



Prepared for

Santee Cooper
One Riverwood Drive
Moncks Corner, SC 29461

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN ASH POND A WINYAH GENERATING STATION

Prepared by

Geosyntec 
consultants

1300 South Mint Street, Suite 300
Charlotte, NC 28203

Project Number: 26009458

September 2026

INTRODUCTION

Winyah Generating Station (WGS or the Site) is a 1,260-megawatt coal-fired electric generating facility owned and operated by the South Carolina Public Service Authority (Santee Cooper). The Site is situated between Pennyroyal and Turkey Creeks and is located in Georgetown, South Carolina. Historically, coal combustion residuals (CCR) generated at WGS have been managed in existing CCR surface impoundments.

In response to the CCR Rule (40 Code of Federal Regulations (CFR) Part 257 Subpart D), Santee Cooper retained Geosyntec Consultants, Inc. (Geosyntec) to prepare documentation for existing surface impoundments at WGS. Pursuant to Section 257.82(c) of the CCR Rule, Geosyntec prepared this Inflow Design Flood Control System Plan for Ash Pond A at WGS.

Section 257.82(a) of the CCR Rule states that *“The owner or operator of an existing or new CCR surface impoundment, legacy CCR surface impoundment, or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.”* The Preamble to the CCR Rule provides guidance on the documentation that should be provided for the Inflow Design Flood Control System Plan.

Section 257.82(b) of the CCR Rule states that the *“discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3”*.

The inflow design flood control system for Ash Pond A at the Site consists of maintaining the minimum operating freeboard for the surface impoundment. Justification and documentation of the adequacy of the inflow design flood control system is presented in the following sections.

The work presented in this report was performed under the direction of Ms. Sarah Herr, PE, of Geosyntec in accordance with Section 257.82(c).

SURFACE IMPOUNDMENT DESCRIPTION

Ash Pond A, encompassing approximately 26.3 acres (ac), is located southeast of the power block. Ash Pond A is bounded by Landfill Area 2 to the north, the Cooling Pond to the east, Ash Pond B to the south, and the Discharge Canal to the west. Ash Pond A is separated from Ash Pond B by a divider dike, which traverses from west to east from the Discharge Canal to the Cooling Pond. Ash Pond A is bounded by perimeter dikes which are approximately 20 feet (ft) to 24.5 ft in height to the east and 12 ft to 15 ft in height to the north (Worley, 2026). **Figure 1** depicts the boundary and hydraulic features associated with Ash Pond A.

Historically, Ash Pond A decanted ash sluice water, low volume wastewater, and Unit 2 Slurry Pond stormwater to Ash Pond B. Presently, Ash Pond A only receives stormwater inflows from the immediate pond area. Since the 2021 assessment, the three culverts connecting Ash Ponds A and B have been abandoned, and the former emergency spillway connecting Ash Ponds A and B has been backfilled. As a result, Ash Ponds A and B are no longer hydraulically connected.

Ash Pond A does not currently hold ponded water, as dewatering activities are underway to facilitate the closure of the surface impoundment. However, for this analysis, dewatering activities are assumed to be non-operational due to temporary loss of power during a large storm event.

CATCHMENT AREA AND DESIGN STORM EVENT

The contributing watershed area for Ash Pond A is 26.3 ac. The surface impoundment is surrounded on all sides by a raised perimeter dike, which limits the stormwater run-on to that generated within the footprint of the pond itself. A description of the drainage area is included in the Hydrologic and Hydraulic Analysis, provided in **Appendix A**.

Since Ash Pond A is classified as a low hazard potential surface impoundment (Geosyntec, 2026), the inflow design flood is the 100-year (yr) flood event.

STORAGE CAPACITY

The available stormwater storage volume in Ash Pond A between elevations 22 ft and 36 ft (Plant Vertical Datum) was calculated by developing an area-volume curve based on topographic data (Worley, 2026). The lowest available contour within Ash Pond A is 22

ft (Plant Vertical Datum). The minimum crest elevation of the Ash Pond A perimeter dikes is 36 ft (Plant Vertical Datum). The surface area of each contour was measured and tabulated at each elevation. Next, the available surface water volume in each depth increment was calculated by averaging the surface area of the upper and lower contours and multiplying by the change in elevation between the contours. The cumulative storage volume of Ash Pond A between these elevations is 246.0 acre-feet (ac-ft). The area-volume data are presented in **Appendix A**.

