ALLIANT ENERGY
Interstate Power and Light Company
Prairie Creek Generating Station

CCR SURFACE IMPOUNDMENT

INFLOW DESIGN FLOOD CONTROL PLAN

Report Issued: October 10, 2016
Revision 0

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EXECUTIVE SUMMARY

This Inflow Flood Control Plan (Report) is prepared in accordance with the requirements of the United States Environmental Protection Agency (USEPA) published Final Rule for Hazardous and Solid Waste Management System – Disposal of Coal Combustion Residual from Electric Utilities (40 CFR Parts 257 and 261, also known as the CCR Rule) published on April 17, 2015 and effective October 19, 2015.

This Report assesses the hydrologic and hydraulic capacity requirements for each CCR unit at Prairie Creek Generating Station in Cedar Rapids, Iowa in accordance with §257.82 of the CCR Rule. For purposes of this Report, a CCR unit is defined as any existing CCR surface impoundment. Primarily, the Report documents how the inflow design flood control system has been designed and constructed to meet the CCR Rule section §257.82.

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1 Introduction

The owner or operator of the Coal Combustion Residual (CCR) unit must conduct an initial and periodic inflow design flood control system plan to determine if each CCR unit adequately manages flow into and from each CCR unit during and following the peak discharge of the inflow design flood. The inflow design flood is selected based on the hazard potential classification (§257.73(a)(2)) for each CCR unit.

This Report is prepared in accordance with the requirements of §257.82 of the CCR Rule.

1.1 CCR Rule Applicability

The CCR Rule requires an initial and periodic inflow design flood control system plan certified by a qualified professional engineer (PE) for all existing CCR surface impoundments. This report is the initial inflow design flood control system plan.

1.2 Hydrologic and Hydraulic Capacity Applicability

The Prairie Creek Generating Station (PCS) in Cedar Rapids, Iowa (Figure 1) has eight existing CCR surface impoundments; PCS Ponds 1 through 7 and the PCS Discharge Pond (PCS Pond 8). There are also three impoundments, PCS Pond 9, PCS Pond 10, and PCS Pond 11, which are not CCR units.

The impoundments are grouped into discharge areas:

- PCS Northern Impoundments (PCS Pond 1, PCS Pond 2, PCS Pond 3, and PCS Pond 4)
- PCS Southern Impoundments (PCS Pond 5, PCS Pond 6, PCS Pond 7, PCS Pond 9, PCS Pond 10, and PCS Pond 11)
- PCS Discharge Pond (PCS Pond 8)

The PCS Northern Impoundments are interconnected and drain the northern limits of PCS, Figure 2. The PCS Southern Impoundments drain a larger area south of the northern drainage area. Both drainage areas discharge to the PCS Discharge Pond (Pond 8), where the outfall flow rate is metered prior to discharge into Prairie Creek.

PCS Discharge Pond and PCS Pond 7 are formed by an embankment on the western end of the drainage basin. All other impoundments in each drainage basin are incised.

2 FACILITY DESCRIPTION

PCS is located in the City of Cedar Rapids, Iowa. The generating plant is located approximately 800 feet west of the western shore of the Cedar River and 1,000 feet east of the eastern shore of Prairie Creek. PCS is located in Linn County, at 3300 C Street S.W., Cedar Rapids, Iowa (Figure 1).

PCS is a fossil-fueled electric generating and steam production station consisting of four coal-fired boilers (Unit 1, Unit 2, Unit 3, and Unit 4), two natural gas-fired package boilers (Unit 5 and Unit 6) and three steam electric turbine generating units. The Unit 2 turbine generator was decommissioned in 2013. Boilers 5 and 6 are used for steam production only and are independent of the turbine generators. Sub-bituminous coal is the primary fuel for producing steam at PCS. The burning of coal produces a by-product of CCR. The CCR at PCS is categorized into two types, bottom ash and precipitator fly ash.

The precipitator fly ash at PCS is collected by the electrostatic precipitators and sent to the on-site storage silos located on the east and west sides of the generating plant. The precipitator fly ash is then transported off-site for beneficial reuse or disposal.

The Northern Impoundment System receives bottom ash and sluice water. The bottom ash is sluiced at 0.08 million gallons per day (MGD) from Unit 3 and 0.39 MGD from Unit 4 into to PCS Pond 1 west of the generating plant, Figure 2. The bottom ash settles in PCS Pond 1 and is removed and stockpiled to dewater at the east end of PCS Pond 1. Additionally, the floor sumps and ash overflow tank discharge into PCS Pond 1 at 1.07 MGD and 1.22 MGD respectively.

The Southern Impoundment System, PCS Pond 5, PCS Pond 6, PCS Pond 7, PCS Pond 9, PCS Pond 10, and PCS Pond 11 receive sump water from the power station and from the coal handling area. The impoundments also act as a backup discharge pathway for PCS Pond 1 through the interconnection between PCS Pond 2 and PCS Pond 5. The sump

water flow is from the basement of the generating station into PCS Pond 11 at 0.07 MGD and from the coal handling facilities into PCS Pond 9 at 0.5 MGD.

The Northern and Southern Impoundment Systems discharge into a final surface impoundment identified as the PCS Discharge Pond (PCS Pond 8). The water in the PCS Discharge Pond discharges through the facilities National Pollution Discharge Elimination System (NPDES) Outfall 002. From the NPDES Outfall 002 the water flows into Prairie Creek.

The impoundments of the Northern and Southern Impoundment Systems are all existing CCR surface impoundments, except for PCS Pond 9, Pond 10, and Pond 11. IPL has determined that PCS Pond 9, PCS Pond 10 and PCS Pond 11 have not contained or received any CCR on or after October 19, 2015, and therefore, are exempt from the requirements of the CCR Rule. Additionally, PCS Discharge Pond and PCS Pond 7 are the only non-incised surface impoundments at PCS.

General Facility Information:

Date of Initial Facility Operations:	1950
NPDES Permit Number:	IA5715108
Latitude / Longitude:	41°56'38.43"N 91°38'22.39"W
Coordinates:	Section 3, Township 82 North, Range 7 West
Unit Nameplate Ratings:	Unit 1 (1996): 16 MW
	Unit 2 (1952): Turbine Decommissioned in 2013
	Unit 3 (1958): 50 MW,
	Unit 4 (1968): 149 MW,

2.1 Northern Impoundment System

In addition to receiving sluiced bottom ash, the plant area to the east of PCS Pond 1, including mainly the plant substation, drains to PCS Pond 1 during rain events. The water elevation in PCS Pond 1 is controlled with a weir board that overflows to an open channel connection with PCS Pond 2, Figure 2. PCS Pond 2 is an impoundment that

normally discharges through an open channel into PCS Pond 3. An alternate high water elevation overflow from PCS Pond 2 at elevation 714.5 (feet above sea level) through a 24-inch diameter corrugated metal pipe allows water to flow to or from PCS Pond 5 of the Southern Impoundment System during high water events. PCS Pond 3 discharges to PCS Pond 4 through an 18-inch diameter metal pipe at invert elevation 712.6 feet (approximately 2 feet below the emergency outlet of PCS Pond 2). PCS Pond 4 is the final impoundment in the string of northern impoundments and is formed by construction of an embankment at the western end. PCS Pond 4 discharges into a 30-inch diameter vertical riser pipe connected to a 30-inch diameter corrugated metal pipe under the embankment discharging into the PCS Discharge Pond (PCS Pond 8). The invert elevation on the top of the riser pipe is elevation 713.7 feet. The incised PCS Pond 3 has emergency overflow capacity to pass water over the interior embankment that separates PCS Pond 3 and PCS Pond 4 in the event that storm water storage exceeds elevation 715.5 feet. The outlet structure on PCS Pond 4 is the final and only storm water critical outlet on the Northern Impoundment System.

2.2 Southern Impoundment System

PCS Pond 9 receives storm water runoff from the PCS plant site, Figure 2. PCS Pond 9 also receives sump water flow from the generating station at via PCS Pond 11. PCS Pond 9 discharges through a 15 inch diameter PVC pipe at invert elevation 714.7 feet south under a plant railroad spur. PCS Pond 10 receives storm water from the CCR storage area and one half of the coal storage area and sump discharge from the coal handling shakerhouse, Figure 1. PCS Pond 10 overflows through a 48-inch diameter concrete pipe at invert elevation 711.5 feet, under the railroad spur. PCS Pond 5 receives flow from PCS Pond 10 and is interconnected with PCS Pond 2 of the Northern Impoundment System. During normal flow conditions, the water in PCS Pond 5 flows to the west through a 24-inch diameter corrugated metal pipe at invert elevation 721.9 feet into incised PCS Pond 6. PCS Pond 6 receives influent flows from PCS Pond 5, and small amounts of storm water runoff. The water in PCS Pond 6 flows to the west through a 24-

inch diameter corrugated metal pipe at invert elevation 712.6 feet into PCS Pond 7. PCS Pond 7 receives influent flows from PCS Pond 6 and controls the normal operating elevation of the southern impoundment system with its 24-inch diameter vertical riser outfall at elevation 713.5 feet. The discharge water from PCS Pond 7 flows to the west through a 24-inch diameter metal pipe under the embankment and into the southeast corner of the PCS Discharge Pond.

2.3 PCS Discharge Pond (PCS Pond 8)

The PCS Discharge Pond is the final impoundment in the CCR surface impoundment system and is located after both the Northern Impoundment System and the Southern Impoundment System.

The PCS Discharge Pond contains a metering Parshall flume cut into the embankment of the impoundment discharging at an elevation of 711 feet. During storm events, the capacity of the metering system is exceeded and water discharges through a V-notch channel with a top width of 13 feet at elevation 713 feet. Above elevation 713 feet the embankment is overtopped.

3 HYDROLOGIC AND HYDRAULIC CAPACITY- §257.82(a)

This Report provides hydrologic and hydraulic capacity information for inflow design flood control systems which is intended to:

1. Adequately manage flow into each CCR unit during and following the peak discharge inflow of the specified design flood,
2. Adequately manage flow from each CCR unit during and following the peak discharge inflow of the specified design flood; and,
3. Handle discharge from the CCR unit in accordance with National Pollutant Discharge Elimination System (NPDES) regulations §257.3-3.

3.1 Hazard Classification and Design Storm

PCS Pond 7 and PCS Discharge Pond are classified as low hazard potential because failure or mis-operation has no probable loss of human life and low economic and/or environmental losses. Additionally, losses would be principally limited to the owner's property. PCS Pond 1, PCS Pond 2, PCS Pond 3, PCS Pond 4, PCS Pond 5, and PCS Pond 6 are incised impoundments without hazard of release.

The design storm for PCS Pond 7 and PCS Discharge Pond is the 100 year return event SCS Type II 24 hour storm as defined in §257.82(3)(ii). The total rainfall for the event selected from the National Oceanographic and Atmospheric Administration's probabilistic map for the OGS site coordinates is 7.40 inches for the 100 year event, Appendix B. The design storm for the incised impoundments is the 25 year event as defined in §257.82(3)(iv).

Since the incised impoundment storage volume is integral to and controlled by the discharge weirs in PCS Pond 4 and PCS Pond 7, the 100 year storm is routed through all of the impoundments and safe passage through the incised impoundments is evidence of compliance with the 25 year storm requirement.

3.2 Hydrologic and Hydraulic Capacity Methods

The 100 year SCS Type II storm was routed through the PCS Pond 4 and PCS Pond 7 over the 30-inch and 24-inch diameter outfall weirs into PCS Discharge Pond and from PCS Discharge Pond through a V-notch weir in the embankment. The routing was completed using the program Hydraflow by Intelisolve[1]. Hydraflow uses the unit hydrograph method to generate a Type II distribution rainfall for the drainage area of the impoundments. Hydraflow routes the rainfall hydrograph through the outlet structure storing water within the impoundments in accordance with the reservoir capacity of each impoundment. The proportion of runoff to rainfall for the drainage watershed is input based on characteristics of the watershed area. The drainage areas of the watershed include 20 acres of level power plant and 10 acres of water surface and embankment for a total of 30 acres draining to the PCS Discharge Pond outfall.

3.3 Hydrologic and Hydraulic Capacity Input and Assumptions

This section identifies the input and assumptions for the hydrologic and hydraulic capacity calculations. The input for each sub-drainage area of the impoundments are:

Impoundment Name	Acreage	Average Curve Number (CN)	Slope (%)	Hydraulic Length (ft)
PCS Pond 1	5.6	75	0.1	800
PCS Pond 2 & PCS Pond 3	2.1	85	0.1	150
PCS Pond 4	2.2	90	0.1	60
PCS Pond 9, PCS Pond 10, & PCS Pond 11	16.4	75	0.1	815
PCS Pond 5	3.5	85	0.1	400
PCS Pond 6	2.1	90	0.1	200
PCS Pond 7	2.6	90	0.1	200

The storm water falling in PCS Discharge Pond is ignored due to its small size. The curve numbers for the two largest areas are an average based on the soil type and the surface usage at the plant site and contribute most of the storm water runoff that is not direct

[1] Intelisolve, Pond Routing Software Hydraflow, 2002

rainfall into the impoundments. Slopes of the coal pile are ignored due to the high infiltration rate.

The outlet characteristics for PCS Pond 4 and PCS Pond 7 are controlled by vertical circular pipes that operate as overflow weirs during low flow and convert to outlet pipe flow at higher flows. For both outlet pipes the pipe flow is controlled by the flooding of PCS Discharge Pond at elevation 713 feet. The PCS Pond 4 pipe at 2.5 foot diameter stays in weir overflow during the design storm due to the capacity of the vertical riser. For the PCS Pond 7 pipe the flow changes to outlet controlled pipe flow at around 18 cubic feet per second, Appendix C.

The outlet for PCS Discharge Pond is modeled as a V-notch weir with a starting overflow elevation of 711 feet and a top surface of 713 feet at approximately 13 foot width. Above elevation 713 the V-notch becomes a broad crest weir 13 foot wide, Appendix C. The actual width of the broad crested weir increases to the full width of the embankment between 713 and 714 elevation and the analysis over predicts the overflow of the PCS Discharge Pond embankment.

During normal PCS operation, the process water flow to the Northern and Southern Impoundment Systems is 1.76 MGD and 0.06 MGD, respectively, Appendix A. At the operating water discharge rate, infiltration of water into the ground below the impoundments results in no discharge from PCS Discharge Pond. The process water does not impact the flow capacity for storm water and the starting water elevation of the impoundments is set equal to the overflow elevation of PCS Pond 4 and PCS Pond 7 as a conservative assessment of storage capacity in the impoundment systems.

The analysis assumes that the outlet of the PCS Discharge Pond outlet is not restricted by the water elevation within Prairie Creek. For this to take place, the peak storm water flow would need to occur in conjunction with a regional flooding event affecting the Cedar River, which are unlikely to occur simultaneously.

The storage capacity of the impoundments is generated by digitizing the area of the impoundment at starting water elevation and retaining the same area as water height increases. The result is a conservative estimation of the storage capacity of the impoundment systems.

Exfiltration of water from impoundments is accounted for by ignoring the operating water flow from PCS, since it normally infiltrates into the ground under the impoundments. Any increase in infiltration rate due to higher water elevations in the impoundments during the storm is ignored.

The interconnecting pipe between PCS Pond 2 and PCS Pond 5 is ignored in the analysis. If PCS Pond 5 water elevation exceed 714.5 feet (the invert on the PCS Pond 2 end of the pipe), water from PCS Pond 5 could flow into the Northern Impoundment System. Since the Southern Impoundment System has more of the drainage area this would let water route through the PCS Pond 4 outlet which is bigger than the PCS Pond 7 outlet. Ignoring the interconnection is conservative to assessing the capacity of PCS Pond 7.

4 Inflow Design Flood Control System Plan

The normal operating water elevation for PCS Pond 4 (elevation 713.7 feet) and for PCS Pond 7 (elevation 713.5 feet) are the starting elevations for routing of the 100 year storm event, Figure 2.

During the 100 year design storm, the PCS Pond 4 and PCS Pond 7 route the storm flow as summarized below:

Impoundment	Peak Flow (cfs)	Water Elevation (feet)	Crest Elevation (feet)	Freeboard (feet)
Pond 4	8.5	714.2	715	0.8
Pond 7	20.2	714.6	715	0.4
PCS Discharge Pond	28.5	713.6	N/A	N/A

PCS Discharge Pond is a metering impoundment without substantial storage that is designed to overflow during intense rain events and has no distinct crest elevation.

During the 100 year storm event the combination of both the Northern and Southern Impoundment Systems stores 6.8 acre feet of water. The incised impoundments all contain the 100 year event without overfilling and therefore meet the 25 year storm routing requirement. The calculation of volumes and storage elevation are included in Appendix D.

5 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

To meet the requirements of 40 CFR 257.82(c)(5), I Mark W. Loerop hereby certify that I am a licensed professional engineer in the State of Iowa; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR 257.82.

By: _____

Name: MARK LOEROP

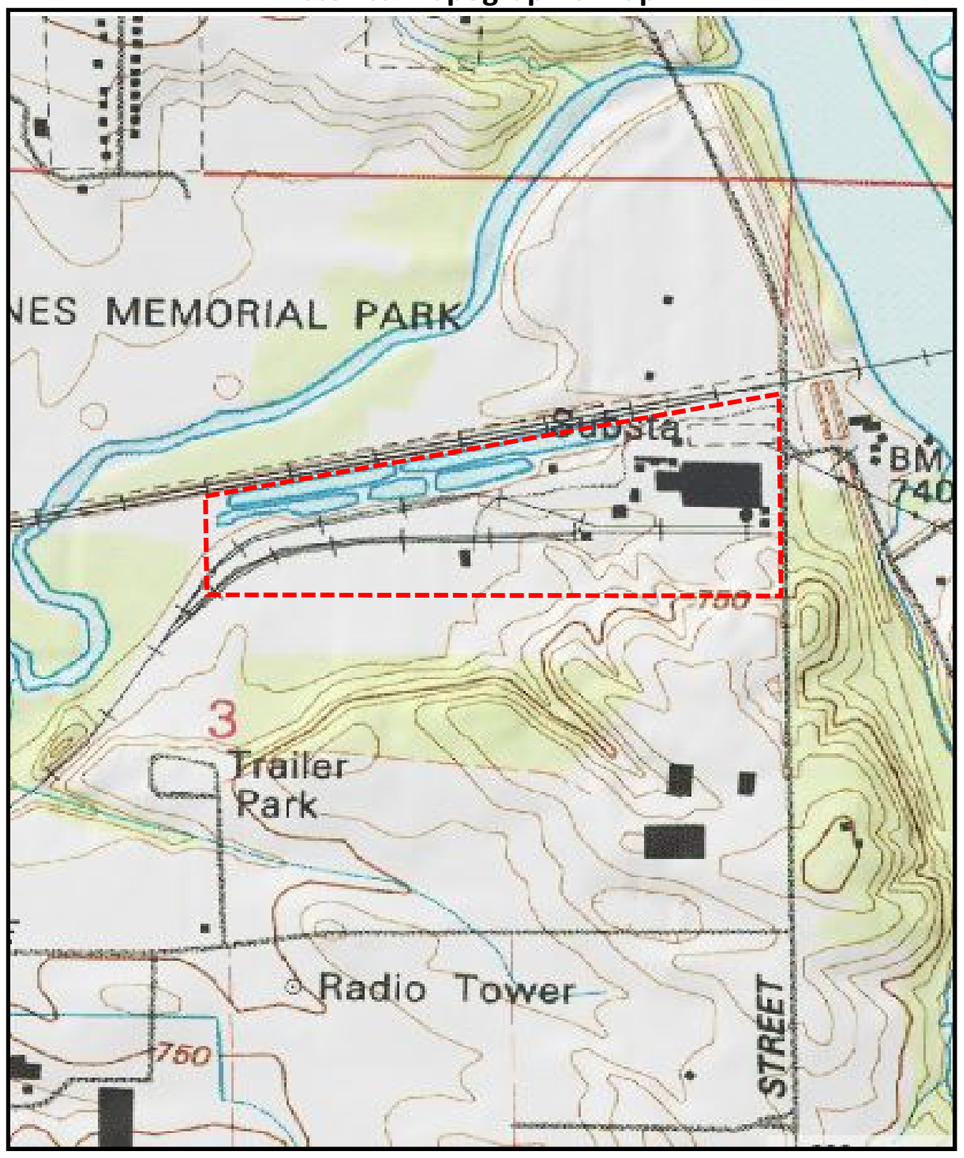
Date: OCT 10, 2016

FIGURES

Alliant Energy
Interstate Power and Light Company
Prairie Creek Generating Station
Cedar Rapids, Iowa

Inflow Design Flood Control System Plan

Historical Topographic Map



Historical Aerial Photo 3/10/2016

Approximate Property Boundary

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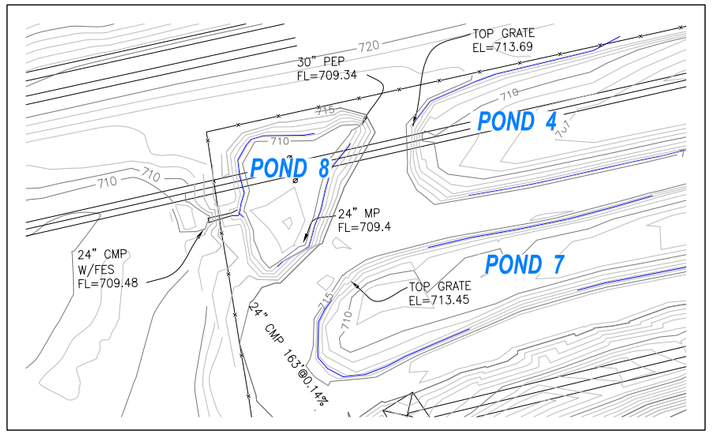
Site Location
Prairie Creek Generating Station
Interstate Power and Light Company

Drawing
Figure 1

Date
7/13/2016



LEGEND:

DIRECTION OF FLOW

N

SCALE

200 0 200 FEET

NOTICE	REV	DATE	BY	DESCRIPTION
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SCALE:	AS SHOWN
DATE:	9-14-16
DRAWN BY:	JFD
CHKD BY:	TJH
APRVD BY:	MWL

