Wyo. Proj.	0433022 & P533034 Comb
Sheet	of Sheets

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
GILLETTE - MONTANA STATE LINE
CORRAL CREEK SECTION

0433022 CAMPBELL COUNTY

PRELIMINARY

DESIGN DATA

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

ADT: 940 (Year 2020)

LOADING:
- Live Load: HL93
  Lateral live load surcharge: 2 ft earth or 72 psf
- Dead Load: Design fill: 2.6 ft at Sta 438+50
  3.6 ft at Sta 674+27
  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)

PRECAST CONCRETE: Load and Resistance Factor Design -
Class A Concrete f'_c = 5000 psi
Reinforcing Steel f_y = 60,000 psi (Grade 60)

APPROACH ROADWAY WIDTH: 36'-0"

INDEX OF STRUCTURES

STATION	ROUTE	RM	STRUCTURE NUMBER	FEATURE INTERSECTED	LOCATION
438+50	ML43B	128.32	M-LUW-C	Unnamed Draw	Sec 25, T52N, R72W
674+27	ML43B	132.79	M-LTW-C	Cedar Creek	Sec 1, T52N, R72W

ESTIMATED QUANTITIES

ITEM NO.	ITEM	UNIT	TOTAL QUANTITY	STA 438+50	STA 674+27 CODE 11-CHC	ESTIMATE
202.03250	REMOVAL OF RC BOX CULVERTS	LS	LUMP SUM	———	X EA	X EA
212.03900	PERVIOUS BACKFILL MATERIAL	CY	X	———	X	
502.01808	PRECAST BOX CULVERTS 8 X 8 ft	FT	X	X	X	
513.00005	CLASS A CONCRETE	LS	LUMP SUM	———	X CY	X CY
514.00015	REINFORCING STEEL	LS	LUMP SUM	———	X LB	X LB
900.60000	CONTRACTOR QUALITY CONTROL (CONCRETE)	LS	LUMP SUM	———	LUMP SUM	

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM
REVISIONS

REVIEW ____	DESIGN ____ ✓ ____	Design Section Q R Stuv
APPROVAL ____	DETAIL HHH ✓ PPP	Drwg No. P-0007 Sheet 1 of 4
	QTY'S ____ ✓ ____	

0433022_pl1.dgn

Wyo. Proj.	0433022 & P533034 Comb
Sheet	of Sheets

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

PRECAST BOX CULVERTS: Design precast boxes for the loading specified. Ensure the title pages of the design computations and shop plans bear the seal and signature of a professional engineer.

The minimum concrete cover to the face of the main reinforcing steel is 1 ½" and 1" to other reinforcing steel unless noted.

SLOPED END SECTIONS, PARAPETS, AND CUTOFF WALLS: The length of precast sloped end sections is included in the estimated quantity for the contract pay item Precast Box Culverts 8 x 8 ft.

Work necessary for the precast parapets and cutoff walls is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

JOINT SEALANT: Use joint sealant conforming to AASHTO M 198. Work necessary for the joint sealant is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

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.

REMOVAL OF RC BOX CULVERTS: At Sta 674+27, remove the existing double barrel 10'-0" x 10'-0" x 41'-0" reinforced concrete box culvert, Structure No. CHC.

CULVERT EXCAVATION: The estimated quantity of culvert excavation at Sta 438+15 is 240 CY and is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

The estimated quantity of culvert excavation at Sta 674+27, including removal of the existing culvert and excavation for the new culvert, is 520 CY and is incidental to the contract pay item Removal of RC Box Culverts.

EPOXY RESIN BONDING COMPOUND: At Sta 674+27, Clean the exposed ends of the precast culvert end sections and coat with epoxy resin bonding compound. If the bonding compound gels before concrete placement, remove by sandblasting and reapply. Use bonding compound conforming to Subsection 810.6, Epoxy Resin. Mix and apply in accordance with the manufacturer's recommendations. Work necessary for the epoxy resin bonding compound 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 the existing culvert has been removed.

STREAM DATA - STA 674+27

Drainage Area	3.4 Sq Mi
Structure Slope	0.30%
Description of Channel Material	Sand, clay, and scoria
Drift Potential	Insignificant
Ordinary High Water Elevation	3981.5 ft
Headwater Elevation Q_{25}	3990.7 ft
Q_{100}	3992.5 ft
Outlet Velocity	12.5 fps
Design Frequency	250 Year
Design Discharge Q_{25}	655 cfs
Review Discharge Q_{100}	1290 cfs
Source of Discharge	Floodflow Characteristics of Wyoming Streams
Method of Analysis	CDS
Flood of Record	Unknown

REFERENCES

WYDOT Plans: Sheet No.

