LEE COUNTY
DEPARTMENT OF TRANSPORTATION

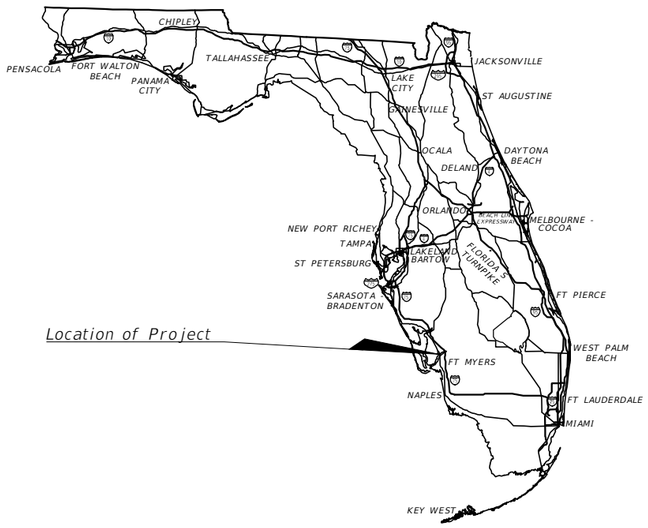
CONTRACT PLANS

FINANCIAL PROJECT ID 442000-1-54-01

LITTLETON ROAD WIDENING
FROM CORBETT ROAD TO U.S. 41
LEE COUNTY (12)

STRUCTURE PLANS

BRIDGE NO. 124028



INDEX OF STRUCTURE PLANS

REVISIONS:

1 Structure Sheets BQ-1 (Revised 04/28/23)

STRUCTURES PLANS
ENGINEER OF RECORD

CHRISTOPHER P. GAMACHE, PE NO. 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759
(727) 531-3505
CONTRACT NO.: C9854
VENDOR NO.: F11000004930
CERTIFICATE OF AUTHORIZATION NO.: 29915

LEE COUNTY PROJECT MANAGER:
KEITH RIDDLE, CGC

CIP NO.	CONSTRUCTION CONTRACT NO.	FISCAL YEAR	SHEET NO.
5028	CN190114	2021	B-1

CHRISTOPHER P. GAMACHE
LICENSE
No.82122
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

Christopher P Gamache
2023.05.05 11:38:17 -04'00'

ON THE DATE ADJACENT TO THE SEAL

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(727) 531-3505
CERTIFICATE OF AUTHORIZATION 29915
CHRISTOPHER P. GAMACHE

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

PLAN INDEX

ADAM JAMES DORNACKER
LICENSE
No.85319
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

Adam J Dornacker
Digitally signed by Adam J Dornacker
DN: c=US, o=Florida, dnQualifier=A01410D0000017EBB80B92A0006C1E6, cn=Adam J Dornacker
Date: 2023.05.05 11:26:40 -04'00'

ON THE DATE ADJACENT TO THE SEAL

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GFA INTERNATIONAL, INC
201 WALDO AVENUE NORTH
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CERTIFICATE OF AUTHORIZATION 85319
ADAM JAMES DORNACKER

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

PLAN INDEX

BRIDGE NO. 124028

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
CHECKED BY: CPG 9-21
DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: SIGNATURE SHEET

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING
FROM CORBETT ROAD TO US 41

SHEET NO.: B-2

SUMMARY OF STRUCTURE QUANTITIES- BRIDGE NO. 124028

SECTION	PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION	UNIT	QUANTITY P	QUANTITY F	TOTAL P	TOTAL F	DESIGN NOTES	CONSTRUCTION REMARKS
LUMP SUM ITEMS	110-3	REMOVAL OF EXISTING STRUCTURES/BRIDGES	BRIDGE 124028, LT	LS/SF	78		156			
			BRIDGE 124028, RT	LS/SF	78					
CULVERT	120-72-1	#57 STONE FILL	STA 27+45.17 LT, OFFSET 30.30	CY	113		199			
			STA 27+13.11 RT, OFFSET 38.86	CY	86					
	400-4-1	CONCRETE CLASS IV, CULVERTS	STA 27+45.17 LT, OFFSET 30.30	CY	96.4		171.1			
			STA 27+13.11 RT, OFFSET 38.86	CY	74.7					
	415-1-1	REINF. STEEL - ROADWAY	STA 27+45.17 LT, OFFSET 30.30	LB	27285		47517			
			STA 27+13.11 RT, OFFSET 38.86	LB	20232					
	430-950	DESILTING CONCRETE BOX CULVERT	STA 27+28.28	CY	96.1		96.1			
	515-4-1	BULLET RAIL, SINGLE RAIL	STA 27+45.17 LT, OFFSET 30.30	LF	78		159			
			STA 27+13.11 RT, OFFSET 38.86	LF	81					
	521-8-3	JUNCTION SLAB WITH BARRIER	STA 27+45.17 LT, OFFSET 30.30	LF	78		159			
			STA 27+13.11 RT, OFFSET 38.86	LF	81					

SUMMARY OF BOX CULVERTS

PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION	UNIT	QUANTITY P	QUANTITY F	TOTAL P	TOTAL F	DESIGN NOTES	CONSTRUCTION REMARKS
400-2-1	CONCRETE CLASS II, CULVERTS	STA 66+88.02	CY	0.6		0.6			
415-1-1	REINF. STEEL - ROADWAY	STA 66+88.02	LB	50		50			
430-950	DESILTING CONCRETE BOX CULVERT	STA 66+88.02	CY	67.2		67.2			

BRIDGE NO. 124028

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
4/28/23		1 Revise quantities.			

CHRISTOPHER P. GAMACHE, P.E.
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DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: SUMMARY OF QUANTITIES

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: BQ-1

Gamache, Christopher 5/5/2023 10:00:22 AM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\Rev1_B1SumOfQuantities01.dwg

DESIGN SPECIFICATIONS:

FDOT STRUCTURES MANUAL, DATED JANUARY 2021.

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION.

FDOT DESIGN MANUAL, DATED JANUARY 2021.

GOVERNING STANDARDS:

FDOT FY 2021-22 STANDARD PLANS AND REVISED INDEX DRAWINGS AS APPENDED HEREIN.

CONSTRUCTION SPECIFICATIONS:

FDOT JULY 2021 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AS AMENDED BY CONTRACT DOCUMENTS.

DESIGN METHOD:

LOAD AND RESISTANCE FACTOR DESIGN METHOD (LRFD) FOR ALL ELEMENTS UNLESS OTHERWISE NOTED.

DESIGN LOADING:

DEAD LOADS:
UNIT WEIGHT OF REINFORCED CONCRETE (INCLUDING REINFORCEMENT) 150 PCF

TRAFFIC RAILING, 32" VERTICAL SHAPE 385 PLF

ALUMINUM BULLET RAILING 10 PLF

LIVE LOADS:

HL-93 LOADING WITH DYNAMIC LOAD ALLOWANCE
PEDESTRIAN LOADING: 75 PSF

ENVIRONMENT:

MODERATELY AGGRESSIVE

CONCRETE:

CLASS	MINIMUM 28-DAY COMPRESSIVE STRENGTH (psi)	LOCATION OF CONCRETE IN STRUCTURE
IV	f'c = 5,500	BOX CULVERT EXTENSION, WINGWALLS, JUNCTION SLAB, AND TRAFFIC RAILING

CONCRETE COVER:

CONCRETE COVER SHOWN IN PLANS DOES NOT INCLUDE PLACEMENT AND FABRICATION TOLERANCES UNLESS SHOWN AS "MINIMUM COVER". SEE FDOT STANDARD SPECIFICATIONS FOR ALLOWABLE TOLERANCES. ALL DIMENSIONS PERTAINING TO LOCATIONS OF REINFORCING ARE TO CENTERLINE OF BARS EXCEPT WHERE THE CLEAR DIMENSION IS SHOWN TO FACE OF CONCRETE.

2" FOR EXTERNAL FORMED SURFACES.
3" FOR EXTERNAL SURFACES CAST AGAINST EARTH.

VERTICAL DATUM

THE BENCH MARK DATUM USED FOR THE PLANS IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

REINFORCING STEEL:

ALL REINFORCEMENT BARS AND WELDED WIRE REINFORCEMENT SHALL BE IN ACCORDANCE WITH FDOT STANDARD SPECIFICATIONS SECTION 931. ALL REINFORCEMENT BARS SHALL BE GRADE 60.

JOINTS IN CONCRETE:

CONSTRUCTION JOINTS WILL BE PERMITTED ONLY AT LOCATIONS INDICATED IN THE PLANS. ADDITIONAL CONSTRUCTION JOINTS OR ALTERATIONS TO THOSE SHOWN SHALL REQUIRE APPROVAL OF THE ENGINEER.

BRIDGE NAME AND NUMBER:

PLACE THE FOLLOWING BRIDGE NAME AND NUMBER ON THE TRAFFIC RAILINGS IN ACCORDANCE WITH THE TRAFFIC RAILING DESIGN STANDARDS:

NAME	NUMBER
LITTLETON RD OVER YELLOW FEVER CREEK	124028

PLAN DIMENSIONS:

ALL DIMENSIONS IN THESE PLANS ARE MEASURED IN FEET EITHER HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE NOTED.

DESIGNATIONS:

REFER TO FDOT STANDARD PLANS ABBREVIATIONS AND THIS NOTE FOR ABBREVIATIONS USED IN THESE PLANS
PLF = POUNDS PER LINEAR FOOT
EF = EACH FACE
ES = EACH SIDE
UNO = UNLESS NOTED OTHERWISE

TRAFFIC CONTROL:

SEE ROADWAY PLANS

PHASING OF WORK:

WORK PHASING AND PROGRESSION OF THE WORK SHALL CONFORM TO THE TRAFFIC CONTROL PLANS LOCATED IN THE ROADWAY PLANS AND THE NOTES ON THE CONSTRUCTION SEQUENCE DRAWINGS.

OVER EXCAVATION OF FOUNDATIONS

EXCAVATE 3 FT OF SOILS BELOW THE BOTTOM OF THE PROPOSED FOUNDATION AND REPLACE IT WITH A BEDDING OF #57 STONE THAT EXTENDS 1'-0" BEYOND THE FOOTPRINT OF THE FOUNDATION. COMPACT THE BEDDING IN 1'-0" LIFTS. WRAP THE BOTTOM AND SIDES OF THE BEDDING IN FILTER FABRIC, TYPE D-4 PER FDOT STANDARD SPECIFICATIONS SECTION 985.

NO SEPARATE PAYMENT WILL BE MADE FOR THE FILTER FABRIC. THE COST OF FURNISHING AND PLACING THE FILTER FABRIC WILL BE INCLUDED IN THE UNIT COST OF THE #57 STONE ITEM.

BRIDGE NO. 124028

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
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DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

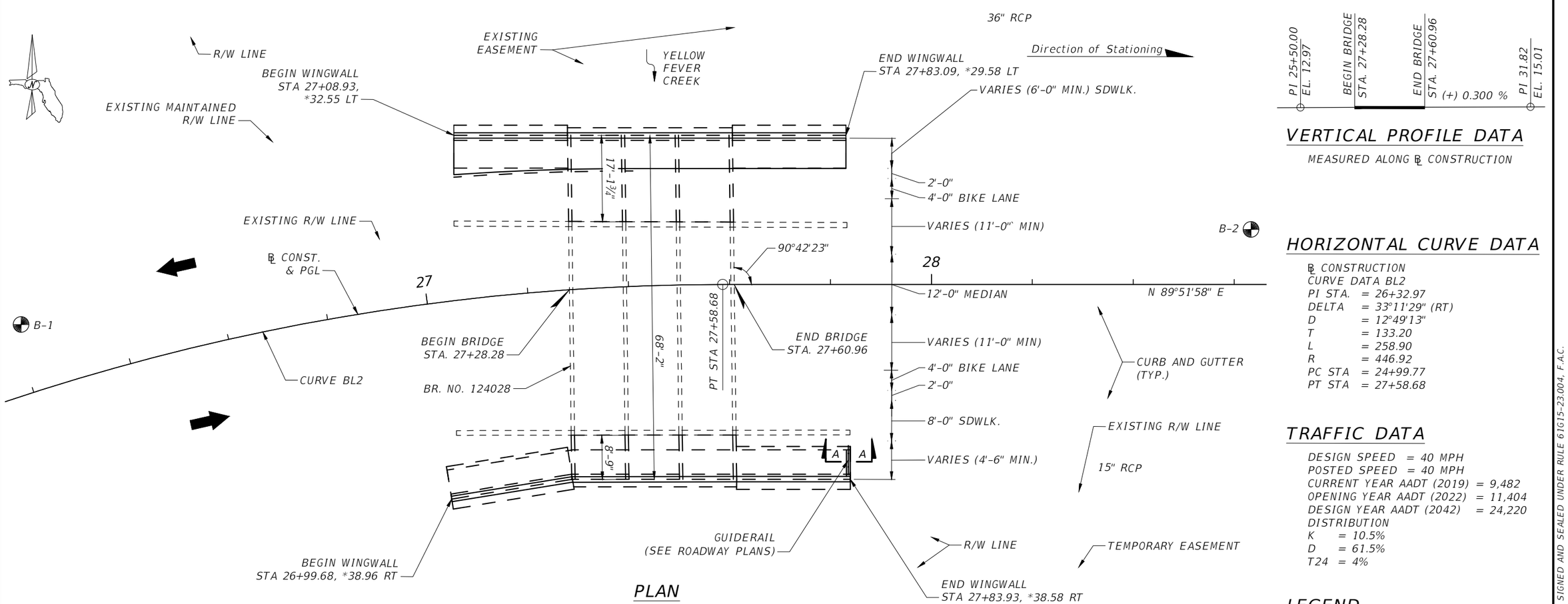
SHEET TITLE: GENERAL NOTES

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

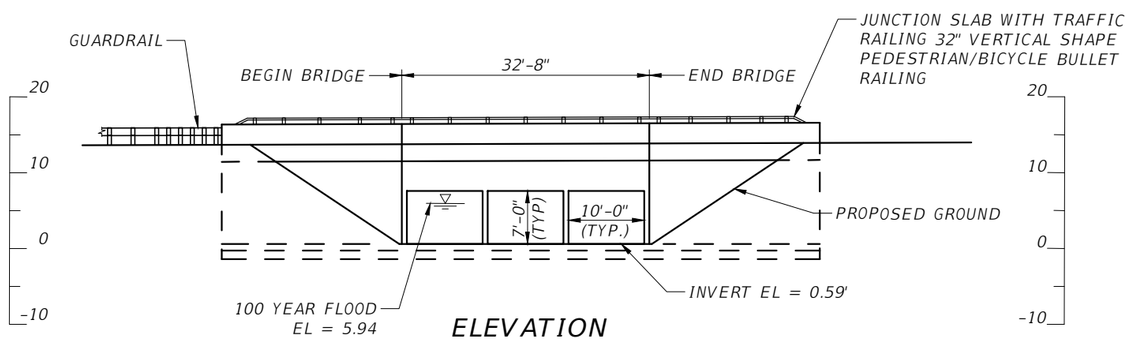
SHEET NO.: B-3

Regan, Michael 4/27/2023 2:05:21 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1GeneralNotes01.dwg



PLAN

*NOTE: OFFSETS ARE MEASURED TO THE FACE OF WINGWALL



ELEVATION

VERTICAL PROFILE DATA

MEASURED ALONG ℄ CONSTRUCTION

HORIZONTAL CURVE DATA

℄ CONSTRUCTION
CURVE DATA BL2
PI STA. = 26+32.97
DELTA = 33°11'29" (RT)
D = 12°49'13"
T = 133.20
L = 258.90
R = 446.92
PC STA = 24+99.77
PT STA = 27+58.68

TRAFFIC DATA

DESIGN SPEED = 40 MPH
POSTED SPEED = 40 MPH
CURRENT YEAR AADT (2019) = 9,482
OPENING YEAR AADT (2022) = 11,404
DESIGN YEAR AADT (2042) = 24,220
DISTRIBUTION
K = 10.5%
D = 61.5%
T24 = 4%

LEGEND

APPROXIMATE SOIL BORING LOCATION

EXISTING CREST GAGE (REMOVE & DISCARD)

BRIDGE NO. 124028

REVISIONS					
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LEE COUNTY DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: PLAN AND ELEVATION

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: B1-1

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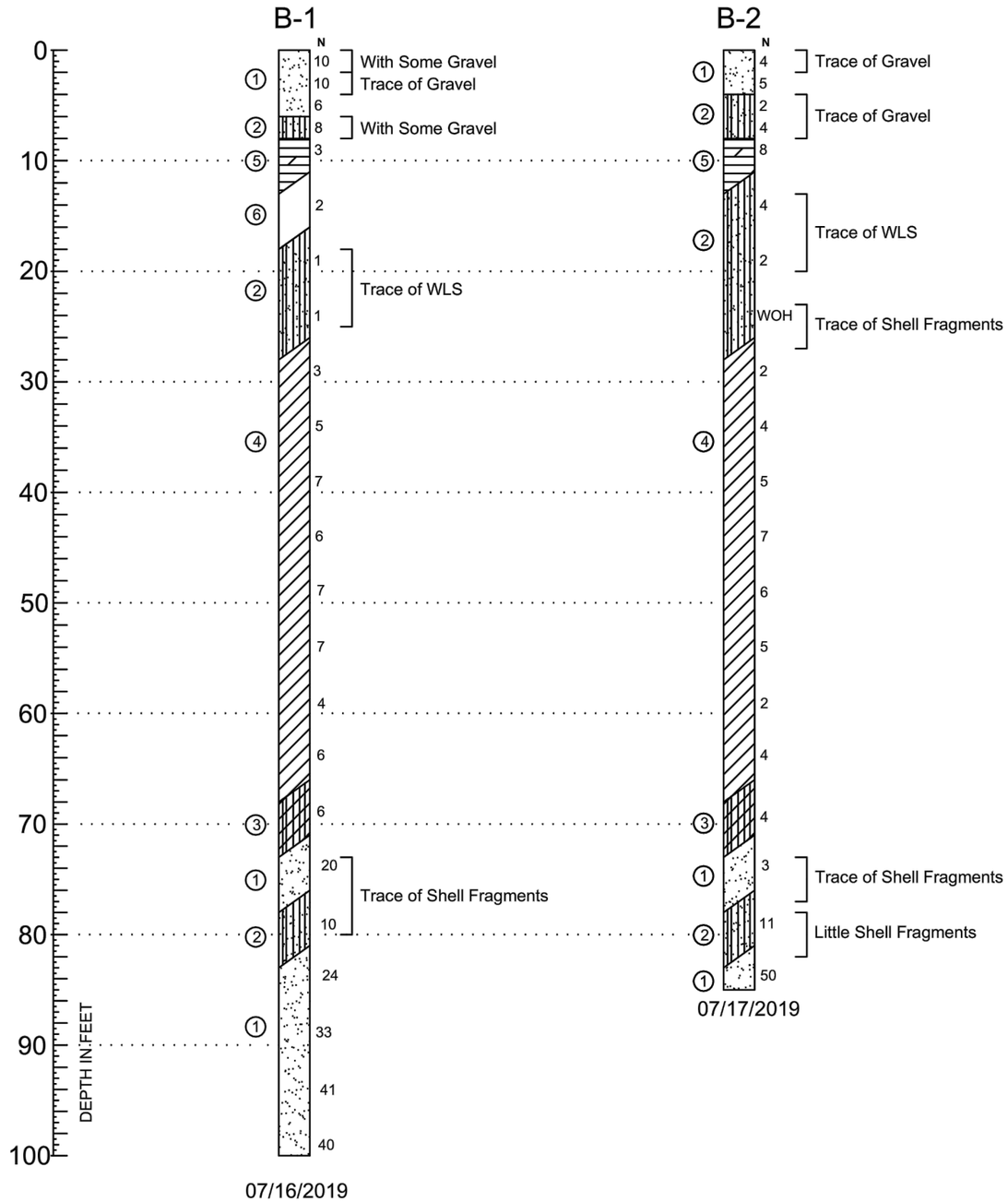
SOIL PROFILES



SOIL PROFILE LEGEND

B-X = BORING NUMBER

SOIL TYPE ⊗ SOIL SYMBOL — N = SPT TEST VALUE

GROUND WATER LEVEL

INDICATES PRACTICAL REFUSAL TO BORING EQUIPMENT

= INDICATES GRADUAL TRANSITION IN SOIL TYPES

SOIL LEGEND

1. Gray to Dark Gray, Dark Brown, Orange, Fine SAND (A-3) Very Loose to Very Dense
2. Gray, Silty SAND (A-2-4) Very Loose to Medium Dense
3. Gray, Clayey SAND (A-2-6) Loose
4. Green, Clay (A-6) Soft to Firm
5. Light Gray to Gray, WEATHERED LIMESTONE (WLS) Very Soft
6. NO RECOVERY

NOTES:

N - STANDARD PENETRATION RESISTANCE TEST (SPT) VALUE. NUMBERS TO THE RIGHT OF BORINGS INDICATE SPT VALUE FOR 12-INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).

WOH - BORING INTERVAL ADVANCED UNDER WEIGHT OF HAMMER.

WOR - BORING INTERVAL ADVANCED UNDER WEIGHT OF ROD.

LFC - LOSS OF DRILLING FLUID CIRCULATION.

WLS - WEATHERED LIMESTONE

SOIL CLASSIFICATION

CORRELATION OF N - VALUES WITH RELATIVE DENSITY AND CONSISTENCY

COHESIONLESS SOIL

N - VALUE	RELATIVE DENSITY
0 - 3	VERY LOOSE
4 - 8	LOOSE
9 - 24	MEDIUM DENSE
25 - 40	DENSE
OVER 40	VERY DENSE

SILTS AND CLAYS

N - VALUE	CONSISTENCY
0 - 1	VERY SOFT
2 - 4	SOFT
5 - 6	FIRM
7 - 12	STIFF
13 - 24	VERY STIFF
OVER 24	HARD

CORRELATION OF N - VALUES WITH HARDNESS DESCRIPTION

LIMEROCK

N - VALUE	RELATIVE DENSITY
0 - 19	VERY SOFT
20 - 49	SOFT
50 - 100	MEDIUM HARD
50 FOR 3 TO 5"	MODERATELY HARD
50 FOR 0 TO 2"	HARD

APPROXIMATE FINES CONTENT	MODIFIERS
5% TO 15%	SLIGHTLY SILTY OR SLIGHTLY CLAYEY
16% TO 25%	SILTY OR CLAYEY
26% TO 49%	VERY SILTY OR VERY CLAYEY

APPROXIMATE SHELL CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE OF SHELL
6% TO 12%	SLIGHTLY SHELLY
13% TO 30%	SHELLY
31% TO 50%	VERY SHELLY

APPROXIMATE ORGANIC CONTENT	MODIFIERS
0% TO 5%	WITH A TRACE
5% TO 20%	WITH ORGANICS
20% TO 75%	HIGHLY ORGANIC
75% TO 100%	PEAT

DEFINITION OF DESCRIPTIVE TERMS OF MODIFIERS FOR SILTS/CLAYS/SHELLS/GRAVELS ARE DESCRIBED AS FOLLOWS :

PERCENTAGE OF MODIFIER MATERIAL	FIRST QUALIFIER	SECOND QUALIFIER
0 - 5	WITH A TRACE OF + MODIFIER	WITH A TRACE
5 - 12	SLIGHTLY + MODIFIER + Y	WITH A LITTLE
12 - 30	MODIFIER + Y	WITH SOME
30 - 50	VERY + MODIFIER + Y	AND

BRIDGE NO. 124028

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ADAM J. DORNACKER, P.E.
P.E. LICENSE NUMBER 85319
GFA INTERNATIONAL, INC.
201 WALDO AVE. N.
LEHIGH ACRES, FL 33759

DRAWN BY: RMG 07-19
CHECKED BY: AJD 07-19
DESIGNED BY:
CHECKED BY:

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: REPORT OF CORE BORINGS

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: B1-2

Regan, Michael 4/27/2023 2:12:47 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1Boring01.dwg

BOX CULVERT DATA TABLES

BOX, HEADWALL AND CUTOFF WALL DATA TABLE (inches unless shown otherwise) — Table Date 7-01-09

LOCATION	STRUCTURE /BRIDGE NUMBER	BOX									HEADWALL AND CUTOFF WALL									
		Wc(ft)	Hc(ft)	Tt	Tw	Tb	Ti	#cells	Lc(ft)	Cover	Blhw	Hlhw	Brhw	Hrhw	Blcw	Hlcw	Brcw	Hrcw	SL(deg)	SR(deg)
STA 27+45.16	124028 (LT)	10	7	10.25	8	10.25	8	3	17.15	2.00	12	59.04	–	–	10	24	–	–	–	–
STA 27+43.82	124028 (RT)	10	7	10.25	8	10.25	8	3	8.75	2.00	–	–	12	59.88	–	–	10	24	–	–

LEFT SIDE WINGWALLS DATA TABLE (inches unless shown otherwise) — Table Date 01-01-11

STRUCTURE /BRIDGE NUMBER	LEFT END WINGWALL									LEFT BEGIN WINGWALL								
	Rt	Rw	Rh	Rd	SW(deg)	β (deg)	He(ft)	Hs(ft)	Lw(ft)	Rt	Rw	Rh	Rd	SW(deg)	β (deg)	He(ft)	Hs(ft)	Lw(ft)
124028 (LT)	24	12	66	12	90	–	12.09	12.02	22.5	24	12	66	12	90	–	11.85	11.92	22.5
124028 (RT)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

RIGHT SIDE WINGWALLS DATA TABLE (inches unless shown otherwise) — Table Date 01-01-11

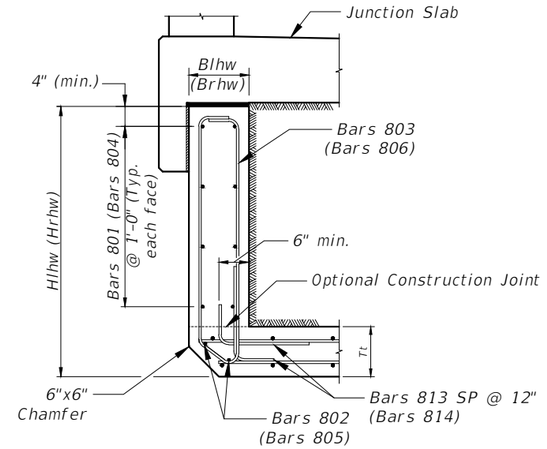
STRUCTURE /BRIDGE NUMBER	RIGHT END WINGWALL									RIGHT BEGIN WINGWALL								
	Rt	Rw	Rh	Rd	SW(deg)	β (deg)	He(ft)	Hs(ft)	Lw(ft)	Rt	Rw	Rh	Rd	SW(deg)	β (deg)	He(ft)	Hs(ft)	Lw(ft)
124028 (LT)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
124028 (RT)	24	12	66	12	90	–	12.23	12.15	22.5	24	12	66	12	100	4.613	11.89	11.99	24.17

ESTIMATED CONCRETE QUANTITIES (CY) — Table Date 7-01-13

STRUCTURE /BRIDGE NUMBER	BOX								LEFT END WINGWALL			LEFT BEGIN WINGWALL			RIGHT END WINGWALL			RIGHT BEGIN WINGWALL		
	Left Cutoff Wall	Right Cutoff Wall	Bottom Slab	Walls	Top Slab	Left Head Wall	Right Head Wall	Sub Total	Footing	Wall	Sub Total	Footing	Wall	Sub Total	Footing	Wall	Sub Total	Footing	Wall	Sub Total
124028 (LT)	1.16	–	21.34	13.24	19.79	4.92	–	60.56	7.08	10.05	17.96	7.08	9.9	17.82	–	–	–	–	–	–
124028 (RT)	–	1.16	12.66	7.43	11.11	–	5.00	37.43	–	–	–	–	–	–	7.08	10.16	18.07	7.61	10.69	19.19

MAIN STEEL REINFORCEMENT SPACING (inches) — Table Date 7-01-09

STRUCTURE /BRIDGE NUMBER	BOX															HEADWALLS		CUTOFF WALLS	
	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115, 116...	803	806	809	812
124028 (LT)	6	6	6	6	6	6	6	6	12	12	12	12	12	12	12	12	–	12	–
124028 (RT)	6	6	6	6	6	6	6	6	12	12	12	12	12	12	12	–	12	–	12



CULVERT TYPICAL HEADWALL SECTION
(LT HEADWALL SHOWN, RT SIMILAR)

NOTES:

1. Environmental Class: Moderately Aggressive
2. Reinforcing Steel, Grade 60
3. Concrete Class IV f'c = 5.5 ksi
4. Soil Properties:
   Friction Angle 30 deg
   Modulus of Subgrade Reaction 155,500 pcf
   Nominal Bearing Resistance 8889 psf
5. Work this Drawing with Standard Plans Index 400-289 and corresponding Reinforcing Bar List sheet
6. Settlement criteria for Precast Box Culvert option (Index 400-291):
   Long Term Differential Settlement (ΔY) = 0.05 ft.
   Effective Length for Settlement (L) = 34 ft.
   A link slab is required for a precast box culvert alternative
7. Face of headwalls are located as follows:
   STA 27+45.16 LT, OFFSET 29.82
   STA 27+43.82 RT, OFFSET 38.36
8. Connection Types permitted for Box Culvert Extensions:
   Structure/ Bridge Number 124028 – Type I or Type II
9. Quantities for Type I and Type II Connections include 2 ft. additional payment length beyond Lc for connection to existing box culvert. (See Summary of Box Culvert Quantities box in Plans)

WINGWALL STEEL REINFORCEMENT SPACING (inches) — Table Date 7-01-09

STRUCTURE /BRIDGE NUMBER	LEFT END WINGWALL							LEFT BEGIN WINGWALL							RIGHT END WINGWALL							RIGHT BEGIN WINGWALL						
	401 407(8)	402 (403)	404 (405)	406	409	410	411	501 507(8)	502 (503)	504 (505)	506	509	510	511	601 607(8)	602 (603)	604 (605)	606	609	610	611	701 707(8)	702 (703)	704 (705)	706	709	710	711
124028 (LT)	4	6	6	6	6	6	6	4	6	6	6	6	6	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
124028 (RT)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	6	6	6	6	6	6	4	6	6	6	6	6	6

WINGWALL NOTE: Bar designations in "( )" are only required for variable height wingwalls.

BRIDGE NO. 124028

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

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CHECKED BY: CPG 9-21

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ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

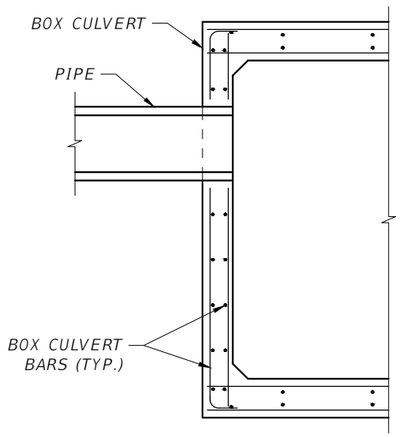
SHEET TITLE: BOX CULVERT DATA TABLES

REF. DWG. NO.:

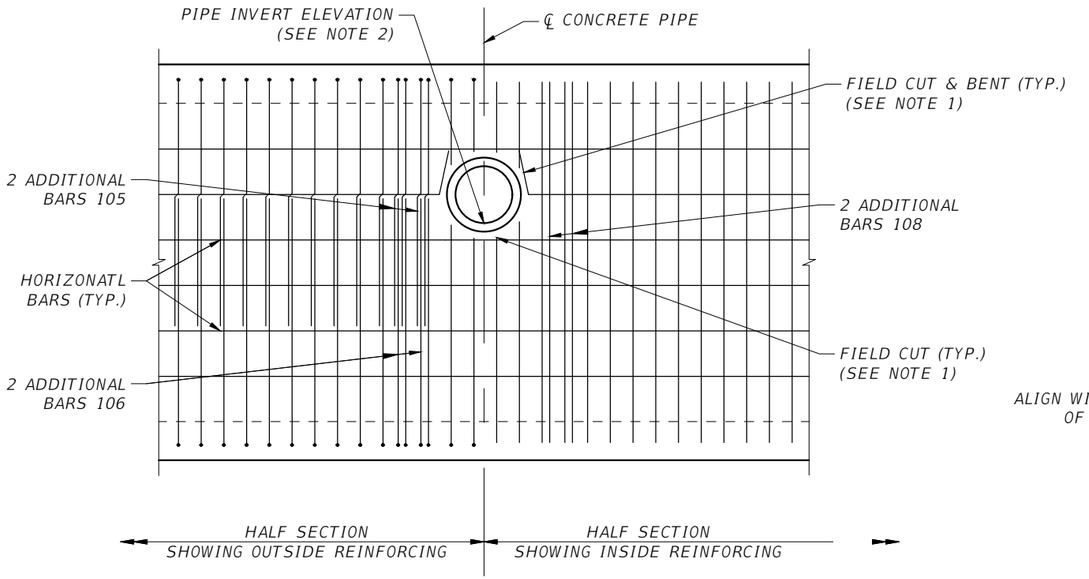
PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: B1-3

Regan, Michael 4/27/2023 2:06:08 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1MiscStrClvt01.dwg

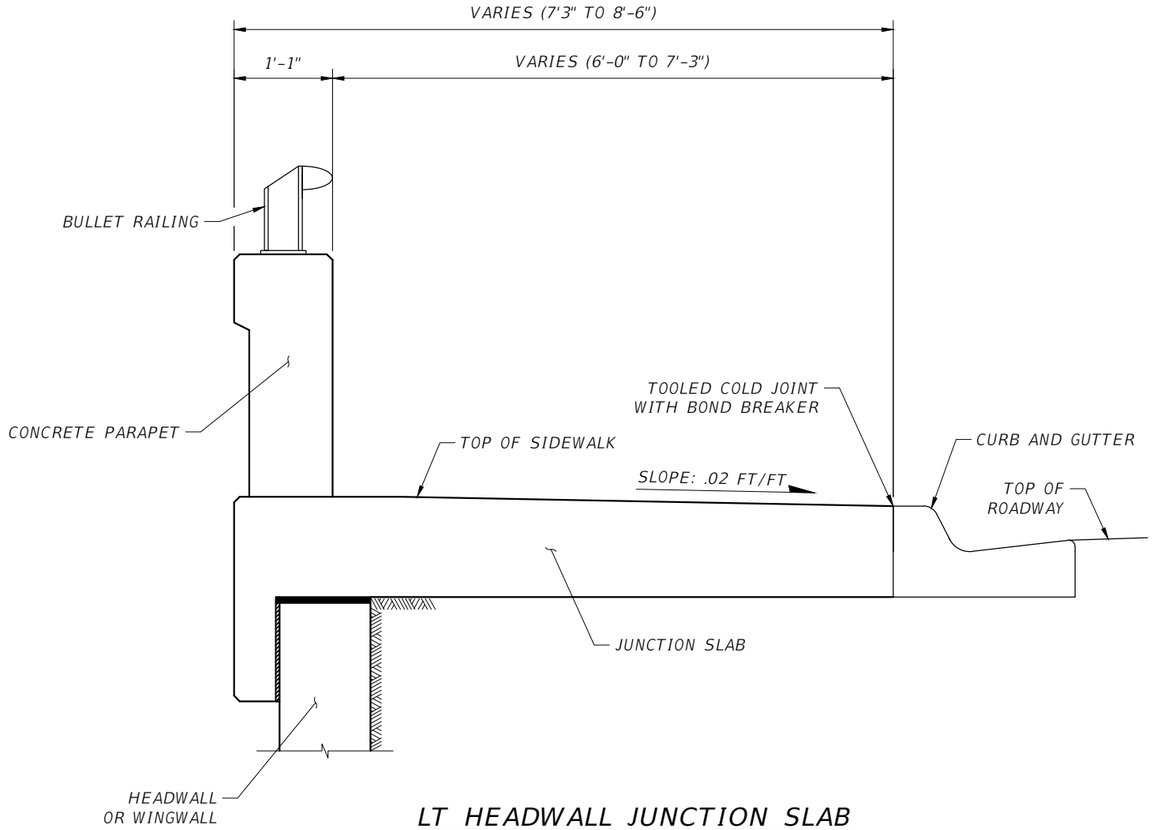


TYPICAL SECTION

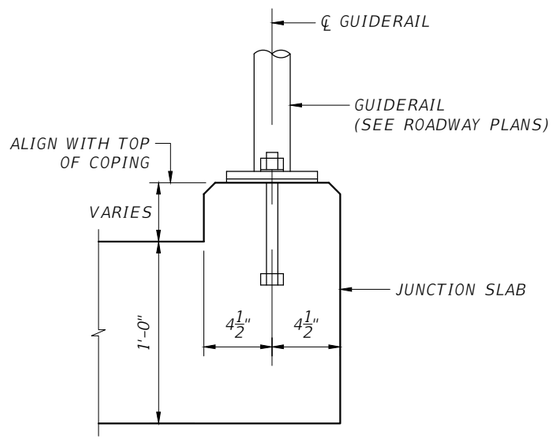


ELEVATION

CULVERT PIPE ENTRANCE DETAILS



LT HEADWALL JUNCTION SLAB TYPICAL SECTION



SECTION A-A

(RT JUNCTION SLAB, SEE SHEET B1-1)

JUNCTION SLAB NOTES

1. CONSTRUCT JUNCTION SLAB OVER THE LT CULVERT HEADWALL PER FDOT STANDARD PLANS INDEX 521-620, EXCEPT AS MODIFIED BY THE DETAILS SHOWN.
2. BOND BREAKER MATERIAL CAN BE ANY IMPERMEABLE COATED, SHEET MEMBRANE, OR PREFORMED MATERIAL HAVING A THICKNESS OF NOT LESS THAN 6 MILS AND NOT MORE THAN ½".
3. CONSTRUCT JUNCTION SLAB OVER THE RT CULVERT HEADWALL PER FDOT STANDARD PLANS INDEXI 521-610, EXCEPT AS MODIFIED BY SECTION A-A.

