Periodic Update to the Brame Bottom Ash Pond Inflow Design Flood Control System Plan

Cleco Power, LLC

Rodemacher Unit 2
Project No. 202248

Revision 2
10/13/2026

Periodic Update to the Brame Bottom Ash Pond
Inflow Design Flood Control System Plan

prepared for

Cleco Power, LLC
Rodemacher Unit 2
Rapides Parish, Louisiana

Project No. 135359

Revision 2
10/13/2026

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

INDEX AND CERTIFICATION

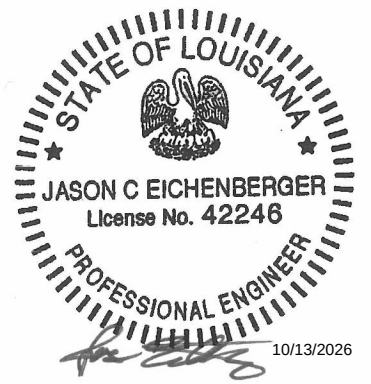
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Certification

I hereby certify, as a Professional Engineer in the state of Louisiana, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by the Cleco Power, LLC or others without specific verification or adaptation by the Engineer.



Jason C. Eichenberger, P.E.
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Date: 10/13/2026

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
3DEP	3D Elevation Program (USGS)
ac	acre
Brame	Brame Energy Center
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
cfs	cubic feet per second
Cleco	Cleco Power, LLC
CY	cubic yard
EPA	Environmental Protection Agency
ft	feet
GPM	gallons per minute
hr	hour
in	inch
LPDES	Louisiana Pollutant Discharge Elimination System
MGD	Million Gallons per Day
min	minute
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NRCS	Natural Resources Conservation Service
PFDS	Precipitation Frequency Data Server
RCRA	Resource Conservations and Recovery Act

Abbreviation	Term/Phrase/Name
SCS	Soil Conservation Service
U.S.C.	United States Code
USDA	US Department of Agriculture
USGS	United States Geological Survey

1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual (CCR) Rule to regulate the disposal of CCR materials generated at coal-fired units. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], using the Subtitle D approach.

The existing CCR impoundments at Cleco Power, LLC's (Cleco's) Brame Energy Center (Brame) are subject to the CCR Rule and as such must meet the hydrologic and hydraulic capacity requirements outlined in 40 Code of Federal Regulations (CFR) §257.82. This report serves as the periodic update to the inflow design flood control system plan for the Bottom Ash Pond at Brame.

This inflow design flood control system plan is in addition to, not in place of, any other applicable site permits, environmental standards, or work safety practices.

2.0 PLAN OBJECTIVES

Per 40 CFR §257.82, the inflow design flood control system plan must contain documentation (including supporting engineering calculations) that the inflow design flood control system has been designed and constructed to:

- Adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood,
- Adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood, and
- Handle discharge from the CCR surface impoundment in accordance with the surface water requirements described in 40 CFR §257.3-3.

Per 40 CFR §257.82(c)(5), Cleco must obtain certification from a qualified professional engineer that the inflow design flood control system plan, and subsequent updates to the plan, meet the requirements of 40 CFR §257.82. This sealed document serves as that certification.

3.0 EXISTING CONDITIONS

Brame is located northwest of Alexandria in Rapides Parish, Louisiana. The Bottom Ash Pond is a 42.25-acre diked pond with approximately 1,100,000 CY of capacity. A site plan is included in Appendix A. The impoundment is surrounded by a 20-foot-wide perimeter dike with a crest elevation ranging from 101 feet to 120 feet. The dike on the southeast side is shared with the Fly Ash Pond which was closed by removal.

The pond receives bottom ash, economizer ash, sluice water, and other process flows from Rodemacher Unit 2. CCR material is sluiced to the pond at 2.16 million gallons per day (MGD) for approximately 12 hours each day. The pool elevation is managed through the use of a pump that operates on a float system. The low operating level is 90 feet and high operating level is 96 feet (NAVD 88). Periodically a separate, manually operated pump is used to pump rainfall collected in the former Fly Ash Pond into the Bottom Ash Pond; however, flow from the former Fly Ash Pond has not been included as part of this analysis because rainfall collected in the area will be retained until plant operators manually turn on the pump.

