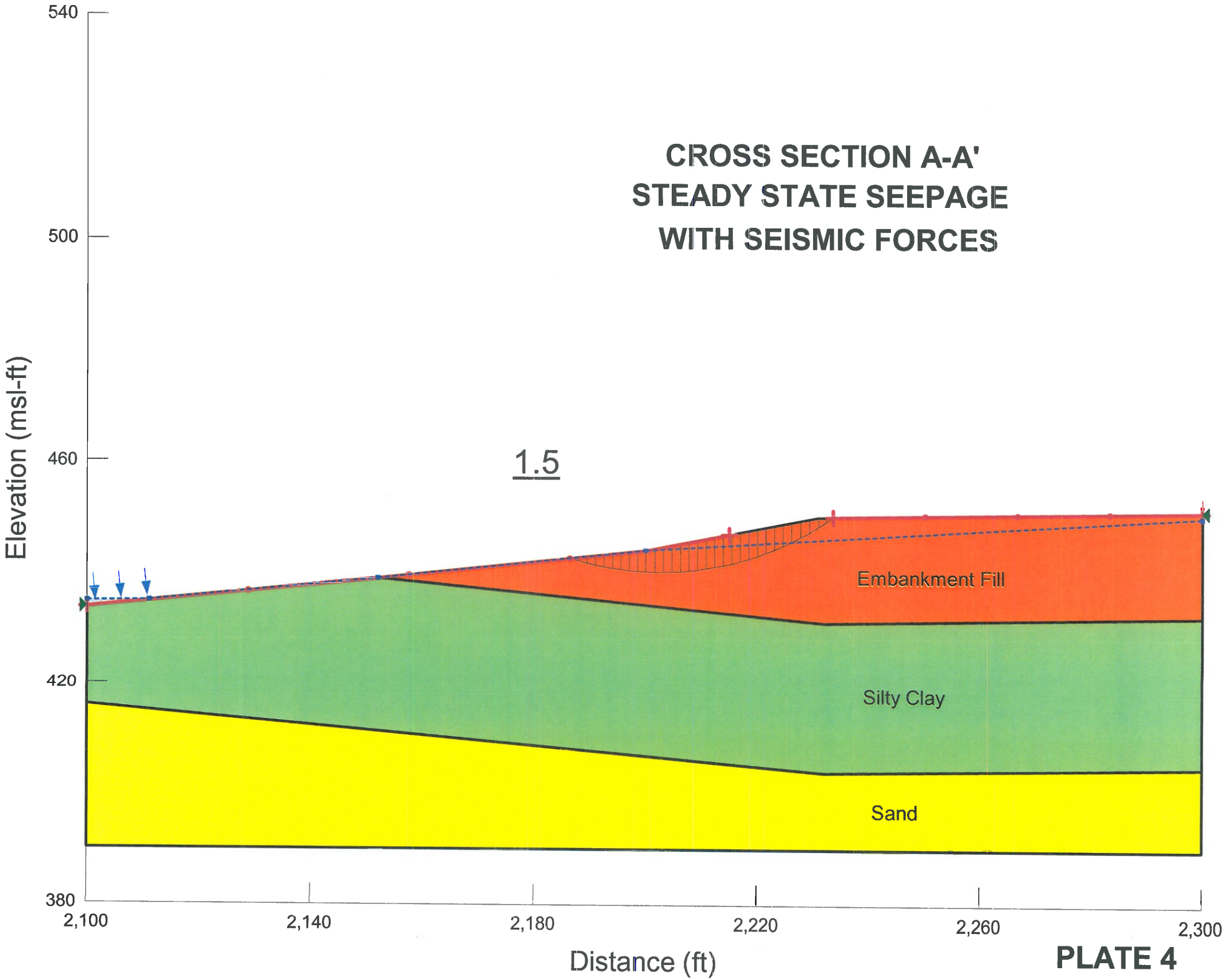

CROSS SECTION A-A'
STEADY STATE SEEPAGE
WITH SEISMIC FORCES
1.5
Embankment Fill
Silty Clay
Sand
Elevation (msl-ft)
540
500
460
420
380
2,100
2,140
2,180
2,220
2,260
2,300
Distance (ft)