PIPE ENTRANCE NOTES

1. FIELD CUT AND/OR BEND REINFORCEMENT AS REQUIRED TO MAINTAIN 2" CLEAR FROM PIPE.
2. SEE DRAINAGE PLANS FOR SIZE, PLACEMENT, AND INVERT ELEVATION

BRIDGE NO. 124028

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
CHECKED BY: CPG 9-21
DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: BOX CULVERT DETAILS

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: B1-4

Regan, Michael 4/27/2023 2:06:29 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1MiscStrClvt02.dwg

MARK		LENGTH	NO	TYP	STY		B	C	D	E	F	H	J	K	N	Ø
SIZE	DES	FT IN	BARS	BAR	A	G	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	NO	ANG
LOCATION		MAIN BOX									NO. REQUIRED = 1					
6	101	32- 4	39	1			32- 4									
6	102	32- 4	39	1			32- 4									
6	103	32- 4	42	1			32- 4									
6	104	32- 4	42	1			32- 4									
5	105	6-10	76	10			1- 9	5- 0 3/4								
5	106	6-10	76	10			1- 9	5- 0 3/4								
5	107	5-11	304	10			0-10	5- 0 3/4								
5	108	8- 5	76	1			8- 4 1/2									
4	109	20- 4	34	1			20- 3 3/4									
4	110	18-10	34	1			18- 9 3/4									
4	111	18- 6	34	1			18- 6									
4	112	20- 4	34	1			20- 3 3/4									
4	113	18-10	16	1			18- 9 3/4									
4	114	18-10	16	1			18- 9 3/4									
4	115	18- 2	32	1			18- 2									
LOCATION		LEFT END WINGWALL									NO. REQUIRED = 1					
6	401	11- 8	68	1			11- 7 3/4									
6	402	22- 2	25	1			22- 2									
6	404	22- 2	25	1			22- 2									
6	406	11- 8	46	1			11- 7 3/4									
6	407	5- 7	68	10			2- 8	2-10 3/4								
6	409	8- 2	46	1			8- 2									
5	410	8- 2	46	1			8- 2									
5	411	22- 2	36	1			22- 2									
5	412	2- 0	19	1			2- 0									
LOCATION		LEFT BEGIN WINGWALL									NO. REQUIRED = 1					
6	501	11- 7	68	1			11- 6 1/4									
6	502	22- 2	25	1			22- 2									
6	504	22- 2	25	1			22- 2									
6	506	11- 7	46	1			11- 6 1/4									
6	507	5- 7	68	10			2- 8	2-10 3/4								
6	509	8- 2	46	1			8- 2									
5	510	8- 2	46	1			8- 2									
5	511	22- 2	36	1			22- 2									
5	512	2- 0	19	1			2- 0									
LOCATION		LEFT HEADWALL									NO. REQUIRED = 1					
6	801	32- 4	8	1			32- 4									
6	802	32- 4	2	1			32- 4									
4	803	8- 8	33	27			3- 7 1/4	0- 6	0- 2	0- 5	3- 2 1/4	0- 6	0- 6			
6	813	2- 2	66	10			1- 6	0- 8								
LOCATION		LEFT CUTOFF WALL									NO. REQUIRED = 1					
4	807	32- 4	2	1			32- 4									
4	808	32- 4	2	1			32- 4									
4	809	4- 9	33	7			1- 7 1/4	0- 6	0- 6	0- 6						
END OF LIST																

BRIDGE NO. 124028

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
CHECKED BY: CPG 9-21
DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: BOX CULVERT REBAR LIST NORTH EXTENSION

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

SHEET NO.: B1-5

Regan, Michael 4/27/2023 2:07:48 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1RebarList01.dwg

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SIZE	DES	FT IN	BARS	BAR	A	G	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	FT IN FR	NO	ANG
LOCATION		MAIN BOX									NO. REQUIRED = 1					
6	101	32- 4	22	1			32- 4									
6	102	32- 4	22	1			32- 4									
6	103	32- 4	25	1			32- 4									
6	104	32- 4	25	1			32- 4									
5	105	6-10	46	10			1- 9	5- 0 3/4								
5	106	6-10	46	10			1- 9	5- 0 3/4								
5	107	5-11	168	10			0-10	5- 0 3/4								
5	108	8- 5	46	1			8- 4 1/2									
4	109	11-11	34	1			11-11									
4	110	10- 5	34	1			10- 5									
4	111	10- 1	34	1			10- 1									
4	112	11-11	34	1			11-11									
4	113	10- 5	16	1			10- 5									
4	114	10- 5	16	1			10- 5									
4	115	9-10	32	1			9- 9 1/4									
LOCATION		RIGHT END WINGWALL									NO. REQUIRED = 1					
6	601	11- 8	68	1			11- 7 3/4									
5	602	22- 2	25	1			22- 2									
5	604	22- 2	25	1			22- 2									
5	606	11- 8	46	1			11- 7 3/4									
6	607	5- 7	68	10			2- 8	2-10 3/4								
6	609	8- 2	46	1			8- 2									
5	610	8- 2	46	1			8- 2									
5	611	22- 2	36	1			22- 2									
5	612	2- 0	19	1			2- 0									
LOCATION		RIGHT BEGIN WINGWALL									NO. REQUIRED = 1					
6	701	11- 7	73	1			11- 6 1/4									
5	702	23-10	25	1			23-10									
5	704	23-10	25	1			23-10									
5	706	11- 7	49	1			11- 6 1/4									
6	707	5- 7	73	10			2- 8	2-10 3/4								
6	709	8- 2	49	1			8- 2									
5	710	8- 2	49	1			8- 2									
5	711	23-10	36	1			23-10									
5	712	2- 0	19	1			2- 0									
LOCATION		RIGHT HEADWALL									NO. REQUIRED = 1					
6	804	32- 4	8	1			32- 4									
6	805	32- 4	2	1			32- 4									
4	806	10- 5	33	27			4- 5 3/4	0- 6	0- 2	0- 5	4- 0 3/4	0- 6	0- 6			
6	814	2- 2	66	10			1- 6	0- 8								
LOCATION		RIGHT CUTOFF WALL									NO. REQUIRED = 1					
4	810	32- 4	2	1			32- 4									
4	811	32- 4	2	1			32- 4									
4	812	4- 9	33	7			1- 7 1/4	0- 6	0- 6	0- 6						

END OF LIST

BRIDGE NO. 124028

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
CHECKED BY: CPG 9-21
DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

SHEET TITLE: BOX CULVERT REBAR LIST SOUTH EXTENSION

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

REF. DWG. NO.:

SHEET NO.: B1-6

Load Rating Summary Details for Reinforced Concrete Bridges

Table Date 01-01-11

Table 2 - LRFR

Level	Limit State	Vehicle	Weight (tons)	Load Factors			Moment (Strength)					Shear (Strength)					Comments:
				LL	DC	DW	Unfactored Ratio LL / Permanent Loads	Rating Factor	Tons	Location	Dimension	Unfactored Ratio LL / Permanent Loads	Rating Factor	Tons	Location	Dimension	
Design Load Rating	Strength I (Inv)	HL-93	N/A	1.75	1.25	1.50	1.04	1.69	N/A	A	4.4 ft	0.95	1.19	N/A	C	9.8 ft	Wheel load distribution method if other than LRFD. Other appropriate comments. Original Box Culvert
	Strength I (Op)	HL-93	N/A	1.35	1.25	1.50	1.04	2.19	N/A	A	4.4 ft	0.95	1.54	N/A	C	9.8 ft	Original Box Culvert
Permit Load Rating	Strength II	FL120	60.0	1.35	1.25	1.50	1.72	1.32	79.0	B	4.8 ft	1.25	1.17	70.4	C	9.8 ft	Original Box Culvert

General Notes:
1. This table is based on the requirements established in the January 2021 "Structures Manual".

Table 2 Notes:
1. Permit capacity is determined by using the permit vehicle in all lanes.
2. Does the depth of fill above the top slab exceed the span length between the inside faces of the end walls (Bridge Culvert Total Span Length)? ☐ Yes ☒ No
3. Rating performed using STAAD.ProV8i and Mathcad 15.0.

Abbreviations:

DL - Dead Load (LFR)

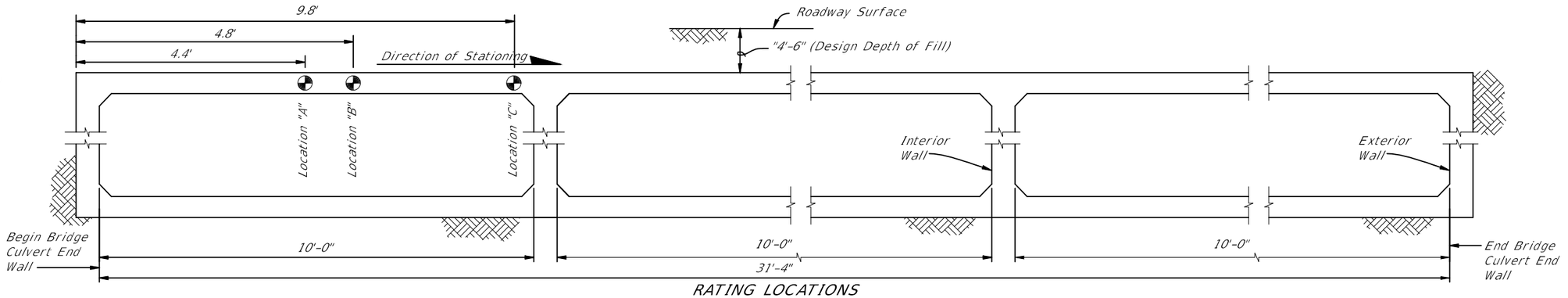
DC - Component Dead Load (LRFR)

DW - Wearing Surface & Utility Dead Load (LRFR)

LL - Live Load

Inv - Inventory

Op - Operating



RATING LOCATIONS

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CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

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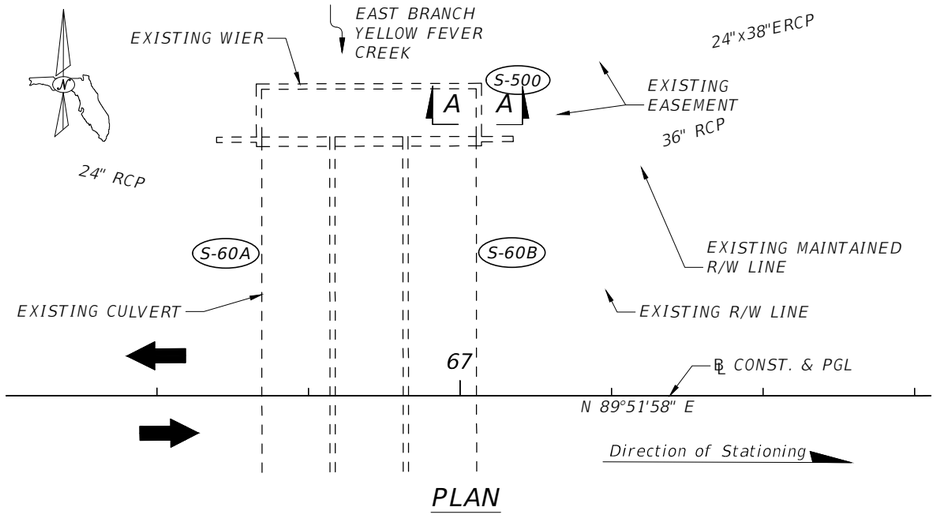
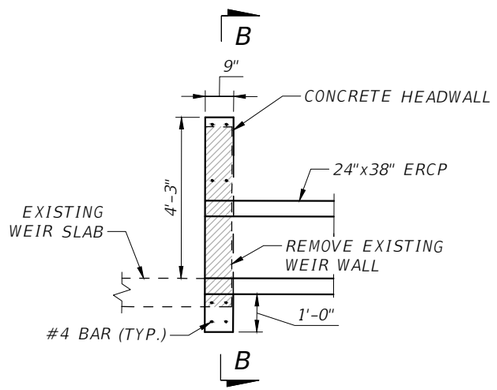
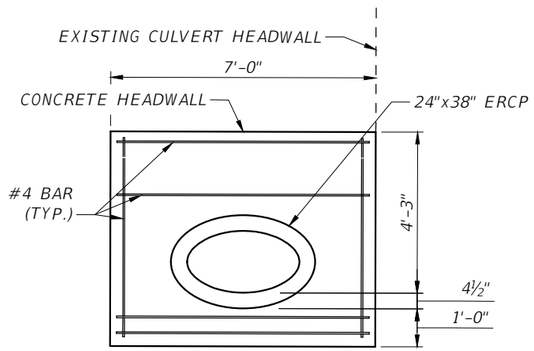


PLAN



SECTION A-A



SECTION B-B

NOTES:

1. REMOVAL OF EXISTING CONCRETE WEIR WALL SHALL BE SUBSIDIARY TO 110-3.
2. EXTEND REINFORCEMENT FROM EXISTING WEIR SLAB AND WALL INTO THE PROPOSED CONCRETE HEADWALL.

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CHRISTOPHER P. GAMACHE, P.E.
P.E. LICENSE NUMBER 82122
STANTEC
380 PARK PLACE BOULEVARD, SUITE 300
CLEARWATER, FL 33759

DRAWN BY: AAM 9-21
CHECKED BY: CPG 9-21
DESIGNED BY: TH 9-21
CHECKED BY: CPG 9-21

LEE COUNTY
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	CONTRACT NO.
LITTLETON ROAD	LEE	CN190114

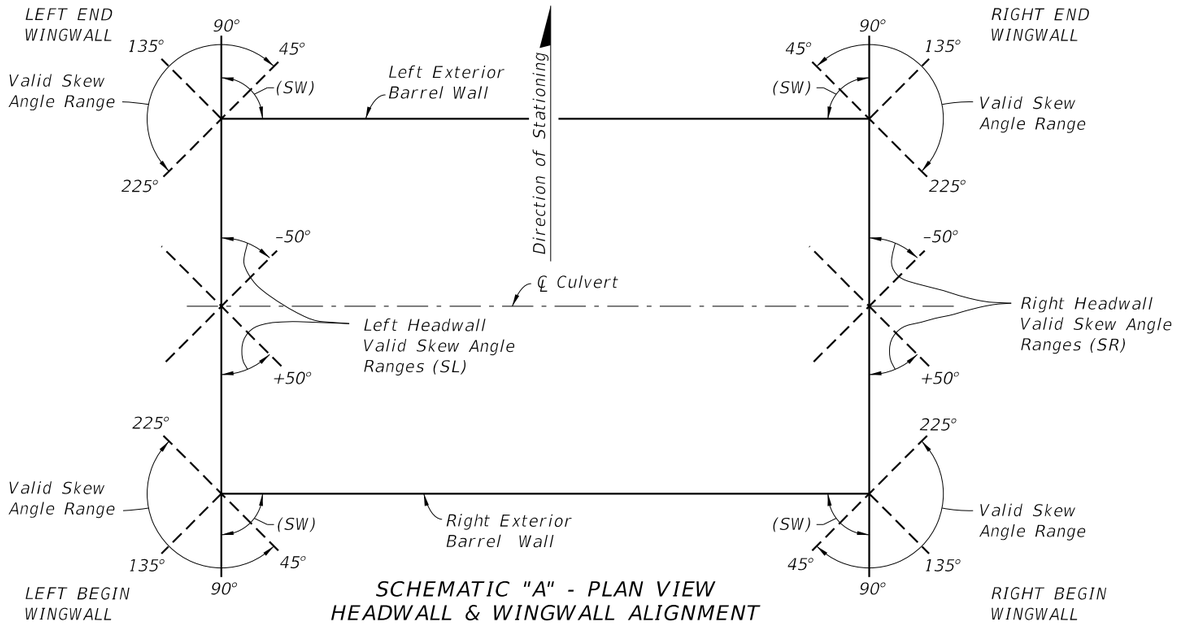
SHEET TITLE: BOX CULVERT MODIFICATION DETAILS

REF. DWG. NO.:

PROJECT NAME: LITTLETON ROAD WIDENING FROM CORBETT ROAD TO US 41

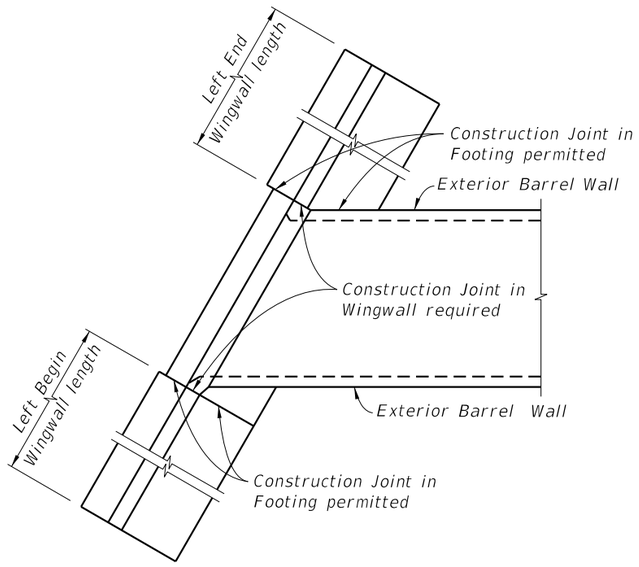
SHEET NO.: BB-1

Regan, Michael 4/27/2023 2:07:26 PM \\Us0706-ppfss01\shared_projects\238200526\ACAD\dwg\00000000000\Struct\Struct\B1PlanElev01.dwg



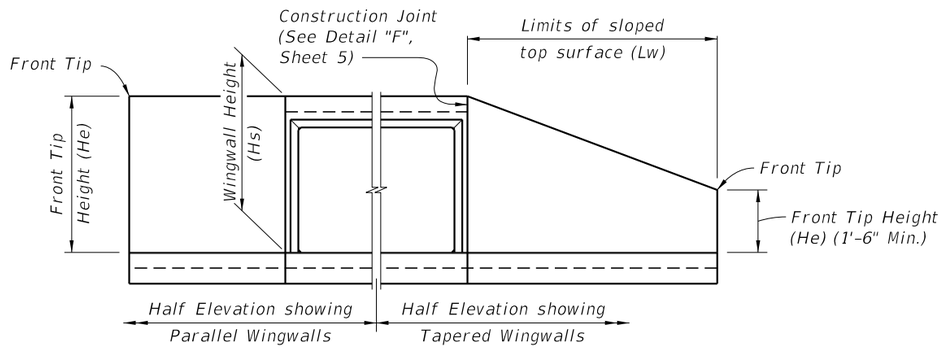
SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".



PART PLAN SHOWING PARALLEL WINGWALLS
AND LOCATION OF CONSTRUCTION JOINTS

NOTE:
Construction Joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall; when the ℄ of wingwall and ℄ of exterior barrel wall results in an acute angle see Left End Wingwall above, and when the angle is obtuse see Left Begin Wingwall above and Detail C (Sheet 5).



END ELEVATION
OF CULVERT

GENERAL NOTES:

LIVE LOAD: HL-93.

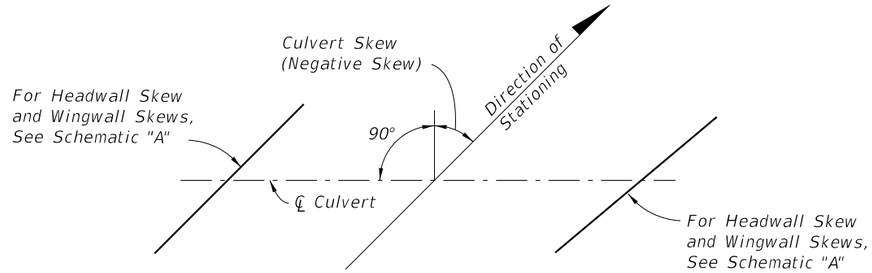
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 2 feet of compacted fill placed above the top slab.

SURFACE FINISH: All concrete surfaces shall receive a general surface finish.

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel, and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.

CULVERT EXTENSIONS: For cut backs and ties into existing concrete box culverts see Sheet 6 of 8.

REINFORCING STEEL: See the "Box Culvert Data Tables" in the Contract Plans for grade and bar spacing. See the Reinforcing Bar List in the Contract Plans for bar sizes and bar bending details.



SCHEMATIC "B" - PLAN VIEW
CULVERT ALIGNMENT

NOTE: For Culvert Skew see Contract Plans.

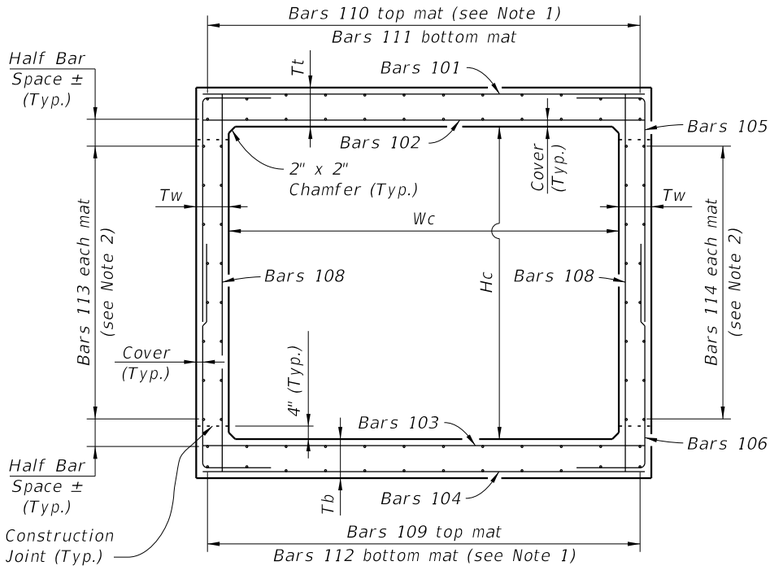
TABLE 1 - MINIMUM BAR SPLICE LENGTHS FOR LONGITUDINAL REINFORCING

BAR SIZE	SPLICE (CLASS B)		BAR SIZE	SPLICE (CLASS B)	
	CLASS II (3400 psi)	CLASS IV (5500 psi)		CLASS II (3400 psi)	CLASS IV (5500 psi)
#3	1'-4"	1'-0"	#8	3'-5"	2'-8"
#4	1'-9"	1'-4"	#9	4'-3"	3'-4"
#5	2'-2"	1'-8"			
#6	2'-7"	2'-0"			
#7	3'-0"	2'-4"			

TABLE 1 NOTE: Splice lengths are based on an AASHTO Class B tension lap splice for the Specification Section 346 concrete class shown.

10/8/2020 10:42:26 AM

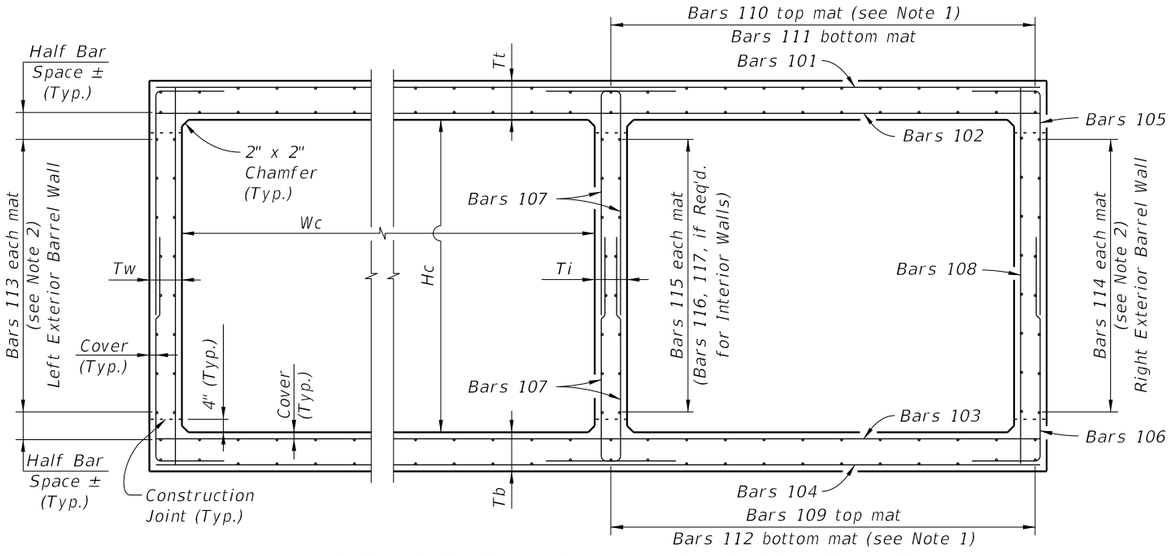
LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/16			FY 2021-22 STANDARD PLANS	CONCRETE BOX CULVERT DETAILS	400-289	1 of 8



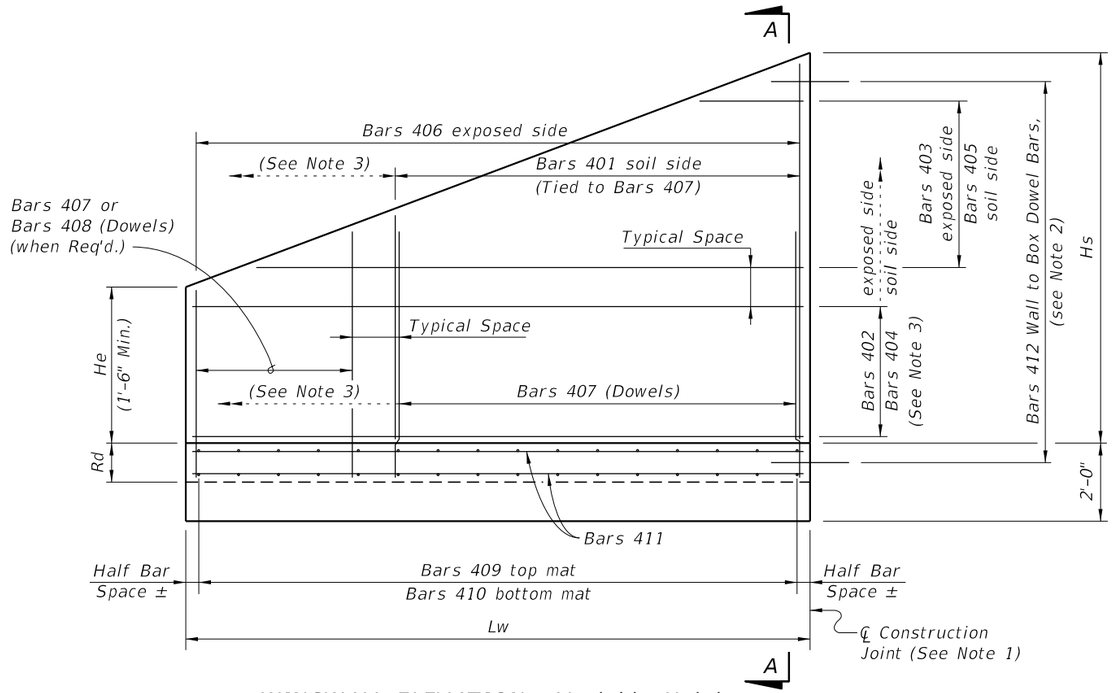
TYPICAL SECTION THRU SINGLE BARREL CULVERT

CULVERT BARREL NOTES:

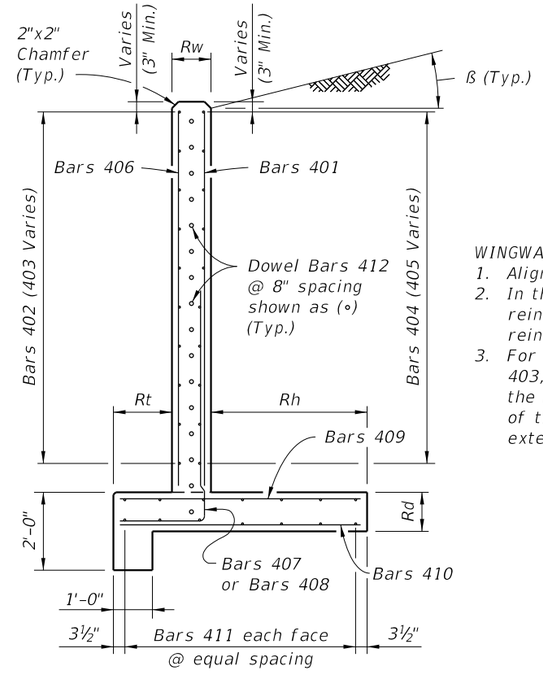
1. *Space Bars 110 and 112 with a bar in each corner, and at the ℄ of interior walls (for multiple barrel culverts only), and the remaining bars placed at equal spacing shown in the Contract Plans. Adjust last bar spacing when required.*
2. *Place Bars 113 and 114 at spacing shown in the Contract Plans evenly between Bars 109 and 111.*
3. *Locate the first transverse bar from the ends of the culvert at one half the bar spacing, but provide the minimum reinforcement cover and not greater than 4" clear.*



TYPICAL SECTION THRU MULTIPLE BARREL CULVERT



WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)



WINGWALL SECTION A-A

WINGWALL NOTES:

1. *Align construction joint perpendicular to wingwall.*
2. *In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.*
3. *For constant height wingwalls, variable length Bars 403, 405 & 408 are not required, and as such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.*

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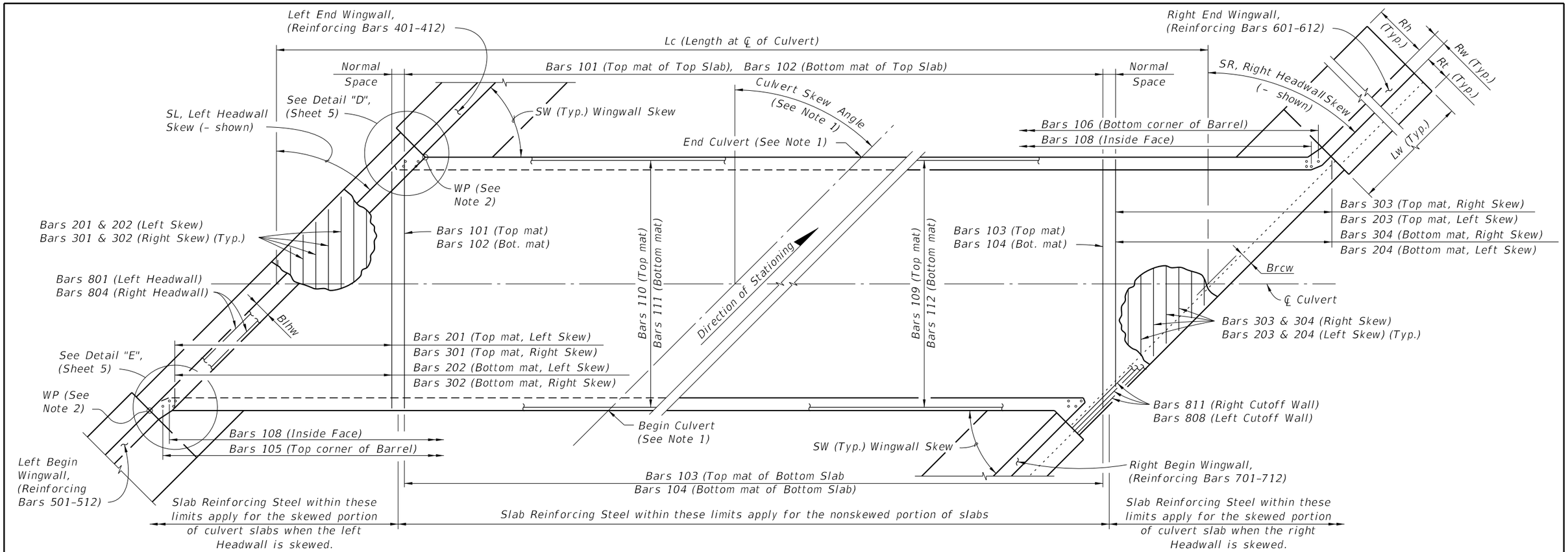
10/8/2020

LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
07/01/13			FY 2021-22 STANDARD PLANS	CONCRETE BOX CULVERT DETAILS	400-289	2 of 8

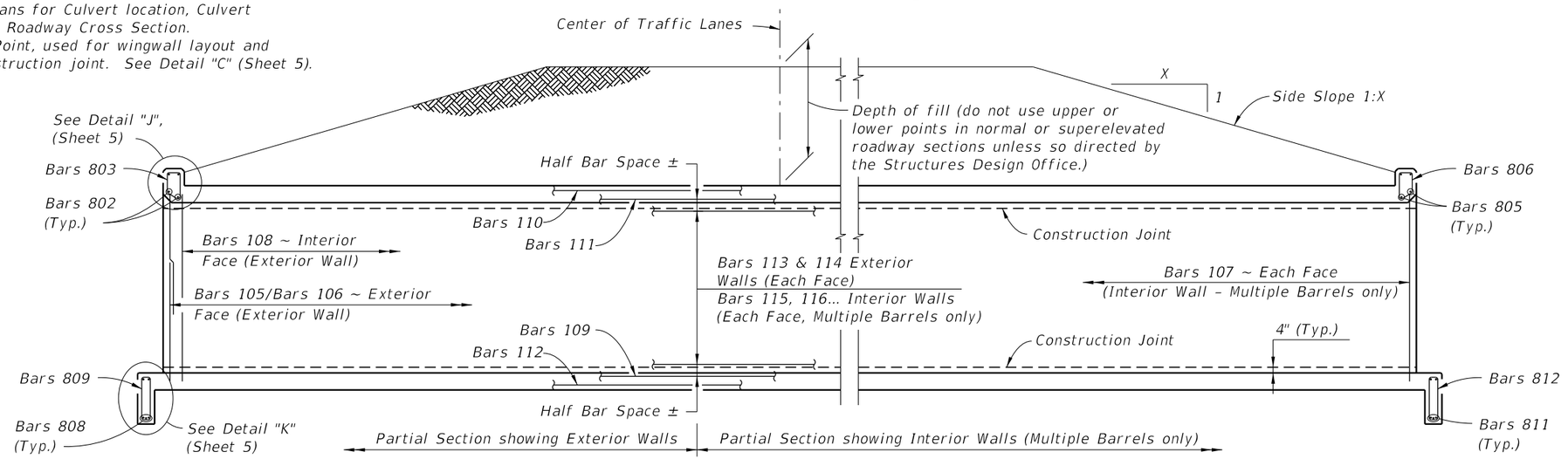


PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

NOTES:
1. See Contract Plans for Culvert location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail "C" (Sheet 5).

SINGLE BARREL BOX CULVERT
(Skewed Culvert With Parallel Wingwalls Shown)



LONGITUDINAL SECTION THRU CULVERT
(Transverse Top & Bottom Slab Reinforcing Not Shown For Clarity)

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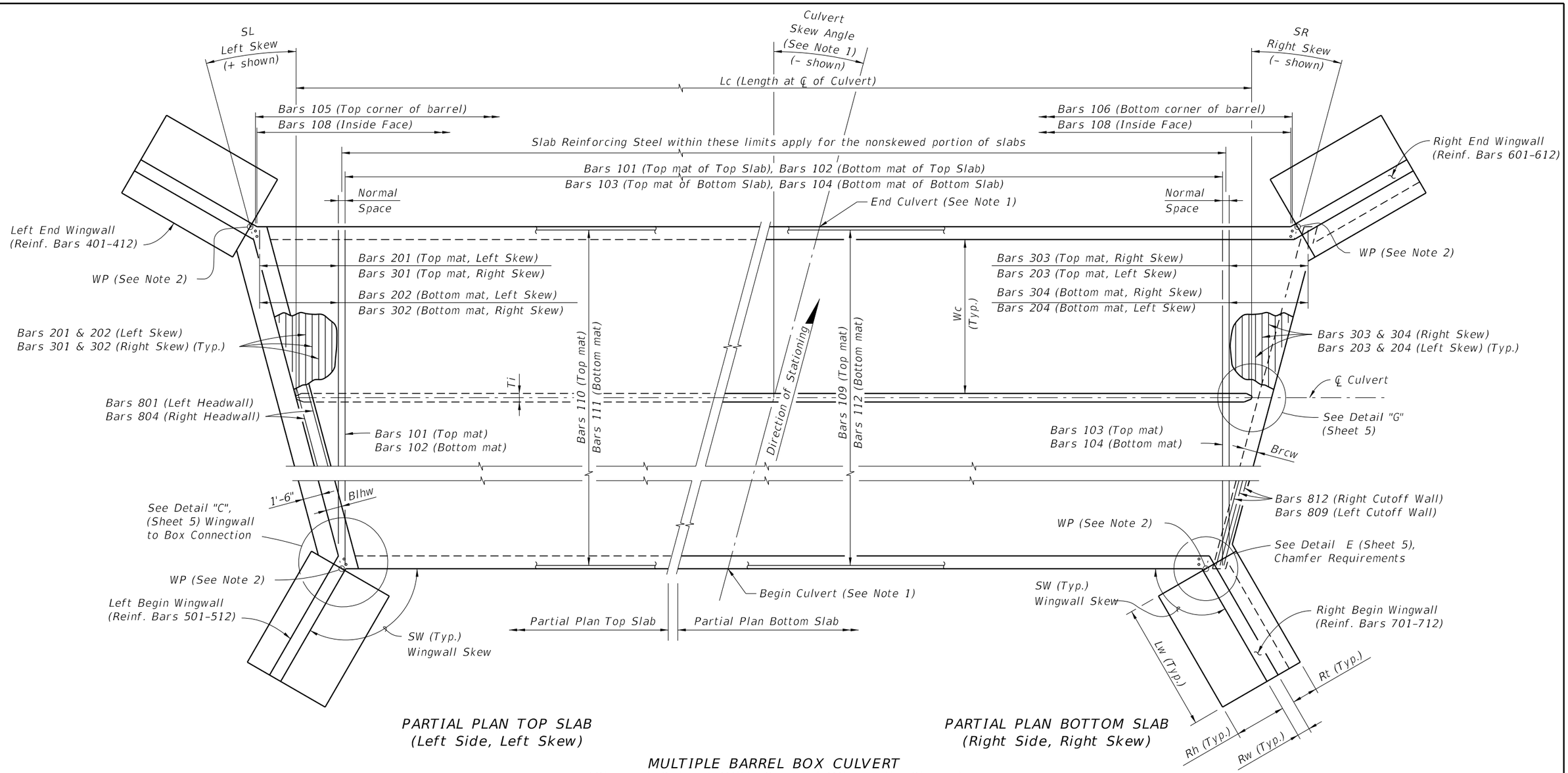
01/01/07			FY 2021-22 STANDARD PLANS	CONCRETE BOX CULVERT DETAILS	400-289	3 of 8



PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

MULTIPLE BARREL BOX CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

NOTES:
1. See Contract Plans for Culvert Location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 5).