HYDROLOGIC AND HYDRAULIC ANALYSIS

Geosyntec performed a hydrologic and hydraulic analysis of Ash Pond A. Stormwater runoff volumes and associated discharges to Ash Pond A were modeled using *HydroCAD Version 10.20* software (HydroCAD, 2024). The model assumed that dewatering activities are non-operational due to temporary loss of power during the 100-yr storm event. **Appendix A** presents the Hydrologic and Hydraulic Analysis and documents assumptions, rainfall abstractions, and drainage areas.

ROUTING RESULTS

The *HydroCAD* model results are presented in **Appendix A**. The resulting peak water surface elevation in Ash Pond A during the 100-yr storm event based on the hydrologic and hydraulic analysis is shown in **Table 1**. Ash Pond A will effectively contain the 100-yr storm event and maintain a freeboard of 11.0 ft assuming Ash Pond A does not hold ponded water. Detailed results are presented in **Appendix A**.

The results from this analysis show that the inflow design flood control system adequately manages flow into the CCR surface impoundment during and following the inflow design flood as specified in the Section 257.82(a) of the CCR Rule. Additionally, all discharges from Ash Pond A are managed through National Pollutant Discharge Elimination System Outfall 002 during normal operating conditions or contained within the CCR surface impoundment during the inflow design flood, thus complying with Section 257.82(b) of the CCR Rule.

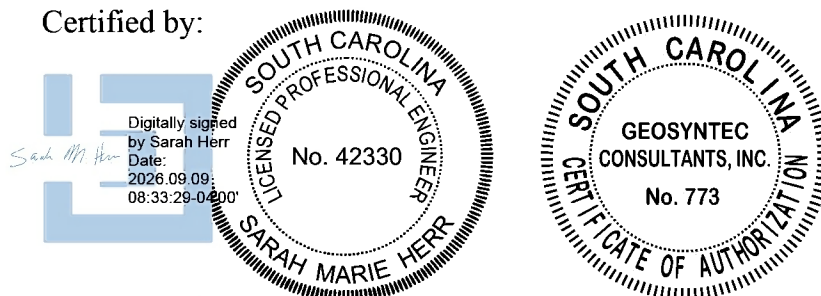
Table 1 – Peak Elevations and Freeboard

Event	<i>Ash Pond A</i>	
	<i>Elevation (ft) (Plant Vertical Datum)</i>	<i>Freeboard (ft)</i>
Normal Operating Condition	Dry	14.0
100-Yr Flood Condition	25.0	11.0

CERTIFICATION

This Inflow Design Flood Control System Plan meets the requirements of Section 257.82 of the CCR Rule and was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. No other warranty is provided in connection therewith. The contents of this report are based solely on the observations of the conditions observed by Geosyntec and information provided to Geosyntec by Santee Cooper. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others. Although we were not able to independently verify such data, we did evaluate it to determine whether it was consistent with other information that we developed in the course of our performance of the scope of services.

Certified by:



Sarah Herr, PE
Licensed State of SC, PE No. 42330

REFERENCES

Geosyntec. (2026). *Hazard Potential Classification Assessment – Ash Pond A*.

HydroCAD. (2024). *HydroCAD Stormwater Modeling System*. Version 10.20-3h.

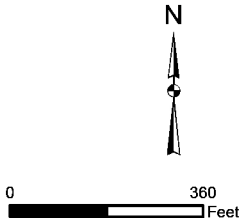
Worley Group, Inc. (2026). *Ash Ponds A & B Initial Sitework Plan*.

FIGURES



Legend
Pond Boundary

Note:
1. Aerial imagery taken from Google Earth, dated April 2025.



