

DESIGN REPORT

Sedimentation Structure

N11-A1

Kayenta Mine

Navajo County, Arizona

PEABODY COAL COMPANY



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**Appendix A - Hydrology, Hydraulic, and Sedimentation Calculations**

**Appendix B - SEDCAD<sup>+</sup> (Input and Output) 10-Year, 24-Hour Storm Event**

**Appendix C - SEDCAD<sup>+</sup> (Input and Output) 100-Year, 6-Hour Storm Event**

**Exhibit 1 - Proposed N11-A, N11-A1, and N11-A2 Sedimentation Ponds**

### Introduction

Sedimentation Structure N11-A1 will be an earthen embankment, designed and constructed by Peabody Coal Company as a temporary sedimentation structure to control runoff and sediment from the proposed N-11 surface mining area at the Kayenta Mine. The location of Structure N11-A1 and its watershed boundary is shown on Drawing No. 85400 (Sheet L-7), and Drawing No. 85405. The site-specific general construction plans are shown on the attached Exhibit 1.

This design report contains information specific to Structure N11-A1 which is located in series with sedimentation structures N11-A and N11-A2. Mine-wide design, construction, and reclamation information is presented in the "General Report, Kayenta and Black Mesa Mines, Navajo County, Arizona for Peabody Coal Company", December, 1985 (PAP), Chapter 6, Attachment D, Volume 2, along with the methods and results of analyses used for slope stability, hydrology, and hydraulics, and in Chapter 6, Pages 11 to 42, "Sediment and Water Control Facility Plan".

### Inspection

The construction site of Structure N11-A1 was inspected by a Registered Professional Engineer from Peabody Coal Company to ensure that the location was suitable and no adverse conditions existed to prevent the successful construction of the structure. A detailed geotechnical investigation was not performed, rather, the information in Chapter 6, Attachment D was utilized for embankment design. A conservative embankment category of (A-2) with a 23-foot total embankment height was utilized for the design.

### Site Description

#### Land Use

Structure N11-A series structures have a 498.25-acre combined drainage area and is located on a tributary to Coal Mine Wash at the Kayenta Mine. The watershed is classified as 4 percent disturbed, 6.5 percent pinon-juniper, 3.5 percent roadway, and 86 percent reclaimed. Structure N11-A1 has a 7.26-acre drainage area.

## Design Analyses

### General

Structure N11-A1 was designed by a Registered Professional Engineer from Peabody Coal Company. The design was performed in accordance with applicable 30 CFR 780 and 816 regulations of the United States Department of the Interior, Office of Surface Mining (OSM) and included a review of available project files. The most current information contained in the Peabody Coal Company files includes topographic maps developed from aerial photography flown in 1983 and was used in the analyses of the structure.

### Stability

A homogeneous earthen embankment, compacted in lifts to design specifications, and approximately 20 feet wide on top will be constructed. An upstream slope of 3:1 (horizontal to vertical) and a downstream slope of 5:1 were assumed. Based on a total embankment height of 23 feet, these slopes are equal to or flatter than the recommended slopes in Table 3-6, Attachment D, Chapter 6; therefore, the embankment will be stable. The emergency spillway will be a minimum 40-foot wide riprap-lined trapezoidal channel.

### Hydrology

The hydrologic analysis was completed using the computer program SEDCAD+ (see Appendices A, B, and C). Structure N11-A1 is located in series with structures N11-A and N11-A2. The three structures have a combined capacity that is greater than 20 acre-feet; therefore, the spillway was analyzed using the 100-year, 6-hour storm for ponds in series. Structures N11-A, N11-A1, and N11-A2 were conservatively assumed to be full to the emergency spillway at the time of the 100-year storm. The storage capacity requirements of Structure N11-A1 was analyzed using the 10-year, 24-hour storm. The combined ponds in series were conservatively assumed to completely contain the 10-year, 24-hour storm without discharge downstream to Coal Mine Wash; plus, provide adequate sediment storage volume.

The following parameters were used in the hydrologic analysis:

	10-Year	100-Year
	<u>24-Hour Storm</u>	<u>6-Hour Storm</u>
1. Water Course Length, L . . . . .	0.076 mi	1.875 mi
2. Elevation Difference, H . . . . .	32 ft	440 ft
3. Time of Concentration, Tc . . . . .	0.035 hr	0.515 hr
4. SCS Curve Number . . . . .	87	82
5. Rainfall Depth . . . . .	2.1 in	2.4 in
6. Drainage Area . . . . .	7.26 ac	483.5 ac

Hydraulics

The SEDCAD<sup>+</sup> and Dodson-Trapezoidal Channel computer programs were used to evaluate inflow to the sedimentation structure, outflow from the structure, and the resulting water surface elevations. The 10-year and 100-year storm was routed through Structures N11-A1 and N11-A2 and into Structure N11-A as will be the worst case scenario during mining and reclamation. The initial conditions and results of the analysis are summarized in the following N11-A1 hydraulics table:

N11-A1 HYDRAULICS TABLE

	Units	10-Yr, 24-Hr	100-Yr, 6-Hr
		Storm	Storm
Initial Reservoir Volume Condition		Empty	Full to emergency spillway elevation
Inflow			
Peak Flow	cfs	208.3	390.7
Volume	ac-ft	0.6*	37.5
Storage			
Peak Stage	msl	N/A	6611.3
Emerg. Spillway Elev.	msl	6609.0	6609.0
Peak Storage	ac-ft	N/A	23.8
Storage Capacity	ac-ft	19.2	19.2
Outflow			
Peak Flow	cfs	N/A	356.3
Spillway Elevation	msl	6609.0	6609.0
Embankment Crest Elev.	msl	6613.0	6613.0
Peak Stage	msl	---	6611.3
Freeboard	ft	---	1.7
Emergency Spillway Channel			
Flow Depth	ft	---	2.3
Critical Velocity	fps	---	6.2
Mannings "n"	---	---	0.051
Width	ft	---	40
Outflow Channel			
Slope	%	---	12.0
Normal Velocity	fps	---	9.1
Normal Depth	ft	---	0.9
Mannings "n"	---	---	0.051

\* Inflow volume for the drainage area between structures N11-A1 and N11-A2.

