



# SUSTAINABLE Environmental Consultants

Project: Keeling Land & Cattle-KS/CO LLC

Practice: Wetland Development (As Constructed)

Location: NW 1/4 Sec 16, T-34S; R-12E  
SE 1/4 Sec 17, T-34S; R-12E  
Chautauqua County, Kansas

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Brian W. Severin, P.E.      February 2024  
 Designed by      Date



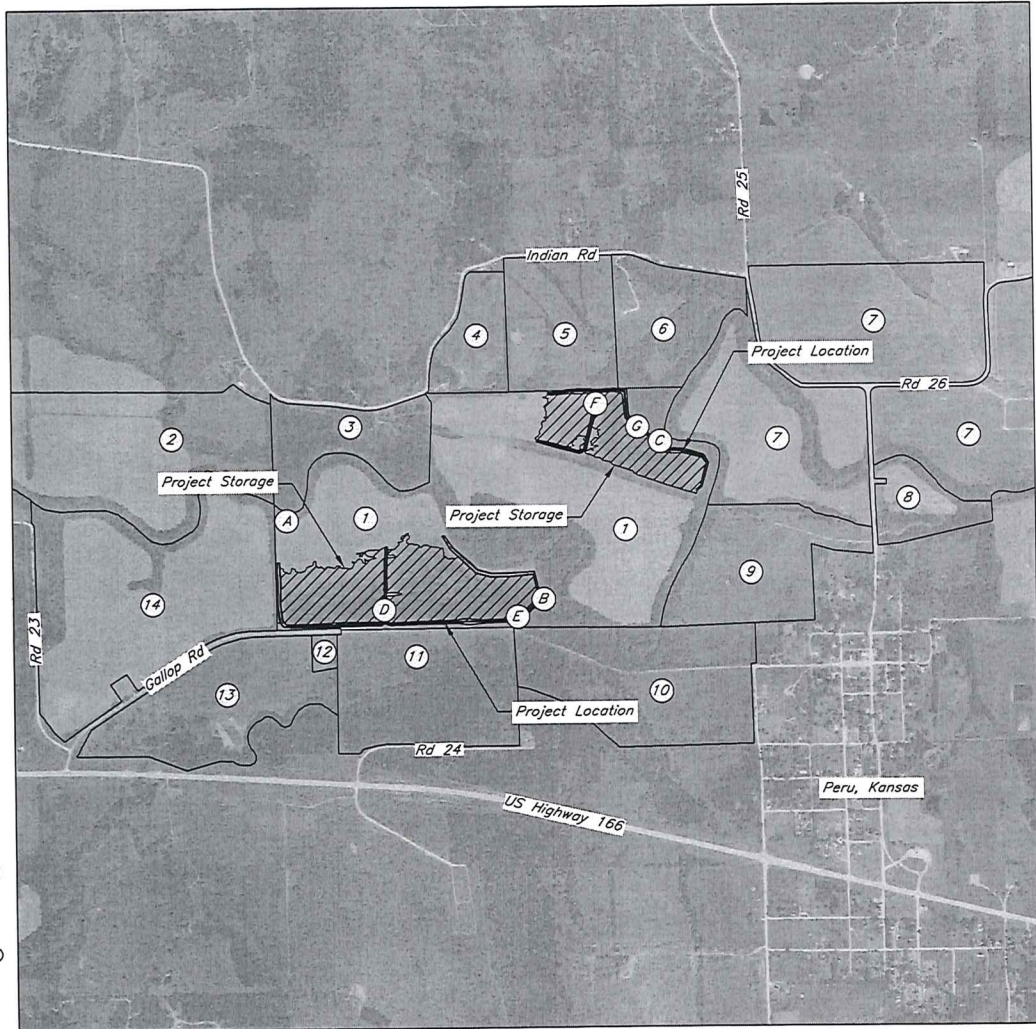
\_\_\_\_\_  
 Approved by      Date

Before any investigation or construction activity, the excavator is responsible for calling Kansas One-Call at 800-344-7233 (800-DIG-SAFE) or 811

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The approximate project location is 0.5 mile west, northwest of Peru, Kansas.

Upstream and Downstream Landowners

- 1) Project Location  
Keeling Land & Cattle-KS/CO LLC  
PO Box 326  
Monett, Missouri 65708
- 2) Ross, William A & Sharon  
PO Box 389  
Sedan, Kansas 67361
- 3) Hull, Gregory A  
% Hull, Alan  
201 E Laurel  
Sedan, Kansas 67361
- 4) Walker, Nolan & Desiray  
2385 Indian Rd  
Sedan, Kansas 67361
- 5) Pyle, Francis L & Linda L  
9560 N 3975 Rd  
Copan, Oklahoma 74022
- 6) Storehouse Properties LLC  
79605 Nina Circle  
Haysville, Kansas 67060
- 7) Carter, Chad J & Lindsey L  
1072 Road 26  
Sedan, Kansas 67361
- 8) McMillan, Daniel & Cheryl  
781 Rd 23  
Peru, Kansas 67360
- 9) Hann, Irvin M & Marion D Rev Living Trust  
205 S Chautauqua  
Sedan, Kansas 67361
- 10) Carter, Mary Jo  
% Carter, Mary Josephine  
11539 Green Oaks  
Houston, Texas 77024
- 11) McKinney, Jay L & Teresa C  
15110 W 29th St North  
Wichita, Kansas 67223
- 12) Kincaid, Marion  
356 SE Elmhurst  
Bartlesville, Oklahoma 74006
- 13) NDTCO FBO Darrin McCloud IRA  
% McCloud Darrin & Kari  
24100 N 3965 Road  
Bartlesville, Oklahoma 74006
- 14) Gorby, John D Jr & Teresa K  
518 E Logan  
Ottawa, Kansas 66067

Points of Diversion

- A) Pump Site - Direct Diversion
- B) Pump Site - Direct Diversion
- C) Pump Site - Direct Diversion
- D) Water Control Structure - Storage
- E) Water Control Structure - Storage
- F) Water Control Structure - Storage
- G) Water Control Structure - Storage

