Submitted to
Southern Indiana
Gas & Electric Company
(SIGECO)
dba CenterPoint Energy
Indiana South (CEIS)
211 Northwest Riverside
Drive, Evansville, IN 47708

Submitted by
AECOM
9400 Amberglen Boulevard
Austin, Texas 78729

October 14, 2021

CCR Certification:

Inflow Design Flood Control System Plan

§257.82

for the

East Ash Pond

at the

F.B. Culley Generating Station

Revision 1

Revision History

Revision	Company	Date of Revision	Description of Revision
0	AECOM	10/13/21	Original issue
1	AECOM	10/14/21	Includes minor typographical edits for clarity

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Executive Summary

This Coal Combustion Residuals (CCR) Inflow Design Flood Control System Plan (Inflow Flood Control Plan) for the East Ash Pond at the Southern Indiana Gas & Electric Company, dba CenterPoint Energy Indiana South (CEIS), F.B. Culley Generating Station has been prepared in accordance with the requirements specified in the USEPA CCR Rule under 40 Code of Federal Regulations CFR §257.82 (a). The CCR Rule required that the specified documentation, assessments and plans for an existing CCR surface impoundment be prepared by October 17, 2016. Pursuant to that requirement, the Initial Inflow Flood Control Plan was completed and placed in the facility operating record on October 13, 2016. These regulations also require that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility's operating record. Since the Initial Inflow Flood Control Plan assessment was placed in the facility's operating record on October 13, 2016, the deadline for completing this 5-year update is October 13, 2021.

This Inflow Flood Control Plan meets the regulatory requirements as summarized in **Table ES-1.**

Table ES-1 – Certification Summary

Report Section	CCR Rule Reference	Requirement Summary	Requirement Met?	Comments
Inflow Design Flood Control System Plan				
4.1	§257.82 (a)(1)	*Adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood*	Yes	CCR unit has the storage capacity to handle the inflow design flood
4.2	§257.82 (a)(2)	*Adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood*	Yes	The pond has adequate capacity to contain 1,000-year 24-hour storm with or without operational outlet pumps.
4.3	§257.82 (a)(3)	*Required Inflow design flood for Significant Hazard Potential Impoundment*	Yes	Inflow design flood utilized was the 1,000-year event
4.4	§257.82 (b)	*Discharge handled in accordance with* §257.3 – 3	Yes	CCR unit discharges in accordance with the existing NPDES permit

The East Ash Pond is considered to be a significant hazard potential CCR surface impoundment, therefore per §257.82 (a)(3), the inflow design flood is the 1,000-year flood. In accordance with the requirements of §257.82 (a)(3), an Inflow Flood Control Plan was developed for the East Ash Pond. This was accomplished by evaluating the effects of a 24-hour duration design storm for the 1,000-year Inflow Design Flood (IDF) to evaluate the East Ash Pond's ability to collect and control the 1,000-year IDF of 10.2 inches, under existing operational and maintenance procedures. Under these conditions there are several interconnected and non-connected pools within the East Ash Pond. These pools are being utilized for treatment and removal of CCR material in the pond. The only outlet from the pond is a pump station, which the interconnected pools are tied to. This outlet does not allow for free flow discharge if the pump station was to malfunction or lose power. To simulate the worst-case scenario, the analysis was completed with no pumps running in the East Ash Pond as if there was a malfunction or power outage at the pump station. Therefore, the East Ash Pond would be required to collect and store the 1,000-year IDF. The results for the East Ash Pond indicate that the CCR unit has sufficient storage capacity and outlet structures to adequately manage inflows and collect and control outflows during peak discharge conditions created by the 1,000-year IDF.

1 Introduction

1.1 Purpose of This Report

The purpose of the Inflow Design Flood Control System Plan (Inflow Flood Control Plan) is to document that the requirements specified in 40 code of Federal Regulations (CFR) §257.82 have been met to support the certification required under each of the applicable regulatory provisions for the F.B. Culley Generating Station (Culley) East Ash Pond. The East Ash Pond is an existing coal combustion residuals (CCR) surface impoundment as defined by 40 CFR §257.53. The CCR Rule required that the specified documentation, assessments and plans for an existing CCR surface impoundment be prepared by October 17, 2016. Pursuant to that requirement, the Initial Inflow Flood Control Plan was completed and placed in the facility operating record on October 13, 2016. These regulations also require that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility's operating record. Since the Initial Inflow Flood Control Plan assessment was placed in the facility's operating record on October 13, 2016, the deadline for completing this 5-year update is October 13, 2021.

The East Ash Pond has been evaluated to determine whether the inflow design flood control system requirements are met. The following table summarizes the documentation required within the CCR Rule and the sections that specifically respond to those requirements of this plan.

Table 1-1 – CCR Rule Cross Reference Table		
Report Section	**Title**	**CCR Rule Reference**
4.1	Inflow Analysis	§257.82 (a)(1)
4.2	Outflow Analysis	§257.82 (a)(2)
4.3	Inflow Design Flood	§257.82 (a)(3)
4.4	Discharge handled in accordance with *§257.3 – 3*	§257.82 (b)

Analyses completed for the hydrologic and hydraulic assessments of the East Ash Pond are described in this report. Data and analyses results in the following sections are based on spillway design information shown on design drawings, topographic surveys, information about operational and maintenance procedures provided by Southern Indiana Gas & Electric Company, dba CenterPoint Energy Indiana South (CEIS), and limited field measurements collected by AECOM. The analysis approach and results of the hydrologic and hydraulic analyses presented in the following sections were used by AECOM to confirm that the East Ash Pond meets the hydrologic and hydraulic capacity requirements of the rules referenced above for CCR surface impoundments.

1.2 Brief Description of Impoundment

The Culley station is located in Warrick County, Indiana, southeast of Newburgh, Indiana, and is owned and operated by SIGECO. The station is located along the north bank of the Ohio River and the west bank of the Little Pigeon Creek along the southeast portion of the site. The Culley station consists of two CCR surface impoundments, identified as the West Pond and East Ash Pond. The East Ash Pond is actively receiving CCR materials. The East Ash Pond is located directly east of the station and is approximately 10 acres in size.

The East Ash Pond was commissioned in or around 1971 and operates as an unlined CCR impoundment. Earthen embankments were constructed along the south and east sides of the impoundment. Structural fill used for the original construction of the Culley station in the 1950's borders the impoundment to the west side, and west end of the north side. The east embankment intersects a natural hillside on the east end of the north side of the impoundment. The embankment is approximately 1,200 feet long, 30 feet high, and has 2.4 to 1 (horizontal to vertical) exterior side slopes covered with grassy vegetation. Interior side slopes varied from 2.5 to 1 (horizontal to vertical) to 2 to 1 (horizontal to vertical) for the upper and lower portion of the embankment, respectively. The embankment crest elevation varies from 392.67 feet[1] to 396.42 feet and has a crest width of approximately 15 feet. The surface area of the impoundment is approximately 9.8 acres. Within the pond, there are three small pools that are being utilized for treatment and separation of CCR material within the pond. The East Ash Pond has a normal operating level of 386.5 feet. For the purpose of this analysis, the normal water surface elevation of the interconnected construction pools within the East Ash Pond is conservatively assumed s 387 feet.

A site location map showing the area surrounding the station is in **Figure 1** of **Appendix A**. **Figure 2** in **Appendix A** presents the F.B. Culley Generating Station Site Map.

1.2.1 Inflow from Plant Operations and Stormwater Runoff

Unit 2 Bottom ash and flue gas desulfurization (FGD) blowdown material is currently pumped from the plant into the East Ash Pond at rate of 0.35 cubic feet per second (cfs) or 0.233 million gallons per day (MGD).

In addition to rain that falls directly into the impoundment, there is an upstream area immediately north of the East Ash Pond that contributes runoff to the impoundment. The rest of the site areas, including the plant area, coal pile, and grassy areas to the northwest of the site that previously discharged to the East Ash Pond have been re-routed to the Contact Stormwater Pond in the former West Ash Pond footprint and eventually discharged to the Ohio River through a NPDES permitted outfall. The total drainage area to the East Ash Pond impoundment is approximately 10.8 acres.

1.2.2 Outlet Structures

Water discharges from the impoundment through a pump station located at the west side of the East Ash Pond. The pond pump station consists of two CP 3170 LT 3~603 model 5,400 gpm submersible pumps manufactured by Flygt. The 10" pump discharge connects to a manhole on an 84 inch pipe that discharges to an underground discharge tunnel, which collects stormwater and other process water from throughout the Culley station and then discharges to the Ohio River through NPDES permitted Outfall 001.

[1] Unless otherwise noted, all elevations in this report are in the NAVD88 datum.

2 Hydrologic Analysis

2.1 Design Storm

The East Ash Pond has been categorized as a Significant hazard potential CCR impoundment, which requires that the inflow design flood is the 1,000-year return frequency design storm event. The full analysis for this classification determination is included in the *CCR Certification: Initial Hazard Potential Classification for the East Ash Pond at the F.B. Culley Generating Station*.

2.2 Rainfall Data

The rainfall information used in the analysis was based on the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 2, Version 3 which provides rainfall data for storm events with average recurrence intervals ranging from 1 to 1,000 years and durations ranging from 5 minutes to 60 days. The design storm rainfall depth, obtained from the NOAA website, is 10.2 inches for the 24-hour, 1,000-year storm. The Indiana Huff, Third Quartile rainfall distribution was used by AECOM and is appropriate to use for storms up to the 1,000-year, 24-hour flood at the project site.

2.3 Runoff Computations

The drainage areas for the East Ash Pond were estimated using a computer-aided design (CAD) analysis of aerial survey conducted in 2011 and topographic ground surveys completed in 2015 by Three I Design and a drone topographic survey completed in 2016 by Lochmueller Group. The grassy areas to the north drain directly to the East Ash Pond. The total drainage area to the East Ash Pond is approximately 10.8 acres. See Figure 3 in **Appendix A** for the Drainage Area Map.

Runoff was calculated using the SCS Curve Number Method, where curve numbers (CN) were assigned to each subcatchment based on the type of land cover and soil type present. Using the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey, the soil type of the site was selected as hydrologic soil group B. CN values for the land cover were selected from the CN Table available in HydroCAD. This data was obtained from the SCS NRCS Technical Release-55 (TR-55) publication. Ash, Water Surface, 50-75% grass cover, and >75% grass covers that are located on site were estimated to have CN values of 88, 98, 69 and 61 respectively. A composite CN was calculated for the subcatchment area by summing the products of each CN multiplied by its percentage of the total area.

