

#### PERIODIC SAFETY FACTOR ASSESSMENT 391-3-4-.10(4) AND 40 C.F.R. PART 257.73(e) PLANT MCDONOUGH ASH POND 3 (AP-3) AND ASH POND 4 (AP-4) GEORGIA POWER COMPANY

The Federal CCR Rule and the Georgia CCR Rule (391-3-4-.10) require the owner or operator of a CCR surface impoundment to conduct initial and periodic safety factor assessments. *See* 40 C.F.R. § 257.73(e); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b)<sup>1</sup>. A direct final rule revision to a partial vacatur of the Final Rule became effective on October 4, 2016. This revision eliminated the exemption for inactive CCR surface impoundments and required such units to meet the same requirements as existing CCR surface impoundments. The owner or operator of the CCR unit must conduct an assessment of the CCR unit and document whether the minimum safety factors outlined in 40 C.F.R. § 257.73(e)(1)(i) through (iv) for the critical cross section of the embankment are achieved. In addition, the Rules require a subsequent assessment be performed within 5 years of the previous assessment. *See* 40 C.F.R. § 257.73(f)(3); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b) 1.

The CCR surface impoundments known as Ash Pond 3 (AP-3) and Ash Pond 4 (AP-4), owned, and operated by Georgia Power Company, are located at Plant McDonough-Atkinson (Plant McDonough) in Cobb County, Georgia. These units no longer receive CCR or other waste streams and no longer function as a CCR surface impoundment. At the time of this submittal, AP-3 and AP-4 are being consolidated and closed in place as combined unit AP-3/4 in accordance with §257.102(d) and are in the process of obtaining a solid waste permit under the Georgia Rules for Solid Waste Management, 391-3-4-.10.

The interim (November 2022) construction condition of AP-3 and AP-4 was analyzed for this periodic assessment. According to section § 257.73(e) of the rule, stability of earth structures must be assessed under four loading conditions:

- Maximum Pool Storage (40 C.F.R. § 257.73(e)(i))
- Maximum Pool Surcharge (40 C.F.R. § 257.73(e)(ii))
- Seismic Loading Conditions (40 C.F.R. § 257.73(e)(iii))
- Post-Seismic Liquefaction Conditions (when liquefaction susceptible materials are present; 40 C.F.R. § 257.73(e)(iv)) (not applicable for AP-3 and AP-4).

Engineering analysis of AP-3/4 in its current condition were evaluated for each loading condition. Stability safety factors were evaluated for each of the loading scenarios using the computer program SLIDE (2018). As required by the EPA rule, a general limit equilibrium (GLE) method (Morgenstern and Price) was used to calculate factors of safety, and the factors of safety were calculated by dividing the resisting forces by the driving forces along the calculated critical slip surface of a given slope.

Stability was evaluated along two cross-sections deemed the most critical for AP-3 and AP-4 as shown in Figure 1. Subsurface stratigraphy at each cross-section was developed from data collected during subsurface explorations from October 2015 to January 2016, and supplemental information collected through November 2022. Similarly, material properties were developed for the dam, foundation, and impounded materials from this

<sup>&</sup>lt;sup>[1]</sup> In a typographical error, 391.3-4.10(4)(b) references the "structural integrity criteria in 40 CFR 247.73," when the reference to such criteria should be 40 CFR 257.73.

data. The conditions modeled in stability analyses are reflective of the (November 2022) interim conditions for AP-3 and AP-4.

The 100-year 24-hour rain event was used for the maximum pool surcharge scenario.

For the surcharge pool scenario for this interim condition (November 2022), WSP considered the effects of the 100-year 24-hour rain event. For AP-3 and AP-4, the interim condition rain event will cause stormwater flow in a combination of lined channels and open working areas. Thus, the stability of AP-3 and AP-4 slopes were evaluated with applicable water levels to the calculated flow depths for the rain event. At the time of this demonstration, the majority of areas of AP-3 and AP-4 are covered with the ClosureTurf final cover system, and limited areas remains as open construction areas.

Factors of safety for stability under seismic loading conditions were calculated based on the earthquake hazard corresponding to a probability of exceedance of 2% in 50 years (2,475 year return period). The Bray and Travasarou displacement-based seismic slope stability screening method was used to evaluate the seismic stability. For this method, a pseudo-static coefficient corresponding to an allowable displacement of six inches (15 cm) is applied as a horizontal force in the static stability model. The pseudo-static coefficient for the above stated criteria was calculated to be 0.029g (g = standard gravity).

The CCR Rule specifies a required factor of safety of 1.2 against liquefaction for pond impoundment structures in 40 C.F.R. § 257.73(e)(iv). The dam and foundation soils at the location of the AP-3 and AP-4 analysis sections were evaluated for liquefaction susceptibility and were found to have calculated factors of safety against liquefaction above 1.2. Since no liquefaction susceptible materials are present, the post-liquefaction analysis is not applicable for AP-3/4. The table below summarizes the results of the slope stability analyses for the current conditions at AP-3 and AP-4, with figures displaying the stability analysis results attached to this demonstration.

For all cases analyzed, the calculated factors of safety are in excess of those required in Sections § 257.73(e)(i) to (iv) of the EPA Rule.