PLATE 4

CROSS SECTION B-B'
STEADY STATE SEEPAGE

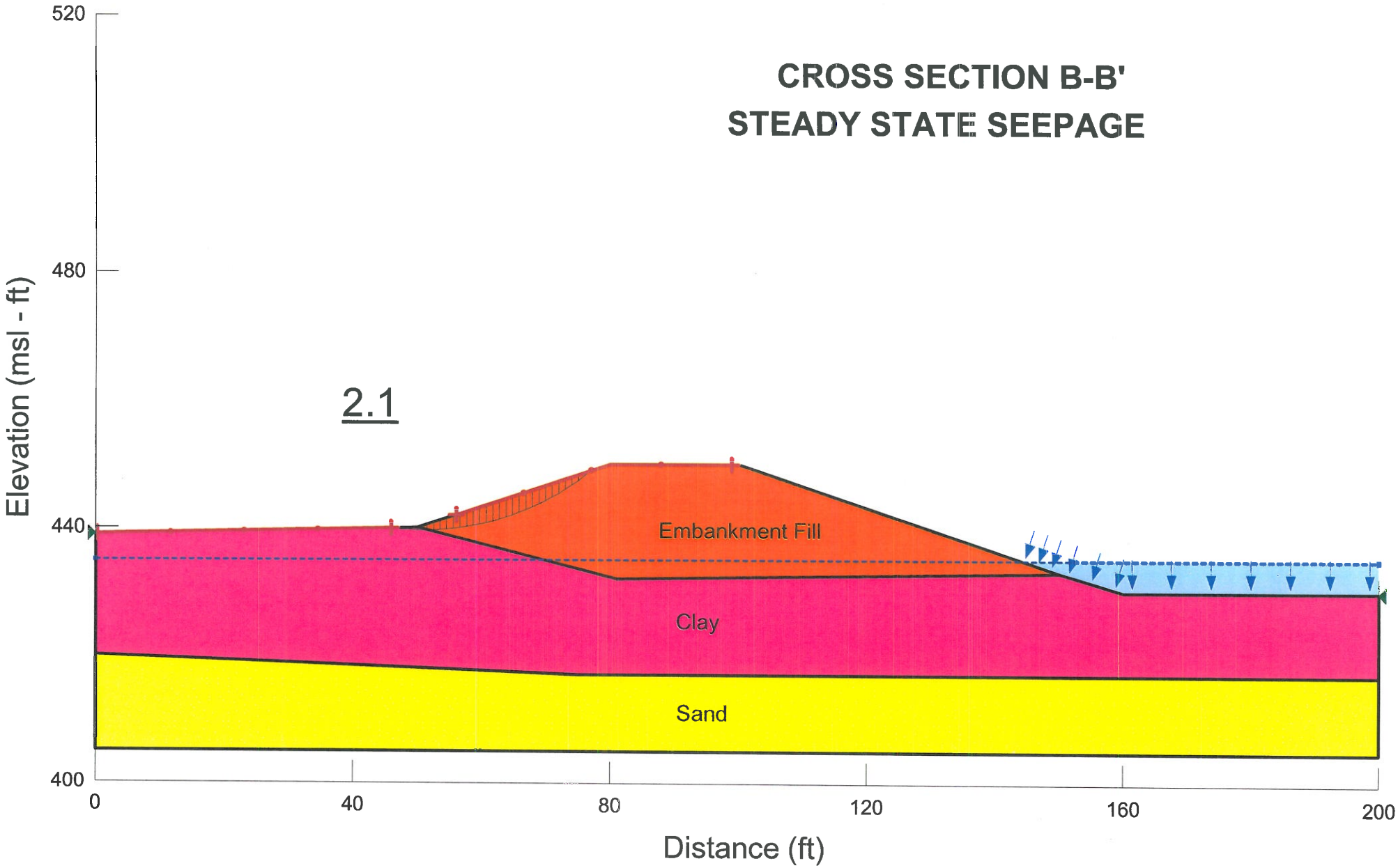


PLATE 5