CLIENT / LOCATION

ALLIANT ENERGY – INTERSTATE POWER AND LIGHT
PRAIRIE CREEK GENERATING STATION
CEDAR RAPIDS, IOWA

DRAWING DESCRIPTION

STORM WATER DRAINAGE
DESIGN INFLOW FLOOD
CONTROL PLAN

JOB 154.018.012.004

SHT. FIGURE 2

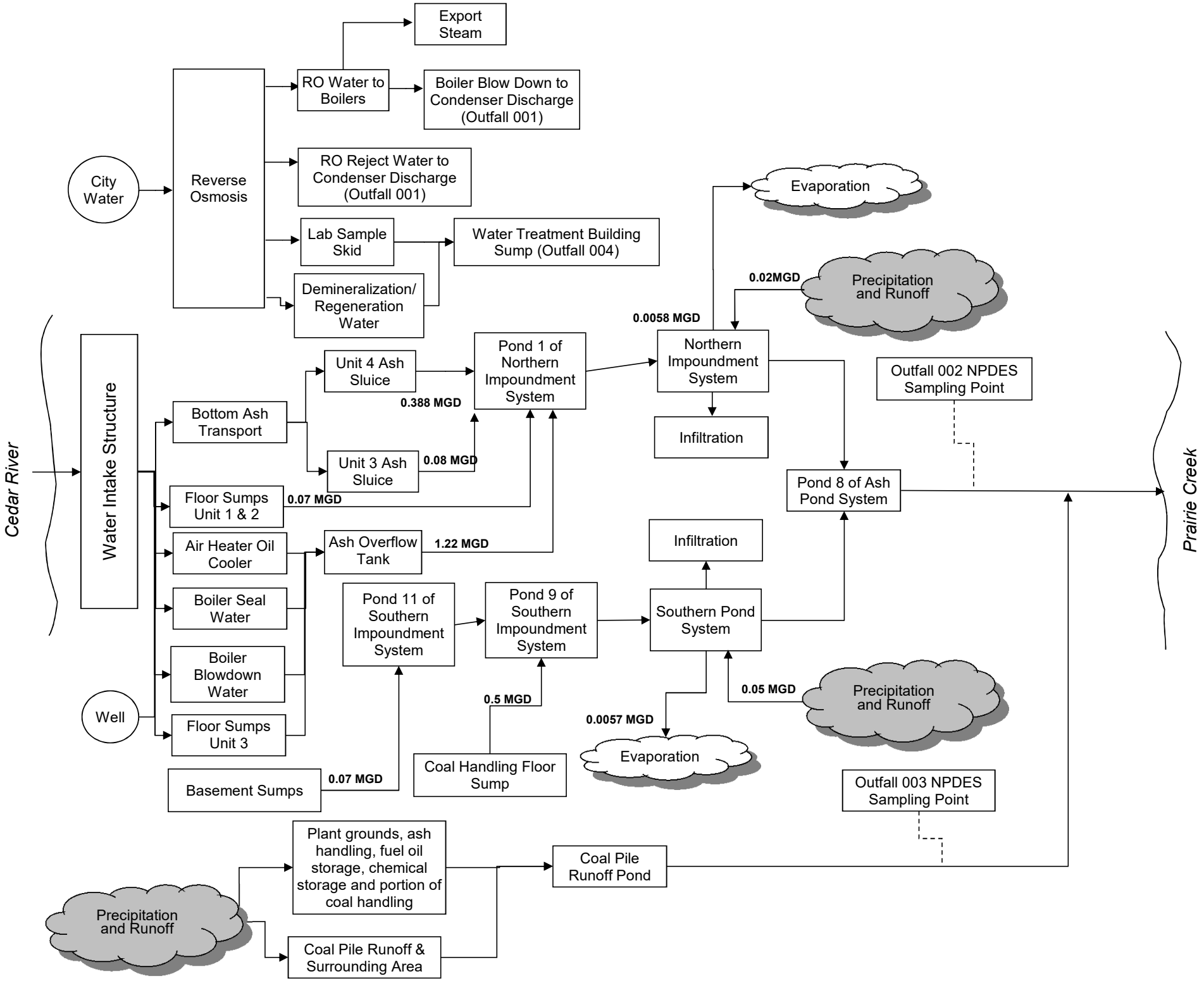
DWG. 154.018.012.004-D1

APPENDIX A – Water Balance Chart

Alliant Energy
Interstate Power and Light Company
Prairie Creek Generating Station
Cedar Rapids, Iowa

Inflow Design Flood Control System Plan

Prairie Creek Generating Station Outfall 002 Water Flow Diagram - 2016



APPENDIX B – NOAA Storm Frequency

Alliant Energy
Interstate Power and Light Company
Prairie Creek Generating Station
Cedar Rapids, Iowa

Inflow Design Flood Control System Plan

NOAA Atlas 14, Volume 8, Version 2
Location name: Cedar Rapids, Iowa, US*
Latitude: 41.9400°, Longitude: -91.6400°
Elevation: 780 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, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.378 (0.293-0.486)	0.440 (0.341-0.565)	0.543 (0.419-0.699)	0.632 (0.485-0.816)	0.759 (0.565-1.01)	0.860 (0.626-1.15)	0.964 (0.678-1.31)	1.07 (0.725-1.49)	1.22 (0.795-1.72)	1.34 (0.847-1.90)
10-min	0.554 (0.429-0.711)	0.644 (0.499-0.827)	0.796 (0.614-1.02)	0.926 (0.711-1.20)	1.11 (0.828-1.47)	1.26 (0.916-1.68)	1.41 (0.993-1.92)	1.57 (1.06-2.18)	1.79 (1.16-2.52)	1.96 (1.24-2.79)
15-min	0.676 (0.524-0.867)	0.785 (0.608-1.01)	0.970 (0.749-1.25)	1.13 (0.867-1.46)	1.35 (1.01-1.80)	1.54 (1.12-2.05)	1.72 (1.21-2.34)	1.92 (1.29-2.65)	2.18 (1.42-3.08)	2.39 (1.51-3.40)
30-min	0.954 (0.740-1.23)	1.11 (0.861-1.43)	1.38 (1.06-1.77)	1.61 (1.23-2.08)	1.93 (1.44-2.56)	2.19 (1.59-2.93)	2.46 (1.73-3.34)	2.74 (1.85-3.79)	3.12 (2.03-4.40)	3.41 (2.17-4.87)
60-min	1.24 (0.961-1.59)	1.45 (1.12-1.86)	1.80 (1.39-2.32)	2.11 (1.62-2.72)	2.56 (1.91-3.40)	2.92 (2.13-3.92)	3.31 (2.33-4.50)	3.71 (2.51-5.15)	4.27 (2.78-6.04)	4.71 (2.98-6.71)
2-hr	1.53 (1.20-1.94)	1.78 (1.39-2.26)	2.22 (1.73-2.83)	2.61 (2.03-3.34)	3.19 (2.41-4.21)	3.66 (2.69-4.86)	4.15 (2.96-5.62)	4.68 (3.20-6.45)	5.41 (3.57-7.62)	6.00 (3.84-8.50)
3-hr	1.70 (1.34-2.14)	1.98 (1.56-2.50)	2.48 (1.95-3.14)	2.93 (2.29-3.72)	3.59 (2.74-4.73)	4.15 (3.08-5.49)	4.73 (3.40-6.38)	5.36 (3.70-7.38)	6.25 (4.15-8.77)	6.96 (4.49-9.82)
6-hr	1.99 (1.59-2.49)	2.33 (1.85-2.91)	2.92 (2.32-3.66)	3.47 (2.74-4.36)	4.29 (3.31-5.60)	4.98 (3.74-6.55)	5.71 (4.15-7.66)	6.51 (4.54-8.90)	7.64 (5.13-10.7)	8.56 (5.57-12.0)
12-hr	2.29 (1.85-2.83)	2.68 (2.16-3.31)	3.37 (2.71-4.17)	4.00 (3.19-4.97)	4.96 (3.87-6.41)	5.76 (4.38-7.50)	6.62 (4.86-8.79)	7.55 (5.32-10.2)	8.87 (6.01-12.3)	9.95 (6.54-13.8)
24-hr	2.61 (2.13-3.19)	3.04 (2.48-3.72)	3.81 (3.10-4.67)	4.51 (3.64-5.54)	5.57 (4.39-7.13)	6.45 (4.96-8.32)	7.40 (5.49-9.74)	8.42 (6.00-11.3)	9.87 (6.76-13.6)	11.0 (7.34-15.3)
2-day	3.02 (2.49-3.64)	3.47 (2.86-4.19)	4.27 (3.51-5.17)	5.00 (4.08-6.08)	6.10 (4.87-7.73)	7.03 (5.46-8.98)	8.02 (6.02-10.5)	9.09 (6.54-12.1)	10.6 (7.34-14.5)	11.8 (7.95-16.3)
3-day	3.33 (2.77-4.00)	3.78 (3.13-4.53)	4.57 (3.78-5.50)	5.30 (4.36-6.39)	6.40 (5.14-8.05)	7.33 (5.73-9.31)	8.32 (6.29-10.8)	9.41 (6.82-12.5)	10.9 (7.63-14.9)	12.2 (8.24-16.7)
4-day	3.60 (3.00-4.29)	4.04 (3.37-4.83)	4.84 (4.02-5.79)	5.57 (4.60-6.69)	6.67 (5.38-8.34)	7.59 (5.96-9.59)	8.58 (6.51-11.1)	9.65 (7.03-12.8)	11.2 (7.82-15.1)	12.4 (8.42-16.9)
7-day	4.23 (3.56-5.00)	4.74 (3.99-5.61)	5.61 (4.71-6.66)	6.38 (5.32-7.60)	7.50 (6.08-9.24)	8.40 (6.65-10.5)	9.35 (7.15-11.9)	10.4 (7.59-13.6)	11.8 (8.28-15.8)	12.9 (8.80-17.4)
10-day	4.79 (4.06-5.63)	5.37 (4.54-6.31)	6.33 (5.34-7.46)	7.14 (6.00-8.46)	8.31 (6.76-10.1)	9.23 (7.33-11.4)	10.2 (7.81-12.9)	11.2 (8.22-14.5)	12.5 (8.85-16.7)	13.5 (9.33-18.3)
20-day	6.50 (5.58-7.55)	7.23 (6.20-8.40)	8.43 (7.20-9.82)	9.44 (8.01-11.0)	10.8 (8.89-13.0)	11.9 (9.55-14.5)	13.0 (10.1-16.2)	14.1 (10.5-18.1)	15.6 (11.1-20.6)	16.7 (11.6-22.4)
30-day	8.01 (6.92-9.23)	8.91 (7.69-10.3)	10.4 (8.92-12.0)	11.6 (9.89-13.4)	13.2 (10.9-15.8)	14.4 (11.7-17.5)	15.7 (12.2-19.5)	16.9 (12.6-21.6)	18.5 (13.3-24.3)	19.7 (13.8-26.4)
45-day	10.0 (8.71-11.5)	11.2 (9.71-12.8)	13.0 (11.3-15.0)	14.5 (12.5-16.8)	16.5 (13.7-19.5)	17.9 (14.6-21.6)	19.4 (15.2-23.8)	20.7 (15.6-26.3)	22.5 (16.2-29.3)	23.7 (16.7-31.6)
60-day	11.8 (10.3-13.4)	13.2 (11.5-15.1)	15.5 (13.5-17.7)	17.2 (14.9-19.8)	19.5 (16.2-22.9)	21.1 (17.2-25.2)	22.7 (17.8-27.8)	24.1 (18.2-30.4)	25.9 (18.8-33.6)	27.1 (19.2-36.0)

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

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

Please refer to NOAA Atlas 14 document for more information.

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APPENDIX C – Outfall Hydraulic Conditions

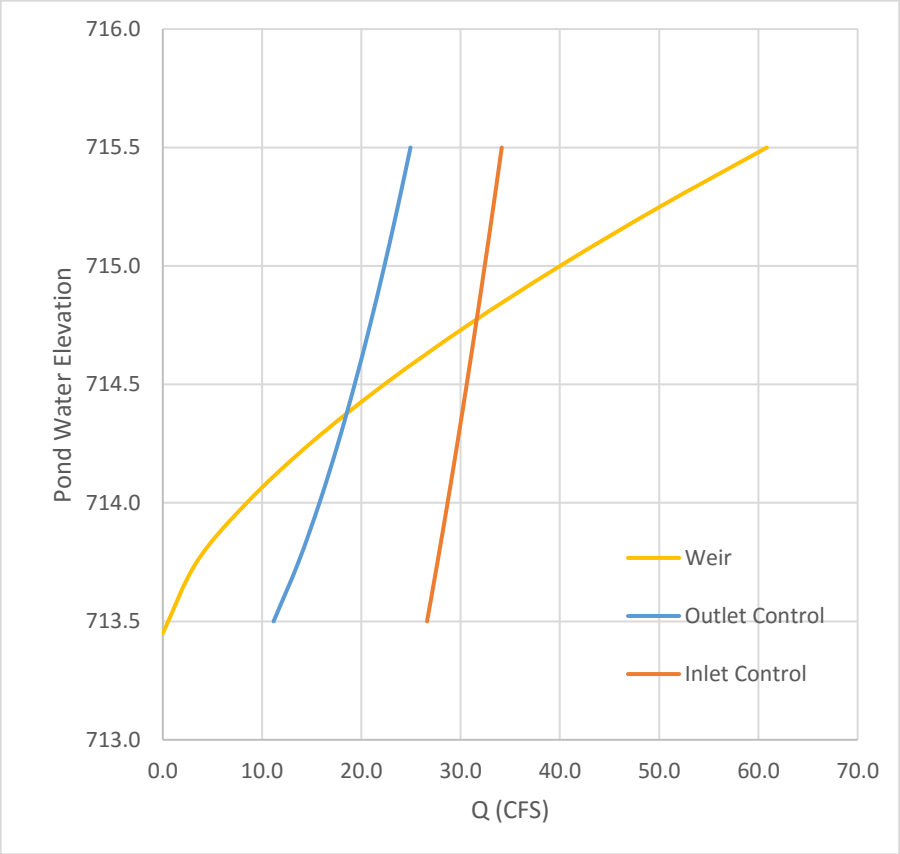
Alliant Energy
Interstate Power and Light Company
Prairie Creek Generating Station
Cedar Rapids, Iowa

Inflow Design Flood Control System Plan

Prarie Creek Generating Station - Pond # 7

SUMMERGED OUTLET

2	FT = Pipe Diameter Steel
0.5	FT = Hydraulic Radius
2.5499	k in Q outlet control equation
709.4	FT = Pipe Inlet Invert Elevation
36	FT = Length
0.02	= n for MP
0.6	= Co for Inlet Control
713	FT = Tail Water Elevation
6.2832	FT = Weir Width
3.3	= Weir Coefficient



OUTLET CONTROL / BARROW CONTROL

Q	Elevation	Head
CFS		Ft
11.159	713.50	0.5
13.668	713.75	0.8
15.782	714.00	1.0
17.645	714.25	1.3
19.329	714.50	1.5
20.877	714.75	1.8
22.319	715.00	2.0
23.673	715.25	2.3
24.953	715.50	2.5

INLET CONTROL

Q	Elevation	Head (to pipe middle)
CFS		Ft
26.623	713.50	3.1
27.675	713.75	3.35
28.689	714.00	3.6
29.669	714.25	3.85
30.617	714.50	4.1
31.536	714.75	4.35
32.43	715.00	4.6
33.3	715.25	4.85
34.147	715.50	5.1

Weir Equation

Q = Cw * L * H^1.5

H	Q
Ft	CFS
713.5	0.0
713.75	3.4
714.00	8.5
714.25	14.8
714.50	22.3
714.75	30.7
715.00	40.0
715.25	50.1
715.50	60.9

COMBO

H	Q	
Ft	CFS	
713.45	0.0	Inlet
713.75	3.4	
714.00	8.5	
714.25	14.8	
714.50	19.3	Outlet
714.75	20.9	
715.00	22.3	
715.25	23.7	
715.50	25.0	

The two Wier outlet pipes can easily handle high flows even if one pipe is plugged and the outlet submerged (15' + above the flood plain).

Prarie Creek Generating Station - Pond # 8

V-Notch Weir

Q=1.38 * Tan(120/2) * H^2.5

Q	Elevation	Head
CFS	Ft	Ft
0	711.00	0.0
0.422537	711.50	0.5
2.39023	712.00	1.0
6.5867	712.50	1.5
13.52118	713.00	2.0

COMBO

Q	Elevation
CFS	Ft
0.00	711.00
0.42	711.50
2.39	712.00
6.59	712.50
13.52	713.00
23.3	713.5
46.0	714.0

Broad Crested Weir Equation

Q = Cw * L * H^1.5

H	Q
Ft	CFS
713.5	9.8
714.00	32.5

2.50 = Cw

13.00 = Length

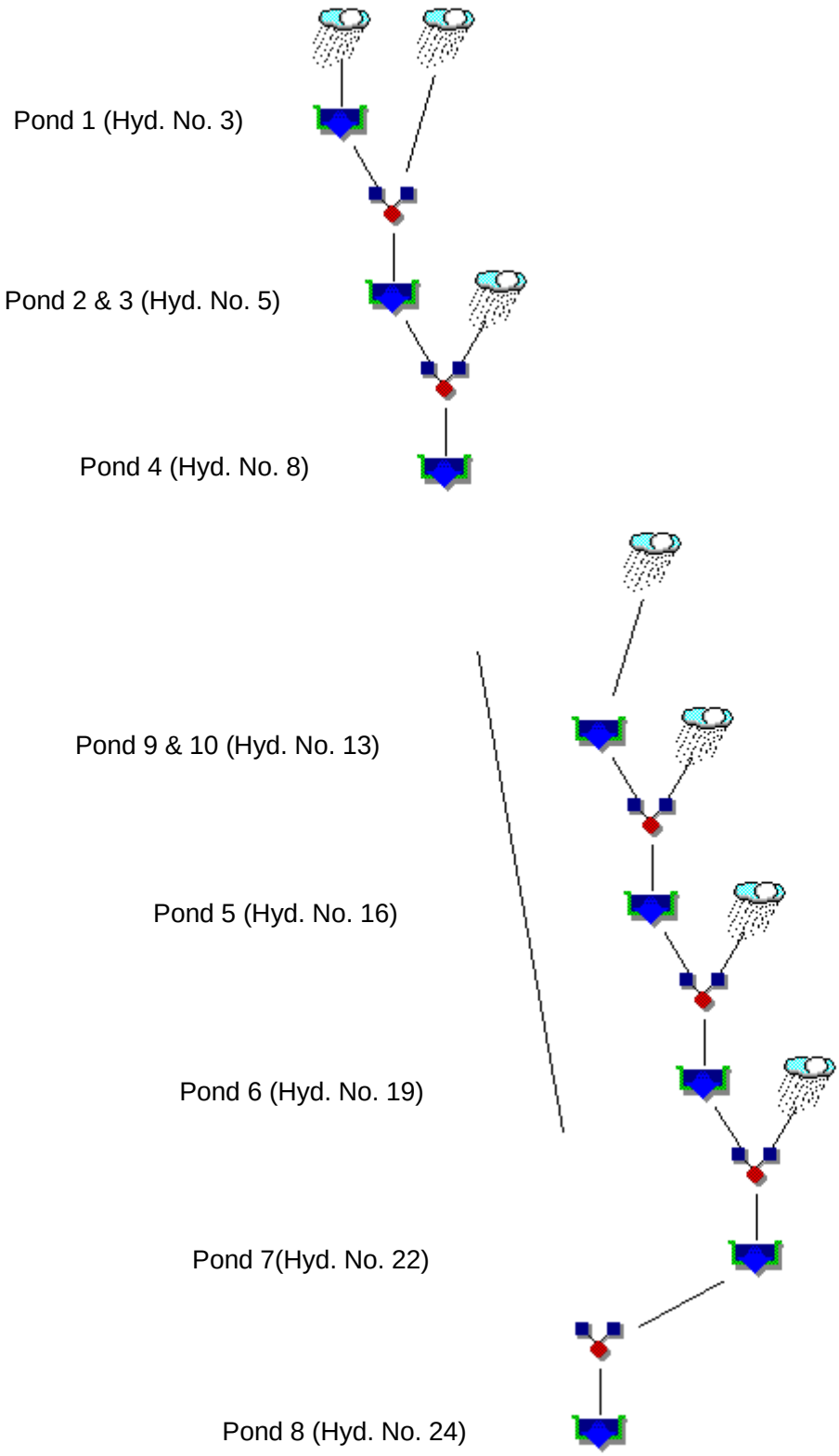
Broad Crested Weir on top of a wide V-Notch Weir two feet high.

APPENDIX D – Hydraulic Analysis

Alliant Energy
Interstate Power and Light Company
Prairie Creek Generating Station
Cedar Rapids, Iowa

Inflow Design Flood Control System Plan

HYDRAFLOW MODEL DIAGRAM



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	9.99	2	772	2.093	----	------	------	Pond 1 Inflow
2	SCS Runoff	13.36	2	724	0.986	----	------	------	Pond 2 and 3 Inflow
3	Reservoir	9.55	2	782	2.093	1	716.12	0.175	Pond 1 Outflow
4	Combine	15.12	2	724	3.079	2, 3	------	------	Ponds 2 and 3 Inflow
5	Reservoir	8.19	2	818	3.006	4	714.73	0.792	Ponds 2 & 3 outflow
6	SCS Runoff	20.06	2	718	1.140	----	------	------	Pond 4 Inflow
7	Combine	21.53	2	720	4.145	5, 6	------	------	Pond 4 Inflow
8	Reservoir	8.53	2	842	4.123	7	714.21	0.689	Pond 4 Outflow
9	SCS Runoff	28.54	2	774	6.155	----	------	------	Ponds 9 and 10 Inflow
10	Reservoir	28.47	2	776	5.741	9	716.72	0.456	Ponds 9 and 10 Outlfow
11	SCS Runoff	13.82	2	738	1.660	----	------	------	Pond 5 Inflow
12	Combine	33.47	2	768	7.401	10, 11	------	------	Pond 5 Inflow
13	Reservoir	25.68	2	802	6.427	12	716.60	2.046	Pond 5 Outflow
14	SCS Runoff	14.32	2	724	1.088	----	------	------	Pond 6 Inflow
15	Combine	26.55	2	802	7.515	13, 14	------	------	Pond 6 Inflow
16	Reservoir	23.75	2	824	7.236	15	715.63	1.215	Pond 6 Outflow
17	SCS Runoff	17.72	2	724	1.347	----	------	------	Pond 7 Inflow
18	Combine	24.64	2	824	8.583	16, 17	------	------	Pond 7 Inflow
19	Reservoir	20.18	2	872	8.583	18	714.64	1.162	Pond 7 Outlfow
20	Combine	28.53	2	858	12.705	8, 19	------	------	North Ponds + South Ponds
21	Reservoir	28.53	2	860	12.692	20	713.62	0.233	Pond 8 Outflow