The time of concentration is commonly defined as the time required for runoff to travel from the most hydrologically distant point to the point of collection. Calculations for the time of concentration for each sub-watershed were performed in HydroCAD and are included in **Appendix B**.

Stormwater runoff from the 1,000-year event into the impoundment has a peak inflow of 10.80 cfs and total inflow volume of 11.71 acre-feet. Refer to **Appendix B** for HydroCAD results.

3 Hydraulic Analyses

3.1 Process Flows

Unit 2 Bottom ash and flue gas desulfurization (FGD) blowdown material is currently pumped from the plant into the East Ash Pond at rate of 0.35 cubic feet per second (cfs) or 0.233 million gallons per day (MGD).

3.2 Storage Capacity

The storage volumes for the East Ash Pond were evaluated using a computer-aided design (CAD) analysis to estimate the volume of the pond under the conditions present. A survey was performed on September 29, 2016 to verify the available volume within the East Ash Pond after ash removal operations. The volume of storage was calculated by estimating the incremental storage volume present for each 1 foot elevation within the updated topographic surface supplied by SIGECO representatives. The incremental storage volume was then used to calculate a cumulative storage volume and was input into HydroCAD. The volume of storage provided by the interconnected construction pools within the East Ash Pond from normal pool elevation of 387.00 feet to the top of embankment elevation of 392.67 feet is approximately 30.37 acre-feet. This volume was determined with the assumption that the pools within the East Ash Pond basin are connected through culverts, allowing storm volumes to be shared by the connected pools. Refer to **Appendix B** for further storage volumes details.

3.3 Discharge Analysis

A hydraulic model was created in HydroCAD 10.00 to assess the capacity of the pond to store and convey the storm flows. HydroCAD has the capability to evaluate each pond within the network, to respond to variable tailwater, pumping rates, permit flow loops, and reversing flows. HydroCAD routing calculations reevaluate the pond systems' discharge capability at each time increment, making the program an efficient and dynamic tool for this evaluation.

While the currently operating pool elevation at the East Ash Pond is 386.50 feet, the analyzed scenario conservatively assumes the starting water surface elevation of the interconnected construction pools within the East Ash Pond as 387 feet. For the purposes of this analysis, the East Ash Pond was analyzed as if neither pump within its pump station was operational. This represents a worst-case scenario. As such, the East Ash Pond must store the design storm. Therefore, the facility does not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the NPDES under section 402 of the Clean Water Act.

4 Results

The hydrologic and hydraulic conditions of the East Ash Pond were modeled with the peak discharge of the 1,000-year storm event.

Regulatory Citation: 40 CFR §257.82 (a); The owner or operator of an existing or new 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.

4.1 Inflow Analysis

Regulatory Citation: 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 inflows design flood specified in paragraph (3).*

Background and Assessment

The East Ash Pond receives process inflows from Unit 2 Bottom Ash and FGD waste streams and collects runoff from only a small area of the Culley station site and this runoff drains to the pond through sheet flow, overland ditching, and culverts located on the northwest side of the pond. These runoff volumes, in addition to the rainfall falling within the pond itself, produce the total inflow to the East Ash Pond. Using the HydroCAD model, the total inflow was stored within the East Ash Pond to evaluate the resulting peak water surface elevation.

Table 4-1 summarizes the maximum water surface elevation of the construction pools within the East Ash Pond prior to and after the inflow design flood.

Table 4-1 - Summary of Hydrologic and Hydraulic Analysis 1,000-Year, 24-Hour Storm				
CCR Unit	Beginning WSE[1] (feet)	Peak WSE (feet)	Top of Dam Elevation (feet)	Freeboard Above Peak WSE (feet)
East Ash Pond	387.00	388.50	392.67	4.17
Notes: [1] WSE = Water Surface Elevation				

Conclusion and Recommendation

As there is adequate storage within the East Ash Pond to manage the inflow design flood, there is no anticipated overtopping of the East Ash Pond embankment, which meets the requirements in §257.82 (a)(1).

4.2 Outflow Analysis

Regulatory Citation: 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 (3) of this section.*

Background and Assessment

In addition to the process inflows from Unit 2 Bottom Ash and FGD waste streams, the East Ash Pond currently collects stormwater from a small area of the site including the grass areas to the north routed through a series of ditches and culverts, as well as any rainfall that falls directly within the perimeter embankments. The rain falling within the pond and the stormwater runoff directly draining to the pond, combine to produce the total inflow to the East Ash Pond. Using the HydroCAD model, the total inflow was stored within the East Ash Pond to estimate the peak water surface elevation during the design storm when the Ohio River is experiencing a 100-year flood.

Table 4-2 summarizes the peak flowrates and velocities through each of the outlet devices.

Table 4-2 - Summary of Outlet Devices 1,000-Year, 24-Hour Storm				
Outlet Device	Type and Size	Invert Elevation (feet)	Peak Flowrate (cfs)	Velocity at Peak Flowrate (fps)
Pump Station - Outlet	2 pump – 5400 GPM; CP 3170 LT 3~ 603	386.00	N/A	N/A
Top of Berm Lowest Elevation	Weir	392.67	0.00	0.00

Conclusion and Recommendation

In the case where the East Ash Pond pump station is not operational, AECOM recommends the Culley station provide pumping capacity equal to the existing lift station pumps by means of providing supplemental pumps or bringing the existing lift station pumps online within 48-hours.

As the East Ash Pond can store the design storm from the plant without utilizing its pump station and without the peak water surface elevation overtopping the East Ash Pond embankment, the pond meets the requirements in §257.82 (a)(2).

4.3 Inflow Design Flood

Regulatory Citation: 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), the probable maximum flood;*
  - *(ii) For a significant hazard potential CCR surface impoundment, as determined under §257.73(a)(2), the 1,000-year flood;*
  - *(iii) For a low hazard potential CCR surface impoundment, as determined under §257.73(a)(2), the 100-year flood; or*

- *(iv) For an incised CCR surface impoundment, the 25-year flood.*

Background and Assessment

The calculations for the inflow design flood are based on the hazard potential given to the impoundment. The different classifications of the impoundment hazard potential are high, significant, and low.

Conclusion and Recommendation

As the impoundment was given a significant hazard potential, the 1,000 year design storm was utilized in the analysis, which meets the requirements in §257.82 (a)(3).

4.4 Discharge

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

Background and Assessment

The East Ash Pond was modeled without a working pump station to simulate a worst case scenario. As such, there is no discharge from the pond in this model scenario. However, during normal operating conditions the discharge from the East Ash Pond pump station is conveyed through a 10” pipe that connects to a manhole on an 84” pipe and discharges to an underground discharge tunnel, which also collects discharge water from the cooling water system and various other clean discharge water sources located throughout the power plant. The underground discharge tunnel runs by the basement of Unit 2 within the power plant and discharges directly to the Ohio River through NPDES Permitting Outfall 001. The Ohio River was modeled at the FEMA 100 year flood elevation of 383.5’. The discharge must meet the requirements of the NDPES under section 402 of the Clean Water Act to meet the CCR rule.

Conclusion and Recommendation

No modifications are necessary or recommended to this unit for compliance with the CCR Rule.

Runoff discharges from the site through a permitted NPDES outfall. As per the current NPDES permit, all discharged water is tested for pollutants to meet the minimum regulatory requirements of the permit, and thereby meets the requirements in §257.82 (b).

5 Conclusions

The Inflow Flood Control Plan of the East Ash Pond adequately manages flow into the CCR unit during and following the peak discharge of the 1,000-year frequency storm event inflow design flood. The inflow design flood control system of the East Ash Pond adequately manages flow from the CCR unit to collect and control the peak discharge resulting from the 1,000-year frequency storm event inflow design flood. Therefore, the East Ash Pond meets the requirements for certification.

In the case where the East Ash Pond pump station is not operational, AECOM recommended that the Culley Generating Station provide pumping capacity equal to the existing lift station pumps by means of providing supplemental pumps or bringing the existing lift station pumps online within 48-hours.

The contents of this report, specifically **Sections 1** through **4**, represent the Inflow Design Flood Control System Plan for this site.

6 Certification

This Certification Statement documents that the East Ash Pond at the F.B. Culley Generating Station meets the Inflow Design Flood Control System Plan requirements specified in 40 CFR §257.82. The East Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule required that the specified documentation, assessments and plans for an existing CCR surface impoundment be prepared by October 17, 2016. Pursuant to that requirement, the Inflow Flood Control Plan was completed and placed in the facility operating record on October 13, 2016. These regulations also require that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility's operating record. Accordingly, the deadline for completing this 5-year update is October 13, 2021.

CCR Unit: Southern Indiana Gas & Electric Company; F.B. Culley Generating Station; East Ash Pond

I, Jay Mokotoff, being a Registered Professional Engineer in good standing in the State of Indiana, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Unit, that the Inflow Design Flood Control System Plan dated October 13, 2021 meets the requirements of 40 CFR § 257.82.

Jay Mokotoff

Printed Name

10-13-2021

Date

7 Limitations

Background information, design basis, and other data which AECOM has used in preparing this report have been furnished to AECOM by SIGECO. AECOM has relied on this information as furnished, and is not responsible for the accuracy of this information. Our recommendations are based on available information from previous and current investigations. These recommendations may be updated as future investigations are performed.