Excess water collected in the Bottom Ash Pond is pumped through a 24-inch corrugated metal pipe to an overflow channel where it can be discharged into Lake Rodemacher via permitted LPDES Outfall 401. The invert elevation of the corrugated metal pipe is 102.6 feet.

4.0 DESIGN BASIS / FLOOD CONTROL SYSTEM

4.1 Hazard Potential Classification

Per 40 CFR §257.73, Cleco has determined the Brame Bottom Ash Pond to be a significant hazard potential CCR surface impoundment.

4.2 Inflow Design Flood System Criteria

4.2.1 Capacity Criteria

The CCR Rule requires CCR surface impoundments to have adequate hydrologic and hydraulic capacity to manage flows for the inflow design flood. For this analysis, the criteria was interpreted as being the top of the surface impoundment dike should not be overtopped during the inflow design flood event.

4.2.2 Freeboard Criteria

The CCR documentation further discusses that operating freeboard must be adequate to meet performance standards, but a specific freeboard is not defined.

4.2.3 Flood Routing Design Criteria

The inflow design flood for this analysis is a 1,000-year flood event per 40 CFR §257.82(a)(3)(ii).

4.3 Project Mapping

Project mapping for this analysis consisted of an inventory of stormwater assets that contribute to the surface impoundment. Three primary sources of information were utilized: construction record drawings, plant operational information, and survey data.

4.3.1 Mapping Sources

Survey data utilized included LIDAR topography from the USGS 3D Elevation Program (3DEP) published in May 2025. Construction record drawings of the surface impoundment and owner-provided information were also utilized in the analysis.

4.3.2 Vertical Datum

Mapping sources referenced were in the North American Vertical Datum of 1988 (NAVD88).

4.3.3 Horizontal Coordinate System

Data from the USGS which was utilized as the basis for mapping and modeling efforts is in the Louisiana State Plane North, North American Datum of 1983 (NAD83) coordinate system.

5.0 HYDROLOGIC AND HYDRAULIC CAPACITY

HydroCAD (version 10.20-7a) was used to model reservoir characteristics under the design storm event. Inputs to the HydroCAD model were assumed to be as follows.

5.1 Runoff

5.1.1 Recurrence Interval and Rainfall Duration

The inflow flood design event for this study, as dictated by the hazard potential classification, was a 1,000-year flood event. Because a storm duration is not specified under 40 CFR §257.82 or other pertinent inflow flood design sections within the CCR Rule, a 24-hour storm duration was utilized.

5.1.2 Rainfall Distribution and Depth

The Soil Conservation Service (SCS) Type III rainfall distribution was used for computations associated with this evaluation. Precipitation data was acquired from the NOAA Precipitation Frequency Data Server (PFDS). Precipitation depth for the inflow design flood event is 22.6 inches.

5.1.3 Subbasin Characteristics

Calculations were determined based on the watershed parameters shown in Table 5-1. Refer to Appendix B for more detailed calculations.

Table 5-1: Watershed Runoff Data for Brame Bottom Ash Pond

Component	Value	Unit
Watershed Area	46.140	ac
SCS Storm Depth: 1,000-yr, 24-hr	22.60	in
Weighted Curve Number	93	-
Time of Concentration	27.8	min

5.2 Pond Characteristics

When conducting the hydraulic analysis, it was assumed that the pond level is at the high operating level (96.0 feet) prior to the storm event. All discharge into the pond is considered to be additional flow above the initial elevation. It was assumed sluicing operations would be maintained for the duration of the storm event control period. To be conservative, it was assumed the Bottom Ash Pond pump system would be inoperable for the duration of the storm event control period.

6.0 RESULTS

The pond was modeled for a 1,000-year, 24-hour storm event with initial elevation set at the high operating level with no discharge during the event. Under the assumed conditions, the pond was able to contain runoff from the 1,000-year, 24-hour storm without overtopping. The results of the modeled storm event are as follows:

Table 6-1: Modeled Pond Design

Component	Property	Value	Unit
Subcatchment	Peak Discharge	605.8	cfs
	Runoff Volume	21.6	in
Pond	Base Flow	3.3	cfs
	Initial EL	96.0	ft
	Peak Inflow	609.1	cfs
	Peak Discharge	0.0	cfs
	Peak Elevation	98.9	ft
	Peak Storage	119.2	ac-ft
	Freeboard	2.1	ft

After a significant storm event, excess water collected in the Bottom Ash Pond can be discharged via pumping to the permitted LPDES Outfall 401 similar to current operations.