Sta 674+27
Bridge Drwg No. 2208 ---------- 1 of 1

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

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

PRELIMINARY GENERAL NOTES

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 Cl

REVIEW _____
APPROVAL _____

DESIGN ____ ✓ ____
DETAIL HHH ✓ PPP
QTY'S ____ ✓ ____

Design Section Q R Stuv
Drwg No. P-0007 Sheet 2 of 4

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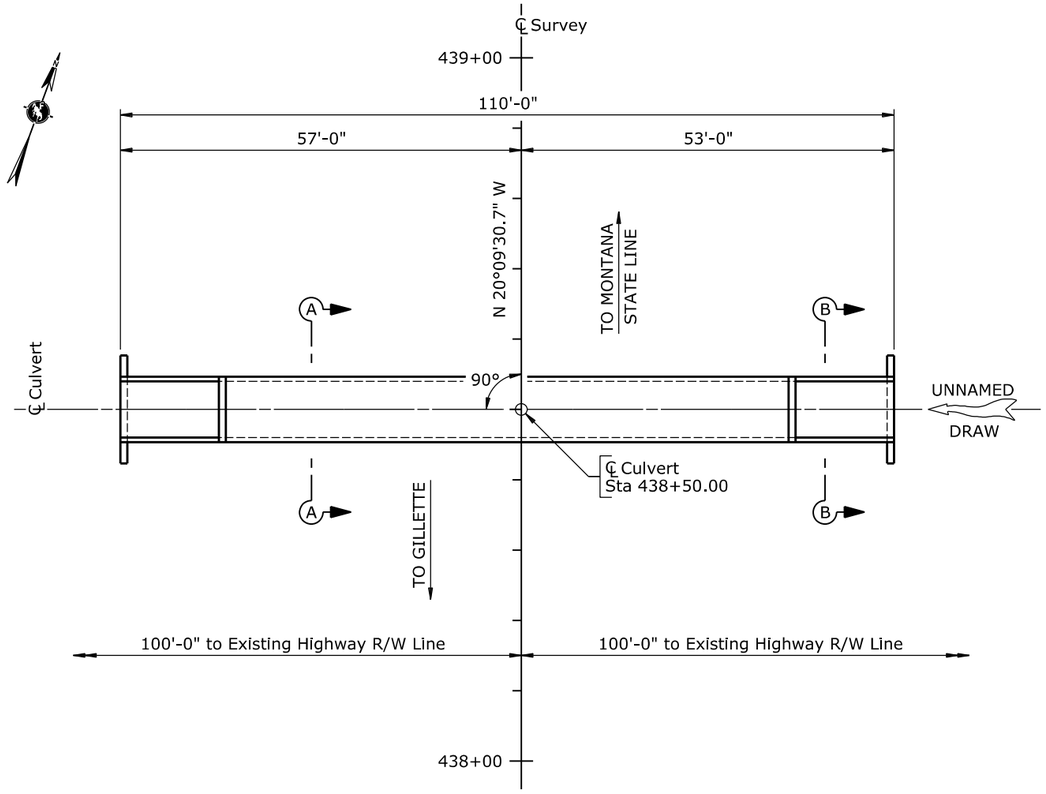
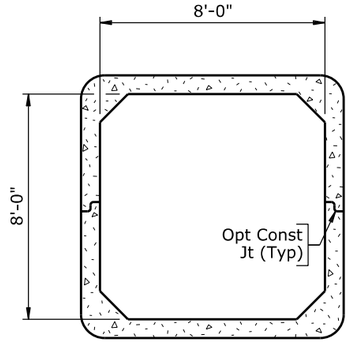
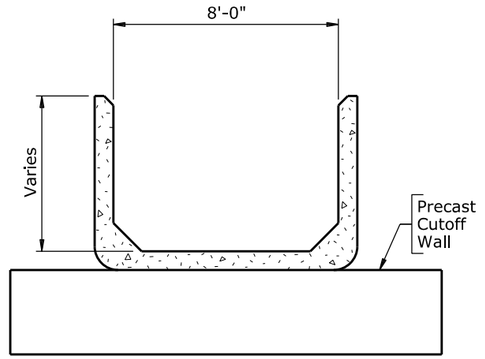
Wyo. Proj.	0433022 & P433034 Comb
Sheet	of Sheets



LOCATION PLAN



SECTION A-A



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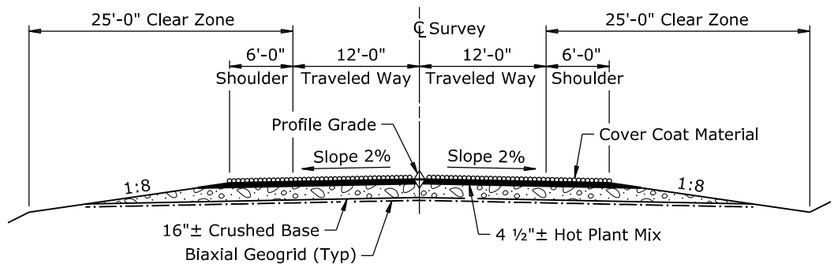
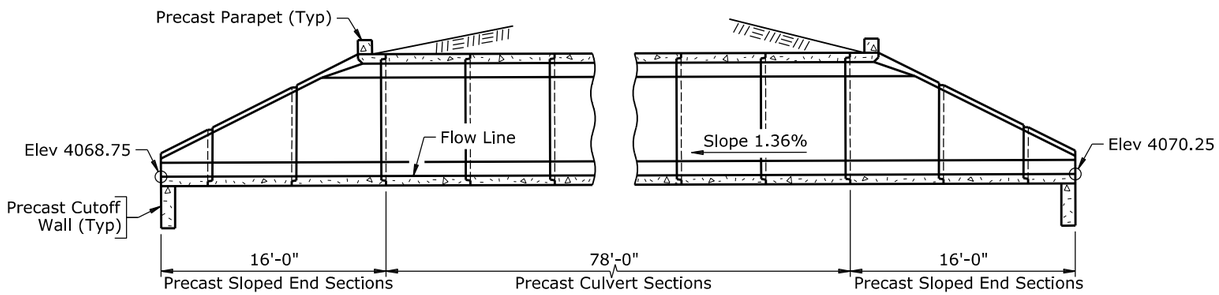


TYPICAL ROADWAY SECTION



LONGITUDINAL SECTION

STA 438+50.00

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

PRELIMINARY LAYOUT

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 CI

REVIEW	DESIGN ___ ✓ ___	Design Section	Q R Stuv
APPROVAL	DETAIL HHH ✓ PPP	Drwg No. P-0007	Sheet 3 of 4
	QTY'S ___ ✓ ___		