WINYAH GENERATING STATION ASH POND A	
Geosyntec consultants	Figure 1
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APPENDIX A

Hydrologic and Hydraulic Analysis – Ash Pond A

Written by: A. Brand Date: 09/08/26 Reviewed by: S. Herr Date: 09/08/26
 Client: Santee Cooper Project: WGS AP A H&H Project No.: 26009458 Phase No.: 04

HYDROLOGIC AND HYDRAULIC ANALYSIS WINYAH GENERATING STATION, ASH POND A, GEORGETOWN, SOUTH CAROLINA

1 PURPOSE AND BACKGROUND

Winyah Generating Station (WGS or the Site) is a 1,260-megawatt coal-fired electric generating facility owned and operated by the South Carolina Public Service Authority (Santee Cooper). The Site is situated between Pennyroyal and Turkey Creeks and is located in Georgetown, South Carolina. Historically, coal combustion residuals (CCR) generated at WGS have been managed in existing CCR surface impoundments.

The purpose of this computation package is to evaluate the hydraulic capacity of Ash Pond A to support spillway capacity assessments, static factor of safety analyses, and hazard rankings required by the United States Environmental Protection Agency's (USEPA's) Coal Combustion Residuals (CCR) Rule. Ash Pond A is regulated by the CCR Rule as an existing CCR surface impoundment. Under the CCR Rule, a low hazard ranking classification is associated with the 100-year (yr) flood. Since Ash Pond A is a low hazard surface impoundment, the 100-yr flood is analyzed herein.

Ash Pond A, encompassing approximately 26.3 acres (ac), is located southeast of the power block. Ash Pond A is bounded by Landfill Area 2 to the north, the Cooling Pond to the east, Ash Pond B to the south, and the Discharge Canal to the west. Ash Pond A is separated from Ash Pond B by a divider dike, which traverses from west to east from the Discharge Canal to the Cooling Pond. Ash Pond A is bounded by perimeter dikes which are approximately 20 feet (ft) to 24.5 ft in height to the east and 12 ft to 15 ft in height to the north (Worley, 2026). **Figure 1** depicts the boundary and hydraulic features associated with Ash Pond A.

Historically, Ash Pond A decanted ash sluice water, low volume wastewater, and Unit 2 Slurry Pond stormwater to Ash Pond B. Presently, Ash Pond A only receives stormwater inflows from the immediate pond area. Since the 2021 assessment, the three culverts connecting Ash Ponds A and B have been abandoned, and the former emergency spillway connecting Ash Ponds A and B has been backfilled. As a result, Ash Ponds A and B are no longer hydraulically connected.

Ash Pond A does not currently hold ponded water, as dewatering activities are underway to facilitate the closure of the surface impoundment. However, for this analysis, dewatering activities are assumed to be non-operational due to temporary loss of power during a large storm event.

Written by: A. Brand Date: 09/08/26 Reviewed by: S. Herr Date: 09/08/26
 Client: Santee Cooper Project: WGS AP A H&H Project No.: 26009458 Phase No.: 04

2 METHODOLOGY AND INPUT PARAMETERS

Stormwater runoff volumes and associated discharges to Ash Pond A were modeled using *HydroCAD Version 10.20* software (HydroCAD, 2024). *HydroCAD* utilizes frequency-based precipitation events, in conjunction with watershed properties, to calculate peak runoff by several accepted methods. The Soil Conservation Service (SCS) Technical Release 20 (TR-20) method was applied in *HydroCAD* to calculate stormwater runoff volumes (SCS, 1982).

The following parameters and assumptions were selected for calculating stormwater runoff volumes to Ash Pond A.

Rainfall

The 72-hour (hr) duration precipitation event was used in this analysis. The rainfall depth corresponding to the 72-hr duration precipitation event for the 100-yr flood for the Site is 12.8 inches (in.) (NOAA, 2021). The design storm hydrograph was developed using SCS Type III rainfall distribution and was directly input to the *HydroCAD* model.

Drainage Areas and Curve Numbers

The contributing watershed area for Ash Pond A is 26.3 ac. The area was delineated using the dike crests to correspond to the pond's direct drainage area. The pond was assigned a curve number (CN) based on guidance provided in Technical Release 55 (TR-55) (SCS, 1986) representing the type of ground cover in that area. Ash Pond A was assumed to be 100% ash (CN = 86). The contributing watershed area and CN is summarized in **Table 1** and was directly input into the *HydroCAD* model.