7.0 PERIODIC ASSESSMENT AND AMENDMENT

Cleco placed the initial plan in the CCR Operating Record by October 17, 2016. Periodic inflow design flood control system plans are required every five years. This report serves as the second periodic update to the inflow design flood control system plan. Cleco may publish revised plans at shorter intervals, noting, however, the deadline for publishing the next revision will be maintained as five years after publishing the previous revision. Cleco may amend the plan at any time and is required to do so whenever there is a change in conditions which would affect the current plan. All amendments and revisions must be placed on the CCR public website. A record of revisions made to this document is included in Section 8.0.

8.0 RECORD OF REVISIONS AND UPDATES

Revision Number	Date	Revisions Made	By Whom
0	10/14/2016	Initial Issue	Burns & McDonnell
1	10/14/2021	Periodic Update to the Initial Plan	Burns & McDonnell
2	10/13/2026	Periodic Update to the Initial Plan	Burns & McDonnell

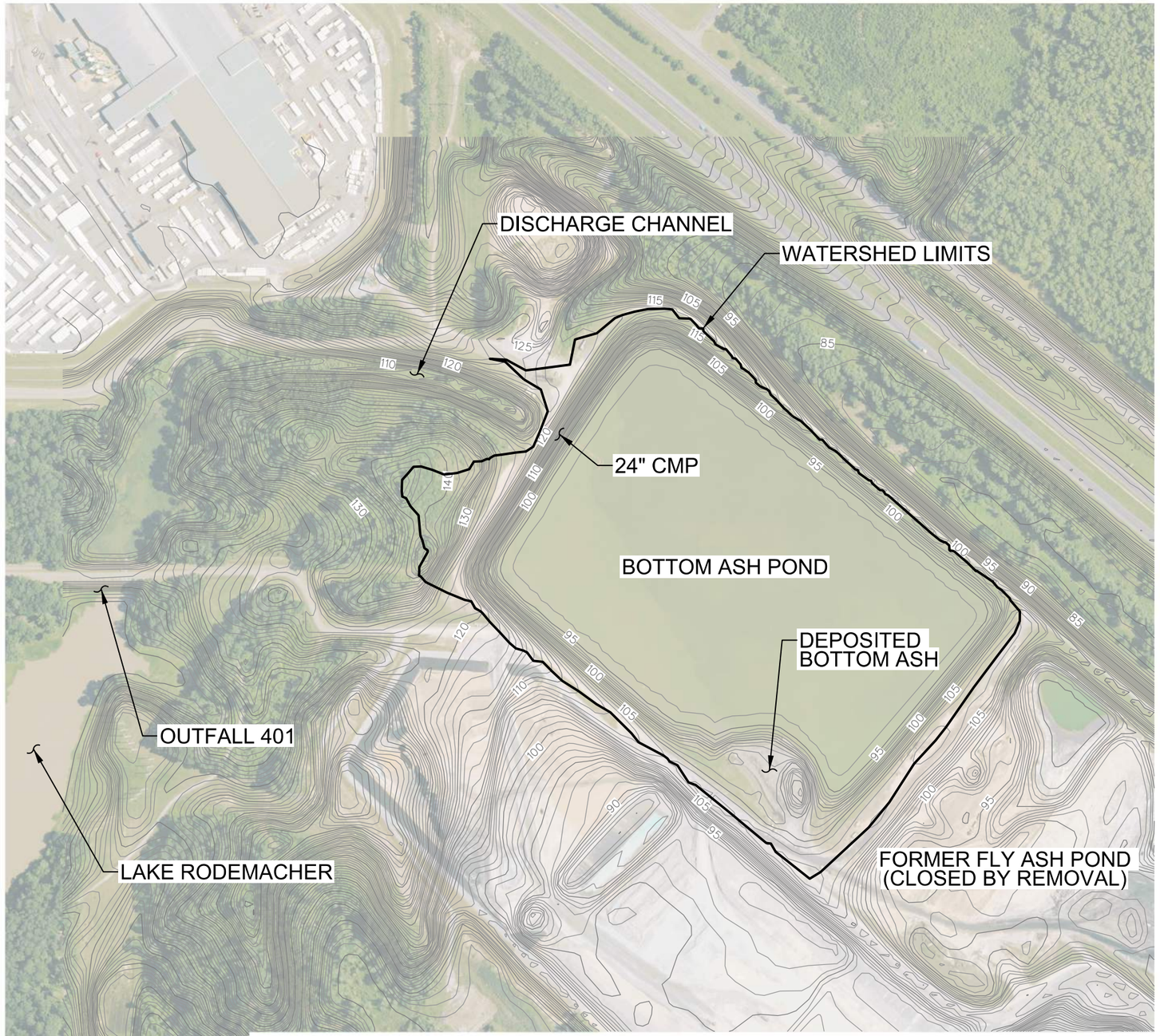
APPENDIX A – SITE PLAN

NOTES:

1. EXISTING CONTOURS PER USGS 3DEP PUBLISHED MAY 2025 AND RETRIEVED AUGUST 2026.