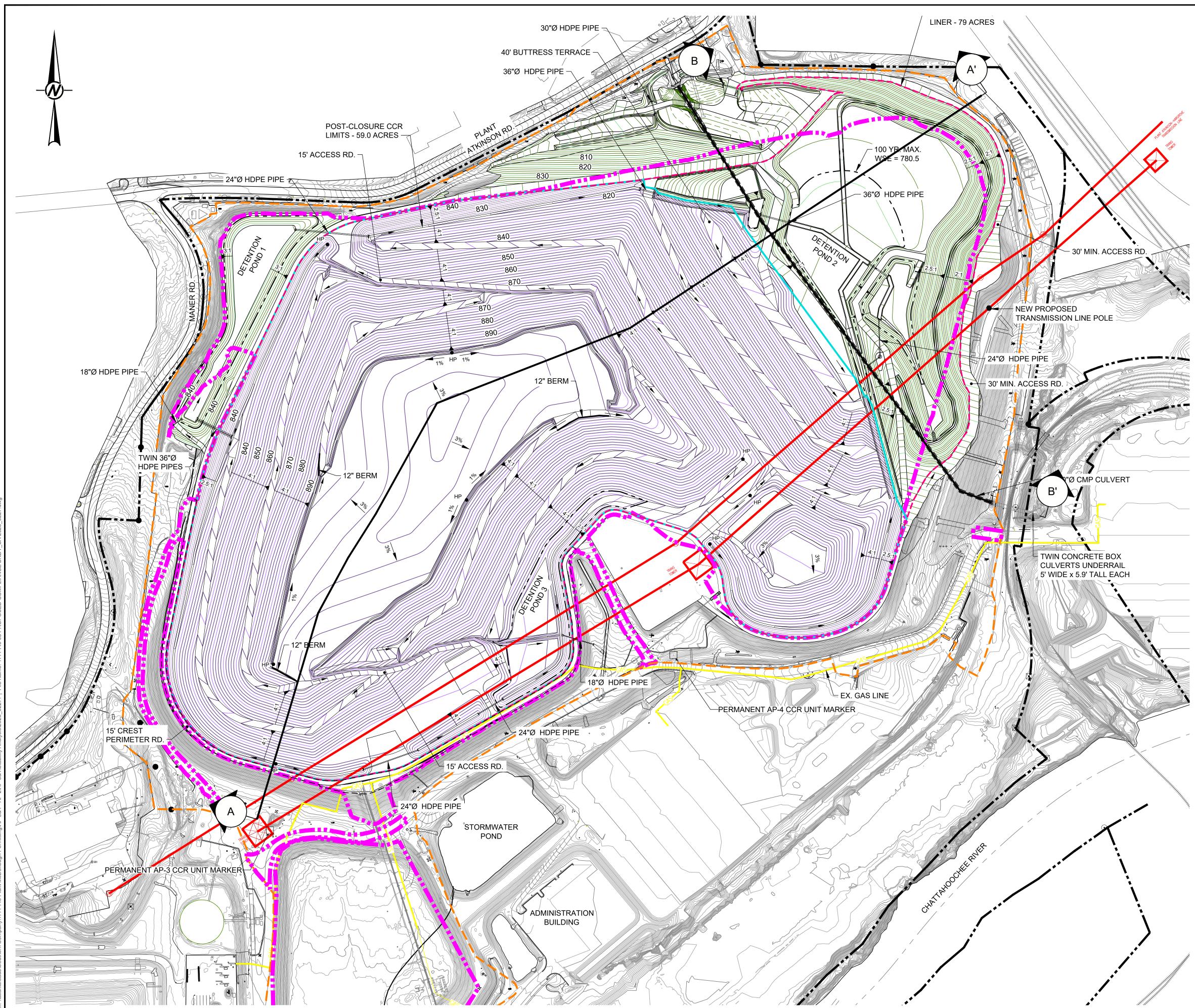
Interim Condition Stability Analysis Results									
Analysis Case	Max. Storage Pool	Seismic	Post Liquefaction						
Rule Section	§ 257.73(e)(i)	§ 257.73(e)(ii)	§ 257.73(e)(iii)	§ 257.73(e)(iv)					
Target Factor of Safety	1.5	1.4	1.0	1.2					
Cross-Sections	Factor of Safety								
A-A' South-West	1.6	1.6	1.5						
A-A' East	2.1	2.1	1.3	Net					
B-B' North	3.1	3.1	2.7	Not Applicable					
B-B' South-East	1.8	1.8	1.6						

I certify that the safety factor assessment for AP-3 and AP-4 was conducted in accordance with 40 C.F.R. § 257.73(e).



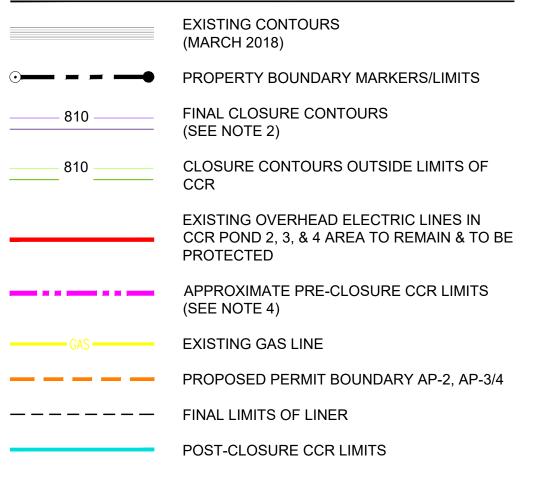
Gregory L. Hebeler, PhD, P.E. Georgia Licensed Professional Engineer No. 034749 WSP USA Inc.

# Stability Analysis Figures for AP-3 and AP-4



Natlanta/cadd/Southern Company/1777449 Plant McDonough Permitting/AP-3&4.Stability Analysis/2023 0227/ | File Name: 1777449 05 PROPOSED COMPLIANCE BNDY SA 2023 022





### REFERENCES

1. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA LAND DEPARTMENT AND METRO ENGINEERING AND SURVEYING CO, INC. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS 03-18-2018. REFER TO THE SURVEY DRAWING TITLED "TOPOGRAPHIC MAP PREPARED FOR GEORGIA POWER COMPANY PLANT MCDONOUGH - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF PHOTOGRAPHY 03-18-2018.

#### NOTES

1. FINAL CLOSURE CONTOURS (PURPLE) DELINEATE FINAL LIMITS OF CCR.

2. CLOSURE CONTOURS OUTSIDE LIMITS OF CCR (GREEN) DELINEATE AREAS WHERE ANY EXISTING ASH IS TO BE COMPLETELY REMOVED.

3. PERMANENT MARKERS FOR EACH CCR UNIT WERE INSTALLED AT PLANT MCDONOUGH ON JULY 31, 2015.

4. CCR DELINEATION IS ONGOING THROUGHOUT CONSTRUCTION AND WILL CONTINUE UNTIL THE COMPLETION OF CLOSURE CERTIFICATION. ALL CCR WITHIN THE CLOSURE PERMIT BOUNDARY TO BE EITHER EXCAVATED OR PLACED WITHIN THE FINAL COVER LIMITS.

