

Dames & Moore
10139-011-22



PEABODY COAL COMPANY

for

Navajo County, Arizona

Black Mesa Mine

J7-R

Sedimentation Structure

INSPECTION REPORT

1. *Urticaria* - *Urticaria* is a skin condition characterized by raised, red, itchy welts (hives). It can be caused by various triggers, including food allergies, medications, environmental factors, or physical stimuli like cold or heat.

2. *Anaphylaxis* - *Anaphylaxis* is a severe, life-threatening allergic reaction that affects multiple body systems. Common symptoms include difficulty breathing, swelling of the face and throat, and a drop in blood pressure. It requires immediate medical attention.

3. *Angioedema* - *Angioedema* is a type of allergic reaction where there is significant swelling of the deeper layers of the skin and surrounding tissue. It often involves the face, hands, feet, and genitalia.

4. *Anaphylactic shock* - *Anaphylactic shock* is a severe form of anaphylaxis that can lead to a drop in blood pressure, reduced blood flow to vital organs, and potentially death if not treated promptly.

5. *Anaphylactic asthma* - *Anaphylactic asthma* is a severe asthma attack triggered by an allergen. It can be part of a broader anaphylactic reaction.

6. *Anaphylactic bronchospasm* - *Anaphylactic bronchospasm* is a narrowing of the airways due to muscle contraction and swelling, which can be a symptom of anaphylaxis.

7. *Anaphylactic hypotension* - *Anaphylactic hypotension* is a drop in blood pressure that occurs during an anaphylactic reaction, often as a result of fluid loss from the body's vessels.

8. *Anaphylactic laryngeal edema* - *Anaphylactic laryngeal edema* is swelling of the larynx (voice box) that can cause difficulty breathing and is a serious symptom of anaphylaxis.

9. *Anaphylactic urticaria* - *Anaphylactic urticaria* is the presence of hives (urticaria) as a symptom of an anaphylactic reaction.

10. *Anaphylactic vasodilation* - *Anaphylactic vasodilation* is the dilation of blood vessels, which can lead to a drop in blood pressure and other symptoms of anaphylaxis.

APPENDIX B - HYDROLOGY AND HYDRAULIC CALCULATIONS

APPENDIX A - INSPECTION CHECK LIST

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Dames & Moore's inspection was performed in accordance with applicable 30 CFR 780 and 816 regulations and included a review of the J7-F structure 30 CFR 780 and 816 regulations and included a review of the J7-F project files and a field inspection of the structure. The most current information contained in the Peabody Coal Company files includes the 1984 and current survey data and inspections performed in 1984 and 1985 by

Mining (OSM) regulations.

With respect to United States Department of Interior, Office of Surface Inspection was to assess the safety and general condition of the structure descriptively team of engineers from Dames & Moore. The purpose of the inspection was to assess the safety and general condition of the structure with respect to United States Department of Interior, Office of Surface Mining (OSM) regulations.

INSPECTION

This inspection report contains information specific to Structure J7-F. Regional site information is presented in the "General Report, Company," along with the methods and results of analyses used for slope stability, hydrology and hydraulics. Kayenta and Black Mesa Mines, Navajo County, Arizona for Peabody Coal Company, " along with the methods and results of analyses used for slope stability, hydrology and hydraulics.

Sedimentation Structure J7-F is shown on Plate I, Site Plan. This inspection report contains information specific to Structure J7-F. Regional site information is presented in the "General Report, Company" as a temporary sedimentation structure to control runoff and sediment from the disturbed mining areas of the Black Mesa Mine. The location of Structure J7-F is shown on Plate I, Site Plan.

INTRODUCTION

Cross Section J7-F, A-A'.

A cross-section of the embankment is shown on Plate 2, Existing Maximum

Embankment	Residual Shale/Sandstone Soils
Foundation	Residual Sandstone Soils
Right Abutment	Residual Sandstone Soils
Left Abutment	Residual Sandstone Soils
Height	5.4 ft
Creep Width	12.5 ft
Upstream Slope	1.75 H : 1 V
Downstream Slope	2.9 H : 1 V

Structure J7-F

Listed in the following table:

Cross-valley embankment. Physical characteristics of the embankment are structure J7-F is a homogeneous earthen embankment classified as a

EMBANKMENT

classified as 39% Sagebrush, 36% rangeland, and 25% disturbed. Located near Sagebrush Wash at the Black Mesa Mine. The watershed is structure J7-F has a 63.8-acre tributary drainage area and is

LAND USE

SITE DESCRIPTION

in this report as Appendix A. The analyses of the structure. Results of the field inspection are included Peabody Coal Company. The survey data developed in August 1984 was used in

of Structure J7-F was analyzed using the 10-year, 24-hour storm. Spillway was analyzed using the 25-year, 6-hour storm. The storage capacity of Structure J7-F is not in series with any other structure and therefore the Engineers generalized computer program HEC-1, Flood Hydrograph Package. The hydrologic analysis was completed using the U.S. Army Corps of Engineers generalized computer program HEC-1, Flood Hydrograph Package.

HYDROLOGY

The J7-F embankment is lower in height and has flatter slopes than the category standard; therefore, the embankment has factors of safety greater than the design minimum.