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LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2021-22 STANDARD PLANS	CONCRETE BOX CULVERT DETAILS	INDEX	SHEET
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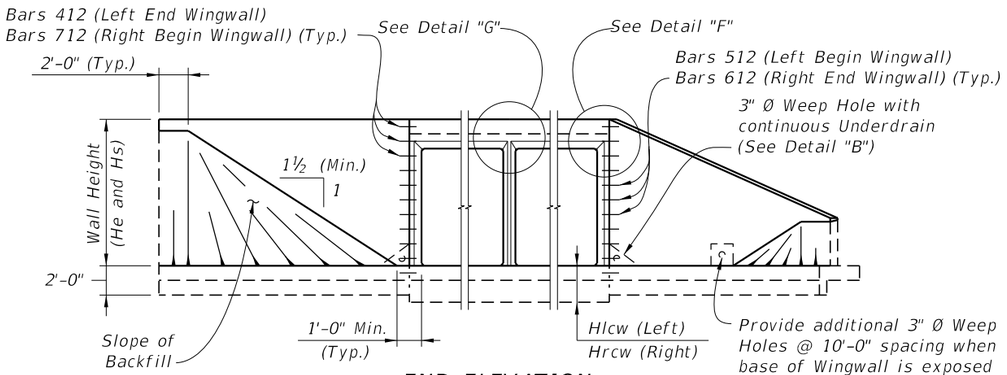
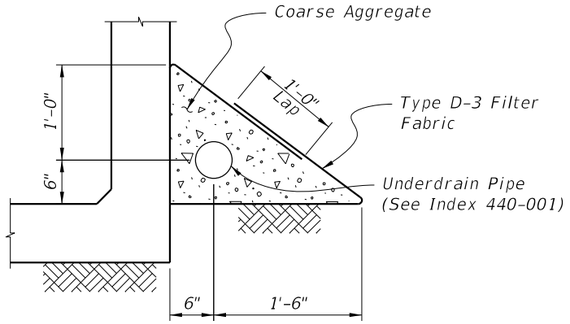


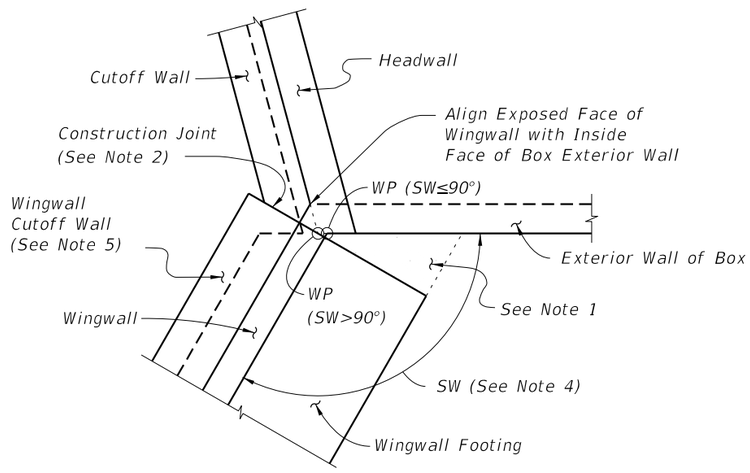
END ELEVATION
(Showing Constant Height And Variable Height Wingwalls)



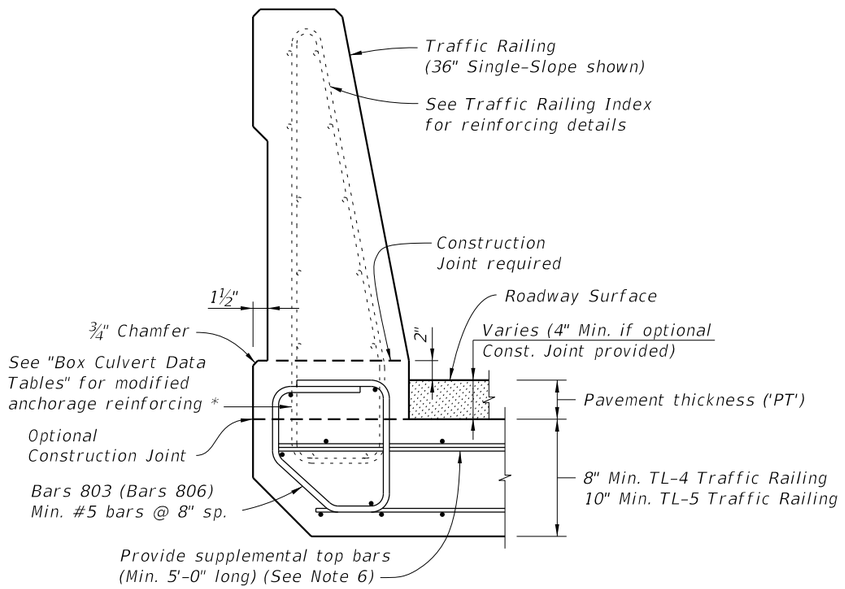
DETAIL "B"
UNDERDRAIN DETAIL
(Similar to Type II ~ Index 440-001)

NOTES:
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.
2. Location of Construction Joint determined by WP at theoretical intersection of:
   – Soil side face of Headwall and outside face of Box Exterior Wall, for SW≤90°;
   – Outside face of Wingwall and outside face of Box Exterior Wall, for SW>90°.
3. Provide 6" chamfer when angle 'A' is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.
4. Wingwall Skew Angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Wall as necessary to meet Box Cutoff Wall.
6. Provide additional reinforcement in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.

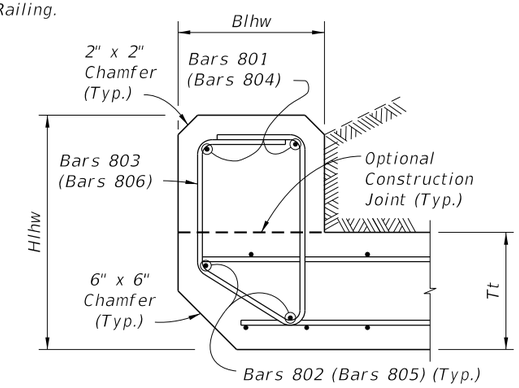
* Included in the cost of the Traffic Railing.



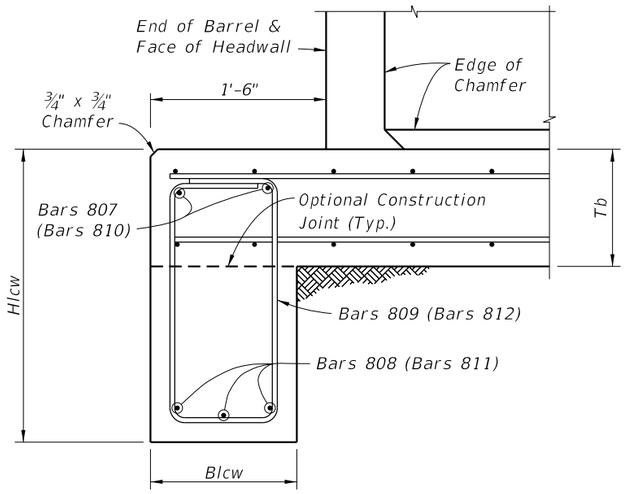
DETAIL "C" - PLAN VIEW
WINGWALL TO BOX CONNECTION
(Left Begin Corner Shown, Other Corners Similar)



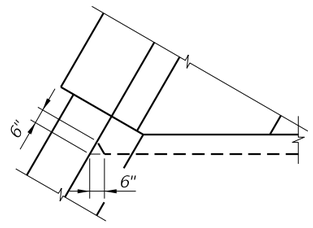
DETAIL "I"
TRAFFIC RAILING ATTACHMENT TO HEADWALL



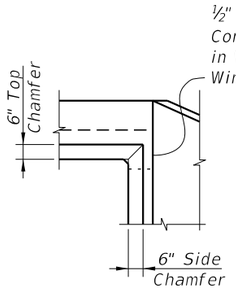
DETAIL "J"
LEFT HEADWALL SECTION
(Right Headwall similar)



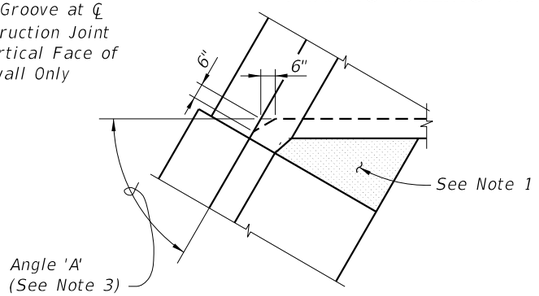
DETAIL "K"
LEFT CUTOFF WALL SECTION
(Right Cutoff Wall similar)



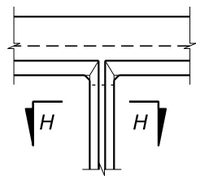
DETAIL "D"



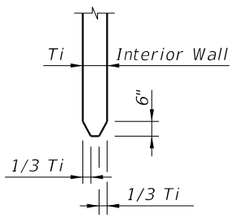
DETAIL "F"



DETAIL "E"



DETAIL "G"



SECTION H-H

CROSS REFERENCE:
See Sheet 3 for locations of Details "D", "E", "J" & "K".
See Sheet 4 for locations of Detail "C".

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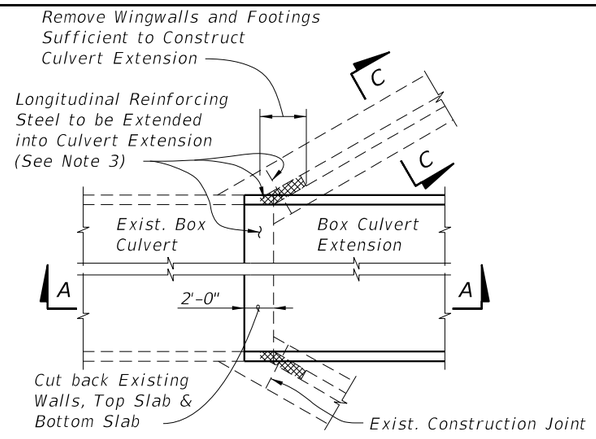
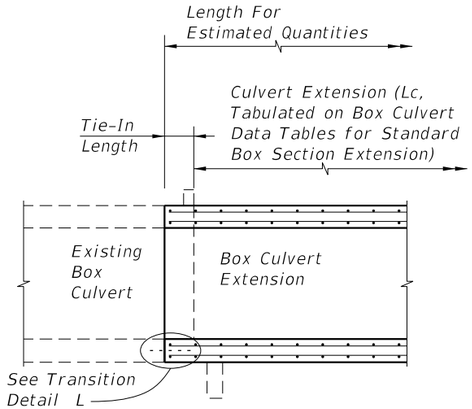
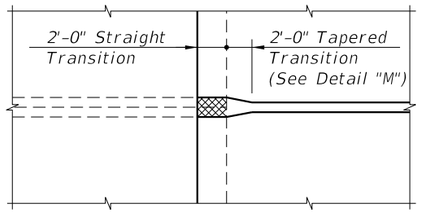


OUTSIDE WALLS OF BOXES

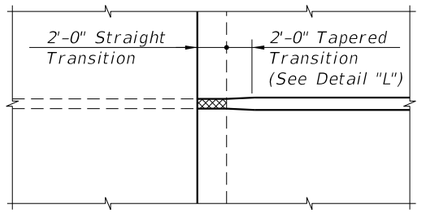


SECTION A-A

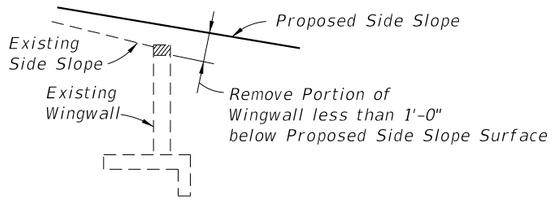
FLARED WINGWALL



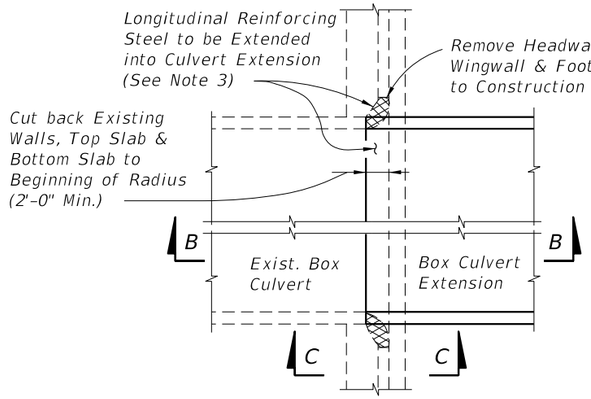
INTERIOR DOUBLE WALLS OF BOXES



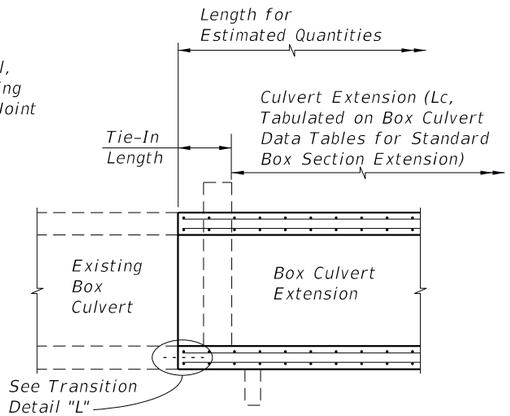
INTERIOR SINGLE WALLS OF BOXES



SECTION C-C



OUTSIDE WALLS OF BOXES



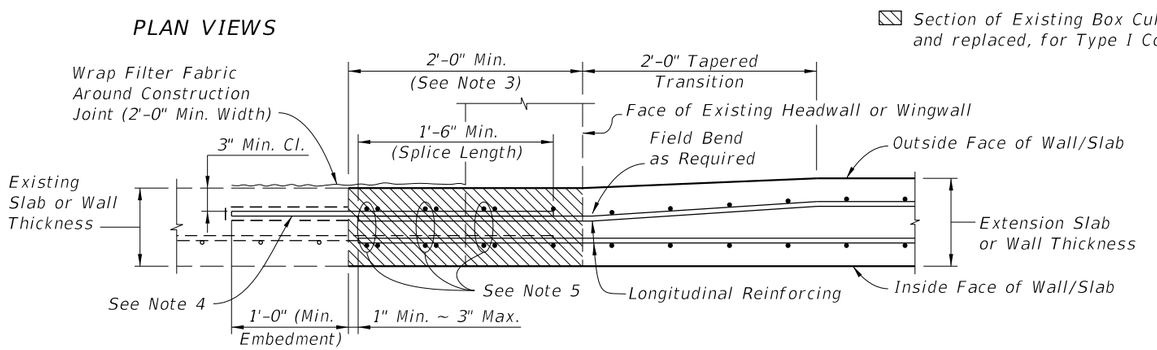
SECTION B-B

STRAIGHT WINGWALL

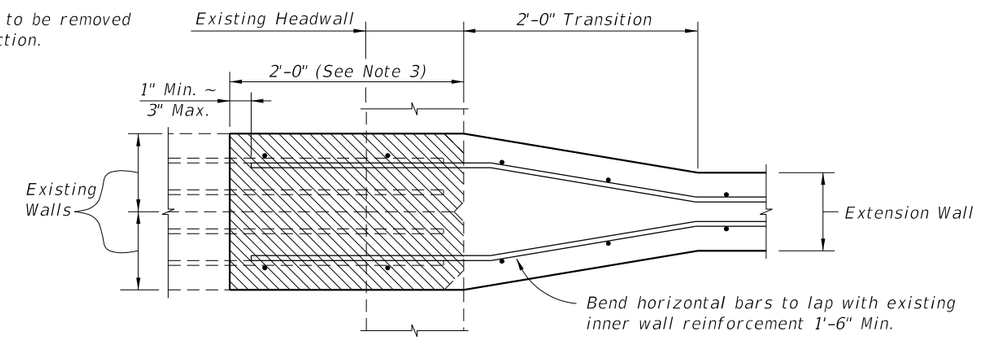
NOTES:

1. The Box Culvert Data Tables and Reinforcing Bar List do not include the additional quantities needed for dowel connections or transitions from double walls of existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for concrete and steel in the culvert extension.
2. Cost for removal and disposal of material from existing headwalls, wingwalls and box, and cost of cleaning, straightening and extending or doweling longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.
3. Remove existing concrete while avoiding damage to existing reinforcement. Clean and straighten existing reinforcement, lap and tie onto extension reinforcement.
4. Dowel in #4 Bars @ 1'-0" max. spacing into wall/slab when there is a single mat of existing reinforcing steel, otherwise splice 1'-6" as shown for inside reinforcement. Use an Adhesive Bonding Material System in accordance with Specifications Section 416 & 937.
5. Provide additional transverse bars for top and bottom slab, parallel and full width of any skewed joint connection when shown in the Plans.
6. See Box Culvert Data Table notes in Plans for Connection Types allowed.

PLAN VIEWS



DETAIL "L" - TRANSITION FOR EXTERIOR WALL/SLAB EXTENSION
(Interior Single Walls Similar)



DETAIL "M" - TRANSITION FOR INTERIOR DOUBLE WALLS OF BOX CULVERTS

TYPE I CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS (CUT BACK EXISTING CONCRETE)

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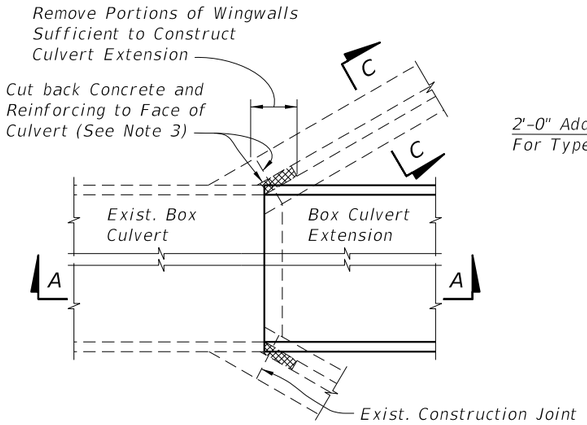
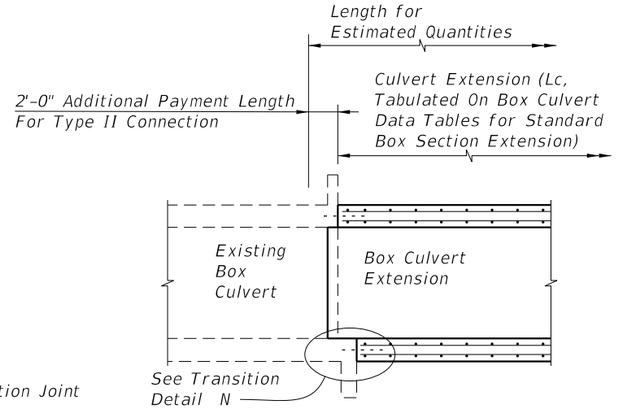
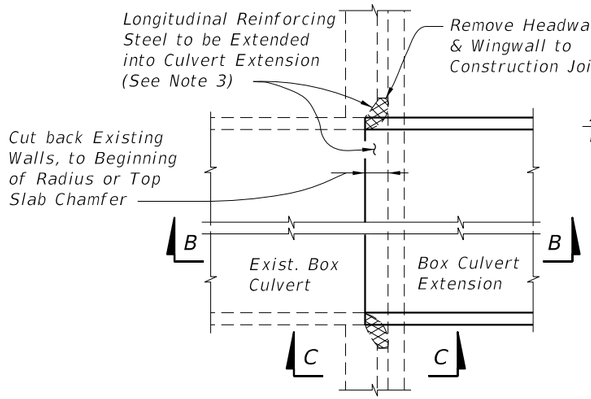


OUTSIDE WALLS OF BOXES

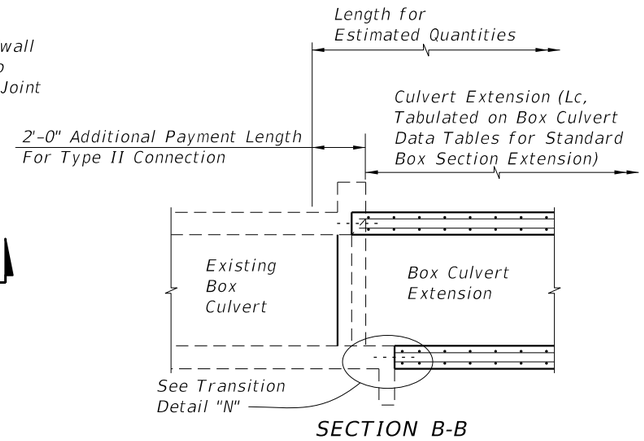


SECTION A-A

FLARED WINGWALL

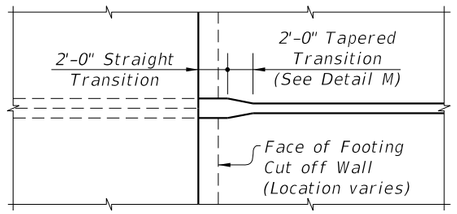


OUTSIDE WALLS OF BOXES

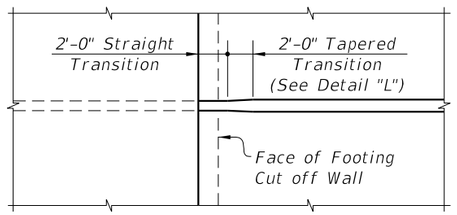


SECTION B-B

STRAIGHT WINGWALL

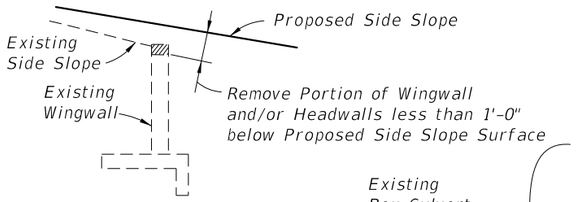


INTERIOR DOUBLE WALLS OF BOXES

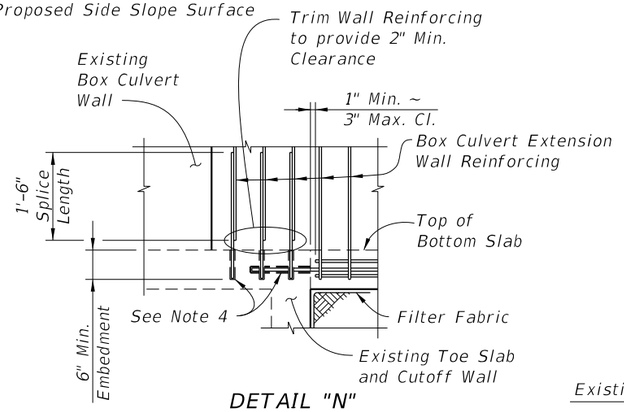


INTERIOR SINGLE WALLS OF BOXES

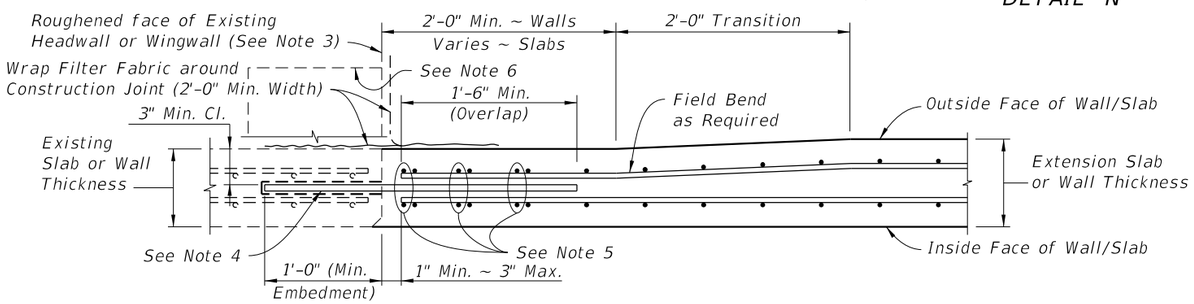
PLAN VIEWS



SECTION C-C



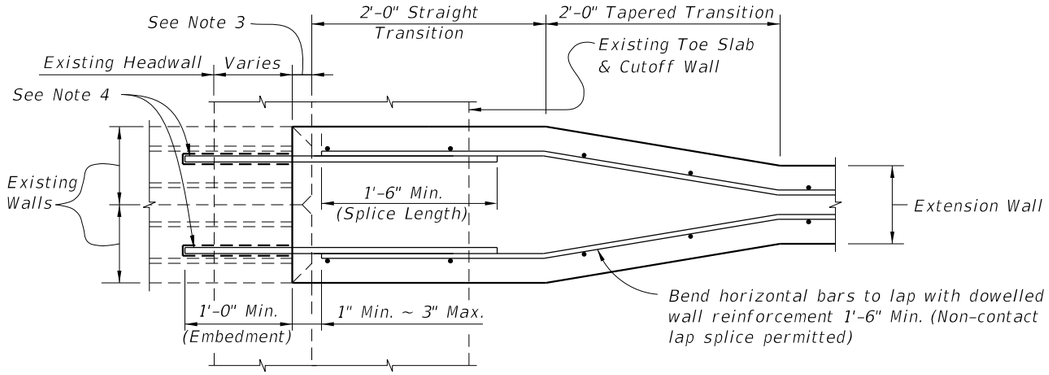
DETAIL "N"



DETAIL "L" - TRANSITION FOR EXTERIOR WALL/SLAB EXTENSION
(Interior Single Walls Similar)

NOTES:

1. The Box Culvert Data Tables and Reinforcing Bar List do not include the additional quantities needed for dowel connections or transitions from double walls of existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for concrete and steel in the culvert extension.
2. Cost for roughening and cleaning existing headwalls, wingwalls and box, and cost of doweling longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.
3. Remove existing concrete and reinforcing back to edge of any chamfers exceeding 1". Roughen and clean existing or exposed surface and coat with a Type A epoxy bonding compound in accordance with the manufacturer's recommendations.
4. Dowel in #5 Bars @ 1'-0" max. spacing horizontally into center of wall/slab. Provide vertical dowels in footing to match size, alignment and spacing of outside vertical wall reinforcing. Use an Adhesive Bonding Material System in accordance with Specifications Section 416 & 937.
5. Provide additional transverse bars for top and bottom slab, parallel and full width of any skewed joint connection when shown in the Plans.
6. Remove top of existing headwall when necessary to provide 1'-0" clearance below finished grade. Saw cut full width and seal with Type F-2 epoxy compound to protect exposed reinforcing.
7. See Box Culvert Data Table notes in Plans for Connection Types allowed.



DETAIL "M" - TRANSITION FOR INTERIOR DOUBLE WALLS OF BOX CULVERTS

TYPE II CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS
(ADHESIVE DOWEL TO EXISTING CONCRETE)

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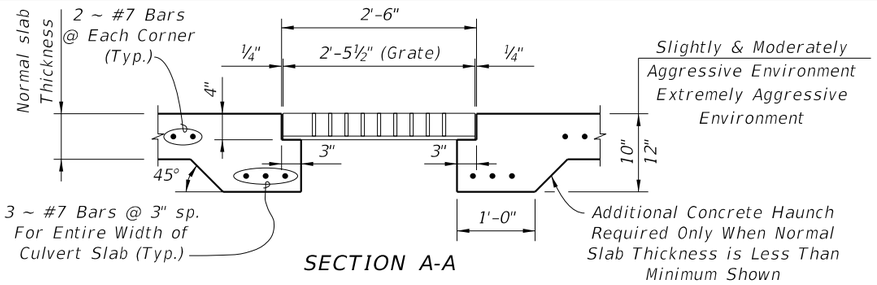
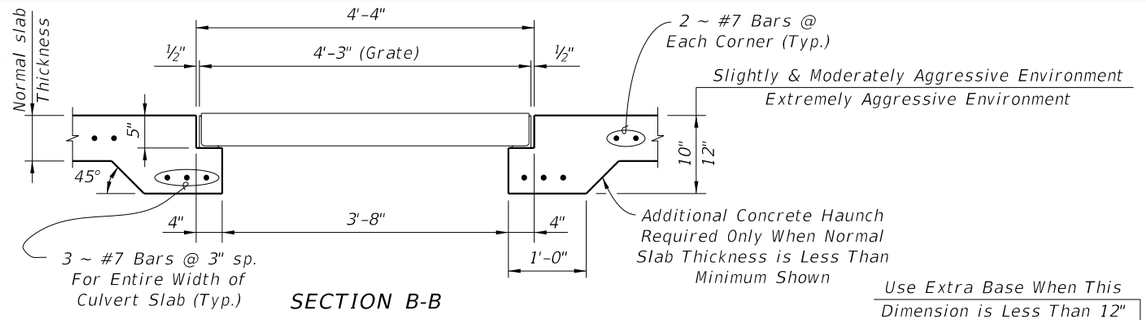
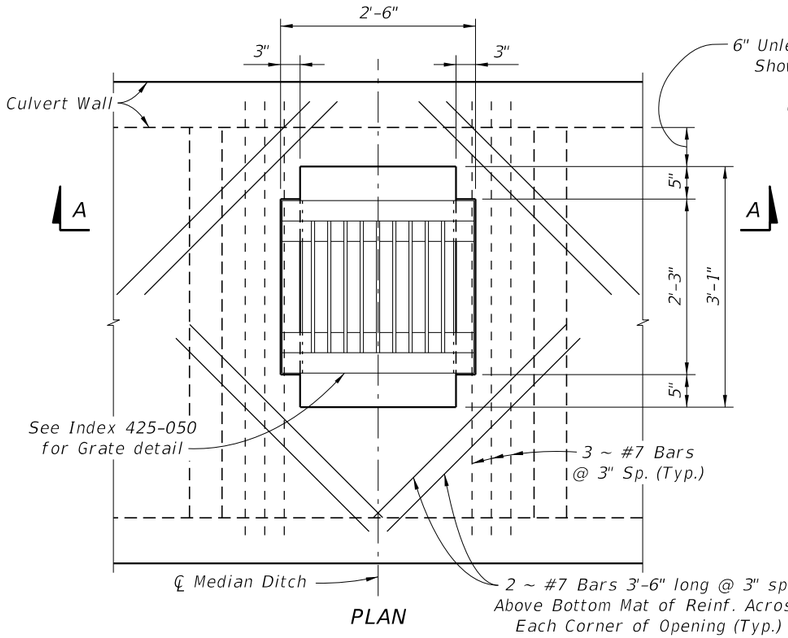


SECTION A-A

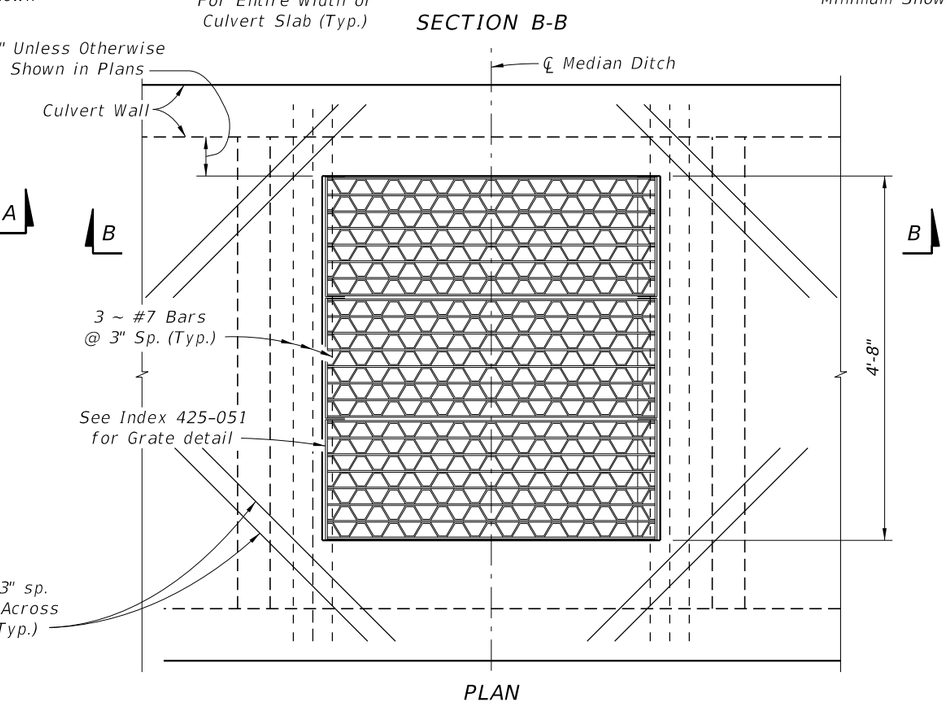


SECTION B-B



PLAN

INLET TYPE A GRATE



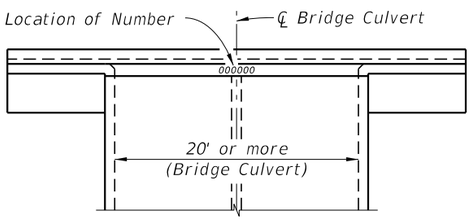
PLAN

INLET TYPE B GRATE

NOTES:

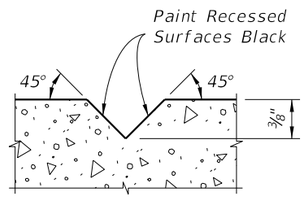
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All reinforcing shall be 2" clear for Slightly and Moderately Aggressive Environments, and 3" clear for Extremely Aggressive Environments.

INLET IN TOP OF BOX CULVERT



The number is to be placed in the center of the top surface of all bridge culvert headwalls. For Bridge Number see Plan-Profile sheet(s).

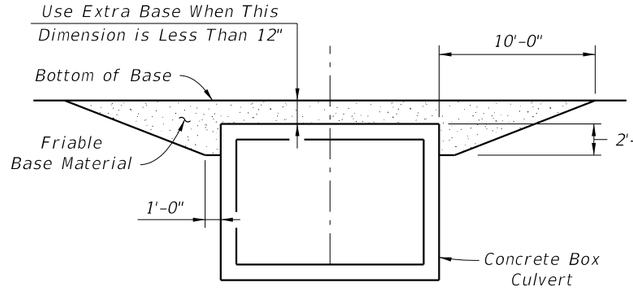
TOP VIEW OF HEADWALL



SECTION THRU RECESSED V-GROOVE TO FORM INSCRIBED FIGURES

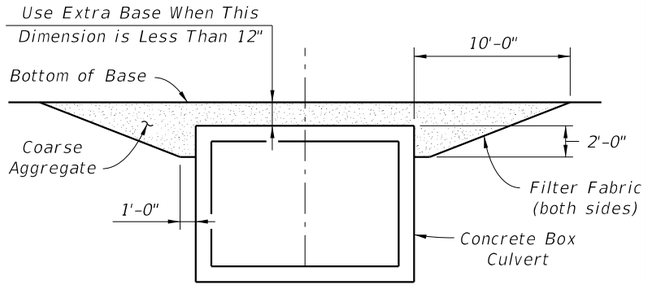
Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of numbers formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed figures.

BRIDGE CULVERT NUMBER LOCATION



The cost of furnishing and installing extra friable base material shall be included in the cost of the Box Culvert.

FRIABLE BASE



Place coarse aggregate in 6 inch lifts and compact sufficiently as to be firm and unyielding. Provide coarse aggregate gravel or stone meeting the requirements of Specification Section 901-2 or 901-3 respectively. Meet the gradation requirements of Specification Section 901-6, Grades 4, 467, 5, 56 or 57 unless restricted in the plans. Provide Type D-3 filter fabric (see Specification Section 985). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the Box Culvert.

ASPHALTIC CONCRETE BASE

NOTE: Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volumes (>1600 ADT) and the cover is within the range specified in the notation above.

EXTRA BASE FOR BOX CULVERTS CROSSING UNDER FLEXIBLE PAVEMENT

10:42:38 AM

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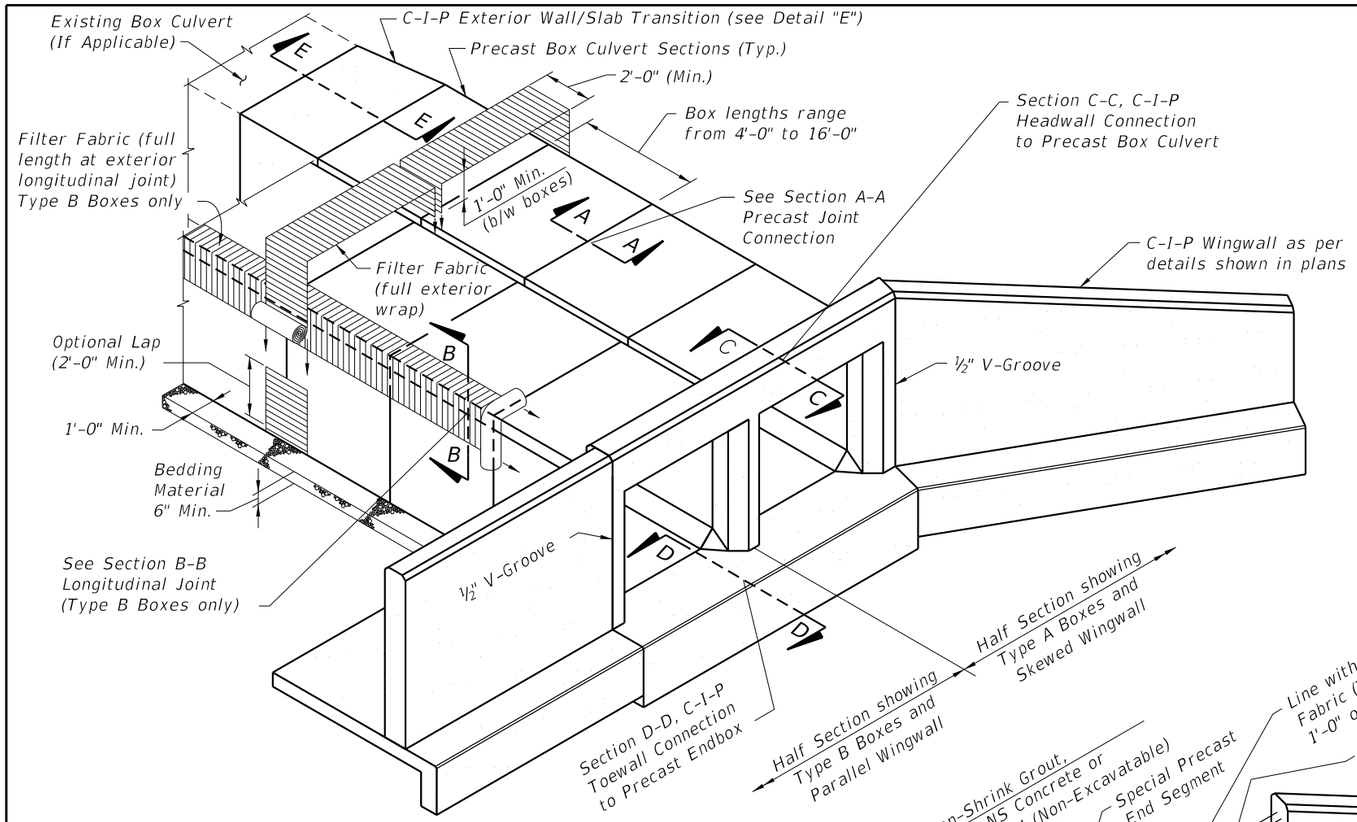
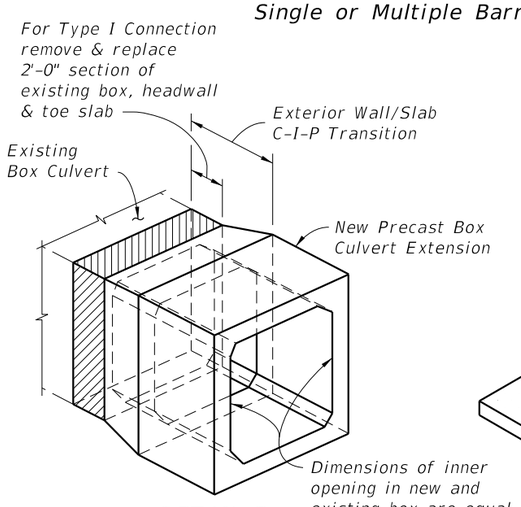
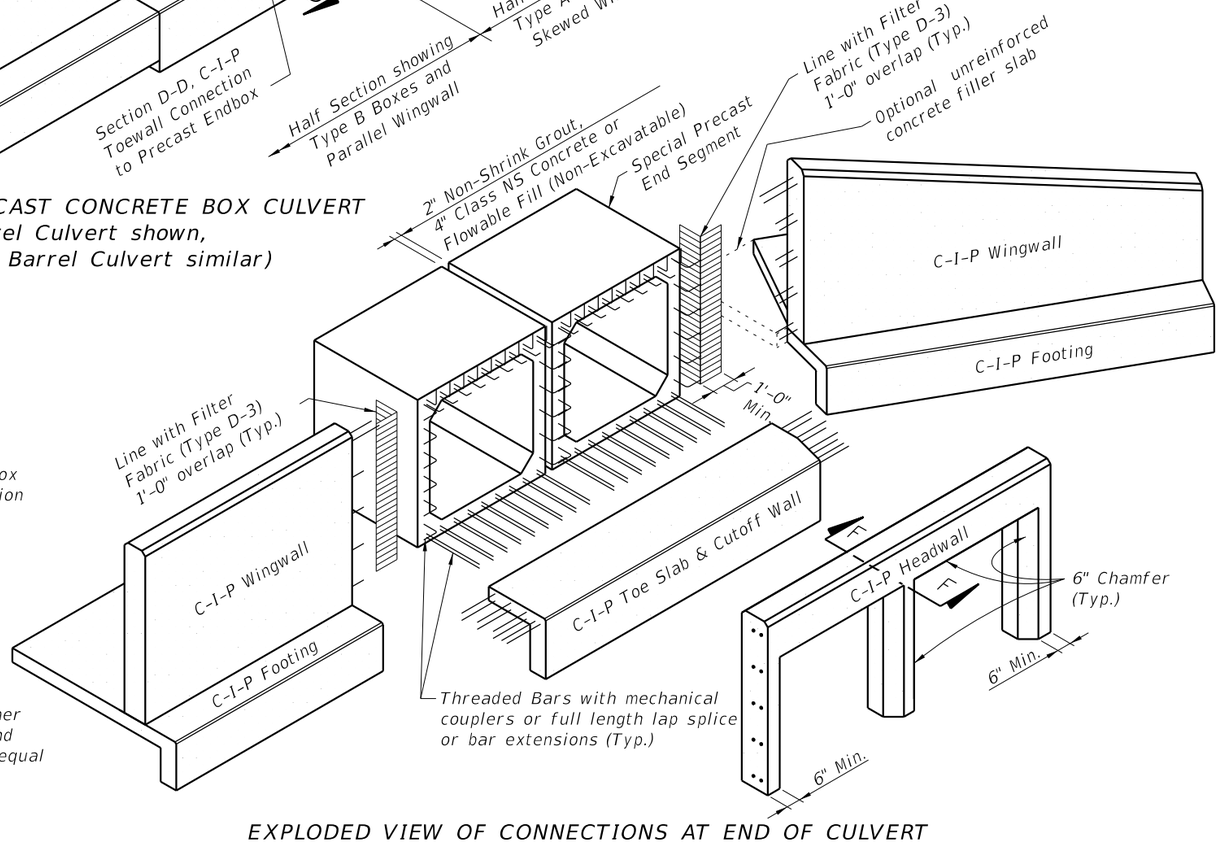


ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT
(Double Barrel Culvert shown, Single or Multiple Barrel Culvert similar)

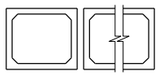
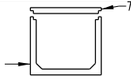
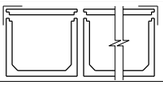
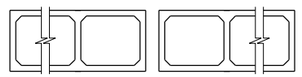


DETAIL E
PICTORIAL VIEW OF EXTERIOR WALL/SLAB TRANSITION



EXPLODED VIEW OF CONNECTIONS AT END OF CULVERT
(Double Barrel Culvert shown, Single or Multiple Barrel Culvert similar)

PERMITTED PRECAST ALTERNATE BOX SECTIONS

TYPE	DESCRIPTION	SINGLE BARREL	MULTIPLE BARRELS	DESIGN NOTES
A	Single Cell Monolithic (Four Sided)			Index 400–292 or Contractor Design
B	Single Cell Two–Piece (Four Sided)			Contractor Design
C	Multicell Monolithic	Not Applicable		Contractor Design

GENERAL NOTES:

1. Specifications:
   - General:
     - FDOT Standard Specifications for Road and Bridge Construction, Section 410 (current edition, and supplements thereto).
   - Concrete (Precast):
     - Class III or Class II Modified (5,000 psi) for slightly aggressive environments.
     - Class IV (5,500 psi) for moderately to extremely aggressive environments.
   - Concrete (Cast–In–Place):
     - Class II (3,400 psi) for slightly aggressive environments.
     - Class IV (5,500 psi) for moderately to extremely aggressive environments.
   - Reinforcing Steel:
     - Maintain minimum clearance of 2" for slightly and moderately aggressive environments or 3" for extremely aggressive environments, unless otherwise shown. Equal area substitution of welded wire (WWR) reinforcement is permitted.
2. Work this Index with the Cast–In–Place Concrete Box Culvert Details and Data Tables shown in the plans, Index 400–289 and the Precast Concrete Box Culverts shown in the shop drawings.
3. All joints between precast sections must be tongue & groove with joint sealant. Joints between cast–in–place & precast sections shall have longitudinal reinforcing extending from top, bottom & both side slabs of the precast box tied to the cast–in–place reinforcement. Single barrel culverts may have precast headwalls cast integrally with the end segment when approved by the Engineer.
4. Extension of existing multiple barrel box culverts with multiple single cell precast box culverts is not permitted unless approved by the District Structures Engineer. Full transition details must be shown in the shop drawings when approved.
5. Culverts larger than the specified size may be substituted with no additional payment to the Contractor. Substitution must be approved by the Engineer, minimum earth cover and invert elevations shown in the Contract Documents must be maintained.