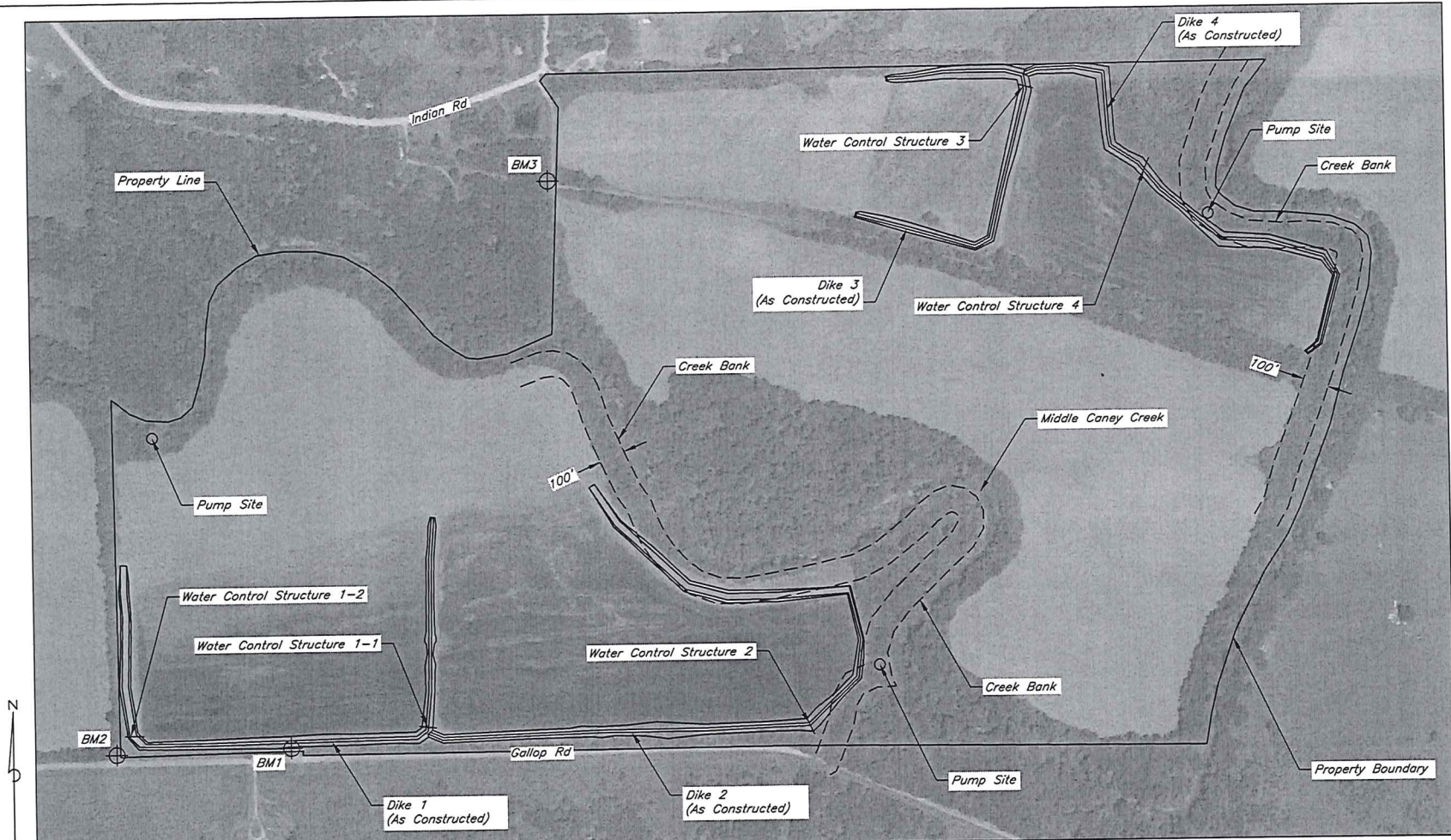
Designed	B. Severin	Date	02/24
Drawn	B. Severin	Checked	M. Miller
Approved	B. Severin		

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Location Map and Table of Quantities



Benchmark Table

Benchmark	Northing	Easting	Survey Elevation	Description
BM1	1474223.54	2007702.88	788.48	Top of rebar
BM2	1474207.10	2007033.90	789.44	Top of rebar
BM3	1476410.18	2008731.97	796.31	Top of rebar

Survey Area:  
Kansas State Plane (South)

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 Drawn B. Severin  
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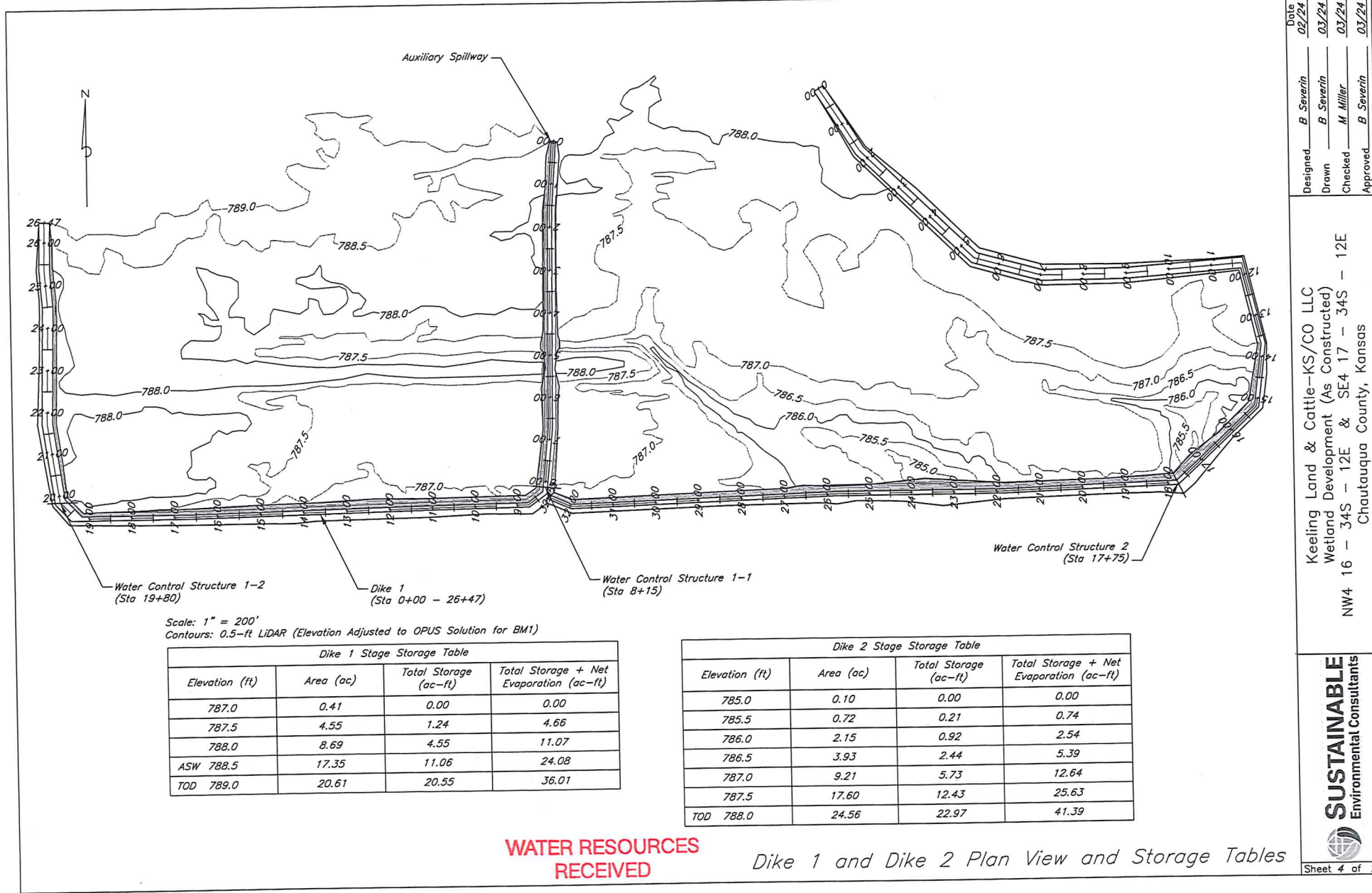
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Scale: 1" = 200'  
 Contours: 0.5-ft LiDAR (Elevation Adjusted to OPUS Solution for BM1)

Elevation (ft)	Area (ac)	Total Storage (ac-ft)	Total Storage + Net Evaporation (ac-ft)
787.0	0.41	0.00	0.00
787.5	4.55	1.24	4.66
788.0	8.69	4.55	11.07
ASW 788.5	17.35	11.06	24.08
TOD 789.0	20.61	20.55	36.01

Elevation (ft)	Area (ac)	Total Storage (ac-ft)	Total Storage + Net Evaporation (ac-ft)
785.0	0.10	0.00	0.00
785.5	0.72	0.21	0.74
786.0	2.15	0.92	2.54
786.5	3.93	2.44	5.39
787.0	9.21	5.73	12.64
787.5	17.60	12.43	25.63
TOD 788.0	24.56	22.97	41.39

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*Dike 1 and Dike 2 Plan View and Storage Tables*