1. Maximum height = 10 ft
2. Maximum upstream slope = 1.5 H : 1 V
3. Maximum downstream slope = 2.5 H : 1 V
4. Normal pool with steady seepage saturation conditions

respectively, under the following conditions:

B-2 embankment has static and seismic factors of safety of 1.5 and 1.2, Structure J7-F is a category B-2 embankment. A standard category

STABILITY

ANALYSES

The HEC-1 program was utilized to evaluate inflow, reservoir response and outflow from the sedimentation structure. The initial conditions and results of the analysis are summarized in the following table.

HYDRAULICS

1. Water Course Length, L	0.485 mi	
2. Elevation Difference, H	151 ft	
3. Time of Concentration in hours, Tc	0.163 h	
4. Lag time, 0.6t	0.098 h	
5. SCS Curve Number	80	
6. Rainfall Depth, 10-year, 24-hour storm	2.1 in.	
7. Drainage Area	63.8 acres	

The following parameters were used in the hydrologic analysis:

Initial Reservoir Volume					
10-year	25-year	100-year	Empty	Full to che spillway elevation	Condition
24-hour	6-hour	Storm	Units		
Inflow	Peak Flow	Volume	cfs	61	70
Storage	Peak Stage	ft	ft	6460.80	6464.03
Spillway Elevation	Peak Storage	ft	ft	6462.75	6465.39
Peak Flow	Peak Flow	cfs	0	38	Outflow
Outflow	Bankment Crest	ft	ft	6464.03	6465.39
Elevation	Break Storage	ft	ft	6464.03	6465.39
Treeboard	Break Storage	ft	ft	6464.03	6465.39
Spillway Channel	Flow Depth	ft	ft	1.28	3.8
Outflow Channel	Critical Velocity	fps	fps	1.28	3.8
Normal Depth	Slope	%	%	24	7.2
Manning's "n"	Normal Velocity	fps	fps	—	0.26
Manning's "n"	Flow Depth	ft	ft	—	0.040

J7-F.

maps available were used in developing Plate 3, Volume-Elevation Curve, 1985 surveys, where available. Additionally, the most current topographic surveys conducted for Peabody Coal Company's August 1984 inspection, and the impoundment volume-elevation curve is based on site specific

STORAGE CAPACITY

The structure presently has no outflow channel.

Outflow Channel

There is presently no erosion protection within the channel.

Channel depth	3.5 ft	Channel width	20 ft	Channel length	24 ft	Slide slopes (horizontal to vertical)	2:1	Average exit slope	3 percent
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Following dimensions:

The existing spillway for J7-F has a trapezoidal channel with the

Spillway Channel

The inspection of Structure J7-F indicated that the only geotechnical problems consist of rill erosion on the side slopes of the spilloway channel and the left abutment. Correction of erosion is considered a periodic maintenance task and does not require remedial action.

GEOTECHNICS

REMEDIAL COMPLIANCE PLAN

Total Storage Capacity	4.65 acre-ft	10-year, 24-hour Storm Inflow	3.35 acre-ft	Available Sediment Storage Capacity	1.31 acre-ft	Sediment Inflow Rate	0.218 acre-ft/yr	Sediment Storage Life	6 yrs
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J7-F STORAGE

The hydrologic analysis gives the storage volume required to contain the 10-year, 24-hour storm, and the remaining storage volume available for storing sediment. The existing storage capacity of J7-F is shown on Plate 3, Volume-Elevation Curve, J7-F, and the results of the analysis are summarized in the following table.

1. Rainfall Factor, R	40	2. Soil Erodibility Factor, K	0.18	3. Slope Factor, LS	3.06	4. Cover Factor, C	0.28	5. Erosion Control Factor, P	1.0
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meters:

The calculations for the sediment load entering Structure J7-F were made utilizing the Universal Soil Loss Equation with the following parameters:

APPENDIX B - HYDROLOGY AND HYDRAULIC CALCULATIONS

APPENDIX A - INSPECTION CHECK LIST

PLATE 6 - SPILLWAY STYLING BASEIN PLAN J7-F

PLATE 5 - SPILLWAY AND OUTFLOW CHANNEL CROSS SECTION J7-F

PLATE 4 - CHANNEL PROFILE J7-F, B-B'

PLATE 3 - VOLUME-ELEVATION CURVE J7-F

PLATE 2 - EXISTING MAXIMUM CROSS SECTION J7-F, A-A'

PLATE 1 - SITE PLAN J7-F

INSPECTION REPORT.

