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MEMORANDUM

October 14, 2026
File No. 0216303

SUBJECT: Periodic Inflow Design Flood Control System Plan
Associated Electric Cooperative, Inc.
New Madrid Power Plant – Pond 003
Marston, Missouri

Haley & Aldrich, Inc. (Haley & Aldrich) has developed this Periodic Inflow Design Flood (IDF) Control System Plan (IDFCS Plan or Plan) on behalf of Associated Electric Cooperative, Inc. (AECI) for the existing coal combustion residuals (CCR) surface impoundment referred to as Pond 003 (Unit) at the New Madrid Power Plant near Marston, Missouri. This Plan was developed on behalf of AECI in accordance with the U.S. Environmental Protection Agency's Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, Title 40 Code of Federal Regulations (CFR) Part 257, Subpart D (CCR Rule), effective October 19, 2015, including subsequent revisions, specifically related to 40 CFR §257.82. The Pond 003 existing conditions and supporting documentation have been reviewed and associated stormwater modeling and analysis performed to satisfy the Inflow Design Flood Control System Plan requirements of 40 CFR §257.82 described below. This Plan has been updated to account for system modifications and meets the requirements to complete a periodic update every five years in accordance with 40 CFR §257.82(c)(4).

40 CFR §257.82(a): 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 (a)(2) of this section.

40 CFR §257.82(a)(1): The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.

Pond 003 was historically used for settling and wet storage of light fly ash, bottom ash, boiler slag sluiced from the NMPP, plant process water, and coal pile runoff. The Unit no longer receives CCR material or non-CCR wastestreams and is currently undergoing closure construction activities. However, the impoundment remains subject to the applicable requirements of 40 CFR §257.82 until closure is completed in accordance with the CCR Rule. Pond 003 is currently maintained as a dry basin during the closure activities and the only source of inflow to the impoundment footprint is direct precipitation. An overflow pump routes water from the Utility Waste Landfill (UWL) directly to the Pond 003 outlet structure for discharge and bypasses the impoundment footprint, not contributing inflow to the CCR unit.

An interior open channel routes precipitation runoff collected within the impoundment footprint from the northwest to a cleared portion of the Unit in the southeastern corner. Accumulated sediment was removed from the southeastern corner during closure construction in 2025. The HydroCAD model incorporates the stage-storage relationship reflecting the ponding area geometry after sediment removal. Water from the impoundment flows to a concrete drop inlet structure with concrete stop logs used to manage water elevations. A discharge pipe directs water through the dike and into a discharge channel that flows toward the Mississippi River.

Hydrologic and hydraulic modeling for this Pond 003 IDFCS Plan was performed using HydroCAD Stormwater Modeling System, version 10.20-9a (HydroCAD) in conjunction with the appropriate IDF as determined per the Periodic Hazard Potential Classification Assessment completed under separate cover. The 1,000-year flood was determined to be the IDF based on results of the hazard potential classification assessment, which is described in more detail below in response to 40 CFR §257.82(a)(3).

Pond 003 is currently operated in a dry condition during ongoing closure activities. The HydroCAD model conservatively assumes stop logs, and therefore the initial water surface, are at the maximum operating elevation at the start of the design flood to represent initial storage and outlet restrictions. This model minimizes available storage and restricts discharge more than the current operating configuration. Under normal operating conditions, there is no tailwater effect on the discharge because the downstream channel to the Mississippi River is dry. During the evaluation, the discharge channel was conservatively modeled for tailwater effects that may be present during elevated Mississippi River conditions. The model assumed a tailwater condition at elevation (El.) 300 feet in the discharge channel to the Mississippi River, based on information reported in the Federal Emergency Management Agency (FEMA) Flood Insurance Study. Local runoff is expected to precede river rise during a flood event caused by precipitation, thereby limiting these tailwater conditions in practice.

The results of the HydroCAD analysis confirm that the IDF control system for Pond 003 adequately manages flow into the impoundment during and after the IDF peak storm discharge by containing the flood within the impoundment. The maximum routed water surface elevation remains below the embankment crest; therefore, no overtopping of the CCR unit occurs during the design event. **Table I** summarizes the effects of the IDF peak discharge on Pond 003. The output from the HydroCAD model simulation extends with enough time duration post-event to simulate model drawdown over time and is provided as **Appendix A**. See **Figure 1** for the Pond 003 existing site plan.

Table I: HydroCAD Output Summary (48-hour, 1,000-year IDF Event)

Parameter	Output Value
Peak flood level (feet)	304.22
Minimum dike elevation (feet)	307.00
Minimum freeboard below dike crest (feet)	2.78
Peak inflow (cubic feet per second [cfs])	804.88
Peak outflow (cfs)	28.87

40 CFR §257.82(a)(2): The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.

The outlet control structure is detailed in the Burns & McDonnell Ash Retaining Dike Grading and Drainage Plan dated October 26, 1977. Pertinent pages providing the required information have been provided as **Appendix B**. Survey and hand measurements of the structure were also made by Engineering Surveys & Services (ESS) on April 11, 2023.[1] The ESS survey is provided in **Appendix C**. Based on the HydroCAD analysis, the IDF control system for Pond 003 was determined to adequately manage flow from the impoundment by collecting and controlling the IDF peak discharge. The peak level and resulting freeboard in Pond 003 during the 1,000-year flood is noted in **Table I**. The HydroCAD model simulation output is provided in **Appendix A**.

40 CFR §257.82(a)(3): The inflow design flood is:

i. For a high hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the probable maximum flood;
ii. For a significant hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the 1,000-year flood;
iii. For a low hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the 100-year flood; or
iv. For an incised CCR surface impoundment, the 25-year flood.

As documented in the most recent Hazard Potential Classification Assessment prepared in accordance with 40 CFR §257.73(a)(2), Pond 003 was determined to have a significant hazard potential; therefore, the design event is the 1,000-year flood. The basis of the hazard potential determination is discussed in the Periodic Hazard Potential Classification Assessment under separate cover.

The 1,000-year flood hydrograph was developed using precipitation-frequency data from National Oceanographic and Atmospheric Administration (NOAA) Atlas 14 and transformed to runoff using Natural Resources Conservation Service methodologies implemented in HydroCAD. Pond 003 does not receive inflow from external drainage areas. Accordingly, the only hydrologic input considered in the evaluation is direct precipitation falling within the impoundment footprint that relies on the precipitation model to develop the 1,000-year flood hydrograph. The NOAA Atlas 14 results are provided as **Appendix D**.

The hydrologic model incorporates watershed-specific characteristics, including drainage area, runoff parameters, and time of concentration, to generate a site-specific inflow hydrograph for routing through the impoundment. The 6-hour, 12-hour, 24-hour, and 48-hour duration 1,000-year precipitation events were evaluated, and the 48-hour event produced the most adverse hydraulic response, resulting in higher routed water surface elevations within the impoundment. Accordingly, the 1,000-year, 48-hour event was selected as the governing design condition for this evaluation. This methodology converts the

[1] Since the Unit and structure have not changed since 2023, there was no reason to resurvey this structure and the previous values are considered accurate.

design precipitation event into a corresponding site-specific flood hydrograph and is consistent with established engineering practice for evaluating impoundment performance under the hydrologic loading condition specified by the CCR Rule. Based on the hydrologic and hydraulic evaluation, Pond 003 is capable of containing and routing the 1,000-year flood event specified for a significant hazard potential CCR surface impoundment under 40 CFR §257.82(a)(3). Positive freeboard is maintained throughout the event and overtopping does not occur.

40 CFR §257.82(b): Discharge from the CCR unit must be handled in accordance with the surface water requirements under § 257.3–3.

40 CFR §257.3-3(a): For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.

40 CFR §257.3-3(b): For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.

40 CFR §257.3-3(c): A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.

Discharges from Pond 003 are managed so they do not violate the applicable requirements of the Missouri State Operating Permit issued by the Missouri Department of Natural Resources. Pond 003 only receives direct precipitation within the impoundment footprint and no longer receives inflow from other external sources. Although an overflow pump routes water from the UWL to the Pond 003 outlet structure, this flow enters directly into the outlet structure and does not contribute flow to the pond footprint.

40 CFR §257.82(c)(1): Content of the plan. The owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(4).

The Initial IDFCS Plan was prepared in accordance with 40 CFR §257.82(c)(1) and is available on AECI's CCR compliance website. This document and all attachments serve as the Periodic IDFCS Plan. Periodic IDFCS plans will be prepared and placed in the facility operating record at five-year increments or whenever there is a change in conditions that would affect the Plan.

40 CFR §257.82(c)(2): Amendment of the plan. The owner or operator of the CCR unit may amend the written inflow design flood control system plan at any time provided the revised plan is placed in the facility's operating record as required by § 257.105(g)(4). The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.

The IDFCS Plan will be amended whenever there is a change in conditions that would substantially affect the written Plan in effect.

A record of amendments to the Plan is tracked below with the latest version of the IDFCS Plan noted on the front cover of the Plan. The version date is based on the date the document is finalized, which may be different from the date on which the document is placed in the CCR Operating Record or the date of subsequent notifications and placement on the CCR website.

Version	Date	Description of Changes Made
1	October 16, 2016	Initial Issuance
2	October 15, 2021	Periodic Update
3	October 14, 2026	Periodic Update

40 CFR §257.82(c)(3): Timeframes for preparing the initial plan

(i) Existing CCR surface impoundments. The owner or operator of the CCR unit must prepare the initial inflow design flood control system plan no later than October 17, 2016.

The Initial IDFCS Plan was prepared within the specified timeframe.

(ii) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner or operator must prepare the initial inflow design flood control system plan no later than the date of initial receipt of CCR in the CCR unit.

Not applicable. Pond 003 is an existing CCR surface impoundment.

40 CFR §257.82(c)(4): Frequency for revising the plan. The owner or operator must prepare periodic inflow design flood control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first periodic plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed an inflow design flood control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(4).

