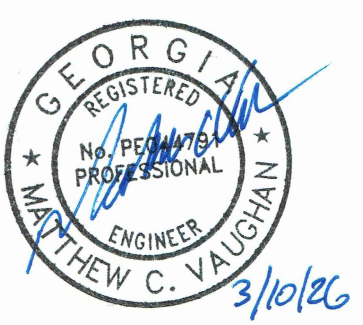
ENGINEERING REPORT FOR INACTIVE CCR UNIT

FORMER PLANT ARKWRIGHT – AP2-DAS
MACON-BIBB COUNTY, GEORGIA
FOR

Georgia Power

MARCH 2026



Stantec

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1. BACKGROUND AND OBJECTIVE

AP2-DAS was issued a Closure Certificate by the Environmental Protection Division (EPD) on July 30, 2010. Although this CCR unit has officially been closed, Georgia Power plans to remove the CCR waste from this CCR unit. After removal of CCR, the area will be regraded and revegetated. This engineering report has been included in the permit application to provide supporting documentation for the updated Closure Plan.

2. LOCATION RESTRICTION DEMONSTRATION

In accordance with the requirements of Georgia Solid Waste Management Rule 391-3-4-.10(9), an Inactive CCR Landfill permit application must include the location restriction demonstration requirements in 40 CFR 257.64 for unstable areas. No unstable areas were identified during the feasibility study for AP2-DAS. Local geologic/geomorphologic features and human-made surface features were studied and additional information for the onsite conditions can be found in the Limited Hydrogeological Study. Since the CCR waste is to be removed, long-term stability and differential settling conditions were not evaluated. Any sub-surface human-made features that may be found during excavation of CCR will be evaluated by a professional engineer and changes will be made to the Closure Plan, if necessary.

A certification from a Georgia-Registered Professional Engineer is included in Appendix A.

3. STORMWATER MANAGEMENT DURING EXCAVATION

The run-on and run-off control plan for AP2-DAS, which is included with this permit application, was prepared to comply with Solid Waste Management Rule 391-3-4-.10. Refer to the run-on and run-off control plan for the engineering analyses and calculations associated with stormwater management during excavation of CCR.

4. SITE RESTORATION STORMWATER H&H ANALYSIS

The following section discusses the stormwater hydrologic and hydraulic design conditions for stormwater discharge for the final site restoration conditions.

4.1 PURPOSE OF CALCULATION

AP2-DAS closure will involve restoration of the unit following removal of CCR. Imported soil fill will be utilized to reach the proposed grades. Stormwater will sheet flow to proposed swales which will drain to flumes to the perimeter of the facility, draining eventually to Beaver Dam Creek. This calculation uses PCSWMM Storm Water Management Model design suite to evaluate the following aspects of the design after CCR removal is complete:

- Ditch geometry (depths, widths, side-slopes);
- Ditch lining;

4.2 SUMMARY OF CONCLUSIONS

The design criteria are met for the final closure condition.

- The Type I and Type II Ditch is designed to convey the 100-year, 24-hour storm with a minimum of 0.5 feet of freeboard
- Velocities and shear stresses calculated using inputs from the PCSWMM model are below the allowable limits for the selected channel lining during the 100-year, 24-hour storm event

Detailed calculations are provided in Appendix B.2.

5. FLOOD PROTECTION

Potential measures to protect removal activities from an overbank flooding event have been evaluated during this permitting design phase. Further evaluations and selection of appropriate measures will be conducted during the detailed design phase. The following features have been evaluated.

5.1 EXCAVATION SEQUENCING

The excavation will proceed in the following general sequence:

a) CCR from AP2-DAS will be almost entirely removed while maintaining an outer CCR berm up to the 100-year flood elevation level. The outer CCR berm will protect the interior excavation areas from flooding and protect the creek from sediment and CCR exposed in the interior excavation.
b) Following removal of the interior CCR, the berm will be removed. Creek forecasts will be monitored during CCR removal. A soil berm may be constructed to replace the excavated CCR berm as berm removal progresses should a flood event be forecasted during the outer CCR berm

removal. Other measures to protect the excavation area during final CCR berm removal include placing temporary cover including soil or geosynthetics over the exposed CCR.

5.2 VEGETATION MAINTENANCE

Existing vegetation on the exterior slopes will be maintained for as long as possible, up until the actual moment of excavation and removal. Equipment will not operate on these outer slopes or otherwise disturb the vegetation or soil surface.

5.3 INTERIM BERMS

Interim berms may be periodically constructed across the interior excavation. These berms will protect previously excavated interior areas from flooding when removal of the outer soil/CCR slopes is occurring or to protect previously excavated areas.

