



TRI-STATE

May 14, 2025

Ms. Hunter Ridley
Environmental Protection Specialist
Colorado Division of Reclamation, Mining & Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Colowyo Coal Company L.P.
Permit No. C-1981-019
Minor Revision No. 262
Adequacy Response

Dear Ms. Ridley,

Tri-State Generation and Transmission Association Inc. (Tri-State), is the parent company to Axial Basin Coal Company, which is the general partner to Colowyo Coal Company L.P. (Colowyo). Therefore, Tri-State on behalf of Colowyo is submitting this adequacy response for minor revision 262 (MR-262).

Tri-State received the Division's adequacy letter dated May 13, 2025, and Tri-State has the following response to the Division's concern:

1. *Colowyo's Permit File currently provides SEDCAD data for the Streeter South Side ditch in Exhibit 07 Item 14 Appendix Exh7-14B in compliance with Rule 4.05.2(2), which requires that "Temporary diversions shall be constructed to pass safely the peak runoff from a precipitation event with a 2-year, recurrence interval, or a larger event as specified by the Division for good cause shown". However, Rule 4.05.3(3) requires that "permanent diversions shall be constructed to pass safely the peak runoff from a precipitation event with a 10-year, recurrent interval, or a larger event as specified by the Division for good cause shown". MR262 has requested that the Streeter South Side Ditch be retained as a permanent structure. Therefore, the Division requests that Colowyo provide data to show that Streeter South Side Ditch meets the requirements of Rule 4.05.3(3).*

Response: The Division is referencing an exhibit that is no longer part of the permit. Appendix Exh. 7-14B Temporary Channels was approved to be removed from the permit under TR-158 (approved March 10, 2025), and in that technical revision the Streeter South Side Ditch design criteria was moved to Appendix Exh. 7-14SP. Further, the Division approved removal of the Streeter South Ditch design criteria which was contained in Appendix Exh. 7-14SP under MR-261 (approved April 11, 2025).

To satisfy the Division's request that the Streeter South Side Ditch meets the requirements of Rule 4.05.3(3), the Streeter Pond hydrology demonstration, previously approved hydrology demonstration for the Streeter Pond by the Division and approved to be removed from the permit under MR-261, has been included in this response for the Division's review. This information is not intended to become part of the permit document. As shown on the attached SEDCAD™ output, the Streeter South Side Ditch (structure #5) was designed for the 10-yr, 24-hr storm event. This information provided and previously approved by the Division for the Streeter Pond watershed, which included the Streeter South Side Ditch, demonstrates compliance with Rule 4.05.3(3).



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If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 824-1232 at your convenience.

Sincerely,

DocuSigned by:

D250C711D0BF450...

Chris Gilbreath
Senior Manager,
Remediation and Reclamation

CG:TT

Enclosure

cc: Tony Tennyson (via email)
File: C. F. 1.1.1.246

Streeter Pond

10 Year 24 Hour Storm Event

Effluent Demonstration
Post-Mining Condition

Tony Tennyson

Tri-State Generation & Transmission Association, Inc.
1100 West 116th Avenue
Westminster, CO 80234

Phone: (970) 326-3560
Email: ttennyson@tristategt.org

General Information

Storm Information:

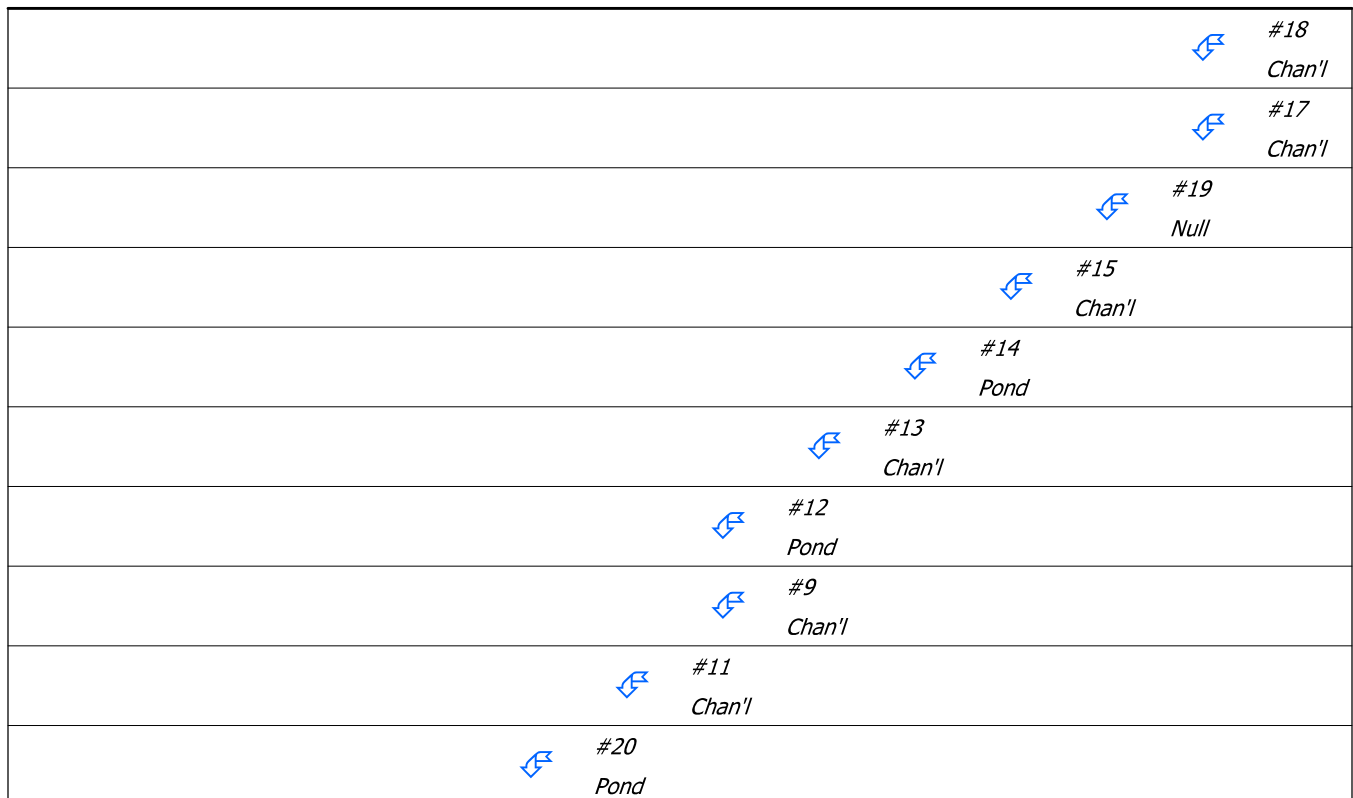
Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	1.800 inches