Proj. file: Prarie Creek 2016.gpw | Return Period: 100 yr | Run date: 09-20-2016

Hydrograph Report

Hyd. No. 1

Pond 1 Inflow

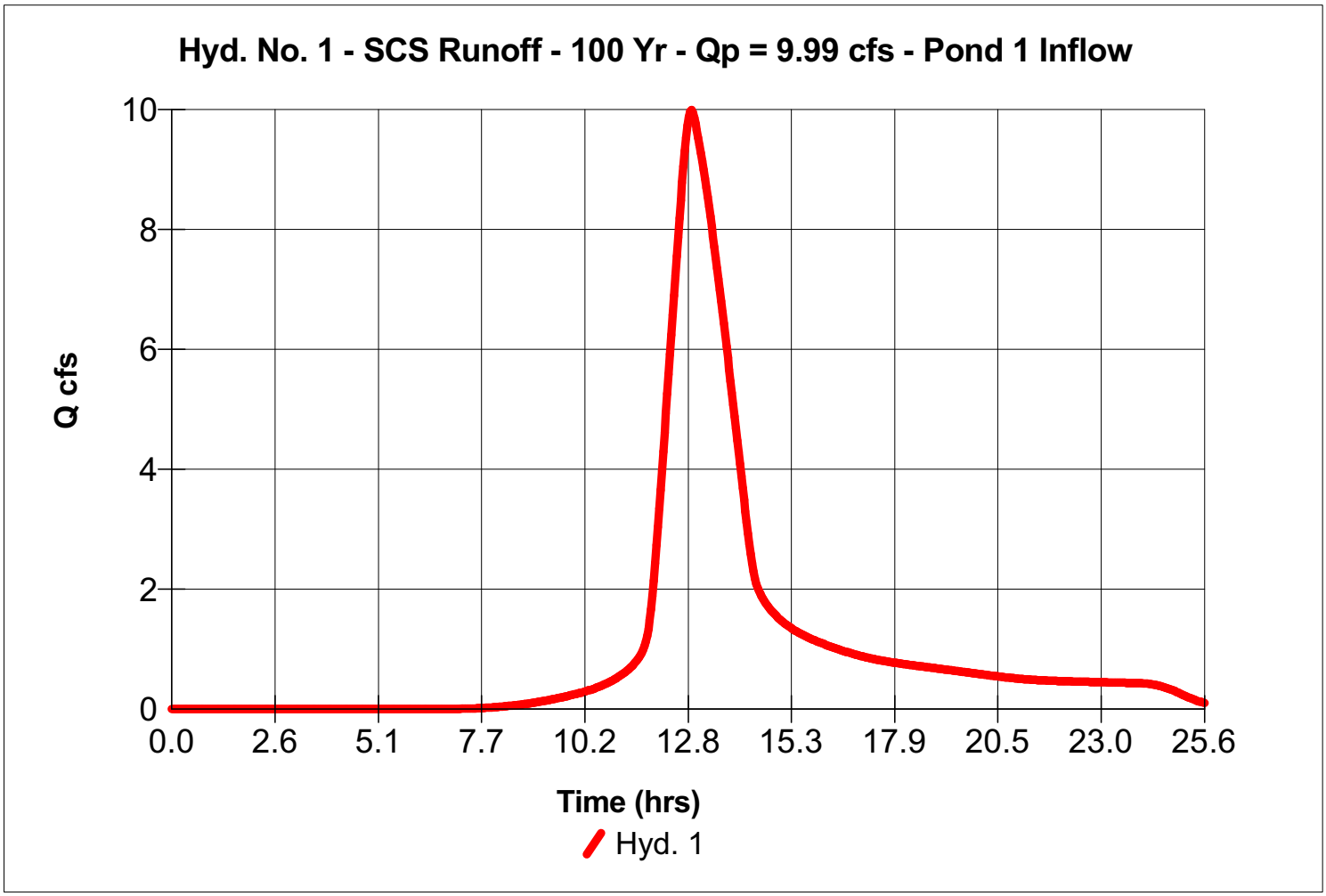
Hydrograph type	= SCS Runoff	Peak discharge	= 9.99 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 5.60 ac	Curve number	= 75
Basin Slope	= 0.1 %	Hydraulic length	= 800 ft
Tc method	= LAG	Time of conc. (Tc)	= 97.8 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 2.093 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.63	0.94
11.83	1.48
12.03	3.03
12.23	4.93
12.43	6.90
12.63	8.78
12.83	9.97
13.03	9.53
13.23	8.70
13.43	7.70
13.63	6.62
13.83	5.47
14.03	4.28
14.23	3.11
14.43	2.18
14.63	1.84
14.83	1.65
15.03	1.51
15.23	1.40
15.43	1.31
15.63	1.23
15.83	1.17
16.03	1.11
16.23	1.06
16.43	1.01
16.63	0.97
16.83	0.92

...End


Hyd. No. 1 - SCS Runoff - 100 Yr - Qp = 9.99 cfs - Pond 1 Inflow
Q cfs
10
8
6
4
2
0
0.0
2.6
5.1
7.7
10.2
12.8
15.3
17.9
20.5
23.0
25.6
Time (hrs)
Hyd. 1

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Pond 2 and 3 Inflow

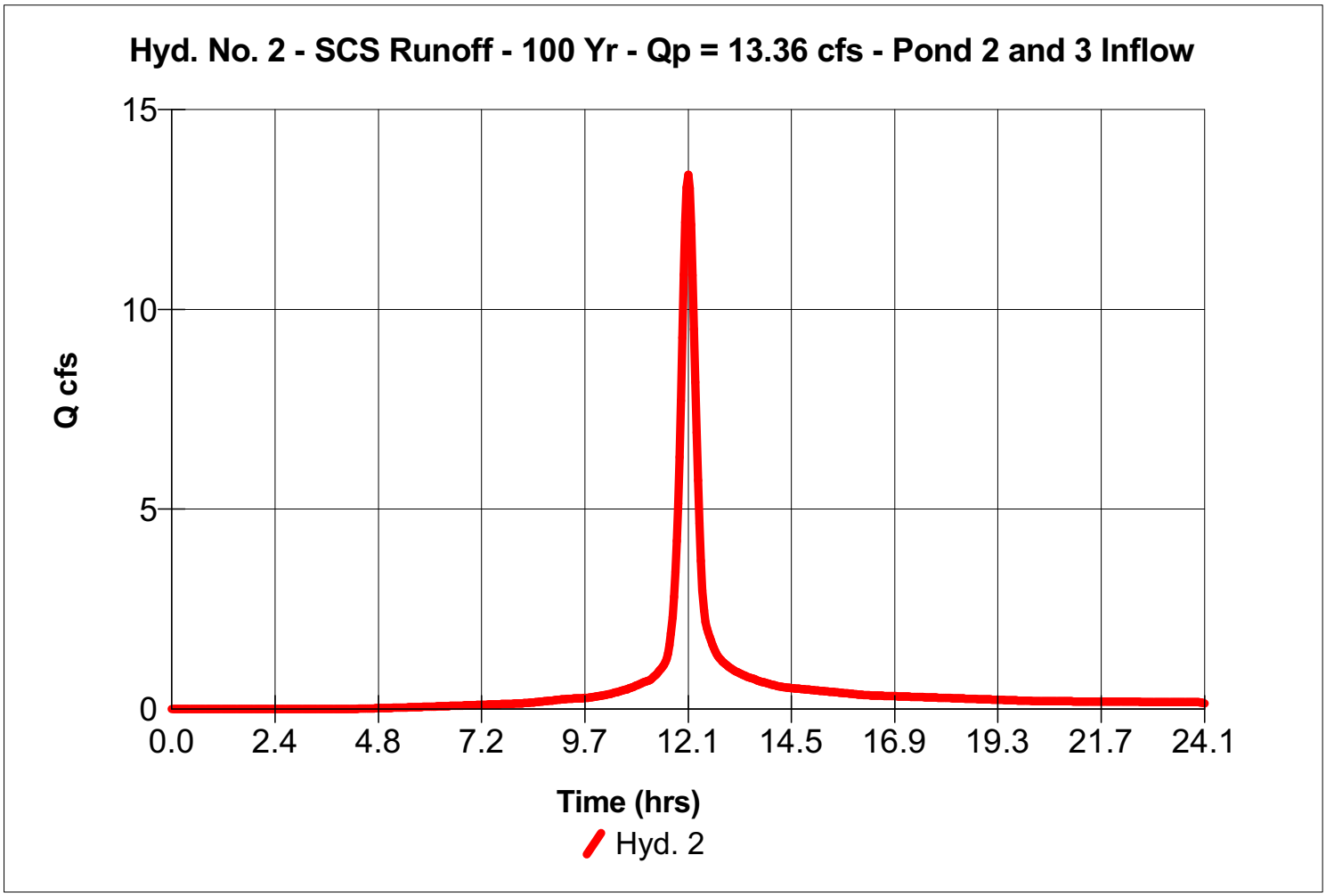
Hydrograph type	= SCS Runoff	Peak discharge	= 13.36 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.10 ac	Curve number	= 85
Basin Slope	= 0.1 %	Hydraulic length	= 150 ft
Tc method	= LAG	Time of conc. (Tc)	= 18.7 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0.986 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.57	1.25
11.77	3.43
11.97	10.86
12.17	10.86
12.37	3.71
12.57	1.81
12.77	1.32

...End


Hyd. No. 2 - SCS Runoff - 100 Yr - Qp = 13.36 cfs - Pond 2 and 3 Inflow
Q cfs
15
10
5
0
0.0
2.4
4.8
7.2
9.7
12.1
14.5
16.9
19.3
21.7
24.1
Time (hrs)
Hyd. 2

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

Pond 1 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 9.55 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 1	Reservoir name	= Pond 1
Max. Elevation	= 716.12 ft	Max. Storage	= 0.175 acft

Storage Indication method used.

Outflow hydrograph volume = 2.093 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.00	2.73	715.60	-----	-----	-----	-----	1.38	-----	-----	-----	-----	1.38
12.20	4.61	715.71	-----	-----	-----	-----	2.71	-----	-----	-----	-----	2.71
12.40	6.57	715.84	-----	-----	-----	-----	4.62	-----	-----	-----	-----	4.62
12.60	8.49	715.97	-----	-----	-----	-----	6.73	-----	-----	-----	-----	6.73
12.80	9.87	716.07	-----	-----	-----	-----	8.65	-----	-----	-----	-----	8.65
13.00	9.65	716.12	-----	-----	-----	-----	9.54	-----	-----	-----	-----	9.54
13.20	8.85	716.11	-----	-----	-----	-----	9.27	-----	-----	-----	-----	9.27
13.40	7.88	716.07	-----	-----	-----	-----	8.55	-----	-----	-----	-----	8.55
13.60	6.80	716.02	-----	-----	-----	-----	7.60	-----	-----	-----	-----	7.60
13.80	5.66	715.96	-----	-----	-----	-----	6.57	-----	-----	-----	-----	6.57
14.00	4.48	715.90	-----	-----	-----	-----	5.46	-----	-----	-----	-----	5.46
14.20	3.30	715.83	-----	-----	-----	-----	4.36	-----	-----	-----	-----	4.36
14.40	2.29	715.75	-----	-----	-----	-----	3.32	-----	-----	-----	-----	3.32
14.60	1.88	715.70	-----	-----	-----	-----	2.53	-----	-----	-----	-----	2.53
14.80	1.67	715.66	-----	-----	-----	-----	2.11	-----	-----	-----	-----	2.11
15.00	1.53	715.64	-----	-----	-----	-----	1.82	-----	-----	-----	-----	1.82
15.20	1.41	715.62	-----	-----	-----	-----	1.62	-----	-----	-----	-----	1.62
15.40	1.32	715.61	-----	-----	-----	-----	1.48	-----	-----	-----	-----	1.48
15.60	1.24	715.60	-----	-----	-----	-----	1.37	-----	-----	-----	-----	1.37
15.80	1.18	715.59	-----	-----	-----	-----	1.30	-----	-----	-----	-----	1.30
16.00	1.12	715.58	-----	-----	-----	-----	1.23	-----	-----	-----	-----	1.23
16.20	1.07	715.57	-----	-----	-----	-----	1.17	-----	-----	-----	-----	1.17
16.40	1.02	715.57	-----	-----	-----	-----	1.11	-----	-----	-----	-----	1.11
16.60	0.97	715.56	-----	-----	-----	-----	1.06	-----	-----	-----	-----	1.06
16.80	0.93	715.56	-----	-----	-----	-----	1.01	-----	-----	-----	-----	1.01
17.00	0.89	715.55	-----	-----	-----	-----	0.96	-----	-----	-----	-----	0.96
17.20	0.86	715.55	-----	-----	-----	-----	0.92	-----	-----	-----	-----	0.92
17.40	0.83	715.54	-----	-----	-----	-----	0.89	-----	-----	-----	-----	0.89

...End

Reservoir Report

Reservoir No. 1 - Pond 1

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	715.40	10,595	0.000	0.000
1.00	716.40	10,595	0.243	0.243
2.00	717.40	10,595	0.243	0.486
3.00	718.40	10,595	0.243	0.730
4.00	719.40	10,595	0.243	0.973

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

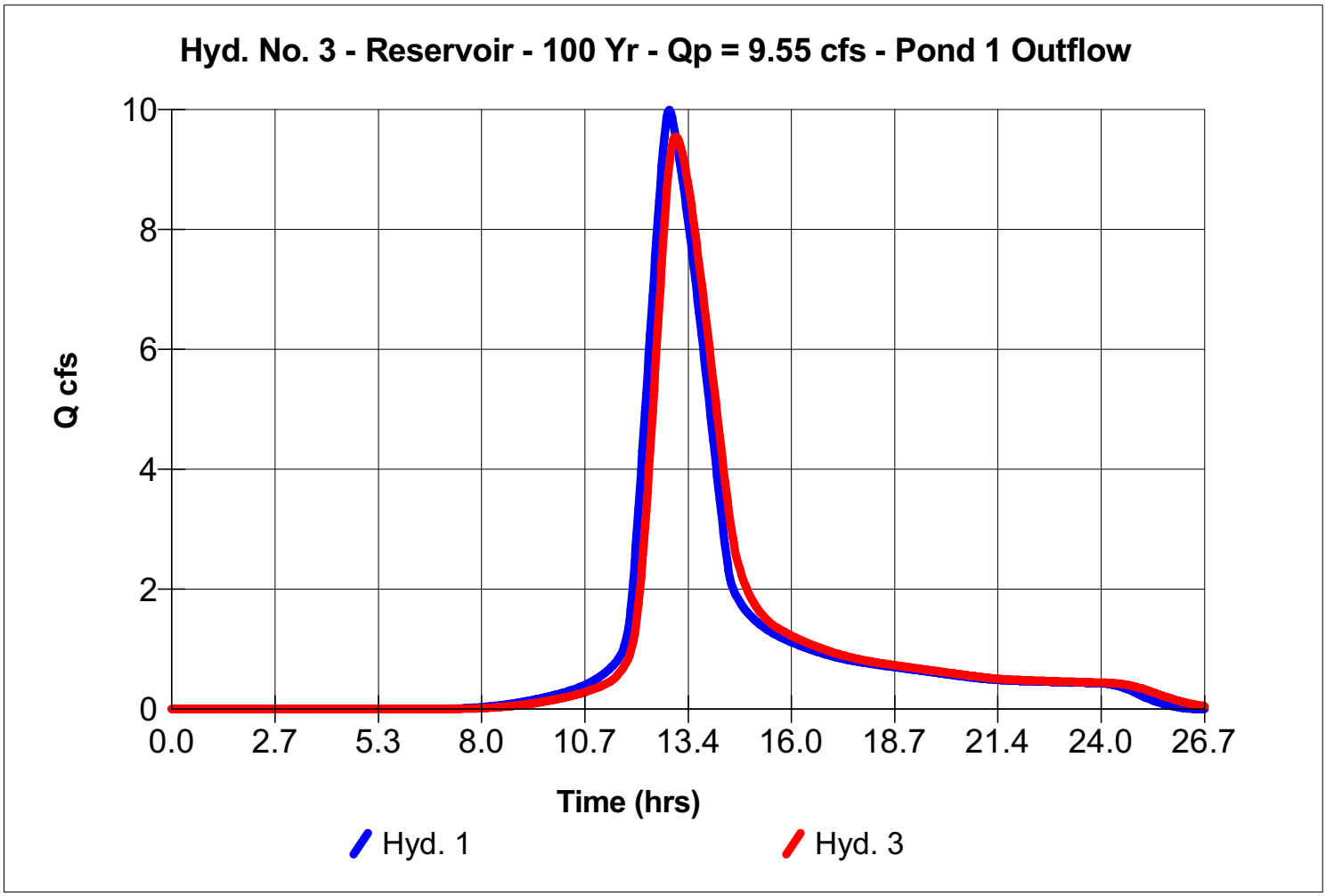
	[A]	[B]	[C]	[D]
Crest Len ft	= 6.00	0.00	0.00	0.00
Crest El. ft	= 715.40	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	715.40	---	---	---	---	0.00	---	---	---	---	0.00
1.00	0.243	716.40	---	---	---	---	15.60	---	---	---	---	15.60
2.00	0.486	717.40	---	---	---	---	44.12	---	---	---	---	44.12
3.00	0.730	718.40	---	---	---	---	81.06	---	---	---	---	81.06
4.00	0.973	719.40	---	---	---	---	124.80	---	---	---	---	124.80


Hyd. No. 3 - Reservoir - 100 Yr - Qp = 9.55 cfs - Pond 1 Outflow
Q cfs
10
8
6
4
2
0
0.0
2.7
5.3
8.0
10.7
13.4
16.0
18.7
21.4
24.0
26.7
Time (hrs)
Hyd. 1
Hyd. 3

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 4

Ponds 2 and 3 Inflow

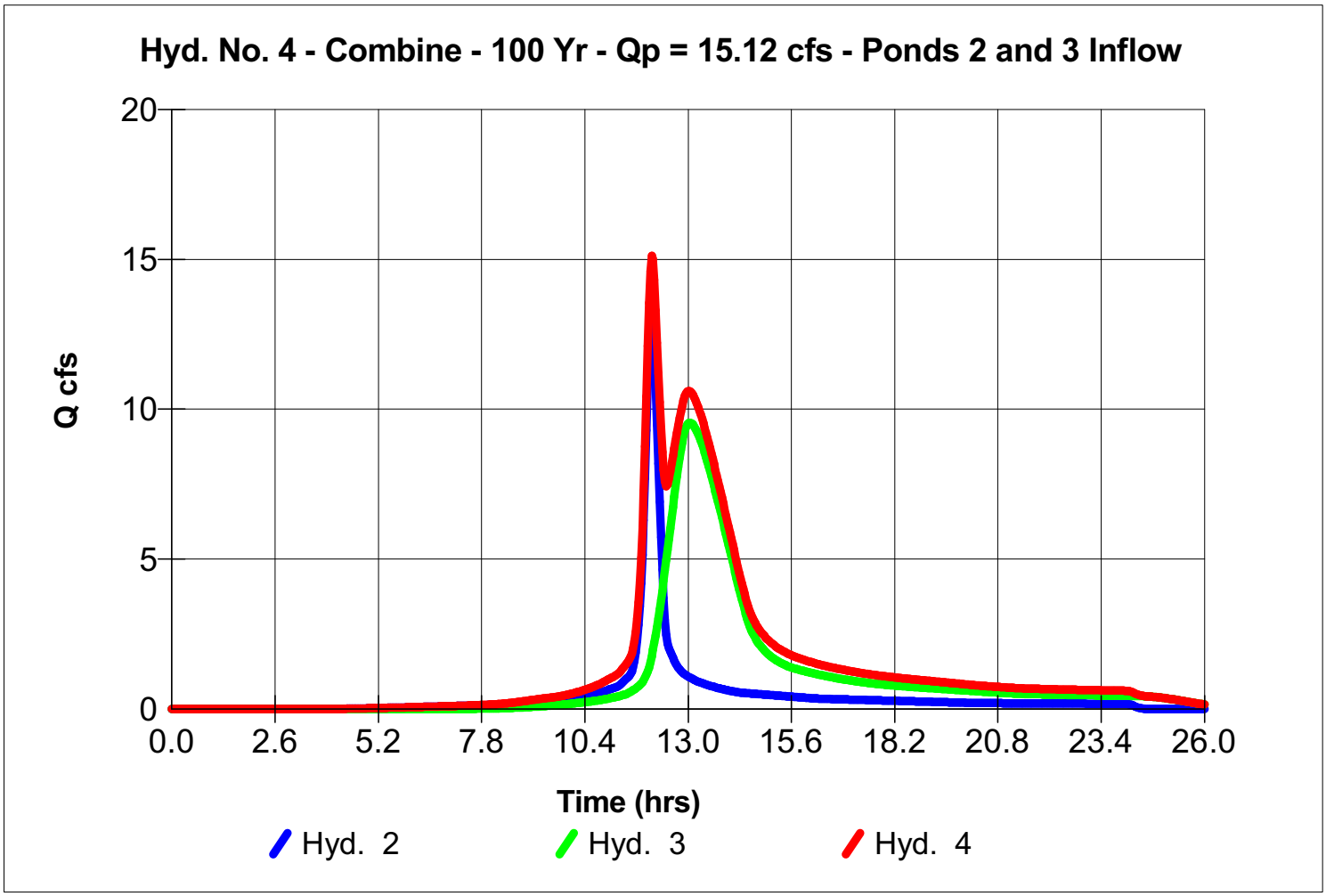
Hydrograph type	= Combine	Peak discharge	= 15.12 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 2, 3		

Hydrograph Volume = 3.079 acft

Hydrograph Discharge Table

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 3 = (cfs)	Outflow (cfs)
11.40	0.97	0.48	1.45
11.60	1.39	0.63	2.01
11.80	4.20	0.84	5.04
12.00	12.17	1.38	13.55
12.20	9.50	2.71	12.21
12.40	2.96	4.62	7.59
12.60	1.71	6.73	8.44
12.80	1.27	8.65	9.92
13.00	1.07	9.54	10.60
13.20	0.93	9.27	10.20
13.40	0.83	8.55	9.38
13.60	0.75	7.60	8.35
13.80	0.67	6.57	7.25
14.00	0.61	5.46	6.08
14.20	0.56	4.36	4.92
14.40	0.53	3.32	3.85
14.60	0.51	2.53	3.04
14.80	0.49	2.11	2.60
15.00	0.47	1.82	2.29
15.20	0.45	1.62	2.07
15.40	0.43	1.48	1.91
15.60	0.41	1.37	1.78
15.80	0.39	1.30	1.68
16.00	0.37	1.23	1.59
16.20	0.35	1.17	1.51
16.40	0.34	1.11	1.44
16.60	0.33	1.06	1.38

...End


Hyd. No. 4 - Combine - 100 Yr - Qp = 15.12 cfs - Ponds 2 and 3 Inflow
Q cfs
20
15
10
5
0
0.0
2.6
5.2
7.8
10.4
13.0
15.6
18.2
20.8
23.4
26.0
Time (hrs)
Hyd. 2
Hyd. 3
Hyd. 4

Hydrograph Report

Hyd. No. 5

Ponds 2 & 3 outflow

Hydrograph type	= Reservoir	Peak discharge	= 8.19 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Reservoir name	= Pond 2 and 3
Max. Elevation	= 714.73 ft	Max. Storage	= 0.792 acft

Storage Indication method used.

