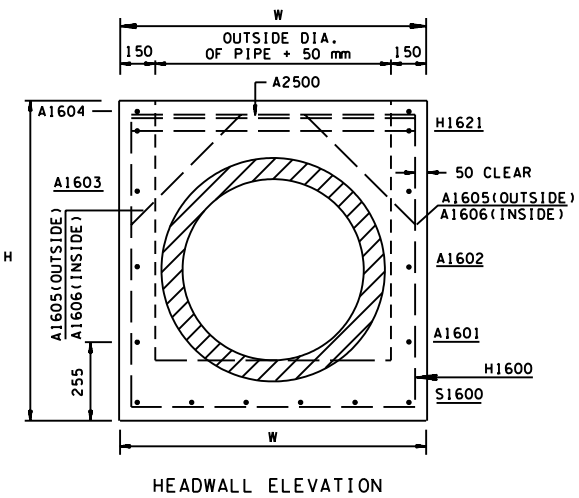
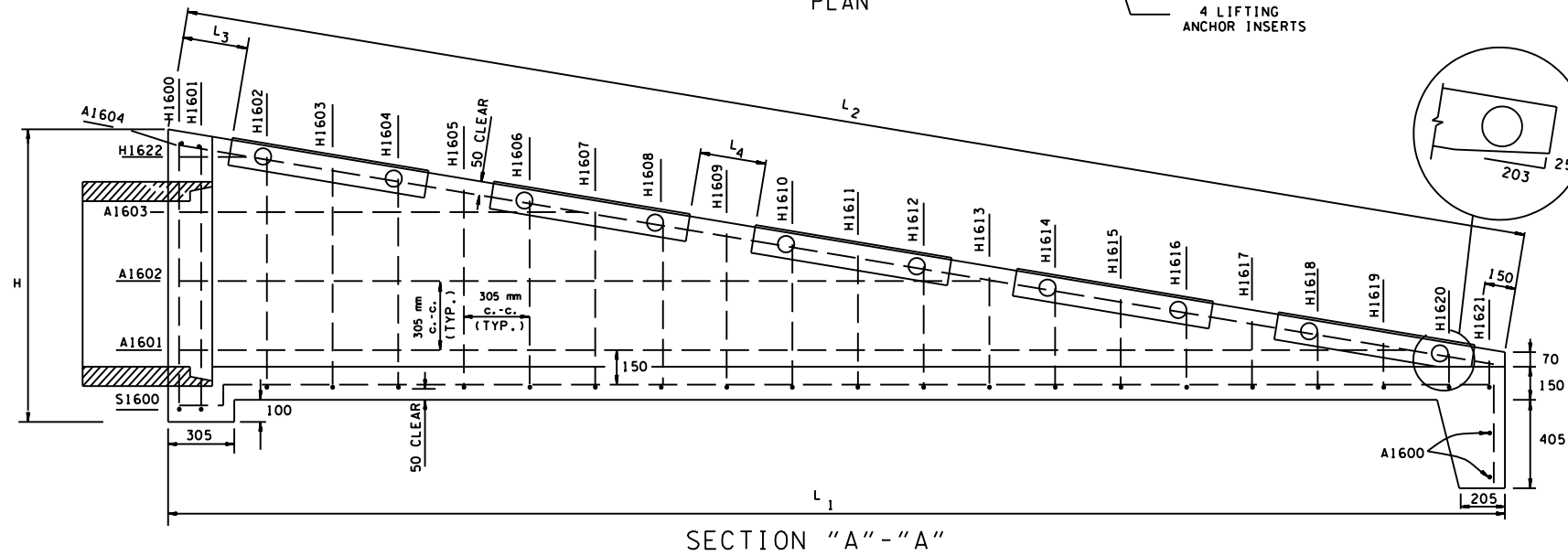
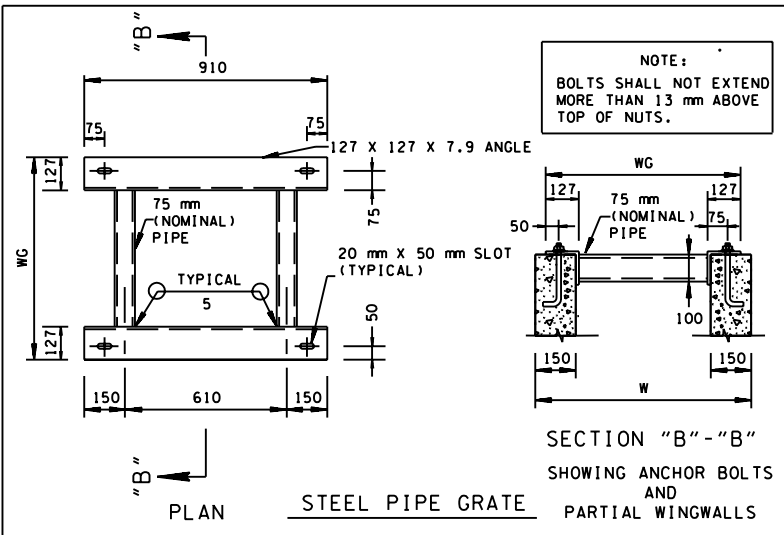
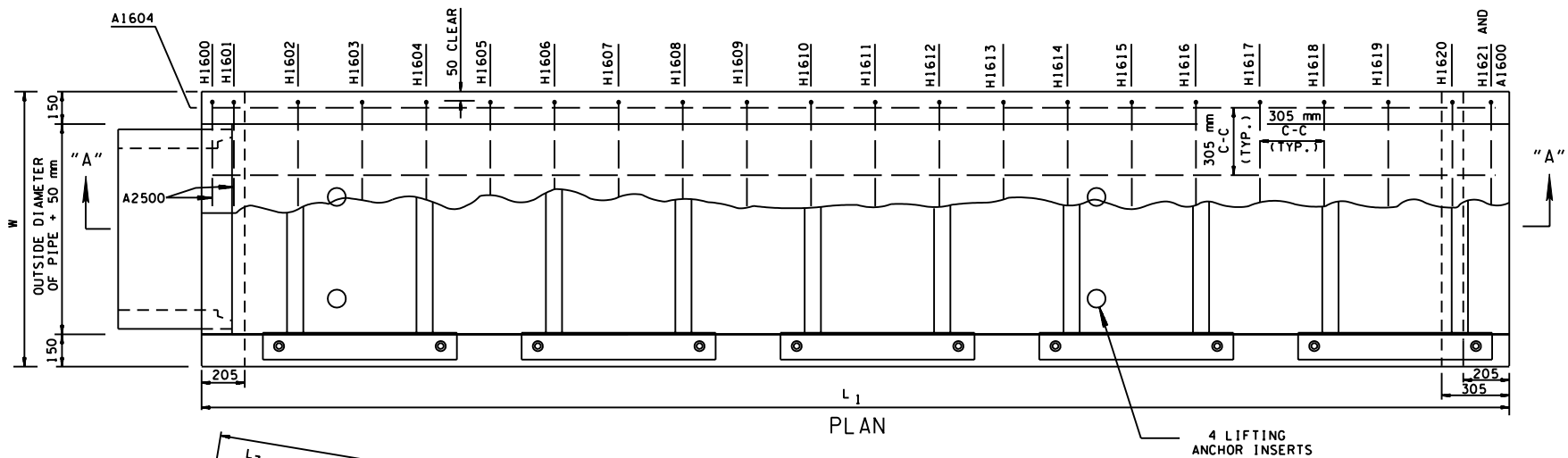