Particle Size Distribution:

Size (mm)	Colowyo Particle Size
4.7500	100.000%
0.0750	73.000%
0.0400	33.000%
0.0010	20.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Null Below Streeter Pond
Pond	#2	==>	#1	0.000	0.000	Streeter Pond
Null	#3	==>	#2	0.000	0.000	Null Above Streeter Pond
Null	#4	==>	#3	0.000	0.000	Streeter Ditch 0+00 to 10+00
Channel	#5	==>	#4	0.000	0.000	Streeter South Side Ditch
Channel	#6	==>	#3	0.000	0.000	Streeter Ditch 10+00 to 25+00
Channel	#7	==>	#6	0.000	0.000	Streeter Ditch 25+00 to 45+00 Streeter Ditch 25+00 to 45+00
Channel	#9	==>	#11	0.000	0.000	Stoker Ditch
Channel	#10	==>	#7	0.000	0.000	Streeter Ditch 45+00 to 80+00
Channel	#11	==>	#20	0.000	0.000	Streeter Ditch 80+00 to 91+00
Pond	#12	==>	#11	0.000	0.000	SD-2 Stockpond
Channel	#13	==>	#12	0.000	0.000	Streeter Ditch 91+00 to 111+00
Pond	#14	==>	#13	0.000	0.000	SD-3 Stockpond
Channel	#15	==>	#14	0.000	0.000	Streeter Ditch 111+00 to 125+00
Channel	#17	==>	#19	0.000	0.000	Buckskin Ditch
Channel	#18	==>	#19	0.000	0.000	Streeter Ditch 125+00 to 187+00
Null	#19	==>	#15	0.011	0.370	Null at Confluence Buckskin/Streeter
Pond	#20	==>	#10	0.000	0.000	SD-1 Stockpond



		#10 Chan'l
		#7 Chan'l
		#6 Chan'l
		#5 Chan'l
		#4 Null
		#3 Null
	#2 Pond	
#1 Null		

Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#19	8. Large gullies, diversions, and low flowing streams	2.60	5.20	200.00	4.83	0.011
#19	Muskingum K:					0.011

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#18	316.200	316.200	21.73	4.99	87.9	300,083	168.65	6.80
#17	135.700	135.700	16.85	1.54	71.9	91,138	51.94	19.06
#19	0.000	451.900	25.50	6.53	159.8	138,263	78.20	9.83
#15	143.100	595.000	42.68	7.96	370.2	176,971	100.53	18.60
#14	In	595.000	42.68	7.96	370.2	176,971	100.53	18.60
	Out		11.71	5.00	0.0	5	0.00	0.00
#13	99.000	694.000	21.13	6.52	230.4	220,429	125.64	14.44
#12	In	694.000	21.13	6.52	230.4	220,429	125.64	14.44
	Out		6.80	3.56	0.0	1	0.00	0.00
#9	19.600	19.600	8.04	0.59	30.6	81,675	46.55	21.14
#11	71.400	785.000	24.37	5.32	201.0	170,377	97.11	15.93
#20	In	785.000	24.37	5.32	201.0	170,377	97.11	15.93
	Out		5.32	2.36	0.0	0	0.00	0.00
#10	160.900	945.900	5.32	2.38	0.1	6,414	3.65	1.92
#7	142.400	1,088.300	5.33	2.38	0.1	6,414	3.64	1.91
#6	58.100	1,146.400	5.33	2.38	0.1	6,414	3.64	1.91
#5	164.800	164.800	0.04	0.01	0.0	5,242	2.54	1.99
#4	9.500	174.300	2.84	0.22	217.0	1,075,732	613.11	301.85
#3	0.000	1,320.700	5.42	2.60	217.0	1,013,139	577.43	26.00
#2	In	1,341.900	5.42	2.60	217.0	1,013,139	577.43	26.00
	Out		1.52	2.29	36.0	16,765	0.00	0.00
#1	0.000	1,341.900	1.52	2.29	36.0	16,759	0.00	0.00