Outflow hydrograph volume = 3.006 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.00	13.55	714.16	2.16	-----	-----	-----	-----	-----	-----	-----	-----	2.16
12.20	12.21	714.38	5.43	-----	-----	-----	-----	-----	-----	-----	-----	5.43
12.40	7.59	714.46	6.15	-----	-----	-----	-----	-----	-----	-----	-----	6.15
12.60	8.44	714.49	6.44	-----	-----	-----	-----	-----	-----	-----	-----	6.44
12.80	9.92	714.54	6.87	-----	-----	-----	-----	-----	-----	-----	-----	6.87
13.00	10.60	714.61	7.40	-----	-----	-----	-----	-----	-----	-----	-----	7.40
13.20	10.20	714.67	7.82	-----	-----	-----	-----	-----	-----	-----	-----	7.82
13.40	9.38	714.71	8.09	-----	-----	-----	-----	-----	-----	-----	-----	8.09
13.60	8.35	714.73	8.19	-----	-----	-----	-----	-----	-----	-----	-----	8.19
13.80	7.25	714.72	8.14	-----	-----	-----	-----	-----	-----	-----	-----	8.14
14.00	6.08	714.69	7.94	-----	-----	-----	-----	-----	-----	-----	-----	7.94
14.20	4.92	714.64	7.60	-----	-----	-----	-----	-----	-----	-----	-----	7.60
14.40	3.85	714.58	7.13	-----	-----	-----	-----	-----	-----	-----	-----	7.13
14.60	3.04	714.50	6.56	-----	-----	-----	-----	-----	-----	-----	-----	6.56
14.80	2.60	714.43	5.92	-----	-----	-----	-----	-----	-----	-----	-----	5.92
15.00	2.29	714.36	5.26	-----	-----	-----	-----	-----	-----	-----	-----	5.26
15.20	2.07	714.30	4.65	-----	-----	-----	-----	-----	-----	-----	-----	4.65
15.40	1.91	714.25	3.98	-----	-----	-----	-----	-----	-----	-----	-----	3.98
15.60	1.78	714.21	3.44	-----	-----	-----	-----	-----	-----	-----	-----	3.44
15.80	1.68	714.18	2.73	-----	-----	-----	-----	-----	-----	-----	-----	2.73
16.00	1.59	714.17	2.20	-----	-----	-----	-----	-----	-----	-----	-----	2.20
16.20	1.51	714.16	1.88	-----	-----	-----	-----	-----	-----	-----	-----	1.88
16.40	1.44	714.15	1.68	-----	-----	-----	-----	-----	-----	-----	-----	1.68
16.60	1.38	714.15	1.55	-----	-----	-----	-----	-----	-----	-----	-----	1.55
16.80	1.33	714.14	1.45	-----	-----	-----	-----	-----	-----	-----	-----	1.45
17.00	1.28	714.14	1.38	-----	-----	-----	-----	-----	-----	-----	-----	1.38
17.20	1.23	714.14	1.32	-----	-----	-----	-----	-----	-----	-----	-----	1.32
17.40	1.19	714.14	1.26	-----	-----	-----	-----	-----	-----	-----	-----	1.26
17.60	1.15	714.13	1.21	-----	-----	-----	-----	-----	-----	-----	-----	1.21
17.80	1.11	714.13	1.17	-----	-----	-----	-----	-----	-----	-----	-----	1.17
18.00	1.08	714.13	1.13	-----	-----	-----	-----	-----	-----	-----	-----	1.13
18.20	1.05	714.13	1.10	-----	-----	-----	-----	-----	-----	-----	-----	1.10
18.40	1.02	714.13	1.06	-----	-----	-----	-----	-----	-----	-----	-----	1.06
18.60	0.99	714.13	1.04	-----	-----	-----	-----	-----	-----	-----	-----	1.03
18.80	0.97	714.13	1.01	-----	-----	-----	-----	-----	-----	-----	-----	1.01
19.00	0.94	714.13	0.98	-----	-----	-----	-----	-----	-----	-----	-----	0.98
19.20	0.91	714.13	0.95	-----	-----	-----	-----	-----	-----	-----	-----	0.95
19.40	0.89	714.13	0.93	-----	-----	-----	-----	-----	-----	-----	-----	0.93

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.60	0.86	714.12	0.90	-----	-----	-----	-----	-----	-----	-----	-----	0.90
19.80	0.84	714.12	0.88	-----	-----	-----	-----	-----	-----	-----	-----	0.88
20.00	0.81	714.12	0.85	-----	-----	-----	-----	-----	-----	-----	-----	0.85
20.20	0.79	714.12	0.83	-----	-----	-----	-----	-----	-----	-----	-----	0.83
20.40	0.77	714.12	0.80	-----	-----	-----	-----	-----	-----	-----	-----	0.80
20.60	0.75	714.12	0.78	-----	-----	-----	-----	-----	-----	-----	-----	0.78
20.80	0.73	714.12	0.76	-----	-----	-----	-----	-----	-----	-----	-----	0.76
21.00	0.72	714.12	0.74	-----	-----	-----	-----	-----	-----	-----	-----	0.74

...End

Reservoir Report

Reservoir No. 2 - Pond 2 and 3

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.70	33,536	0.000	0.000
1.00	714.70	33,536	0.770	0.770
2.00	715.70	33,536	0.770	1.540

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 712.60	0.00	0.00	0.00
Length ft	= 16.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .015	.000	.000	.000
Orif. Coeff.	= 0.86	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

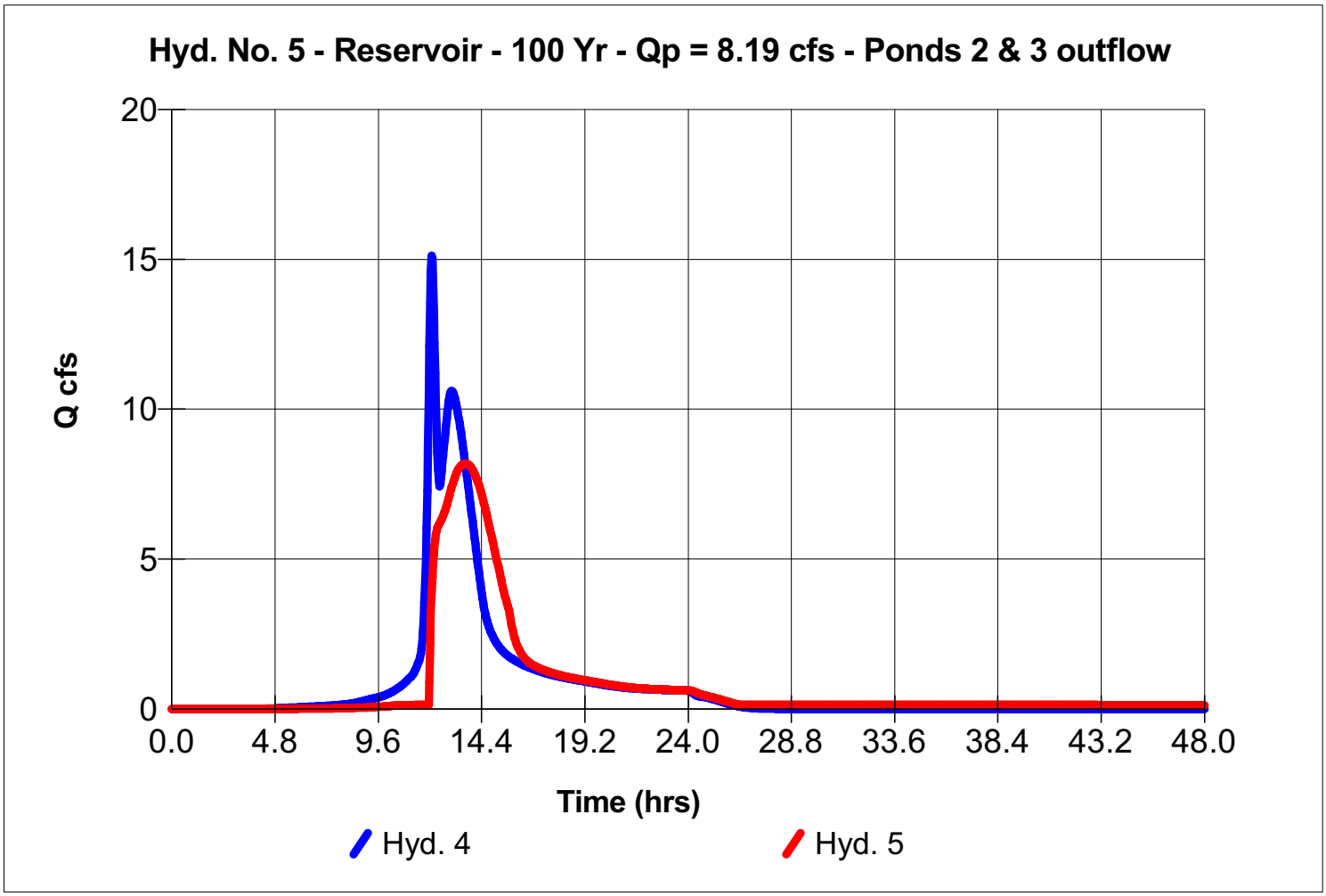
	[A]	[B]	[C]	[D]
Crest Len ft	= 33.00	0.00	0.00	0.00
Crest El. ft	= 715.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 713.71 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.70	0.00	---	---	---	0.00	---	---	---	---	0.00
1.00	0.770	714.70	8.00	---	---	---	0.00	---	---	---	---	8.00
2.00	1.540	715.70	13.07	---	---	---	7.67	---	---	---	---	20.74


Hyd. No. 5 - Reservoir - 100 Yr - Qp = 8.19 cfs - Ponds 2 & 3 outflow
Q cfs
20
15
10
5
0
0.0
4.8
9.6
14.4
19.2
24.0
28.8
33.6
38.4
43.2
48.0
Time (hrs)
Hyd. 4
Hyd. 5

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 6

Pond 4 Inflow

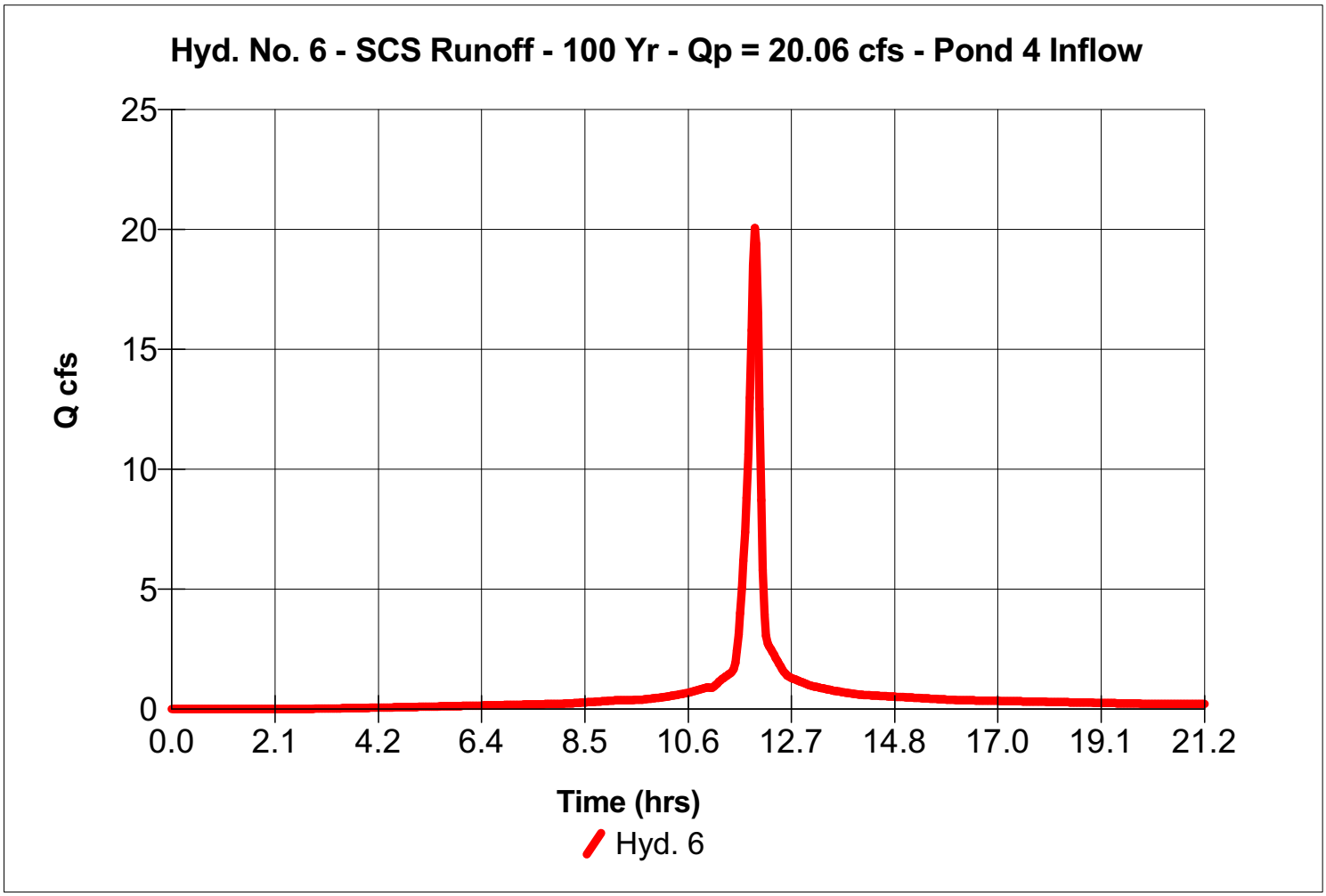
Hydrograph type	= SCS Runoff	Peak discharge	= 20.06 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.20 ac	Curve number	= 90
Basin Slope	= 0.1 %	Hydraulic length	= 60 ft
Tc method	= LAG	Time of conc. (Tc)	= 7.4 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1.140 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.57	1.93
11.77	7.38
11.97	20.06 <<
12.17	3.93
12.37	2.25

...End


Hyd. No. 6 - SCS Runoff - 100 Yr - Qp = 20.06 cfs - Pond 4 Inflow
Q cfs
25
20
15
10
5
0
0.0
2.1
4.2
6.4
8.5
10.6
12.7
14.8
17.0
19.1
21.2
Time (hrs)
Hyd. 6

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 7

Pond 4 Inflow

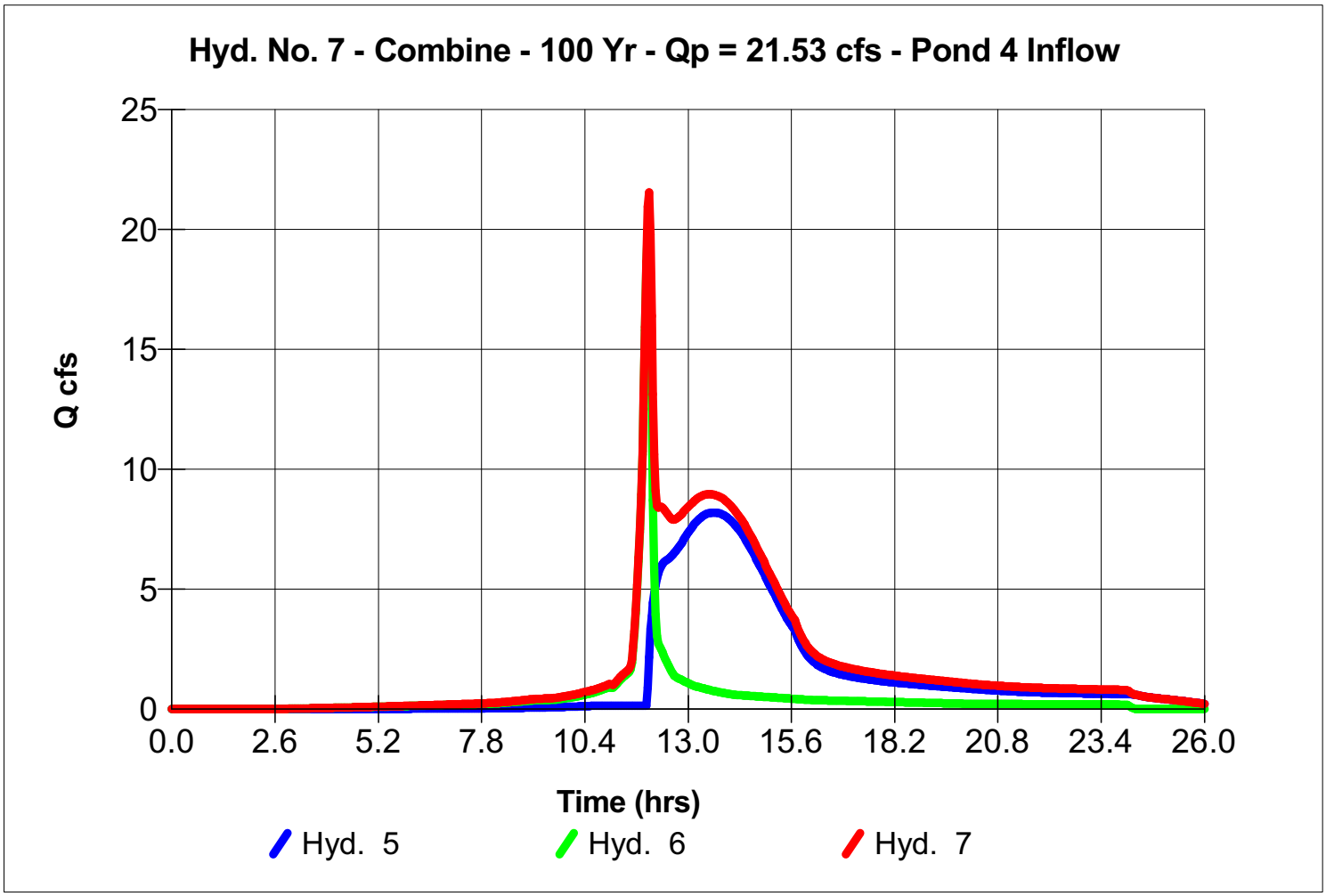
Hydrograph type	= Combine	Peak discharge	= 21.53 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 5, 6		

Hydrograph Volume = 4.145 acft

Hydrograph Discharge Table

Time (hrs)	Hyd. 5 + (cfs)	Hyd. 6 = (cfs)	Outflow (cfs)
11.60	0.13	2.42	2.56
11.80	0.14	8.81	8.94
12.00	2.16	19.38	21.53 <<
12.20	5.43	3.04	8.47
12.40	6.15	2.13	8.28
12.60	6.44	1.46	7.90
12.80	6.87	1.22	8.09
13.00	7.40	1.06	8.46
13.20	7.82	0.93	8.75
13.40	8.09	0.84	8.93
13.60	8.19	0.76	8.94
13.80	8.14	0.69	8.83
14.00	7.94	0.63	8.57
14.20	7.60	0.58	8.18
14.40	7.13	0.56	7.69
14.60	6.56	0.54	7.10
14.80	5.92	0.51	6.44
15.00	5.26	0.49	5.76
15.20	4.65	0.47	5.12
15.40	3.98	0.45	4.43
15.60	3.44	0.43	3.87
15.80	2.73	0.40	3.14
16.00	2.20	0.38	2.58
16.20	1.88	0.37	2.24
16.40	1.68	0.36	2.04

...End


Hyd. No. 7 - Combine - 100 Yr - Qp = 21.53 cfs - Pond 4 Inflow
Q cfs
25
20
15
10
5
0
0.0
2.6
5.2
7.8
10.4
13.0
15.6
18.2
20.8
23.4
26.0
Time (hrs)
Hyd. 5
Hyd. 6
Hyd. 7

Hydrograph Report

Hyd. No. 8

Pond 4 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 8.53 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 7	Reservoir name	= Pond 4
Max. Elevation	= 714.21 ft	Max. Storage	= 0.689 acft

Storage Indication method used.

Outflow hydrograph volume = 4.123 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
11.80	8.94	713.85	-----	-----	-----	-----	1.40	-----	-----	-----	-----	1.40
12.00	21.53 <<	714.01	-----	-----	-----	-----	4.08	-----	-----	-----	-----	4.08
12.20	8.47	714.11	-----	-----	-----	-----	6.27	-----	-----	-----	-----	6.27
12.40	8.28	714.14	-----	-----	-----	-----	6.80	-----	-----	-----	-----	6.80
12.60	7.90	714.15	-----	-----	-----	-----	7.12	-----	-----	-----	-----	7.12
12.80	8.09	714.16	-----	-----	-----	-----	7.33	-----	-----	-----	-----	7.33
13.00	8.46	714.17	-----	-----	-----	-----	7.57	-----	-----	-----	-----	7.57
13.20	8.75	714.18	-----	-----	-----	-----	7.83	-----	-----	-----	-----	7.83
13.40	8.93	714.19	-----	-----	-----	-----	8.09	-----	-----	-----	-----	8.09
13.60	8.94	714.20	-----	-----	-----	-----	8.31	-----	-----	-----	-----	8.31
13.80	8.83	714.21	-----	-----	-----	-----	8.46	-----	-----	-----	-----	8.46
14.00	8.57	714.21 <<	-----	-----	-----	-----	8.53	-----	-----	-----	-----	8.53
14.20	8.18	714.21	-----	-----	-----	-----	8.49	-----	-----	-----	-----	8.49
14.40	7.69	714.20	-----	-----	-----	-----	8.34	-----	-----	-----	-----	8.34
14.60	7.10	714.19	-----	-----	-----	-----	8.10	-----	-----	-----	-----	8.10
14.80	6.44	714.18	-----	-----	-----	-----	7.76	-----	-----	-----	-----	7.76
15.00	5.76	714.16	-----	-----	-----	-----	7.34	-----	-----	-----	-----	7.34
15.20	5.12	714.14	-----	-----	-----	-----	6.86	-----	-----	-----	-----	6.86
15.40	4.43	714.12	-----	-----	-----	-----	6.33	-----	-----	-----	-----	6.33
15.60	3.87	714.09	-----	-----	-----	-----	5.80	-----	-----	-----	-----	5.80
15.80	3.14	714.07	-----	-----	-----	-----	5.29	-----	-----	-----	-----	5.29
16.00	2.58	714.04	-----	-----	-----	-----	4.73	-----	-----	-----	-----	4.73
16.20	2.24	714.02	-----	-----	-----	-----	4.21	-----	-----	-----	-----	4.21
16.40	2.04	713.99	-----	-----	-----	-----	3.76	-----	-----	-----	-----	3.76
16.60	1.90	713.97	-----	-----	-----	-----	3.41	-----	-----	-----	-----	3.41
16.80	1.79	713.96	-----	-----	-----	-----	3.11	-----	-----	-----	-----	3.11
17.00	1.71	713.94	-----	-----	-----	-----	2.85	-----	-----	-----	-----	2.85
17.20	1.64	713.93	-----	-----	-----	-----	2.62	-----	-----	-----	-----	2.62
17.40	1.58	713.92	-----	-----	-----	-----	2.42	-----	-----	-----	-----	2.42
17.60	1.52	713.91	-----	-----	-----	-----	2.25	-----	-----	-----	-----	2.25
17.80	1.47	713.90	-----	-----	-----	-----	2.11	-----	-----	-----	-----	2.11
18.00	1.43	713.89	-----	-----	-----	-----	2.01	-----	-----	-----	-----	2.01
18.20	1.38	713.89	-----	-----	-----	-----	1.91	-----	-----	-----	-----	1.91
18.40	1.34	713.88	-----	-----	-----	-----	1.83	-----	-----	-----	-----	1.83
18.60	1.30	713.87	-----	-----	-----	-----	1.75	-----	-----	-----	-----	1.75
18.80	1.27	713.87	-----	-----	-----	-----	1.68	-----	-----	-----	-----	1.68
19.00	1.23	713.86	-----	-----	-----	-----	1.61	-----	-----	-----	-----	1.62
19.20	1.20	713.86	-----	-----	-----	-----	1.55	-----	-----	-----	-----	1.55

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.40	1.17	713.86	-----	-----	-----	-----	1.50	-----	-----	-----	-----	1.50
19.60	1.13	713.85	-----	-----	-----	-----	1.44	-----	-----	-----	-----	1.44
19.80	1.10	713.85	-----	-----	-----	-----	1.39	-----	-----	-----	-----	1.39
20.00	1.07	713.84	-----	-----	-----	-----	1.35	-----	-----	-----	-----	1.35
20.20	1.03	713.84	-----	-----	-----	-----	1.30	-----	-----	-----	-----	1.30
20.40	1.01	713.84	-----	-----	-----	-----	1.26	-----	-----	-----	-----	1.26
20.60	0.99	713.83	-----	-----	-----	-----	1.22	-----	-----	-----	-----	1.22
20.80	0.96	713.83	-----	-----	-----	-----	1.18	-----	-----	-----	-----	1.18
21.00	0.94	713.83	-----	-----	-----	-----	1.15	-----	-----	-----	-----	1.15
21.20	0.93	713.83	-----	-----	-----	-----	1.11	-----	-----	-----	-----	1.11
21.40	0.91	713.82	-----	-----	-----	-----	1.08	-----	-----	-----	-----	1.08
21.60	0.89	713.82	-----	-----	-----	-----	1.06	-----	-----	-----	-----	1.06
21.80	0.88	713.82	-----	-----	-----	-----	1.03	-----	-----	-----	-----	1.03
22.00	0.87	713.82	-----	-----	-----	-----	1.01	-----	-----	-----	-----	1.01
22.20	0.86	713.82	-----	-----	-----	-----	0.98	-----	-----	-----	-----	0.98
22.40	0.85	713.82	-----	-----	-----	-----	0.96	-----	-----	-----	-----	0.96
22.60	0.84	713.81	-----	-----	-----	-----	0.95	-----	-----	-----	-----	0.95
22.80	0.83	713.81	-----	-----	-----	-----	0.93	-----	-----	-----	-----	0.93
23.00	0.83	713.81	-----	-----	-----	-----	0.91	-----	-----	-----	-----	0.91
23.20	0.82	713.81	-----	-----	-----	-----	0.90	-----	-----	-----	-----	0.90
23.40	0.81	713.81	-----	-----	-----	-----	0.89	-----	-----	-----	-----	0.89
23.60	0.81	713.81	-----	-----	-----	-----	0.88	-----	-----	-----	-----	0.88
23.80	0.80	713.81	-----	-----	-----	-----	0.86	-----	-----	-----	-----	0.86
24.00	0.79	713.81	-----	-----	-----	-----	0.85	-----	-----	-----	-----	0.85
24.20	0.60	713.81	-----	-----	-----	-----	0.83	-----	-----	-----	-----	0.83
24.40	0.53	713.80	-----	-----	-----	-----	0.79	-----	-----	-----	-----	0.79