# FOR PERMITTING PURPOSES NOT FOR CONSTRUCTION



# GEORGIA POWER COMPANY



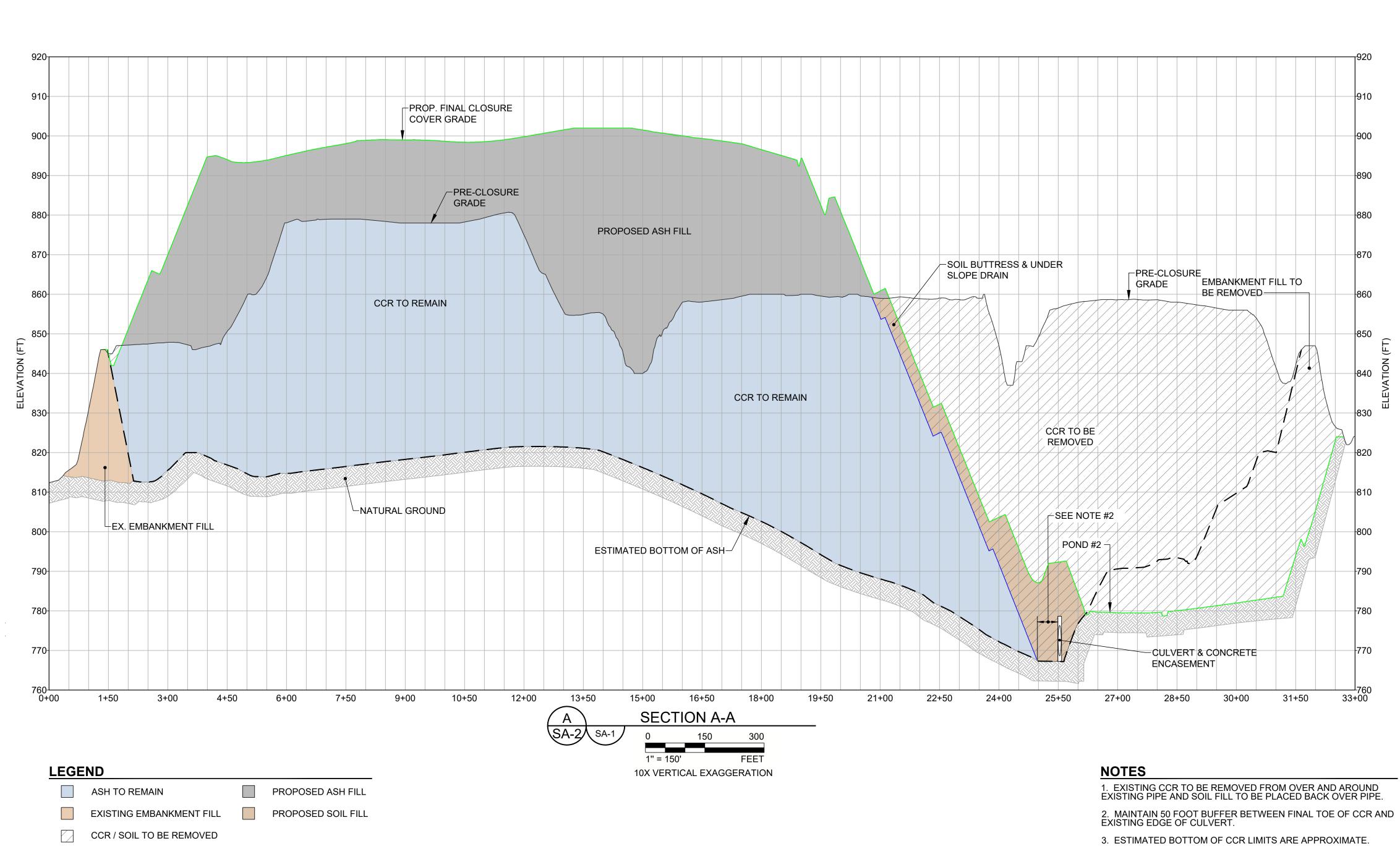
PROJECT PLANT MCDONOUGH - ATKINSON ASH POND 3 AND ASH POND 4 (AP-3/4) CLOSURE & ASH POND 2 (AP-2) CLOSURE

#### TITLE STABILITY ANALYSIS PERMIT BOUNDARY AP-2, & AP-3/4 SITE PLAN

CONSULTANT

PROJECT NO. 1777449

YYYY-MMM	2023 - FEB
DESIGNED	GLH
PREPARED	CRP
CHECKED	LS
REVIEWED / APPROVED	GLH
REV.	SHEET
0	SA-1



#### REFERENCES

1. THE PRE-CLOSURE TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA LAND DEPARTMENT AND METRO ENGINEERING AND SURVEYING CO, INC. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS 10-16-2012. REFER TO THE SURVEY DRAWING TITLED "TOPOGRAPHIC MAP PREPARED FOR GEORGIA POWER COMPANY PLANT MCDONOUGH - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF PHOTOGRAPHY 10-26-12. PROJECT NO. 13225 -01-13-2013."

2. REVISED PRE-CLOSURE TOPOGRAPHY & CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA POWER LAND DEPARTMENT. THE DATA SHOWN IS AN UPDATE TO THE PLANS DONE ON 10-16-2012 & THE ONSITE CHANGES SINCE THAT 2012 SURVEY. THE REVISED SURVEY WAS DONE ON 1-12-2016 & MERGED WITH THE DATA ON 10-16-2012. GEORGIA POWER COMPANY PLANT MCDONOUGH ASH PONDS - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF SURVEY 1-12-2016.