THE FOLLOWING PLATES AND APPENDIX ARE ATTACHED AND COMPLETE THIS

* * *

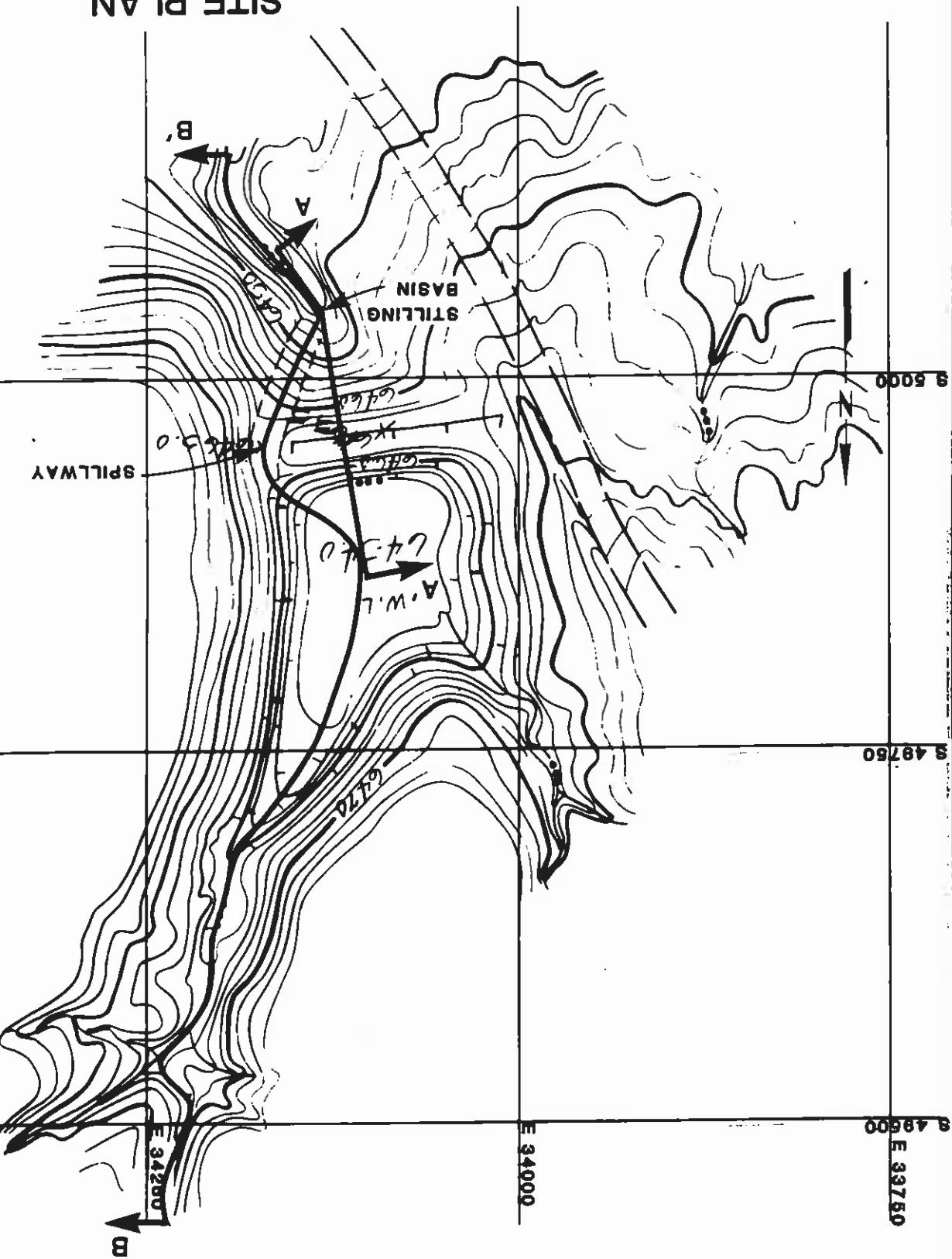
TRAP as shown in Plate 5.

and spilling basin should be protected against erosion using geotextile and
dimensions are shown in Plate 5 and Plate 6. The spillway, outflow channel
channel and spilling basin profile is shown in Plate 4 and the required
basin should be constructed along the alignment B-B', shown in Plate 1. The
adequate erosion protection. A trapezoidal outflow channel and a spilling
adequate; however, the spillway does not have an adequate outflow channel or
The storage capacity and spillway capacity of Structure J7-F are