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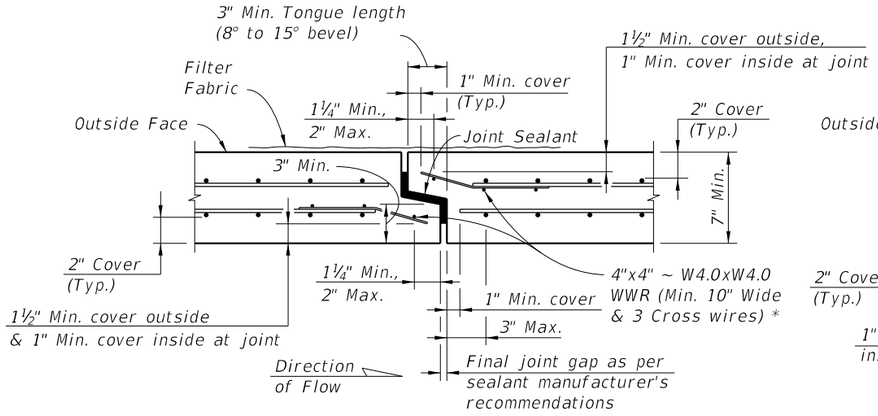
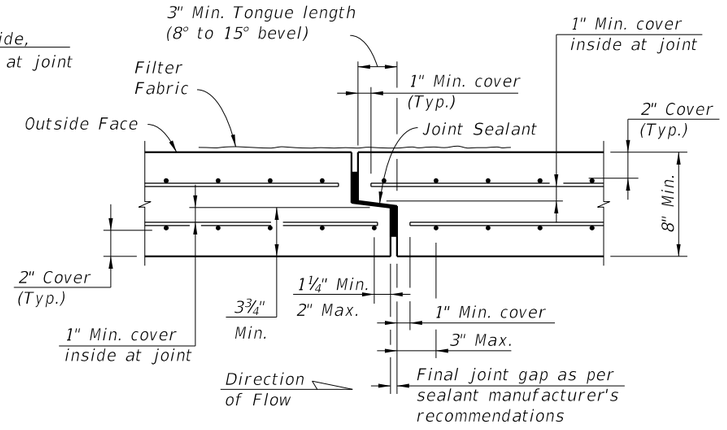
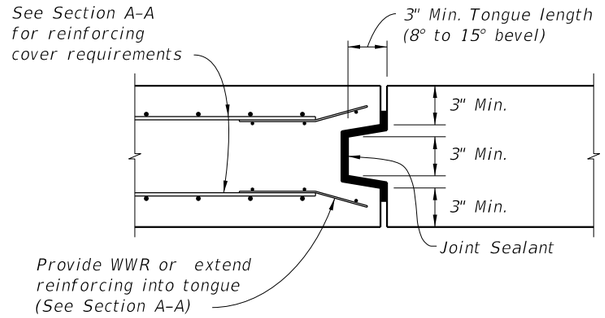


SECTION A-A
(2" Cover - Thin Wall Detail)

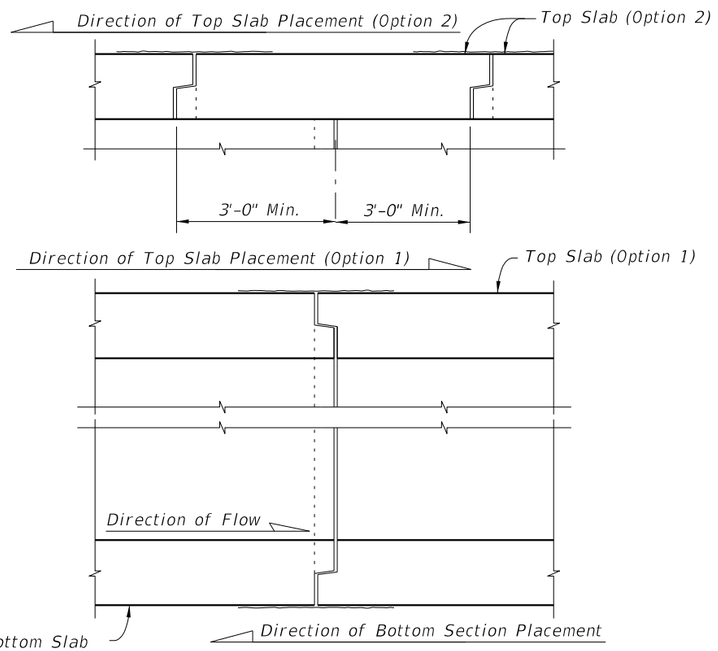


SECTION A-A
(2" Cover - Thick Wall Detail)

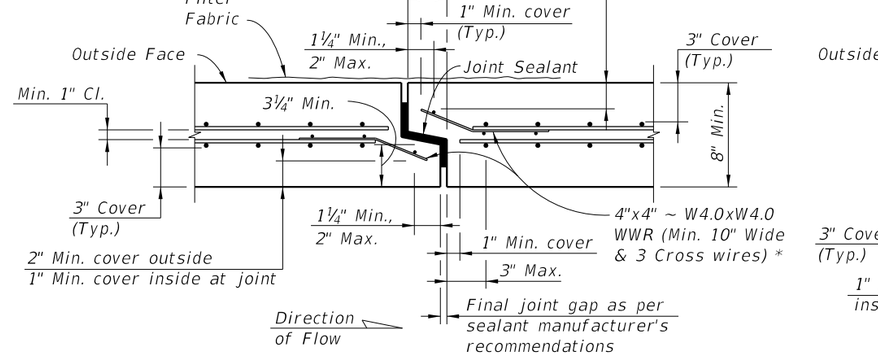


ALTERNATE BOTTOM SLAB TRANSVERSE JOINT
TYPICAL SECTION
(DOUBLE-SIDED TONGUE & GROOVE JOINT)
(All reinforcing not shown for clarity)

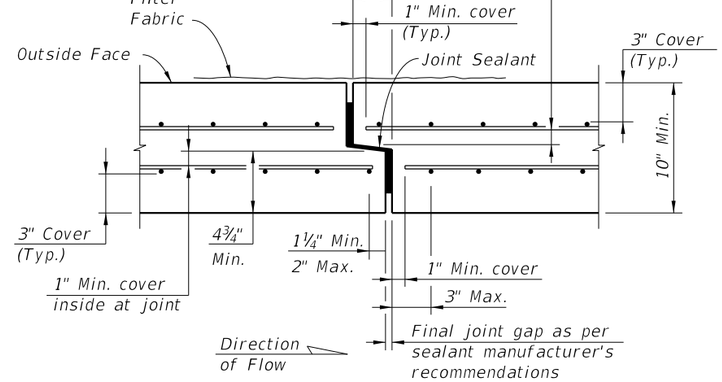
NOTE:
Bottom Slab Joints in Type B Boxes may be single tongue & groove joints as shown in Section A-A when the Top Slab Joints are oriented as shown in Schematic "A".



SCHEMATIC "A"
TYPE B BOX SECTION PLACEMENT
FOR SINGLE TONGUE & GROOVE JOINTS



SECTION A-A
(3" Cover - Thin Wall Detail)



SECTION A-A
(3" Cover - Thick Wall Detail)

* *At the Contractor's option when the box culvert reinforcing utilizes WWR, extend wall and slab reinforcing into the joint and bend to maintain cover in lieu of 4"x4" ~ W4.0xW4.0 WWR at joint. Transverse wire in tongue may be cut at corners of box to allow bending of the WWR.*

PRECAST SEGMENT TO SEGMENT TONGUE & GROOVE TRANSVERSE JOINTS

TWO-PIECE PRECAST SEGMENT ADDITIONAL JOINT DETAILS (TYPE B BOX)

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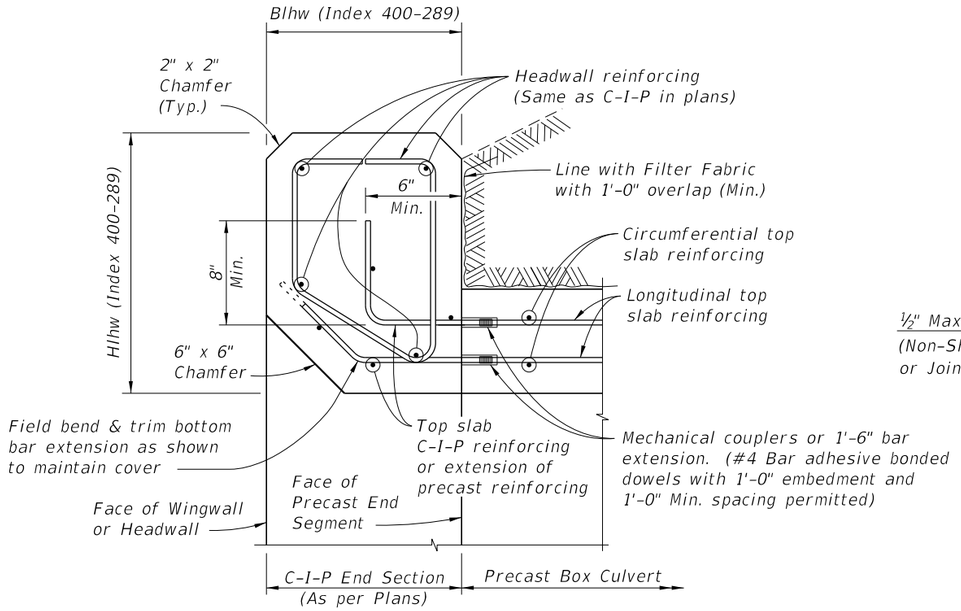
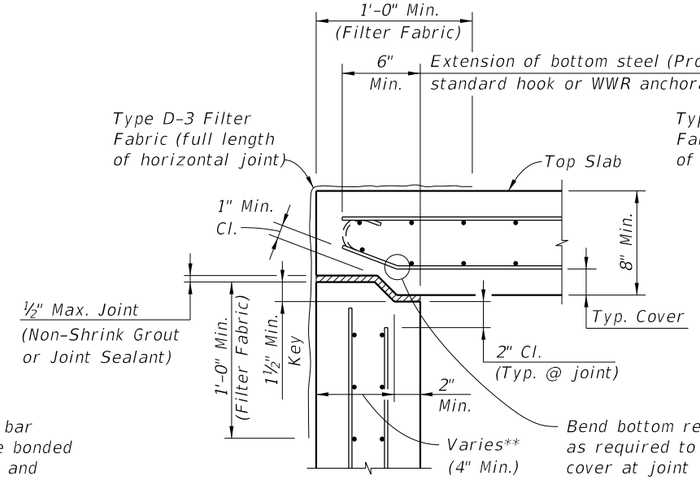
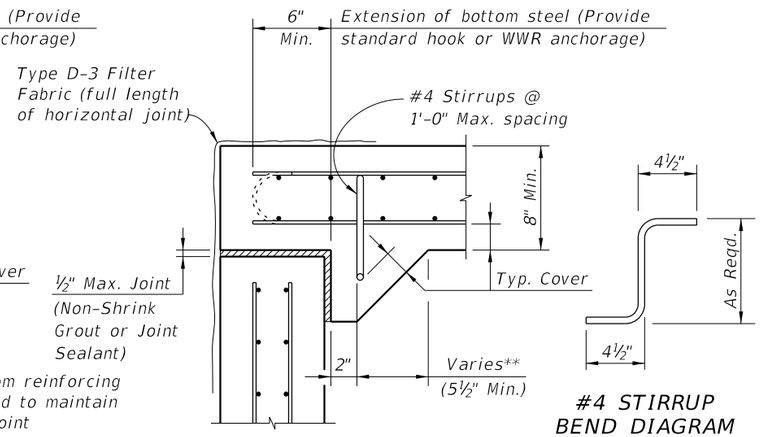


SECTION C-C
C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX



SECTION B-B
TOP SLAB TO WALL JOINT
(KEYED JOINT)

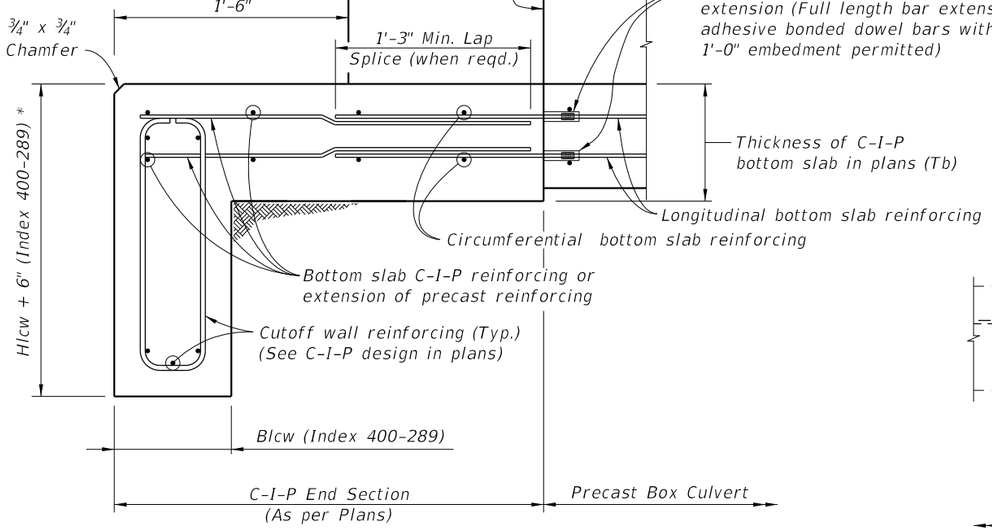


SECTION B-B
TOP SLAB TO WALL JOINT
(HAUNCHED JOINT)

#4 STIRRUP
BEND DIAGRAM

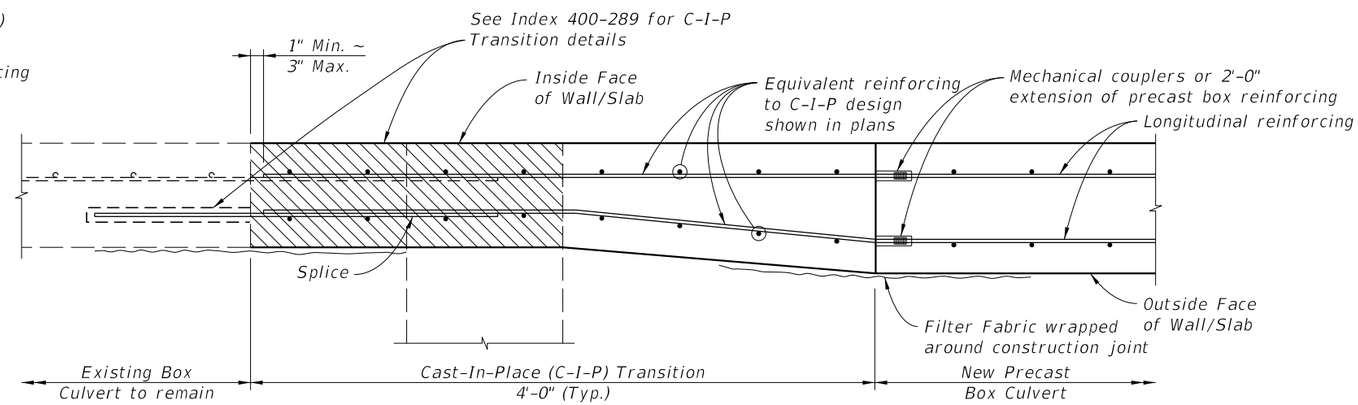
** Provide adequate width to satisfy shear strength requirements at joint

TYPE B BOX LONGITUDINAL JOINTS



SECTION D-D
C-I-P TOE SLAB & CUTOFF WALL DETAILS
AND CONNECTION TO PRECAST BOX

* Provide additional 6" depth of cutoff wall at no additional cost.



SECTION E-E
EXTERIOR WALL/SLAB TRANSITION DETAIL FOR PRECAST EXTENSION
(Type I Connection shown, Type II Connection similar)

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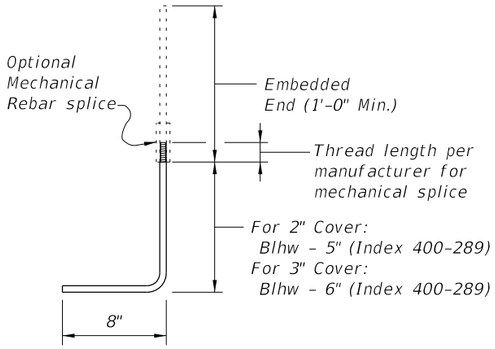
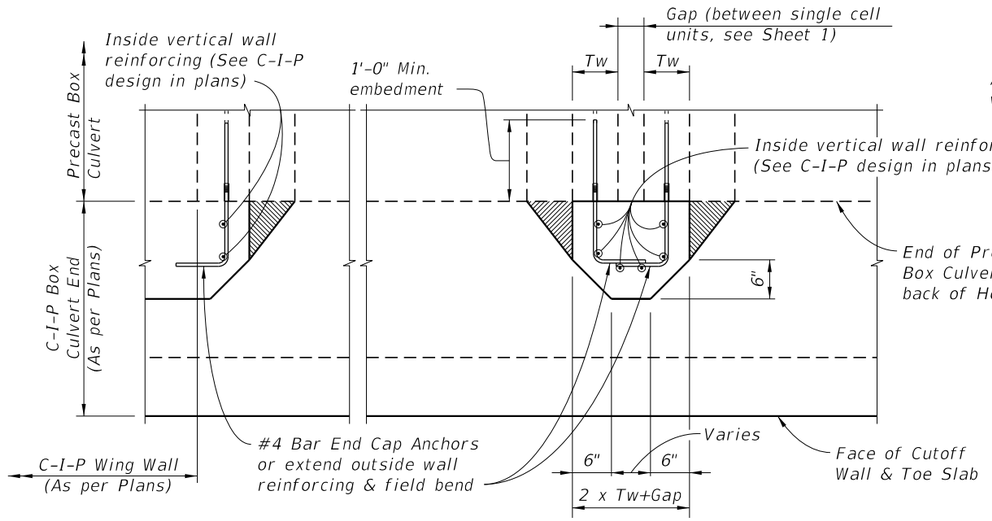
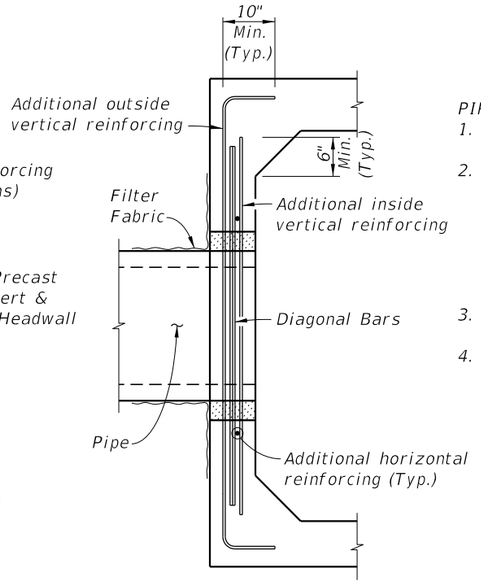


#4 BAR END CAP ANCHOR
BAR BEND DIAGRAM



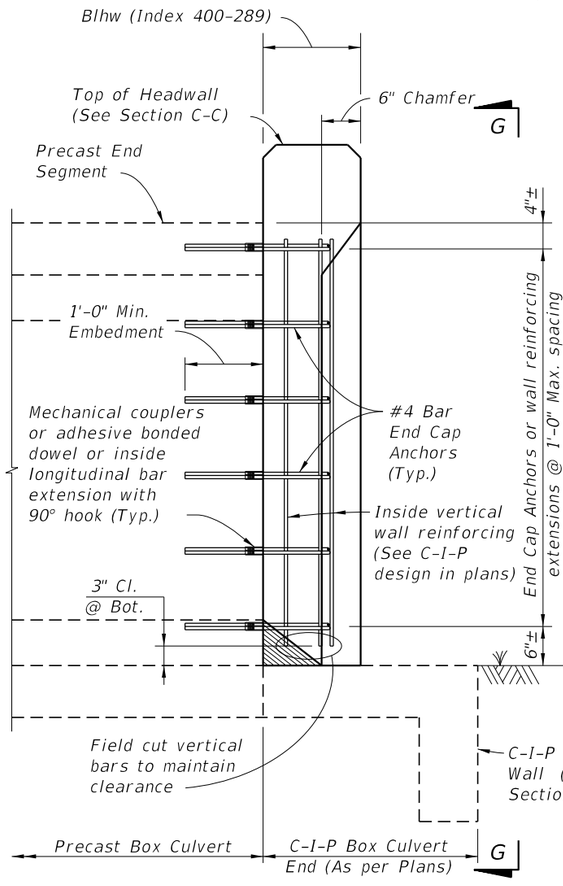
SECTION H-H



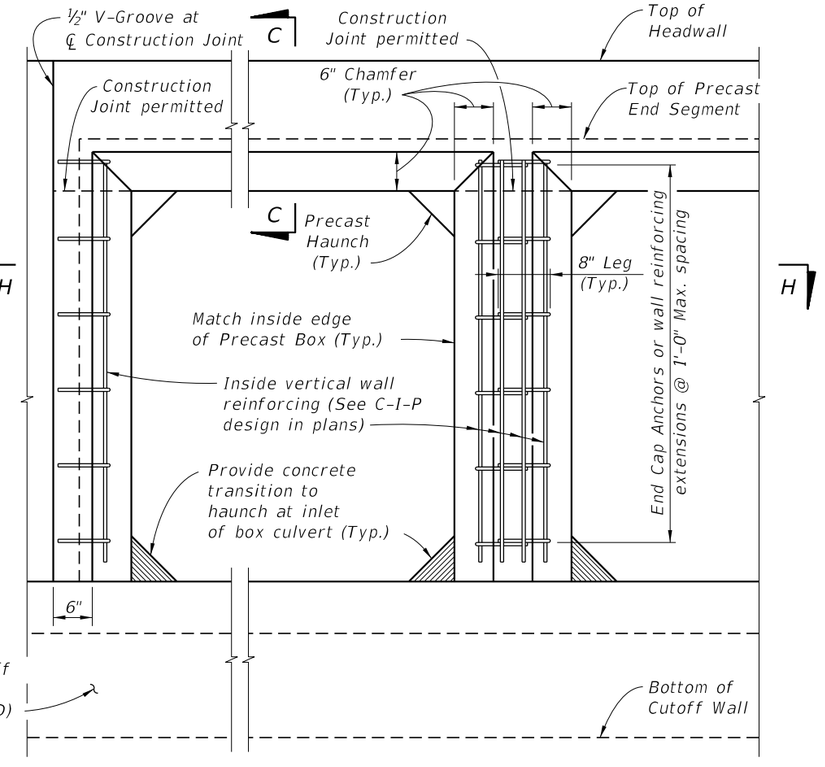
SECTION I-I
(Showing additional blockout reinforcing only)

PIPE BLOCKOUT NOTES:

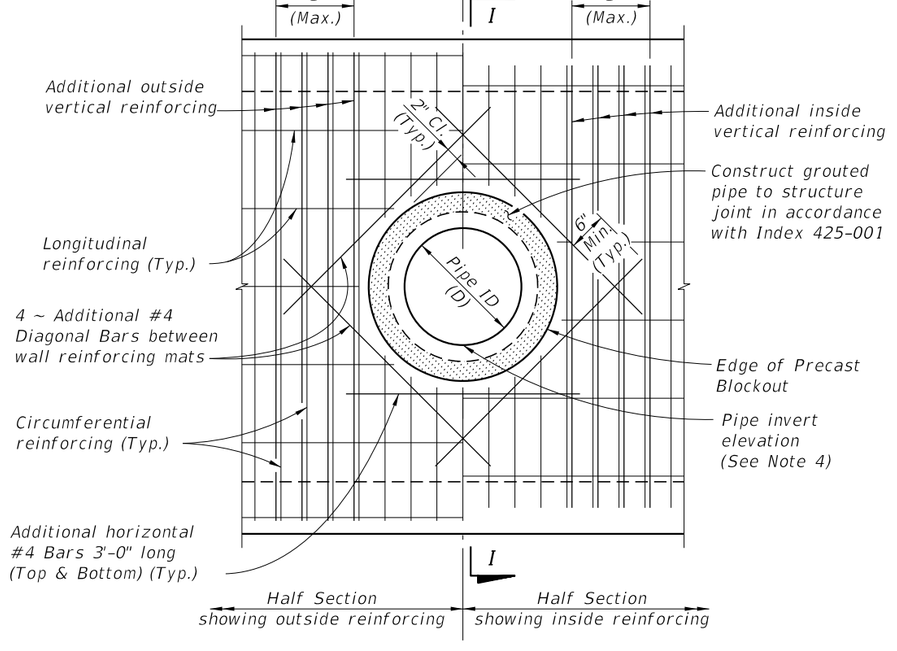
1. Cut box culvert reinforcement as required to maintain 2" cover.
2. For Precast Sections construct opening a minimum of 1'-6" away from any box to box joint, except opening may be a minimum of 1'-0" away from joint when at least 2'-0" of clearance to the box to box joint is provided on the opposite side of the pipe opening.
3. Pipe blockout diameter to be 6" greater than pipe outside diameter.
4. See Drainage Plans for size, placement, and invert elevation.



SECTION F-F



VIEW G-G
(Headwall, Toe Slab and Cutoff Wall Reinforcing not shown for clarity)



ELEVATION VIEW

PIPE BLOCKOUT DETAILS

C-I-P END CAP DETAILS AND CONNECTION TO PRECAST BOX

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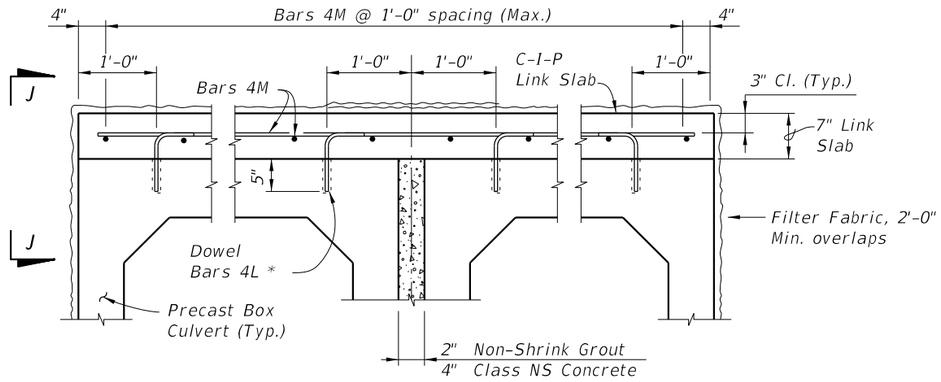
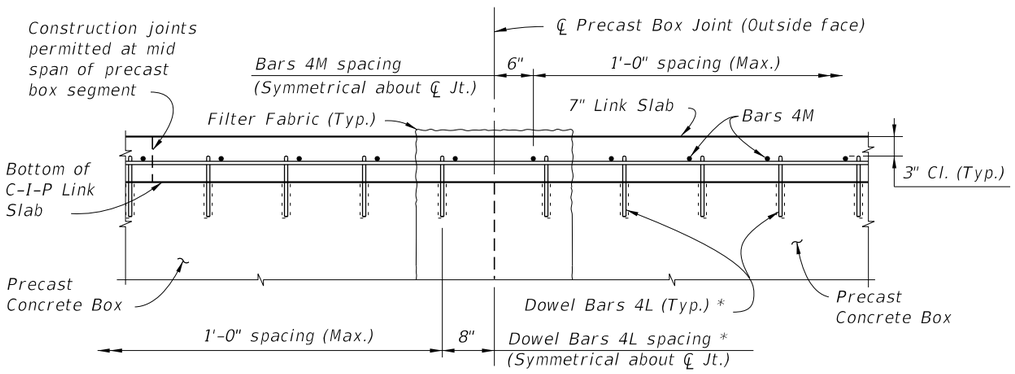


LINK SLAB TYPICAL SECTION
(Multiple Barrel Culvert shown, Single Barrel Culvert similar)

* Install dowels with an Adhesive Bonding Material System in accordance with Specification Section 416. The Contractor may substitute mechanical couplers in lieu of adhesive bonded dowels. Shift dowels to clear box culvert reinforcing.



VIEW J-J

LINK SLAB NOTES:

1. Provide a Cast-In-Place Link Slab to ensure uniform joint opening of precast box culverts when the differential settlement shown in the plans exceeds the following limits, except that a Link Slab is not required for differential settlements less than ½".

$$\Delta Y \leq \frac{(L)^2}{760 \times R \times W}$$

Where:
ΔY = Maximum Long-Term Differential Settlement (ft.)
R = Exterior height of Box Culvert (ft.)
W = Length of Box Culvert Segments (ft.)
L = Effective length for single curvature deflection (ft.)

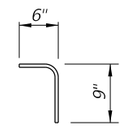
2. Extend Link Slab to back face of headwalls and to limits of existing box culverts for extensions.

ESTIMATED LINK SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Class II or IV Concrete (Culvert)	CY/SF	0.0216
Reinforcing Steel (Roadway)	Lb./SF	1.52

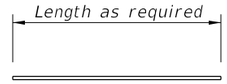
NOTE: Estimated quantities are based the plan area of precast box slabs, and are provided for information only. No additional payment will be made for Link Slabs where these are required for the precast box culverts.

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
L	4	2 per Barrel/Ft.	1'-3"
M	4	As Reqd.	As Reqd.

REINFORCING STEEL BENDING DIAGRAMS



DOWEL BARS 4L

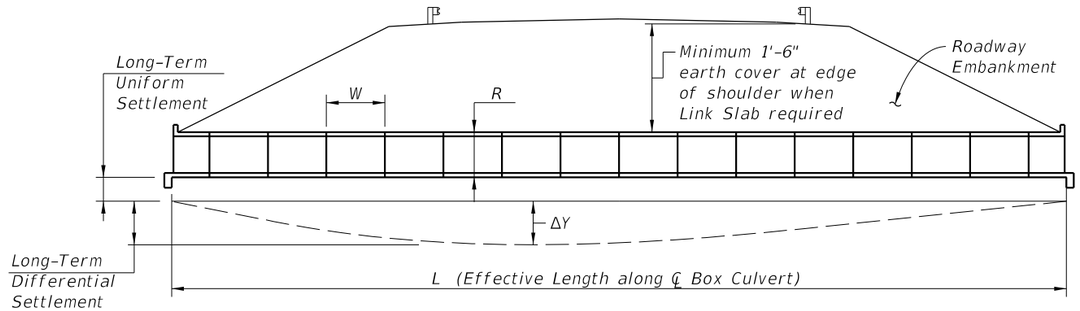


BAR 4M

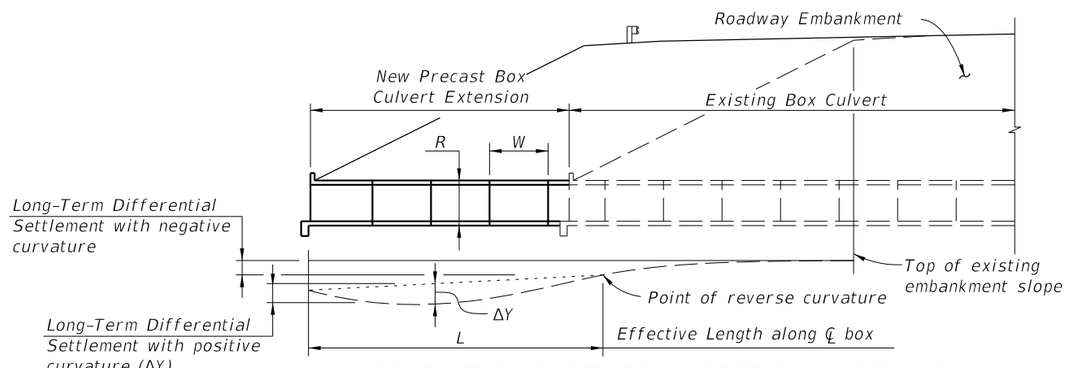
NOTES:
1. All bar dimensions are out to out.
2. Lap splice length for Bars 4M is 1'-4" minimum.

