GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

STATE OF OKLAHOMA
GRAND RIVER DAM AUTHORITY

PLAN OF PROPOSED

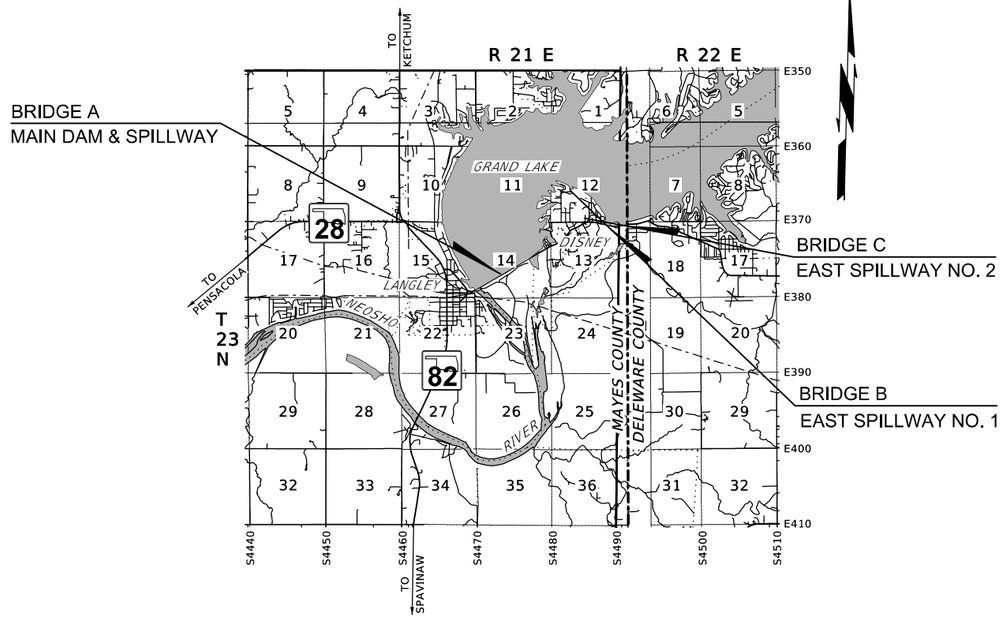
STATE HIGHWAY

PROJECT NO. 41806
BRIDGE WIDENING AND REHABILITATION
SH 28

MAYES COUNTY

CONTROL SECTION 28-49-16

BRIDGE A LOCATION NO. 4916-1450X,
BRIDGE B LOCATION NO. 4916-1628X,
BRIDGE C LOCATION NO. 4916-1651X
NBI NOS. 27569,29642 AND 29645



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0022	PARAPET DETAILS (1)
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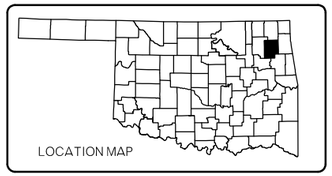
DESIGN DATA

AADT 2017	2300
AADT 2037	3300
K (DHV / ADT-TWO WAY)	11%
D (DIRECTIONAL DIST.)	58%
T (% OF DHV)	11%
T (% OF AADT)	14%
T_3 OVERLOADS (AXLES)	7%
20-YR FLEX ESALs	1.97 MIL
SH 28	V=65 MPH

SCALES
PLAN 1" = 50'
PROFILE HOR. 1" = 50'
VER. 1" = 5'
LAYOUT MAP 1" = 3000'

CONVENTIONAL SYMBOLS

PROPOSED ROAD
RAILROADS
RANGE & TOWNSHIP
SECTION LINES
QUARTER SECTION LINES
FENCES
GROUND LINE
EXISTING ROADS
BASE LINE
GRADE LINES
TELEPHONE & TELEGRAPH
POWER LINES
BUILDINGS
OIL WELL
DRAINAGE STRUCTURES - IN PLACE
DRAINAGE STRUCTURES - NEW
RIGHT-OF-WAY LINES - EXISTING (PRES. R/W)
RIGHT-OF-WAY LINES - NEW (R/W)
CONTROLLED ACCESS
RIGHT-OF-WAY FENCE (R/W)



NOTE: PROJECT LENGTH BASED ON PENSACOLA DAM STATIONING.

BRIDGE A LENGTH	5678.67 FT.	1.075	MI.
BRIDGE B LENGTH	451.00 FT.	0.085	MI.
BRIDGE C LENGTH	410.00 FT.	0.077	MI.
ROADWAY LENGTH	00.00 FT.	0.000	MI.
PROJECT LENGTH		1.237	MI.

EQUATIONS : NONE
EXCEPTIONS : NONE

THE FOLLOWING ODOT STANDARDS WILL BE REQUIRED

(TO BE ADDED AT LATER DATE)

2009 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION-ENGLISH GOVERN, APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, JANUARY 4, 2010.

CERTIFICATE OF AUTHORIZATION NO. 7569 P.E., L.S. RENEWAL DATE 6-30-18

BENHAM
a Haskell Company
Benham Design, LLC
One West Third Street, Suite 200
Tulsa, Oklahoma 74103
(918) 492-1600
Susan Owen Tryon, P.E.
OK P.E. NO. 15852
PROJECT MANAGER
DATE :

GRAND RIVER DAM AUTHORITY
DATE APPROVED
BY
CHIEF ENGINEER

DATE APPROVED
BY
DIVISION ADMINISTRATOR

SWO N/A PROJECT NO. 41806
COUNTY MAYES HIGHWAY SH-28 SHEET NO. 0001

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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

JOB NO. 41806 NBI NO. 27569

BRIDGE "A" PAY ITEMS

0200 BRIDGE A

REPAIR EXISTING BRIDGE WITH 51 ARCH SECTIONS @ 84', 21 GRAVITY OVERFLOW SECTIONS @ 41', AND 11 GRAVITY NON-OVERFLOW SECTIONS; 19'-8" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT ℄ STA. 38+68.85 SH 28 MAIN BRIDGE OVER PENSACOLA DAM & SPILLWAY.

ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	20
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	15
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	250
503(A)	xxxx	PRESTRESSED BOX BEAMS (TEXAS)	(BR-1)	LF	4284
503(A)	xxxx	ARCH BEAM	(BR-1)	EA	51
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	1312
504(D)	6245	CONCRETE RAIL (TR3)	(BR-1)	LF	215
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	5600
506(A)	1322	STRUCTURAL STEEL		LB	6810
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	12420
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	3925
509(B)	1328	CLASS A CONCRETE	(BR-1)	CY	66
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	915400
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	3000
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	250
521(A)	6210	PNUEMATICALLY PLACED MORTAR		SY	1000
523(A)	6550	SEALER CRACK PREPARATION		LF	5853
523(B)	6560	SEALER RESIN		GAL	65
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER		SF	16000
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	1000
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	20
540	4525	(PL) REPAIR BRIDGE ITEM (TYPE B)	(BR-3)	EA	20
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	1088
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	137.5
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	2
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	2
871(A)	8325	IMPACT ATTENUATOR		EA	2
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806 NBI NO. 29642

BRIDGE "B" PAY ITEMS

0201 BRIDGE B

REPAIR BRIDGE WITH 11 CONCRETE GIRDER SPANS @ 41', 20'-0" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT ℄ STA. 2+25.50 SH 28 OVER EAST SPILLWAY NO. 1

ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	25
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	98
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	250
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	451
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	451
506(A)	1322	STRUCTURAL STEEL		LB	475
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	1013
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	414
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	229400
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	25
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	2
521(A)	6210	PNUEMATICALLY PLACED MORTAR		SY	20
523(A)	6550	SEALER CRACK PREPARATION		LF	50
523(B)	6560	SEALER RESIN		GAL	1
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER	(BR-1)	SF	1400
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	20
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	5
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	120
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	100
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	4
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806 NBI NO. 29645

BRIDGE "C" PAY ITEMS

0202 BRIDGE C

REPAIR BRIDGE WITH 10 CONCRETE GIRDER SPANS @ 41', 20'-0" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT ℄ STA. 2+05.00 SH 28 OVER EAST SPILLWAY NO. 2

ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	25
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	98
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	250
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	410
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	410
506(A)	1322	STRUCTURAL STEEL		LB	440
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	904
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	380
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	176800
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	25
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	2
521(A)	6210	PNUEMATICALLY PLACED MORTAR		SY	20
523(A)	6550	SEALER CRACK PREPARATION		LF	50
523(B)	6560	SEALER RESIN		GAL	1
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER	(BR-1)	SF	1250
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	20
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	5
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	110
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	300
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	4
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806

CONSTRUCTION PAY ITEMS

0600 STAKING

ITEM NO.	CODE NO.	DESCRIPTION	NOTE	UNIT	TOTAL
642(B)	0096	CONSTRUCTION STAKING LEVEL II	(BR-11)	LSUM	1

JOB NO. 41806

CONSTRUCTION PAY ITEMS

0640 CONSTRUCTION

ITEM NO.	CODE NO.	DESCRIPTION	NOTE	UNIT	TOTAL
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1
640(A)	1398	FIELD OFFICE		EA	1
641	1399	MOBILIZATION		LSUM	1

PAY ITEM NOTES

(BR-1) PAY PLAN QUANTITY PER SECTION 109.01(B) OF THE STANDARD SPECIFICATIONS.

(BR-2) REMOVE AND REPLACE CATWALK AND HANDRAIL. REPAIR DAMAGE AT PIER AS NECESSARY TO BE USED AT THE DISCRETION OF GRDA.

(BR-3) REMOVE AND REPLACE A MAXIMUM OF 3 LINEAR FEET OF UPSTREAM LONGITUDINAL GIRDER AT HINGE POINTS. INCLUDE ALL COSTS INCLUDING ENGINEERING FALSEWORK AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE WORK. TO BE USED AT THE DISCRETION OF GRDA.

(BR-4) PIPE FOR DECK DRAINS, INCLUDE ALL COSTS OF RESETTING DECK DRAINS TO FINISH GRADE.

(BR-5) REMOVAL OF BRIDGE ITEMS SHALL INCLUDE:

- REMOVAL OF EXISTING PARAPET.
- REMOVAL OF EXISTING CONCRETE DECK. FROM BEGIN/END OF BRIDGE AT THE ABUTMENTS.
- REMOVAL OF EXISTING CONCRETE AT PIERS, BUTTRESSES AND ABUTMENTS AS SHOWN IN THE PLANS.

DESIGN	MKR	3/17
DRAWN	JT	3/17
CHECKED	STF	6/17
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

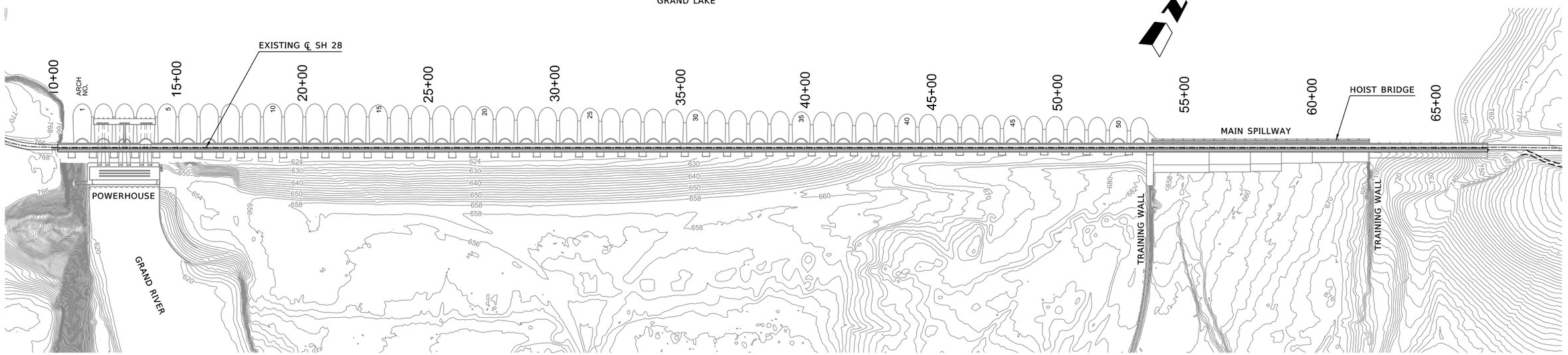
BRIDGE PAY ITEMS & NOTES

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0002

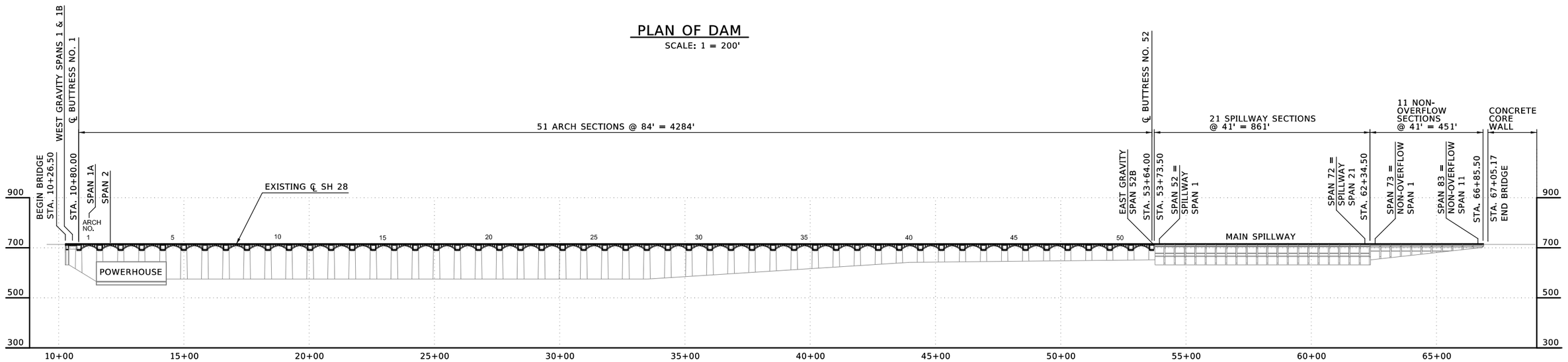
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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF DAM
SCALE: 1 = 200'



DOWNSTREAM ELEVATION OF DAM
SCALE: 1 = 200'

BRIDGE A

DESIGN	KSJ	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

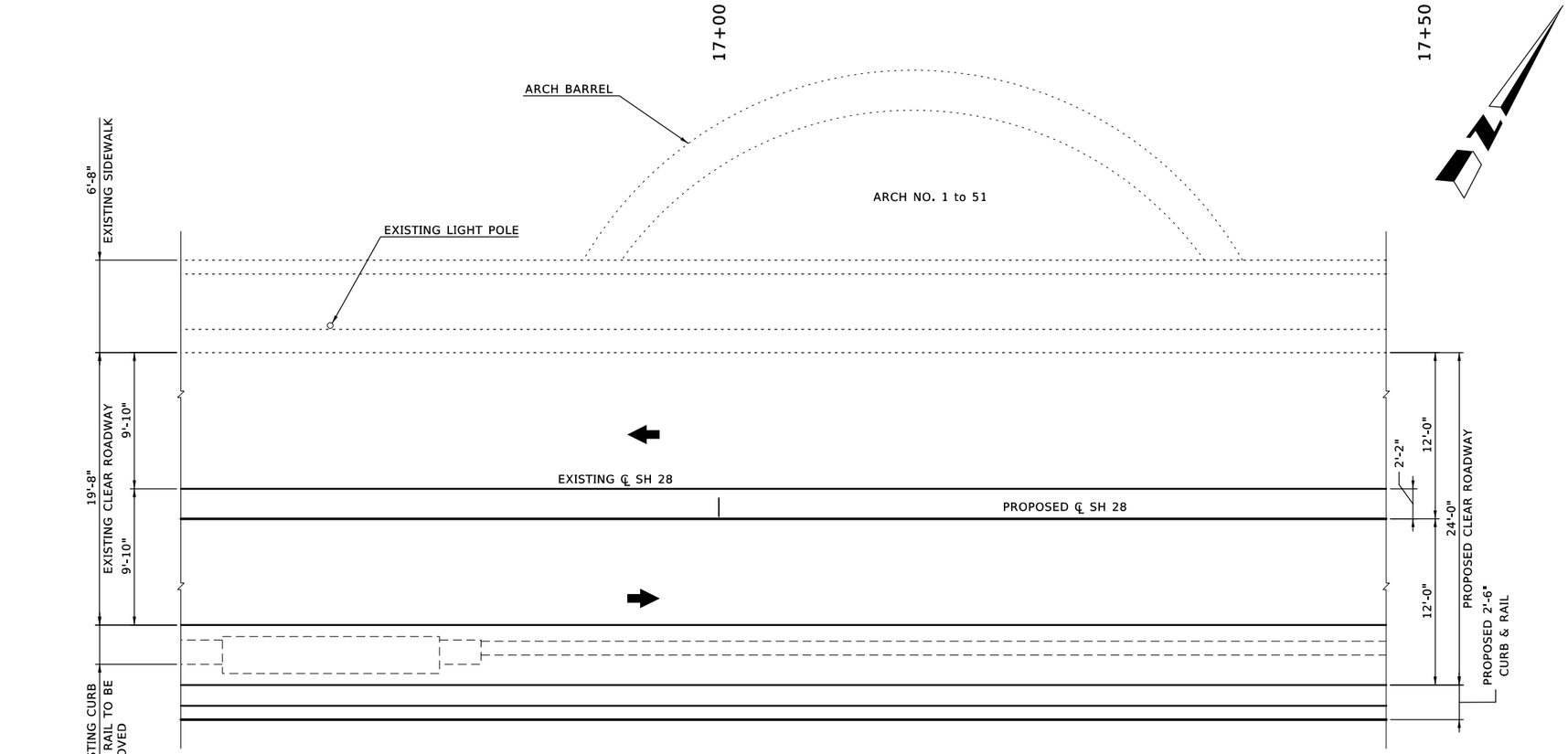
GENERAL DAM PLAN AND ELEVATION (1)
℄ STA. 38+65.83

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0003

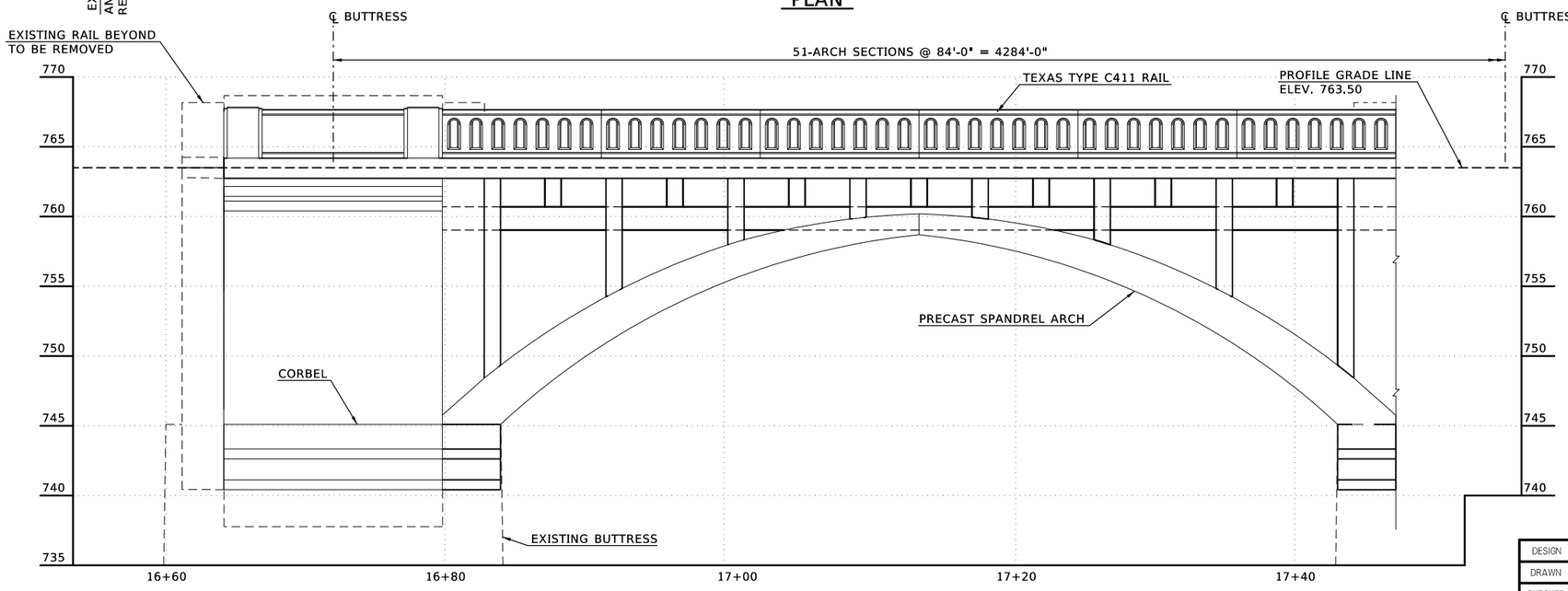
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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN



ELEVATION - TYPICAL ARCH SECTION

DESIGN DATA
NEW CONSTRUCTION

MATERIALS

CONCRETE	
CLASS AA	f'c = 4,000 PSI
CLASS A	f'c = 3,000 PSI
REINFORCING STEEL:	Fy = 60,000 PSI
STRUCTURAL STEEL M270 (GRADE 50W)	Fy = 50,000 PSI
STAINLESS STEEL A240 (TYPE 316)	Fy = 30,000 PSI
STAINLESS STEEL A320; CLASS 2 (GRADE B8M)	Fy = 58,000 PSI

LOADING:
H-20

DESIGN:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION
ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE
ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL

NOTES:

1. X

BRIDGE A

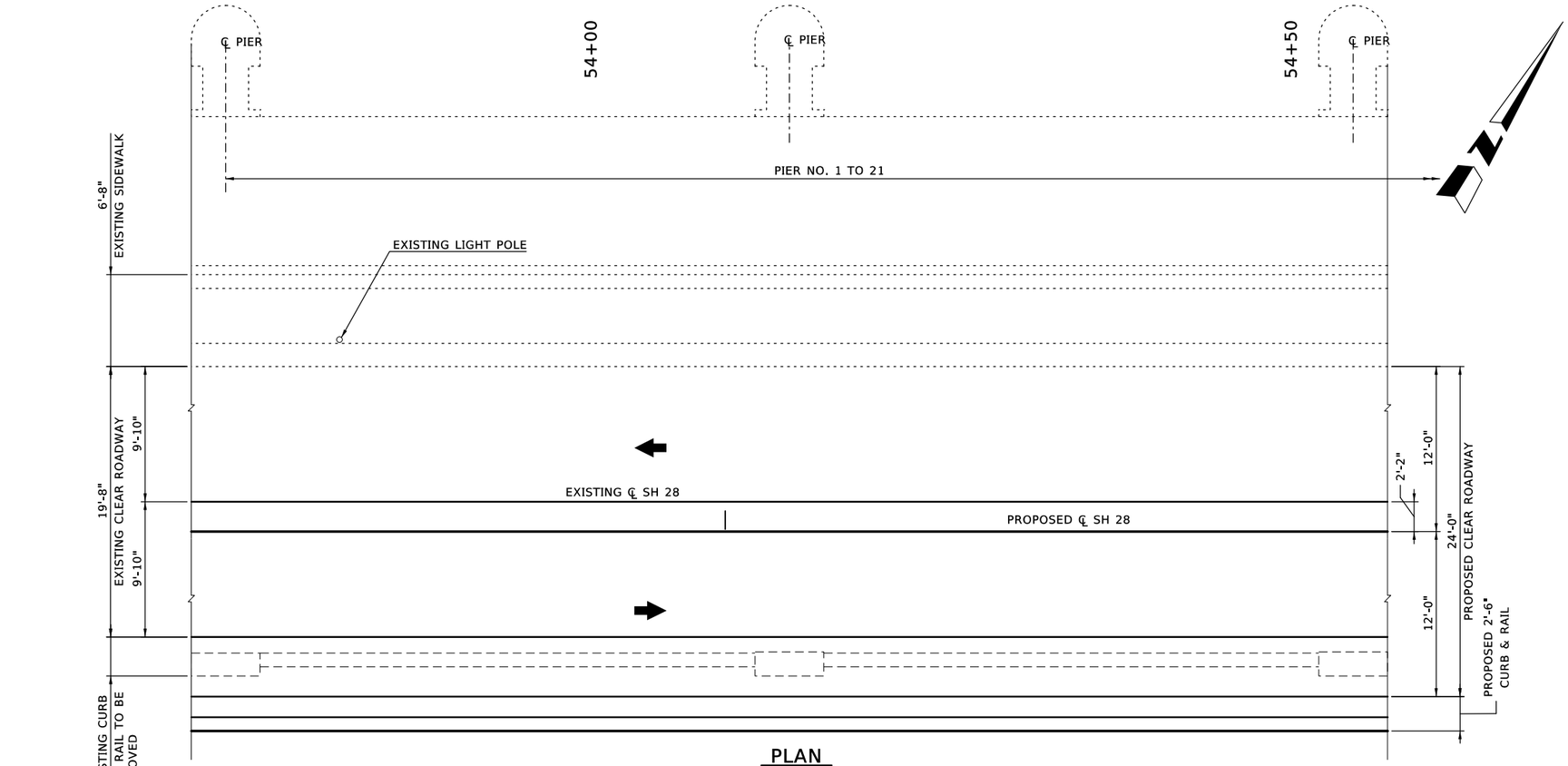
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DRAWN			
CHECKED			GENERAL DAM PLAN AND ELEVATION (2)
APPROVED	SOT	2/18	DOWNSTREAM WIDENING
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0004

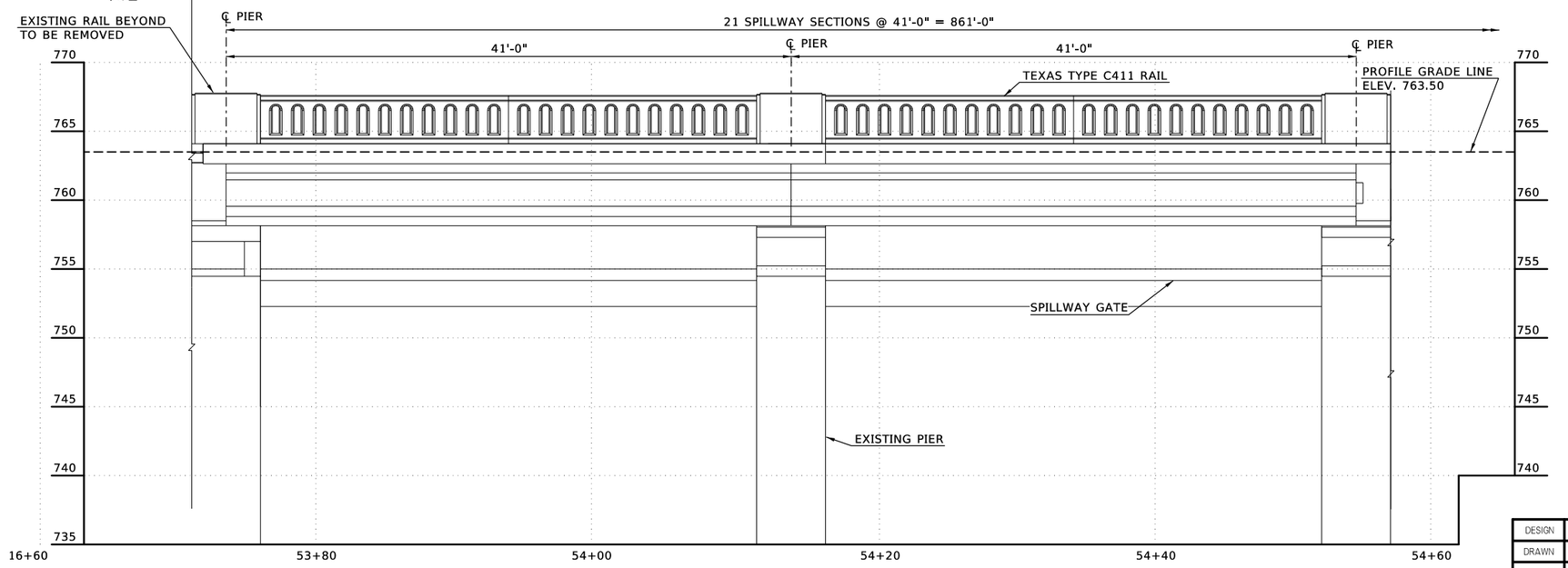
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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN



ELEVATION - SPILLWAY SECTION

DESIGN DATA
NEW CONSTRUCTION

MATERIALS

CONCRETE	
CLASS AA	f'c = 4,000 PSI
CLASS A	f'c = 3,000 PSI
REINFORCING STEEL:	Fy = 60,000 PSI
STRUCTURAL STEEL M270 (GRADE 50W)	Fy = 50,000 PSI
STAINLESS STEEL A240 (TYPE 316)	Fy = 30,000 PSI
STAINLESS STEEL A320; CLASS 2 (GRADE B8M)	Fy = 58,000 PSI

LOADING:

H-20

DESIGN:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION
ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE
ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL

NOTES:

1. X

BRIDGE A

DESIGN		
DRAWN		
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

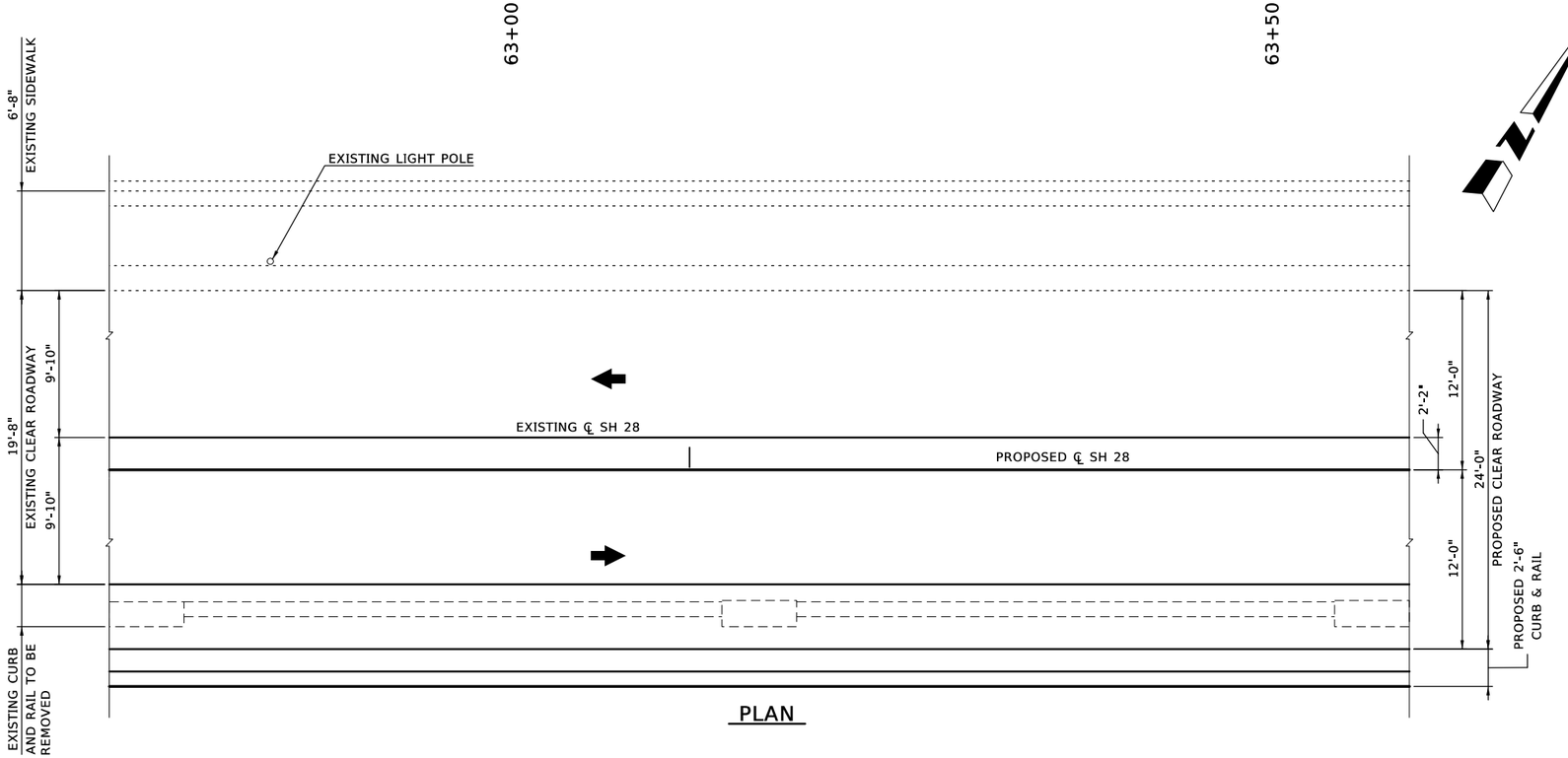
GENERAL DAM PLAN AND ELEVATION (3)
DOWNSTREAM WIDENING

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0005

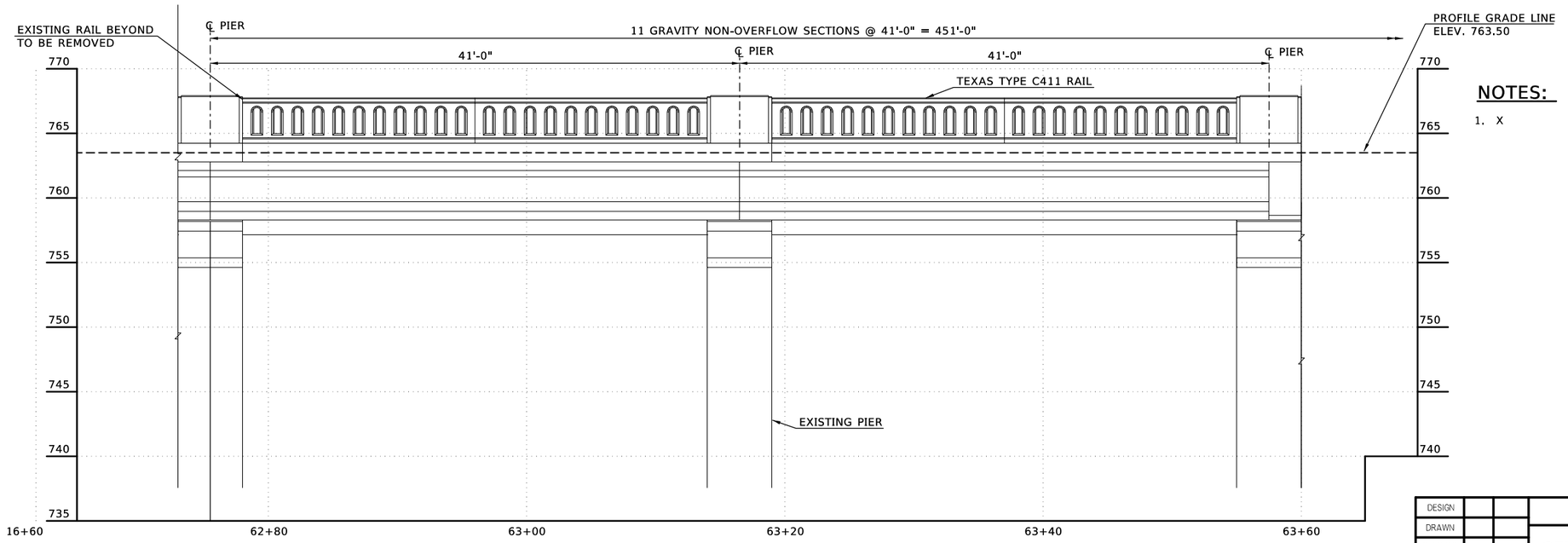
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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN



ELEVATION - GRAVITY NON-OVERFLOW SECTION

DESIGN DATA
NEW CONSTRUCTION

MATERIALS

CONCRETE	
CLASS AA	f'c = 4,000 PSI
CLASS A	f'c = 3,000 PSI
REINFORCING STEEL:	Fy = 60,000 PSI
STRUCTURAL STEEL M270 (GRADE 50W)	Fy = 50,000 PSI
STAINLESS STEEL A240 (TYPE 316)	Fy = 30,000 PSI
STAINLESS STEEL A320; CLASS 2 (GRADE B8M)	Fy = 58,000 PSI

LOADING:

H-20

DESIGN:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION
ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE
ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL

NOTES:

1. X

BRIDGE A

DESIGN		
DRAWN		
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

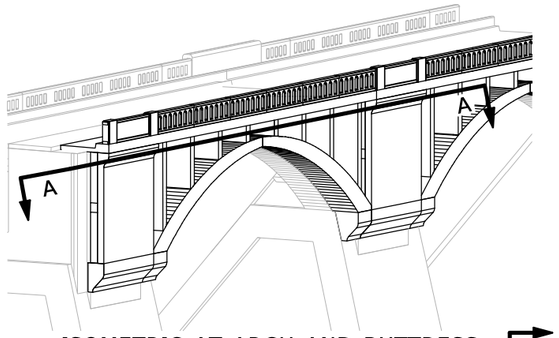
GENERAL DAM PLAN AND ELEVATION (4)
DOWNSTREAM WIDENING

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0006

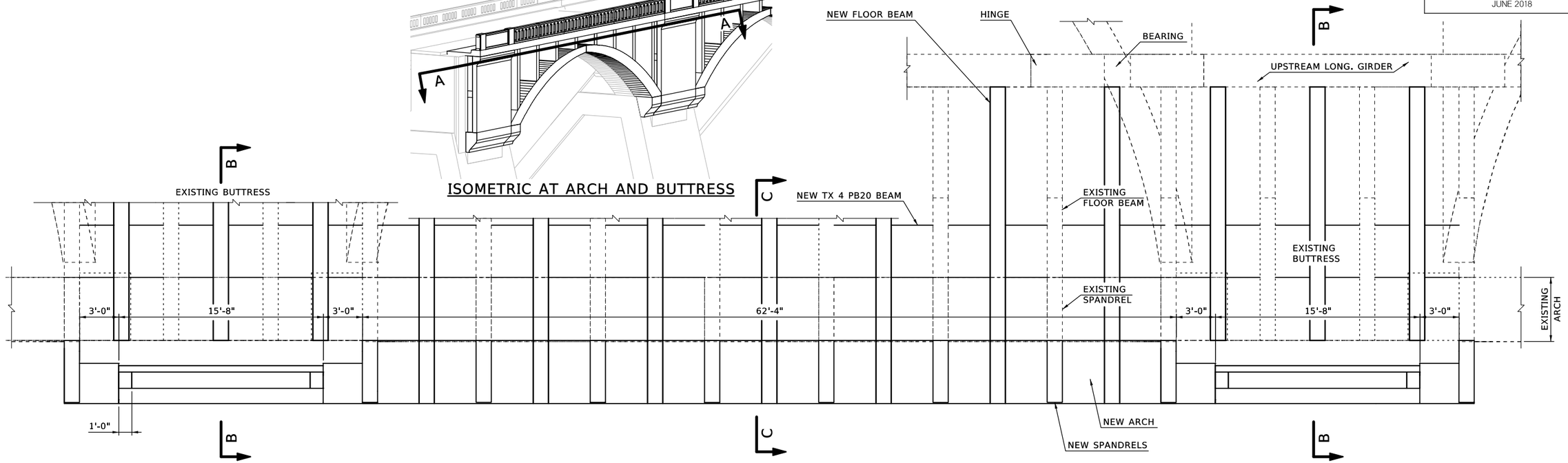
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GRAND RIVER DAM AUTHORITY

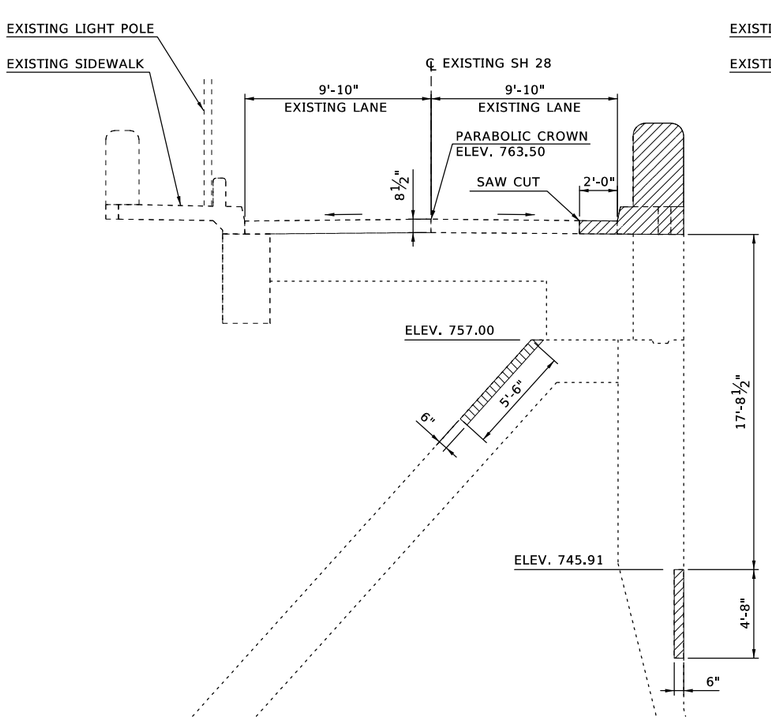
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PLANS
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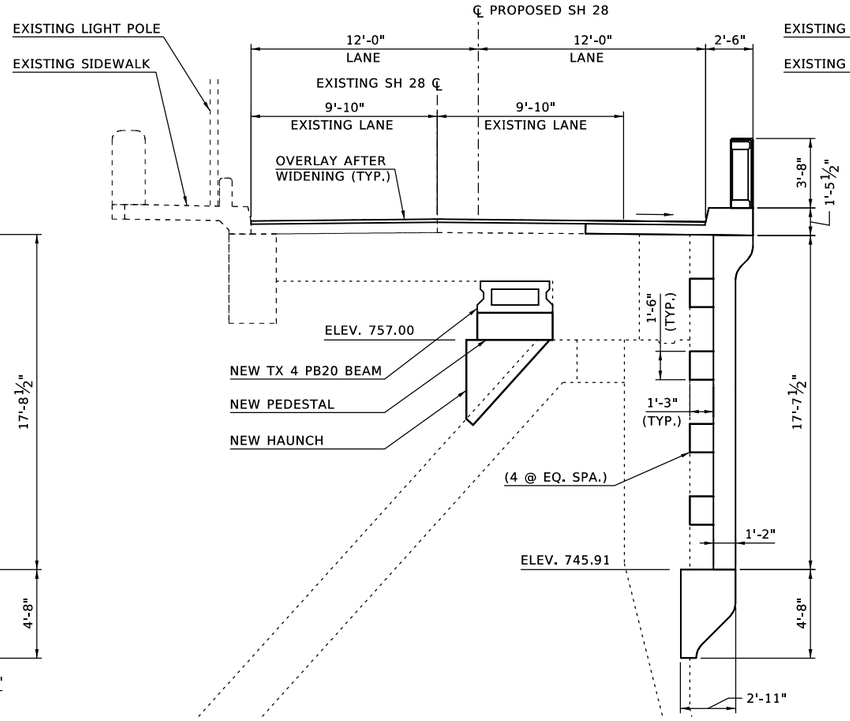
ISOMETRIC AT ARCH AND BUTTRESS



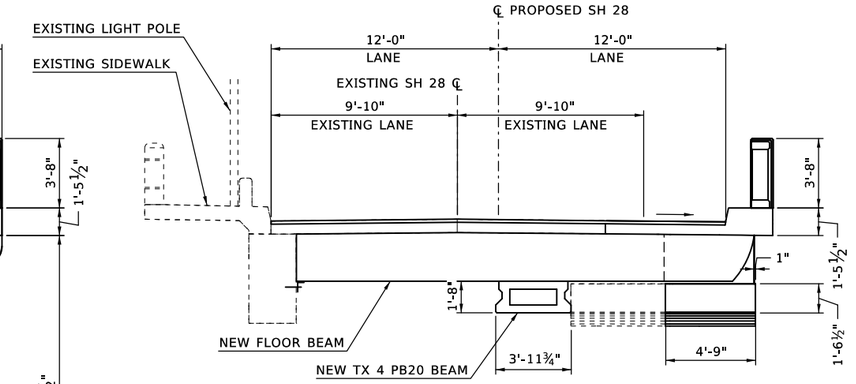
SECTION A-A



TYPICAL SECTION OF REMOVAL



SECTION B-B



SECTION C-C

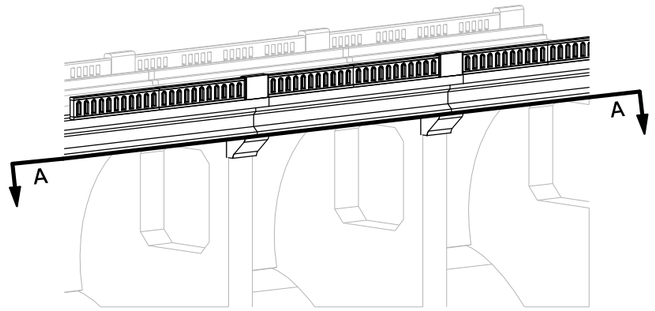
BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			MAIN DAM ARCH
APPROVED	SOT	2/18	TYPICAL SECTION
SQUAD	BENHAM		