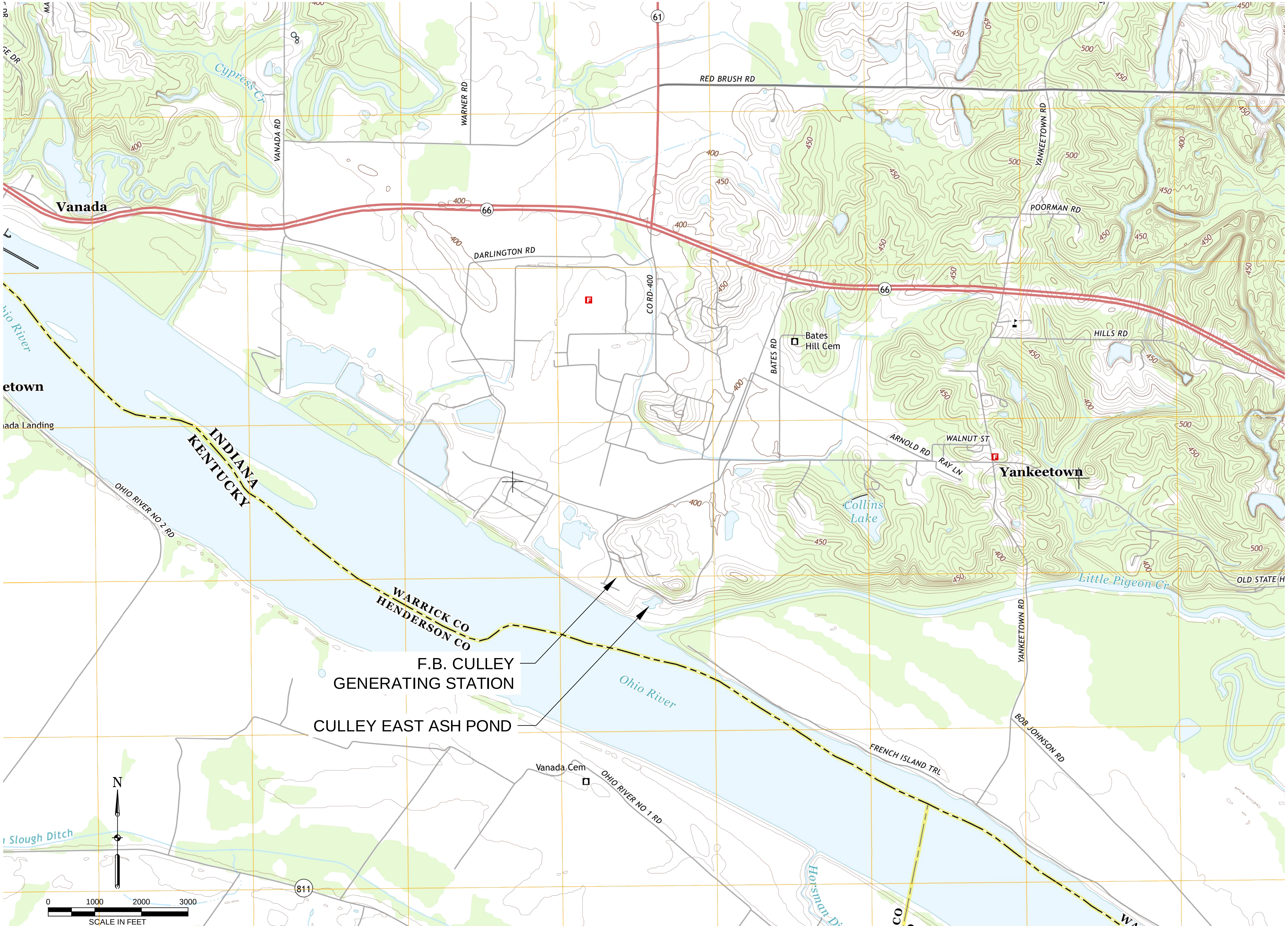
The conclusions presented in this report are intended only for the purpose, site location, and project indicated. The recommendations presented in this report should not be used for other projects or purposes. Conclusions or recommendations made from these data by others are their responsibility. The conclusions and recommendations are based on AECOM's understanding of current plant operations, maintenance, stormwater handling, and ash handling procedures at the station, as provided by SIGECO. Changes in any of these operations or procedures may invalidate the findings in this report until AECOM has had the opportunity to review the findings, and revise the report if necessary.

This hydrologic and hydraulic analysis was performed in accordance with the standard of care commonly used as state-of-practice in our profession. Specifically, our services have been performed in accordance with accepted principles and practices of the engineering profession. The conclusions presented in this report are professional opinions based on the indicated project criteria and data available at the time this report was prepared. Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

While the CCR unit adequately manages the inflow design flood, SIGECO must perform routine maintenance on the CCR unit to continually manage flood events without failure. The pump station should be cleared of debris that could block or damage the device. The interconnected construction pools within the East Ash Pond should maintain a water surface elevation at or below 387 feet. Pipes, intake structures, and pumps should be monitored and repaired if deterioration or deformation occurs. All grass lined slopes should be examined for erosion and repaired if damaged. Rip rap lined channels should be inspected for stones that have shifted or bare spots that have formed. Replace rip rap as needed. Additionally, in the case where the East Ash Pond pump station is not working, SIGECO shall provide pumping capacity equal to the existing lift station pumps by means of providing supplemental pumps or bringing the existing lift station pumps online within 48-hours.

Appendix A
Figures

Figure 1 – Location Map
Figure 2 – Site Map
Figure 3 – Drainage Area Map



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F.B. CULLEY GENERATING STATION
NEWBURGH, IN

CCR CERTIFICATION
EAST ASH POND

ISSUED FOR CERTIFICATION

ISSUED FOR BIDDING	DATE	BY
ISSUED FOR CONSTRUCTION	DATE	BY

REVISIONS

NO.	DESCRIPTION	DATE
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AECOM PROJECT NO:	60442676
DRAWN BY:	MJC
DESIGNED BY:	MJC
CHECKED BY:	TLE
DATE CREATED:	8/18/2016
PLOT DATE:	4/22/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

LOCATION MAP

FIGURE 1

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F.B. CULLEY GENERATING STATION
NEWBURGH, IN

CCR CERTIFICATION
EAST ASH POND

ISSUED FOR CERTIFICATION

ISSUED FOR BIDDING ____ DATE BY

ISSUED FOR CONSTRUCTION ____ DATE BY

REVISIONS

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DATE CREATED:	8/18/2016
PLOT DATE:	4/22/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

SITE MAP

FIGURE 2

CARUSO, MICHAEL, 10/7/2016 3:13 PM

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0 80 160 240
GRAPHIC SCALE (IN FEET)

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F.B. CULLEY GENERATING STATION NEWBURGH, IN

CCR CERTIFICATION EAST ASH POND

ISSUED FOR CERTIFICATION

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
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AECOM PROJECT NO:	60442676
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CHECKED BY:	
DATE CREATED:	
PLOT DATE:	10/13/2021
SCALE:	
ACAD VER:	2019

SHEET TITLE

SITE DRAINAGE AREA MAP

FIGURE 3

Appendix B
Hydrologic and Hydraulic Calculations

NOAA Precipitation Data

Soils Data

Water Balance

HydroCAD Output

NOAA Precipitation Data

NOAA Atlas 14, Volume 2, Version 3
Location name: Newburgh, Indiana, US*
Latitude: 37.9163°, Longitude: -87.3369°
Elevation: 394 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

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	0.382 (0.347-0.418)	0.450 (0.411-0.494)	0.530 (0.483-0.581)	0.595 (0.541-0.652)	0.677 (0.612-0.740)	0.742 (0.668-0.810)	0.802 (0.718-0.875)	0.868 (0.774-0.948)	0.953 (0.843-1.04)	1.02 (0.896-1.12)
10-min	0.596 (0.542-0.653)	0.706 (0.644-0.775)	0.831 (0.758-0.911)	0.925 (0.840-1.01)	1.04 (0.945-1.14)	1.14 (1.02-1.24)	1.22 (1.10-1.33)	1.31 (1.17-1.44)	1.43 (1.26-1.56)	1.51 (1.33-1.65)
15-min	0.734 (0.668-0.805)	0.870 (0.793-0.954)	1.03 (0.937-1.13)	1.15 (1.04-1.26)	1.30 (1.18-1.42)	1.41 (1.27-1.54)	1.53 (1.37-1.67)	1.64 (1.46-1.79)	1.78 (1.58-1.95)	1.89 (1.66-2.07)
30-min	0.981 (0.892-1.07)	1.17 (1.07-1.29)	1.42 (1.29-1.56)	1.61 (1.46-1.76)	1.86 (1.68-2.03)	2.05 (1.84-2.24)	2.24 (2.00-2.44)	2.43 (2.17-2.66)	2.69 (2.38-2.94)	2.89 (2.54-3.16)
60-min	1.20 (1.09-1.32)	1.45 (1.32-1.59)	1.79 (1.63-1.96)	2.06 (1.87-2.26)	2.42 (2.19-2.65)	2.72 (2.45-2.97)	3.02 (2.70-3.29)	3.33 (2.96-3.63)	3.75 (3.32-4.10)	4.09 (3.60-4.48)
2-hr	1.45 (1.32-1.59)	1.75 (1.60-1.92)	2.19 (1.99-2.40)	2.54 (2.30-2.77)	3.01 (2.72-3.28)	3.39 (3.06-3.70)	3.79 (3.39-4.13)	4.20 (3.74-4.58)	4.77 (4.21-5.20)	5.22 (4.57-5.70)
3-hr	1.56 (1.42-1.71)	1.88 (1.71-2.07)	2.35 (2.13-2.58)	2.73 (2.47-2.99)	3.26 (2.94-3.57)	3.69 (3.31-4.04)	4.15 (3.70-4.53)	4.62 (4.10-5.04)	5.29 (4.64-5.78)	5.83 (5.07-6.38)
6-hr	1.91 (1.74-2.10)	2.30 (2.10-2.54)	2.87 (2.61-3.15)	3.34 (3.02-3.66)	3.99 (3.60-4.37)	4.53 (4.06-4.95)	5.10 (4.55-5.57)	5.71 (5.06-6.22)	6.56 (5.74-7.16)	7.25 (6.30-7.92)
12-hr	2.27 (2.07-2.50)	2.74 (2.50-3.01)	3.40 (3.09-3.73)	3.94 (3.57-4.32)	4.70 (4.24-5.14)	5.32 (4.78-5.81)	5.97 (5.34-6.52)	6.66 (5.92-7.28)	7.63 (6.72-8.34)	8.42 (7.34-9.21)
24-hr	2.72 (2.54-2.92)	3.28 (3.05-3.52)	4.08 (3.80-4.38)	4.73 (4.39-5.08)	5.65 (5.22-6.07)	6.41 (5.89-6.88)	7.20 (6.58-7.74)	8.04 (7.29-8.66)	9.21 (8.26-9.98)	10.2 (9.03-11.0)
2-day	3.25 (3.02-3.50)	3.91 (3.63-4.21)	4.87 (4.52-5.24)	5.66 (5.23-6.09)	6.80 (6.25-7.32)	7.75 (7.09-8.36)	8.76 (7.95-9.47)	9.85 (8.87-10.7)	11.4 (10.1-12.5)	12.7 (11.2-13.9)
3-day	3.47 (3.23-3.73)	4.16 (3.87-4.48)	5.17 (4.81-5.57)	6.01 (5.57-6.47)	7.23 (6.66-7.79)	8.25 (7.57-8.90)	9.34 (8.51-10.1)	10.5 (9.51-11.4)	12.2 (10.9-13.4)	13.6 (12.0-15.0)
4-day	3.68 (3.44-3.97)	4.41 (4.11-4.76)	5.47 (5.10-5.90)	6.36 (5.91-6.86)	7.66 (7.08-8.26)	8.75 (8.05-9.45)	9.93 (9.06-10.7)	11.2 (10.1-12.2)	13.0 (11.7-14.3)	14.6 (12.9-16.0)
7-day	4.29 (3.99-4.63)	5.14 (4.78-5.55)	6.38 (5.92-6.89)	7.42 (6.86-8.02)	8.94 (8.22-9.67)	10.2 (9.35-11.1)	11.6 (10.6-12.6)	13.2 (11.8-14.3)	15.4 (13.6-16.9)	17.2 (15.1-19.0)
10-day	4.84 (4.50-5.25)	5.79 (5.39-6.29)	7.17 (6.66-7.78)	8.32 (7.70-9.02)	10.0 (9.21-10.8)	11.4 (10.4-12.4)	12.9 (11.7-14.1)	14.6 (13.1-15.9)	16.9 (15.0-18.6)	18.9 (16.6-20.9)
20-day	6.66 (6.27-7.11)	7.91 (7.44-8.43)	9.50 (8.92-10.1)	10.8 (10.1-11.5)	12.6 (11.7-13.4)	14.0 (13.0-14.9)	15.4 (14.3-16.5)	16.9 (15.6-18.2)	19.0 (17.3-20.5)	20.6 (18.6-22.4)
30-day	8.21 (7.75-8.70)	9.70 (9.16-10.3)	11.5 (10.8-12.1)	12.9 (12.1-13.6)	14.8 (13.9-15.7)	16.3 (15.3-17.3)	17.9 (16.6-19.0)	19.4 (18.0-20.7)	21.6 (19.8-23.1)	23.2 (21.1-25.0)
45-day	10.3 (9.79-10.9)	12.1 (11.5-12.8)	14.2 (13.4-14.9)	15.8 (14.9-16.6)	17.9 (16.9-18.9)	19.6 (18.4-20.7)	21.2 (19.9-22.4)	22.9 (21.3-24.3)	25.1 (23.2-26.7)	26.7 (24.6-28.6)
60-day	12.3 (11.7-12.9)	14.5 (13.7-15.2)	16.8 (15.9-17.7)	18.5 (17.6-19.5)	20.9 (19.7-22.0)	22.6 (21.3-23.9)	24.3 (22.9-25.7)	26.0 (24.3-27.5)	28.1 (26.2-29.9)	29.7 (27.5-31.7)