2. ASH POND OPERATING CHARACTERISTICS ARE AS FOLLOWS:

	WATERSHED AREA (AC)	HIGH OPERATING LEVEL (FT)
BOTTOM ASH POND	46.140	96.0



N

0 400' 800'

SCALE IN FEET

BURNS McDONNELL

date 9/16/2026

designed A. MYERS

CLECO CORPORATION

CCR COMPLIANCE DOCUMENTATION
INFLOW DESIGN FLOOD
SITE PLAN - BOTTOM ASH POND

project 202248

contract -

drawing no. **SK - CIVIL - 001** rev. **0**



BURNS McDONNELL

date 9/16/2026

designed A. MYERS

CLECO CORPORATION

CCR COMPLIANCE DOCUMENTATION
INFLOW DESIGN FLOOD
SITE PLAN - BOTTOM ASH POND

project 202248

contract -

drawing no. **SK - CIVIL - 002** rev. **0**

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APPENDIX B – ENGINEERING CALCULATIONS

WORKSHEET TITLE:	Inflow Design Flood - Brame Bottom Ash Pond	CALCULATION NO.:	202248 - C - 001
CREATED:	9/14/2026	REVISION:	A
PERFORMED BY:	A. MYERS	REVIEWED BY:	J. Eichenberger
OBJECTIVE:	Determine capacity of pond to maintain a 1,000-year, 24-hour storm event using SCS Curve Number Method		

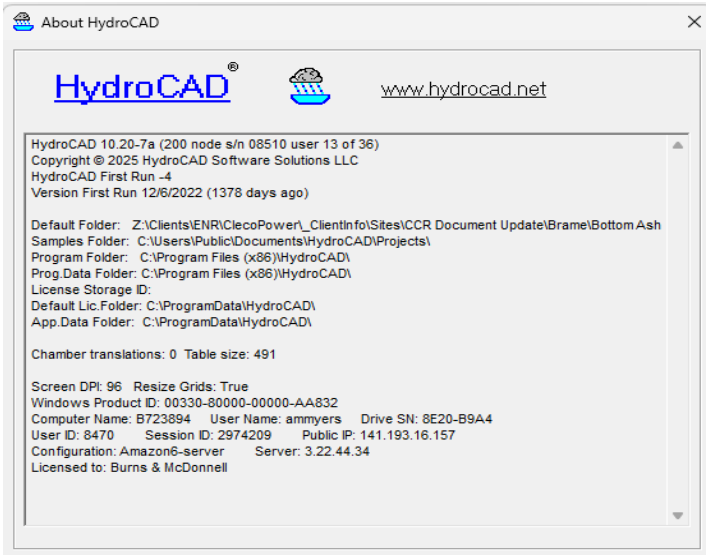
REFERENCES:

1 USDA Soil Conservation Service. (1986). Urban Hydrology for Small Watersheds (Technical Release No. 55). U.S. Department of Agriculture, Washington, D.C.