This Periodic IDFCS Plan or any subsequent version of the IDFCS Plan will be assessed and amended whenever there is a change in operation of the CCR surface impoundment that would substantially affect the IDFCS Plan or when unanticipated events necessitate a revision of the Plan either before or after closure activities have commenced.

Attachments:

- Professional Engineer Certification
- Figure 1 – Pond 003 Site Plan
- Appendix A – HydroCAD Results
- Appendix B – Ash Retaining Dike Grading and Drainage Plan (1977) by Burns & McDonnell
- Appendix C – Topographic Survey (2023) by Engineering Surveys & Services
- Appendix D – NOAA Rainfall Data

Professional Engineer Certification

40 CFR §257.82(c)(5): The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from the EPA where EPA is the permitting authority stating that the initial and periodic inflow design flood control system plans meet the requirements of this section.

I certify that this Periodic Inflow Design Flood Control System Plan for AECI's Pond 003 at the New Madrid Power Plant meets the requirements of 40 CFR §257.82.

Signed: _____
Qualified Professional Engineer

Printed Name: Steven F. Putrich
Missouri License No.: 2014035813
Title: Principal Consultant
Company: Haley & Aldrich, Inc.

Professional Engineer's Seal:



Steven F. Putrich

Digitally signed by Steven F. Putrich
Date: 2026.10.14 15:33:23 -04'00'

HALEY ALDRICH

Figures



LEGEND

- APPROXIMATE LIMITS OF POND 003
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING FENCE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING CULVERT OR STORM PIPE
- EXISTING TREE LINE

NOTES

1. EXISTING TOPOGRAPHY BASED ON SURVEY COMPOSITES. CLEAR POND FIELD SURVEYS CONDUCTED BY SMITH & CO. ENGINEERS IN APRIL 9, 2026 AND OCTOBER 24, 2025. POND AND SURROUNDING AREA IS A COMPILATION OF UAS LIDAR, PHOTOGRAMMETRY, AND FIELD SURVEY COMPLETED BY ENGINEERING SURVEYS & SERVICES IN MARCH 1, 2023.

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SCALE IN FEET

HALEY ALDRICH

ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT
MARSTON, MISSOURI

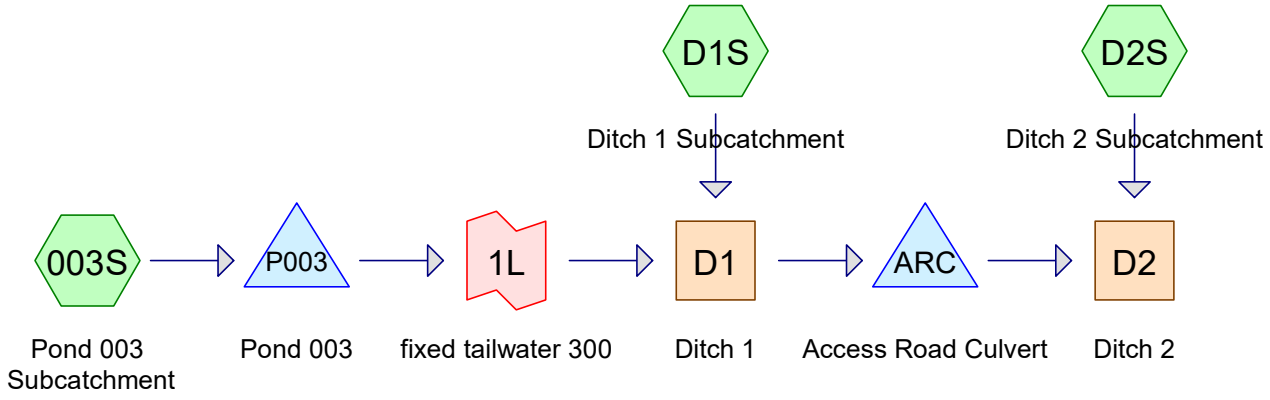
POND 003
SITE PLAN

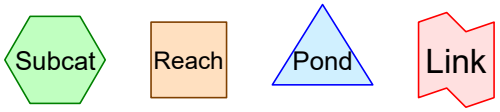
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FIGURE 1

Saved by: ABRUGGEMAN Printed: 10/7/2026 10:16 AM Sheet: 1
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\021246\9\CAD\FIGURES\2026 COMPLIANCE\129342-046 FIG-1 SITE PLAN.DWG

Appendix A
HydroCAD Results





Routing Diagram for 2026_HAI_Pond003_Stormwater
Prepared by Haley & Aldrich, Inc, Printed 10/7/2026
HydroCAD® 10.20-9a s/n 03902 © 2026 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
132.553	84	50-75% Grass cover, Fair, HSG D (003S, D1S, D2S)
1.032	98	Water Surface, HSG A (D1S, D2S)
133.585	**84**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.032	HSG A	D1S, D2S
0.000	HSG B	
0.000	HSG C	
132.553	HSG D	003S, D1S, D2S
0.000	Other	
133.585		**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	132.553	0.000	132.553	50-75% Grass cover, Fair	003S, D1S, D2S
1.032	0.000	0.000	0.000	0.000	1.032	Water Surface	D1S, D2S
1.032	**0.000**	**0.000**	**132.553**	**0.000**	**133.585**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	ARC	283.53	281.88	100.0	0.0165	0.012	0.0	30.0	0.0	
2	P003	282.80	281.13	170.0	0.0098	0.013	0.0	24.0	0.0	

Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 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

Subcatchment 003S: Pond 003 Runoff Area=4,853,498 sf 0.00% Impervious Runoff Depth=11.26"
Flow Length=2,189' Tc=24.4 min CN=84 Runoff=804.88 cfs 104.541 af

Subcatchment D1S: Ditch 1 Subcatchment Runoff Area=21.833 ac 4.50% Impervious Runoff Depth=11.39"
Flow Length=1,416' Tc=61.3 min CN=85 Runoff=100.69 cfs 20.730 af

Subcatchment D2S: Ditch 2 Subcatchment Runoff Area=0.331 ac 14.80% Impervious Runoff Depth=11.53"
Flow Length=116' Tc=8.6 min CN=86 Runoff=2.74 cfs 0.318 af

Reach D1: Ditch 1 Avg. Flow Depth=2.13' Max Vel=3.62 fps Inflow=127.65 cfs 117.743 af
n=0.022 L=1,180.0' S=0.0017 '/' Capacity=6,424.73 cfs Outflow=126.39 cfs 117.743 af

Reach D2: Ditch 2 Avg. Flow Depth=1.95' Max Vel=2.08 fps Inflow=64.19 cfs 115.336 af
n=0.078 L=130.0' S=0.0077 '/' Capacity=1,236.71 cfs Outflow=64.19 cfs 115.336 af

Pond ARC: Access Road Culvert Peak Elev=289.36' Storage=9.938 af Inflow=126.39 cfs 117.743 af
30.0" Round Culvert n=0.012 L=100.0' S=0.0165 '/' Outflow=63.99 cfs 115.018 af

Pond P003: Pond 003 Peak Elev=304.22' Storage=6,639,275 cf Inflow=804.88 cfs 104.541 af
Outflow=28.87 cfs 97.013 af

Link 1L: fixed tailwater 300 Inflow=28.87 cfs 97.013 af
Primary=28.87 cfs 97.013 af

Total Runoff Area = 133.585 ac Runoff Volume = 125.590 af Average Runoff Depth = 11.28"
99.23% Pervious = 132.553 ac 0.77% Impervious = 1.032 ac

Summary for Subcatchment 003S: Pond 003 Subcatchment

[47] Hint: Peak is 343% of capacity of segment #3

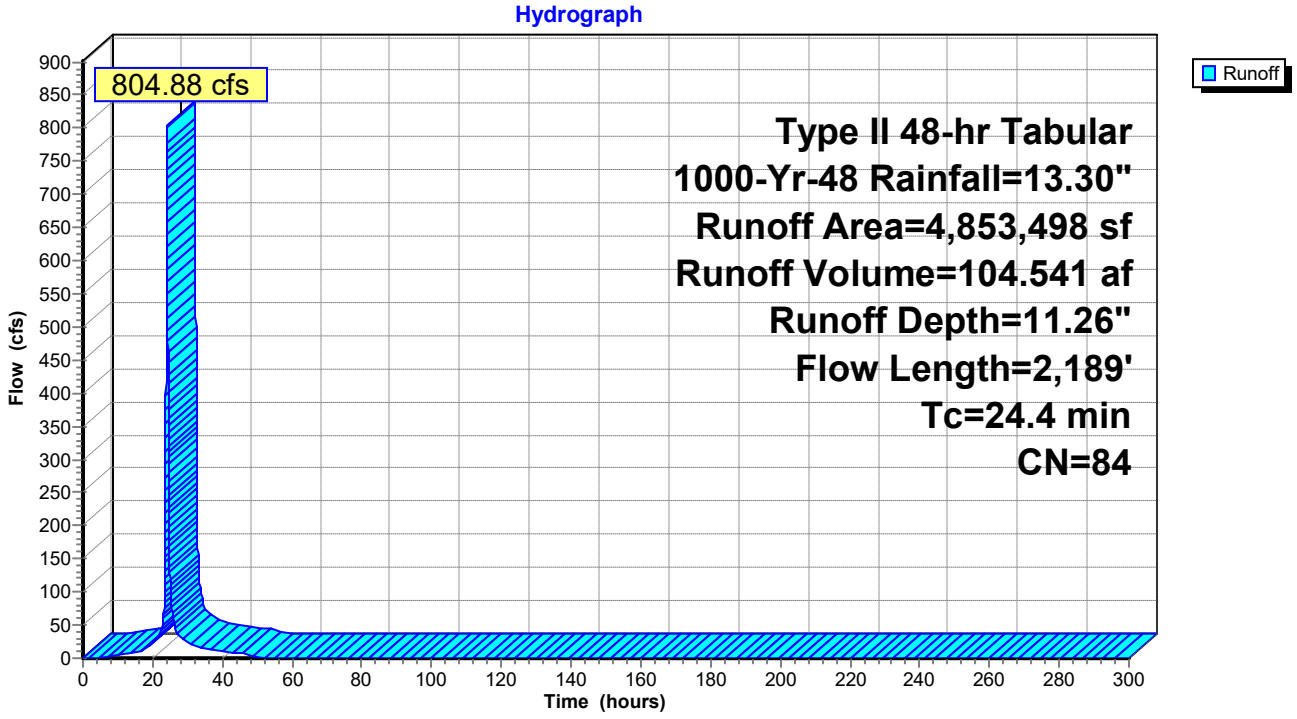
Runoff = 804.88 cfs @ 24.12 hrs, Volume= 104.541 af, Depth=11.26"
Routed to Pond P003 : Pond 003