Times of Concentration

The time of concentration represents the time required for runoff to flow from the most hydraulically remote point of the drainage area to the point under investigation. The flow path from the most remote point within Ash Pond A is characterized by sheet flow and shallow concentrated flow (shown in **Figure 2**). *HydroCAD* applied the Overton and Meadows formulation to calculate travel time for sheet flow for distances less than 300 ft (NRCS, 2010):

$$T_t = \frac{0.007(nL)^{0.8}}{P_{2-24}^{0.5} S^{0.4}}$$

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where: T_t = travel time for overland sheet flow (hr);
 n = Manning's roughness coefficient for sheet flow (--);
 L = flow length (ft);
 P_{2-24} = 2-yr, 24-hr rainfall (in.); and
 S = slope of hydraulic grade line (or land slope) (ft/ft).

A Manning's roughness coefficient of 0.020 was used to represent sheet flow in Ash Pond A. The sheet flow length was limited to 100 ft, because sheet flow beyond 100 ft typically transitions to shallow concentrated flow. The rainfall depth for the 2-yr, 24-hr frequency storm event is 4.42 in. (NOAA, 2021). The parameters used to model sheet flow within Ash Pond A are shown in **Table 2**.

Shallow concentrated flow travel time was computed using the Upland Method (NRCS, 2010).

$$T_t = \frac{L}{V}$$

where: T_t = travel time (s);
 L = flow length (ft); and
 V = average velocity (ft/s).

The average velocity was computed using the following equation (NRCS, 2010).

$$V = K_v S^{0.5}$$

where: V = average velocity (ft/s);
 K_v = velocity factor (ft/s); and
 S = slope of hydraulic grade line (or land slope) (ft/ft).

A velocity factor of 16.1 ft/s, representing flow across an unpaved surface, was used to calculate shallow concentrated flow travel time within Ash Pond A. The parameters used to describe shallow concentrated flow within Ash Pond A are presented in **Table 2**.

The resulting times of concentration for sheet flow and shallow concentrated flow are presented in **Table 2**.

Written by: A. Brand Date: 09/08/26 Reviewed by: S. Herr Date: 09/08/26
 Client: Santee Cooper Project: WGS AP A H&H Project No.: 26009458 Phase No.: 04

Inflows

Stormwater inflow generated from Ash Pond A is modeled as Subcatchment 1S. Stormwater inflow generated from Subcatchment 1S flows into Pond 1P (Ash Pond A). The *HydroCAD* model routing diagram is provided in **Attachment A**.

Storage Capacities

The available stormwater storage volume in Ash Pond A between elevations 22 ft and 36 ft (Plant Vertical Datum) was calculated by developing an area-volume curve based on topographic data (Worley, 2026). The lowest available contour within Ash Pond A is 22 ft (Plant Vertical Datum). The minimum crest elevation of the Ash Pond A perimeter dikes is 36 ft (Plant Vertical Datum). The surface area of each contour was measured and tabulated at each elevation. Next, the available surface water volume in each depth increment was calculated by averaging the surface area of the upper and lower contours and multiplying by the change in elevation between the contours. The cumulative storage volume of Ash Pond A between these elevations is 246.0 acre-feet (ac-ft). The area-volume data are presented in **Table 3**.

Ash Pond A does not currently hold ponded water, as dewatering activities are underway to facilitate the closure of the surface impoundment.

Outlet Structures

For this analysis, dewatering activities are assumed to be non-operational due to temporary loss of power during a large storm event.

3 RESULTS OF ANALYSES

The resulting peak water surface elevation and water volume for the 100-yr flood are shown in **Table 4**. Ash Pond A will effectively contain the 100-yr flood and maintain a freeboard of 16.6 ft. This hydrologic and hydraulic analysis demonstrates that Ash Pond A contains the 100-yr flood assuming Ash Pond A does not hold ponded water.

4 REFERENCES

HydroCAD. (2024). *HydroCAD Stormwater Modeling System*. Version 10.20-3h.

NOAA. (2021). *Precipitation-Frequency Atlas of the United States*. Atlas 14, Volume 2, Version 3.0.

Written by: A. Brand Date: 09/08/26 Reviewed by: S. Herr Date: 09/08/26
Client: Santee Cooper Project: WGS AP A H&H Project No.: 26009458 Phase No.: 04

NRCS. (2010). *National Engineering Handbook: Part 630 Hydrology*.

SCS. (1982). *Technical Release Number 20 (TR-20)*. National Technical Information Service.