# FOR PERMITTING PURPOSES NOT FOR CONSTRUCTION

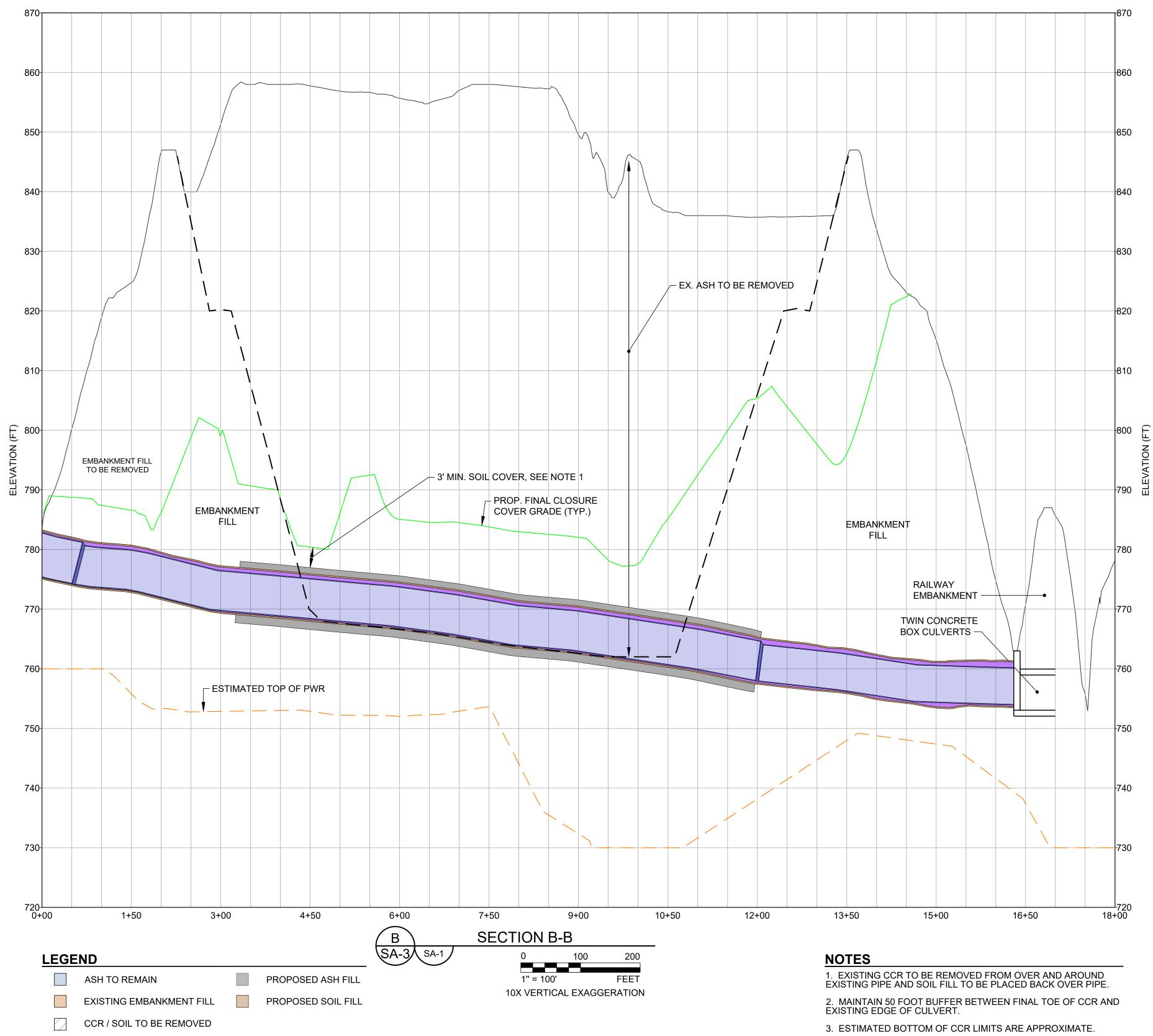
### CLIENT GEORGIA POWER COMPANY



PROJECT PLANT MCDONOUGH - ATKINSON ASH POND 3 AND ASH POND 4 (AP-3/4) CLOSURE & ASH POND 2 (AP-2) CLOSURE

TITLE STABILITY ANALYSIS PERMIT BOUNDARY AP-2, & AP-3/4 - SECTION A - A'

CONSULTANT	YYYY-MMM	2023-FEB
	DESIGNED	GLH
	PREPARED	CRP
	CHECKED	LS
	REVIEWED / APPROVED	GLH
PROJECT NO.	REV.	SHEET
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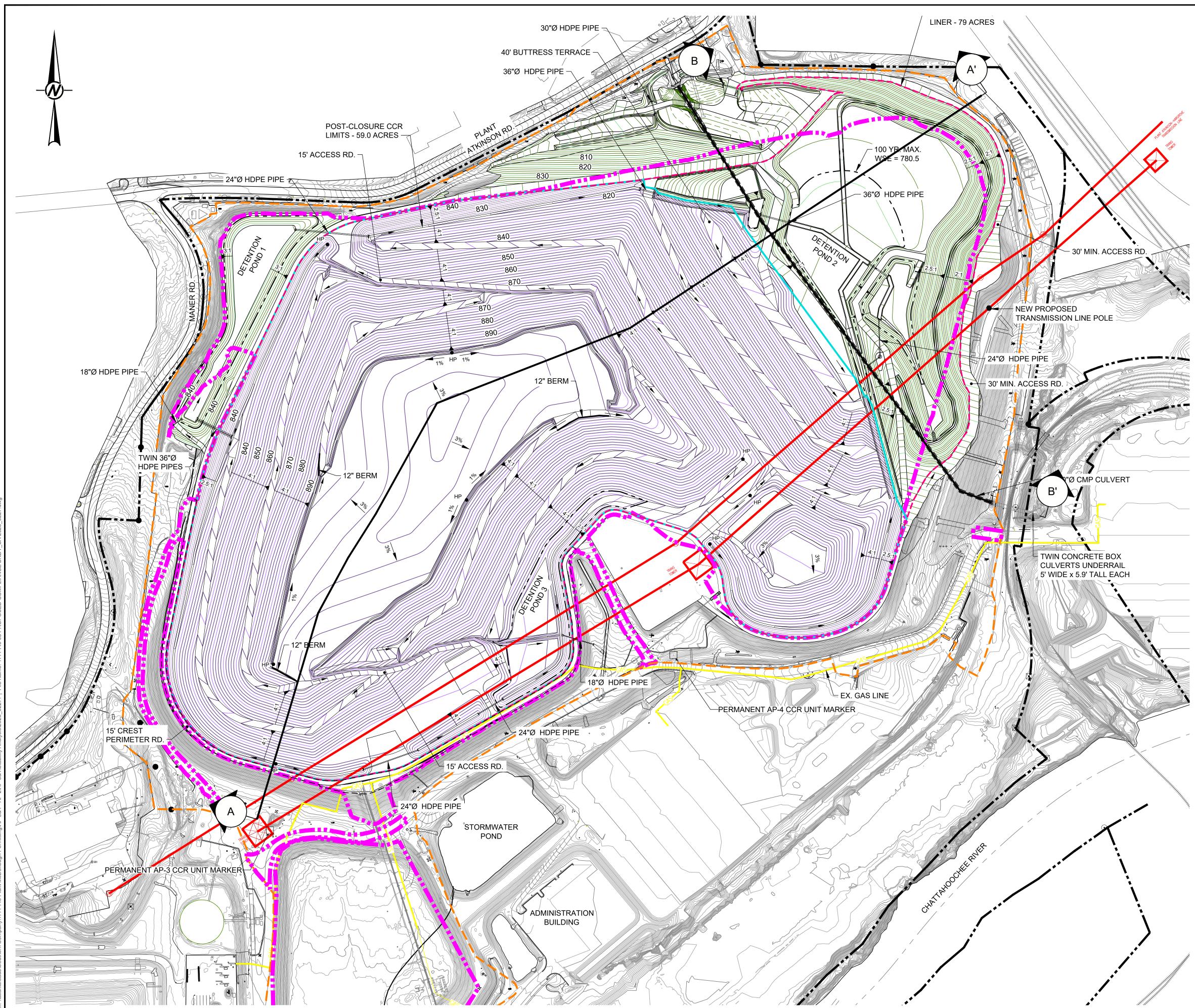
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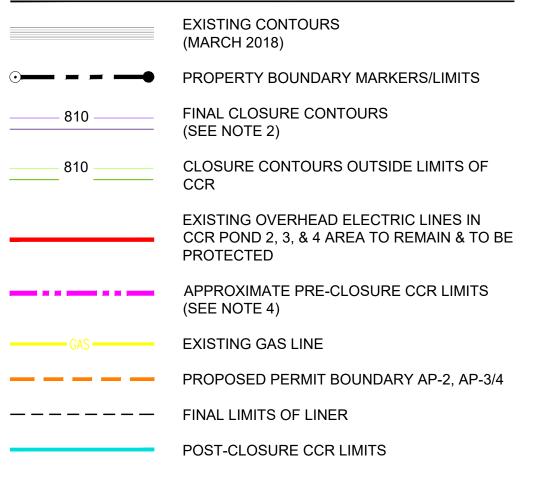
TITLE STABILITY ANALYSIS PERMIT BOUNDARY AP-2, & AP-3/4 - SECTION B - B'