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Type II 48-hr Tabular 1000-Yr-48 Rainfall=13.30"

Area (sf)	CN	Description
4,853,498	84	50-75% Grass cover, Fair, HSG D
4,853,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0110	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.72"
2.0	86	0.0105	0.72		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	2,003	0.0030	3.77	234.54	**Channel Flow,** Area= 62.2 sf Perim= 49.9' r= 1.25' n= 0.025 Earth, clean & winding
24.4	2,189	Total			

Subcatchment 003S: Pond 003 Subcatchment



Summary for Subcatchment D1S: Ditch 1 Subcatchment

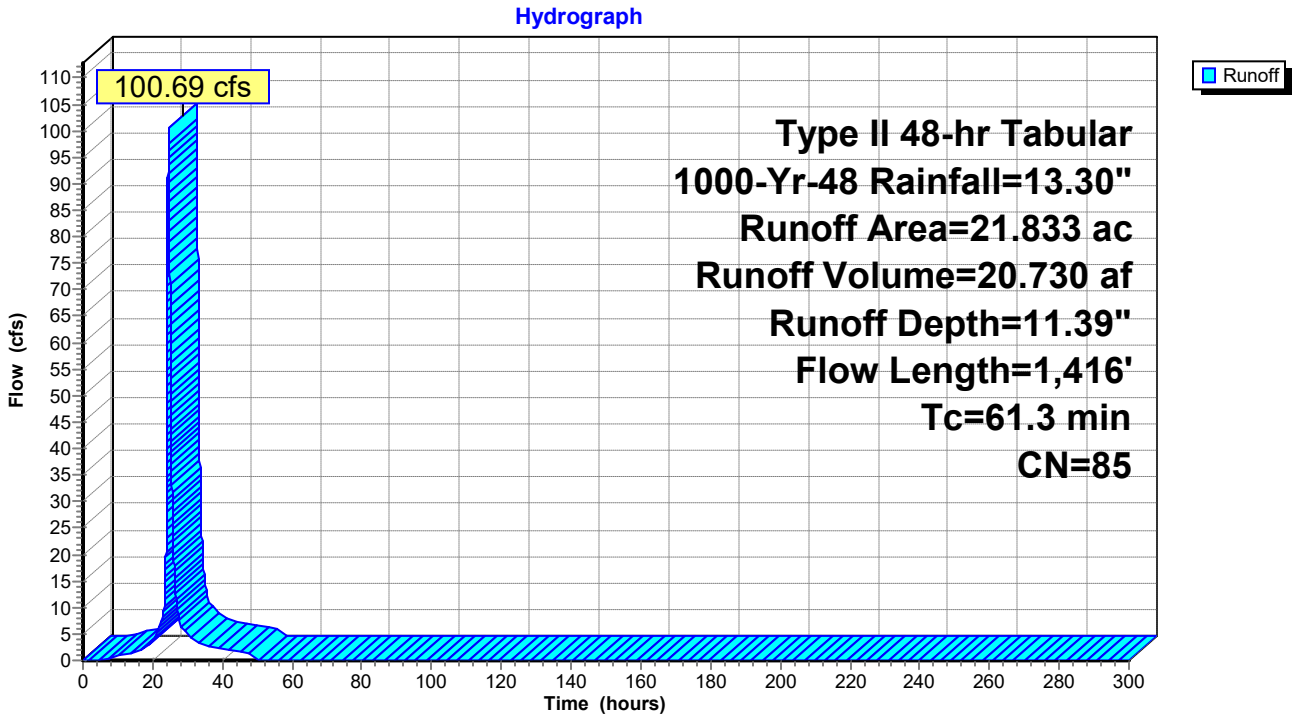
Runoff = 100.69 cfs @ 24.58 hrs, Volume= 20.730 af, Depth=11.39"
Routed to Reach D1 : Ditch 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Type II 48-hr Tabular 1000-Yr-48 Rainfall=13.30"

Area (ac)	CN	Description
0.983	98	Water Surface, HSG A
20.850	84	50-75% Grass cover, Fair, HSG D
21.833	85	Weighted Average
20.850		95.50% Pervious Area
0.983		4.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	100	0.0040	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.72"
41.1	1,316	0.0058	0.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
61.3	1,416	Total			

Subcatchment D1S: Ditch 1 Subcatchment



Summary for Subcatchment D2S: Ditch 2 Subcatchment

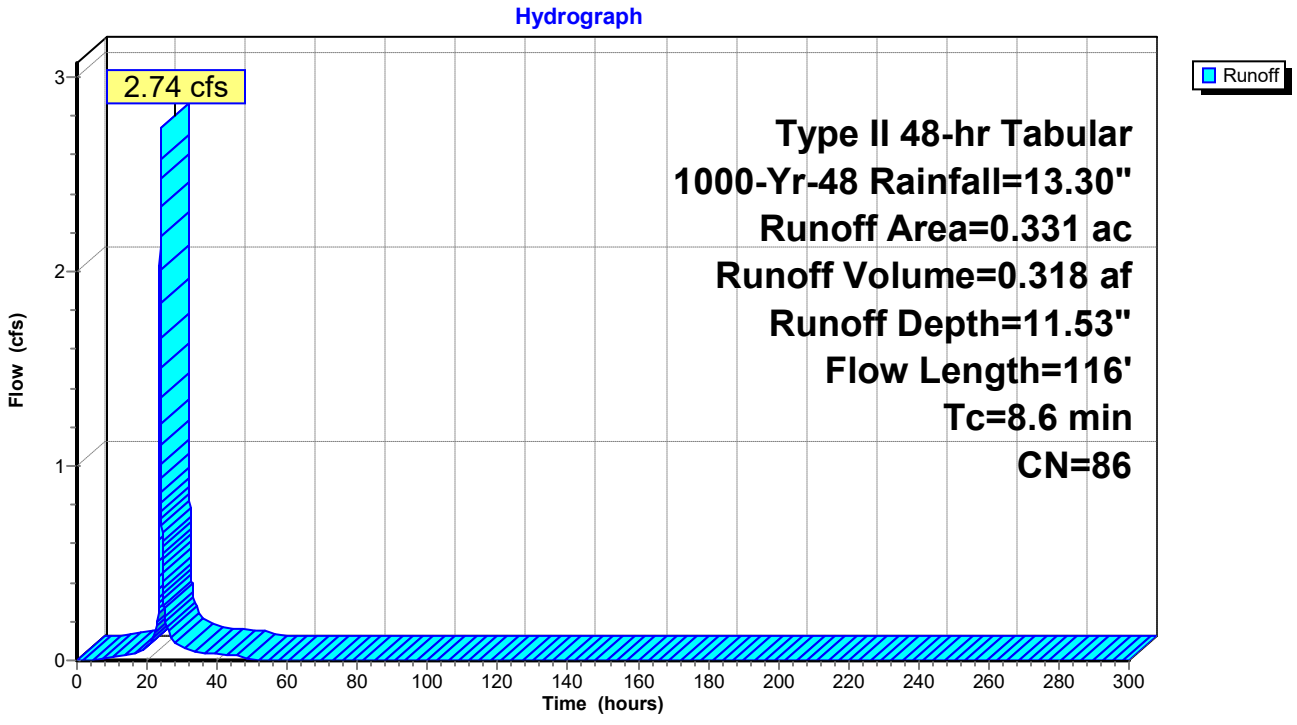
Runoff = 2.74 cfs @ 24.01 hrs, Volume= 0.318 af, Depth=11.53"
Routed to Reach D2 : Ditch 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Type II 48-hr Tabular 1000-Yr-48 Rainfall=13.30"

Area (ac)	CN	Description
0.049	98	Water Surface, HSG A
0.282	84	50-75% Grass cover, Fair, HSG D
0.331	86	Weighted Average
0.282		85.20% Pervious Area
0.049		14.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0350	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.72"
0.1	16	0.4062	4.46		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	116	Total			

Subcatchment D2S: Ditch 2 Subcatchment



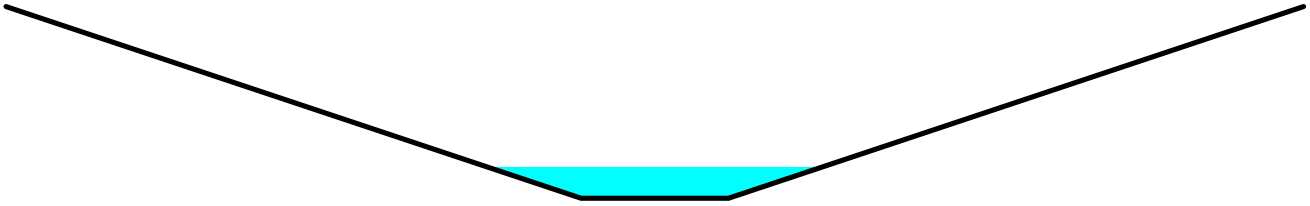
Summary for Reach D1: Ditch 1

Inflow Area = 133.254 ac, 0.74% Impervious, Inflow Depth = 10.60" for 1000-Yr-48 event
Inflow = 127.65 cfs @ 24.58 hrs, Volume= 117.743 af
Outflow = 126.39 cfs @ 24.62 hrs, Volume= 117.743 af, Atten= 1%, Lag= 2.5 min
Routed to Pond ARC : Access Road Culvert

