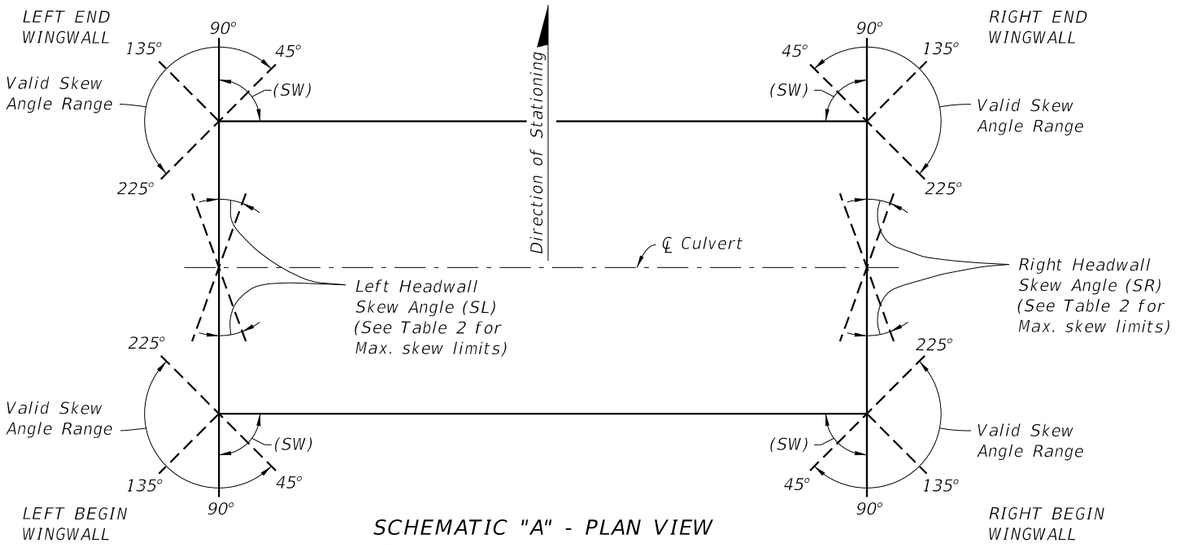
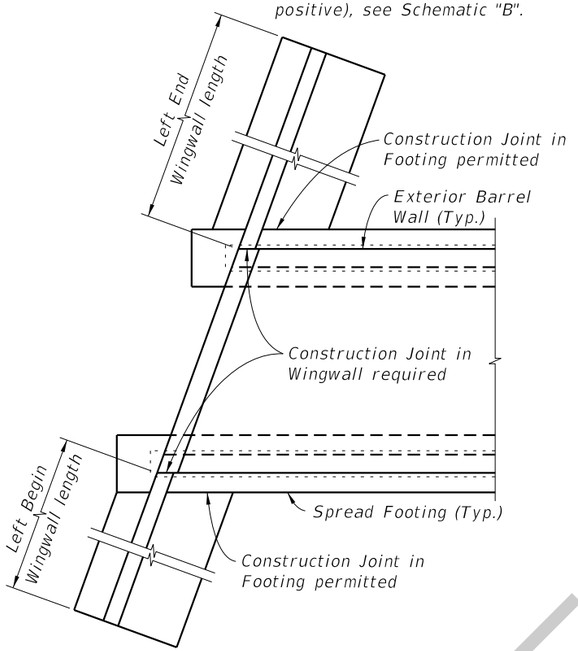


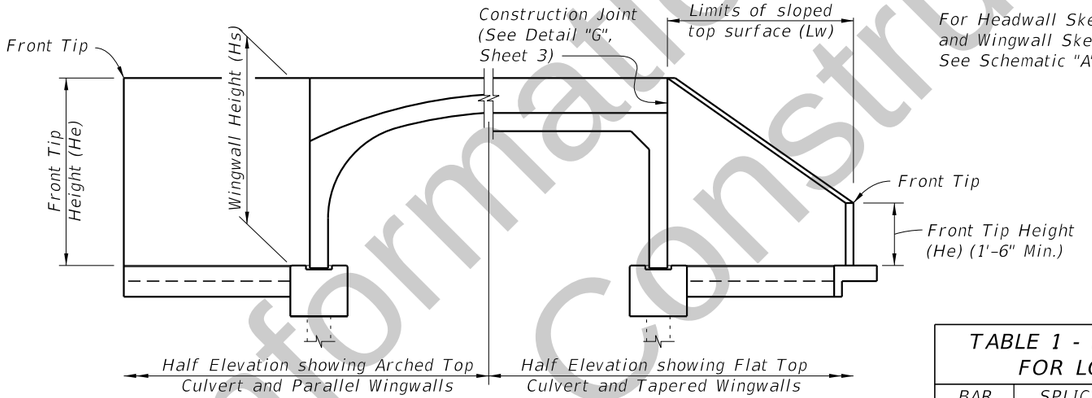
SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

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".



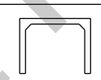
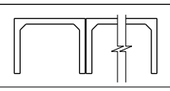
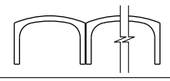
PART PLAN SHOWING PARALLEL WINGWALLS AND LOCATION OF CONSTRUCTION JOINTS

NOTE:
See Detail "D" and "E" (Sheet 3) for wingwall to culvert connection details.



