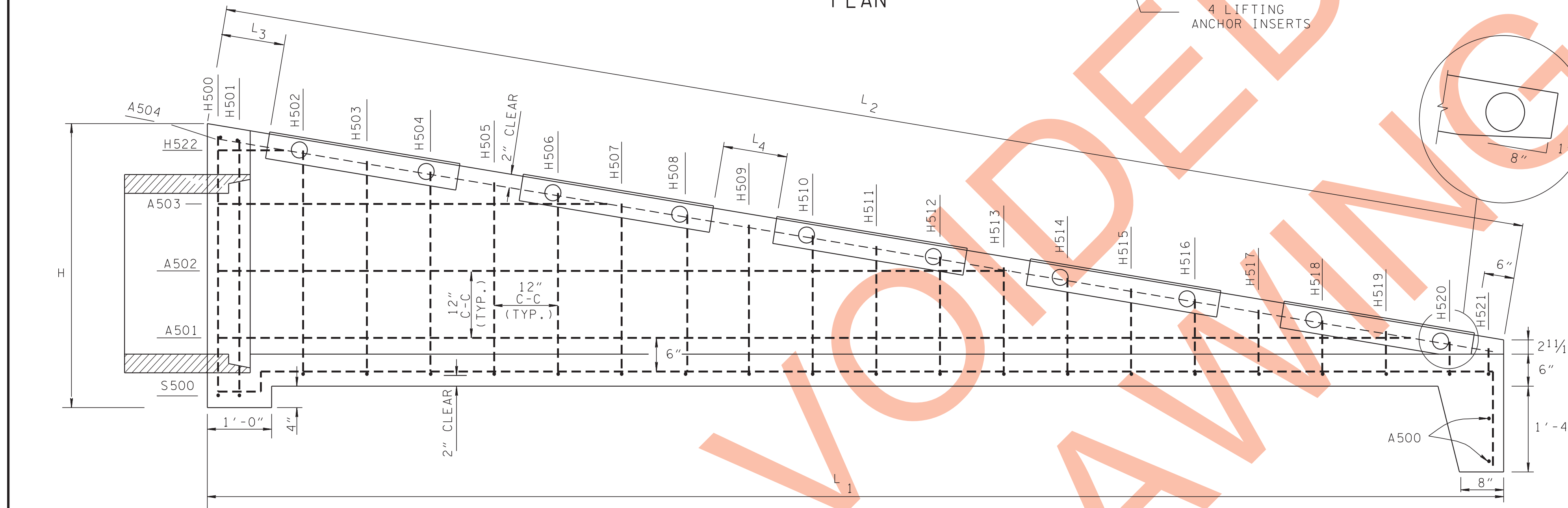