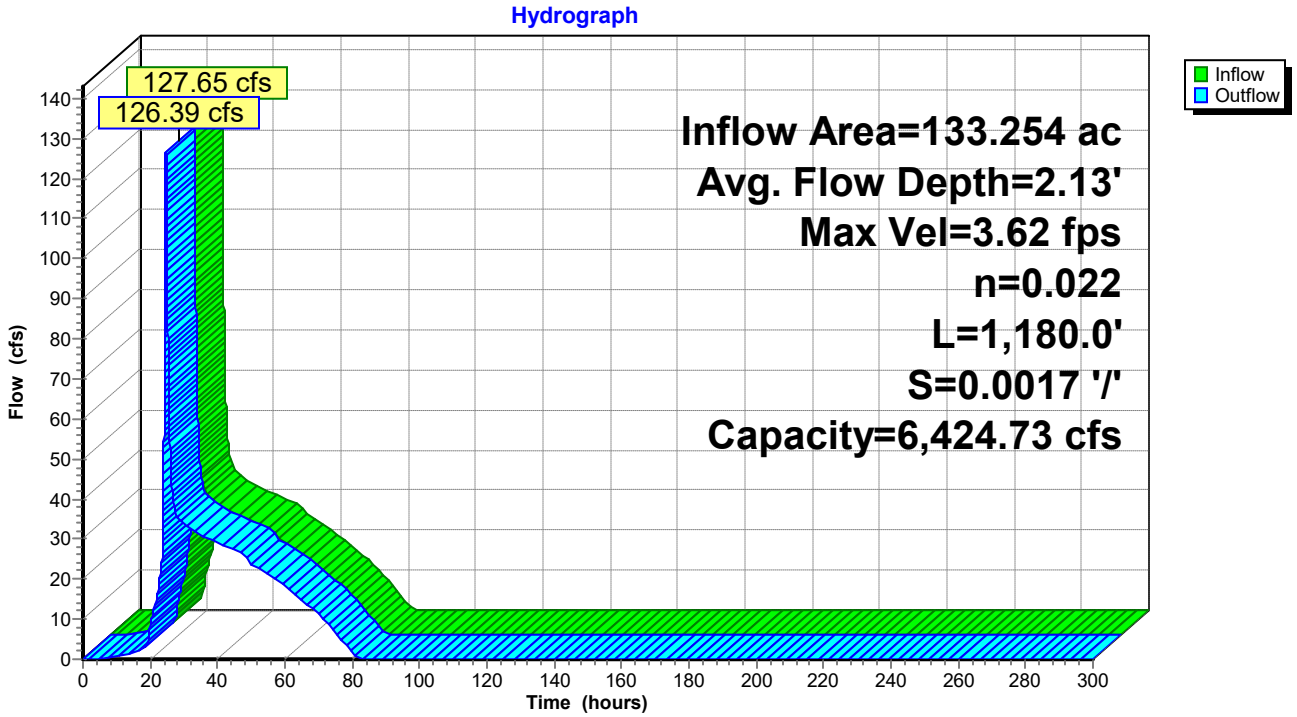
Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.62 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 11.5 min

Peak Storage= 41,158 cf @ 24.62 hrs
Average Depth at Peak Storage= 2.13' , Surface Width= 22.77'
Bank-Full Depth= 13.00' Flow Area= 637.0 sf, Capacity= 6,424.73 cfs

10.00' x 13.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 88.00'
Length= 1,180.0' Slope= 0.0017 '/'
Inlet Invert= 279.00', Outlet Invert= 277.00'



Reach D1: Ditch 1



Summary for Reach D2: Ditch 2

Inflow Area = 133.585 ac, 0.77% Impervious, Inflow Depth = 10.36" for 1000-Yr-48 event
Inflow = 64.19 cfs @ 25.53 hrs, Volume= 115.336 af
Outflow = 64.19 cfs @ 25.55 hrs, Volume= 115.336 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 4.0 min

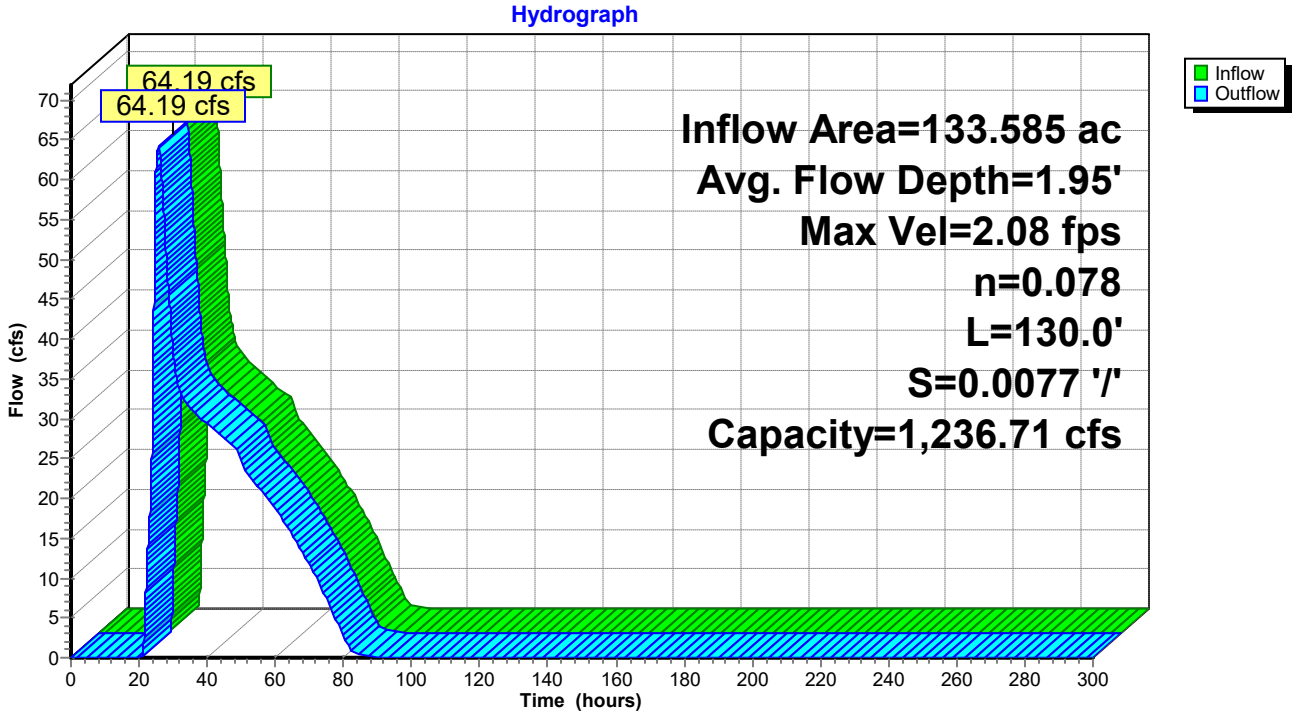
Peak Storage= 4,020 cf @ 25.55 hrs
Average Depth at Peak Storage= 1.95' , Surface Width= 21.70'
Bank-Full Depth= 8.00' Flow Area= 272.0 sf, Capacity= 1,236.71 cfs

10.00' x 8.00' deep channel, n= 0.078 Riprap, 12-inch
Side Slope Z-value= 3.0 '/' Top Width= 58.00'
Length= 130.0' Slope= 0.0077 '/'
Inlet Invert= 276.00', Outlet Invert= 275.00'



‡

Reach D2: Ditch 2



Summary for Pond ARC: Access Road Culvert

[63] Warning: Exceeded Reach D1 INLET depth by 8.97' @ 25.89 hrs

Inflow Area = 133.254 ac, 0.74% Impervious, Inflow Depth = 10.60" for 1000-Yr-48 event
Inflow = 126.39 cfs @ 24.62 hrs, Volume= 117.743 af
Outflow = 63.99 cfs @ 25.54 hrs, Volume= 115.018 af, Atten= 49%, Lag= 55.1 min
Primary = 63.99 cfs @ 25.54 hrs, Volume= 115.018 af
Routed to Reach D2 : Ditch 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Peak Elev= 289.36' @ 25.54 hrs Surf.Area= 2.969 ac Storage= 9.938 af

Plug-Flow detention time= 140.8 min calculated for 115.014 af (98% of inflow)
Center-of-Mass det. time= 92.0 min (2,602.6 - 2,510.6)

