

# CCR COMPLIANCE

## FLY ASH BASIN AND BOTTOM ASH BASIN INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

Prepared for:



Louisiana Generating LLC, a subsidiary of NRG  
Big Cajun II  
10431 Cajun II Road  
New Roads, LA 70760

Prepared by:



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## List of Acronyms

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BC II Plant	Big Cajun II Plant
CB&I	CB&I Environmental and Infrastructure
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
cm/sec	centimeters per second
EAP	Emergency Action Plan
EPA	U.S. Environmental Protection Agency
LAC	Louisiana Administrative Code
LaGen	Louisiana Generating, LLC
LDEQ	Louisiana Department of Environmental Quality
LPDES	Louisiana Pollutant Discharge Elimination System
MSL	Mean Sea Level
NOAA	Nation Oceanographic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NRG	NRG Energy, Inc.
Plan	Inflow Design Flood Control System Plan
RCRA	Resource Conservation and Recovery Act
SCS	Soil Conservation Service
SWMU	Solid Waste Management Units
yd <sup>3</sup>	cubic yards



**Plan Review/Amendment Log §257.82(c)(2)**

<b>Date of Review</b>	<b>Reviewer Name</b>	<b>Sections Amended and Reason</b>	<b>Version</b>



## CCR Regulatory Requirements

USEPA CCR Rule Criteria 40 CFR 257.82	NRG Big Cajun II Power Plant Inflow Design Flood Control System Plan
<p>§257.82(a)(1) stipulates:</p> <p><i>(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.</i></p> <p><i>(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.</i></p> <p><i>(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.</i></p>	<p>Section 5.3.1 and 5.4.1</p>
<p>§257.82(a)(3) stipulates:</p> <p><i>(3) The inflow design flood is:</i></p> <p><i>(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;</i></p> <p><i>(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;</i></p> <p><i>(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</i></p> <p><i>(iv) For an incised CCR surface impoundment, the 25-year flood.</i></p>	<p>Section 4.0</p>



<b>USEPA CCR Rule Criteria 40 CFR 257.82</b>	<b>NRG Big Cajun II Power Plant Inflow Design Flood Control System Plan</b>
<p>§257.82(b) stipulates:</p> <p><i>(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.</i></p>	<p>Section 3.7</p>
<p>§257.82(c)(1) stipulates:</p> <p><i>(c) Inflow design flood control system plan— (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).</i></p>	<p>Sections 1.0 - 7.0</p>
<p>§257.82(c)(2) stipulates:</p> <p><i>(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.</i></p>	<p>Section 6.3</p>



<p align="center"><b>USEPA CCR Rule Criteria 40 CFR 257.82</b></p>	<p align="center"><b>NRG Big Cajun II Power Plant Inflow Design Flood Control System Plan</b></p>
<p>§257.82(c)(3) stipulates:</p> <p><i>(3) Timeframes for preparing the initial plan—</i></p> <p><i>(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.</i></p> <p><i>(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.</i></p>	<p align="center">Sections 1.0 and 2.0</p>
<p>§257.82(c)(4) stipulates:</p> <p><i>(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).</i></p>	<p align="center">Section 6.3</p>
<p>§257.82(c)(5) stipulates:</p> <p><i>(5) The owner or operator must obtain a certification from a qualified professional engineer stating that the initial and periodic inflow design flood control system plans meet the requirements of this section.</i></p>	<p align="center">Section 7.0</p>





<b>USEPA CCR Rule Criteria 40 CFR 257.82</b>	<b>NRG Big Cajun II Power Plant Inflow Design Flood Control System Plan</b>
<p>§257.82(d) stipulates:</p> <p><i>(d) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g).</i></p>	<p>Section 6.0</p>



## 1.0 INTRODUCTION

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CB&I Environmental and Infrastructure, Inc. (CB&I) has prepared the following Inflow Design Flood Control System Plan (Plan) at the request of Louisiana Generating, LLC (LaGen) (a subsidiary of NRG Energy, Inc. [NRG]) for the Fly Ash and Bottom Ash Basins located at its Big Cajun II Power Plant (BC II Plant) near New Roads, Pointe Coupee Parish, Louisiana (**Figure 1**). The BC II Plant is a coal-fired and natural gas fired power plant that has been in operation since 1980. The Fly Ash Basin and Bottom Ash Basin have been deemed to be regulated coal combustion residual (CCR) units by the U.S. Environmental Protection Agency (EPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule), Title 40 Code of Federal Regulations (CFR) Parts §257 and §261.

CCR regulations set forth within 40 CFR Part §257.82, provide guidelines for inflow design flood control systems to ensure that regulated CCR units are designed to safely manage stormwater flow during the inflow design flood. Specifically, §257.82(a) stipulates the following:

*“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... (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... and (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”*

There are five solid waste management units (SWMUs) at the BC II Plant that are operated as industrial surface impoundments in accordance with the Louisiana Department of Environmental Quality (LDEQ), Louisiana Solid Waste Regulations (Louisiana Administrative Code [LAC] Title 33: part VII) under Permit Number P-0108R1 for Facility Identification Number GD-077-0583. Two of the five SWMUs are required to comply with the requirements of the CCR Rule, which include the Fly Ash Basin and Bottom Ash Basin. The other three LDEQ-permitted surface impoundments at the BC II Plant that are not subject to the CCR Rule requirements include the Primary Louisiana Pollutant Discharge Elimination System (LPDES) Treatment Pond, Secondary LPDES Treatment Pond, and Rainfall Surge Pond (**Figure 2**).

This Plan is intended to provide an evaluation of the inflow design flood control system and demonstrate that the system is appropriately sized to manage the inflow design flood event. As demonstrated in this Plan, the inflow design flood control system has been designed to safely



manage the inflow design flood and is in compliance with §257.82, as described in Section 2.0. This document provides discussion of CB&I's professional judgement/opinion regarding specific aspects of the Rule as they pertain to the Fly Ash Basin and Bottom Ash Basin which have been deemed as regulated CCR units at the BC II Plant. This Plan will be placed within the Facility Operations Plan prior to October 17, 2016, in accordance with 40 CFR Part §257.82(c)(3).



## 2.0 REGULATORY OVERVIEW OF HYDROLOGIC & HYDRAULIC CAPACITY REQUIREMENTS

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On April 17, 2015, the EPA published the CCR Rule under Subtitle D of the Resource Conservation and Recovery Act (RCRA) as 40 CFR Part §257 and §261. The purpose of the CCR Rule is to regulate the management of coal combustion residuals in regulated units for landfill and surface impoundments. Section 257.82(c) of the CCR Rule requires owners or operators of a CCR Unit to prepare an initial and periodic inflow design flood control system plans, which document how the inflow design flood control system has been designed and constructed to meet the requirements.

This Plan marks the initial analysis of the facility inflow design flood control system based on the current facility conditions. Construction activities may occur at the facility that will subsequently modify the current conditions as described within this Plan. This Plan will be amended in accordance with §257.82(2), which stipulates:

*“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.”*

This Plan will be amended to accurately analyze the inflow design flood control system associated with the current facility conditions. Amendments to this Plan will be documented within the Plan Review/Amendment Log immediately following the Table of Contents.

In addition to the above, the Plan must ensure compliance with the closure recordkeeping requirements specified in §257.105(g)(4). A written certification is provided in Section 7.0 from a qualified professional engineer in the State of Louisiana, to certify that this Plan meets the requirements of the CCR Rule.



### **3.0 FLY ASH BASIN AND BOTTOM ASH BASIN OVERVIEW**

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Pertinent site information and history related to the installation and operation of the Fly Ash and Bottom Ash Basins is presented below to provide context for the Plan.

#### **3.1 Location, Topography, and Character**

The LaGen BC II Plant is located at 10431 Cajun II Road, New Roads, Pointe Coupee Parish, Louisiana. The BC II Plant is situated in Sections 4, 5, and 37 in Township 4 South and Range 11 East. The Fly Ash Basin is located on the southwest end of the surface impoundments west of the BC II Plant and is bordered on the east by the Bottom Ash Basin; on the west by wooded property, a drainage ditch, and agricultural land; on the north by wooded property and agricultural land; and on the south by wooded property and grassy fields, as detailed on **Figures 1 and 2**. The Fly Ash Basin has an area of approximately 175 acres and the Bottom Ash Basin has an area of approximately 66 acres.

The Fly Ash Basin was constructed above natural grade with a base of approximately 30 feet Mean Sea Level (MSL) and a surrounding berm with a designed crest elevation of approximately 40-foot MSL. The Bottom Ash Basin was constructed above natural grade with a base of approximately 30 feet MSL and a surrounding berm with a designed crest elevation of approximately 48-foot MSL. The existing site topography is depicted on **Figure 3**. The Fly Ash Basin has an approximate capacity of 1,750 acre-feet with a permitted total ash storage capacity of 3,905,000 cubic yards (yd<sup>3</sup>). The Bottom Ash Basin has an approximate capacity of 1,188 acre-feet with a permitted total ash storage capacity of 2,585,000yd<sup>3</sup>. The soils underlying the Fly and Bottom Ash Basins consist of naturally occurring and/or recompacted clayey soil that is a minimum of 3-feet thick to over 10-feet thick in some areas.

#### **3.2 Existing Regulatory Permits**

The Fly Ash Basin and Bottom Ash Basin have been granted and are currently operating under a LDEQ Solid Waste Permit as an industrial surface impoundment in accordance with the Louisiana Solid Waste Regulations (LAC 33:VII) under Permit Number P-0108R1 and Facility Identification Number GD-077-0583. The Solid Waste Permit renewal was issued by the LDEQ on February 24, 2011 and allows CCR materials generated on-site at the LaGen BC II Plant to be properly disposed of within the boundaries of the Fly Ash and Bottom Ash Basins.

#### **3.3 Fly Ash Generation, Recycling, and Disposal**

Fly ash has been generated at the BC II Plant since it was constructed and became operational in 1980. Fly ash is generated from the burning of finely pulverized coal in high efficiency boilers.



The fly ash is composed primarily of oxides of silicon, aluminum, calcium, sulfur, and iron and is typically a fine, spherical particle ranging in diameter from 0.5 to 100 microns, which can be used as a soil or aggregate stabilization agent.

Fly ash that is generated at the BC II Plant has historically been recycled (sold for beneficial reuse as a cement additive, for road base, and/or for soil stabilization applications) and/or transported to the Fly Ash Basin for disposal. Recycled fly ash rates depend on the market demand and can affect the life of the Basin due to the variability in the amount of recycled material. Disposal rates therefore vary based on recycling opportunities, which vary between years. When the demand for ash exceeds production, the fly ash in the Basin can be removed and sold.

### **3.4 Bottom Ash Generation, Recycling, and Disposal**

Bottom ash has been generated at the BC II Plant since it was constructed and became operational in 1980. Bottom ash is generated concurrently with fly ash during the combustion of coal in the boilers when particles of ash fuse together. These fused particles become too large to remain entrained in the rising flue gas and fall to the bottom of the boiler. Particles of bottom ash vary in diameter but approximate the size of coarse sand. Due to their similar origins, bottom ash and fly ash have the same approximate chemical makeup. The Bottom Ash Basin receives bottom ash from Units 1 and 3, as well as sediment from the clarifier beds associated with the cooling towers and boilers. Unit 2 is currently a gas fired unit; therefore, ash is no longer generated by this unit. The clarifier sediments are produced when water from the Mississippi River is clarified and softened for use as cooling water or boiler water. These sediments consist primarily of Mississippi River water naturally occurring silts and clays. They also contain some lime, sodium aluminate, and trace amounts of an EPA-approved water treatment polymer.

### **3.5 Fly Ash Basin Operations**

Fly ash that is placed in the Fly Ash Basin for disposal is collected, stored in a silo, and transported by truck in dry powdered form to the Fly Ash Basin. Currently transport trucks discharge loads of fly ash in the Fly Ash Basin and dozer equipment then spread the fill evenly. The fly ash is hydrated by rainfall and compacted so that it will harden as it dries. Straight hardened fly ash has a theoretical hydraulic conductivity range of  $10^{-6}$  centimeters per second (cm/sec) to  $10^{-7}$  cm/sec; due to the desirable characteristics of the material, the fly ash will be a suitable material to be utilized as a subgrade material prior to placement of the cover for closure of the Basin. Periodic dozing of the fly ash material will occur as needed, within the active area to maintain a relatively uniform height.



Daily cover is not applied in the active area of fly ash disposal due to the fly ash being wetted (by rainfall) and hardened, and thereby minimizing potential dust generation. Additionally, no intermediate cover is applied to the Basin due to the rapid hardening of the fly ash. Weekly (7-day) inspections and annual reporting are undertaken for the Fly Ash Basin in line with site inspection requirements for CCR units (§257.83[b]: Inspection Requirements for CCR Surface Impoundments) to identify any stability, operational, and/or safety issues which require attention.

During the 2015 annual inspection of the Fly Ash Basin, observations indicated the water level inside the basin was approximately 5 feet below the crest of the levee and approximately two-thirds of the Fly Ash Basin was covered with open water.

### **3.6 Bottom Ash Basin Operations**

The bottom ash from Unit 1 is collected in hoppers at the base of the boiler of Unit 1 and then transported hydraulically (sluiced) through a pipe directly to the south part of the Bottom Ash Basin. Bottom ash from Unit 3 is collected in hoppers at the base of the boiler and trucked in a hydrated state to the southwest corner of the Bottom Ash Basin for disposal. The clarifier sediments are piped to the southeast corner of the Bottom Ash Basin. The filling of the basin started along the south levee and is proceeding northward.

Periodic dozing of the bottom ash material will occur as needed, within the active area to maintain a relatively uniform height. Daily and/or interim cover is not applied in the active area of bottom ash disposal. The bottom ash is wet and/or transported in hydrated form that prevents potential dust generation. Weekly (7-day) inspections and annual reporting are undertaken for the Bottom Ash Basin in line with site inspection requirements for CCR units (§257.83[b]: Inspection Requirements for CCR Surface Impoundments) to identify any stability, operational, and/or safety issues which require attention.

During the 2015 annual inspection of the Bottom Ash Basin, observations indicated there was minimal open water in the Bottom Ash Unit and the bottom of the unit was covered with bottom ash. The north half of the pond was covered to a level of about 15 feet below the crest of the levee, while the southern half was filled to about the level of the levee. The southern half also had a large stockpile of ash at the ash disposal location. The stockpile was approximately 15 to 20 feet tall, but was no closer than approximately 50 feet from the levee. Rainfall runoff is removed from the Basin by a stormwater runoff collection system.

### **3.7 Existing Flood Control System**

All surface runoff from the Fly Ash Basin and Bottom Ash Basin is collected and transported by gravity to the Rainfall Surge Pond. All water collected in the Rainfall Surge Pond is treated in



the Industrial Solid Waste Surface Impoundments permitted under the LPDES program (Permit No. LA0054135). The inflow design flood control system and surface water impoundment features are depicted on **Figure 2**. All item numbers cited in the following explanation refer to the equipment numbers in **Figure 2**.

Rain falling on the Fly Ash basin will fall on either the in place fly ash and then run off to the open water area of the Fly Ash Basin or on the open water. The rainfall runoff exits from the northeast corner of the basin. Item 1 on **Figure 2** is a swale and the purpose of this swale is to channel the runoff toward the Fly Ash Basin drain pipe (Item 2). Rainfall runoff leaves the Fly Ash Basin by passing through a concrete entrance box and then through a 30-inch diameter, Schedule 40 steel pipe. The Fly Ash Basin drain pipe passes through the levee that separates the Fly Ash Basin from the Bottom Ash Basin and discharges into a drainage swale (Item 3) in the Bottom Ash Basin. The “V” shaped swale in the Bottom Ash Basin runs from west to east near the north levee. This swale carries runoff from the Fly Ash Basin drain pipe (Item 2) and also collects and channels the surface runoff from the Bottom Ash Basin to the Bottom Ash Basin exit weir (Item 4). The Bottom Ash Basin exit weir serves as an inlet to the Bottom Ash Basin drain pipe (Item 5). This drain pipe is a 30-inch diameter, Schedule 40 steel pipe that carries the combined Fly Ash Basin and Bottom Ash Basin surface runoff through the north levee. The flow of water is controlled with a 30-inch butterfly valve (Item 6). Item 7 is a continuation of the 30-inch drain-pipe, which carries the runoff from the Bottom Ash Basin through a junction box (Item 8) and to the drain pipe discharge area (Item 9) in the Rainfall Surge Pond. The discharge area is fitted with a concrete apron to prevent erosion caused by the discharge of the water.

The above described equipment (Items 1 through 9) are the elements of the Fly Ash Basin and Bottom Ash Basin runoff collection system. Since the discharge point (Item 9) is the lowest point in the system, all movement of surface runoff is by gravity. The collection system was designed without pumps to minimize the operation and maintenance costs and to avoid the drainage problems that could arise from downtime due to equipment failure or maintenance.

Items 10 through 14 are components of the LPDES Treatment Ponds. Item 10 is Lift Station No. 1. Its purpose is to pump the water from the Rainfall Surge Pond up to the Primary Treatment Basin. Item 11 is the chemical storage area. Water Treatment chemicals may be added to the wastewater at this point to adjust the pH or to reduce suspended solids to the limits defined in the LPDES permit. Item 12 is the 24-inch diameter steel pipe that is used to carry the water from Lift Station No. 1 to the Primary Treatment Pond. Item 13 is an air mix chamber that is connected to the end of a 48-inch diameter steel pipe. Water flows from the Primary Treatment Pond through the pipe, over the air mix chamber and into the Secondary Treatment Pond. The





air mix chamber adds dissolved oxygen to the water flowing over it. Item 14 is Lift Station No. 2, which pumps the treated water to the Mississippi River in accordance with the LPDES permit.



## **4.0 HAZARD POTENTIAL DEFINITION**

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In accordance with §257.82(a)(3), the inflow design flood event utilized to demonstrate compliance with the Rule is determined by the hazard potential of the existing CCR surface impoundment. The hazard potential for the Fly Ash Basin and Bottom Ash Basin was presented in the CCR Rule Structural Integrity Assessment document per §257.73(a)(2). The Fly Ash and Bottom Ash Basins were determined to have a low hazard potential based on the impoundments capacity and physical location relative to downgradient inhabitants/structures and environmental systems, such that failure or mis-operation of the Fly Ash and Bottom Ash Basins was unlikely to cause loss of human life, economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. As defined in §257.82(a)(3), the 100-year flood event (100-year, 24-hour storm event) is utilized for inflow design flood control system analysis for low hazard potential surface impoundments. The inflow design control system will be evaluated to demonstrate the ability to adequately manage stormwater flow, per §257.82(a)(1), and collect and control the peak discharge, per §257.82(a)(2).

### **4.1 Emergency Action Plan**

In accordance with §257.73(a)(3), an Emergency Action Plan (EAP) is required for all CCR units that have been classified as either a high hazard potential or significant hazard potential CCR surface impoundment. Although the Fly Ash and Bottom Ash Basins are not required to have an EAP, LaGen has prepared emergency action procedures for the BC II Plant as part of the regulatory permitting of the surface impoundments under the Louisiana Solid Waste Rules and Regulations.



## 5.0 INFLOW DESIGN FLOOD CONTROL SYSTEMS ANALYSIS

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### 5.1 Methodology Overview

In order to determine compliance with 40 CFR Part §257.82 regarding the inflow design flood control system at the Fly Ash Basin and Bottom Ash Basin, existing site topography and existing inflow design flood control system features were modeled using the computer model software HydroCAD<sup>®</sup> by HydroCAD Software Solutions, LLC. This computer model was used to develop discharge rates and volumes associated with the subcatchments contributing to the flow into the Fly Ash and Bottom Ash Basins. Inflow design flood features were modeled to ensure that these features are capable of managing peak discharge rates and volumes associated with the inflow design flood.

### 5.2 Model Input Parameters

To ensure that the inflow design flood control system complies with 40 CFR Part §257.82, all elements were computer modeled with numerous conservative assumptions. AutoCAD was utilized to delineate key features and the computer model HydroCAD<sup>®</sup> was used to develop discharge rates and volumes for the inflow design flood event. HydroCAD<sup>®</sup> is a computer aided design program used to model hydrology and hydraulics of stormwater using either TR-20 or TR-55 procedures developed by the SCS, now the Natural Resource Conservation Service (NRCS).

The stormwater modeling methodology used the following analysis methods, as further described in subsequent text:

Runoff Calculation Method:	SCS TR-20
Pond Routing Method:	Storage Indication Method
Storm Distribution:	National Oceanographic and Atmospheric Administration (NOAA) Atlas 14, Volume 9, Version 2 – New Road, LA
Unit Hydrograph:	SCS

The NRCS developed methods TR-20 and TR-55 as standardized stormwater modeling. Both provide similar results; the main differentiation in methodology is based on the use of chart-based solutions vs. computer modeling. TR-55, frequently called the “tabular method” was developed prior to the widespread use of computer modeling. As such it was developed to utilize chart based solutions to use the SCS runoff equation. TR-20 is a computer based modeling approach that is more complex and generally considered more accurate than TR-55.



### 5.2.1 *Rainfall Totals and Distributions*

Rainfall intensities for the inflow design flood system analysis are determined by the hazard potential classification. The Fly Ash Basin and Bottom Ash Basin have been categorized as a low hazard potential CCR unit. The 100-year flood event (100-year, 24-hour storm event) will be utilized within the model, in accordance with 40 CFR Part §257.82(3) which states:

*“The inflow design flood is: ... (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;”*

The 24-hour, 100-year storm event rainfall depth and distribution pattern for the inflow design flood system analysis was determined for New Roads, Louisiana, using NOAA Atlas 14, Volume 9, Version 2. The rainfall depth for the modeled scenario was selected from this report and entered into HydroCAD<sup>®</sup>. TR-55 outlines that an NRCS Type III 24-hour storm distribution is appropriate within this region of Louisiana. The distribution pattern may be selected from a drop-down list in HydroCAD<sup>®</sup>. The rainfall total and distribution utilized within the analysis can be found in **Appendix A**.

### 5.2.2 *Subcatchment Boundaries*

Subcatchment areas (also known as watersheds) were delineated using AutoCAD based on topographic breaks within the areas to be analyzed. For the inflow design flood system analysis, direct precipitation onto the Fly Ash Basin and Bottom Ash Basin and all areas contributing to stormwater run-on into the Fly Ash and Bottom Ash Basins are delineated and imported into HydroCAD<sup>®</sup>. Subcatchment boundaries are depicted in **Figure 2**.

### 5.2.3 *Run-off Coefficient Variables*

The Curve Numbers method was used to identify the runoff characteristics of an area. Curve numbers consider both the land cover that will be encountered by surface water (such as grass, CCR material, standing water, etc.) as well as the type of soil that underlies the land cover. The underlying soil is important because the soil matrix has a large impact on whether water infiltrates into the soil or is shed.

The NRCS technical resource TR-55 provides lookup tables of curve numbers for combinations of various land covers and the underlying surficial soils. As further described below, CB&I developed assumptions of surficial soil types and delineated various land covers to develop a weighted average for each modeled subcatchment area using values specified in TR-55.



## Surficial Soil Types

The site is covered with mostly clay and CCR material. The NRCS defines such surficial soil type as Hydrologic Soil Group D (HSG-D) based on the high run-off potential of both the native soils and CCR material. Surficial soil type within the HydroCAD<sup>®</sup> model was assumed to be HSG-D in all areas within model boundary.

## Land Covers

The land covers were determined based on a review of aerial photography and the topographic survey within the model boundary.

Stormwater run-off from levee areas surrounding the Fly Ash Basin and Bottom Ash Basin boundaries were conservatively assumed to be poor grass cover. The TR-55 manual designates poor grass cover as grassland with less than 50 percent vegetative density.

Stormwater run-off from the dry operational area was assumed to be newly graded, which is congruent with hardened ash material.

Direct precipitation falling onto the wet portion of the Fly Ash and Bottom Ash Basins was assumed to be a water surface. It was assumed that the normal water level within the Fly Ash Basin and Bottom Ash Basin was at approximate elevation of 35 feet MSL.

### 5.2.4 Time of Concentration

The time of concentration, defined as the longest amount of time a water drop would take to travel from the headwater of a subcatchment area to its downstream edge (i.e., prior to being managed by a downstream element) was delineated in AutoCAD and manually entered in HydroCAD<sup>®</sup>.

The following assumptions were made in the calculations:

- ❑ For each subcatchment the time of concentration,  $T_c$ , is the sum of the travel times,  $T_t$ , of various consecutive flow segments. There are three types of flow: sheet flow, shallow concentrated flow, and open channel flow.
- ❑ Sheet flow is assumed to become shallow concentrated flow at 100 feet. It is noted that TR-20 and TR-55 methods specify 300 feet, but subsequent research has generally shown 100 feet to be more accurate.
- ❑ The Manning's coefficient "n" for sheet flow was assumed to be 0.011, indicative of smooth surfaces. This is appropriate for the hardened bottom ash covered subcatchment.



- ❑ The Manning’s coefficient “n” for the 30-inch drainage pipes was assumed to be 0.030, indicative of a corrugated metal pipe.
- ❑ The time of concentration for the water surface area was conservatively assumed to be zero to show direct entry into the 30-inch horizontal outlet pipe.

### 5.2.5 Fly Ash Basin and Bottom Ash Basin Model

The Fly Ash Basin and Bottom Ash Basin were modeled by entering the area at major contour intervals between the normal water elevation and the top of perimeter berm elevation to determine incremental detention volumes. The normal water elevation was assumed to be at an approximate elevation 35 feet MSL. The top of perimeter Fly Ash Basin berm was modeled at an elevation of 38 feet MSL and the top of the perimeter Bottom Ash Basin berm as elevation of 45 feet MSL as indicated on the topographic map (**Figure 3**). The Fly Ash Basin and Bottom Ash Basins were modeled with a 30-inch horizontal pipe as the solitary outlet structure.

## 5.3 Model Findings

The HydroCAD<sup>®</sup> results for the 100-year flood event (100-year, 24-hour storm event) were analyzed to evaluate the inflow design flood control system at the Fly Ash Basin and Bottom Ash Basin. Results from the model indicate that the inflow design flood control system properly manages flow into and out of the Fly Ash Basin and Bottom Ash Basin. Overland flow from stormwater run-off provides appropriate flow into the Fly Ash Basin and Bottom Ash Basin. Erosion or scour is not anticipated to occur during overland flow into the Fly Ash or Bottom Ash Basins. The inflow design flood control system properly manages water from the inflow design flood event without overtopping the perimeter berm structures.

### 5.3.1 Inflow Design Flood Control System Analysis

The inflow design flood control system analysis was completed to demonstrate that the existing system complies with §257.82(a), which states:

*“(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.*

*“(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.”*

Peak discharge rates for each subcatchment were determined using HydroCAD<sup>®</sup>. A review of the peak discharge rates and flow velocities show that the Fly Ash Basin and Bottom Ash Basin have the available capacity to accept water volumes associated with the 100-year flood event. A



review of the flow velocities indicate that erosion or scour is not anticipated to occur for vegetation or CCR material covered subcatchments.

The inflow design flood control system consisting of a 30-inch horizontal pipe was modeled as the solitary outlet structure for the Fly Ash Basin and Bottom Ash Basin during the 100-year flood event. A review of the model shows that during the 100-year flood event, the Fly Ash and Bottom Ash Basins drain such that the peak elevation during the flood event is approximately 36.30 feet MSL in the Fly Ash Basin and 37.05 feet MSL in the Bottom Ash Basin. The peak elevations in the Fly Ash Basin and Bottom Ash Basin, respectively, occur approximately 25 hours and 20 hours following the start of the design rainfall. During the 100-year flood event, the inflow design flood control system provides approximately 1.70 feet of freeboard in the Fly Ash Basin and approximately 7.95 feet of freeboard in the Bottom Ash Basin between the peak water elevation and the top of the perimeter berm.

Results from the inflow design flood control system analysis can be found in **Appendix B**.

A review of the results indicate that the flood control system for the ash ponds are design limited and the ash basins act as temporary rainfall detention ponds. Due to the smaller storage capacity of the Bottom Ash Basin, it fills to a higher water stage than the Fly Ash Basin and water temporarily backflows from the Bottom Ash Basin into the Fly Ash Basin. As water discharges from the Bottom Ash Basin outlet pipe, the situation reverses and all of the storm event water is discharged from both basins. The analysis indicates that water levels return to pre-storm levels in approximately 8 to 10 days.

## **5.4 Engineering Evaluation of Findings**

### **5.4.1 Design Appropriateness Based on Model Findings**

Based on the model findings, it has been demonstrated that the current inflow design flood control system complies with §257.82(a) of the CCR Rule. The inflow design flood control system has been appropriately designed to properly manage direct precipitation and stormwater run-off associated with the 100-year flood event.

### **5.4.2 Operations and Maintenance Considerations**

Until the Fly Ash Basin and Bottom Ash Basin are closed, regular inspections of the inflow design flood control system and the perimeter berm are recommended in order to clear debris, repair erosion, and monitor any erosion control measures.



## **6.0 RECORDS RETENTION AND MAINTENANCE**

---

### **6.1 Incorporation of Plan into Operating Record**

Part §257.105(g) provides record keeping requirements to ensure that the Inflow Design Flood Control System Plan must be placed in the facility's operating record. Specifically, §257.105(g) stipulates:

*“(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information, as it becomes available, in the facility's operating record: (4) The initial and periodic inflow design flood control system plan as required by §257.82(c).”*

This Plan will be placed within the Facility Operating Record.

### **6.2 Notification Requirements**

Part §257.106(g) provides guidelines for the notification of the availability of the initial and periodic Plan. Specifically, §257.106(g) stipulates:

*“(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must notify the State Director and/or appropriate Tribal authority when information has been placed in the operating record and on the owner or operator's publicly accessible internet site. The owner or operator must: (4) Provide notification of the availability of the initial and periodic inflow design flood control system plans specified under §257.105(g)(4).”*

The State Director will be notified upon placement of this Plan in the Facility Operating Record.

Part §257.107(g) provides publicly accessible Internet site requirements to ensure that the Plan is accessible through the NRG webpage. Specifically, §257.107(g) stipulates:

*“(g) Operating criteria. The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site: (4) The initial and periodic inflow design flood control system plans specified under §257.105(g)(4).”*

This Plan will be uploaded to NRG CCR Compliance reporting website.





### **6.3 Plan Amendments**

This Inflow Design Flood Control System Plan has been completed in accordance with §257.82(c)(3) to provide an initial analysis of the inflow design flood control system. LaGen is required to prepare inflow design flood control system plans every 5 years, as required by §257.82(c)(4) of the CCR Rule. The amended Plan will be reviewed and recertified by a registered professional engineer and will be placed in the facility operating record as required per §257.105(g)(4). The amended Plan will supersede and replace any prior versions. Availability of the amended Plan will be noticed to the State Director per §257.106(g)(4) and posted to the publicly accessible internet site per §257.107(g)(4).

A record of the Plan reviews/assessments is provided on the first page of this document, immediately following the Table of Contents.