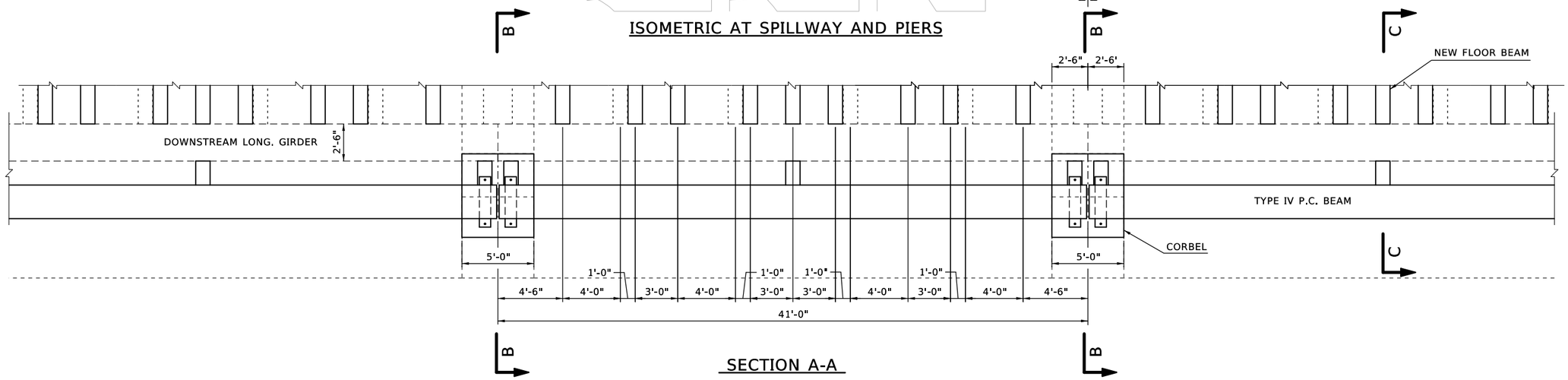
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0007

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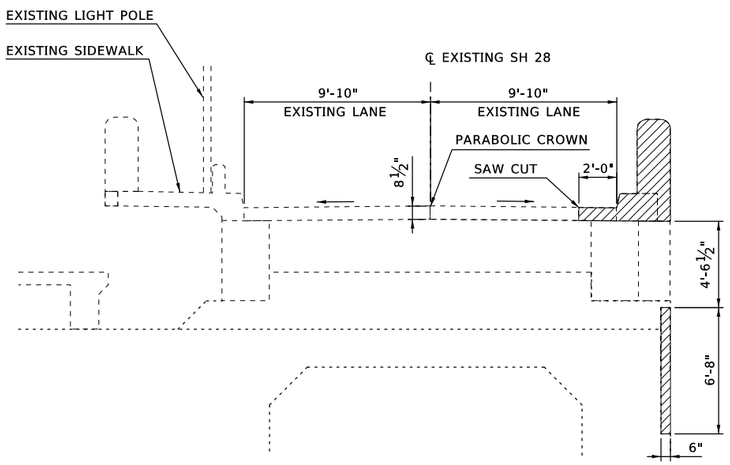
GRAND RIVER DAM AUTHORITY
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PLANS
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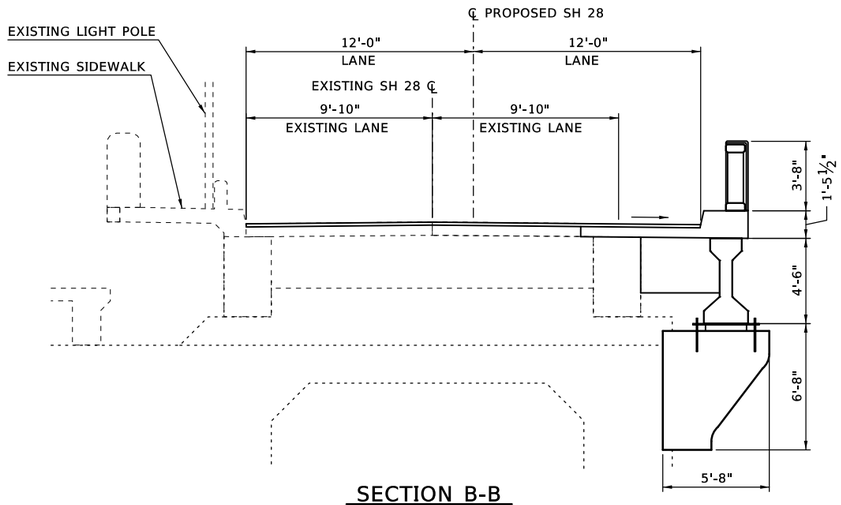
ISOMETRIC AT SPILLWAY AND PIERS



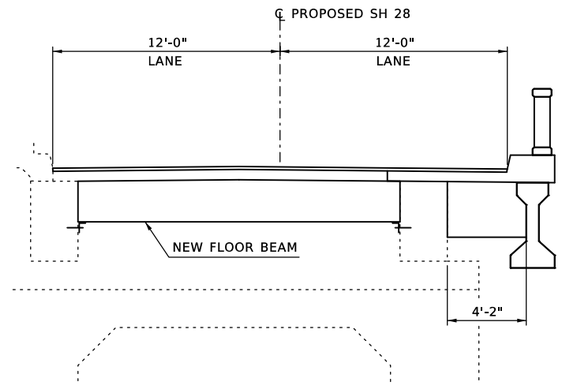
SECTION A-A



TYPICAL SECTION OF REMOVAL



SECTION B-B



SECTION C-C

BRIDGE A

DESIGN		
DRAWN		
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

MAIN DAM SPILLWAY
TYPICAL SECTION

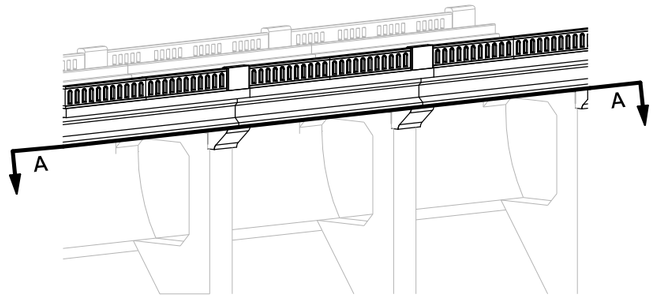
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0008

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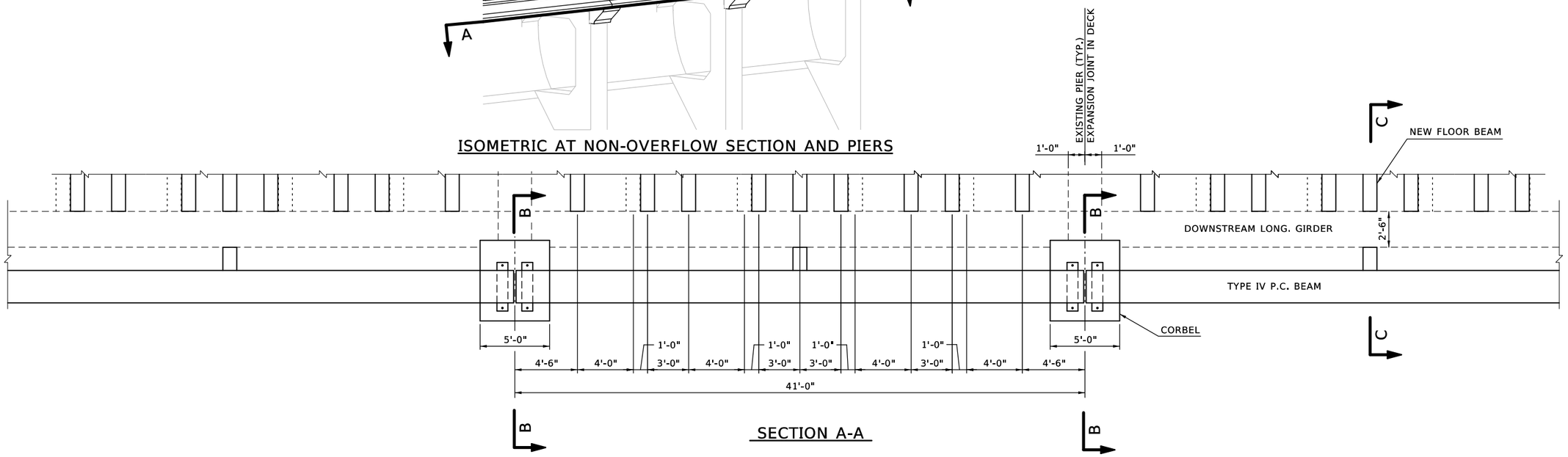
6/29/2018

GRAND RIVER DAM AUTHORITY

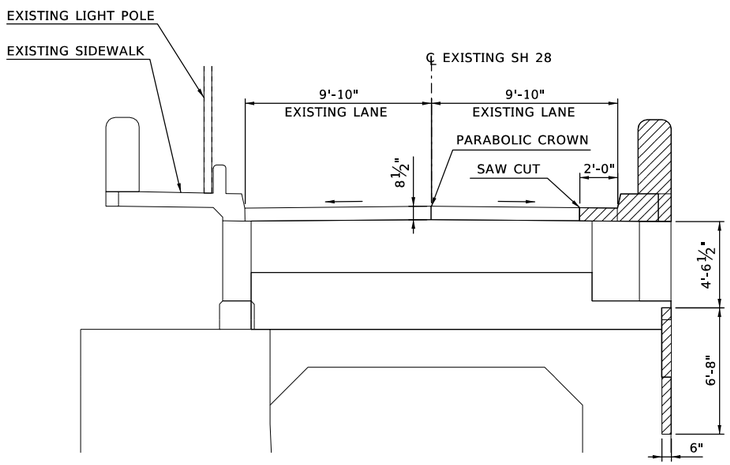
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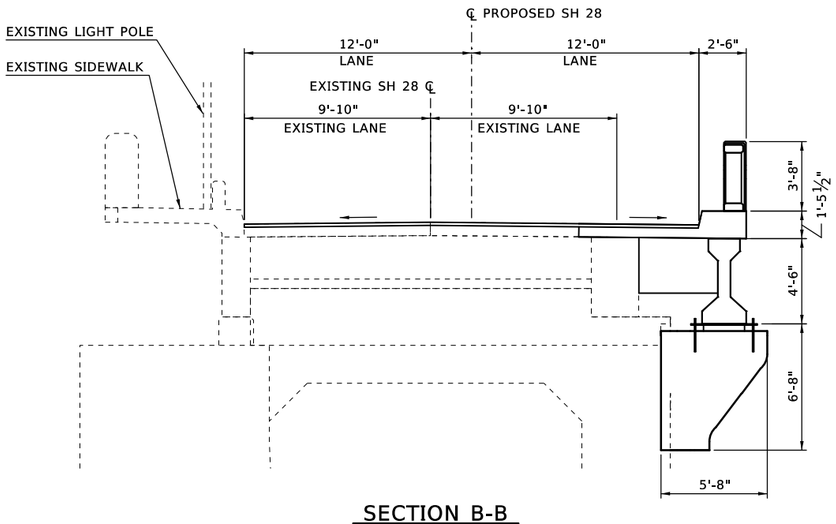
ISOMETRIC AT NON-OVERFLOW SECTION AND PIERS



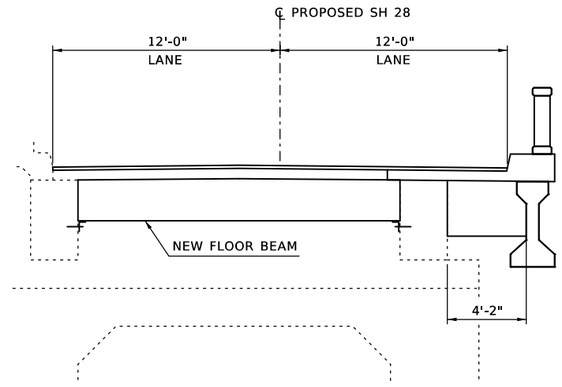
SECTION A-A



TYPICAL SECTION OF REMOVAL



SECTION B-B



SECTION C-C

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			MAIN DAM NON-OVERFLOW TYPICAL SECTION
APPROVED	SOT	2/18	
SQUAD	BENHAM		

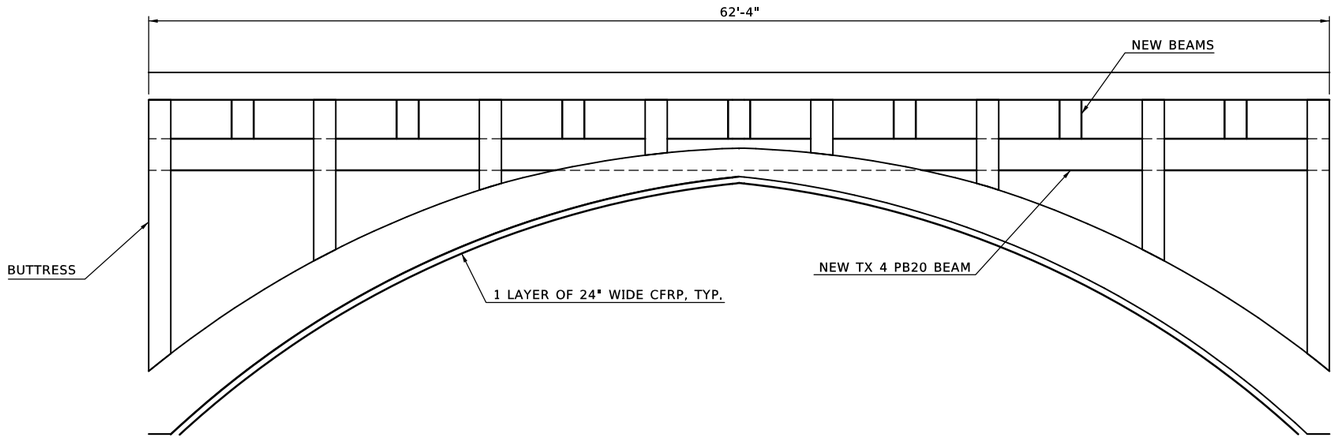
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0009

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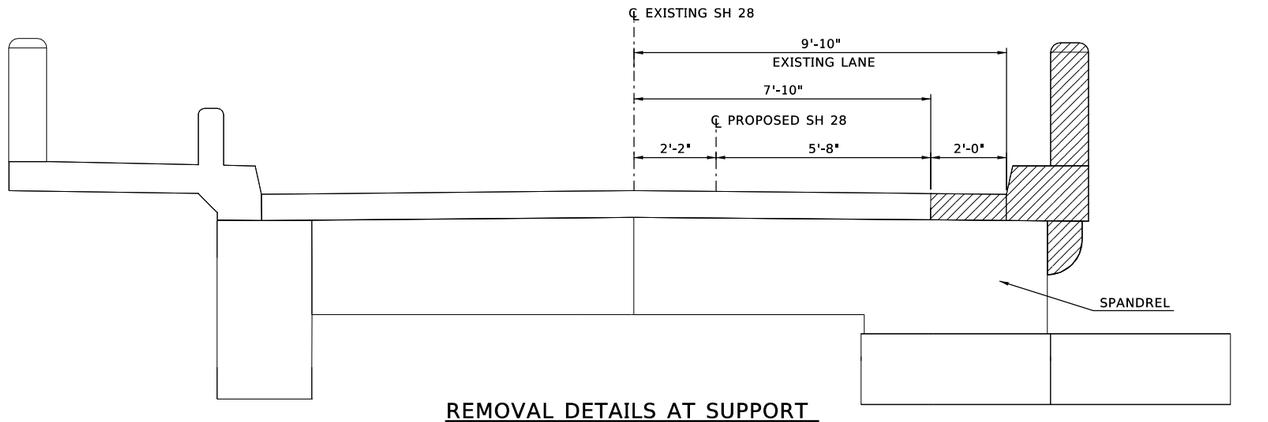
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GRAND RIVER DAM AUTHORITY

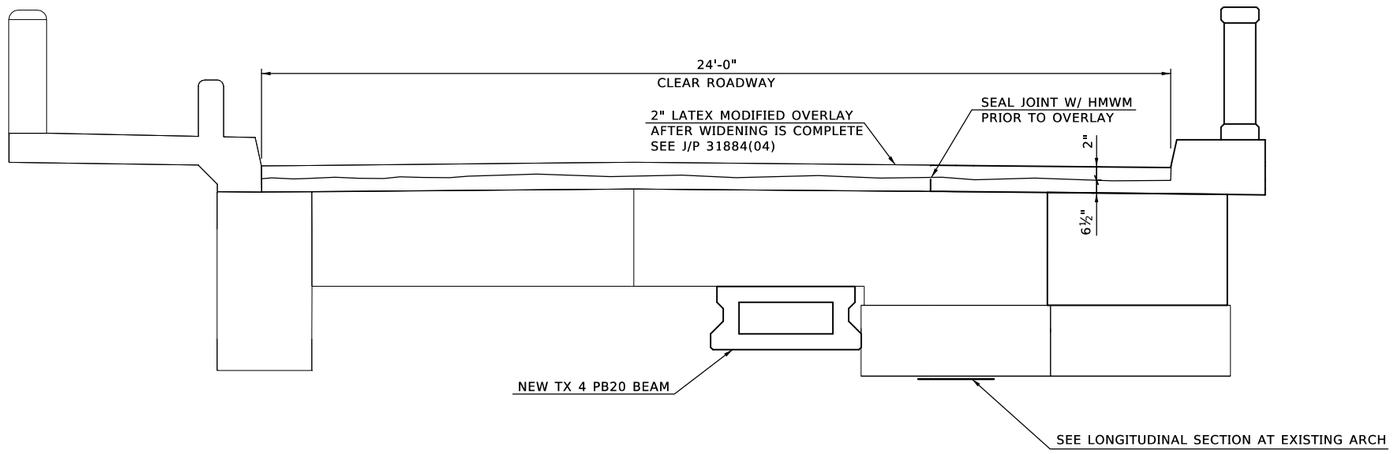
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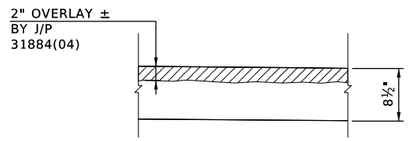
LONGITUDINAL SECTION AT EXISTING ARCH SPANDREL



REMOVAL DETAILS AT SUPPORT



DECK SECTION AT SUPPORT



TYPICAL AT SHALLOW OVERLAY DECK DETAIL

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			SUPERSTRUCTURE DETAILS (1) STRUCTURAL REPAIRS
APPROVED	SOT	2/18	
SQUAD	BENHAM		

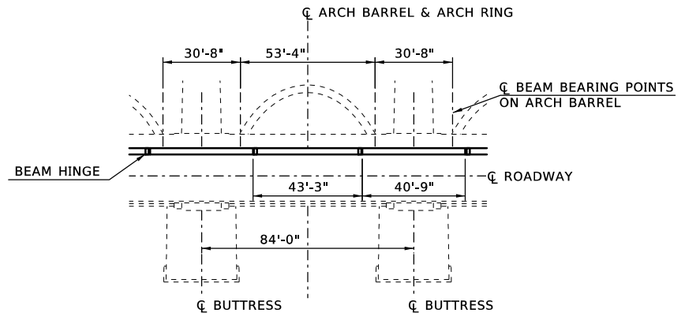
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0010

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GRAND RIVER DAM AUTHORITY

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NOTE:
1. SOUND ALL HINGE POINTS AND PERFORM PULL-OFF TEST. DETERMINE IF CRACKS EXTEND THRU ENTIRE MEMBER. IF THESE TESTS INDICATE THE MEMBERS ARE STRUCTURALLY SOUND, REPAIR WITH PNUEMATICALLY PLACED MORTAR AND INJECT CRACKS WITH EPOXY. IF THE MEMBERS ARE UNSOUND, SUPPORT GIRDER AND CUT BACK TO SOUND CONCRETE A MINIMUM OF 3 FEET EACH SIDE OF ℄ OF HINGE AND REPLACE WITH CLASS AA CONCRETE. FOLLOWING CURE TIME, APPLY BI-DIRECTIONAL CARBON FIBER REINFORCEMENT.

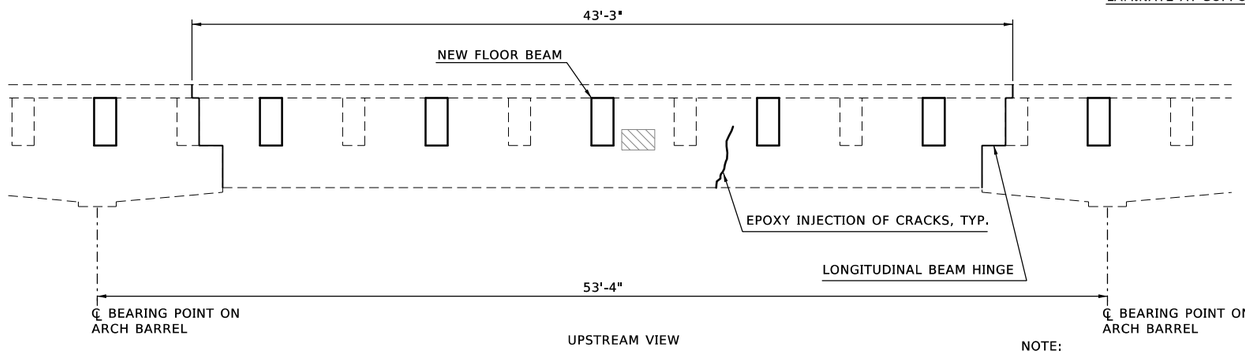


LONGITUDINAL BEAM KEY PLAN

LEGEND:

PNEUMATICALLY PLACED MORTAR REPAIR

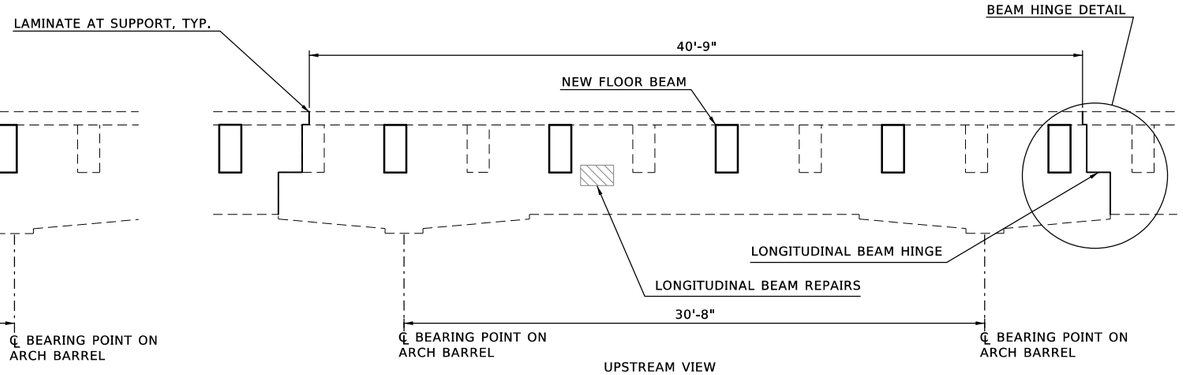
CLASS AA BEAM REPAIRS OR PNEUMATICALLY PLACED MORTAR REPAIR AND EPOXY INJECTION OF CRACKS. APPLY BI-DIRECTIONAL CARBON FIBER REINFORCEMENT.