5.4 EROSION CONTROL MEASURES

Erosion control measures will be utilized to protect the integrity of the exterior slopes from erosion by floodwaters or rain events. Erosion control measures may consist of, but not be limited to, the following:

a) Soil stockpiles close to slope excavation areas so that exposed CCR can be covered quickly if sufficiently high-water levels are predicted;
b) Erosion control matting deployed on disturbed areas;
c) Geotextiles or temporary geomembranes (rain tarps) deployed on disturbed areas;
d) Temporary seeding or sodding of disturbed areas;
e) Sediment perimeter controls such as compost filter socks or silt fence installed at the toe of the outer slope to filter out sediment before entering the creek;
f) Additional rows of sediment perimeter controls installed above the toe of the outer slope but downhill from disturbed areas;
g) Small soil berms constructed at or near the toe of the outer slope to trap sediment; and
h) Monitoring and maintenance of erosion control measures so that trapped sediment is promptly removed, and the full sediment retention capacity of the fence/bale/berm is available.

5.5 POLYMER EMULSIONS

Polymer emulsions may be applied to disturbed areas to reduce erosion.

5.6 CONSTRUCTION SCHEDULE ADJUSTMENT

During construction, the forecast for local weather will be closely monitored. If heavy local rains are predicted, construction activities may be paused or modified to reduce the potential for erosion. Temporary measures described in Sections 5.3 through 5.5 may also be deployed.

Beaverdam Creek water levels correlate with Ocmulgee River water levels as the creek is backwater during large river flood events. Predicted water levels will be closely monitored during construction. United States Geological Survey (USGS) monitoring stations are located both upstream and downstream on the Ocmulgee River of the project site, and water levels at the project can be predicted by interpolating from predictions at these USGS stations. If predicted water levels will rise as high as exposed CCR excavation

areas, then construction will be paused and one or more of the temporary measures described in Sections 5.3 through 5.5 may be deployed. Additionally, Georgia Power personnel will maintain close communications with dam operations personnel at Lake Juliette so that flow releases from the lake may be reduced during periods of high-water levels.

APPENDIX A. PE CERTIFICATION FOR LOCATION RESTRICTION DEMONSTRATION

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LOCATION RESTRICTION DEMONSTRATION

UNSTABLE AREAS

FORMER PLANT ARKWRIGHT – AP2-DAS LANDFILL

GEORGIA POWER COMPANY

Georgia's Solid Waste Management Rule 391-3-4-.10(9) requires that Inactive CCR Landfill solid waste handling permit applications meet requirements of (9)(c)3.(i) – (iv), including the location restriction demonstration requirements in 40 C.F.R. 257.64 for unstable areas.

Per § 257.64 of Subpart D - Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, the owner or operator must demonstrate that the facility is not located within an unstable area or a demonstration must be made that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted. As defined in § 257.53, an unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains.

The AP2-DAS Landfill is located in Bibb County approximately six miles northwest of Macon, Georgia. A review of the site geology, hydrogeology, and information available of onsite surface and subsurface conditions confirmed that the CCR unit is not located within an unstable area having subsurface soil conditions, onsite geologic or geomorphologic features, and/or on-site human-made features or events (both surface and subsurface) that may result in significant differential settling of the foundation of the CCR unit.

I hereby certify, to the best of my knowledge and based on the information presented in the CCR Unit Solid Waste Handling Permit Application dated November 2018, that for Georgia Power's former Plant Arkwright – AP2-DAS Landfill, the unstable areas location restriction demonstration meets the requirements of 391-3-4-.10(9)(c)3.(i).

GEORGIA REGISTERED No. PE14390 PROFESSIONAL ENGINEER MICHAEL T. FEENEY

11-14-18

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11/14/18

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APPENDIX B. CALCULATIONS

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APPENDIX B.1 SITE RESTORATION STORMWATER CALCULATIONS

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Georgia Power Plant Arkwright Macon, Bibb County, Georgia	**Plant Arkwright Closure**

Calculation Package Permit Design

Final Site Restoration Stormwater Management

Purpose:

- Evaluate proposed closure grades after removal of CCR to manage stormwater during the 100-year, 24-hour storm event.

Methods:

- Utilize the Georgia Stormwater Management Manual to size drainage ditches, culverts, and flumes
    - Perform hydrologic modeling using CHI PCSWMM
    - Evaluate hydraulic capacity of ditches, culverts, and flumes
    - Select appropriate channel lining material for ditches and flumes

Results:

- Stormwater management features presented in the permit design drawings are sufficiently sized to convey the 100-year, 24-hour storm event.

Calculation Performed by: Stantec Consulting Services, Inc.	
Prepared by: Elizabeth Vanderloo, EIT	*Reviewed by:* Sam Lee, PE
Revisions:	

Attachment A: SWMM Summary

Design Standards and References

Calculations conducted in accordance with the Georgia Stormwater Management Manual.