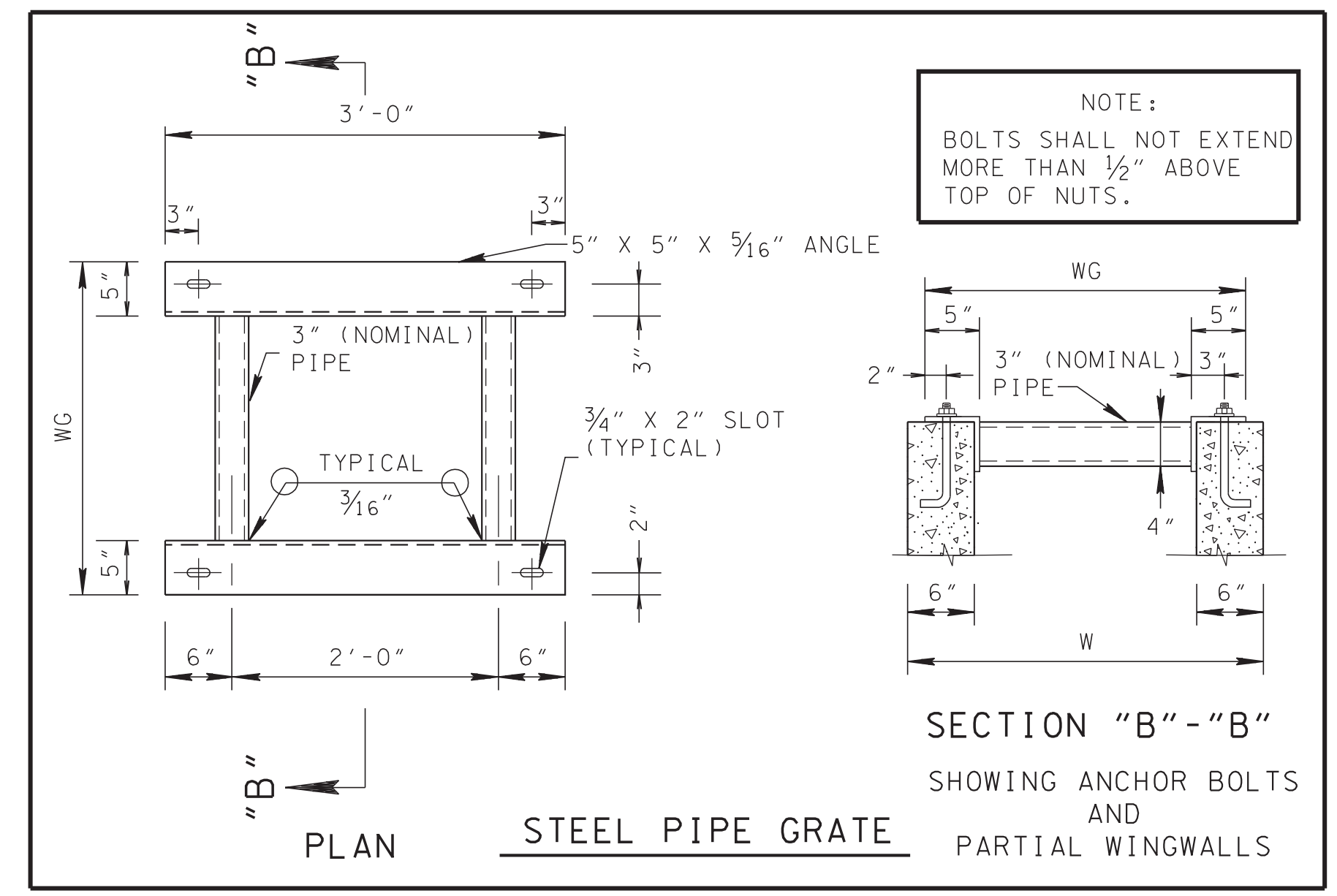
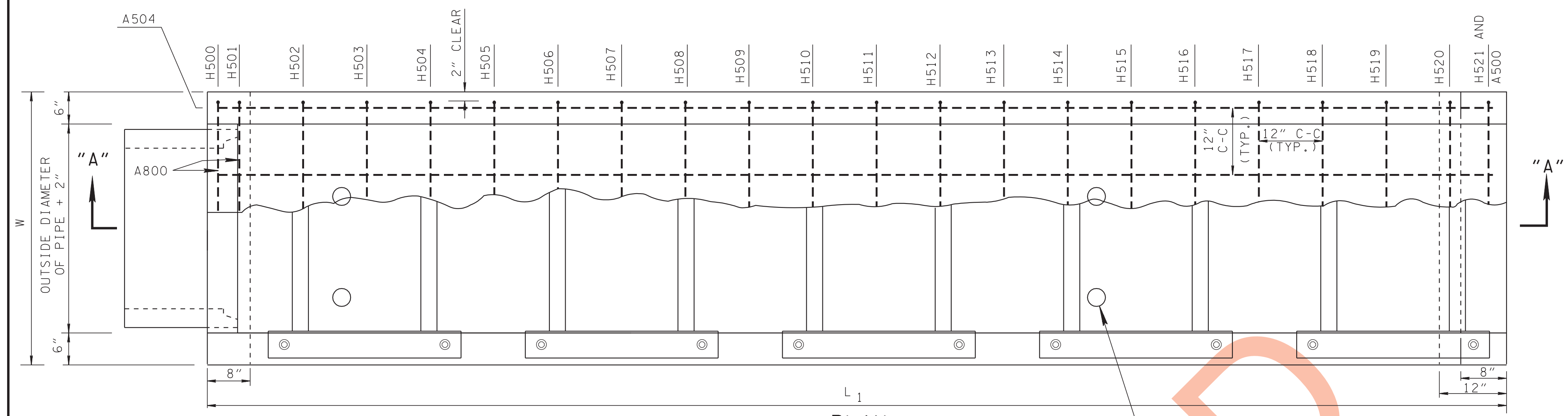