UPSTREAM VIEW

DECK ELEVATION AT ARCH BARREL

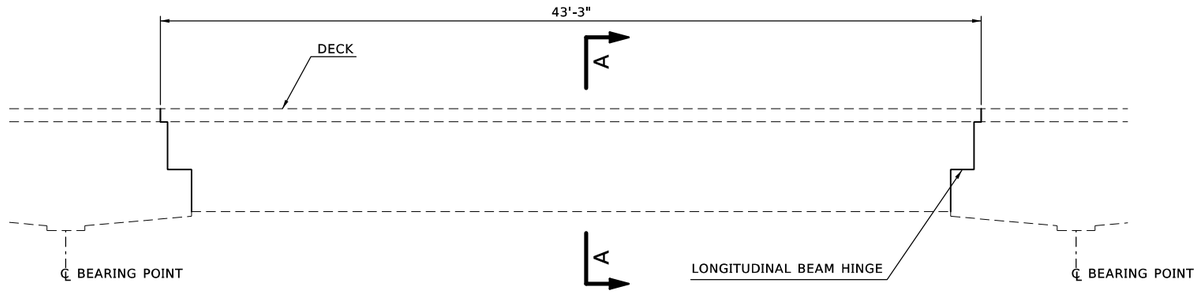
NOTE:
SEE DECK SECTIONS FOR FABRIC AND LAMINATE DETAILS



UPSTREAM VIEW

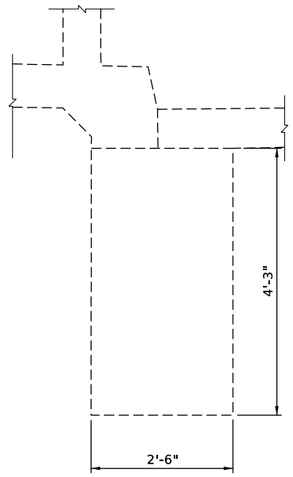
DECK ELEVATION AT BUTTRESS

(ONLY DECK STRENGTHENING IS SHOWN)

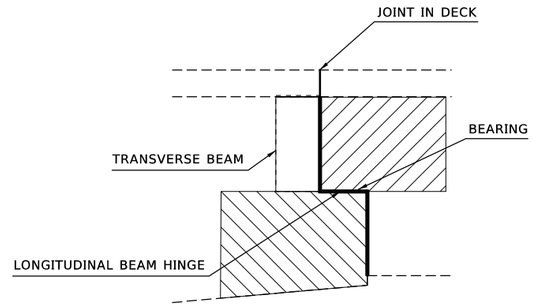


DOWNSTREAM VIEW

LONGITUDINAL BEAM OVER ARCH BARREL



SECTION A-A



BEAM HINGE DETAIL

SEE NOTE 1

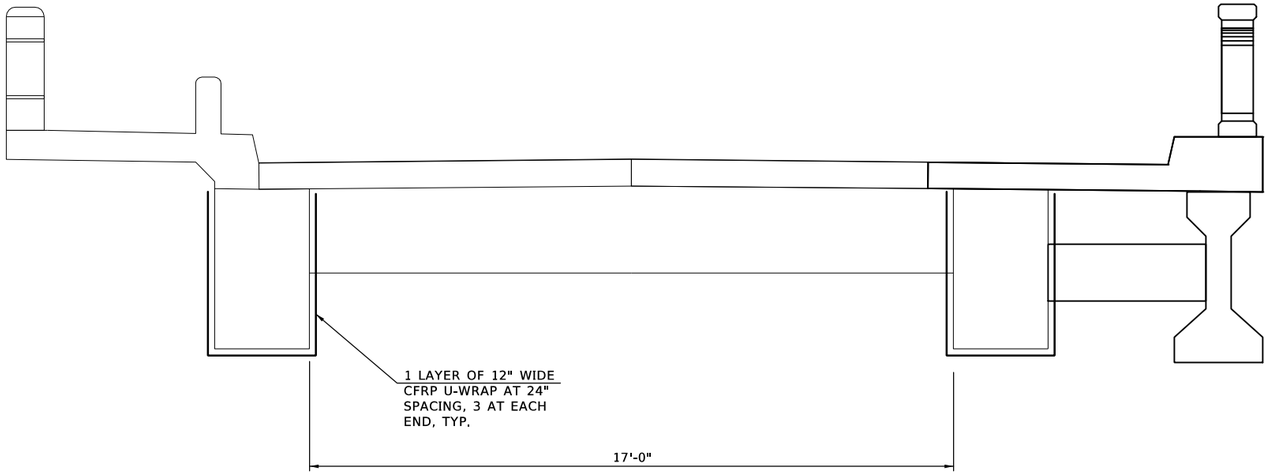
BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			SUPERSTRUCTURE DETAILS (2) STRUCTURAL REPAIRS
APPROVED	SOT	2/18	
SQUAD	BENHAM		

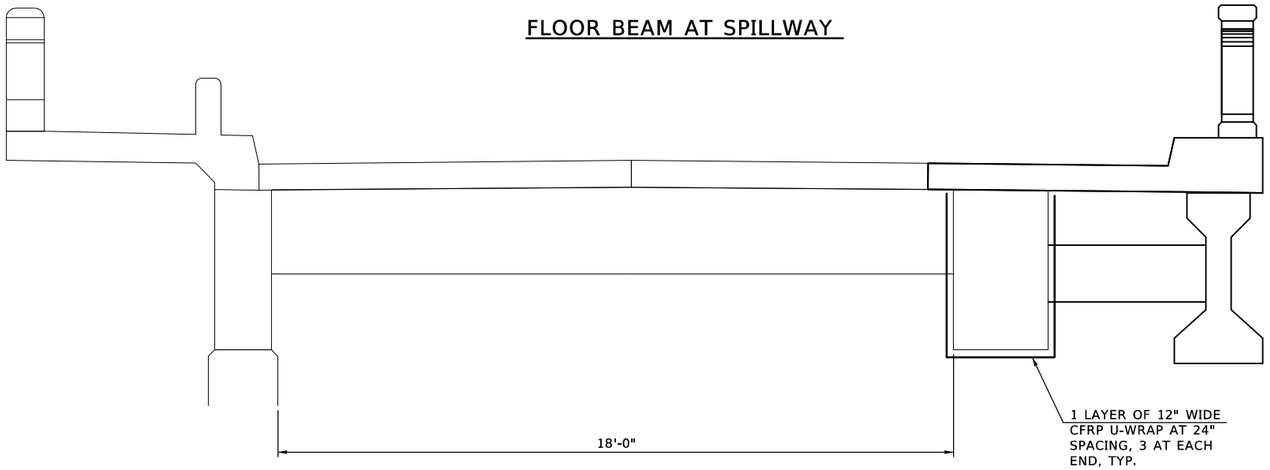
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0011

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GRAND RIVER DAM AUTHORITY
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JUNE 2018



FLOOR BEAM AT SPILLWAY



FLOOR BEAM AT NON-OVERFLOW

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BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			SUPERSTRUCTURE DETAILS (3) STRUCTURAL REPAIRS
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0012

6/29/2018

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

BRIDGE A
FLOOR BEAMS

Span Type	West Gravity Non-Overflow			Arch Section																			
Span No.	1			Arch No. 1										Arch No. 2									
Floor Beam No.	1	2	3	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Arch Section																													
Span No.	Arch No. 3										Arch No. 4										Arch No. 5									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 6										Arch No. 7										Arch No. 8									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 9										Arch No. 10										Arch No. 11									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 12										Arch No. 13										Arch No. 14									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 15										Arch No. 16										Arch No. 17									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 18										Arch No. 19										Arch No. 20									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			REHABILITATION SUMMARY (1)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0013

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BRIDGE A
FLOOR BEAMS CONT.

Span Type	Arch Section																													
Span No.	Arch No. 21										Arch No. 22										Arch No. 23									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 24										Arch No. 25										Arch No. 26									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 27										Arch No. 28										Arch No. 29									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 30										Arch No. 31										Arch No. 32									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 33										Arch No. 34										Arch No. 35									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 36										Arch No. 37										Arch No. 38									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 39										Arch No. 40										Arch No. 41									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			REHABILITATION SUMMARY (2)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0014

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6/29/2018

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

BRIDGE A
FLOOR BEAMS CONT.

Span Type	Arch Section																													
Span No.	Arch No. 42										Arch No. 43										Arch No. 44									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 45										Arch No. 46										Arch No. 47									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 48										Arch No. 49										Arch No. 50									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section										East Gravity Non-Overflow			Spillway Section																
Span No.	Arch No. 51										Span No. 52B			Spillway Span 1						Spillway Span 2						Spillway Span 3					
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Spillway Section																													
Span No.	Spillway Span 4						Spillway Span 5						Spillway Span 6						Spillway Span 7						Spillway Span 8					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																													
Span No.	Spillway Span 9						Spillway Span 10						Spillway Span 11						Spillway Span 12						Spillway Span 13					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																													
Span No.	Spillway Span 14						Spillway Span 15						Spillway Span 16						Spillway Span 17						Spillway Span 18					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																	
Span No.	Spillway Span 19						Spillway Span 20						Spillway Span 21					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																		
Epoxy Injection of Cracks																		
Carbon Fiber Wrap																		

BRIDGE A

DESIGN		
DRAWN		
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

REHABILITATION SUMMARY (3)

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0015

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6/29/2018

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

BRIDGE A
FLOOR BEAMS CONT.

Span Type	Non-Overflow Section																																	
Span No.	Non-Overflow Span 1						Non-Overflow Span 2						Non-Overflow Span 3						Non-Overflow Span 4						Non-Overflow Span 5						Non-Overflow Span 6					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

Span Type	Non-Overflow Section																																	
Span No.	Non-Overflow Span 7						Non-Overflow Span 8						Non-Overflow Span 9						Non-Overflow Span 10						Non-Overflow Span 11											
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6						
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

BRIDGE A
LONGITUDINAL GIRDERS

Span Type	West Gravity Non-Overflow		Arch Section																															
Span No.	1		Arch Span 1			Arch Span 2			Arch Span 3			Arch Span 4			Arch Span 5			Arch Span 6			Arch Span 7			Arch Span 8			Arch Span 9			Arch Span 10		
Upstream Overall, Hinge 1 or Hinge 2	US Long	DS Long	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rebuild Hinge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Arch Section																																	
Span No.	Arch Span 11			Arch Span 12			Arch Span 13			Arch Span 14			Arch Span 15			Arch Span 16			Arch Span 17			Arch Span 18			Arch Span 19			Arch Span 20					
Upstream Overall, Hinge 1 or Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2			
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Rebuild Hinge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Span Type	Arch Section																																	
Span No.	Arch Span 21			Arch Span 22			Arch Span 23			Arch Span 24			Arch Span 25			Arch Span 26			Arch Span 27			Arch Span 28			Arch Span 29			Arch Span 30					
Upstream Overall, Hinge 1 or Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2			
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Rebuild Hinge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Span Type	Arch Section																																	
Span No.	Arch Span 31			Arch Span 32			Arch Span 33			Arch Span 34			Arch Span 35			Arch Span 36			Arch Span 37			Arch Span 38			Arch Span 39			Arch Span 40					
Upstream Overall, Hinge 1 or Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2			
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Rebuild Hinge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Span Type	Arch Section																																	
Span No.	Arch Span 41			Arch Span 42			Arch Span 43			Arch Span 44			Arch Span 45			Arch Span 46			Arch Span 47			Arch Span 48			Arch Span 49			Arch Span 50			Arch Span 51		
Upstream Overall, Hinge 1 or Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2	US Long	US Hinge 1	US Hinge 2
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rebuild Hinge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			
APPROVED	SOT	2/18	REHABILITATION SUMMARY (4)
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0016

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BRIDGE A
LONGITUDINAL GIRDERS CONT.

Span Type	Spillway Section																									
Span No.	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10		Spillway Span 11		Spillway Span 12		Spillway Span 13	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Spillway Section															
Span No.	Spillway Span 14		Spillway Span 15		Spillway Span 16		Spillway Span 17		Spillway Span 18		Spillway Span 19		Spillway Span 20		Spillway Span 21	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Non-Overflow Section													
Span No.	N-O'flow Span 1		N-O'flow Span 2		N-O'flow Span 3		N-O'flow Span 4		N-O'flow Span 5		N-O'flow Span 6		N-O'flow Span 7	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Non-Overflow Section									
Span No.	N-O'flow Span 8		N-O'flow Span 9		N-O'flow Span 10		N-O'flow Span 11		East Gravity Section	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			REHABILITATION SUMMARY (5)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0017

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6/29/2018

GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

BRIDGE B - EAST SPILLWAY N0. 1
FLOOR BEAMS

Span Type	Spillway Section																																	
Span No.	Spillway Span 1						Spillway Span 2						Spillway Span 3						Spillway Span 4						Spillway Span 5						Spillway Span 6			
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

Span Type	Spillway Section																																	
Span No.	Spillway Span 7						Spillway Span 8						Spillway Span 9						Spillway Span 10						Spillway Span 11											
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6						
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

BRIDGE B - EAST SPILLWAY N0. 1
LONGITUDINAL GIRDERS

Span Type	Spillway Section																					
Span No.	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10		Spillway Span 11	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

BRIDGE C - EAST SPILLWAY N0. 2
FLOOR BEAMS

Span Type	Spillway Section																																	
Span No.	Spillway Span 1						Spillway Span 2						Spillway Span 3						Spillway Span 4						Spillway Span 5											
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6						
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

Span Type	Spillway Section																																	
Span No.	Spillway Span 6						Spillway Span 7						Spillway Span 8						Spillway Span 9						Spillway Span 10											
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6						
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

BRIDGE C - EAST SPILLWAY N0. 2
LONGITUDINAL GIRDERS

Span Type	Spillway Section																			
Span No.	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10	
Upstream or Downstream	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

BRIDGE B&C

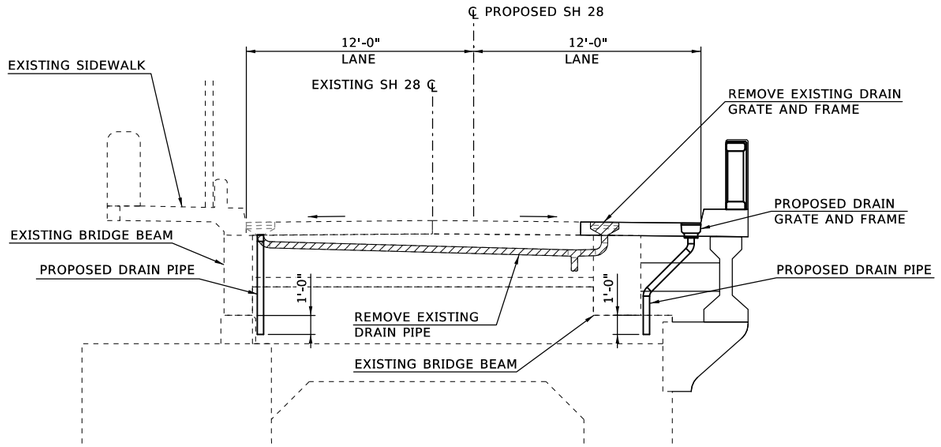
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DRAWN			
CHECKED			
APPROVED	SOT	2/18	REHABILITATION SUMMARY (6)
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0013

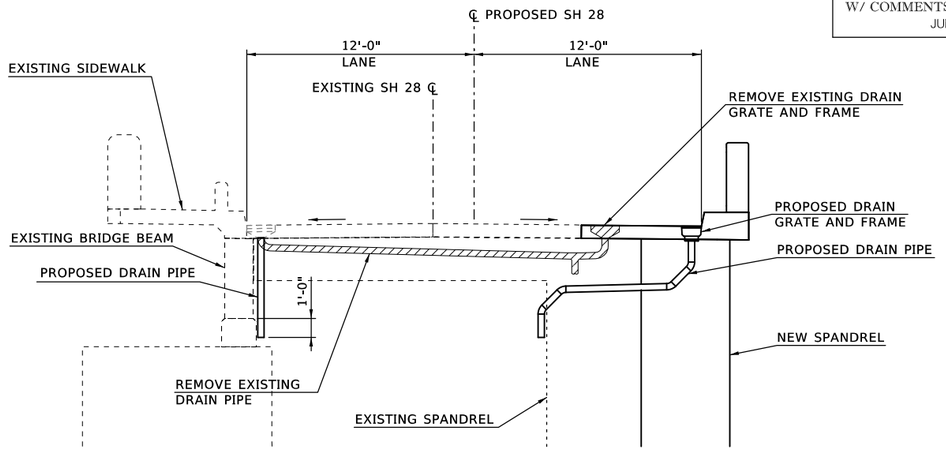
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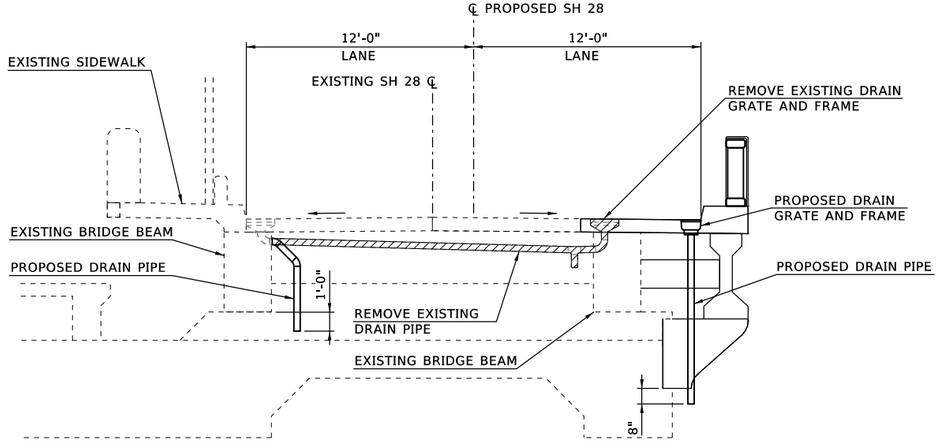
GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



DRAIN SECTION AT NON-OVERFLOW



DRAIN SECTION AT ARCH



DRAIN SECTION AT SPILLWAY

(BRIDGES B&C SIMILAR)

BRIDGE A

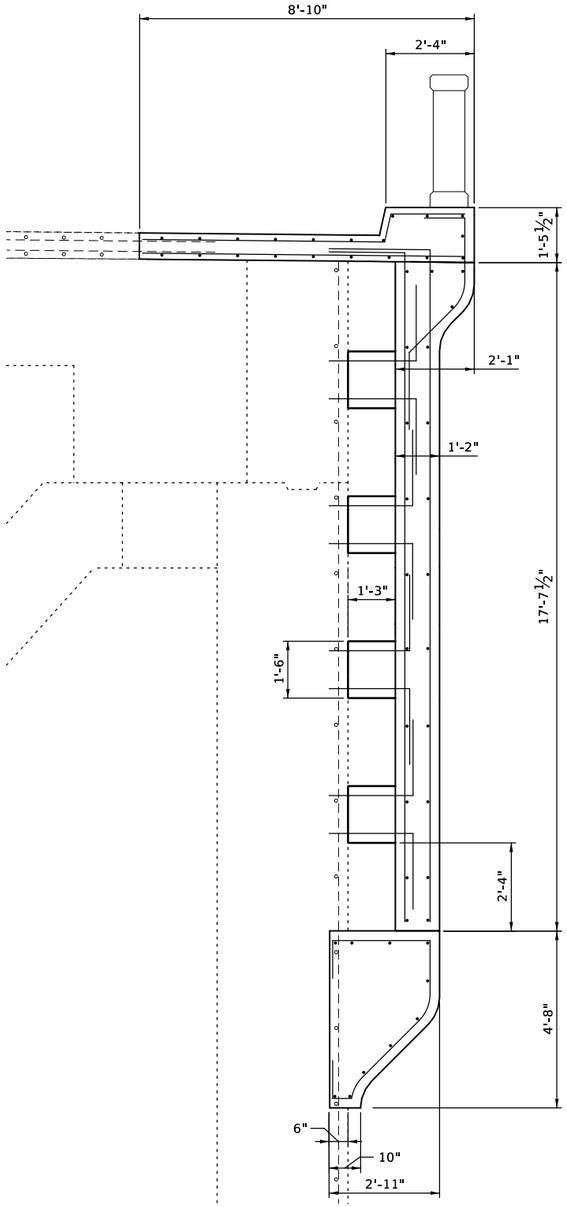
DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			DECK DETAILS (1)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0019

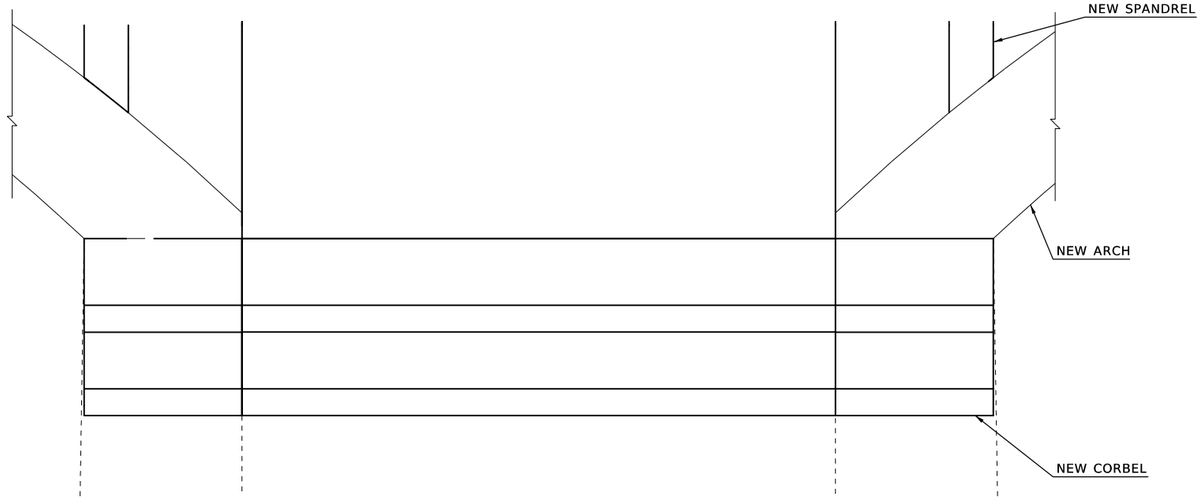
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GRAND RIVER DAM AUTHORITY

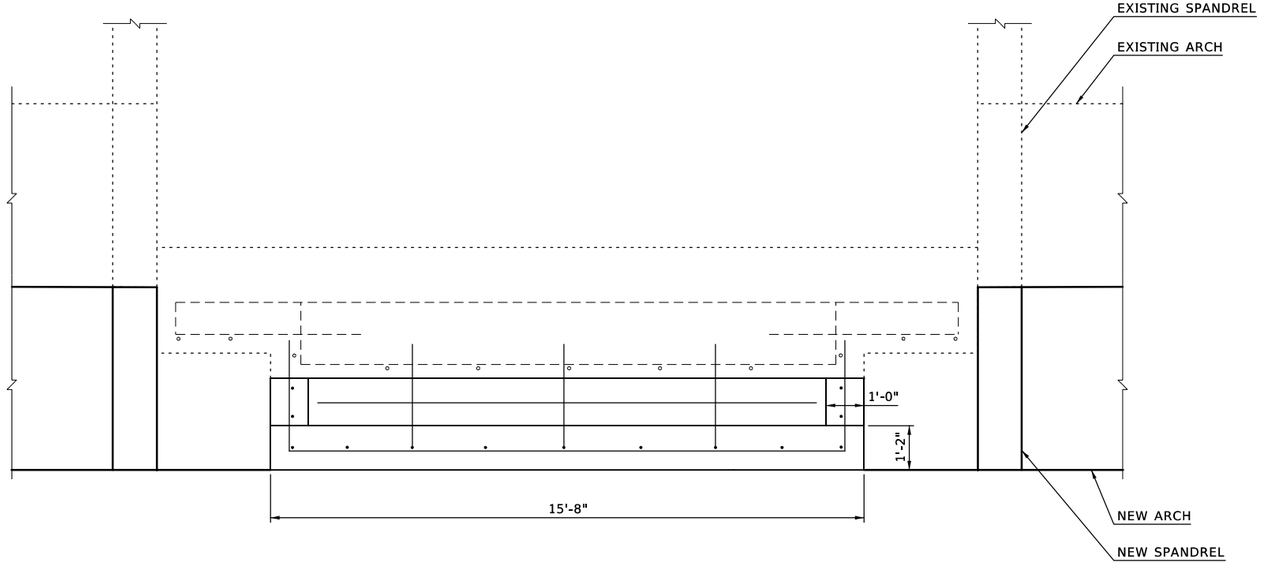
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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