HYDRAULICS

SITE PLAN
J7-F

SCALE FEET
0 100 200

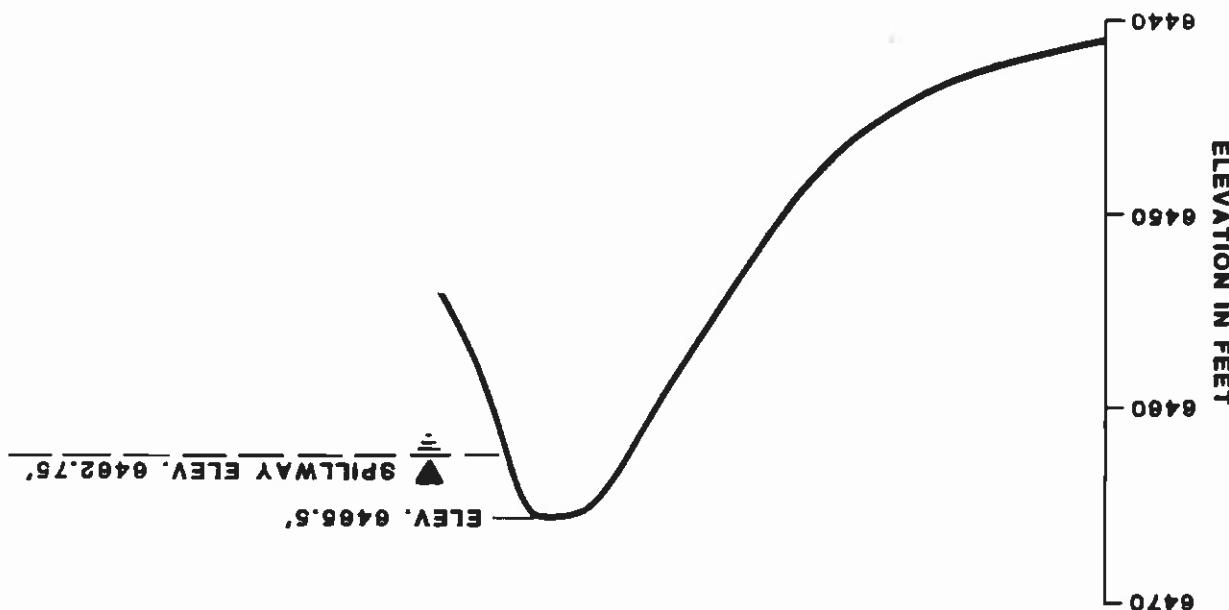


J7-F

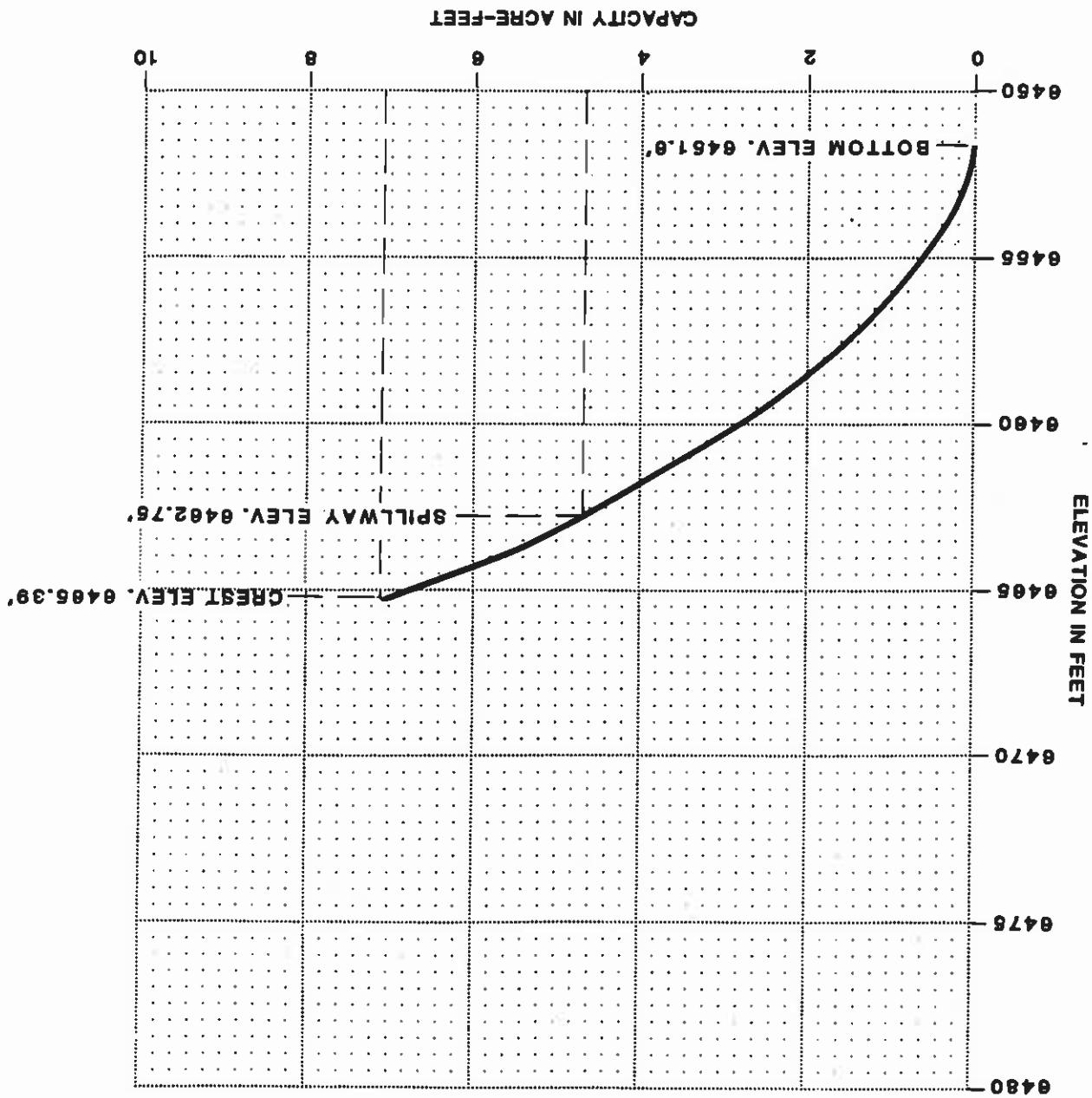
A-A'