[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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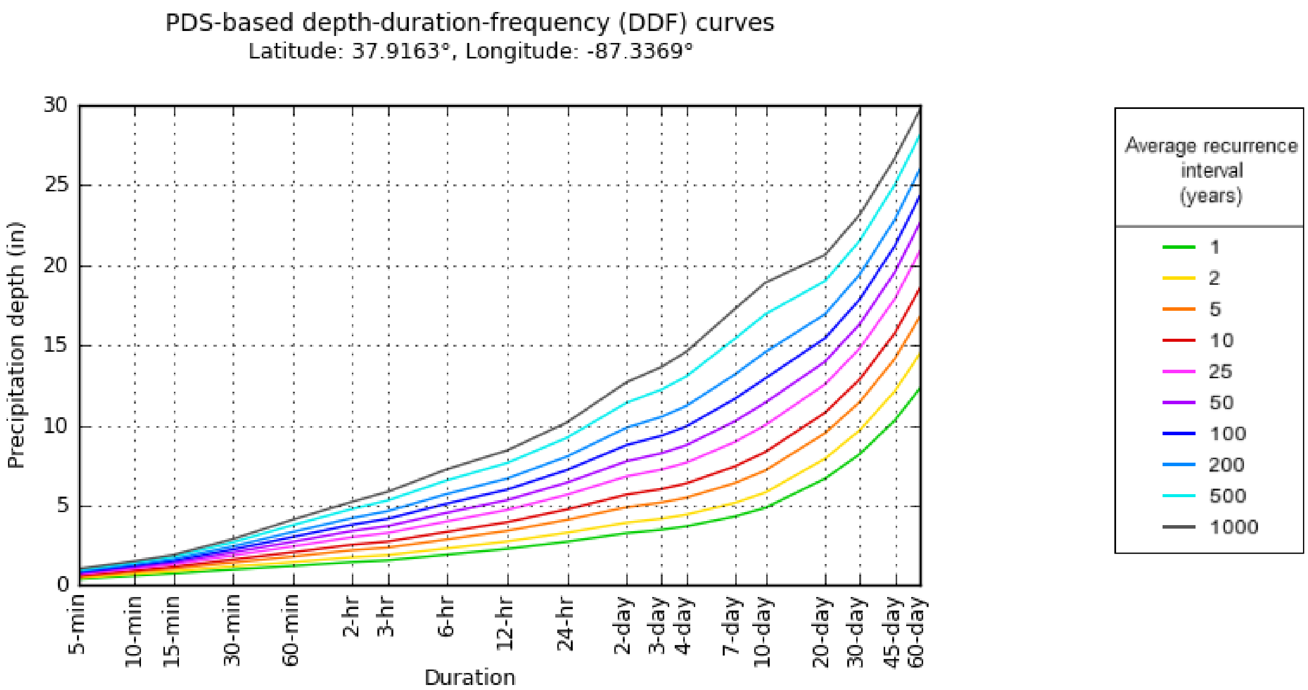
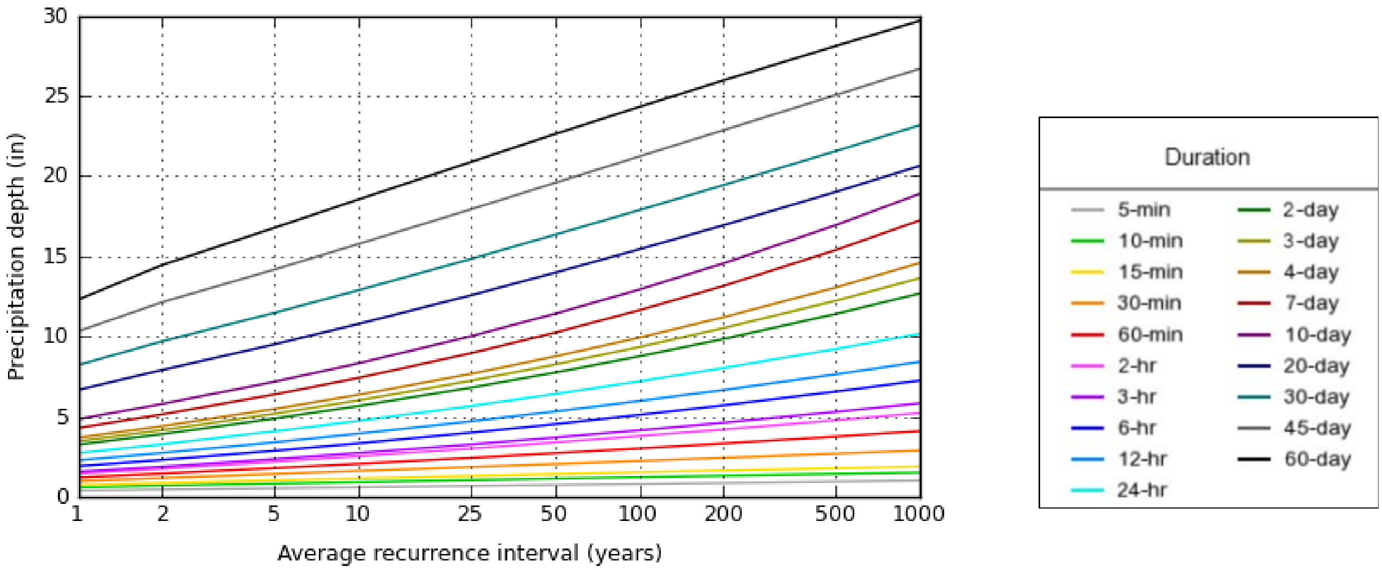
PF graphical





NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Fri Aug 5 19:42:56 2016

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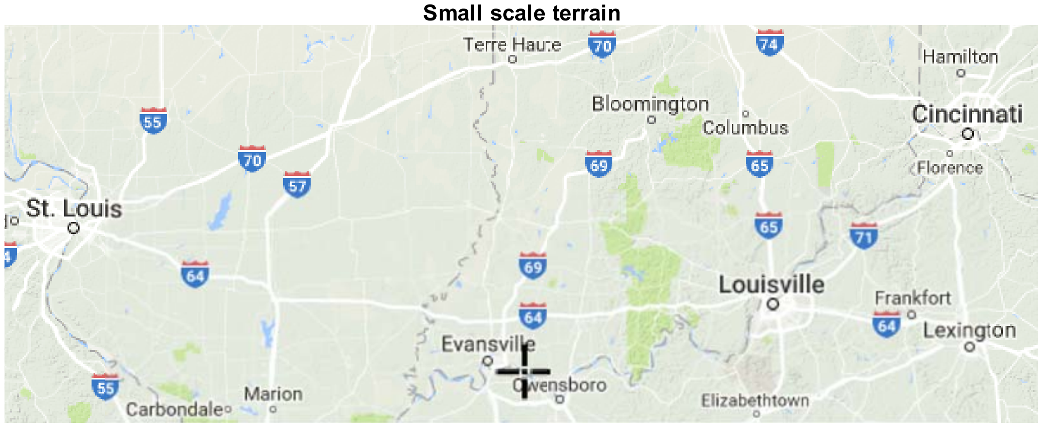
Maps & aerials

