

# SINGLE BARREL 20'-0" X 12'-0" CONCRETE BOX CULVERT STA 13+55 DEER CROSSING UNDERPASS SAGE JUNCTION EAST

N121098

LINCOLN COUNTY

## PRELIMINARY

GENERAL NOTES

**SPECIFICATIONS:** WYDOT Standard Specifications for Road and Bridge Construction, 2010 Edition.

**DIMENSIONS:** Longitudinal dimensions are along flow line. Slopes are vertical : horizontal.

**REINFORCING STEEL:** Ensure reinforcing steel conforms to ASTM A 615 (Grade 60) for all bars, including ties and stirrups. Concrete cover to face of reinforcing steel is 2" unless noted. Dimensions for bent bars are out to out. Ensure bars marked with an asterisk (\*) are coated.

BAR MARKS



**EYEBOLTS:** Use galvanized bar conforming to ASTM A 709 (Grade 36). Work necessary for the eyebolts is incidental to the contract pay item Class A Concrete.

**WEEP HOLE ASSEMBLIES:** Work necessary for the weep hole assemblies is incidental to the contract pay item Class A Concrete.

**PREFORMED EXPANSION JOINT FILLER:** Work necessary for the preformed expansion joint filler is incidental to the contract pay item Class A Concrete.

**CULVERT EXCAVATION:** The estimated quantity of culvert excavation is 3060 CY and is incidental to the contract pay item Class A Concrete.

**CULVERT SUBEXCAVATION:** The bottom limits of culvert subexcavation is 3'-0" below the bottom of the culvert. Line the bottom of the culvert subexcavation with geotextile material separation. Backfill with pit run subbase conforming to grading J. The estimated quantity of culvert subexcavation is calculated in accordance with Standard Plan 206-1, Culvert and Trench Excavation.

**CULVERT BOTTOM BACKFILL:** Backfill the bottom of the culvert with 2'-0"± of excavated material from the adjacent highway embankment. Work necessary for backfilling is incidental to the contract pay item Class A Concrete.

**BRIDGE OFFICE NOTIFICATION:** The engineer will notify the State Bridge Engineer in writing within 14 calendar days after work has been completed at this structure.

DESIGN DATA

**SPECIFICATIONS:** AASHTO LRFD Bridge Design Specifications, 8th Edition.

**ADT:** 1945 (Year 2005)

LOADING:

- Live Load: HL93
- Lateral live load surcharge: 2 ft earth or 72 psf
- Dead Load: Design fill: 2.0 ft
- (1) Vertical earth pressure: 120 pcf
- Lateral earth pressure: 36 pcf
- (2) Vertical earth pressure: 120 pcf
- Lateral earth pressure: 72 pcf

**REINFORCED CONCRETE:** Load and Resistance Factor Design -  
Class A Concrete  $f'_c = 4000$  psi  
Reinforcing Steel  $f_y = 60,000$  psi (Grade 60)

**APPROACH ROADWAY WIDTH:** 40'-0"

REFERENCES

- Supplementary Specifications:  
 SS-100K Adjustment for Structural Steel  
 SS-500G Structural Concrete with Quality Control and Quality Acceptance

Standard Plans:  
 206-1A Culvert and Trench Excavation

STRUCTURE NO. LFN  
ML12B, RM 30.05 SEC 7, T21N, R119W

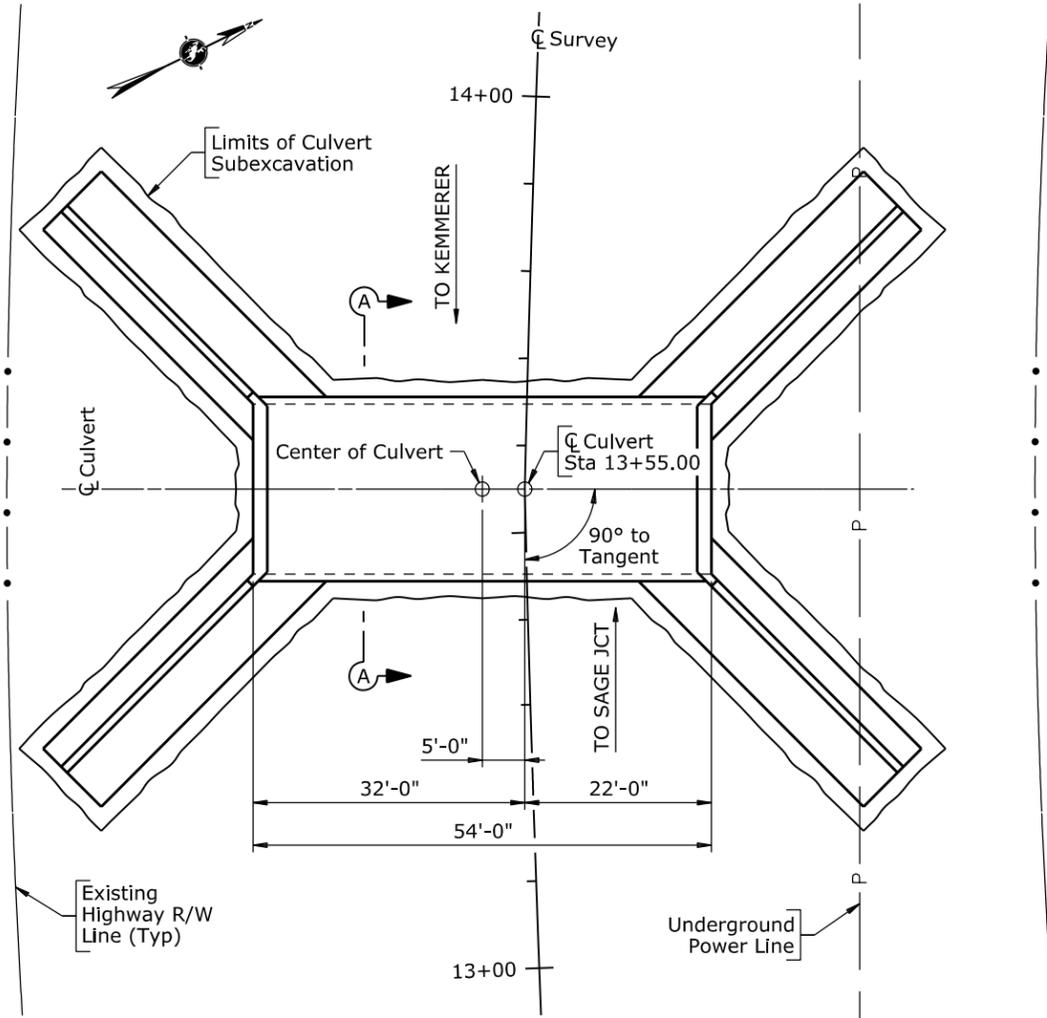
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206.03300	CULVERT SUBEXCAVATION	CY	X	
212.03900	PERVIOUS BACKFILL MATERIAL	CY	X	
217.01025	GEOTEXTILE, MATERIAL SEPARATION (NON-WOVEN)	SY	X	
301.01010	PIT RUN SUBBASE	CY	X	
503.01000	BRIDGE RAILING	FT	X	
513.00005	CLASS A CONCRETE	LS	LUMP SUM	X CY
514.00015	REINFORCING STEEL	LS	LUMP SUM	X LB
900.60000	CONTRACTOR QUALITY CONTROL (CONCRETE)	LS	LUMP SUM	

WYOMING DEPARTMENT OF TRANSPORTATION BRIDGE PROGRAM			
REVISIONS			
REVIEW _____	DESIGN _____	Design Section L M Nop	
APPROVAL _____	DETAIL <u>BBB</u> <u>GGG</u>	Drwg No. P-0006 Sheet 1 of 2	