2 US Department of Agriculture. (no date). Custom soils resouces report for Rapides Parish, LA. Retrieved from http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

3 National Oceanic and Atmospheric Administration. (2026). NOAA Atlas 14, Volume 9, Version 2. [Point precipitation frequency estimates for Lena, LA, Station Boyce 3 WNW (16-1232), US]. Retrieved from http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=la

SOFTWARE:



ASSUMPTIONS:

1 Design storm is 1,000 years (significant hazard classification per 2016 hazard potential classification)
2 Minimum time of concentration is 6 minutes — Reference 1
3 Soils are Hydrologic Soil Group D. — Reference 2
5 The Curve Number (CN) for CCR material is assumed to be 86.
4 The starting elevation at the Bottom Ash Pond is 96 ft (high water level).
5 Sluicing operations are maintained / discharge pump is inoperable over duration of storm event.

CALCULATIONS:

1 Establish drainage area

A_d (ac)	46.1

Measured in Microstation, see SK-CIVIL-001 in Appendix A. Area delineated using contours generated from the USDA.

2 Establish rainfall data (assume SCS Type III distribution)

SCS Storm	Depth (in)
1000yr, 24hr	22.6

Reference 3

3 Establish CN and Time of Concentration - see HydroCAD Report

4 Establish storage volume for pond - see HydroCAD Report. Including storage above the initial pond elevation (EL 96) which is considered high water level.

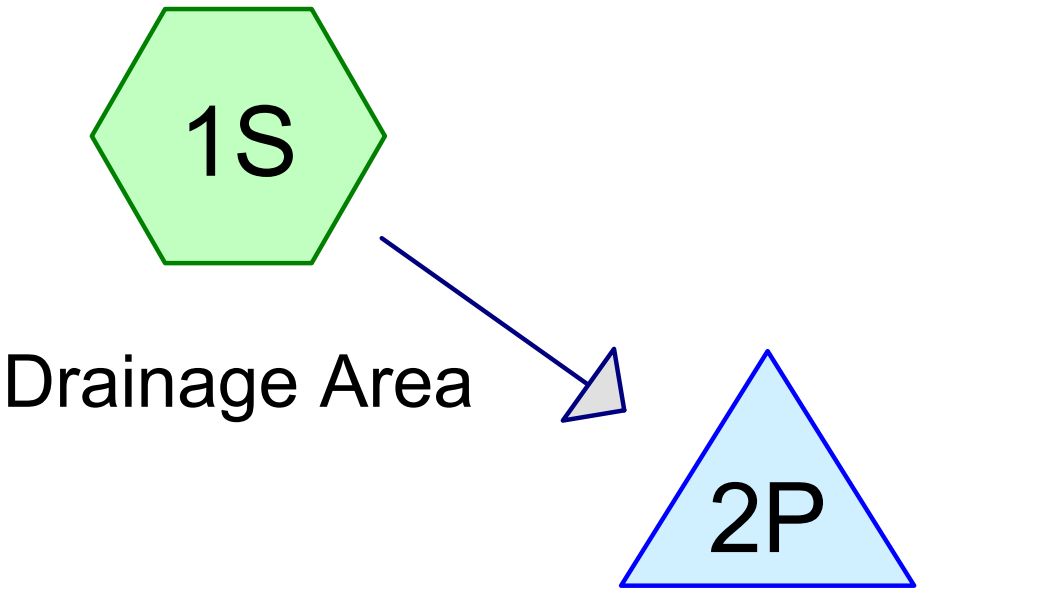
5 Run HydroCAD with input parameters: include sluice flow @ 2.16 MGD as base flow.

RESULTS:

See HydroCAD report.

CONCLUSION:

Under the modeled conditions, the Bottom Ash Pond can accept inflows from the design flood event and sluicing operations without overtopping.