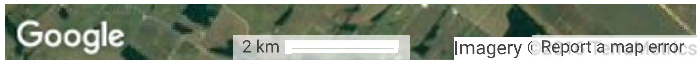
Small scale terrain



Large scale terrain

Large scale map

Large scale aerial



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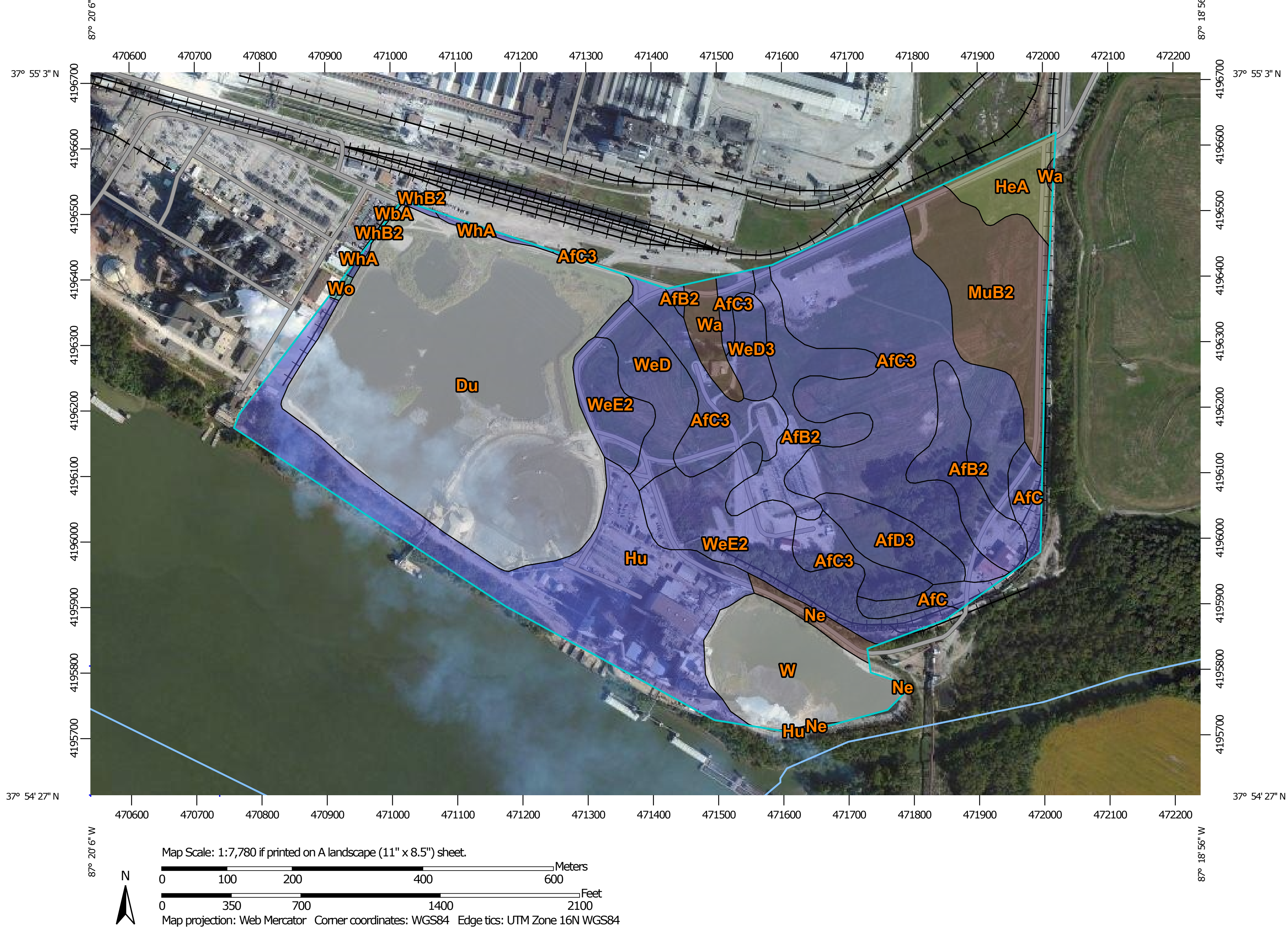
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Soils Data



87° 20' 6" W
87° 18' 56" W
37° 55' 3" N
37° 54' 27" N
470600 470700 470800 470900 471000 471100 471200 471300 471400 471500 471600 471700 471800 471900 472000 472100 472200
4196700 4196600 4196500 4196400 4196300 4196200 4196100 4196000 4195900 4195800 4195700
WhB2
WbA
WhB2
WhA
WhA
Wo
AfC3
AfB2
AfC3
Wa
WeD3
HeA
Wa
MuB2
Du
WeD
WeE2
AfC3
AfC3
AfB2
AfB2
AfC
Hu
WeE2
AfD3
AfC3
AfC
Ne
W
Ne
Hu
Ne
Map Scale: 1:7,780 if printed on A landscape (11" x 8.5") sheet.
Meters
0 100 200 400 600
Feet
0 350 700 1400 2100
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Warrick County, Indiana
Survey Area Data: Version 18, Sep 11, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 3, 2011—Oct 4, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Warrick County, Indiana (IN173)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AfB2	Alford silt loam, 2 to 6 percent slopes, eroded	B	11.4	6.6%
AfC	Alford silt loam, 6 to 12 percent slopes	B	3.1	1.8%
AfC3	Alford silt loam, 6 to 12 percent slopes, severely eroded	B	35.2	20.3%
AfD3	Alford silt loam, 12 to 18 percent slopes, severely eroded	B	3.7	2.1%
Du	Dumps, mine		46.4	26.8%
HeA	Henshaw silt loam, 0 to 2 percent slopes, rarely flooded	C/D	3.5	2.0%
Hu	Huntington silt loam, frequently flooded	B	23.6	13.6%
MuB2	Muren silt loam, 2 to 6 percent slopes, eroded	B/D	11.4	6.6%
Ne	Newark silty clay loam, frequently flooded	B/D	1.4	0.8%
W	Water		9.9	5.7%
Wa	Wakeland silt loam, frequently flooded	B/D	2.1	1.2%
WbA	Weinbach silt loam, 0 to 2 percent slopes	C/D	0.0	0.0%
WeD	Wellston silt loam, 12 to 18 percent slopes	B	4.9	2.8%
WeD3	Wellston silt loam, 12 to 18 percent slopes, severely eroded	B	2.1	1.2%
WeE2	Wellston silt loam, 18 to 25 percent slopes, eroded	B	13.9	8.0%
WhA	Wheeling silt loam, 0 to 2 percent slopes	B	0.5	0.3%
WhB2	Wheeling silt loam, 2 to 6 percent slopes, eroded	B	0.1	0.1%
Wo	Woodmere silty clay loam, occasionally flooded	C	0.2	0.1%
Totals for Area of Interest			**173.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

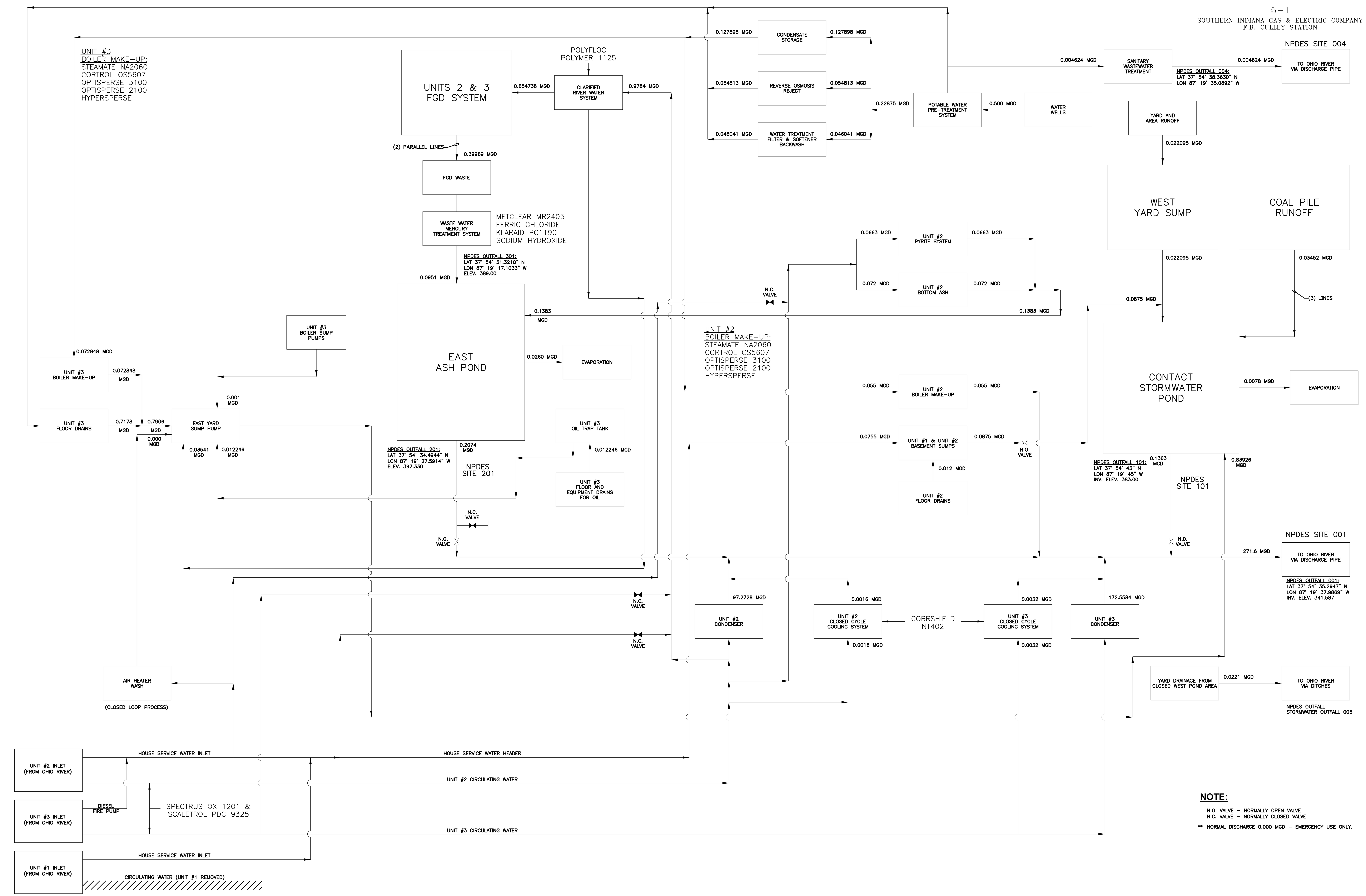
Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Water Balance

5-1
SOUTHERN INDIANA GAS & ELECTRIC COMPANY
F.B. CULLEY STATION



NOTE:

N.O. VALVE – NORMALLY OPEN VALVE
N.C. VALVE – NORMALLY CLOSED VALVE
** NORMAL DISCHARGE 0.000 MGD – EMERGENCY USE ONLY.