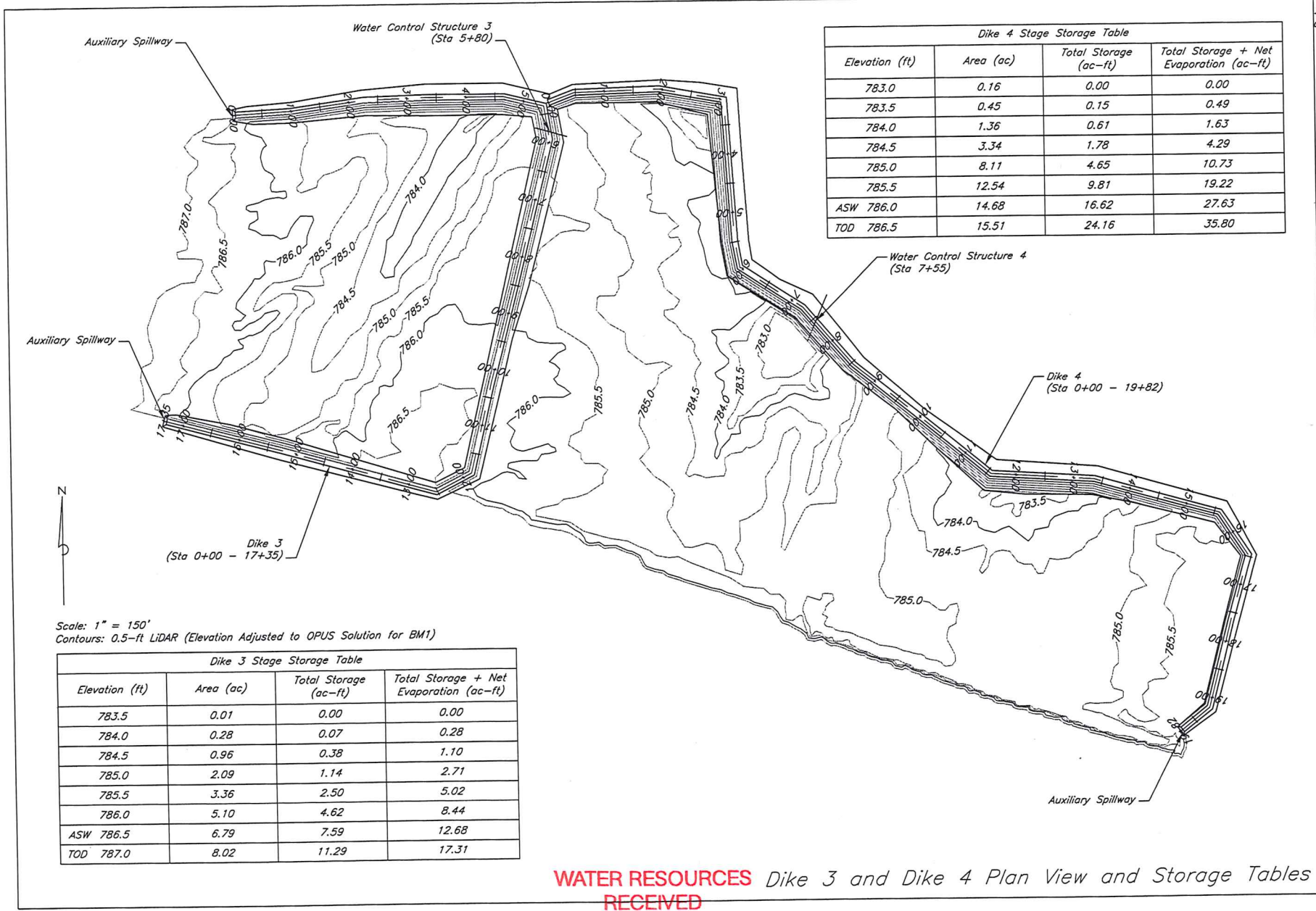
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**Dike 4 Stage Storage Table**

Elevation (ft)	Area (ac)	Total Storage (ac-ft)	Total Storage + Net Evaporation (ac-ft)
783.0	0.16	0.00	0.00
783.5	0.45	0.15	0.49
784.0	1.36	0.61	1.63
784.5	3.34	1.78	4.29
785.0	8.11	4.65	10.73
785.5	12.54	9.81	19.22
ASW 786.0	14.68	16.62	27.63
TOD 786.5	15.51	24.16	35.80

**Dike 3 Stage Storage Table**

Elevation (ft)	Area (ac)	Total Storage (ac-ft)	Total Storage + Net Evaporation (ac-ft)
783.5	0.01	0.00	0.00
784.0	0.28	0.07	0.28
784.5	0.96	0.38	1.10
785.0	2.09	1.14	2.71
785.5	3.36	2.50	5.02
786.0	5.10	4.62	8.44
ASW 786.5	6.79	7.59	12.68
TOD 787.0	8.02	11.29	17.31

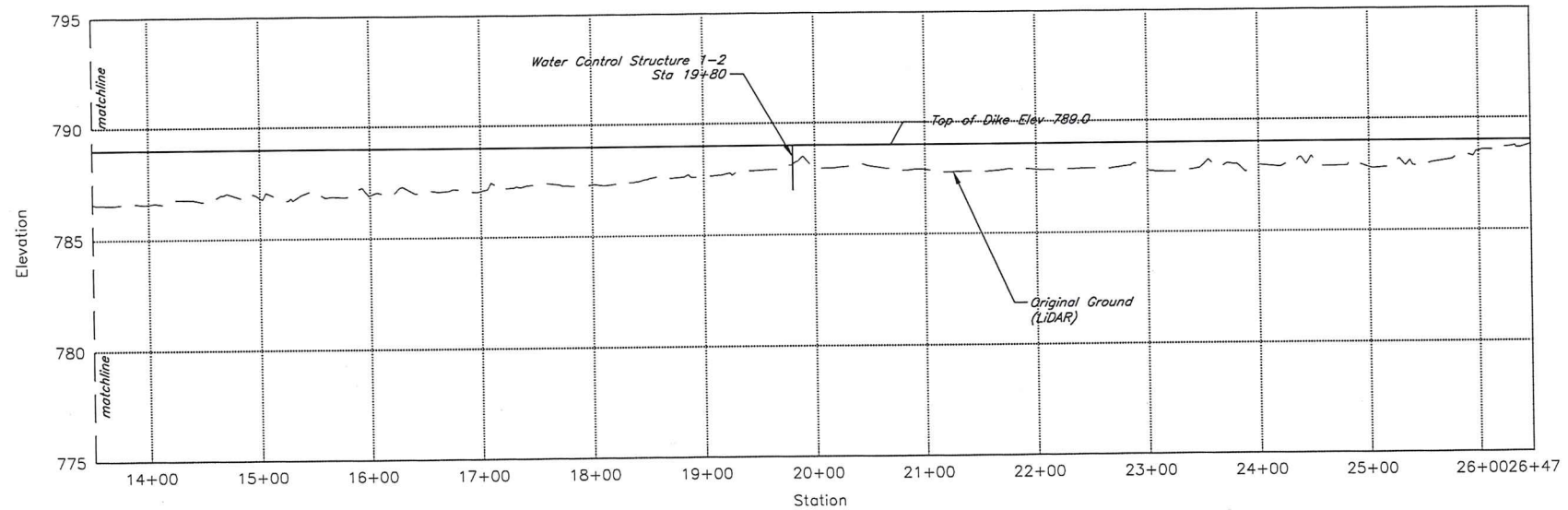
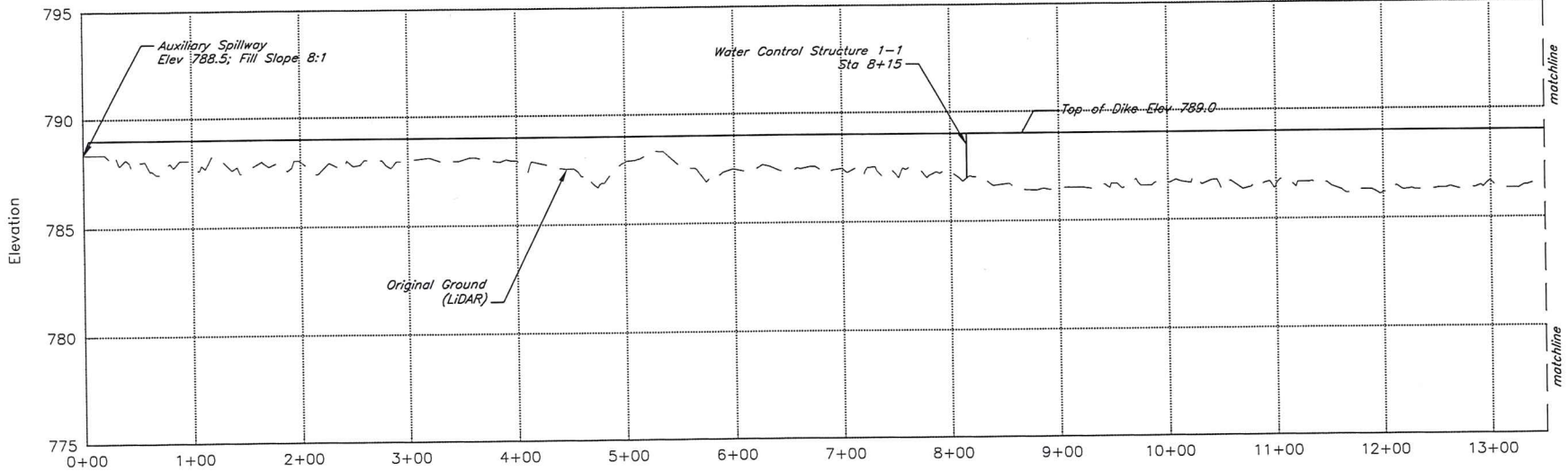
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Profile View of Dike 1