Subcat Reach Pond Link

Routing Diagram for Brame_IDF
Prepared by Burns & McDonnell, Printed 9/17/2026
HydroCAD® 10.20-7a s/n 08510 © 2025 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.097	84	50-75% Grass cover, Fair, HSG D (1S)
0.844	73	Brush, Good, HSG D (1S)
2.624	86	CCR (1S)
2.608	96	Gravel surface, HSG D (1S)
28.967	98	Water Surface, HSG D (1S)
46.140	**93**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Drainage Area Runoff Area=46.140 ac 62.78% Impervious Runoff Depth>21.64"
Flow Length=434' Tc=27.8 min CN=93 Runoff=605.76 cfs 83.209 af

Pond 2P: Bottom Ash Pond Peak Elev=98.89' Storage=119.221 af Inflow=609.10 cfs 89.848 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 46.140 ac Runoff Volume = 83.209 af Average Runoff Depth = 21.64"
37.22% Pervious = 17.173 ac 62.78% Impervious = 28.967 ac

Summary for Subcatchment 1S: Drainage Area

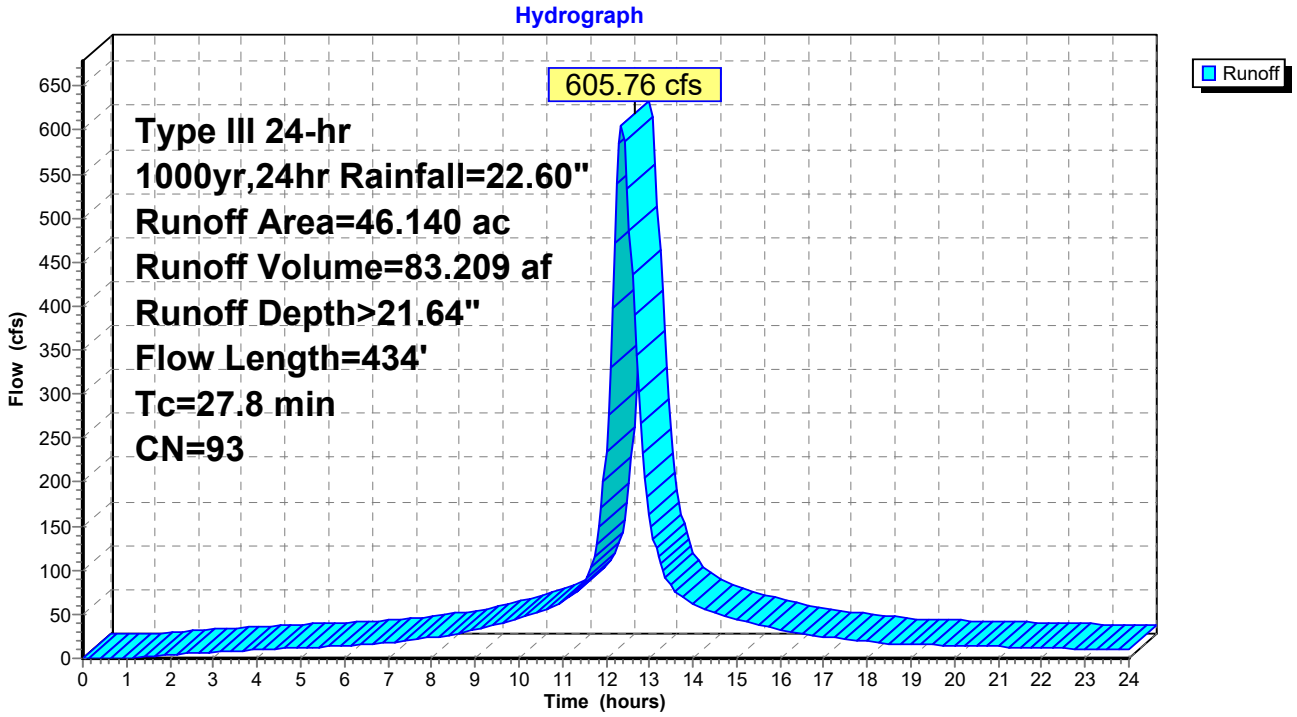
Runoff = 605.76 cfs @ 12.36 hrs, Volume= 83.209 af, Depth>21.64"
Routed to Pond 2P : Bottom Ash Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1000yr,24hr Rainfall=22.60"

	Area (ac)	CN	Description
	28.967	98	Water Surface, HSG D
	11.097	84	50-75% Grass cover, Fair, HSG D
*	2.624	86	CCR
	2.608	96	Gravel surface, HSG D
	0.844	73	Brush, Good, HSG D
	46.140	93	Weighted Average
	17.173		37.22% Pervious Area
	28.967		62.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	163	0.0300	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 5.13"
4.5	37	0.0770	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 5.13"
1.1	28	0.0077	0.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	62	0.1450	2.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	41	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	103	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
27.8	434	Total			