#### Emergency Spillway and Outlet Channel

The emergency spillway and outlet channel for N11-A1 will be a trapezoidal channel, the alignment and dimensions are shown on Exhibit 1 and includes with the following dimensions:

Minimum Channel Depth (Spillway) . . . . .	3.5 ft.
	(Outflow) . . . . . 2.0 ft.
Channel Width . . . . . . . . . . .	40 ft.
Channel Length (Spillway) . . . . .	50 ft.
	(Outflow) . . . . . 200 ft.
Side Slopes (Horizontal to Vertical) . .	3:1 or flatter
Average Slope (Spillway) . . . . .	0 %
Maximum Slope (Outflow) . . . . .	12 %
Spillway Elevation . . . . .	6609.0

A minimum 15-foot long riprapped channel will be constructed beyond the toe of the embankment as a transition into the downstream natural channel.

#### Storage Capacity

The impoundment stage-capacity table (see Exhibit 1) is based on the 1983 aerial topographic mapping conducted for Peabody Coal Company. The total storage capacity of Structure N11-A1 is designed to contain approximately 19.21 acre-feet.

The calculations for the sediment load entering Structure N11-A1 were made utilizing the Revised Universal Soil Loss Equation with the following parameters:

1. Rainfall Factor, R . . . . . 40
2. Soil Erodibility Factor, K . . . . . 0.21
3. Slope Factor, LS . . . . . 5.86
4. Cover Factor, C . . . . . 1.0
5. Erosion Control Factor, P . . . . . 0.43

The hydrologic analysis gives the storage volume required to treat the 10-year, 24-hour storm, and the remaining storage volume available for storing sediment. Structure N11-A1 does have sufficient storage by itself; however, the structure upstream contributes excess runoff downstream to N11-A1 and N11-A. The combined sediment storage capacity was determined for the three structures in series and the results of the analysis are presented in the following table.

Combined Storage for Structures N11-A2, N11-A1, and N11-A

	N11-A2	N11-A1	N11-A	Combined
Total Storage Capacity	17.11	19.21	18.97	55.29 ac-ft
10-Year, 24-Hour Storm Inflow	28.40	0.60	1.21	30.21 ac-ft
Available Sediment				
Storage Capacity	---	7.34	17.74	25.08 ac-ft
Sediment Inflow Rate	10.52	0.07	0.14	10.73 ac-ft/yr
Sediment Storage Life	---	---	---	2.3 yrs

The following appendices and drawing are attached and complete this design report.

Appendix A - Hydrology, Hydraulic, and Sedimentation Calculations

Appendix B - SEDCAD+ (Input and Output) 10-year, 24-hour Storm Event

Appendix C - SEDCAD+ (Input and Output) 100-year, 6-hour Storm Event

Exhibit 1 - Proposed N11-A, N11-A1, and N11-A2 Sedimentation Ponds

APPENDIX A

HYDROLOGY, HYDRAULIC, AND SEDIMENTATION CALCULATIONS

N11-A1

Project: N11-A1 Pond

Time of Concentration:

$$\text{Elevation Difference} = 6622 - 6590 = 32 \text{ ft.}$$

$$\text{Watercourse Length} = 400 \text{ ft.} = 0.076 \text{ mi}$$

$$T_c = [11.9(W.L.)^3/(E.D.)]^{0.385} = 0.035 \text{ hr}$$

SCS Curve Number:

Cover	Soil		Area	
Type	Group	CN	(Acres)	CN*Area
Disturbed	B	86	6.23	535.8
Road	C	89	<u>1.03</u>	<u>91.7</u>
			7.26	627.5

$$\text{Weighted CN} = 627.5/7.26 = 86.4 = \underline{\text{Use 87}}$$

Drainage Basin Area:

7.26 acres      0.01 sq. miles

SEDCAD Utility - Routing Parameter:

$$K = 0.013 \text{ hr}$$

$$X = 0.417 \text{ hr}$$

Project: N11-A1 Pond

Soil Erodibility Factor = k = 0.21 (graded/disturbed)

Slope Factor:

Length (ft)	Elev.	Slope (%)	M	Theta (Degrees)	LS
300	55	18.33	0.6	10.39	5.98
320	55	17.19	0.6	9.75	5.75
Avg. LS = <u>5.86</u>					

Cover Factor: C = 1.0

Practice Factor: P = 0.43 (Rough grading)

Rainfall Factor: R = 40

Revised USLE Calculations:

$$A = R * K * LS * C * P = 21.17 \text{ Ton/acre}$$

Sediment Inflow Rate:

$$DA = 7.26 \text{ ac.}$$

$$SDR = 0.95$$

$$SI = (A * DA * SDR * 94) / 192,400 = 0.07 \text{ ac-ft/yr}$$

TRAPEZOIDAL CHANNEL ANALYSIS  
CRITICAL DEPTH COMPUTATION

July 14, 1993  
N11-A1 SPILLWAY 100-YR., 6-HR. STORM

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Flow Rate (cubic feet per second).....	356.3
Manning's Roughness Coefficient (n-value).....	0.0510
Channel Side Slope - Left Side (horizontal/vertical)....	3.00
Channel Side Slope - Right Side (horizontal/vertical)...	3.00
Channel Bottom Width (feet).....	40.0

PROGRAM RESULTS:

DESCRIPTION	VALUE
Critical Depth (feet).....	1.31
Critical Slope (feet per foot).....	0.0361
Flow Velocity (feet per second).....	6.21
Froude Number.....	1.000
Velocity Head (feet).....	0.60
Energy Head (feet).....	1.91
Cross-Sectional Area of Flow (square feet).....	57.35
Top Width of Flow (feet).....	47.83

TRAPEZOIDAL CHANNEL ANALYSIS COMPUTER PROGRAM, Version 1.3 (c) 1986  
Dodson & Associates, Inc., 7015 W. Tidwell, #107, Houston, TX 77092  
(713) 895-8322. A manual with equations & flow chart is available.