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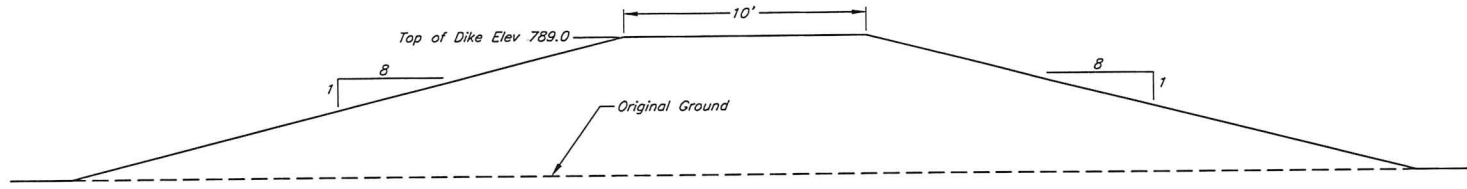
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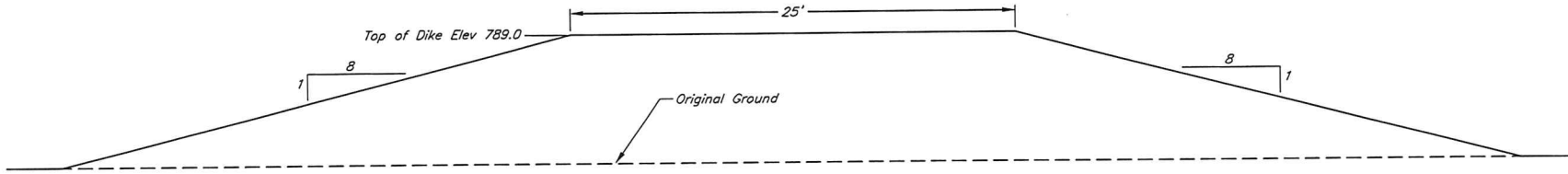
WATER RESOURCES RECEIVED Dike 1 Profile

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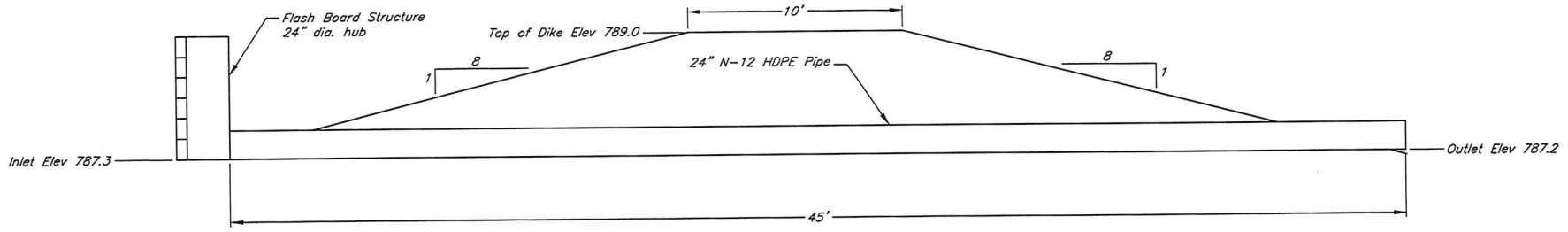
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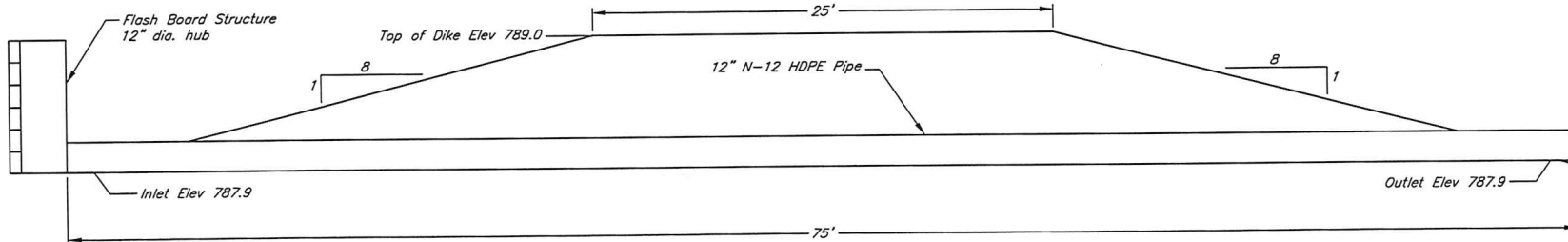
Typical Dike 1 (Station 0+00 - 19+25) Cross Section