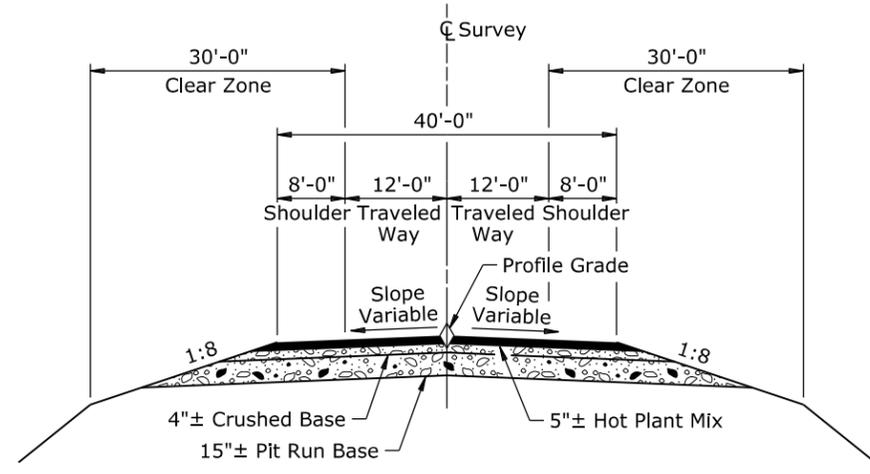
Nov 2018

4.01 - Example

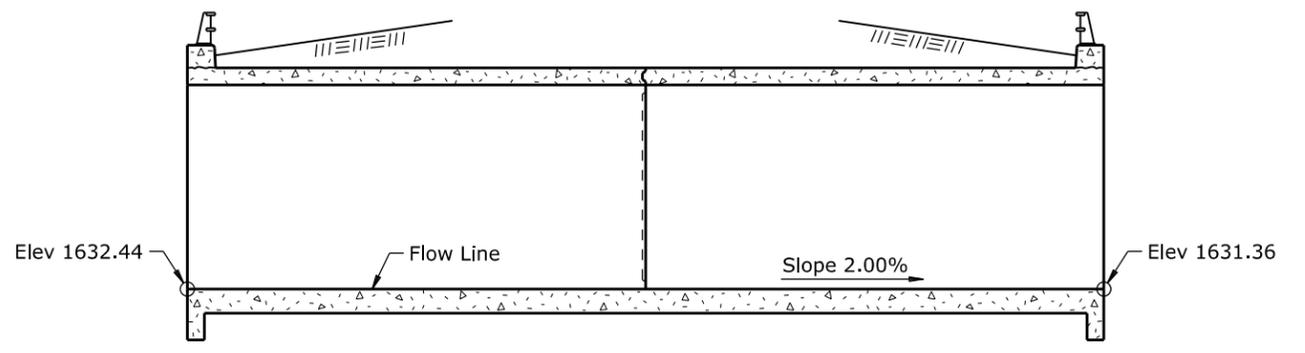
Wyo. Proj. N121098  
 Sheet of Sheets



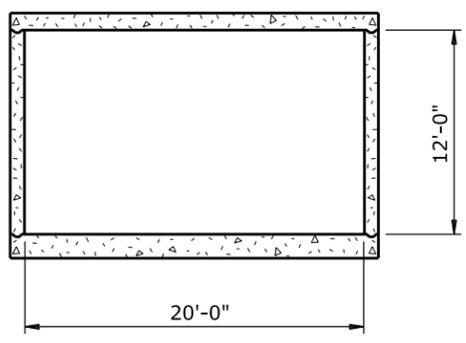
LOCATION PLAN



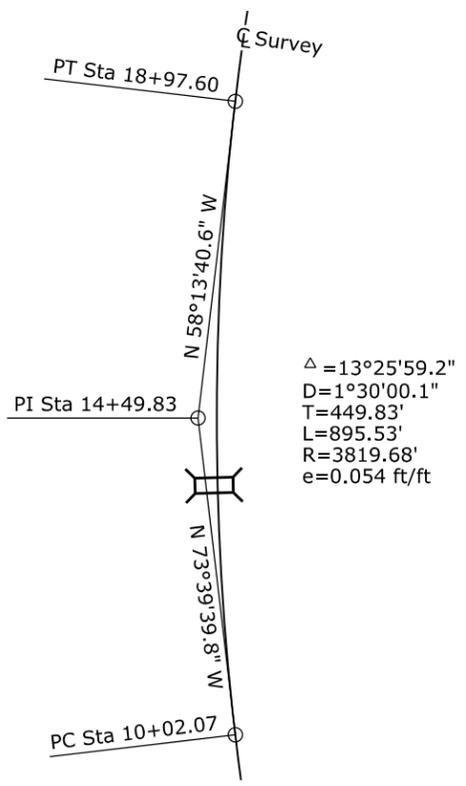
TYPICAL ROADWAY SECTION



LONGITUDINAL SECTION



SECTION A-A



HORIZONTAL CURVE DATA

WYOMING DEPARTMENT OF TRANSPORTATION BRIDGE PROGRAM			
PRELIMINARY LAYOUT			
SINGLE BARREL 20'-0" X 12'-0"			
CONCRETE BOX CULVERT			
STA 13+55			
Deer Crossing Underpass			
Sage Junction East			
N121098		Ln	
DESIGN	BBB	AAA	Design Section L M Nop
DETAIL	BBB	AAA	Drwg No. P-0006 Sheet 2 of 2
QTY'S			

Section 4.01 - Preliminary

# SINGLE BARREL 20'-0" X 12'-0" CONCRETE BOX CULVERT STA 13+55 DEER CROSSING UNDERPASS SAGE JUNCTION EAST

N121098

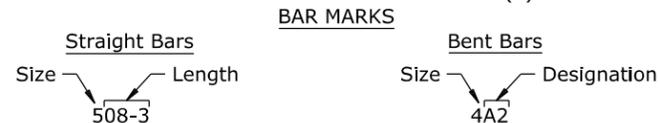
LINCOLN COUNTY

GENERAL NOTES

SPECIFICATIONS: WYDOT Standard Specifications for Road and Bridge Construction, 2010 Edition.

DIMENSIONS: Longitudinal dimensions are along flow line. Slopes are vertical : horizontal.

REINFORCING STEEL: Ensure reinforcing steel conforms to ASTM A 615 (Grade 60) for all bars, including ties and stirrups. Concrete cover to face of reinforcing steel is 2" unless noted. Dimensions for bent bars are out to out. Ensure bars marked with an asterisk (\*) are coated.



EYEBOLTS: Use galvanized bar conforming to ASTM A 709 (Grade 36). Work necessary for the eyebolts is incidental to the contract pay item Class A Concrete.

WEEP HOLE ASSEMBLIES: Work necessary for the weep hole assemblies is incidental to the contract pay item Class A Concrete.

PREFORMED EXPANSION JOINT FILLER: Work necessary for the preformed expansion joint filler is incidental to the contract pay item Class A Concrete.

CULVERT EXCAVATION: The estimated quantity of culvert excavation is 3060 CY and is incidental to the contract pay item Class A Concrete.

CULVERT SUBEXCAVATION: The bottom limits of culvert subexcavation is 3'-0" below the bottom of the culvert. Line the bottom of the culvert subexcavation with geotextile material separation. Backfill with pit run subbase conforming to grading J. The estimated quantity of culvert subexcavation is calculated in accordance with Standard Plan 206-1, Culvert and Trench Excavation.

CULVERT BOTTOM BACKFILL: Backfill the bottom of the culvert with 2'-0"± of excavated material from the adjacent highway embankment. Work necessary for backfilling is incidental to the contract pay item Class A Concrete.

BRIDGE OFFICE NOTIFICATION: The engineer will notify the State Bridge Engineer in writing within 14 calendar days after work has been completed at this structure.

DESIGN DATA

SPECIFICATIONS: AASHTO LRFD Bridge Design Specifications, 8th Edition.