SECTION AT ARCH



ELEVATION AT ARCH AND BUTTRESS



DETAIL AT ARCH BUTTRESS

BRIDGE A

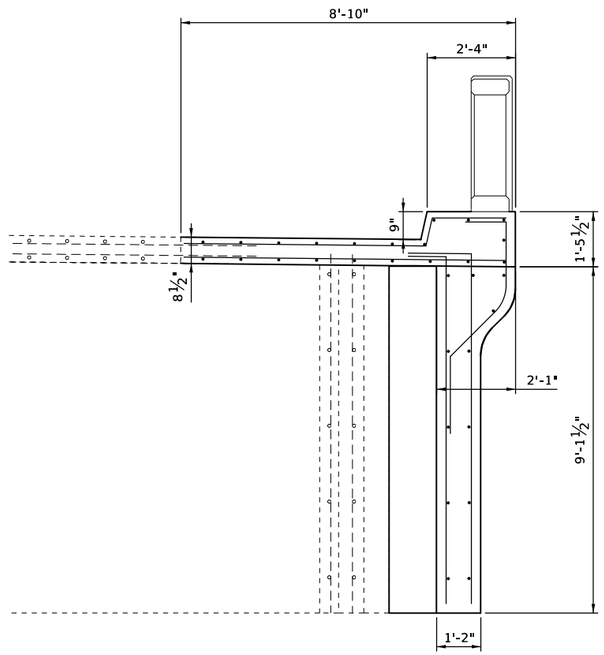
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DRAWN			
CHECKED			
APPROVED	SOT	2/18	ARCH BUTTRESS DETAILS (1)
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0020

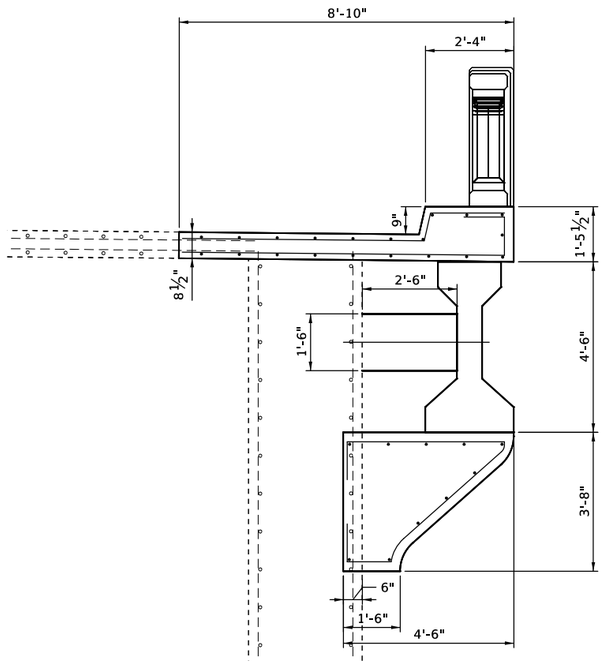
6/29/2018
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GRAND RIVER DAM AUTHORITY

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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



SECTION AT DAM WEST ABUTMENT



SECTION AT DAM EAST ABUTMENT

BRIDGE A

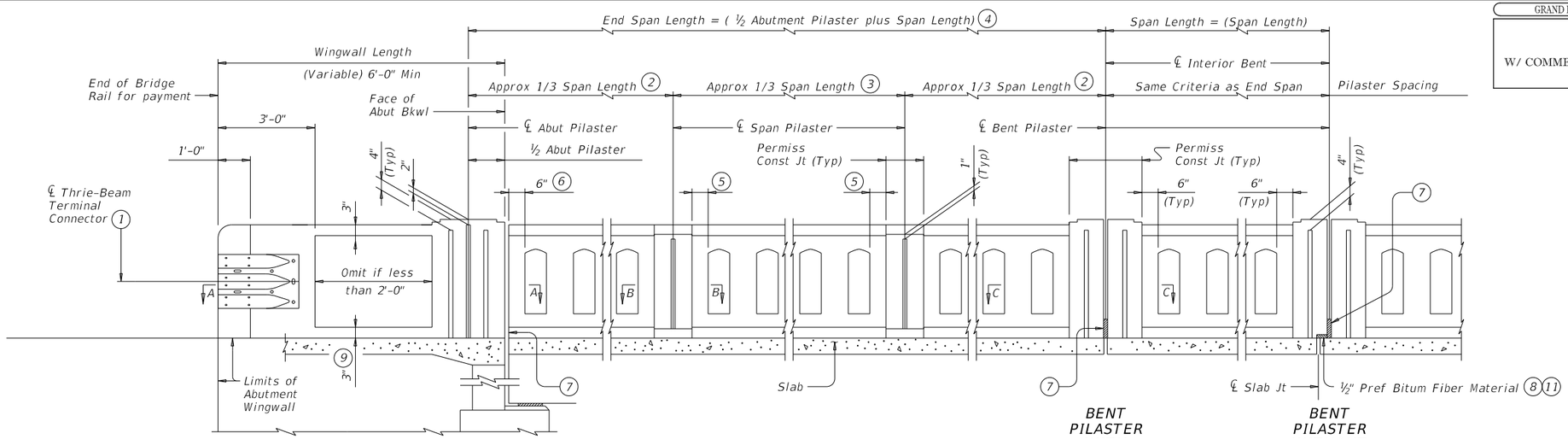
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DRAWN			
CHECKED			ABUTMENT DETAILS (1)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0021

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GRAND RIVER DAM AUTHORITY

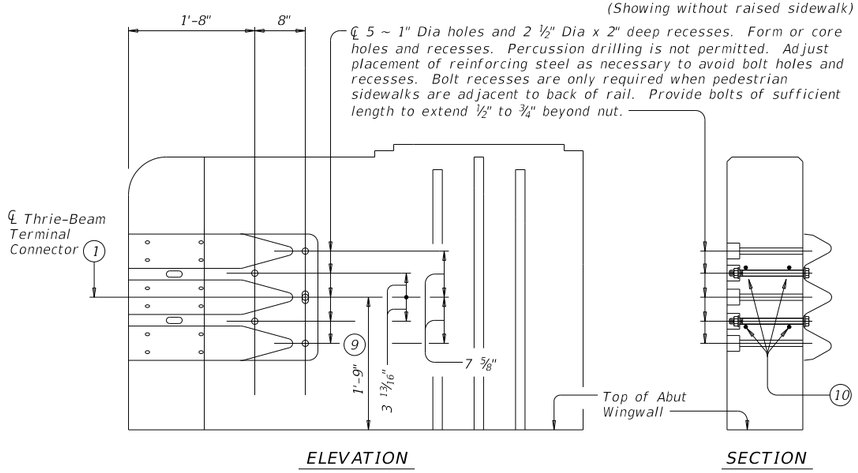
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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



ROADWAY ELEVATION OF RAIL

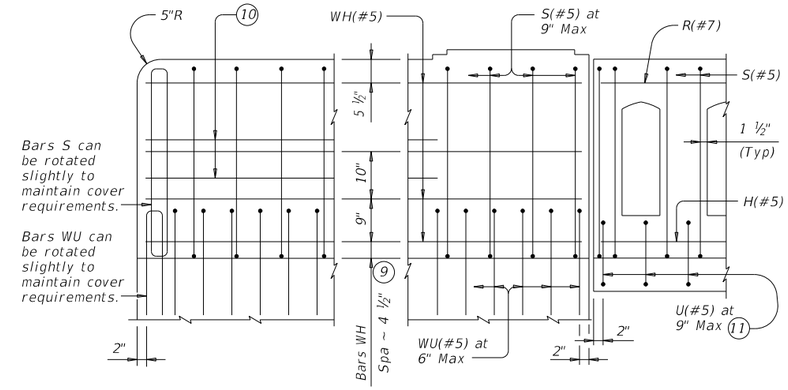
(Showing without raised sidewalk)

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Number of windows in exterior bays are equal.
3. Number of windows in interior bay(s) are not less than the amount in exterior bays (Note 2).
4. Space Span Pilasters at 1/3 span length (Approx) when spans are 100 ft and less, as shown. Space Span Pilasters at 1/5 span length (Approx) for spans greater than 100 ft.
5. Dimension is the same for all posts adjacent to Span Pilasters in a span. Dimension may vary from span to span, Min = 3", Max = 7 ½".
6. Min = 6", Max = 1'-3".
7. Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be ¼" Min to ¾" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
8. Place Preformed Bituminous Fiber Material between slab and rail when rail extends over expansion joint. Shift Bars U as necessary.
9. Increase 2" for structures with overlay.
10. Place 4 additional Bars WH(#5) 3'-8" in length inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
11. Shift U Bars from region below ½" Preformed Bituminous Fiber Material at joints.



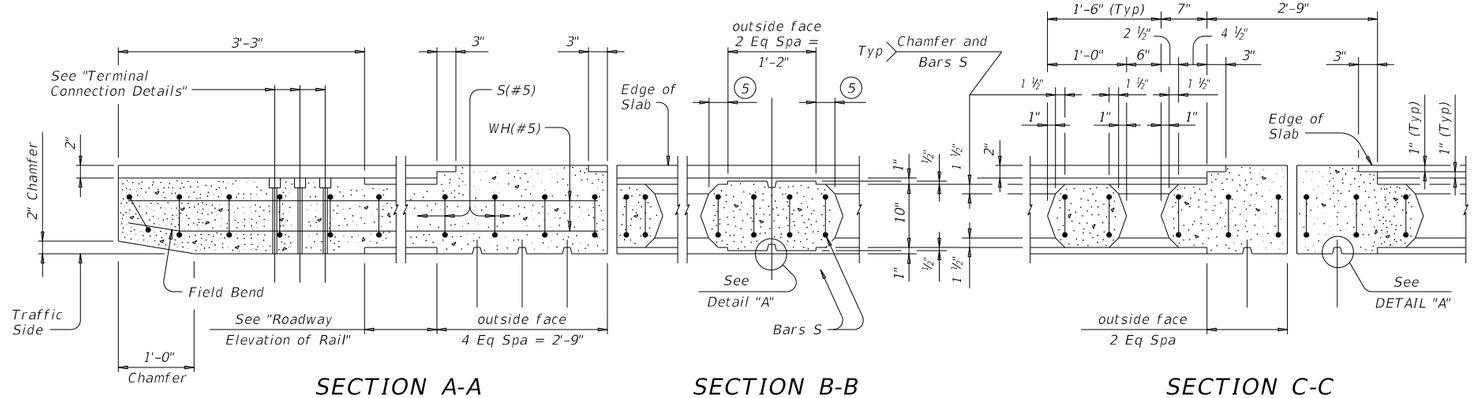
TERMINAL CONNECTION DETAILS

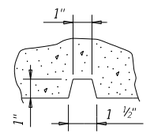
(Showing parapet with Pilaster on 6'-0" Wingwall)



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)





DETAIL "A"

The use of this railing is restricted to speeds of 45 mph or less.

TxDOT
COMBINATION RAIL
TEXAS CLASSIC
TYPE C411

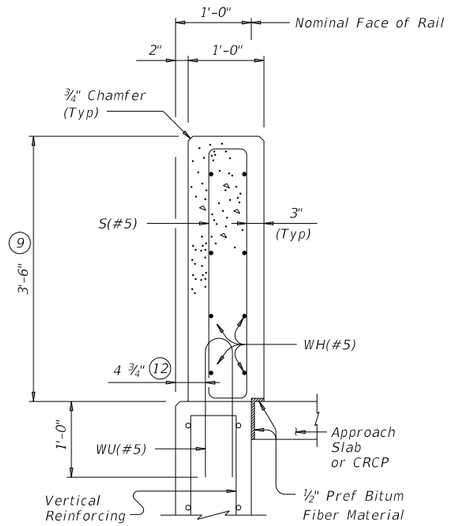
BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			PARAPET DETAILS (1)
APPROVED	SOT	2/18	
SQUAD	BENHAM		

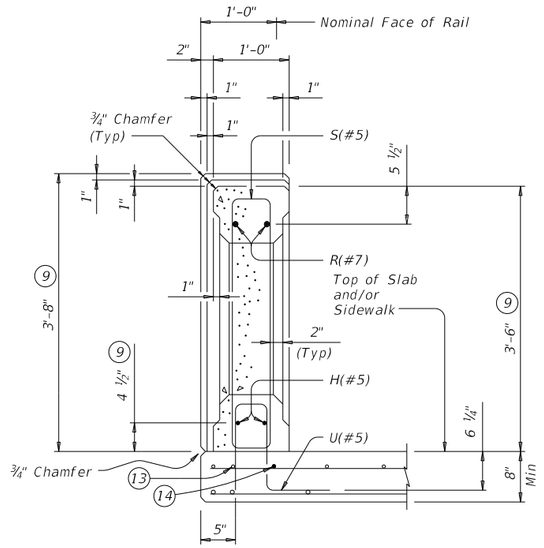
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0022

6/29/2018

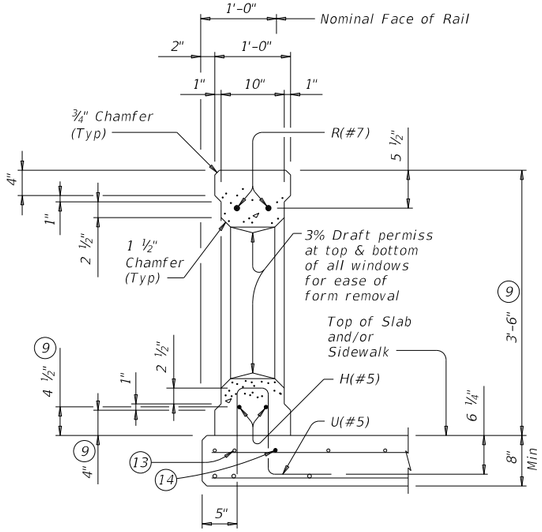
GRAND RIVER DAM AUTHORITY
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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



SECTION THRU POST ON BRIDGE SLAB
(Showing Pilaster)



SECTION THRU WINDOW ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

(9) Increase 2" for structures with overlay.

(12) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(13) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(14) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

TxDOT
COMBINATION RAIL
TEXAS CLASSIC
TYPE C411

BRIDGE A

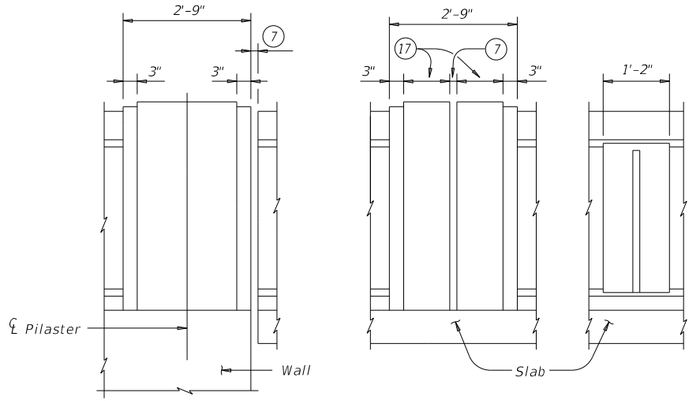
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DRAWN			
CHECKED			
APPROVED	SOT	2/18	PARAPET DETAILS (2)
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0023

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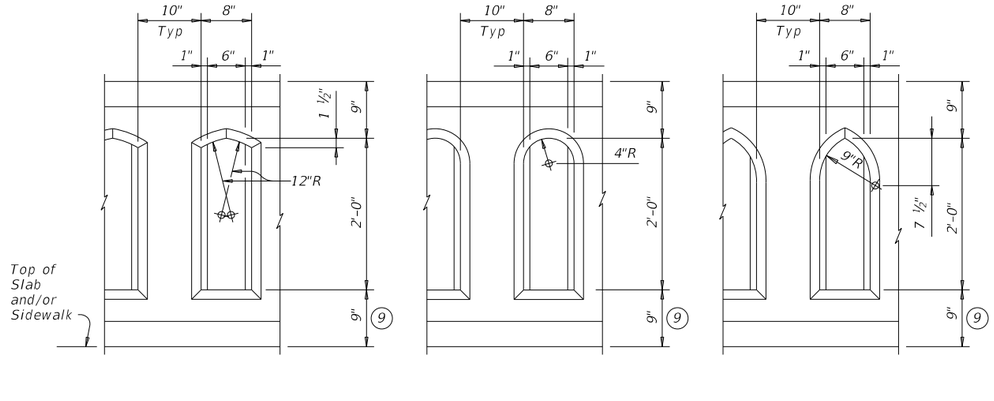
6/29/2018

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

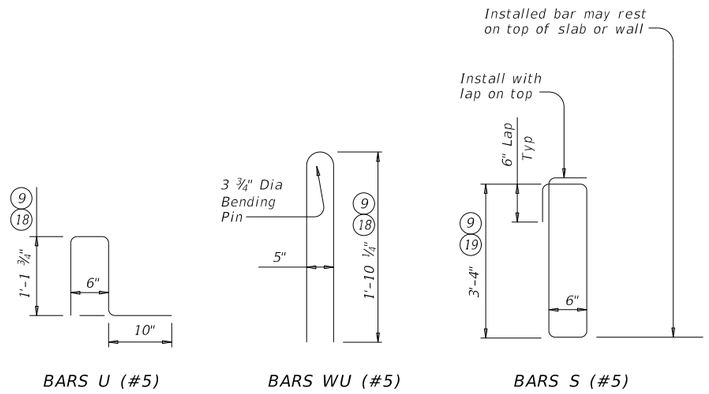


EXTERIOR PILASTER ELEVATIONS

(Showing without raised sidewalk)



WINDOW TYPES



CONSTRUCTION NOTES:

Face of rail and pilasters, parapet must be plumb unless otherwise approved.

Apply a one rub finish to all railing surfaces unless otherwise shown elsewhere on the plans.

MATERIAL NOTES:

Provide Class AA concrete for railing. Provide Class AA concrete if shown elsewhere in the plans.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"
Uncoated or galvanized ~ #7 = 2'-11"
Epoxy coated ~ #5 = 3'-0"
Epoxy coated ~ #7 = 4'-4"

GENERAL NOTES:

This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. This rail is only approved for low speed use, speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

See Bridge Layout or other plan sheets for the following: dimensions with the number of span pilasters, dimensions with the number of windows, window type, inclusion of bronze stars, inclusion of construction year with abutment identity.

Submit erection drawings showing span number, span pilaster locations, number of windows between pilasters and spacing to first window (see Note 6) to the Engineer for approval.

Average weight of railing with no overlay increase and no pilasters is 350 plf.

(7) Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be ¼" Min to ¾" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.

(9) Increase 2" for structures with overlay.

(16) Construction year (use if shown elsewhere on plans) 3" High "Plantin Bold" Typeface with ¼" recess. Placed at one Abutment only or as directed by the Engineer.

(17) Dimensions must be the same on each side of joint.

(18) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(19) Reduce by 2" or field bend over Preformed Bituminous Fiber Material to gain cover.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

TxDOT
COMBINATION RAIL
TEXAS CLASSIC
TYPE C411

BRIDGE A

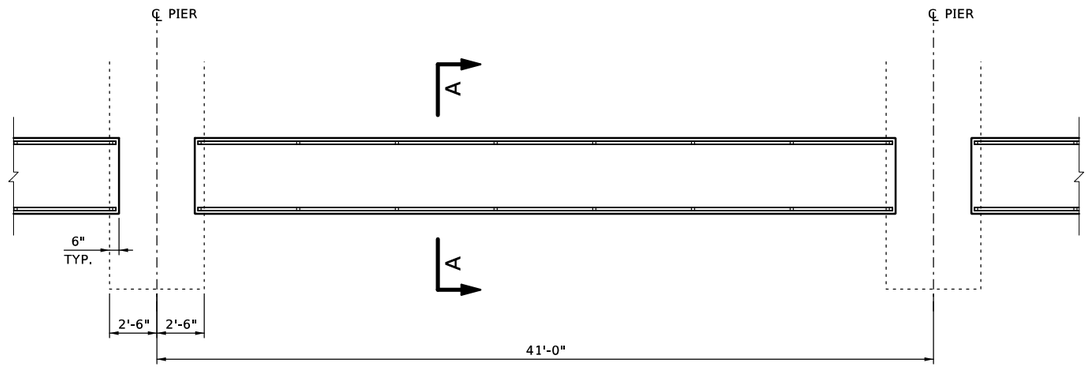
DESIGN			GRAND RIVER DAM AUTHORITY
DRAWN			
CHECKED			
APPROVED	SOT	2/18	PARAPET DETAILS (3)
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0024

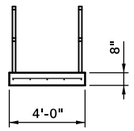
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GRAND RIVER DAM AUTHORITY
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PLANS
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CATWALK PLAN AT SPILLWAY SECTION



SECTION A-A

BRIDGE A

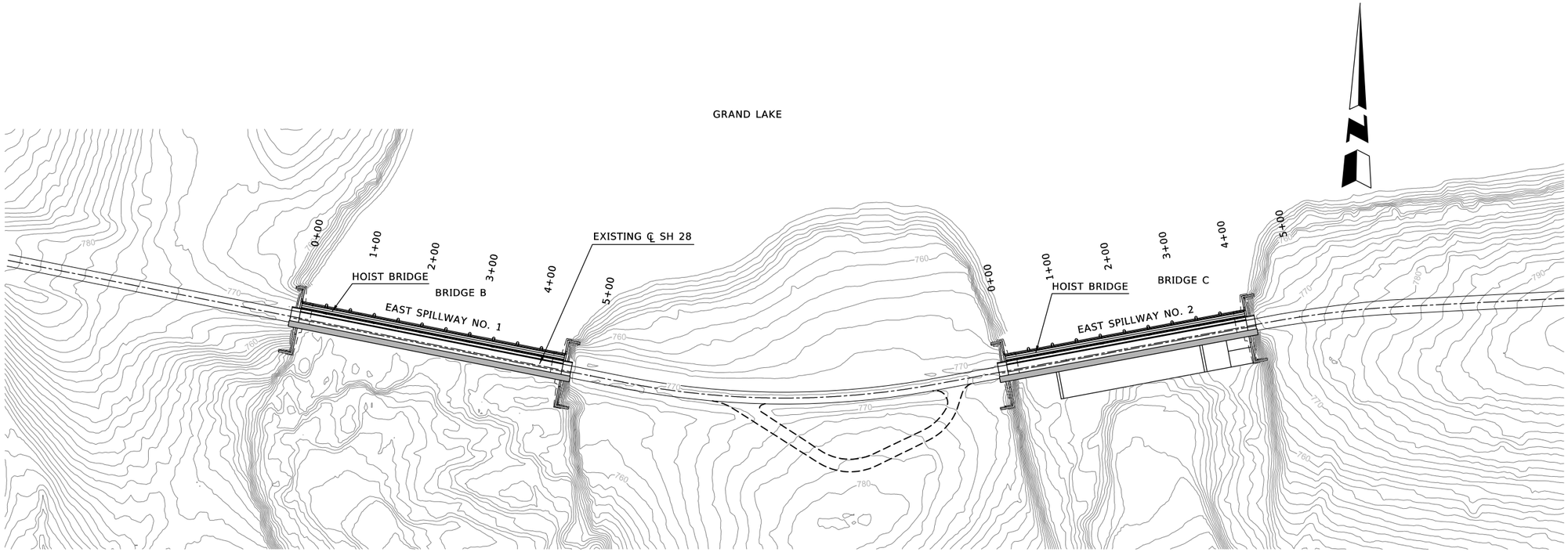
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DRAWN			
CHECKED			CATWALK DETAILS
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0025