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	DESIGNED	GLH
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	REVIEWED / APPROVED	GLH
PROJECT NO.	REV.	SHEET
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Natlanta/cadd/Southern Company/1777449 Plant McDonough Permitting/AP-3&4.Stability Analysis/2023 0227/ | File Name: 1777449 05 PROPOSED COMPLIANCE BNDY SA 2023 022





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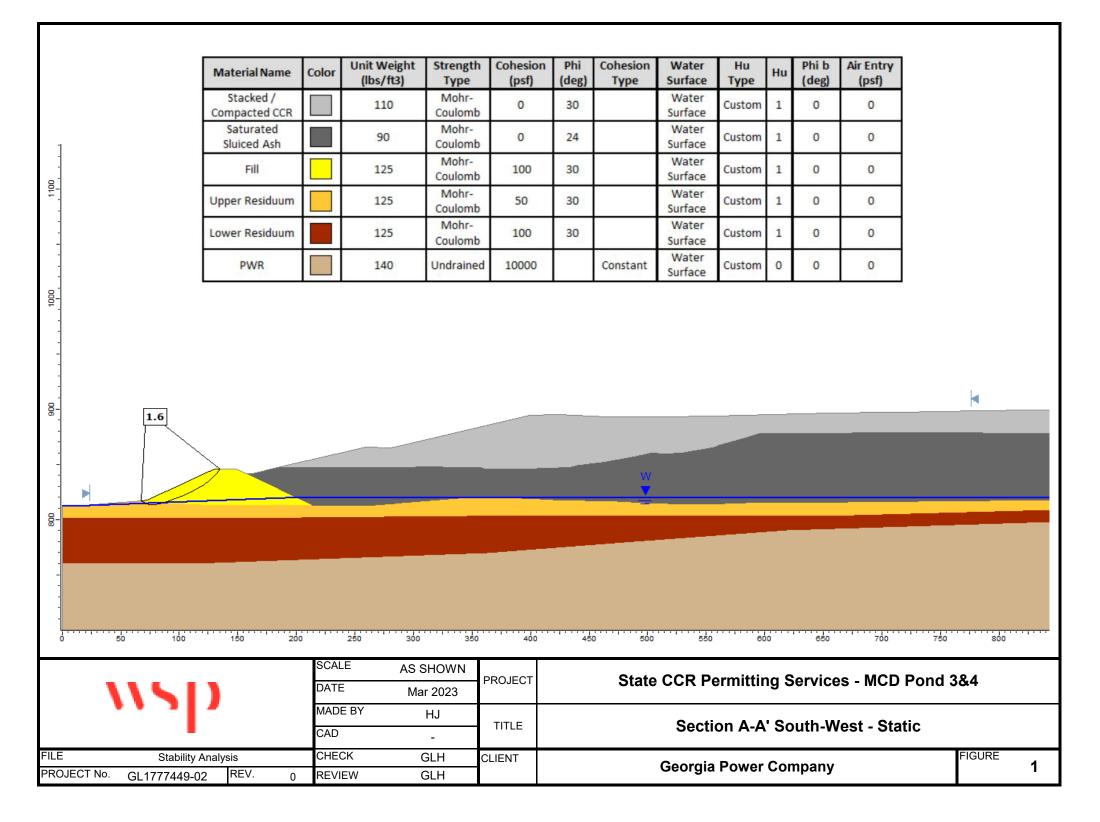
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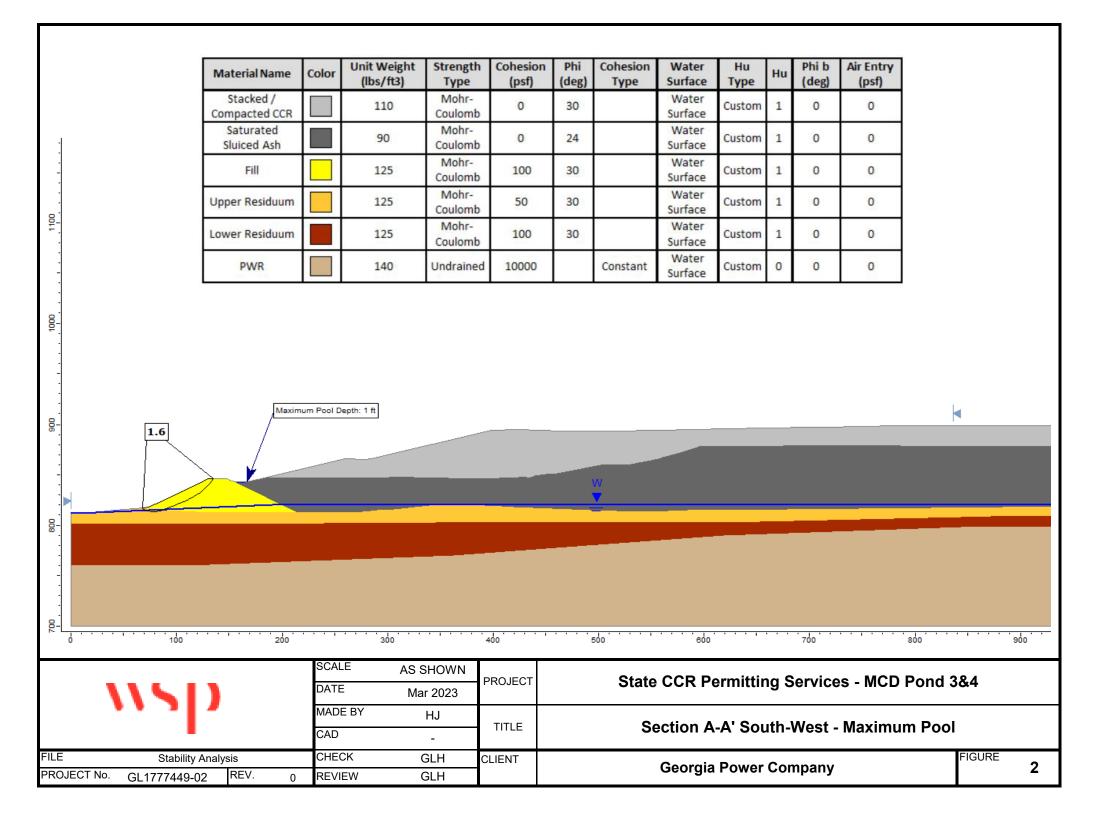
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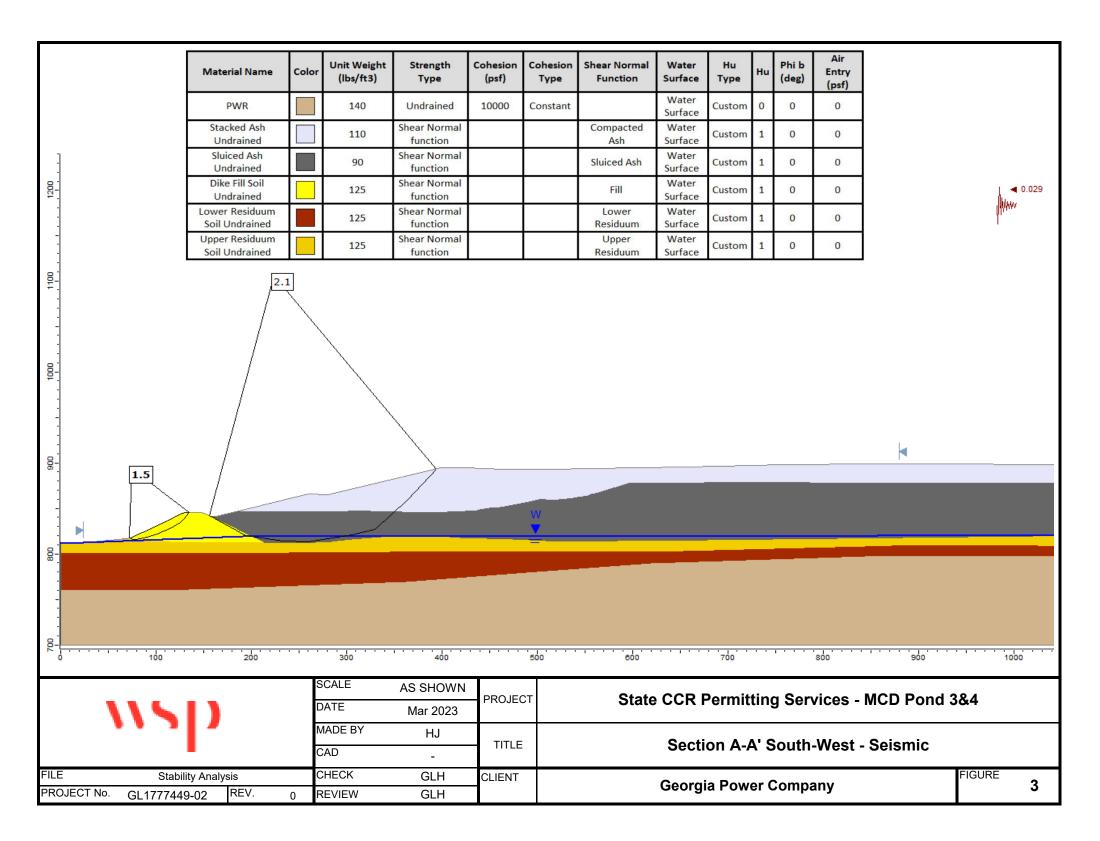