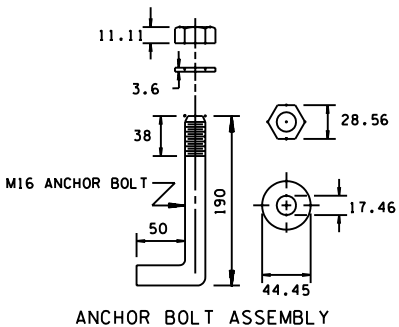
REV. 4-15-05: MODIFIED REINFORCING STEEL IN HEADWALL AND INCREASED REINFORCING STEEL ACCORDINGLY IN TABLE.

REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611M07.03. IN GENERAL NOTE ② ADDED SUB-SECTION NOTE ⑥.



PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS						STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		ESTIMATED QUANTITIES		
	H	L ₁	L ₂	L ₃	L ₄	W	WG	NO. REOD.	CLASS "A" CONCRETE m ³	STEEL BAR REINF. ① kg	STRUCT. STEEL kg
450	965	3860	3915	410	255	940	865	3	2.41	108	126
600	1145	4930	4995	270	255	1120	1040	4	3.36	163	184
750	1345	6145	6230	290	255	1295	1220	5	4.76	223	407

① SEE DM-SEW-600 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 M16 ANCHORS IS 49000 N.

IN PLACE REQUIREMENTS :
THE UNITS SHALL BE SUBSET 2.4 mm TO 6.4 mm 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 6.4 mm. 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.

- GENERAL NOTES
- CAST-IN-PLACE CONCRETE ENDWALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
 - THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
 - ANGLES ASTM A36
 - STEEL PIPE ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS STANDARD, SCHEDULE 40 (WALL THICKNESS 5.49 mm) - FOR 450 mm AND 600 mm DIAMETER PIPE CULVERT, ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS XXS (WALL THICKNESS 15.24 mm) - FOR 750 mm DIAMETER PIPE CULVERT.
 - 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.
 - THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.
 - THE FORWARD EDGES OF THE FIRST GRATE UNIT ARE TO HAVE A 203 mm X 25 mm TRIANGLE CUT BY METHOD OF SAWING ON EITHER SIDE AS SHOWN IN BLOW UP VIEW. THIS WILL ASSURE A SMOOTH MACHINED EDGE TO THE FIRST GRATE UNIT.
 - THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
 - BOLTS, NUTS AND WASHERS ASTM A307
 - GALVANIZING ASTM A153
 - 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.
 - PRECAST UNIT NOTE:
THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:
 - 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.
 - THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF 25 mm OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
 - PIPE OPENINGS THROUGH HEADWALL ARE CAST 50 mm GREATER THAN THE OUTSIDE DIAMETER OF THE PROPOSED PIPE.
 - PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
- CONCRETE: F'c=31 MPa MINIMUM AT 28 DAYS.
REINFORCING STEEL: ASTM A615M, Fy=400 MPa.
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.
- PAYMENT WILL BE MADE UNDER:
ITEM NUMBER 611M07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC METER.
ITEM NUMBER 611M07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)----KILOGRAM.
ITEM NUMBER 611M07.03, STRUCTURAL STEEL (PIPE ENDWALLS)----KILOGRAM.

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

ALL UNITS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION



CONCRETE ENDWALL
TYPE "SD" WITH
STEEL PIPE GRATE
FOR 450 mm THRU 750 mm
PIPES - 6:1 SLOPE
5-15-00 DM-SEW-6DC

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