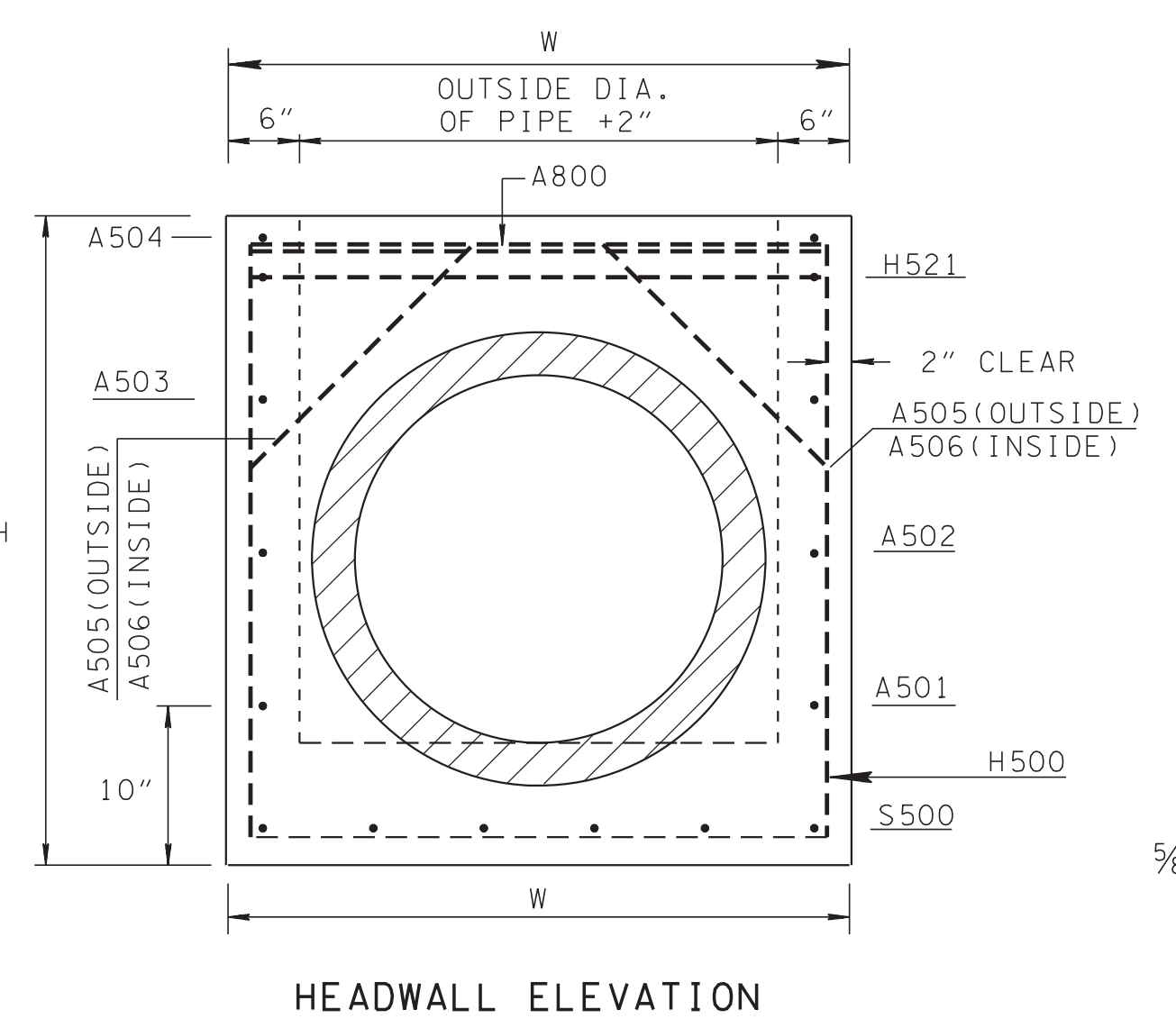