CROSS SECTION B-B'
STEADY STATE SEEPAGE AT MAJOR FLOOD STAGE

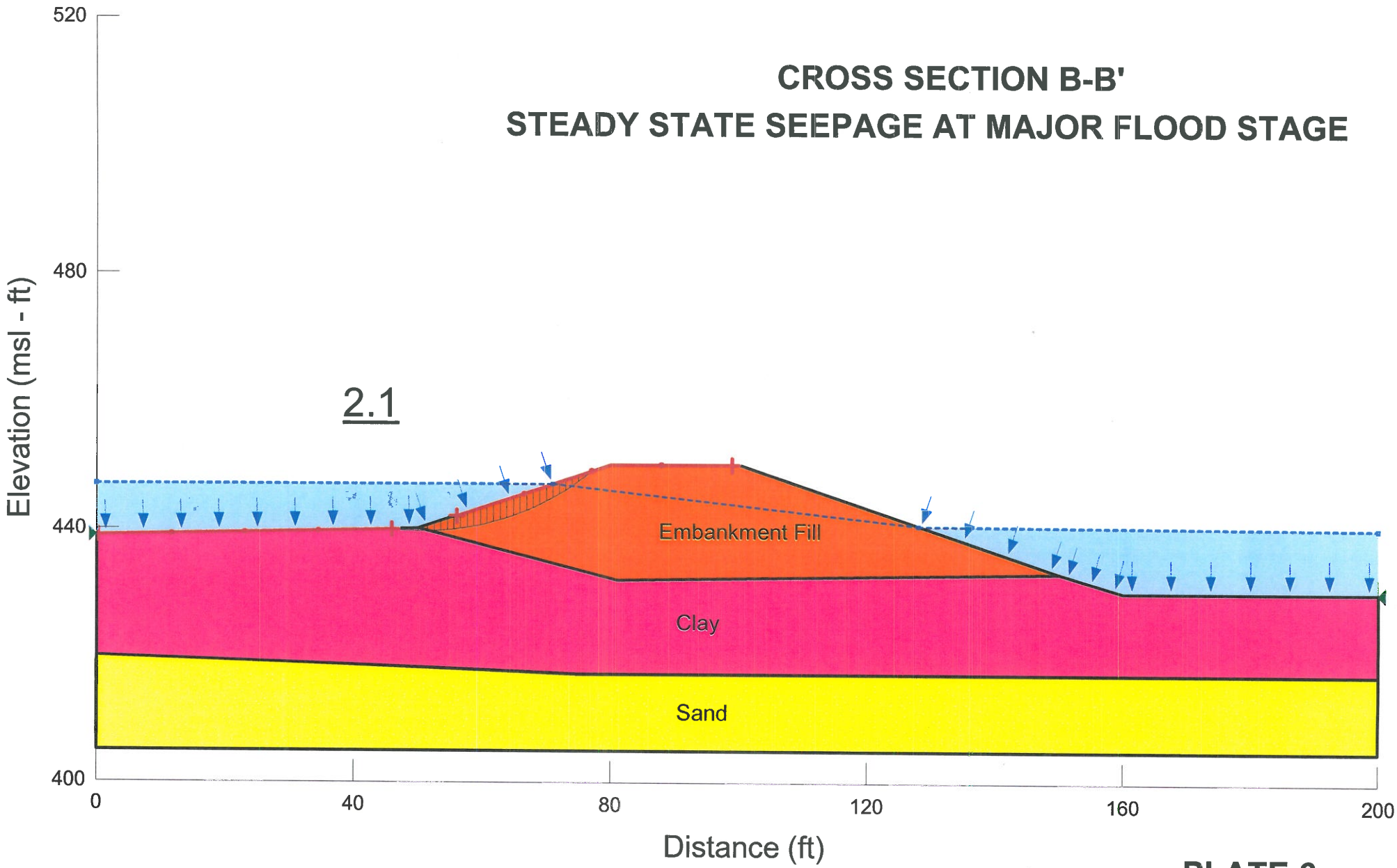


PLATE 6

