

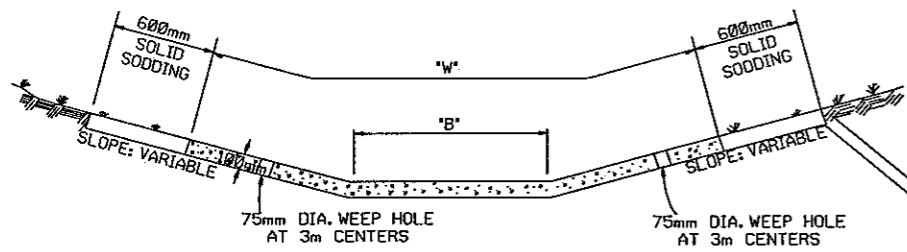
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
STANDARD METRIC ROADWAY DRAWINGS  
LATEST REVISIONS 7-26-12



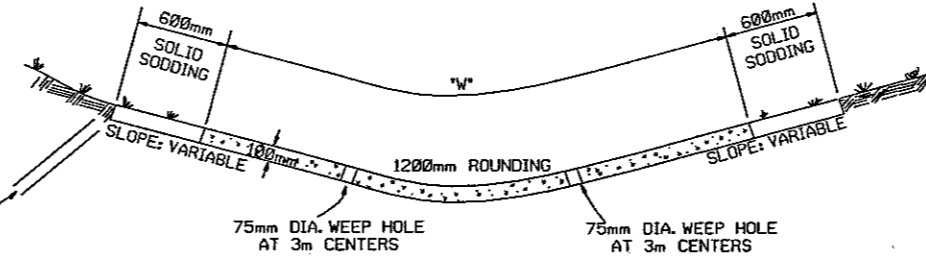
CDP-1(M)	11/17/10	CONCRETE DITCH PAVING	PCC-1(M)	<i>PENDING</i>	CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING
CG-1(M)	11/29/07	CURBING DETAILS	PCM-1(M)	<i>PENDING</i>	METAL PIPE CULVERT FILL HEIGHTS & BEDDING
CPCR-1(M)	4/3/97	DETAILS OF CONCRETE PAVEMENT CONTINUOUSLY REINFORCED	PCP-1(M)	<i>PENDING</i>	PLASTIC PIPE CULVERT (HIGH DENSITY POLYETHYLENE)
CPCR-2(M)	4/3/97	DETAILS OF CONCRETE PAVEMENT CONTINUOUSLY REINFORCED DEFORMED WIRE MAT	PCP-2(M)	<i>PENDING</i>	PLASTIC PIPE CULVERT (PVC F949)
CPCR-3(M)	4/3/97	DETAILS OF TERMINAL JOINTS FOR CONCRETE PAVEMENT CONTINUOUSLY REINFORCED	PM-1(M)	11/17/10	PAVEMENT MARKING DETAILS
CPCR-4(M)	4/3/97	DETAILS OF ENTRANCE & EXIT RAMP FOR CONCRETE PAVEMENT CONTINUOUSLY REINFORCED	PM-2(M)	12/15/11	PERMANENT PAVEMENT MARKING ON ACCESS CONTROLLED ROADWAYS
CPTJ-6A(M)	5/25/06	TRANSVERSE & LONGITUDINAL JOINTS FOR CONCRETE PAVEMENT (NON-REINFORCED)	PU-1(M)	4/10/03	DETAILS OF PIPE UNDERDRAINS
DR-1(M)	11/29/07	DETAILS OF DRIVEWAYS & ISLANDS	RCB-1(M)	7/26/12	REINFORCED CONCRETE BOX CULVERT DETAILS
FES-1(M)	4/3/97	FLARED END SECTION	RCB-2(M)	11/20/03	EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS
FES-2(M)	10/18/96	FLARED END SECTION	RCB-3(M)	4/3/97	METHOD OF EXTENDING EXISTING R.C. BOX CULVERTS
FPC-2A(M)	7/20/95	PIPE SIPHON	RRS-1(M)	11/20/08	PAVEMENT MARKING FOR RAILROAD CROSSING
FPC-9(M)	11/16/01	DETAILS OF DROP INLETS & JUNCTION BOXES	SE-1(M)	4/26/96	TABLES AND METHOD OF SUPERELEVATION FOR ONE-WAY TRAFFIC
FPC-9D(M)	8/22/02	DETAILS OF DROP INLETS	SE-2(M)	10/18/96	TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC
FPC-9E(M)	8/22/02	DETAILS OF DROP INLETS (TYPE C)	SES-1(M)	4/3/97	SAFETY END SECTION FOR CIRCULAR AND ARCH PIPES
FPC-9M(M)	8/22/02	DETAILS OF DROP INLET (TYPE MO)	SHS-2(M)	10/12/95	U-CHANNEL POST ASSEMBLIES
FPC-9N(M)	7/2/98	DETAILS OF DROP INLETS AND SPILLWAY OUTLET	SI-1(M)	4/17/08	DETAILS OF SPECIAL ITEMS