SEDCAD+ RIPRAP CHANNEL DESIGN

---

N11-A1 SPILLWAY 100-YR., 6-HR. STORM

INPUT VALUES:

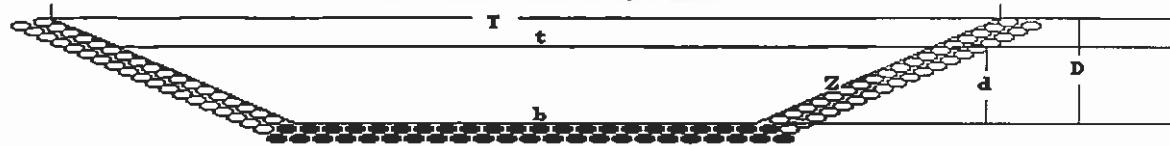
Shape	TRAPEZOIDAL
Discharge	356.30 cfs
Slope	12.00 %
Sideslopes (L and R)	3.00:1      3.00:1
Bottom Width	40.00 feet
Freeboard	1 ft

RESULTS:

Steep Slope Design - PADER Method

Depth	0.91 ft
with Freeboard	1.91 ft
Top Width	45.49 ft
with Freeboard	51.49 ft
Velocity	9.11 fps
Cross Sectional Area	39.11 sq ft
Hydraulic Radius	0.85 ft
Manning's n	0.051
Froude Number	1.73
Dmax	0.938 ft (11.25 in)
D50	0.750 ft ( 9.00 in)
D10	0.250 ft ( 3.00 in)

N11-A1 SEDCAD+ CHANNEL DESIGN  
SPILLWAY 100-YR., 6-HR. STORM



Riprap - Steep Slope Design - PADER Method

Discharge	= 356.30 cfs	Depth (d)	= 0.91 ft	w/ Freeboard:
Bottom (b)	= 40.00 ft	Top width (t)	= 45.49 ft	$D = 1.91$ ft
Side slopes (z)	= 3.0:1(L) 3.0:1(R)	Velocity	= 9.11 fps	$T = 51.49$ ft
Bed Slope	= 12.00 %	Hydraulic Radius	= 0.85 ft	
Manning's n	= 0.051	Froude number	= 1.73	
		$D_{max} = 0.94$ ft (11.25 in)		
		$D_{50} = 0.75$ ft (9.00 in)		
		$D_{10} = 0.25$ ft (3.00 in)		



APPENDIX B

N11-A1 SEDCAD+ (INPUT AND OUTPUT)

10-YEAR, 24-HOUR STORM EVENT



CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

N11-A SERIES POND 10-YR., 24-HR. STORM

by

Name: JGS

Company Name: PEABODY COAL COMPANY  
File Name: C:\SEDCAD3\K-MINE\N11RUNN

Date: 07-16-1993

Civil Software Design -- SEDCAD+ Version 3.1  
Copyright (C) 1987-1992. Pamela J. Schwab. All rights reserved.

Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUNN User: JGS  
Date: 07-16-1993 Time: 09:40:34  
N11-A SERIES POND 10-YR.,24-HR. STORM  
Storm: 2.10 inches, 10 year-24 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE  
=====

-Hydrology-

JBS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base- Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
111	1	476.28	82	F	0.475	0.000	0.000	0.0	28.40	229.45
			Type:	Pond		Label:	N11-A2 POND			
111	Structure	476.28							28.40	
111	Total IN	476.28							28.40	229.45
111	Total OUT								28.40	206.79
112	1	7.26	87	F	0.035	0.000	0.000	0.0	0.60	7.53
			Type:	Pond		Label:	N11-A1 POND			
112	Structure	7.26							28.99	
112	Total IN	483.54							28.99	208.30
112	Total OUT								28.99	182.23
111	to 112 Routing				0.013	0.417				
113	1	14.71	87	F	0.044	0.000	0.000	0.0	1.21	15.26
			Type:	Null		Label:	N11-A POND			
113	Structure	14.71							30.20	
113	Total IN/OUT	498.25							30.20	185.36
112	to 113 Routing				0.018	0.411				
114	1	0.00	0	F	0.000	0.000	0.000	0.0	0.00	0.00
			Type:	Null		Label:	NULL			
114	Structure	0.00							30.20	
114	Total IN/OUT	498.25							30.20	185.36
113	to 114 Routing				0.000	0.000				

Civil Software Design -- SEDCAD+ Version 3.1  
Copyright (C) 1987-1992. Pamela J. Schwab. All rights reserved.

Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUNN User: JGS  
Date: 07-16-1993 Time: 09:40:34  
N11-A SERIES POND 10-YR., 24-HR. STORM  
Storm: 2.10 inches, 10 year-24 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
LAST POND ONLY TABLE  
=====

J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1: 7.3 acres  
Total Contributing Drainage Area: 483.5 acres

DISCHARGE OPTIONS:

Emergency  
Spillway

=====

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6609.0
Crest Length (ft)	50.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

POND RESULTS:

Permanent  
Pool  
(ac-ft)  
=====

19.2

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	28.99	208.30
OUT	28.99	182.23

Elevation	Peak Hydrograph Detention Time (hrs)
6610.5	0.16

\*\*\*\*\*

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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUNN User: JGS  
Date: 07-16-1993 Time: 09:40:34  
N11-A SERIES POND 10-YR., 24-HR. STORM  
Storm: 2.10 inches, 10 year-24 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====

POND INPUT/OUTPUT TABLE

=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

DISCHARGE OPTIONS:

Emergency  
Spillway

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6622.0
Crest Length (ft)	50.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

POND RESULTS:

Permanent  
Pool  
(ac-ft)

=====

17.1

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	28.40	229.45
OUT	28.40	206.79

Elevation	Peak Hydrograph Detention Time (hrs)
6623.6	0.17

\*\*\*\*\*

J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1: 7.3 acres  
Total Contributing Drainage Area: 483.5 acres