END ELEVATION OF CULVERT
(Spread Footing Foundation shown,
Slab Footing Foundation similar)

TABLE 3 - PERMITTED THREE-SIDED CULVERT SECTIONS

TYPE	DESCRIPTION	SINGLE BARREL	MULTIPLE BARRELS	DESIGN NOTES
D	Flat Top (Rectangular)			Contractor Design
E	Arched Top (Proprietary)			Contractor Design
F	Two-Piece Arched Top (Proprietary)		Not Permitted	Contractor Design

GENERAL NOTES:

LIVE LOAD: HL-93.

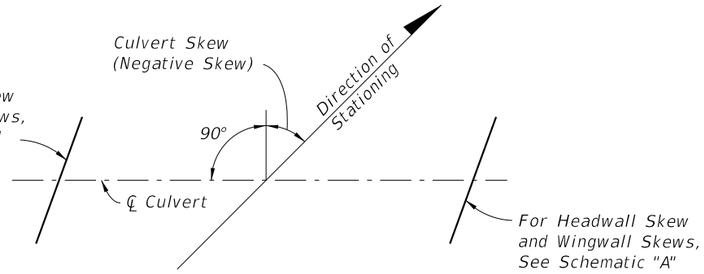
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 2 feet of compacted fill placed above the top slab.

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

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of C-I-P 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.

REINFORCING STEEL: ASTM A615, see the "Three-Sided Culvert Data Tables" in Contract Plans for grade and bar spacing. See the Reinforcing Bar List in the Contract Plans for bar sizes and bar bending details for wingwalls and spread footings. Equal area substitution of ASTM A1064, deformed welded wire reinforcement is permitted.

CONSTRUCTION: Culvert Barrels and Headwalls may be precast or cast-in-place, Wingwalls and Footings must be C-I-P, unless otherwise shown in the Contract Plans.



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) CLASS II (3400 psi)	SPLICE (CLASS B) CLASS IV (5500 psi)	BAR SIZE	SPLICE (CLASS B) CLASS II (3400 psi)	SPLICE (CLASS B) CLASS IV (5500 psi)
#3	1'-0"	1'-0"	#8	3'-6"	2'-9"
#4	1'-4"	1'-4"	#9	4'-5"	3'-6"
#5	1'-8"	1'-8"			
#6	1'-11"	1'-11"			
#7	2'-8"	2'-3"			

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

TABLE 2 - HEADWALL SKEW LIMITS

SPAN	RECOMMENDED SKEW RANGE
≤12'	-20° to +20°
>12' to 20'	-13° to +13°
>20' to 28'	-9° to +9°
>28'	-5° to +5°