## 7.0 PROFESSIONAL ENGINEER CERTIFICATION

---

The undersigned registered professional engineer is familiar with the requirements of §257.82 and has visited and examined the NRC BC II Plant or has supervised examination of the NRC BC II Plant by appropriately qualified personnel. The undersigned registered professional engineer attests that this Inflow Design Flood Control System Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and meets the requirements of §257.82, and that this Plan is adequate for the facility. This certification was prepared as required by §257.82(c)(5)

Name of Professional Engineer: Glen R. Landry.

Company: CBI Environmental, Inc

Signature: Glen R. Landry

Date: 10/5/16

PE Registration State: Louisiana

PE Registration Number: 18931

Professional Engineer Seal:





## 8.0 REFERENCES

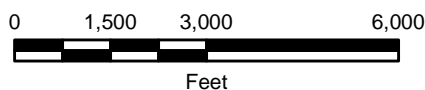
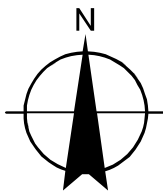
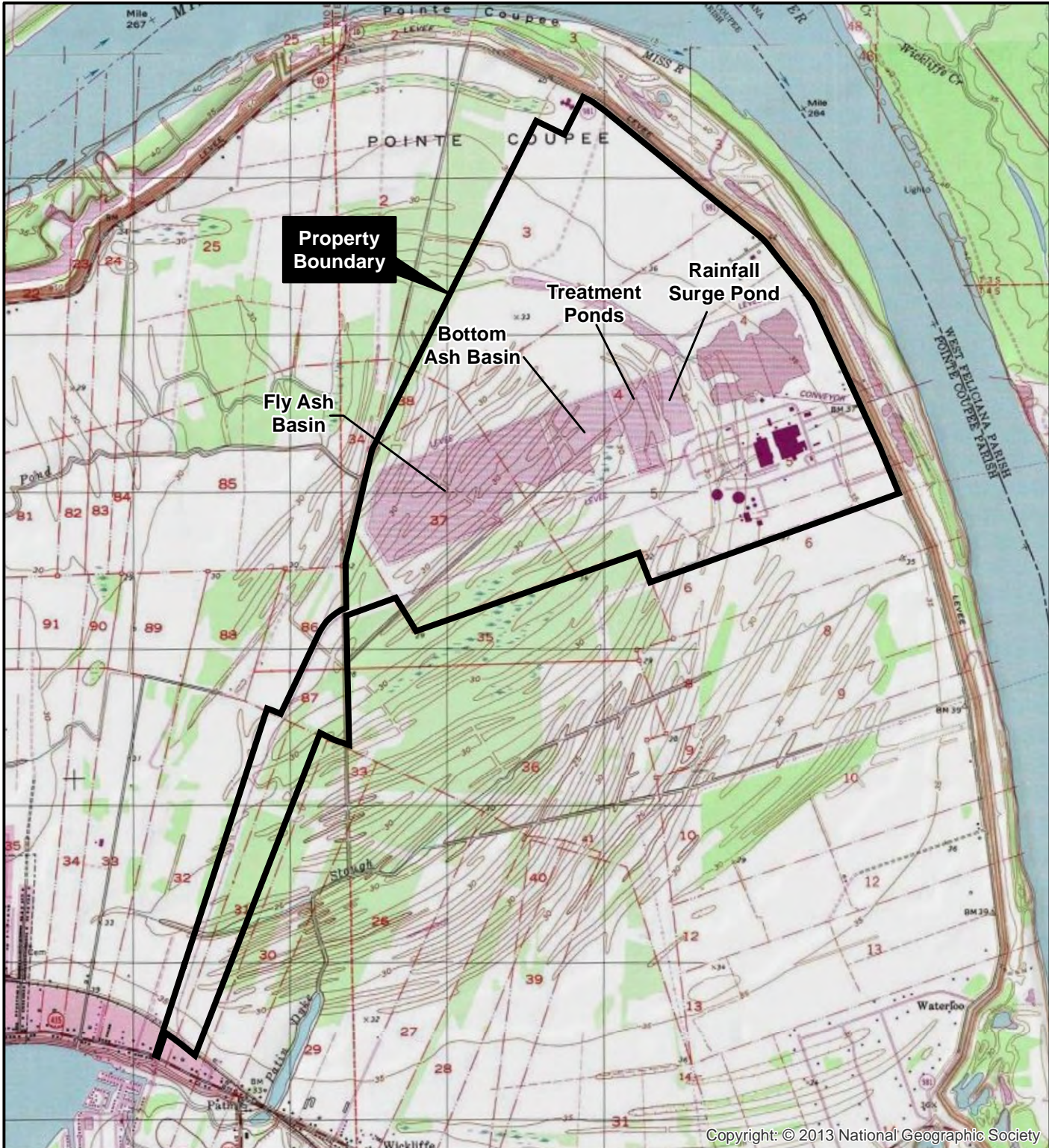
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Environmental Protection Agency, April 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 Code of Federal Regulations Parts 257 and 261.

Louisiana Department of Environmental Quality, November 2014, Louisiana Discharge Pollutant Elimination System, Water Discharge Permit No. LA0054135, prepared for Louisiana Generating, LLC, Big Cajun II Power Plant, New Roads, Pointe Coupee Parish, Louisiana.

Shaw Environmental and Infrastructure, Inc. November 2011, Type I Solid Waste Facility Permit Renewal and Modification Application, Permit No. P-0108, Volumes 1 and 2, prepared for Louisiana Generating, LLC, Big Cajun II Power Plant, New Roads, Pointe Coupee Parish, Louisiana.

## *FIGURES*



LOUISIANA GENERATING, LLC  
 BIG CAJUN II POWER PLANT  
 NEW ROADS, LOUISIANA

BIG CAJUN II POWER PLANT  
 INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

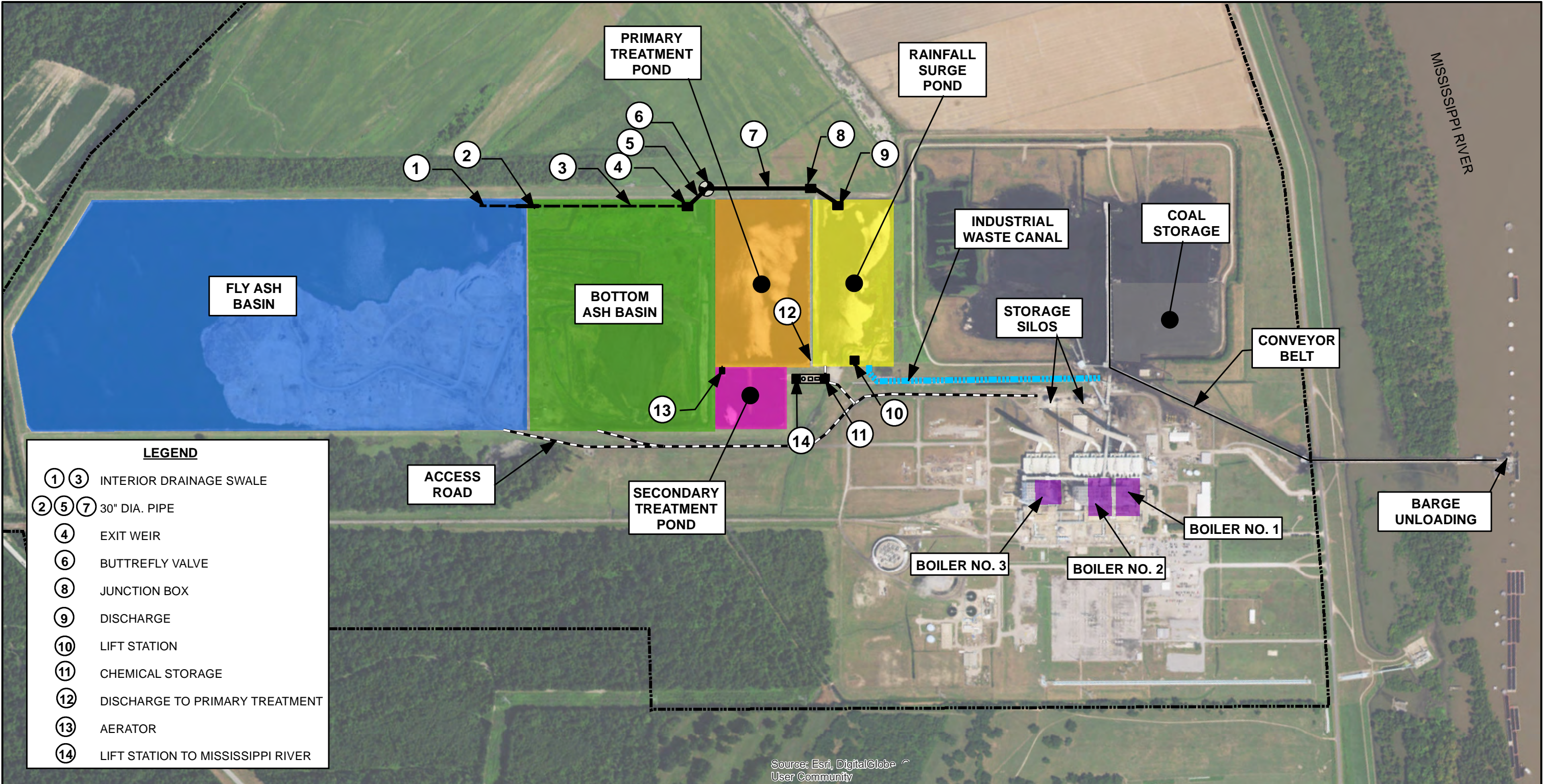
FIGURE  
 NUMBER

1

**SITE LOCATION**

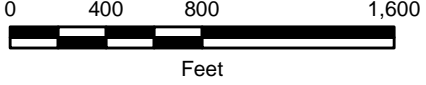
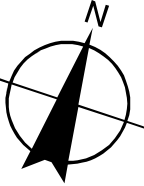


CB&I Environmental & Infrastructure, Inc.  
 4171 Essen Lane  
 Baton Rouge, Louisiana 70809

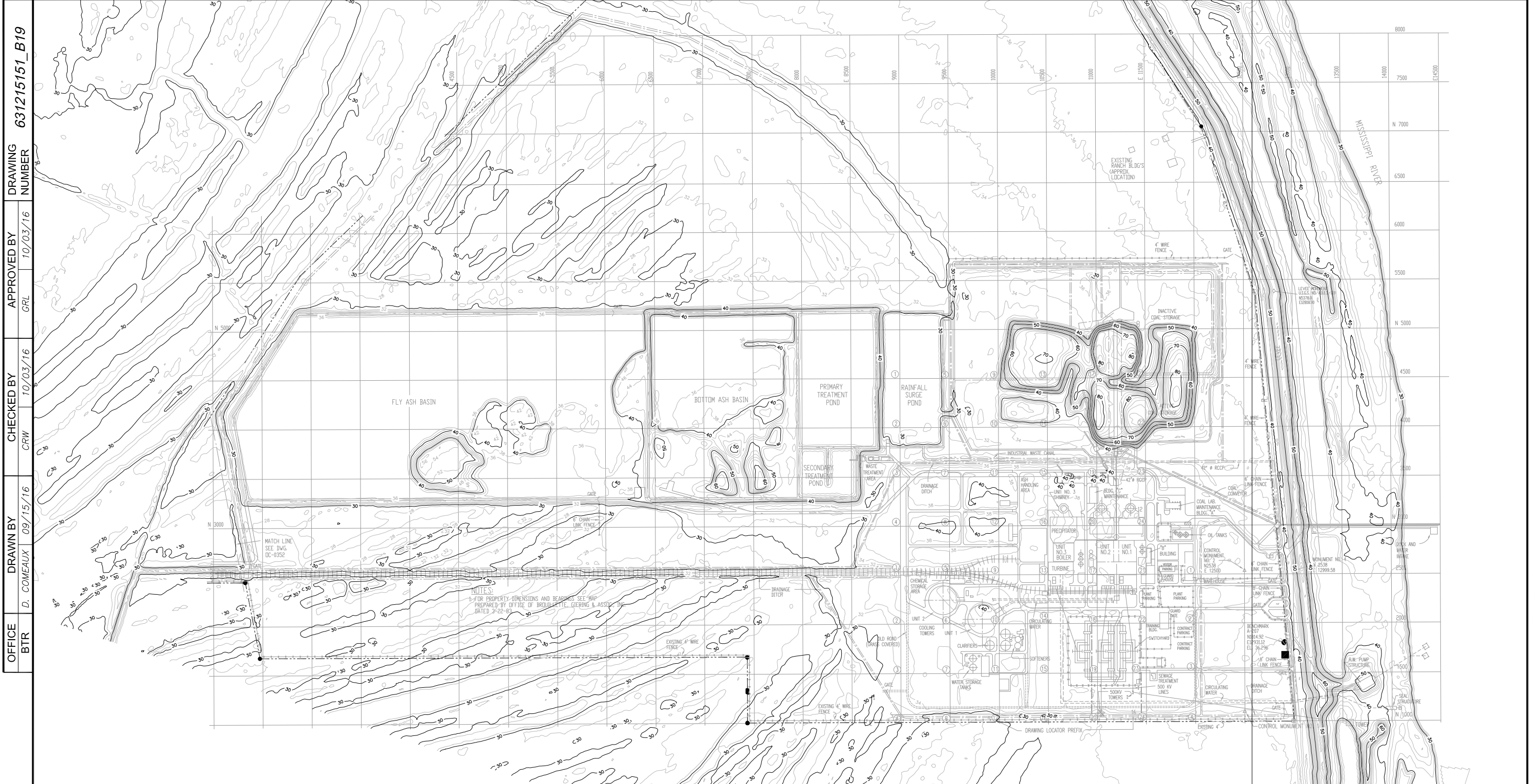


Source: Esri, DigitalGlobe, User Community

LEGEND	
① ③	INTERIOR DRAINAGE SWALE
② ⑤ ⑦	30" DIA. PIPE
④	EXIT WEIR
⑥	BUTTERFLY VALVE
⑧	JUNCTION BOX
⑨	DISCHARGE
⑩	LIFT STATION
⑪	CHEMICAL STORAGE
⑫	DISCHARGE TO PRIMARY TREATMENT
⑬	AERATOR
⑭	LIFT STATION TO MISSISSIPPI RIVER



LOUISIANA GENERATING, LLC BIG CAJUN II POWER PLANT NEW ROADS, LOUISIANA	
BIG CAJUN II POWER PLANT INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN	
FIGURE NUMBER <b>2</b>	<b>SITE LAYOUT</b>
 CB&I Environmental & Infrastructure, Inc. 4171 Essen Lane Baton Rouge, Louisiana 70809	



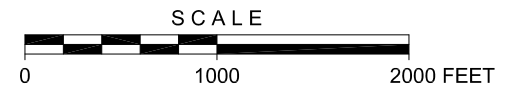
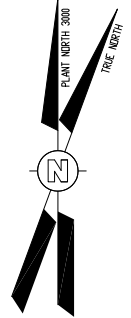
OFFICE BTR  
 DRAWN BY D. COMEAUX 09/15/16  
 CHECKED BY CRW 10/03/16  
 APPROVED BY GRL 10/03/16  
 DRAWING NUMBER 631215151\_B19

**LEGEND**

----- PROPERTY LINE

30 TOPOGRAPHIC CONTOUR (FEET, NGVD 29) WITH 2-FOOT CONTOUR INTERVAL

NOTES:  
 1- FOR PROPERTY DIMENSIONS AND BEARINGS SEE MAP PREPARED BY OFFICE OF BROUILLETTE, GIERING & ASSOCIATES, INC. DATED 7-22-03



LOUISIANA GENERATING, L.L.C.  
 BIG CAJUN II POWER PLANT  
 NEW ROADS, LOUISIANA

BIG CAJUN II POWER PLANT  
 INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

FIGURE NUMBER  
**3**  
**EXISTING SITE TOPOGRAPHY**

**CBI**  
 CB&I Environmental & Infrastructure, Inc.  
 4171 Essen Lane  
 Baton Rouge, Louisiana 70809

REFERENCE: Louisiana Oil Spill Coordinator's Office (LOSCO), LIDAR Digital Elevation Map (DEM) of Louisiana, 2009.

## *APPENDIX A*





NOAA Atlas 14, Volume 9, Version 2  
 Location name: New Roads, Louisiana, US\*  
 Latitude: 30.7258°, Longitude: -91.3860°  
 Elevation: 36 ft\*  
 \* source: Google Maps



**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

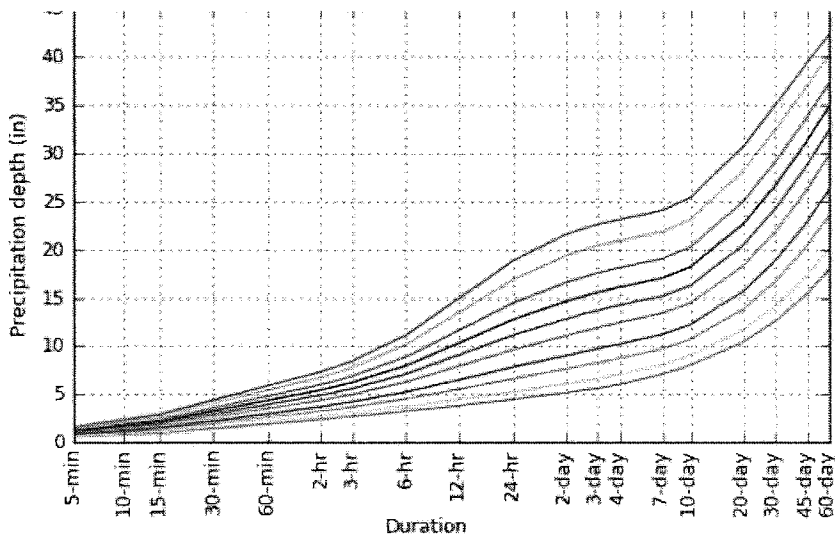
**PF tabular**

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.541 (0.431-0.665)	0.617 (0.492-0.760)	0.744 (0.591-0.918)	0.851 (0.672-1.05)	1.00 (0.768-1.27)	1.12 (0.840-1.44)	1.24 (0.901-1.62)	1.36 (0.954-1.82)	1.53 (1.03-2.09)	1.65 (1.09-2.29)
10-min	0.792 (0.631-0.974)	0.904 (0.720-1.11)	1.09 (0.865-1.34)	1.25 (0.984-1.54)	1.47 (1.12-1.86)	1.64 (1.23-2.10)	1.81 (1.32-2.37)	1.99 (1.40-2.66)	2.23 (1.51-3.06)	2.42 (1.60-3.35)
15-min	0.966 (0.770-1.19)	1.10 (0.878-1.36)	1.33 (1.06-1.64)	1.52 (1.20-1.88)	1.79 (1.37-2.27)	2.00 (1.50-2.56)	2.21 (1.61-2.89)	2.43 (1.70-3.25)	2.73 (1.85-3.73)	2.95 (1.95-4.09)
30-min	1.43 (1.14-1.76)	1.64 (1.30-2.01)	1.98 (1.57-2.44)	2.26 (1.79-2.80)	2.67 (2.04-3.38)	2.98 (2.24-3.83)	3.30 (2.40-4.32)	3.63 (2.55-4.86)	4.08 (2.76-5.57)	4.42 (2.92-6.11)
60-min	1.92 (1.53-2.36)	2.18 (1.74-2.69)	2.63 (2.08-3.24)	3.00 (2.37-3.72)	3.53 (2.71-4.49)	3.95 (2.97-5.07)	4.38 (3.19-5.73)	4.82 (3.38-6.44)	5.41 (3.66-7.40)	5.87 (3.88-8.13)
2-hr	2.40 (1.93-2.93)	2.73 (2.19-3.33)	3.28 (2.63-4.01)	3.74 (2.98-4.59)	4.40 (3.41-5.55)	4.92 (3.73-6.27)	5.45 (4.00-7.08)	6.00 (4.24-7.97)	6.75 (4.60-9.17)	7.32 (4.87-10.1)
3-hr	2.71 (2.19-3.29)	3.08 (2.49-3.74)	3.70 (2.98-4.50)	4.23 (3.39-5.16)	4.99 (3.89-6.27)	5.59 (4.26-7.10)	6.21 (4.59-8.05)	6.86 (4.87-9.08)	7.74 (5.30-10.5)	8.43 (5.63-11.6)
6-hr	3.26 (2.66-3.92)	3.73 (3.04-4.48)	4.53 (3.69-5.47)	5.24 (4.24-6.34)	6.25 (4.93-7.82)	7.08 (5.45-8.94)	7.94 (5.92-10.2)	8.86 (6.34-11.7)	10.1 (6.99-13.6)	11.1 (7.47-15.1)
12-hr	3.83 (3.16-4.56)	4.45 (3.67-5.31)	5.53 (4.54-6.61)	6.49 (5.30-7.78)	7.90 (6.29-9.83)	9.06 (7.04-11.4)	10.3 (7.74-13.2)	11.6 (8.38-15.2)	13.4 (9.35-18.0)	14.9 (10.1-20.2)
24-hr	4.47 (3.72-5.28)	5.23 (4.35-6.18)	6.58 (5.46-7.80)	7.80 (6.43-9.27)	9.60 (7.73-11.9)	11.1 (8.71-13.9)	12.7 (9.64-16.2)	14.4 (10.5-18.8)	16.8 (11.8-22.4)	18.8 (12.8-25.2)
2-day	5.18 (4.36-6.06)	6.06 (5.10-7.10)	7.62 (6.38-8.94)	9.01 (7.50-10.6)	11.1 (9.00-13.6)	12.8 (10.1-15.8)	14.6 (11.2-18.5)	16.6 (12.2-21.5)	19.4 (13.7-25.6)	21.6 (14.8-28.8)
3-day	5.63 (4.76-6.55)	6.59 (5.57-7.67)	8.25 (6.96-9.64)	9.73 (8.15-11.4)	11.9 (9.71-14.5)	13.7 (10.9-16.8)	15.6 (12.0-19.6)	17.6 (12.9-22.6)	20.4 (14.4-26.8)	22.6 (15.6-30.0)
4-day	6.02 (5.11-6.97)	7.01 (5.95-8.13)	8.72 (7.38-10.1)	10.2 (8.60-11.9)	12.4 (10.2-15.1)	14.2 (11.3-17.4)	16.1 (12.4-20.2)	18.1 (13.4-23.2)	20.9 (14.8-27.4)	23.1 (15.9-30.6)
7-day	7.08 (6.07-8.15)	8.05 (6.89-9.27)	9.73 (8.30-11.2)	11.2 (9.52-13.0)	13.4 (11.0-16.1)	15.2 (12.2-18.4)	17.1 (13.2-21.2)	19.0 (14.2-24.3)	21.8 (15.6-28.5)	24.0 (16.7-31.7)
10-day	7.99 (6.88-9.15)	8.98 (7.73-10.3)	10.7 (9.17-12.3)	12.2 (10.4-14.1)	14.4 (12.0-17.3)	16.2 (13.1-19.7)	18.2 (14.2-22.5)	20.2 (15.1-25.6)	23.1 (16.5-30.0)	25.3 (17.6-33.3)
20-day	10.5 (9.10-11.9)	11.7 (10.2-13.3)	13.8 (12.0-15.8)	15.7 (13.5-17.9)	18.3 (15.3-21.7)	20.5 (16.7-24.5)	22.7 (17.8-27.8)	25.0 (18.8-31.4)	28.2 (20.3-36.3)	30.7 (21.5-40.1)
30-day	12.6 (11.0-14.2)	14.1 (12.3-15.9)	16.7 (14.5-18.9)	18.8 (16.3-21.4)	21.8 (18.3-25.6)	24.2 (19.8-28.7)	26.6 (21.0-32.3)	29.1 (21.9-36.2)	32.4 (23.4-41.4)	34.9 (24.6-45.4)
45-day	15.4 (13.6-17.3)	17.3 (15.2-19.4)	20.3 (17.8-22.9)	22.8 (19.9-25.8)	26.2 (22.0-30.4)	28.7 (23.5-33.8)	31.2 (24.7-37.6)	33.7 (25.5-41.7)	36.9 (26.8-46.9)	39.3 (27.8-50.9)
60-day	18.0 (15.9-20.1)	20.1 (17.8-22.5)	23.5 (20.7-26.4)	26.2 (23.0-29.5)	29.8 (25.0-34.2)	32.4 (26.6-37.8)	34.8 (27.6-41.7)	37.2 (28.2-45.7)	40.2 (29.2-50.8)	42.3 (30.0-54.6)

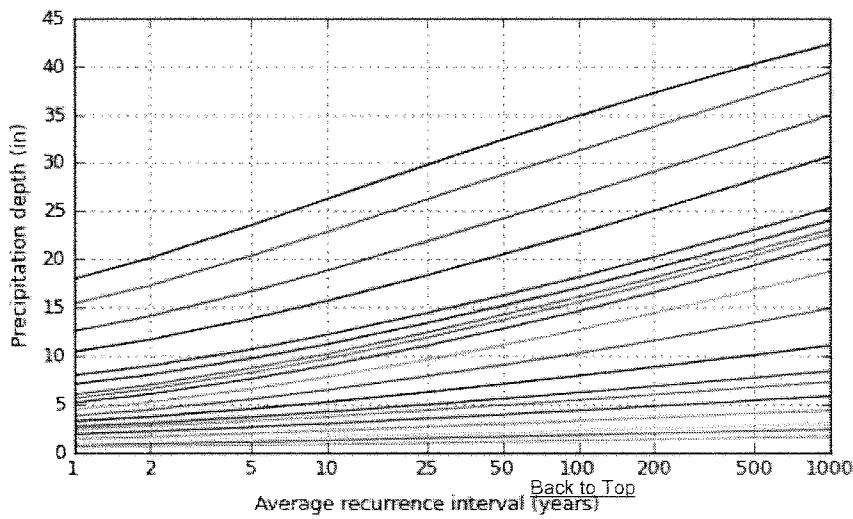
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration 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**



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

NOAA Atlas 14, Volume 9, Version 2

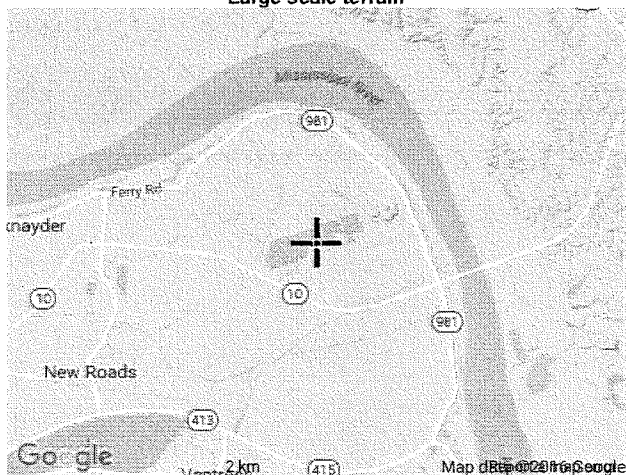
Maps & aerials

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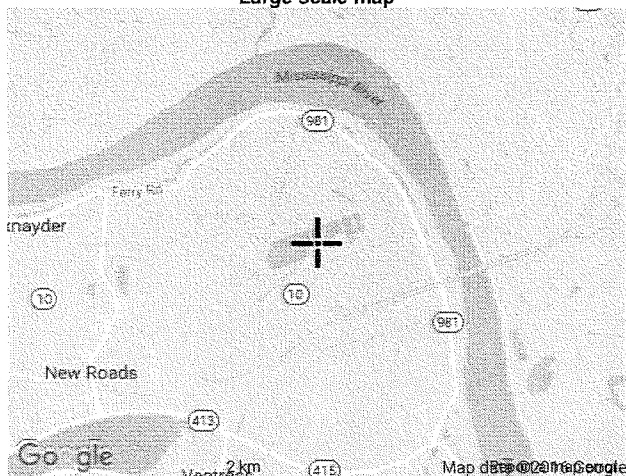
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

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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](mailto:HDSC.Questions@noaa.gov)

[Disclaimer](#)

## *APPENDIX B*



By Joseph Christopher

Date 8/26/16 Subject NRG Fly Ash Basin

Sheet No. 1 of 2

Checked By

Date

Project No. 631215151

Surface Area Approximation from Google Earth ortho Dec 2014  
Fly Ash Sub Basin Total SF 7298218 SF and CAD contour file

Fly Ash Grading Area ~ 2340,624 SF

HydroCAD Curve # 94 Newly Graded pervious only

Water Surface Area ~ 4957894 SF

ref TR-55

$$\text{Sheet flow } T_E = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

$n$  = Manning's roughness coef  
assumed 0.011

$L = 300'$  flow length

$P_2 = 2$  year 24 hr rainfall (in) = 5.23 in  
from NOAA Atlas 14 New Road, LA

$$S = \frac{(36 - 35.8)}{300} = 0.0007$$

$$\Rightarrow \text{Sheet flow } T_E = \frac{0.007 ((0.011)(300))^{0.8}}{(5.23)^{0.5} (0.0007)^{0.4}}$$

$$= 0.145 \text{ hr}$$

Shallow Concentrate flow

$$\text{Eq 8-41 } v = \frac{149 n^{2/3} S^{1/2}}{n}$$

$$= \frac{149 (n_{ave})^{2/3} S^{1/2}}{n}$$

$$= \frac{149 (0.12)^{2/3} 0.0004^{0.5}}{0.011}$$

$$= 0.659 \text{ ft/s}$$

$C = \frac{a}{P_w}$  = cross sectional area of  
flow / wetted perimeter

$\Rightarrow C$  assumed from CAD file

$$C_1 = \frac{(160)(0.16)}{160.32} = 0.16$$

$$C_2 = \frac{(373)(0.08)}{373.16} = 0.08 \quad n_{ave} = 0.12$$

$$S = \frac{(35.8 - 35)}{1930} = 0.0004$$

$$n = " " 0.011$$

$$T_E = \frac{L}{3600 v} = \frac{1930}{3600 (0.659)} = 0.81$$



By Joseph Christopher Date 8/26/16 Subject NRG Fly Ash Basin Sheet No. 2 of 2  
Checked By Date Project No. G31215151

Fly Ash Pond Approximate from CAD File Levee Top ~ 38' EL

@EL 30.16'	4,520,077 SF
EL 32.00'	4,726,672 SF
EL 34.00'	4,907,661 SF
EL 36.00'	5,789,962 SF
EL 38.00	6,362,991 SF

Available Storage 40,991,918 CF

outlet 30" dia CMP assumed @ 0.25% slope for L=82'

Hydro CAD used to model basin



By Joseph Christopher

Date 8/26/16 Subject NRG Bottom Ash Basin

Sheet No. 1 of 3

Checked By

Date

Project No. 631215151

Surface Area Approximations from CAD contour file and Google Earth on the Dec 2014

Bottom ash Basin ~ 2,713,737 SF Clay class D soil

~ 60% CN 94 Newly Graded pervious only

=> 1,628,362 @ CN 94

~ 3% water surface => 81,418 SF CN 99

~ 37% industrial clay => 1,004,156 SF CN 89 Open space  
less 50% Grass cover

Sheet flow L = 300' slope:  $(37-36)/300 = 0.003$  n = 0.011

$$T_L = \frac{0.007((0.011)(300)^{1.48}}{(5.23)^{0.5}(0.003)^{0.4}} \quad P_2 = 5.23$$

$$= 0.081 \text{ hr}$$

Open Channel flow 1

L = 5540' assumed x-section area 10' x 1'

n = 0.011

$$V = \frac{1.49 r^{2/3} S^{1/2}}{n} \quad S = (44-34)/5540 = 0.002$$

$$= \frac{1.49(0.83)^{2/3} 0.002^{0.5}}{0.011} \quad r = \frac{(10)(1)}{12} = 0.83$$

$$= 5.35 \text{ ft/s}$$

$$T_T = \frac{L}{3600V} = \frac{5540}{3600(5.35)} = 0.287 \text{ hr}$$





By Joseph Christopher

Date 8/26/16

Subject NRG Bottom Ash Basin

Sheet No. 2 of 3

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## Open Channel Flow 2

$$L = 937.7$$

assumed x-section area 25' x 1.5'

$$n = 0.011$$

$$S = \text{assumed} = \frac{(34 - 33.5)}{937}$$

$$r = \frac{(25)(1.5)}{28} = 1.34$$

$$= 0.0005$$

$$\Rightarrow V_2 = \frac{1.49 (1.34)^{2/3} (0.0005)^{0.5}}{0.011} = 3.68 \text{ ft}^2$$

$$T_{T2} = \frac{937.7}{(3600)(3.68)} = 0.07 \text{ hr}$$

## Open Channel Flow 3

$$L = 133' \text{ assumed x-section } 88' \times 2'$$

$$n = 0.011 \text{ assumed } S = \frac{(33.5 - 33)}{133} = 0.0037$$

$$r = \frac{(88)(2)}{92} = 1.91$$

$$V_3 = \frac{1.49 (1.91)^{2/3} (0.0037)^{1/2}}{0.011} = 12.68 \text{ ft}^2$$

$$T_{T3} = \frac{133}{(3600)(12.68)} = 0.003 \text{ hr}$$

By Joseph Christopher Date 8/26/16 Subject NRG Bottom Ash Basin Sheet No. 3 of 3  
 Checked By \_\_\_\_\_ Date \_\_\_\_\_ Project No. 631215151

Bottom Ash Approximate Storage from CAD File Level Top ~ 42'

@ EL 36' 12,613 SF  
 EL 32' 56,329 SF  
 EL 34' 97,813 SF  
 EL 36' 934,477 SF  
 EL 38' 1,327,081 SF  
 EL 40' 1,444,953 SF

Available Storage 6,248,966 CF

Outlet assumed vertical 30" CMP orifice @ EL 34'

to 30" CMP  $w = 1250'$   $S = 0.25\%$

Create TW to Fly Ash Pond @ EL 36.9'

=> No outflow to Bottom Ash Basin

Add'l Elev.