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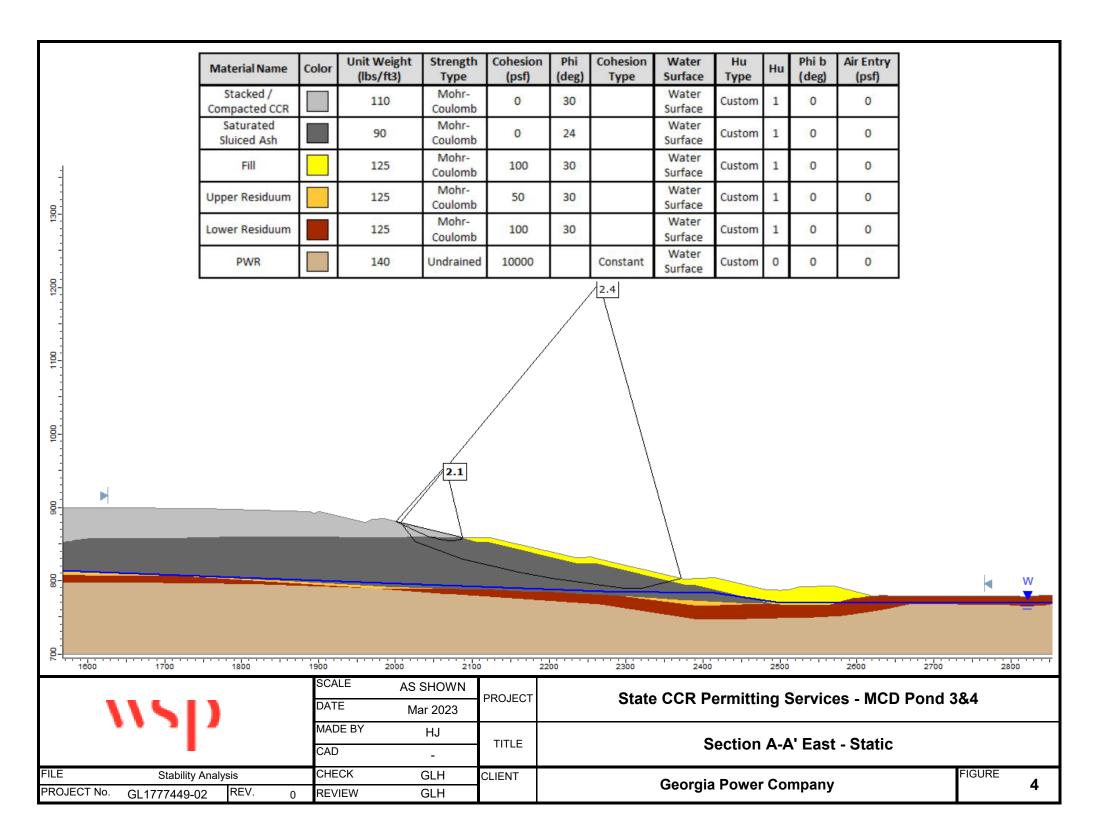
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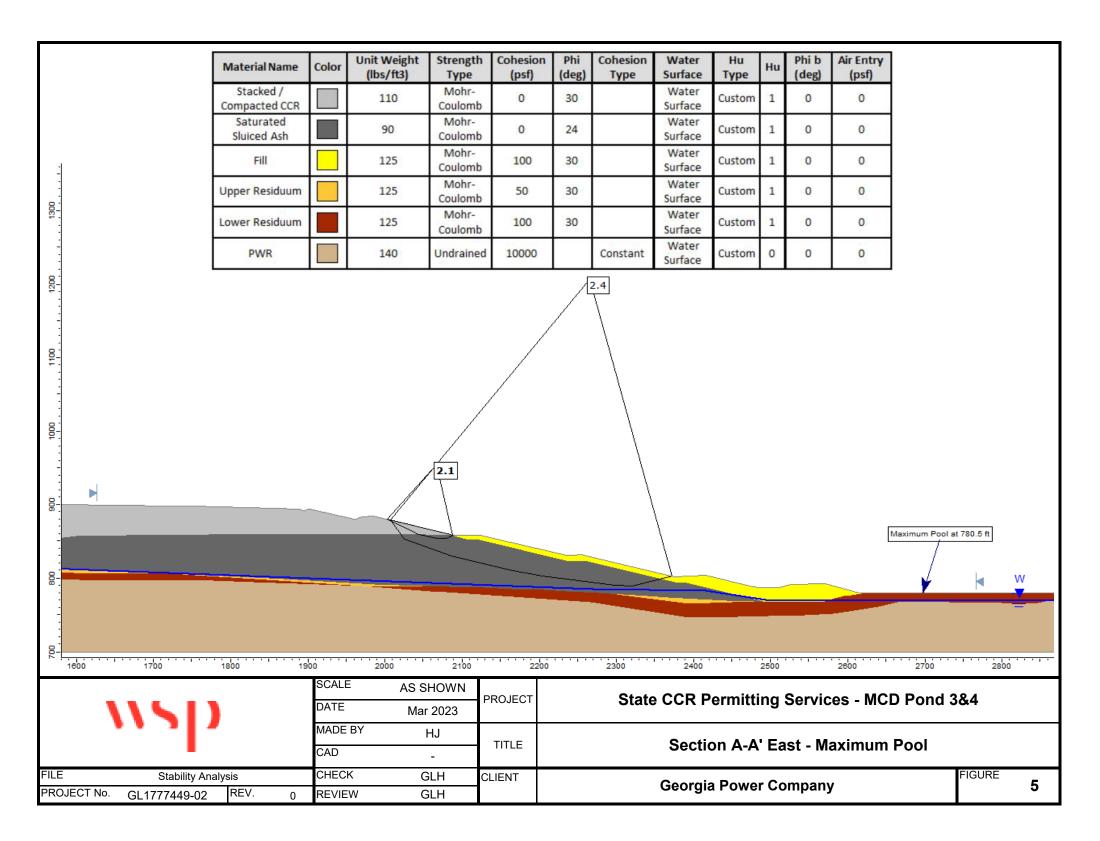
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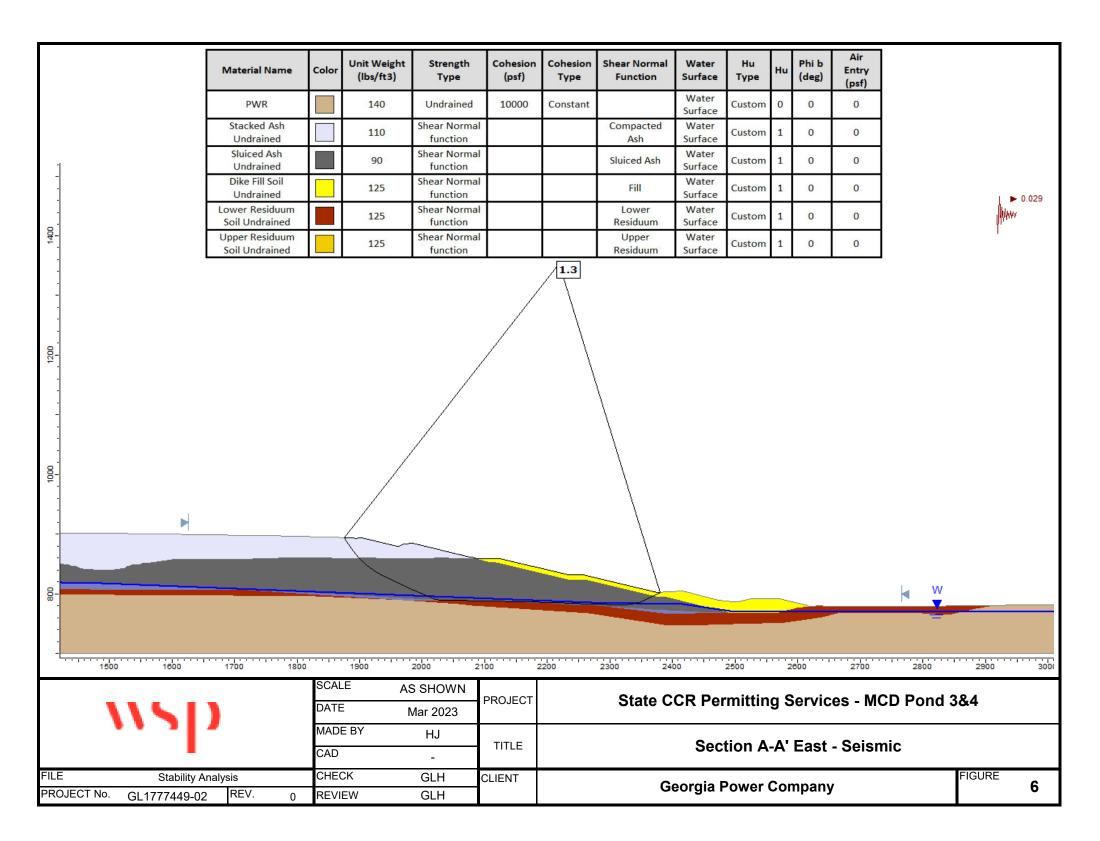