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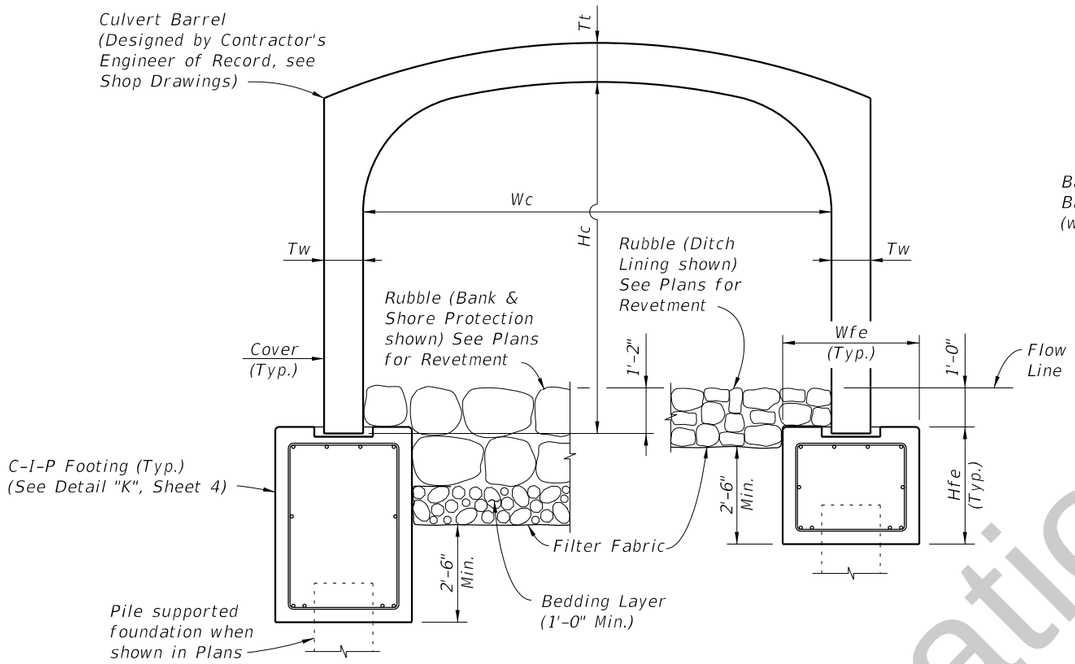
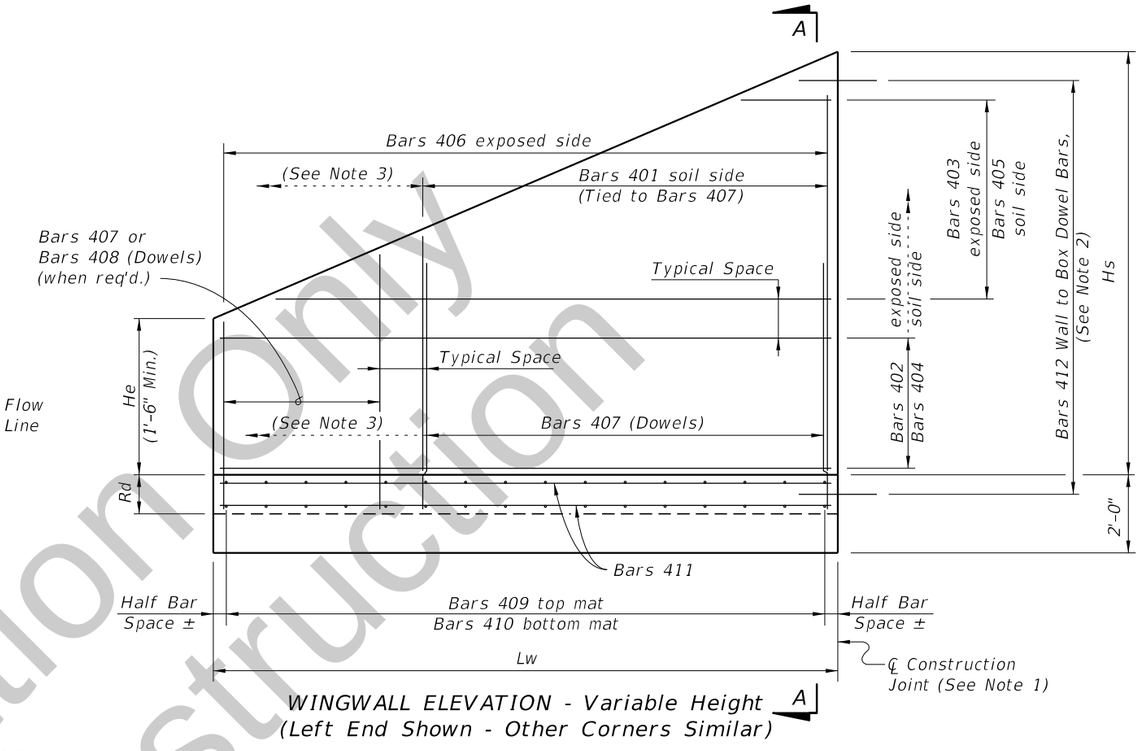
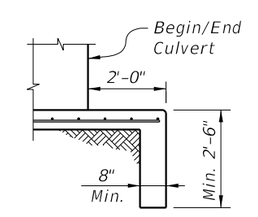
LAST REVISION	REVISION	DESCRIPTION:			
01/01/16			DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	INDEX NO. D296 / SHEET NO. 1 of 6



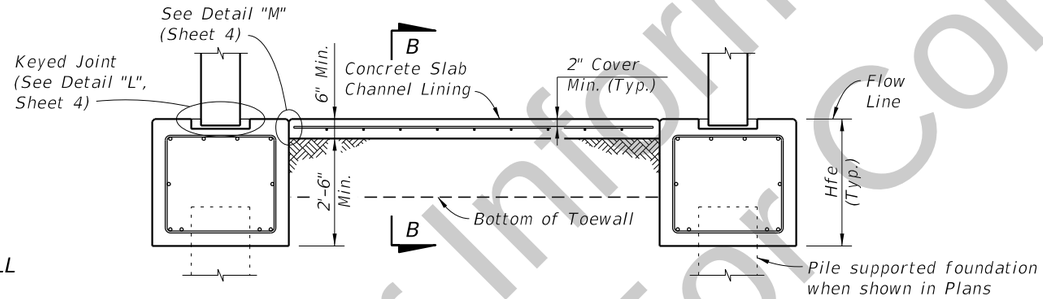
TYPICAL SECTION THRU SINGLE BARREL CULVERT
ON SPREAD FOOTING FOUNDATION WITH RUBBLE RIPRAP CHANNEL LINING
(Arched Top Culvert Shown, Flat Top Culvert Similar)



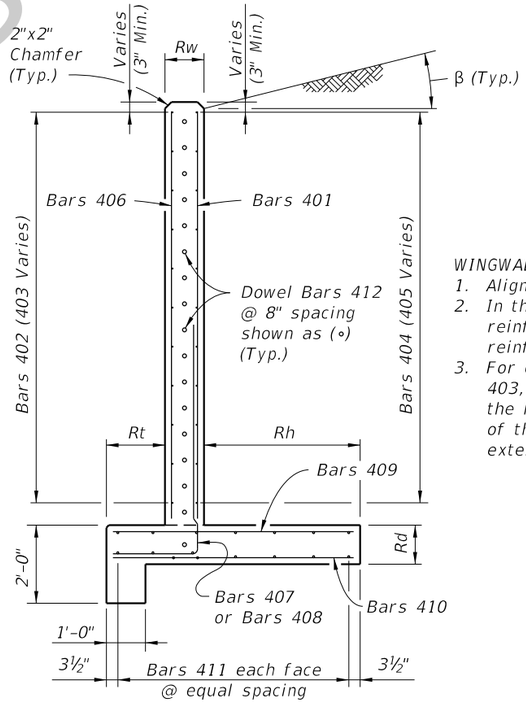
WINGWALL ELEVATION - Variable Height
(Left End Shown - Other Corners Similar)