EL	42	1,588,295	ft <sup>2</sup>
EL	44	1,769,488	ft <sup>2</sup>
EL	45	1,949,865	ft <sup>2</sup>



By Joseph Christopher

Date 8/20/16 Subject Surge Pond

Sheet No. 1 of 1

Checked By

Date

Project No. G31215151

Surge pond SF measured in CAD for sub-basin

818,570 SF of CN 98 Water Surface

$$T_c = \frac{L}{3600V}$$

$$v = (gD)^{1/2}$$

$$L = 753' \quad \text{Mean depth} = \text{assumed } 2'$$

$$= ((32.2)(2))^{1/2} = 8.02$$

$$\Rightarrow \frac{753}{(3600)(8.02)} = 0.026 \text{ hr}$$

Storage Approximated from CAD File

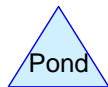
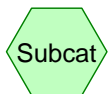
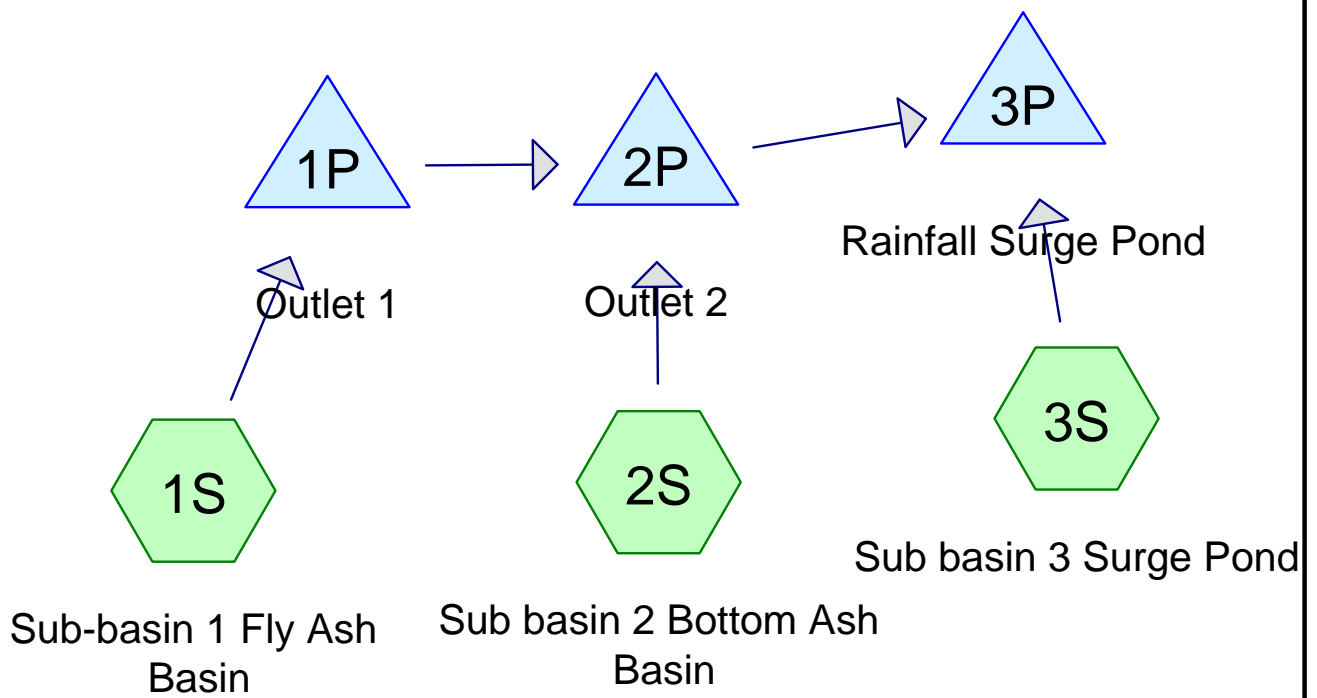
- ① EL 26.0' 44,76 SF
- EL 28.0' 682,493 SF
- EL 30.0' 768,432 SF
- EL 32.0' 818,905 SF

Waste channel outlet considered as weir flow

with weir invert @ 28' EL assumed

crest length 43.0' measured in CAD

crest breadth 128.0' measurement to first bend in CAD file



## BigCajunII\_rev2

Prepared by Chicago Bridge and Iron Company

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### Area Listing (all nodes)

Area (sq-miles)	CN	Description (subcatchment-numbers)
0.0360	89	<50% Grass cover, Poor, HSG D (2S)
0.1424	94	Newly graded area, HSG D (1S, 2S)
0.2072	98	Water Surface, 0% imp, HSG D (1S, 3S)
0.0029	98	Water Surface, HSG D (2S)
<b>0.3885</b>	<b>96</b>	<b>TOTAL AREA</b>

**Summary for Subcatchment 1S: Sub-basin 1 Fly Ash Basin**

Runoff = 862.32 cfs @ 12.74 hrs, Volume= 172.239 af, Depth=12.34"

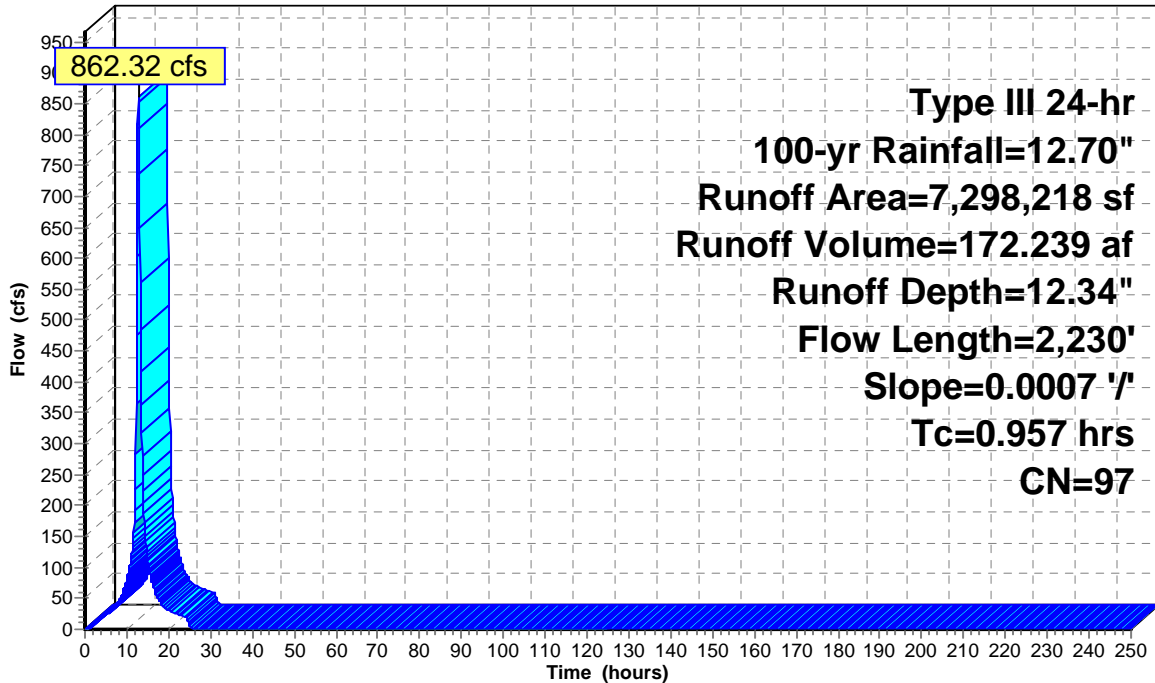
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=12.70"

Area (sf)	CN	Description
4,957,594	98	Water Surface, 0% imp, HSG D
2,340,624	94	Newly graded area, HSG D
7,298,218	97	Weighted Average

Tc (hours)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.145	300	0.0007	0.57		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 5.23"
0.812	1,930		0.66		<b>Direct Entry, Shallow Concentrated Flow TR-55 eq 3-4 and 3-1</b>
0.957	2,230	Total			

**Subcatchment 1S: Sub-basin 1 Fly Ash Basin**

Hydrograph



Runoff

**Hydrograph for Subcatchment 1S: Sub-basin 1 Fly Ash Basin**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.50	12.70	12.34	0.10
0.50	0.06	0.00	0.00	27.00	12.70	12.34	0.01
1.00	0.13	0.01	0.33	27.50	12.70	12.34	0.00
1.50	0.19	0.04	3.31	28.00	12.70	12.34	0.00
2.00	0.25	0.07	7.58	28.50	12.70	12.34	0.00
2.50	0.32	0.12	11.04	29.00	12.70	12.34	0.00
3.00	0.39	0.17	13.97	29.50	12.70	12.34	0.00
3.50	0.47	0.23	16.77	30.00	12.70	12.34	0.00
4.00	0.55	0.30	19.38	30.50	12.70	12.34	0.00
4.50	0.63	0.37	21.82	31.00	12.70	12.34	0.00
5.00	0.72	0.45	24.11	31.50	12.70	12.34	0.00
5.50	0.82	0.53	26.28	32.00	12.70	12.34	0.00
6.00	0.91	0.63	28.36	32.50	12.70	12.34	0.00
6.50	1.02	0.73	30.50	33.00	12.70	12.34	0.00
7.00	1.15	0.85	33.95	33.50	12.70	12.34	0.00
7.50	1.29	0.98	38.81	34.00	12.70	12.34	0.00
8.00	1.45	1.13	44.16	34.50	12.70	12.34	0.00
8.50	1.63	1.31	49.91	35.00	12.70	12.34	0.00
9.00	1.85	1.53	58.34	35.50	12.70	12.34	0.00
9.50	2.11	1.78	69.53	36.00	12.70	12.34	0.00
10.00	2.40	2.07	81.65	36.50	12.70	12.34	0.00
10.50	2.75	2.41	94.54	37.00	12.70	12.34	0.00
11.00	3.18	2.83	112.68	37.50	12.70	12.34	0.00
11.50	3.78	3.44	138.91	38.00	12.70	12.34	0.00
12.00	6.35	5.99	227.71	38.50	12.70	12.34	0.00
12.50	8.92	8.55	<b>725.09</b>	39.00	12.70	12.34	0.00
13.00	9.52	9.16	<b>735.58</b>	39.50	12.70	12.34	0.00
13.50	9.95	9.59	362.51	40.00	12.70	12.34	0.00
14.00	10.30	9.94	203.90	40.50	12.70	12.34	0.00
14.50	10.59	10.23	140.46	41.00	12.70	12.34	0.00
15.00	10.85	10.49	109.33	41.50	12.70	12.34	0.00
15.50	11.07	10.71	91.10	42.00	12.70	12.34	0.00
16.00	11.25	10.89	77.84	42.50	12.70	12.34	0.00
16.50	11.41	11.05	65.60	43.00	12.70	12.34	0.00
17.00	11.55	11.19	56.20	43.50	12.70	12.34	0.00
17.50	11.68	11.31	49.62	44.00	12.70	12.34	0.00
18.00	11.79	11.42	43.92	44.50	12.70	12.34	0.00
18.50	11.88	11.52	38.61	45.00	12.70	12.34	0.00
19.00	11.98	11.62	34.84	45.50	12.70	12.34	0.00
19.50	12.07	11.71	32.57	46.00	12.70	12.34	0.00
20.00	12.15	11.79	30.79	46.50	12.70	12.34	0.00
20.50	12.23	11.87	29.15	47.00	12.70	12.34	0.00
21.00	12.31	11.95	27.70	47.50	12.70	12.34	0.00
21.50	12.39	12.02	26.43	48.00	12.70	12.34	0.00
22.00	12.46	12.09	25.20	48.50	12.70	12.34	0.00
22.50	12.52	12.16	23.99	49.00	12.70	12.34	0.00
23.00	12.58	12.22	22.78	49.50	12.70	12.34	0.00
23.50	12.64	12.28	21.57	50.00	12.70	12.34	0.00
24.00	<b>12.70</b>	<b>12.34</b>	20.36	50.50	12.70	12.34	0.00
24.50	12.70	12.34	16.39	51.00	12.70	12.34	0.00
25.00	12.70	12.34	6.00	51.50	12.70	12.34	0.00
25.50	12.70	12.34	1.64	52.00	12.70	12.34	0.00
26.00	12.70	12.34	0.44	52.50	12.70	12.34	0.00

**Hydrograph for Subcatchment 1S: Sub-basin 1 Fly Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
53.00	12.70	12.34	0.00	79.50	12.70	12.34	0.00
53.50	12.70	12.34	0.00	80.00	12.70	12.34	0.00
54.00	12.70	12.34	0.00	80.50	12.70	12.34	0.00
54.50	12.70	12.34	0.00	81.00	12.70	12.34	0.00
55.00	12.70	12.34	0.00	81.50	12.70	12.34	0.00
55.50	12.70	12.34	0.00	82.00	12.70	12.34	0.00
56.00	12.70	12.34	0.00	82.50	12.70	12.34	0.00
56.50	12.70	12.34	0.00	83.00	12.70	12.34	0.00
57.00	12.70	12.34	0.00	83.50	12.70	12.34	0.00
57.50	12.70	12.34	0.00	84.00	12.70	12.34	0.00
58.00	12.70	12.34	0.00	84.50	12.70	12.34	0.00
58.50	12.70	12.34	0.00	85.00	12.70	12.34	0.00
59.00	12.70	12.34	0.00	85.50	12.70	12.34	0.00
59.50	12.70	12.34	0.00	86.00	12.70	12.34	0.00
60.00	12.70	12.34	0.00	86.50	12.70	12.34	0.00
60.50	12.70	12.34	0.00	87.00	12.70	12.34	0.00
61.00	12.70	12.34	0.00	87.50	12.70	12.34	0.00
61.50	12.70	12.34	0.00	88.00	12.70	12.34	0.00
62.00	12.70	12.34	0.00	88.50	12.70	12.34	0.00
62.50	12.70	12.34	0.00	89.00	12.70	12.34	0.00
63.00	12.70	12.34	0.00	89.50	12.70	12.34	0.00
63.50	12.70	12.34	0.00	90.00	12.70	12.34	0.00
64.00	12.70	12.34	0.00	90.50	12.70	12.34	0.00
64.50	12.70	12.34	0.00	91.00	12.70	12.34	0.00
65.00	12.70	12.34	0.00	91.50	12.70	12.34	0.00
65.50	12.70	12.34	0.00	92.00	12.70	12.34	0.00
66.00	12.70	12.34	0.00	92.50	12.70	12.34	0.00
66.50	12.70	12.34	0.00	93.00	12.70	12.34	0.00
67.00	12.70	12.34	0.00	93.50	12.70	12.34	0.00
67.50	12.70	12.34	0.00	94.00	12.70	12.34	0.00
68.00	12.70	12.34	0.00	94.50	12.70	12.34	0.00
68.50	12.70	12.34	0.00	95.00	12.70	12.34	0.00
69.00	12.70	12.34	0.00	95.50	12.70	12.34	0.00
69.50	12.70	12.34	0.00	96.00	12.70	12.34	0.00
70.00	12.70	12.34	0.00	96.50	12.70	12.34	0.00
70.50	12.70	12.34	0.00	97.00	12.70	12.34	0.00
71.00	12.70	12.34	0.00	97.50	12.70	12.34	0.00
71.50	12.70	12.34	0.00	98.00	12.70	12.34	0.00
72.00	12.70	12.34	0.00	98.50	12.70	12.34	0.00
72.50	12.70	12.34	0.00	99.00	12.70	12.34	0.00
73.00	12.70	12.34	0.00	99.50	12.70	12.34	0.00
73.50	12.70	12.34	0.00	100.00	12.70	12.34	0.00
74.00	12.70	12.34	0.00	100.50	12.70	12.34	0.00
74.50	12.70	12.34	0.00	101.00	12.70	12.34	0.00
75.00	12.70	12.34	0.00	101.50	12.70	12.34	0.00
75.50	12.70	12.34	0.00	102.00	12.70	12.34	0.00
76.00	12.70	12.34	0.00	102.50	12.70	12.34	0.00
76.50	12.70	12.34	0.00	103.00	12.70	12.34	0.00
77.00	12.70	12.34	0.00	103.50	12.70	12.34	0.00
77.50	12.70	12.34	0.00	104.00	12.70	12.34	0.00
78.00	12.70	12.34	0.00	104.50	12.70	12.34	0.00
78.50	12.70	12.34	0.00	105.00	12.70	12.34	0.00
79.00	12.70	12.34	0.00	105.50	12.70	12.34	0.00



**Hydrograph for Subcatchment 1S: Sub-basin 1 Fly Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
106.00	12.70	12.34	0.00	132.50	12.70	12.34	0.00
106.50	12.70	12.34	0.00	133.00	12.70	12.34	0.00
107.00	12.70	12.34	0.00	133.50	12.70	12.34	0.00
107.50	12.70	12.34	0.00	134.00	12.70	12.34	0.00
108.00	12.70	12.34	0.00	134.50	12.70	12.34	0.00
108.50	12.70	12.34	0.00	135.00	12.70	12.34	0.00
109.00	12.70	12.34	0.00	135.50	12.70	12.34	0.00
109.50	12.70	12.34	0.00	136.00	12.70	12.34	0.00
110.00	12.70	12.34	0.00	136.50	12.70	12.34	0.00
110.50	12.70	12.34	0.00	137.00	12.70	12.34	0.00
111.00	12.70	12.34	0.00	137.50	12.70	12.34	0.00
111.50	12.70	12.34	0.00	138.00	12.70	12.34	0.00
112.00	12.70	12.34	0.00	138.50	12.70	12.34	0.00
112.50	12.70	12.34	0.00	139.00	12.70	12.34	0.00
113.00	12.70	12.34	0.00	139.50	12.70	12.34	0.00
113.50	12.70	12.34	0.00	140.00	12.70	12.34	0.00
114.00	12.70	12.34	0.00	140.50	12.70	12.34	0.00
114.50	12.70	12.34	0.00	141.00	12.70	12.34	0.00
115.00	12.70	12.34	0.00	141.50	12.70	12.34	0.00
115.50	12.70	12.34	0.00	142.00	12.70	12.34	0.00
116.00	12.70	12.34	0.00	142.50	12.70	12.34	0.00
116.50	12.70	12.34	0.00	143.00	12.70	12.34	0.00
117.00	12.70	12.34	0.00	143.50	12.70	12.34	0.00
117.50	12.70	12.34	0.00	144.00	12.70	12.34	0.00
118.00	12.70	12.34	0.00	144.50	12.70	12.34	0.00
118.50	12.70	12.34	0.00	145.00	12.70	12.34	0.00
119.00	12.70	12.34	0.00	145.50	12.70	12.34	0.00
119.50	12.70	12.34	0.00	146.00	12.70	12.34	0.00
120.00	12.70	12.34	0.00	146.50	12.70	12.34	0.00
120.50	12.70	12.34	0.00	147.00	12.70	12.34	0.00
121.00	12.70	12.34	0.00	147.50	12.70	12.34	0.00
121.50	12.70	12.34	0.00	148.00	12.70	12.34	0.00
122.00	12.70	12.34	0.00	148.50	12.70	12.34	0.00
122.50	12.70	12.34	0.00	149.00	12.70	12.34	0.00
123.00	12.70	12.34	0.00	149.50	12.70	12.34	0.00
123.50	12.70	12.34	0.00	150.00	12.70	12.34	0.00
124.00	12.70	12.34	0.00	150.50	12.70	12.34	0.00
124.50	12.70	12.34	0.00	151.00	12.70	12.34	0.00
125.00	12.70	12.34	0.00	151.50	12.70	12.34	0.00
125.50	12.70	12.34	0.00	152.00	12.70	12.34	0.00
126.00	12.70	12.34	0.00	152.50	12.70	12.34	0.00
126.50	12.70	12.34	0.00	153.00	12.70	12.34	0.00
127.00	12.70	12.34	0.00	153.50	12.70	12.34	0.00
127.50	12.70	12.34	0.00	154.00	12.70	12.34	0.00
128.00	12.70	12.34	0.00	154.50	12.70	12.34	0.00
128.50	12.70	12.34	0.00	155.00	12.70	12.34	0.00
129.00	12.70	12.34	0.00	155.50	12.70	12.34	0.00
129.50	12.70	12.34	0.00	156.00	12.70	12.34	0.00
130.00	12.70	12.34	0.00	156.50	12.70	12.34	0.00
130.50	12.70	12.34	0.00	157.00	12.70	12.34	0.00
131.00	12.70	12.34	0.00	157.50	12.70	12.34	0.00
131.50	12.70	12.34	0.00	158.00	12.70	12.34	0.00
132.00	12.70	12.34	0.00	158.50	12.70	12.34	0.00

**Hydrograph for Subcatchment 1S: Sub-basin 1 Fly Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
159.00	12.70	12.34	0.00	185.50	12.70	12.34	0.00
159.50	12.70	12.34	0.00	186.00	12.70	12.34	0.00
160.00	12.70	12.34	0.00	186.50	12.70	12.34	0.00
160.50	12.70	12.34	0.00	187.00	12.70	12.34	0.00
161.00	12.70	12.34	0.00	187.50	12.70	12.34	0.00
161.50	12.70	12.34	0.00	188.00	12.70	12.34	0.00
162.00	12.70	12.34	0.00	188.50	12.70	12.34	0.00
162.50	12.70	12.34	0.00	189.00	12.70	12.34	0.00
163.00	12.70	12.34	0.00	189.50	12.70	12.34	0.00
163.50	12.70	12.34	0.00	190.00	12.70	12.34	0.00
164.00	12.70	12.34	0.00	190.50	12.70	12.34	0.00
164.50	12.70	12.34	0.00	191.00	12.70	12.34	0.00
165.00	12.70	12.34	0.00	191.50	12.70	12.34	0.00
165.50	12.70	12.34	0.00	192.00	12.70	12.34	0.00
166.00	12.70	12.34	0.00	192.50	12.70	12.34	0.00
166.50	12.70	12.34	0.00	193.00	12.70	12.34	0.00
167.00	12.70	12.34	0.00	193.50	12.70	12.34	0.00
167.50	12.70	12.34	0.00	194.00	12.70	12.34	0.00
168.00	12.70	12.34	0.00	194.50	12.70	12.34	0.00
168.50	12.70	12.34	0.00	195.00	12.70	12.34	0.00
169.00	12.70	12.34	0.00	195.50	12.70	12.34	0.00
169.50	12.70	12.34	0.00	196.00	12.70	12.34	0.00
170.00	12.70	12.34	0.00	196.50	12.70	12.34	0.00
170.50	12.70	12.34	0.00	197.00	12.70	12.34	0.00
171.00	12.70	12.34	0.00	197.50	12.70	12.34	0.00
171.50	12.70	12.34	0.00	198.00	12.70	12.34	0.00
172.00	12.70	12.34	0.00	198.50	12.70	12.34	0.00
172.50	12.70	12.34	0.00	199.00	12.70	12.34	0.00
173.00	12.70	12.34	0.00	199.50	12.70	12.34	0.00
173.50	12.70	12.34	0.00	200.00	12.70	12.34	0.00
174.00	12.70	12.34	0.00	200.50	12.70	12.34	0.00
174.50	12.70	12.34	0.00	201.00	12.70	12.34	0.00
175.00	12.70	12.34	0.00	201.50	12.70	12.34	0.00
175.50	12.70	12.34	0.00	202.00	12.70	12.34	0.00
176.00	12.70	12.34	0.00	202.50	12.70	12.34	0.00
176.50	12.70	12.34	0.00	203.00	12.70	12.34	0.00
177.00	12.70	12.34	0.00	203.50	12.70	12.34	0.00
177.50	12.70	12.34	0.00	204.00	12.70	12.34	0.00
178.00	12.70	12.34	0.00	204.50	12.70	12.34	0.00
178.50	12.70	12.34	0.00	205.00	12.70	12.34	0.00
179.00	12.70	12.34	0.00	205.50	12.70	12.34	0.00
179.50	12.70	12.34	0.00	206.00	12.70	12.34	0.00
180.00	12.70	12.34	0.00	206.50	12.70	12.34	0.00
180.50	12.70	12.34	0.00	207.00	12.70	12.34	0.00
181.00	12.70	12.34	0.00	207.50	12.70	12.34	0.00
181.50	12.70	12.34	0.00	208.00	12.70	12.34	0.00
182.00	12.70	12.34	0.00	208.50	12.70	12.34	0.00
182.50	12.70	12.34	0.00	209.00	12.70	12.34	0.00
183.00	12.70	12.34	0.00	209.50	12.70	12.34	0.00
183.50	12.70	12.34	0.00	210.00	12.70	12.34	0.00
184.00	12.70	12.34	0.00	210.50	12.70	12.34	0.00
184.50	12.70	12.34	0.00	211.00	12.70	12.34	0.00
185.00	12.70	12.34	0.00	211.50	12.70	12.34	0.00

**Hydrograph for Subcatchment 1S: Sub-basin 1 Fly Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
212.00	12.70	12.34	0.00	238.50	12.70	12.34	0.00
212.50	12.70	12.34	0.00	239.00	12.70	12.34	0.00
213.00	12.70	12.34	0.00	239.50	12.70	12.34	0.00
213.50	12.70	12.34	0.00	240.00	12.70	12.34	0.00
214.00	12.70	12.34	0.00	240.50	12.70	12.34	0.00
214.50	12.70	12.34	0.00	241.00	12.70	12.34	0.00
215.00	12.70	12.34	0.00	241.50	12.70	12.34	0.00
215.50	12.70	12.34	0.00	242.00	12.70	12.34	0.00
216.00	12.70	12.34	0.00	242.50	12.70	12.34	0.00
216.50	12.70	12.34	0.00	243.00	12.70	12.34	0.00
217.00	12.70	12.34	0.00	243.50	12.70	12.34	0.00
217.50	12.70	12.34	0.00	244.00	12.70	12.34	0.00
218.00	12.70	12.34	0.00	244.50	12.70	12.34	0.00
218.50	12.70	12.34	0.00	245.00	12.70	12.34	0.00
219.00	12.70	12.34	0.00	245.50	12.70	12.34	0.00
219.50	12.70	12.34	0.00	246.00	12.70	12.34	0.00
220.00	12.70	12.34	0.00	246.50	12.70	12.34	0.00
220.50	12.70	12.34	0.00	247.00	12.70	12.34	0.00
221.00	12.70	12.34	0.00	247.50	12.70	12.34	0.00
221.50	12.70	12.34	0.00	248.00	12.70	12.34	0.00
222.00	12.70	12.34	0.00	248.50	12.70	12.34	0.00
222.50	12.70	12.34	0.00	249.00	12.70	12.34	0.00
223.00	12.70	12.34	0.00	249.50	12.70	12.34	0.00
223.50	12.70	12.34	0.00	250.00	12.70	12.34	0.00
224.00	12.70	12.34	0.00				
224.50	12.70	12.34	0.00				
225.00	12.70	12.34	0.00				
225.50	12.70	12.34	0.00				
226.00	12.70	12.34	0.00				
226.50	12.70	12.34	0.00				
227.00	12.70	12.34	0.00				
227.50	12.70	12.34	0.00				
228.00	12.70	12.34	0.00				
228.50	12.70	12.34	0.00				
229.00	12.70	12.34	0.00				
229.50	12.70	12.34	0.00				
230.00	12.70	12.34	0.00				
230.50	12.70	12.34	0.00				
231.00	12.70	12.34	0.00				
231.50	12.70	12.34	0.00				
232.00	12.70	12.34	0.00				
232.50	12.70	12.34	0.00				
233.00	12.70	12.34	0.00				
233.50	12.70	12.34	0.00				
234.00	12.70	12.34	0.00				
234.50	12.70	12.34	0.00				
235.00	12.70	12.34	0.00				
235.50	12.70	12.34	0.00				
236.00	12.70	12.34	0.00				
236.50	12.70	12.34	0.00				
237.00	12.70	12.34	0.00				
237.50	12.70	12.34	0.00				
238.00	12.70	12.34	0.00				