SIGECO
F. B. CULLEY GENERATING STATION
NEWBURGH, INDIANA

REV.	DATE	BY	ITEM
6	9 26 19	JI	UPDATED PER VECTREN RED-LINES
7	05 20 21	PAI	UPDATED PER VECTREN TR-210221-001
8	06 08 21	PAI	UPDATED PER VECTREN TR-210221-002

THREE i DESIGN
ENGINEERING + ARCHITECTURE
2425 W. INDIANA ST., EVANSVILLE, IN 47712
WWW.THREEIDESIGN.COM (812) 423-6800
THREE i DESIGN JOB NUMBER: 07354A

PLANT WATER BALANCE

DRAWN BY: J.M.R. DATE 10-11-11 SHEET NO:
CKD. BY: J.M.R. SCALE: NONE
DRAWING NO: F-3025.3

Other Supporting Documentation

CP 3170 LT 3~ 603 (Discontinued)

Performance curve

Pump

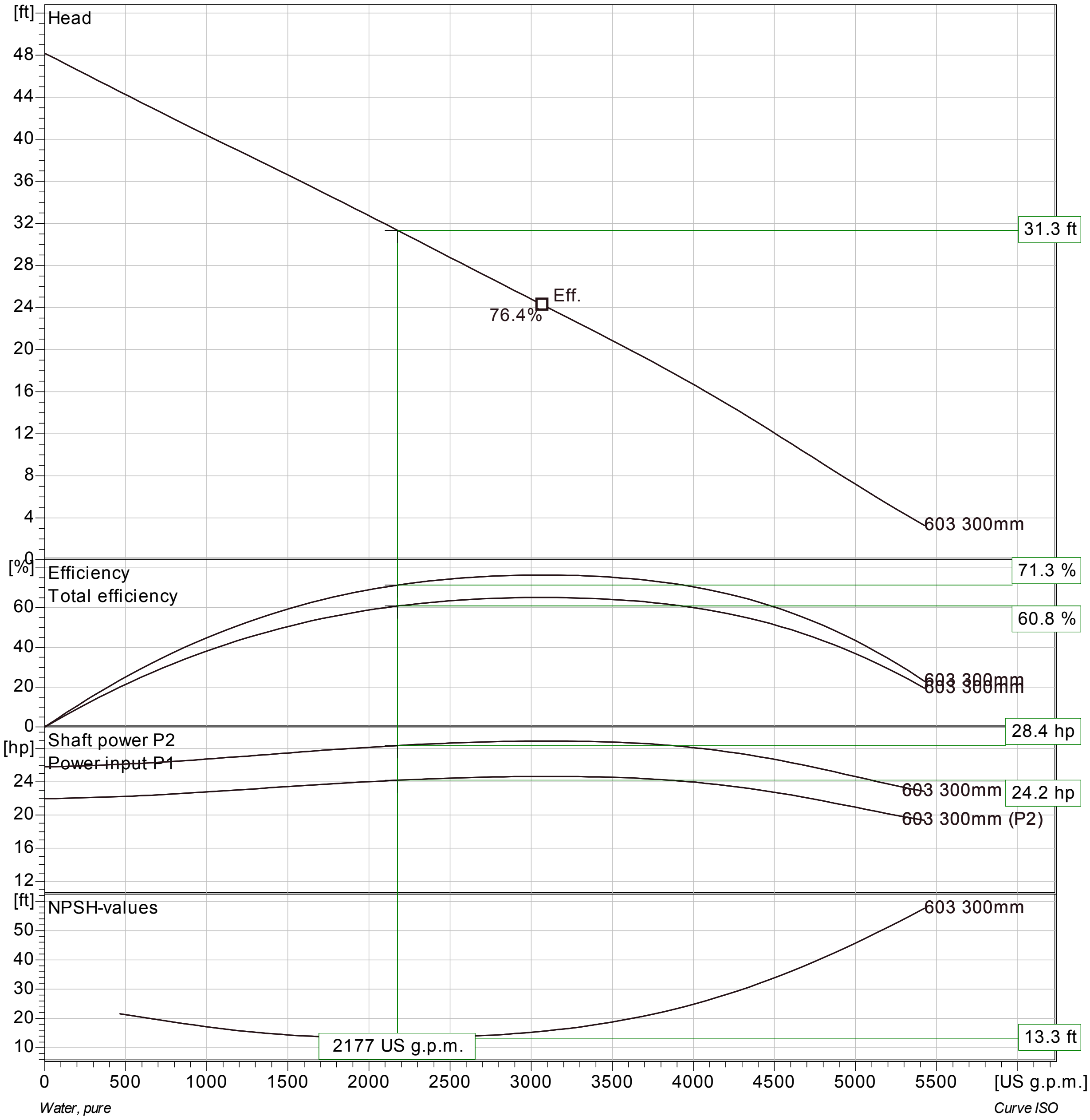
Discharge Flange Diameter	9 13/16 inch
Inlet diameter	250 mm
Impeller diameter	11 13/16"
Number of blades	2
Throughlet diameter	4 inch

Motor

Motor #	C3170.180 27-20-6AA-W 25hp
Stator variant	37
Frequency	60 Hz
Rated voltage	460 V
Number of poles	6
Phases	3~
Rated power	25 hp
Rated current	34 A
Starting current	219 A
Rated speed	1170 rpm

Power factor	
1/1 Load	0.81
3/4 Load	0.75
1/2 Load	0.64

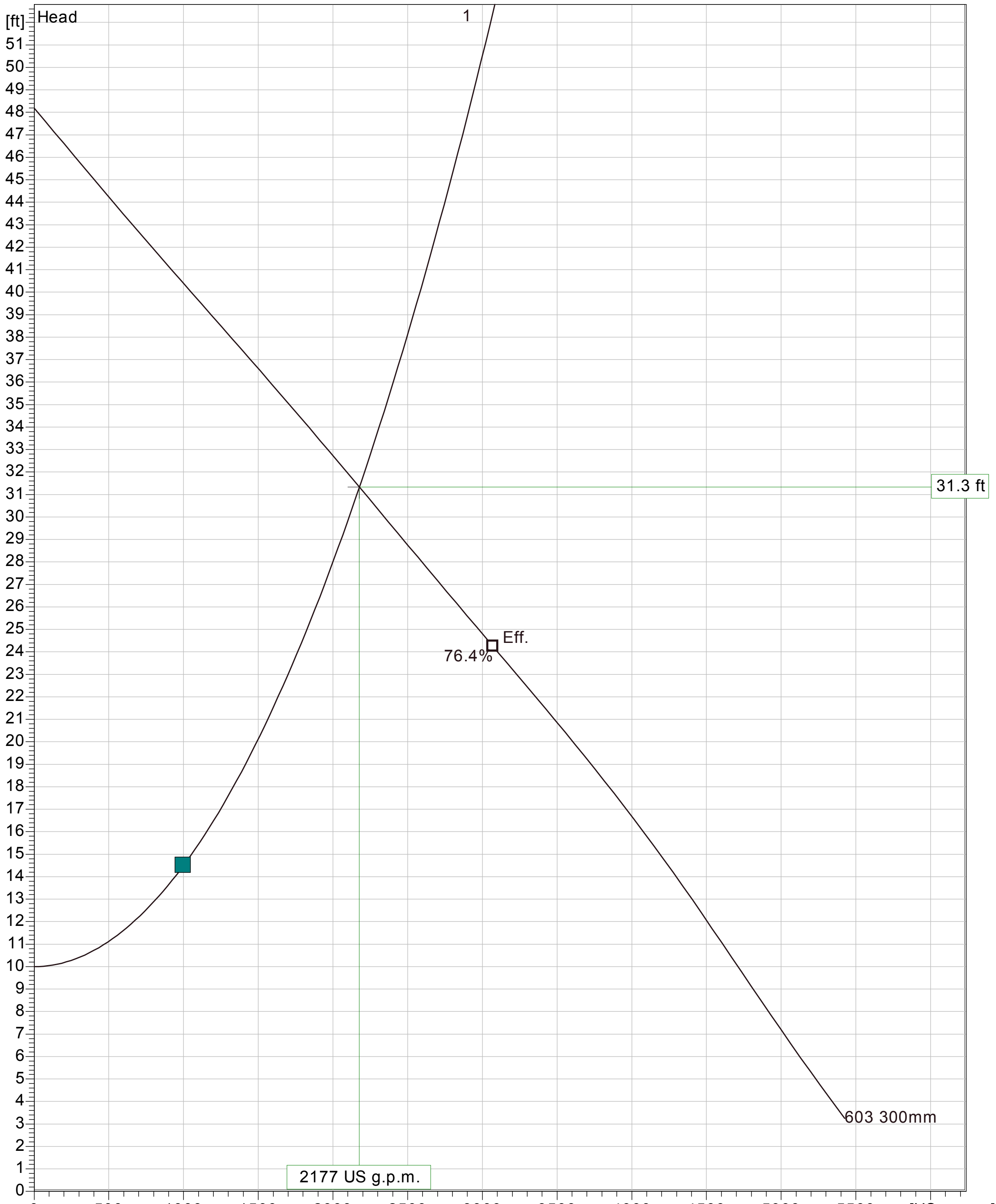
Efficiency	
1/1 Load	85.0 %
3/4 Load	84.5 %
1/2 Load	81.5 %



Project	Project ID	Created by	Created on	Last update
			2015-08-14	

CP 3170 LT 3~ 603 (Discontinued)