...End

Reservoir Report

Reservoir No. 3 - Pond 4

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.70	59,078	0.000	0.000
1.00	714.70	59,078	1.356	1.356
2.00	715.70	59,078	1.356	2.712

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

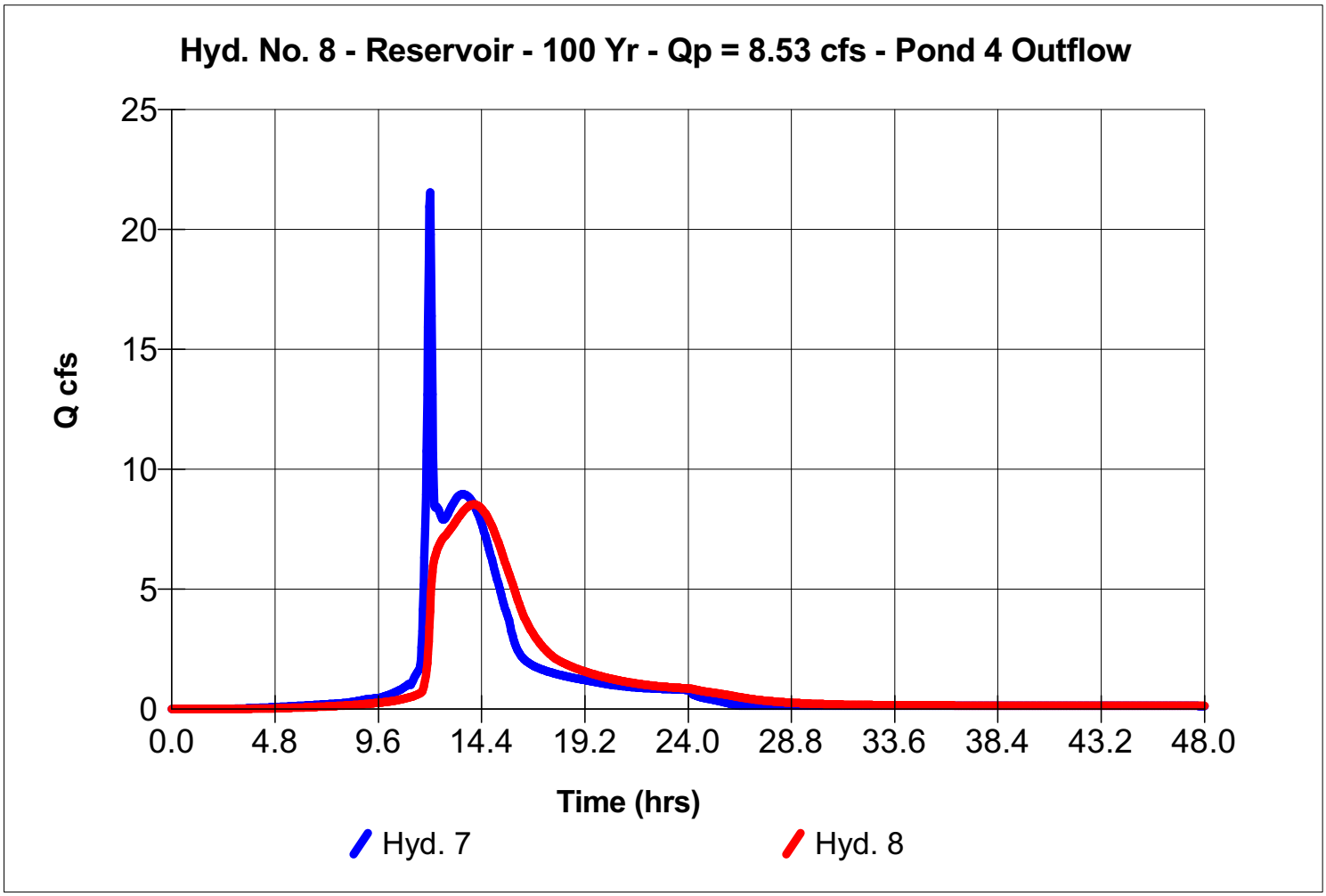
	[A]	[B]	[C]	[D]
Crest Len ft	= 7.85	0.00	0.00	0.00
Crest El. ft	= 713.70	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.70	---	---	---	---	0.00	---	---	---	---	0.00
1.00	1.356	714.70	---	---	---	---	23.55	---	---	---	---	23.55
2.00	2.712	715.70	---	---	---	---	66.61	---	---	---	---	66.61


Hyd. No. 8 - Reservoir - 100 Yr - Qp = 8.53 cfs - Pond 4 Outflow
Q cfs
25
20
15
10
5
0
0.0
4.8
9.6
14.4
19.2
24.0
28.8
33.6
38.4
43.2
48.0
Time (hrs)
Hyd. 7
Hyd. 8

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 9

Ponds 9 and 10 Inflow

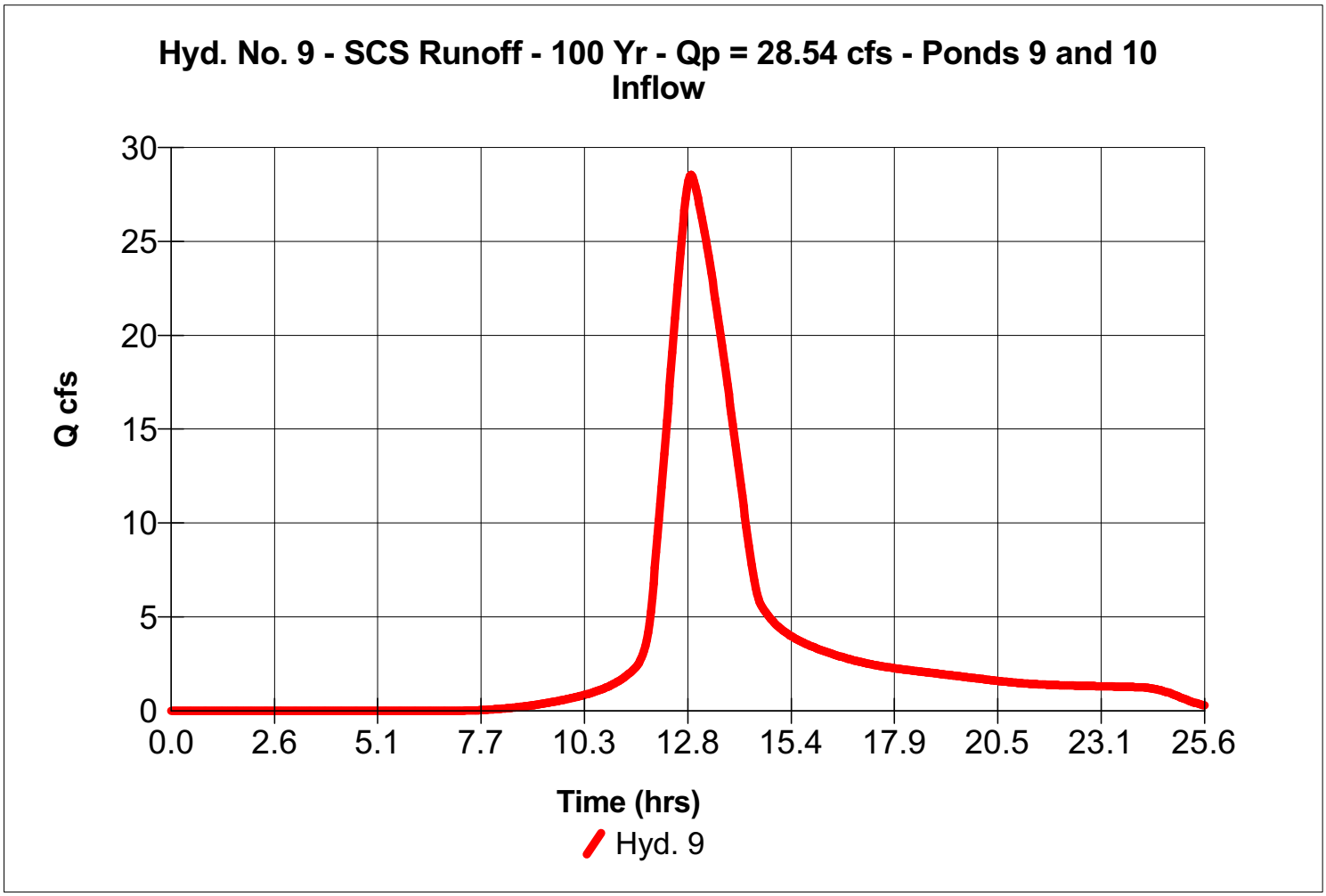
Hydrograph type	= SCS Runoff	Peak discharge	= 28.54 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 16.40 ac	Curve number	= 75
Basin Slope	= 0.1 %	Hydraulic length	= 815 ft
Tc method	= LAG	Time of conc. (Tc)	= 99.2 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6.155 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.63	2.66
11.83	4.17
12.03	8.44
12.23	13.67
12.43	19.09
12.63	24.38
12.83	28.21
13.03	27.64
13.23	25.49
13.43	22.86
13.63	19.95
13.83	16.86
14.03	13.64
14.23	10.36
14.43	7.34
14.63	5.64
14.83	5.00
15.03	4.54
15.23	4.19
15.43	3.91
15.63	3.68
15.83	3.48
16.03	3.31
16.23	3.15
16.43	3.01
16.63	2.87
16.83	2.75
17.03	2.64

...End


Hyd. No. 9 - SCS Runoff - 100 Yr - Qp = 28.54 cfs - Ponds 9 and 10 Inflow
Q cfs
30
25
20
15
10
5
0
0.0
2.6
5.1
7.7
10.3
12.8
15.4
17.9
20.5
23.1
25.6
Time (hrs)
Hyd. 9

Hydrograph Report

Hyd. No. 10

Ponds 9 and 10 Outlfow

Hydrograph type	= Reservoir	Peak discharge	= 28.47 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 9	Reservoir name	= Ponds 9 and 10
Max. Elevation	= 716.72 ft	Max. Storage	= 0.456 acft

Storage Indication method used.

Outflow hydrograph volume = 5.741 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.20	12.78	716.54	12.41	-----	-----	-----	-----	-----	-----	-----	-----	12.41
12.40	18.18	716.59	17.67	-----	-----	-----	-----	-----	-----	-----	-----	17.67
12.60	23.55	716.65	23.05	-----	-----	-----	-----	-----	-----	-----	-----	23.06
12.80	27.80	716.71	27.34	-----	-----	-----	-----	-----	-----	-----	-----	27.34
13.00	27.93	716.72	28.14	-----	-----	-----	-----	-----	-----	-----	-----	28.14
13.20	25.89	716.69	26.20	-----	-----	-----	-----	-----	-----	-----	-----	26.20
13.40	23.33	716.65	23.69	-----	-----	-----	-----	-----	-----	-----	-----	23.70
13.60	20.45	716.62	20.73	-----	-----	-----	-----	-----	-----	-----	-----	20.73
13.80	17.38	716.59	17.68	-----	-----	-----	-----	-----	-----	-----	-----	17.68
14.00	14.18	716.56	14.48	-----	-----	-----	-----	-----	-----	-----	-----	14.48
14.20	10.90	716.53	11.13	-----	-----	-----	-----	-----	-----	-----	-----	11.13
14.40	7.80	716.51	7.99	-----	-----	-----	-----	-----	-----	-----	-----	7.99
14.60	5.79	716.49	5.86	-----	-----	-----	-----	-----	-----	-----	-----	5.86
14.80	5.09	716.49	5.13	-----	-----	-----	-----	-----	-----	-----	-----	5.13
15.00	4.60	716.48	4.63	-----	-----	-----	-----	-----	-----	-----	-----	4.63
15.20	4.24	716.48	4.27	-----	-----	-----	-----	-----	-----	-----	-----	4.27
15.40	3.96	716.48	3.97	-----	-----	-----	-----	-----	-----	-----	-----	3.97
15.60	3.72	716.48	3.73	-----	-----	-----	-----	-----	-----	-----	-----	3.73
15.80	3.51	716.48	3.53	-----	-----	-----	-----	-----	-----	-----	-----	3.53
16.00	3.34	716.47	3.34	-----	-----	-----	-----	-----	-----	-----	-----	3.35
16.20	3.18	716.47	3.19	-----	-----	-----	-----	-----	-----	-----	-----	3.19
16.40	3.03	716.47	3.04	-----	-----	-----	-----	-----	-----	-----	-----	3.04
16.60	2.89	716.47	2.91	-----	-----	-----	-----	-----	-----	-----	-----	2.90
16.80	2.77	716.47	2.77	-----	-----	-----	-----	-----	-----	-----	-----	2.78
17.00	2.65	716.47	2.66	-----	-----	-----	-----	-----	-----	-----	-----	2.66

...End

Reservoir Report

Hydraflow Hydrographs by Intelisolve

Reservoir No. 5 - Ponds 9 and 10

Pond Data

Pond storage is based on known values

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.45	00	0.000	0.000
1.00	714.45	00	0.106	0.106
2.00	715.45	00	0.154	0.260
3.00	716.45	00	0.154	0.414
4.00	717.45	00	0.154	0.568

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 48.0	0.0	0.0	0.0
Span in	= 48.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 711.46	0.00	0.00	0.00
Length ft	= 95.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

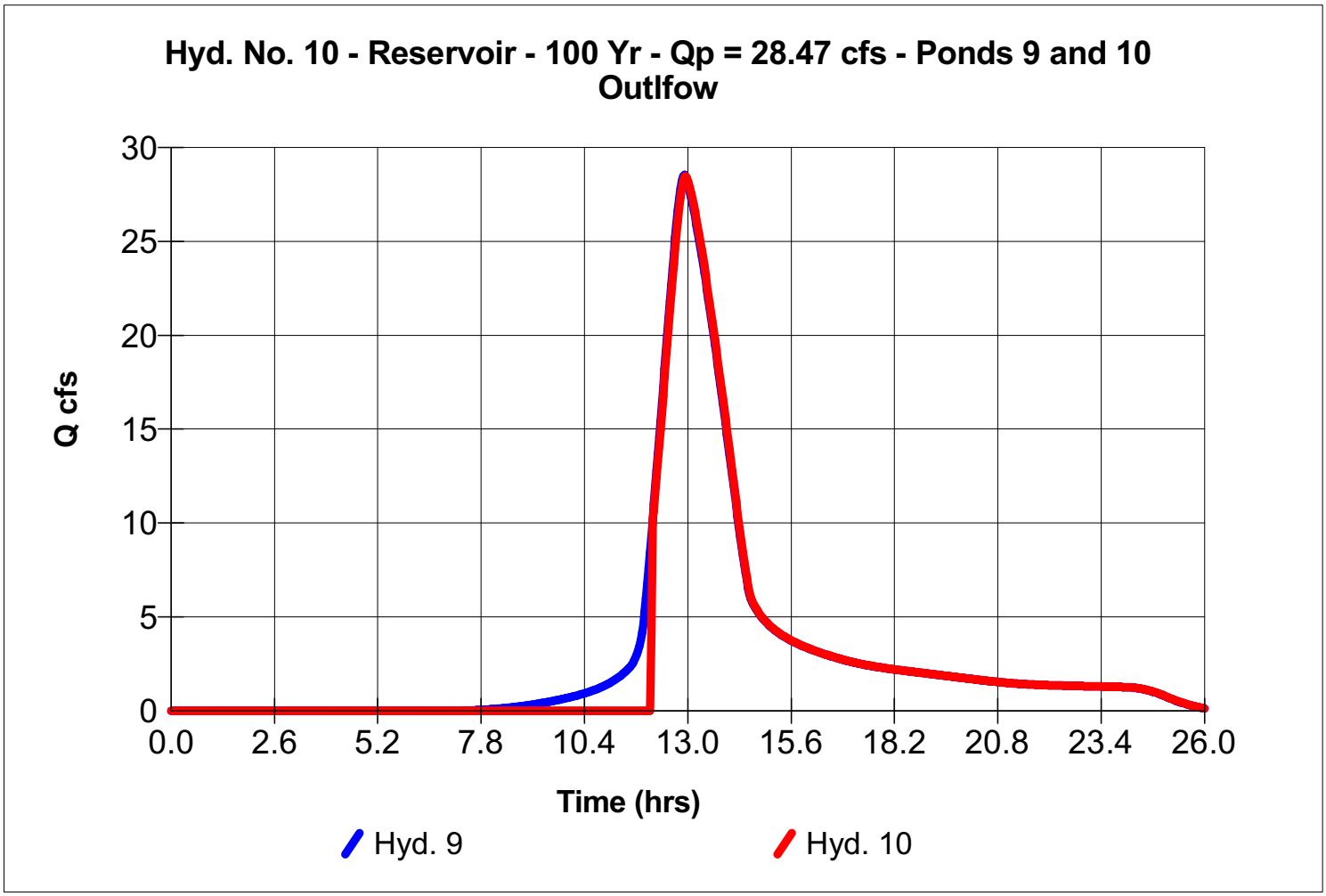
	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 716.50 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.45	0.00	---	---	---	---	---	---	---	---	0.00
1.00	0.106	714.45	0.00	---	---	---	---	---	---	---	---	0.00
2.00	0.260	715.45	0.00	---	---	---	---	---	---	---	---	0.00
3.00	0.414	716.45	0.00	---	---	---	---	---	---	---	---	0.00
4.00	0.568	717.45	58.97	---	---	---	---	---	---	---	---	58.97


Hyd. No. 10 - Reservoir - 100 Yr - Qp = 28.47 cfs - Ponds 9 and 10 Outlfow
Q cfs
30
25
20
15
10
5
0
0.0
2.6
5.2
7.8
10.4
13.0
15.6
18.2
20.8
23.4
26.0
Time (hrs)
Hyd. 9
Hyd. 10

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 11

Pond 5 Inflow

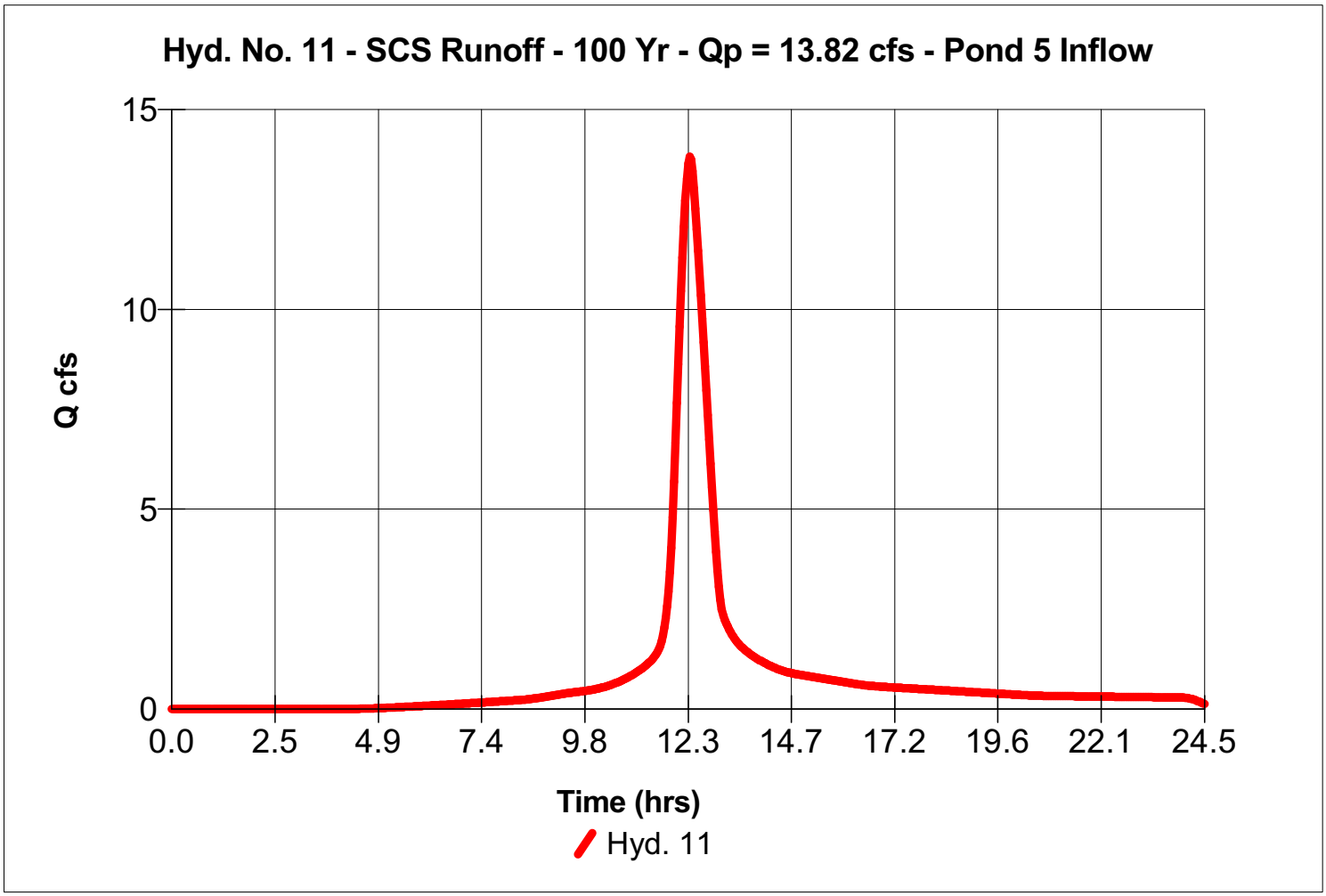
Hydrograph type	= SCS Runoff	Peak discharge	= 13.82 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 3.50 ac	Curve number	= 85
Basin Slope	= 0.1 %	Hydraulic length	= 400 ft
Tc method	= LAG	Time of conc. (Tc)	= 41 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1.660 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.43	1.27
11.63	1.69
11.83	3.42
12.03	8.63
12.23	13.26
12.43	12.52
12.63	9.18
12.83	5.55
13.03	2.73
13.23	2.00
13.43	1.67
13.63	1.46
13.83	1.31

...End


Hyd. No. 11 - SCS Runoff - 100 Yr - Qp = 13.82 cfs - Pond 5 Inflow
Q cfs
15
10
5
0
0.0
2.5
4.9
7.4
9.8
12.3
14.7
17.2
19.6
22.1
24.5
Time (hrs)
Hyd. 11