**Summary for Subcatchment 2S: Sub basin 2 Bottom Ash Basin**

Runoff = 458.03 cfs @ 12.35 hrs, Volume= 60.813 af, Depth=11.71"

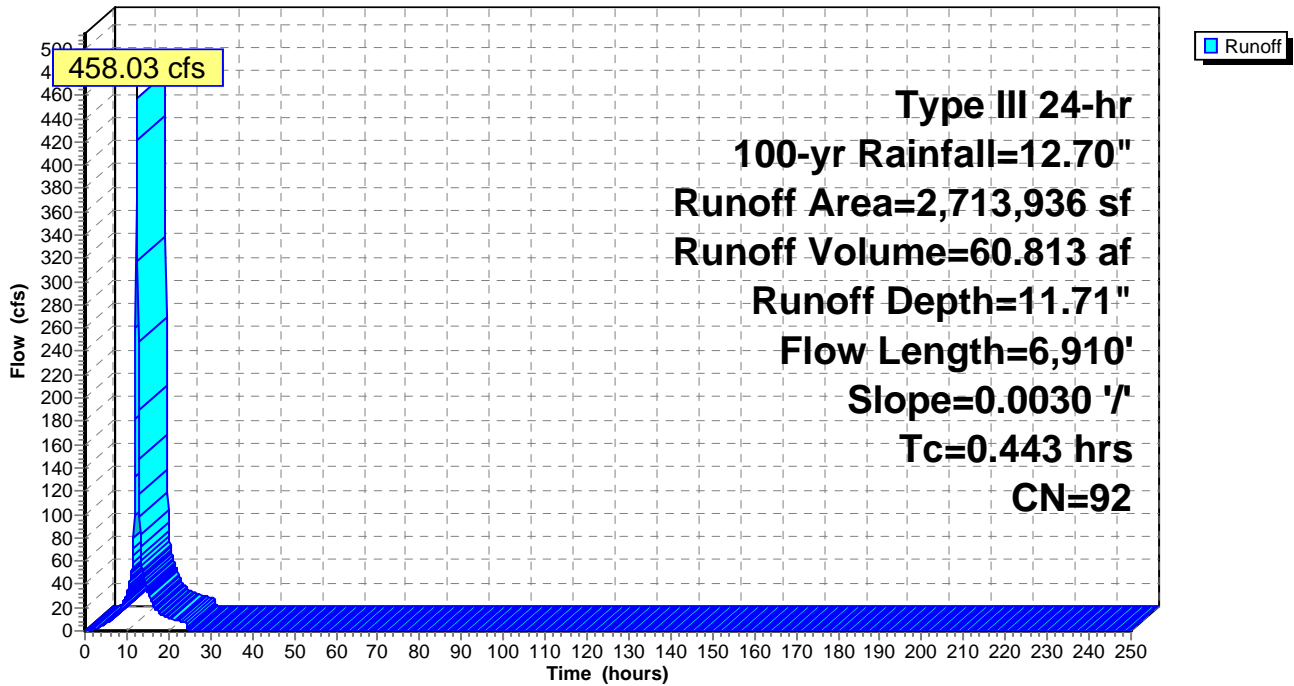
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs  
Type III 24-hr 100-yr Rainfall=12.70"

Area (sf)	CN	Description
81,418	98	Water Surface, HSG D
1,628,362	94	Newly graded area, HSG D
1,004,156	89	<50% Grass cover, Poor, HSG D
2,713,936	92	Weighted Average

Tc (hours)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.081	300	0.0030	1.03		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 5.23"
0.288	5,540		5.35		<b>Direct Entry, Open Channel Flow 1</b>
0.071	937		3.68		<b>Direct Entry, Open Channel Flow 2</b>
0.003	133		12.68		<b>Direct Entry, Open Channel Flow 3</b>
0.443	6,910	Total			

**Subcatchment 2S: Sub basin 2 Bottom Ash Basin**

Hydrograph



**Hydrograph for Subcatchment 2S: Sub basin 2 Bottom Ash Basin**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.50	12.70	11.71	0.00
0.50	0.06	0.00	0.00	27.00	12.70	11.71	0.00
1.00	0.13	0.00	0.00	27.50	12.70	11.71	0.00
1.50	0.19	0.00	0.00	28.00	12.70	11.71	0.00
2.00	0.25	0.01	0.52	28.50	12.70	11.71	0.00
2.50	0.32	0.02	1.47	29.00	12.70	11.71	0.00
3.00	0.39	0.04	2.47	29.50	12.70	11.71	0.00
3.50	0.47	0.07	3.47	30.00	12.70	11.71	0.00
4.00	0.55	0.11	4.47	30.50	12.70	11.71	0.00
4.50	0.63	0.16	5.46	31.00	12.70	11.71	0.00
5.00	0.72	0.21	6.43	31.50	12.70	11.71	0.00
5.50	0.82	0.27	7.37	32.00	12.70	11.71	0.00
6.00	0.91	0.34	8.30	32.50	12.70	11.71	0.00
6.50	1.02	0.42	9.48	33.00	12.70	11.71	0.00
7.00	1.15	0.52	11.36	33.50	12.70	11.71	0.00
7.50	1.29	0.63	13.41	34.00	12.70	11.71	0.00
8.00	1.45	0.76	15.54	34.50	12.70	11.71	0.00
8.50	1.63	0.91	18.32	35.00	12.70	11.71	0.00
9.00	1.85	1.10	22.63	35.50	12.70	11.71	0.00
9.50	2.11	1.33	27.28	36.00	12.70	11.71	0.00
10.00	2.40	1.60	32.05	36.50	12.70	11.71	0.00
10.50	2.75	1.93	38.13	37.00	12.70	11.71	0.00
11.00	3.18	2.33	47.33	37.50	12.70	11.71	0.00
11.50	3.78	2.91	64.05	38.00	12.70	11.71	0.00
12.00	6.35	5.41	<b>182.49</b>	38.50	12.70	11.71	0.00
12.50	8.92	7.95	<b>392.33</b>	39.00	12.70	11.71	0.00
13.00	9.52	8.56	117.58	39.50	12.70	11.71	0.00
13.50	9.95	8.98	60.02	40.00	12.70	11.71	0.00
14.00	10.30	9.32	46.77	40.50	12.70	11.71	0.00
14.50	10.59	9.62	38.48	41.00	12.70	11.71	0.00
15.00	10.85	9.87	33.51	41.50	12.70	11.71	0.00
15.50	11.07	10.09	28.93	42.00	12.70	11.71	0.00
16.00	11.25	10.27	24.38	42.50	12.70	11.71	0.00
16.50	11.41	10.43	20.51	43.00	12.70	11.71	0.00
17.00	11.55	10.57	18.31	43.50	12.70	11.71	0.00
17.50	11.68	10.69	16.32	44.00	12.70	11.71	0.00
18.00	11.79	10.80	14.33	44.50	12.70	11.71	0.00
18.50	11.88	10.90	12.72	45.00	12.70	11.71	0.00
19.00	11.98	11.00	12.01	45.50	12.70	11.71	0.00
19.50	12.07	11.08	11.41	46.00	12.70	11.71	0.00
20.00	12.15	11.17	10.81	46.50	12.70	11.71	0.00
20.50	12.23	11.25	10.26	47.00	12.70	11.71	0.00
21.00	12.31	11.33	9.80	47.50	12.70	11.71	0.00
21.50	12.39	11.40	9.35	48.00	12.70	11.71	0.00
22.00	12.46	11.47	8.91	48.50	12.70	11.71	0.00
22.50	12.52	11.54	8.46	49.00	12.70	11.71	0.00
23.00	12.58	11.60	8.01	49.50	12.70	11.71	0.00
23.50	12.64	11.66	7.57	50.00	12.70	11.71	0.00
24.00	<b>12.70</b>	<b>11.71</b>	7.12	50.50	12.70	11.71	0.00
24.50	12.70	11.71	1.78	51.00	12.70	11.71	0.00
25.00	12.70	11.71	0.10	51.50	12.70	11.71	0.00
25.50	12.70	11.71	0.00	52.00	12.70	11.71	0.00
26.00	12.70	11.71	0.00	52.50	12.70	11.71	0.00

**Hydrograph for Subcatchment 2S: Sub basin 2 Bottom Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
53.00	12.70	11.71	0.00	79.50	12.70	11.71	0.00
53.50	12.70	11.71	0.00	80.00	12.70	11.71	0.00
54.00	12.70	11.71	0.00	80.50	12.70	11.71	0.00
54.50	12.70	11.71	0.00	81.00	12.70	11.71	0.00
55.00	12.70	11.71	0.00	81.50	12.70	11.71	0.00
55.50	12.70	11.71	0.00	82.00	12.70	11.71	0.00
56.00	12.70	11.71	0.00	82.50	12.70	11.71	0.00
56.50	12.70	11.71	0.00	83.00	12.70	11.71	0.00
57.00	12.70	11.71	0.00	83.50	12.70	11.71	0.00
57.50	12.70	11.71	0.00	84.00	12.70	11.71	0.00
58.00	12.70	11.71	0.00	84.50	12.70	11.71	0.00
58.50	12.70	11.71	0.00	85.00	12.70	11.71	0.00
59.00	12.70	11.71	0.00	85.50	12.70	11.71	0.00
59.50	12.70	11.71	0.00	86.00	12.70	11.71	0.00
60.00	12.70	11.71	0.00	86.50	12.70	11.71	0.00
60.50	12.70	11.71	0.00	87.00	12.70	11.71	0.00
61.00	12.70	11.71	0.00	87.50	12.70	11.71	0.00
61.50	12.70	11.71	0.00	88.00	12.70	11.71	0.00
62.00	12.70	11.71	0.00	88.50	12.70	11.71	0.00
62.50	12.70	11.71	0.00	89.00	12.70	11.71	0.00
63.00	12.70	11.71	0.00	89.50	12.70	11.71	0.00
63.50	12.70	11.71	0.00	90.00	12.70	11.71	0.00
64.00	12.70	11.71	0.00	90.50	12.70	11.71	0.00
64.50	12.70	11.71	0.00	91.00	12.70	11.71	0.00
65.00	12.70	11.71	0.00	91.50	12.70	11.71	0.00
65.50	12.70	11.71	0.00	92.00	12.70	11.71	0.00
66.00	12.70	11.71	0.00	92.50	12.70	11.71	0.00
66.50	12.70	11.71	0.00	93.00	12.70	11.71	0.00
67.00	12.70	11.71	0.00	93.50	12.70	11.71	0.00
67.50	12.70	11.71	0.00	94.00	12.70	11.71	0.00
68.00	12.70	11.71	0.00	94.50	12.70	11.71	0.00
68.50	12.70	11.71	0.00	95.00	12.70	11.71	0.00
69.00	12.70	11.71	0.00	95.50	12.70	11.71	0.00
69.50	12.70	11.71	0.00	96.00	12.70	11.71	0.00
70.00	12.70	11.71	0.00	96.50	12.70	11.71	0.00
70.50	12.70	11.71	0.00	97.00	12.70	11.71	0.00
71.00	12.70	11.71	0.00	97.50	12.70	11.71	0.00
71.50	12.70	11.71	0.00	98.00	12.70	11.71	0.00
72.00	12.70	11.71	0.00	98.50	12.70	11.71	0.00
72.50	12.70	11.71	0.00	99.00	12.70	11.71	0.00
73.00	12.70	11.71	0.00	99.50	12.70	11.71	0.00
73.50	12.70	11.71	0.00	100.00	12.70	11.71	0.00
74.00	12.70	11.71	0.00	100.50	12.70	11.71	0.00
74.50	12.70	11.71	0.00	101.00	12.70	11.71	0.00
75.00	12.70	11.71	0.00	101.50	12.70	11.71	0.00
75.50	12.70	11.71	0.00	102.00	12.70	11.71	0.00
76.00	12.70	11.71	0.00	102.50	12.70	11.71	0.00
76.50	12.70	11.71	0.00	103.00	12.70	11.71	0.00
77.00	12.70	11.71	0.00	103.50	12.70	11.71	0.00
77.50	12.70	11.71	0.00	104.00	12.70	11.71	0.00
78.00	12.70	11.71	0.00	104.50	12.70	11.71	0.00
78.50	12.70	11.71	0.00	105.00	12.70	11.71	0.00
79.00	12.70	11.71	0.00	105.50	12.70	11.71	0.00

**Hydrograph for Subcatchment 2S: Sub basin 2 Bottom Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
106.00	12.70	11.71	0.00	132.50	12.70	11.71	0.00
106.50	12.70	11.71	0.00	133.00	12.70	11.71	0.00
107.00	12.70	11.71	0.00	133.50	12.70	11.71	0.00
107.50	12.70	11.71	0.00	134.00	12.70	11.71	0.00
108.00	12.70	11.71	0.00	134.50	12.70	11.71	0.00
108.50	12.70	11.71	0.00	135.00	12.70	11.71	0.00
109.00	12.70	11.71	0.00	135.50	12.70	11.71	0.00
109.50	12.70	11.71	0.00	136.00	12.70	11.71	0.00
110.00	12.70	11.71	0.00	136.50	12.70	11.71	0.00
110.50	12.70	11.71	0.00	137.00	12.70	11.71	0.00
111.00	12.70	11.71	0.00	137.50	12.70	11.71	0.00
111.50	12.70	11.71	0.00	138.00	12.70	11.71	0.00
112.00	12.70	11.71	0.00	138.50	12.70	11.71	0.00
112.50	12.70	11.71	0.00	139.00	12.70	11.71	0.00
113.00	12.70	11.71	0.00	139.50	12.70	11.71	0.00
113.50	12.70	11.71	0.00	140.00	12.70	11.71	0.00
114.00	12.70	11.71	0.00	140.50	12.70	11.71	0.00
114.50	12.70	11.71	0.00	141.00	12.70	11.71	0.00
115.00	12.70	11.71	0.00	141.50	12.70	11.71	0.00
115.50	12.70	11.71	0.00	142.00	12.70	11.71	0.00
116.00	12.70	11.71	0.00	142.50	12.70	11.71	0.00
116.50	12.70	11.71	0.00	143.00	12.70	11.71	0.00
117.00	12.70	11.71	0.00	143.50	12.70	11.71	0.00
117.50	12.70	11.71	0.00	144.00	12.70	11.71	0.00
118.00	12.70	11.71	0.00	144.50	12.70	11.71	0.00
118.50	12.70	11.71	0.00	145.00	12.70	11.71	0.00
119.00	12.70	11.71	0.00	145.50	12.70	11.71	0.00
119.50	12.70	11.71	0.00	146.00	12.70	11.71	0.00
120.00	12.70	11.71	0.00	146.50	12.70	11.71	0.00
120.50	12.70	11.71	0.00	147.00	12.70	11.71	0.00
121.00	12.70	11.71	0.00	147.50	12.70	11.71	0.00
121.50	12.70	11.71	0.00	148.00	12.70	11.71	0.00
122.00	12.70	11.71	0.00	148.50	12.70	11.71	0.00
122.50	12.70	11.71	0.00	149.00	12.70	11.71	0.00
123.00	12.70	11.71	0.00	149.50	12.70	11.71	0.00
123.50	12.70	11.71	0.00	150.00	12.70	11.71	0.00
124.00	12.70	11.71	0.00	150.50	12.70	11.71	0.00
124.50	12.70	11.71	0.00	151.00	12.70	11.71	0.00
125.00	12.70	11.71	0.00	151.50	12.70	11.71	0.00
125.50	12.70	11.71	0.00	152.00	12.70	11.71	0.00
126.00	12.70	11.71	0.00	152.50	12.70	11.71	0.00
126.50	12.70	11.71	0.00	153.00	12.70	11.71	0.00
127.00	12.70	11.71	0.00	153.50	12.70	11.71	0.00
127.50	12.70	11.71	0.00	154.00	12.70	11.71	0.00
128.00	12.70	11.71	0.00	154.50	12.70	11.71	0.00
128.50	12.70	11.71	0.00	155.00	12.70	11.71	0.00
129.00	12.70	11.71	0.00	155.50	12.70	11.71	0.00
129.50	12.70	11.71	0.00	156.00	12.70	11.71	0.00
130.00	12.70	11.71	0.00	156.50	12.70	11.71	0.00
130.50	12.70	11.71	0.00	157.00	12.70	11.71	0.00
131.00	12.70	11.71	0.00	157.50	12.70	11.71	0.00
131.50	12.70	11.71	0.00	158.00	12.70	11.71	0.00
132.00	12.70	11.71	0.00	158.50	12.70	11.71	0.00

**Hydrograph for Subcatchment 2S: Sub basin 2 Bottom Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
159.00	12.70	11.71	0.00	185.50	12.70	11.71	0.00
159.50	12.70	11.71	0.00	186.00	12.70	11.71	0.00
160.00	12.70	11.71	0.00	186.50	12.70	11.71	0.00
160.50	12.70	11.71	0.00	187.00	12.70	11.71	0.00
161.00	12.70	11.71	0.00	187.50	12.70	11.71	0.00
161.50	12.70	11.71	0.00	188.00	12.70	11.71	0.00
162.00	12.70	11.71	0.00	188.50	12.70	11.71	0.00
162.50	12.70	11.71	0.00	189.00	12.70	11.71	0.00
163.00	12.70	11.71	0.00	189.50	12.70	11.71	0.00
163.50	12.70	11.71	0.00	190.00	12.70	11.71	0.00
164.00	12.70	11.71	0.00	190.50	12.70	11.71	0.00
164.50	12.70	11.71	0.00	191.00	12.70	11.71	0.00
165.00	12.70	11.71	0.00	191.50	12.70	11.71	0.00
165.50	12.70	11.71	0.00	192.00	12.70	11.71	0.00
166.00	12.70	11.71	0.00	192.50	12.70	11.71	0.00
166.50	12.70	11.71	0.00	193.00	12.70	11.71	0.00
167.00	12.70	11.71	0.00	193.50	12.70	11.71	0.00
167.50	12.70	11.71	0.00	194.00	12.70	11.71	0.00
168.00	12.70	11.71	0.00	194.50	12.70	11.71	0.00
168.50	12.70	11.71	0.00	195.00	12.70	11.71	0.00
169.00	12.70	11.71	0.00	195.50	12.70	11.71	0.00
169.50	12.70	11.71	0.00	196.00	12.70	11.71	0.00
170.00	12.70	11.71	0.00	196.50	12.70	11.71	0.00
170.50	12.70	11.71	0.00	197.00	12.70	11.71	0.00
171.00	12.70	11.71	0.00	197.50	12.70	11.71	0.00
171.50	12.70	11.71	0.00	198.00	12.70	11.71	0.00
172.00	12.70	11.71	0.00	198.50	12.70	11.71	0.00
172.50	12.70	11.71	0.00	199.00	12.70	11.71	0.00
173.00	12.70	11.71	0.00	199.50	12.70	11.71	0.00
173.50	12.70	11.71	0.00	200.00	12.70	11.71	0.00
174.00	12.70	11.71	0.00	200.50	12.70	11.71	0.00
174.50	12.70	11.71	0.00	201.00	12.70	11.71	0.00
175.00	12.70	11.71	0.00	201.50	12.70	11.71	0.00
175.50	12.70	11.71	0.00	202.00	12.70	11.71	0.00
176.00	12.70	11.71	0.00	202.50	12.70	11.71	0.00
176.50	12.70	11.71	0.00	203.00	12.70	11.71	0.00
177.00	12.70	11.71	0.00	203.50	12.70	11.71	0.00
177.50	12.70	11.71	0.00	204.00	12.70	11.71	0.00
178.00	12.70	11.71	0.00	204.50	12.70	11.71	0.00
178.50	12.70	11.71	0.00	205.00	12.70	11.71	0.00
179.00	12.70	11.71	0.00	205.50	12.70	11.71	0.00
179.50	12.70	11.71	0.00	206.00	12.70	11.71	0.00
180.00	12.70	11.71	0.00	206.50	12.70	11.71	0.00
180.50	12.70	11.71	0.00	207.00	12.70	11.71	0.00
181.00	12.70	11.71	0.00	207.50	12.70	11.71	0.00
181.50	12.70	11.71	0.00	208.00	12.70	11.71	0.00
182.00	12.70	11.71	0.00	208.50	12.70	11.71	0.00
182.50	12.70	11.71	0.00	209.00	12.70	11.71	0.00
183.00	12.70	11.71	0.00	209.50	12.70	11.71	0.00
183.50	12.70	11.71	0.00	210.00	12.70	11.71	0.00
184.00	12.70	11.71	0.00	210.50	12.70	11.71	0.00
184.50	12.70	11.71	0.00	211.00	12.70	11.71	0.00
185.00	12.70	11.71	0.00	211.50	12.70	11.71	0.00



**Hydrograph for Subcatchment 2S: Sub basin 2 Bottom Ash Basin (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
212.00	12.70	11.71	0.00	238.50	12.70	11.71	0.00
212.50	12.70	11.71	0.00	239.00	12.70	11.71	0.00
213.00	12.70	11.71	0.00	239.50	12.70	11.71	0.00
213.50	12.70	11.71	0.00	240.00	12.70	11.71	0.00
214.00	12.70	11.71	0.00	240.50	12.70	11.71	0.00
214.50	12.70	11.71	0.00	241.00	12.70	11.71	0.00
215.00	12.70	11.71	0.00	241.50	12.70	11.71	0.00
215.50	12.70	11.71	0.00	242.00	12.70	11.71	0.00
216.00	12.70	11.71	0.00	242.50	12.70	11.71	0.00
216.50	12.70	11.71	0.00	243.00	12.70	11.71	0.00
217.00	12.70	11.71	0.00	243.50	12.70	11.71	0.00
217.50	12.70	11.71	0.00	244.00	12.70	11.71	0.00
218.00	12.70	11.71	0.00	244.50	12.70	11.71	0.00
218.50	12.70	11.71	0.00	245.00	12.70	11.71	0.00
219.00	12.70	11.71	0.00	245.50	12.70	11.71	0.00
219.50	12.70	11.71	0.00	246.00	12.70	11.71	0.00
220.00	12.70	11.71	0.00	246.50	12.70	11.71	0.00
220.50	12.70	11.71	0.00	247.00	12.70	11.71	0.00
221.00	12.70	11.71	0.00	247.50	12.70	11.71	0.00
221.50	12.70	11.71	0.00	248.00	12.70	11.71	0.00
222.00	12.70	11.71	0.00	248.50	12.70	11.71	0.00
222.50	12.70	11.71	0.00	249.00	12.70	11.71	0.00
223.00	12.70	11.71	0.00	249.50	12.70	11.71	0.00
223.50	12.70	11.71	0.00	250.00	12.70	11.71	0.00
224.00	12.70	11.71	0.00				
224.50	12.70	11.71	0.00				
225.00	12.70	11.71	0.00				
225.50	12.70	11.71	0.00				
226.00	12.70	11.71	0.00				
226.50	12.70	11.71	0.00				
227.00	12.70	11.71	0.00				
227.50	12.70	11.71	0.00				
228.00	12.70	11.71	0.00				
228.50	12.70	11.71	0.00				
229.00	12.70	11.71	0.00				
229.50	12.70	11.71	0.00				
230.00	12.70	11.71	0.00				
230.50	12.70	11.71	0.00				
231.00	12.70	11.71	0.00				
231.50	12.70	11.71	0.00				
232.00	12.70	11.71	0.00				
232.50	12.70	11.71	0.00				
233.00	12.70	11.71	0.00				
233.50	12.70	11.71	0.00				
234.00	12.70	11.71	0.00				
234.50	12.70	11.71	0.00				
235.00	12.70	11.71	0.00				
235.50	12.70	11.71	0.00				
236.00	12.70	11.71	0.00				
236.50	12.70	11.71	0.00				
237.00	12.70	11.71	0.00				
237.50	12.70	11.71	0.00				
238.00	12.70	11.71	0.00				

**Summary for Subcatchment 3S: Sub basin 3 Surge Pond**

Runoff = 197.81 cfs @ 12.13 hrs, Volume= 19.510 af, Depth=12.46"

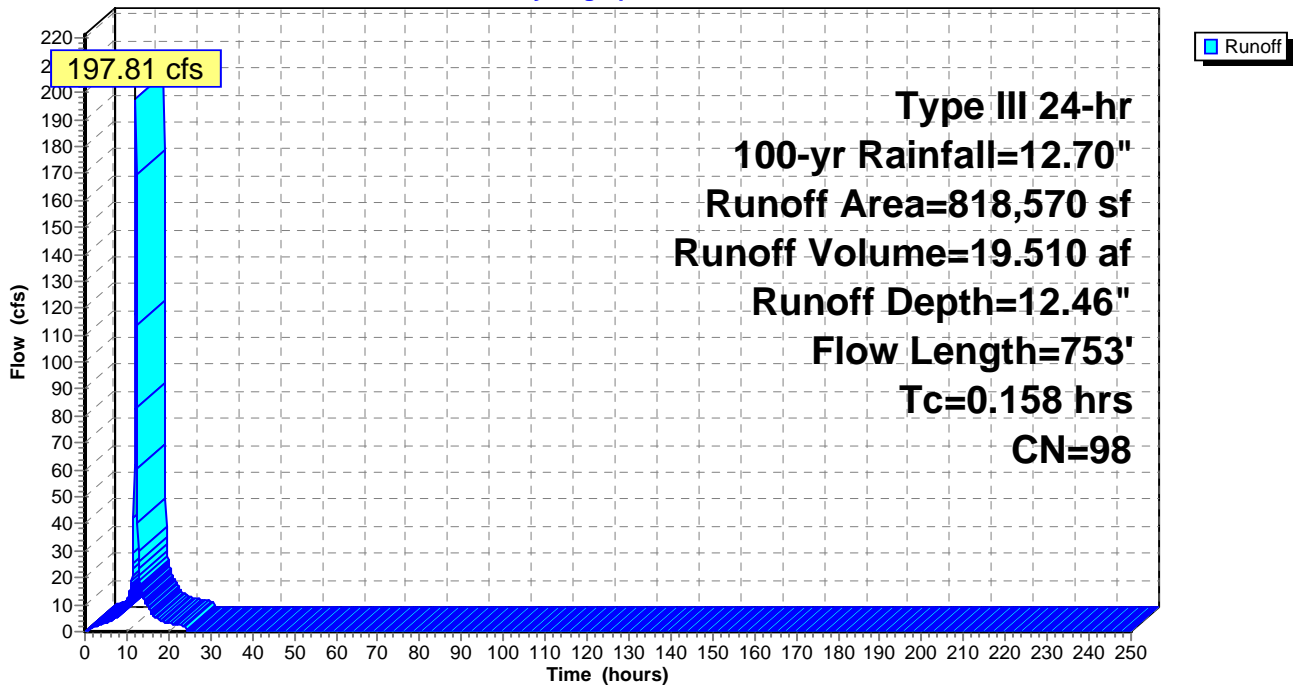
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs  
 Type III 24-hr 100-yr Rainfall=12.70"

Area (sf)	CN	Description
818,570	98	Water Surface, 0% imp, HSG D

Tc (hours)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.026	753		8.02		Lake or Reservoir, Water body Mean Depth= 2.00'
0.026	753	Total, Increased to minimum Tc = 0.158 hrs			

**Subcatchment 3S: Sub basin 3 Surge Pond**

Hydrograph



**Hydrograph for Subcatchment 3S: Sub basin 3 Surge Pond**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.50	12.70	12.46	0.00
0.50	0.06	0.00	0.14	27.00	12.70	12.46	0.00
1.00	0.13	0.03	1.04	27.50	12.70	12.46	0.00
1.50	0.19	0.06	1.51	28.00	12.70	12.46	0.00
2.00	0.25	0.11	1.77	28.50	12.70	12.46	0.00
2.50	0.32	0.16	2.04	29.00	12.70	12.46	0.00
3.00	0.39	0.22	2.32	29.50	12.70	12.46	0.00
3.50	0.47	0.29	2.57	30.00	12.70	12.46	0.00
4.00	0.55	0.36	2.80	30.50	12.70	12.46	0.00
4.50	0.63	0.44	3.03	31.00	12.70	12.46	0.00
5.00	0.72	0.52	3.24	31.50	12.70	12.46	0.00
5.50	0.82	0.61	3.45	32.00	12.70	12.46	0.00
6.00	0.91	0.71	3.65	32.50	12.70	12.46	0.00
6.50	1.02	0.81	4.14	33.00	12.70	12.46	0.00
7.00	1.15	0.94	4.75	33.50	12.70	12.46	0.00
7.50	1.29	1.07	5.36	34.00	12.70	12.46	0.00
8.00	1.45	1.23	5.98	34.50	12.70	12.46	0.00
8.50	1.63	1.41	7.14	35.00	12.70	12.46	0.00
9.00	1.85	1.63	8.52	35.50	12.70	12.46	0.00
9.50	2.11	1.88	9.92	36.00	12.70	12.46	0.00
10.00	2.40	2.17	11.31	36.50	12.70	12.46	0.00
10.50	2.75	2.52	13.76	37.00	12.70	12.46	0.00
11.00	3.18	2.94	16.65	37.50	12.70	12.46	0.00
11.50	3.78	3.55	25.32	38.00	12.70	12.46	0.00
12.00	6.35	6.11	<b>117.86</b>	38.50	12.70	12.46	0.00
12.50	8.92	8.68	<b>60.14</b>	39.00	12.70	12.46	0.00
13.00	9.52	9.28	20.80	39.50	12.70	12.46	0.00
13.50	9.95	9.71	15.52	40.00	12.70	12.46	0.00
14.00	10.30	10.06	12.63	40.50	12.70	12.46	0.00
14.50	10.59	10.35	10.81	41.00	12.70	12.46	0.00
15.00	10.85	10.61	9.43	41.50	12.70	12.46	0.00
15.50	11.07	10.83	8.04	42.00	12.70	12.46	0.00
16.00	11.25	11.01	6.66	42.50	12.70	12.46	0.00
16.50	11.41	11.17	5.83	43.00	12.70	12.46	0.00
17.00	11.55	11.31	5.23	43.50	12.70	12.46	0.00
17.50	11.68	11.43	4.63	44.00	12.70	12.46	0.00
18.00	11.79	11.54	4.03	44.50	12.70	12.46	0.00
18.50	11.88	11.64	3.72	45.00	12.70	12.46	0.00
19.00	11.98	11.74	3.54	45.50	12.70	12.46	0.00
19.50	12.07	11.83	3.36	46.00	12.70	12.46	0.00
20.00	12.15	11.91	3.18	46.50	12.70	12.46	0.00
20.50	12.23	11.99	3.03	47.00	12.70	12.46	0.00
21.00	12.31	12.07	2.90	47.50	12.70	12.46	0.00
21.50	12.39	12.14	2.76	48.00	12.70	12.46	0.00
22.00	12.46	12.21	2.63	48.50	12.70	12.46	0.00
22.50	12.52	12.28	2.49	49.00	12.70	12.46	0.00
23.00	12.58	12.34	2.36	49.50	12.70	12.46	0.00
23.50	12.64	12.40	2.22	50.00	12.70	12.46	0.00
24.00	<b>12.70</b>	<b>12.46</b>	2.08	50.50	12.70	12.46	0.00
24.50	12.70	12.46	0.00	51.00	12.70	12.46	0.00
25.00	12.70	12.46	0.00	51.50	12.70	12.46	0.00
25.50	12.70	12.46	0.00	52.00	12.70	12.46	0.00
26.00	12.70	12.46	0.00	52.50	12.70	12.46	0.00