SECTION B-B
CHANNEL LINING TOEWALL

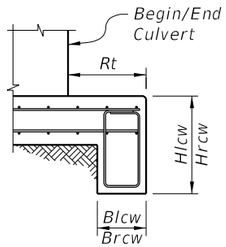


TYPICAL SECTION THRU CULVERT FOOTING FOUNDATION
WITH CONCRETE SLAB CHANNEL LINING

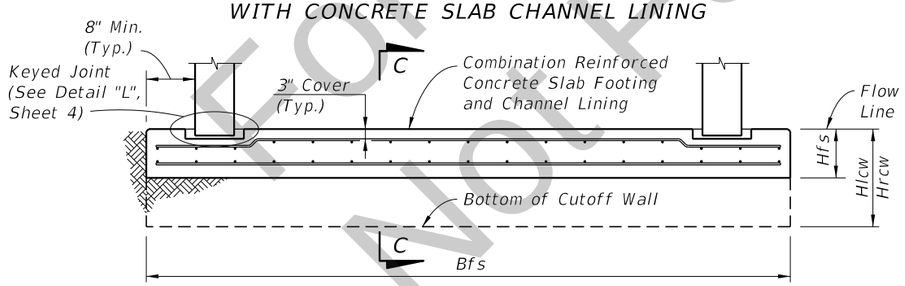


WINGWALL SECTION A-A

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.



SECTION C-C
SLAB CUTOFF WALL



TYPICAL SECTION THRU CULVERT SLAB FOUNDATION

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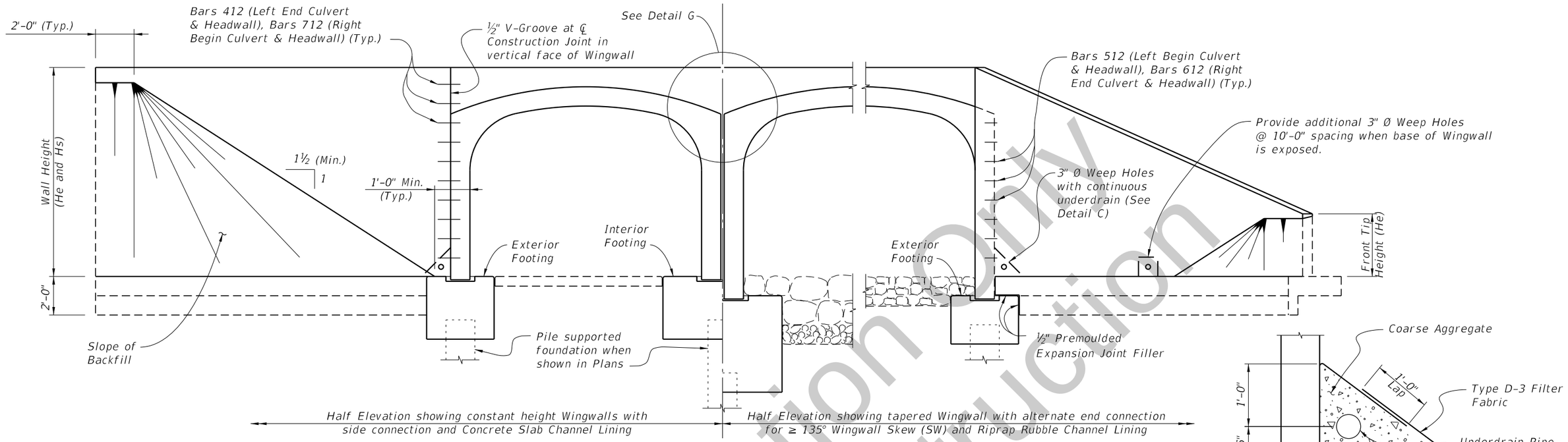
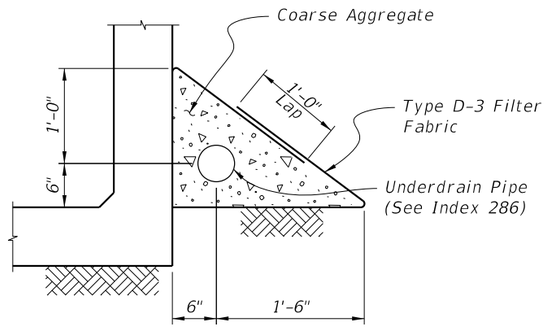
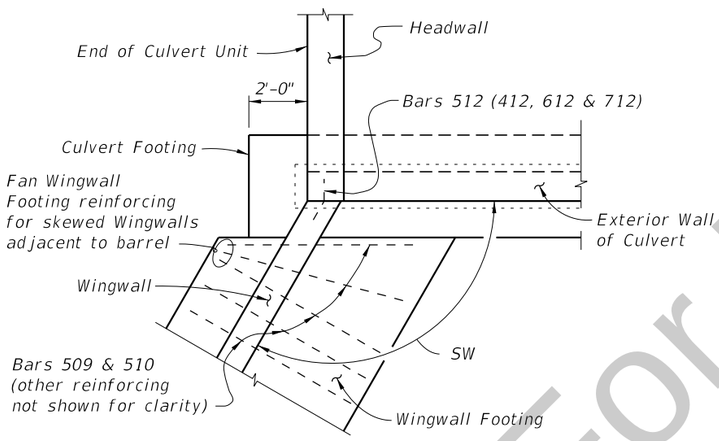
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/16			FDOT DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	D296	2 of 6