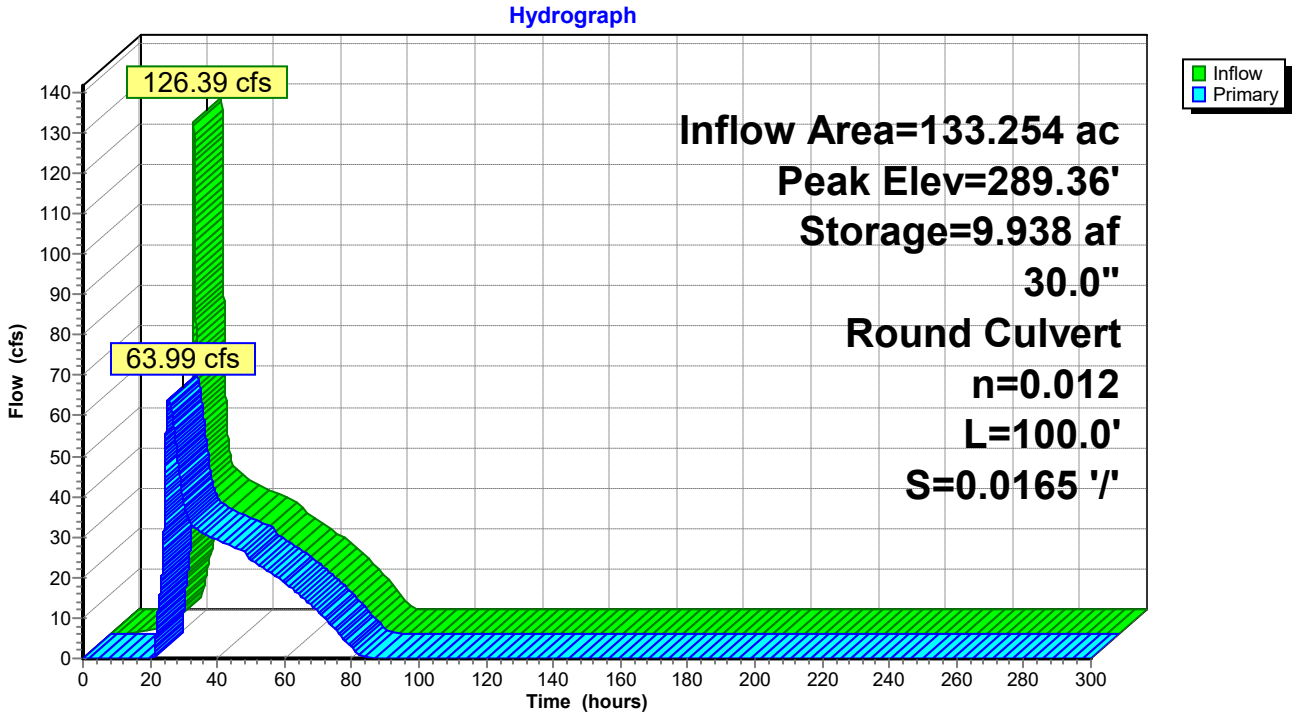
Volume	Invert	Avail.Storage	Storage Description
#1	277.00'	18.677 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
277.00	0.026	0.000	0.000
278.00	0.145	0.085	0.085
279.00	0.265	0.205	0.290
280.00	0.385	0.325	0.615
281.00	0.505	0.445	1.060
282.00	0.624	0.564	1.625
283.00	0.744	0.684	2.309
284.00	0.864	0.804	3.113
285.00	0.983	0.924	4.036
286.00	1.103	1.043	5.080
287.00	1.224	1.163	6.243
288.00	1.371	1.298	7.541
289.00	1.718	1.544	9.085
290.00	5.155	3.436	12.522
291.00	7.155	6.155	18.677

Device	Routing	Invert	Outlet Devices
#1	Primary	283.53'	**30.0" Round Culvert** L= 100.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 283.53' / 281.88' S= 0.0165 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf

Primary OutFlow Max=63.99 cfs @ 25.54 hrs HW=289.36' TW=277.95' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 63.99 cfs @ 13.04 fps)

Pond ARC: Access Road Culvert



Summary for Pond P003: Pond 003

Inflow Area = 111.421 ac, 0.00% Impervious, Inflow Depth = 11.26" for 1000-Yr-48 event
Inflow = 804.88 cfs @ 24.12 hrs, Volume= 104.541 af
Outflow = 28.87 cfs @ 28.69 hrs, Volume= 97.013 af, Atten= 96%, Lag= 273.9 min
Primary = 28.87 cfs @ 28.69 hrs, Volume= 97.013 af
Routed to Link 1L : fixed tailwater 300

Routing by Dyn-Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
Starting Elev= 299.02' Surf.Area= 327,703 sf Storage= 3,644,590 cf
Peak Elev= 304.22' @ 28.69 hrs Surf.Area= 911,004 sf Storage= 6,639,275 cf (2,994,685 cf above start)
Flood Elev= 306.25' Surf.Area= 1,190,609 sf Storage= 8,662,720 cf (5,018,130 cf above start)

Plug-Flow detention time= 3,115.5 min calculated for 13.344 af (13% of inflow)
Center-of-Mass det. time= 1,134.6 min (2,696.3 - 1,561.7)

Volume	Invert	Avail.Storage	Storage Description
#1	282.00'	8,662,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

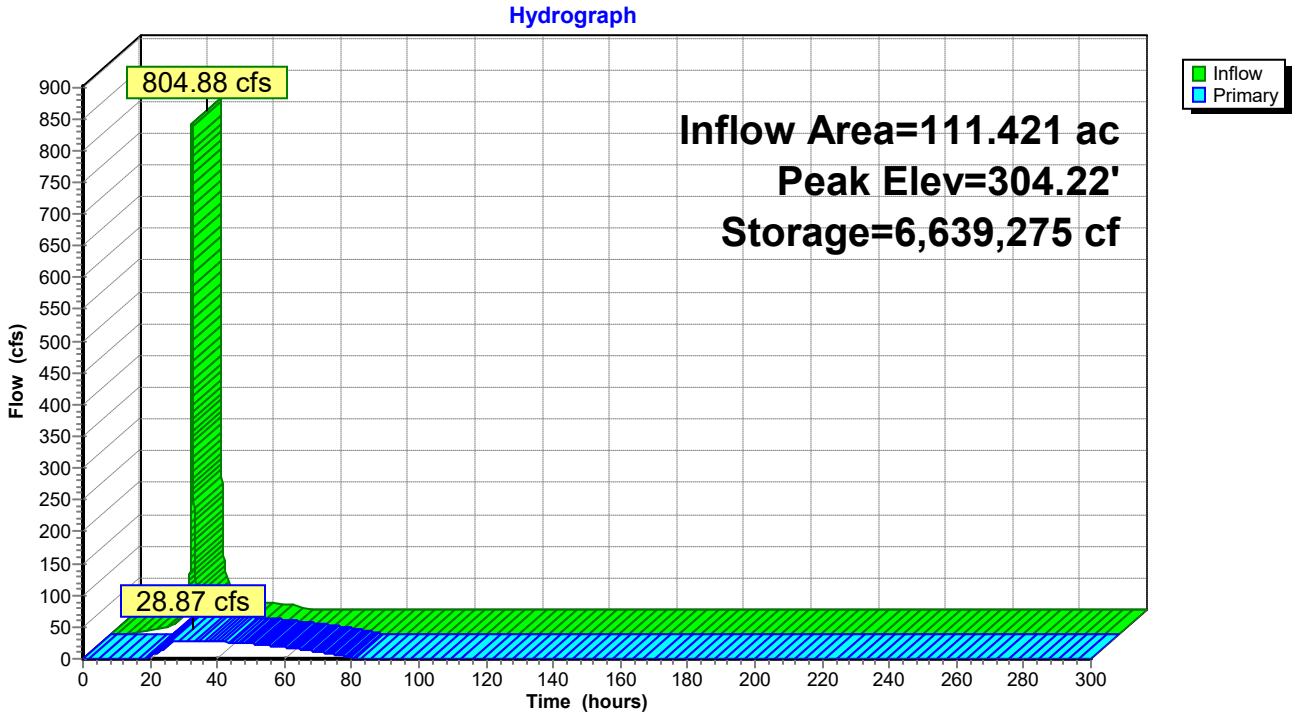
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
282.00	142	0	0
283.00	5,075	2,609	2,609
284.00	26,861	15,968	18,577
285.00	112,273	69,567	88,144
286.00	146,582	129,428	217,571
287.00	170,110	158,346	375,917
288.00	191,983	181,047	556,964
289.00	214,430	203,207	760,170
290.00	236,851	225,641	985,811
291.00	261,720	249,286	1,235,096
292.00	279,469	270,595	1,505,691
293.00	287,461	283,465	1,789,156
294.00	295,027	291,244	2,080,400
295.00	302,042	298,535	2,378,934
296.00	308,563	305,303	2,684,237
297.00	314,782	311,673	2,995,909
298.00	321,028	317,905	3,313,814
299.00	327,421	324,225	3,638,039
300.00	341,527	334,474	3,972,513
301.00	479,359	410,443	4,382,956
302.00	611,434	545,397	4,928,352
303.00	756,819	684,127	5,612,479
304.00	896,618	826,719	6,439,197
305.00	961,604	929,111	7,368,308
306.00	1,063,654	1,012,629	8,380,937
306.25	1,190,609	281,783	8,662,720

Device	Routing	Invert	Outlet Devices
#1	Primary	282.80'	**24.0" Round Culvert** L= 170.0' RCP, rounded edge headwall, Ke= 0.100

			Inlet / Outlet Invert= 282.80' / 281.13' S= 0.0098 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 3.14 sf
#2	Device 1	299.02'	**3.0' long x 1.0' breadth Stop Log** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=28.87 cfs @ 28.69 hrs HW=304.22' TW=300.00' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 28.87 cfs @ 9.19 fps)
↑**2=Stop Log** (Passes 28.87 cfs of 114.33 cfs potential flow)