#### DISCHARGE OPTIONS:

##### Emergency Spillway

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6609.0
Crest Length (ft)	50.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

#### POND RESULTS:

##### Permanent Pool (ac-ft)

=====

19.2

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	28.99	208.30
OUT	28.99	182.23

Elevation	Peak Hydrograph Detention Time (hrs)
6610.5	0.16

\*\*\*\*\*

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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUNN User: JGS  
Date: 07-16-1993 Time: 09:40:34  
N11-A SERIES POND 10-YR.,24-HR. STORM  
Storm: 2.10 inches, 10 year-24 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====

ELEVATION-DISCHARGE TABLE

=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

Elevation	Emergency Spillway (cfs)	Total Discharge (cfs)
6605.00	0.0	0.0
6605.50	0.0	0.0
6606.00	0.0	0.0
6606.50	0.0	0.0
6607.00	0.0	0
6607.50	0.0	0.
6608.00	0.0	0.0
6608.50	0.0	0.0
6609.00	0.0	0.0
6609.50	0.0	0.0
6610.00	0.0	0.0
6610.50	0.0	0.0
6611.00	0.0	0.0
6611.50	0.0	0.0
6612.00	0.0	0.0
6612.50	0.0	0.0
6613.00	0.0	0.0
6613.50	0.0	0.0
6614.00	0.0	0.0
6614.50	0.0	0.0
6615.00	0.0	0.0
6615.50	0.0	0.0
6616.00	0.0	0.0
6616.50	0.0	0.0
6617.00	0.0	0.0
6617.50	0.0	0.0
6618.00	0.0	0.0
6618.50	0.0	0.0
6619.00	0.0	0.0
6619.50	0.0	0
6620.00	0.0	0
6620.50	0.0	0.0
6621.00	0.0	0.0
6621.50	0.0	0.0
6622.00	0.0	0.0

6622.50	27.2	27.2
6622.70	38.1	38.1
6622.80	50.4	50.4
6622.90	62.2	62.2
6623.00	74.9	74.9
6623.50	174.5	174.5
6624.00	283.7	283.7
6624.50	422.4	422.4
6625.00	586.6	586.6
6625.50	781.1	781.1
6626.00	999.5	999.5
6626.50	1241.6	1241.6
6627.00	1507.5	1507.5
6627.50	1797.3	1797.3
6628.00	2111.2	2111.2

---

J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1:            7.3 acres  
Total Contributing Drainage Area:            483.5 acres

Elevation	Emergency Spillway (cfs)	Total Discharge (cfs)
6590.00	0.0	0.0
590.50	0.0	0.0
6591.00	0.0	0.0
6591.50	0.0	0.0
6592.00	0.0	0.0
6592.50	0.0	0.0
6593.00	0.0	0.0
6593.50	0.0	0.0
6594.00	0.0	0.0
6594.50	0.0	0.0
6595.00	0.0	0.0
6595.50	0.0	0.0
6596.00	0.0	0.0
6596.50	0.0	0.0
6597.00	0.0	0.0
6597.50	0.0	0.0
6598.00	0.0	0.0
6598.50	0.0	0.0
6599.00	0.0	0.0
6599.50	0.0	0.0
6600.00	0.0	0.0
6600.50	0.0	0.0
6601.00	0.0	0.0
6601.50	0.0	0.0
6602.00	0.0	0.0
6602.50	0.0	0.0
6603.00	0.0	0.0
6603.50	0.0	0.0
6604.00	0.0	0.0
6604.50	0.0	0.0
6605.00	0.0	0.0
6605.50	0.0	0.0

6606.00	0.0	0.0
6606.50	0.0	0.0
6607.00	0.0	0.0
6607.50	0.0	0
6608.00	0.0	0.
6608.50	0.0	0.0
6609.00	0.0	0.0
6609.50	27.2	27.2
6609.70	38.1	38.1
6609.80	50.4	50.4
6609.90	62.2	62.2
6610.00	74.9	74.9
6610.50	174.5	174.5
6611.00	283.7	283.7
6611.50	422.4	422.4
6612.00	586.6	586.6
6612.50	781.1	781.1
6613.00	999.5	999.5

\*\*\*\*\*

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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUNN User: JGS  
Date: 07-16-1993 Time: 09:40:34  
N11-A SERIES POND 10-YR., 24-HR. STORM  
Storm: 2.10 inches, 10 year-24 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
ELEVATION-AREA-CAPACITY-DISCHARGE TABLE  
=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

SW#1: Emergency Spillway

Elev	Stage	Area	Capacity	Discharge
	(ft)	(ac)	(ac-ft)	(cfs)
6605.00	0.00	0.43	0.00	0.00
6605.50	0.50	0.45	0.22	0.00
6606.00	1.00	0.48	0.45	0.00
6606.50	1.50	0.50	0.70	0.00
6607.00	2.00	0.53	0.96	0.00
6607.50	2.50	0.55	1.22	0.00
6608.00	3.00	0.58	1.51	0.00
6608.50	3.50	0.61	1.80	0.00
6609.00	4.00	0.63	2.11	0.00
6609.50	4.50	0.66	2.44	0.00
6610.00	5.00	0.69	2.77	0.00
6610.50	5.50	0.72	3.13	0.00
6611.00	6.00	0.76	3.50	0.00
6611.50	6.50	0.79	3.88	0.00
6612.00	7.00	0.82	4.29	0.00
6612.50	7.50	0.86	4.71	0.00
6613.00	8.00	0.90	5.15	0.00
6613.50	8.50	0.93	5.61	0.00
6614.00	9.00	0.97	6.08	0.00
6614.50	9.50	1.01	6.58	0.00
6615.00	10.00	1.05	7.09	0.00
6615.50	10.50	1.10	7.63	0.00
6616.00	11.00	1.15	8.19	0.00
6616.50	11.50	1.20	8.78	0.00
6617.00	12.00	1.26	9.40	0.00
6617.50	12.50	1.31	10.04	0.00
6618.00	13.00	1.37	10.71	0.00
6618.50	13.50	1.42	11.40	0.00
6619.00	14.00	1.48	12.13	0.00
6619.50	14.50	1.54	12.89	0.00
6620.00	15.00	1.60	13.67	0.00
6620.50	15.50	1.66	14.49	0.00
6621.00	16.00	1.72	15.33	0.00
6621.50	16.50	1.78	16.21	0.00
6622.00	17.00	1.85	17.11	0.00