FPC-9S(M)	<i>PENDING</i>	DETAILS OF DROP INLET & JUNCTION BOX (TYPE ST)	TC-1(M)	12/15/11	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION
G-1(M)	4/3/97	STEEL GRATE ASSEMBLY (TYPE 1)	TC-2(M)	3/11/10	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION
G-2(M)	4/3/97	STEEL GRATE ASSEMBLY (TYPE 1)	TC-3(M)	10/15/09	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION
G-3(M)	4/3/97	STEEL GRATE ASSEMBLY (TYPE 1)	TC-4(M)	10/15/09	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION - TEMPORARY PRECAST BARRIER
GC-1(M)	10/18/96	GUARD CABLE	TC-5(M)	10/15/09	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION - TEMPORARY PRECAST BARRIER
GR-7(M)	7/14/10	GUARD RAIL DETAILS (TYPE C) STREET/ROAD BARRICADE OR TEMPORARY INSTALLATION	TEC-1(M)	12/15/11	TEMPORARY EROSION CONTROL DEVICES
GR-8(M)	7/14/10	GUARD RAIL DETAILS	TEC-2(M)	7/20/95	TEMPORARY EROSION CONTROL DEVICES
GR-8A(M)	7/14/10	GUARD RAIL DETAILS	TEC-3(M)	7/20/95	TEMPORARY EROSION CONTROL DEVICES
GR-9(M)	4/17/08	GUARD RAIL DETAILS	TEC-4(M)	7/26/12	TEMPORARY EROSION CONTROL DEVICES
GR-9A(M)	4/17/08	GUARD RAIL DETAILS	TR-1(M)	1/12/00	DETAILS OF STANDARD TURNOUT FOR ENTRANCE & EXIT RAMP
GR-10(M)	7/14/10	GUARD RAIL DETAILS	TR-1A(M)	8/22/02	DETAILS OF STANDARD TURNOUT FOR ENTRANCE & EXIT RAMP (NON-REINFORCED)
GR-10A(M)	7/14/10	GUARD RAIL DETAILS	WF-1(M)	8/22/02	WIRE FENCE TYPE A AND B
GR-11(M)	7/14/10	CONCRETE BARRIER WALL (PIER PROTECTION TYPE A)	WF-2(M)	7/20/95	WIRE FENCE WATER GAPS
GRT-1(M)	7/14/10	GUARD RAIL DETAILS	WF-3(M)	11/17/10	CHAIN LINK FENCE
IB-1(M)	10/15/09	IMPACT ATTENUATION BARRIER	WF-4(M)	8/22/02	WIRE FENCE TYPE C AND D
MB-1(M)	11/18/04	MAILBOX DETAILS	WR-1(M)	11/10/05	WHEELCHAIR RAMPS NEW CONSTRUCTION AND ALTERATIONS
PBC-1(M)	7/26/12	PRECAST CONCRETE BOX CULVERTS	WR-2(M)	10/9/03	WHEELCHAIR RAMPS ALTERATIONS ONLY

REFER TO TABULATION OF QUANTITIES FOR 'W' & 'B' DIMENSIONS

REFER TO TABULATION OF QUANTITIES FOR 'W' DIMENSIONS



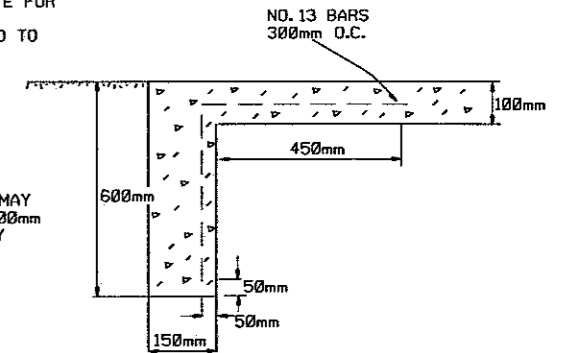
TYPE A



TYPE B

EXCAVATE TO NEAT LINES TO CONSTRUCT DITCH PAVING AND SOLID SODDING.