MAXIMUM CROSS-SECTION
EXISTING

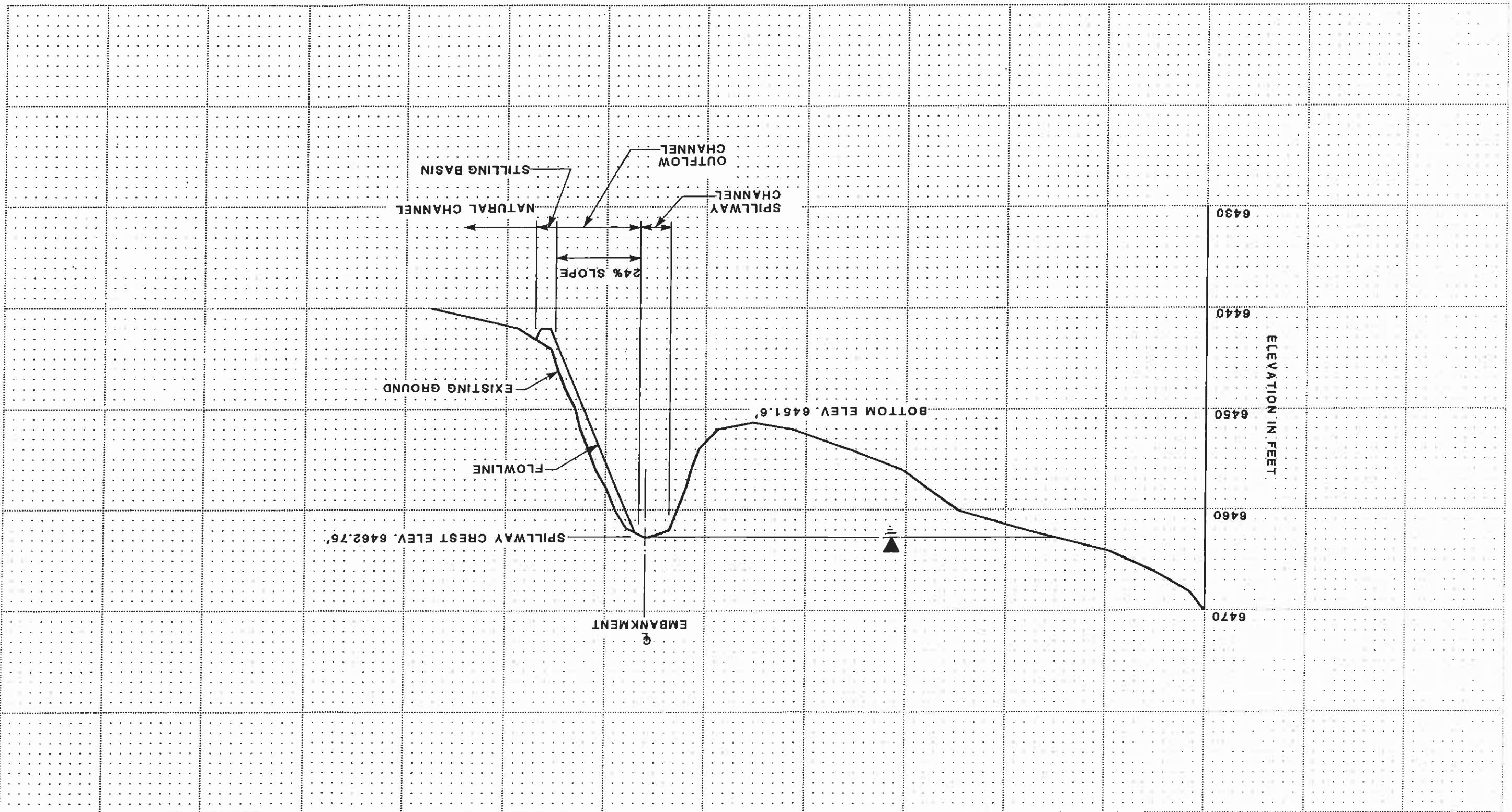
SCALE 100 FEET
0 50 100