SCS. (1986). *Technical Release Number 55 (TR-55)*. National Technical Information Service.

Worley Group, Inc. (2026). *Ash Ponds A & B Initial Sitework Plan*

TABLES

Table 1. Land Use Conditions

Drainage Area ID	Land Use Description	CN	Area (acres)	Total Area (acres)	Weighted CN
Ash Pond A	CCR	86	26.3	26.3	86

Table 2. Time of Concentration

Drainage Area ID	Time of Concentration - Sheet Flow Contribution						Time of Concentration - Shallow Concentrated Flow Contribution					Total Time of Concentration {Tc} (min)
	Surface Description	Manning's No. {n}	Flow Length {L} (ft)	2-Yr, 24-Hr Rainfall {I} (in.)	Land Slope {S} (ft/ft)	Time of Concentration from Sheet Flow {Tc, sheet} (min)	Surface Description	Velocity Factor (ft/s)	Flow Length {L} (ft)	Land Slope {S} (ft/ft)	Time of Concentration from Shallow Concentrated Flow {Tc, scf} (min)	
Ash Pond A	Smooth	0.020	100	4.42	0.0588	1.1	Unpaved	16.1	429	0.0174	3.4	4.5

Table 3. Ash Pond A Stage Storage

Elevation (ft) (Plant Vertical Datum)	Area (ac)	Incremental Volume (ac-ft)	Cumulative Volume (ac-ft)
22	2.9	0.0	0
23	6.2	4.6	4.6
24	9.8	8.0	12.6
25	13.3	11.6	24.1
26	15.9	14.6	38.8
27	17.9	16.9	55.7
28	19.3	18.6	74.3
29	20.0	19.7	94.0
30	20.6	20.3	114.3
31	21.1	20.9	135.1
32	21.6	21.3	156.5
33	22.0	21.8	178.3
34	22.4	22.2	200.5
35	22.8	22.6	223.1
36	23.1	23.0	246.0

Table 4. H&H Calculation Results

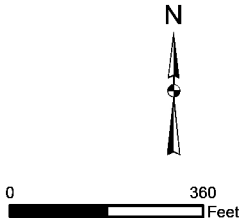
Pond ID	Storm Event	Normal Operating Elevation (ft) (Plant Vertical Datum)	Peak Water Surface Elevation (ft) (Plant Vertical Datum)	Water Volume (ac-ft)	Freeboard (ft)
Ash Pond A	100-Yr Flood	Dry	25.0	24.2	11.0