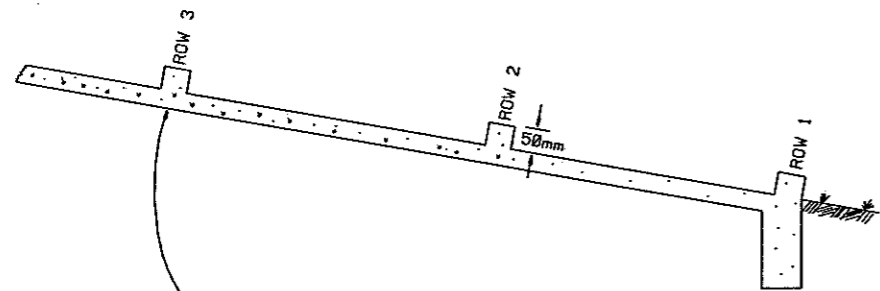
THE STEEL AND ADDITIONAL CONCRETE FOR THE WALLS SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR 'CONCRETE DITCH PAVING.'



TOE WALL DETAIL FOR CONCRETE DITCH PAVING

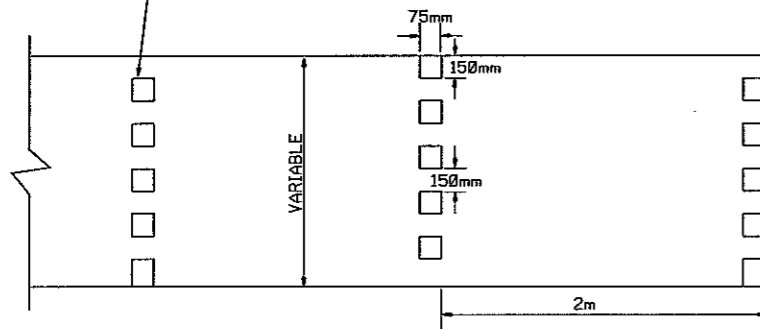
GENERAL NOTES

1. THE FULL WIDTH OF EACH SECTION SHALL BE POURED MONOLITHICALLY.
2. TOE WALLS TO BE CONSTRUCTED FULL WIDTH AT EACH END OF DITCH PAVING, AND POURED MONOLITHICALLY.
3. SOLID SOD ALONG DITCH PAVING TO BE PLACED WITHIN 14 DAYS OF DITCH PAVING CONSTRUCTION.
4. 25mm WIDE TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE DITCH PAVING AT 13.5m INTERVALS. THE SPACE SHALL BE FILLED WITH APPROVED JOINT FILLER COMPLYING WITH AASHTO M213.



NUMBER OF ELEMENTS PER ROW VARIES WITH WIDTH OF PAVING SPECIFIED

ENERGY DISSIPATORS TO BE USED FOR THE ENTIRE LENGTH OF DITCH WHEN SLOPE OF DITCH PAVING EXCEEDS 7%. THE DISSIPATORS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR CONCRETE DITCH PAVING.



ENERGY DISSIPATORS  
(NO SCALE)

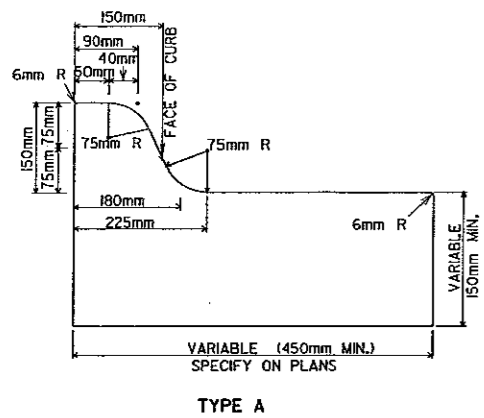
ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE DITCH PAVING