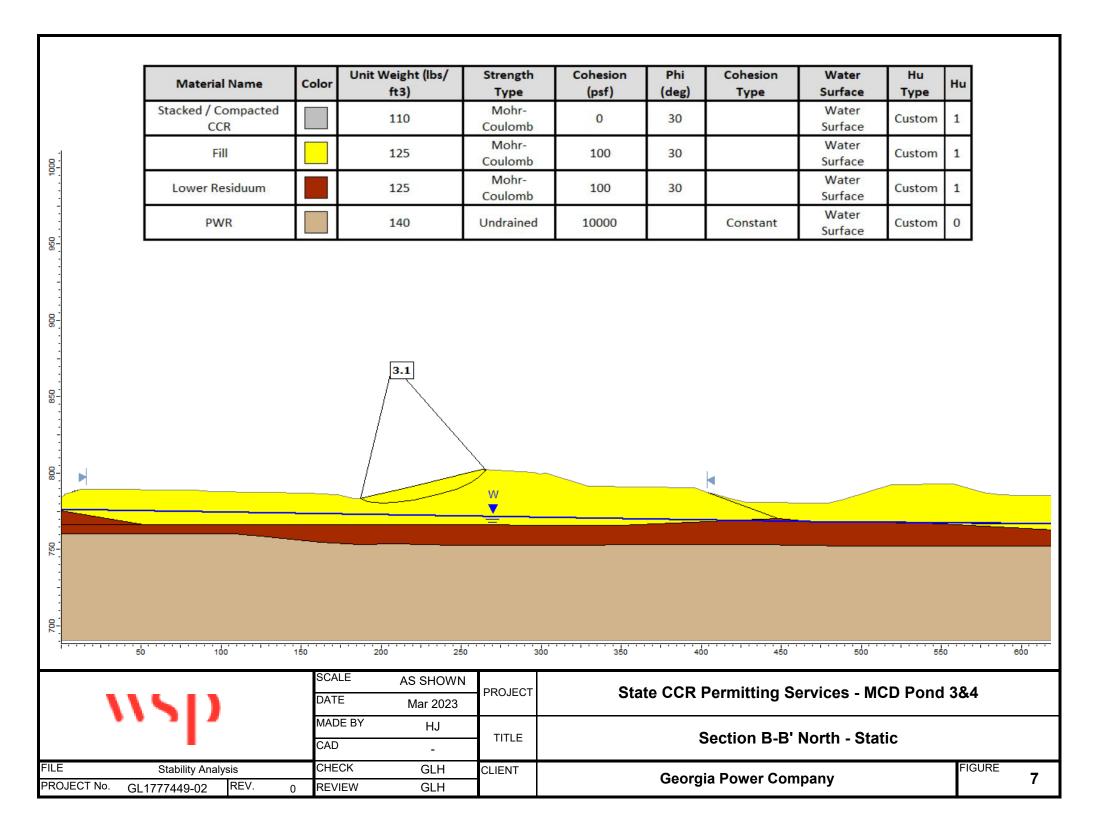




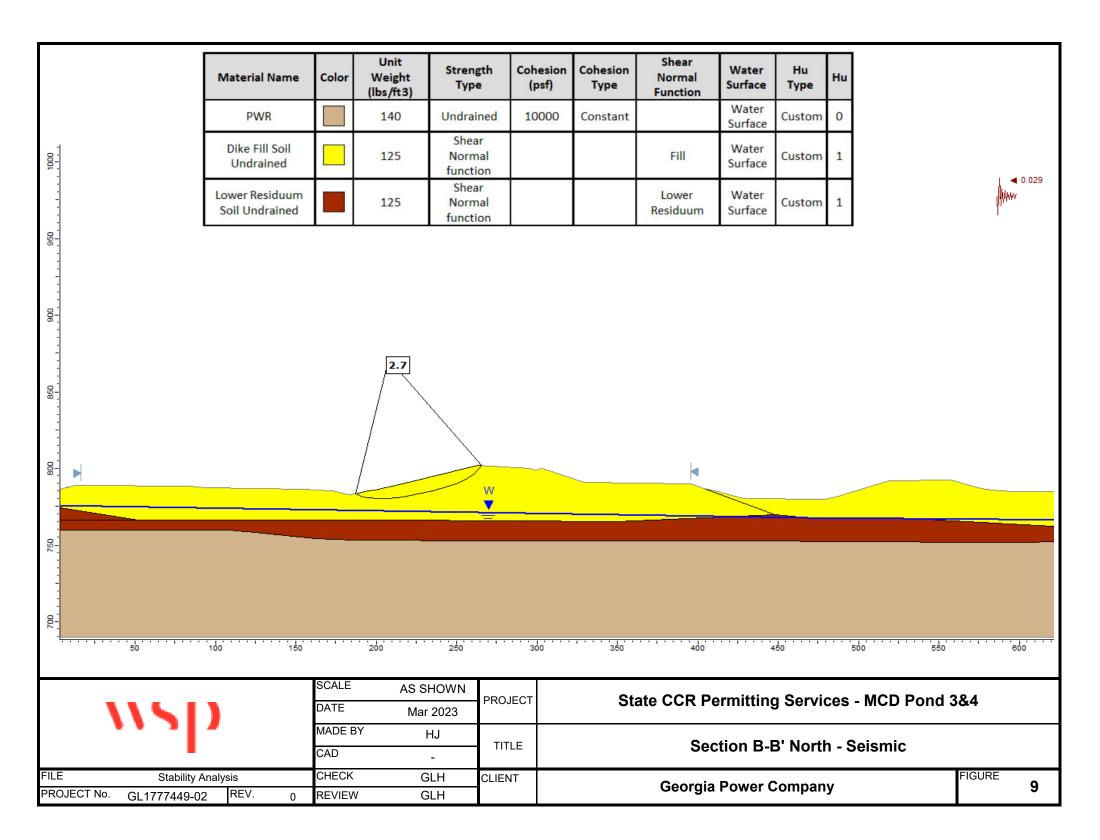








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