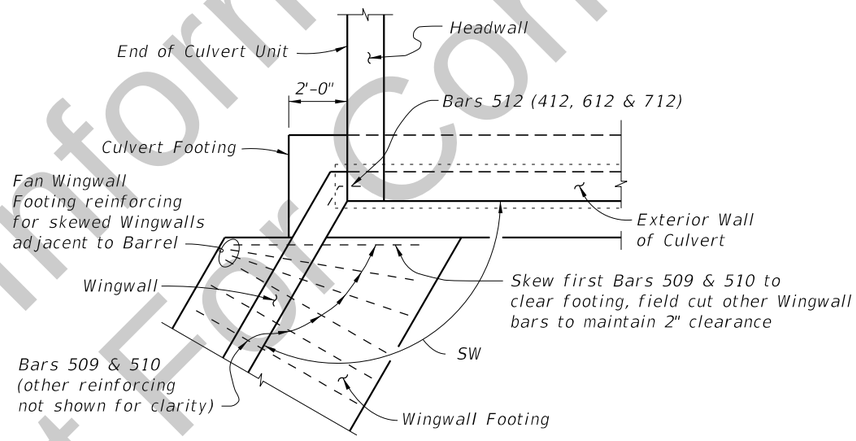
END ELEVATION - MULTIPLE BARREL CULVERT
(Arched Top Culvert shown, Flat Top Culvert similar)



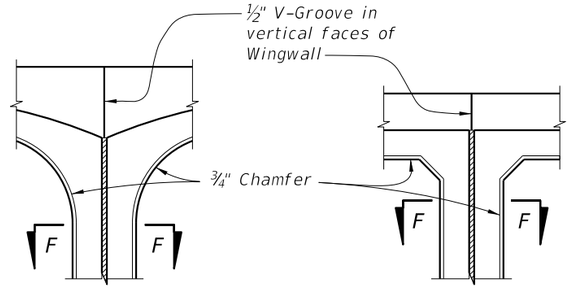
DETAIL "C"
UNDERDRAIN DETAIL
(Similar to Type II ~ Index 286)



DETAIL "D" - PLAN VIEW
WINGWALL TO CULVERT SIDE CONNECTION
(Left Begin Corner Shown, Other Corners Similar)



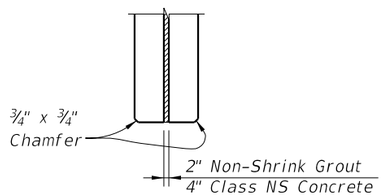
DETAIL "E" - PLAN VIEW
ALTERNATE WINGWALL TO CULVERT END CONNECTION
FOR WINGWALL SKEW (SW) ≥ 135°)
(Left Begin Corner shown, other Corners similar)



ARCHED TOP CULVERT

FLAT TOP CULVERT

DETAIL "G"



SECTION F-F

CROSS REFERENCES:
See Sheet 5 and 6 for location of Detail "D".
See Sheet 6 for location of Detail "E".

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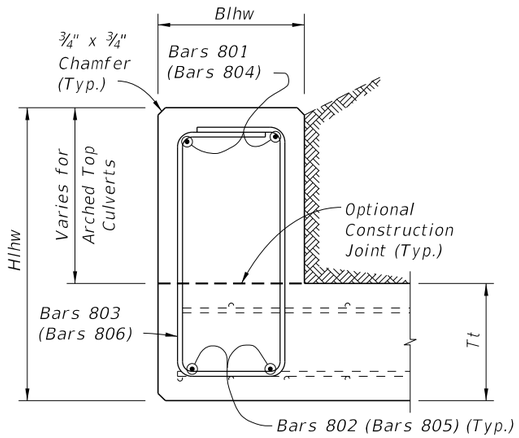
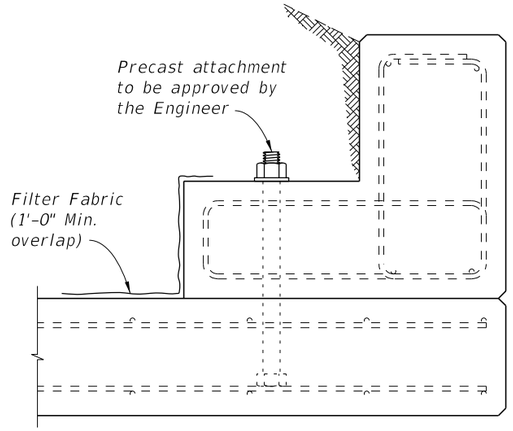
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/16			FDOT DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	D296	3 of 6