Pond P003: Pond 003



Summary for Link 1L: fixed tailwater 300

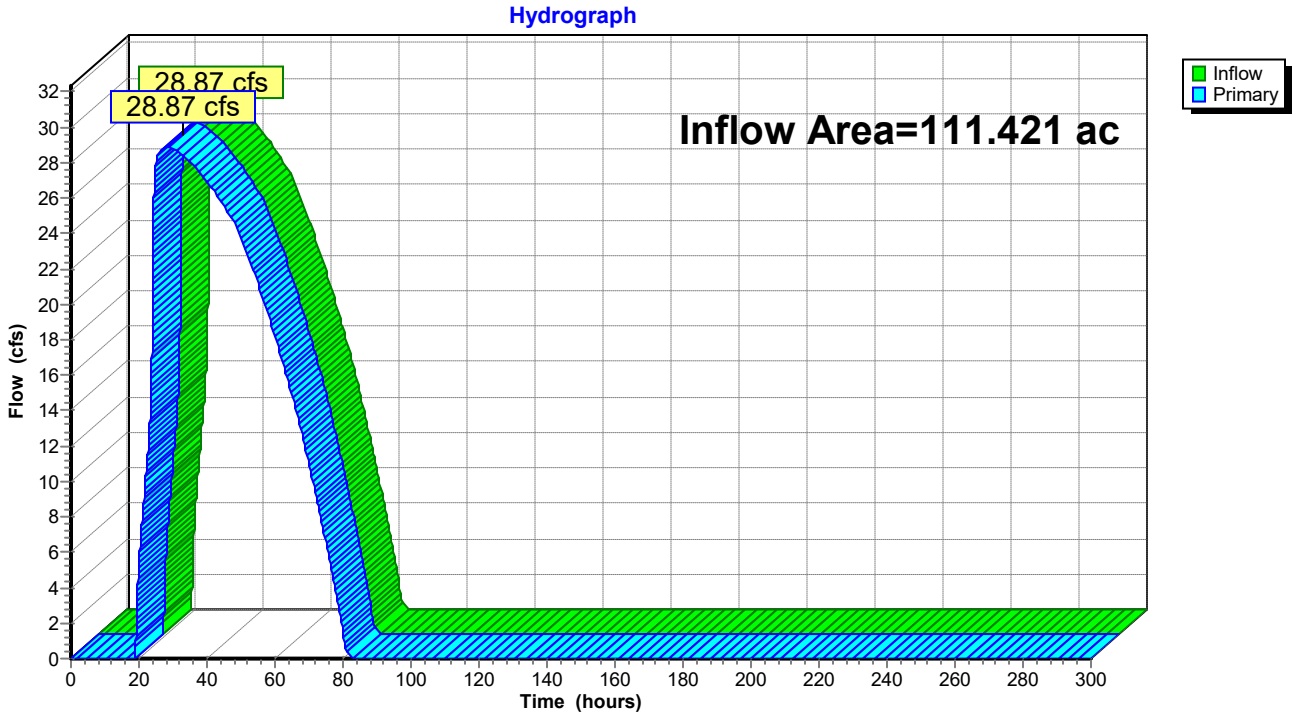
[80] Warning: Exceeded Pond P003 by 0.98' @ 0.00 hrs (8.64 cfs 12.488 af)

Inflow Area = 111.421 ac, 0.00% Impervious, Inflow Depth = 10.45" for 1000-Yr-48 event
Inflow = 28.87 cfs @ 28.69 hrs, Volume= 97.013 af
Primary = 28.87 cfs @ 28.69 hrs, Volume= 97.013 af, Atten= 0%, Lag= 0.0 min
Routed to Reach D1 : Ditch 1

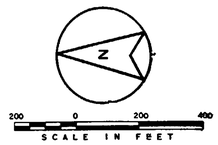
Primary outflow = Inflow, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 300.00'

Link 1L: fixed tailwater 300

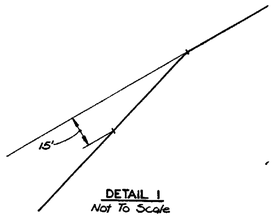


Appendix B
Ash Retaining Dike Grading and Drainage Plan (1977)
By Burns & McDonnell

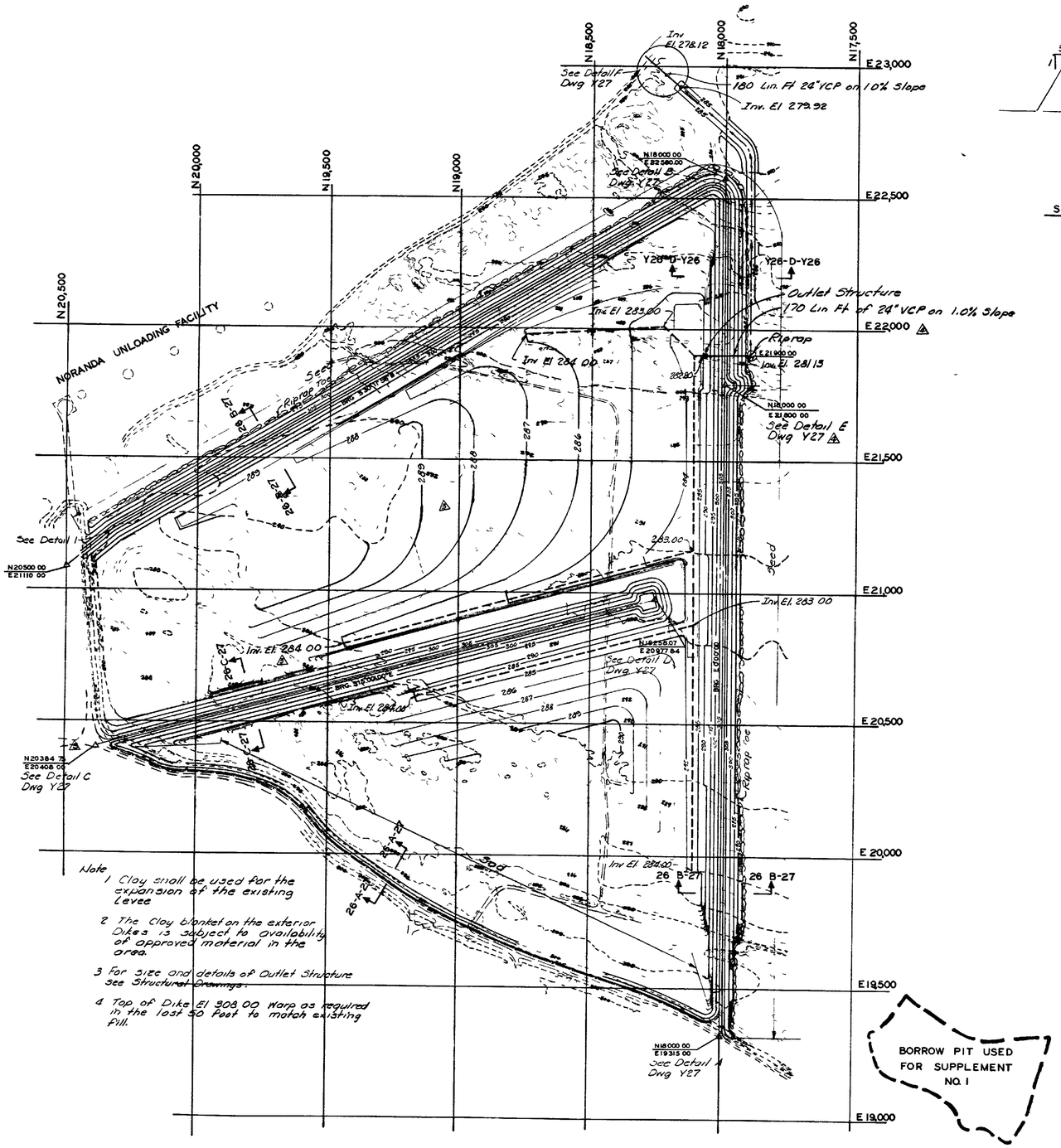


LEGEND

- 290 Existing Contour
- 290 Finish Contour
- Guardrail
- Culvert or Pipe
- Subdrain

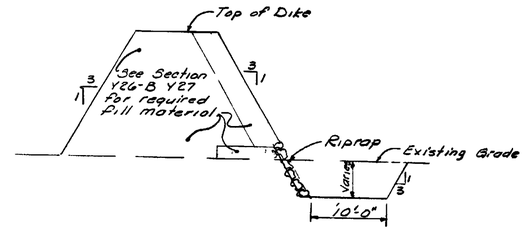


DETAIL 1
Not To Scale



Note

1. Clay shall be used for the expansion of the existing Levee
2. The Clay blanket on the exterior Dikes is subject to availability of approved material in the area.
3. For size and details of Outlet Structure See Structural Drawings.
4. Top of Dike El 308.00 Warp as required in the last 50 Feet to match existing Fill.



SECTION Y26-D-Y26
Not to Scale △4

NO	DATE	BY	REVISION
△1	2-3-71	RZ	Increased 18"VCP to 24"VCP @ Outlet Structure Revised Sub Drain @ Outlet Structure Added Riprap @ the Outlet Struct. Pipe
△2	4-23-71	RZ	Revised existing topography per new Survey Regraded as required
△3	6-29-71	RZ	Lowered Inv. Elevs on Subdrain, Regraded area within I/E Dike
4	7-14-71	RZ	Relocated Outlet Structure & Turn around Added Section Y26-D Y26
△5	10-26-71	TDW	