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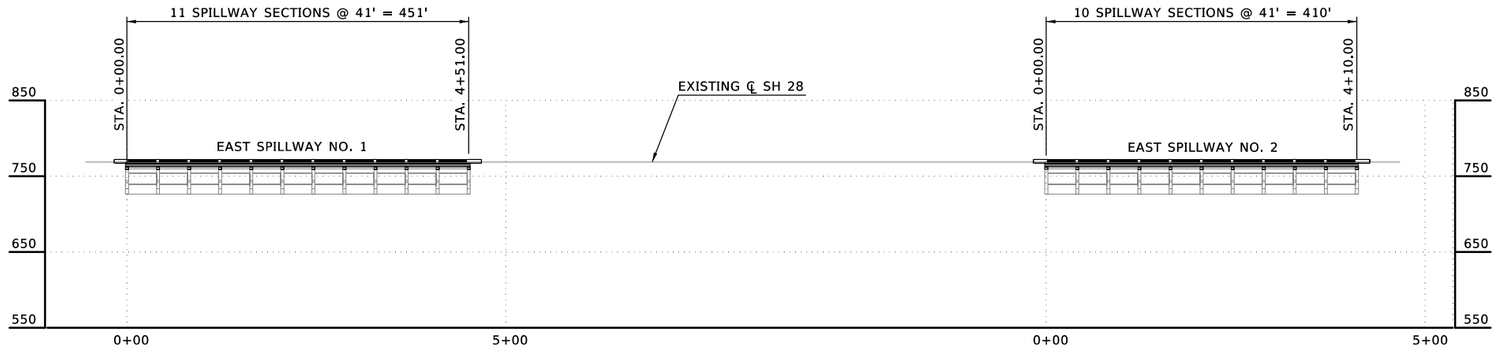
GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF EAST SPILLWAYS

SCALE: 1 = 100'



DOWNSTREAM ELEVATION OF EAST SPILLWAYS

SCALE: 1 = 100'

BRIDGE B&C

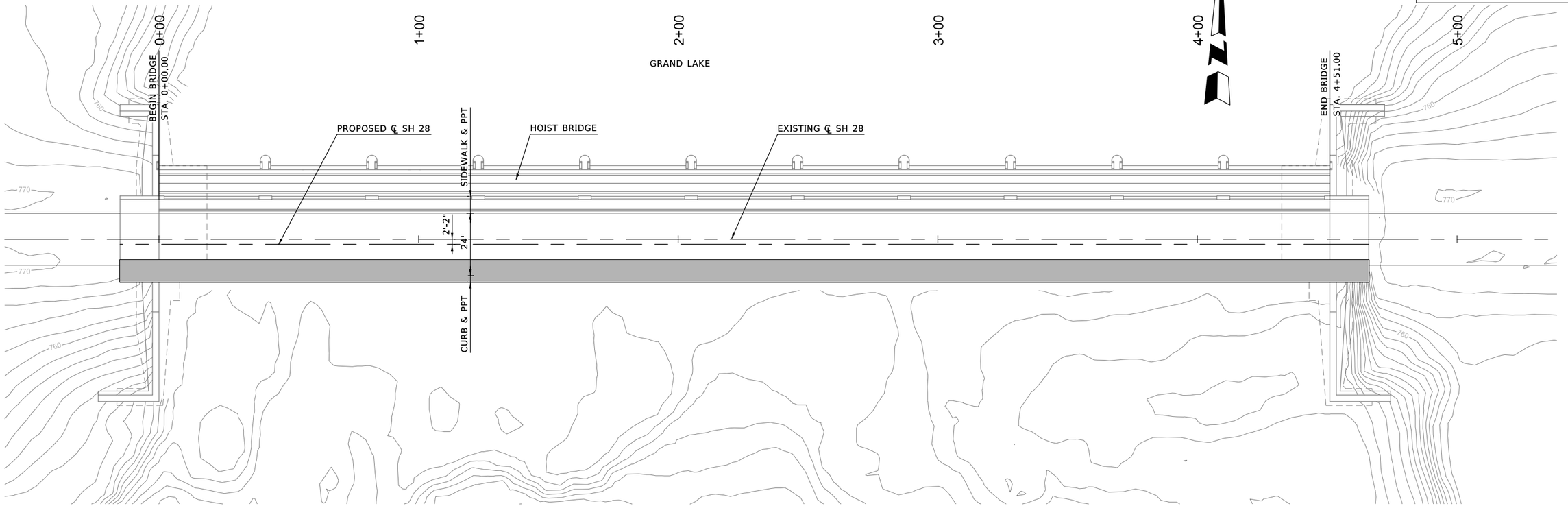
DESIGN	KSJ	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			GENERAL EAST SPILLWAY PLAN AND ELEVATION
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0026

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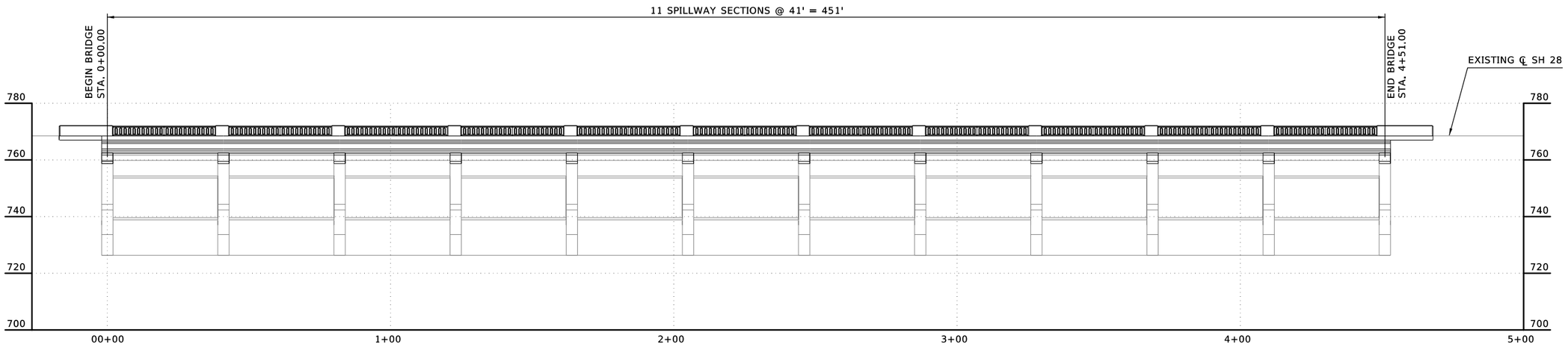
GRAND RIVER DAM AUTHORITY

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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF EAST SPILLWAY NO. 1

SCALE: 1 = 20'



DOWNSTREAM ELEVATION OF EAST SPILLWAY NO. 1

SCALE: 1 = 20'

BRIDGE B

DESIGN	KSJ	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

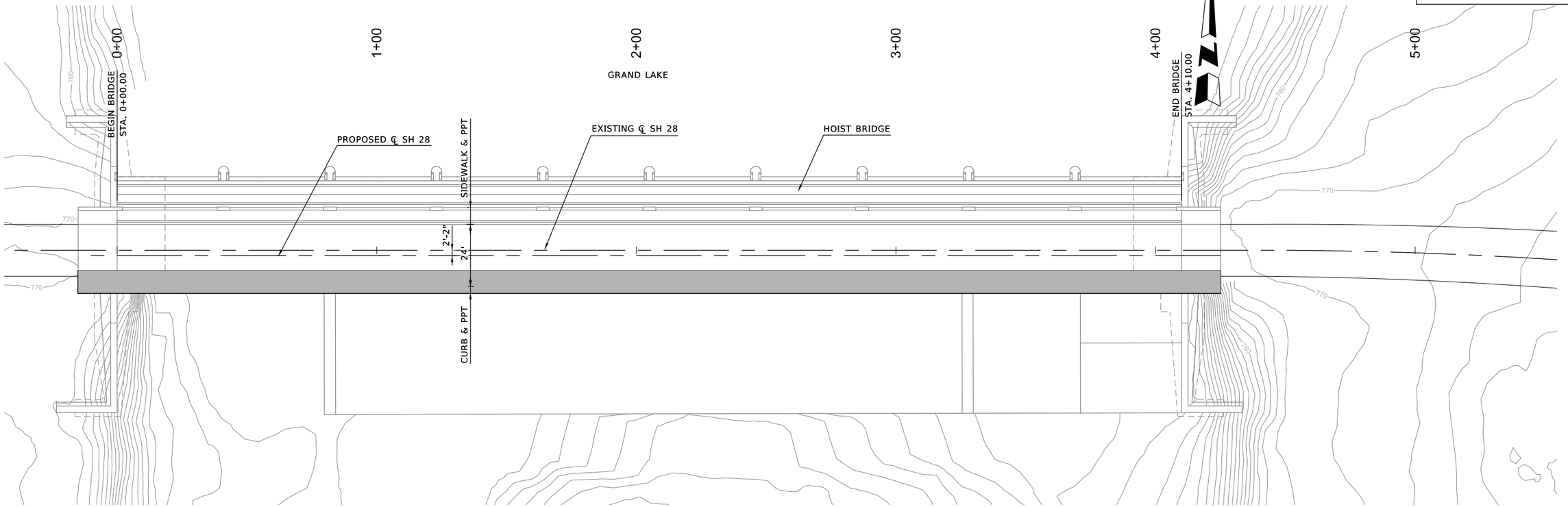
GENERAL EAST SPILLWAY NO. 1
PLAN AND ELEVATION
℄ STA. 2+25.50

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0027

6/29/2018
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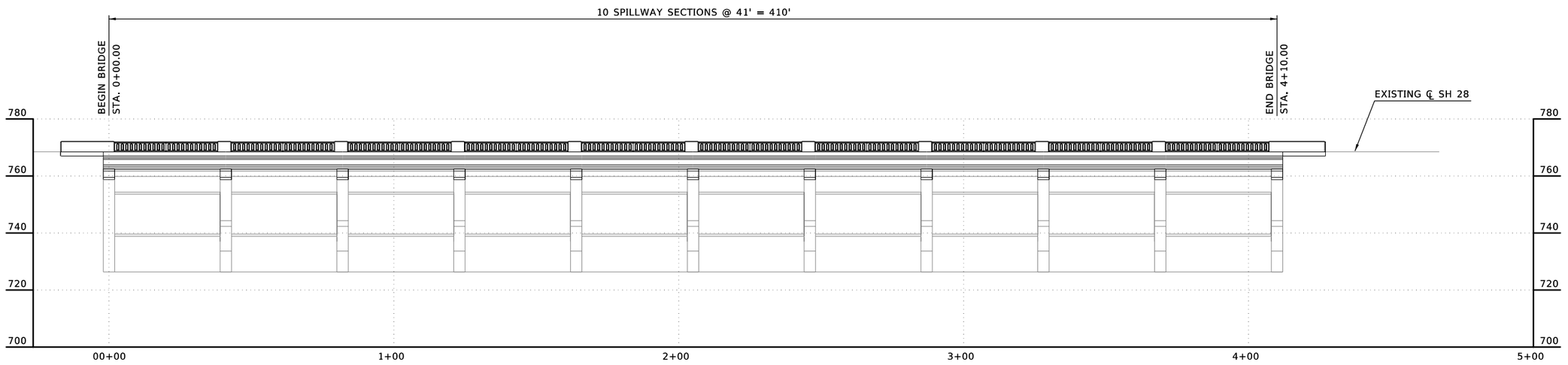
GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF EAST SPILLWAY NO. 2

SCALE: 1 = 20'



DOWNSTREAM ELEVATION OF EAST SPILLWAY NO. 2

SCALE: 1 = 20'

BRIDGE C

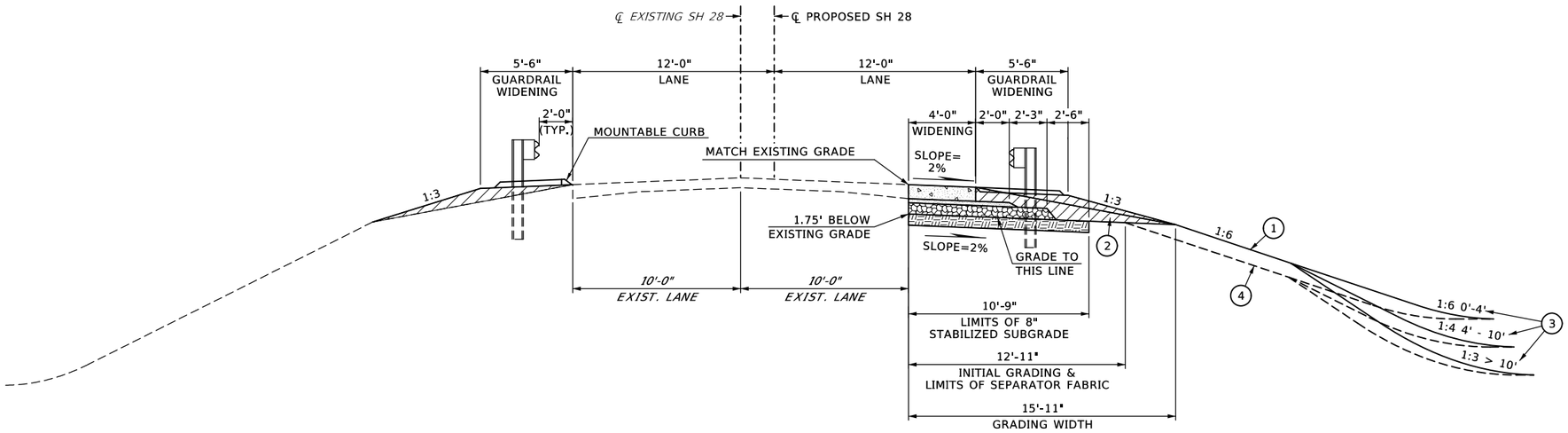
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DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

GENERAL EAST SPILLWAY NO. 2
PLAN AND ELEVATION
℄ STA. 2+05.00

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0028

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PAVEMENT REQUIREMENT	
PAVEMENT STRUCTURE	4'-0" WIDENING
SURFACE COURSE	10" TIED PC PAVEMENT
BASE COURSE	3" SUPERPAVE, TYPE S3(PG 64-22 OK)
	8" AGGREGATE BASE TYPE A

A TYPICAL SECTION - SH 28

N.T.S.

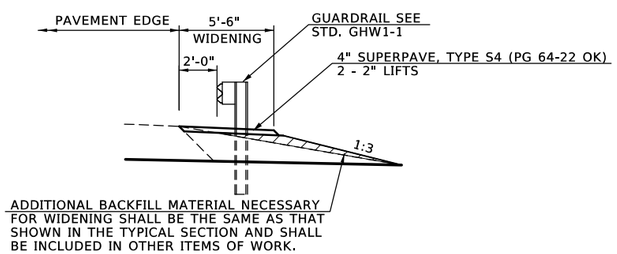
(1) PERMANENT SLOPE PROTECTION.

(2) TO BE BACKFILLED & COMPACTED AS PART OF THE FINISHING OPERATIONS. COST TO BE INCLUDED IN TBSC TYPE E.

(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

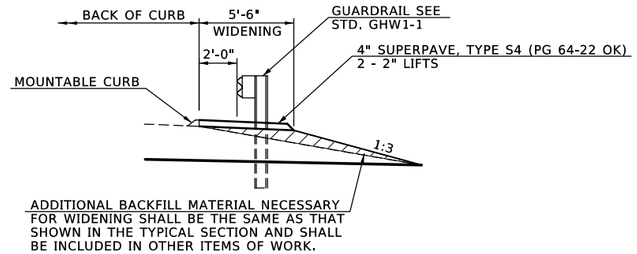
(4) TOPSOIL NOTE :
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL,STOCKPILE IT AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETE SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATION SHALL BE INCLUDED IN THE PAY ITEMS FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO TOP OF THE SOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND TOPSOIL QUANTITY IS INCLUDED IN THE SUMMARIZED EARTHWORK.



GUARDRAIL WIDENING DETAIL

N.T.S.



GUARDRAIL WIDENING DETAIL W/ MOUNTABLE CURB

N.T.S.

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JDH	2/18	
CHECKED			TYPICAL SECTION
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0029

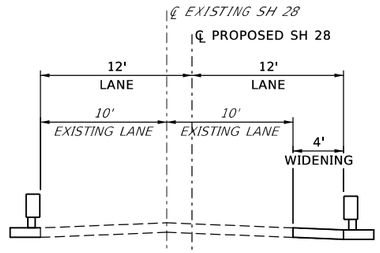
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6/29/2018

GRAND RIVER DAM AUTHORITY

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PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

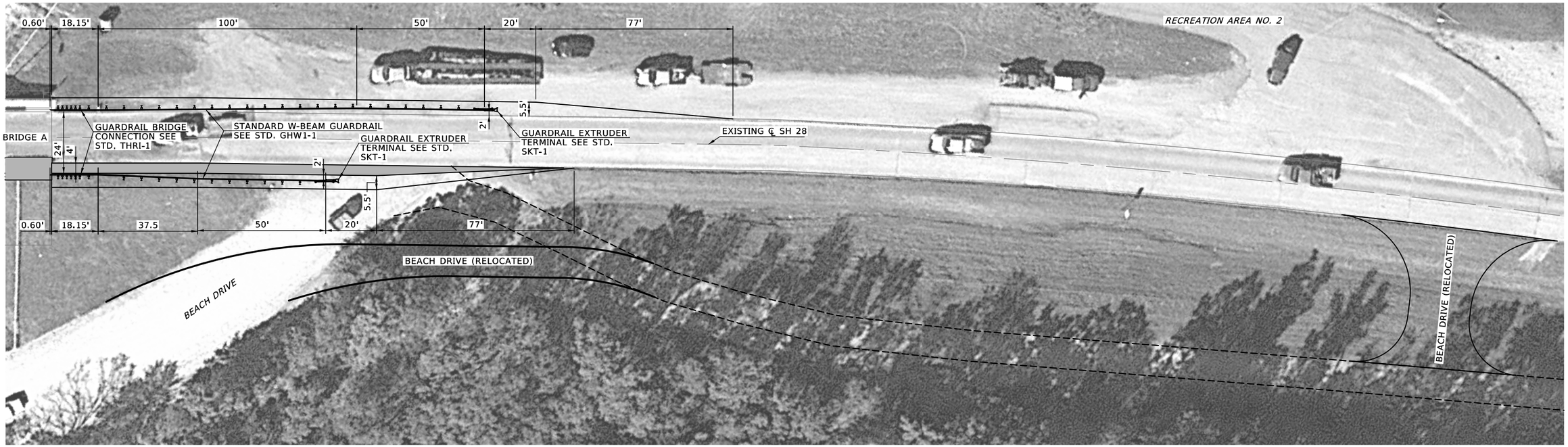




SECTION A-A

PLAN OF MAIN DAM & SPILLWAY WEST END

SCALE: 1 = 40'



PLAN OF MAIN DAM & SPILLWAY EAST END

SCALE: 1 = 40'

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

MAIN DAM & SPILLWAY
ROADWAY, BARRIER
AND GUARDRAIL LAYOUT

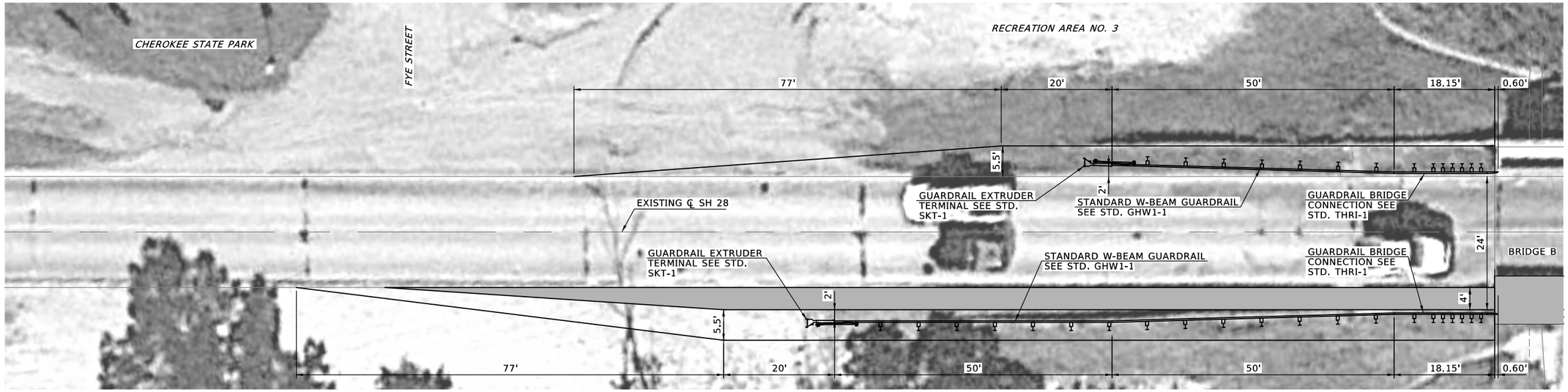
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0030

P:\FDB\1650-TUL\CIV\140204-GRDA-PensDam\20_DESIGN\40_CAD\C\Roadway\41806 MAIN DAM ROADWAY, BARRIER AND GUARDRAIL2018 MODEL.dgn