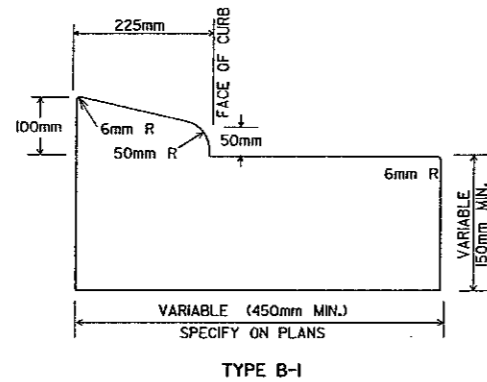
STANDARD DRAWING CDP-1 (M)

DATE	REVISION	DATE FILMED
11-17-10	REVISED GENERAL NOTES	
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
7-20-95	CONVERTED TO METRIC	

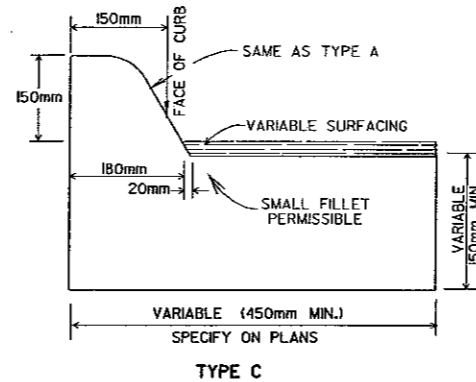




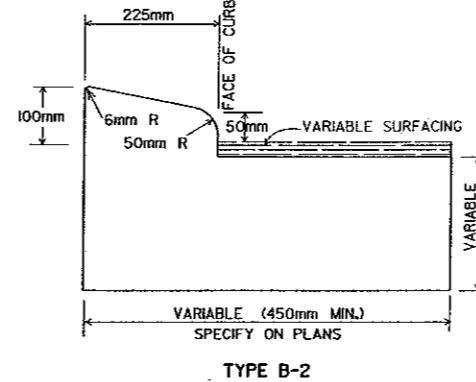
TYPE A



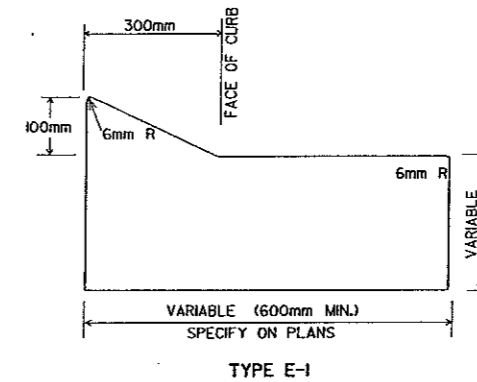
TYPE B-1



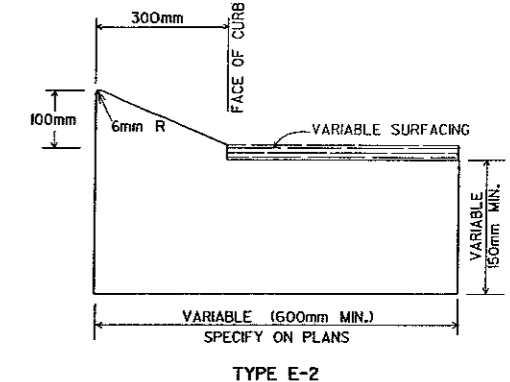
TYPE C



TYPE B-2