CROSS SECTION B-B'
RAPID DRAWDOWN FROM MAJOR FLOOD STAGE

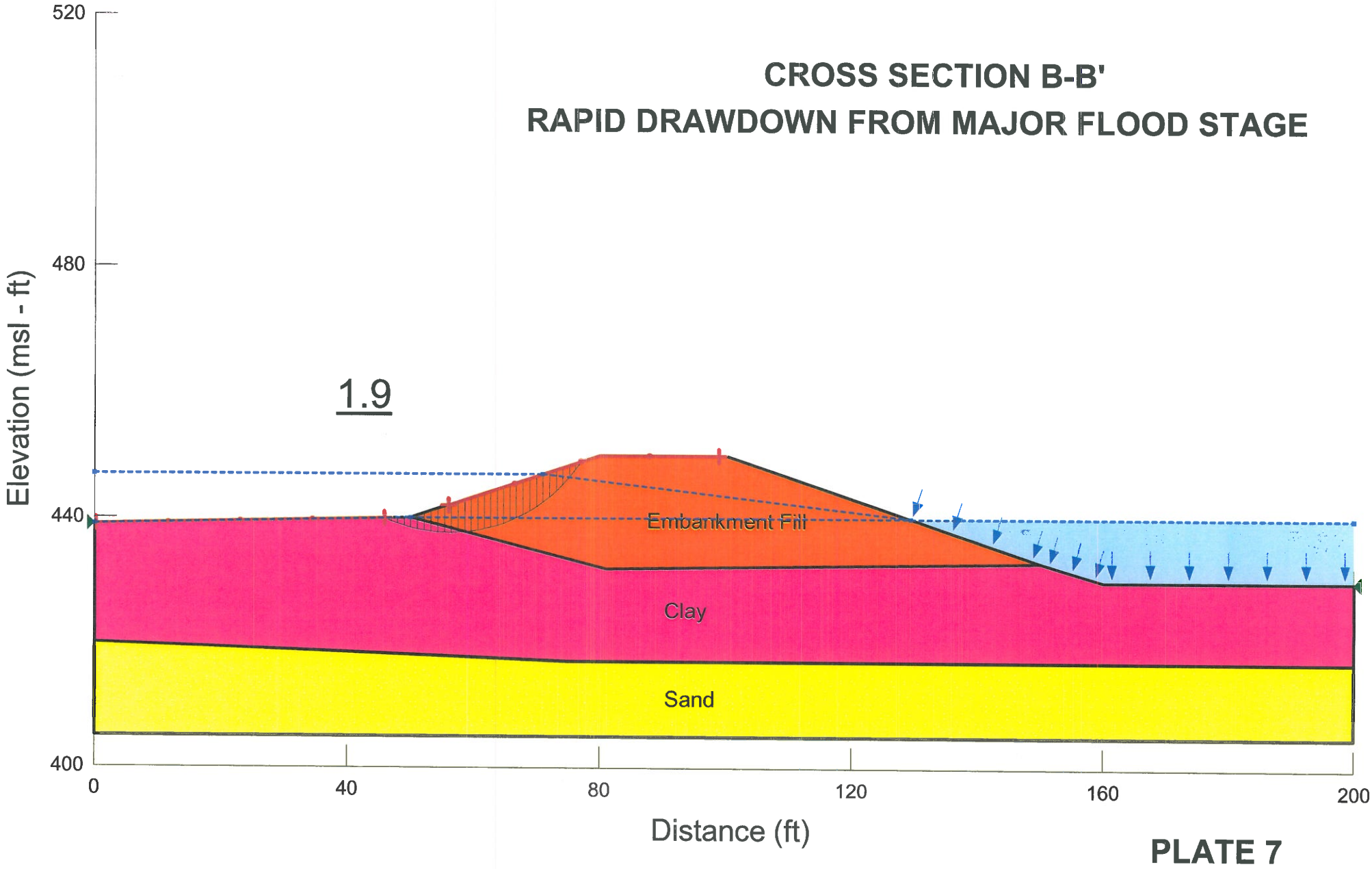


PLATE 7