FIGURES

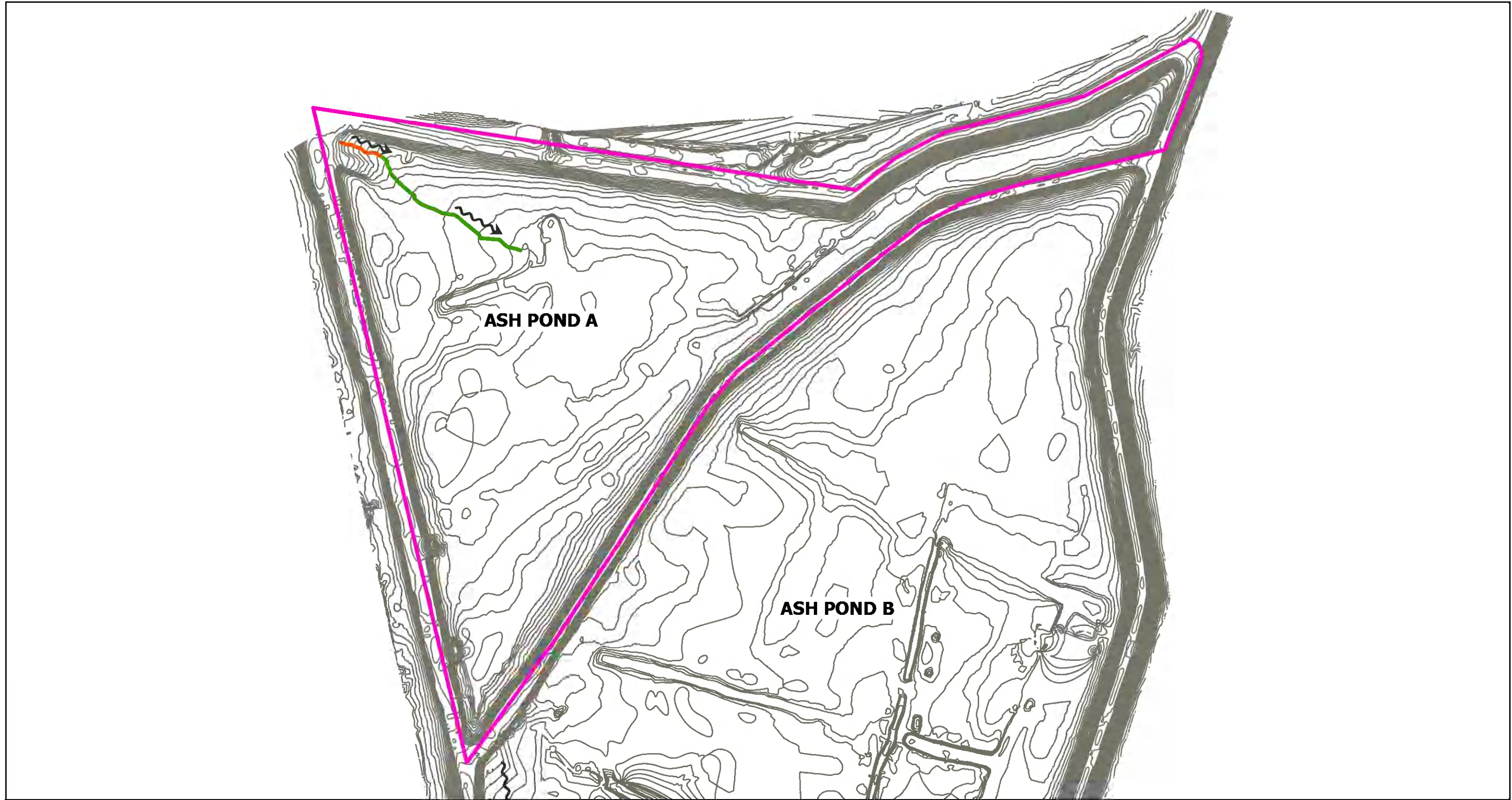


Legend
Pond Boundary

Note:
1. Aerial imagery taken from Google Earth, dated April 2025.



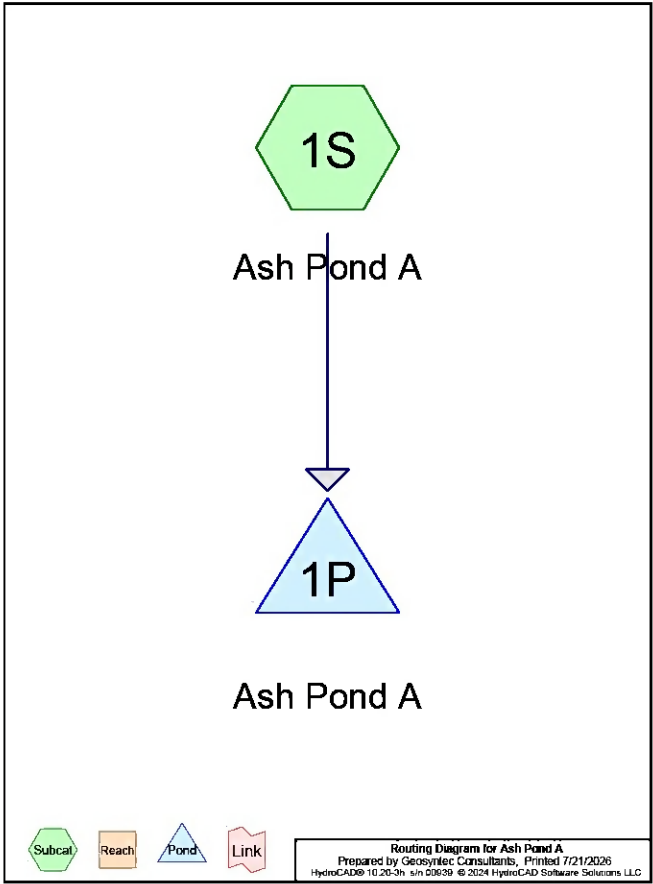
WINYAH GENERATING STATION ASH POND A	
Geosyntec consultants	Figure 1
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Legend Pond Boundary Shallow Concentrated Flow Sheet Flow Flow Direction	Note: 1. Topographic survey information by Worley Group, dated 1-27-2026.	WINYAH GENERATING STATION	
		ASH POND A	
		Geosyntec consultants	Figure 2
0 220 Feet		26009458	September 2026