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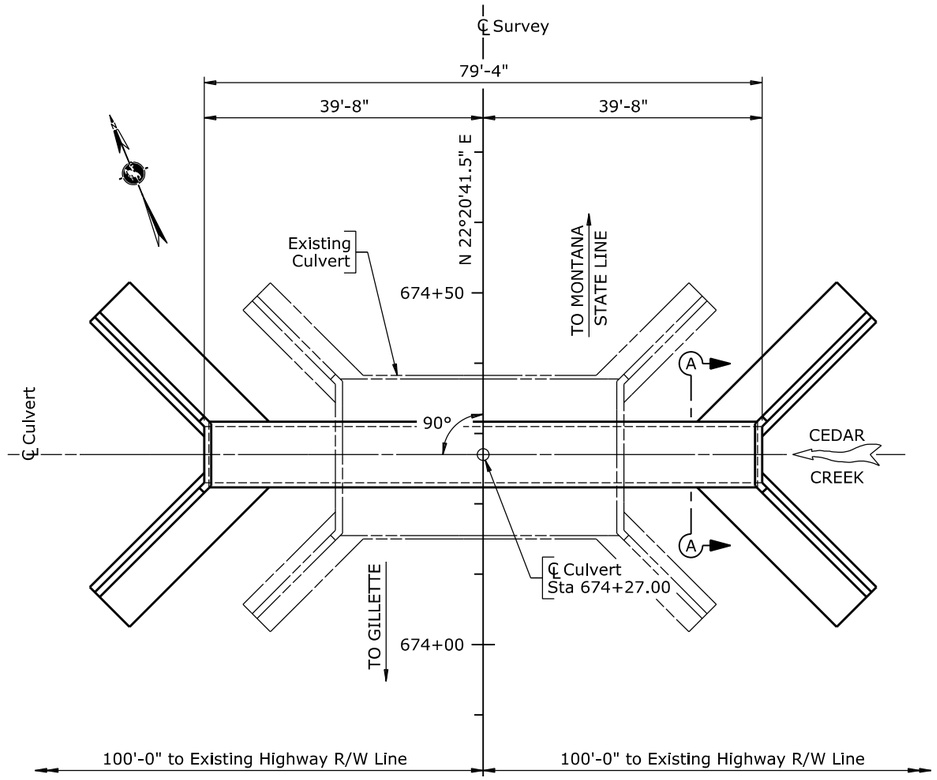
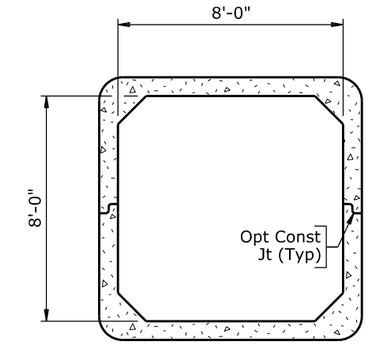
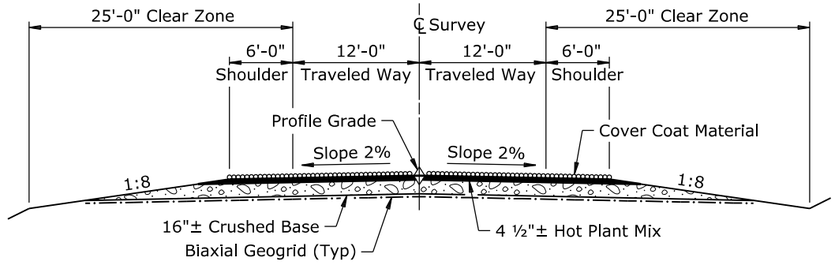


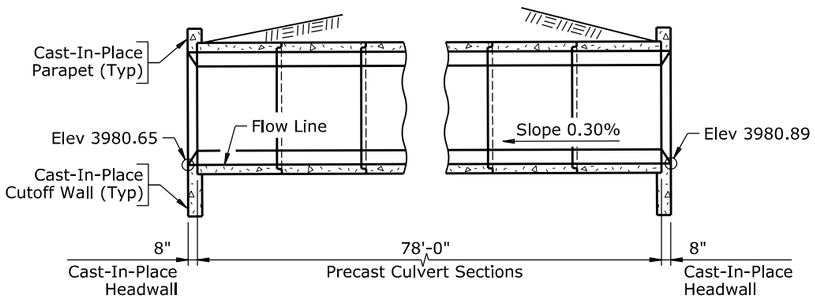
LOCATION PLAN



SECTION A-A



TYPICAL ROADWAY SECTION



LONGITUDINAL SECTION

Note: Replace the existing culvert, Structure No. CHC, with the new culvert, Structure No. LTW.

STA 674+27.00

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

PRELIMINARY LAYOUT

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 CI

REVIEW
APPROVAL

DESIGN
DETAIL HHH ✓ PPP
QTY'S

Design Section Q R Stuv

Drwg No. P-0007 Sheet 4 of 4

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Wyo. Proj. 0433022 & P533034 Comb
Sheet B65 of B85 Sheets

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
GILLETTE - MONTANA STATE LINE
CORRAL CREEK SECTION

0433022 CAMPBELL COUNTY

DESIGN DATA

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

ADT: 940 (Year 2020)

LOADING:
Live Load: HL93
Lateral live load surcharge: 2 ft earth or 72 psf
Dead Load: Design fill: 2.6 ft at Sta 438+50
3.6 ft at Sta 674+27
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)

PRECAST CONCRETE: Load and Resistance Factor Design -
Class A Concrete f'_c = 5000 psi
Reinforcing Steel f_y = 60,000 psi (Grade 60)

APPROACH ROADWAY WIDTH: 36'-0"

INDEX OF STRUCTURES

STATION	ROUTE	RM	STRUCTURE NUMBER	FEATURE INTERSECTED	LOCATION
438+50	ML43B	128.32	M-LUW-C	Unnamed Draw	Sec 25, T52N, R72W
674+27	ML43B	132.79	M-LTW-C	Cedar Creek	Sec 1, T52N, R72W

ESTIMATED QUANTITIES

ITEM NO.	ITEM	UNIT	TOTAL QUANTITY	STA 438+50	STA 674+27 CODE 11-CHC	ESTIMATE
202.03250	REMOVAL OF RC BOX CULVERTS	LS	LUMP SUM	———	1 EA	1 EA
212.03900	PERVIOUS BACKFILL MATERIAL	CY	20	———	20	
502.01808	PRECAST BOX CULVERTS 8 X 8 ft	FT	188	110	78	
513.00005	CLASS A CONCRETE	LS	LUMP SUM	———	61.3 CY	61.3 CY
514.00015	REINFORCING STEEL	LS	LUMP SUM	———	3980 LB	3980 LB
900.60000	CONTRACTOR QUALITY CONTROL (CONCRETE)	LS	LUMP SUM	———	LUMP SUM	

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM
REVISIONS

REVIEW _____
APPROVAL _____
DESIGN ___ ✓ ___
DETAIL HHH ✓ PPP
QTY'S ___ ✓ ___
Design Section Q R Stuv
Drwg No. 0007 Sheet 1 of 6

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Wyo. Proj. 0433022 & P533034 Comb
Sheet B65 of B85 Sheets

GENERAL NOTES

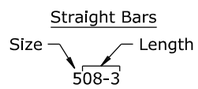
SPECIFICATIONS: WYDOT Standard Specifications for Road and Bridge Construction, 2010 Edition.