Typical Dike 1 (Station 19+25 - 26+47) Cross Section



Water Control Structure 1-1 (Station 8+15) Cross Section



Water Control Structure 1-2 (Station 19+80) Cross Section

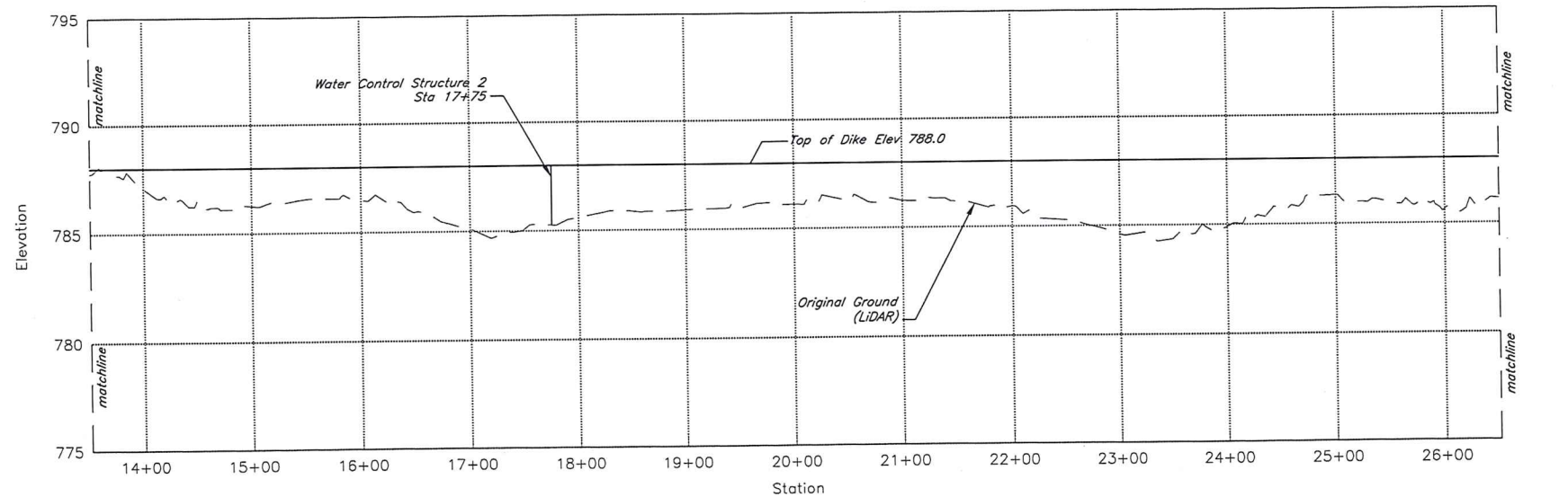
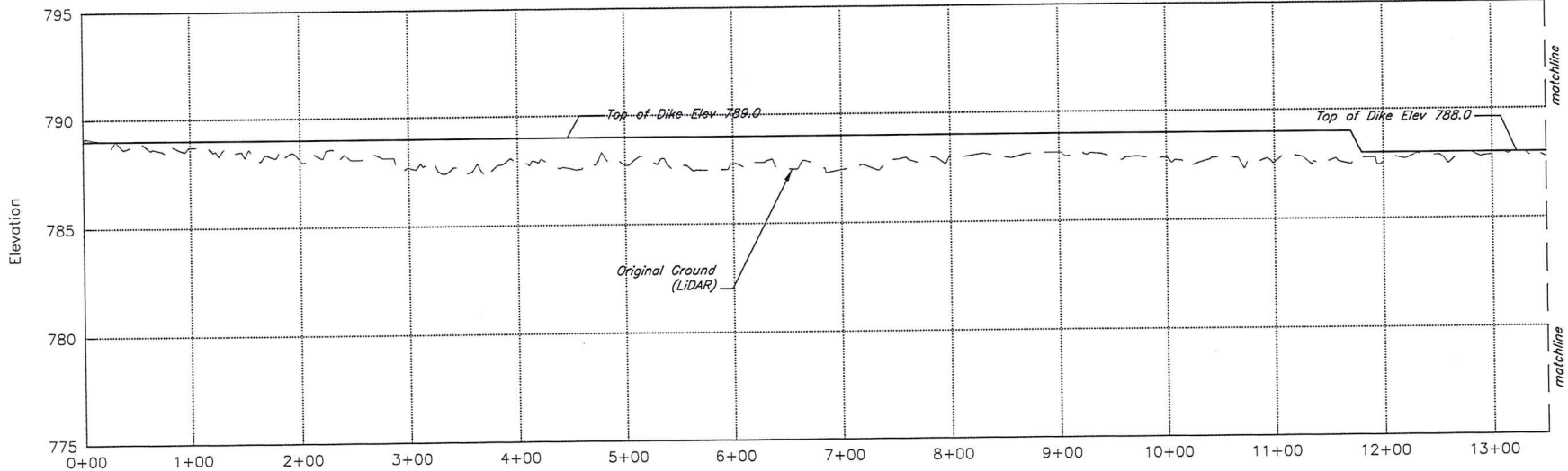
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Dike 1 Cross Sections



Profile View of Dike 2

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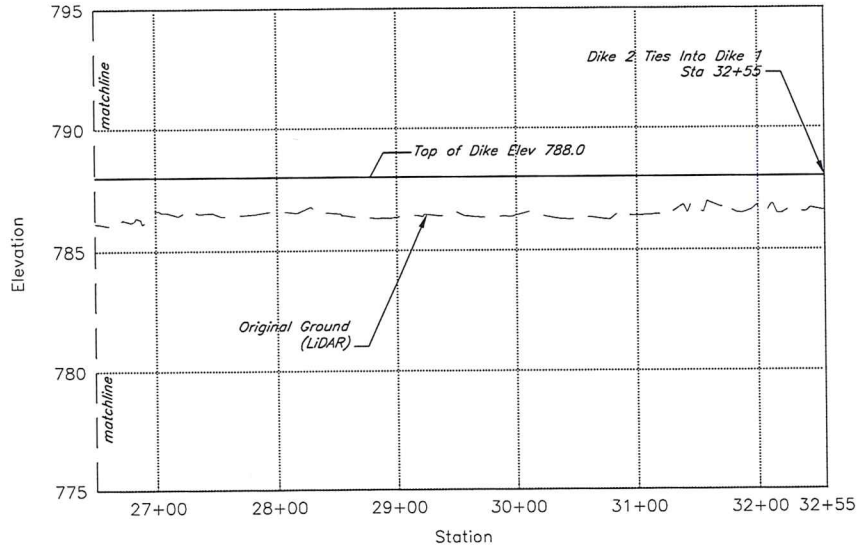
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WATER RESOURCES RECEIVED Dike 2 Profile

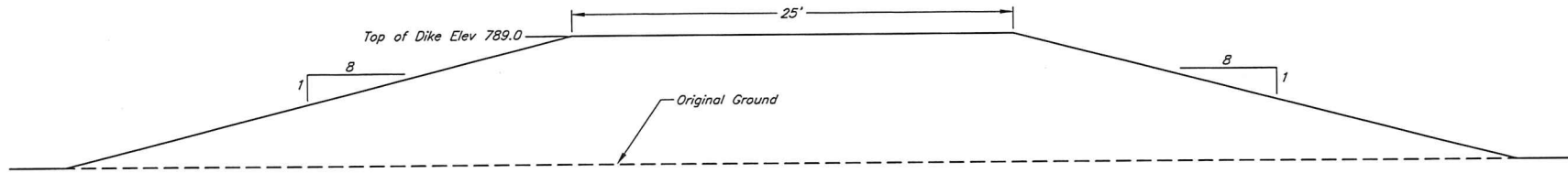
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Profile View of Dike 2



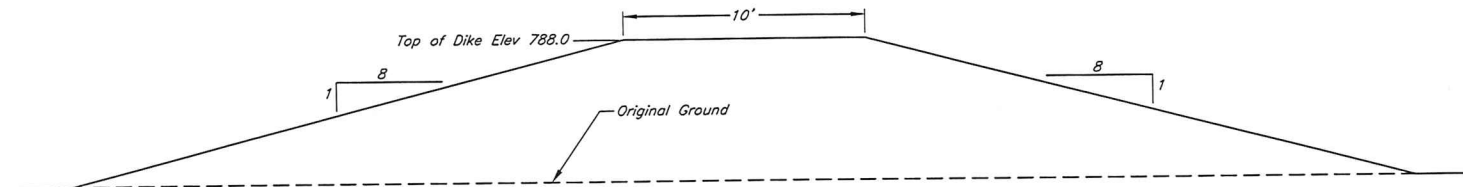
Typical Dike 2 (Station 0+00 - 11+75) Cross Section