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 12

Pond 5 Inflow

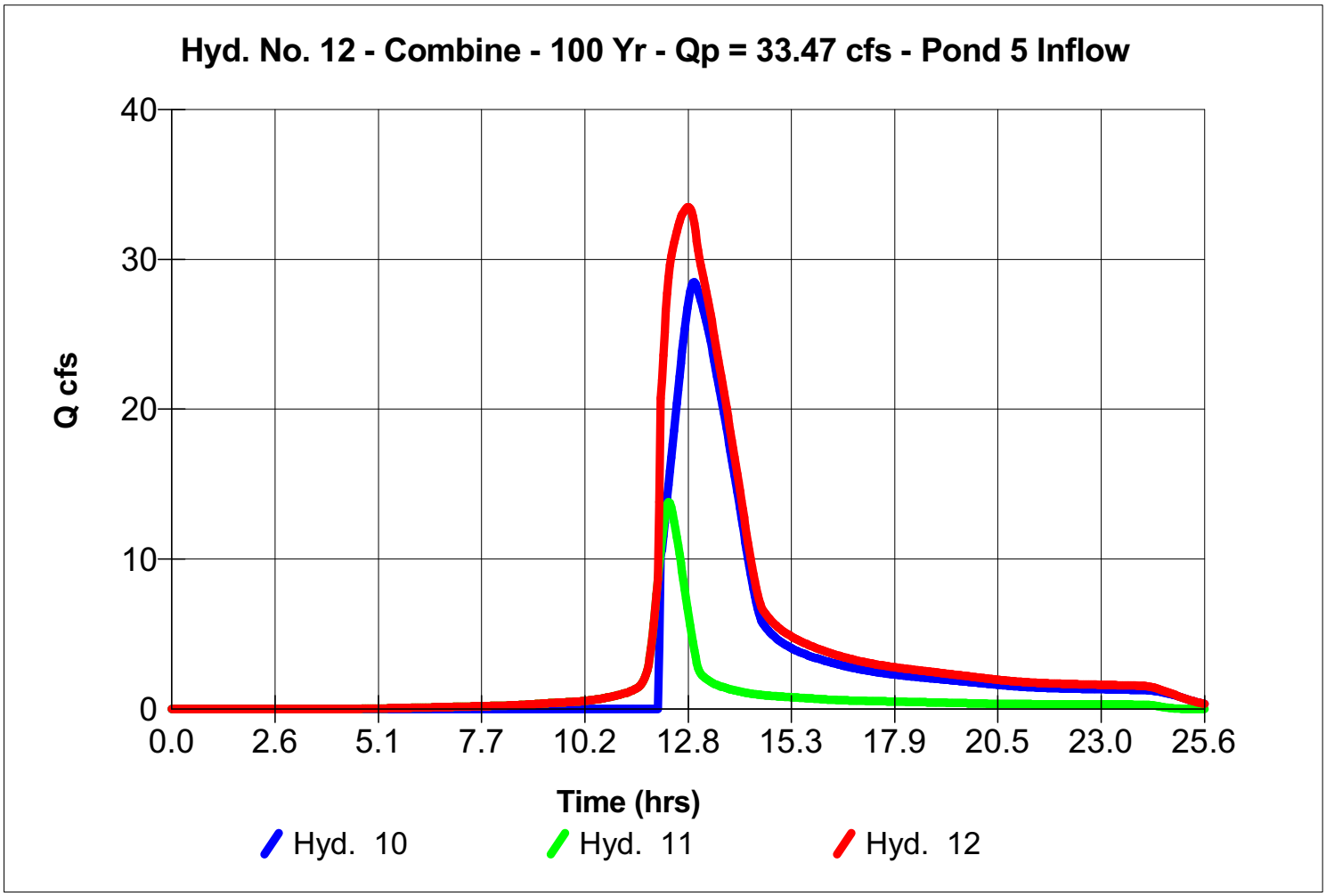
Hydrograph type	= Combine	Peak discharge	= 33.47 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 10, 11		

Hydrograph Volume = 7.401 acft

Hydrograph Discharge Table

Time (hrs)	Hyd. 10 + (cfs)	Hyd. 11 = (cfs)	Outflow (cfs)
12.00	0.00	7.66	7.66
12.20	12.41	12.72	25.14
12.40	17.67	13.01	30.68
12.60	23.06	9.77	32.83
12.80	27.34	6.14	33.47 <<
13.00	28.14	3.06	31.20
13.20	26.20	2.07	28.26
13.40	23.70	1.71	25.41
13.60	20.73	1.49	22.22
13.80	17.68	1.33	19.01
14.00	14.48	1.20	15.68
14.20	11.13	1.09	12.21
14.40	7.99	1.00	8.99
14.60	5.86	0.93	6.79
14.80	5.13	0.88	6.01
15.00	4.63	0.84	5.47
15.20	4.27	0.80	5.07
15.40	3.97	0.77	4.74
15.60	3.73	0.74	4.47
15.80	3.53	0.70	4.23
16.00	3.35	0.67	4.01
16.20	3.19	0.63	3.82
16.40	3.04	0.60	3.64
16.60	2.90	0.58	3.48
16.80	2.78	0.56	3.34
17.00	2.66	0.55	3.21
17.20	2.56	0.53	3.09

...End


Hyd. No. 12 - Combine - 100 Yr - Qp = 33.47 cfs - Pond 5 Inflow
Q cfs
40
30
20
10
0
0.0
2.6
5.1
7.7
10.2
12.8
15.3
17.9
20.5
23.0
25.6
Time (hrs)
Hyd. 10
Hyd. 11
Hyd. 12

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 13

Pond 5 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 25.68 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 12	Reservoir name	= Pond 5
Max. Elevation	= 716.60 ft	Max. Storage	= 2.046 acft

Storage Indication method used.

Outflow hydrograph volume = 6.427 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.40	30.68	715.08	5.05	-----	-----	-----	-----	-----	-----	-----	-----	5.05
12.60	32.83	715.62	14.28	-----	-----	-----	-----	-----	-----	-----	-----	14.28
12.80	33.47 <<	716.05	18.52	-----	-----	-----	-----	-----	-----	-----	-----	18.52
13.00	31.20	716.37	21.18	-----	-----	-----	-----	-----	-----	-----	-----	21.18
13.20	28.26	716.56	22.58	-----	-----	-----	1.18	-----	-----	-----	-----	23.76
13.40	25.41	716.60	22.89	-----	-----	-----	2.78	-----	-----	-----	-----	25.67
13.60	22.22	716.57	22.65	-----	-----	-----	1.57	-----	-----	-----	-----	24.22
13.80	19.01	716.50	22.15	-----	-----	-----	0.44	-----	-----	-----	-----	22.60
14.00	15.68	716.39	21.29	-----	-----	-----	-----	-----	-----	-----	-----	21.29
14.20	12.21	716.21	19.93	-----	-----	-----	-----	-----	-----	-----	-----	19.93
14.40	8.99	716.00	18.07	-----	-----	-----	-----	-----	-----	-----	-----	18.07
14.60	6.79	715.76	15.81	-----	-----	-----	-----	-----	-----	-----	-----	15.81
14.80	6.01	715.55	13.46	-----	-----	-----	-----	-----	-----	-----	-----	13.46
15.00	5.47	715.39	11.21	-----	-----	-----	-----	-----	-----	-----	-----	11.21
15.20	5.07	715.26	9.21	-----	-----	-----	-----	-----	-----	-----	-----	9.22
15.40	4.74	715.17	7.49	-----	-----	-----	-----	-----	-----	-----	-----	7.49
15.60	4.47	715.12	6.07	-----	-----	-----	-----	-----	-----	-----	-----	6.07
15.80	4.23	715.09	5.15	-----	-----	-----	-----	-----	-----	-----	-----	5.15
16.00	4.01	715.07	4.60	-----	-----	-----	-----	-----	-----	-----	-----	4.60
16.20	3.82	715.06	4.23	-----	-----	-----	-----	-----	-----	-----	-----	4.23
16.40	3.64	715.05	3.93	-----	-----	-----	-----	-----	-----	-----	-----	3.93
16.60	3.48	715.04	3.69	-----	-----	-----	-----	-----	-----	-----	-----	3.68
16.80	3.34	715.04	3.50	-----	-----	-----	-----	-----	-----	-----	-----	3.50
17.00	3.21	715.03	3.35	-----	-----	-----	-----	-----	-----	-----	-----	3.35
17.20	3.09	715.03	3.21	-----	-----	-----	-----	-----	-----	-----	-----	3.21
17.40	2.99	715.03	3.10	-----	-----	-----	-----	-----	-----	-----	-----	3.10
17.60	2.90	715.02	2.99	-----	-----	-----	-----	-----	-----	-----	-----	2.99
17.80	2.82	715.02	2.90	-----	-----	-----	-----	-----	-----	-----	-----	2.90
18.00	2.74	715.02	2.82	-----	-----	-----	-----	-----	-----	-----	-----	2.82
18.20	2.67	715.02	2.74	-----	-----	-----	-----	-----	-----	-----	-----	2.74
18.40	2.60	715.02	2.67	-----	-----	-----	-----	-----	-----	-----	-----	2.67
18.60	2.54	715.01	2.60	-----	-----	-----	-----	-----	-----	-----	-----	2.60
18.80	2.47	715.01	2.54	-----	-----	-----	-----	-----	-----	-----	-----	2.54
19.00	2.41	715.01	2.47	-----	-----	-----	-----	-----	-----	-----	-----	2.47
19.20	2.35	715.01	2.41	-----	-----	-----	-----	-----	-----	-----	-----	2.41
19.40	2.28	715.01	2.34	-----	-----	-----	-----	-----	-----	-----	-----	2.34

...End

Reservoir Report

Reservoir No. 6 - Pond 5

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.45	28,271	0.000	0.000
1.00	714.45	28,271	0.649	0.649
2.00	715.45	28,271	0.649	1.298
3.00	716.45	28,271	0.649	1.947
4.00	717.45	28,271	0.649	2.596

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 24.0	0.0	0.0	0.0
Span in	= 24.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 712.85	0.00	0.00	0.00
Length ft	= 27.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .015	.000	.000	.000
Orif. Coeff.	= 0.86	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

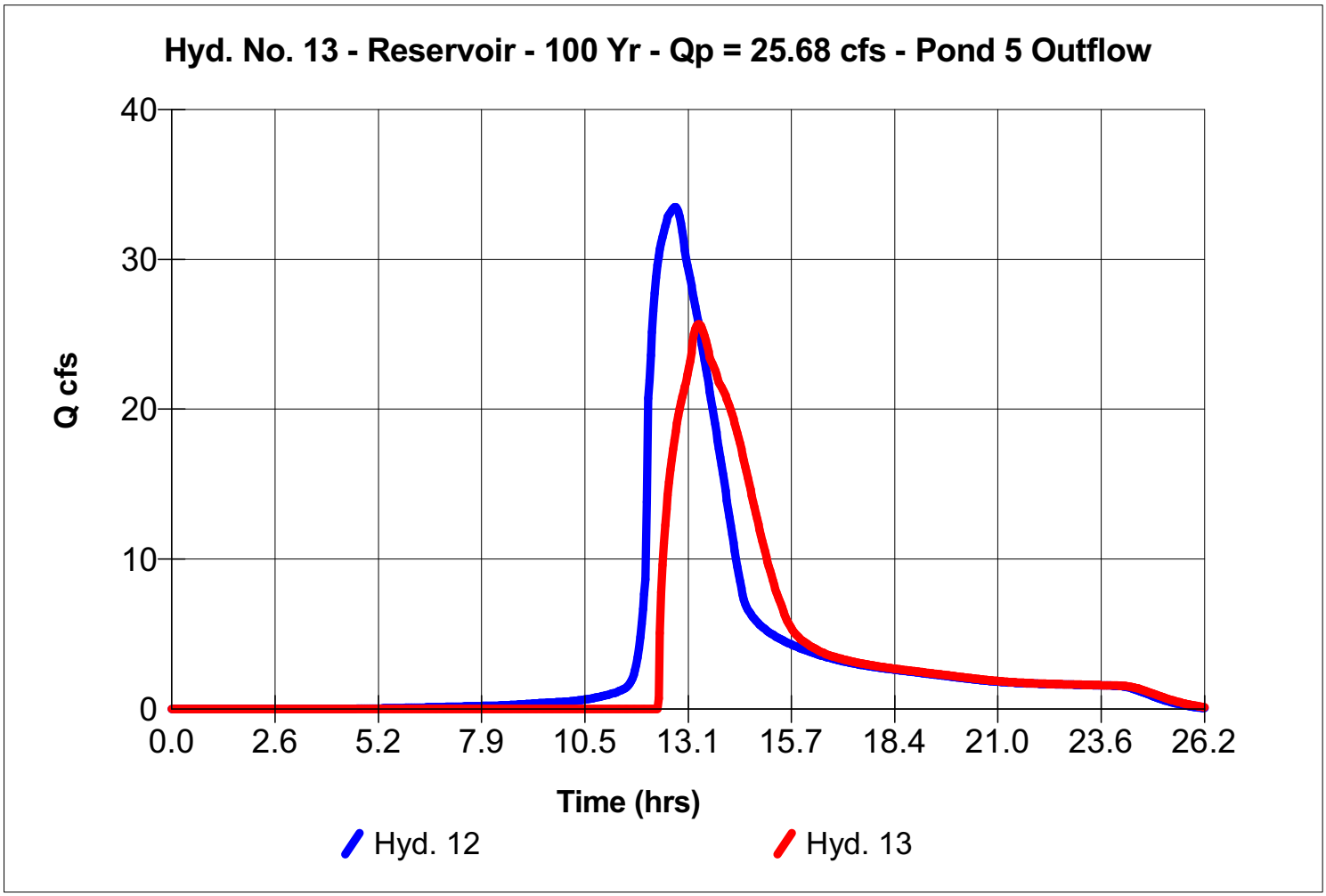
	[A]	[B]	[C]	[D]
Crest Len ft	= 30.00	0.00	0.00	0.00
Crest El. ft	= 716.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 715.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.45	0.00	---	---	---	0.00	---	---	---	---	0.00
1.00	0.649	714.45	0.00	---	---	---	0.00	---	---	---	---	0.00
2.00	1.298	715.45	12.13	---	---	---	0.00	---	---	---	---	12.13
3.00	1.947	716.45	21.78	---	---	---	0.00	---	---	---	---	21.78
4.00	2.596	717.45	28.31	---	---	---	72.23	---	---	---	---	100.53


Hyd. No. 13 - Reservoir - 100 Yr - Qp = 25.68 cfs - Pond 5 Outflow
Q cfs
40
30
20
10
0
0.0
2.6
5.2
7.9
10.5
13.1
15.7
18.4
21.0
23.6
26.2
Time (hrs)
Hyd. 12
Hyd. 13

Hydrograph Report

Hyd. No. 14

Pond 6 Inflow

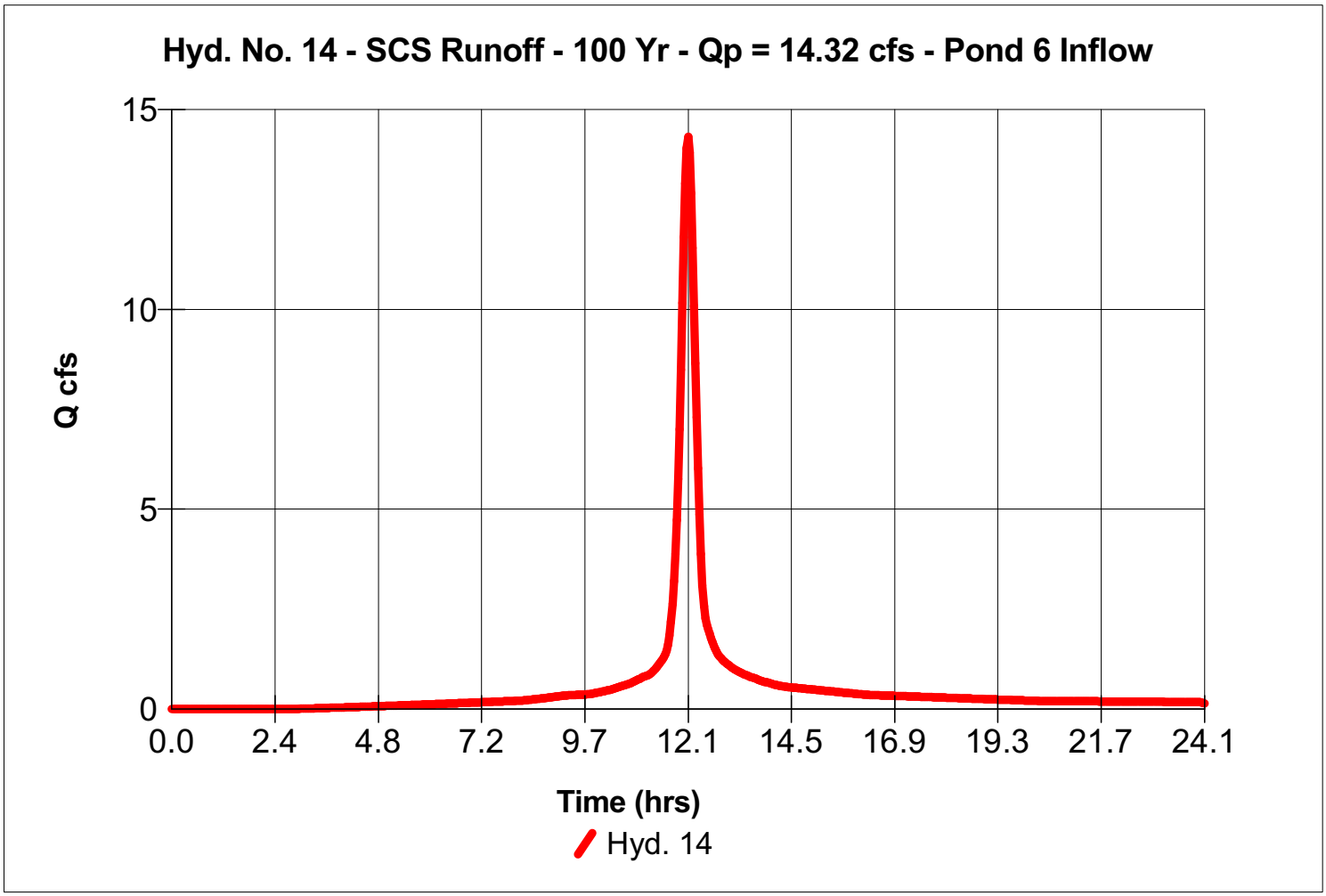
Hydrograph type	= SCS Runoff	Peak discharge	= 14.32 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.10 ac	Curve number	= 90
Basin Slope	= 0.1 %	Hydraulic length	= 200 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.5 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1.088 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.50	1.29
11.70	2.62
11.90	8.49
12.10	13.92
12.30	6.02
12.50	2.10
12.70	1.50

...End


Hyd. No. 14 - SCS Runoff - 100 Yr - Qp = 14.32 cfs - Pond 6 Inflow
Q cfs
15
10
5
0
0.0
2.4
4.8
7.2
9.7
12.1
14.5
16.9
19.3
21.7
24.1
Time (hrs)
Hyd. 14

Hydrograph Report

Hyd. No. 15

Pond 6 Inflow

Hydrograph type	= Combine	Peak discharge	= 26.55 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 13, 14		

Hydrograph Volume = 7.515 acft

Hydrograph Discharge Table

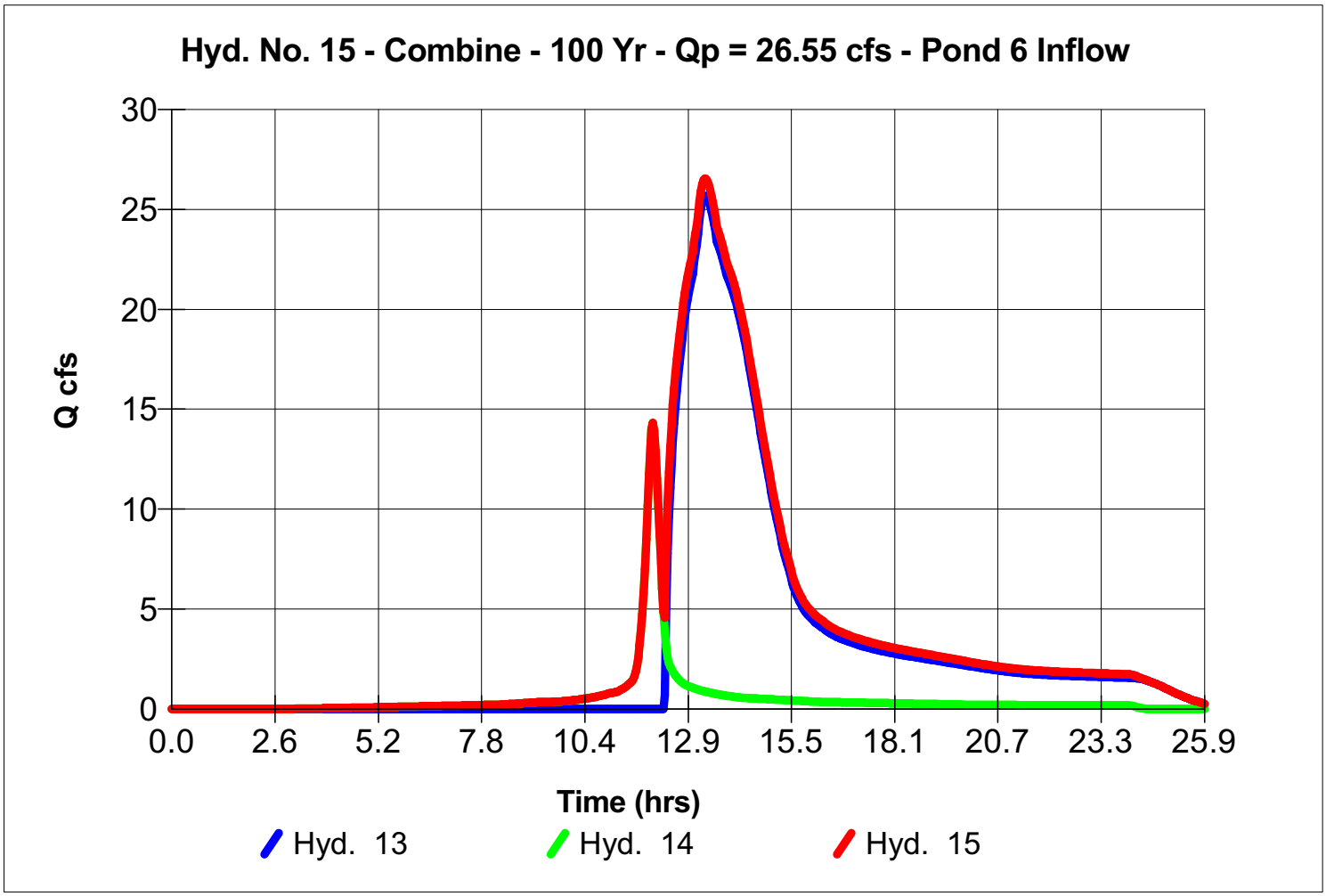
Time (hrs)	Hyd. 13 + (cfs)	Hyd. 14 = (cfs)	Outflow (cfs)
11.80	0.00	4.73	4.73
12.00	0.00	13.15	13.15
12.20	0.00	10.07	10.07
12.40	5.05	3.09	8.15
12.60	14.28	1.77	16.05
12.80	18.52	1.32	19.83
13.00	21.18	1.11	22.29
13.20	23.76	0.96	24.72
13.40	25.67	0.86	26.53
13.60	24.22	0.77	24.99
13.80	22.60	0.70	23.30
14.00	21.29	0.63	21.92
14.20	19.93	0.58	20.51
14.40	18.07	0.55	18.62
14.60	15.81	0.53	16.33
14.80	13.46	0.50	13.96
15.00	11.21	0.48	11.70
15.20	9.22	0.46	9.68
15.40	7.49	0.44	7.93
15.60	6.07	0.42	6.49
15.80	5.15	0.40	5.55
16.00	4.60	0.38	4.97
16.20	4.23	0.36	4.59
16.40	3.93	0.35	4.28
16.60	3.68	0.34	4.02
16.80	3.50	0.33	3.83
17.00	3.35	0.32	3.67
17.20	3.21	0.32	3.53
17.40	3.10	0.31	3.41
17.60	2.99	0.30	3.29
17.80	2.90	0.29	3.19
18.00	2.82	0.28	3.10
18.20	2.74	0.28	3.02
18.40	2.67	0.27	2.94
18.60	2.60	0.26	2.86
18.80	2.54	0.25	2.79
19.00	2.47	0.25	2.72
19.20	2.41	0.24	2.65

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Hyd. 13 + (cfs)	Hyd. 14 = (cfs)	Outflow (cfs)
19.40	2.34	0.23	2.57
19.60	2.28	0.22	2.50
19.80	2.21	0.22	2.43

...End


Hyd. No. 15 - Combine - 100 Yr - Qp = 26.55 cfs - Pond 6 Inflow
Q cfs
30
25
20
15
10
5
0
0.0
2.6
5.2
7.8
10.4
12.9
15.5
18.1
20.7
23.3
25.9
Time (hrs)
Hyd. 13
Hyd. 14
Hyd. 15

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 16

Pond 6 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 23.75 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 15	Reservoir name	= Pond 6
Max. Elevation	= 715.63 ft	Max. Storage	= 1.215 acft

Storage Indication method used.