- REV. 7-19-10: DELETED GENERAL NOTE (E)
- REV. 4-15-05: MODIFIED REINFORCING STEEL IN HEADWALL AND INCREASED REINFORCING STEEL ACCORDINGLY IN TABLE.
- REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611-07.03. IN GENERAL NOTE (E) ADDED SUB-SECTION NOTE (E)
- REV. 6-1-09: ADDED GENERAL NOTE (E) UNDER (E)

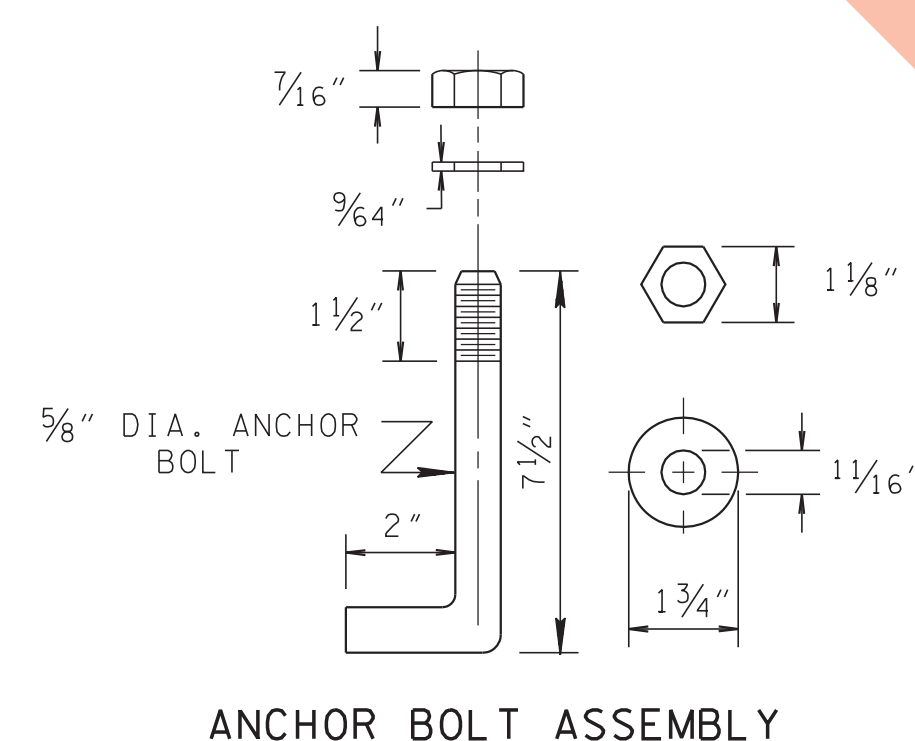


- ### GENERAL NOTES
- (1) CAST-IN-PLACE CONCRETE ENDWALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
 - (2) THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
 - (A) ANGLES - ASTM A36
 - (B) STEEL PIPE - ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS STANDARD, SCHEDULE 40 (WALL THICKNESS 0.216") - FOR 15" THRU 24" DIAMETER PIPE CULVERT. - ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS XXS (WALL THICKNESS 0.600") - FOR 30" THRU 48" DIAMETER PIPE CULVERT.
 - (C) WELDING - AWS SPECIFICATIONS D1.1 (LATEST EDITION) AS MODIFIED BY CURRENT AASHTO STANDARD SPECIFICATIONS FOR THE WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES AND SUBSEQUENT AASHTO SPECIFICATION-BRIDGES.
 - (D) THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.
 - (3) THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
 - (A) BOLTS, NUTS AND WASHERS - ASTM A307
 - (B) GALVANIZING - ASTM A153
 - (4) THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR PIPE ENDWALL.
 - (5) PRECAST UNIT NOTE
THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:
 - (A) APPROPRIATE SIZING AND LOCATION OF THE FOUR (4) LIFTING INSERTS SHALL BE THE RESPONSIBILITY OF THE FABRICATOR TO ASSURE BALANCED HANDLING DURING INSTALLATION OF THE PRECAST ENDWALL.
 - (B) THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
 - (C) PIPE OPENINGS THROUGH HEADWALL ARE CAST TWO INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE PROPOSED PIPE.
 - (D) PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
- CONCRETE: $F_c = 4,500$ POUNDS PER SQUARE INCH MINIMUM AT 28 DAYS.
 REINFORCING STEEL: ASTM A615, $F_y = 60,000$ POUNDS PER SQUARE INCH.