Stage of SW#1

6622.50	17.50	1.91	18.05	27.24
6622.70	17.70	1.94	18.44	38.14
6622.80	17.80	1.95	18.63	50.36
6622.90	17.90	1.96	18.83	62.20
6623.00	18.00	1.98	19.03	74.91
6623.50	18.50	2.04	20.03	174.49
6623.65	18.65	2.04	20.34	206.79
6624.00	19.00	2.11	21.07	283.74
6624.50	19.50	2.18	22.14	422.43
6625.00	20.00	2.25	23.25	586.56
6625.50	20.50	2.35	24.40	781.13
6626.00	21.00	2.46	25.60	999.50
6626.50	21.50	2.56	26.86	1241.61
6627.00	22.00	2.67	28.17	1507.51
6627.50	22.50	2.79	29.53	1797.32
6628.00	23.00	2.90	30.95	2111.24

\*\*\*\*\*

J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1:                    7.3 acres  
Total Contributing Drainage Area:                    483.5 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)
------	---------------	--------------	---------------------	--------------------

---

6590.00	0.00	0.45	0.00	0.00
6590.50	0.50	0.47	0.23	0.00
6591.00	1.00	0.49	0.47	0.00
6591.50	1.50	0.51	0.72	0.00
6592.00	2.00	0.54	0.99	0.00
6592.50	2.50	0.56	1.26	0.00
6593.00	3.00	0.58	1.54	0.00
6593.50	3.50	0.61	1.84	0.00
6594.00	4.00	0.63	2.15	0.00
6594.50	4.50	0.65	2.47	0.00
6595.00	5.00	0.68	2.81	0.00
6595.50	5.50	0.71	3.15	0.00
6596.00	6.00	0.74	3.51	0.00
6596.50	6.50	0.77	3.89	0.00
6597.00	7.00	0.80	4.28	0.00
6597.50	7.50	0.83	4.69	0.00
6598.00	8.00	0.86	5.12	0.00
6598.50	8.50	0.90	5.56	0.00
6599.00	9.00	0.93	6.01	0.00
6599.50	9.50	0.97	6.49	0.00
6600.00	10.00	1.00	6.98	0.00
6600.50	10.50	1.03	7.49	0.00
6601.00	11.00	1.06	8.01	0.00
6601.50	11.50	1.10	8.55	0.00
6602.00	12.00	1.13	9.11	0.00
6602.50	12.50	1.16	9.68	0.00
6603.00	13.00	1.20	10.27	0.00
6603.50	13.50	1.23	10.88	0.00
6604.00	14.00	1.27	11.51	0.00
6604.50	14.50	1.30	12.15	0.00
6605.00	15.00	1.34	12.81	0.00

6605.50	15.50	1.40	13.49	0.00
6606.00	16.00	1.46	14.21	0.00
6606.50	16.50	1.53	14.96	0.00
6607.00	17.00	1.60	15.74	0.00
6607.50	17.50	1.66	16.56	0.00
6608.00	18.00	1.73	17.40	0.00
6608.50	18.50	1.80	18.29	0.00
6609.00	19.00	1.87	19.21	0.00      Stage of SW#1
6609.50	19.50	1.95	20.16	27.24
6609.70	19.70	1.98	20.55	38.14
6609.80	19.80	1.99	20.75	50.36
6609.90	19.90	2.01	20.95	62.20
6610.00	20.00	2.02	21.15	74.91
6610.50	20.50	2.09	22.18	174.49
6610.54	20.54	2.09	22.26	182.23      Peak Stage
6611.00	21.00	2.17	23.25	283.74
6611.50	21.50	2.24	24.35	422.43
6612.00	22.00	2.32	25.49	586.56
6612.50	22.50	2.40	26.67	781.13
6613.00	23.00	2.48	27.89	999.50

\*\*\*\*\*



**APPENDIX C**

**N11-A1 SEDCAD+ (INPUT AND OUTPUT)**

**100-YEAR, 6-HOUR STORM EVENT**



CIVIL SOFTWARE DESIGN

SEDCAD+ Version 3

N11-A SERIES POND 100-YR., 6-HR. STORM

by

Name: JGS

Company Name: PEABODY COAL COMPANY  
File Name: C:\SEDCAD3\K-MINE\N11RUN8

Date: 07-14-1993

Civil Software Design -- SEDCAD+ Version 3.1  
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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUN8 User: JGS  
Date: 07-14-1993 Time: 15:20:36  
N11-A SERIES POND 100-YR., 6-HR. STORM  
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
SUBWATERSHED/STRUCTURE INPUT/OUTPUT TABLE  
=====

-Hydrology-

JBS	SWS	Area (ac)	CN	UHS	Tc (hrs)	K (hrs)	X	Base- Flow (cfs)	Runoff Volume (ac-ft)	Peak Discharge (cfs)
111	1	476.28	82	F	0.475	0.000	0.000	0.0	36.72	420.54
			Type: Pond			Label: N11-A2 POND				
111	Structure	476.28							36.72	
111	Total IN	476.28							36.72	420.54
111	Total OUT								36.72	387.98
112	1	7.26	87	F	0.035	0.000	0.000	0.0	0.74	13.56
			Type: Pond			Label: N11-A1 POND				
112	Structure	7.26							37.47	
112	Total IN	483.54							37.47	390.71
112	Total OUT								37.47	356.25
111	to 112 Routing				0.013	0.417				
113	1	14.71	87	F	0.044	0.000	0.000	0.0	1.51	27.49
			Type: Pond			Label: N11-A POND				
113	Structure	14.71							38.97	
113	Total IN	498.25							38.97	361.84
113	Total OUT								38.97	318.47
112	to 113 Routing				0.018	0.411				
114	1	0.00	0	F	0.000	0.000	0.000	0.0	0.00	0.00
			Type: Null			Label: NULL				
114	Structure	0.00							38.97	
114	Total IN/OUT	498.25							38.97	318.47
113	to 114 Routing				0.000	0.000				