ADT: 1945 (Year 2005)

LOADING:

- Live Load: HL93
- Lateral live load surcharge: 2 ft earth or 72 pcf
- Dead Load: Design fill: 2.0 ft
  - (1) Vertical earth pressure: 120 pcf
  - Lateral earth pressure: 36 pcf
  - (2) Vertical earth pressure: 120 pcf
  - Lateral earth pressure: 72 pcf

REINFORCED CONCRETE: Load and Resistance Factor Design -  
Class A Concrete  $f'_c = 4000$  psi  
Reinforcing Steel  $f_y = 60,000$  psi (Grade 60)

APPROACH ROADWAY WIDTH: 40'-0"

REFERENCES

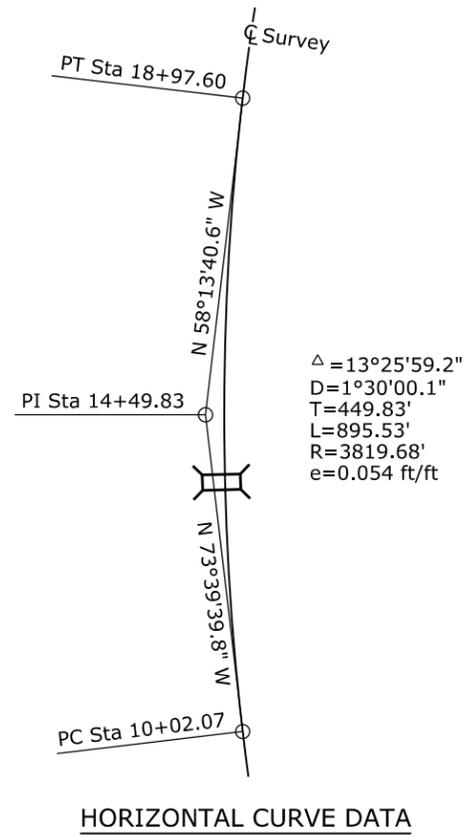
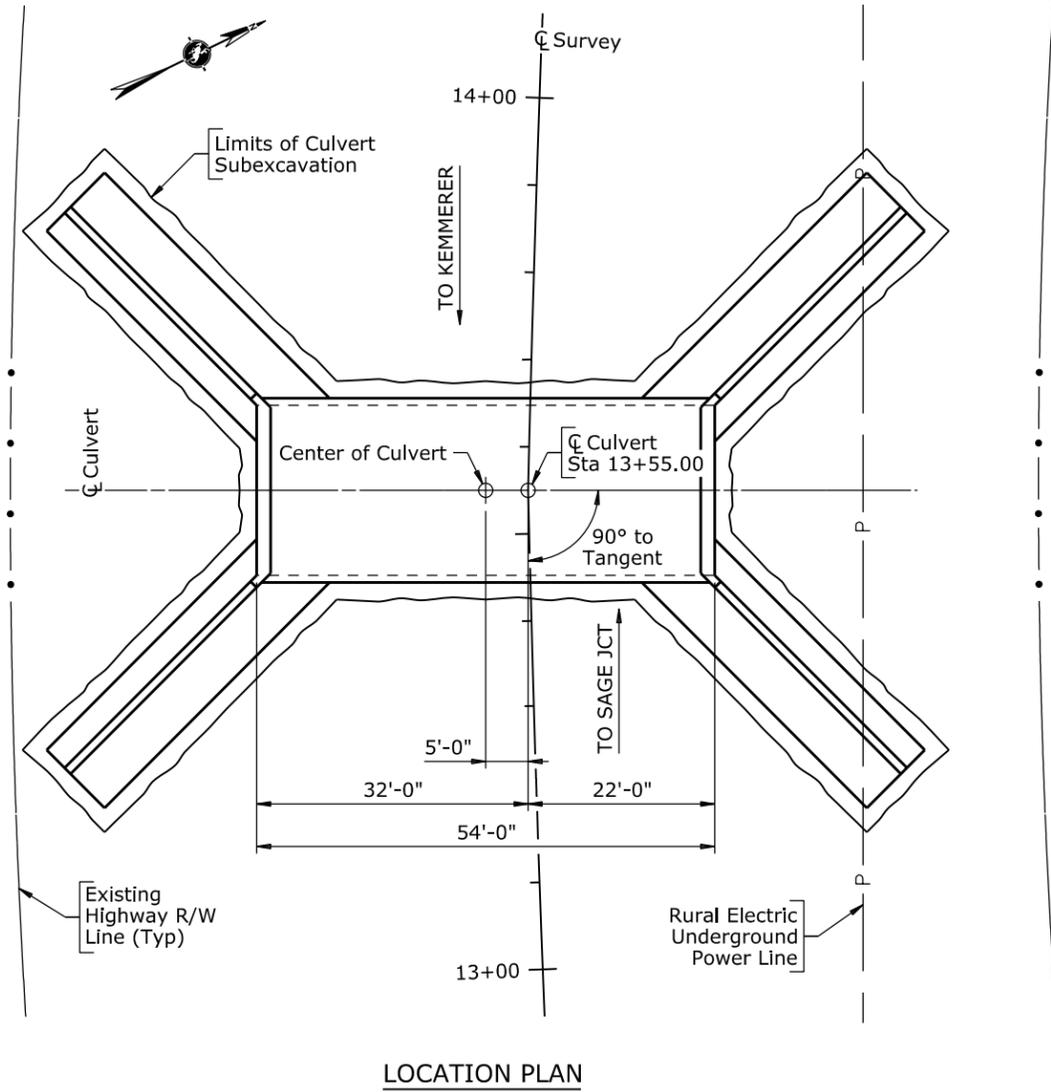
- Supplementary Specifications:
- SS-100K Adjustment for Structural Steel
  - SS-500G Structural Concrete with Quality Control and Quality Acceptance

- Standard Plans:
- 206-1A Culvert and Trench Excavation

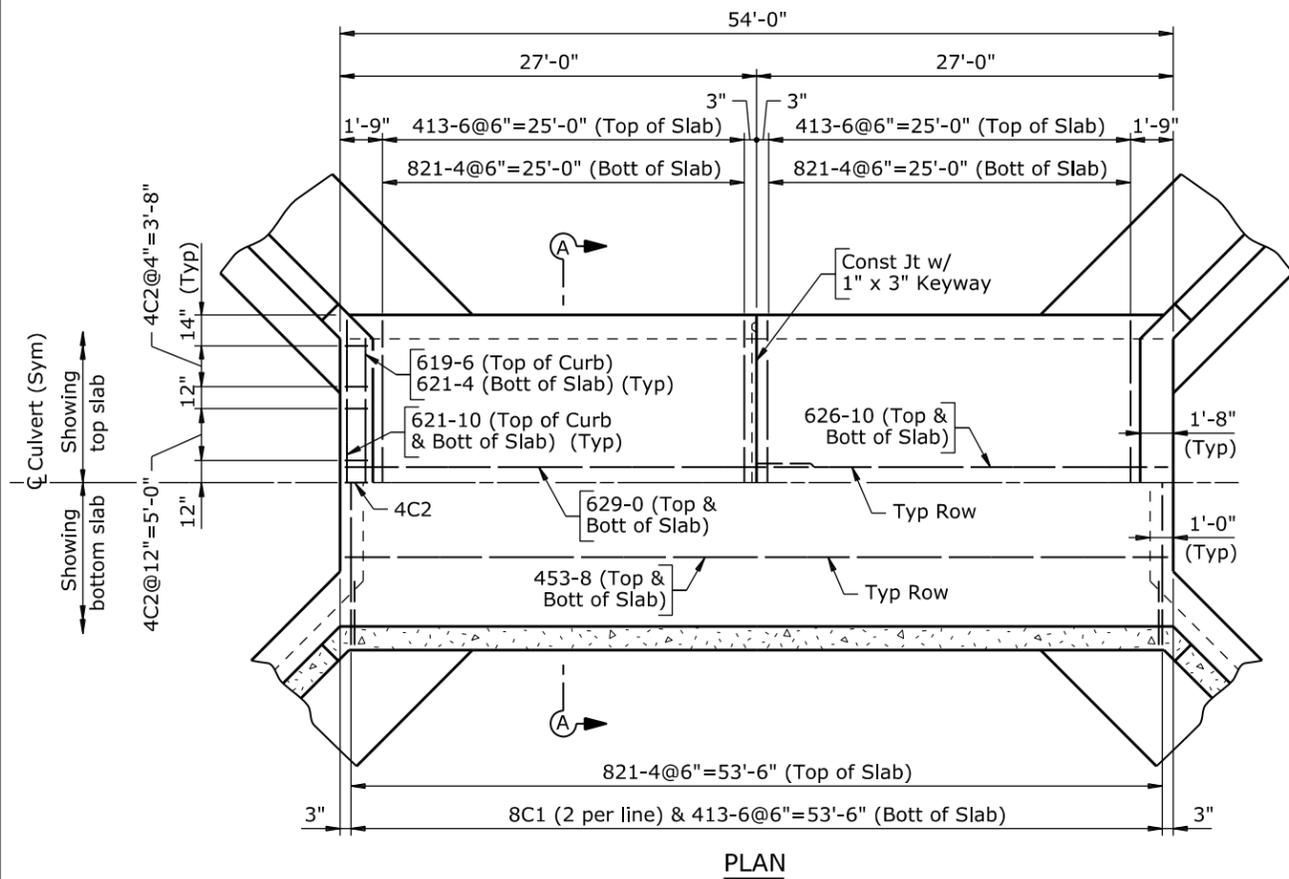
STRUCTURE NO. LFN  
ML12B, RM 30.05 SEC 7, T21N, R119W