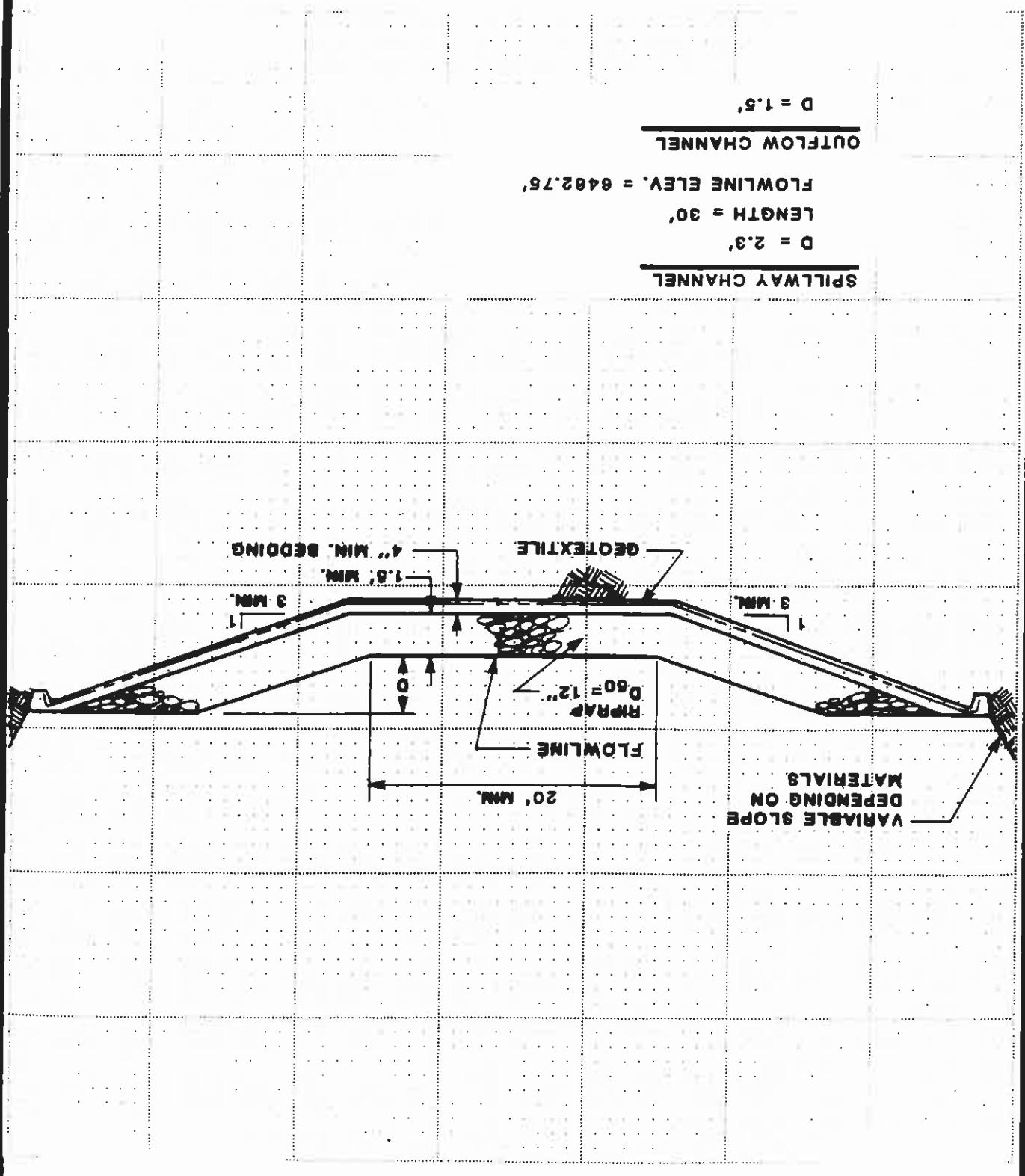
J7-F
CURVE
VOLUME-ELEVATION



J7-F
CHANNEL PROFILE B-B'