Subcatchment 1S: Drainage Area



Summary for Pond 2P: Bottom Ash Pond

Inflow Area = 46.140 ac, 62.78% Impervious, Inflow Depth > 23.37" for 1000yr,24hr event
Inflow = 609.10 cfs @ 12.36 hrs, Volume= 89.848 af, Incl. 3.34 cfs Base Flow
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

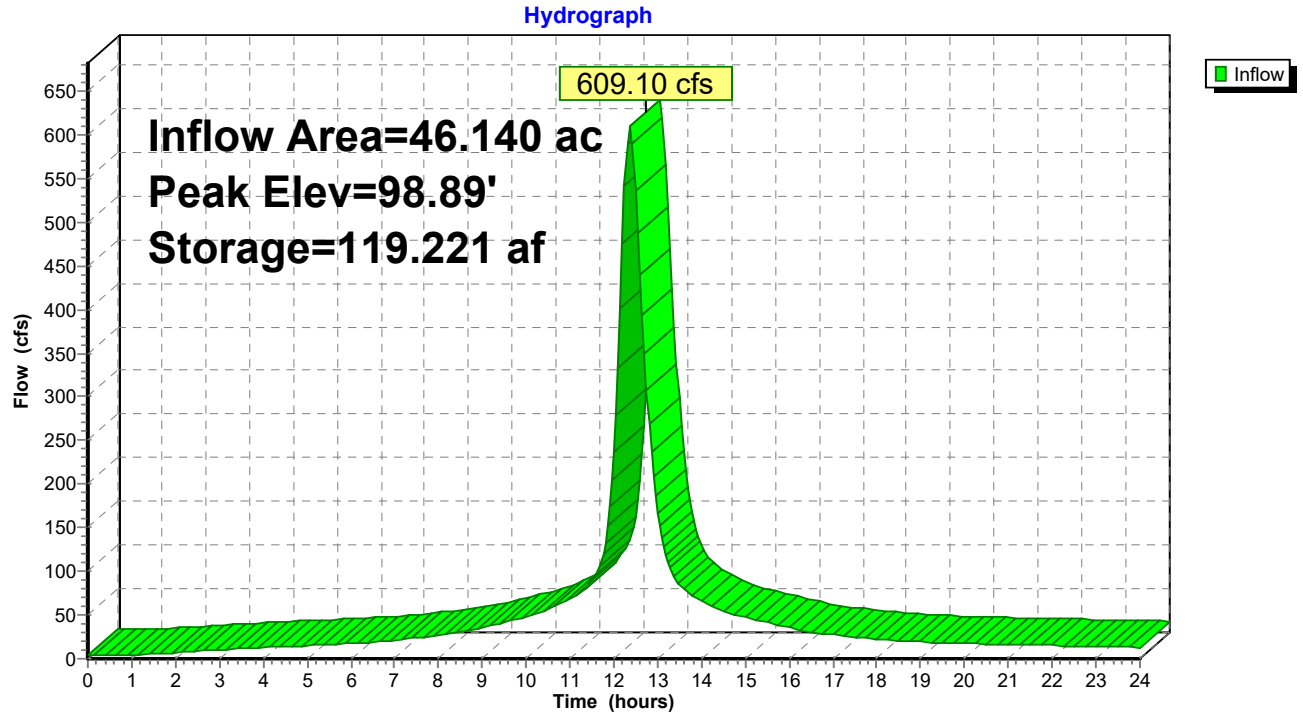
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 96.00' Surf.Area= 29.831 ac Storage= 29.399 af
Peak Elev= 98.89' @ 24.00 hrs Surf.Area= 32.115 ac Storage= 119.221 af (89.822 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	95.00'	188.275 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
95.00	28.967	0.000	0.000
98.00	31.560	90.791	90.791
100.00	32.804	64.364	155.154
101.00	33.437	33.120	188.275

Pond 2P: Bottom Ash Pond



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CREATE AMAZING.

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