Particle Size Distribution(s) at Each Structure

Structure #18 (Streeter Ditch 125+00 to 187+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	74.067%
0.0400	34.141%
0.0010	20.691%

Structure #17 (Buckskin Ditch):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.028%
0.0400	33.013%
0.0010	20.008%

Structure #19 (Null at Confluence Buckskin/Streeter):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.599%
0.0400	33.633%
0.0010	20.384%

Structure #15 (Streeter Ditch 111+00 to 125+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.260%
0.0400	33.274%
0.0010	20.166%

Structure #14 (SD-3 Stockpond):

Size (mm)	In	Out
4.7500	100.000%	100.000%
0.0750	73.260%	100.000%
0.0400	33.274%	100.000%
0.0010	20.166%	100.000%

Structure #13 (Streeter Ditch 91+00 to 111+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.000%
0.0400	33.001%
0.0010	20.001%

Structure #12 (SD-2 Stockpond):

Size (mm)	In	Out
4.7500	100.000%	100.000%
0.0750	73.000%	100.000%
0.0400	33.001%	100.000%
0.0010	20.001%	100.000%

Structure #9 (Stoker Ditch):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.000%
0.0400	33.000%
0.0010	20.000%

Structure #11 (Streeter Ditch 80+00 to 91+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.000%
0.0400	33.000%
0.0010	20.000%

Structure #20 (SD-1 Stockpond):

Size (mm)	In	Out
4.7500	100.000%	100.000%

Size (mm)	In	Out
0.0750	73.000%	100.000%
0.0400	33.000%	100.000%
0.0010	20.000%	100.000%

Structure #10 (Streeter Ditch 45+00 to 80+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.054%
0.0400	33.134%
0.0010	20.160%

Structure #7 (Streeter Ditch 25+00 to 45+00

Streeter Ditch 25+00 to 45+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.664%
0.0400	33.406%
0.0010	20.322%

Structure #6 (Streeter Ditch 10+00 to 25+00):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.664%
0.0400	33.406%
0.0010	20.322%

Structure #5 (Streeter South Side Ditch):

Size (mm)	In/Out
4.7500	100.000%
0.0750	100.000%
0.0400	45.193%
0.0010	27.390%

Structure #4 (Streeter Ditch 0+00 to 10+00):

Size (mm)	In/Out
4.7500	100.000%

Size (mm)	In/Out
0.0750	73.006%
0.0400	33.003%
0.0010	20.002%

Structure #3 (Null Above Streeter Pond):

Size (mm)	In/Out
4.7500	100.000%
0.0750	73.006%
0.0400	33.003%
0.0010	20.002%

Structure #2 (Streeter Pond):

Size (mm)	In	Out
4.7500	100.000%	100.000%
0.0750	73.006%	100.000%
0.0400	33.003%	100.000%
0.0010	20.002%	100.000%

Structure #1:

Size (mm)	In/Out
4.7500	100.000%
0.0750	100.000%
0.0400	100.000%
0.0010	100.000%

Structure Detail:

Structure #18 (Vegetated Channel)

Streeter Ditch 125+00 to 187+00

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
15.00	3.0:1	3.0:1	2.6	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	21.73 cfs		21.73 cfs	
Depth:	0.51 ft		0.90 ft	
Top Width:	18.05 ft		20.39 ft	
Velocity:	2.59 fps		1.37 fps	
X-Section Area:	8.39 sq ft		15.89 sq ft	
Hydraulic Radius:	0.461 ft		0.768 ft	
Froude Number:	0.67		0.27	
Roughness Coefficient:	0.0552		0.1473	

Structure #17 (Vegetated Channel)

Buckskin Ditch

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
12.00	3.0:1	3.0:1	4.0	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	16.85 cfs		16.85 cfs	
Depth:	0.44 ft		0.79 ft	
Top Width:	14.65 ft		16.72 ft	
Velocity:	2.87 fps		1.49 fps	
X-Section Area:	5.88 sq ft		11.29 sq ft	
Hydraulic Radius:	0.397 ft		0.665 ft	
Froude Number:	0.80		0.32	
Roughness Coefficient:	0.0560		0.1517	

Structure #19 (Null)

Null at Confluence Buckskin/Streeter

Structure #15 (Vegetated Channel)

Streeter Ditch 111+00 to 125+00

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
15.00	3.0:1	3.0:1	2.6	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	42.68 cfs		42.68 cfs	
Depth:	0.67 ft		1.10 ft	
Top Width:	19.05 ft		21.59 ft	
Velocity:	3.71 fps		2.12 fps	
X-Section Area:	11.49 sq ft		20.09 sq ft	
Hydraulic Radius:	0.596 ft		0.915 ft	
Froude Number:	0.84		0.39	
Roughness Coefficient:	0.0457		0.1065	

Structure #14 (Pond)

SD-3 Stockpond

Pond Inputs:

Initial Pool Elev:	97.00 ft
Initial Pool:	1.05 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
103.00	20.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	103.24 ft
H'graph Detention Time:	2.13 hrs
Pond Model:	CSTRS
Dewater Time:	0.54 days
Trap Efficiency:	100.00 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
90.00	0.050	0.000	0.000	Top of Sed. Storage
90.01	0.050	0.001	0.000	
91.00	0.072	0.061	0.000	
92.00	0.098	0.145	0.000	
93.00	0.128	0.258	0.000	
94.00	0.162	0.403	0.000	
95.00	0.200	0.583	0.000	
96.00	0.231	0.799	0.000	
97.00	0.265	1.046	0.000	
98.00	0.301	1.329	0.000	
99.00	0.339	1.649	0.000	
100.00	0.380	2.008	0.000	
101.00	0.554	2.473	0.000	
102.00	0.761	3.127	0.000	
103.00	1.000	4.005	0.000	Spillway #1
103.24	0.916	4.248	11.713	12.95 Peak Stage
104.00	1.010	5.010	48.400	
105.00	1.020	6.025	167.398	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
90.00	0.000	0.000
90.01	0.000	0.000
91.00	0.000	0.000
92.00	0.000	0.000
93.00	0.000	0.000
94.00	0.000	0.000
95.00	0.000	0.000
96.00	0.000	0.000
97.00	0.000	0.000
98.00	0.000	0.000
99.00	0.000	0.000
100.00	0.000	0.000
101.00	0.000	0.000
102.00	0.000	0.000
103.00	0.000	0.000
104.00	48.400	48.400
105.00	167.398	167.398

Structure #13 (Vegetated Channel)

Streeter Ditch 91+00 to 111+00

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
15.00	3.0:1	3.0:1	3.2	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	21.13 cfs		21.13 cfs	
Depth:	0.47 ft		0.83 ft	
Top Width:	17.83 ft		20.01 ft	
Velocity:	2.73 fps		1.45 fps	
X-Section Area:	7.73 sq ft		14.62 sq ft	
Hydraulic Radius:	0.430 ft		0.721 ft	
Froude Number:	0.73		0.30	
Roughness Coefficient:	0.0555		0.1480	

Structure #12 (Pond)*SD-2 Stockpond*

Pond Inputs:

Initial Pool Elev:	97.00 ft
Initial Pool:	1.05 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
103.00	20.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	103.14 ft
H'graph Detention Time:	2.91 hrs
Pond Model:	CSTRS
Dewater Time:	0.44 days
Trap Efficiency:	100.00 %

*Dewatering time is calculated from peak stage to lowest spillway*Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
90.00	0.050	0.000	0.000	Top of Sed. Storage
90.01	0.050	0.001	0.000	
91.00	0.072	0.061	0.000	
92.00	0.098	0.145	0.000	
93.00	0.128	0.258	0.000	
94.00	0.162	0.403	0.000	
95.00	0.200	0.583	0.000	
96.00	0.231	0.799	0.000	
97.00	0.265	1.046	0.000	
98.00	0.301	1.329	0.000	
99.00	0.339	1.649	0.000	
100.00	0.380	2.008	0.000	
101.00	0.554	2.473	0.000	
102.00	0.761	3.127	0.000	
103.00	1.000	4.005	0.000	Spillway #1
103.14	0.909	4.147	6.797	10.60 Peak Stage

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
104.00	1.020	5.015	48.400	
105.00	1.040	6.045	167.398	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
90.00	0.000	0.000
90.01	0.000	0.000
91.00	0.000	0.000
92.00	0.000	0.000
93.00	0.000	0.000
94.00	0.000	0.000
95.00	0.000	0.000
96.00	0.000	0.000
97.00	0.000	0.000
98.00	0.000	0.000
99.00	0.000	0.000
100.00	0.000	0.000
101.00	0.000	0.000
102.00	0.000	0.000
103.00	0.000	0.000
104.00	48.400	48.400
105.00	167.398	167.398

Structure #9 (Vegetated Channel)

Stoker Ditch

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.00	1.0:1	7.0:1	3.0	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	8.04 cfs		8.04 cfs	
Depth:	0.68 ft		1.14 ft	
Top Width:	7.42 ft		11.14 ft	
Velocity:	2.52 fps		1.07 fps	
X-Section Area:	3.19 sq ft		7.50 sq ft	
Hydraulic Radius:	0.420 ft		0.657 ft	
Froude Number:	0.68		0.23	
Roughness Coefficient:	0.0573		0.1818	

Structure #11 (Vegetated Channel)

Streeter Ditch 80+00 to 91+00

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
15.00	3.0:1	3.0:1	3.2	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	24.37 cfs		24.37 cfs	
Depth:	0.50 ft		0.87 ft	
Top Width:	18.00 ft		20.23 ft	
Velocity:	2.95 fps		1.59 fps	
X-Section Area:	8.25 sq ft		15.34 sq ft	
Hydraulic Radius:	0.454 ft		0.748 ft	
Froude Number:	0.77		0.32	
Roughness Coefficient:	0.0533		0.1381	

Structure #20 (Pond)

SD-1 Stockpond

Pond Inputs:

Initial Pool Elev:	97.00 ft
Initial Pool:	1.05 ac-ft

*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
103.00	20.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	103.11 ft
H'graph Detention Time:	3.80 hrs
Pond Model:	CSTRS
Dewater Time:	0.33 days
Trap Efficiency:	100.00 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
90.00	0.050	0.000	0.000	Top of Sed. Storage
91.00	0.072	0.061	0.000	
92.00	0.098	0.145	0.000	
93.00	0.128	0.258	0.000	
94.00	0.162	0.403	0.000	
95.00	0.200	0.583	0.000	
96.00	0.231	0.799	0.000	
97.00	0.265	1.046	0.000	
98.00	0.301	1.329	0.000	
99.00	0.339	1.649	0.000	
100.00	0.380	2.008	0.000	
101.00	0.554	2.473	0.000	
102.00	0.761	3.127	0.000	
103.00	1.000	4.005	0.000	Spillway #1
103.11	0.899	4.116	5.317	8.00 Peak Stage
104.00	1.010	5.010	48.400	
105.00	1.020	6.025	167.398	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
90.00	0.000	0.000
91.00	0.000	0.000
92.00	0.000	0.000
93.00	0.000	0.000
94.00	0.000	0.000
95.00	0.000	0.000
96.00	0.000	0.000
97.00	0.000	0.000
98.00	0.000	0.000
99.00	0.000	0.000
100.00	0.000	0.000
101.00	0.000	0.000
102.00	0.000	0.000
103.00	0.000	0.000
104.00	48.400	48.400
105.00	167.398	167.398

Structure #10 (Vegetated Channel)

Streeter Ditch 45+00 to 80+00

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
12.00	3.0:1	3.0:1	2.0	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	5.32 cfs		5.32 cfs	
Depth:	0.33 ft		0.69 ft	
Top Width:	14.01 ft		16.16 ft	
Velocity:	1.22 fps		0.54 fps	
X-Section Area:	4.36 sq ft		9.76 sq ft	
Hydraulic Radius:	0.309 ft		0.596 ft	
Froude Number:	0.39		0.12	
Roughness Coefficient:	0.0786		0.2733	

Structure #7 (Riprap Channel)

Streeter Ditch 25+00 to 45+00

Streeter Ditch 25+00 to 45+00

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
12.00	3.0:1	3.0:1	2.0			

Riprap Channel Results:

Simons/OSM Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	5.33 cfs	
Depth:	0.22 ft	
Top Width:	13.30 ft	
Velocity:	1.95 fps	
X-Section Area:	2.74 sq ft	
Hydraulic Radius:	0.205 ft	
Froude Number:	0.76	
Manning's n:	0.0377	
Dmin:	2.00 in	
D50:	9.00 in	
Dmax:	12.00 in	

Structure #6 (Riprap Channel)

Streeter Ditch 10+00 to 25+00

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
6.00	2.0:1	2.0:1	10.9			

Riprap Channel Results:

Simons/OSM Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	5.33 cfs	

	w/o Freeboard	w/ Freeboard
Depth:	0.11 ft	
Top Width:	6.42 ft	
Velocity*:		
X-Section Area:	0.66 sq ft	
Hydraulic Radius:	0.101 ft	
Froude Number*:		
Manning's n*:		
Dmin:	2.00 in	
D50:	6.00 in	
Dmax:	7.50 in	

Velocity and Manning's n calculations may not apply for this method.

Structure #5 (Vegetated Channel)

Streeter South Side Ditch

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.00	1.0:1	7.0:1	3.0	D, B				7.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.04 cfs		0.04 cfs	
Depth:	0.08 ft		0.27 ft	
Top Width:	2.68 ft		4.16 ft	
Velocity:	0.22 fps		0.05 fps	
X-Section Area:	0.20 sq ft		0.83 sq ft	
Hydraulic Radius:	0.074 ft		0.197 ft	
Froude Number:	0.14		0.02	
Roughness Coefficient:	0.2068		1.6946	

Structure #4 (Null)

Streeter Ditch 0+00 to 10+00

Structure #3 (Null)

Null Above Streeter Pond

Structure #2 (Pond)

Streeter Pond

Pond Inputs:

Initial Pool Elev:	6,583.00 ft
Initial Pool:	1.41 ac-ft
*Sediment Storage:	0.00 ac-ft
Dead Space:	20.00 %

**No sediment capacity defined*

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
12.00	3.00	18.00	87.00	4.50	0.0150	6,585.00	2

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,588.00	50.00	1.50:1	1.50:1	20.00

Pond Results:

Peak Elevation:	6,585.13 ft
H'graph Detention Time:	10.52 hrs
Pond Model:	CSTRS
Dewater Time:	1.06 days
Trap Efficiency:	83.41 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,579.00	0.045	0.000	0.000	Top of Sed. Storage
6,580.00	0.140	0.088	0.000	
6,581.00	0.356	0.328	0.000	
6,582.00	0.560	0.783	0.000	
6,583.00	0.692	1.407	0.000	Low hole SPW #1
6,584.00	0.873	2.188	0.840	11.24*
6,585.00	1.159	3.201	1.188	12.20 Spillway #1
6,585.13	1.169	3.363	1.518	2.00 Peak Stage
6,586.00	1.398	4.478	3.782	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
6,587.00	1.876	6.109	5.348	
6,588.00	2.120	8.106	6.550	Spillway #2
6,589.00	2.324	10.328	45.017	
6,590.00	2.465	12.722	150.324	
6,591.00	2.607	15.258	302.542	