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

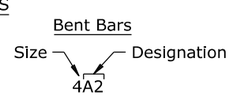
REINFORCING STEEL: Ensure reinforcing steel conforms to ASTM A 615 (Grade 60) for all bars, including ties and stirrups. Concrete cover to face of reinforcing steel is 2" unless noted. Dimensions for bent bars are out to out. Ensure bars marked with an asterisk (*) are coated.

BAR MARKS

Straight Bars



Bent Bars



PRECAST BOX CULVERTS: Design precast boxes for the loading specified. Ensure the title pages of the design computations and shop plans bear the seal and signature of a professional engineer.

The minimum concrete cover to the face of the main reinforcing steel is 1 ½" and 1" to other reinforcing steel unless noted.

SLOPED END SECTIONS, PARAPETS, AND CUTOFF WALLS: The length of precast sloped end sections is included in the estimated quantity for the contract pay item Precast Box Culverts 8 x 8 ft.

Work necessary for the precast parapets and cutoff walls is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

JOINT SEALANT: Use joint sealant conforming to AASHTO M 198. Work necessary for the joint sealant is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

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.

REMOVAL OF RC BOX CULVERTS: At Sta 674+27, remove the existing double barrel 10'-0" x 10'-0" x 41'-0" reinforced concrete box culvert, Structure No. CHC.

CULVERT EXCAVATION: The estimated quantity of culvert excavation at Sta 438+15 is 240 CY and is incidental to the contract pay item Precast Box Culverts 8 x 8 ft.

The estimated quantity of culvert excavation at Sta 674+27, including removal of the existing culvert and excavation for the new culvert, is 520 CY and is incidental to the contract pay item Removal of RC Box Culverts.

EPOXY RESIN BONDING COMPOUND: At Sta 674+27, Clean the exposed ends of the precast culvert end sections and coat with epoxy resin bonding compound. If the bonding compound gels before concrete placement, remove by sandblasting and reapply. Use bonding compound conforming to Subsection 810.6, Epoxy Resin. Mix and apply in accordance with the manufacturer's recommendations. Work necessary for the epoxy resin bonding compound 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 the existing culvert has been removed.

STREAM DATA - STA 674+27

Drainage Area	3.4 Sq Mi
Structure Slope	0.30%
Description of Channel Material	Sand, clay, and scoria
Drift Potential	Insignificant
Ordinary High Water Elevation	3981.5 ft
Headwater Elevation Q_{25}	3990.7 ft
Q_{100}	3992.5 ft
Outlet Velocity	12.5 fps
Design Frequency	250 Year
Design Discharge Q_{25}	655 cfs
Review Discharge Q_{100}	1290 cfs
Source of Discharge	Floodflow Characteristics of Wyoming Streams
Method of Analysis	CDS
Flood of Record	Unknown