ATTACHMENTS

ATTACHMENT A



Area Listing (all nodes)		
Area (acres)	CN	Description (subcatchment-numbers)
26.300	86	(1S)
26.300	86	TOTAL AREA

Rainfall Events Listing (selected events)								
Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/S	Depth (inches)	AMC
1	100-YR, 72-HR	Type III 24-hr		Scale	72.00	1	12.80	2

Soil Listing (all nodes)		
Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
26.300	Other	1S
26.300		TOTAL AREA

Ground Covers (all nodes)							
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	26.300	26.300		1S
0.000	0.000	0.000	0.000	26.300	26.300	TOTAL AREA	

Time span=0.00-900.00 hrs, dt=0.01 hrs, 90001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: Ash Pond A

Runoff Area=26.300 ac 0.00% Impervious Runoff Depth=11.03"

Flow Length=529' Tc=4.5 min CN=86 Runoff=124.07 cfs 24.184 af

Pond 1P: Ash Pond A

Peak Elev=25.00' Storage=24.183 af Inflow=124.07 cfs 24.184 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 26.300 ac Runoff Volume = 24.184 af Average Runoff Depth = 11.03"

100.00% Pervious = 26.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Ash Pond A

Runoff = 124.07 cfs @ 36.06 hrs, Volume= 24.184 af, Depth=11.03"

Routed to Pond 1P: Ash Pond A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-900.00 hrs, dt= 0.01 hrs

Type III 24-hr scaled to 72.00 hrs 100-YR, 72-HR Rainfall=12.80"

Area (ac)	CN	Description
26.300	86	
26.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0588	1.54		Sheet Flow, Sheet Flow
3.4	429	0.0174	2.12		Shallow Concentrated Flow, Shallow Concentrated Flow
4.5	529	Total			Unpaved Ky= 16.1 fps

Summary for Pond 1P: Ash Pond A

Inflow Area = 26.300 ac, 0.00% Impervious, Inflow Depth = 11.03" for 100-YR, 72-HR event

Inflow = 124.07 cfs @ 36.06 hrs, Volume= 24.184 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-900.00 hrs, dt= 0.01 hrs

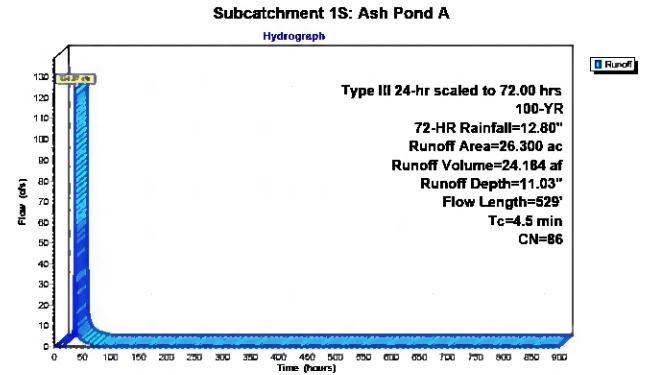
Peak Elev= 25.00' @ 72.26 hrs Surf.Area= 13.349 ac Storage= 24.183 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass del. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	246.025 af	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
22.00	2.911	0.000	0.000
23.00	6.195	4.553	4.553
24.00	9.809	8.002	12.555
25.00	13.338	11.574	24.128
26.00	15.916	14.627	38.756
27.00	17.919	16.918	55.673
28.00	19.317	18.618	74.291
29.00	20.037	19.677	93.968
30.00	20.614	20.325	114.294
31.00	21.089	20.851	135.145
32.00	21.577	21.333	156.478
33.00	21.983	21.780	178.258
34.00	22.412	22.197	200.455
35.00	22.818	22.615	223.071
36.00	23.091	22.954	246.025



Pond 1P: Ash Pond A