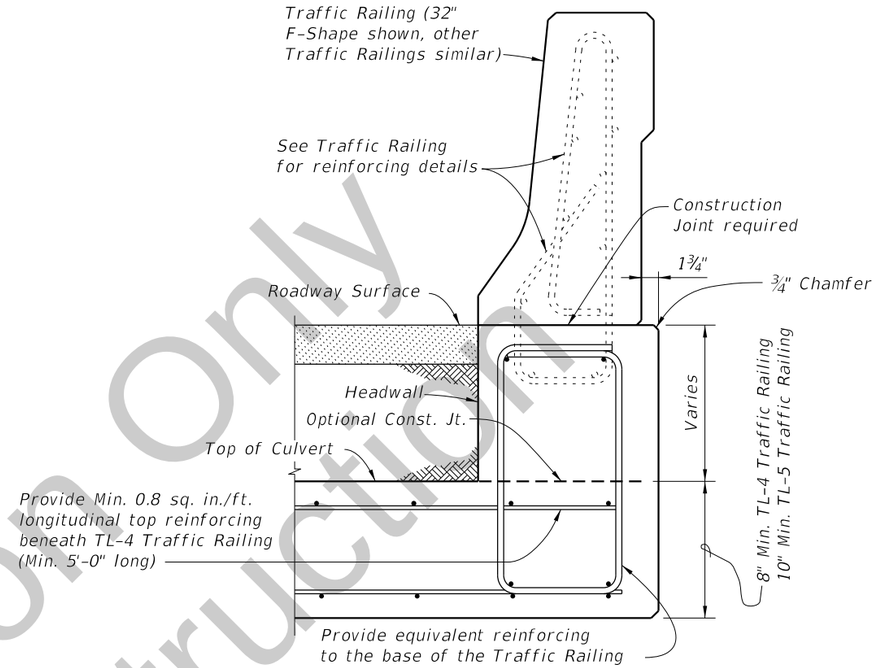


C-I-P OR INTEGRAL
LEFT HEADWALL SECTION
(Right Headwall similar)

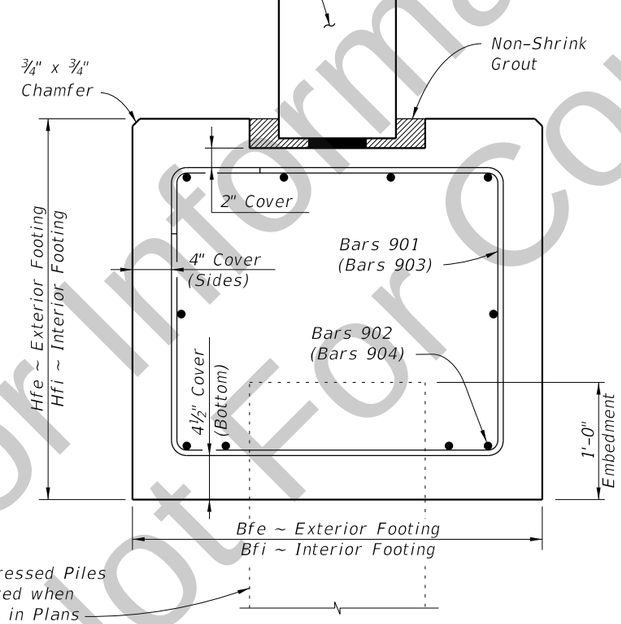


PRECAST NON-INTEGRAL
RIGHT HEADWALL SECTION
(Left Headwall similar)

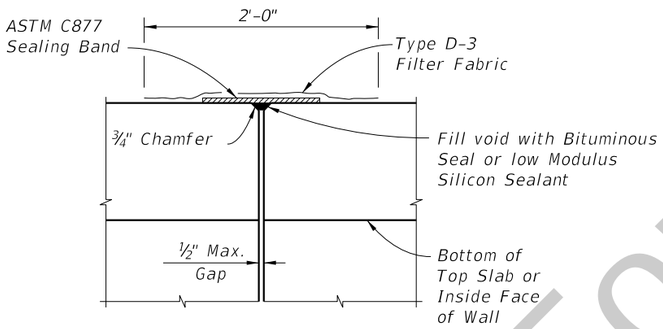
DETAIL "H"



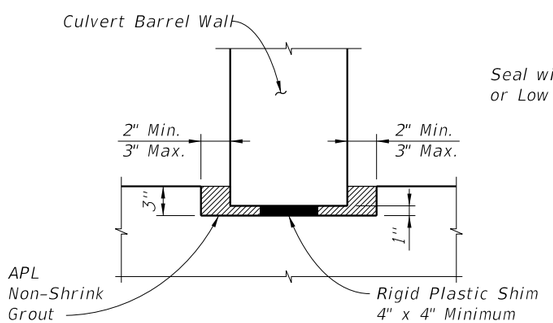
DETAIL "I"
TRAFFIC RAILING ATTACHMENT RIGHT HEADWALL SECTION
(Left Headwall similar)



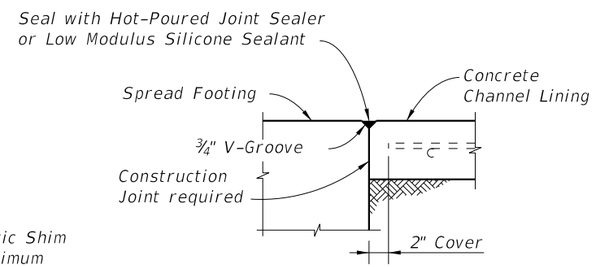
DETAIL "K"
TYPICAL FOOTING SECTION



DETAIL "J"
PRECAST BARREL BUTT JOINT DETAIL



DETAIL "L" - KEYED JOINT
IN FOOTING OR SLAB FOUNDATION



DETAIL "M"

CROSS REFERENCE:
See Sheet 2 for locations of Details "K", "L" & "M".
See Sheet 5 for locations of Details "J", "H" & "I".