CONFORMING TO CONSTRUCTION RECORDS

RICHARD D. WADE NUMBER E-10690 REGISTERED PROFESSIONAL ENGINEER STATE OF MISSOURI

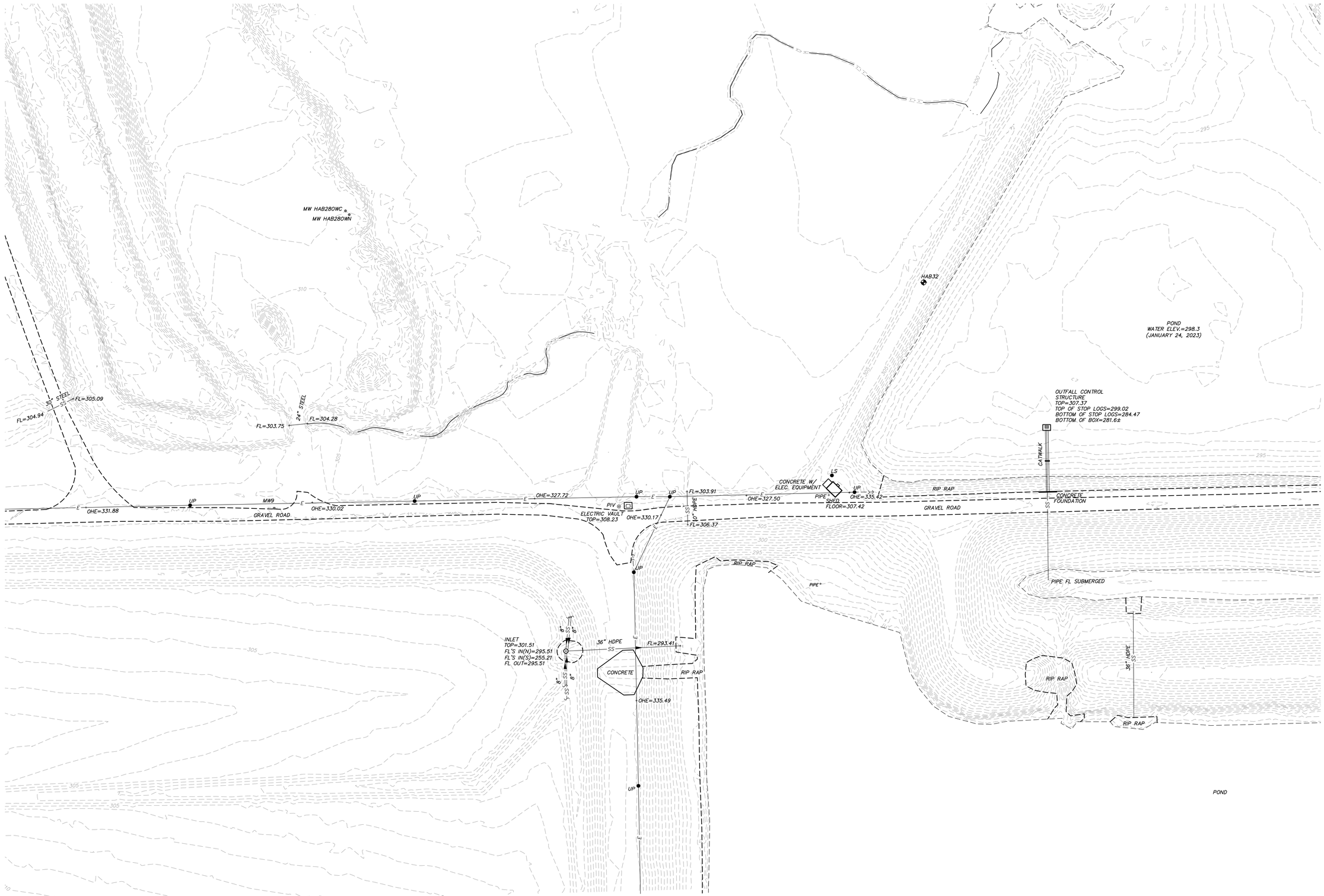
CONTRACT NO 150
SUPPLEMENT 14
STEAM GENERATING STATION-UNIT 1
CITY OF NEW MADRID
NEW MADRID, MISSOURI
ASH RETAINING DIKE
GRADING AND DRAINAGE PLAN

BURNS & McDONNELL ENGINEERING CO
KANSAS CITY MISSOURI

DATE DEC 7 1970	DRAWING NO REV
DESIGNED RZ	Y26 -5
DETAILED RZ	PROJECT 67 51D
CHECKED	SHEET 26 OF 68 SHEETS

6231 9/1/68

Appendix C
Topographic Survey (2023)
By Engineering Surveys & Services



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N

0 1"
SCALE: 1" = 50'

HALEY & ALDRICH, INC.
POND 003
AECI NEW MADRID POWER PLANT
MARSTON, NEW MADRID COUNTY, MISSOURI

4/11/2023

STATE OF MISSOURI
FREDERICK EMIL CARROZ III
NUMBER PLS-2008016655
PROFESSIONAL LAND SURVEYOR

FREDERICK E. CARROZ III
PROFESSIONAL LAND SURVEYOR
PLS - 2008016655

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Date
APRIL 11, 2023

Revised

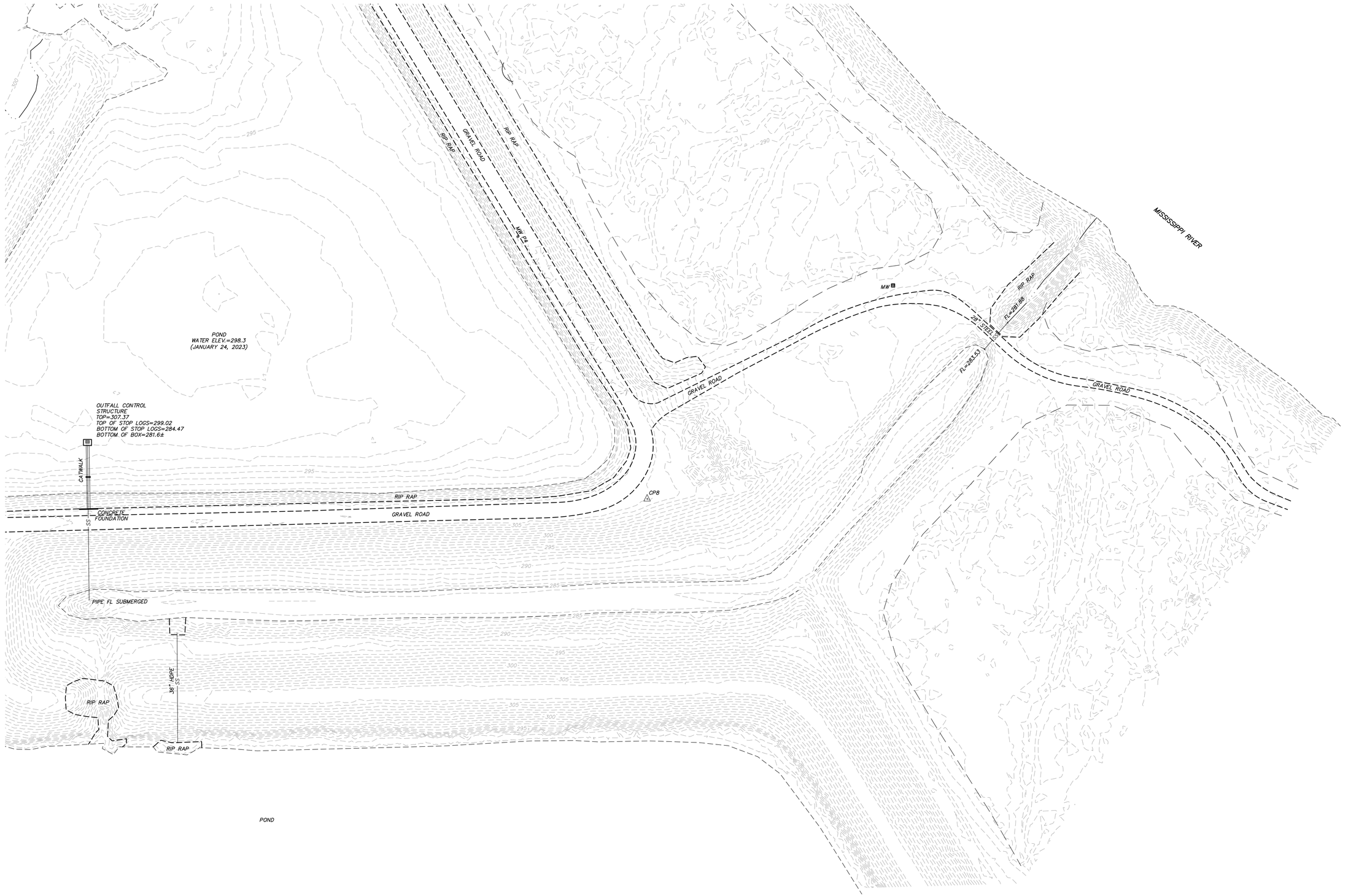
Surveyed: NTL Drawn: CGH

TOPOGRAPHIC SURVEY

Sheet
V1.09
9 of 10

ES&S PROJECT NO. 15922

P:\GENERAL PROJECTS\15922--HALEY_ALDRICH--NEW_MADRID\CAD\15922 SURVEY.DWG 4/11/2023



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0 1"

SCALE: 1" = 50'

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AECI NEW MADRID POWER PLANT
MARSTON, NEW MADRID COUNTY, MISSOURI

4/11/2023

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Date

APRIL 11, 2023

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TOPOGRAPHIC SURVEY

Sheet

V1.10

10 of 10

ES&S PROJECT NO. 15922

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Appendix D
NOAA Rainfall Data