DESIGN NOTE:

1. Link Slab required when joint openings from differential settlement exceed ⅛" as determined in Link Slab Note 1.



SCHEMATIC LONGITUDINAL SECTION (NEW CONSTRUCTION)



SCHEMATIC LONGITUDINAL SECTION (WIDENING)

DIFFERENTIAL SETTLEMENT COUNTERMEASURES FOR PRECAST BOX CULVERTS

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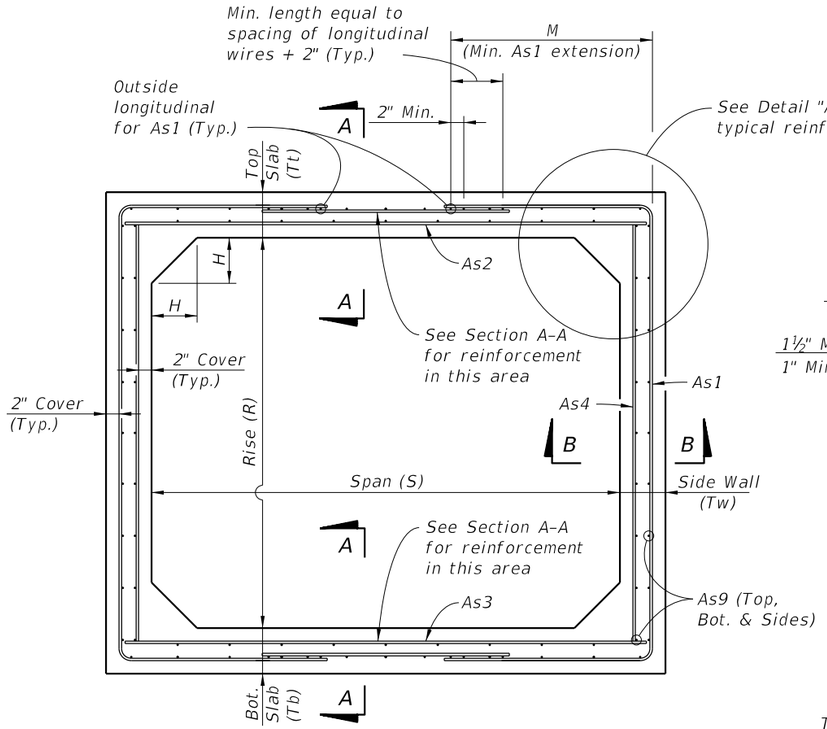
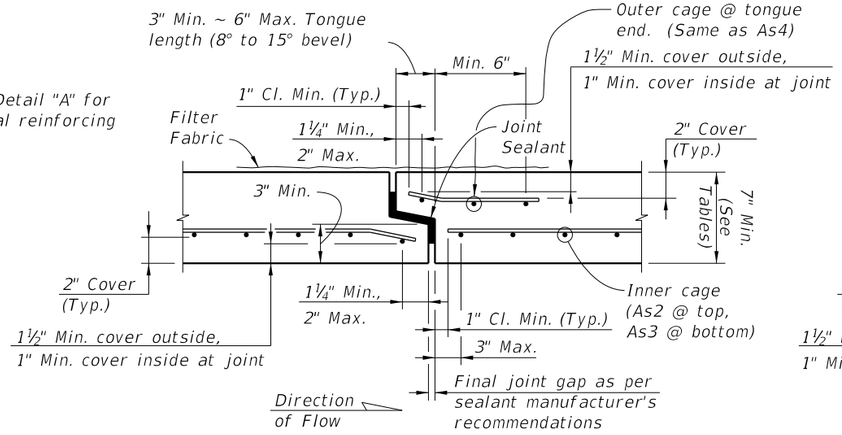
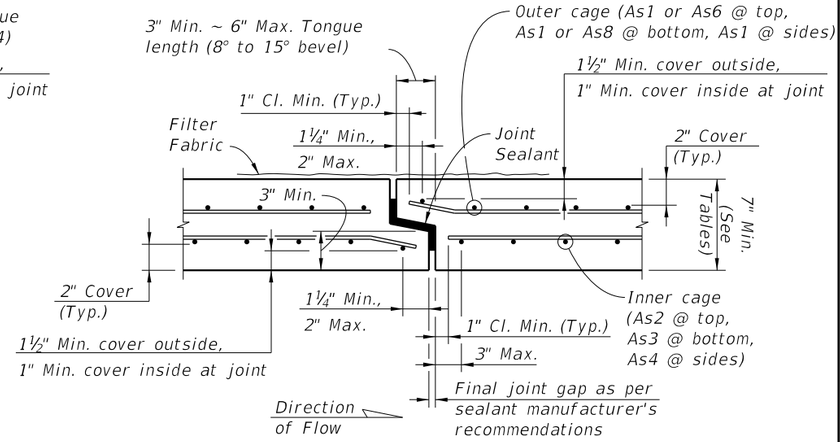


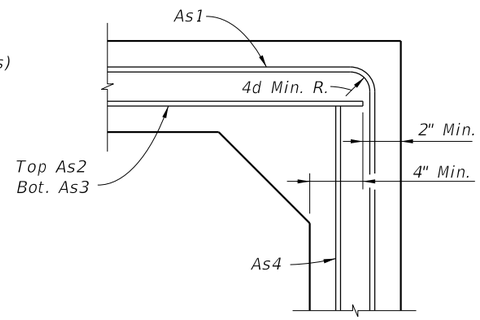
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 2' OR GREATER
(Option 1 Reinforcing Configuration Shown)



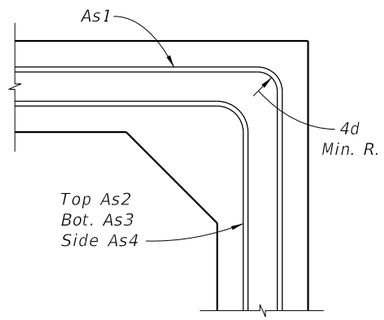
SECTION A-A



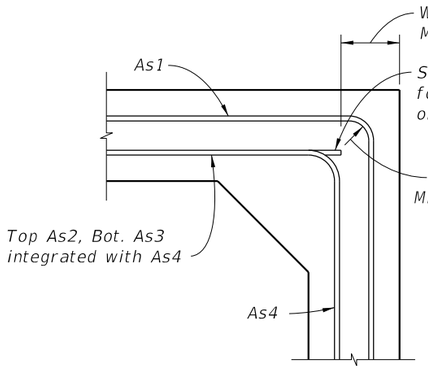
SECTION B-B
TYPICAL SECTION THRU JOINT



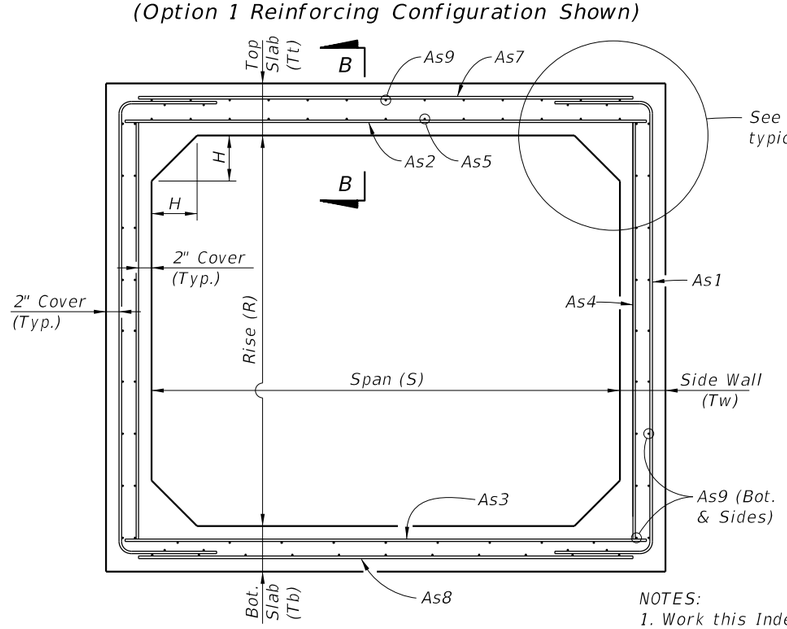
DETAIL "A"
(OPTION 1)



DETAIL "A"
(OPTION 2)

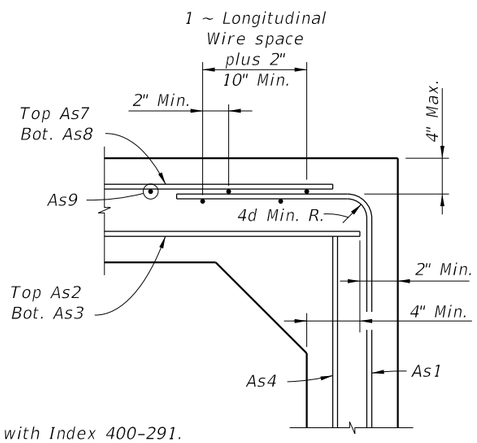


DETAIL "A"
(OPTION 3)

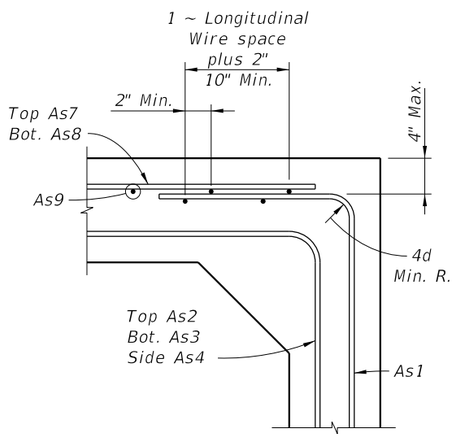


TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 2'
(Option 1 Reinforcing Configuration Shown)

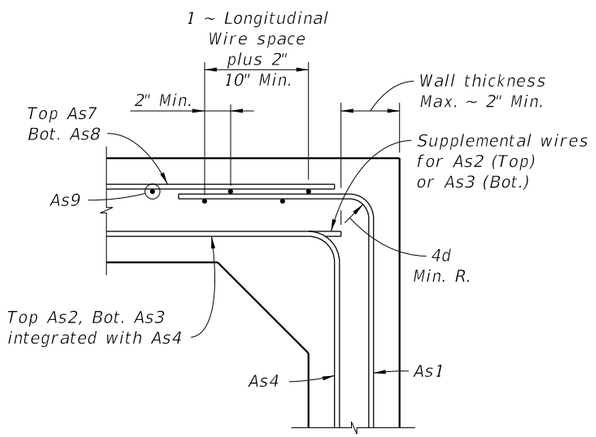
NOTES:
1. Work this Index with Index 400-291.
2. See sheets 2 thru 5 for dimensions and areas of reinforcement.



DETAIL "B"
(OPTION 1)



DETAIL "B"
(OPTION 2)



DETAIL "B"
(OPTION 3)

STANDARD PRECAST BOX CULVERT WITH 2" CONCRETE COVER

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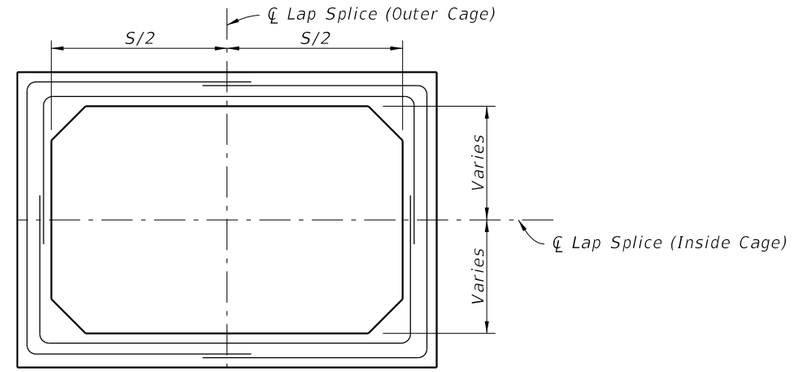
GENERAL NOTES:

1. These precast designs may be substituted for cast-in-place box culverts designed to AASHTO LRFD Bridge Design Specifications, 4th Edition. Designs are based on the design criteria shown in FDOT Structures Design Guidelines.
2. Loading: HL-93 & any fill heights between the minimum & maximum shown.
3. Only one design of precast box culvert is to be used for any installation.
4. Reinforcing steel must consist of smooth or deformed welded wire reinforcement (WWR) meeting the requirements of Specification Section 931. Longitudinal reinforcement may consist of reinforcing bars meeting the requirements of Specification Section 931. Minimum cover must be 2" for slightly or moderately aggressive environments or 3" for extremely aggressive environments, unless otherwise shown. The spacing of circumferential wires must not be less than 2" nor more than 4". The spacing of longitudinal wires or bars must not be more than 8".
5. As9 longitudinal wires must have a minimum cross-sectional area of 40% of the circumferential wires, but not less than a W2.5 or D4.0 for WWR, or #3 bars for deformed bars.
6. Welding of reinforcement must be limited to the locations shown in ASTM C1577 and in accordance with ANSI/AWS D1.4 "Structural Welding Code – Reinforcing Steel".
7. For alternate reinforcing configuration Options 2 and 3 shown in Detail "A" and "B" (Sheet 1), As1 may be extended to the middle of either slab and lap spliced with As7 and As8. As4 may be lap spliced at any location or connected to As2 or As3 at corners by welding.
8. Haunch dimensions may vary between the minimum and maximum dimensions shown in the Design Tables but only one haunch dimension must be used within the full length of the box culvert installation.
9. Submittal of redesign calculations are not required for any increase to the slab and/or wall thickness when the minimum reinforcement areas shown in the Design Tables are provided.
10. For Design Earth Cover greater than 10 feet, the Contractor may interpolate the required areas of reinforcement and slab or wall thickness. Interpolated areas of reinforcement, slab or wall thickness must be approved by the Engineer.
11. Minimum length of precast box segments is 4 feet and maximum length is 16 feet.
12. See Index 400-291 for connections to wingwalls, headwalls and other general details.



SCHEMATIC OF LAP SPLICE LOCATIONS
FOR OPTION 2 & 3 REINFORCING CONFIGURATIONS

TABLE 1A - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
3' x 3'	7	7	7	4 to 8	0.33' - <2'	0.17	0.29	0.21	0.17	0.17	0.17	0.17	See General Note 5	–
					2' - <3'	0.13	0.28	0.21	0.09	–	–	–		31
					3' - <5'	0.09	0.17	0.17	0.09	–	–	–		31
					5' - 10'	0.09	0.17	0.17	0.09	–	–	–		31
					15'	0.09	0.17	0.17	0.09	–	–	–		31
					20'	0.12	0.17	0.17	0.09	–	–	–		31
					25'	0.14	0.18	0.18	0.09	–	–	–		31
					30'	0.17	0.21	0.22	0.09	–	–	–		31
					35'	0.19	0.25	0.25	0.09	–	–	–		31
4' x 3'	7	7	7	4 to 8	0.33' - <2'	0.19	0.38	0.26	0.17	0.19	0.17	0.19		–
					2' - <3'	0.19	0.38	0.26	0.09	–	–	–		38
					3' - <5'	0.14	0.20	0.22	0.09	–	–	–		38
					5' - 10'	0.11	0.17	0.17	0.09	–	–	–		38
					15'	0.15	0.17	0.18	0.09	–	–	–		38
					20'	0.20	0.23	0.23	0.09	–	–	–		38
					25'	0.24	0.28	0.29	0.09	–	–	–		38
					30'	0.29	0.34	0.35	0.09	–	–	–		38
4' x 4'	7	7	7	4 to 8	0.33' - <2'	0.19	0.41	0.28	0.17	0.21	0.17	0.19		–
					2' - <3'	0.19	0.41	0.28	0.09	–	–	–		38
					3' - <5'	0.14	0.21	0.24	0.09	–	–	–		38
					5' - 10'	0.12	0.17	0.17	0.09	–	–	–		38
					15'	0.16	0.19	0.20	0.09	–	–	–		38
					20'	0.21	0.25	0.25	0.09	–	–	–		38
					25'	0.26	0.31	0.32	0.09	–	–	–		38
					30'	0.31	0.37	0.38	0.09	–	–	–		38

TABLE 1B - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
3' x 3'	8	8	8	4 to 8	0.33' - <2'	0.20	0.26	0.32	0.20	0.20	0.20	0.20	See General Note 5	–
					2' - <3'	0.16	0.25	0.31	0.10	–	–	–		31
					3' - <5'	0.10	0.20	0.20	0.10	–	–	–		31
					5' - 10'	0.10	0.20	0.20	0.10	–	–	–		31
					15'	0.10	0.20	0.20	0.10	–	–	–		31
					20'	0.10	0.20	0.20	0.10	–	–	–		31
					25'	0.11	0.20	0.20	0.10	–	–	–		31
					30'	0.13	0.20	0.20	0.10	–	–	–		31
					35'	0.15	0.21	0.21	0.10	–	–	–		31
4' x 3'	8	8	8	4 to 8	0.33' - <2'	0.20	0.31	0.22	0.20	0.20	0.20	0.20		–
					2' - <3'	0.12	0.31	0.22	0.10	–	–	–		38
					3' - <5'	0.12	0.20	0.20	0.10	–	–	–		38
					5' - 10'	0.10	0.20	0.20	0.10	–	–	–		38
					15'	0.12	0.20	0.20	0.10	–	–	–		38
					20'	0.16	0.20	0.20	0.10	–	–	–		38
					25'	0.19	0.24	0.24	0.10	–	–	–		38
					30'	0.22	0.28	0.29	0.10	–	–	–		38
4' x 4'	8	8	8	4 to 8	0.33' - <2'	0.20	0.33	0.24	0.20	0.20	0.20	0.20		–
					2' - <3'	0.17	0.33	0.24	0.10	–	–	–		38
					3' - <5'	0.12	0.20	0.20	0.10	–	–	–		38
					5' - 10'	0.10	0.20	0.20	0.10	–	–	–		38
					15'	0.13	0.20	0.20	0.10	–	–	–		38
					20'	0.16	0.21	0.22	0.10	–	–	–		38
					25'	0.20	0.26	0.27	0.10	–	–	–		38
					30'	0.23	0.31	0.32	0.10	–	–	–		38

NOTES: 1. See Sheet 1 for Reinforcing Details and dimension locations.
2. See Sheet 14 for WWR Bending Diagram.

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TABLE 2A - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 5' & 6' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
5' x 3'	7	7	7	4 to 8	0.33' - <2'	0.31	0.48	0.42	0.17	0.21	0.23	0.31	See General Note 5	-
					2' - <3'	0.31	0.48	0.42	0.09	-	-	-		45
					3' - <5'	0.20	0.27	0.27	0.09	-	-	-		36
					5' - 10'	0.17	0.19	0.21	0.09	-	-	-		36
					15'	0.24	0.25	0.25	0.09	-	-	-		35
					20'	0.32	0.33	0.33	0.09	-	-	-		35
					25'	0.39	0.41	0.42	0.09	-	-	-		35
					30'	0.47	0.50	0.50	0.09	-	-	-		35
5' x 4'	7	7	7	4 to 8	0.33' - <2'	0.30	0.51	0.45	0.17	0.23	0.21	0.30		-
					2' - <3'	0.30	0.51	0.45	0.09	-	-	-		45
					3' - <5'	0.18	0.30	0.29	0.09	-	-	-		45
					5' - 10'	0.17	0.21	0.23	0.09	-	-	-		36
					15'	0.24	0.27	0.28	0.09	-	-	-		35
					20'	0.31	0.36	0.37	0.09	-	-	-		35
					25'	0.39	0.45	0.46	0.09	-	-	-		35
					30'	0.46	0.55	0.56	0.09	-	-	-		35
5' x 5'	7	7	7	4 to 8	0.33' - <2'	0.30	0.53	0.48	0.17	0.24	0.21	0.30		-
					2' - <3'	0.29	0.53	0.48	0.09	-	-	-		45
					3' - <5'	0.19	0.31	0.31	0.09	-	-	-		45
					5' - 10'	0.19	0.22	0.25	0.09	-	-	-		45
					15'	0.26	0.29	0.31	0.09	-	-	-		36
					20'	0.34	0.39	0.40	0.09	-	-	-		35
					25'	0.41	0.49	0.50	0.09	-	-	-		35
					30'	0.49	0.59	0.61	0.09	-	-	-		35
6' x 3'	7.5	7	7	4 to 12	0.33' - <2'	0.39	0.54	0.48	0.17	0.22	0.25	0.39		-
	7	7	7		2' - <3'	0.39	0.58	0.49	0.09	-	-	-		43
					3' - <5'	0.28	0.36	0.36	0.09	-	-	-		39
					5' - 10'	0.25	0.26	0.28	0.09	-	-	-		39
					15'	0.36	0.34	0.34	0.09	-	-	-		38
					20'	0.47	0.46	0.46	0.09	-	-	-		38
	7	7.5	7		25'	0.59	0.57	0.55	0.09	-	-	-		38
	8	8	7		30'	0.60	0.64	0.64	0.09	-	-	-		38
6' x 4'	7.5	7	7	4 to 12	0.33' - <2'	0.37	0.58	0.52	0.17	0.24	0.23	0.37		-
	7	7	7		2' - <3'	0.37	0.61	0.53	0.09	-	-	-		43
					3' - <5'	0.26	0.39	0.39	0.09	-	-	-		39
					5' - 10'	0.24	0.28	0.31	0.09	-	-	-		39
					15'	0.35	0.37	0.38	0.09	-	-	-		38
					20'	0.46	0.50	0.50	0.09	-	-	-		38
	7	7.5	7		25'	0.56	0.63	0.60	0.09	-	-	-		38
	8	8	7		30'	0.58	0.69	0.69	0.09	-	-	-		38
6' x 5'	7.5	7	7	4 to 12	0.33' - <2'	0.36	0.60	0.56	0.17	0.25	0.22	0.36		-
	7	7	7		2' - <3'	0.36	0.64	0.56	0.09	-	-	-		43
					3' - <5'	0.26	0.410	0.42	0.09	-	-	-		43
					5' - 10'	0.25	0.30	0.33	0.09	-	-	-		39
					15'	0.34	0.40	0.41	0.09	-	-	-		38
					20'	0.46	0.54	0.54	0.09	-	-	-		38
	7	7.5	7		25'	0.56	0.67	0.65	0.09	-	-	-		38
	8	8	8		30'	0.60	0.74	0.74	0.09	-	-	-		38
6' x 6'	7.5	7	7	4 to 12	0.33' - <2'	0.36	0.63	0.59	0.17	0.26	0.22	.036		-
	7	7	7		2' - <3'	0.35	0.67	0.59	0.09	-	-	-		52
					3' - <5'	0.27	0.43	0.44	0.09	-	-	-		52
					5' - 10'	0.27	0.32	0.35	0.09	-	-	-		43
					15'	0.38	0.43	0.44	0.09	-	-	-		39
					20'	0.50	0.57	0.59	0.09	-	-	-		39
	7	7.5	7		25'	0.60	0.72	0.70	0.09	-	-	-		38
	8	8	7		30'	0.67	0.78	0.79	0.09	-	-	-		38

TABLE 2B - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 5' & 6' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
5' x 3'	8	8	8	4 to 8	0.33' - <2'	0.26	0.39	0.36	0.20	0.20	0.20	0.26	See General Note 5	-
					2' - <3'	0.26	0.39	0.36	0.10	-	-	-		45
					3' - <5'	0.16	0.23	0.24	0.10	-	-	-		36
					5' - 10'	0.13	0.20	0.20	0.10	-	-	-		36
					15'	0.19	0.21	0.22	0.10	-	-	-		35
					20'	0.24	0.28	0.28	0.10	-	-	-		35
					25'	0.30	0.34	0.35	0.10	-	-	-		35
					30'	0.36	0.41	0.41	0.10	-	-	-		35
5' x 4'	8	8	8	4 to 8	0.33' - <2'	0.25	0.42	0.38	0.20	0.20	0.20	0.25		-
					2' - <3'	0.25	0.42	0.38	0.10	-	-	-		45
					3' - <5'	0.16	0.25	0.25	0.10	-	-	-		45
					5' - 10'	0.13	0.20	0.20	0.10	-	-	-		36
					15'	0.19	0.23	0.24	0.10	-	-	-		35
					20'	0.24	0.30	0.31	0.10	-	-	-		35
					25'	0.30	0.37	0.38	0.10	-	-	-		35
					30'	0.35	0.45	0.46	0.10	-	-	-		35
5' x 5'	8	8	8	4 to 8	0.33' - <2'	0.25	0.44	0.41	0.20	0.20	0.20	0.25		-
					2' - <3'	0.25	0.44	0.41	0.10	-	-	-		45
					3' - <5'	0.16	0.26	0.27	0.10	-	-	-		45
					5' - 10'	0.15	0.20	0.22	0.10	-	-	-		45
					15'	0.20	0.25	0.26	0.10	-	-	-		36
					20'	0.26	0.32	0.33	0.10	-	-	-		35
					25'	0.32	0.40	0.41	0.10	-	-	-		35
					30'	0.37	0.48	0.49	0.10	-	-	-		35
6' x 3'	8	8	8	4 to 12	0.33' - <2'	0.32	0.47	0.41	0.20	0.20	0.25	0.32		-
					2' - <3'	0.32	0.47	0.41	0.10	-	-	-		43
					3' - <5'	0.23	0.30	0.31	0.10	-	-	-		39
					5' - 10'	0.19	0.22	0.24	0.10	-	-	-		39
					15'	0.28	0.29	0.29	0.10	-	-	-		38
					20'	0.36	0.38	0.38	0.10	-	-	-		38
					25'	0.45	0.47	0.47	0.10	-	-	-		38
					30'	0.54	0.57	0.57	0.10	-	-	-		38
6' x 4'	8	8	8	4 to 12	0.33' - <2'	0.31	0.50	0.44	0.20	0.21	0.23	0.31		-
					2' - <3'	0.31	0.50	0.44	0.10	-	-	-		43
					3' - <5'	0.23	0.32	0.34	0.10	-	-	-		39
					5' - 10'	0.19	0.24	0.26	0.10	-	-	-		39
					15'	0.27	0.31	0.32	0.10	-	-	-		38
					20'	0.35	0.41	0.41	0.10	-	-	-		38
					25'	0.43	0.51	0.51	0.10	-	-	-		38
					30'	0.52	0.62	0.62	0.10	-	-	-		38
6' x 5'	8	8	8	4 to 12	0.33' - <2'	0.30	0.52	0.47	0.20	0.22	0.22	0.30		-
					2' - <3'	0.30	0.52	0.47	0.10	-	-	-		43
					3' - <5'	0.22	0.34	0.36	0.10	-	-	-		43
					5' - 10'	0.20	0.26	0.28	0.10	-	-	-		39
					15'	0.27	0.33	0.34	0.10	-	-	-		38
					20'	0.36	0.44	0.45	0.10	-	-	-		38
					25'	0.44	0.55	0.55	0.10	-	-	-		38
					30'	0.52	0.66	0.67	0.10	-	-	-		38
6' x 6'	8	8	8	4 to 12	0.33' - <2'	0.30	0.54	0.50	0.20	0.22	0.22	0.30		-
					2' - <3'	0.30	0.54	0.50	0.10	-	-	-		52
					3' - <5'	0.23	0.36	0.38	0.10	-	-	-		52
					5' - 10'	0.21	0.27	0.30	0.10	-	-	-		43
					15'	0.29	0.35	0.37	0.10	-	-	-		39
					20'	0.38	0.47	0.48	0.10	-	-	-		39
					25'	0.47	0.59	0.60	0.10	-	-	-		38
					30'	0.55	0.70	0.71	0.10	-	-	-		38

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LAST REVISION	REVISION	DESCRIPTION:				
07/01/13			FDOT FY 2021-22 STANDARD PLANS	STANDARD PRECAST CONCRETE BOX CULVERTS	INDEX 400-292	SHEET 3 of 14

TABLE 3 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 7' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
7' x 4'	8	8	8	4 to 12	0.33' – <2'	0.37	0.58	0.49	0.20	0.22	0.29	0.37	See General Note 5	–
					2' – <3'	0.37	0.58	0.49	0.10	–	–	–		43
					3' – <5'	0.30	0.40	0.42	0.10	–	–	–		43
					5' – 10'	0.26	0.30	0.33	0.10	–	–	–		43
					15'	0.37	0.40	0.40	0.10	–	–	–		41
					20'	0.49	0.53	0.53	0.10	–	–	–		41
	8	8	8	7 to 12	25'	0.60	0.67	0.66	0.10	–	–	–		41
	8.5	8.5	8		30'	0.68	0.79	0.78	0.10	–	–	–		41
7' x 5'	8	8	8	4 to 12	0.33' – <2'	0.36	0.60	0.53	0.20	0.23	0.28	0.36		–
					2' – <3'	0.36	0.60	0.53	0.10	–	–	–		47
					3' – <5'	0.30	0.42	0.45	0.10	–	–	–		43
					5' – 10'	0.26	0.32	0.35	0.10	–	–	–		43
					15'	0.37	0.43	0.44	0.10	–	–	–		41
					20'	0.48	0.57	0.57	0.10	–	–	–		41
	8	8	8	7 to 12	25'	0.60	0.72	0.72	0.10	–	–	–		41
	8.5	8.5	8		30'	0.67	0.84	0.84	0.10	–	–	–		41
7' x 6'	8	8	8	4 to 12	0.33' – <2'	0.36	0.63	0.56	0.20	0.24	0.27	0.36		–
					2' – <3'	0.36	0.63	0.56	0.10	–	–	–		59
					3' – <5'	0.29	0.44	0.47	0.10	–	–	–		47
					5' – 10'	0.27	0.34	0.37	0.10	–	–	–		43
					15'	0.38	0.46	0.46	0.10	–	–	–		41
					20'	0.49	0.60	0.61	0.10	–	–	–		41
	8	8	8	7 to 12	25'	0.61	0.76	0.76	0.10	–	–	–		41
	8.5	8.5	8		30'	0.69	0.89	0.89	0.10	–	–	–		41
7' x 7'	8	8	8	4 to 12	0.33' – <2'	0.36	0.65	0.58	0.20	0.25	0.27	0.36		–
					2' – <3'	0.36	0.65	0.58	0.10	–	–	–		59
					3' – <5'	0.30	0.46	0.50	0.10	–	–	–		59
					5' – 10'	0.30	0.35	0.50	0.10	–	–	–		47
					15'	0.41	0.48	0.50	0.10	–	–	–		43
					20'	0.53	0.64	0.65	0.10	–	–	–		43
	8	8	8	7 to 12	25'	0.65	0.80	0.81	0.10	–	–	–		43
	8.5	9	8		30'	0.72	0.92	0.91	0.10	–	–	–		41

TABLE 4 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 8' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
8' x 4'	9	8.5	8	4 to 12	0.33' – <2'	0.40	0.60	0.52	0.20	0.22	0.28	0.39	See General Note 5	–
	8	8	8		2' – <3'	0.45	0.66	0.54	0.10	–	–	–		50
					3' – <5'	0.39	0.48	0.50	0.10	–	–	–		50
					5' – 10'	0.34	0.38	0.40	0.10	–	–	–		45
					15'	0.49	0.51	0.50	0.10	–	–	–		41
					20'	0.65	0.68	0.66	0.10	–	–	–		41
	8.5	8.5	8	8 to 12	25'	0.76	0.83	0.80	0.10	–	–	–		41
	9.5	9.5	8		30'	0.79	0.94	0.92	0.10	–	–	–		41
8' x 5'	9	8.5	8	4 to 12	0.33' – <2'	0.38	0.65	0.59	0.20	0.22	0.30	0.37		–
	8	8	8		2' – <3'	0.43	0.69	0.58	0.10	–	–	–		50
					3' – <5'	0.37	0.51	0.53	0.10	–	–	–		45
					5' – 10'	0.33	0.41	0.42	0.10	–	–	–		45
					15'	0.48	0.54	0.53	0.10	–	–	–		41
					20'	0.63	0.73	0.70	0.10	–	–	–		41
	8.5	8.5	8	8 to 12	25'	0.74	0.88	0.86	0.10	–	–	–		41
	9.5	9.5	8		30'	0.77	1.00	0.98	0.10	–	–	–		41
8' x 6'	9	9	8	4 to 12	0.33' – <2'	0.32	0.65	0.58	0.20	0.23	0.25	0.31		–
	8	8	8		2' – <3'	0.42	0.71	0.61	0.10	–	–	–		50
					3' – <5'	0.37	0.54	0.56	0.10	–	–	–		50
					5' – 10'	0.34	0.43	0.45	0.10	–	–	–		45
					15'	0.49	0.57	0.57	0.10	–	–	–		41
					20'	0.64	0.77	0.76	0.10	–	–	–		41
	8.5	8.5	8	8 to 12	25'	0.74	0.94	0.92	0.10	–	–	–		41
	9.5	9.5	8		30'	0.78	1.05	1.04	0.10	–	–	–		41
8' x 7'	9	9	8	4 to 12	0.33' – <2'	0.31	0.67	0.60	0.20	0.24	0.24	0.31		–
	8	8	8		2' – <3'	0.42	0.74	0.64	0.10	–	–	–		55
					3' – <5'	0.37	0.56	0.59	0.10	–	–	–		55
					5' – 10'	0.36	0.45	0.47	0.10	–	–	–		50
					15'	0.51	0.61	0.61	0.10	–	–	–		45
					20'	0.66	0.81	0.80	0.10	–	–	–		41
	8.5	8.5	8	8 to 12	25'	0.78	0.98	0.97	0.10	–	–	–		41
	9.5	9.5	8		30'	0.84	1.10	1.09	0.10	–	–	–		41
8' x 8'	9	9	8	4 to 12	0.33' – <2'	0.32	0.68	0.62	0.20	0.24	0.25	0.32		–
	8	8	8		2' – <3'	0.43	0.76	0.67	0.14	–	–	–		65
					3' – <5'	0.38	0.58	0.61	0.14	–	–	–		65
					5' – 10'	0.39	0.46	0.50	0.13	–	–	–		55
					15'	0.55	0.64	0.65	0.10	–	–	–		45
					20'	0.71	0.86	0.85	0.10	–	–	–		45
	8.5	8.5	8	8 to 12	25'	0.84	1.03	1.02	0.10	–	–	–		41
	9.5	9.5	8		30'	0.93	1.15	1.15	0.10	–	–	–		41

NOTES:
1. See Sheet 1 for Reinforcing Details and dimension locations.
2. See Sheet 2 for General Notes.
3. See Sheet 14 for Welded Wire Reinforcement Bending Diagram.

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TABLE 5 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 9' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
9' x 5'	9.5	9.5	9	4	0.33' - <2'	0.41	0.62	0.53	0.22	0.23	0.34	0.38	See General Note 5	-
	9	9	9	to 12	2' - <3'	0.44	0.65	0.54	0.11	-	-	-		54
					3' - <5'	0.39	0.53	0.51	0.11	-	-	-		49
					5' - 10'	0.35	0.42	0.44	0.11	-	-	-		49
					15'	0.50	0.56	0.55	0.11	-	-	-		44
					20'	0.65	0.75	0.73	0.11	-	-	-		44
	9.5	9.5	9	8 to 12	25'	0.77	0.92	0.90	0.11	-	-	-		44
	10.5	11	9		30'	0.81	1.05	1.02	0.11	-	-	-		44
9' x 6'	9.5	9.5	9	4	0.33' - <2'	0.38	0.64	0.56	0.23	0.23	0.33	0.37		-
	9	9	9	to 12	2' - <3'	0.43	0.67	0.57	0.11	-	-	-		54
					3' - <5'	0.37	0.55	0.54	0.11	-	-	-		49
					5' - 10'	0.35	0.45	0.47	0.11	-	-	-		49
					15'	0.49	0.60	0.59	0.11	-	-	-		44
					20'	0.65	0.80	0.78	0.11	-	-	-		44
	9.5	9.5	9	8 to 12	25'	0.76	0.98	0.95	0.11	-	-	-		44
	10.5	11	9		30'	0.80	1.10	1.08	0.11	-	-	-		44
9' x 7'	9.5	9.5	9	4	0.33' - <2'	0.37	0.67	0.59	0.22	0.23	0.32	0.37		-
	9	9	9	to 12	2' - <3'	0.42	0.69	0.60	0.11	-	-	-		59
					3' - <5'	0.37	0.58	0.56	0.11	-	-	-		54
					5' - 10'	0.36	0.47	0.49	0.11	-	-	-		49
					15'	0.50	0.63	0.63	0.11	-	-	-		44
					20'	0.66	0.84	0.80	0.11	-	-	-		44
	9.5	9.5	9	8 to 12	25'	0.77	1.02	1.00	0.11	-	-	-		44
	10.5	11	9		30'	0.81	1.15	1.13	0.11	-	-	-		44
9' x 8'	9.5	9.5	9	4	0.33' - <2'	0.37	0.68	0.61	0.22	0.23	0.31	0.37		-
	9	9	9	to 12	2' - <3'	0.42	0.71	0.62	0.11	-	-	-		59
					3' - <5'	0.37	0.60	0.59	0.11	-	-	-		59
					5' - 10'	0.38	0.49	0.51	0.11	-	-	-		54
					15'	0.53	0.66	0.66	0.11	-	-	-		44
					20'	0.68	0.88	0.87	0.11	-	-	-		44
	9.5	9.5	9	8 to 12	25'	0.81	1.07	1.05	0.11	-	-	-		44
	10.5	11	9		30'	0.86	1.20	1.18	0.11	-	-	-		44
9' x 9'	9.5	9.5	9	4	0.33' - <2'	0.38	0.70	0.63	0.22	0.23	0.32	0.38		-
	9	9	9	to 12	2' - <3'	0.43	0.73	0.65	0.15	-	-	-		72
					3' - <5'	0.38	0.62	0.61	0.15	-	-	-		72
					5' - 10'	0.41	0.50	0.53	0.14	-	-	-		59
					15'	0.57	0.69	0.70	0.12	-	-	-		49
					20'	0.73	0.92	0.91	0.11	-	-	-		49
	9.5	10	9	8 to 12	25'	0.83	1.11	1.09	0.11	-	-	-		44
	10.5	11	9		30'	0.93	1.25	1.23	0.11	-	-	-		44

TABLE 6 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 10' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
10' x 5'	10	10	10	4	0.33' - <2'	0.46	0.62	0.52	0.24	0.24	0.41	0.45	See General Note 5	-
				to 12	2' - <3'	0.46	0.62	0.52	0.12	-	-	-		58
					3' - <5'	0.42	0.54	0.50	0.12	-	-	-		53
					5' - 10'	0.38	0.46	0.49	0.12	-	-	-		52
					15'	0.52	0.59	0.58	0.12	-	-	-		47
					20'	0.69	0.78	0.76	0.12	-	-	-		47
	10.5	10.5	10	8 to 12	25'	0.81	0.97	0.93	0.12	-	-	-		47
	11.5	12	10		30'	0.87	1.11	1.11	0.12	-	-	-		47
10' x 6'	10	10	10	4	0.33' - <2'	0.44	0.64	0.54	0.24	0.24	0.39	0.44		-
				to 12	2' - <3'	0.44	0.64	0.54	0.12	-	-	-		58
					3' - <5'	0.39	0.57	0.52	0.12	-	-	-		52
					5' - 10'	0.37	0.48	0.52	0.12	-	-	-		52
					15'	0.51	0.62	0.61	0.12	-	-	-		47
					20'	0.67	0.83	0.80	0.12	-	-	-		47
	10.5	10.5	10	8 to 12	25'	0.79	1.02	0.99	0.12	-	-	-		47
	11.5	12	10		30'	0.85	1.17	1.14	0.12	-	-	-		47
10' x 7'	10	10	10	4	0.33' - <2'	0.43	0.66	0.57	0.24	0.24	0.38	0.43		-
				to 12	2' - <3'	0.43	0.66	0.57	0.12	-	-	-		58
					3' - <5'	0.38	0.59	0.55	0.12	-	-	-		58
					5' - 10'	0.37	0.50	0.54	0.12	-	-	-		52
					15'	0.52	0.66	0.65	0.12	-	-	-		47
					20'	0.67	0.87	0.85	0.12	-	-	-		47
	10.5	10.5	10	8 to 12	25'	0.79	1.07	1.04	0.12	-	-	-		47
	11.5	12	10		30'	0.84	1.22	1.19	0.12	-	-	-		47
10' x 8'	10	10	10	4	0.33' - <2'	0.43	0.68	0.60	0.24	0.24	0.38	0.43		-
				to 12	2' - <3'	0.43	0.68	0.60	0.12	-	-	-		64
					3' - <5'	0.38	0.62	0.57	0.12	-	-	-		58
					5' - 10'	0.38	0.52	0.57	0.12	-	-	-		52
					15'	0.53	0.69	0.68	0.12	-	-	-		47
					20'	0.68	0.91	0.89	0.12	-	-	-		47
	10.5	10.5	10	8 to 12	25'	0.81	1.12	1.09	0.12	-	-	-		47
	11.5	12	10		30'	0.86	1.27	1.25	0.12	-	-	-		47
10' x 9'	10	10	10	4	0.33' - <2'	0.43	0.70	0.62	0.24	0.24	0.38	0.43		-
				to 12	2' - <3'	0.43	0.70	0.62	0.12	-	-	-		70
					3' - <5'	0.39	0.64	0.60	0.12	-	-	-		64
					5' - 10'	0.40	0.54	0.59	0.12	-	-	-		58
					15'	0.56	0.72	0.72	0.12	-	-	-		52
					20'	0.71	0.95	0.94	0.12	-	-	-		47
	10.5	11	10	8 to 12	25'	0.82	1.15	1.13	0.12	-	-	-		47
	11.5	12	10		30'	0.90	1.32	1.30	0.12	-	-	-		47
10' x 10'	10	10	10	4	0.33' - <2'	0.44	0.71	0.64	0.24	0.24	0.38	0.44		-
				to 12	2' - <3'	0.44	0.71	0.64	0.17	-	-	-		79
					3' - <5'	0.40	0.65	0.62	0.16	-	-	-		70
					5' - 10'	0.44	0.56	0.61	0.15	-	-	-		64
					15'	0.60	0.75	0.76	0.12	-	-	-		52
					20'	0.76	0.99	0.99	0.12	-	-	-		52
	10.5	11	10	8 to 12	25'	0.86	1.20	1.18	0.12	-	-	-		47
	11.5	12	10		30'	0.97	1.36	1.35	0.13	-	-	-		47

NOTES:
1. See Sheet 1 for Reinforcing Details and dimension locations.
2. See Sheet 2 for General Notes.
3. See Sheet 14 for WWR Bending Diagram.