**Hydrograph for Subcatchment 3S: Sub basin 3 Surge Pond (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
53.00	12.70	12.46	0.00	79.50	12.70	12.46	0.00
53.50	12.70	12.46	0.00	80.00	12.70	12.46	0.00
54.00	12.70	12.46	0.00	80.50	12.70	12.46	0.00
54.50	12.70	12.46	0.00	81.00	12.70	12.46	0.00
55.00	12.70	12.46	0.00	81.50	12.70	12.46	0.00
55.50	12.70	12.46	0.00	82.00	12.70	12.46	0.00
56.00	12.70	12.46	0.00	82.50	12.70	12.46	0.00
56.50	12.70	12.46	0.00	83.00	12.70	12.46	0.00
57.00	12.70	12.46	0.00	83.50	12.70	12.46	0.00
57.50	12.70	12.46	0.00	84.00	12.70	12.46	0.00
58.00	12.70	12.46	0.00	84.50	12.70	12.46	0.00
58.50	12.70	12.46	0.00	85.00	12.70	12.46	0.00
59.00	12.70	12.46	0.00	85.50	12.70	12.46	0.00
59.50	12.70	12.46	0.00	86.00	12.70	12.46	0.00
60.00	12.70	12.46	0.00	86.50	12.70	12.46	0.00
60.50	12.70	12.46	0.00	87.00	12.70	12.46	0.00
61.00	12.70	12.46	0.00	87.50	12.70	12.46	0.00
61.50	12.70	12.46	0.00	88.00	12.70	12.46	0.00
62.00	12.70	12.46	0.00	88.50	12.70	12.46	0.00
62.50	12.70	12.46	0.00	89.00	12.70	12.46	0.00
63.00	12.70	12.46	0.00	89.50	12.70	12.46	0.00
63.50	12.70	12.46	0.00	90.00	12.70	12.46	0.00
64.00	12.70	12.46	0.00	90.50	12.70	12.46	0.00
64.50	12.70	12.46	0.00	91.00	12.70	12.46	0.00
65.00	12.70	12.46	0.00	91.50	12.70	12.46	0.00
65.50	12.70	12.46	0.00	92.00	12.70	12.46	0.00
66.00	12.70	12.46	0.00	92.50	12.70	12.46	0.00
66.50	12.70	12.46	0.00	93.00	12.70	12.46	0.00
67.00	12.70	12.46	0.00	93.50	12.70	12.46	0.00
67.50	12.70	12.46	0.00	94.00	12.70	12.46	0.00
68.00	12.70	12.46	0.00	94.50	12.70	12.46	0.00
68.50	12.70	12.46	0.00	95.00	12.70	12.46	0.00
69.00	12.70	12.46	0.00	95.50	12.70	12.46	0.00
69.50	12.70	12.46	0.00	96.00	12.70	12.46	0.00
70.00	12.70	12.46	0.00	96.50	12.70	12.46	0.00
70.50	12.70	12.46	0.00	97.00	12.70	12.46	0.00
71.00	12.70	12.46	0.00	97.50	12.70	12.46	0.00
71.50	12.70	12.46	0.00	98.00	12.70	12.46	0.00
72.00	12.70	12.46	0.00	98.50	12.70	12.46	0.00
72.50	12.70	12.46	0.00	99.00	12.70	12.46	0.00
73.00	12.70	12.46	0.00	99.50	12.70	12.46	0.00
73.50	12.70	12.46	0.00	100.00	12.70	12.46	0.00
74.00	12.70	12.46	0.00	100.50	12.70	12.46	0.00
74.50	12.70	12.46	0.00	101.00	12.70	12.46	0.00
75.00	12.70	12.46	0.00	101.50	12.70	12.46	0.00
75.50	12.70	12.46	0.00	102.00	12.70	12.46	0.00
76.00	12.70	12.46	0.00	102.50	12.70	12.46	0.00
76.50	12.70	12.46	0.00	103.00	12.70	12.46	0.00
77.00	12.70	12.46	0.00	103.50	12.70	12.46	0.00
77.50	12.70	12.46	0.00	104.00	12.70	12.46	0.00
78.00	12.70	12.46	0.00	104.50	12.70	12.46	0.00
78.50	12.70	12.46	0.00	105.00	12.70	12.46	0.00
79.00	12.70	12.46	0.00	105.50	12.70	12.46	0.00

**Hydrograph for Subcatchment 3S: Sub basin 3 Surge Pond (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
106.00	12.70	12.46	0.00	132.50	12.70	12.46	0.00
106.50	12.70	12.46	0.00	133.00	12.70	12.46	0.00
107.00	12.70	12.46	0.00	133.50	12.70	12.46	0.00
107.50	12.70	12.46	0.00	134.00	12.70	12.46	0.00
108.00	12.70	12.46	0.00	134.50	12.70	12.46	0.00
108.50	12.70	12.46	0.00	135.00	12.70	12.46	0.00
109.00	12.70	12.46	0.00	135.50	12.70	12.46	0.00
109.50	12.70	12.46	0.00	136.00	12.70	12.46	0.00
110.00	12.70	12.46	0.00	136.50	12.70	12.46	0.00
110.50	12.70	12.46	0.00	137.00	12.70	12.46	0.00
111.00	12.70	12.46	0.00	137.50	12.70	12.46	0.00
111.50	12.70	12.46	0.00	138.00	12.70	12.46	0.00
112.00	12.70	12.46	0.00	138.50	12.70	12.46	0.00
112.50	12.70	12.46	0.00	139.00	12.70	12.46	0.00
113.00	12.70	12.46	0.00	139.50	12.70	12.46	0.00
113.50	12.70	12.46	0.00	140.00	12.70	12.46	0.00
114.00	12.70	12.46	0.00	140.50	12.70	12.46	0.00
114.50	12.70	12.46	0.00	141.00	12.70	12.46	0.00
115.00	12.70	12.46	0.00	141.50	12.70	12.46	0.00
115.50	12.70	12.46	0.00	142.00	12.70	12.46	0.00
116.00	12.70	12.46	0.00	142.50	12.70	12.46	0.00
116.50	12.70	12.46	0.00	143.00	12.70	12.46	0.00
117.00	12.70	12.46	0.00	143.50	12.70	12.46	0.00
117.50	12.70	12.46	0.00	144.00	12.70	12.46	0.00
118.00	12.70	12.46	0.00	144.50	12.70	12.46	0.00
118.50	12.70	12.46	0.00	145.00	12.70	12.46	0.00
119.00	12.70	12.46	0.00	145.50	12.70	12.46	0.00
119.50	12.70	12.46	0.00	146.00	12.70	12.46	0.00
120.00	12.70	12.46	0.00	146.50	12.70	12.46	0.00
120.50	12.70	12.46	0.00	147.00	12.70	12.46	0.00
121.00	12.70	12.46	0.00	147.50	12.70	12.46	0.00
121.50	12.70	12.46	0.00	148.00	12.70	12.46	0.00
122.00	12.70	12.46	0.00	148.50	12.70	12.46	0.00
122.50	12.70	12.46	0.00	149.00	12.70	12.46	0.00
123.00	12.70	12.46	0.00	149.50	12.70	12.46	0.00
123.50	12.70	12.46	0.00	150.00	12.70	12.46	0.00
124.00	12.70	12.46	0.00	150.50	12.70	12.46	0.00
124.50	12.70	12.46	0.00	151.00	12.70	12.46	0.00
125.00	12.70	12.46	0.00	151.50	12.70	12.46	0.00
125.50	12.70	12.46	0.00	152.00	12.70	12.46	0.00
126.00	12.70	12.46	0.00	152.50	12.70	12.46	0.00
126.50	12.70	12.46	0.00	153.00	12.70	12.46	0.00
127.00	12.70	12.46	0.00	153.50	12.70	12.46	0.00
127.50	12.70	12.46	0.00	154.00	12.70	12.46	0.00
128.00	12.70	12.46	0.00	154.50	12.70	12.46	0.00
128.50	12.70	12.46	0.00	155.00	12.70	12.46	0.00
129.00	12.70	12.46	0.00	155.50	12.70	12.46	0.00
129.50	12.70	12.46	0.00	156.00	12.70	12.46	0.00
130.00	12.70	12.46	0.00	156.50	12.70	12.46	0.00
130.50	12.70	12.46	0.00	157.00	12.70	12.46	0.00
131.00	12.70	12.46	0.00	157.50	12.70	12.46	0.00
131.50	12.70	12.46	0.00	158.00	12.70	12.46	0.00
132.00	12.70	12.46	0.00	158.50	12.70	12.46	0.00

**Hydrograph for Subcatchment 3S: Sub basin 3 Surge Pond (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
159.00	12.70	12.46	0.00	185.50	12.70	12.46	0.00
159.50	12.70	12.46	0.00	186.00	12.70	12.46	0.00
160.00	12.70	12.46	0.00	186.50	12.70	12.46	0.00
160.50	12.70	12.46	0.00	187.00	12.70	12.46	0.00
161.00	12.70	12.46	0.00	187.50	12.70	12.46	0.00
161.50	12.70	12.46	0.00	188.00	12.70	12.46	0.00
162.00	12.70	12.46	0.00	188.50	12.70	12.46	0.00
162.50	12.70	12.46	0.00	189.00	12.70	12.46	0.00
163.00	12.70	12.46	0.00	189.50	12.70	12.46	0.00
163.50	12.70	12.46	0.00	190.00	12.70	12.46	0.00
164.00	12.70	12.46	0.00	190.50	12.70	12.46	0.00
164.50	12.70	12.46	0.00	191.00	12.70	12.46	0.00
165.00	12.70	12.46	0.00	191.50	12.70	12.46	0.00
165.50	12.70	12.46	0.00	192.00	12.70	12.46	0.00
166.00	12.70	12.46	0.00	192.50	12.70	12.46	0.00
166.50	12.70	12.46	0.00	193.00	12.70	12.46	0.00
167.00	12.70	12.46	0.00	193.50	12.70	12.46	0.00
167.50	12.70	12.46	0.00	194.00	12.70	12.46	0.00
168.00	12.70	12.46	0.00	194.50	12.70	12.46	0.00
168.50	12.70	12.46	0.00	195.00	12.70	12.46	0.00
169.00	12.70	12.46	0.00	195.50	12.70	12.46	0.00
169.50	12.70	12.46	0.00	196.00	12.70	12.46	0.00
170.00	12.70	12.46	0.00	196.50	12.70	12.46	0.00
170.50	12.70	12.46	0.00	197.00	12.70	12.46	0.00
171.00	12.70	12.46	0.00	197.50	12.70	12.46	0.00
171.50	12.70	12.46	0.00	198.00	12.70	12.46	0.00
172.00	12.70	12.46	0.00	198.50	12.70	12.46	0.00
172.50	12.70	12.46	0.00	199.00	12.70	12.46	0.00
173.00	12.70	12.46	0.00	199.50	12.70	12.46	0.00
173.50	12.70	12.46	0.00	200.00	12.70	12.46	0.00
174.00	12.70	12.46	0.00	200.50	12.70	12.46	0.00
174.50	12.70	12.46	0.00	201.00	12.70	12.46	0.00
175.00	12.70	12.46	0.00	201.50	12.70	12.46	0.00
175.50	12.70	12.46	0.00	202.00	12.70	12.46	0.00
176.00	12.70	12.46	0.00	202.50	12.70	12.46	0.00
176.50	12.70	12.46	0.00	203.00	12.70	12.46	0.00
177.00	12.70	12.46	0.00	203.50	12.70	12.46	0.00
177.50	12.70	12.46	0.00	204.00	12.70	12.46	0.00
178.00	12.70	12.46	0.00	204.50	12.70	12.46	0.00
178.50	12.70	12.46	0.00	205.00	12.70	12.46	0.00
179.00	12.70	12.46	0.00	205.50	12.70	12.46	0.00
179.50	12.70	12.46	0.00	206.00	12.70	12.46	0.00
180.00	12.70	12.46	0.00	206.50	12.70	12.46	0.00
180.50	12.70	12.46	0.00	207.00	12.70	12.46	0.00
181.00	12.70	12.46	0.00	207.50	12.70	12.46	0.00
181.50	12.70	12.46	0.00	208.00	12.70	12.46	0.00
182.00	12.70	12.46	0.00	208.50	12.70	12.46	0.00
182.50	12.70	12.46	0.00	209.00	12.70	12.46	0.00
183.00	12.70	12.46	0.00	209.50	12.70	12.46	0.00
183.50	12.70	12.46	0.00	210.00	12.70	12.46	0.00
184.00	12.70	12.46	0.00	210.50	12.70	12.46	0.00
184.50	12.70	12.46	0.00	211.00	12.70	12.46	0.00
185.00	12.70	12.46	0.00	211.50	12.70	12.46	0.00

**Hydrograph for Subcatchment 3S: Sub basin 3 Surge Pond (continued)**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
212.00	12.70	12.46	0.00	238.50	12.70	12.46	0.00
212.50	12.70	12.46	0.00	239.00	12.70	12.46	0.00
213.00	12.70	12.46	0.00	239.50	12.70	12.46	0.00
213.50	12.70	12.46	0.00	240.00	12.70	12.46	0.00
214.00	12.70	12.46	0.00	240.50	12.70	12.46	0.00
214.50	12.70	12.46	0.00	241.00	12.70	12.46	0.00
215.00	12.70	12.46	0.00	241.50	12.70	12.46	0.00
215.50	12.70	12.46	0.00	242.00	12.70	12.46	0.00
216.00	12.70	12.46	0.00	242.50	12.70	12.46	0.00
216.50	12.70	12.46	0.00	243.00	12.70	12.46	0.00
217.00	12.70	12.46	0.00	243.50	12.70	12.46	0.00
217.50	12.70	12.46	0.00	244.00	12.70	12.46	0.00
218.00	12.70	12.46	0.00	244.50	12.70	12.46	0.00
218.50	12.70	12.46	0.00	245.00	12.70	12.46	0.00
219.00	12.70	12.46	0.00	245.50	12.70	12.46	0.00
219.50	12.70	12.46	0.00	246.00	12.70	12.46	0.00
220.00	12.70	12.46	0.00	246.50	12.70	12.46	0.00
220.50	12.70	12.46	0.00	247.00	12.70	12.46	0.00
221.00	12.70	12.46	0.00	247.50	12.70	12.46	0.00
221.50	12.70	12.46	0.00	248.00	12.70	12.46	0.00
222.00	12.70	12.46	0.00	248.50	12.70	12.46	0.00
222.50	12.70	12.46	0.00	249.00	12.70	12.46	0.00
223.00	12.70	12.46	0.00	249.50	12.70	12.46	0.00
223.50	12.70	12.46	0.00	250.00	12.70	12.46	0.00
224.00	12.70	12.46	0.00				
224.50	12.70	12.46	0.00				
225.00	12.70	12.46	0.00				
225.50	12.70	12.46	0.00				
226.00	12.70	12.46	0.00				
226.50	12.70	12.46	0.00				
227.00	12.70	12.46	0.00				
227.50	12.70	12.46	0.00				
228.00	12.70	12.46	0.00				
228.50	12.70	12.46	0.00				
229.00	12.70	12.46	0.00				
229.50	12.70	12.46	0.00				
230.00	12.70	12.46	0.00				
230.50	12.70	12.46	0.00				
231.00	12.70	12.46	0.00				
231.50	12.70	12.46	0.00				
232.00	12.70	12.46	0.00				
232.50	12.70	12.46	0.00				
233.00	12.70	12.46	0.00				
233.50	12.70	12.46	0.00				
234.00	12.70	12.46	0.00				
234.50	12.70	12.46	0.00				
235.00	12.70	12.46	0.00				
235.50	12.70	12.46	0.00				
236.00	12.70	12.46	0.00				
236.50	12.70	12.46	0.00				
237.00	12.70	12.46	0.00				
237.50	12.70	12.46	0.00				
238.00	12.70	12.46	0.00				

**Summary for Pond 1P: Outlet 1**

Inflow Area = 0.2618 sm, Inflow Depth = 12.34" for 100-yr event  
 Inflow = 862.32 cfs @ 12.74 hrs, Volume= 172.239 af  
 Outflow = 10.74 cfs @ 119.40 hrs, Volume= 182.298 af, Atten= 99%, Lag= 6,399.5 min  
 Primary = 10.74 cfs @ 119.40 hrs, Volume= 182.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs / 2  
 Starting Elev= 35.00' Surf.Area= 5,348,812 sf Storage= 23,269,578 cf  
 Peak Elev= 36.30' @ 27.40 hrs Surf.Area= 5,875,695 sf Storage= 30,584,310 cf (7,314,731 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= 7,894.2 min ( 8,682.5 - 788.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	30.16'	40,991,918 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.16	4,520,077	0	0
32.00	4,726,672	8,507,009	8,507,009
34.00	4,907,661	9,634,333	18,141,342
36.00	5,789,962	10,697,623	28,838,965
38.00	6,362,991	12,152,953	40,991,918

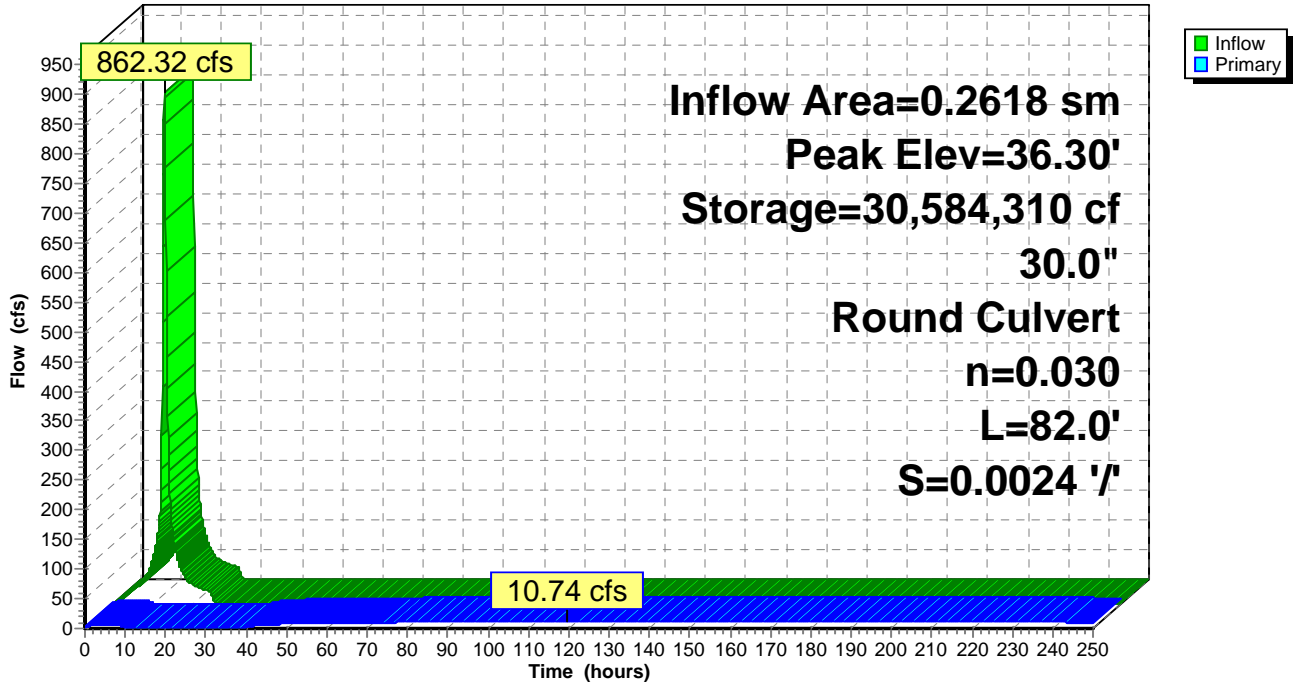
Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	<b>30.0" Round CMP_Round 30"</b> L= 82.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 31.00' / 30.80' S= 0.0024 1/'' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf

**Primary OutFlow** Max=10.74 cfs @ 119.40 hrs HW=35.82' TW=35.38' (Dynamic Tailwater)  
 ↑1=CMP\_Round 30" (Outlet Controls 10.74 cfs @ 2.19 fps)



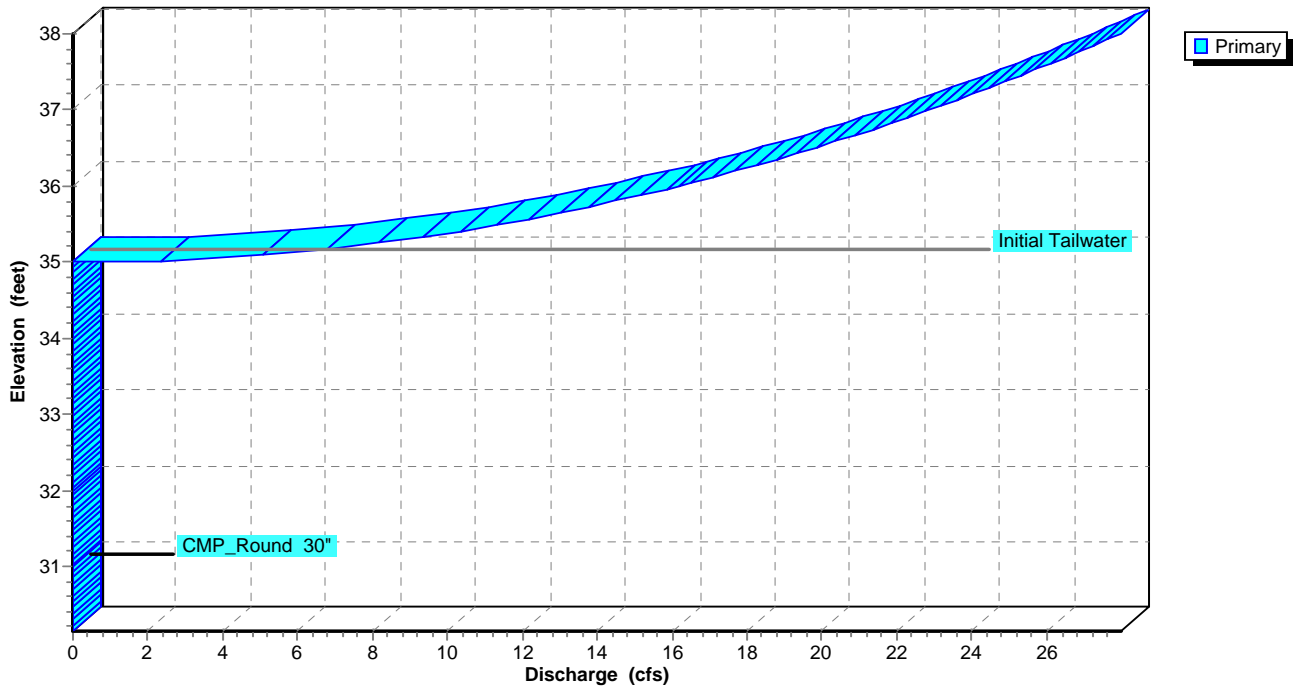
### Pond 1P: Outlet 1

Hydrograph

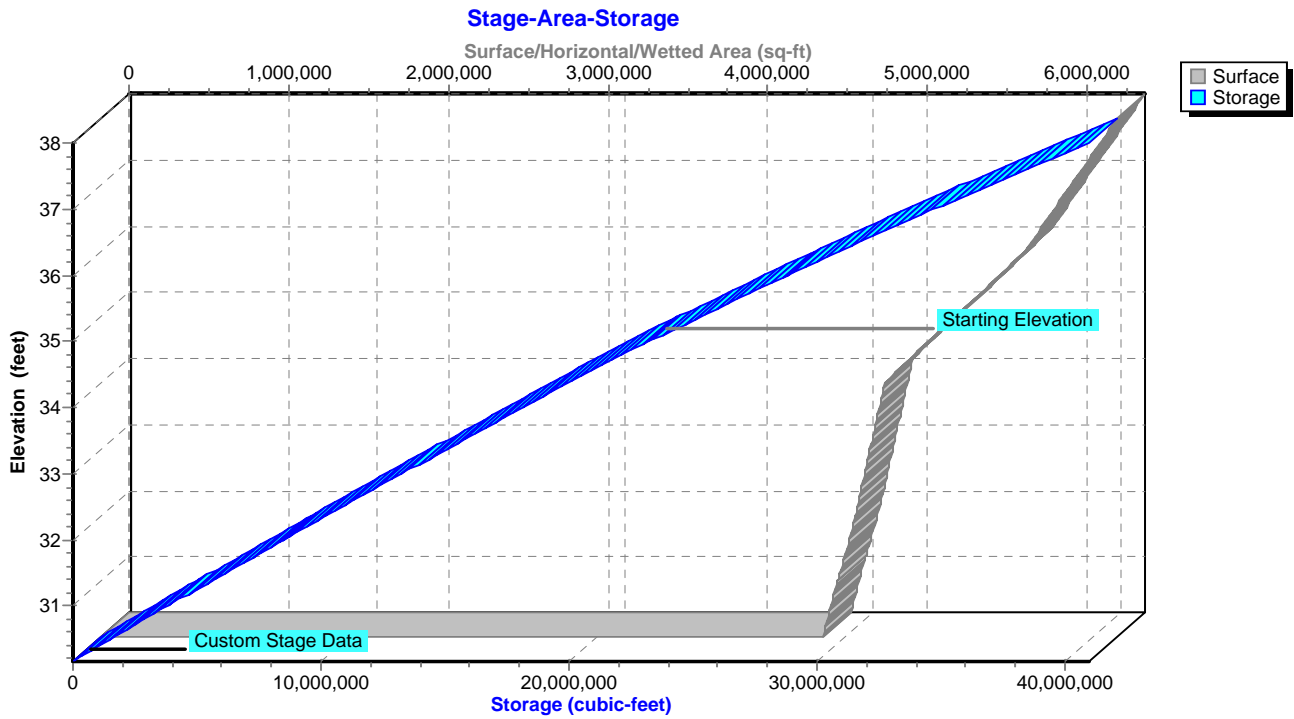


### Pond 1P: Outlet 1

Stage-Discharge



### Pond 1P: Outlet 1



**Hydrograph for Pond 1P: Outlet 1**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	23,269,578	35.00	0.00
0.50	0.00	23,266,010	35.00	2.95
1.00	0.33	23,259,809	35.00	4.01
1.50	3.31	23,254,716	35.00	4.77
2.00	7.58	23,255,412	35.00	5.38
2.50	11.04	23,262,171	35.00	5.85
3.00	13.97	23,273,846	35.00	6.19
3.50	16.77	23,290,154	35.00	6.43
4.00	19.38	23,310,985	35.01	6.59
4.50	21.82	23,336,150	35.01	6.67
5.00	24.11	23,365,483	35.02	6.68
5.50	26.28	23,398,858	35.02	6.64
6.00	28.36	23,436,182	35.03	6.55
6.50	30.50	23,477,437	35.04	6.40
7.00	33.95	23,523,841	35.05	6.17
7.50	38.81	23,578,400	35.06	5.83
8.00	44.16	23,642,928	35.07	5.38
8.50	49.91	23,718,238	35.08	4.80
9.00	58.34	23,807,182	35.10	3.94
9.50	69.53	23,916,081	35.12	2.55
10.00	81.65	24,049,932	35.15	0.01
10.50	94.54	24,208,204	35.17	0.00
11.00	112.68	24,393,643	35.21	0.00
11.50	138.91	24,618,211	35.25	0.00
12.00	227.71	24,925,100	35.31	0.00
12.50	<b>725.09</b>	25,718,603	35.45	0.00
13.00	<b>735.58</b>	27,182,712	35.71	0.00
13.50	362.51	28,139,656	35.88	0.00
14.00	203.90	28,627,346	35.96	0.00
14.50	140.46	28,930,146	36.02	0.00
15.00	109.33	29,152,117	36.05	0.00
15.50	91.10	29,331,155	36.08	0.00
16.00	77.84	29,482,956	36.11	0.00
16.50	65.60	29,611,868	36.13	0.00
17.00	56.20	29,720,930	36.15	0.00
17.50	49.62	29,815,952	36.17	0.00
18.00	43.92	29,900,081	36.18	0.00
18.50	38.61	29,974,280	36.20	0.00
19.00	34.84	30,040,095	36.21	0.00
19.50	32.57	30,100,651	36.22	0.00
20.00	30.79	30,157,642	36.23	0.00
20.50	29.15	30,211,563	36.24	0.00
21.00	27.70	30,262,691	36.24	0.00
21.50	26.43	30,311,389	36.25	0.00
22.00	25.20	30,357,844	36.26	0.00
22.50	23.99	30,402,109	36.27	0.00
23.00	22.78	30,444,198	36.28	0.00
23.50	21.57	30,484,116	36.28	0.00
24.00	20.36	30,521,862	36.29	0.00
24.50	16.39	30,556,205	36.29	0.00
25.00	6.00	30,576,063	36.30	0.00
25.50	1.64	30,582,132	36.30	0.00
26.00	0.44	30,583,790	36.30	0.00

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.50	0.10	30,584,219	36.30	0.00
27.00	0.01	<b>30,584,306</b>	<b>36.30</b>	0.00
27.50	0.00	<b>30,584,310</b>	<b>36.30</b>	0.00
28.00	0.00	30,584,310	36.30	0.00
28.50	0.00	30,584,310	36.30	0.00
29.00	0.00	30,584,310	36.30	0.00
29.50	0.00	30,584,310	36.30	0.00
30.00	0.00	30,584,310	36.30	0.00
30.50	0.00	30,584,310	36.30	0.00
31.00	0.00	30,584,310	36.30	0.00
31.50	0.00	30,584,310	36.30	0.00
32.00	0.00	30,584,310	36.30	0.00
32.50	0.00	30,584,310	36.30	0.00
33.00	0.00	30,584,310	36.30	0.00
33.50	0.00	30,584,310	36.30	0.00
34.00	0.00	30,584,310	36.30	0.00
34.50	0.00	30,584,310	36.30	0.00
35.00	0.00	30,584,310	36.30	0.00
35.50	0.00	30,584,310	36.30	0.00
36.00	0.00	30,584,310	36.30	0.00
36.50	0.00	30,584,310	36.30	0.00
37.00	0.00	30,584,310	36.30	0.00
37.50	0.00	30,584,310	36.30	0.00
38.00	0.00	30,584,310	36.30	0.00
38.50	0.00	30,584,310	36.30	0.00
39.00	0.00	30,584,306	36.30	0.00
39.50	0.00	30,584,254	36.30	0.25
40.00	0.00	30,581,435	36.30	2.31
40.50	0.00	30,576,472	36.30	3.15
41.00	0.00	30,570,231	36.30	3.76
41.50	0.00	30,563,009	36.30	4.25
42.00	0.00	30,554,981	36.29	4.66
42.50	0.00	30,546,263	36.29	5.02
43.00	0.00	30,536,940	36.29	5.33
43.50	0.00	30,527,077	36.29	5.62
44.00	0.00	30,516,727	36.29	5.88
44.50	0.00	30,505,935	36.29	6.11
45.00	0.00	30,494,735	36.28	6.33
45.50	0.00	30,483,160	36.28	6.53
46.00	0.00	30,471,237	36.28	6.72
46.50	0.00	30,458,989	36.28	6.89
47.00	0.00	30,446,438	36.28	7.05
47.50	0.00	30,433,602	36.27	7.21
48.00	0.00	30,420,499	36.27	7.35
48.50	0.00	30,407,143	36.27	7.49
49.00	0.00	30,393,548	36.27	7.62
49.50	0.00	30,379,728	36.26	7.74
50.00	0.00	30,365,695	36.26	7.85
50.50	0.00	30,351,458	36.26	7.96
51.00	0.00	30,337,028	36.26	8.07
51.50	0.00	30,322,415	36.25	8.17
52.00	0.00	30,307,626	36.25	8.26
52.50	0.00	30,292,671	36.25	8.35