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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUN8 User: JGS  
Date: 07-14-1993 Time: 15:20:36  
N11-A SERIES POND 100-YR., 6-HR. STORM  
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
LAST POND ONLY TABLE  
=====

J1, B1, S3  
N11-A POND

Drainage Area from J1, B1, S3, SWS(s)1: 14.7 acres  
Total Contributing Drainage Area: 498.3 acres

DISCHARGE OPTIONS:

Emergency  
Spillway

=====

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6588.0
Crest Length (ft)	80.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

POND RESULTS:

Permanent  
Pool  
(ac-ft)

=====

19.0

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	38.97	361.84
OUT	38.97	318.47

Elevation	Peak Hydrograph Detention Time (hrs)
6590.2	0.21

\*\*\*\*\*

Civil Software Design -- SEDCAD+ Version 3.1  
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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUN8 User: JGS  
Date: 07-14-1993 Time: 15:20:36  
N11-A SERIES POND 100-YR., 6-HR. STORM  
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====

POND INPUT/OUTPUT TABLE

=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

DISCHARGE OPTIONS:

Emergency  
Spillway

=====

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6622.0
Crest Length (ft)	50.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

OND RESULTS:

Permanent  
Pool  
(ac-ft)

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	36.72	420.54
OUT	36.72	387.98

Elevation	Peak Hydrograph Detention Time (hrs)
6624.4	0.16

\*\*\*\*\*  
**J1, B1, S2  
 N11-A1 POND**

**Drainage Area from J1, B1, S2, SWS(s)1:** 7.3 acres  
**Total Contributing Drainage Area:** 483.5 acres

**DISCHARGE OPTIONS:**

**Emergency  
 Spillway**

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6609.0
Crest Length (ft)	50.0
Z:1 (Left and Right)	3 3
Bottom Width (ft)	40.0

**POND RESULTS:**

**Permanent  
 Pool  
(ac-ft)**

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	37.47	390.71
OUT	37.47	356.25

Elevation	Peak Hydrograph Detention Time (hrs)
6611.3	0.15

\*\*\*\*\*  
**J1, B1, S3  
 N11-A POND**

**Drainage Area from J1, B1, S3, SWS(s)1:** 14.7 acres  
**Total Contributing Drainage Area:** 498.3 acres

**DISCHARGE OPTIONS:**

**Emergency  
 Spillway**

Riser Diameter (in)	----
Riser Height (ft)	----
Barrel Diameter (in)	----
Barrel Length (ft)	----
Barrel Slope (%)	----
Manning's n of Pipe	----
Spillway Elevation	----
Lowest Elevation of Holes	----
# of Holes/Elevation	----
Entrance Loss Coefficient	----
Tailwater Depth (ft)	----
Notch Angle (degrees)	----
Weir Width (ft)	----
Siphon Crest Elevation	----
Siphon Tube Diameter (in)	----
Siphon Tube Length (ft)	----
Manning's n of Siphon	----
Siphon Inlet Elevation	----
Siphon Outlet Elevation	----
Emergency Spillway Elevation	6588.0
Crest Length (ft)	80.0
1 (Left and Right)	3   3
Bottom Width (ft)	40.0

**POND RESULTS:**

**Permanent**

Pool  
(ac-ft)

=====

19.0

	Runoff Volume (ac-ft)	Peak Discharge (cfs)
IN	38.97	361.84
OUT	38.97	318.47

Elevation	Peak Hydrograph Detention Time (hrs)
6590.2	0.21

\*\*\*\*\*

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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUN8 User: JGS  
Date: 07-14-1993 Time: 15:20:36  
N11-A SERIES POND 100-YR., 6-HR. STORM  
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====

ELEVATION-DISCHARGE TABLE

=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

Elevation	Emergency Spillway (cfs)	Total Discharge (cfs)
6605.00	0.0	0.0
6605.50	0.0	0.0
6606.00	0.0	0.0
6606.50	0.0	0.0
6607.00	0.0	0.0
6607.50	0.0	0.0
6608.00	0.0	0.0
6608.50	0.0	0.0
6609.00	0.0	0.0
6609.50	0.0	0.0
6610.00	0.0	0.0
6610.50	0.0	0.0
6611.00	0.0	0.0
6611.50	0.0	0.0
6612.00	0.0	0.0
6612.50	0.0	0.0
6613.00	0.0	0.0
6613.50	0.0	0.0
6614.00	0.0	0.0
6614.50	0.0	0.0
6615.00	0.0	0.0
6615.50	0.0	0.0
6616.00	0.0	0.0
6616.50	0.0	0.0
6617.00	0.0	0.0
6617.50	0.0	0.0
6618.00	0.0	0.0
6618.50	0.0	0.0
6619.00	0.0	0.0
6619.50	0.0	0.0
6620.00	0.0	0.0
6620.50	0.0	0.0
6621.00	0.0	0.0
6621.50	0.0	0.0
6622.00	0.0	0.0

6622.50	27.2	27.2
6622.70	38.1	38.1
6622.80	50.4	50.4
6622.90	62.2	62
6623.00	74.9	74
6623.50	174.5	174.5
6624.00	283.7	283.7
6624.50	422.4	422.4
6625.00	586.6	586.6
6625.50	781.1	781.1
6626.00	999.5	999.5
6626.50	1241.6	1241.6
6627.00	1507.5	1507.5
6627.50	1797.3	1797.3
6628.00	2111.2	2111.2

---

J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1:            7.3 acres  
Total Contributing Drainage Area:            483.5 acres