6/29/2018

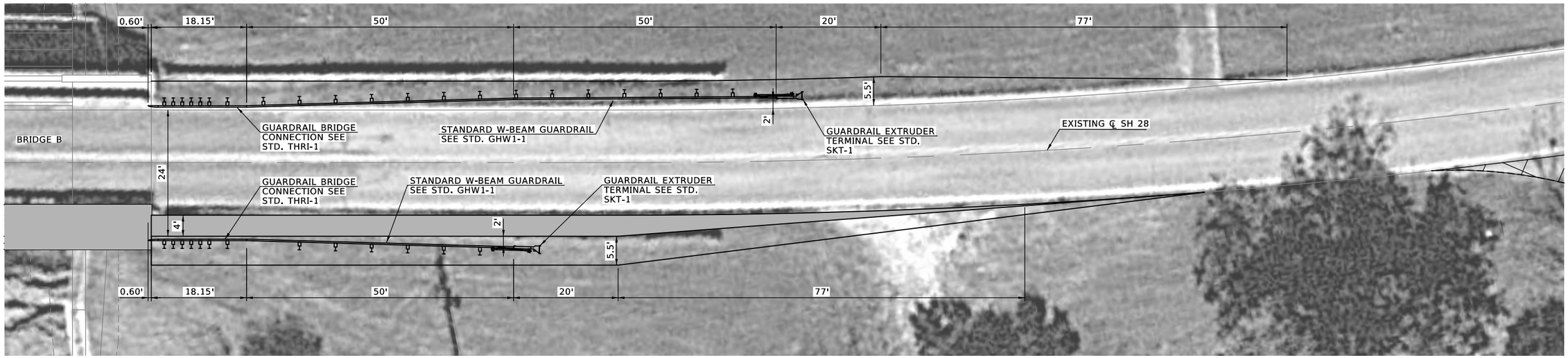
GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF EAST SPILLWAY NO. 1 WEST END

SCALE: 1 = 20'



PLAN OF EAST SPILLWAY NO. 1 EAST END

SCALE: 1 = 20'

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

EAST SPILLWAY NO. 1
ROADWAY AND GUARDRAIL LAYOUT

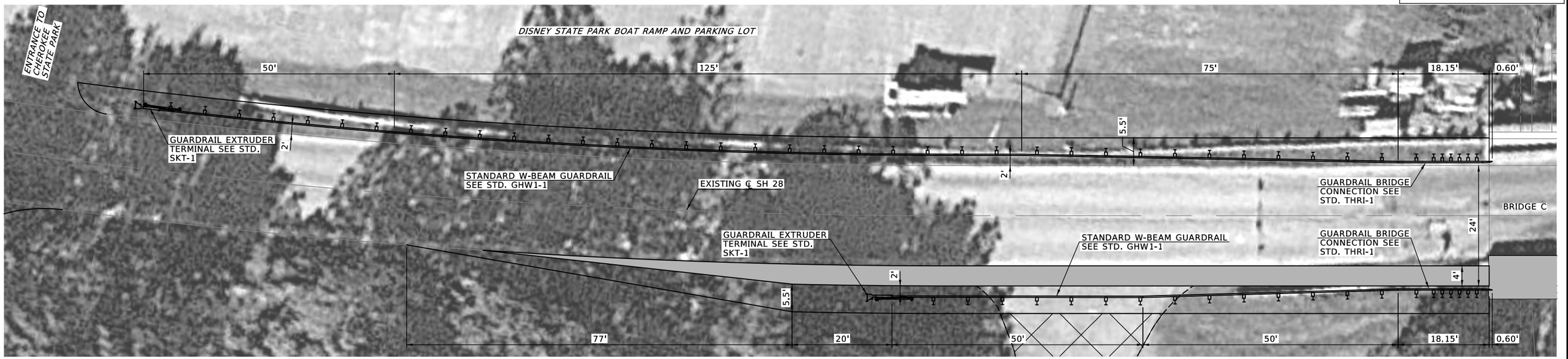
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0031

P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20_DESGN\40_CAD\C\Roadway\41806 EAST SPILLWAY NO. 1ROADWAY AND GUARDRAIL2.2.dgn

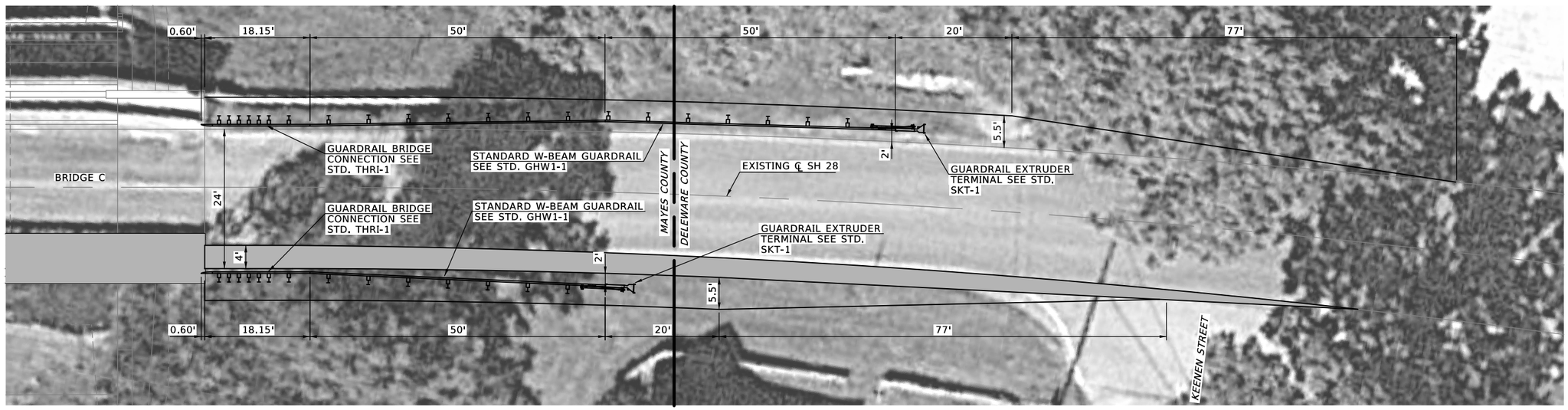
6/29/2018

GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF EAST SPILLWAY NO. 2 WEST END
SCALE: 1 = 20'



PLAN OF EAST SPILLWAY NO. 2 EAST END
SCALE: 1 = 20'

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

EAST SPILLWAY NO. 2
ROADWAY AND GUARDRAIL LAYOUT

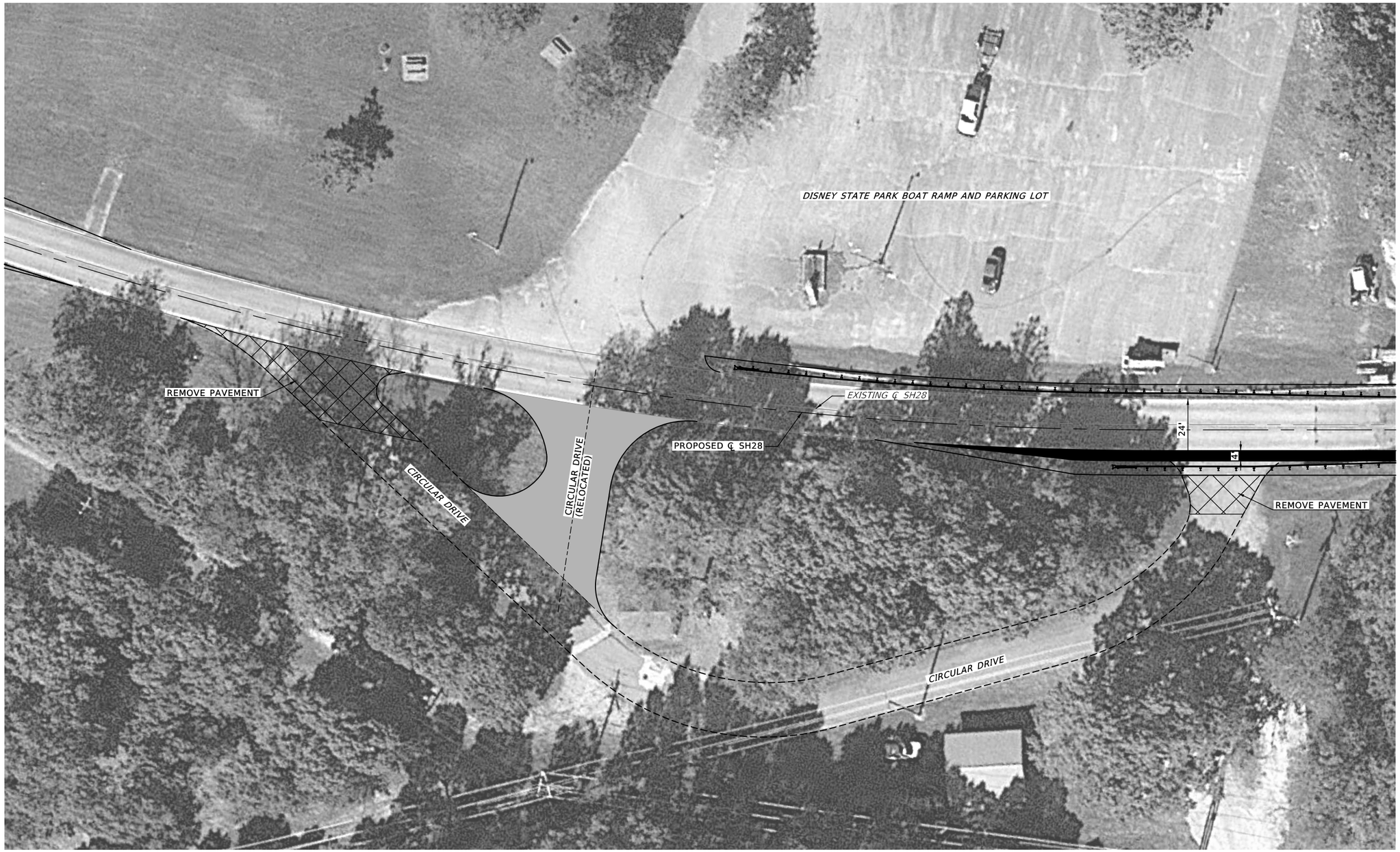
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0032

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6/29/2018
2:27:32 PM
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GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF CIRCULAR DRIVE SOUTH OF DISNEY STATE PARK
SCALE: 1 = 40'

DESIGN	LLW	2/18
DRAWN	JDH	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

CIRCULAR DRIVE REALIGNMENT
SOUTH OF DISNEY STATE PARK

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0033

6/29/2018
2:27:40 PM
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20_DESGN\40_CAD\C\Roadway\EMERGENCY DETOUR ROUTES.dgn

GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



NOT TO SCALE

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JDH	2/18	
CHECKED			EMERGENCY DETOUR ROUTES
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0034

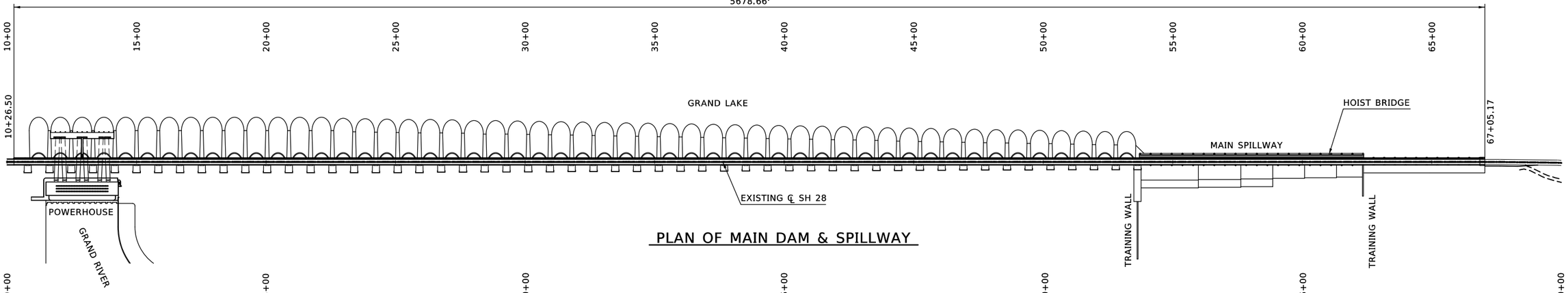
6/29/2018

GRAND RIVER DAM AUTHORITY

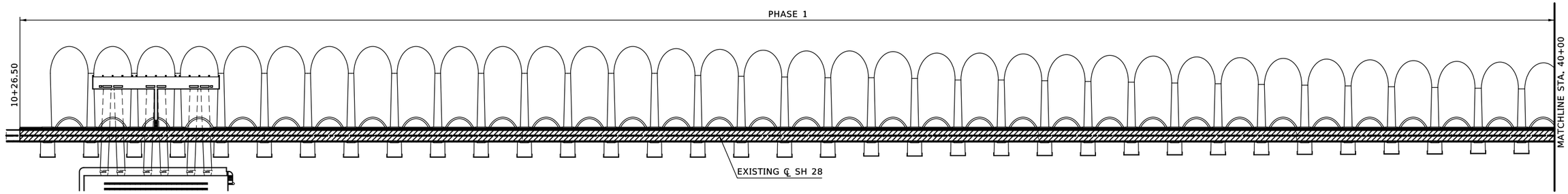
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

PHASE 1

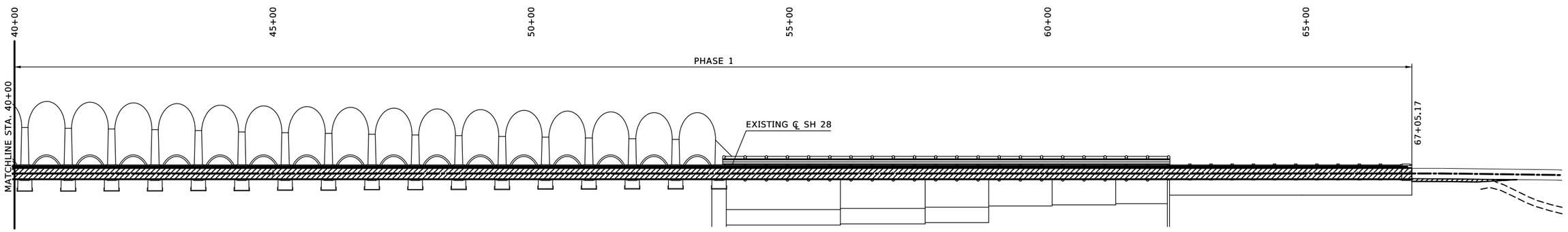
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
Main Dam & Spillway	(*widening, hydrodemolition, overlay*)	SH 28 Westbound: closed, on Detour
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

LEGEND:

WORK ZONE

BRIDGE A

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

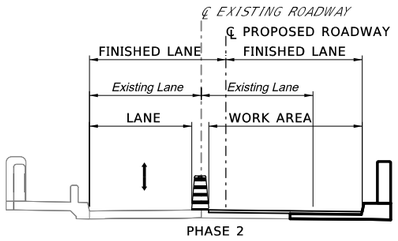
GRAND RIVER DAM AUTHORITY

CONSTRUCTION SEQUENCE
MAIN DAM & SPILLWAY
PHASE 1

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0035

P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20_DESGN\40_CAD\C\Construction Sequence\CONSTRUCTION SEQUENCE 01.dgn 2:27:46 PM

6/29/2018



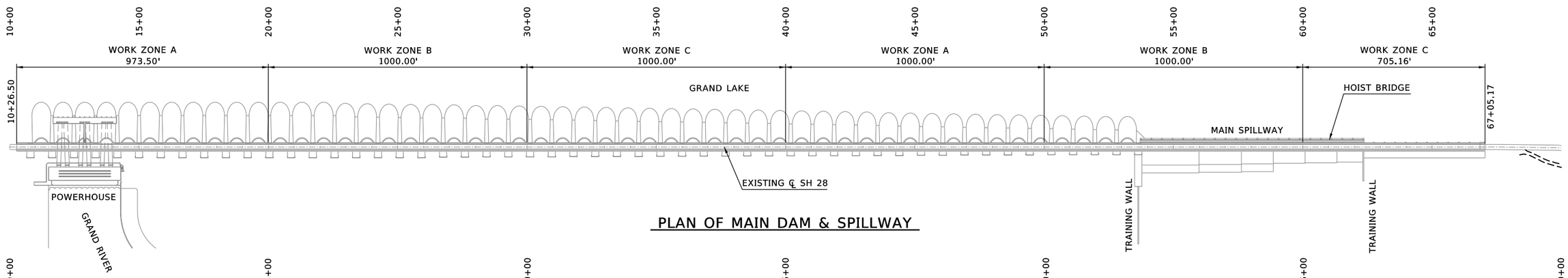
PHASE 2

ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on downstream side (*rehabilitation*	SH 28 Eastbound: open, on SH 28 Westbound in work zones
Main Dam & Spillway	*below bridge deck*)	SH 28 Westbound: open
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open

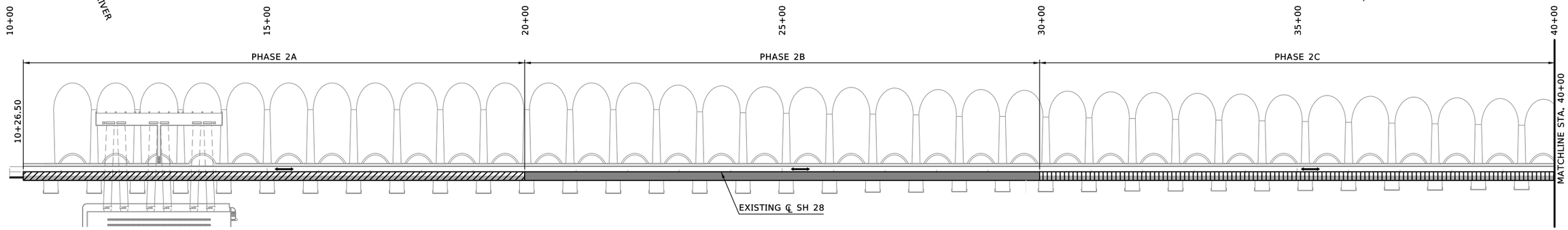
Due to the length of the Main Dam & Spillway, work zone lengths shall be limited to 1000 feet. A maximum of two work zones, separated by 2000 feet, can be operational at one time.

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

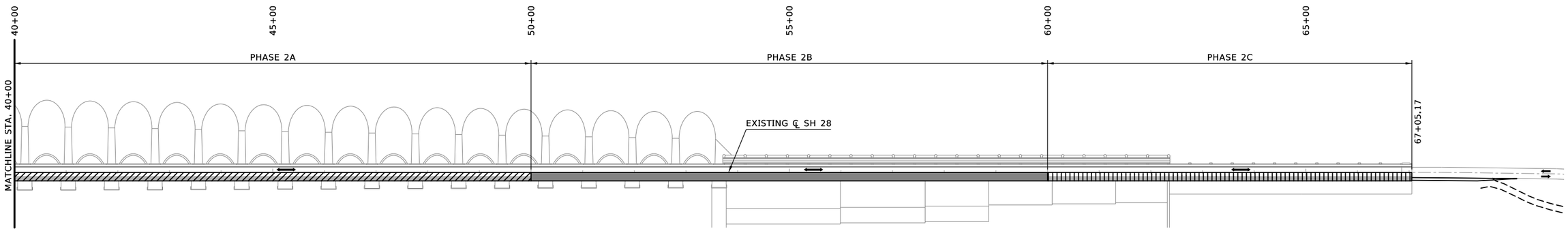
PHASE 2
WORK ZONE



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

LEGEND:

- WORK ZONE A
- WORK ZONE B
- WORK ZONE C
- TRAFFIC FLOW DIRECTION

BRIDGE A

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

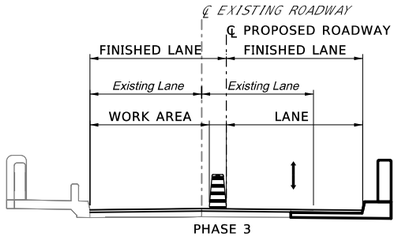
GRAND RIVER DAM AUTHORITY

CONSTRUCTION SEQUENCE
MAIN DAM & SPILLWAY
PHASE 2

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0036

P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20_DESGN\40_CAD\C\Construction Sequence\CONSTRUCTION SEQUENCE 02.dgn 2:27:47 PM

6/29/2018



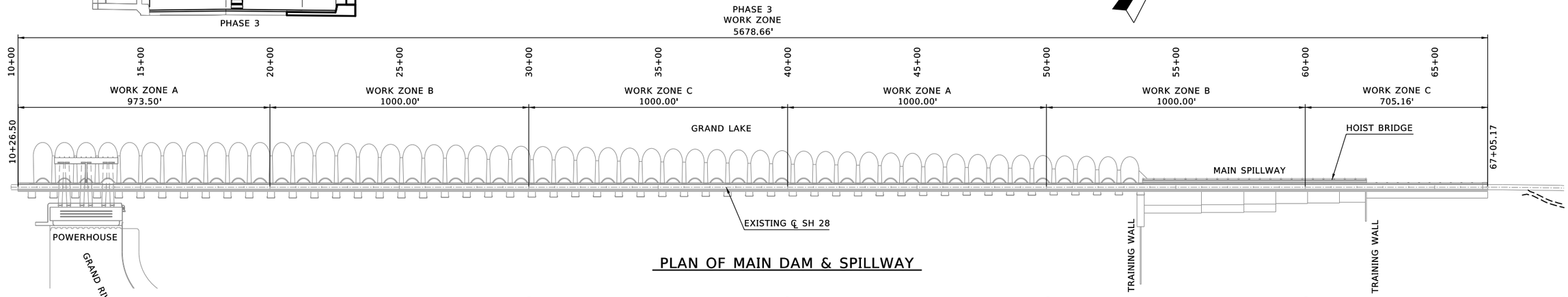
PHASE 3

ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on upstream side (*rehabilitation*	SH 28 Eastbound: open
Main Dam & Spillway	*below bridge deck*)	SH 28 Westbound: open, on SH 28 Eastbound in work zones
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open

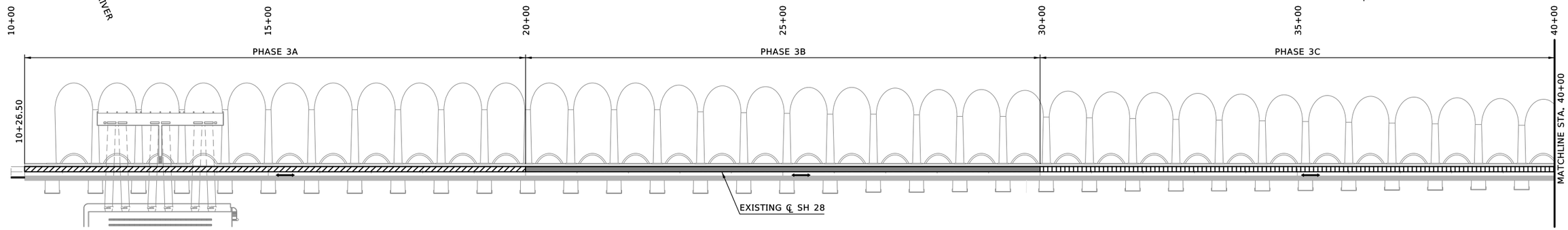
Due to the length of the Main Dam & Spillway, work zone lengths shall be limited to 1000 feet. A maximum of two work zones, separated by 2000 feet, can be operational at one time.