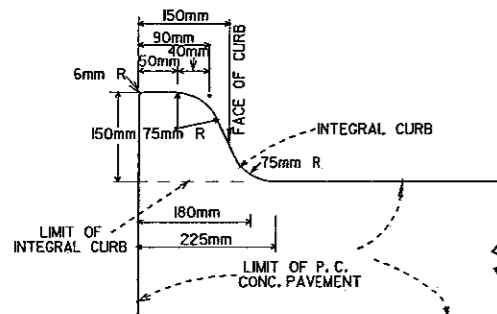


TYPE E-1

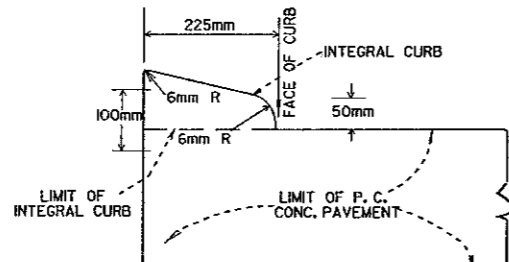


TYPE E-2

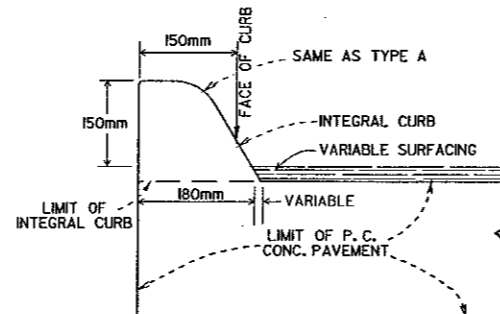
CONCRETE COMBINATION CURB AND GUTTER



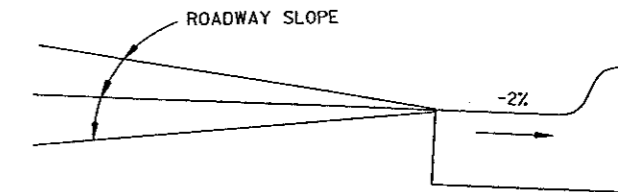
TYPE A



TYPE B

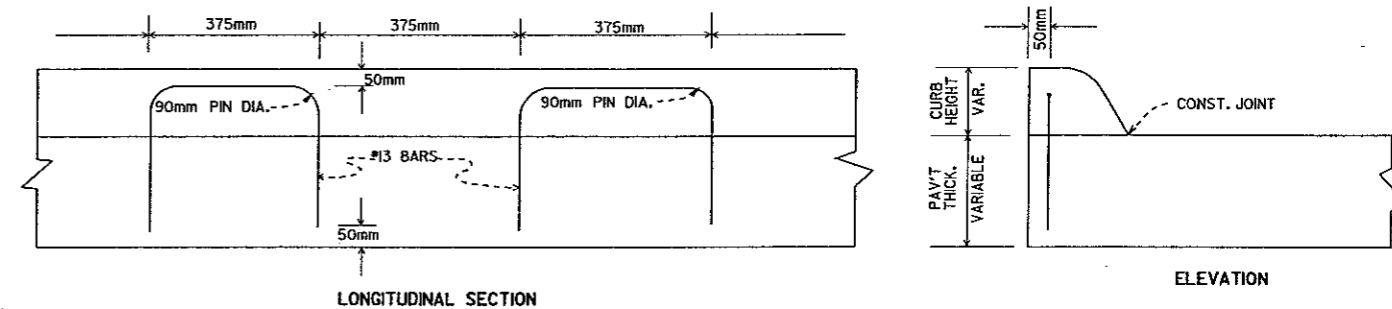


TYPE C

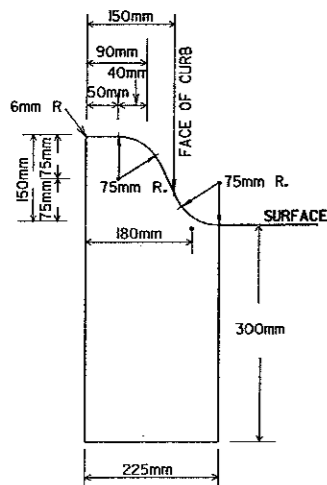


DETAIL OF GUTTER SLOPE  
GUTTER SHALL BE CONSTRUCTED ON 2% SLOPE AWAY FROM ROADWAY, REGARDLESS OF ROADWAY SLOPE.