Elevation	Emergency Spillway (cfs)	Total Discharge (cfs)
6590.00	0.0	0.0
6590.50	0.0	0
6591.00	0.0	0.
6591.50	0.0	0.0
6592.00	0.0	0.0
6592.50	0.0	0.0
6593.00	0.0	0.0
6593.50	0.0	0.0
6594.00	0.0	0.0
6594.50	0.0	0.0
6595.00	0.0	0.0
6595.50	0.0	0.0
6596.00	0.0	0.0
6596.50	0.0	0.0
6597.00	0.0	0.0
6597.50	0.0	0.0
6598.00	0.0	0.0
6598.50	0.0	0.0
6599.00	0.0	0.0
6599.50	0.0	0.0
6600.00	0.0	0.0
6600.50	0.0	0.0
6601.00	0.0	0.0
6601.50	0.0	0.0
6602.00	0.0	0.0
6602.50	0.0	0.0
6603.00	0.0	0 ^
6603.50	0.0	0 C
6604.00	0.0	0.0
6604.50	0.0	0.0
6605.00	0.0	0.0
6605.50	0.0	0.0

6606.00	0.0	0.0
6606.50	0.0	0.0
6607.00	0.0	0.0
6607.50	0.0	0.0
6608.00	0.0	0.0
6608.50	0.0	0.0
6609.00	0.0	0.0
6609.50	27.2	27.2
6609.70	38.1	38.1
6609.80	50.4	50.4
6609.90	62.2	62.2
6610.00	74.9	74.9
6610.50	174.5	174.5
6611.00	283.7	283.7
6611.50	422.4	422.4
6612.00	586.6	586.6
6612.50	781.1	781.1
6613.00	999.5	999.5

J1, B1, S3  
N11-A POND

Drainage Area from J1, B1, S3, SWS(s)1: 14.7 acres  
     Total Contributing Drainage Area: 498.3 acres

Elevation	Emergency Spillway (cfs)	Total Discharge (cfs)
6575.00	0.0	0.0
6575.50	0.0	0.0
6576.00	0.0	0.0
6576.50	0.0	0.0
6577.00	0.0	0.0
6577.50	0.0	0.0
6578.00	0.0	0.0
6578.50	0.0	0.0
6579.00	0.0	0.0
6579.50	0.0	0.0
6580.00	0.0	0.0
6580.50	0.0	0.0
6581.00	0.0	0.0
6581.50	0.0	0.0
6582.00	0.0	0.0
6582.50	0.0	0.0
6583.00	0.0	0.0
6583.50	0.0	0.0
6584.00	0.0	0.0
6584.50	0.0	0.0
6585.00	0.0	0.0
6585.50	0.0	0.0
6586.00	0.0	0.0
6586.50	0.0	0.0
587.00	0.0	0.0
6587.50	0.0	0.0
6588.00	0.0	0.0
6588.50	26.6	26.6
6588.80	42.5	42.5

6588.90	53.7	53.7
6589.00	66.3	66.3
6589.50	159.8	159.8
6590.00	261.5	261
6590.50	390.0	390
6591.00	538.7	538.7
6591.50	726.9	726.9
6592.00	938.9	938.9
6592.50	1166.5	1166.5
6593.00	1434.3	1434.3

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Civil Software Design -- SEDCAD+ Version 3.1  
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Company Name: PEABODY COAL COMPANY  
Filename: C:\SEDCAD3\K-MINE\N11RUN8 User: JGS  
Date: 07-14-1993 Time: 15:20:36  
N11-A SERIES POND 100-YR., 6-HR. STORM  
Storm: 2.40 inches, 100 year- 6 hour, SCS Type II  
Hydrograph Convolution Interval: 0.1 hr

=====  
ELEVATION-AREA-CAPACITY-DISCHARGE TABLE  
=====

J1, B1, S1  
N11-A2 POND

Drainage Area from J1, B1, S1, SWS(s)1: 476.3 acres  
Total Contributing Drainage Area: 476.3 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)
6605.00	0.00	0.43	0.00	0.00
6605.50	0.50	0.45	0.22	0.00
6606.00	1.00	0.48	0.45	0.00
6606.50	1.50	0.50	0.70	0.00
6607.00	2.00	0.53	0.96	0.00
6607.50	2.50	0.55	1.22	0.00
6608.00	3.00	0.58	1.51	0.00
6608.50	3.50	0.61	1.80	0.00
6609.00	4.00	0.63	2.11	0.00
6609.50	4.50	0.66	2.44	0.00
6610.00	5.00	0.69	2.77	0.00
6610.50	5.50	0.72	3.13	0.00
6611.00	6.00	0.76	3.50	0.00
6611.50	6.50	0.79	3.88	0.00
6612.00	7.00	0.82	4.29	0.00
6612.50	7.50	0.86	4.71	0.00
6613.00	8.00	0.90	5.15	0.00
6613.50	8.50	0.93	5.61	0.00
6614.00	9.00	0.97	6.08	0.00
6614.50	9.50	1.01	6.58	0.00
6615.00	10.00	1.05	7.09	0.00
6615.50	10.50	1.10	7.63	0.00
6616.00	11.00	1.15	8.19	0.00
6616.50	11.50	1.20	8.78	0.00
6617.00	12.00	1.26	9.40	0.00
6617.50	12.50	1.31	10.04	0.00
6618.00	13.00	1.37	10.71	0.00
6618.50	13.50	1.42	11.40	0.00
6619.00	14.00	1.48	12.13	0.00
6619.50	14.50	1.54	12.89	0.00
6620.00	15.00	1.60	13.67	0.00
6620.50	15.50	1.66	14.49	0.00
6621.00	16.00	1.72	15.33	0.00
6621.50	16.50	1.78	16.21	0.00
6622.00	17.00	1.85	17.11	0.00 Stage of SW#1