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TABLE 7 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 11' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
11' x 4'	11	11	11	4 to 12	0.33' - <2'	0.51	0.57	0.47	0.27	0.27	0.45	0.48	See General Note 5	-
					2' - <3'	0.51	0.57	0.47	0.14	-	-	-		62
					3' - <5'	0.48	0.57	0.46	0.14	-	-	-		62
					5' - 10'	0.47	0.50	0.50	0.14	-	-	-		55
					15'	0.59	0.58	0.56	0.14	-	-	-		55
					20'	0.77	0.77	0.74	0.14	-	-	-		55
	11.5	11.5	11	8 to 12	25'	0.92	0.95	0.91	0.14	-	-	-		55
	13	13	11		30'	0.94	1.09	1.06	0.14	-	-	-		55
11' x 6'	11	11	11	4 to 12	0.33' - <2'	0.45	0.62	0.52	0.27	0.27	0.41	0.45		-
					2' - <3'	0.45	0.62	0.52	0.14	-	-	-		62
					3' - <5'	0.42	0.58	0.51	0.14	-	-	-		55
					5' - 10'	0.43	0.56	0.56	0.14	-	-	-		55
					15'	0.54	0.65	0.64	0.14	-	-	-		50
					20'	0.70	0.86	0.83	0.14	-	-	-		50
	11.5	11.5	11	8 to 12	25'	0.83	1.07	1.03	0.14	-	-	-		50
	13	13	11		30'	0.85	1.22	1.19	0.14	-	-	-		50
11' x 8'	11	11	11	4 to 12	0.33' - <2'	0.42	0.67	0.57	0.27	0.27	0.39	0.43		-
					2' - <3'	0.43	0.67	0.57	0.14	-	-	-		62
					3' - <5'	0.39	0.63	0.56	0.14	-	-	-		62
					5' - 10'	0.43	0.60	0.61	0.14	-	-	-		55
					15'	0.54	0.72	0.71	0.14	-	-	-		50
					20'	0.70	0.94	0.92	0.14	-	-	-		50
	11.5	11.5	11	8 to 12	25'	0.82	1.16	1.13	0.14	-	-	-		50
	13	13	11		30'	0.86	1.32	1.30	0.14	-	-	-		50
11' x 10'	11	11	11	4 to 12	0.33' - <2'	0.44	0.71	0.62	0.27	0.27	0.38	0.44		-
					2' - <3'	0.44	0.71	0.62	0.14	-	-	-		75
					3' - <5'	0.41	0.67	0.61	0.14	-	-	-		69
					5' - 10'	0.47	0.64	0.66	0.14	-	-	-		62
					15'	0.59	0.78	0.78	0.14	-	-	-		55
					20'	0.75	1.03	1.01	0.14	-	-	-		50
	11.5	12	11	8 to 12	25'	0.85	1.24	1.22	0.14	-	-	-		50
	13	13.5	11		30'	0.91	1.40	1.39	0.14	-	-	-		50
11' x 11'	11	11	11	4 to 12	0.33' - <2'	0.45	0.72	0.64	0.27	0.27	0.39	0.45		-
					2' - <3'	0.45	0.72	0.64	0.18	-	-	-		86
					3' - <5'	0.42	0.69	0.63	0.18	-	-	-		75
					5' - 10'	0.51	0.66	0.69	0.16	-	-	-		69
					15'	0.63	0.81	0.82	0.14	-	-	-		55
					20'	0.80	1.07	1.06	0.14	-	-	-		55
	11.5	12	11	8 to 12	25'	0.91	1.29	1.27	0.14	-	-	-		50
	13	13.5	11		30'	0.99	1.44	1.44	0.14	-	-	-		50

TABLE 8 - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 12' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
12' x 4'	12	12	12	4 to 12	0.33' - <2'	0.52	0.57	0.45	0.29	0.29	0.47	0.49	See General Note 5	-
					2' - <3'	0.52	0.57	0.45	0.15	-	-	-		73
					3' - <5'	0.50	0.54	0.45	0.15	-	-	-		66
					5' - 10'	0.50	0.52	0.52	0.15	-	-	-		66
					15'	0.63	0.61	0.59	0.15	-	-	-		59
					20'	0.82	0.81	0.77	0.15	-	-	-		59
	12.5	12.5	12	8 to 12	25'	0.99	0.99	0.95	0.15	-	-	-		59
	14	14	12		30'	1.03	1.15	1.11	0.15	-	-	-		59
12' x 6'	12	12	12	4 to 12	0.33' - <2'	0.47	0.62	0.51	0.29	0.29	0.42	0.46		-
					2' - <3'	0.47	0.62	0.51	0.15	-	-	-		66
					3' - <5'	0.45	0.60	0.51	0.15	-	-	-		59
					5' - 10'	0.47	0.59	0.59	0.15	-	-	-		59
					15'	0.57	0.68	0.66	0.15	-	-	-		53
					20'	0.74	0.90	0.86	0.15	-	-	-		53
	12.5	12.5	12	8 to 12	25'	0.88	1.11	1.06	0.15	-	-	-		53
	14	14.5	12		30'	0.92	1.27	1.24	0.15	-	-	-		53
12' x 8'	12	12	12	4 to 12	0.33' - <2'	0.44	0.67	0.56	0.29	0.29	0.40	0.44		-
					2' - <3'	0.44	0.67	0.56	0.15	-	-	-		66
					3' - <5'	0.41	0.64	0.56	0.15	-	-	-		59
					5' - 10'	0.45	0.63	0.64	0.15	-	-	-		59
					15'	0.56	0.75	0.73	0.15	-	-	-		53
					20'	0.72	0.98	0.95	0.15	-	-	-		53
	12.5	13	12	8 to 12	25'	0.85	1.20	1.16	0.15	-	-	-		53
	14	14.5	12		30'	0.89	1.38	1.35	0.15	-	-	-		53
12' x 10'	12	12	12	4 to 12	0.33' - <2'	0.44	0.71	0.60	0.29	0.29	0.39	0.44		-
					2' - <3'	0.44	0.71	0.60	0.15	-	-	-		73
					3' - <5'	0.42	0.68	0.60	0.15	-	-	-		66
					5' - 10'	0.47	0.67	0.69	0.15	-	-	-		59
					15'	0.59	0.81	0.81	0.15	-	-	-		53
					20'	0.75	1.06	1.04	0.15	-	-	-		53
	12.5	13	12	8 to 12	25'	0.87	1.30	1.26	0.15	-	-	-		53
	14	14.5	12		30'	0.92	1.47	1.45	0.15	-	-	-		53
12' x 12'	12	12	12	4 to 12	0.33' - <2'	0.46	0.74	0.64	0.29	0.29	0.40	0.46		-
					2' - <3'	0.46	0.74	0.64	0.20	-	-	-		93
					3' - <5'	0.42	0.72	0.64	0.20	-	-	-		80
					5' - 10'	0.54	0.71	0.74	0.18	-	-	-		73
					15'	0.66	0.87	0.89	0.15	-	-	-		59
					20'	0.83	1.14	1.13	0.15	-	-	-		59
	12.5	13	12	8 to 12	25'	0.96	1.39	1.37	0.15	-	-	-		53
	14	14.5	12.5		30'	1.05	1.56	1.56	0.15	-	-	-		53

NOTES:

1. See Sheet 1 for Reinforcing Details and dimension locations.
2. See Sheet 2 for General Notes.
3. See Sheet 14 for Welded Wire Reinforcement Bending Diagram.

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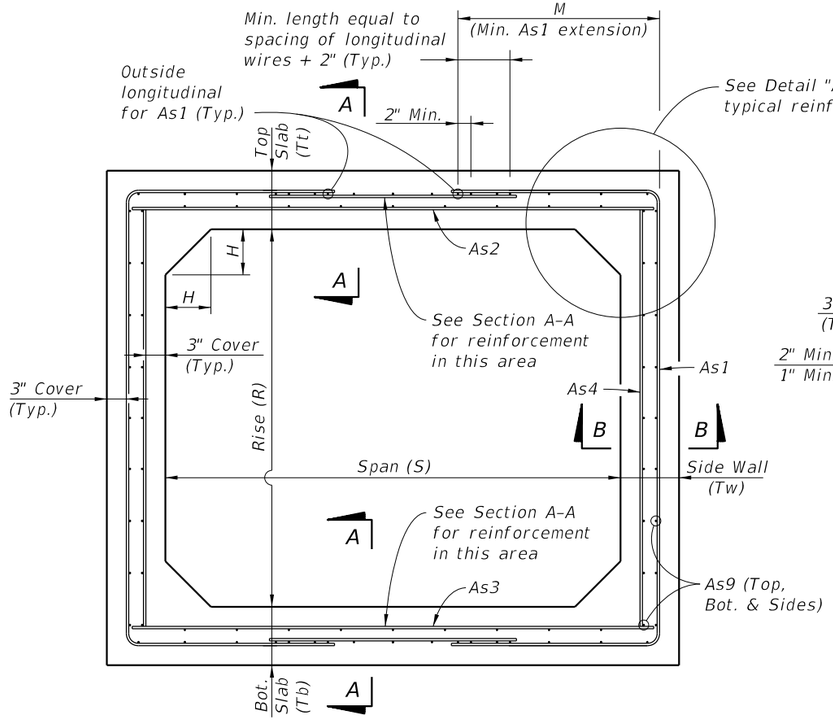
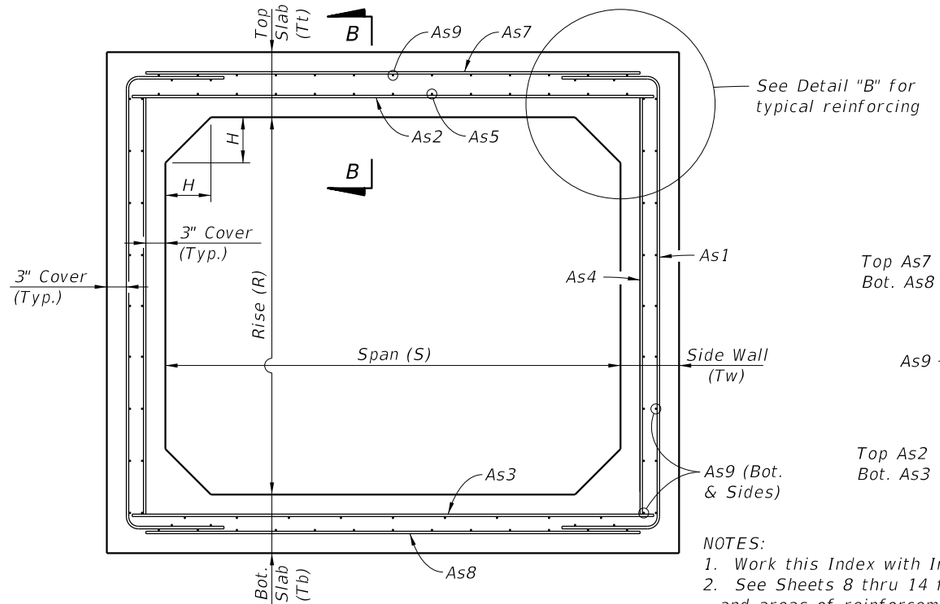


TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 2' OR GREATER
(Option 1 Reinforcing Configuration Shown)



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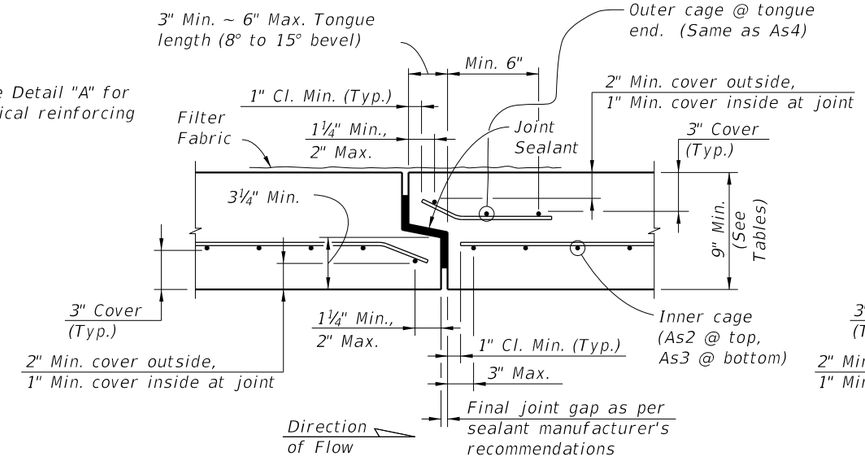
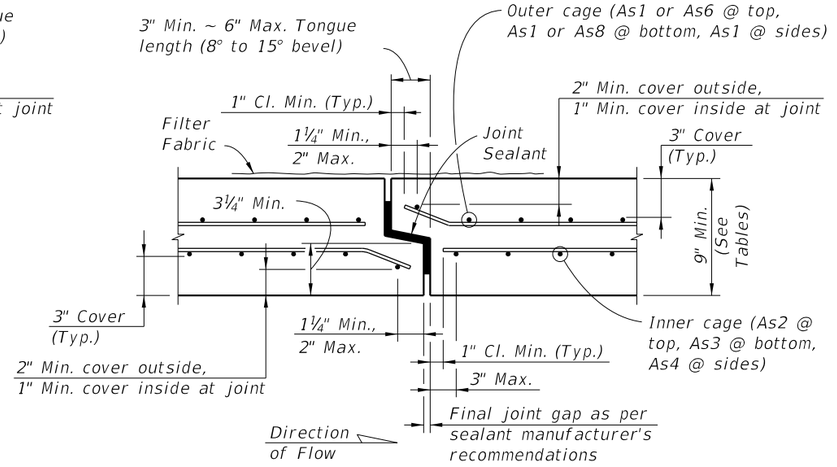
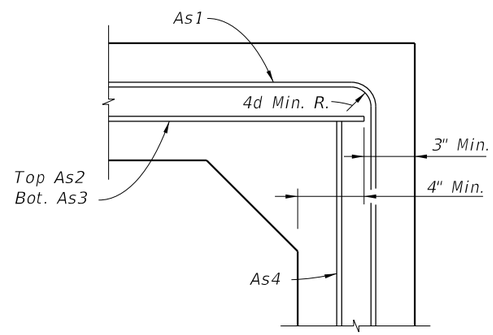
(Option 1 Reinforcing Configuration Shown)



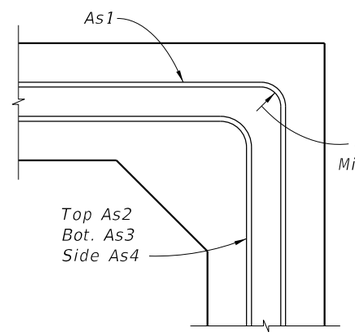
SECTION A-A



SECTION B-B
TYPICAL SECTION THRU JOINT



DETAIL "A"
(OPTION 1)



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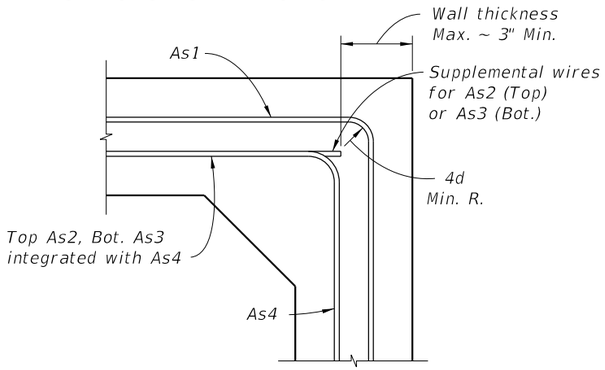

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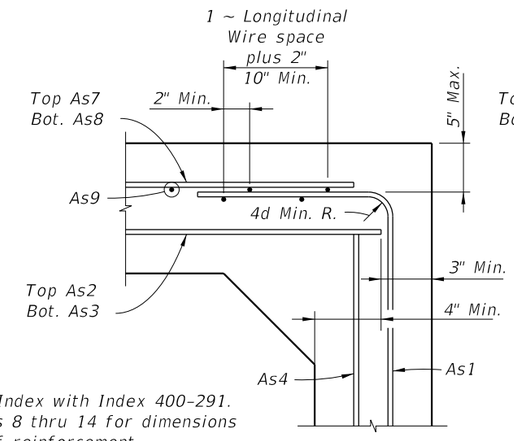

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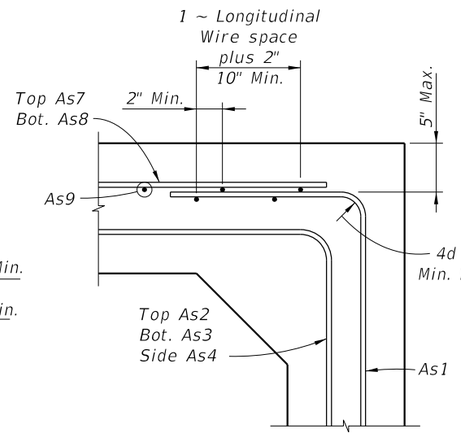

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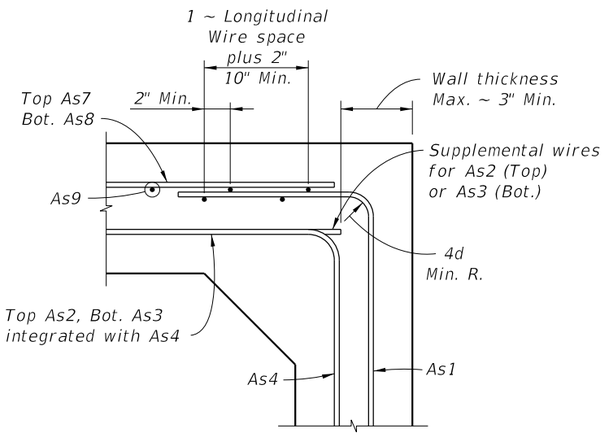

DETAIL "B"
(OPTION 3)

NOTES:
1. Work this Index with Index 400-291.
2. See Sheets 8 thru 14 for dimensions and areas of reinforcement.

STANDARD PRECAST BOX CULVERT WITH 3" CONCRETE COVER

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LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2021-22 STANDARD PLANS	STANDARD PRECAST CONCRETE BOX CULVERTS	INDEX	SHEET
07/01/13						400-292	7 of 14

TABLE 9A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
3' x 3'	9	9	9	4 to 8	0.33' - <2'	0.22	0.24	0.22	0.22	0.22	0.22	0.22	See General Note 5	–
					2' - <3'	0.11	0.23	0.22	0.11	–	–	–		31
					3' - <5'	0.11	0.22	0.22	0.11	–	–	–		31
					5' - 10'	0.11	0.22	0.22	0.11	–	–	–		31
					15'	0.11	0.22	0.22	0.11	–	–	–		31
					20'	0.13	0.22	0.22	0.11	–	–	–		31
					25'	0.16	0.22	0.22	0.11	–	–	–		31
					30'	0.19	0.24	0.25	0.11	–	–	–		31
					35'	0.22	0.28	0.29	0.11	–	–	–		31
4' x 3'	9	9	9	4 to 8	0.33' - <2'	0.22	0.32	0.24	0.22	0.22	0.22	0.22		–
					2' - <3'	0.17	0.31	0.24	0.11	–	–	–		38
					3' - <5'	0.13	0.22	0.22	0.11	–	–	–		38
					5' - 10'	0.13	0.22	0.22	0.11	–	–	–		38
					15'	0.17	0.22	0.22	0.11	–	–	–		38
					20'	0.23	0.26	0.27	0.11	–	–	–		38
					25'	0.28	0.32	0.34	0.11	–	–	–		38
					30'	0.33	0.39	0.40	0.11	–	–	–		38
4' x 4'	9	9	9	4 to 8	0.33' - <2'	0.22	0.34	0.26	022	0.22	0.22	0.22		–
					2' - <3'	0.17	0.33	0.26	0.11	–	–	–		38
					3' - <5'	0.13	0.22	0.22	0.11	–	–	–		38
					5' - 10'	0.14	0.22	0.22	0.11	–	–	–		38
					15'	0.19	0.22	0.23	0.11	–	–	–		38
					20'	0.24	0.28	0.30	0.11	–	–	–		38
					25'	0.29	0.36	0.37	0.11	–	–	–		38
					30'	0.34	0.43	0.45	0.11	–	–	–		38

TABLE 9B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
3' x 3'	10	10	10	4 to 8	0.33' - <2'	0.24	0.24	0.24	0.24	0.24	0.24	0.24	See General Note 5	–
					2' - <3'	0.12	0.24	0.24	0.24	–	–	–		31
					3' - <5'	0.12	0.24	0.24	0.24	–	–	–		31
					5' - 10'	0.12	0.24	0.24	0.24	–	–	–		31
					15'	0.12	0.24	0.24	0.24	–	–	–		31
					20'	0.12	0.24	0.24	0.24	–	–	–		31
					25'	0.13	0.24	0.24	0.24	–	–	–		31
					30'	0.15	0.24	0.24	0.12	–	–	–		31
					35'	0.18	0.24	0.24	0.12	–	–	–		31
4' x 3'	10	10	10	4 to 8	0.33' - <2'	0.24	0.26	0.24	0.24	0.24	0.24	0.24		–
					2' - <3'	0.14	0.26	0.24	0.12	–	–	–		38
					3' - <5'	0.12	0.24	0.24	0.12	–	–	–		38
					5' - 10'	0.12	0.24	0.24	0.12	–	–	–		38
					15'	0.14	0.24	0.24	0.12	–	–	–		38
					20'	0.18	0.24	0.24	0.12	–	–	–		38
					25'	0.22	0.26	0.27	0.12	–	–	–		38
					30'	0.26	0.31	0.32	0.12	–	–	–		38
4' x 4'	10	10	10	4 to 8	0.33' - <2'	0.24	0.28	0.24	0.24	0.24	0.24	0.24		–
					2' - <3'	0.14	0.28	0.24	0.12	–	–	–		38
					3' - <5'	0.12	0.24	0.24	0.12	–	–	–		38
					5' - 10'	0.12	0.24	0.24	0.12	–	–	–		38
					15'	0.15	0.24	0.24	0.12	–	–	–		38
					20'	0.19	0.24	0.24	0.12	–	–	–		38
					25'	0.23	0.28	0.30	0.12	–	–	–		38
					30'	0.27	0.34	0.35	0.12	–	–	–		38

NOTES:
1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

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TABLE 10A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 5' & 6' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
5' x 3'	9	9	9	4 to 8	0.33' - <2'	0.27	0.39	0.37	0.22	0.22	0.22	0.27	See General Note 5	-
					2' - <3'	0.26	0.39	0.37	0.11	-	-	-		45
					3' - <5'	0.19	0.24	0.25	0.11	-	-	-		36
					5' - 10'	0.20	0.22	0.22	0.11	-	-	-		36
					15'	0.28	0.28	0.30	0.11	-	-	-		35
					20'	0.37	0.38	0.39	0.11	-	-	-		35
					25'	0.45	0.48	0.49	0.11	-	-	-		35
					30'	0.54	0.58	0.59	0.11	-	-	-		35
5' x 4'	9	9	9	4 to 8	0.33' - <2'	0.26	0.42	0.39	0.22	0.22	0.22	0.26		-
					2' - <3'	0.26	0.42	0.39	0.11	-	-	-		45
					3' - <5'	0.19	0.26	0.27	0.11	-	-	-		45
					5' - 10'	0.20	0.22	0.23	0.11	-	-	-		36
					15'	0.27	0.31	0.33	0.11	-	-	-		35
					20'	0.36	0.42	0.43	0.11	-	-	-		35
					25'	0.44	0.52	0.54	0.11	-	-	-		35
					30'	0.53	0.63	0.65	0.11	-	-	-		35
5' x 5'	9	9	9	4 to 8	0.33' - <2'	0.27	0.44	0.42	0.22	0.22	0.22	0.27		-
					2' - <3'	0.27	0.44	0.42	0.11	-	-	-		45
					3' - <5'	0.20	0.27	0.28	0.11	-	-	-		45
					5' - 10'	0.22	0.23	0.26	0.11	-	-	-		45
					15'	0.30	0.34	0.36	0.11	-	-	-		36
					20'	0.38	0.45	0.47	0.11	-	-	-		35
					25'	0.47	0.56	0.59	0.11	-	-	-		35
					30'	0.55	0.68	0.71	0.11	-	-	-		35
6' x 3'	9	9	9	4 to 12	0.33' - <2'	0.34	0.47	0.42	0.22	0.22	0.25	0.34		-
					2' - <3'	0.34	0.47	0.42	0.11	-	-	-		43
					3' - <5'	0.27	0.31	0.32	0.11	-	-	-		39
					5' - 10'	0.29	0.26	0.28	0.11	-	-	-		39
					15'	0.42	0.39	0.40	0.11	-	-	-		38
					20'	0.55	0.52	0.53	0.11	-	-	-		38
					25'	0.68	0.66	0.67	0.11	-	-	-		38
					30'	0.82	0.81	0.82	0.11	-	-	-		38
6' x 4'	9	9	9	4 to 12	0.33' - <2'	0.33	0.50	0.46	0.22	0.22	0.23	0.33		-
					2' - <3'	0.33	0.50	0.46	0.11	-	-	-		43
					3' - <5'	0.27	0.33	0.35	0.11	-	-	-		39
					5' - 10'	0.28	0.29	0.31	0.11	-	-	-		39
					15'	0.40	0.43	0.45	0.11	-	-	-		38
					20'	0.52	0.57	0.59	0.11	-	-	-		38
					25'	0.65	0.73	0.74	0.11	-	-	-		38
					30'	0.78	0.88	0.90	0.11	-	-	-		38
6' x 5'	9	9	9	4 to 12	0.33' - <2'	0.33	0.52	0.49	0.22	0.22	0.23	0.33		-
					2' - <3'	0.33	0.52	0.49	0.11	-	-	-		43
					3' - <5'	0.27	0.35	0.37	0.11	-	-	-		43
					5' - 10'	0.29	0.31	0.34	0.11	-	-	-		39
					15'	0.41	0.46	0.49	0.11	-	-	-		38
					20'	0.53	0.62	0.64	0.11	-	-	-		38
					25'	0.66	0.78	0.80	0.11	-	-	-		38
					30'	0.78	0.95	0.97	0.11	-	-	-		38
6' x 6'	9	9	9	4 to 12	0.33' - <2'	0.34	0.55	0.51	0.22	0.22	0.24	0.34		-
					2' - <3'	0.34	0.54	0.51	0.11	-	-	-		52
					3' - <5'	0.29	0.37	0.39	0.11	-	-	-		52
					5' - 10'	0.32	0.34	0.37	0.11	-	-	-		43
					15'	0.44	0.50	0.53	0.11	-	-	-		39
					20'	0.57	0.66	0.70	0.11	-	-	-		39
					25'	0.70	0.84	0.87	0.11	-	-	-		38
					30'	0.83	1.02	1.05	0.11	-	-	-		38

TABLE 10B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 5' & 6' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
5' x 3'	10	10	10	4 to 12	0.33' - <2'	0.24	0.33	0.32	0.24	0.24	0.24	0.24	See General Note 5	-
					2' - <3'	0.22	0.33	0.32	0.12	-	-	-		45
					3' - <5'	0.16	0.24	0.24	0.12	-	-	-		36
					5' - 10'	0.16	0.24	0.24	0.12	-	-	-		36
					15'	0.23	0.24	0.24	0.12	-	-	-		35
					20'	0.29	0.30	0.31	0.12	-	-	-		35
					25'	0.36	0.38	0.39	0.12	-	-	-		35
					30'	0.43	0.46	0.47	0.12	-	-	-		35
5' x 4'	10	10	10	4 to 12	0.33' - <2'	0.24	0.35	0.34	0.24	0.24	0.24	0.24		-
					2' - <3'	0.22	0.35	0.34	0.12	-	-	-		45
					3' - <5'	0.15	0.24	0.24	0.12	-	-	-		45
					5' - 10'	0.16	0.24	0.24	0.12	-	-	-		36
					15'	0.22	0.25	0.27	0.12	-	-	-		35
					20'	0.29	0.33	0.34	0.12	-	-	-		35
					25'	0.36	0.41	0.43	0.12	-	-	-		35
					30'	0.42	0.50	0.51	0.12	-	-	-		35
5' x 5'	10	10	10	4 to 12	0.33' - <2'	0.24	0.37	0.36	0.24	0.24	0.24	0.24		-
					2' - <3'	0.21	0.37	0.36	0.12	-	-	-		45
					3' - <5'	0.16	0.24	0.25	0.12	-	-	-		45
					5' - 10'	0.17	0.24	0.24	0.12	-	-	-		45
					15'	0.24	0.27	0.29	0.12	-	-	-		36
					20'	0.30	0.36	0.38	0.12	-	-	-		35
					25'	0.37	0.44	0.47	0.12	-	-	-		35
					30'	0.44	0.53	0.56	0.12	-	-	-		35
6' x 3'	10	10	10	4 to 12	0.33' - <2'	0.28	0.40	0.36	0.24	0.24	0.24	0.28		-
					2' - <3'	0.28	0.40	0.36	0.12	-	-	-		43
					3' - <5'	0.22	0.26	0.28	0.12	-	-	-		39
					5' - 10'	0.24	0.24	0.24	0.12	-	-	-		39
					15'	0.34	0.31	0.32	0.12	-	-	-		38
					20'	0.44	0.41	0.42	0.12	-	-	-		38
					25'	0.54	0.52	0.53	0.12	-	-	-		38
					30'	0.64	0.63	0.64	0.12	-	-	-		38
6' x 4'	10	10	10	4 to 12	0.33' - <2'	0.27	0.42	0.39	0.24	0.24	0.24	0.27		-
					2' - <3'	0.27	0.42	0.39	0.12	-	-	-		43
					3' - <5'	0.21	0.28	0.30	0.12	-	-	-		39
					5' - 10'	0.23	0.24	0.25	0.12	-	-	-		39
					15'	0.32	0.34	0.35	0.12	-	-	-		38
					20'	0.42	0.45	0.47	0.12	-	-	-		38
					25'	0.51	0.56	0.58	0.12	-	-	-		38
					30'	0.61	0.68	0.70	0.12	-	-	-		38
6' x 5'	10	10	10	4 to 12	0.33' - <2'	0.26	0.44	0.42	0.24	0.24	0.24	0.26		-
					2' - <3'	0.26	0.44	0.42	0.12	-	-	-		43
					3' - <5'	0.22	0.30	0.33	0.12	-	-	-		43
					5' - 10'	0.24	0.25	0.27	0.12	-	-	-		39
					15'	0.33	0.36	0.39	0.12	-	-	-		38
					20'	0.42	0.48	0.51	0.12	-	-	-		38
					25'	0.52	0.61	0.63	0.12	-	-	-		38
					30'	0.61	0.74	0.76	0.12	-	-	-		38
6' x 6'	10	10	10	4 to 12	0.33' - <2'	0.27	0.46	0.44	0.24	0.24	0.24	0.27		-
					2' - <3'	0.27	0.46	0.44	0.12	-	-	-		52
					3' - <5'	0.23	0.31	0.34	0.12	-	-	-		52
					5' - 10'	0.25	0.27	0.30	0.12	-	-	-		43
					15'	0.35	0.39	0.42	0.12	-	-	-		39
					20'	0.45	0.52	0.55	0.12	-	-	-		39
					25'	0.54	0.65	0.68	0.12	-	-	-		38
					30'	0.64	0.78	0.81	0.12	-	-	-		38

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LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
07/01/13			FDOT FY 2021-22 STANDARD PLANS	STANDARD PRECAST CONCRETE BOX CULVERTS	400-292	9 of 14

TABLE 11A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 7' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
7' x 4'	9	9	9	4 to 12	0.33' - <2'	0.42	0.58	0.52	0.22	0.22	0.31	0.42	See General Note 5	-
					2' - <3'	0.42	0.58	0.51	0.11	-	-	-		43
					3' - <5'	0.36	0.41	0.44	0.11	-	-	-		43
					5' - 10'	0.39	0.40	0.39	0.11	-	-	-		43
					15'	0.56	0.56	0.58	0.11	-	-	-		41
					20'	0.74	0.76	0.77	0.11	-	-	-		41
					25'	0.92	0.97	0.97	0.11	-	-	-		41
	9	9.5	9	7 to 12	30'	1.09	1.18	1.10	0.11	-	-	-		41
7' x 5'	9	9	9	4 to 12	0.33' - <2'	0.41	0.61	0.55	0.22	0.23	0.30	0.41		-
					2' - <3'	0.41	0.61	0.55	0.11	-	-	-		47
					3' - <5'	0.37	0.43	0.47	0.11	-	-	-		43
					5' - 10'	0.39	0.41	0.43	0.11	-	-	-		43
					15'	0.56	0.61	0.63	0.11	-	-	-		41
					20'	0.73	0.82	0.83	0.11	-	-	-		41
					25'	0.90	1.04	1.06	0.11	-	-	-		41
	9	9.5	9	7 to 12	30'	1.06	1.26	1.19	0.11	-	-	-		41
7' x 6'	9	9	9	4 to 12	0.33' - <2'	0.42	0.63	0.58	0.22	0.24	0.30	0.42		-
					2' - <3'	0.42	0.63	0.58	0.11	-	-	-		59
					3' - <5'	0.38	0.45	0.50	0.11	-	-	-		47
					5' - 10'	0.41	0.44	0.47	0.11	-	-	-		43
					15'	0.57	0.65	0.68	0.11	-	-	-		41
					20'	0.75	0.87	0.90	0.11	-	-	-		41
					25'	0.93	1.11	1.13	0.11	-	-	-		41
	9	9.5	9	7 to 12	30'	1.07	1.35	1.27	0.11	-	-	-		41
7' x 7'	9	9	9	4 to 12	0.33' - <2'	0.44	0.66	0.61	0.22	0.25	0.31	0.44		-
					2' - <3'	0.44	0.65	0.61	0.11	-	-	-		59
					3' - <5'	0.41	0.47	0.52	0.11	-	-	-		59
					5' - 10'	0.44	0.47	0.52	0.11	-	-	-		47
					15'	0.62	0.69	0.74	0.11	-	-	-		43
					20'	0.80	0.93	0.97	0.11	-	-	-		43
					25'	0.99	1.18	1.22	0.11	-	-	-		43
	9	9.5	9	7 to 12	30'	1.12	1.43	1.36	0.11	-	-	-		41

TABLE 11B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 7' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
7' x 4'	10	10	10	4 to 12	0.33' - <2'	0.33	0.49	0.44	0.24	0.24	0.24	0.33	See General Note 5	-
					2' - <3'	0.33	0.49	0.44	0.12	-	-	-		43
					3' - <5'	0.29	0.35	0.38	0.12	-	-	-		43
					5' - 10'	0.31	0.30	0.31	0.12	-	-	-		43
					15'	0.44	0.44	0.45	0.12	-	-	-		41
					20'	0.58	0.59	0.60	0.12	-	-	-		41
					25'	0.71	0.74	0.75	0.12	-	-	-		41
					30'	0.85	0.91	0.91	0.12	-	-	-		41
7' x 5'	10	10	10	4 to 12	0.33' - <2'	0.32	0.51	0.47	0.24	0.24	0.24	0.32		-
					2' - <3'	0.32	0.51	0.47	0.12	-	-	-		47
					3' - <5'	0.29	0.37	0.41	0.12	-	-	-		43
					5' - 10'	0.31	0.32	0.35	0.12	-	-	-		43
					15'	0.44	0.47	0.50	0.12	-	-	-		41
					20'	0.57	0.63	0.65	0.12	-	-	-		41
					25'	0.70	0.80	0.82	0.12	-	-	-		41
					30'	0.84	0.97	0.99	0.12	-	-	-		41
7' x 6'	10	10	10	4 to 12	0.33' - <2'	0.33	0.53	0.50	0.24	0.24	0.24	0.33		-
					2' - <3'	0.33	0.53	0.50	0.12	-	-	-		59
					3' - <5'	0.30	0.38	0.43	0.12	-	-	-		47
					5' - 10'	0.33	0.35	0.38	0.12	-	-	-		43
					15'	0.45	0.51	0.54	0.12	-	-	-		41
					20'	0.58	0.68	0.70	0.12	-	-	-		41
					25'	0.72	0.85	0.88	0.12	-	-	-		41
					30'	0.85	1.04	1.06	0.12	-	-	-		41
7' x 7'	10	10	10	4 to 12	0.33' - <2'	0.35	0.55	0.52	0.24	0.24	0.24	0.35		-
					2' - <3'	0.35	0.55	0.52	0.12	-	-	-		59
					3' - <5'	0.32	0.40	0.46	0.12	-	-	-		59
					5' - 10'	0.35	0.37	0.41	0.12	-	-	-		47
					15'	0.48	0.54	0.58	0.12	-	-	-		43
					20'	0.62	0.72	0.76	0.12	-	-	-		43
					25'	0.76	0.90	0.94	0.12	-	-	-		43
					30'	0.90	1.10	1.13	0.12	-	-	-		41

NOTES:
1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

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TABLE 12A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 8' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
8' x 4'	9	9	9	4	0.33' - <2'	0.52	0.66	0.57	0.22	0.24	0.42	0.52	See General Note 5	-
				to	2' - <3'	0.52	0.66	0.57	0.11	-	-	-		50
					3' - <5'	0.48	0.49	0.52	0.11	-	-	-		50
					5' - 10'	0.52	0.48	0.49	0.11	-	-	-		45
				12	15'	0.75	0.72	0.72	0.11	-	-	-		41
					20'	1.00	0.98	0.97	0.11	-	-	-		41
	9	9.5	9	8 to	25'	1.25	1.24	1.14	0.11	-	-	-		41
	10	10.5	9	12	30'	1.31	1.29	1.21	0.11	-	-	-		41
8' x 5'	9	9	9	4	0.33' - <2'	0.51	0.69	0.60	0.22	0.25	0.40	0.51		-
				to	2' - <3'	0.51	0.69	0.60	0.11	-	-	-		50
					3' - <5'	0.46	0.52	0.56	0.11	-	-	-		45
					5' - 10'	0.51	0.51	0.53	0.11	-	-	-		45
				12	15'	0.74	0.77	0.78	0.11	-	-	-		41
					20'	0.97	1.05	1.05	0.11	-	-	-		41
	9	9.5	9	8 to	25'	1.20	1.33	1.23	0.11	-	-	-		41
	10	10.5	9	12	30'	1.26	1.38	1.30	0.11	-	-	-		41
8' x 6'	9	9	9	4	0.33' - <2'	0.51	0.72	0.64	0.22	0.26	0.39	0.51		-
				to	2' - <3'	0.51	0.72	0.64	0.11	-	-	-		50
					3' - <5'	0.47	0.55	0.59	0.11	-	-	-		50
					5' - 10'	0.52	0.55	0.58	0.11	-	-	-		45
				12	15'	0.74	0.83	0.85	0.11	-	-	-		41
					20'	0.97	1.12	1.13	0.11	-	-	-		41
	9	9.5	9	8 to	25'	1.18	1.42	1.32	0.11	-	-	-		41
	10	10.5	9	12	30'	1.26	1.46	1.39	0.11	-	-	-		41
8' x 7'	9	9	9	4	0.33' - <2'	0.52	0.74	0.67	0.22	0.26	0.40	0.52		-
				to	2' - <3'	0.52	0.74	0.67	0.11	-	-	-		55
					3' - <5'	0.49	0.57	0.62	0.11	-	-	-		55
					5' - 10'	0.55	0.59	0.63	0.11	-	-	-		50
				12	15'	0.77	0.88	0.91	0.11	-	-	-		41
					20'	1.01	1.19	1.21	0.11	-	-	-		41
	9	9.5	9	8 to	25'	1.21	1.51	1.41	0.11	-	-	-		41
	10	10.5	9	12	30'	1.31	1.53	1.47	0.11	-	-	-		41
8' x 8'	9	9	9	4	0.33' - <2'	0.55	0.77	0.70	0.22	0.27	0.41	0.55		-
				to	2' - <3'	0.55	0.77	0.70	0.13	-	-	-		65
					3' - <5'	0.53	0.59	0.64	0.12	-	-	-		65
					5' - 10'	0.60	0.63	0.68	0.11	-	-	-		55
				12	15'	0.83	0.93	0.98	0.11	-	-	-		45
					20'	1.08	1.26	1.29	0.11	-	-	-		45
	9	9.5	9	8 to	25'	1.28	1.59	1.50	0.11	-	-	-		41
	10	10.5	9	12	30'	1.41	1.61	1.55	0.11	-	-	-		41