Date	02/24
Designed	B. Severin
Drawn	B. Severin
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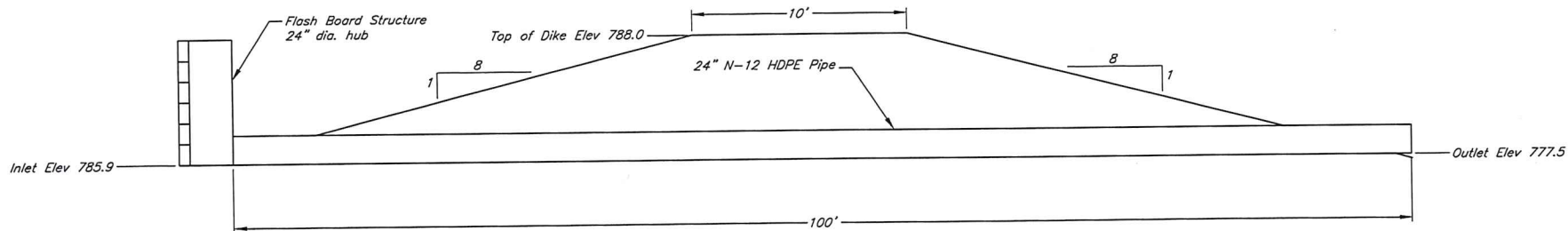
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 Dike 2 Profile and Cross Section



Typical Dike 2 (Station 11+75 - 32+55) Cross Section



Water Control Structure 2 (Station 17+75) Cross Section

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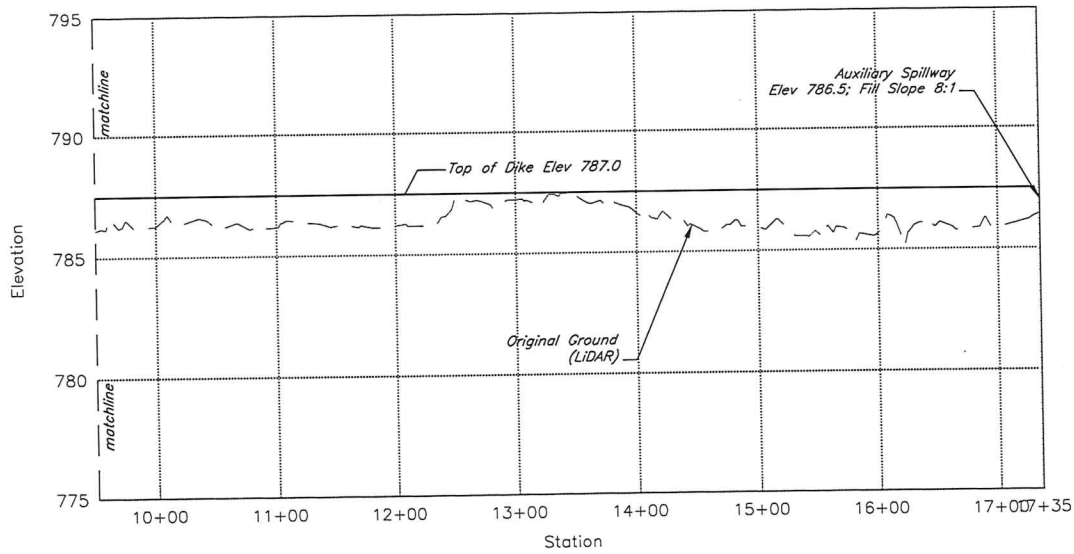
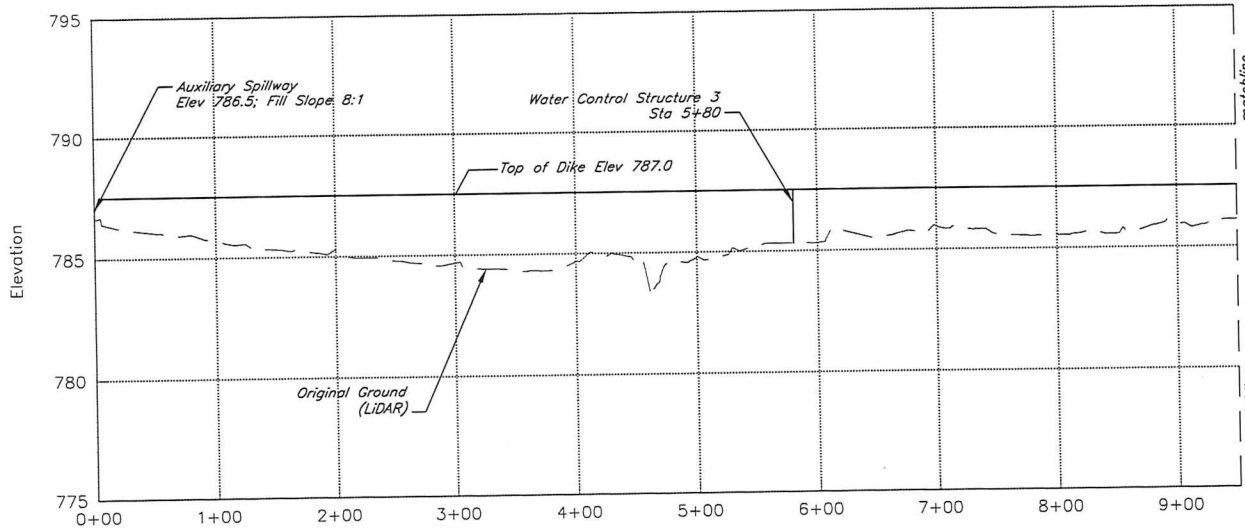
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Dike 2 Cross Sections

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Profile View of Dike 3

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Drawn	B. Severin		03/24
Checked	M. Miller		03/24
Approved	B. Severin		03/24

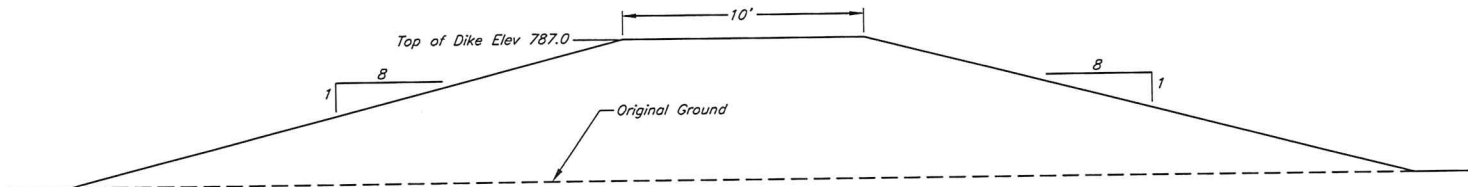
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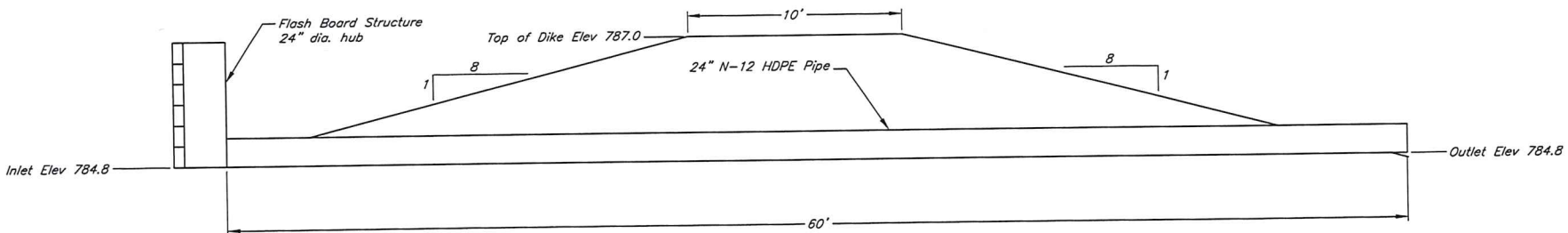
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Typical Dike 3 (Station 0+00 - 17+35) Cross Section