 ALL REINFORCING STEEL IS TO BE INSTALLED AS DETAILED ON THIS STANDARD DRAWING.
 ENDWALL UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED ENDWALL UNITS AT HIS EXPENSE.
- (6) PAYMENT WILL BE MADE UNDER:
 - ITEM NUMBER 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)---CUBIC YARD.
 - ITEM NUMBER 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)---POUND.
 - ITEM NUMBER 611-07.03, STRUCTURAL STEEL (PIPE ENDWALLS)---POUND.



PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS					STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		ESTIMATED QUANTITIES			
	H	L ₁	L ₂	L ₃	L ₄	WG	NO. REQD.	CLASS "A" CONCRETE CU. YD.	STEEL BAR REINF. (1) LB.	STRUCT. STEEL LB.	
18"	3'-2"	12'-8"	12'-10 1/8"	1'-4 1/8"	1'-0"	3'-1"	2'-10"	3	1.84	238	277
24"	3'-9"	16'-2"	16'-4 1/16"	0'-10 1/16"	1'-0"	3'-8"	3'-5"	4	2.57	360	405
30"	4'-5"	20'-2"	20'-5 3/16"	0'-11 3/8"	1'-0"	4'-3"	4'-0"	5	3.64	491	898

(1) SEE D-SEW-6DD FOR BILL OF STEEL.



ALTERNATE DRILLED IN ANCHORS

CERTIFICATION :
 THE CONTRACTOR SHALL FURNISH CERTIFIED ANCHOR PULL OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE AS PRESCRIBED BY TENNESSEE HIGHWAY SPECIFICATIONS. THE REQUIRED ULTIMATE LOAD FOR 5/8" DIAMETER ANCHORS IS 11,000 POUNDS.

IN PLACE REQUIREMENTS :
 THE UNITS SHALL BE SUBSET 3/32" TO 1/4" AND TORQUED, WITH STEEL PIPE GRATE IN PLACE, TO AN EQUIVALENT DIRECT PULL OUT LOAD 60 PERCENT OF REQUIRED ULTIMATE LOAD. SLIPPAGE SHALL NOT EXCEED 1/4". THE DEPARTMENT WILL PERFORM TESTING OF ANCHORS ON SITE TO INSURE THE SPECIFIED IN PLACE REQUIREMENTS. INSTALLATIONS NOT MEETING THESE REQUIREMENTS MUST BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

THIS ENDWALL MAY BE USED FOR SIDEDRAINS IN LIEU OF THE SAFETY ENDWALL SHOWN ON STANDARD DRAWING D-SEW-6DA. IT IS TO BE USED FOR SIDEDRAINS ONLY.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

CONCRETE ENDWALL
 TYPE "SD" WITH
 STEEL PIPE GRATE
 FOR 18" THRU 30"
 PIPES - 6:1 SLOPE

5-15-00 D-SEW-6DC