NOAA Atlas 14, Volume 8, Version 2
Location name: Marston, Missouri, USA*
Latitude: 36.5069°, Longitude: -89.5578°
Elevation: 315 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.411** (0.330-0.515)	**0.476** (0.382-0.596)	**0.581** (0.465-0.730)	**0.669** (0.533-0.843)	**0.792** (0.611-1.02)	**0.886** (0.670-1.15)	**0.982** (0.719-1.30)	**1.08** (0.761-1.45)	**1.21** (0.823-1.66)	**1.31** (0.870-1.82)
10-min	**0.602** (0.484-0.754)	**0.696** (0.559-0.873)	**0.851** (0.681-1.07)	**0.980** (0.780-1.23)	**1.16** (0.894-1.49)	**1.30** (0.981-1.69)	**1.44** (1.05-1.90)	**1.58** (1.12-2.13)	**1.77** (1.21-2.43)	**1.92** (1.27-2.66)
15-min	**0.735** (0.590-0.920)	**0.849** (0.681-1.06)	**1.04** (0.830-1.30)	**1.20** (0.951-1.50)	**1.41** (1.09-1.82)	**1.58** (1.20-2.06)	**1.75** (1.28-2.32)	**1.93** (1.36-2.59)	**2.16** (1.47-2.96)	**2.34** (1.55-3.24)
30-min	**1.05** (0.846-1.32)	**1.22** (0.981-1.53)	**1.50** (1.20-1.88)	**1.73** (1.38-2.18)	**2.05** (1.58-2.63)	**2.29** (1.73-2.98)	**2.54** (1.86-3.35)	**2.79** (1.97-3.75)	**3.12** (2.12-4.28)	**3.37** (2.24-4.68)
60-min	**1.39** (1.12-1.74)	**1.61** (1.29-2.01)	**1.96** (1.57-2.46)	**2.27** (1.80-2.85)	**2.69** (2.08-3.48)	**3.03** (2.30-3.95)	**3.38** (2.48-4.47)	**3.73** (2.64-5.04)	**4.22** (2.88-5.80)	**4.59** (3.05-6.38)
2-hr	**1.73** (1.40-2.14)	**1.99** (1.62-2.46)	**2.43** (1.96-3.01)	**2.80** (2.26-3.49)	**3.34** (2.62-4.27)	**3.77** (2.89-4.86)	**4.22** (3.13-5.52)	**4.68** (3.35-6.25)	**5.31** (3.67-7.23)	**5.81** (3.91-7.98)
3-hr	**1.96** (1.60-2.40)	**2.24** (1.83-2.75)	**2.73** (2.22-3.35)	**3.15** (2.56-3.89)	**3.77** (2.98-4.78)	**4.26** (3.30-5.46)	**4.78** (3.58-6.24)	**5.33** (3.84-7.09)	**6.09** (4.24-8.26)	**6.69** (4.54-9.14)
6-hr	**2.39** (1.98-2.90)	**2.72** (2.26-3.30)	**3.31** (2.73-4.02)	**3.82** (3.14-4.66)	**4.58** (3.67-5.76)	**5.20** (4.07-6.59)	**5.85** (4.44-7.54)	**6.54** (4.78-8.61)	**7.51** (5.29-10.1)	**8.29** (5.68-11.2)
12-hr	**2.88** (2.42-3.44)	**3.29** (2.76-3.94)	**4.00** (3.34-4.80)	**4.62** (3.84-5.56)	**5.53** (4.48-6.86)	**6.27** (4.97-7.84)	**7.05** (5.41-8.98)	**7.87** (5.81-10.2)	**9.01** (6.42-11.9)	**9.92** (6.88-13.3)
24-hr	**3.41** (2.90-4.03)	**3.93** (3.33-4.64)	**4.80** (4.06-5.68)	**5.55** (4.67-6.59)	**6.63** (5.42-8.09)	**7.49** (5.99-9.23)	**8.37** (6.50-10.5)	**9.30** (6.94-11.9)	**10.6** (7.61-13.8)	**11.6** (8.12-15.3)
2-day	**3.98** (3.43-4.64)	**4.62** (3.97-5.39)	**5.68** (4.87-6.64)	**6.58** (5.60-7.70)	**7.83** (6.47-9.40)	**8.81** (7.12-10.7)	**9.80** (7.68-12.1)	**10.8** (8.17-13.7)	**12.2** (8.88-15.7)	**13.3** (9.42-17.3)
3-day	**4.38** (3.79-5.06)	**5.07** (4.38-5.86)	**6.21** (5.36-7.20)	**7.18** (6.16-8.34)	**8.53** (7.10-10.2)	**9.59** (7.81-11.6)	**10.7** (8.42-13.1)	**11.8** (8.94-14.8)	**13.3** (9.72-17.0)	**14.4** (10.3-18.7)
4-day	**4.68** (4.08-5.38)	**5.41** (4.70-6.22)	**6.61** (5.74-7.62)	**7.63** (6.59-8.82)	**9.07** (7.59-10.8)	**10.2** (8.36-12.2)	**11.3** (9.01-13.9)	**12.5** (9.58-15.7)	**14.1** (10.4-18.0)	**15.4** (11.1-19.9)
7-day	**5.41** (4.76-6.14)	**6.21** (5.46-7.06)	**7.56** (6.62-8.60)	**8.71** (7.59-9.95)	**10.3** (8.76-12.2)	**11.6** (9.65-13.8)	**13.0** (10.4-15.7)	**14.4** (11.1-17.8)	**16.3** (12.1-20.6)	**17.8** (12.9-22.7)
10-day	**6.08** (5.39-6.86)	**6.94** (6.14-7.83)	**8.37** (7.39-9.47)	**9.61** (8.43-10.9)	**11.4** (9.70-13.3)	**12.8** (10.7-15.1)	**14.2** (11.5-17.1)	**15.7** (12.2-19.3)	**17.8** (13.3-22.3)	**19.4** (14.2-24.6)
20-day	**8.18** (7.35-9.10)	**9.17** (8.23-10.2)	**10.8** (9.66-12.0)	**12.2** (10.8-13.6)	**14.1** (12.2-16.2)	**15.6** (13.2-18.1)	**17.1** (14.0-20.3)	**18.7** (14.7-22.7)	**20.8** (15.8-25.8)	**22.4** (16.6-28.2)
30-day	**10.0** (9.05-11.0)	**11.1** (10.1-12.3)	**13.0** (11.7-14.3)	**14.5** (13.0-16.1)	**16.5** (14.3-18.7)	**18.1** (15.4-20.8)	**19.6** (16.2-23.0)	**21.2** (16.8-25.5)	**23.2** (17.8-28.6)	**24.8** (18.5-31.0)
45-day	**12.3** (11.2-13.5)	**13.7** (12.5-15.0)	**15.8** (14.4-17.4)	**17.6** (15.9-19.3)	**19.8** (17.3-22.3)	**21.5** (18.4-24.5)	**23.1** (19.2-26.9)	**24.7** (19.7-29.4)	**26.7** (20.5-32.5)	**28.1** (21.1-34.9)
60-day	**14.3** (13.1-15.5)	**15.9** (14.6-17.3)	**18.4** (16.8-20.0)	**20.3** (18.5-22.3)	**22.9** (20.0-25.4)	**24.7** (21.2-27.9)	**26.4** (22.0-30.4)	**28.0** (22.4-33.1)	**30.0** (23.1-36.2)	**31.3** (23.7-38.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

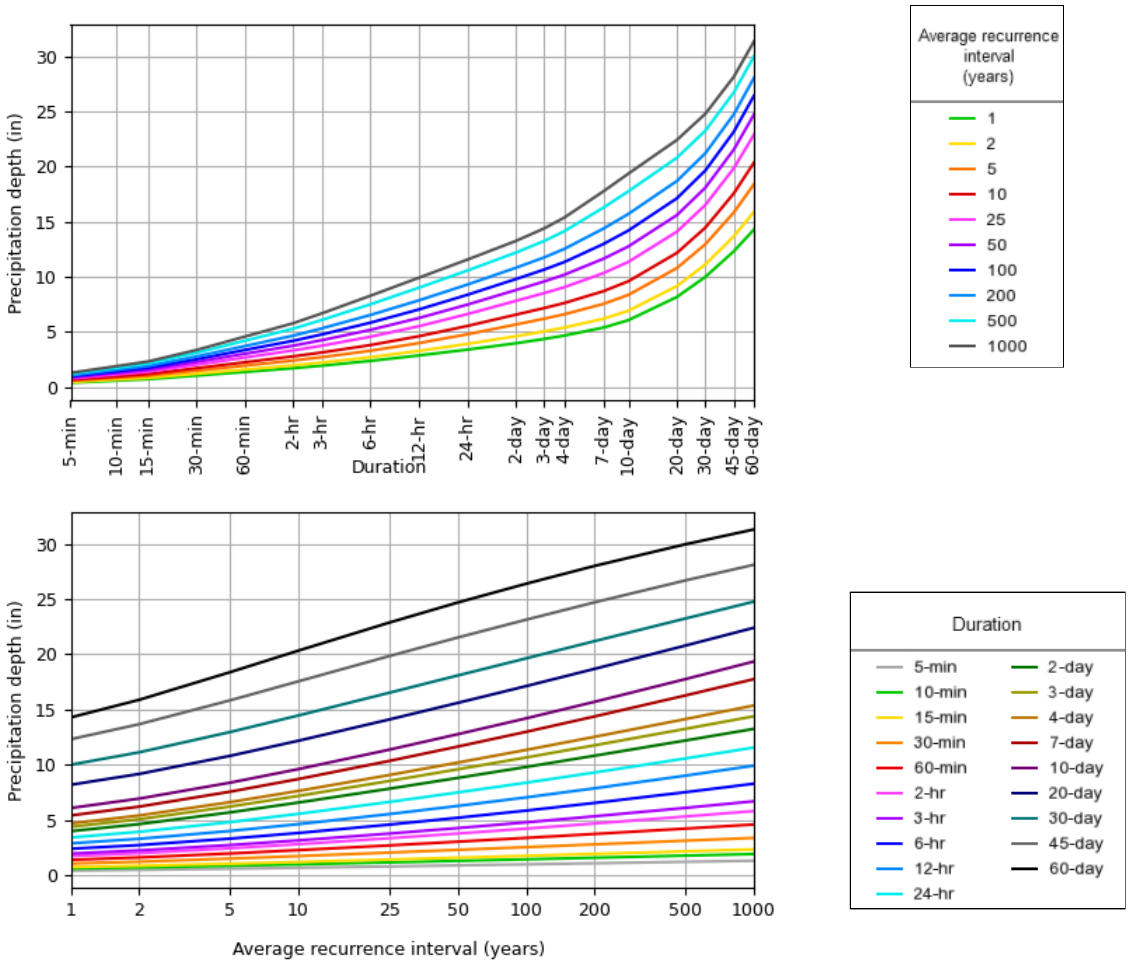
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 36.5069°, Longitude: -89.5578°



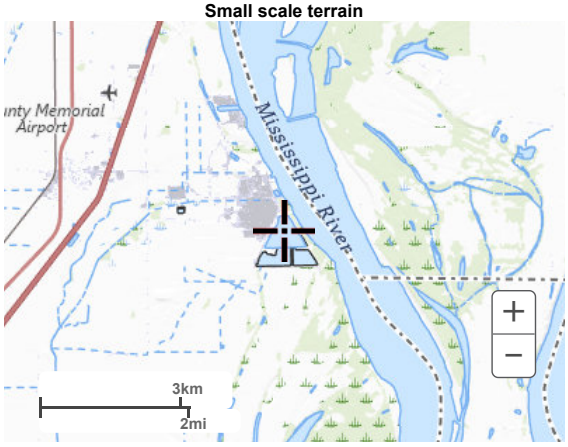
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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