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,579.00	0.000	0.000	0.000
6,580.00	0.000	0.000	0.000
6,581.00	0.000	0.000	0.000
6,582.00	0.000	0.000	0.000
6,583.00	4.00	0.000	0.000
6,584.00	0.840	0.000	0.840
6,585.00	1.188	0.000	1.188
6,586.00	3.782	0.000	3.782
6,587.00	5.348	0.000	5.348
6,588.00	6.550	0.000	6.550
6,589.00	7.563	37.453	45.017
6,590.00	8.456	141.868	150.324
6,591.00	9.263	293.279	302.542

Structure #1 (Null)

Null Below Streeter Pond

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#18	1	8.500	0.050	0.000	0.000	80.000	F	4.38	0.315
	2	213.800	0.803	0.000	0.000	74.000	F	20.63	4.368
	3	10.200	0.035	0.000	0.000	62.000	M	0.08	0.042
	4	11.600	0.147	0.000	0.000	62.000	M	0.06	0.039
	5	55.100	0.125	0.000	0.000	62.000	M	0.27	0.184
	6	6.300	0.118	0.000	0.000	47.000	S	0.00	0.000
	7	10.700	0.070	0.000	0.000	62.000	M	0.08	0.044
	Σ	316.200						21.73	4.990
#17	1	31.200	0.122	0.000	0.000	80.000	F	16.08	1.155
	2	101.900	0.516	0.000	0.000	62.000	M	0.44	0.333
	3	2.600	0.021	0.000	0.000	74.000	F	0.78	0.056
	Σ	135.700						16.85	1.544
#19	Σ	451.900						25.50	6.534
#15	1	6.600	0.044	0.000	0.000	47.000	M	0.00	0.000
	2	83.200	0.301	0.000	0.000	47.000	S	0.00	0.000
	3	16.600	0.091	0.000	0.000	62.000	M	0.13	0.068
	4	36.700	0.087	0.000	0.000	80.000	F	18.91	1.358
	Σ	595.000						42.68	7.961
#14	Σ	595.000						42.68	7.961
#13	1	32.800	0.034	0.000	0.000	80.000	F	16.90	1.214
	2	6.900	0.055	0.000	0.000	47.000	S	0.00	0.000
	3	20.300	0.068	0.000	0.000	47.000	S	0.00	0.000
	4	8.200	0.025	0.000	0.000	80.000	F	4.23	0.303
	5	2.900	0.067	0.000	0.000	47.000	S	0.00	0.000
	6	27.900	0.196	0.000	0.000	47.000	S	0.00	0.000
	Σ	694.000						21.13	6.518
#12	Σ	694.000						21.13	6.518
#9	1	4.000	0.078	0.000	0.000	62.000	F	0.03	0.016
	2	15.600	0.073	0.000	0.000	80.000	F	8.04	0.577
	Σ	19.600						8.04	0.594
#11	1	17.700	0.075	0.000	0.000	80.000	F	9.12	0.655
	2	6.800	0.029	0.000	0.000	80.000	F	3.50	0.252
	3	27.900	0.205	0.000	0.000	47.000	S	0.00	0.000
	4	7.200	0.058	0.000	0.000	80.000	F	3.71	0.266
	5	11.800	0.178	0.000	0.000	47.000	S	0.00	0.000

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
	Σ	785.000						24.37	5.323
#20	Σ	785.000						24.37	5.323
#10	1	78.800	0.424	0.000	0.000	47.000	S	0.00	0.000
	2	65.200	0.120	0.000	0.000	47.000	S	0.00	0.000
	3	0.600	0.022	0.000	0.000	80.000	F	0.31	0.018
	4	16.300	0.141	0.000	0.000	47.000	S	0.00	0.000
	Σ	945.900						5.32	2.380
#7	1	130.200	0.381	0.000	0.000	47.000	S	0.00	0.000
	2	12.200	0.168	0.000	0.000	57.000	S	0.01	0.004
	Σ	1,088.300						5.33	2.384
#6	1	22.400	0.072	0.000	0.000	47.000	S	0.00	0.000
	2	35.700	0.131	0.000	0.000	47.000	S	0.00	0.000
	Σ	1,146.400						5.33	2.384
#5	1	9.200	0.016	0.000	0.000	47.000	S	0.00	0.000
	2	155.600	0.375	0.000	0.000	54.000	S	0.04	0.009
	Σ	164.800						0.04	0.009
#4	1	9.500	0.058	0.000	0.000	74.000	F	2.84	0.206
	Σ	174.300						2.84	0.215
#3	Σ	1,320.700						5.42	2.600
#2	1	16.600	0.056	0.000	0.000	47.000	S	0.00	0.000
	2	4.600	0.048	0.000	0.000	57.000	S	0.00	0.000
	Σ	1,341.900						5.42	2.600
#1	Σ	1,341.900						1.52	2.292

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#18	1	0.300	200.00	14.20	0.8000	0.9000	1	84.3	364,575	207.80	101.24
	2	0.300	400.00	9.30	0.0100	0.3800	1	3.4	1,005	0.37	0.21
	3	0.300	100.00	8.50	0.0700	0.3800	1	0.0	756	0.43	0.33
	4	0.030	100.00	1.50	0.0700	0.3800	1	0.0	12	0.01	0.01
	5	0.300	400.00	10.60	0.0100	0.3800	1	0.1	382	0.19	0.16
	6	0.300	400.00	9.50	0.0310	0.9000	1	0.0	1	0.00	0.00
	7	0.300	200.00	8.50	0.0310	0.3800	1	0.0	476	0.27	0.21