REFERENCES

WYDOT Plans: Sheet No.
Sta 674+27
Bridge Drwg No. 2208 ---------- 1 of 1

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

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

GENERAL NOTES

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 Cl

REVIEW _____
APPROVAL _____

DESIGN ____ ✓ ____
DETAIL HHH ✓ PPP
QTY'S ____ ✓ ____

Design Section Q R Stuv
Drwg No. 0007 Sheet 2 of 6

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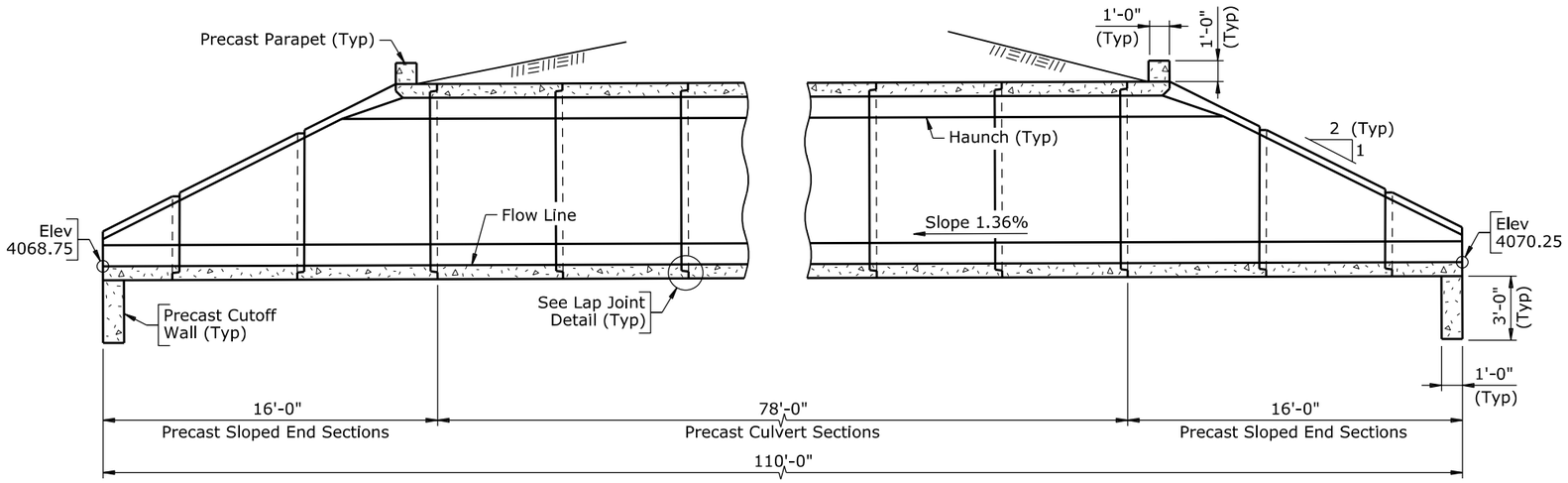
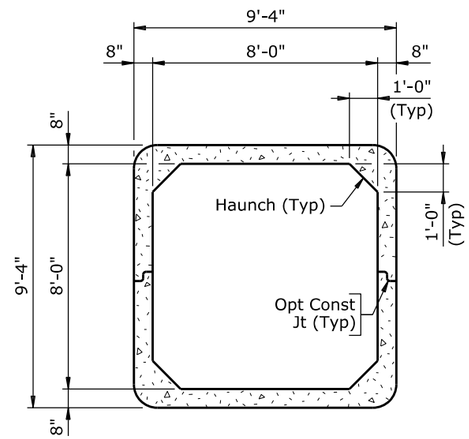
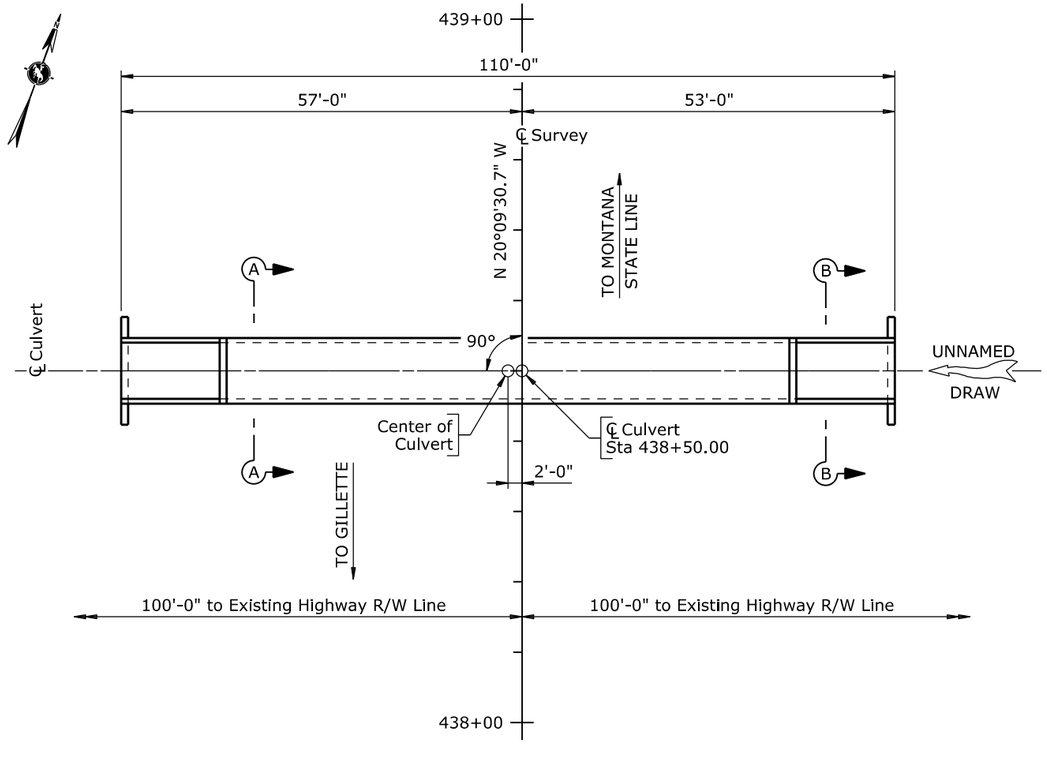
Wyo. Proj. 0433022 & P433034 Comb
Sheet B67 of B85 Sheets



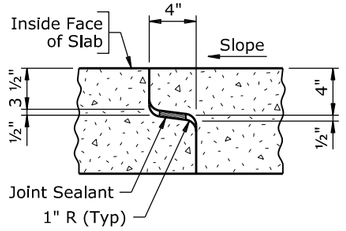
LONGITUDINAL SECTION



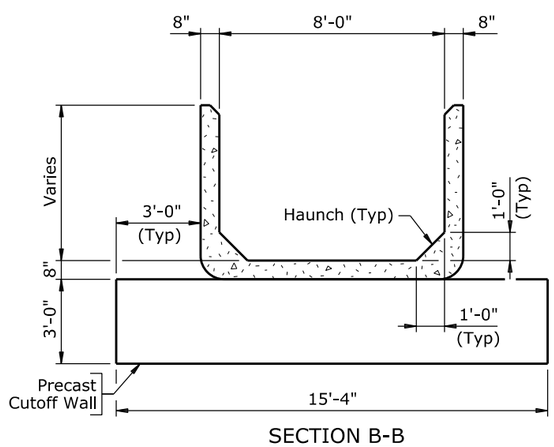
SECTION A-A



LOCATION PLAN



LAP JOINT DETAIL
(Slab shown, wall similar)



SECTION B-B

STA 438+50.00

Note:
1) Fill lifting holes with grout.
2) Mechanically anchor cutoff walls and parapets to the precast sections in accordance with the precaster's recommendations.
3) The weight of each precast culvert section is approximately 3700 lb/ft.