GRAND RIVER DAM AUTHORITY

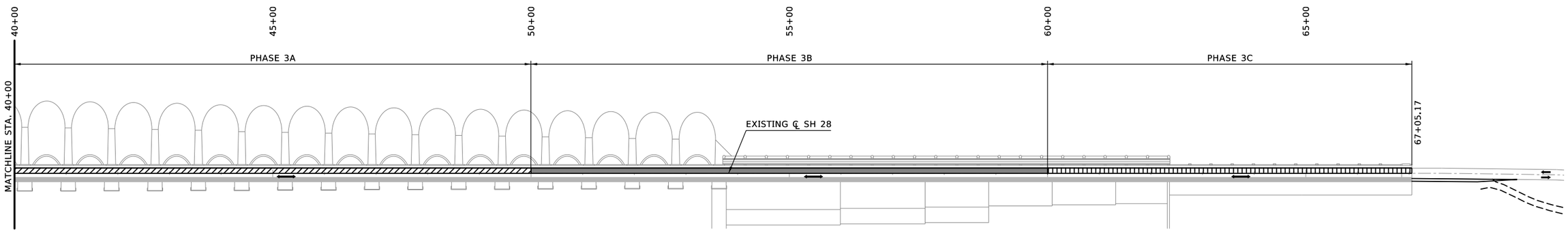
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

LEGEND:

- WORK ZONE A
- WORK ZONE B
- WORK ZONE C
- TRAFFIC FLOW DIRECTION

BRIDGE A

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

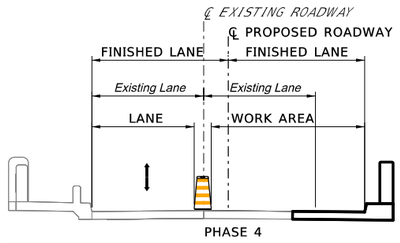
CONSTRUCTION SEQUENCE
MAIN DAM & SPILLWAY
PHASE 3

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0037

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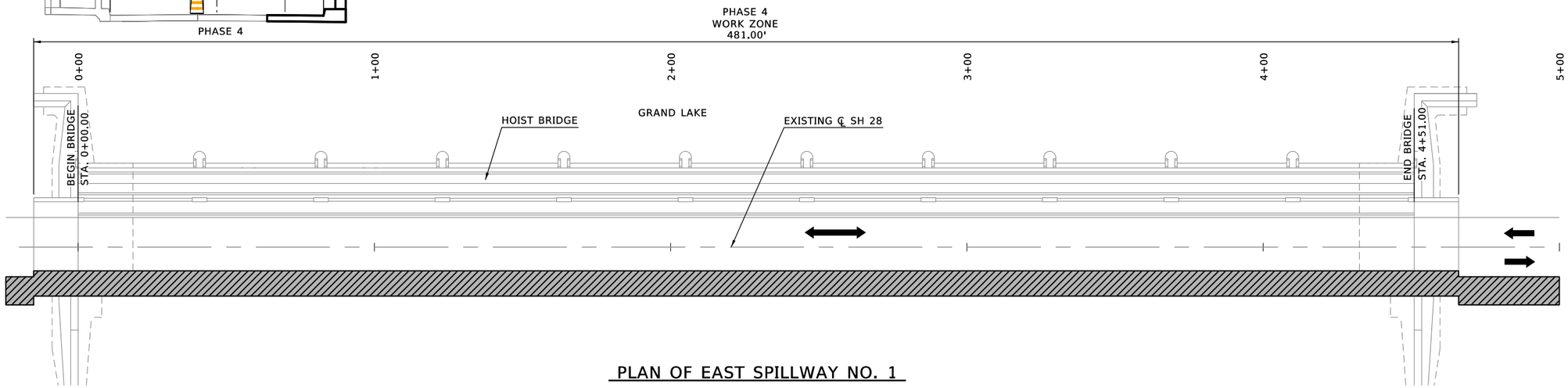
6/29/2018

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



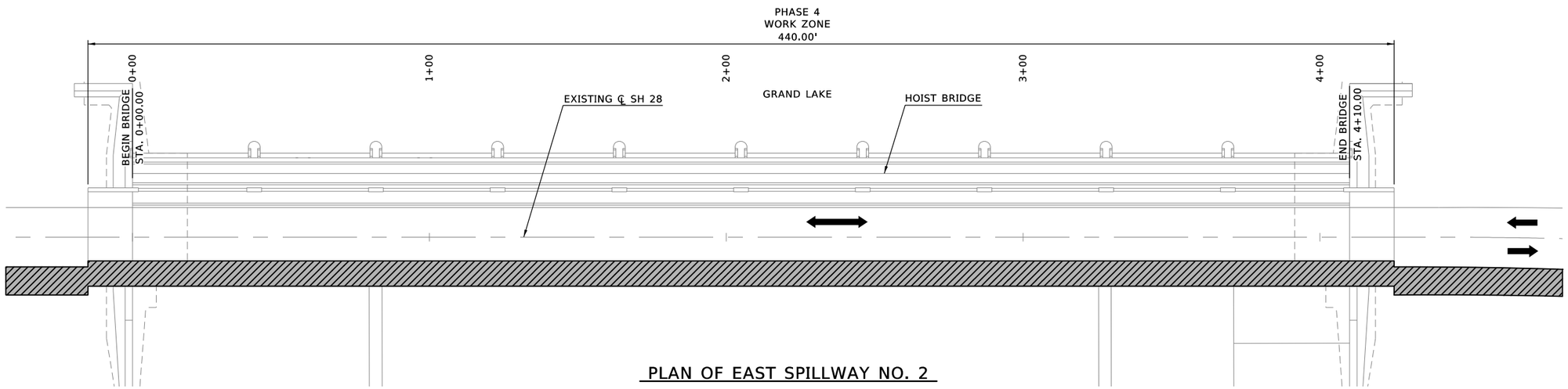
PHASE 4

ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway		SH 28 Westbound: open
Bridge B	Construction on downstream side (*widening*)	SH 28 Eastbound: closed, on SH 28 Westbound in work zone
East Spillway No. 1		SH 28 Westbound: open
Bridge C	Construction on downstream side (*widening*)	SH 28 Eastbound: closed, on SH 28 Westbound in work zone
East Spillway No. 2		SH 28 Westbound: open



PLAN OF EAST SPILLWAY NO. 1

BRIDGE B



PLAN OF EAST SPILLWAY NO. 2

BRIDGE C

LEGEND:

WORK ZONE

TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

CONSTRUCTION SEQUENCE
EAST SPILLWAY NO. 1
& EAST SPILLWAY NO. 2
PHASE 4

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0038

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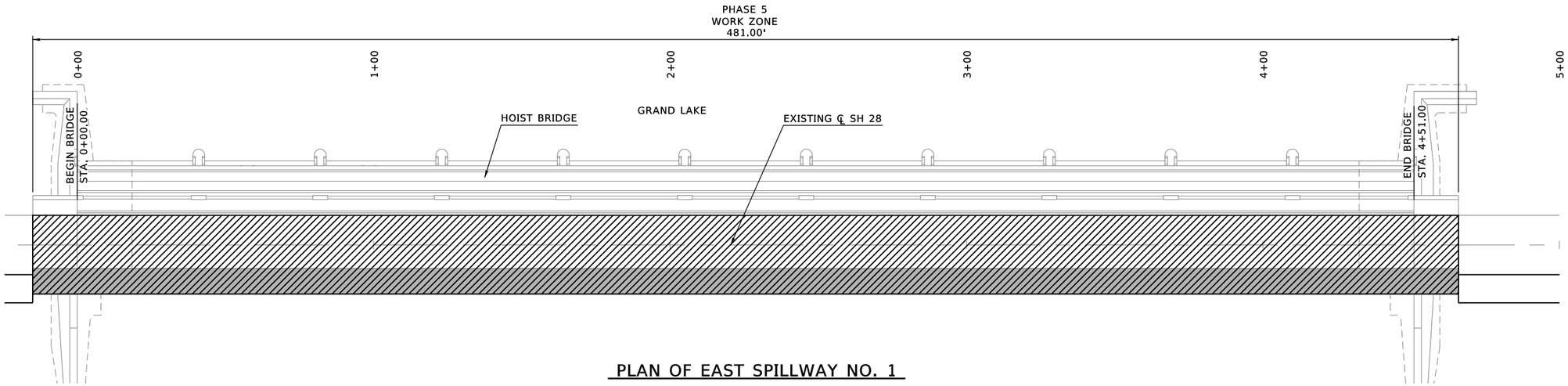
6/29/2018

GRAND RIVER DAM AUTHORITY

60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

PHASE 5

ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway		SH 28 Westbound: open
Bridge B	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
East Spillway No. 1	(*hydrodemolition, overlay*)	SH 28 Westbound: closed, on Detour
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open

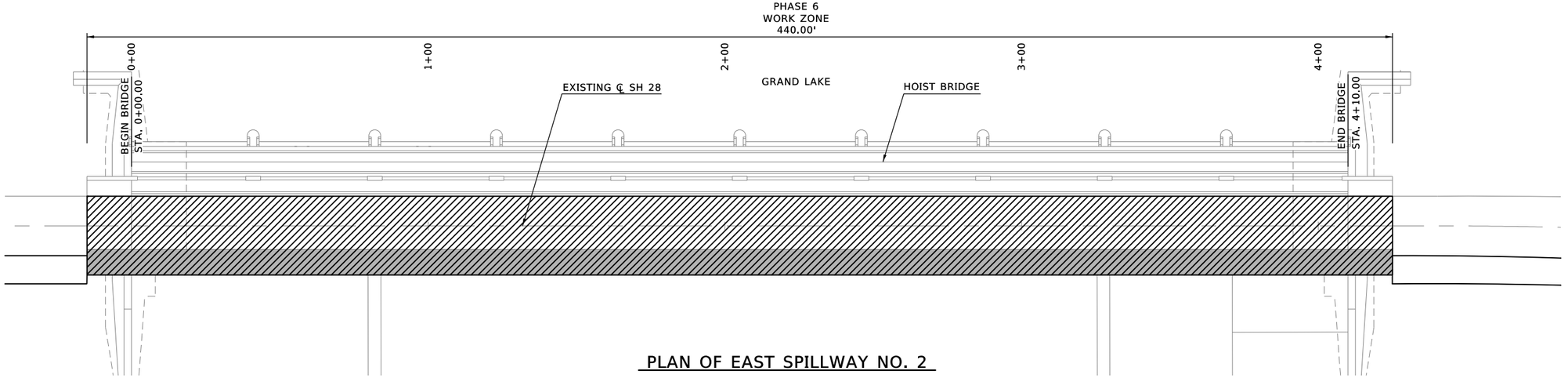


PLAN OF EAST SPILLWAY NO. 1

BRIDGE B

PHASE 6

ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway		SH 28 Westbound: open
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
East Spillway No. 2	(*hydrodemolition, overlay*)	SH 28 Westbound: closed, on Detour



PLAN OF EAST SPILLWAY NO. 2

BRIDGE C

LEGEND:

WORK ZONE

TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

CONSTRUCTION SEQUENCE EAST SPILLWAY NO. 1 & EAST SPILLWAY NO. 2 PHASES 5 AND 6

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0039

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6/29/2018
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GRAND RIVER DAM AUTHORITY

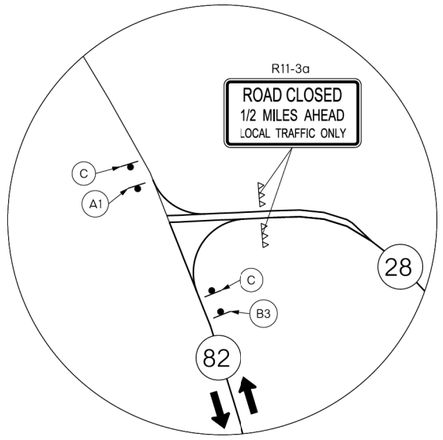
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

	A	B
	DETOUR M4-8 EAST M3-2 28 M1-6(3)	DETOUR M4-8 WEST M3-4 28 M1-6(3)
1	M6-3	M6-3
2	M6-1(R)	M6-1(R)
3	END M4-6	END M4-6

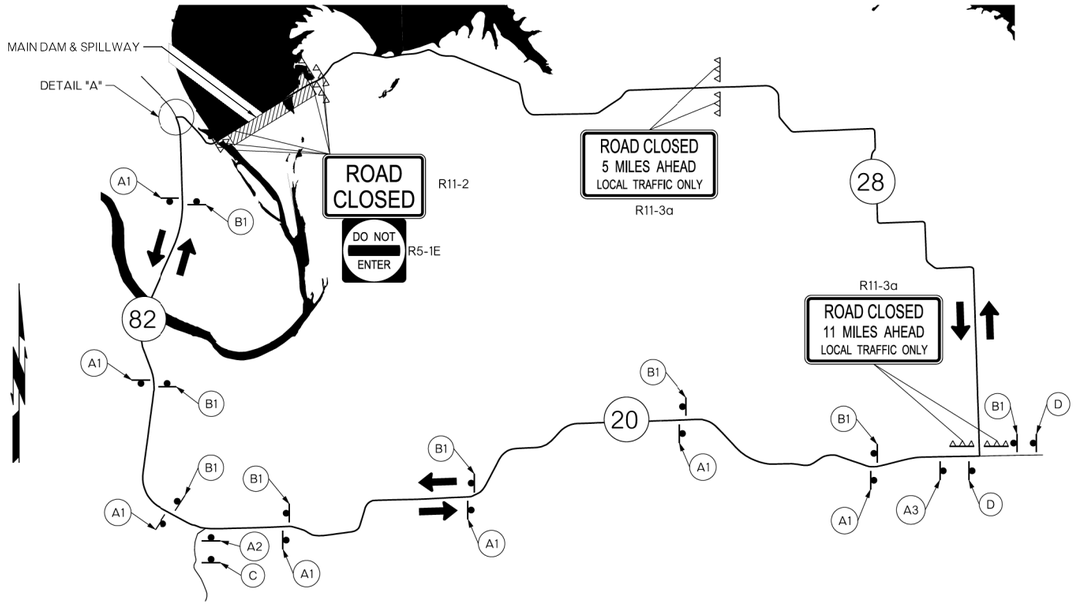
C	D
CONSTRUCTION 28 EAST TO 20 CLOSED	CONSTRUCTION 28 WEST TO 82 CLOSED

* SEE SPECIAL SIGN DETAILS SHEET

SIGN ASSEMBLY DETAILS



DETAIL "A"



LEGEND

- SIGN
- TYPE III BARRICADES
- WORK AREA
- A1
- DETOUR EAST 28

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	TRAFFIC CONTROL PLAN PHASE 1
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0040

6/29/2018
2:28:00 PM
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GRAND RIVER DAM AUTHORITY

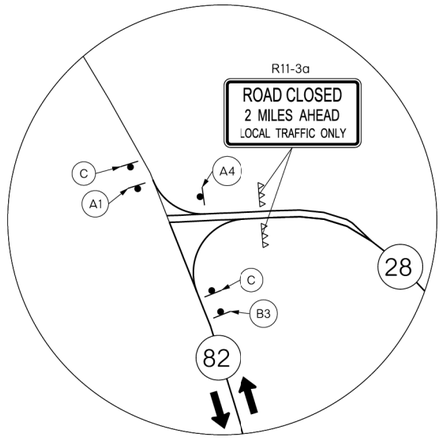
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018

	A	B
	DETOUR M4-8 EAST M3-2 28 M1-6(3)	DETOUR M4-8 WEST M3-4 28 M1-6(3)
1	M6-3	M6-3
2	M6-1(R)	M6-1(R)
3	END M4-6	END M4-6
4	M6-1(L)	M6-1(L)

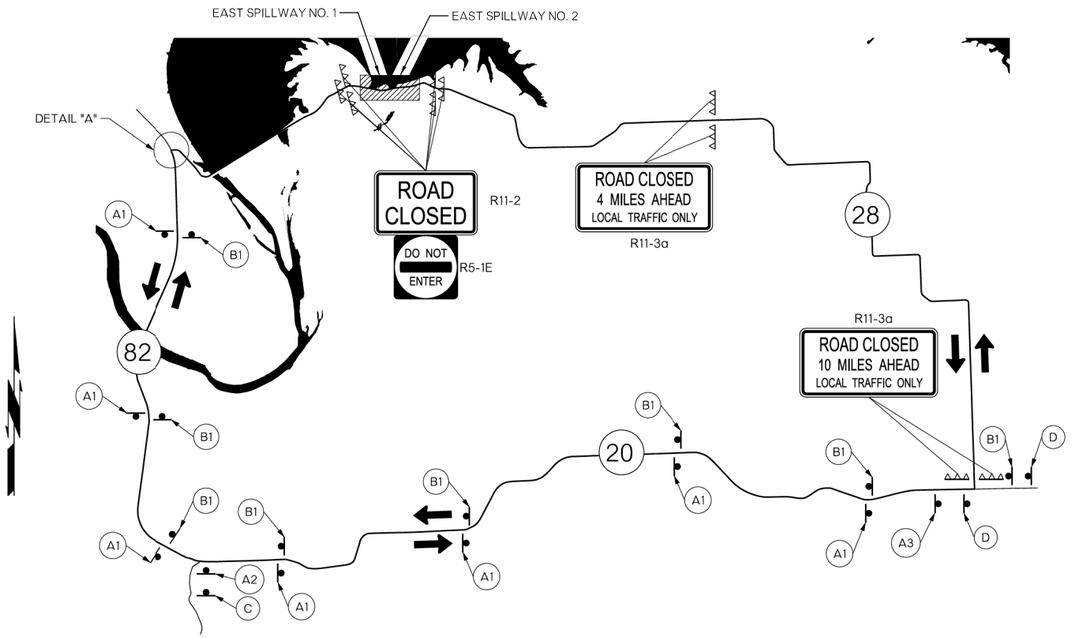
C	D
CONSTRUCTION 28 EAST TO 20 CLOSED	CONSTRUCTION 28 WEST TO 82 CLOSED

* SEE SPECIAL SIGN DETAILS SHEET

SIGN ASSEMBLY DETAILS



DETAIL "A"



LEGEND

- SIGN
- TYPE III BARRICADES
- WORK AREA
- A1
- DETOUR EAST 28

NOTE:
PHASE 5: EAST SPILLWAY NO. 1 CLOSED; EAST SPILLWAY NO. 2 OPEN
PHASE 6: EAST SPILLWAY NO. 1 OPEN; EAST SPILLWAY NO. 2 CLOSED

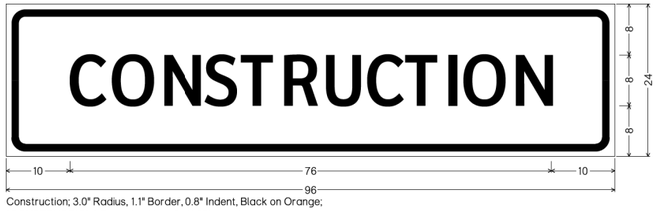
DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

TRAFFIC CONTROL PLAN
PHASES 5 AND 6

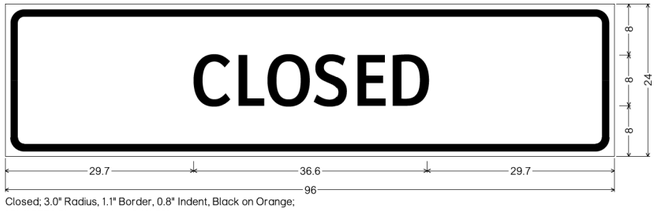
COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0041

GRAND RIVER DAM AUTHORITY
60%
PLANS
W/ COMMENTS INCORPORATED
JUNE 2018



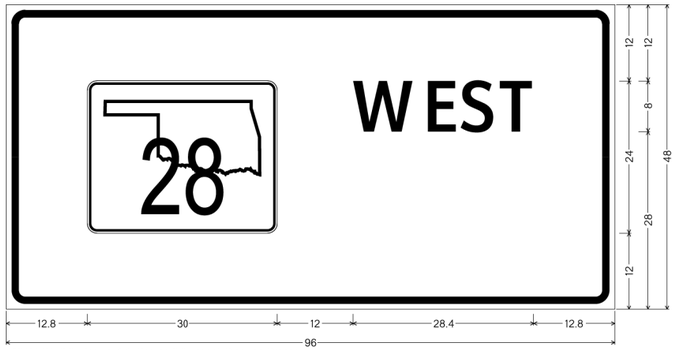
Construction; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
[CONSTRUCTION] ClearviewHwy-3-W 62} spacing;

SPECIAL SIGN NO. 1



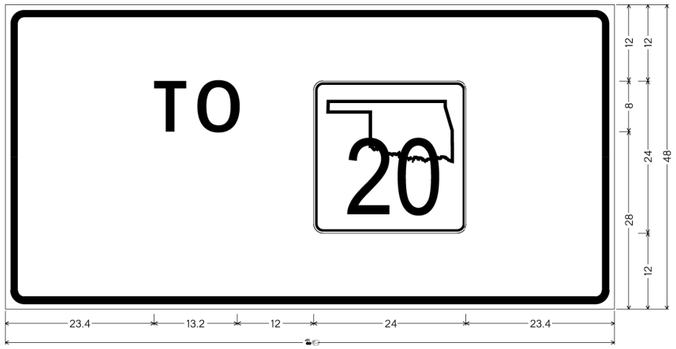
Closed; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
[CLOSED] ClearviewHwy-3-W 58} spacing;

SPECIAL SIGN NO. 2



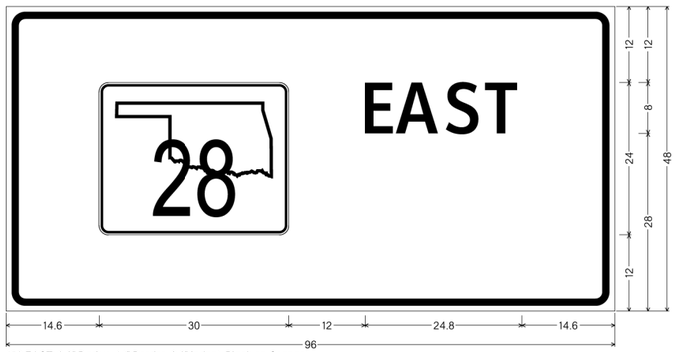
152 WEST; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
Rectangle White; [WEST] ClearviewHwy-3-W;

SPECIAL SIGN NO. 3



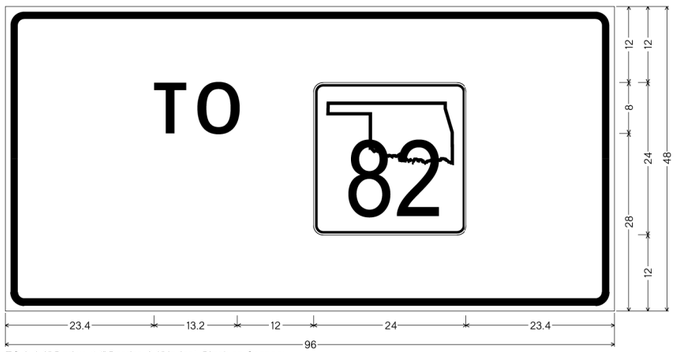
TO 44; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
[TO] ClearviewHwy-3-W; Rectangle White;

SPECIAL SIGN NO. 4



152 EAST; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
Rectangle White; [EAST] ClearviewHwy-3-W;

SPECIAL SIGN NO. 5



TO 6; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;
[TO] ClearviewHwy-3-W; Rectangle White;

SPECIAL SIGN NO. 6

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

TRAFFIC CONTROL
SPECIAL SIGN DETAILS

COUNTY MAYES HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0042

P:\FDB\650-TUL\CIV\140020A-GRDA-PensDam\20_DESIGN\40_CADD\C\Traffic Control\TRAFFIC CONTROL 03.dgn 2:28:08 PM