ESTIMATED QUANTITIES - CODE 08				
ITEM NO.	ITEM	UNIT	TOTAL QUANTITY	ESTIMATE
206.03300	CULVERT SUBEXCAVATION	CY	20	268.7 CY 55,880 LB
212.03900	PERVIOUS BACKFILL MATERIAL	CY	20	
217.01025	GEOTEXTILE, MATERIAL SEPARATION (NON-WOVEN)	SY	310	
301.01010	PIT RUN SUBBASE	CY	110	
503.01000	BRIDGE RAILING	FT	44	
513.00005	CLASS A CONCRETE	LS	LUMP SUM	
514.00015	REINFORCING STEEL	LS	LUMP SUM	
900.60000	CONTRACTOR QUALITY CONTROL (CONCRETE)	LS	LUMP SUM	

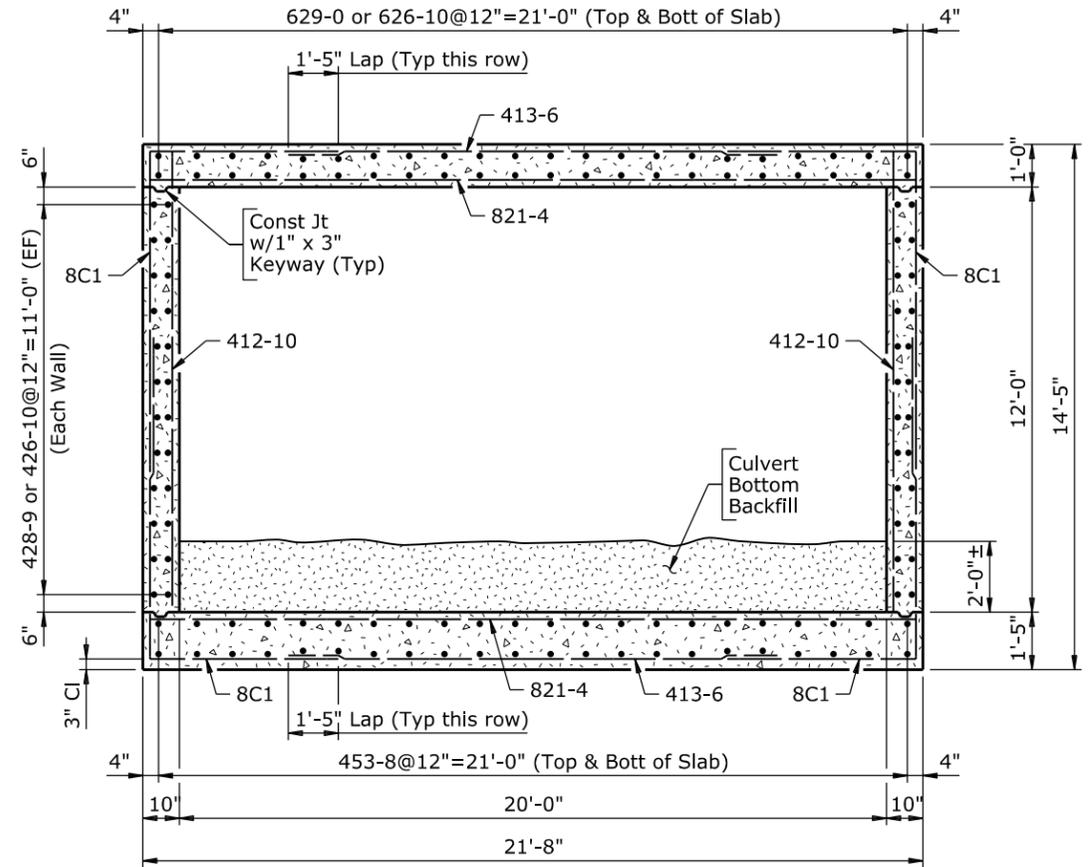
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REVISIONS			
REVIEW	DESIGN	Design Section	L M Nop
	DETAIL	BBB	G G G
APPROVAL	QTY'S	Drwg No. 0006	Sheet 1 of 6



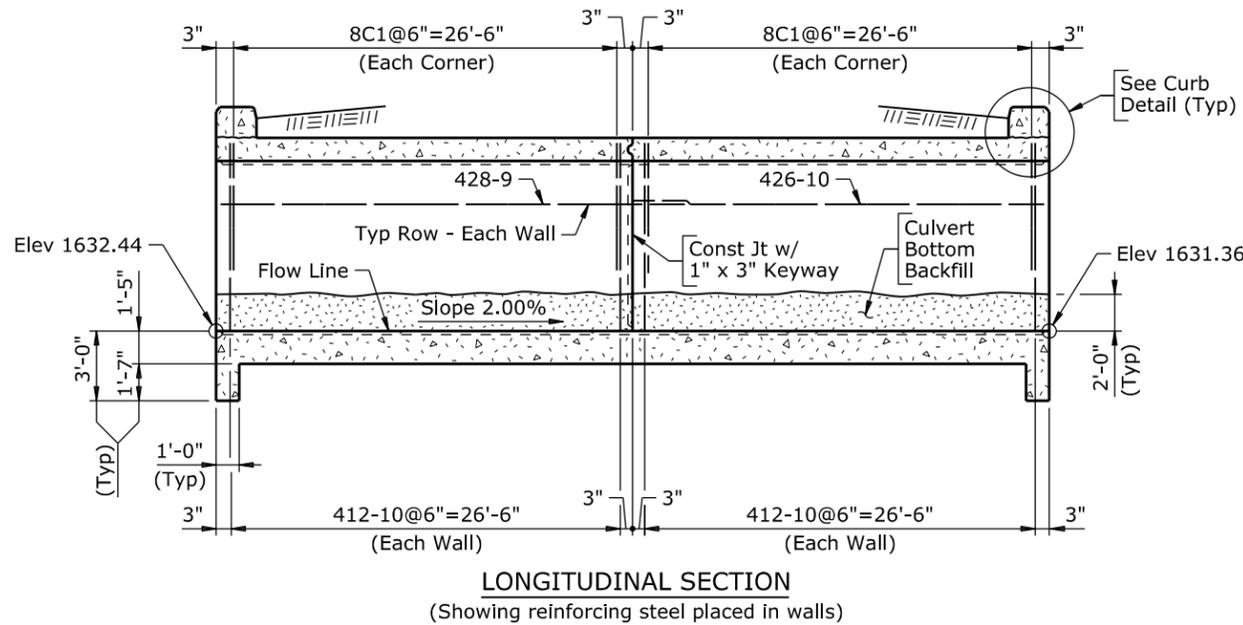
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REVISIONS	CULVERT DETAILS		
	SINGLE BARREL 20'-0" X 12'-0" CONCRETE BOX CULVERT STA 13+55 Deer Crossing Underpass Sage Junction East		
	N121098	Ln	
DESIGN	GGG ✓ EEE	Design Section	L M Nop
DETAIL	BBB ✓ GGG	Drwg No. 0006	Sheet 2 of 6
APPROVAL	QTY'S BBB ✓ GGG		