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
53.00	0.00	30,277,554	36.25	8.44
53.50	0.00	30,262,285	36.24	8.52
54.00	0.00	30,246,868	36.24	8.60
54.50	0.00	30,231,310	36.24	8.68
55.00	0.00	30,215,616	36.24	8.76
55.50	0.00	30,199,792	36.23	8.83
56.00	0.00	30,183,842	36.23	8.89
56.50	0.00	30,167,773	36.23	8.96
57.00	0.00	30,151,587	36.23	9.02
57.50	0.00	30,135,291	36.22	9.08
58.00	0.00	30,118,887	36.22	9.14
58.50	0.00	30,102,379	36.22	9.20
59.00	0.00	30,085,773	36.21	9.25
59.50	0.00	30,069,070	36.21	9.31
60.00	0.00	30,052,275	36.21	9.36
60.50	0.00	30,035,390	36.21	9.40
61.00	0.00	30,018,420	36.20	9.45
61.50	0.00	30,001,367	36.20	9.50
62.00	0.00	29,984,234	36.20	9.54
62.50	0.00	29,967,024	36.19	9.58
63.00	0.00	29,949,739	36.19	9.62
63.50	0.00	29,932,382	36.19	9.66
64.00	0.00	29,914,955	36.18	9.70
64.50	0.00	29,897,462	36.18	9.74
65.00	0.00	29,879,904	36.18	9.77
65.50	0.00	29,862,283	36.18	9.81
66.00	0.00	29,844,601	36.17	9.84
66.50	0.00	29,826,861	36.17	9.87
67.00	0.00	29,809,065	36.17	9.90
67.50	0.00	29,791,214	36.16	9.93
68.00	0.00	29,773,310	36.16	9.96
68.50	0.00	29,755,355	36.16	9.99
69.00	0.00	29,737,351	36.15	10.02
69.50	0.00	29,719,299	36.15	10.04
70.00	0.00	29,701,201	36.15	10.07
70.50	0.00	29,683,059	36.15	10.09
71.00	0.00	29,664,873	36.14	10.11
71.50	0.00	29,646,646	36.14	10.14
72.00	0.00	29,628,379	36.14	10.16
72.50	0.00	29,610,072	36.13	10.18
73.00	0.00	29,591,728	36.13	10.20
73.50	0.00	29,573,348	36.13	10.22
74.00	0.00	29,554,932	36.12	10.24
74.50	0.00	29,536,482	36.12	10.26
75.00	0.00	29,517,999	36.12	10.28
75.50	0.00	29,499,485	36.11	10.29
76.00	0.00	29,480,939	36.11	10.31
76.50	0.00	29,462,364	36.11	10.33
77.00	0.00	29,443,760	36.10	10.34
77.50	0.00	29,425,128	36.10	10.36
78.00	0.00	29,406,470	36.10	10.37
78.50	0.00	29,387,785	36.09	10.39
79.00	0.00	29,369,075	36.09	10.40

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
79.50	0.00	29,350,341	36.09	10.41
80.00	0.00	29,331,583	36.08	10.43
80.50	0.00	29,312,803	36.08	10.44
81.00	0.00	29,294,000	36.08	10.45
81.50	0.00	29,275,177	36.08	10.46
82.00	0.00	29,256,333	36.07	10.47
82.50	0.00	29,237,469	36.07	10.49
83.00	0.00	29,218,586	36.07	10.50
83.50	0.00	29,199,684	36.06	10.51
84.00	0.00	29,180,765	36.06	10.52
84.50	0.00	29,161,828	36.06	10.53
85.00	0.00	29,142,875	36.05	10.53
85.50	0.00	29,123,905	36.05	10.54
86.00	0.00	29,104,920	36.05	10.55
86.50	0.00	29,085,920	36.04	10.56
87.00	0.00	29,066,906	36.04	10.57
87.50	0.00	29,047,878	36.04	10.58
88.00	0.00	29,028,836	36.03	10.58
88.50	0.00	29,009,781	36.03	10.59
89.00	0.00	28,990,713	36.03	10.60
89.50	0.00	28,971,634	36.02	10.60
90.00	0.00	28,952,542	36.02	10.61
90.50	0.00	28,933,440	36.02	10.62
91.00	0.00	28,914,327	36.01	10.62
91.50	0.00	28,895,203	36.01	10.63
92.00	0.00	28,876,069	36.01	10.63
92.50	0.00	28,856,925	36.00	10.64
93.00	0.00	28,837,772	36.00	10.64
93.50	0.00	28,818,610	36.00	10.65
94.00	0.00	28,799,440	35.99	10.65
94.50	0.00	28,780,261	35.99	10.66
95.00	0.00	28,761,074	35.99	10.66
95.50	0.00	28,741,879	35.98	10.67
96.00	0.00	28,722,677	35.98	10.67
96.50	0.00	28,703,468	35.98	10.67
97.00	0.00	28,684,253	35.97	10.68
97.50	0.00	28,665,030	35.97	10.68
98.00	0.00	28,645,802	35.97	10.68
98.50	0.00	28,626,567	35.96	10.69
99.00	0.00	28,607,327	35.96	10.69
99.50	0.00	28,588,081	35.96	10.69
100.00	0.00	28,568,829	35.95	10.70
100.50	0.00	28,549,573	35.95	10.70
101.00	0.00	28,530,312	35.95	10.70
101.50	0.00	28,511,047	35.94	10.70
102.00	0.00	28,491,777	35.94	10.71
102.50	0.00	28,472,502	35.94	10.71
103.00	0.00	28,453,224	35.93	10.71
103.50	0.00	28,433,942	35.93	10.71
104.00	0.00	28,414,657	35.93	10.72
104.50	0.00	28,395,367	35.92	10.72
105.00	0.00	28,376,075	35.92	10.72
105.50	0.00	28,356,780	35.92	10.72

## Hydrograph for Pond 1P: Outlet 1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
106.00	0.00	28,337,481	35.91	10.72
106.50	0.00	28,318,180	35.91	10.72
107.00	0.00	28,298,876	35.91	10.73
107.50	0.00	28,279,570	35.90	10.73
108.00	0.00	28,260,261	35.90	10.73
108.50	0.00	28,240,951	35.90	10.73
109.00	0.00	28,221,638	35.89	10.73
109.50	0.00	28,202,323	35.89	10.73
110.00	0.00	28,183,006	35.89	10.73
110.50	0.00	28,163,688	35.88	10.73
111.00	0.00	28,144,368	35.88	10.73
111.50	0.00	28,125,047	35.88	10.73
112.00	0.00	28,105,724	35.87	10.74
112.50	0.00	28,086,400	35.87	10.74
113.00	0.00	28,067,075	35.87	10.74
113.50	0.00	28,047,748	35.86	10.74
114.00	0.00	28,028,421	35.86	10.74
114.50	0.00	28,009,093	35.86	10.74
115.00	0.00	27,989,765	35.85	10.74
115.50	0.00	27,970,435	35.85	10.74
116.00	0.00	27,951,105	35.85	10.74
116.50	0.00	27,931,775	35.84	10.74
117.00	0.00	27,912,444	35.84	10.74
117.50	0.00	27,893,113	35.84	10.74
118.00	0.00	27,873,782	35.83	10.74
118.50	0.00	27,854,450	35.83	10.74
119.00	0.00	27,835,118	35.83	<b>10.74</b>
119.50	0.00	27,815,786	35.82	<b>10.74</b>
120.00	0.00	27,796,455	35.82	10.74
120.50	0.00	27,777,123	35.82	10.74
121.00	0.00	27,757,791	35.81	10.74
121.50	0.00	27,738,460	35.81	10.74
122.00	0.00	27,719,129	35.81	10.74
122.50	0.00	27,699,798	35.80	10.74
123.00	0.00	27,680,468	35.80	10.74
123.50	0.00	27,661,138	35.79	10.74
124.00	0.00	27,641,808	35.79	10.74
124.50	0.00	27,622,479	35.79	10.74
125.00	0.00	27,603,151	35.78	10.74
125.50	0.00	27,583,823	35.78	10.74
126.00	0.00	27,564,496	35.78	10.74
126.50	0.00	27,545,169	35.77	10.74
127.00	0.00	27,525,844	35.77	10.74
127.50	0.00	27,506,519	35.77	10.74
128.00	0.00	27,487,195	35.76	10.74
128.50	0.00	27,467,871	35.76	10.73
129.00	0.00	27,448,549	35.76	10.73
129.50	0.00	27,429,228	35.75	10.73
130.00	0.00	27,409,907	35.75	10.73
130.50	0.00	27,390,588	35.75	10.73
131.00	0.00	27,371,270	35.74	10.73
131.50	0.00	27,351,952	35.74	10.73
132.00	0.00	27,332,636	35.74	10.73

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
132.50	0.00	27,313,321	35.73	10.73
133.00	0.00	27,294,007	35.73	10.73
133.50	0.00	27,274,694	35.73	10.73
134.00	0.00	27,255,383	35.72	10.73
134.50	0.00	27,236,073	35.72	10.73
135.00	0.00	27,216,763	35.72	10.73
135.50	0.00	27,197,456	35.71	10.73
136.00	0.00	27,178,149	35.71	10.73
136.50	0.00	27,158,844	35.71	10.72
137.00	0.00	27,139,540	35.70	10.72
137.50	0.00	27,120,238	35.70	10.72
138.00	0.00	27,100,937	35.70	10.72
138.50	0.00	27,081,637	35.69	10.72
139.00	0.00	27,062,339	35.69	10.72
139.50	0.00	27,043,042	35.69	10.72
140.00	0.00	27,023,747	35.68	10.72
140.50	0.00	27,004,453	35.68	10.72
141.00	0.00	26,985,161	35.68	10.72
141.50	0.00	26,965,870	35.67	10.72
142.00	0.00	26,946,581	35.67	10.72
142.50	0.00	26,927,293	35.67	10.71
143.00	0.00	26,908,007	35.66	10.71
143.50	0.00	26,888,722	35.66	10.71
144.00	0.00	26,869,439	35.66	10.71
144.50	0.00	26,850,157	35.65	10.71
145.00	0.00	26,830,877	35.65	10.71
145.50	0.00	26,811,599	35.65	10.71
146.00	0.00	26,792,323	35.64	10.71
146.50	0.00	26,773,048	35.64	10.71
147.00	0.00	26,753,774	35.63	10.71
147.50	0.00	26,734,503	35.63	10.71
148.00	0.00	26,715,233	35.63	10.71
148.50	0.00	26,695,964	35.62	10.70
149.00	0.00	26,676,698	35.62	10.70
149.50	0.00	26,657,433	35.62	10.70
150.00	0.00	26,638,169	35.61	10.70
150.50	0.00	26,618,908	35.61	10.70
151.00	0.00	26,599,648	35.61	10.70
151.50	0.00	26,580,390	35.60	10.70
152.00	0.00	26,561,134	35.60	10.70
152.50	0.00	26,541,879	35.60	10.70
153.00	0.00	26,522,626	35.59	10.70
153.50	0.00	26,503,375	35.59	10.69
154.00	0.00	26,484,126	35.59	10.69
154.50	0.00	26,464,879	35.58	10.69
155.00	0.00	26,445,633	35.58	10.69
155.50	0.00	26,426,389	35.58	10.69
156.00	0.00	26,407,147	35.57	10.69
156.50	0.00	26,387,906	35.57	10.69
157.00	0.00	26,368,668	35.57	10.69
157.50	0.00	26,349,431	35.56	10.69
158.00	0.00	26,330,196	35.56	10.69
158.50	0.00	26,310,963	35.56	10.68



**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
159.00	0.00	26,291,732	35.55	10.68
159.50	0.00	26,272,502	35.55	10.68
160.00	0.00	26,253,275	35.55	10.68
160.50	0.00	26,234,049	35.54	10.68
161.00	0.00	26,214,825	35.54	10.68
161.50	0.00	26,195,603	35.54	10.68
162.00	0.00	26,176,383	35.53	10.68
162.50	0.00	26,157,164	35.53	10.68
163.00	0.00	26,137,948	35.52	10.68
163.50	0.00	26,118,733	35.52	10.67
164.00	0.00	26,099,520	35.52	10.67
164.50	0.00	26,080,309	35.51	10.67
165.00	0.00	26,061,100	35.51	10.67
165.50	0.00	26,041,893	35.51	10.67
166.00	0.00	26,022,688	35.50	10.67
166.50	0.00	26,003,485	35.50	10.67
167.00	0.00	25,984,283	35.50	10.67
167.50	0.00	25,965,083	35.49	10.67
168.00	0.00	25,945,886	35.49	10.66
168.50	0.00	25,926,690	35.49	10.66
169.00	0.00	25,907,496	35.48	10.66
169.50	0.00	25,888,304	35.48	10.66
170.00	0.00	25,869,113	35.48	10.66
170.50	0.00	25,849,925	35.47	10.66
171.00	0.00	25,830,739	35.47	10.66
171.50	0.00	25,811,554	35.47	10.66
172.00	0.00	25,792,372	35.46	10.66
172.50	0.00	25,773,191	35.46	10.66
173.00	0.00	25,754,012	35.46	10.65
173.50	0.00	25,734,836	35.45	10.65
174.00	0.00	25,715,661	35.45	10.65
174.50	0.00	25,696,488	35.45	10.65
175.00	0.00	25,677,317	35.44	10.65
175.50	0.00	25,658,148	35.44	10.65
176.00	0.00	25,638,981	35.44	10.65
176.50	0.00	25,619,815	35.43	10.65
177.00	0.00	25,600,652	35.43	10.65
177.50	0.00	25,581,491	35.42	10.64
178.00	0.00	25,562,331	35.42	10.64
178.50	0.00	25,543,174	35.42	10.64
179.00	0.00	25,524,018	35.41	10.64
179.50	0.00	25,504,864	35.41	10.64
180.00	0.00	25,485,713	35.41	10.64
180.50	0.00	25,466,563	35.40	10.64
181.00	0.00	25,447,415	35.40	10.64
181.50	0.00	25,428,269	35.40	10.64
182.00	0.00	25,409,125	35.39	10.63
182.50	0.00	25,389,983	35.39	10.63
183.00	0.00	25,370,843	35.39	10.63
183.50	0.00	25,351,705	35.38	10.63
184.00	0.00	25,332,569	35.38	10.63
184.50	0.00	25,313,435	35.38	10.63
185.00	0.00	25,294,302	35.37	10.63

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
185.50	0.00	25,275,172	35.37	10.63
186.00	0.00	25,256,044	35.37	10.63
186.50	0.00	25,236,917	35.36	10.63
187.00	0.00	25,217,793	35.36	10.62
187.50	0.00	25,198,670	35.36	10.62
188.00	0.00	25,179,550	35.35	10.62
188.50	0.00	25,160,431	35.35	10.62
189.00	0.00	25,141,315	35.35	10.62
189.50	0.00	25,122,200	35.34	10.62
190.00	0.00	25,103,087	35.34	10.62
190.50	0.00	25,083,977	35.33	10.62
191.00	0.00	25,064,868	35.33	10.62
191.50	0.00	25,045,761	35.33	10.61
192.00	0.00	25,026,656	35.32	10.61
192.50	0.00	25,007,554	35.32	10.61
193.00	0.00	24,988,453	35.32	10.61
193.50	0.00	24,969,354	35.31	10.61
194.00	0.00	24,950,257	35.31	10.61
194.50	0.00	24,931,162	35.31	10.61
195.00	0.00	24,912,069	35.30	10.61
195.50	0.00	24,892,978	35.30	10.61
196.00	0.00	24,873,889	35.30	10.60
196.50	0.00	24,854,802	35.29	10.60
197.00	0.00	24,835,717	35.29	10.60
197.50	0.00	24,816,634	35.29	10.60
198.00	0.00	24,797,553	35.28	10.60
198.50	0.00	24,778,474	35.28	10.60
199.00	0.00	24,759,397	35.28	10.60
199.50	0.00	24,740,322	35.27	10.60
200.00	0.00	24,721,248	35.27	10.60
200.50	0.00	24,702,177	35.26	10.59
201.00	0.00	24,683,108	35.26	10.59
201.50	0.00	24,664,041	35.26	10.59
202.00	0.00	24,644,976	35.25	10.59
202.50	0.00	24,625,912	35.25	10.59
203.00	0.00	24,606,851	35.25	10.59
203.50	0.00	24,587,792	35.24	10.59
204.00	0.00	24,568,735	35.24	10.59
204.50	0.00	24,549,680	35.24	10.59
205.00	0.00	24,530,626	35.23	10.58
205.50	0.00	24,511,575	35.23	10.58
206.00	0.00	24,492,526	35.23	10.58
206.50	0.00	24,473,479	35.22	10.58
207.00	0.00	24,454,433	35.22	10.58
207.50	0.00	24,435,390	35.22	10.58
208.00	0.00	24,416,349	35.21	10.58
208.50	0.00	24,397,310	35.21	10.58
209.00	0.00	24,378,272	35.21	10.58
209.50	0.00	24,359,237	35.20	10.57
210.00	0.00	24,340,204	35.20	10.57
210.50	0.00	24,321,173	35.20	10.57
211.00	0.00	24,302,143	35.19	10.57
211.50	0.00	24,283,116	35.19	10.57

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
212.00	0.00	24,264,091	35.18	10.57
212.50	0.00	24,245,068	35.18	10.57
213.00	0.00	24,226,046	35.18	10.57
213.50	0.00	24,207,027	35.17	10.57
214.00	0.00	24,188,010	35.17	10.56
214.50	0.00	24,168,995	35.17	10.56
215.00	0.00	24,149,982	35.16	10.56
215.50	0.00	24,130,971	35.16	10.56
216.00	0.00	24,111,961	35.16	10.56
216.50	0.00	24,092,954	35.15	10.56
217.00	0.00	24,073,949	35.15	10.56
217.50	0.00	24,054,946	35.15	10.56
218.00	0.00	24,035,945	35.14	10.56
218.50	0.00	24,016,946	35.14	10.55
219.00	0.00	23,997,949	35.14	10.55
219.50	0.00	23,978,954	35.13	10.55
220.00	0.00	23,959,961	35.13	10.55
220.50	0.00	23,940,970	35.12	10.55
221.00	0.00	23,921,981	35.12	10.55
221.50	0.00	23,902,994	35.12	10.55
222.00	0.00	23,884,010	35.11	10.55
222.50	0.00	23,865,027	35.11	10.55
223.00	0.00	23,846,046	35.11	10.54
223.50	0.00	23,827,067	35.10	10.54
224.00	0.00	23,808,090	35.10	10.54
224.50	0.00	23,789,116	35.10	10.54
225.00	0.00	23,770,143	35.09	10.54
225.50	0.00	23,751,172	35.09	10.54
226.00	0.00	23,732,204	35.09	10.54
226.50	0.00	23,713,237	35.08	10.54
227.00	0.00	23,694,272	35.08	10.54
227.50	0.00	23,675,310	35.08	10.53
228.00	0.00	23,656,349	35.07	10.53
228.50	0.00	23,637,391	35.07	10.53
229.00	0.00	23,618,434	35.07	10.53
229.50	0.00	23,599,480	35.06	10.53
230.00	0.00	23,580,528	35.06	10.53
230.50	0.00	23,561,578	35.05	10.53
231.00	0.00	23,542,629	35.05	10.53
231.50	0.00	23,523,683	35.05	10.53
232.00	0.00	23,504,739	35.04	10.52
232.50	0.00	23,485,797	35.04	10.52
233.00	0.00	23,466,857	35.04	10.52
233.50	0.00	23,447,919	35.03	10.52
234.00	0.00	23,428,983	35.03	10.52
234.50	0.00	23,410,049	35.03	10.52
235.00	0.00	23,391,117	35.02	10.52
235.50	0.00	23,372,187	35.02	10.52
236.00	0.00	23,353,260	35.02	10.51
236.50	0.00	23,334,334	35.01	10.51
237.00	0.00	23,315,410	35.01	10.51
237.50	0.00	23,296,489	35.01	10.51
238.00	0.00	23,277,569	35.00	10.51

**Hydrograph for Pond 1P: Outlet 1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
238.50	0.00	23,258,652	35.00	10.51
239.00	0.00	23,239,736	34.99	10.51
239.50	0.00	23,220,830	34.99	10.50
240.00	0.00	23,201,940	34.99	10.49
240.50	0.00	23,183,075	34.98	10.47
241.00	0.00	23,164,240	34.98	10.45
241.50	0.00	23,145,441	34.98	10.43
242.00	0.00	23,126,681	34.97	10.41
242.50	0.00	23,107,964	34.97	10.39
243.00	0.00	23,089,291	34.97	10.36
243.50	0.00	23,070,665	34.96	10.33
244.00	0.00	23,052,087	34.96	10.31
244.50	0.00	23,033,559	34.96	10.28
245.00	0.00	23,015,081	34.95	10.25
245.50	0.00	22,996,655	34.95	10.22
246.00	0.00	22,978,281	34.95	10.19
246.50	0.00	22,959,959	34.94	10.16
247.00	0.00	22,941,690	34.94	10.13
247.50	0.00	22,923,475	34.94	10.10
248.00	0.00	22,905,313	34.93	10.08
248.50	0.00	22,887,204	34.93	10.05
249.00	0.00	22,869,149	34.92	10.02
249.50	0.00	22,851,148	34.92	9.99
250.00	0.00	22,833,201	34.92	9.96

**Summary for Pond 2P: Outlet 2**

Inflow Area = 0.3591 sm, Inflow Depth > 12.69" for 100-yr event  
 Inflow = 458.03 cfs @ 12.35 hrs, Volume= 243.111 af  
 Outflow = 13.61 cfs @ 18.19 hrs, Volume= 247.605 af, Atten= 97%, Lag= 350.2 min  
 Primary = 13.61 cfs @ 18.19 hrs, Volume= 247.605 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs / 2  
 Starting Elev= 35.00' Surf.Area= 516,145 sf Storage= 490,063 cf  
 Peak Elev= 37.05' @ 18.19 hrs Surf.Area= 1,141,496 sf Storage= 2,310,030 cf (1,819,967 cf above start)

Plug-Flow detention time= 1,146.2 min calculated for 236.354 af (97% of inflow)  
 Center-of-Mass det. time= 585.5 min ( 7,290.5 - 6,705.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	30.00'	6,248,966 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.00	12,613	0	0
32.00	36,329	48,942	48,942
34.00	97,813	134,142	183,084
36.00	934,477	1,032,290	1,215,374
38.00	1,327,081	2,261,558	3,476,932
40.00	1,444,953	2,772,034	6,248,966

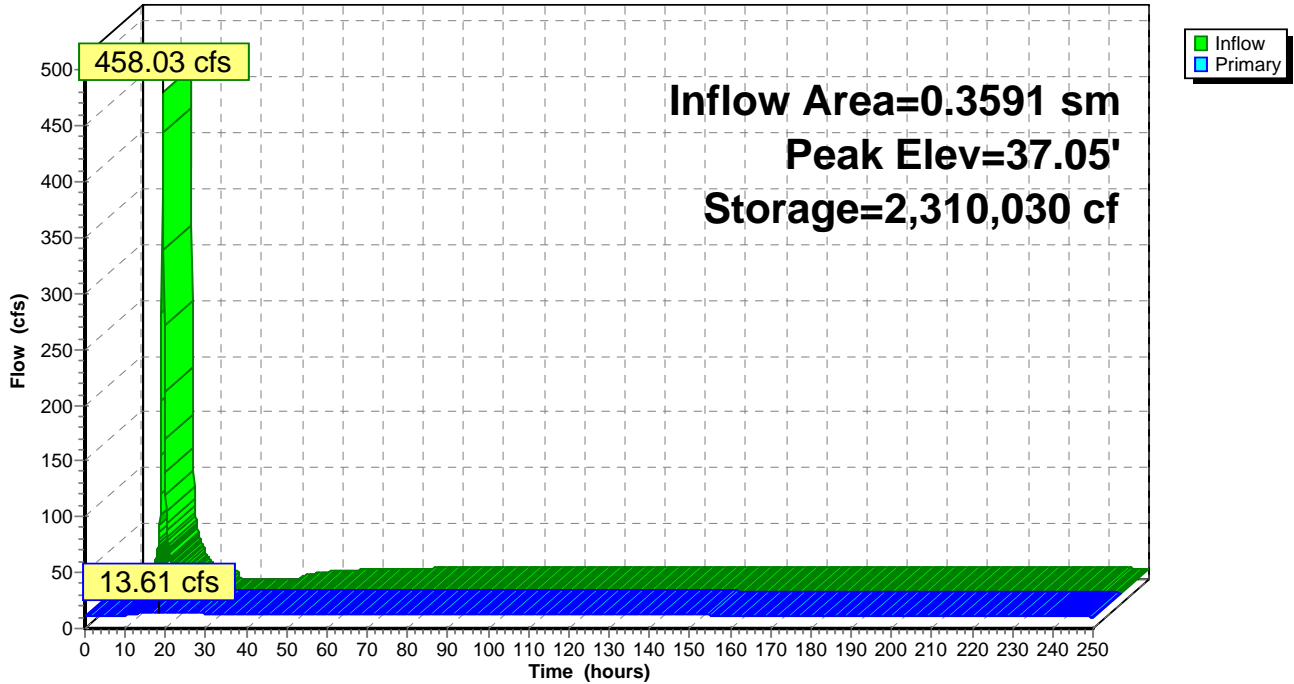
Device	Routing	Invert	Outlet Devices
#1	Primary	30.00'	<b>30.0" Round CMP_Round 30"</b> L= 1,249.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 30.00' / 27.00' S= 0.0024 1' Cc= 0.900 n= 0.030 Corrugated metal, Flow Area= 4.91 sf
#2	Device 1	34.00'	<b>30.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=13.61 cfs @ 18.19 hrs HW=37.05' TW=28.32' (Dynamic Tailwater)

- ↑1=CMP\_Round 30" (Barrel Controls 13.61 cfs @ 2.77 fps)
- ↑2=Orifice/Grate (Passes 13.61 cfs of 41.31 cfs potential flow)