Water Control Structure 3 (Station 5+80) Cross Section

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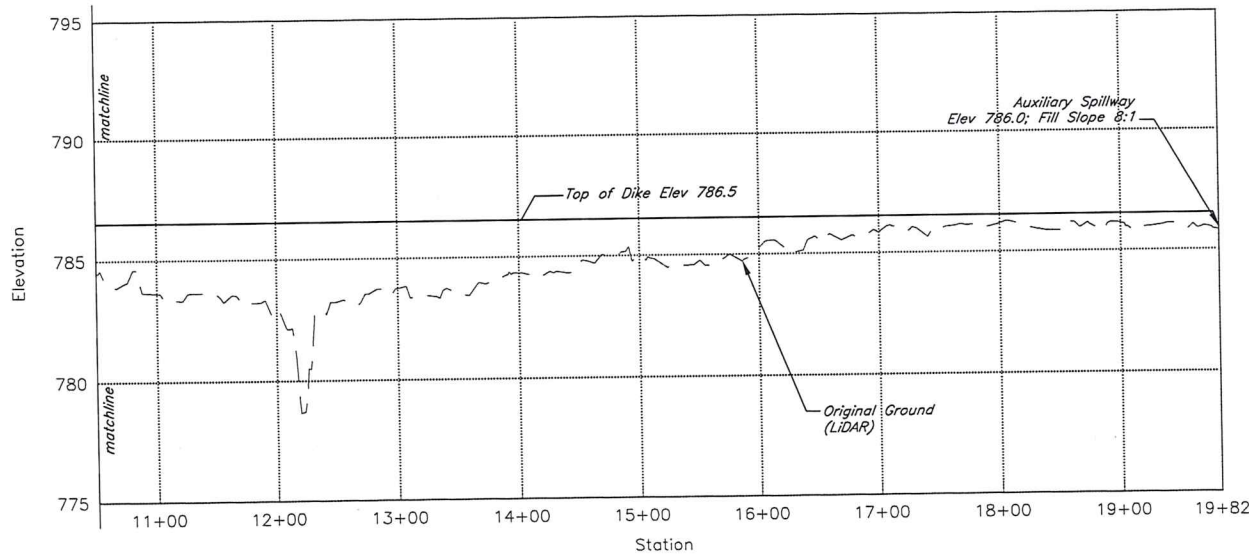
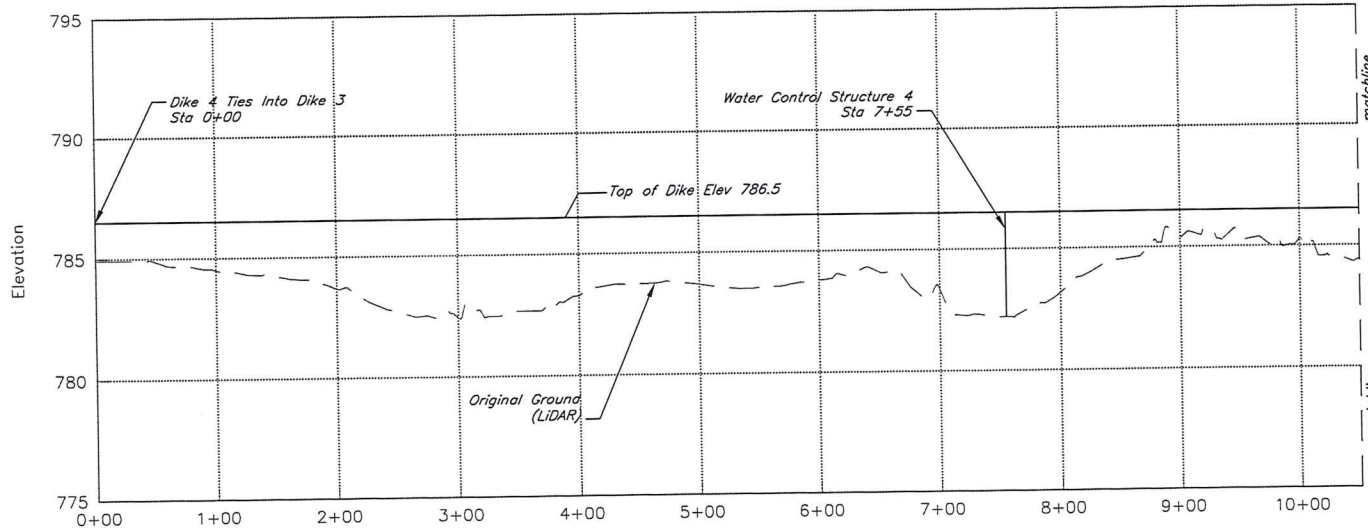


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Dike 3 Cross Sections

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Profile View of Dike 4

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Checked	M. Miller		03/24
Approved	B. Severin		03/24

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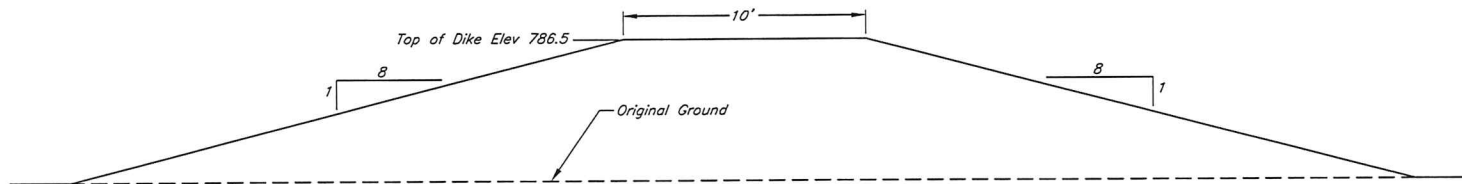


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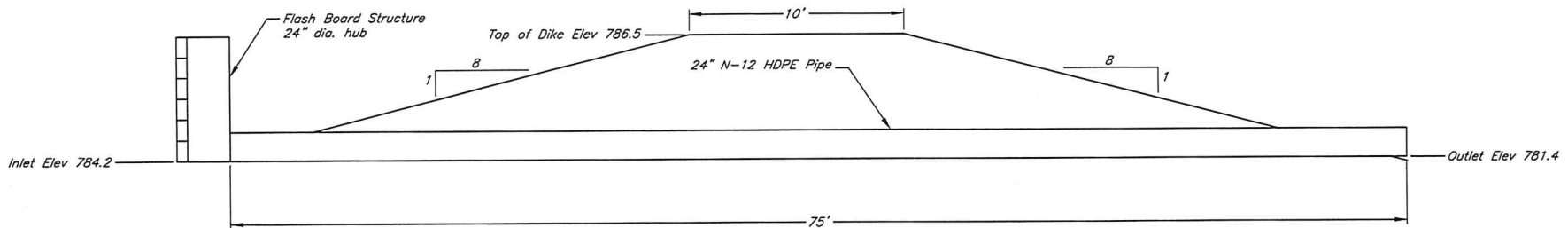
Dike 4 Profile

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Typical Dike 4 (Station 0+00 - 19+82) Cross Section



Water Control Structure 4 (Station 7+55) Cross Section

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Drawn	B. Severin		03/24
Checked	M. Miller		03/24
Approved	B. Severin		03/24