Outflow hydrograph volume = 7.236 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.00	13.15	714.09	4.45	-----	-----	-----	-----	-----	-----	-----	-----	4.45
12.20	10.07	714.29	7.27	-----	-----	-----	-----	-----	-----	-----	-----	7.27
12.40	8.15	714.27	7.22	-----	-----	-----	-----	-----	-----	-----	-----	7.22
12.60	16.05	714.43	7.65	-----	-----	-----	-----	-----	-----	-----	-----	7.65
12.80	19.83	714.71	10.49	-----	-----	-----	-----	-----	-----	-----	-----	10.49
13.00	22.29	714.98	13.90	-----	-----	-----	-----	-----	-----	-----	-----	13.91
13.20	24.72	715.22	16.43	-----	-----	-----	-----	-----	-----	-----	-----	16.43
13.40	26.53	715.47	18.69	-----	-----	-----	0.16	-----	-----	-----	-----	18.84
13.60	24.99	715.61	19.88	-----	-----	-----	3.23	-----	-----	-----	-----	23.11
13.80	23.30	715.63	19.98	-----	-----	-----	3.68	-----	-----	-----	-----	23.67
14.00	21.92	715.61	19.82	-----	-----	-----	2.91	-----	-----	-----	-----	22.73
14.20	20.51	715.58	19.60	-----	-----	-----	1.94	-----	-----	-----	-----	21.54
14.40	18.62	715.54	19.32	-----	-----	-----	0.82	-----	-----	-----	-----	20.13
14.60	16.33	715.48	18.79	-----	-----	-----	0.26	-----	-----	-----	-----	19.05
14.80	13.96	715.38	17.94	-----	-----	-----	-----	-----	-----	-----	-----	17.94
15.00	11.70	715.25	16.72	-----	-----	-----	-----	-----	-----	-----	-----	16.72
15.20	9.68	715.09	15.15	-----	-----	-----	-----	-----	-----	-----	-----	15.15
15.40	7.93	714.93	13.34	-----	-----	-----	-----	-----	-----	-----	-----	13.34
15.60	6.49	714.77	11.38	-----	-----	-----	-----	-----	-----	-----	-----	11.38
15.80	5.55	714.64	9.40	-----	-----	-----	-----	-----	-----	-----	-----	9.40
16.00	4.97	714.44	7.67	-----	-----	-----	-----	-----	-----	-----	-----	7.67
16.20	4.59	714.45	7.69	-----	-----	-----	-----	-----	-----	-----	-----	7.69
16.40	4.28	714.37	7.51	-----	-----	-----	-----	-----	-----	-----	-----	7.51
16.60	4.02	714.27	7.23	-----	-----	-----	-----	-----	-----	-----	-----	7.23
16.80	3.83	714.18	6.45	-----	-----	-----	-----	-----	-----	-----	-----	6.45
17.00	3.67	714.12	5.24	-----	-----	-----	-----	-----	-----	-----	-----	5.24
17.20	3.53	714.09	4.31	-----	-----	-----	-----	-----	-----	-----	-----	4.31
17.40	3.41	714.07	3.83	-----	-----	-----	-----	-----	-----	-----	-----	3.83
17.60	3.29	714.06	3.55	-----	-----	-----	-----	-----	-----	-----	-----	3.55
17.80	3.19	714.05	3.38	-----	-----	-----	-----	-----	-----	-----	-----	3.37
18.00	3.10	714.05	3.24	-----	-----	-----	-----	-----	-----	-----	-----	3.24
18.20	3.02	714.04	3.12	-----	-----	-----	-----	-----	-----	-----	-----	3.12
18.40	2.94	714.04	3.03	-----	-----	-----	-----	-----	-----	-----	-----	3.03
18.60	2.86	714.04	2.95	-----	-----	-----	-----	-----	-----	-----	-----	2.95
18.80	2.79	714.04	2.87	-----	-----	-----	-----	-----	-----	-----	-----	2.87
19.00	2.72	714.03	2.80	-----	-----	-----	-----	-----	-----	-----	-----	2.79
19.20	2.65	714.03	2.72	-----	-----	-----	-----	-----	-----	-----	-----	2.72
19.40	2.57	714.03	2.65	-----	-----	-----	-----	-----	-----	-----	-----	2.65

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.60	2.50	714.03	2.58	-----	-----	-----	-----	-----	-----	-----	-----	2.58
19.80	2.43	714.03	2.50	-----	-----	-----	-----	-----	-----	-----	-----	2.50
20.00	2.36	714.02	2.43	-----	-----	-----	-----	-----	-----	-----	-----	2.43
20.20	2.29	714.02	2.36	-----	-----	-----	-----	-----	-----	-----	-----	2.36
20.40	2.22	714.02	2.29	-----	-----	-----	-----	-----	-----	-----	-----	2.29
20.60	2.16	714.02	2.22	-----	-----	-----	-----	-----	-----	-----	-----	2.22
20.80	2.10	714.02	2.16	-----	-----	-----	-----	-----	-----	-----	-----	2.16

...End

Reservoir Report

Reservoir No. 7 - Pond 6

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.45	24,296	0.000	0.000
1.00	714.45	24,296	0.558	0.558
2.00	715.45	24,296	0.558	1.116
3.00	716.45	24,296	0.558	1.673

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 24.0	0.0	0.0	0.0
Span in	= 24.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 712.55	0.00	0.00	0.00
Length ft	= 31.0	0.0	0.0	0.0
Slope %	= 0.60	0.00	0.00	0.00
N-Value	= .015	.000	.000	.000
Orif. Coeff.	= 0.86	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

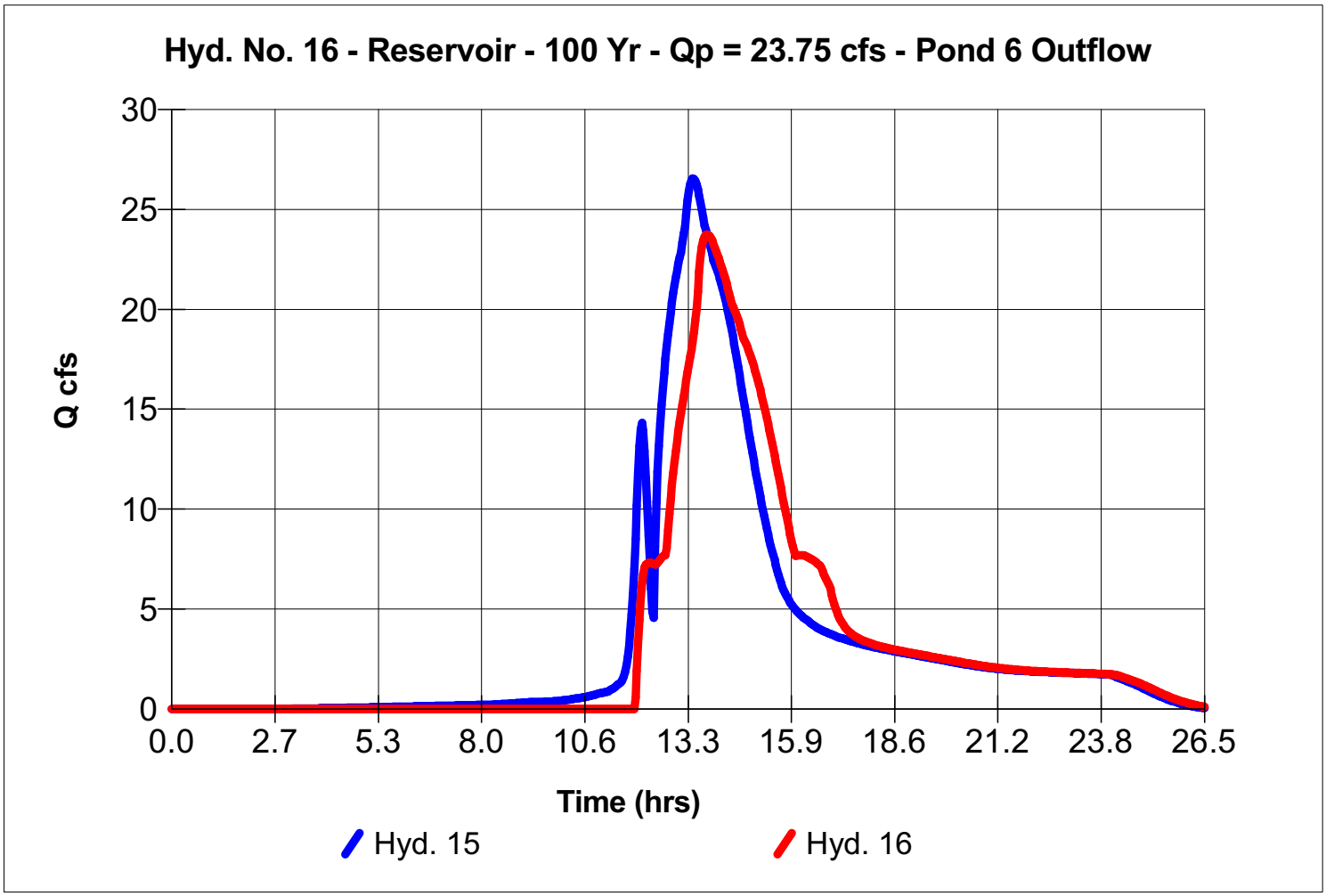
	[A]	[B]	[C]	[D]
Crest Len ft	= 30.00	0.00	0.00	0.00
Crest El. ft	= 715.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 714.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.45	0.00	---	---	---	0.00	---	---	---	---	0.00
1.00	0.558	714.45	7.69	---	---	---	0.00	---	---	---	---	7.69
2.00	1.116	715.45	18.54	---	---	---	0.00	---	---	---	---	18.54
3.00	1.673	716.45	25.69	---	---	---	72.23	---	---	---	---	97.91


Hyd. No. 16 - Reservoir - 100 Yr - Qp = 23.75 cfs - Pond 6 Outflow
Q cfs
30
25
20
15
10
5
0
0.0
2.7
5.3
8.0
10.6
13.3
15.9
18.6
21.2
23.8
26.5
Time (hrs)
Hyd. 15
Hyd. 16

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 17

Pond 7 Inflow

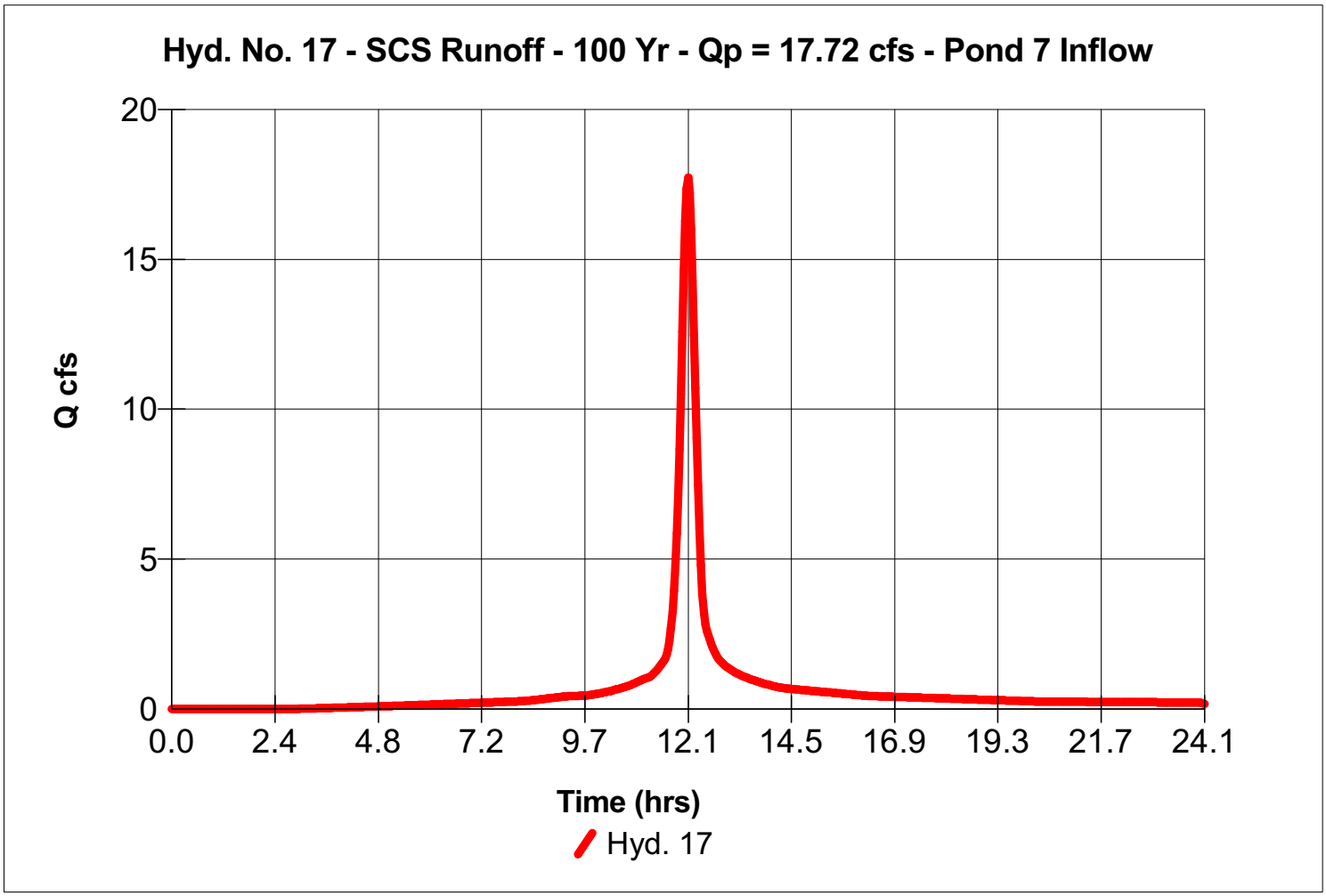
Hydrograph type	= SCS Runoff	Peak discharge	= 17.72 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 2.60 ac	Curve number	= 90
Basin Slope	= 0.1 %	Hydraulic length	= 200 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.5 min
Total precip.	= 7.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1.347 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
11.50	1.60
11.70	3.25
11.90	10.52
12.10	17.23
12.30	7.45
12.50	2.61
12.70	1.86

...End


Hyd. No. 17 - SCS Runoff - 100 Yr - Qp = 17.72 cfs - Pond 7 Inflow
Q cfs
20
15
10
5
0
0.0
2.4
4.8
7.2
9.7
12.1
14.5
16.9
19.3
21.7
24.1
Time (hrs)
Hyd. 17

Hydrograph Report

Hyd. No. 18

Pond 7 Inflow

Hydrograph type	= Combine	Peak discharge	= 24.64 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 16, 17		

Hydrograph Volume = 8.583 acft

Hydrograph Discharge Table

Time (hrs)	Hyd. 16 + (cfs)	Hyd. 17 = (cfs)	Outflow (cfs)
11.80	0.00	5.85	5.85
12.00	4.45	16.28	20.73
12.20	7.27	12.47	19.74
12.40	7.22	3.83	11.06
12.60	7.65	2.20	9.85
12.80	10.49	1.63	12.12
13.00	13.91	1.37	15.28
13.20	16.43	1.19	17.62
13.40	18.84	1.06	19.90
13.60	23.11	0.96	24.07
13.80	23.67	0.86	24.53
14.00	22.73	0.79	23.52
14.20	21.54	0.72	22.26
14.40	20.13	0.68	20.81
14.60	19.05	0.65	19.70
14.80	17.94	0.62	18.57
15.00	16.72	0.60	17.31
15.20	15.15	0.57	15.72
15.40	13.34	0.55	13.89
15.60	11.38	0.52	11.90
15.80	9.40	0.49	9.89
16.00	7.67	0.47	8.14
16.20	7.69	0.44	8.13
16.40	7.51	0.43	7.94
16.60	7.23	0.42	7.65
16.80	6.45	0.41	6.86
17.00	5.24	0.40	5.64
17.20	4.31	0.39	4.70
17.40	3.83	0.38	4.21
17.60	3.55	0.37	3.93
17.80	3.37	0.36	3.74
18.00	3.24	0.35	3.59
18.20	3.12	0.34	3.47
18.40	3.03	0.33	3.36
18.60	2.95	0.32	3.27
18.80	2.87	0.31	3.18
19.00	2.79	0.31	3.10
19.20	2.72	0.30	3.02

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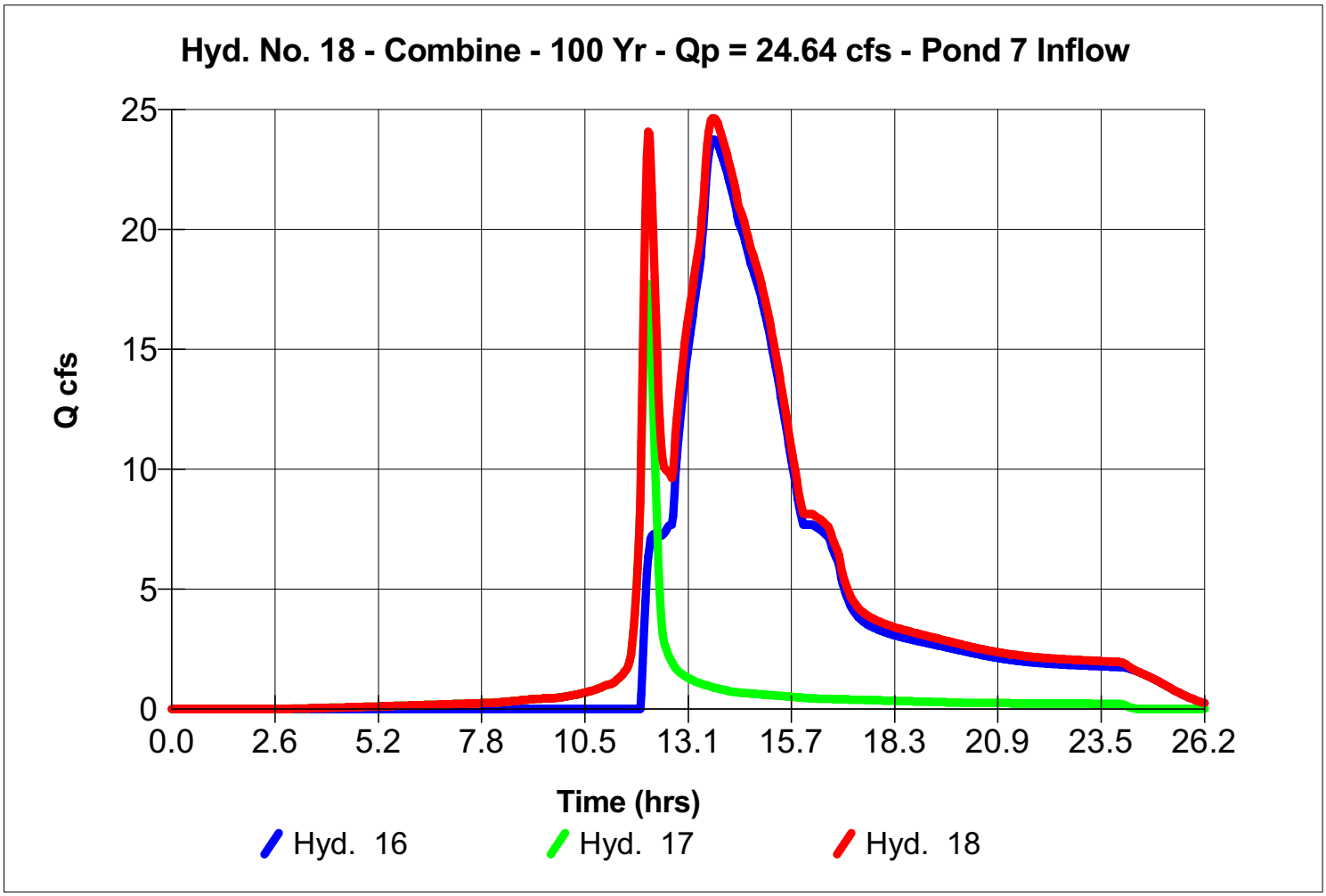
Hydrograph Discharge Table

Time (hrs)	Hyd. 16 + (cfs)	Hyd. 17 = (cfs)	Outflow (cfs)
19.40	2.65	0.29	2.94
19.60	2.58	0.28	2.85
19.80	2.50	0.27	2.77
20.00	2.43	0.26	2.69
20.20	2.36	0.25	2.61
20.40	2.29	0.25	2.53
20.60	2.22	0.24	2.47
20.80	2.16	0.24	2.40
21.00	2.10	0.24	2.34
21.20	2.05	0.24	2.29
21.40	2.01	0.24	2.25

...End


Hyd. No. 18 - Combine - 100 Yr - Qp = 24.64 cfs - Pond 7 Inflow
Q cfs
25
20
15
10
5
0
0.0
2.6
5.2
7.8
10.5
13.1
15.7
18.3
20.9
23.5
26.2
Time (hrs)
Hyd. 16
Hyd. 17
Hyd. 18

Hydrograph Report

Hyd. No. 19

Pond 7 Outlfow

Hydrograph type	= Reservoir	Peak discharge	= 20.18 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 18	Reservoir name	= Pond 7
Max. Elevation	= 714.64 ft	Max. Storage	= 1.162 acft

Storage Indication method used.