J7-F
CROSS SECTION
OUTFLOW CHANNEL
SPILLWAY AND



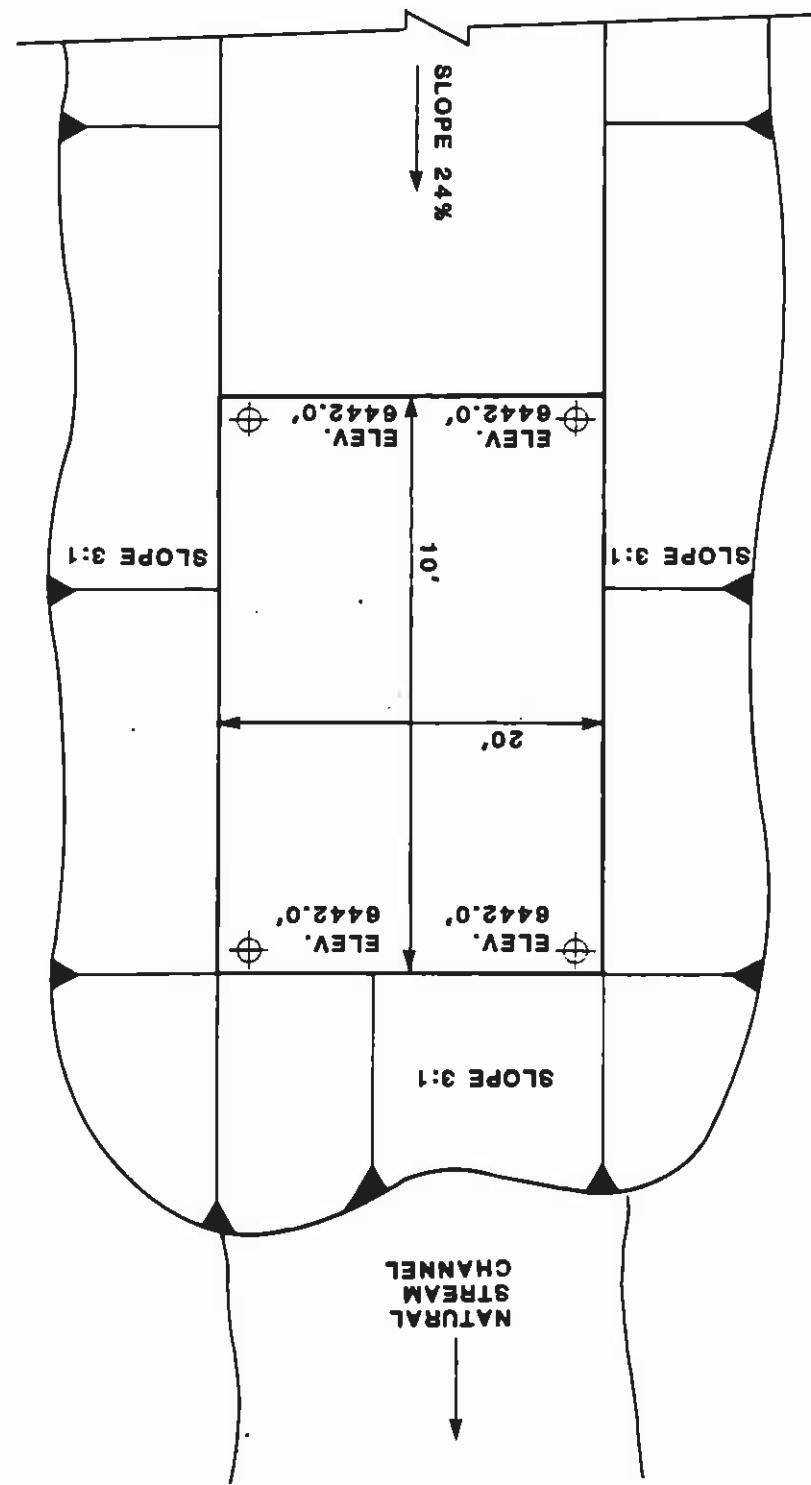
J7-F

BASIN PLAN

SPILLWAY STYLING

MINIMUM DEPTH OF BASIN FLOOR = 1.6'

MINIMUM HEIGHT OF RIPRAP
ALONG SIDEWALLS ABOVE
THE BASIN FLOOR = 2.8'



INSPECTION CHECK LIST

APPENDIX A

ITEM	YES	NO	REMARKS
1. GROVE			
a. Any visual settlements?	X		
b. Misalignment?	X		
c. Cracking?	X		
2. UPSTREAM SLOPE			
a. Any erosion?	X		20%
b. Adequate grass cover?	X		
c. Are trees growing on slopes?	X		
d. Longitudinal cracks?	X		
e. Transverse cracks?	X		
f. Adequate riprap protection?	X		UA
g. Any stone deterioration?	X		
h. Visual depressions or bulges?	X		
i. Visual settlements?	X		
j. Animal burrows?	X		
3. DOWNSTREAM SLOPE			
a. Any erosion?	X		20%
b. Adequate grass cover?	X		
c. Are trees growing on slopes?	X		
d. Longitudinal cracks?	X		
e. Transverse cracks?	X		
f. Adequate riprap protection?	X		
g. Any stone deterioration?	X		
h. Visual depressions or bulges?	X		
i. Visual settlements?	X		
j. Animal burrows?	X		
4. ABUTMENT CONTRACT, RIGGT			
a. Any erosion?	X		
b. Visual differential movement?	X		
c. Any cracks noted?	X		
d. Is seepage present?	X		
e. Type of material?	X		
5. ABUTMENT CONTRACT, LEFT			
a. Any erosion?	X		
b. Visual differential movement?	X		
c. Any cracks noted?	X		
d. Is seepage present?	X		
e. Type of material?	X		

INSPECTION CHECK LIST

Page:

4

Sediment Impoundment Name:

23 - F

a. LOCATION:	
b. APPROPRIATE CHANNEL:	X
c. SPILLWAY CHANNEL:	X
d. OUTFLOW CHANNEL:	X
e. WEIR:	X
f. EROSION PROTECTION:	X
g. OBSTACLES:	X
h. BOTTOM OF CHANNEL ERODING:	X
i. ARE SIDE SLOPES SLoughing?	X
j. ARE SIDE SLOPES ERODING?	X
k. ARE SIDE SLOPES SLOUGHING?	X
l. ARE SIDE SLOPES ERODING?	X
m. ARE SIDE SLOPES SLoughing?	X
n. ARE SIDE SLOPES ERODING?	X
o. ARE SIDE SLOPES SLoughing?	X
p. ARE SIDE SLOPES ERODING?	X
q. ARE SIDE SLOPES SLoughing?	X
r. ARE SIDE SLOPES ERODING?	X
s. ARE SIDE SLOPES SLoughing?	X
t. ARE SIDE SLOPES ERODING?	X
u. ARE SIDE SLOPES SLoughing?	X
v. ARE SIDE SLOPES ERODING?	X
w. ARE SIDE SLOPES SLoughing?	X
x. ARE SIDE SLOPES ERODING?	X
y. ARE SIDE SLOPES SLoughing?	X
z. ARE SIDE SLOPES ERODING?	X
AA. CREST OF Embankments?	X
BB. RIGHT ABUTMENT?	X
CC. LEFT ABUTMENT?	X
DD. EROSION PROTECTION:	X
EE. OBSTACLES:	X
FF. BOTTOM OF CHANNEL ERODING:	X
GG. ARE SIDE SLOPES SLoughing?	X
HH. ARE SIDE SLOPES ERODING?	X
II. SPILLWAY/EMERGENCY	X
JJ. CONDITIONS?	X