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

CULVERT DETAILS

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 CI

REVIEW	DESIGN PPP ✓ OOO	Design Section	Q R Stuv
APPROVAL	DETAIL JJJ ✓ PPP		
	QTY'S JJJ ✓ PPP	Drwg No. 0007	Sheet 3 of 6

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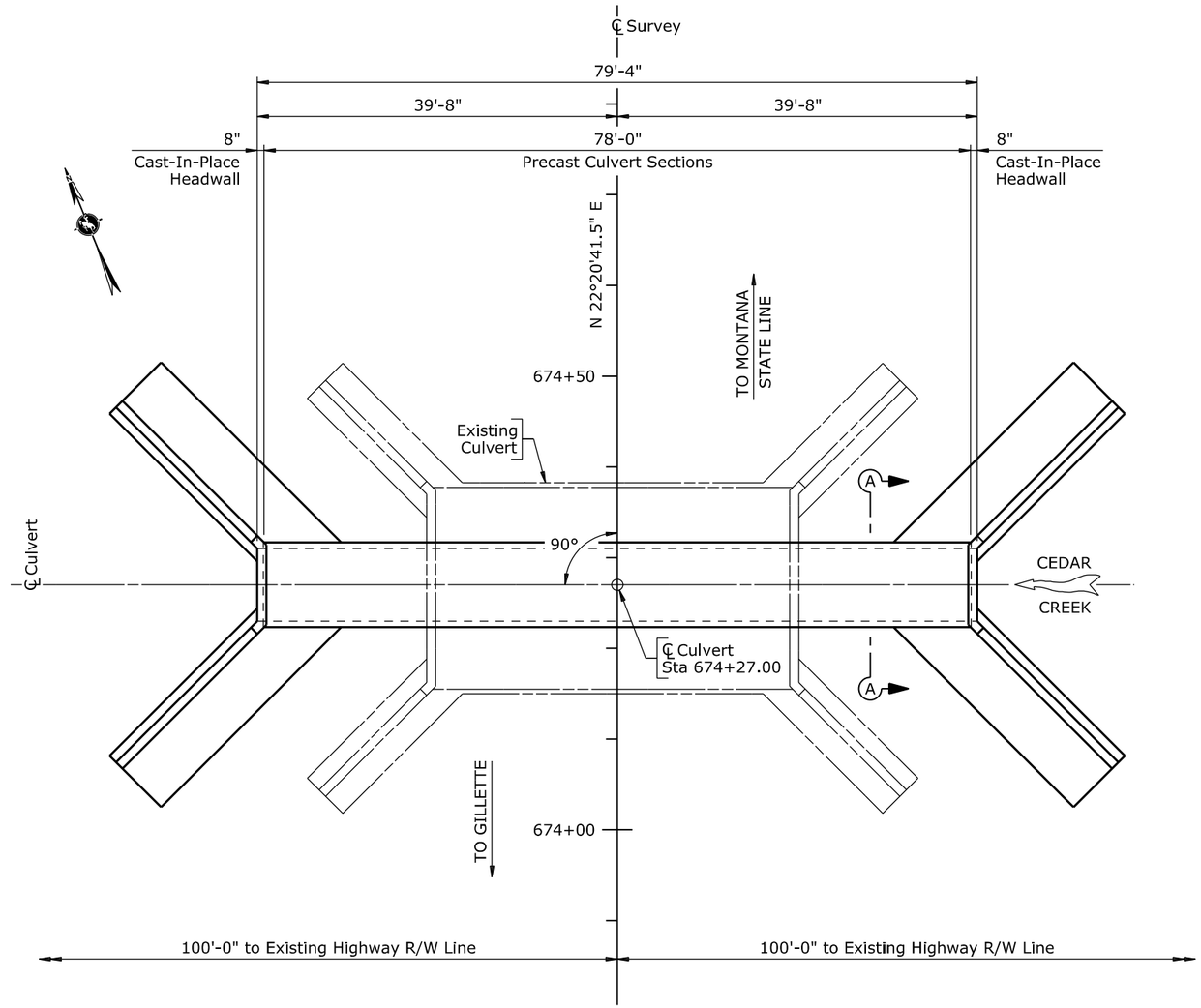

LOCATION PLAN

Note: For Section A-A, see Sheet No. 5.

STA 674+27.00

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

CULVERT DETAILS

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 Cl

REVIEW	DESIGN PPP ✓ OOO	Design Section	Q R Stuv
APPROVAL	DETAIL JJJ ✓ PPP		
	QTY'S JJJ ✓ PPP	Drwg No. 0007	Sheet 4 of 6

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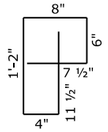
BILL OF REINFORCEMENT		
Location	Mark	Number Required
Footings & Cutoff Walls	427-1	32
	6C2	88
	607-8	88
	609-0	4
	Weight	2269 LB
Headwalls & Parapets	4C1	18
	608-9	4
	609-4	4
	609-11	4
	Weight	216 LB
Wingwalls	420-8	20
	Set 2 Bars	4
	621-0	8
	Set 1 Bars	4
	Weight	1495 LB

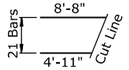
Bending Diagrams



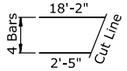
4C1 (Tie)
(4'-3")

6C2
(4'-7")