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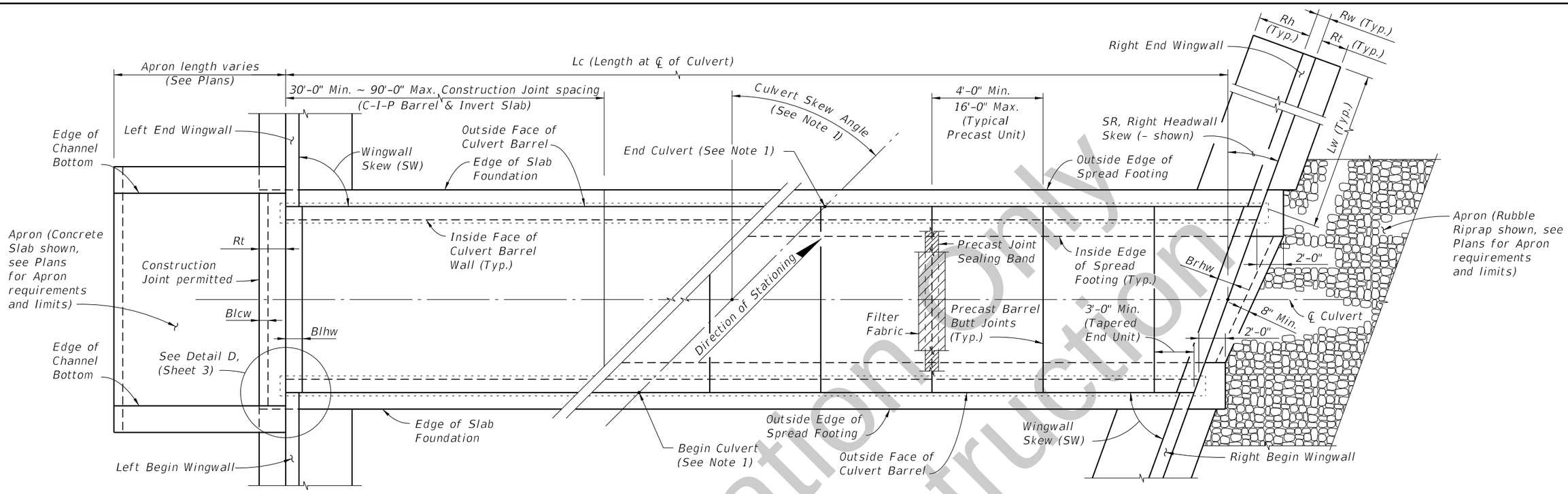
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/16			FDOT DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	D296	4 of 6

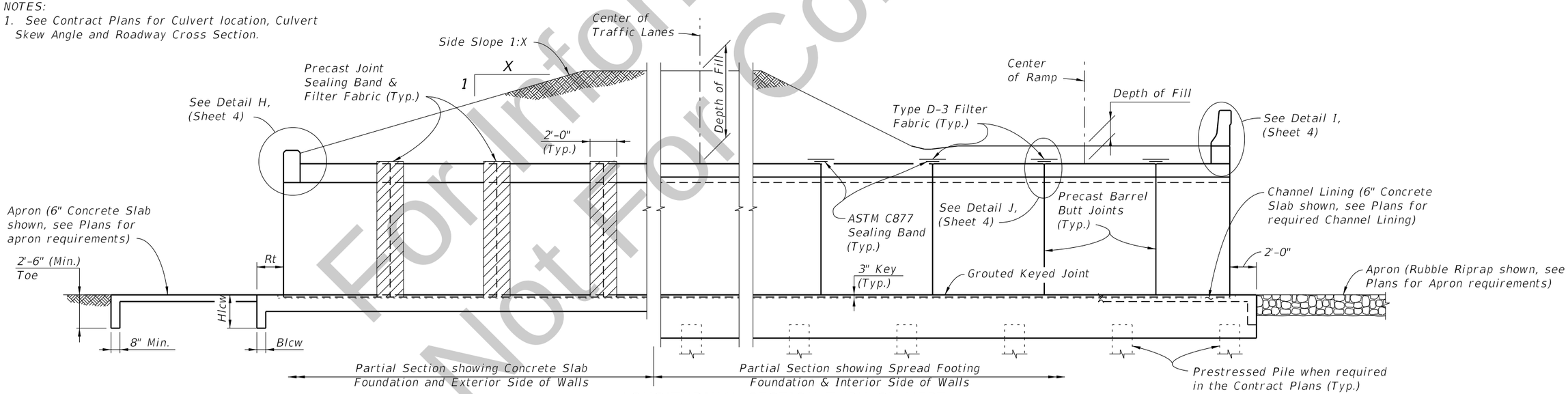


PARTIAL PLAN - SQUARED END
SHOWING C-I-P BARREL & SLAB FOUNDATION
(Left Side)

PARTIAL PLAN - SKEWED END
SHOWING PRECAST BARREL & SPREAD FOOTING
(Right Side)

SINGLE BARREL CULVERT
(Skewed Culvert With Parallel Wingwalls)

NOTES:
1. See Contract Plans for Culvert location, Culvert Skew Angle and Roadway Cross Section.