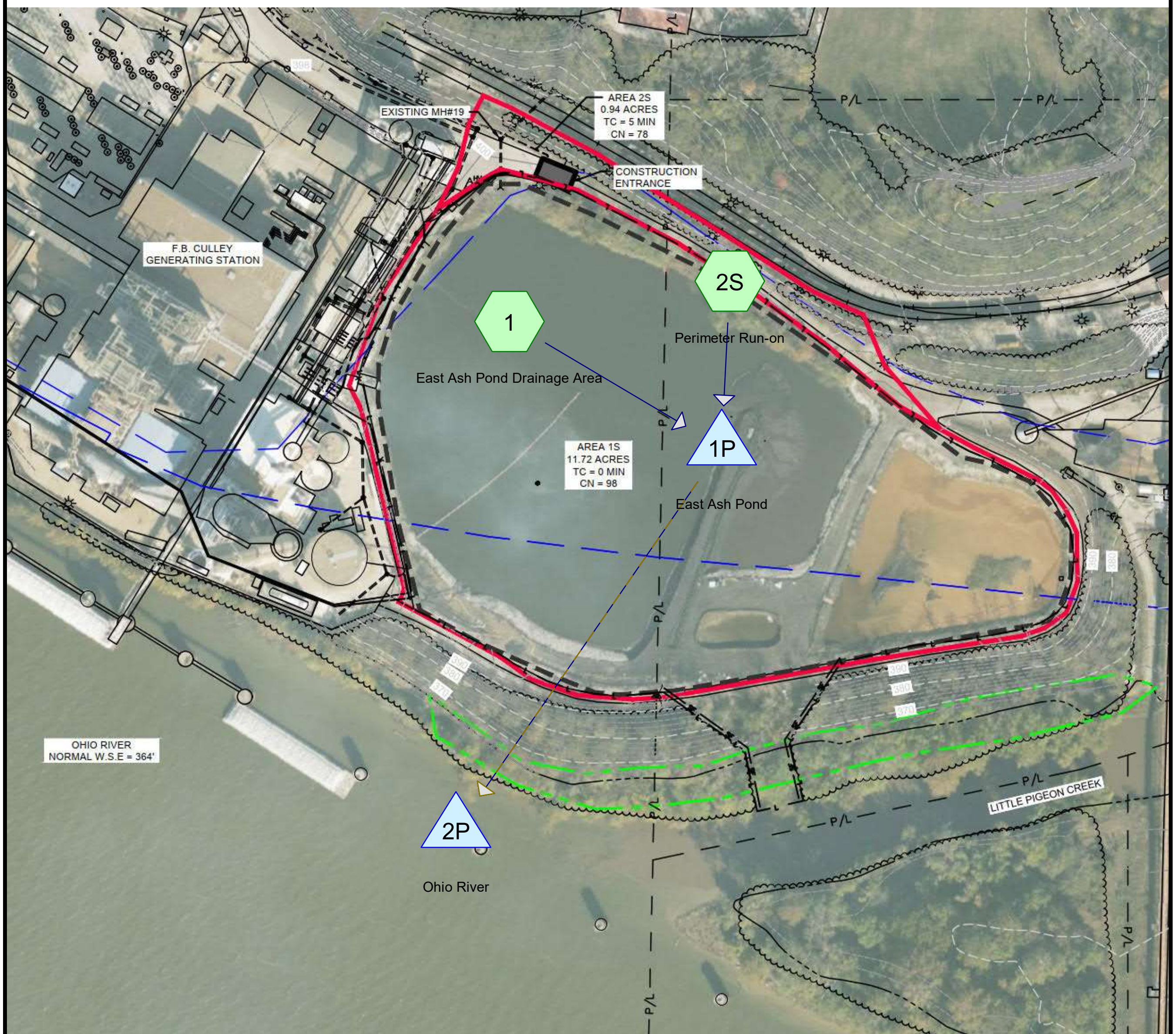
Duty Analysis

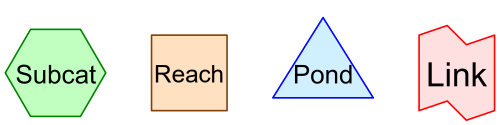


Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
1	2180 US g.p.m.	31.3 ft	24.2 hp	2180 US g.p.m.	31.3 ft	24.2 hp	71.3 %	162 kWh/US MG	13.3 ft

Project	Project ID	Created by	Created on	Last update
			2015-08-14	

HydroCAD Output Report





Routing Diagram for Culley East Existing Conditions Model_IDF
Prepared by AECOM, Printed 10/12/2021
HydroCAD® 10.00 s/n 01723 © 2013 HydroCAD Software Solutions LLC

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	0.510	0.000	0.000	0.000	0.510	Gravel surface	2S
0.000	10.770	0.000	0.000	0.000	10.770	Water Surface	1
0.000	0.430	0.000	0.000	0.000	0.430	Woods, Poor	2S
0.000	**11.710**	**0.000**	**0.000**	**0.000**	**11.710**	**TOTAL AREA**	

Summary for Subcatchment 1: East Ash Pond Drainage Area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

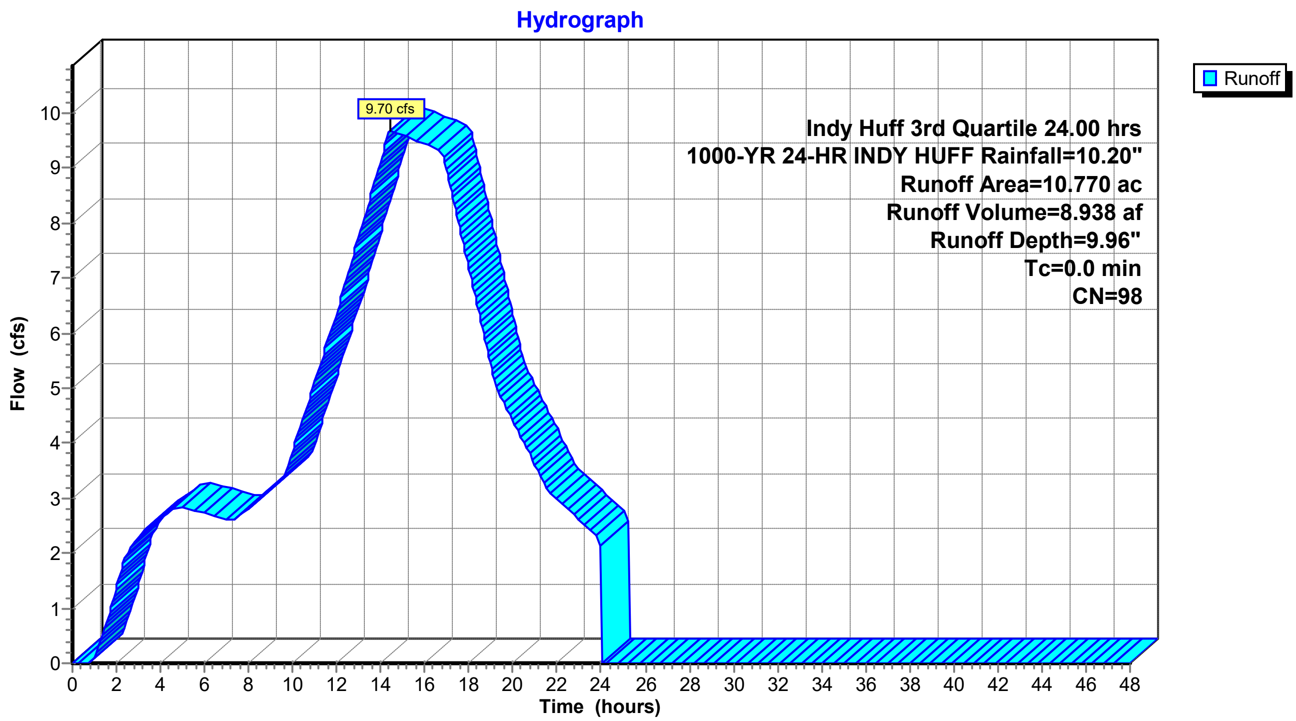
Runoff = 9.70 cfs @ 14.41 hrs, Volume= 8.938 af, Depth= 9.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Indy Huff 3rd Quartile 24.00 hrs 1000-YR 24-HR INDY HUFF Rainfall=10.20"

Area (ac)	CN	Description
10.770	98	Water Surface, HSG B
10.770		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry,**

Subcatchment 1: East Ash Pond Drainage Area



Summary for Subcatchment 2S: Perimeter Run-on

Acre number found using LIDAR data from 2012 and measuring areas in AutoCAD. CN used for class B soils and grass 50 - 75% was used .

Due to the close proximity of the subcatchment to the Culley East Ash Pond, a minimum Time of concentration of 5 minutes is utilized.

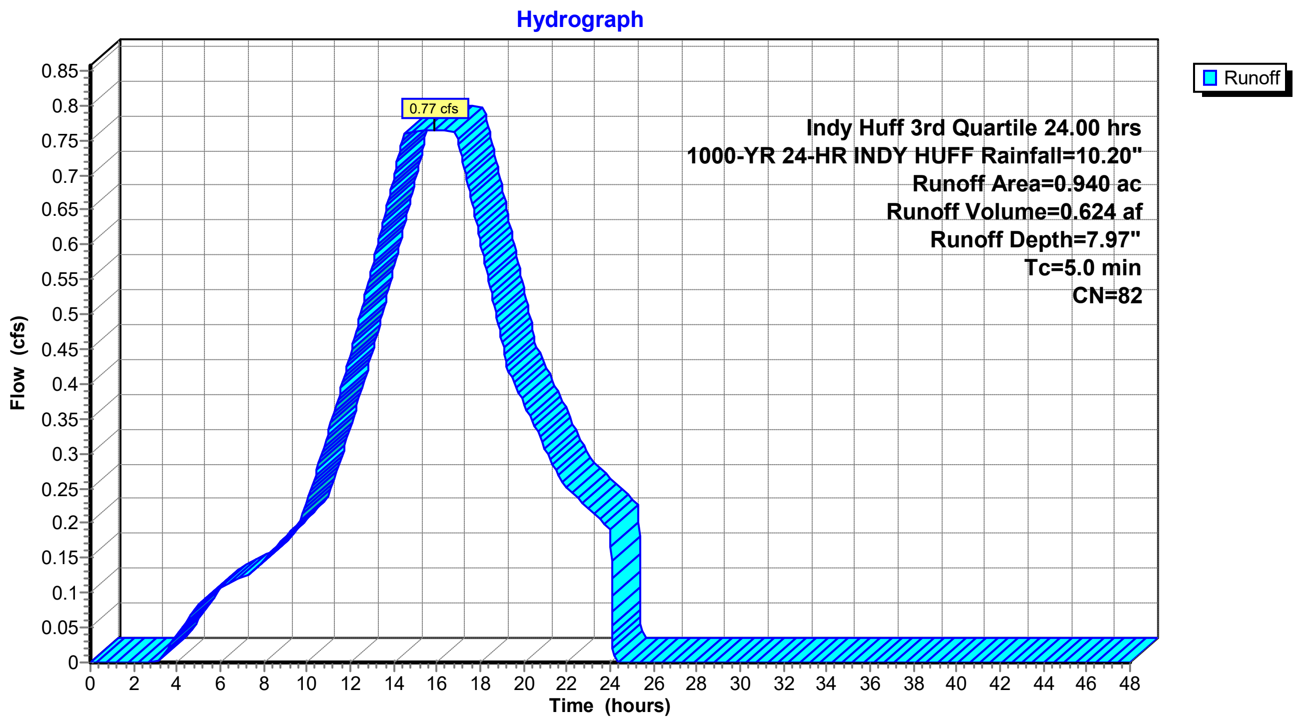
Runoff = 0.77 cfs @ 15.85 hrs, Volume= 0.624 af, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Indy Huff 3rd Quartile 24.00 hrs 1000-YR 24-HR INDY HUFF Rainfall=10.20"

Area (ac)	CN	Description
0.430	66	Woods, Poor, HSG B
0.510	96	Gravel surface, HSG B
0.940	82	Weighted Average
0.940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: Perimeter Run-on



Summary for Pond 1P: East Ash Pond

Pump curve modeled off of the given pumps for Culley East pump curves. Two Flyght pumps, CP 3170 LT 3~ 603.