a. LOCATION:	
b. APPROPRIATE CHANNEL:	X
c. SPILLWAY CHANNEL:	X
d. OUTFLOW CHANNEL:	X
e. WEIR:	X
f. EROSION PROTECTION:	X
g. OBSTACLES:	X
h. BOTTOM OF CHANNEL ERODING:	X
i. ARE SIDE SLOPES SLoughing?	X
j. ARE SIDE SLOPES ERODING?	X
k. ARE SIDE SLOPES SLoughing?	X
l. ARE SIDE SLOPES ERODING?	X
m. ARE SIDE SLOPES SLoughing?	X
n. ARE SIDE SLOPES ERODING?	X
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v. ARE SIDE SLOPES ERODING?	X
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x. ARE SIDE SLOPES ERODING?	X
y. ARE SIDE SLOPES SLoughing?	X
z. ARE SIDE SLOPES ERODING?	X
AA. CREST OF Embankments?	X
BB. RIGHT ABUTMENT?	X
CC. LEFT ABUTMENT?	X
DD. EROSION PROTECTION:	X
EE. OBSTACLES:	X
FF. BOTTOM OF CHANNEL ERODING:	X
GG. ARE SIDE SLOPES SLoughing?	X
HH. ARE SIDE SLOPES ERODING?	X
II. SPILLWAY/NORMAL	X
MM. ITEM	
NN. REMARKS	
OO. YES	
PP. NO	

ITEM	YES	NO	REMARKS
a. Sinkholes?			
b. Water present?	<input checked="" type="checkbox"/>		(Elev.) feet
c. Silations?	<input checked="" type="checkbox"/>		
d. Watershed matches soil map?	<input checked="" type="checkbox"/>		(A%) %
Ground cover 85% <i>Cyperus</i>			
Soil 20% <i>Cyperus</i>			

9. GENERAL COMMENTS

HYDROLOGY AND HYDRAULIC CALCULATIONS

APPENDIX B

Names & Moore

BY _____ DATE _____
 CHECKED BY _____
 COPY TO EO _____

63.8 AC. 0.100 SA. M.

DRAINAGE BASIN AREA1/26 80

DRAINAGE	ICUET	Hypothetical	Area	1/26	DRAINAGE AREA
Acre (ac)	Type	(Dare - in)	Type	EH 23	80.0
24.0 (39%)	S-G	Feet	C	22.8 (36%)	22.8
16.2 (25%)	Distal	-	D	16.2 (25%)	16.2
24.0 (39%)	S-G	Feet	C	0.36 (81%)	0.36
16.2 (25%)	Distal	-	D	0.25 (94%)	0.25
24.0 (39%)	S-G	Feet	C	27.3	27.3

SCS Curve Number

REVISIONS
 BY _____ DATE _____ TO EO _____
 BY _____ DATE _____ TO EO _____

$$\text{LA} = \frac{\text{Area}}{\text{Total Area}} = \frac{2.6}{15.1} = 0.098 \text{ hr}$$

$$\text{LA} = \left(\frac{11.9 (0.455)}{15.1} \right)^{0.385} = 0.163 \text{ hr}$$

$$\text{LA} = \text{LA} \times \text{ICUET} = 0.163 \times 0.495 = 0.495 \text{ mi}^2$$

$$\text{Elevation Difference} = 6614 - 6463 = 151 \text{ ft}$$

ME 02 (2020-2021)

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Damages & More

$$A = 7.36 \left(\frac{1}{200} \right) (0.638)(0.95) = .218 \text{ acre-feet/year}$$

$$A = 40 (0.18)(3.06) .334(1.0) \rightarrow 7.36 \text{ ton/acre/year}$$

SEDIMENT INFLUX

$$P = 1.0$$

Erosion Control Factor

$$C = 334$$

ADEA (ac)	WATER TYPE	% COVEA	CANOPY (%)	WEIGHTED C
34%	SL	60	25%	0.39 (.082) =
25%	DISSTRACTION	-	-	0.25 (1.0) =
36%	EROSION	-	-	0.36 (1.5) =
34%	SOIL	-	-	0.34 (1.0) =

SOIL FACTOR

$$USE 3.06$$

LEADTH (ft)	A ELEV (ft)	SLOPE (%)	LS
250	70	8	2.90
250	70	8	2.90
250	70	8	2.90

SLOPE FACTOR

$$K = 0.18$$

$$SOIL TYPE = EARTH$$

SOIL EROSIONALITY FACTOR

$$R = 40$$

RAINFALL FACTOR

UNVEGETATED SOIL LOSS EROSION

CHECKED BY	DATE
COPY TO EO	

REVISIONS

BY	DATE	TO EO
BY	DATE	TO EO