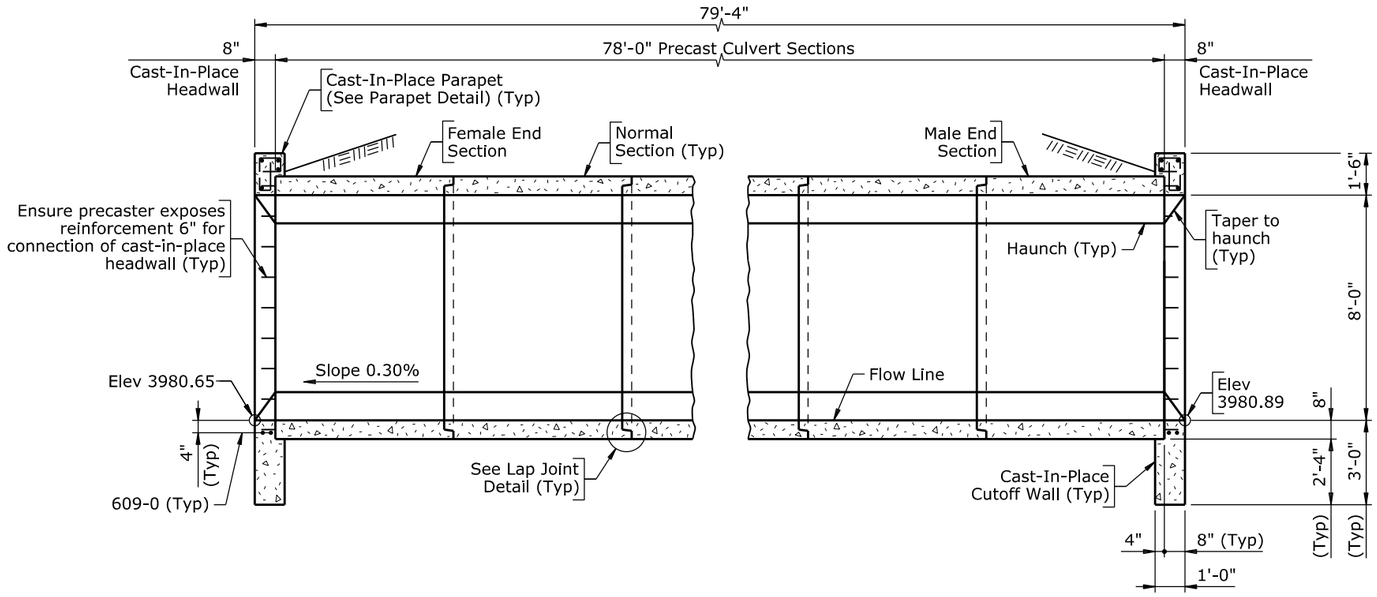
Set Diagrams



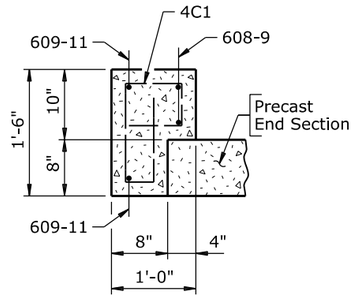
Set 1 Bars (No. 6 Bars)
(Avg length=6'-9 ½")



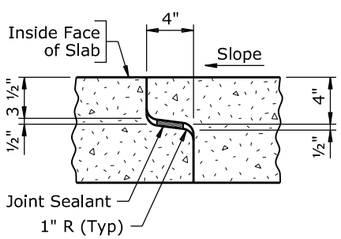
Set 2 Bars (No. 4 Bars)
(Avg length=10'-3 ½")



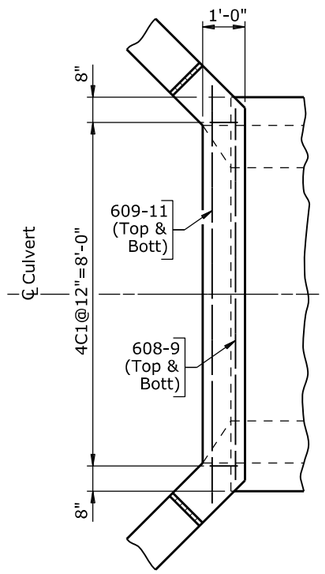
LONGITUDINAL SECTION



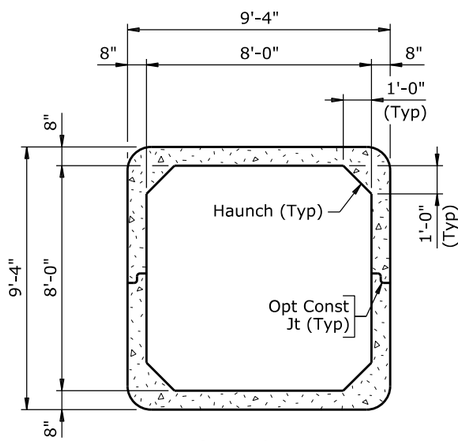
PARAPET DETAIL



LAP JOINT DETAIL
(Slab shown, wall similar)



PARAPET PLAN
(Outlet shown, inlet similar)



SECTION A-A

Note:
1) Place 609-0 bars symmetrical about ℄ Culvert.
2) Fill lifting holes with grout.
3) The weight of each precast culvert section is approximately 3700 lb/ft.
4) For location of Section A-A, see Sheet No. 4.

STA 674+27.00

Wyo. Proj. 0433022 & P433034 Comb
Sheet B69 of B85 Sheets

WYOMING DEPARTMENT OF TRANSPORTATION
BRIDGE PROGRAM

REVISIONS

CULVERT DETAILS

SINGLE BARREL 8'-0" X 8'-0"
PRECAST CONCRETE BOX CULVERTS
VARIOUS LOCATIONS
Gillette - Montana State Line
Corral Creek Section

0433022 CI

REVIEW	DESIGN PPP ✓ OOO	Design Section	Q R Stuv
APPROVAL	DETAIL JJJ ✓ PPP		
	QTY'S JJJ ✓ PPP	Drwg No. 0007	Sheet 5 of 6

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Wyo. Proj. 0433022 & P433034 Comb