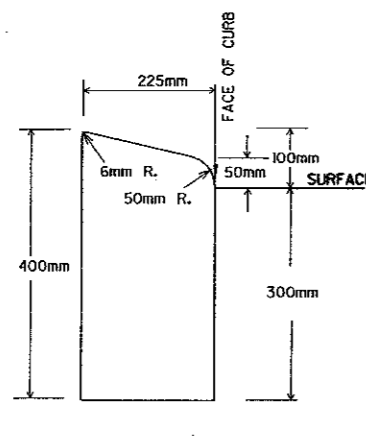
INTEGRAL CURB



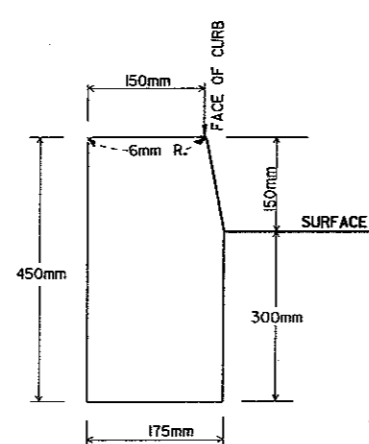
ALTERNATE CONSTRUCTION METHOD FOR INTEGRAL CURB



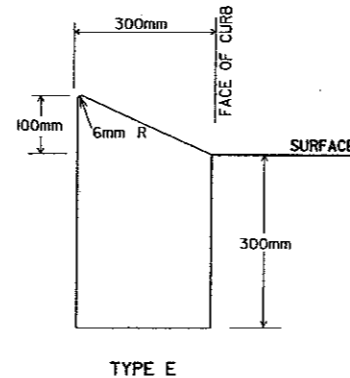
TYPE A



TYPE B

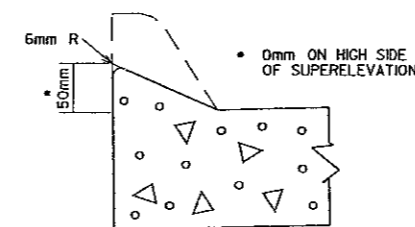


TYPE D



TYPE E

CONCRETE CURB



DETAILS OF MODIFIED CURB

NOTE: USE MODIFIED CURB AS SPECIFIED ON STD. DR-KM). COMPENSATION FOR MODIFIED CURB WILL BE CONSIDERED IN THE PRICE BID FOR THE TYPE OF CURB OR CURB AND GUTTER SPECIFIED.