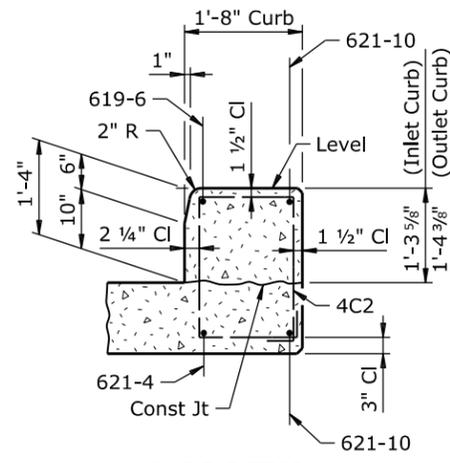
PLAN



SECTION A-A



LONGITUDINAL SECTION  
 (Showing reinforcing steel placed in walls)

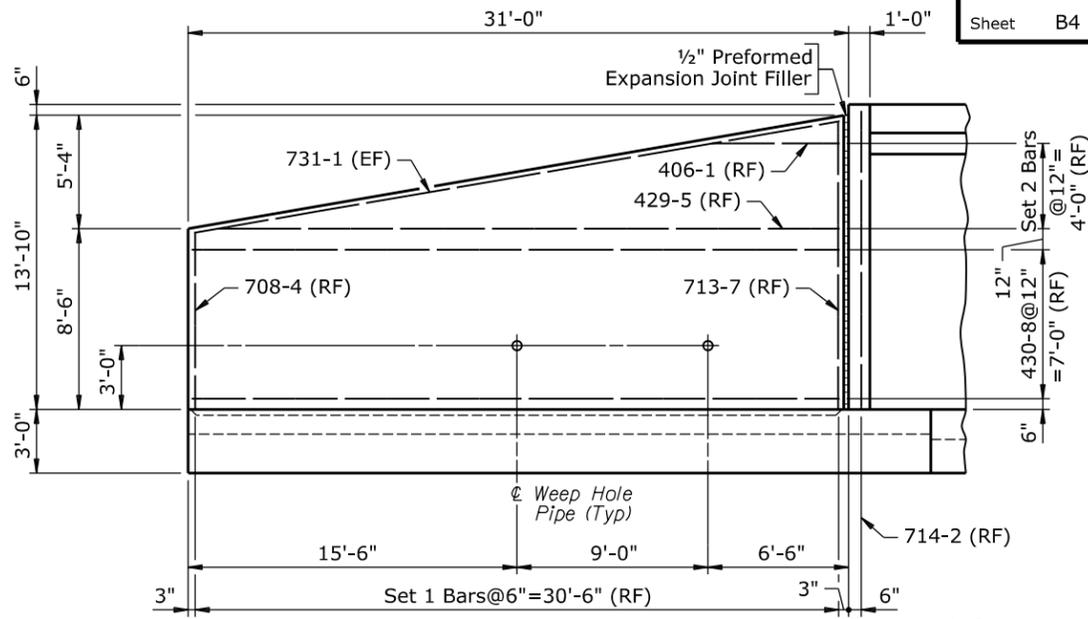
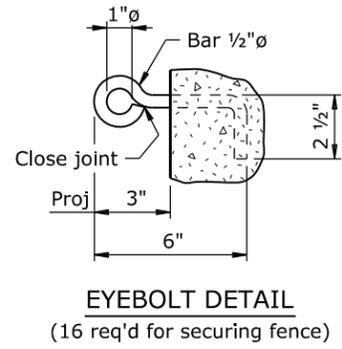
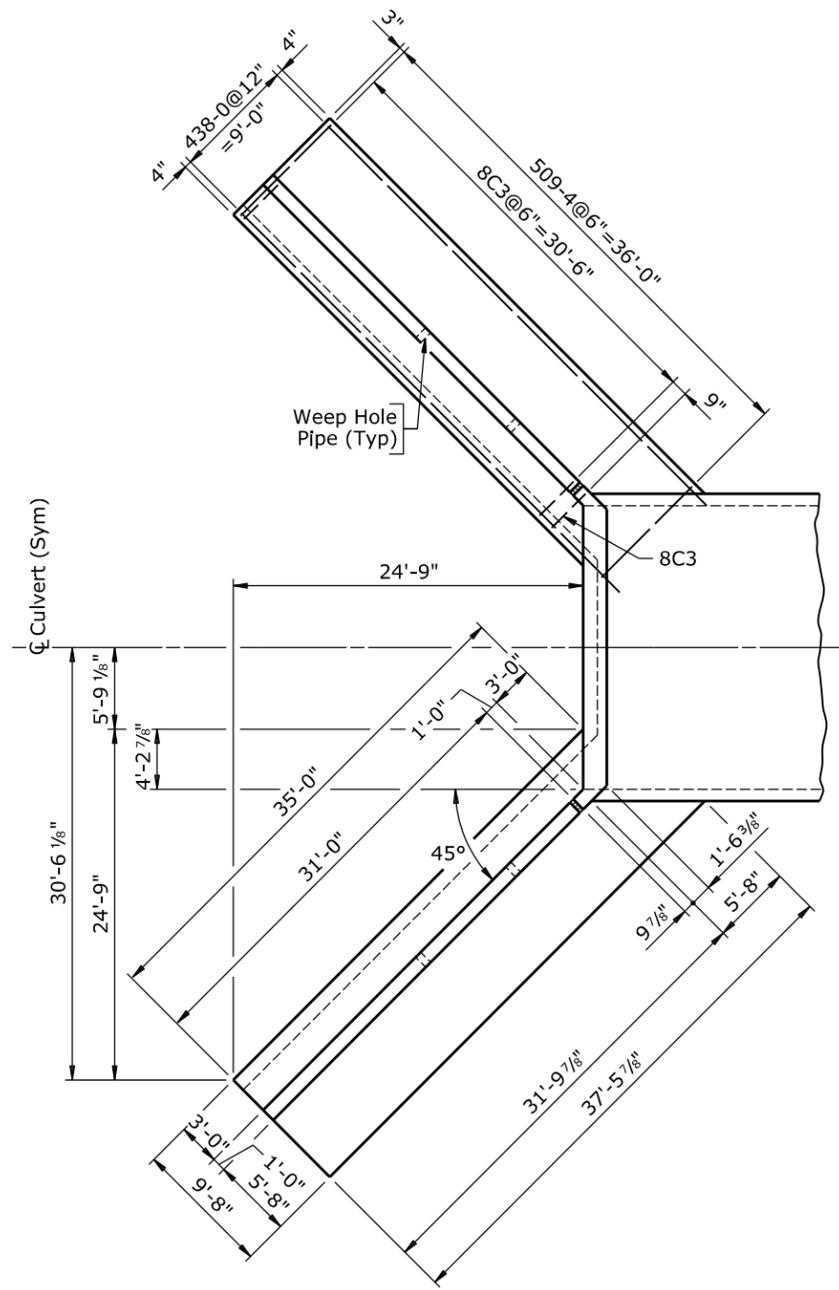


CURB DETAIL

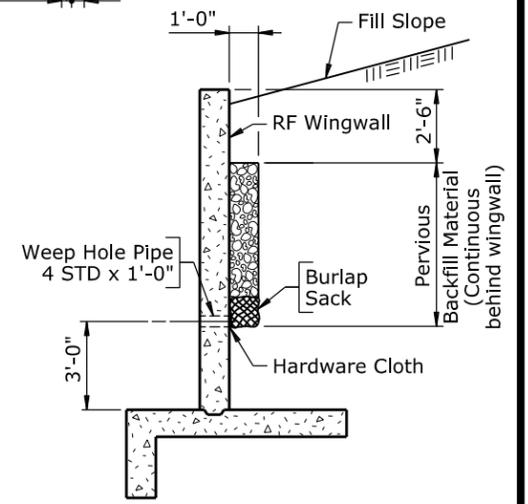
- Note:
- 1) Place long leg of 8C1 bars in walls.
  - 2) Either inlet or outlet may be built first. If outlet is built first, reverse longitudinal reinforcing steel in walls and top slab.
  - 3) For Bridge Railing Details, see Sheets No. 5 and 6.