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
Σ								87.9	300,083	168.65	6.80
#17	1	0.300	400.00	6.60	0.8000	0.3800	1	71.6	95,041	54.17	25.34
	2	0.300	400.00	7.40	0.0100	0.3800	1	0.1	191	0.09	0.08
	3	0.300	100.00	11.80	0.0700	0.3800	1	0.2	7,426	4.23	1.73
Σ								71.9	91,138	51.94	19.06
#19 Σ								159.8	138,263	78.20	9.83
#15	1	0.300	200.00	15.00	0.0310	0.9000	1	0.0	1	0.00	0.00
	2	0.300	400.00	9.40	0.0310	0.9000	1	0.0	1	0.00	0.00
	3	0.300	400.00	11.30	0.0100	0.3800	1	0.0	414	0.24	0.18
	4	0.300	400.00	11.50	0.8000	0.3800	1	210.3	224,470	127.94	61.00
Σ								370.2	176,971	100.53	18.60
#14 Σ								370.2	176,971	100.53	18.60
#13	1	0.300	200.00	18.60	0.8000	0.3800	1	224.4	263,388	150.12	72.00
	2	0.300	300.00	15.70	0.0310	0.9000	1	0.0	1	0.00	0.00
	3	0.300	300.00	15.80	0.0310	0.9000	1	0.0	1	0.00	0.00
	4	0.300	100.00	4.80	0.8000	0.3800	1	5.9	30,704	17.50	8.11
	5	0.300	200.00	5.50	0.0310	0.9000	1	0.0	1	0.00	0.00
	6	0.300	400.00	6.70	0.0310	0.9000	1	0.0	1	0.00	0.00
Σ								230.4	220,429	125.64	14.44
#12 Σ								230.4	220,429	125.64	14.44
#9	1	0.300	200.00	5.00	0.0100	0.3800	1	0.0	79	0.05	0.03
	2	0.300	300.00	7.10	0.8000	0.3800	1	30.6	81,675	46.55	21.74
Σ								30.6	81,675	46.55	21.14
#11	1	0.300	400.00	14.70	0.8000	0.3800	1	128.2	277,070	157.92	75.89
	2	0.300	200.00	16.90	0.8000	0.3800	1	34.4	200,127	114.07	54.19
	3	0.300	400.00	6.60	0.0310	0.9000	1	0.0	1	0.00	0.00
	4	0.300	200.00	5.20	0.8000	0.3800	1	7.8	45,831	26.12	12.14
	5	0.300	400.00	8.40	0.0310	0.9000	1	0.0	1	0.00	0.00
Σ								201.0	170,377	97.11	15.93
#20 Σ								201.0	170,377	97.11	15.93
#10	1	0.300	400.00	4.70	0.0310	0.9000	1	0.0	1	0.00	0.00
	2	0.300	400.00	12.70	0.0310	0.9000	1	0.0	1	0.00	0.00
	3	0.300	50.00	1.50	0.8000	0.3800	1	0.1	6,414	3.66	1.92
	4	0.300	400.00	9.80	0.0310	0.9000	1	0.0	1	0.00	0.00
Σ								0.1	6,414	3.65	1.92
#7	1	0.300	400.00	8.60	0.3100	0.9000	1	0.0	1	0.00	0.00

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
	2	0.300	300.00	3.00	0.0310	0.9000	1	0.0	499	0.25	0.23
	Σ							0.1	6,414	3.64	1.91
#6	1	0.300	400.00	25.90	0.0310	0.9000	1	0.0	1	0.00	0.00
	2	0.300	400.00	14.10	0.0310	0.9000	1	0.0	1	0.00	0.00
	Σ							0.1	6,414	3.64	1.91
#5	1	0.300	100.00	22.20	0.0310	0.9000	1	0.0	1	0.00	0.00
	2	0.300	400.00	11.60	0.0310	0.9000	1	0.0	5,242	2.54	1.99
	Σ							0.0	5,242	2.54	1.99
#4	1	0.300	400.00	34.90	0.8000	0.9000	1	216.9	1,075,732	613.13	314.33
	Σ							217.0	1,075,732	613.11	301.85
#3	Σ							217.0	1,013,139	577.43	26.00
#2	1	0.300	400.00	30.40	0.0310	0.9000	1	0.0	1	0.00	0.00
	2	0.300	400.00	34.10	0.0800	0.9000	1	0.0	1	0.00	0.00
	Σ							217.0	1,013,139	577.43	26.00
#1	Σ							36.0	16,759	0.00	0.00