Design Standards and References

Parameter	Design Standard/Method/Source
Stormwater Design Storm Return Interval	100-yr, 24-hour NOAA Atlas 14 Precipitation Frequency Data Server
Stormwater Runoff Calculations	SCS Curve Number Approach USDA NRCS "Urban Hydrology for Small Watersheds" (Technical Release 55, June 1986)
Stormwater Modeling Software	Computational Hydraulics Institute, PCSWMM (SWMM Version 5.2.3)

Inputs and Assumptions

PCSWMM inputs are discussed below. Model layouts are included in Attachment B.

Drainage Subcatchments

1. Rainfall Depth: 100-yr, 24-hr: 8.1 inches SCS Type II Rainfall Distribution
2. Subcatchment Geometry (Area, Drainage Length, Slope): Delineated in PCSWMM based on permit design plans topography.
   - Drainage area slope referenced from permit design plans
3. SCS Curve Number:
   - CN = 78 for grass

Conduit Parameters

1. Roughness:
   - Grass: 0.027 referenced from "Open Channel Hydraulics" by Ven Te Chow
   - Riprap: 0.078 referenced from Georgia Stormwater Management Manual Table 5.4-4 for GDOT Type I riprap
   - Concrete: 0.013 referenced from "Open Channel Hydraulics" by Ven Te Chow

Storage Node Parameters

1. Geometry: Delineated in PCSWMM based on permit design plans topography.
   - Pond Bottom Elevation: 316 feet
   - Pond Rim Elevation: 321.9 feet
2. Elevation-Area: Delineated in AutoCAD Civil 3D from permit design plans.
3. Elevation-Discharge: Rating curve calculated from topographic data in permit design plans.

System Outfall

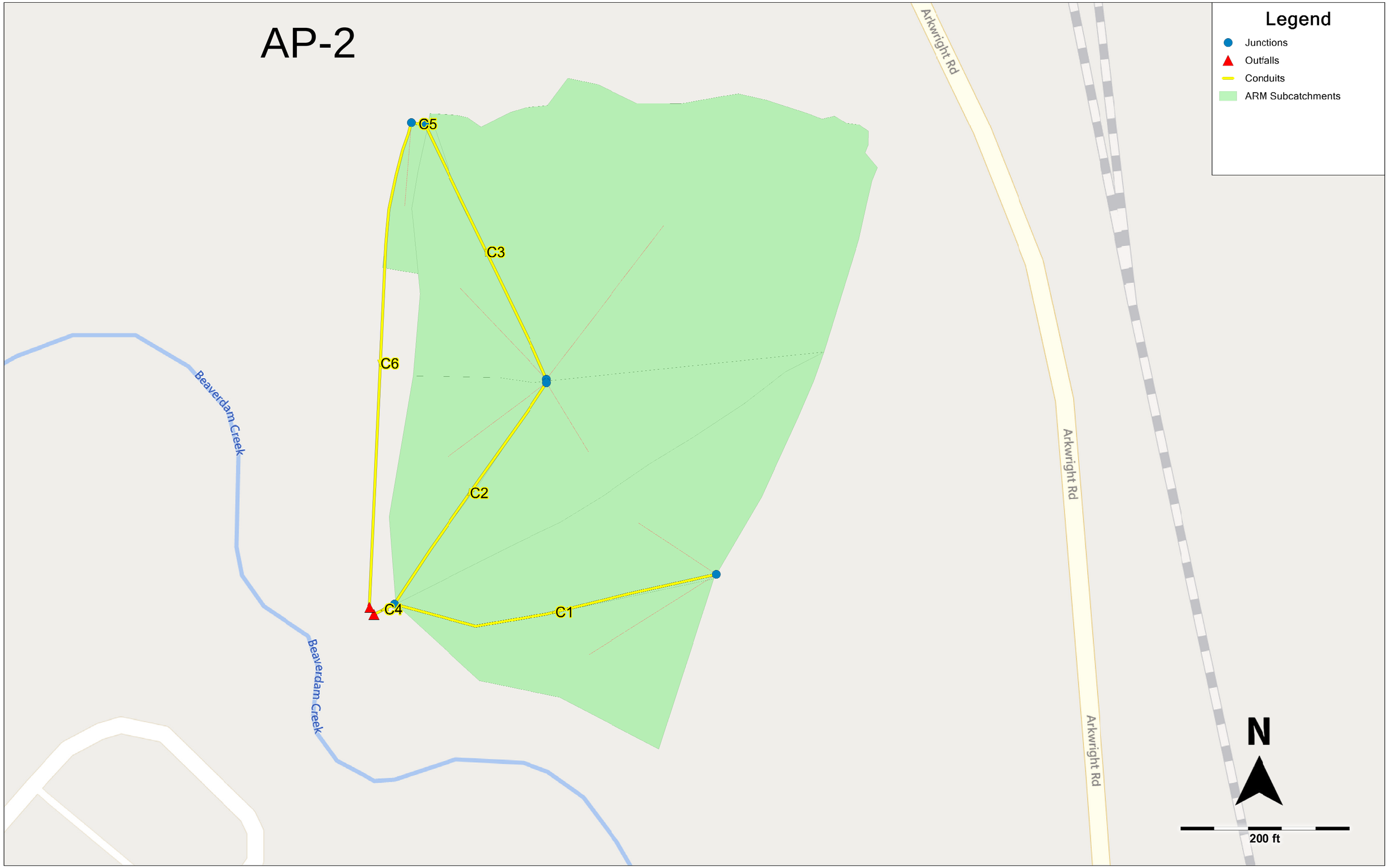
Assumed a “free” outfall (i.e. no tailwater conditions).