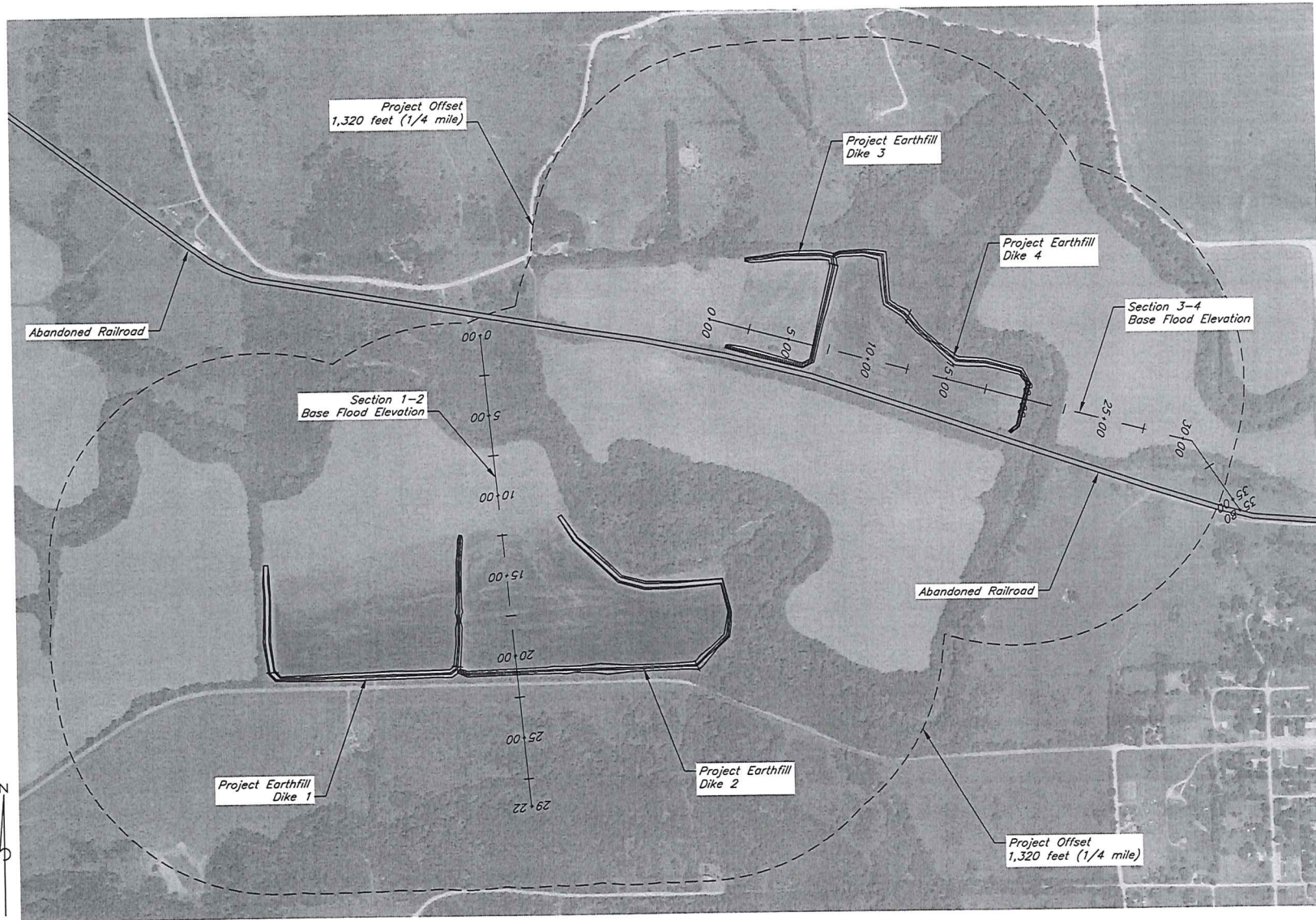
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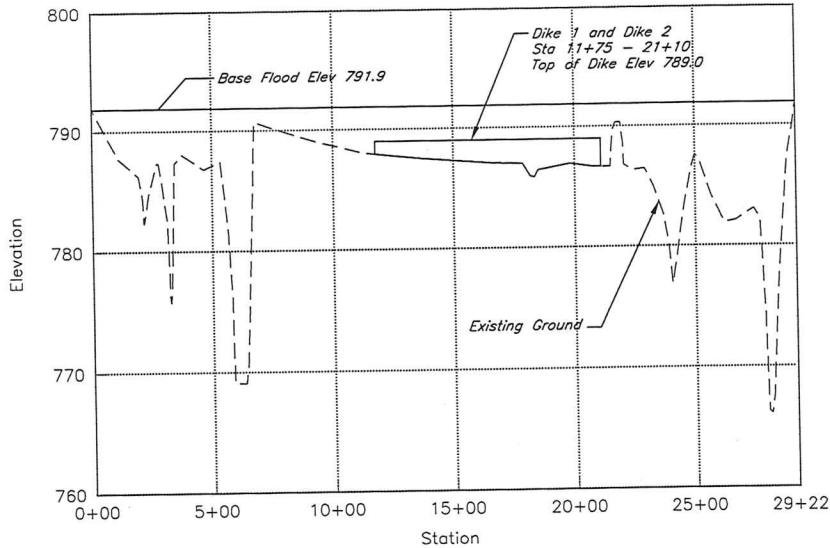
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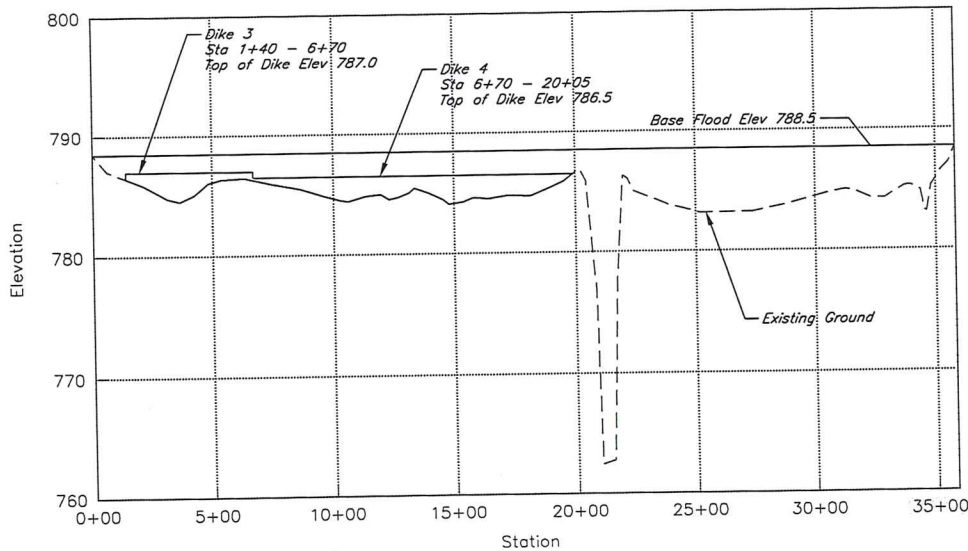
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*Base Flood Analysis*



Section 1-2 - Base Flood Elevation



Section 3-4 - Base Flood Elevation

References:

Existing ground and channels: LiDAR Topographic Data and the U.S. Geological Survey (USGS) 7.5 minute quadrangle map

Base Flood Elevation Determination: Cheyenne Sun Eagle, KDA - Division of Water Resources and William Pace, KDA - Division of Water Resources

Notes:

1. FEMA Zone A Floodplain: No current FEMA Zone A floodplain maps exist for Chautauqua County
2. No DWR permitted floodplain fills are located within 1/4 mile of the dike location. Therefore, a geometric base flood analysis was completed.
3. Two geometric cross sections were completed for this project. The abandoned railroad fill between the two wetland cells creates a large change in base flood elevation.

Section 1-2:

Base flood elevation = 791.9  
 Base flood section area = 17,700 sq. ft.  
 Top width of base flood section = 2,922 ft  
 Maximum earthfill area below base flood elevation = 1,780 sq. ft.

Earthfill will increase base flood area by 10%  
 Earthfill will increase base flood elevation by 0.61 ft.

Section 3-4:

Base flood elevation = 788.5  
 Base flood section area = 14,600 sq. ft.  
 Top width of base flood section = 3,580 ft  
 Maximum earthfill area below base flood elevation = 2,650 sq. ft.

Earthfill will increase base flood area by 18%  
 Earthfill will increase base flood elevation by 0.74 ft.

Base Flood Analysis Completed By: Brian W Severin Date: 3/12/24

Designed	B Severin	Date	02/24
Drawn	B Severin		03/24
Checked	M Miller		03/24
Approved	B Severin		03/24

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Base Flood Analysis

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