TABLE 12B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 8' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
8' x 4'	10	10	10	4	0.33' - <2'	0.42	0.56	0.49	0.24	0.24	0.32	0.41	See General Note 5	-
				to	2' - <3'	0.42	0.56	0.49	0.12	-	-	-		50
					3' - <5'	0.38	0.42	0.46	0.12	-	-	-		50
					5' - 10'	0.41	0.38	0.39	0.12	-	-	-		45
				12	15'	0.59	0.56	0.57	0.12	-	-	-		41
					20'	0.78	0.75	0.76	0.12	-	-	-		41
					25'	0.97	0.96	0.96	0.12	-	-	-		41
	10	10.5	10	8 to 12	30'	1.15	1.16	1.10	0.12	-	-	-		41
8' x 5'	10	10	10	4	0.33' - <2'	0.40	0.58	0.52	0.24	.034	0.31	0.40		-
				to	2' - <3'	0.40	0.58	0.52	0.12	-	-	-		50
					3' - <5'	0.37	0.45	0.48	0.12	-	-	-		45
					5' - 10'	0.41	0.41	0.43	0.12	-	-	-		45
				12	15'	0.58	0.60	0.62	0.12	-	-	-		41
					20'	0.76	0.81	0.81	0.12	-	-	-		41
					25'	0.94	1.03	1.03	0.12	-	-	-		41
	10	10.5	10	8 to 12	30'	1.10	1.24	1.24	0.12	-	-	-		41
8' x 6'	10	10	10	4	0.33' - <2'	0.40	0.60	0.55	0.24	0.24	0.30	0.40		-
				to	2' - <3'	0.40	0.60	0.55	0.12	-	-	-		50
					3' - <5'	0.37	0.47	0.51	0.12	-	-	-		50
					5' - 10'	0.42	0.43	0.46	0.12	-	-	-		45
				12	15'	0.58	0.64	0.67	0.12	-	-	-		41
					20'	0.76	0.86	0.88	0.12	-	-	-		41
					25'	0.94	1.09	1.11	0.12	-	-	-		41
	10	10.5	10	8 to 12	30'	1.09	1.32	1.26	0.12	-	-	-		41
8' x 7'	10	10	10	4	0.33' - <2'	0.41	0.63	0.58	0.24	0.24	0.30	0.41		-
				to	2' - <3'	0.41	0.63	0.58	0.12	-	-	-		55
					3' - <5'	0.39	0.49	0.53	0.12	-	-	-		55
					5' - 10'	0.44	0.46	0.50	0.12	-	-	-		50
				12	15'	0.61	0.68	0.72	0.12	-	-	-		45
					20'	0.78	0.91	0.94	0.12	-	-	-		41
					25'	0.97	1.16	1.18	0.12	-	-	-		41
	10	10.5	10	8 to 12	30'	1.11	1.40	1.34	0.12	-	-	-		41
8' x 8'	10	10	10	4	0.33' - <2'	0.44	0.64	0.60	0.24	0.24	0.31	0.44		-
				to	2' - <3'	0.44	0.64	0.60	0.12	-	-	-		65
					3' - <5'	0.42	0.51	0.56	0.12	-	-	-		65
					5' - 10'	0.47	0.50	0.55	0.12	-	-	-		55
				12	15'	0.65	0.72	0.77	0.12	-	-	-		45
					20'	0.84	0.96	1.01	0.12	-	-	-		45
					25'	1.03	1.22	1.26	0.12	-	-	-		41
	10	10.5	10	8 to 12	30'	1.16	1.47	1.42	0.12	-	-	-		41

NOTES:
1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

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TABLE 13A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 9' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
9' x 5'	9	9	9	4 to 12	0.33' - <2'	0.62	0.78	0.65	0.22	0.26	0.52	0.61	See General Note 5	–
					2' - <3'	0.62	0.78	0.65	0.11	–	–	–		54
					3' - <5'	0.58	0.63	0.61	0.11	–	–	–		49
					5' - 10'	0.65	0.63	0.64	0.11	–	–	–		49
					15'	0.95	0.96	0.95	0.11	–	–	–		44
	9	9	9	8	20'	1.26	1.32	1.28	0.11	–	–	–		44
	10	10.5	9	to	25'	1.39	1.41	1.32	0.11	–	–	–		44
	11	11.5	9	12	30'	1.46	1.50	1.42	0.11	–	–	–		44
9' x 6'	9	9	9	4 to 12	0.33' - <2'	0.60	0.81	0.69	0.22	0.27	0.51	0.60		–
					2' - <3'	0.60	0.81	0.69	0.11	–	–	–		54
					3' - <5'	0.56	0.66	0.65	0.11	–	–	–		49
					5' - 10'	0.65	0.68	0.69	0.11	–	–	–		49
					15'	0.94	1.03	1.02	0.11	–	–	–		44
	9	9	9	8	20'	1.25	1.40	1.38	0.11	–	–	–		44
	10	10.5	9	to	25'	1.37	1.49	1.40	0.11	–	–	–		44
	11	11.5	9	12	30'	1.44	1.58	1.50	0.11	–	–	–		44
9' x 7'	9	9	9	4 to 12	0.33' - <2'	0.61	0.84	0.72	0.22	0.28	0.51	0.61		–
					2' - <3'	0.61	0.83	0.72	0.11	–	–	–		59
					3' - <5'	0.58	0.69	0.68	0.11	–	–	–		54
					5' - 10'	0.67	0.73	0.75	0.11	–	–	–		49
					15'	0.96	1.09	1.10	0.11	–	–	–		44
	9	9	9	8	20'	1.27	1.49	1.47	0.11	–	–	–		44
	10	10.5	9	to	25'	1.38	1.57	1.48	0.11	–	–	–		44
	11	11.5	9	12	30'	1.49	1.70	1.58	0.11	–	–	–		44
9' x 8'	9	9.5	9	4 to 12	0.33' - <2'	0.60	0.85	0.73	0.22	0.29	0.52	0.53		–
					2' - <3'	0.64	0.86	0.76	0.12	–	–	–		59
					3' - <5'	0.62	0.72	0.72	0.11	–	–	–		59
					5' - 10'	0.71	0.77	0.81	0.11	–	–	–		54
					15'	1.01	1.16	1.17	0.11	–	–	–		44
	9	9.5	9	8	20'	1.27	1.56	1.45	0.11	–	–	–		44
	10	10.5	9	to	25'	1.45	1.65	1.57	0.11	–	–	–		44
	11	11.5	9	12	30'	1.59	1.72	1.66	0.11	–	–	–		44
9' x 9'	9	9.5	9	4 to 12	0.33' - <2'	0.68	0.88	0.76	0.22	0.29	0.55	0.57		–
					2' - <3'	0.68	0.88	0.78	0.18	–	–	–		72
					3' - <5'	0.68	0.75	0.78	0.18	–	–	–		72
					5' - 10'	0.79	0.82	0.88	0.17	–	–	–		59
					15'	1.11	1.22	1.26	0.13	–	–	–		49
	9	9.5	9	8	20'	1.37	1.64	1.54	0.13	–	–	–		49
	10	10.5	9	to	25'	1.56	1.73	1.65	0.13	–	–	–		44
	11	11.5	9.5	12	30'	1.56	1.73	1.68	0.12	–	–	–		44

TABLE 13B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 9' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
9' x 5'	10	10	10	4 to 12	0.33' - <2'	0.49	0.65	0.57	0.24	0.24	0.40	0.48	See General Note 5	–
					2' - <3'	0.49	0.65	0.57	0.12	–	–	–		54
					3' - <5'	0.46	0.54	0.53	0.12	–	–	–		49
					5' - 10'	0.52	0.50	0.51	0.12	–	–	–		49
					15'	0.75	0.74	0.75	0.12	–	–	–		44
					20'	0.98	1.01	1.00	0.12	–	–	–		44
	10	10.5	10	8 to	25'	1.21	1.27	1.19	0.12	–	–	–		44
	11	11.5	10	12	30'	1.30	1.36	1.30	0.12	–	–	–		44
9' x 6'	10	10	10	4 to 12	0.33' - <2'	0.48	0.68	0.60	0.24	0.24	0.39	0.48		–
					2' - <3'	0.48	0.68	0.60	0.12	–	–	–		54
					3' - <5'	0.45	0.57	0.56	0.12	–	–	–		49
					5' - 10'	0.52	0.53	0.56	0.12	–	–	–		49
					15'	0.74	0.79	0.81	0.12	–	–	–		44
					20'	0.97	1.07	1.07	0.12	–	–	–		44
	10	10.5	10	8 to	25'	1.18	1.35	1.28	0.12	–	–	–		44
	11	11.5	10	12	30'	1.27	1.44	1.38	0.12	–	–	–		44
9' x 7'	10	10	10	4 to 12	0.33' - <2'	0.49	0.70	0.63	0.24	0.24	0.39	0.49		–
					2' - <3'	0.49	0.70	0.63	0.12	–	–	–		59
					3' - <5'	0.46	0.59	0.59	0.12	–	–	–		54
					5' - 10'	0.54	0.57	0.60	0.12	–	–	–		49
					15'	0.75	0.84	0.86	0.12	–	–	–		44
					20'	0.98	1.13	1.14	0.12	–	–	–		44
	10	10.5	10	8 to	25'	1.18	1.43	1.36	0.12	–	–	–		44
	11	11.5	10	12	30'	1.28	1.52	1.46	0.12	–	–	–		44
9' x 8'	10	10	10	4 to 12	0.33' - <2'	0.51	0.72	0.65	0.24	0.24	0.39	0.51		–
					2' - <3'	0.51	0.72	0.65	0.12	–	–	–		59
					3' - <5'	0.49	0.61	0.62	0.12	–	–	–		59
					5' - 10'	0.57	0.60	0.65	0.12	–	–	–		54
					15'	0.79	0.89	0.92	0.12	–	–	–		44
					20'	1.02	1.20	1.22	0.12	–	–	–		44
	10	10.5	10	8 to	25'	1.21	1.50	1.44	0.12	–	–	–		44
	11	11.5	10	12	30'	1.33	1.59	1.54	0.12	–	–	–		44
9' x 9'	10	10	10	4 to 12	0.33' - <2'	0.54	0.74	0.68	0.24	0.24	0.41	0.54		–
					2' - <3'	0.54	0.74	0.68	0.15	–	–	–		72
					3' - <5'	0.53	0.63	0.64	0.13	–	–	–		72
					5' - 10'	0.62	0.64	0.70	0.12	–	–	–		59
					15'	0.85	0.94	0.99	0.12	–	–	–		49
					20'	1.09	1.26	1.29	0.12	–	–	–		49
	10	10.5	10	8 to	25'	1.28	1.56	1.52	0.12	–	–	–		44
	11	11.5	10	12	30'	1.42	1.66	1.66	0.12	–	–	–		44

NOTES:
1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

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TABLE 14 - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 10' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
10' x 5'	10	10	10	4 to 12	0.33' - <2'	0.60	0.73	0.61	0.24	0.24	0.50	0.57	See General Note 5	-
					2' - <3'	0.60	0.73	0.61	0.12	-	-	-		58
					3' - <5'	0.57	0.64	0.58	0.12	-	-	-		53
					5' - 10'	0.65	0.60	0.60	0.12	-	-	-		52
					15'	0.94	0.90	0.89	0.12	-	-	-		47
	10	10	10	8 to 12	20'	1.24	1.23	1.19	0.12	-	-	-		47
	11	11.5	10		25'	1.39	1.37	1.28	0.12	-	-	-		47
	12.5	12.5	10		30'	1.38	1.43	1.41	0.12	-	-	-		47
10' x 6'	10	10	10	4 to 12	0.33' - <2'	0.58	0.75	0.64	0.24	0.24	0.48	0.56		-
					2' - <3'	0.58	0.75	0.64	0.12	-	-	-		58
					3' - <5'	0.56	0.67	0.62	0.12	-	-	-		52
					5' - 10'	0.64	0.64	0.65	0.12	-	-	-		52
					15'	0.92	0.96	0.95	0.12	-	-	-		47
	10	10	10	8 to 12	20'	1.21	1.31	1.27	0.12	-	-	-		47
	11	11.5	10		25'	1.35	1.44	1.36	0.12	-	-	-		47
	12.5	12.5	10		30'	1.35	1.51	1.49	0.12	-	-	-		47
10' x 7'	10	10	10	4 to 12	0.33' - <2'	0.57	0.78	0.67	0.24	0.24	0.48	0.57		-
					2' - <3'	0.57	0.78	0.67	0.12	-	-	-		58
					3' - <5'	0.58	0.70	0.65	0.12	-	-	-		58
					5' - 10'	0.65	0.68	0.70	0.12	-	-	-		52
					15'	0.92	1.02	1.02	0.12	-	-	-		47
	10	10	10	8 to 12	20'	1.21	1.38	1.35	0.12	-	-	-		47
	11	11.5	10		25'	1.33	1.52	1.44	0.12	-	-	-		47
	12.5	12.5	10		30'	1.38	1.58	1.57	0.12	-	-	-		47
10' x 8'	10	10	10	4 to 12	0.33' - <2'	0.58	0.80	0.70	0.24	0.26	0.48	0.58		-
					2' - <3'	0.58	0.80	0.70	0.12	-	-	-		64
					3' - <5'	0.60	0.72	0.68	0.12	-	-	-		58
					5' - 10'	0.67	0.72	0.75	0.12	-	-	-		52
					15'	0.95	1.08	1.08	0.12	-	-	-		47
	10	10	10	8 to 12	20'	1.24	1.45	1.44	0.12	-	-	-		47
	11	11.5	10		25'	1.36	1.59	1.52	0.12	-	-	-		47
	12.5	12.5	10		30'	1.45	1.64	1.64	0.12	-	-	-		47
10' x 9'	10	10	10	4 to 12	0.33' - <2'	0.61	0.82	0.73	0.24	0.26	0.50	0.61		-
					2' - <3'	0.61	0.82	0.73	0.14	-	-	-		70
					3' - <5'	0.64	0.75	0.73	0.13	-	-	-		64
					5' - 10'	0.72	0.77	0.80	0.12	-	-	-		58
					15'	1.00	1.13	1.15	0.12	-	-	-		52
	10	10	10	8 to 12	20'	1.30	1.53	1.52	0.12	-	-	-		47
	11	11.5	10		25'	1.42	1.66	1.60	0.12	-	-	-		47
	12.5	12.5	10		30'	1.57	1.70	1.72	0.12	-	-	-		47
10' x 10'	10	10	10	4 to 12	0.33' - <2'	0.66	0.84	0.75	0.24	0.27	0.52	0.65		-
					2' - <3'	0.66	0.84	0.75	0.20	-	-	-		79
					3' - <5'	0.70	0.77	0.79	0.19	-	-	-		70
					5' - 10'	0.79	0.81	0.87	0.18	-	-	-		64
					15'	1.09	1.19	1.23	0.15	-	-	-		52
	10	10	10	8 to 12	20'	1.40	1.61	1.61	0.14	-	-	-		52
	11	11.5	10		25'	1.53	1.74	1.68	0.14	-	-	-		47
	12.5	12.5	10.5		30'	1.60	1.71	1.74	0.14	-	-	-		47

TABLE 15 - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 11' SPANS

SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
11' x 4'	11	11	11	4 to 12	0.33' - <2'	0.60	0.66	0.54	0.27	0.27	0.52	0.56	See General Note 5	-
					2' - <3'	0.60	0.66	0.54	0.14	-	-	-		62
					3' - <5'	0.60	0.61	0.53	0.14	-	-	-		62
					5' - 10'	0.79	0.63	0.62	0.14	-	-	-		55
					15'	1.01	0.82	0.79	0.14	-	-	-		55
	12	12	11	8 to 12	20'	1.34	1.11	1.06	0.14	-	-	-		55
	13.5	13.5	11		25'	1.52	1.27	1.23	0.14	-	-	-		55
					30'	1.54	1.37	1.34	0.14	-	-	-		50
11' x 6'	11	11	11	4 to 12	0.33' - <2'	0.57	0.71	0.60	0.27	0.27	0.47	0.53		-
					2' - <3'	0.56	0.71	0.60	0.14	-	-	-		62
					3' - <5'	0.56	0.67	0.59	0.14	-	-	-		55
					5' - 10'	0.73	0.71	0.72	0.14	-	-	-		55
					15'	0.92	0.92	0.91	0.14	-	-	-		50
	11	11	11	8 to 12	20'	1.21	1.25	1.21	0.14	-	-	-		50
	12	12	11		25'	1.37	1.43	1.39	0.14	-	-	-		50
	13.5	13.5	11		30'	1.39	1.53	1.50	0.14	-	-	-		50
11' x 8'	11	11	11	4 to 12	0.33' - <2'	0.55	0.76	0.66	0.27	0.27	0.46	0.55		-
					2' - <3'	0.55	0.76	0.66	0.14	-	-	-		62
					3' - <5'	0.54	0.72	0.65	0.14	-	-	-		62
					5' - 10'	0.73	0.79	0.82	0.14	-	-	-		55
					15'	0.93	1.03	1.03	0.14	-	-	-		50
	11	11	11	8 to 12	20'	1.21	1.39	1.36	0.14	-	-	-		50
	12	12.5	11		25'	1.34	1.56	1.50	0.14	-	-	-		50
	13.5	13.5	11		30'	1.41	1.66	1.65	0.14	-	-	-		50
11' x 10'	11	11	11	4 to 12	0.33' - <2'	0.60	0.81	0.71	0.27	0.27	0.48	0.60		-
					2' - <3'	0.60	0.81	0.71	0.15	-	-	-		75
					3' - <5'	0.61	0.77	0.70	0.14	-	-	-		69
					5' - 10'	0.80	0.88	0.93	0.14	-	-	-		62
					15'	1.01	1.13	1.15	0.14	-	-	-		55
	11	11	11	8 to 12	20'	1.30	1.52	1.52	0.14	-	-	-		50
	12	12.5	11		25'	1.42	1.70	1.65	0.14	-	-	-		50
	13.5	14	11		30'	1.53	1.77	1.74	0.14	-	-	-		50
11' x 11'	11	11	11	4 to 12	0.33' - <2'	0.64	0.83	0.74	0.27	0.27	0.51	0.64		-
					2' - <3'	0.64	0.83	0.74	0.21	-	-	-		86
					3' - <5'	0.67	0.79	0.75	0.21	-	-	-		75
					5' - 10'	0.88	0.93	0.99	0.19	-	-	-		69
					15'	1.09	1.19	1.23	0.16	-	-	-		55
	11	11	11	8 to 12	20'	1.40	1.59	1.60	0.15	-	-	-		55
	12	12.5	11		25'	1.54	1.77	1.73	0.15	-	-	-		50
	13.5	14	11.5		30'	1.57	1.77	1.76	0.14	-	-	-		50

NOTES:
1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

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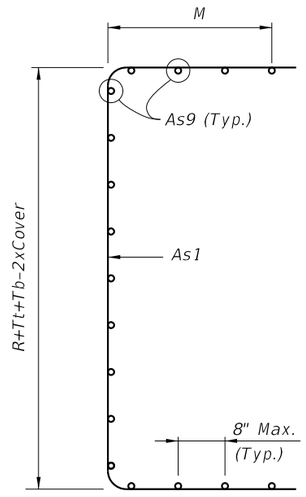
TABLE 16 - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 12' SPANS

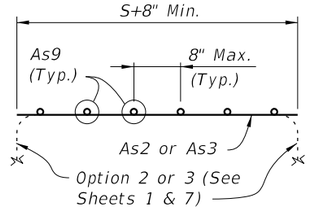
SPAN x RISE (S) (R) (Ft.)	SLAB / WALL THICKNESS TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)	DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./Ft.) As1	As2	As3	As4	As5	As7	As8	As9	As1 EXT. LENGTH (M) (in.)
12' x 4'	12	12	12	4 to 12	0.33' - <2'	0.59	0.64	0.51	0.29	0.29	0.52	0.55	See General Note 5	–
					2' - <3'	0.60	0.64	0.51	0.15	–	–	–		73
					3' - <5'	0.60	0.61	0.51	0.15	–	–	–		66
					5' - 10'	0.81	0.61	0.61	0.15	–	–	–		66
					15'	1.04	0.80	0.77	0.15	–	–	–		59
					20'	1.37	1.08	1.03	0.15	–	–	–		59
	13	13	12	8 to 12	25'	1.58	1.26	1.21	0.15	–	–	–		59
	14.5	14.5	12		30'	1.63	1.38	1.34	0.15	–	–	–		53
12' x 6'	12	12	12	4 to 12	0.33' - <2'	0.56	0.70	0.57	0..29	0.29	0.47	0.52		–
					2' - <3'	0.56	0.70	0.57	0.15	–	–	–		66
					3' - <5'	0.56	0.67	0.57	0.15	–	–	–		59
					5' - 10'	0.74	0.69	0.70	0.15	–	–	–		59
					15'	0.94	0.90	0.88	0.15	–	–	–		53
					20'	1.23	1.22	1.17	0.15	–	–	–		53
	13	13	12	8 to 12	25'	1.40	1.42	1.37	0.15	–	–	–		53
	14.5	15	12		30'	1.44	1.54	1.48	0.15	–	–	–		53
12' x 8'	12	12	12	4 to 12	0.33' - <2'	0.55	0.75	0.63	0.29	0.29	0.45	0.53		–
					2' - <3'	0.55	0.75	0.63	0.15	–	–	–		66
					3' - <5'	0.55	0.73	0.63	0.15	–	–	–		59
					5' - 10'	0.73	0.77	0.79	0.15	–	–	–		59
					15'	0.93	1.00	0.99	0.15	–	–	–		53
	12	12	12	8 to 12	20'	1.21	1.35	1.31	0.15	–	–	–		53
	13	13.5	12		25'	1.35	1.55	1.48	0.15	–	–	–		53
	14.5	15	12		30'	1.40	1.67	1.62	0.15	–	–	–		53
12' x 10'	12	12	12	4 to 12	0.33' - <2'	0.57	0.80	0.68	0.29	0.29	0.46	0.57		–
					2' - <3'	0.57	0.80	0.68	0.15	–	–	–		73
					3' - <5'	0.59	0.77	0.68	0.15	–	–	–		66
					5' - 10'	0.78	0.85	0.89	0.15	–	–	–		59
					15'	0.98	1.10	1.11	0.15	–	–	–		53
	12	12	12	8 to 12	20'	1.26	1.47	1.45	0.15	–	–	–		53
	13	13.5	12		25'	1.39	1.68	1.63	0.15	–	–	–		53
	14.5	15	12		30'	1.48	1.79	1.76	0.15	–	–	–		53
12' x 12'	12	12	12	4 to 12	0.33' - <2'	0.65	0.84	0.73	0.29	0.29	0.50	0.65		–
					2' - <3'	0.65	0.84	0.73	0.23	–	–	–		93
					3' - <5'	0.68	0.81	0.75	0.22	–	–	–		80
					5' - 10'	0.90	0.94	1.01	0.21	–	–	–		73
					15'	1.12	1.20	1.24	0.18	–	–	–		59
	12	12	12	8 to 12	20'	1.42	1.60	1.61	0.16	–	–	–		59
	13	13.5	12		25'	1.57	1.81	1.78	0.16	–	–	–		53
	14.5	15	12.5		30'	1.63	1.86	1.85	0.15	–	–	–		53

NOTES:
1. See Sheet 2 of 14 for General Notes.
2. See Sheet 7 of 14 for Reinforcing Details and dimension locations.

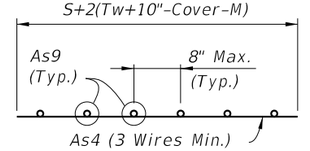
WELDED WIRE REINFORCEMENT BENDING DIAGRAM



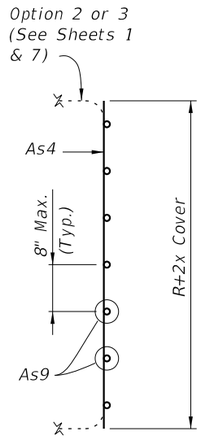
WWR PIECE NO. 1
(2 Reqd. per segment)



WWR PIECE NO. 2
(2 Reqd. per segment)

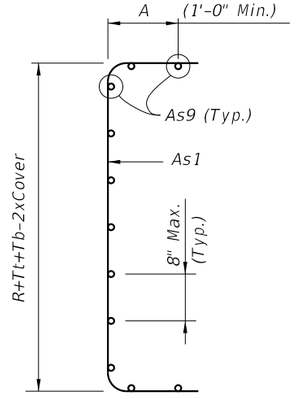


WWR PIECE NO. 4
(Tongue Reinforcement)
(4 Reqd. per segment)

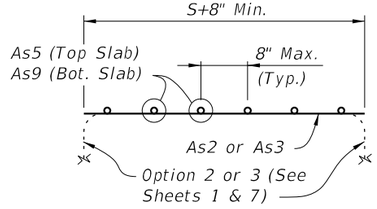


WWR PIECE NO. 3
(2 Reqd. per segment)

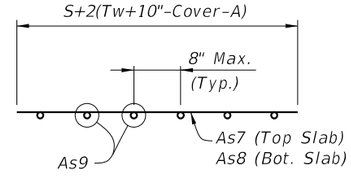
TYPE 2 BOX SECTION (DESIGN EARTH COVER 2' OR GREATER)



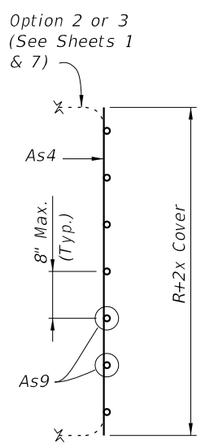
WWR PIECE NO. 1
(2 Reqd. per segment)



WWR PIECE NO. 2
(2 Reqd. per segment)



WWR PIECE NO. 4
(2 Reqd. per segment)

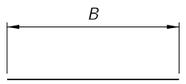


WWR PIECE NO. 3
(2 Reqd. per segment)

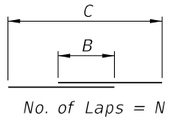
TYPE 1 BOX SECTION (DESIGN EARTH COVER LESS THAN 2')

REINFORCEMENT NOTES:
1. Reinforcement bending dimensions are out-to-out.
2. See General Notes 4, 5 and 6 on Sheet 2.
3. See Tables 1 thru 16 for dimensions M, R, S, Tb, Tt and Tw.
4. Dimension "A" is determined by the Manufacturer in accordance with the requirements of Detail "B" on Sheets 1 and 7.

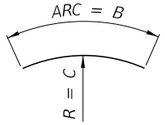
10/8/2020 10:41:46 AM



TYPE 1



TYPE 2



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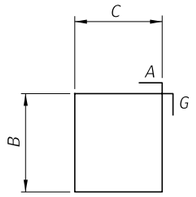
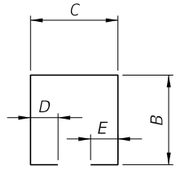
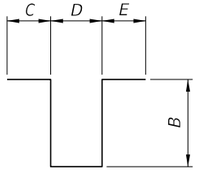


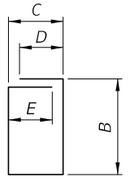
TYPE 4



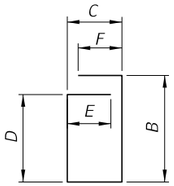
TYPE 5



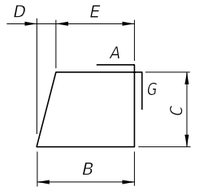
TYPE 6



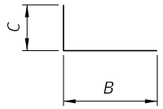
TYPE 7



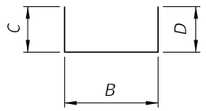
TYPE 8



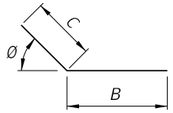
TYPE 9



TYPE 10



TYPE 1 1



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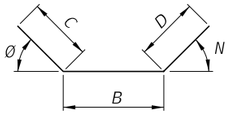
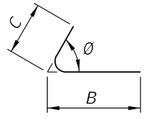
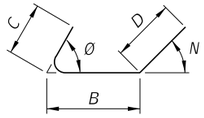


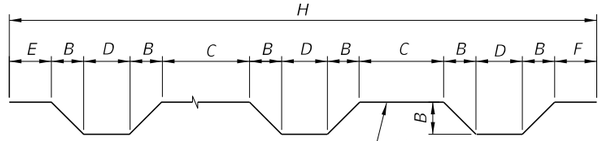
TYPE 13



TYPE 14

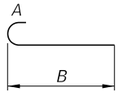


TYPE 15

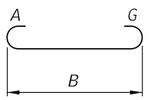


TYPE 16

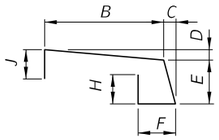
Number of Beams or Walls = N
Number of D's = N-1
Number of B's = 2N-2
Number of C's = N-2
45° Typical



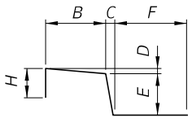
TYPE 17



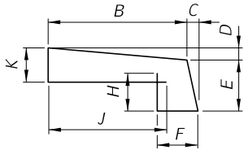
TYPE 18



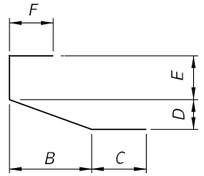
TYPE 19



TYPE 20



TYPE 21



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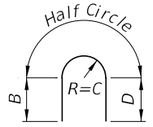
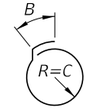
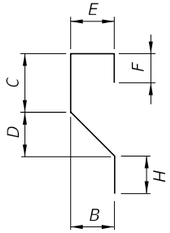


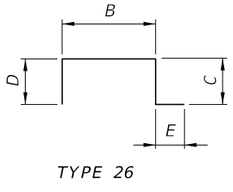
TYPE 23



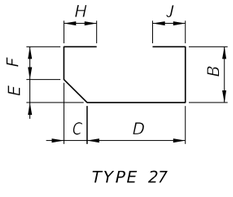
TYPE 24



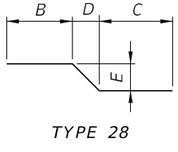
TYPE 25



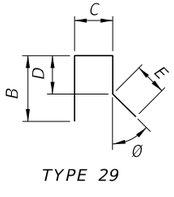
TYPE 26



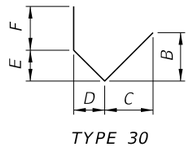
TYPE 27



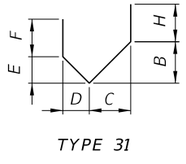
TYPE 28



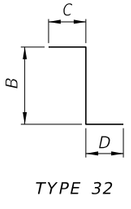
TYPE 29



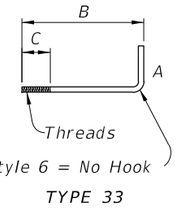
TYPE 30



TYPE 31

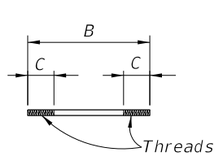


TYPE 32

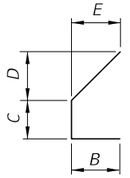


Style 6 = No Hook

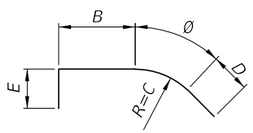
TYPE 33



TYPE 34



TYPE 35



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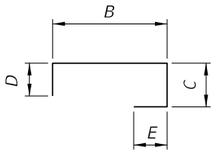
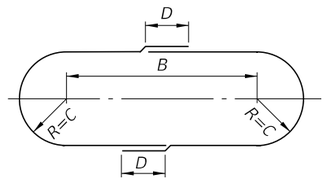
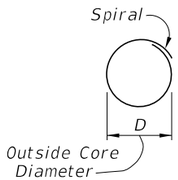


TYPE 37



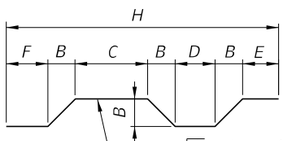
TYPE 38



TYPE 39

C = Pitch
B = Overall Height
N = Total number of closed turns at Top and Bottom of columns

Splices may be accomplished by lapping 1.5 turns. Cost of Channel Spacers and Splices shall be included in the Contract Unit Price for Reinf. Steel (Substructure)



Number of Beams or Walls = N
Number of D's = N-1
Number of B's = 2N-1
Number of C's = N-1
45° Typical

TYPE 40

TYPE 41

TYPE 42

TYPE 43

HOOK DETAILS

180° 90°

BAR SIZE	D	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	1'-0"
#7	5¼"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9½"	1'-3"	11¾"	1'-7"
#10	10¾"	1'-5"	1'-1¼"	1'-10"
#11	12"	1'-7"	1'-2¾"	2'-0"
#14	18¼"	2'-3"	1'-9¾"	2'-7"
#18	24"	3'-0"	2'-4½"	3'-5"
STYLE		1		3

90° 135°

STIRRUPS (TIES SIMILAR)

STIRRUP & TIE HOOK DIMENSIONS

BAR SIZE	D	90° HOOKS A or G	135° HOOKS A or G	135° HOOKS H *
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	1'-0"	8"	4½"
#7	5¼"	1'-2"	9"	5¼"
#8	6"	1'-4"	10½"	6"
STYLE		4	5	

STYLE 6 = NO HOOK

* Dimension is approximate.

Hook Styles Detailed on this sheet are for Illustration Only.

Actual Hook Style for any particular bar will be shown under A or G Heading on REINFORCING BAR LIST sheet(s) in Structures Plans.

All Dimensions are out-to-out.

NOTE: For Bar Dimensions See REINFORCING BAR LIST Sheet(s) in Structures Plans.

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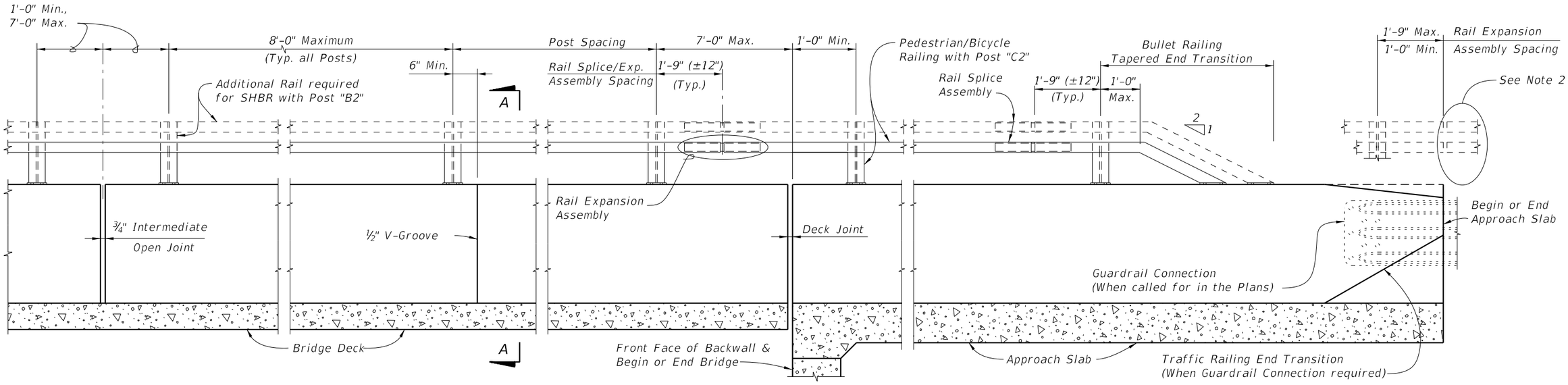
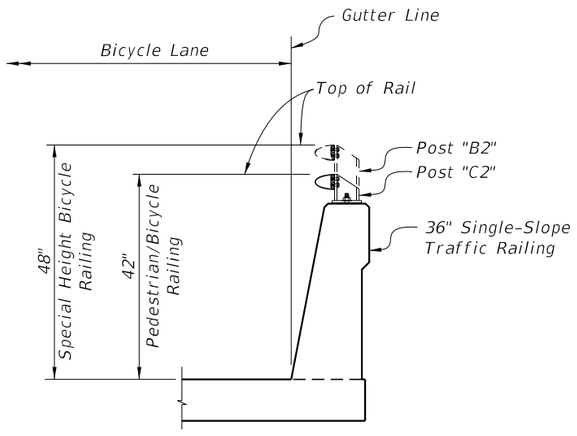
10/8/2020

LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/20			FDOT FY 2021-22 STANDARD PLANS	BAR BENDING DETAILS (STEEL)	415-001	1 of 1



ELEVATION OF INSIDE FACE OF TRAFFIC RAILING WITH PEDESTRIAN/BICYCLE BULLET RAILING



SECTION A-A
TYPICAL SECTION THRU BRIDGE DECK
(APPROACH SLAB SIMILAR)

NOTES:

1. A Bullet Railing Tapered-End Transition is required for all approach ends of Bullet Railings on Traffic Railings. When Guardrail Connection is required terminate the Bullet Railing Tapered-End Transition at beginning of the Traffic Railing End Transition.

2. Where Bullet Railing continues on retaining wall mounted Traffic Railings or Barriers, provide a Bullet Railing Tapered End Transition at the terminus of the Bullet Railing.

CROSS REFERENCES:

Work in conjunction with Index 515-022.

For Traffic Railing Details, Reinforcement and Notes see Index 521-427.