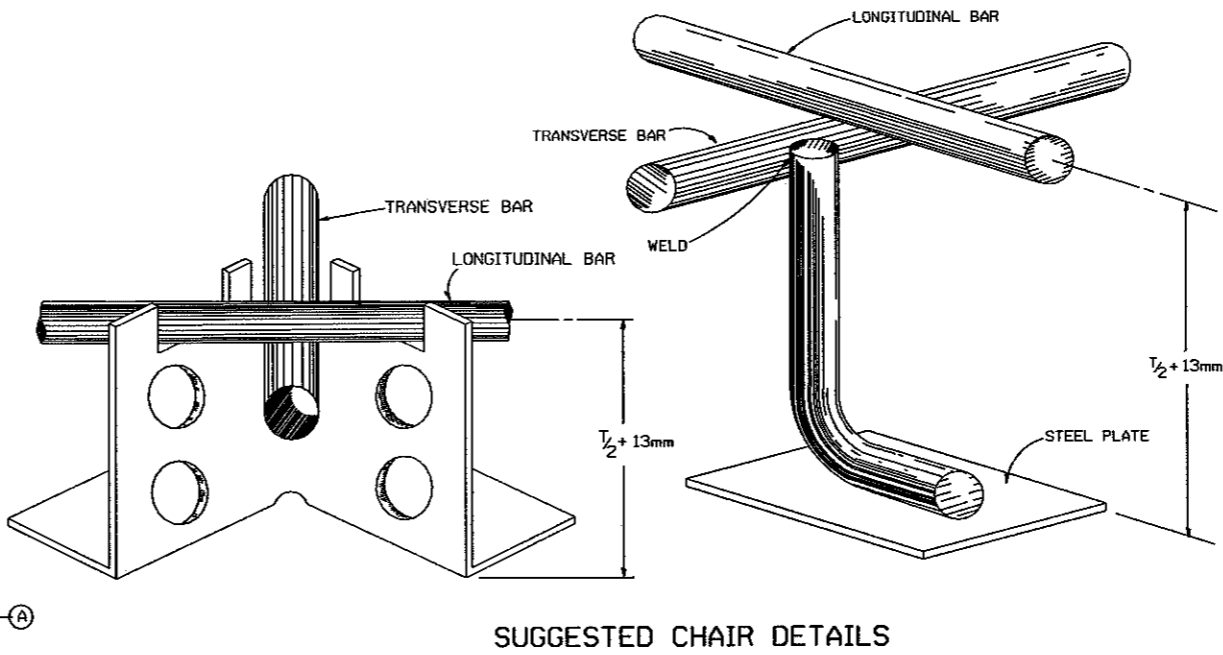
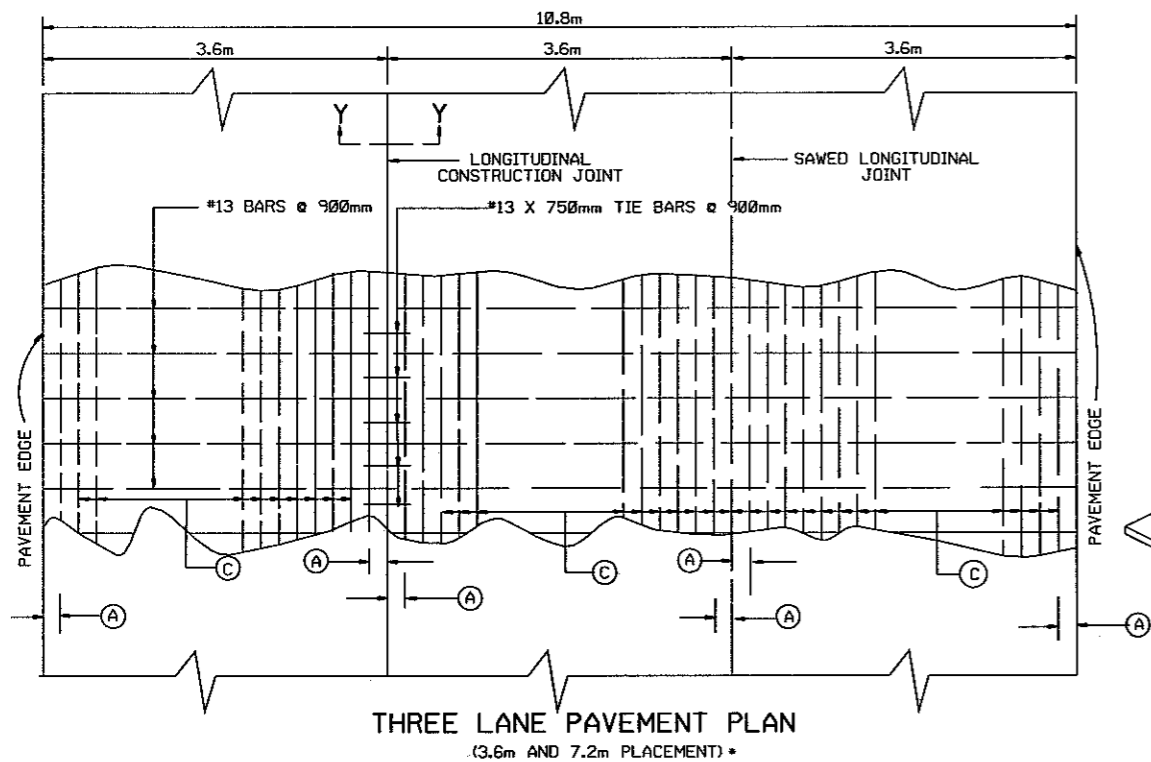
ARKANSAS STATE HIGHWAY COMMISSION

CURBING DETAILS

STANDARD DRAWING CG-1 (M)

8-23-07	REVISED GUTTER SLOPE & MODIFIED CURB DETAIL	
8-10-05	ADDED DETAILS OF TYPE E CURBS	
8-18-98	REVISED MODIFIED CURB	
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
7-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE DRAWN





**GENERAL NOTES**

SAWED JOINT AND JOINT SEALANT FOR TRANSVERSE CONSTRUCTION JOINT, LONGITUDINAL CONSTRUCTION JOINT AND SAWED LONGITUDINAL JOINT SHALL CONFORM TO THE DETAILS SHOWN FOR SAWED LONGITUDINAL JOINT ON STANDARD DRAWING CPTJ-6(M).

NO EXPANSION JOINTS WILL BE USED EXCEPT AT STRUCTURE ENDS OR FIXED OBJECTS AS SHOWN ELSEWHERE IN THE PLANS.

FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND REINFORCEMENT REFER TO THE GOVERNING SPECIFICATIONS FOR "CONTINUOUSLY REINFORCED CONCRETE PAVEMENT."