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	30.40	270.56	890.00	4.410	0.056
#2	1	Time of Concentration:					0.056
#2	2	3. Short grass pasture	34.00	274.04	806.00	4.660	0.048
#2	2	Time of Concentration:					0.048
#4	1	3. Short grass pasture	35.00	351.05	1,003.00	4.730	0.058
#4	1	Time of Concentration:					0.058
#5	1	3. Short grass pasture	22.00	49.72	226.00	3.750	0.016
#5	1	Time of Concentration:					0.016
#5	2	3. Short grass pasture	11.60	426.64	3,677.93	2.720	0.375
#5	2	Time of Concentration:					0.375
#6	1	3. Short grass pasture	26.00	275.85	1,061.00	4.070	0.072
#6	1	Time of Concentration:					0.072
#6	2	3. Short grass pasture	14.00	198.66	1,419.00	2.990	0.131
#6	2	Time of Concentration:					0.131
#7	1	3. Short grass pasture	8.60	276.31	3,212.90	2.340	0.381
#7	1	Time of Concentration:					0.381
#7	2	3. Short grass pasture	3.00	25.05	835.00	1.380	0.168
#7	2	Time of Concentration:					0.168

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#9	1	3. Short grass pasture	5.00	25.15	503.00	1.780	0.078
#9	1	Time of Concentration:					0.078
#9	2	5. Nearly bare and untilled, and alluvial valley fans	7.10	49.70	700.00	2.660	0.073
#9	2	Time of Concentration:					0.073
#10	1	3. Short grass pasture	4.70	124.36	2,646.00	1.730	0.424
#10	1	Time of Concentration:					0.424
#10	2	3. Short grass pasture	11.00	126.17	1,147.00	2.650	0.120
#10	2	Time of Concentration:					0.120
#10	3	5. Nearly bare and untilled, and alluvial valley fans	1.50	1.50	100.00	1.220	0.022
#10	3	Time of Concentration:					0.022
#10	4	3. Short grass pasture	9.80	124.46	1,270.00	2.500	0.141
#10	4	Time of Concentration:					0.141
#11	1	5. Nearly bare and untilled, and alluvial valley fans	14.00	143.22	1,023.00	3.740	0.075
#11	1	Time of Concentration:					0.075
#11	2	5. Nearly bare and untilled, and alluvial valley fans	17.00	75.48	444.00	4.120	0.029
#11	2	Time of Concentration:					0.029
#11	3	3. Short grass pasture	6.60	100.05	1,515.90	2.050	0.205
#11	3	Time of Concentration:					0.205
#11	4	5. Nearly bare and untilled, and alluvial valley fans	5.20	24.80	477.00	2.280	0.058
#11	4	Time of Concentration:					0.058
#11	5	3. Short grass pasture	8.40	124.48	1,482.00	2.310	0.178
#11	5	Time of Concentration:					0.178
#13	1	5. Nearly bare and untilled, and alluvial valley fans	18.60	99.84	536.80	4.310	0.034
#13	1	Time of Concentration:					0.034
#13	2	3. Short grass pasture	16.00	101.75	636.00	3.200	0.055
#13	2	Time of Concentration:					0.055
#13	3	3. Short grass pasture	16.00	126.24	789.00	3.200	0.068
#13	3	Time of Concentration:					0.068
#13	4	5. Nearly bare and untilled, and alluvial valley fans	5.00	10.12	202.40	2.230	0.025
#13	4	Time of Concentration:					0.025
#13	5	3. Short grass pasture	5.50	25.13	457.00	1.870	0.067
#13	5	Time of Concentration:					0.067
#13	6	3. Short grass pasture	7.00	104.72	1,496.00	2.110	0.196
#13	6	Time of Concentration:					0.196
#15	1	3. Short grass pasture	15.00	74.85	498.99	3.090	0.044
#15	1	Time of Concentration:					0.044
#15	2	5. Nearly bare and untilled, and alluvial valley fans	11.50	125.46	1,091.00	3.390	0.089
#15	2	Time of Concentration:					0.301

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#15	3	3. Short grass pasture	11.30	100.00	885.00	2.680	0.091
#15	3	Time of Concentration:					0.091
#15	4	5. Nearly bare and untilled, and alluvial valley fans	12.00	130.80	1,090.00	3.460	0.087
#15	4	Time of Concentration:					0.087
#17	1	5. Nearly bare and untilled, and alluvial valley fans	6.60	74.58	1,130.00	2.560	0.122
#17	1	Time of Concentration:					0.122
#17	2	3. Short grass pasture	7.40	298.66	4,036.00	2.170	0.516
#17	2	Time of Concentration:					0.516
#17	3	3. Short grass pasture	11.80	24.89	211.00	2.740	0.021
#17	3	Time of Concentration:					0.021
#18	1	5. Nearly bare and untilled, and alluvial valley fans	8.50	44.88	528.00	2.910	0.050
#18	1	Time of Concentration:					0.050
#18	2	3. Short grass pasture	9.30	653.32	7,025.00	2.430	0.803
#18	2	Time of Concentration:					0.803
#18	3	3. Short grass pasture	8.50	25.07	295.00	2.330	0.035
#18	3	Time of Concentration:					0.035
#18	4	3. Short grass pasture	1.50	7.74	516.00	0.970	0.147
#18	4	Time of Concentration:					0.147
#18	5	3. Short grass pasture	10.60	124.86	1,178.00	2.600	0.125
#18	5	Time of Concentration:					0.125
#18	6	3. Short grass pasture	9.50	99.84	1,051.00	2.460	0.118
#18	6	Time of Concentration:					0.118
#18	7	3. Short grass pasture	8.50	50.23	591.00	2.330	0.070
#18	7	Time of Concentration:					0.070