For the purpose of this analysis the assumption is that the lift station is out of order and no pumps are running. This simulates the worst case scenario at the pond.

Inflow Area = 11.710 ac, 91.97% Impervious, Inflow Depth > 11.22" for 1000-YR 24-HR INDY HUFF event
Inflow = 10.80 cfs @ 14.41 hrs, Volume= 10.951 af, Incl. 0.35 cfs Base Flow
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 387.00' Surf.Area= 307,535 sf Storage= 1,863,715 cf
Peak Elev= 388.50' @ 48.00 hrs Surf.Area= 325,810 sf Storage= 2,340,739 cf (477,024 cf 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	374.00'	4,795,755 cf	**Custom Stage Data (Irregular)** Listed below

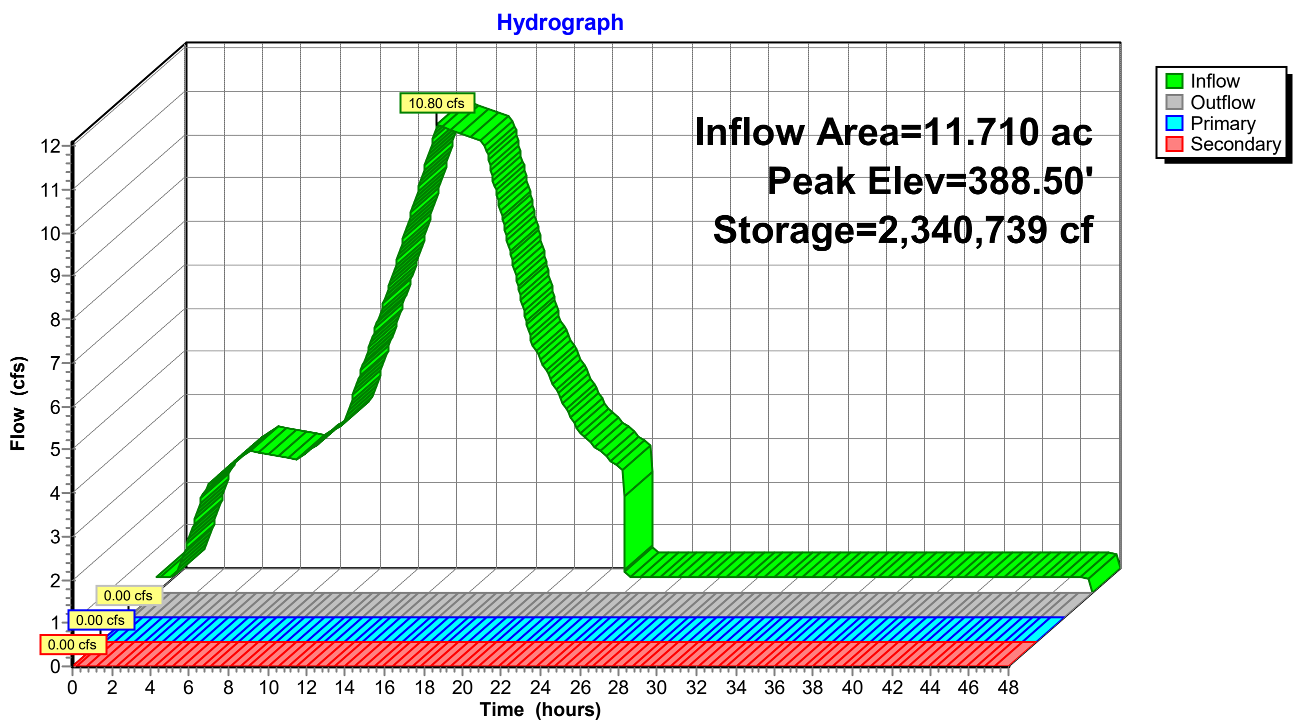
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
374.00	7,870	554.4	0	0	7,870
375.00	22,044	931.3	14,362	14,362	52,436
376.00	37,766	1,089.3	29,554	43,916	77,862
377.00	61,682	1,762.0	49,238	93,154	230,504
378.00	97,340	1,706.2	78,836	171,990	246,001
379.00	113,592	1,685.8	105,361	277,351	251,763
380.00	130,429	1,592.8	121,914	399,265	276,082
381.00	141,250	1,600.2	135,804	535,069	278,549
382.00	173,638	2,475.2	157,166	692,234	562,328
383.00	204,778	2,491.9	188,994	881,228	569,380
384.00	220,993	2,559.4	212,834	1,094,062	596,631
385.00	235,228	2,770.2	228,073	1,322,136	686,074
386.00	270,601	4,192.8	252,708	1,574,844	1,474,341
387.00	307,535	3,483.8	288,871	1,863,715	1,907,475
388.00	318,524	3,735.8	313,013	2,176,729	2,052,299
389.00	332,994	4,001.7	325,732	2,502,461	2,216,067
390.00	347,818	4,056.9	340,379	2,842,840	2,251,695
391.00	361,912	3,968.0	354,842	3,197,681	2,308,608
392.00	381,408	3,601.8	371,617	3,569,299	2,529,234
393.00	404,414	2,972.4	392,855	3,962,154	2,858,526
394.00	420,948	3,160.1	412,653	4,374,807	2,950,177
395.00	420,948	3,160.1	420,948	4,795,755	2,953,337

Device	Routing	Invert	Outlet Devices
#1	Primary	387.00'	**Dewatering Pump #1 (off) X 0.00** Discharges@390.15' Turns Off@386.98' 10.0" Diam. x 500.0' Long Discharge, Hazen-Williams C= 130 Flow (gpm)= 0.0 2,177.0 4,500.0 5,400.0 Head (feet)= 48.00 31.30 12.00 4.00 -Loss (feet)= 0.00 13.01 49.94 69.99 =Lift (feet)= 48.00 18.29 -37.94 -65.99
#2	Primary	388.00'	**Dewatering Pump #2 (off) X 0.00** Discharges@390.15' Turns Off@387.01' 10.0" Diam. x 500.0' Long Discharge, Hazen-Williams C= 130 Flow (gpm)= 0.0 2,177.0 4,500.0 5,400.0 Head (feet)= 48.00 31.30 12.00 4.00 -Loss (feet)= 0.00 13.01 49.94 69.99 =Lift (feet)= 48.00 18.29 -37.94 -65.99
#3	Secondary	392.67'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=387.00' TW=366.00' (Dynamic Tailwater)
↑—**1=Dewatering Pump #1 (off)** (Pump Controls 0.00 cfs)
└—**2=Dewatering Pump #2 (off)** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=387.00' TW=366.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: East Ash Pond



Summary for Pond 2P: Ohio River

Arbitrary storage entered for the Ohio River, begins at elevation of 383.5, the 100 year flood elevation.

Inflow Area = 11.710 ac, 91.97% Impervious, Inflow Depth = 0.00" for 1000-YR 24-HR INDY HUFF event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

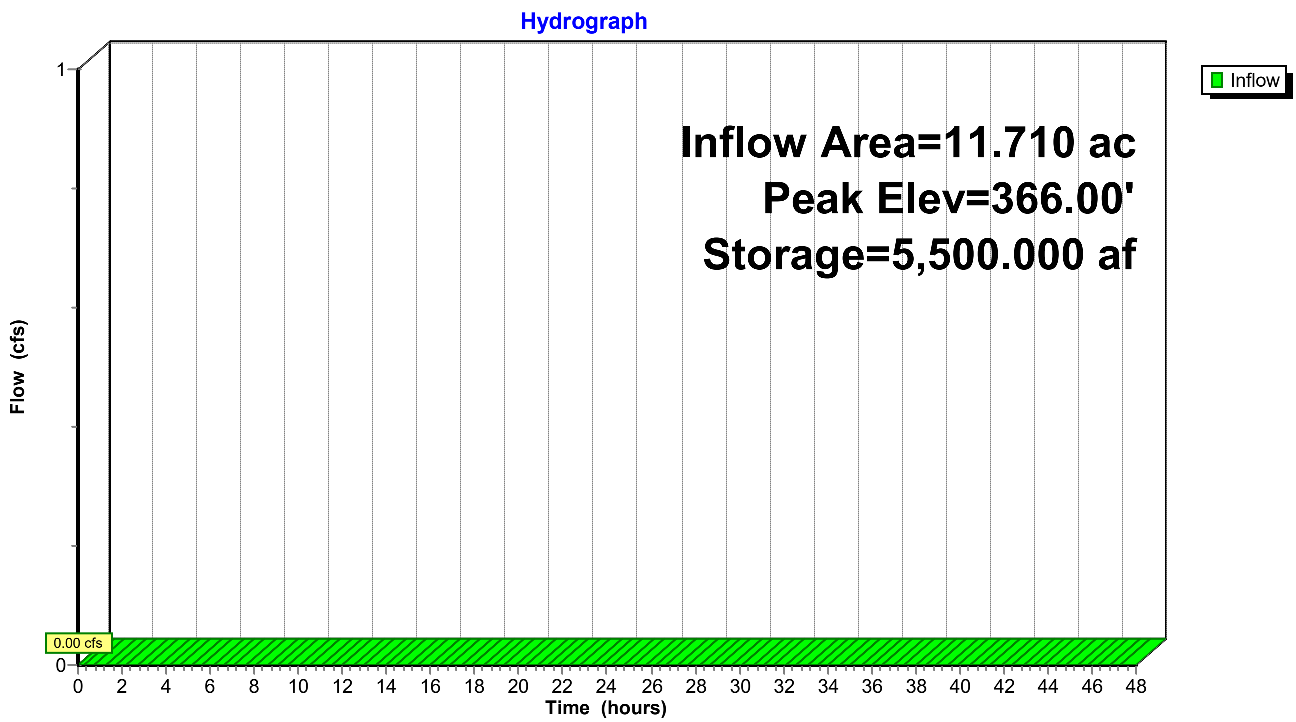
Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 383.50' Surf.Area= 3,000.000 ac Storage= 5,500.000 af
Peak Elev= 366.00' @ 0.00 hrs Surf.Area= 3,000.000 ac Storage= 5,500.000 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	363.00'	5,500.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
363.00	1,000.000	0.000	0.000
365.00	2,000.000	3,000.000	3,000.000
366.00	3,000.000	2,500.000	5,500.000

Pond 2P: Ohio River



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