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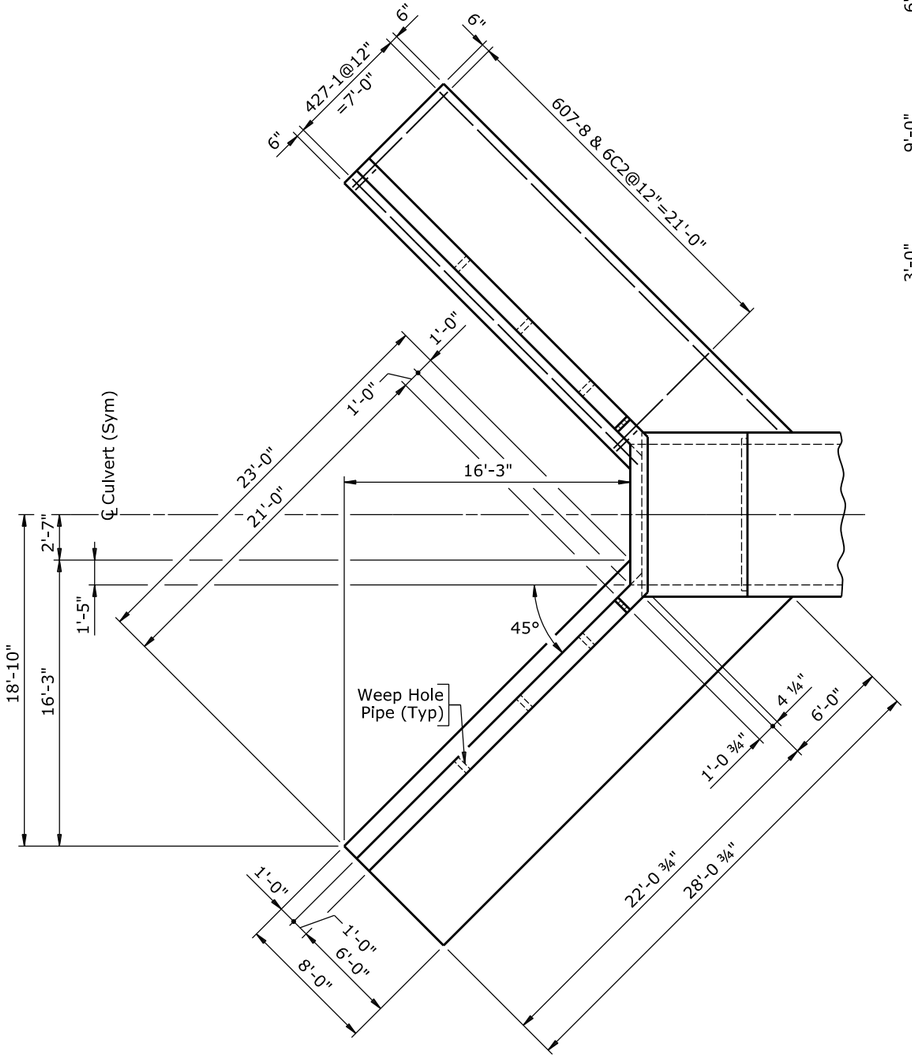
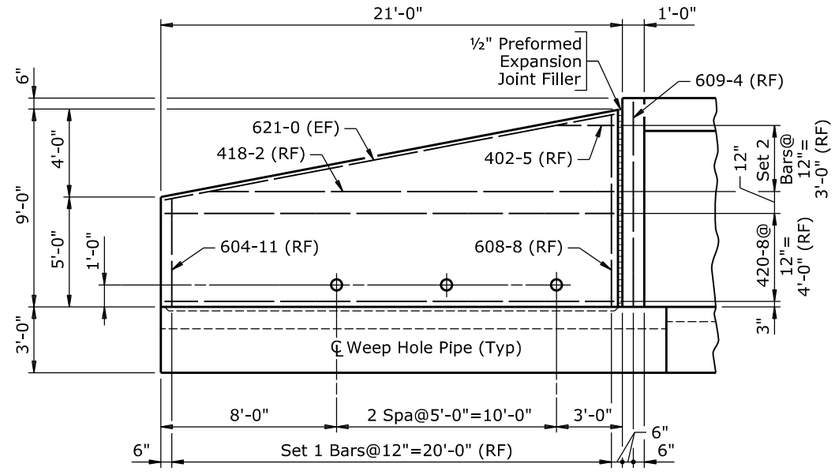
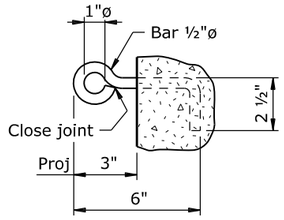


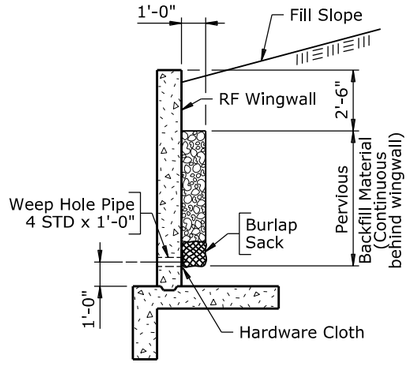
WINGWALL PLAN
(Outlet shown, inlet similar)



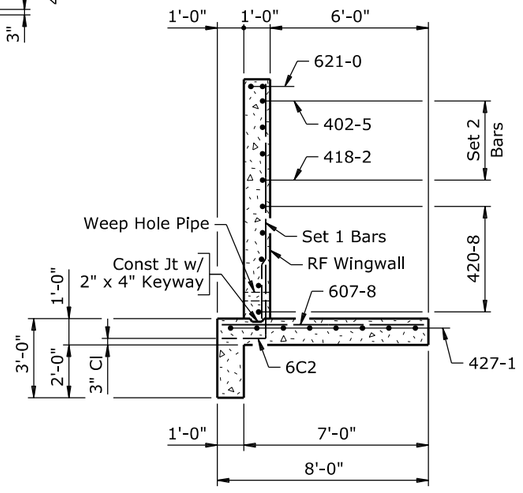
TYPICAL WINGWALL ELEVATION



EYEBOLT DETAIL
(16 req'd for securing fence)



WEEP HOLE ASSEMBLY DETAIL



TYPICAL WINGWALL SECTION

Note:
1) Place short leg of 6C2 bars in footing.
2) Place 609-4 bars and Set 1 Bars with 6C2 bars.
3) Field cut 427-1 bars to maintain 2" clearance from precast sections.
4) 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.

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0433022 Cl

REVIEW	DESIGN PPP ✓ OOO	Design Section	Q R Stuv
APPROVAL	DETAIL JJJ ✓ PPP	Drwg No. 0007	Sheet 6 of 6
	QTY'S JJJ ✓ PPP		

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