LONGITUDINAL SECTION THRU CULVERT
(Reinforcing Not Shown For Clarity)

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LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/16			FDOT DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	D296	5 of 6

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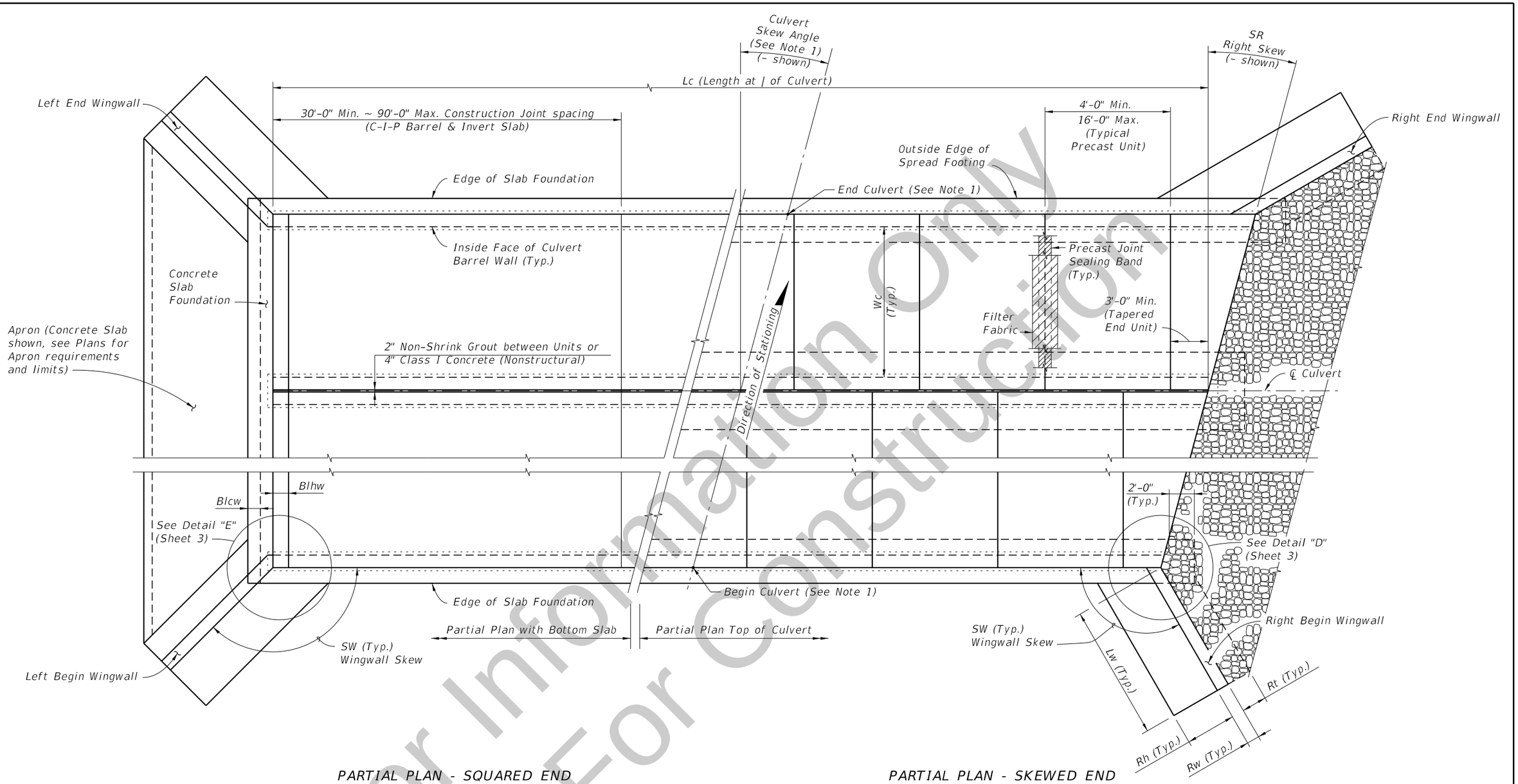

PARTIAL PLAN - SQUARED END
SHOWING SKEWED WINGWALLS & CONCRETE SLAB FOUNDATION
(Left Side)

PARTIAL PLAN - SKEWED END
SHOWING SKEWED WINGWALLS & SPREAD FOOTINGS
(Right Side - Rubble Riprap Channel Lining)

MULTIPLE BARREL CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

NOTES:
1. See Contract Plans for Culvert Location, Culvert Skew Angle and Roadway Cross Section.

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LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/16			FDOT DEVELOPMENTAL DESIGN STANDARDS	THREE-SIDED CONCRETE CULVERT DETAILS	D296	6 of 6