Results

PCSWMM results can be found in the tables in Attachment C. Channel lining material was determined using Equation 5.4.13 in the Georgia Stormwater Management Manual. Calculated D_{30} using Equation 5.4.13 was used to determine D_{50} and channel type.

Attachment B: SWMM Model Layouts

AP-2


Legend
Junctions
Outfalls
Conduits
ARM Subcatchments
C5
C3
C6
C2
C4
C1
Arkwright Rd
Arkwright Rd
Arkwright Rd
Beaverdam Creek
Beaverdam Creek
N
200 ft

Attachment C: Tables

Table 1: AP-2 Subcatchments

Name	Area (ac)	Flow Length (ft)	Slope (%)	Time of Concentration (min)	SCS Curve Number	Peak Runoff (cfs)
S1	3.1	450	3	10	78	23.1
R1	1.0	185	3	6	78	8.5
R2	0.8	120	3	6	78	6.8
R3	1.2	130	3	6	78	10.5
R4	0.6	100	3	6	78	4.9
R5	0.5	180	3	6	78	4.6
R6	0.1	40	33	6	78	1.0

Table 2: AP-2 Ditches & Flumes

Name	Length (ft)	Roughness	Slope (ft/ft)	Max Flow (cfs)	Max Velocity (ft/s)	Max/Full Depth (%)	Channel Type
C1	391	0.027	0.01	17.1	2.9	63%	Type I
C2	317	0.027	0.01	13.0	2.3	59%	Type I
C3	331	0.027	0.01	26.8	3.4	58%	Type I
C4	27	0.078	0.31	29.3	6.7	47%	Type III
C5	17	0.078	0.24	26.8	1.9	56%	Type III
C6	574	0.027	0.01	20.0	1.8	69%	Type I

Attachment D: Channel Lining

Georgia Power
Plant Arkwright Closure 30% Design
AP-2 Final Grade Riprap Sizing

Channel ID	n	S	Q	b	z	d	W	A	Wp	R	V	Shear Stress	Hydraulic Depth	Froude	GA D30 (inches)	D50	Channel Type
C4	0.078	0.31	29.3	4	3	**0.7**	**8.2**	4.3	8.5	0.5	**6.8**	**13.7**	**0.5**	**1.7**	5.77	**7.3**	Type III
C5	0.078	0.24	26.8	4	3	**0.7**	**8.3**	4.4	8.5	0.5	**6.1**	**10.8**	**0.5**	**1.5**	4.31	**5.4**	Type III
C6	0.027	0.01	27.3	4	3	**1.0**	**10.3**	7.5	10.6	0.7	**3.6**	**0.5**	**0.7**	**0.8**	1.20	**1.5**	Type I
C3	0.027	0.01	26.8	10	6	**0.6**	**16.8**	7.6	16.9	0.4	**3.6**	**0.4**	**0.5**	**0.9**	1.10	**1.4**	Type I
C1	0.027	0.01	17.1	6	6	**0.5**	**12.5**	5.0	12.6	0.4	**3.4**	**0.4**	**0.4**	**0.9**	1.08	**1.4**	Type I
C2	0.027	0.01	13.0	6	6	**0.5**	**11.7**	4.2	11.7	0.4	**3.1**	**0.4**	**0.4**	**0.9**	0.88	**1.1**	Type I

Governing Geometry Equations

$$W = b + 2dz$$

$$A = bd + zd^2$$

$$W_P = b + 2d\sqrt{z^2 + 1}$$

Open Channel Equations

$$Q = \frac{1.49}{n} A R^{\frac{2}{3}} S_o^{\frac{1}{2}} \qquad R = \frac{A}{W_P}$$

$$\tau_d = \gamma d S \qquad V = \frac{Q}{A}$$

Riprap Sizing Equations

$$D_{30} = D * 0.193 * Fr^{2.5}$$

$$D_{50} = D_{30} * 2^{1/3}$$