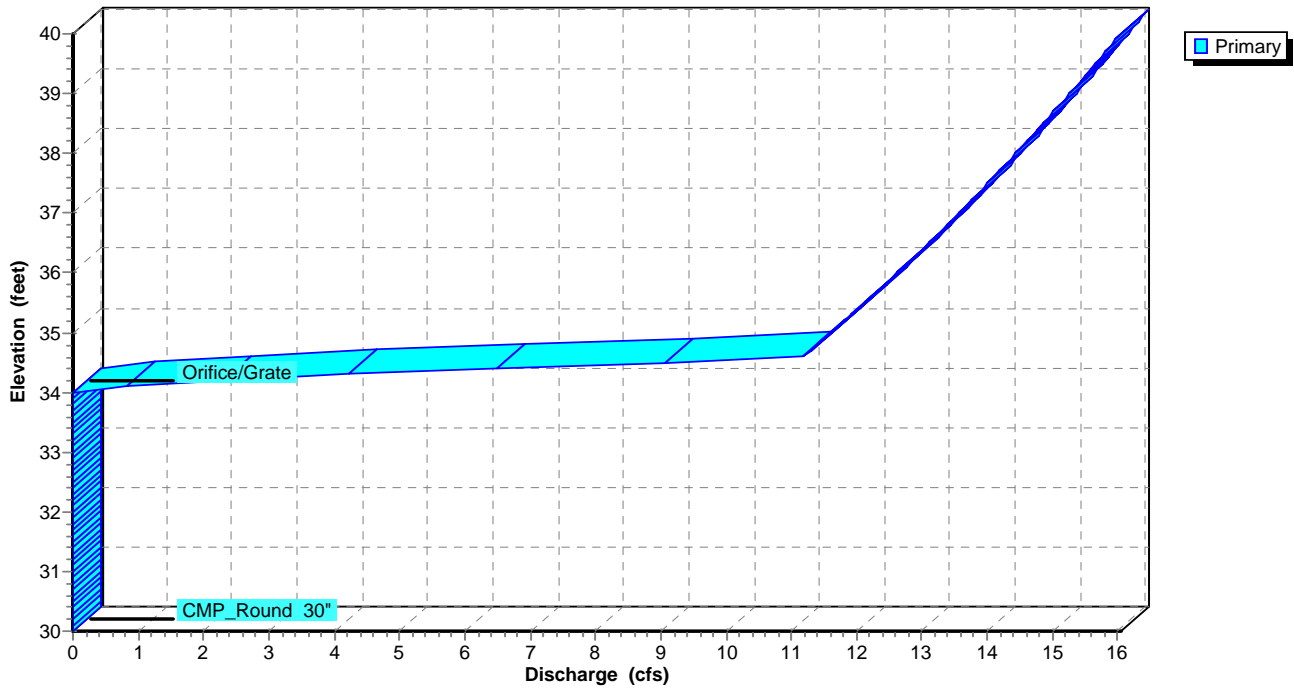
### Pond 2P: Outlet 2

Hydrograph

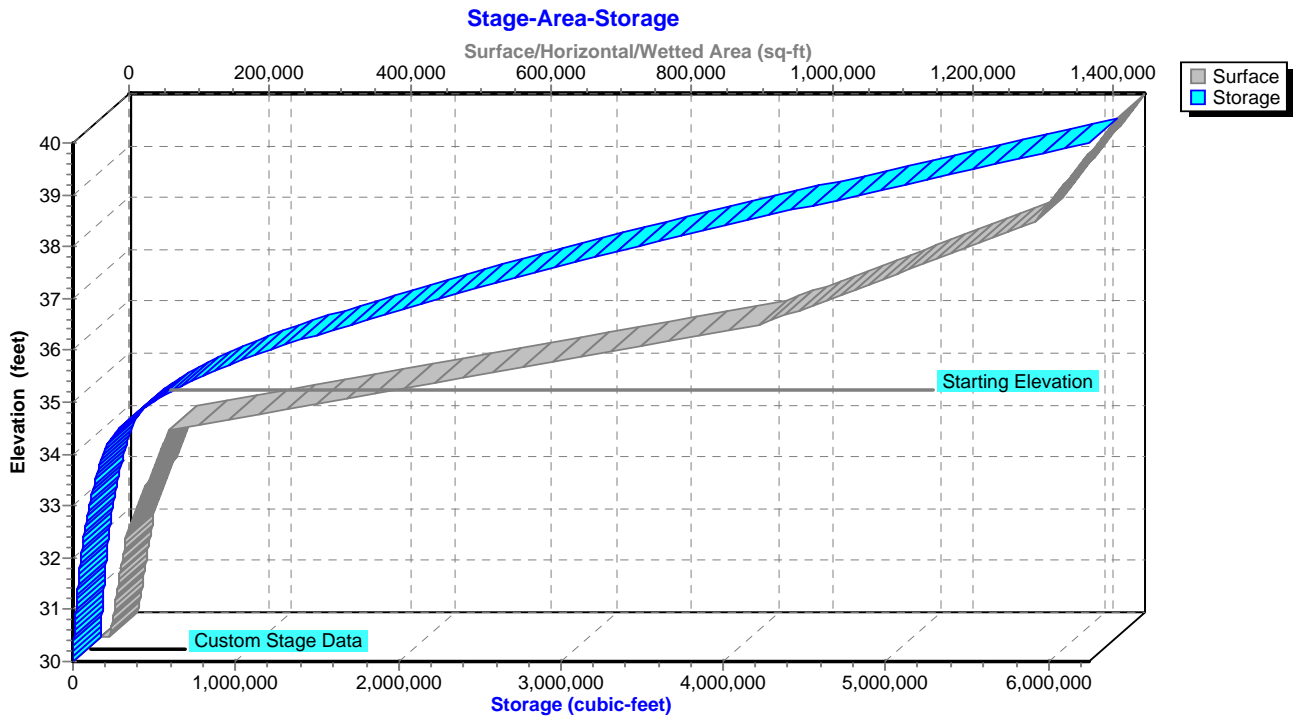


### Pond 2P: Outlet 2

Stage-Discharge



### Pond 2P: Outlet 2



**Hydrograph for Pond 2P: Outlet 2**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	490,063	35.00	11.61
0.50	2.95	472,759	34.97	11.58
1.00	4.01	458,274	34.94	11.55
1.50	4.77	445,436	34.91	11.52
2.00	5.90	434,204	34.89	11.49
2.50	7.32	425,445	34.87	11.47
3.00	8.66	419,199	34.85	11.46
3.50	9.90	415,301	34.85	11.45
4.00	11.06	413,576	34.84	11.45
4.50	12.13	413,851	34.84	11.45
5.00	13.11	415,966	34.85	11.45
5.50	14.01	419,766	34.86	11.46
6.00	14.84	425,108	34.87	11.47
6.50	15.88	431,979	34.88	11.49
7.00	17.53	441,314	34.90	11.51
7.50	19.25	453,667	34.93	11.54
8.00	20.93	469,033	34.96	11.57
8.50	23.12	487,568	35.00	11.61
9.00	26.57	511,318	35.04	11.66
9.50	29.83	541,133	35.10	11.71
10.00	32.05	575,501	35.16	11.78
10.50	38.13	616,831	35.23	11.85
11.00	47.33	672,164	35.31	11.94
11.50	64.05	747,625	35.43	12.06
12.00	<b>182.49</b>	907,939	35.64	12.27
12.50	<b>392.33</b>	1,540,000	36.34	12.95
13.00	117.58	1,933,288	36.71	13.30
13.50	60.02	2,056,158	36.83	13.41
14.00	46.77	2,126,573	36.89	13.46
14.50	38.48	2,178,373	36.94	13.51
15.00	33.51	2,218,678	36.97	13.54
15.50	28.93	2,250,477	37.00	13.56
16.00	24.38	2,274,028	37.02	13.58
16.50	20.51	2,289,657	37.04	13.60
17.00	18.31	2,300,040	37.05	13.60
17.50	16.32	2,306,706	37.05	13.61
18.00	14.33	<b>2,309,792</b>	<b>37.05</b>	<b>13.61</b>
18.50	12.72	<b>2,309,473</b>	<b>37.05</b>	<b>13.61</b>
19.00	12.01	2,307,190	37.05	13.61
19.50	11.41	2,303,767	37.05	13.61
20.00	10.81	2,299,277	37.05	13.60
20.50	10.26	2,293,741	37.04	13.60
21.00	9.80	2,287,314	37.03	13.59
21.50	9.35	2,280,086	37.03	13.59
22.00	8.91	2,272,066	37.02	13.58
22.50	8.46	2,263,254	37.01	13.57
23.00	8.01	2,253,651	37.00	13.57
23.50	7.57	2,243,260	37.00	13.56
24.00	7.12	2,232,079	36.99	13.55
24.50	1.78	2,216,863	36.97	13.54
25.00	0.10	2,193,617	36.95	13.52
25.50	0.00	2,169,356	36.93	13.50
26.00	0.00	2,145,075	36.91	13.48



**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.50	0.00	2,120,830	36.89	13.46
27.00	0.00	2,096,620	36.86	13.44
27.50	0.00	2,072,447	36.84	13.42
28.00	0.00	2,048,309	36.82	13.40
28.50	0.00	2,024,208	36.80	13.38
29.00	0.00	2,000,143	36.78	13.36
29.50	0.00	1,976,115	36.75	13.34
30.00	0.00	1,952,124	36.73	13.32
30.50	0.00	1,928,169	36.71	13.30
31.00	0.00	1,904,252	36.69	13.28
31.50	0.00	1,880,371	36.67	13.26
32.00	0.00	1,856,528	36.64	13.24
32.50	0.00	1,832,722	36.62	13.21
33.00	0.00	1,808,954	36.60	13.19
33.50	0.00	1,785,224	36.58	13.17
34.00	0.00	1,761,532	36.55	13.15
34.50	0.00	1,737,877	36.53	13.13
35.00	0.00	1,714,261	36.51	13.11
35.50	0.00	1,690,684	36.48	13.09
36.00	0.00	1,667,145	36.46	13.07
36.50	0.00	1,643,645	36.44	13.04
37.00	0.00	1,620,183	36.42	13.02
37.50	0.00	1,596,761	36.39	13.00
38.00	0.00	1,573,378	36.37	12.98
38.50	0.00	1,550,035	36.35	12.96
39.00	0.00	1,526,735	36.32	12.94
39.50	0.25	1,503,523	36.30	12.91
40.00	2.31	1,483,117	36.28	12.89
40.50	3.15	1,464,886	36.26	12.88
41.00	3.76	1,447,965	36.24	12.86
41.50	4.25	1,432,053	36.23	12.84
42.00	4.66	1,416,975	36.21	12.83
42.50	5.02	1,402,612	36.20	12.82
43.00	5.33	1,388,880	36.18	12.80
43.50	5.62	1,375,711	36.17	12.79
44.00	5.88	1,363,052	36.16	12.78
44.50	6.11	1,350,858	36.14	12.76
45.00	6.33	1,339,092	36.13	12.75
45.50	6.53	1,327,723	36.12	12.74
46.00	6.72	1,316,722	36.11	12.73
46.50	6.89	1,306,066	36.10	12.72
47.00	7.05	1,295,732	36.09	12.71
47.50	7.21	1,285,701	36.07	12.70
48.00	7.35	1,275,956	36.06	12.69
48.50	7.49	1,266,481	36.05	12.68
49.00	7.62	1,257,262	36.04	12.67
49.50	7.74	1,248,285	36.04	12.66
50.00	7.85	1,239,539	36.03	12.65
50.50	7.96	1,231,011	36.02	12.64
51.00	8.07	1,222,692	36.01	12.63
51.50	8.17	1,214,572	36.00	12.63
52.00	8.26	1,206,642	35.99	12.62
52.50	8.35	1,198,894	35.98	12.61

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
53.00	8.44	1,191,321	35.97	12.60
53.50	8.52	1,183,916	35.97	12.59
54.00	8.60	1,176,672	35.96	12.59
54.50	8.68	1,169,583	35.95	12.58
55.00	8.76	1,162,643	35.94	12.57
55.50	8.83	1,155,847	35.94	12.56
56.00	8.89	1,149,188	35.93	12.56
56.50	8.96	1,142,663	35.92	12.55
57.00	9.02	1,136,267	35.91	12.54
57.50	9.08	1,129,994	35.91	12.54
58.00	9.14	1,123,840	35.90	12.53
58.50	9.20	1,117,802	35.89	12.52
59.00	9.25	1,111,875	35.89	12.52
59.50	9.31	1,106,056	35.88	12.51
60.00	9.36	1,100,341	35.87	12.50
60.50	9.40	1,094,726	35.87	12.50
61.00	9.45	1,089,208	35.86	12.49
61.50	9.50	1,083,785	35.85	12.48
62.00	9.54	1,078,452	35.85	12.48
62.50	9.58	1,073,207	35.84	12.47
63.00	9.62	1,068,047	35.84	12.47
63.50	9.66	1,062,970	35.83	12.46
64.00	9.70	1,057,973	35.82	12.45
64.50	9.74	1,053,052	35.82	12.45
65.00	9.77	1,048,207	35.81	12.44
65.50	9.81	1,043,435	35.81	12.44
66.00	9.84	1,038,732	35.80	12.43
66.50	9.87	1,034,098	35.80	12.43
67.00	9.90	1,029,530	35.79	12.42
67.50	9.93	1,025,026	35.79	12.42
68.00	9.96	1,020,585	35.78	12.41
68.50	9.99	1,016,203	35.78	12.41
69.00	10.02	1,011,881	35.77	12.40
69.50	10.04	1,007,615	35.77	12.40
70.00	10.07	1,003,404	35.76	12.39
70.50	10.09	999,246	35.76	12.39
71.00	10.11	995,141	35.75	12.38
71.50	10.14	991,086	35.75	12.38
72.00	10.16	987,080	35.74	12.37
72.50	10.18	983,121	35.74	12.37
73.00	10.20	979,209	35.73	12.36
73.50	10.22	975,342	35.73	12.36
74.00	10.24	971,518	35.72	12.35
74.50	10.26	967,736	35.72	12.35
75.00	10.28	963,996	35.71	12.34
75.50	10.29	960,296	35.71	12.34
76.00	10.31	956,634	35.70	12.33
76.50	10.33	953,011	35.70	12.33
77.00	10.34	949,424	35.69	12.33
77.50	10.36	945,873	35.69	12.32
78.00	10.37	942,356	35.69	12.32
78.50	10.39	938,874	35.68	12.31
79.00	10.40	935,425	35.68	12.31

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
79.50	10.41	932,007	35.67	12.30
80.00	10.43	928,621	35.67	12.30
80.50	10.44	925,265	35.66	12.30
81.00	10.45	921,938	35.66	12.29
81.50	10.46	918,640	35.66	12.29
82.00	10.47	915,370	35.65	12.28
82.50	10.49	912,128	35.65	12.28
83.00	10.50	908,912	35.64	12.28
83.50	10.51	905,722	35.64	12.27
84.00	10.52	902,556	35.64	12.27
84.50	10.53	899,416	35.63	12.26
85.00	10.53	896,299	35.63	12.26
85.50	10.54	893,206	35.62	12.26
86.00	10.55	890,135	35.62	12.25
86.50	10.56	887,086	35.62	12.25
87.00	10.57	884,059	35.61	12.24
87.50	10.58	881,053	35.61	12.24
88.00	10.58	878,068	35.60	12.24
88.50	10.59	875,102	35.60	12.23
89.00	10.60	872,156	35.60	12.23
89.50	10.60	869,229	35.59	12.22
90.00	10.61	866,321	35.59	12.22
90.50	10.62	863,430	35.58	12.22
91.00	10.62	860,558	35.58	12.21
91.50	10.63	857,702	35.58	12.21
92.00	10.63	854,864	35.57	12.20
92.50	10.64	852,042	35.57	12.20
93.00	10.64	849,236	35.57	12.20
93.50	10.65	846,446	35.56	12.19
94.00	10.65	843,671	35.56	12.19
94.50	10.66	840,911	35.55	12.19
95.00	10.66	838,166	35.55	12.18
95.50	10.67	835,435	35.55	12.18
96.00	10.67	832,718	35.54	12.18
96.50	10.67	830,015	35.54	12.17
97.00	10.68	827,325	35.54	12.17
97.50	10.68	824,648	35.53	12.16
98.00	10.68	821,985	35.53	12.16
98.50	10.69	819,333	35.53	12.16
99.00	10.69	816,694	35.52	12.15
99.50	10.69	814,067	35.52	12.15
100.00	10.70	811,452	35.52	12.15
100.50	10.70	808,848	35.51	12.14
101.00	10.70	806,256	35.51	12.14
101.50	10.70	803,674	35.50	12.14
102.00	10.71	801,104	35.50	12.13
102.50	10.71	798,544	35.50	12.13
103.00	10.71	795,994	35.49	12.12
103.50	10.71	793,455	35.49	12.12
104.00	10.72	790,926	35.49	12.12
104.50	10.72	788,406	35.48	12.11
105.00	10.72	785,896	35.48	12.11
105.50	10.72	783,396	35.48	12.11

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
106.00	10.72	780,905	35.47	12.10
106.50	10.72	778,423	35.47	12.10
107.00	10.73	775,950	35.47	12.10
107.50	10.73	773,486	35.46	12.09
108.00	10.73	771,030	35.46	12.09
108.50	10.73	768,584	35.46	12.09
109.00	10.73	766,145	35.45	12.08
109.50	10.73	763,715	35.45	12.08
110.00	10.73	761,293	35.45	12.08
110.50	10.73	758,878	35.44	12.07
111.00	10.73	756,472	35.44	12.07
111.50	10.73	754,074	35.43	12.06
112.00	10.74	751,683	35.43	12.06
112.50	10.74	749,299	35.43	12.06
113.00	10.74	746,923	35.42	12.05
113.50	10.74	744,554	35.42	12.05
114.00	10.74	742,193	35.42	12.05
114.50	10.74	739,838	35.41	12.04
115.00	10.74	737,491	35.41	12.04
115.50	10.74	735,151	35.41	12.04
116.00	10.74	732,817	35.40	12.03
116.50	10.74	730,490	35.40	12.03
117.00	10.74	728,169	35.40	12.03
117.50	10.74	725,856	35.39	12.02
118.00	10.74	723,548	35.39	12.02
118.50	10.74	721,248	35.39	12.02
119.00	10.74	718,953	35.38	12.01
119.50	10.74	716,665	35.38	12.01
120.00	10.74	714,383	35.38	12.01
120.50	10.74	712,107	35.37	12.00
121.00	10.74	709,837	35.37	12.00
121.50	10.74	707,573	35.37	12.00
122.00	10.74	705,315	35.36	11.99
122.50	10.74	703,064	35.36	11.99
123.00	10.74	700,817	35.36	11.99
123.50	10.74	698,577	35.35	11.98
124.00	10.74	696,343	35.35	11.98
124.50	10.74	694,114	35.35	11.97
125.00	10.74	691,890	35.34	11.97
125.50	10.74	689,673	35.34	11.97
126.00	10.74	687,461	35.34	11.96
126.50	10.74	685,254	35.33	11.96
127.00	10.74	683,053	35.33	11.96
127.50	10.74	680,857	35.33	11.95
128.00	10.74	678,666	35.32	11.95
128.50	10.73	676,481	35.32	11.95
129.00	10.73	674,302	35.32	11.94
129.50	10.73	672,127	35.31	11.94
130.00	10.73	669,958	35.31	11.94
130.50	10.73	667,794	35.31	11.93
131.00	10.73	665,635	35.30	11.93
131.50	10.73	663,481	35.30	11.93
132.00	10.73	661,333	35.30	11.92

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
132.50	10.73	659,189	35.29	11.92
133.00	10.73	657,051	35.29	11.92
133.50	10.73	654,917	35.29	11.91
134.00	10.73	652,789	35.28	11.91
134.50	10.73	650,665	35.28	11.91
135.00	10.73	648,547	35.28	11.90
135.50	10.73	646,433	35.27	11.90
136.00	10.73	644,324	35.27	11.90
136.50	10.72	642,221	35.27	11.89
137.00	10.72	640,122	35.26	11.89
137.50	10.72	638,028	35.26	11.89
138.00	10.72	635,938	35.26	11.88
138.50	10.72	633,854	35.25	11.88
139.00	10.72	631,774	35.25	11.87
139.50	10.72	629,700	35.25	11.87
140.00	10.72	627,629	35.24	11.87
140.50	10.72	625,564	35.24	11.86
141.00	10.72	623,504	35.24	11.86
141.50	10.72	621,448	35.23	11.86
142.00	10.72	619,396	35.23	11.85
142.50	10.71	617,350	35.23	11.85
143.00	10.71	615,308	35.22	11.85
143.50	10.71	613,271	35.22	11.84
144.00	10.71	611,239	35.22	11.84
144.50	10.71	609,211	35.21	11.84
145.00	10.71	607,188	35.21	11.83
145.50	10.71	605,169	35.21	11.83
146.00	10.71	603,155	35.20	11.83
146.50	10.71	601,146	35.20	11.82
147.00	10.71	599,141	35.20	11.82
147.50	10.71	597,141	35.19	11.82
148.00	10.71	595,146	35.19	11.81
148.50	10.70	593,155	35.19	11.81
149.00	10.70	591,168	35.18	11.81
149.50	10.70	589,186	35.18	11.80
150.00	10.70	587,209	35.18	11.80
150.50	10.70	585,236	35.17	11.80
151.00	10.70	583,268	35.17	11.79
151.50	10.70	581,305	35.17	11.79
152.00	10.70	579,345	35.16	11.78
152.50	10.70	577,391	35.16	11.78
153.00	10.70	575,441	35.16	11.78
153.50	10.69	573,495	35.15	11.77
154.00	10.69	571,554	35.15	11.77
154.50	10.69	569,618	35.15	11.77
155.00	10.69	567,686	35.14	11.76
155.50	10.69	565,758	35.14	11.76
156.00	10.69	563,835	35.14	11.76
156.50	10.69	561,917	35.13	11.75
157.00	10.69	560,003	35.13	11.75
157.50	10.69	558,093	35.13	11.75
158.00	10.69	556,188	35.12	11.74
158.50	10.68	554,288	35.12	11.74

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
159.00	10.68	552,392	35.12	11.74
159.50	10.68	550,500	35.11	11.73
160.00	10.68	548,613	35.11	11.73
160.50	10.68	546,730	35.11	11.73
161.00	10.68	544,852	35.10	11.72
161.50	10.68	542,979	35.10	11.72
162.00	10.68	541,109	35.10	11.71
162.50	10.68	539,245	35.09	11.71
163.00	10.68	537,384	35.09	11.71
163.50	10.67	535,529	35.09	11.70
164.00	10.67	533,677	35.08	11.70
164.50	10.67	531,830	35.08	11.70
165.00	10.67	529,988	35.08	11.69
165.50	10.67	528,150	35.07	11.69
166.00	10.67	526,317	35.07	11.69
166.50	10.67	524,488	35.06	11.68
167.00	10.67	522,663	35.06	11.68
167.50	10.67	520,843	35.06	11.68
168.00	10.66	519,028	35.05	11.67
168.50	10.66	517,217	35.05	11.67
169.00	10.66	515,410	35.05	11.67
169.50	10.66	513,608	35.04	11.66
170.00	10.66	511,810	35.04	11.66
170.50	10.66	510,017	35.04	11.65
171.00	10.66	508,228	35.03	11.65
171.50	10.66	506,444	35.03	11.65
172.00	10.66	504,664	35.03	11.64
172.50	10.66	502,889	35.02	11.64
173.00	10.65	501,118	35.02	11.64
173.50	10.65	499,352	35.02	11.63
174.00	10.65	497,590	35.01	11.63
174.50	10.65	495,832	35.01	11.63
175.00	10.65	494,079	35.01	11.62
175.50	10.65	492,331	35.00	11.62
176.00	10.65	490,587	35.00	11.62
176.50	10.65	488,847	35.00	11.61
177.00	10.65	487,112	34.99	11.61
177.50	10.64	485,382	34.99	11.60
178.00	10.64	483,655	34.99	11.60
178.50	10.64	481,934	34.98	11.60
179.00	10.64	480,217	34.98	11.59
179.50	10.64	478,504	34.98	11.59
180.00	10.64	476,796	34.97	11.59
180.50	10.64	475,092	34.97	11.58
181.00	10.64	473,393	34.97	11.58
181.50	10.64	471,699	34.96	11.58
182.00	10.63	470,009	34.96	11.57
182.50	10.63	468,323	34.96	11.57
183.00	10.63	466,642	34.95	11.57
183.50	10.63	464,965	34.95	11.56
184.00	10.63	463,293	34.95	11.56
184.50	10.63	461,625	34.94	11.55
185.00	10.63	459,962	34.94	11.55

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
185.50	10.63	458,304	34.94	11.55
186.00	10.63	456,649	34.93	11.54
186.50	10.63	455,000	34.93	11.54
187.00	10.62	453,355	34.93	11.54
187.50	10.62	451,714	34.92	11.53
188.00	10.62	450,078	34.92	11.53
188.50	10.62	448,447	34.92	11.53
189.00	10.62	446,819	34.91	11.52
189.50	10.62	445,197	34.91	11.52
190.00	10.62	443,579	34.91	11.52
190.50	10.62	441,966	34.90	11.51
191.00	10.62	440,357	34.90	11.51
191.50	10.61	438,752	34.90	11.50
192.00	10.61	437,153	34.89	11.50
192.50	10.61	435,557	34.89	11.50
193.00	10.61	433,966	34.89	11.49
193.50	10.61	432,380	34.88	11.49
194.00	10.61	430,799	34.88	11.49
194.50	10.61	429,221	34.88	11.48
195.00	10.61	427,649	34.87	11.48
195.50	10.61	426,081	34.87	11.48
196.00	10.60	424,517	34.87	11.47
196.50	10.60	422,958	34.86	11.47
197.00	10.60	421,404	34.86	11.46
197.50	10.60	419,854	34.86	11.46
198.00	10.60	418,309	34.85	11.46
198.50	10.60	416,768	34.85	11.45
199.00	10.60	415,232	34.85	11.45
199.50	10.60	413,700	34.84	11.45
200.00	10.60	412,173	34.84	11.44
200.50	10.59	410,651	34.84	11.44
201.00	10.59	409,133	34.83	11.44
201.50	10.59	407,620	34.83	11.43
202.00	10.59	406,111	34.82	11.43
202.50	10.59	404,607	34.82	11.42
203.00	10.59	403,107	34.82	11.42
203.50	10.59	401,612	34.81	11.42
204.00	10.59	400,122	34.81	11.41
204.50	10.59	398,636	34.81	11.41
205.00	10.58	397,155	34.80	11.41
205.50	10.58	395,678	34.80	11.40
206.00	10.58	394,206	34.80	11.40
206.50	10.58	392,739	34.79	11.40
207.00	10.58	391,276	34.79	11.39
207.50	10.58	389,818	34.79	11.39
208.00	10.58	388,364	34.78	11.38
208.50	10.58	386,915	34.78	11.38
209.00	10.58	385,471	34.78	11.38
209.50	10.57	384,031	34.77	11.37
210.00	10.57	382,596	34.77	11.37
210.50	10.57	381,165	34.77	11.37
211.00	10.57	379,739	34.76	11.36
211.50	10.57	378,318	34.76	11.36

**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
212.00	10.57	376,901	34.76	11.35
212.50	10.57	375,489	34.75	11.35
213.00	10.57	374,082	34.75	11.35
213.50	10.57	372,679	34.75	11.34
214.00	10.56	371,281	34.74	11.34
214.50	10.56	369,887	34.74	11.34
215.00	10.56	368,499	34.74	11.33
215.50	10.56	367,114	34.73	11.33
216.00	10.56	365,735	34.73	11.33
216.50	10.56	364,360	34.73	11.32
217.00	10.56	362,989	34.72	11.32
217.50	10.56	361,624	34.72	11.31
218.00	10.56	360,263	34.72	11.31
218.50	10.55	358,906	34.71	11.31
219.00	10.55	357,555	34.71	11.30
219.50	10.55	356,208	34.71	11.30
220.00	10.55	354,865	34.70	11.30
220.50	10.55	353,527	34.70	11.29
221.00	10.55	352,194	34.70	11.29
221.50	10.55	350,866	34.69	11.28
222.00	10.55	349,542	34.69	11.28
222.50	10.55	348,223	34.68	11.28
223.00	10.54	346,909	34.68	11.27
223.50	10.54	345,599	34.68	11.27
224.00	10.54	344,294	34.67	11.27
224.50	10.54	342,994	34.67	11.26
225.00	10.54	341,698	34.67	11.26
225.50	10.54	340,408	34.66	11.25
226.00	10.54	339,121	34.66	11.25
226.50	10.54	337,840	34.66	11.25
227.00	10.54	336,563	34.65	11.24
227.50	10.53	335,291	34.65	11.24
228.00	10.53	334,023	34.65	11.24
228.50	10.53	332,761	34.64	11.23
229.00	10.53	331,503	34.64	11.23
229.50	10.53	330,249	34.64	11.22
230.00	10.53	329,001	34.63	11.22
230.50	10.53	327,757	34.63	11.22
231.00	10.53	326,518	34.63	11.21
231.50	10.53	325,283	34.62	11.21
232.00	10.52	324,053	34.62	11.21
232.50	10.52	322,828	34.62	11.20
233.00	10.52	321,608	34.61	11.20
233.50	10.52	320,393	34.61	11.19
234.00	10.52	319,182	34.61	11.19
234.50	10.52	317,976	34.60	11.19
235.00	10.52	316,774	34.60	11.18
235.50	10.52	315,578	34.60	11.18
236.00	10.51	314,386	34.59	11.18
236.50	10.51	313,199	34.59	11.17
237.00	10.51	312,016	34.59	11.17
237.50	10.51	310,839	34.58	11.16
238.00	10.51	309,666	34.58	11.16



**Hydrograph for Pond 2P: Outlet 2 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
238.50	10.51	308,498	34.58	11.16
239.00	10.51	307,361	34.57	11.10
239.50	10.50	306,366	34.57	11.01
240.00	10.49	305,498	34.57	10.94
240.50	10.47	304,732	34.56	10.87
241.00	10.45	304,049	34.56	10.81
241.50	10.43	303,431	34.56	10.76
242.00	10.41	302,867	34.56	10.71
242.50	10.39	302,344	34.56	10.67
243.00	10.36	301,857	34.56	10.62
243.50	10.33	301,396	34.55	10.58
244.00	10.31	300,957	34.55	10.55
244.50	10.28	300,537	34.55	10.51
245.00	10.25	300,130	34.55	10.47
245.50	10.22	299,735	34.55	10.44
246.00	10.19	299,349	34.55	10.41
246.50	10.16	298,970	34.55	10.37
247.00	10.13	298,598	34.55	10.34
247.50	10.10	298,231	34.54	10.31
248.00	10.08	297,867	34.54	10.28
248.50	10.05	297,507	34.54	10.24
249.00	10.02	297,150	34.54	10.21
249.50	9.99	296,795	34.54	10.18
250.00	9.96	296,441	34.54	10.15

**Summary for Pond 3P: Rainfall Surge Pond**

Inflow Area = 0.3885 sm, Inflow Depth > 12.89" for 100-yr event  
 Inflow = 210.20 cfs @ 12.13 hrs, Volume= 267.114 af  
 Outflow = 42.68 cfs @ 12.73 hrs, Volume= 248.190 af, Atten= 80%, Lag= 36.1 min  
 Primary = 42.68 cfs @ 12.73 hrs, Volume= 248.190 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-250.00 hrs, dt= 0.10 hrs / 2  
 Peak Elev= 28.51' @ 12.73 hrs Surf.Area= 704,545 sf Storage= 1,042,879 cf

Plug-Flow detention time= 1,089.1 min calculated for 248.142 af (93% of inflow)  
 Center-of-Mass det. time= 511.0 min ( 7,323.0 - 6,812.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	26.00'	3,725,231 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

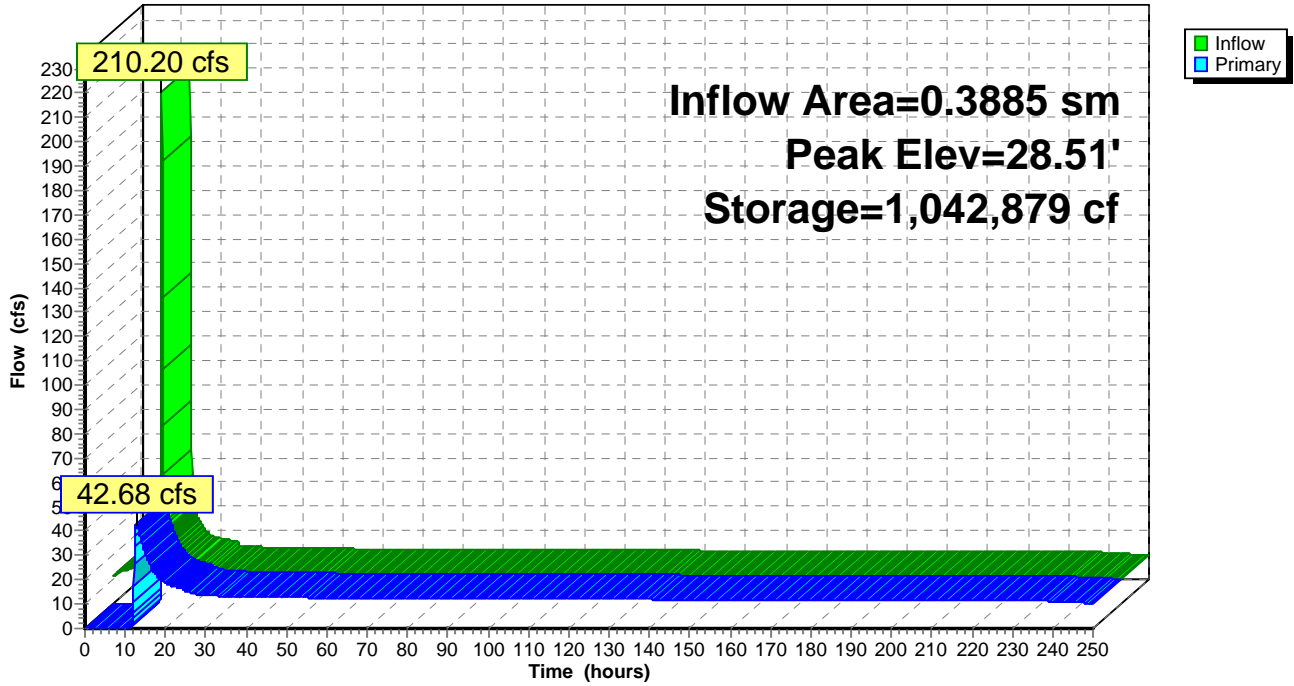
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.00	4,476	0	0
28.00	682,493	686,969	686,969
30.00	768,432	1,450,925	2,137,894
32.00	818,905	1,587,337	3,725,231