WYOMING DEPARTMENT OF TRANSPORTATION BRIDGE PROGRAM			
<b>CULVERT DETAILS</b>			
<b>SINGLE BARREL 20'-0" X 12'-0"</b>			
<b>CONCRETE BOX CULVERT</b>			
<b>STA 13+55</b>			
<b>Deer Crossing Underpass</b>			
<b>Sage Junction East</b>			
N121098		Ln	
DESIGN: GGG ✓ EEE	Design Section	L M Nop	
DETAIL: BBB ✓ GGG	Drwg No. 0006	Sheet 3 of 6	
APPROVAL: BBB ✓ GGG			

BILL OF REINFORCEMENT		
Location	Mark	Number Required
Top Slab and Curbs (11,085 LB)	4C2	74
	413-6	102
	619-6	2
	621-4	2
	621-10	4
	626-10	44
	629-0	44
Bott Slab and Footings (25,881 LB)	821-4	102
	413-6	108
	438-0	40
	453-8	44
	509-4	292
	8C1	216
	8C3	252
Walls (11,958 LB)	821-4	108
	412-10	216
	426-10	48
	428-9	48
	714-2	4
Wingwalls (6957 LB)	8C1	216
	430-8	32
	Set 2 Bars	4
Bending Diagrams		
Set Diagrams		

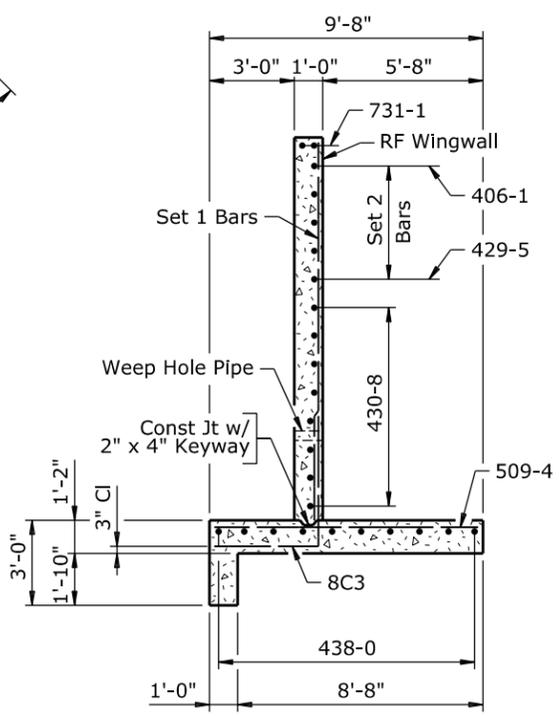


TYPICAL WINGWALL ELEVATION



WEEP HOLE ASSEMBLY DETAIL

- Note:
- 1) Place short leg of 8C3 bars in footing.
  - 2) Place Set 1 Bars and 714-2 bars with 8C3 bars.
  - 3) Each weep hole assembly consists of a pipe 4 STD through the wingwall, one 6" x 6" piece of aluminum or galvanized steel wire 4 mesh hardware cloth (Minimum wire diameter 0.03") centered over pipe end and firmly anchored to rear face of wingwall, and one cubic foot of coarse aggregate in a securely tied burlap sack.

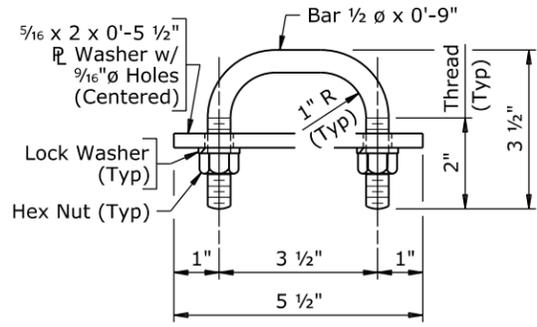


TYPICAL WINGWALL SECTION

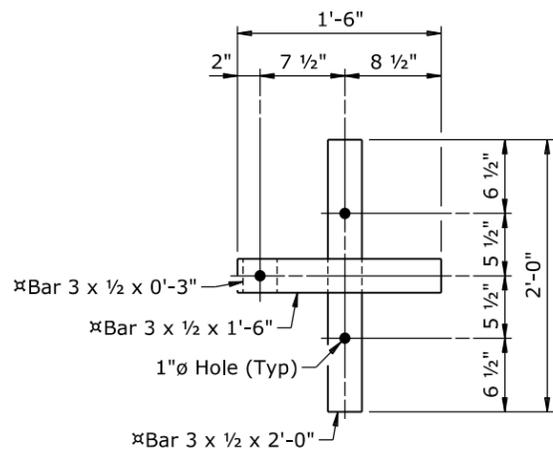
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<b>CULVERT DETAILS</b>			
<b>SINGLE BARREL 20'-0" X 12'-0"</b>			
<b>CONCRETE BOX CULVERT</b>			
<b>STA 13+55</b>			
<b>Deer Crossing Underpass</b>			
<b>Sage Junction East</b>			
N121098		Ln	
DESIGN	GGG ✓ EEE	Design Section	L M Nop
DETAIL	BBB ✓ GGG	Drwg No. 0006	Sheet 4 of 6
APPROVAL	QTY'S BBB ✓ GGG		

Nov 2018

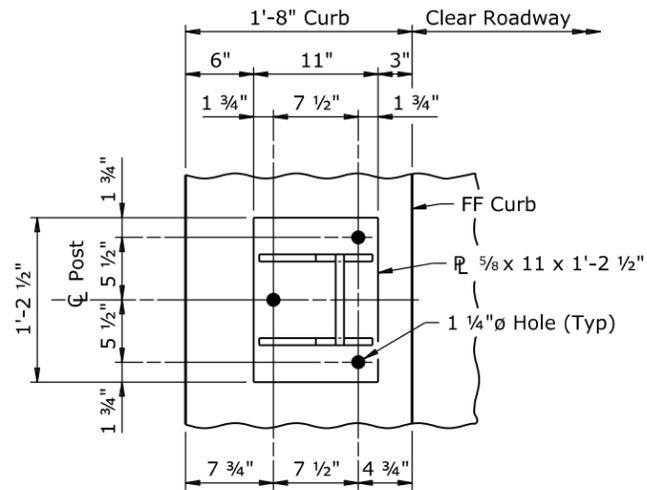
4.10 - Example



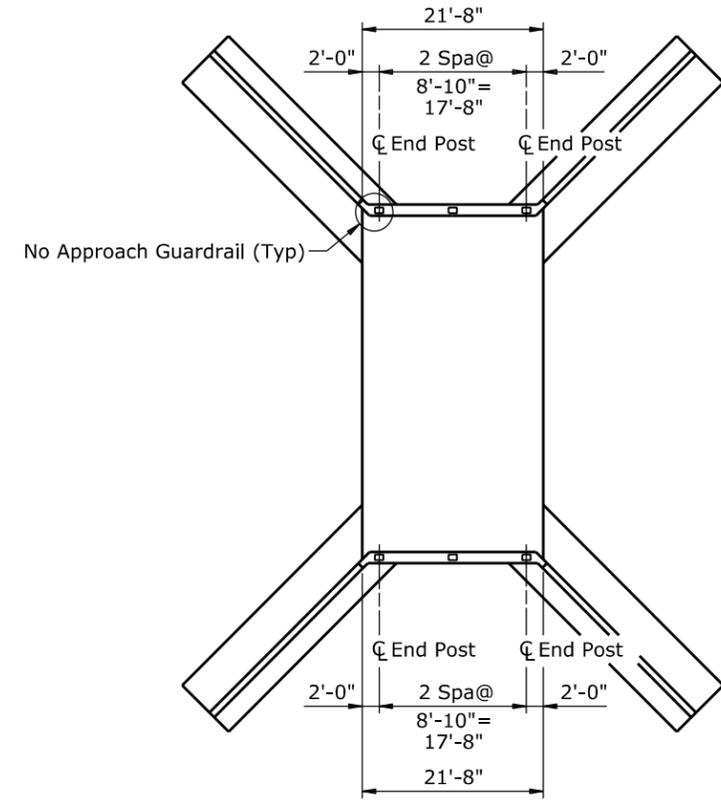
RAIL BOLT DETAIL



SECTION B-B  
 (Not galvanized)  
 (Anchor bolts and slab not shown)