6622.50	17.50	1.91	18.05	27.24
6622.70	17.70	1.94	18.44	38.14
6622.80	17.80	1.95	18.63	50.36
6622.90	17.90	1.96	18.83	62.20
6623.00	18.00	1.98	19.03	74.91
6623.50	18.50	2.04	20.03	174.49
6624.00	19.00	2.11	21.07	283.74
6624.38	19.38	2.11	21.88	387.98      Peak Stage
6624.50	19.50	2.18	22.14	422.43
6625.00	20.00	2.25	23.25	586.56
6625.50	20.50	2.35	24.40	781.13
6626.00	21.00	2.46	25.60	999.50
6626.50	21.50	2.56	26.86	1241.61
6627.00	22.00	2.67	28.17	1507.51
6627.50	22.50	2.79	29.53	1797.32
6628.00	23.00	2.90	30.95	2111.24

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J1, B1, S2  
N11-A1 POND

Drainage Area from J1, B1, S2, SWS(s)1:      7.3 acres  
Total Contributing Drainage Area:      483.5 acres

SW#1: Emergency Spillway

Elev	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)
6590.00	0.00	0.45	0.00	0.00
6590.50	0.50	0.47	0.23	0.00
6591.00	1.00	0.49	0.47	0.00
6591.50	1.50	0.51	0.72	0.00
6592.00	2.00	0.54	0.99	0.00
6592.50	2.50	0.56	1.26	0.00
6593.00	3.00	0.58	1.54	0.00
6593.50	3.50	0.61	1.84	0.00
6594.00	4.00	0.63	2.15	0.00
6594.50	4.50	0.65	2.47	0.00
6595.00	5.00	0.68	2.81	0.00
6595.50	5.50	0.71	3.15	0.00
6596.00	6.00	0.74	3.51	0.00
6596.50	6.50	0.77	3.89	0.00
6597.00	7.00	0.80	4.28	0.00
6597.50	7.50	0.83	4.69	0.00
6598.00	8.00	0.86	5.12	0.00
6598.50	8.50	0.90	5.56	0.00
6599.00	9.00	0.93	6.01	0.00
6599.50	9.50	0.97	6.49	0.00
6600.00	10.00	1.00	6.98	0.00
6600.50	10.50	1.03	7.49	0.00
6601.00	11.00	1.06	8.01	0.00
6601.50	11.50	1.10	8.55	0.00
6602.00	12.00	1.13	9.11	0.00
6602.50	12.50	1.16	9.68	0.00
6603.00	13.00	1.20	10.27	0.00
6603.50	13.50	1.23	10.88	0.00
6604.00	14.00	1.27	11.51	0.00
6604.50	14.50	1.30	12.15	0.00
6605.00	15.00	1.34	12.81	0.00

6605.50	15.50	1.40	13.49	0.00
6606.00	16.00	1.46	14.21	0.00
6606.50	16.50	1.53	14.96	0.00
6607.00	17.00	1.60	15.74	0.00
6607.50	17.50	1.66	16.56	0.00
6608.00	18.00	1.73	17.40	0.00
6608.50	18.50	1.80	18.29	0.00
6609.00	19.00	1.87	19.21	0.00      Stage of SW#1
6609.50	19.50	1.95	20.16	27.24
6609.70	19.70	1.98	20.55	38.14
6609.80	19.80	1.99	20.75	50.36
6609.90	19.90	2.01	20.95	62.20
6610.00	20.00	2.02	21.15	74.91
6610.50	20.50	2.09	22.18	174.49
6611.00	21.00	2.17	23.25	283.74
6611.26	21.26	2.17	23.82	356.25      Peak Stage
6611.50	21.50	2.24	24.35	422.43
6612.00	22.00	2.32	25.49	586.56
6612.50	22.50	2.40	26.67	781.13
6613.00	23.00	2.48	27.89	999.50

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J1, B1, S3  
N11-A POND

Drainage Area from J1, B1, S3, SWS(s)1:      14.7 acres  
Total Contributing Drainage Area:      498.3 acres

SW#1: Emergency Spillway

Lev (ft)	Stage (ft)	Area (ac)	Capacity (ac-ft)	Discharge (cfs)
6575.00	0.00	0.82	0.00	0.00
6575.50	0.50	0.86	0.42	0.00
6576.00	1.00	0.91	0.86	0.00
6576.50	1.50	0.95	1.33	0.00
6577.00	2.00	1.00	1.81	0.00
6577.50	2.50	1.04	2.32	0.00
6578.00	3.00	1.09	2.85	0.00
6578.50	3.50	1.14	3.41	0.00
6579.00	4.00	1.19	3.99	0.00
6579.50	4.50	1.24	4.60	0.00
6580.00	5.00	1.29	5.23	0.00
6580.50	5.50	1.34	5.89	0.00
6581.00	6.00	1.39	6.57	0.00
6581.50	6.50	1.44	7.28	0.00
6582.00	7.00	1.49	8.01	0.00
6582.50	7.50	1.54	8.76	0.00
6583.00	8.00	1.59	9.55	0.00
6583.50	8.50	1.64	10.35	0.00
6584.00	9.00	1.70	11.19	0.00
6584.50	9.50	1.75	12.05	0.00
6585.00	10.00	1.81	12.94	0.00
6585.50	10.50	1.87	13.87	0.00
6586.00	11.00	1.94	14.82	0.00
6586.50	11.50	2.01	15.80	0.00
6587.00	12.00	2.07	16.82	0.00
6587.50	12.50	2.14	17.88	0.00
6588.00	13.00	2.21	18.97	0.00      Stage of SW#1

6588.50	13.50	2.28	20.09	26.58
6588.80	13.80	2.32	20.78	42.52
6588.90	13.90	2.34	21.01	53.72
6589.00	14.00	2.35	21.25	66.34
6589.50	14.50	2.43	22.44	159.76
6590.00	15.00	2.50	23.67	261.48
6590.22	15.22	2.50	24.24	318.47 Peak Stage
6590.50	15.50	2.57	24.94	390.04
6591.00	16.00	2.64	26.24	538.72
6591.50	16.50	2.72	27.58	726.91
6592.00	17.00	2.79	28.96	938.95
6592.50	17.50	2.86	30.37	1166.49
6593.00	18.00	2.94	31.82	1434.27

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