Device	Routing	Invert	Outlet Devices
#1	Primary	28.00'	<b>43.0' long x 128.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=42.64 cfs @ 12.73 hrs HW=28.51' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 42.64 cfs @ 1.93 fps)

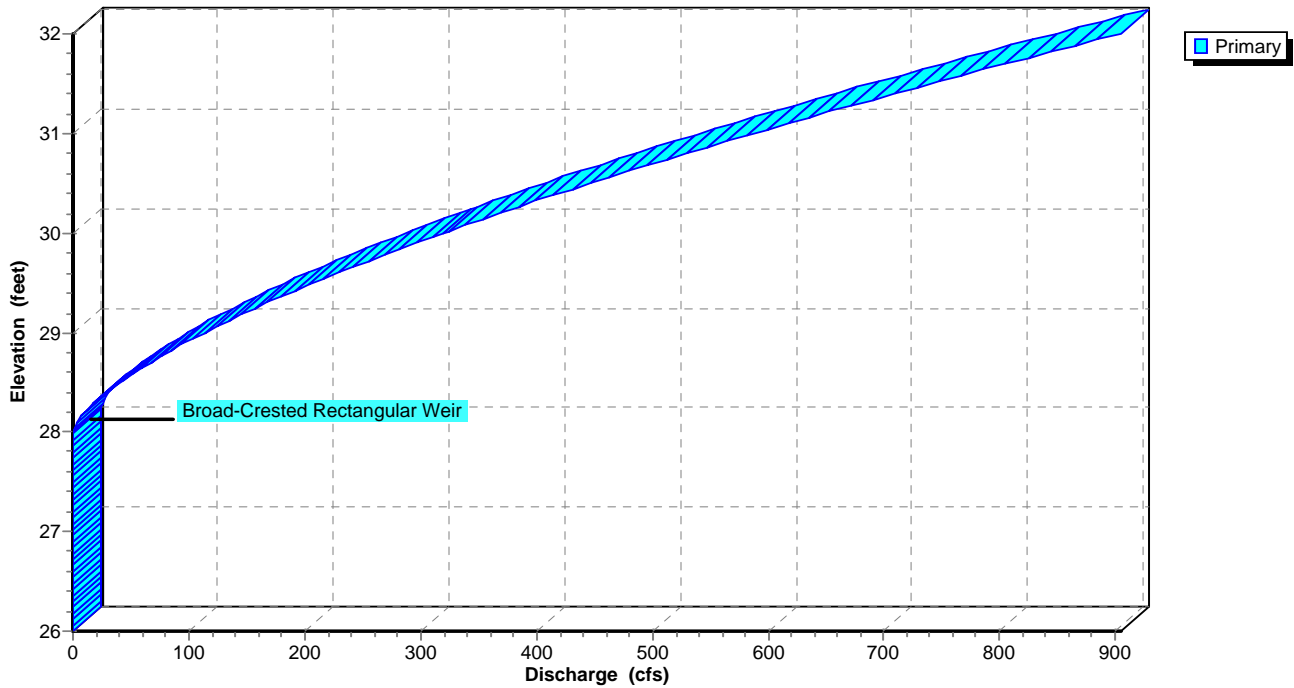
### Pond 3P: Rainfall Surge Pond

Hydrograph

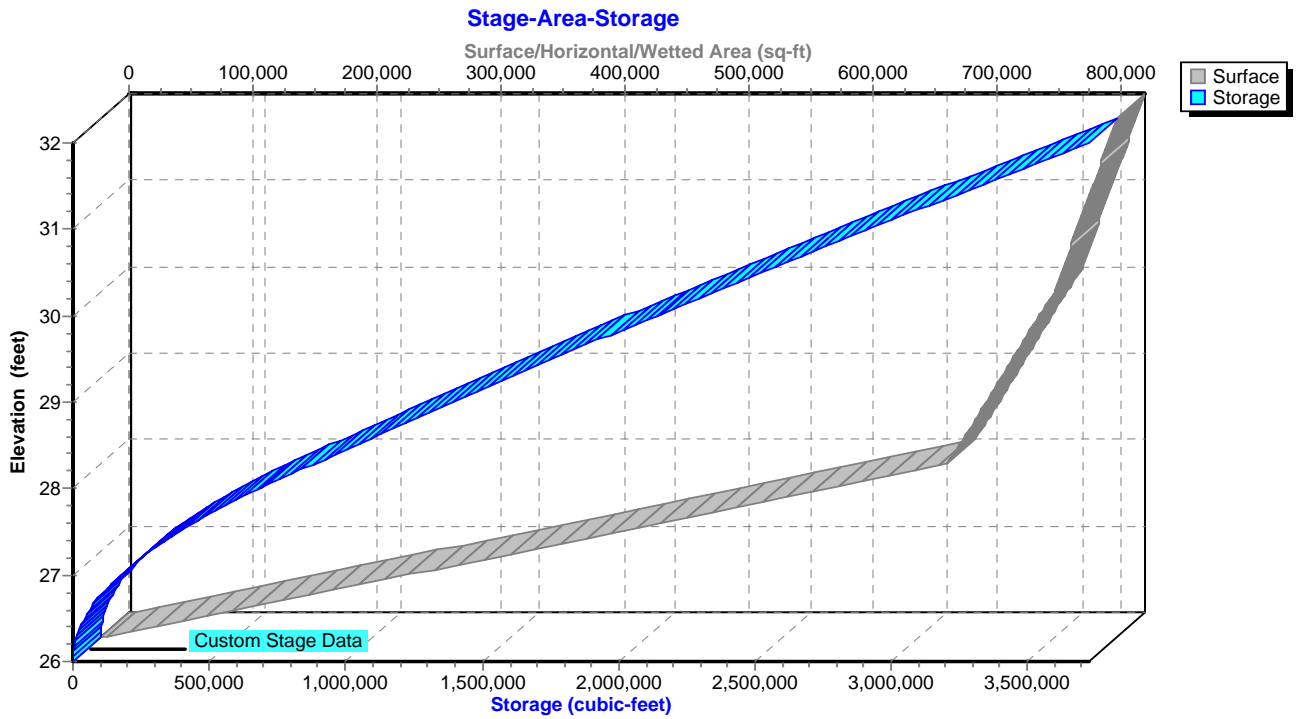


### Pond 3P: Rainfall Surge Pond

Stage-Discharge



### Pond 3P: Rainfall Surge Pond



**Hydrograph for Pond 3P: Rainfall Surge Pond**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	11.61	2,091	26.10	0.00
0.50	11.72	22,993	26.36	0.00
1.00	12.59	44,940	26.50	0.00
1.50	13.03	68,042	26.62	0.00
2.00	13.27	91,731	26.72	0.00
2.50	13.52	115,822	26.81	0.00
3.00	13.78	140,387	26.90	0.00
3.50	14.02	165,402	26.97	0.00
4.00	14.25	190,842	27.05	0.00
4.50	14.47	216,693	27.12	0.00
5.00	14.69	242,943	27.18	0.00
5.50	14.91	269,587	27.25	0.00
6.00	15.13	296,621	27.31	0.00
6.50	15.63	324,237	27.37	0.00
7.00	16.26	352,939	27.43	0.00
7.50	16.90	382,786	27.49	0.00
8.00	17.55	413,789	27.55	0.00
8.50	18.74	446,328	27.61	0.00
9.00	20.18	481,359	27.67	0.00
9.50	21.63	518,987	27.74	0.00
10.00	23.09	559,232	27.80	0.00
10.50	25.61	602,817	27.87	0.00
11.00	28.59	651,596	27.95	0.00
11.50	37.38	709,464	28.03	0.69
12.00	<b>130.13</b>	827,253	28.20	10.64
12.50	<b>73.09</b>	<b>1,032,974</b>	<b>28.50</b>	<b>40.94</b>
13.00	34.11	<b>1,038,003</b>	<b>28.51</b>	<b>41.82</b>
13.50	28.93	1,020,786	28.48	38.83
14.00	26.10	1,003,134	28.46	35.83
14.50	24.32	986,333	28.43	33.05
15.00	22.97	971,591	28.41	30.67
15.50	21.61	958,415	28.39	28.58
16.00	20.24	946,354	28.38	26.70
16.50	19.43	935,409	28.36	25.03
17.00	18.83	926,071	28.35	23.64
17.50	18.24	917,977	28.33	22.45
18.00	17.64	910,802	28.32	21.42
18.50	17.33	904,492	28.32	20.52
19.00	17.15	899,275	28.31	19.79
19.50	16.97	894,926	28.30	19.18
20.00	16.78	891,243	28.30	18.68
20.50	16.63	888,089	28.29	18.25
21.00	16.49	885,393	28.29	17.88
21.50	16.35	883,053	28.28	17.57
22.00	16.21	880,989	28.28	17.29
22.50	16.07	879,138	28.28	17.04
23.00	15.92	877,453	28.28	16.82
23.50	15.78	875,895	28.27	16.61
24.00	15.63	874,434	28.27	16.42
24.50	13.54	870,725	28.27	15.94
25.00	13.52	866,854	28.26	15.44
25.50	13.50	863,752	28.26	15.04
26.00	13.48	861,254	28.25	14.72

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.50	13.46	859,233	28.25	14.47
27.00	13.44	857,589	28.25	14.26
27.50	13.42	856,245	28.25	14.10
28.00	13.40	855,139	28.24	13.96
28.50	13.38	854,222	28.24	13.84
29.00	13.36	853,456	28.24	13.75
29.50	13.34	852,810	28.24	13.67
30.00	13.32	852,260	28.24	13.60
30.50	13.30	851,786	28.24	13.54
31.00	13.28	851,373	28.24	13.49
31.50	13.26	851,009	28.24	13.45
32.00	13.24	850,683	28.24	13.41
32.50	13.21	850,389	28.24	13.37
33.00	13.19	850,119	28.24	13.34
33.50	13.17	849,868	28.24	13.31
34.00	13.15	849,633	28.24	13.28
34.50	13.13	849,410	28.24	13.25
35.00	13.11	849,197	28.24	13.23
35.50	13.09	848,992	28.24	13.20
36.00	13.07	848,792	28.24	13.18
36.50	13.04	848,597	28.24	13.15
37.00	13.02	848,405	28.23	13.13
37.50	13.00	848,216	28.23	13.11
38.00	12.98	848,029	28.23	13.08
38.50	12.96	847,843	28.23	13.06
39.00	12.94	847,658	28.23	13.04
39.50	12.91	847,474	28.23	13.02
40.00	12.89	847,292	28.23	12.99
40.50	12.88	847,116	28.23	12.97
41.00	12.86	846,947	28.23	12.95
41.50	12.84	846,785	28.23	12.93
42.00	12.83	846,631	28.23	12.91
42.50	12.82	846,484	28.23	12.90
43.00	12.80	846,343	28.23	12.88
43.50	12.79	846,208	28.23	12.86
44.00	12.78	846,079	28.23	12.85
44.50	12.76	845,955	28.23	12.83
45.00	12.75	845,837	28.23	12.82
45.50	12.74	845,722	28.23	12.80
46.00	12.73	845,612	28.23	12.79
46.50	12.72	845,506	28.23	12.78
47.00	12.71	845,403	28.23	12.76
47.50	12.70	845,304	28.23	12.75
48.00	12.69	845,207	28.23	12.74
48.50	12.68	845,114	28.23	12.73
49.00	12.67	845,024	28.23	12.72
49.50	12.66	844,936	28.23	12.71
50.00	12.65	844,850	28.23	12.70
50.50	12.64	844,767	28.23	12.69
51.00	12.63	844,685	28.23	12.68
51.50	12.63	844,606	28.23	12.67
52.00	12.62	844,529	28.23	12.66
52.50	12.61	844,454	28.23	12.65

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
53.00	12.60	844,380	28.23	12.64
53.50	12.59	844,308	28.23	12.63
54.00	12.59	844,237	28.23	12.62
54.50	12.58	844,168	28.23	12.62
55.00	12.57	844,100	28.23	12.61
55.50	12.56	844,034	28.23	12.60
56.00	12.56	843,968	28.23	12.59
56.50	12.55	843,904	28.23	12.58
57.00	12.54	843,841	28.23	12.58
57.50	12.54	843,779	28.23	12.57
58.00	12.53	843,718	28.23	12.56
58.50	12.52	843,658	28.23	12.55
59.00	12.52	843,600	28.23	12.55
59.50	12.51	843,542	28.23	12.54
60.00	12.50	843,485	28.23	12.53
60.50	12.50	843,428	28.23	12.53
61.00	12.49	843,373	28.23	12.52
61.50	12.48	843,319	28.23	12.51
62.00	12.48	843,265	28.23	12.51
62.50	12.47	843,212	28.23	12.50
63.00	12.47	843,160	28.23	12.50
63.50	12.46	843,108	28.23	12.49
64.00	12.45	843,057	28.23	12.48
64.50	12.45	843,007	28.23	12.48
65.00	12.44	842,958	28.23	12.47
65.50	12.44	842,909	28.23	12.47
66.00	12.43	842,861	28.23	12.46
66.50	12.43	842,813	28.23	12.45
67.00	12.42	842,766	28.23	12.45
67.50	12.42	842,720	28.23	12.44
68.00	12.41	842,674	28.23	12.44
68.50	12.41	842,628	28.23	12.43
69.00	12.40	842,583	28.23	12.43
69.50	12.40	842,539	28.23	12.42
70.00	12.39	842,495	28.23	12.42
70.50	12.39	842,452	28.23	12.41
71.00	12.38	842,409	28.23	12.41
71.50	12.38	842,366	28.23	12.40
72.00	12.37	842,324	28.23	12.40
72.50	12.37	842,282	28.23	12.39
73.00	12.36	842,241	28.23	12.39
73.50	12.36	842,200	28.23	12.38
74.00	12.35	842,160	28.23	12.38
74.50	12.35	842,119	28.23	12.37
75.00	12.34	842,080	28.23	12.37
75.50	12.34	842,040	28.23	12.36
76.00	12.33	842,001	28.23	12.36
76.50	12.33	841,962	28.23	12.35
77.00	12.33	841,924	28.23	12.35
77.50	12.32	841,886	28.23	12.34
78.00	12.32	841,848	28.23	12.34
78.50	12.31	841,810	28.23	12.33
79.00	12.31	841,773	28.23	12.33

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
79.50	12.30	841,736	28.23	12.32
80.00	12.30	841,699	28.23	12.32
80.50	12.30	841,663	28.23	12.32
81.00	12.29	841,626	28.23	12.31
81.50	12.29	841,590	28.22	12.31
82.00	12.28	841,555	28.22	12.30
82.50	12.28	841,519	28.22	12.30
83.00	12.28	841,484	28.22	12.29
83.50	12.27	841,449	28.22	12.29
84.00	12.27	841,414	28.22	12.29
84.50	12.26	841,379	28.22	12.28
85.00	12.26	841,345	28.22	12.28
85.50	12.26	841,310	28.22	12.27
86.00	12.25	841,276	28.22	12.27
86.50	12.25	841,242	28.22	12.27
87.00	12.24	841,209	28.22	12.26
87.50	12.24	841,175	28.22	12.26
88.00	12.24	841,142	28.22	12.25
88.50	12.23	841,109	28.22	12.25
89.00	12.23	841,075	28.22	12.25
89.50	12.22	841,043	28.22	12.24
90.00	12.22	841,010	28.22	12.24
90.50	12.22	840,977	28.22	12.23
91.00	12.21	840,945	28.22	12.23
91.50	12.21	840,912	28.22	12.23
92.00	12.20	840,880	28.22	12.22
92.50	12.20	840,848	28.22	12.22
93.00	12.20	840,816	28.22	12.22
93.50	12.19	840,784	28.22	12.21
94.00	12.19	840,752	28.22	12.21
94.50	12.19	840,720	28.22	12.20
95.00	12.18	840,689	28.22	12.20
95.50	12.18	840,657	28.22	12.20
96.00	12.18	840,626	28.22	12.19
96.50	12.17	840,595	28.22	12.19
97.00	12.17	840,564	28.22	12.19
97.50	12.16	840,532	28.22	12.18
98.00	12.16	840,501	28.22	12.18
98.50	12.16	840,471	28.22	12.17
99.00	12.15	840,440	28.22	12.17
99.50	12.15	840,409	28.22	12.17
100.00	12.15	840,378	28.22	12.16
100.50	12.14	840,348	28.22	12.16
101.00	12.14	840,317	28.22	12.16
101.50	12.14	840,287	28.22	12.15
102.00	12.13	840,256	28.22	12.15
102.50	12.13	840,226	28.22	12.15
103.00	12.12	840,196	28.22	12.14
103.50	12.12	840,165	28.22	12.14
104.00	12.12	840,135	28.22	12.13
104.50	12.11	840,105	28.22	12.13
105.00	12.11	840,075	28.22	12.13
105.50	12.11	840,045	28.22	12.12



**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
106.00	12.10	840,015	28.22	12.12
106.50	12.10	839,985	28.22	12.12
107.00	12.10	839,955	28.22	12.11
107.50	12.09	839,925	28.22	12.11
108.00	12.09	839,895	28.22	12.11
108.50	12.09	839,866	28.22	12.10
109.00	12.08	839,836	28.22	12.10
109.50	12.08	839,806	28.22	12.10
110.00	12.08	839,777	28.22	12.09
110.50	12.07	839,747	28.22	12.09
111.00	12.07	839,717	28.22	12.08
111.50	12.06	839,688	28.22	12.08
112.00	12.06	839,658	28.22	12.08
112.50	12.06	839,629	28.22	12.07
113.00	12.05	839,599	28.22	12.07
113.50	12.05	839,570	28.22	12.07
114.00	12.05	839,540	28.22	12.06
114.50	12.04	839,511	28.22	12.06
115.00	12.04	839,482	28.22	12.06
115.50	12.04	839,452	28.22	12.05
116.00	12.03	839,423	28.22	12.05
116.50	12.03	839,393	28.22	12.05
117.00	12.03	839,364	28.22	12.04
117.50	12.02	839,335	28.22	12.04
118.00	12.02	839,305	28.22	12.04
118.50	12.02	839,276	28.22	12.03
119.00	12.01	839,247	28.22	12.03
119.50	12.01	839,218	28.22	12.03
120.00	12.01	839,188	28.22	12.02
120.50	12.00	839,159	28.22	12.02
121.00	12.00	839,130	28.22	12.02
121.50	12.00	839,101	28.22	12.01
122.00	11.99	839,072	28.22	12.01
122.50	11.99	839,042	28.22	12.00
123.00	11.99	839,013	28.22	12.00
123.50	11.98	838,984	28.22	12.00
124.00	11.98	838,955	28.22	11.99
124.50	11.97	838,926	28.22	11.99
125.00	11.97	838,896	28.22	11.99
125.50	11.97	838,867	28.22	11.98
126.00	11.96	838,838	28.22	11.98
126.50	11.96	838,809	28.22	11.98
127.00	11.96	838,780	28.22	11.97
127.50	11.95	838,751	28.22	11.97
128.00	11.95	838,721	28.22	11.97
128.50	11.95	838,692	28.22	11.96
129.00	11.94	838,663	28.22	11.96
129.50	11.94	838,634	28.22	11.96
130.00	11.94	838,605	28.22	11.95
130.50	11.93	838,575	28.22	11.95
131.00	11.93	838,546	28.22	11.95
131.50	11.93	838,517	28.22	11.94
132.00	11.92	838,488	28.22	11.94

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
132.50	11.92	838,459	28.22	11.94
133.00	11.92	838,430	28.22	11.93
133.50	11.91	838,400	28.22	11.93
134.00	11.91	838,371	28.22	11.93
134.50	11.91	838,342	28.22	11.92
135.00	11.90	838,313	28.22	11.92
135.50	11.90	838,283	28.22	11.92
136.00	11.90	838,254	28.22	11.91
136.50	11.89	838,225	28.22	11.91
137.00	11.89	838,195	28.22	11.91
137.50	11.89	838,166	28.22	11.90
138.00	11.88	838,137	28.22	11.90
138.50	11.88	838,107	28.22	11.89
139.00	11.87	838,078	28.22	11.89
139.50	11.87	838,049	28.22	11.89
140.00	11.87	838,020	28.22	11.88
140.50	11.86	837,990	28.22	11.88
141.00	11.86	837,961	28.22	11.88
141.50	11.86	837,932	28.22	11.87
142.00	11.85	837,903	28.22	11.87
142.50	11.85	837,873	28.22	11.87
143.00	11.85	837,844	28.22	11.86
143.50	11.84	837,815	28.22	11.86
144.00	11.84	837,785	28.22	11.86
144.50	11.84	837,756	28.22	11.85
145.00	11.83	837,726	28.22	11.85
145.50	11.83	837,697	28.22	11.85
146.00	11.83	837,668	28.22	11.84
146.50	11.82	837,638	28.22	11.84
147.00	11.82	837,609	28.22	11.84
147.50	11.82	837,579	28.22	11.83
148.00	11.81	837,550	28.22	11.83
148.50	11.81	837,520	28.22	11.83
149.00	11.81	837,491	28.22	11.82
149.50	11.80	837,461	28.22	11.82
150.00	11.80	837,432	28.22	11.81
150.50	11.80	837,402	28.22	11.81
151.00	11.79	837,373	28.22	11.81
151.50	11.79	837,343	28.22	11.80
152.00	11.78	837,314	28.22	11.80
152.50	11.78	837,284	28.22	11.80
153.00	11.78	837,254	28.22	11.79
153.50	11.77	837,225	28.22	11.79
154.00	11.77	837,195	28.22	11.79
154.50	11.77	837,165	28.22	11.78
155.00	11.76	837,136	28.22	11.78
155.50	11.76	837,106	28.22	11.78
156.00	11.76	837,076	28.22	11.77
156.50	11.75	837,047	28.22	11.77
157.00	11.75	837,017	28.22	11.77
157.50	11.75	836,987	28.22	11.76
158.00	11.74	836,957	28.22	11.76
158.50	11.74	836,928	28.22	11.76

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
159.00	11.74	836,898	28.22	11.75
159.50	11.73	836,868	28.22	11.75
160.00	11.73	836,838	28.22	11.75
160.50	11.73	836,808	28.22	11.74
161.00	11.72	836,779	28.22	11.74
161.50	11.72	836,749	28.22	11.73
162.00	11.71	836,719	28.22	11.73
162.50	11.71	836,689	28.22	11.73
163.00	11.71	836,659	28.22	11.72
163.50	11.70	836,629	28.22	11.72
164.00	11.70	836,599	28.22	11.72
164.50	11.70	836,569	28.22	11.71
165.00	11.69	836,539	28.22	11.71
165.50	11.69	836,509	28.22	11.71
166.00	11.69	836,479	28.22	11.70
166.50	11.68	836,449	28.22	11.70
167.00	11.68	836,419	28.22	11.70
167.50	11.68	836,389	28.22	11.69
168.00	11.67	836,359	28.22	11.69
168.50	11.67	836,329	28.22	11.69
169.00	11.67	836,299	28.22	11.68
169.50	11.66	836,269	28.22	11.68
170.00	11.66	836,239	28.22	11.67
170.50	11.65	836,209	28.22	11.67
171.00	11.65	836,178	28.22	11.67
171.50	11.65	836,148	28.22	11.66
172.00	11.64	836,118	28.22	11.66
172.50	11.64	836,088	28.22	11.66
173.00	11.64	836,058	28.22	11.65
173.50	11.63	836,027	28.22	11.65
174.00	11.63	835,997	28.22	11.65
174.50	11.63	835,967	28.22	11.64
175.00	11.62	835,936	28.22	11.64
175.50	11.62	835,906	28.22	11.64
176.00	11.62	835,876	28.22	11.63
176.50	11.61	835,845	28.22	11.63
177.00	11.61	835,815	28.22	11.63
177.50	11.60	835,785	28.22	11.62
178.00	11.60	835,754	28.22	11.62
178.50	11.60	835,724	28.22	11.61
179.00	11.59	835,693	28.22	11.61
179.50	11.59	835,663	28.22	11.61
180.00	11.59	835,633	28.22	11.60
180.50	11.58	835,602	28.22	11.60
181.00	11.58	835,572	28.22	11.60
181.50	11.58	835,541	28.22	11.59
182.00	11.57	835,510	28.22	11.59
182.50	11.57	835,480	28.22	11.59
183.00	11.57	835,449	28.22	11.58
183.50	11.56	835,419	28.22	11.58
184.00	11.56	835,388	28.22	11.58
184.50	11.55	835,357	28.22	11.57
185.00	11.55	835,327	28.22	11.57

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
185.50	11.55	835,296	28.22	11.56
186.00	11.54	835,266	28.22	11.56
186.50	11.54	835,235	28.22	11.56
187.00	11.54	835,204	28.22	11.55
187.50	11.53	835,173	28.22	11.55
188.00	11.53	835,143	28.22	11.55
188.50	11.53	835,112	28.22	11.54
189.00	11.52	835,081	28.22	11.54
189.50	11.52	835,050	28.22	11.54
190.00	11.52	835,019	28.22	11.53
190.50	11.51	834,989	28.22	11.53
191.00	11.51	834,958	28.22	11.53
191.50	11.50	834,927	28.22	11.52
192.00	11.50	834,896	28.22	11.52
192.50	11.50	834,865	28.22	11.51
193.00	11.49	834,834	28.22	11.51
193.50	11.49	834,803	28.22	11.51
194.00	11.49	834,772	28.22	11.50
194.50	11.48	834,741	28.22	11.50
195.00	11.48	834,710	28.22	11.50
195.50	11.48	834,679	28.21	11.49
196.00	11.47	834,648	28.21	11.49
196.50	11.47	834,617	28.21	11.49
197.00	11.46	834,586	28.21	11.48
197.50	11.46	834,555	28.21	11.48
198.00	11.46	834,524	28.21	11.47
198.50	11.45	834,493	28.21	11.47
199.00	11.45	834,462	28.21	11.47
199.50	11.45	834,430	28.21	11.46
200.00	11.44	834,399	28.21	11.46
200.50	11.44	834,368	28.21	11.46
201.00	11.44	834,337	28.21	11.45
201.50	11.43	834,305	28.21	11.45
202.00	11.43	834,274	28.21	11.45
202.50	11.42	834,243	28.21	11.44
203.00	11.42	834,212	28.21	11.44
203.50	11.42	834,180	28.21	11.43
204.00	11.41	834,149	28.21	11.43
204.50	11.41	834,118	28.21	11.43
205.00	11.41	834,086	28.21	11.42
205.50	11.40	834,055	28.21	11.42
206.00	11.40	834,023	28.21	11.42
206.50	11.40	833,992	28.21	11.41
207.00	11.39	833,961	28.21	11.41
207.50	11.39	833,929	28.21	11.41
208.00	11.38	833,898	28.21	11.40
208.50	11.38	833,866	28.21	11.40
209.00	11.38	833,835	28.21	11.39
209.50	11.37	833,803	28.21	11.39
210.00	11.37	833,771	28.21	11.39
210.50	11.37	833,740	28.21	11.38
211.00	11.36	833,708	28.21	11.38
211.50	11.36	833,677	28.21	11.38

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
212.00	11.35	833,645	28.21	11.37
212.50	11.35	833,613	28.21	11.37
213.00	11.35	833,582	28.21	11.36
213.50	11.34	833,550	28.21	11.36
214.00	11.34	833,518	28.21	11.36
214.50	11.34	833,487	28.21	11.35
215.00	11.33	833,455	28.21	11.35
215.50	11.33	833,423	28.21	11.35
216.00	11.33	833,391	28.21	11.34
216.50	11.32	833,359	28.21	11.34
217.00	11.32	833,328	28.21	11.34
217.50	11.31	833,296	28.21	11.33
218.00	11.31	833,264	28.21	11.33
218.50	11.31	833,232	28.21	11.32
219.00	11.30	833,200	28.21	11.32
219.50	11.30	833,168	28.21	11.32
220.00	11.30	833,136	28.21	11.31
220.50	11.29	833,104	28.21	11.31
221.00	11.29	833,072	28.21	11.31
221.50	11.28	833,040	28.21	11.30
222.00	11.28	833,008	28.21	11.30
222.50	11.28	832,976	28.21	11.29
223.00	11.27	832,944	28.21	11.29
223.50	11.27	832,912	28.21	11.29
224.00	11.27	832,880	28.21	11.28
224.50	11.26	832,848	28.21	11.28
225.00	11.26	832,816	28.21	11.28
225.50	11.25	832,783	28.21	11.27
226.00	11.25	832,751	28.21	11.27
226.50	11.25	832,719	28.21	11.26
227.00	11.24	832,687	28.21	11.26
227.50	11.24	832,655	28.21	11.26
228.00	11.24	832,622	28.21	11.25
228.50	11.23	832,590	28.21	11.25
229.00	11.23	832,558	28.21	11.25
229.50	11.22	832,525	28.21	11.24
230.00	11.22	832,493	28.21	11.24
230.50	11.22	832,461	28.21	11.24
231.00	11.21	832,428	28.21	11.23
231.50	11.21	832,396	28.21	11.23
232.00	11.21	832,364	28.21	11.22
232.50	11.20	832,331	28.21	11.22
233.00	11.20	832,299	28.21	11.22
233.50	11.19	832,266	28.21	11.21
234.00	11.19	832,234	28.21	11.21
234.50	11.19	832,201	28.21	11.21
235.00	11.18	832,169	28.21	11.20
235.50	11.18	832,136	28.21	11.20
236.00	11.18	832,103	28.21	11.19
236.50	11.17	832,071	28.21	11.19
237.00	11.17	832,038	28.21	11.19
237.50	11.16	832,006	28.21	11.18
238.00	11.16	831,973	28.21	11.18

**Hydrograph for Pond 3P: Rainfall Surge Pond (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
238.50	11.16	831,940	28.21	11.17
239.00	11.10	831,882	28.21	11.17
239.50	11.01	831,699	28.21	11.15
240.00	10.94	831,419	28.21	11.11
240.50	10.87	831,078	28.21	11.08
241.00	10.81	830,699	28.21	11.03
241.50	10.76	830,299	28.21	10.99
242.00	10.71	829,891	28.21	10.94
242.50	10.67	829,482	28.21	10.89
243.00	10.62	829,079	28.21	10.85
243.50	10.58	828,683	28.21	10.80
244.00	10.55	828,297	28.21	10.76
244.50	10.51	827,922	28.21	10.71
245.00	10.47	827,558	28.20	10.67
245.50	10.44	827,205	28.20	10.63
246.00	10.41	826,862	28.20	10.59
246.50	10.37	826,527	28.20	10.56
247.00	10.34	826,201	28.20	10.52
247.50	10.31	825,883	28.20	10.48
248.00	10.28	825,571	28.20	10.45
248.50	10.24	825,265	28.20	10.41
249.00	10.21	824,965	28.20	10.38
249.50	10.18	824,668	28.20	10.35
250.00	10.15	824,376	28.20	10.31