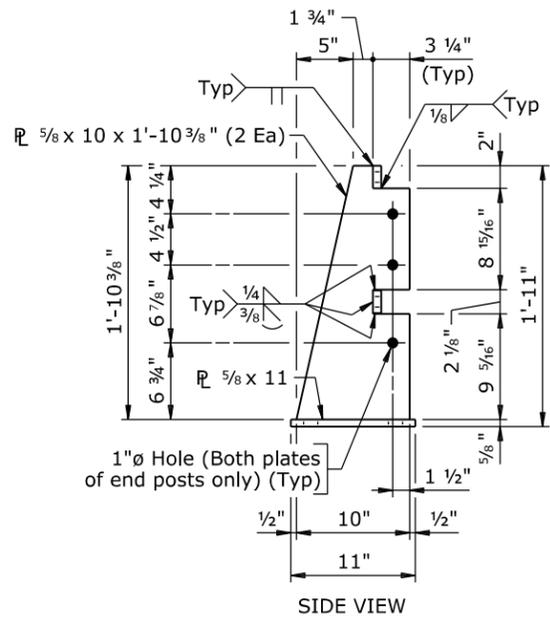


VIEW A-A  
 (Anchor bolts, rails, and rail bolts not shown)

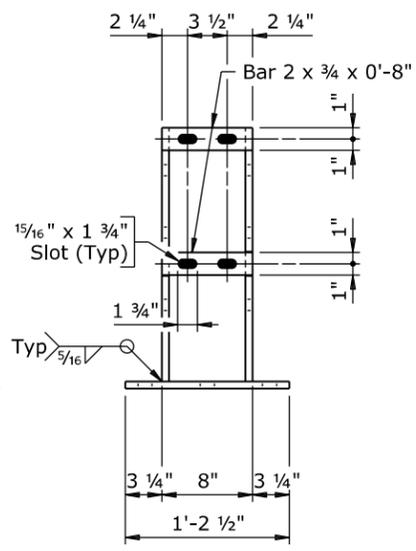


PLAN  
 (6 posts req'd)

- Note:
- 1) Ensure the expansion splice is located in the railing panel which passes over the bridge expansion joint as indicated on the plan.
  - 2) Anchor bolts may be tack welded to anchorage (Shop or field).
  - 3) At post locations, drill two 1 1/16 inch diameter holes in each rail to receive rail bolts (Shop or field). See Post Details for hole spacing.
  - 4) Paint surfaces of the railing components that have been cut, drilled, or otherwise damaged with two coats of zinc-rich paint conforming to ASTM A 780.
  - 5) After installing rails, paint exposed bolt threads with two coats of zinc-rich paint conforming to ASTM A 780.

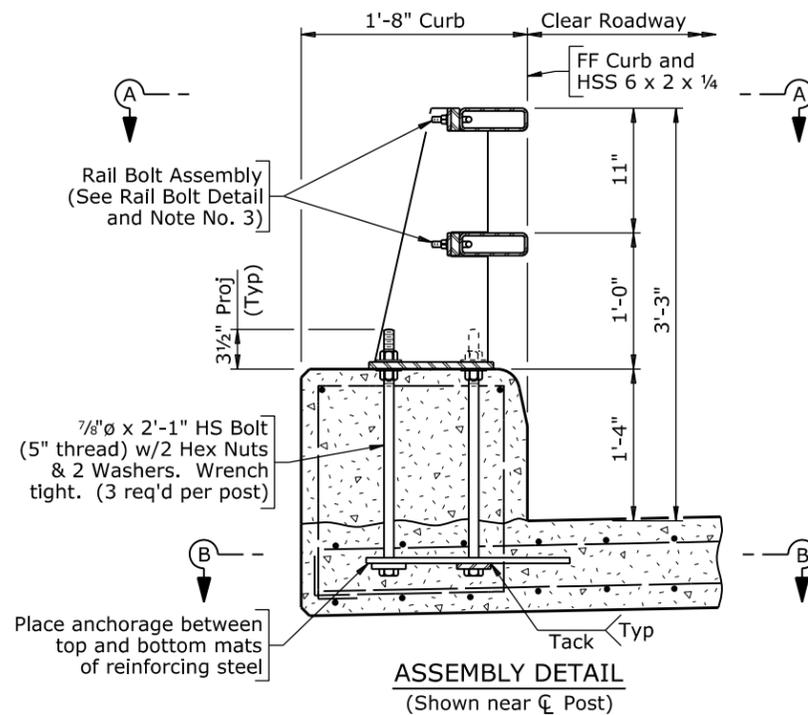


SIDE VIEW



FRONT VIEW

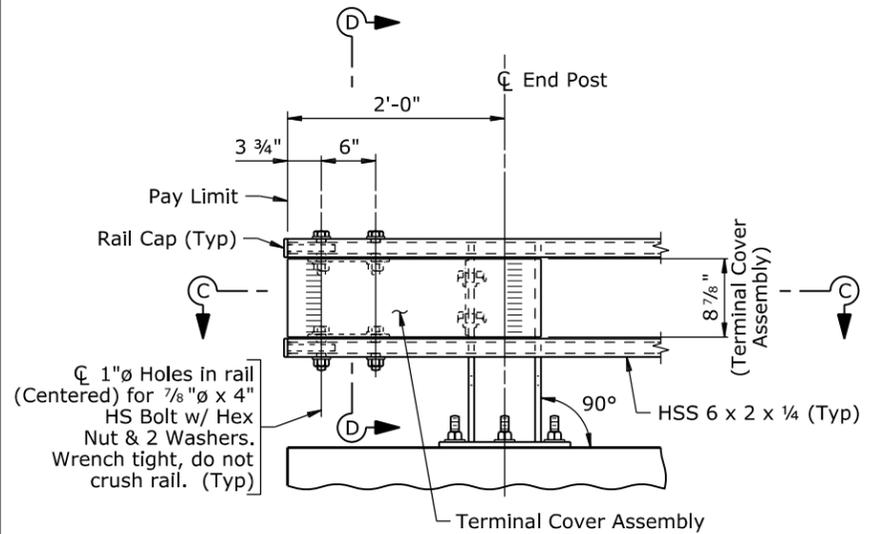
POST DETAILS  
 (See View A-A for anchor bolt hole spacing)



ASSEMBLY DETAIL  
 (Shown near End Post)

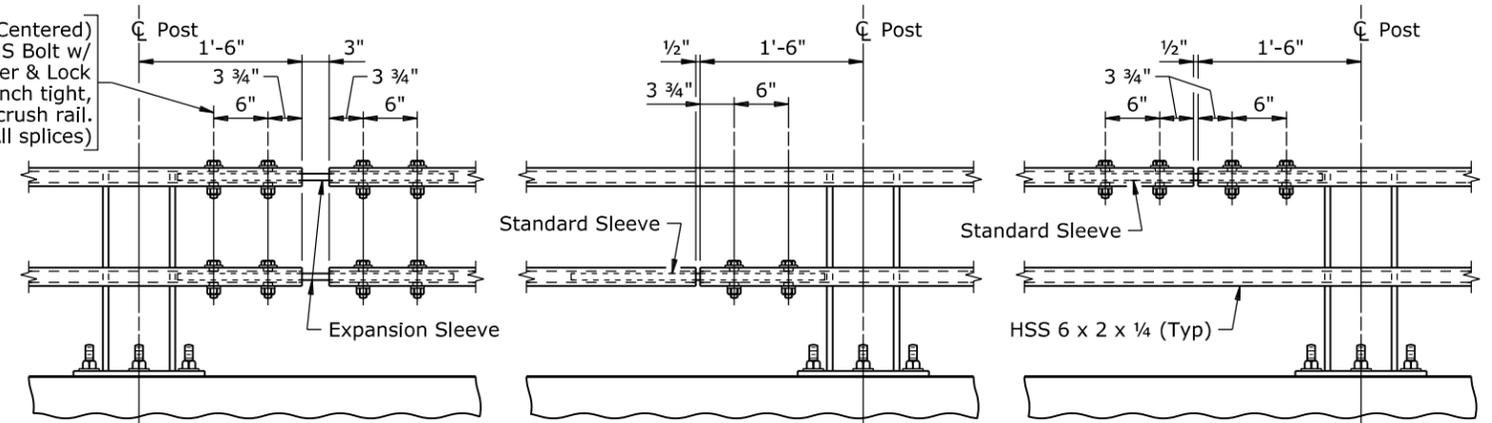
WYOMING DEPARTMENT OF TRANSPORTATION BRIDGE PROGRAM			
<b>BRIDGE RAILING DETAILS</b>			
<b>SINGLE BARREL 20'-0" X 12'-0"</b>			
<b>CONCRETE BOX CULVERT</b>			
<b>STA 13+55</b>			
<b>Deer Crossing Underpass</b>			
<b>Sage Junction East</b>			
N121098		Ln	
REVISIONS	DESIGN	Design Section	L M Nop
	DETAIL	BBB	GGG
	QTY'S	BBB	GGG
		Drwg No. 0006	Sheet 5 of 6