Outflow hydrograph volume = 8.583 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.00	20.73	713.74	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.29
12.20	19.74	714.02	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.94
12.40	11.06	714.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.93
12.60	9.85	714.09	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.64
12.80	12.12	714.08	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.59
13.00	15.28	714.13	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.74
13.20	17.62	714.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.41
13.40	19.90	714.27	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.15
13.60	24.07	714.37	-----	-----	-----	-----	-----	-----	-----	-----	-----	16.97
13.80	24.53	714.48	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.95
14.00	23.52	714.56	-----	-----	-----	-----	-----	-----	-----	-----	-----	19.68
14.20	22.26	714.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.01
14.40	20.81	714.63	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.16
14.60	19.70	714.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.17
14.80	18.57	714.62	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.06
15.00	17.31	714.59	-----	-----	-----	-----	-----	-----	-----	-----	-----	19.85
15.20	15.72	714.53	-----	-----	-----	-----	-----	-----	-----	-----	-----	19.51
15.40	13.89	714.46	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.56
15.60	11.90	714.38	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.06
15.80	9.89	714.29	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.43
16.00	8.14	714.19	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.34
16.20	8.13	714.12	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.53
16.40	7.94	714.07	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.32
16.60	7.65	714.04	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.44
16.80	6.86	714.01	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.69
17.00	5.64	713.97	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.97
17.20	4.70	713.93	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.13
17.40	4.21	713.89	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.34
17.60	3.93	713.86	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.67
17.80	3.74	713.83	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.13
18.00	3.59	713.81	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.70
18.20	3.47	713.80	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.36
18.40	3.36	713.78	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.08
18.60	3.27	713.77	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.86
18.80	3.18	713.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.67
19.00	3.10	713.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.52
19.20	3.02	713.75	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.39
19.40	2.94	713.74	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.32

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.60	2.85	713.74	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.24
19.80	2.77	713.73	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.17
20.00	2.69	713.72	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.09
20.20	2.61	713.72	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.01
20.40	2.53	713.71	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.94
20.60	2.47	713.70	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.86
20.80	2.40	713.70	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.79
21.00	2.34	713.69	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.71
21.20	2.29	713.68	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.64
21.40	2.25	713.68	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.58
21.60	2.21	713.67	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.52
21.80	2.17	713.67	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.46
22.00	2.14	713.66	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.41
22.20	2.12	713.66	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.36
22.40	2.09	713.65	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.31
22.60	2.07	713.65	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.27
22.80	2.05	713.65	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.24
23.00	2.04	713.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.20
23.20	2.02	713.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.17
23.40	2.00	713.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.15
23.60	1.99	713.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.12
23.80	1.97	713.64	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.00	1.96	713.63	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.07
24.20	1.83	713.63	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.04
24.40	1.62	713.63	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.99
24.60	1.47	713.62	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.91
24.80	1.32	713.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.82

...End

Reservoir Report

Reservoir No. 8 - Pond 7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	713.45	42,621	0.000	0.000
0.30	713.75	42,621	0.294	0.294
0.55	714.00	42,621	0.245	0.538
0.80	714.25	42,621	0.245	0.783
1.05	714.50	42,621	0.245	1.027
1.30	714.75	42,621	0.245	1.272
1.55	715.00	42,621	0.245	1.517
1.80	715.25	42,621	0.245	1.761
2.05	715.50	42,621	0.245	2.006

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

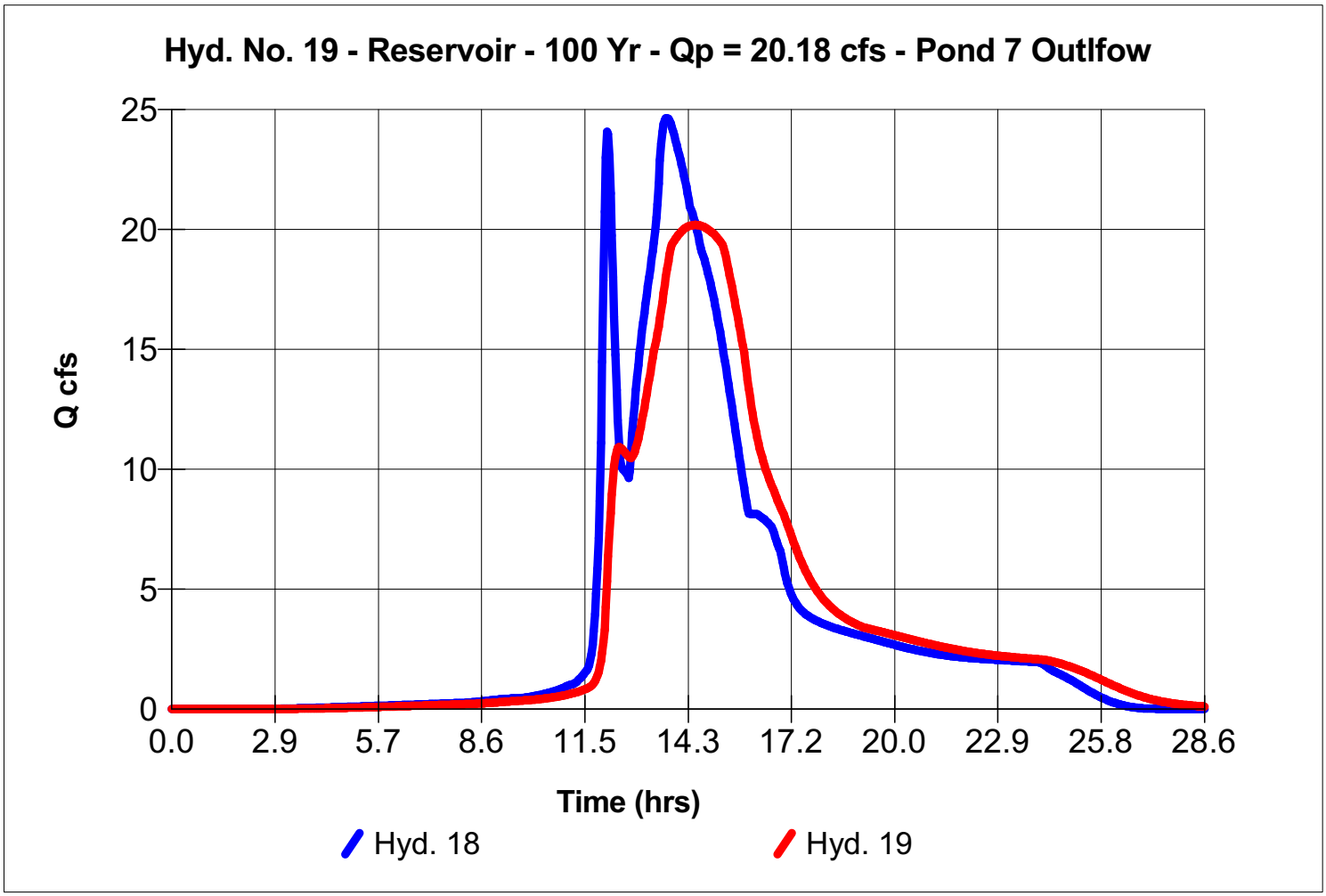
	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	713.45	---	---	---	---	22.46	10.20	---	---	---	0.00
0.30	0.294	713.75	---	---	---	---	---	---	---	---	---	3.40
0.55	0.538	714.00	---	---	---	---	---	---	---	---	---	8.50
0.80	0.783	714.25	---	---	---	---	---	---	---	---	---	14.80
1.05	1.027	714.50	---	---	---	---	---	---	---	---	---	19.30
1.30	1.272	714.75	---	---	---	---	---	---	---	---	---	20.90
1.55	1.517	715.00	---	---	---	---	---	---	---	---	---	22.30
1.80	1.761	715.25	---	---	---	---	---	---	---	---	---	23.70
2.05	2.006	715.50	---	---	---	---	---	---	---	---	---	25.00


Hyd. No. 19 - Reservoir - 100 Yr - Qp = 20.18 cfs - Pond 7 Outlfow
Q cfs
25
20
15
10
5
0
0.0
2.9
5.7
8.6
11.5
14.3
17.2
20.0
22.9
25.8
28.6
Time (hrs)
Hyd. 18
Hyd. 19

Hydrograph Report

Hyd. No. 20

North Ponds + South Ponds

Hydrograph type	= Combine	Peak discharge	= 28.53 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 8, 19		

Hydrograph Volume = 12.705 acft

Hydrograph Discharge Table

Time (hrs)	Hyd. 8 + (cfs)	Hyd. 19 = (cfs)	Outflow (cfs)
11.80	1.40	1.39	2.78
12.00	4.08	3.29	7.37
12.20	6.27	8.94	15.21
12.40	6.80	10.93	17.73
12.60	7.12	10.64	17.76
12.80	7.33	10.59	17.92
13.00	7.57	11.74	19.31
13.20	7.83	13.41	21.24
13.40	8.09	15.15	23.24
13.60	8.31	16.97	25.28
13.80	8.46	18.95	27.42
14.00	8.53	19.68	28.21
14.20	8.49	20.01	28.49
14.40	8.34	20.16	28.50
14.60	8.10	20.17	28.27
14.80	7.76	20.06	27.82
15.00	7.34	19.85	27.19
15.20	6.86	19.51	26.36
15.40	6.33	18.56	24.89
15.60	5.80	17.06	22.86
15.80	5.29	15.43	20.72
16.00	4.73	13.34	18.07
16.20	4.21	11.53	15.74
16.40	3.76	10.32	14.08
16.60	3.41	9.44	12.86
16.80	3.11	8.69	11.80
17.00	2.85	7.97	10.81
17.20	2.62	7.13	9.75
17.40	2.42	6.34	8.76
17.60	2.25	5.67	7.92
17.80	2.11	5.13	7.24
18.00	2.01	4.70	6.71
18.20	1.91	4.36	6.27
18.40	1.83	4.08	5.91
18.60	1.75	3.86	5.61
18.80	1.68	3.67	5.35
19.00	1.62	3.52	5.13
19.20	1.55	3.39	4.94

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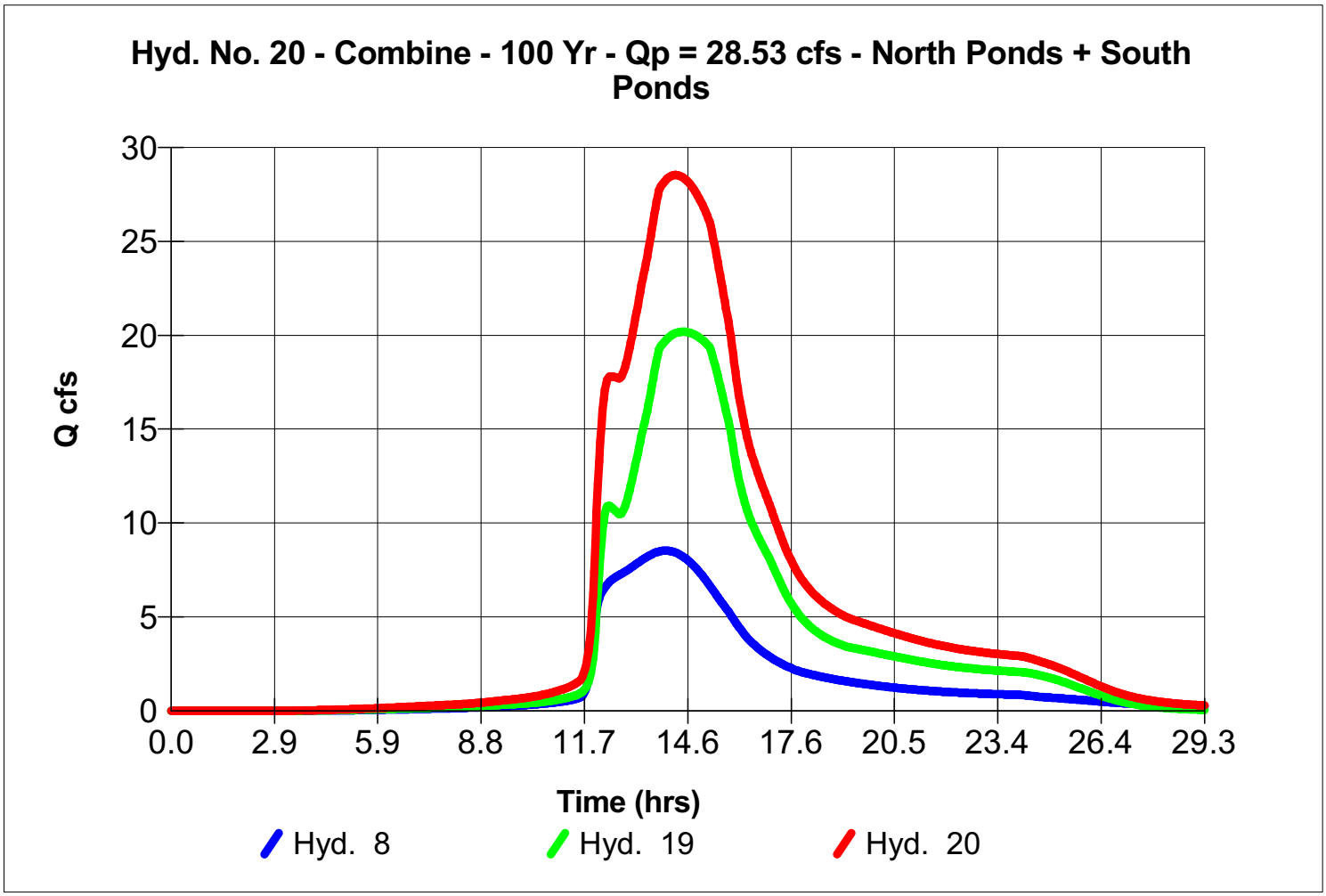
Hydrograph Discharge Table

Time (hrs)	Hyd. 8 + (cfs)	Hyd. 19 = (cfs)	Outflow (cfs)
19.40	1.50	3.32	4.81
19.60	1.44	3.24	4.69
19.80	1.39	3.17	4.56
20.00	1.35	3.09	4.44
20.20	1.30	3.01	4.31
20.40	1.26	2.94	4.19
20.60	1.22	2.86	4.08
20.80	1.18	2.79	3.97
21.00	1.15	2.71	3.86
21.20	1.11	2.64	3.76
21.40	1.08	2.58	3.66
21.60	1.06	2.52	3.57
21.80	1.03	2.46	3.49
22.00	1.01	2.41	3.41
22.20	0.98	2.36	3.34
22.40	0.96	2.31	3.28
22.60	0.95	2.27	3.22
22.80	0.93	2.24	3.17
23.00	0.91	2.20	3.12
23.20	0.90	2.17	3.07
23.40	0.89	2.15	3.03
23.60	0.88	2.12	2.99
23.80	0.86	2.10	2.96
24.00	0.85	2.07	2.93
24.20	0.83	2.04	2.87
24.40	0.79	1.99	2.78
24.60	0.75	1.91	2.65

...End


Hyd. No. 20 - Combine - 100 Yr - Qp = 28.53 cfs - North Ponds + South Ponds
Q cfs
30
25
20
15
10
5
0
0.0
2.9
5.9
8.8
11.7
14.6
17.6
20.5
23.4
26.4
29.3
Time (hrs)
Hyd. 8
Hyd. 19
Hyd. 20

Hydrograph Report

Hyd. No. 21

Pond 8 Outflow

Hydrograph type	= Reservoir	Peak discharge	= 28.53 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 20	Reservoir name	= Pond 8
Max. Elevation	= 713.62 ft	Max. Storage	= 0.233 acft

Storage Indication method used.

Outflow hydrograph volume = 12.692 acft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.00	7.37	712.21	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.19
12.20	15.21	712.92	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.35
12.40	17.73	713.19	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.28
12.60	17.76	713.22	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.77
12.80	17.92	713.22	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.79
13.00	19.31	713.27	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.88
13.20	21.24	713.37	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.70
13.40	23.24	713.47	-----	-----	-----	-----	-----	-----	-----	-----	-----	22.73
13.60	25.28	713.54	-----	-----	-----	-----	-----	-----	-----	-----	-----	25.00
13.80	27.42	713.59	-----	-----	-----	-----	-----	-----	-----	-----	-----	27.19
14.00	28.21	713.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.15
14.20	28.49	713.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.47
14.40	28.50	713.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.51
14.60	28.27	713.61	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.31
14.80	27.82	713.60	-----	-----	-----	-----	-----	-----	-----	-----	-----	27.88
15.00	27.19	713.59	-----	-----	-----	-----	-----	-----	-----	-----	-----	27.27
15.20	26.36	713.57	-----	-----	-----	-----	-----	-----	-----	-----	-----	26.47
15.40	24.89	713.54	-----	-----	-----	-----	-----	-----	-----	-----	-----	25.12
15.60	22.86	713.49	-----	-----	-----	-----	-----	-----	-----	-----	-----	23.19
15.80	20.72	713.40	-----	-----	-----	-----	-----	-----	-----	-----	-----	21.31
16.00	18.07	713.27	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.84
16.20	15.74	713.14	-----	-----	-----	-----	-----	-----	-----	-----	-----	16.33
16.40	14.08	713.05	-----	-----	-----	-----	-----	-----	-----	-----	-----	14.50
16.60	12.86	712.98	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.25
16.80	11.80	712.91	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.21
17.00	10.81	712.83	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.20
17.20	9.75	712.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.16
17.40	8.76	712.68	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.14
17.60	7.92	712.62	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.24
17.80	7.24	712.57	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.50
18.00	6.71	712.52	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.91
18.20	6.27	712.49	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.48
18.40	5.91	712.45	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.13
18.60	5.61	712.41	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.81
18.80	5.35	712.37	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.52
19.00	5.13	712.34	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.28
19.20	4.94	712.32	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.07
19.40	4.81	712.30	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.91

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.60	4.69	712.28	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.77
19.80	4.56	712.27	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.64
20.00	4.44	712.25	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.52
20.20	4.31	712.24	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.39
20.40	4.19	712.22	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.27
20.60	4.08	712.21	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.15
20.80	3.97	712.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.04
21.00	3.86	712.18	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.93
21.20	3.76	712.17	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.82
21.40	3.66	712.16	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.72
21.60	3.57	712.15	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.63
21.80	3.49	712.14	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.54
22.00	3.41	712.13	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.46
22.20	3.34	712.12	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.39
22.40	3.28	712.11	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.32
22.60	3.22	712.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.26
22.80	3.17	712.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.20
23.00	3.12	712.09	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.15
23.20	3.07	712.08	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.10
23.40	3.03	712.08	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.06
23.60	2.99	712.07	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.02
23.80	2.96	712.07	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.98
24.00	2.93	712.07	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.95
24.20	2.87	712.06	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.91
24.40	2.78	712.05	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.83
24.60	2.65	712.04	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.73
24.80	2.54	712.03	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.61

...End

Reservoir Report

Reservoir No. 9 - Pond 8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	711.00	3,883	0.000	0.000
0.50	711.50	3,883	0.045	0.045
1.00	712.00	3,883	0.045	0.089
1.50	712.50	3,883	0.045	0.134
2.00	713.00	3,883	0.045	0.178
2.50	713.50	3,883	0.045	0.223
3.00	714.00	3,883	0.045	0.267

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 0.0	0.0	0.0	0.0
Span in	= 0.0	0.0	0.0	0.0
No. Barrels	= 0	0	0	0
Invert El. ft	= 0.00	0.00	0.00	0.00
Length ft	= 0.0	0.0	0.0	0.0
Slope %	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

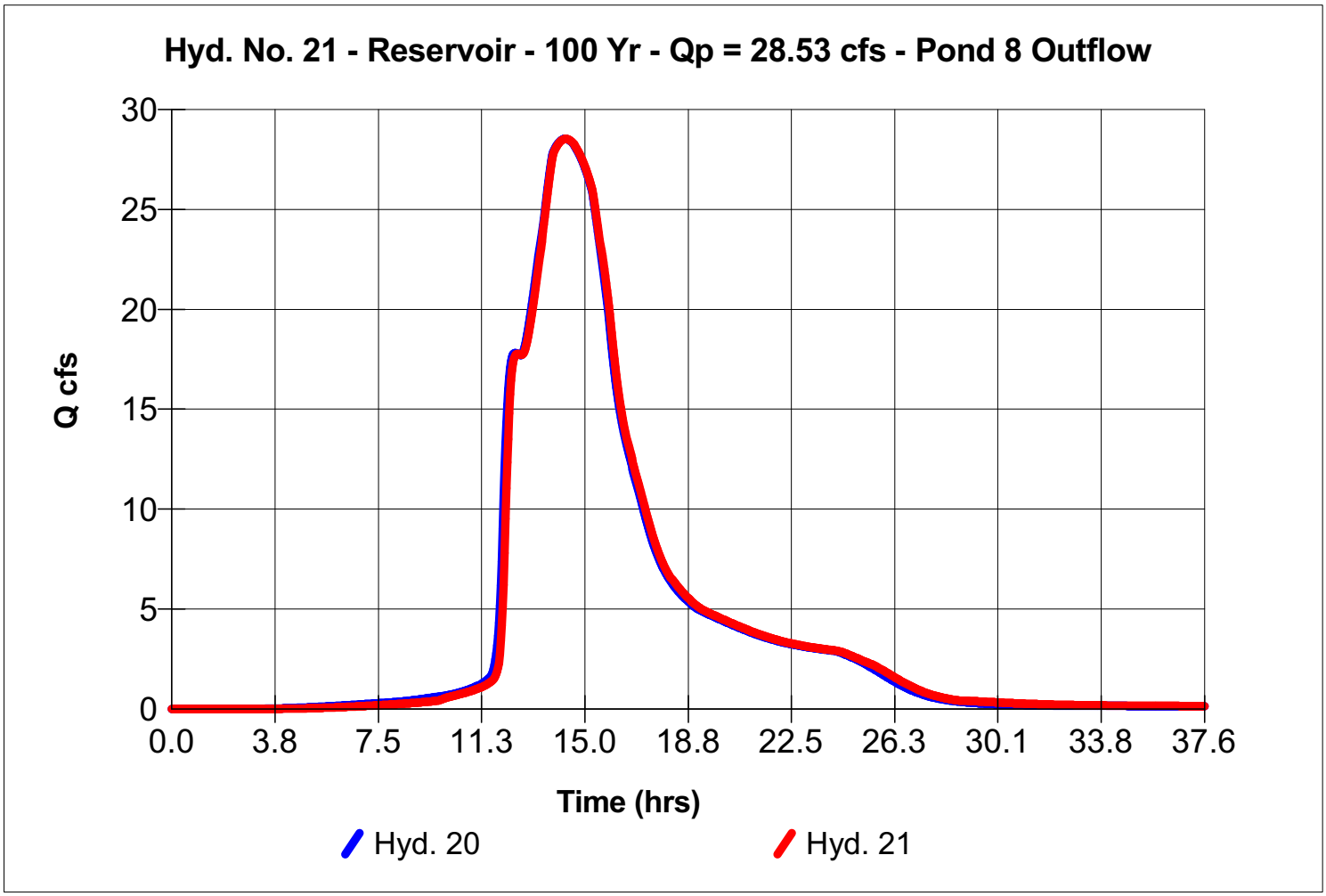
	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0.000	711.00	---	---	---	---	---	---	---	---	---	0.00
0.50	0.045	711.50	---	---	---	---	---	---	---	---	---	0.42
1.00	0.089	712.00	---	---	---	---	---	---	---	---	---	2.39
1.50	0.134	712.50	---	---	---	---	---	---	---	---	---	6.59
2.00	0.178	713.00	---	---	---	---	---	---	---	---	---	13.52
2.50	0.223	713.50	---	---	---	---	---	---	---	---	---	23.30
3.00	0.267	714.00	---	---	---	---	---	---	---	---	---	46.00


Hyd. No. 21 - Reservoir - 100 Yr - Qp = 28.53 cfs - Pond 8 Outflow
Q cfs
30
25
20
15
10
5
0
0.0
3.8
7.5
11.3
15.0
18.8
22.5
26.3
30.1
33.8
37.6
Time (hrs)
Hyd. 20
Hyd. 21