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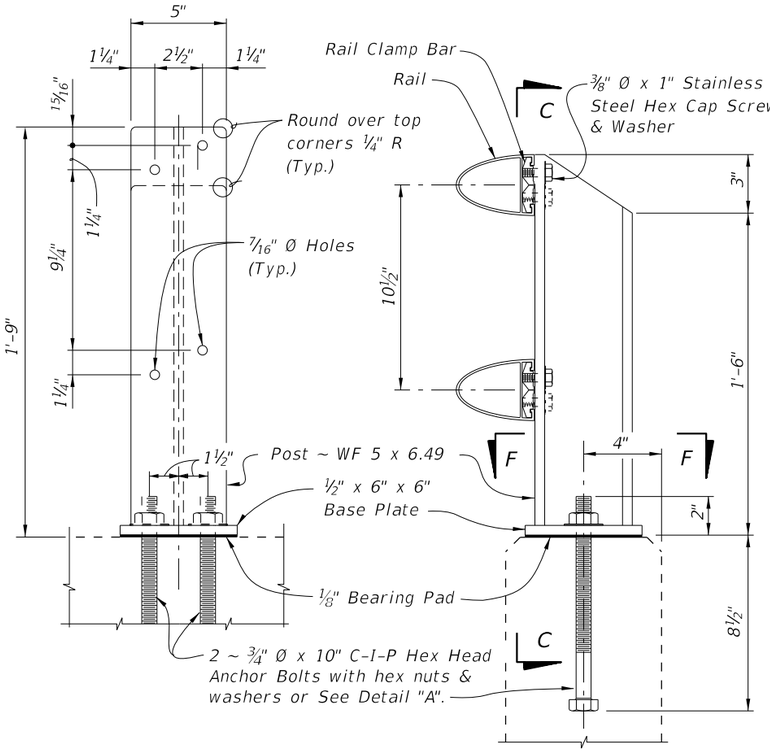
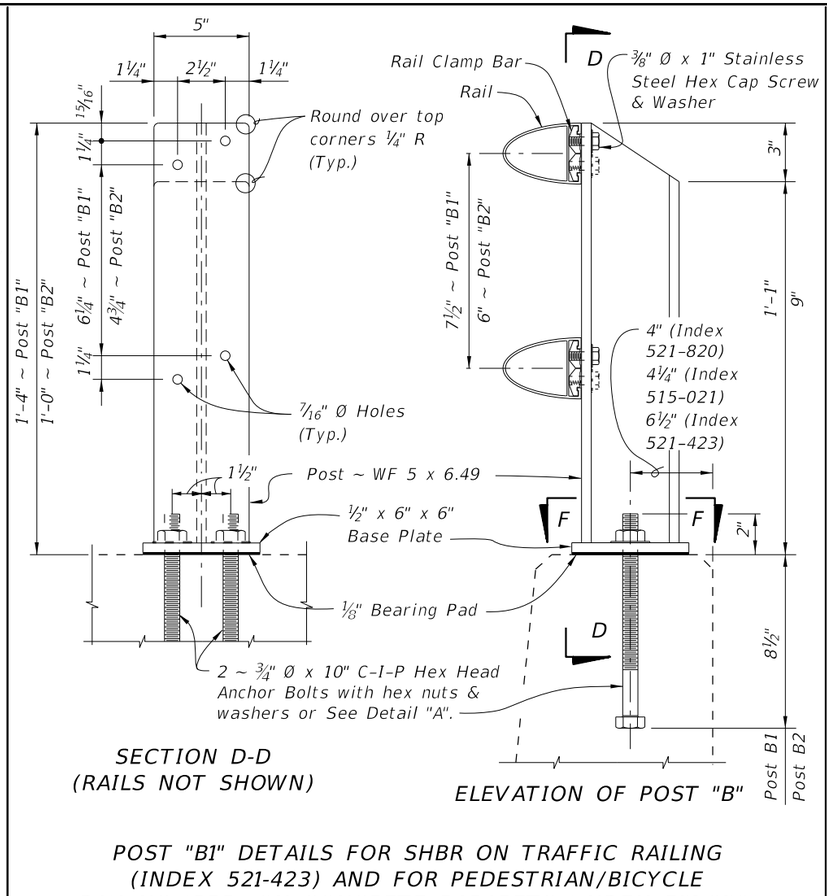
11/01/17						515-021	1 of 1



SECTION C-C
(RAILS NOT SHOWN)

ELEVATION
OF POST "D"

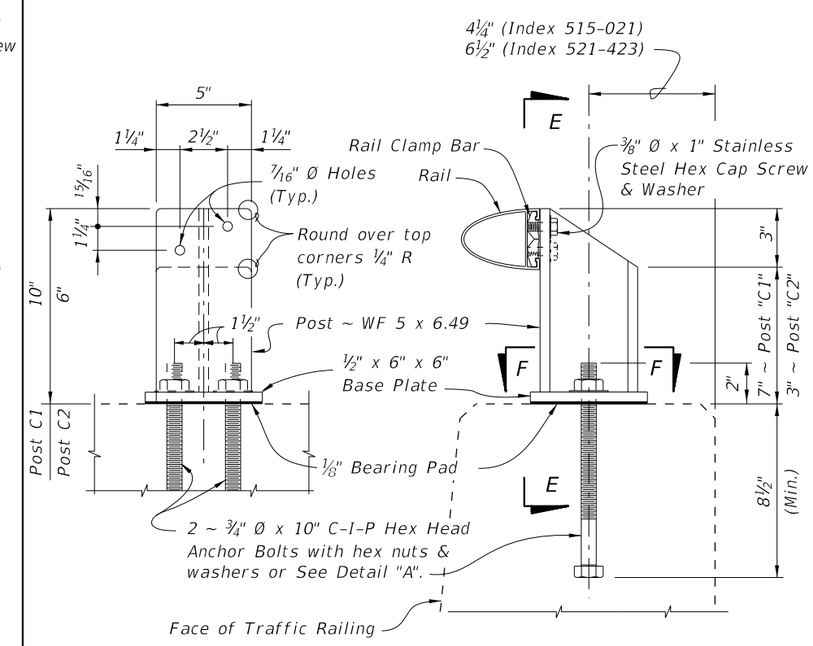
POST "D" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING (SHBR) ON CONCRETE PARAPET (INDEX 521-820)



SECTION D-D
(RAILS NOT SHOWN)

ELEVATION OF POST "B"

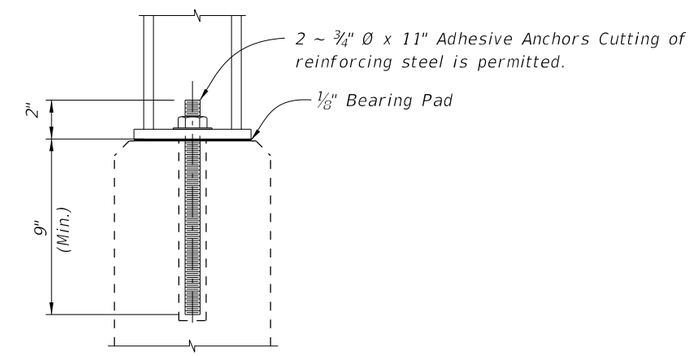
POST "B1" DETAILS FOR SHBR ON TRAFFIC RAILING (INDEX 521-423) AND FOR PEDESTRIAN/BICYCLE RAILING (PBR) ON CONCRETE PARAPETS (INDEX 521-820)
POST "B2" DETAILS FOR SHBR ON TRAFFIC RAILING (INDEX 521-427 AND 515-021)



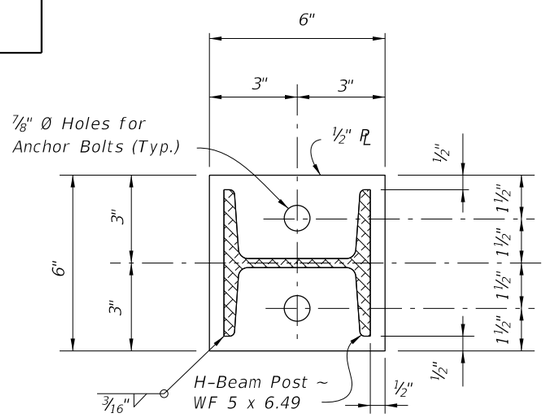
SECTION E-E
(RAIL NOT SHOWN)

ELEVATION
OF POST "C"

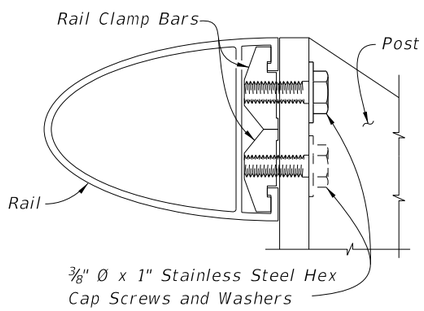
POST "C1" DETAILS FOR PEDESTRIAN/BICYCLE RAILING (PBR) ON TRAFFIC RAILINGS (INDEX 521-423)
POST "C2" DETAILS FOR PBR ON TRAFFIC RAILING (INDEX 521-427 & 515-021)



DETAIL "A"
ALTERNATE ANCHOR BOLT
(Concrete Parapet Shown, Traffic Railings Similar)



SECTION F-F
BASE PLATE DETAIL



RAIL TO POST CONNECTION DETAIL

CROSS REFERENCES:

For post spacing on Concrete Parapets see Index 521-820.

For post spacing on Traffic Railings see Index 515-021.

For Rail Details see Sheet 2.

For Railing Notes and Tapered End Transition Details see Sheet 3.

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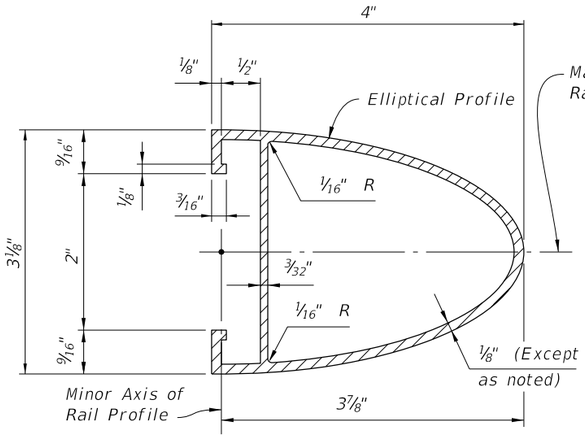
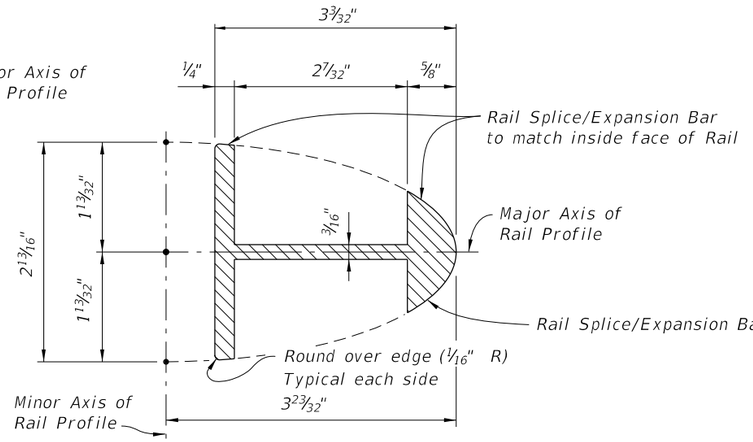
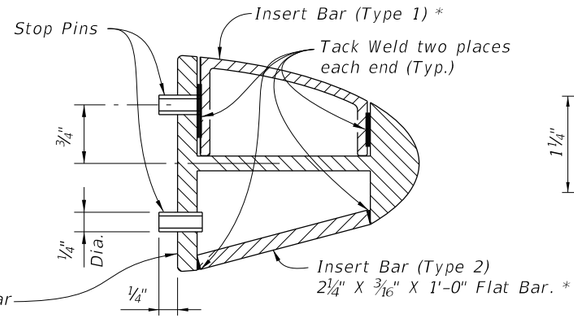


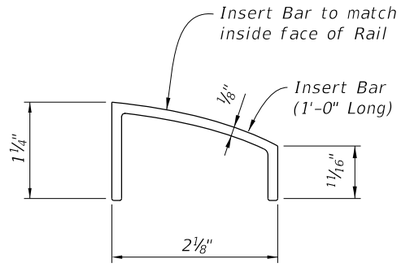
SECTION A-A
TYPICAL SECTION THRU RAIL



SECTION B-B - RAIL SPLICE/EXPANSION BAR
(Rail not shown for clarity)

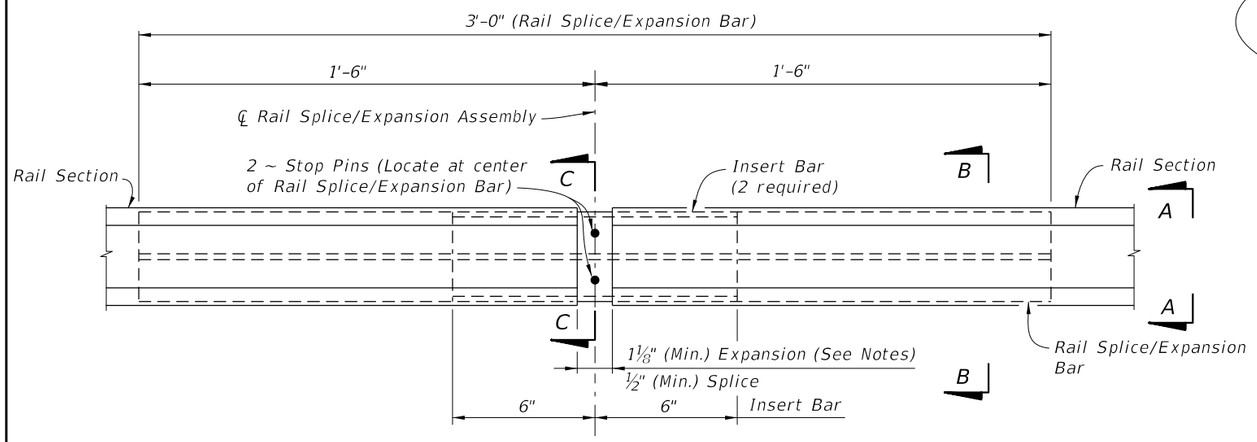


SECTION C-C
RAIL SPLICE/EXPANSION
BAR ASSEMBLY

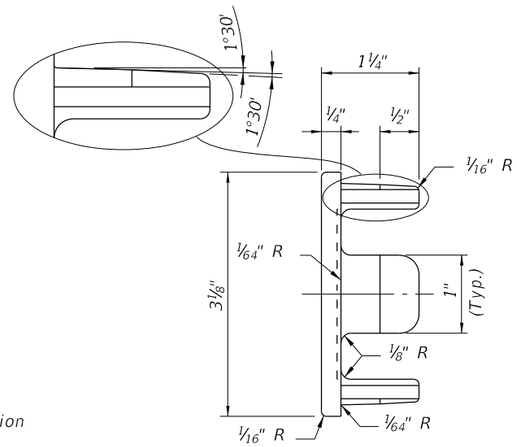


INSERT BAR DETAIL (TYPE 1)

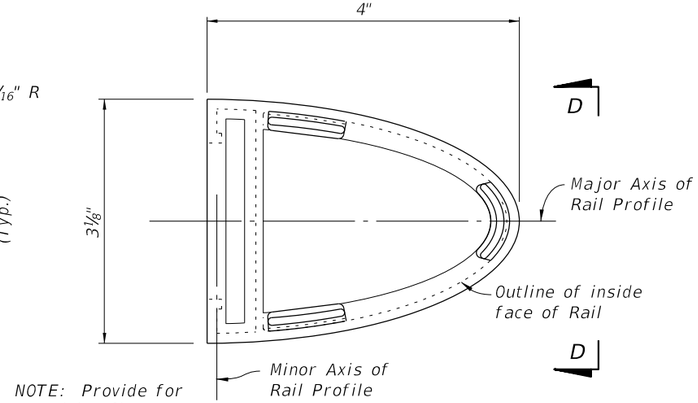
* Use of either Type 1 or Type 2 Insert Bars is at the option of the Contractor.



RAIL SPLICE/EXPANSION ASSEMBLY DETAIL



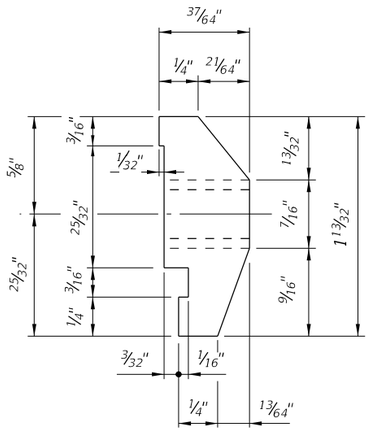
VIEW D-D



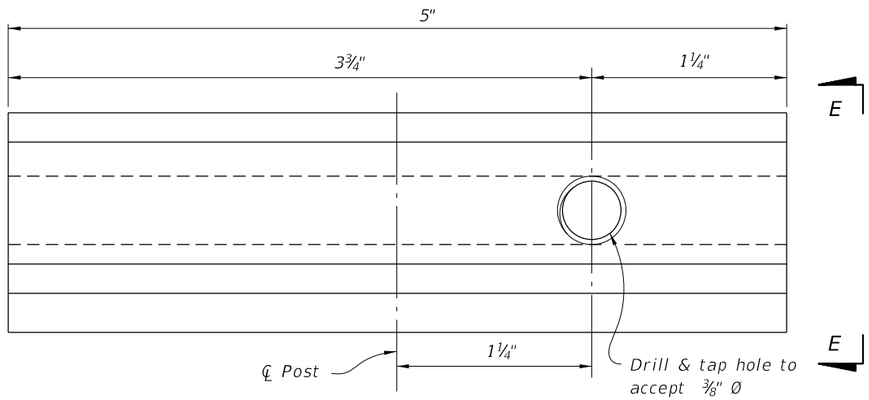
NOTE: Provide for drive fit.

RAIL END CAP DETAIL

CROSS REFERENCE:
For Notes and Tapered End Transition Details, See Sheet 3.



VIEW E-E



RAIL CLAMP BAR DETAIL

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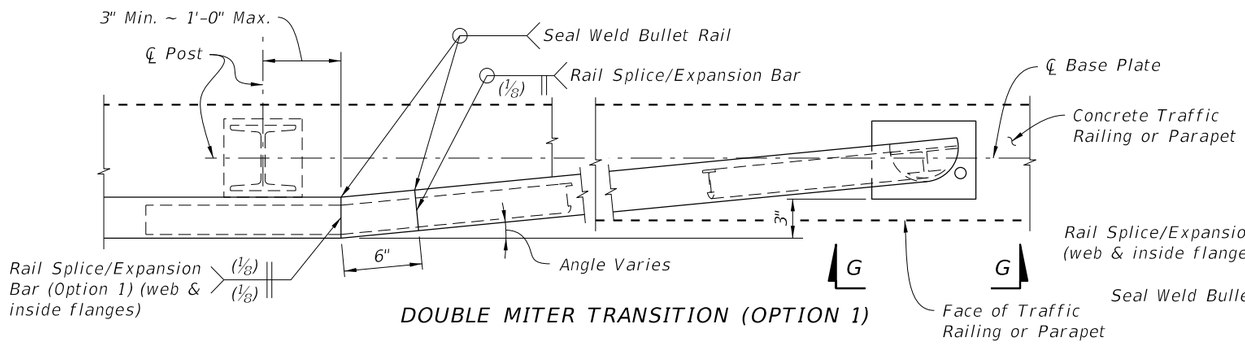
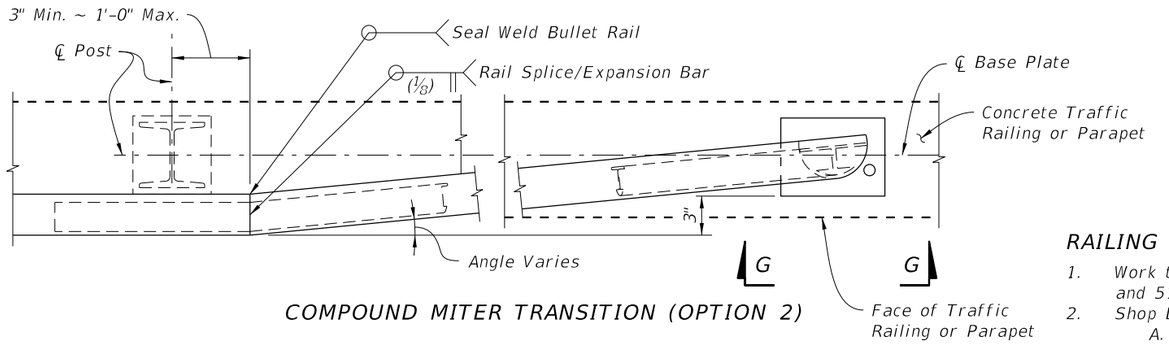
07/01/14			FDOT FY 2021-22 STANDARD PLANS	PEDESTRIAN/BICYCLE BULLET RAILING DETAILS	INDEX 515-022	SHEET 2 of 3

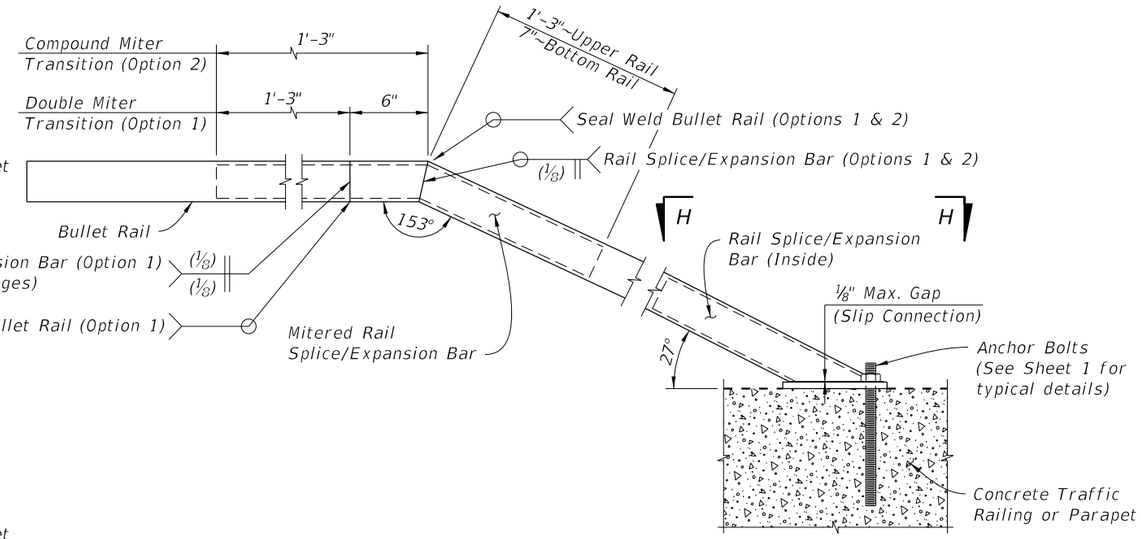


DOUBLE MITER TRANSITION (OPTION 1)

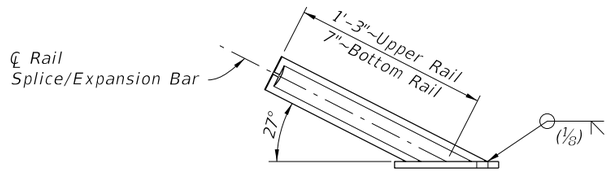


COMPOUND MITER TRANSITION (OPTION 2)

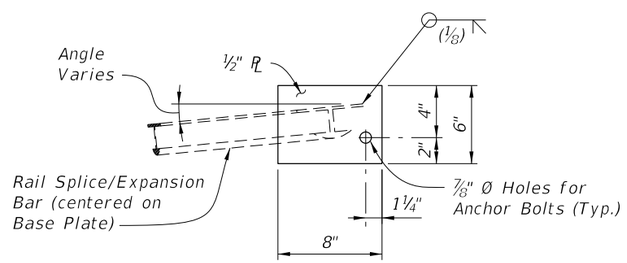
PARTIAL PLAN OF TAPERED END TRANSITIONS
(Single Rail Shown, Double or Triple Rail Similar)



ELEVATION OF TAPERED END TRANSITION
(Single Rail Shown, Double or Triple Rail Similar)



VIEW G-G TRANSITION BASE PLATE
(Bullet Rail not shown for Clarity)



VIEW H-H TRANSITION BASE PLATE
(Bullet Rail not shown for Clarity)

RAILING NOTES:

1. Work this Index with Index 521-423, 521-427, 521-428, 521-820 and 515-021 and Specification Section 515.
2. Shop Drawings: Submit shop drawings prior to fabrication.
   A. Include post and rail splice/expansion assembly location for curved alignments with radii < 40 feet and for all end terminations.
3. Materials:
   A. Supply Aluminum materials In accordance with Specification Section 965 and the following:
   Wrought Aluminum Post: ASTM B221, Alloy 6061-T6 or 6351-T5
   Rail End Cap: ASTM B26 sand cast aluminum alloy 356.0-F
   Plate and Bars: ASTM B209 Alloy 6061-T6
   Rails: ASTM B221 Alloy 6061-T6 or 6351-T5.
   Stop Pins: Press-fit aluminum or stainless steel pins or tubes
   B. Stainless Steel Fasteners: ASTM F-593, Alloy Group 2 (316).
   C. Bearing Pads: Plain or Fiber Reinforced meeting Specification Section 932 for Ancillary Structures.
   D. Anchor Bolts: Galvanized ASTM A307 Grade 36 Hex Head. Galvanized ASTM 1554 Grade 55 Threaded rods for Adhesive Anchors.
4. Layout:
   A. Posts shall be uniformly spaced with reasonable consistency.
   B. Tapered End Transitions are required at the terminus of the approach ends of Bullet Railing mounted on a Traffic Railing. Bullet Railings on concrete parapets shielded by a traffic railing do not require Tapered End Transitions unless noted otherwise in the Plans.
   C. Adjust post spacing's to avoid parapet obstacles, such as armor expansion plates, by 9 inches minimum.
   D. Rails shall be continuous over a minimum of 3 posts, except that lengths less than 12 feet need only be continuous over 2 posts.
   E. Space splices at 40 feet maximum. Splice all rails in a given railing section at about the same center line.
   F. Provide rail expansion assemblies in panels between posts on either side of a bridge expansion joint. Rail expansion assemblies are similar to the rail splice assemblies with increased space at the expansion assembly to allow for movement equal to 1.5 times the bridge joint opening or 1" greater than the expected joint movement.
5. Installation:
   A. Set rails near bridge expansion joints to allow for expected movement.
   B. Cutting of reinforcing steel is permitted for post installed anchors.
6. Payment: Includes the full cost of installed bullet railing. Cost of the Concrete Parapet or Traffic Railing is separate.

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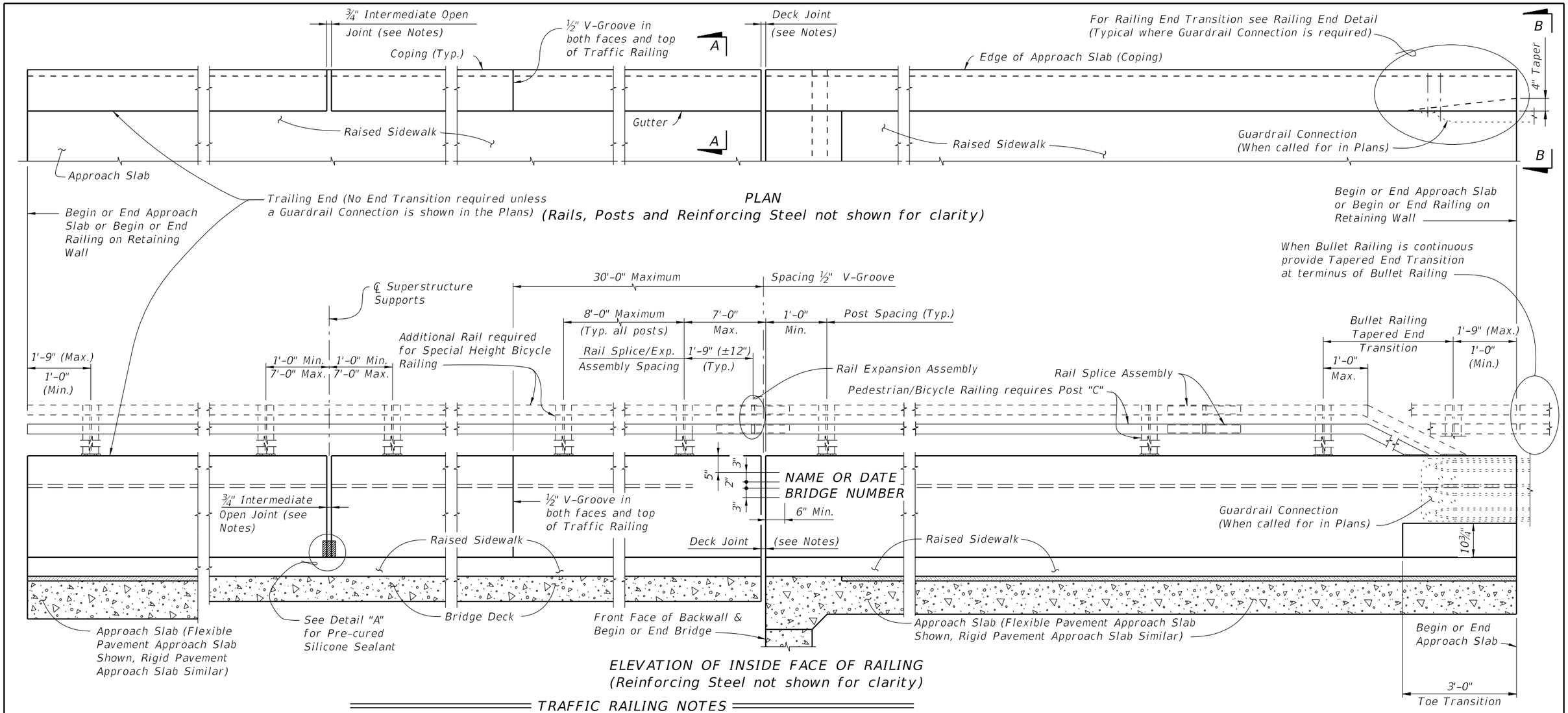

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

TRAFFIC RAILING NOTES

1. Materials: See Structures Plans, General Notes
2. Guardrail Connection Details: See Index 534-001
3. Traffic Railings may be constructed perpendicular to the sidewalk surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.
4. Name, Date & Bridge Number: Place the Name and Bridge Number on the Traffic Railing on the driver's right side when approaching the bridge. Place the Date on the driver's left side when approaching the bridge. Use the Name as shown in the General Notes of the Structures Plans. The Date is the year the bridge is completed. For a widening when the existing railing is removed, use both the date on the removed rail and the year of the widening. Form letters and figures with ⅜" V-Grooves using preformed letters and figures. Black plastic letters and figures 3" tall may be used, if approved by the Engineer.
5. Open Joints: See the Superstructure Plans, Approach Slab and Retaining Wall Sheets for Deck Joint dimensions and orientation. Provide Open Railing Joints matching the dimensions of the Deck Joint at Deck Expansion Joint locations.
   A. For treatment of railings on skewed bridges see Sheet 3.
6. Open Joints: Provide ¾" Open Joints at:
   A. Superstructure supports where the slab is continuous.
   B. At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.
7. V-Grooves: Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and the at V-Groove locations on the Retaining Wall footing/junction slabs.
8. Barrier Delineators: Install Barrier Delineators on top of the Traffic Railing 2" from the face of the traffic side in accordance with Specification Section 705. Match the Barrier Delineator to the color (white or yellow) of the near edgeline.
9. For embedded conduit and junction boxes see Index 630-010.
10. For Traffic Railings with Pedestrian/Bicycle Bullet Railings see Index 515-021 and 515-022 for Notes, Details and post spacing.

CROSS REFERENCE:
For Section A-A and View B-B, see Sheet 2.
For Detail "A" see Sheet 3.

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LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2021-22 STANDARD PLANS	TRAFFIC RAILING - (32" VERTICAL SHAPE)	INDEX	SHEET
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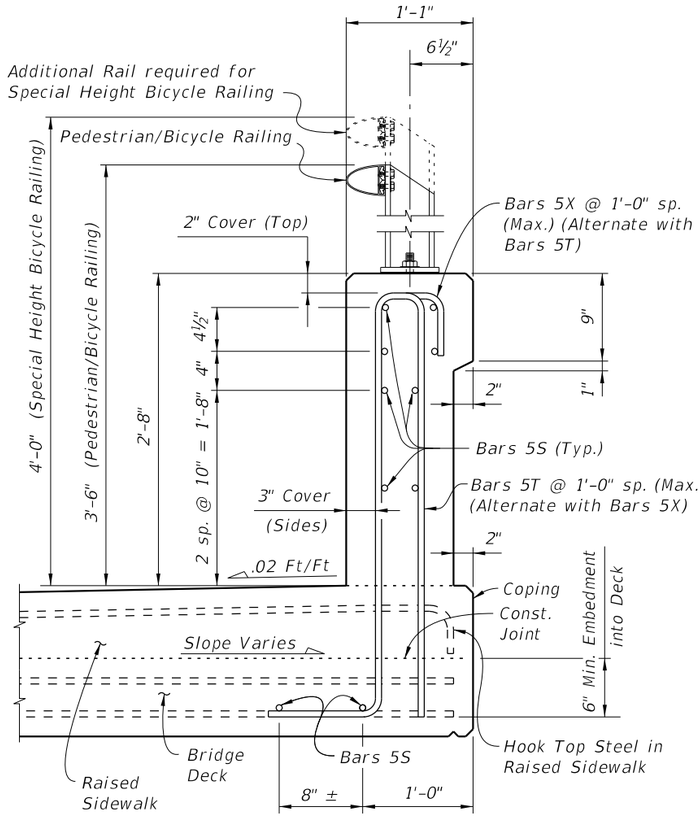
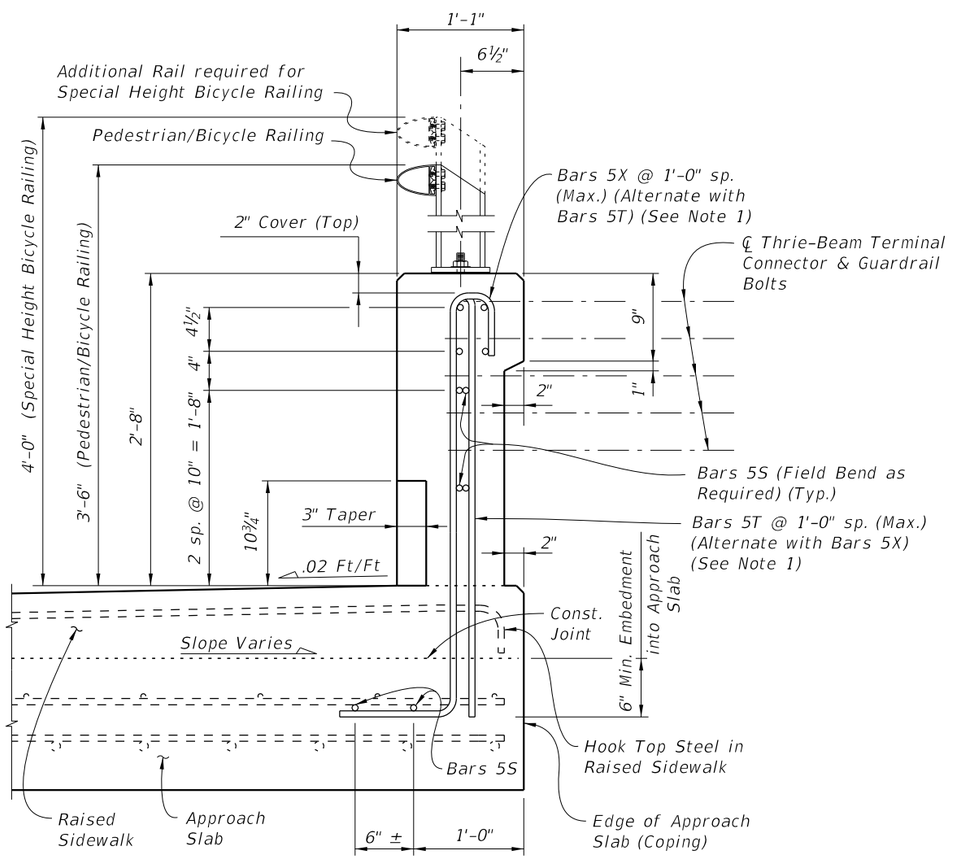


SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(Section Thru Bridge Deck shown)

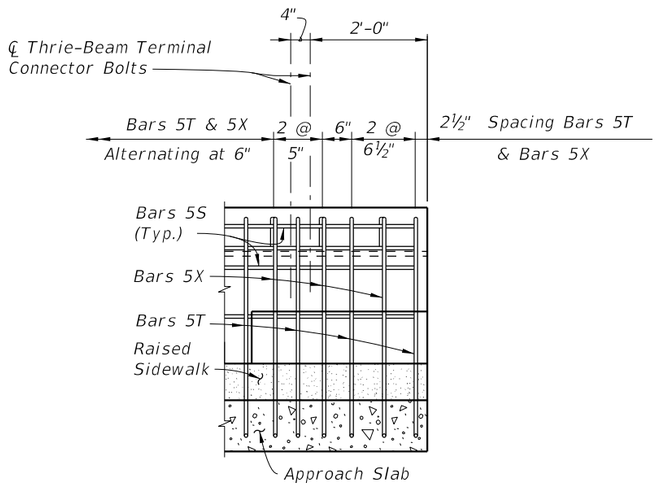


VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING

NOTES:

1. *Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to avoid conflict with guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Cut, shift and rotate Bars 5T and 5X as required to maintain cover in Railing End Transition.*

2. *Omit Railing End Transition and Guardrail if Concrete Traffic Railing is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Taper and Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5T and 5X at 1'-0" (Typ.)*



RAILING END DETAIL
(Guardrail Not Shown For Clarity)

CROSS REFERENCE:
For location of Section A-A and View B-B see Sheet 1.

NOTE: For Bullet Railing Details, see Index 515-022.

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LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2021-22 STANDARD PLANS	TRAFFIC RAILING - (32" VERTICAL SHAPE)	INDEX	SHEET
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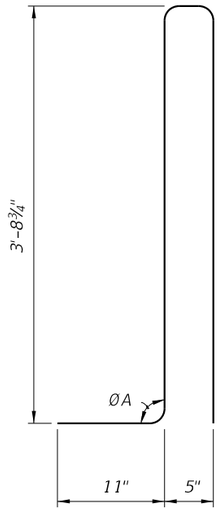
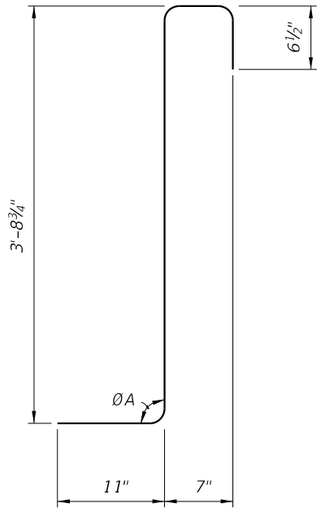
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	9'-0"
X	5	5'-10"

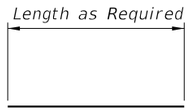
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



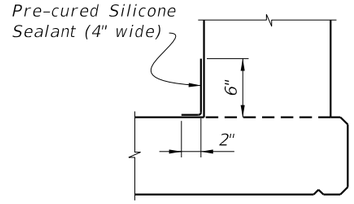
STIRRUP BAR 5X



BAR 5S

REINFORCING STEEL NOTES:

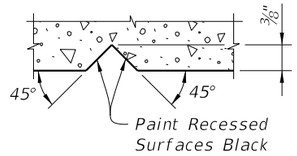
1. All bar dimensions in the bending diagrams are out to out.
2. The 3'-8¾" vertical dimensions shown for Bars 5T and 5X are based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slopes vary from the above amounts, adjust these vertical dimensions accordingly to achieve a 6" minimum embedment into the bridge deck.
3. The reinforcement for the railing on a Retaining Wall shall be the same as detailed with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement (WWR) when approved by the Engineer. WWR must consist of Deformed wire meeting the requirements of Specification Section 931.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.095
Reinforcing Steel	LB/LF	25.90

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope.)

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