Section 4.10 - Bridge Railing



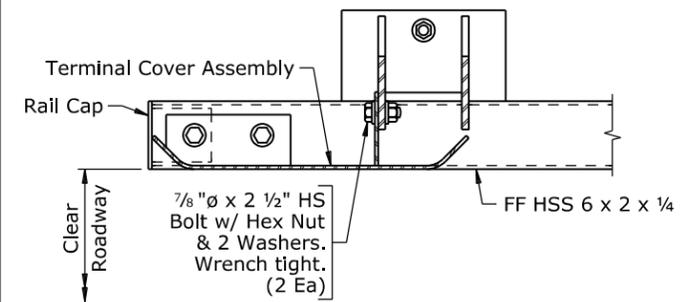
ELEVATION AT TERMINAL

1"  $\phi$  Holes in rail (Centered) for 3/4"  $\phi$  x 3 1/2" HS Bolt w/ Hex Nut, Washer & Lock Washer. Wrench tight, do not crush rail. (Typ) (All splices)

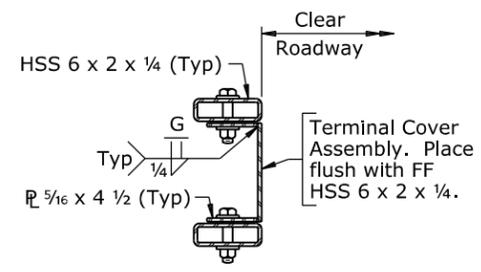


EXPANSION SPLICE (Top and bottom rail)  
STANDARD SPLICE (Top or bottom rail)  
DOUBLE-BOLTED SPLICE (Top or bottom rail)  
SPLICE DETAILS

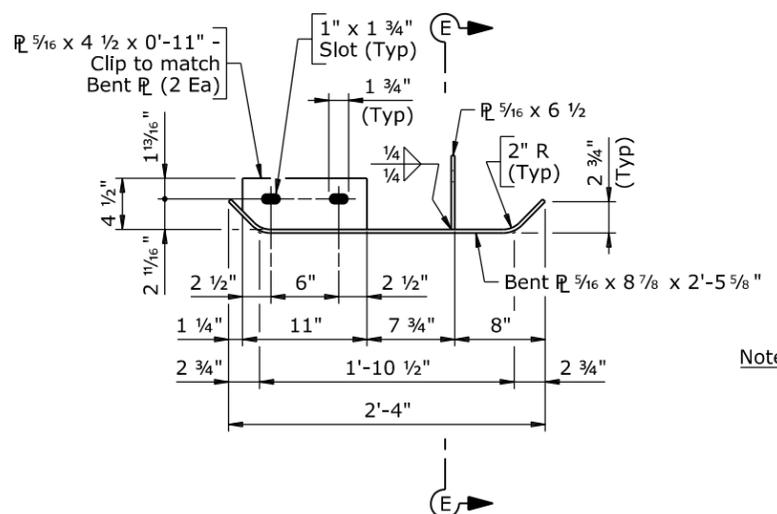
TERMINAL COMPONENT REQUIREMENTS		
Approach Guardrail Connection	Rail Caps Required	Terminal Cover Assembly Required
MGS Approach Guardrail	Yes (Without bolts)	± No
Box Beam w/ Rubrail Approach Guardrail	No	No
No Approach Guardrail	Yes (With bolts)	Yes



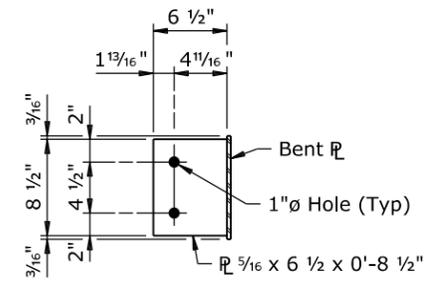
SECTION C-C



SECTION D-D

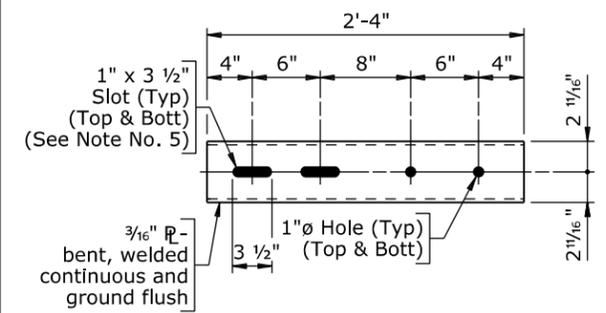


TERMINAL COVER ASSEMBLY DETAIL

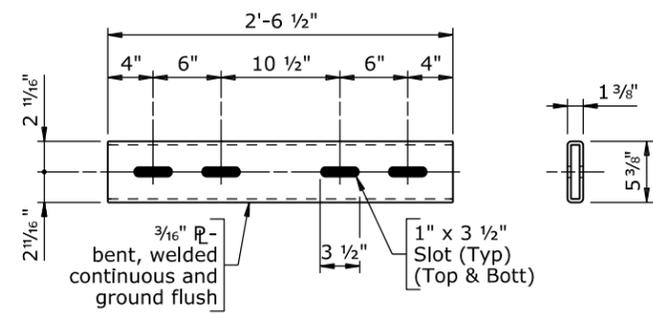


SECTION E-E

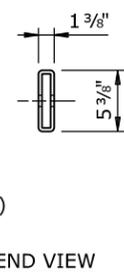
- Note:
- 1) Ensure each rail length is continuous over a minimum of two posts.
  - 2) In rehabilitation work, ensure railing that cannot feasibly be made continuous over a minimum of two posts has a double-bolted splice.
  - 3) Splices may be located on either side of post.
  - 4) Not more than one splice is permitted per side of post, except at expansion splices.
  - 5) Slots may be omitted in standard sleeves where bolts are required on one side of splice only.
  - 6) Do not shop splice rails.
  - 7) Terminal components removed during rehabilitation work will remain the property of the department.
  - 8) Installation of MGS approach guardrail will require other fabricated assemblies to be connected to end post. See road plans for details and pay item.



STANDARD SLEEVE

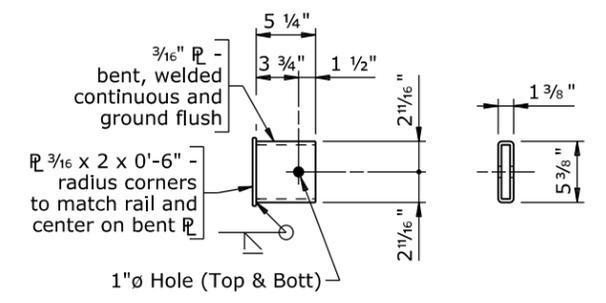


EXPANSION SLEEVE



END VIEW

SLEEVE DETAILS



PLAN

END VIEW (3/16 inch x 2 not shown)

RAIL CAP DETAILS

WYOMING DEPARTMENT OF TRANSPORTATION BRIDGE PROGRAM			
<b>BRIDGE RAILING DETAILS</b>			
<b>SINGLE BARREL 20'-0" X 12'-0"</b>			
<b>CONCRETE BOX CULVERT</b>			
<b>STA 13+55</b>			
<b>Deer Crossing Underpass</b>			
<b>Sage Junction East</b>			
N121098		Ln	
DESIGN	BBB ✓ GGG	Design Section	L M Nop
DETAIL	BBB ✓ GGG	Drwg No.	0006
APPROVAL	BBB ✓ GGG	Sheet	6 of 6