FOR DETAILS OF PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE REFER TO TYPICAL SECTIONS.

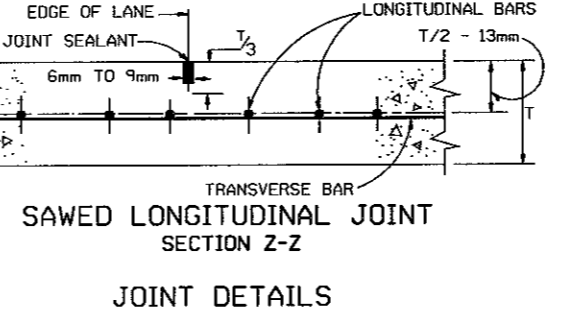
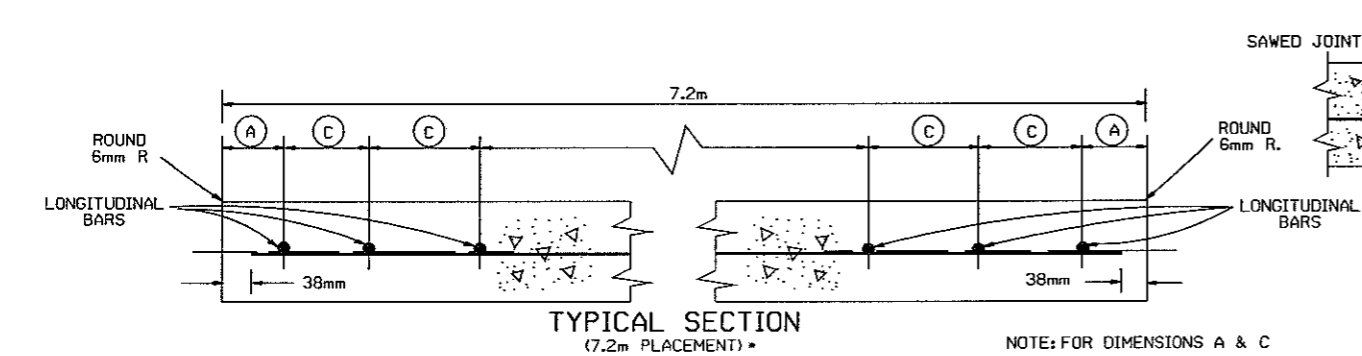
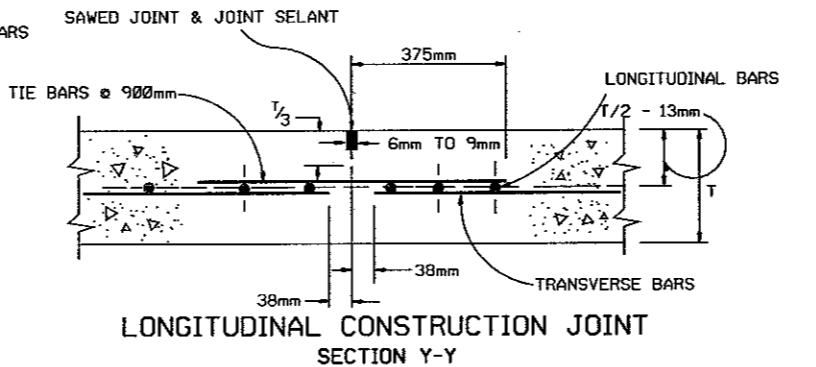
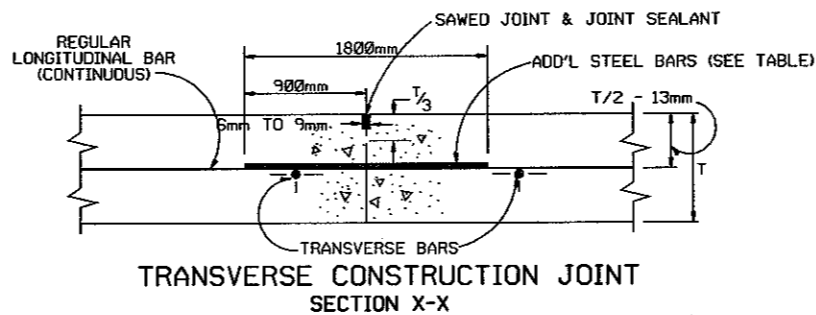
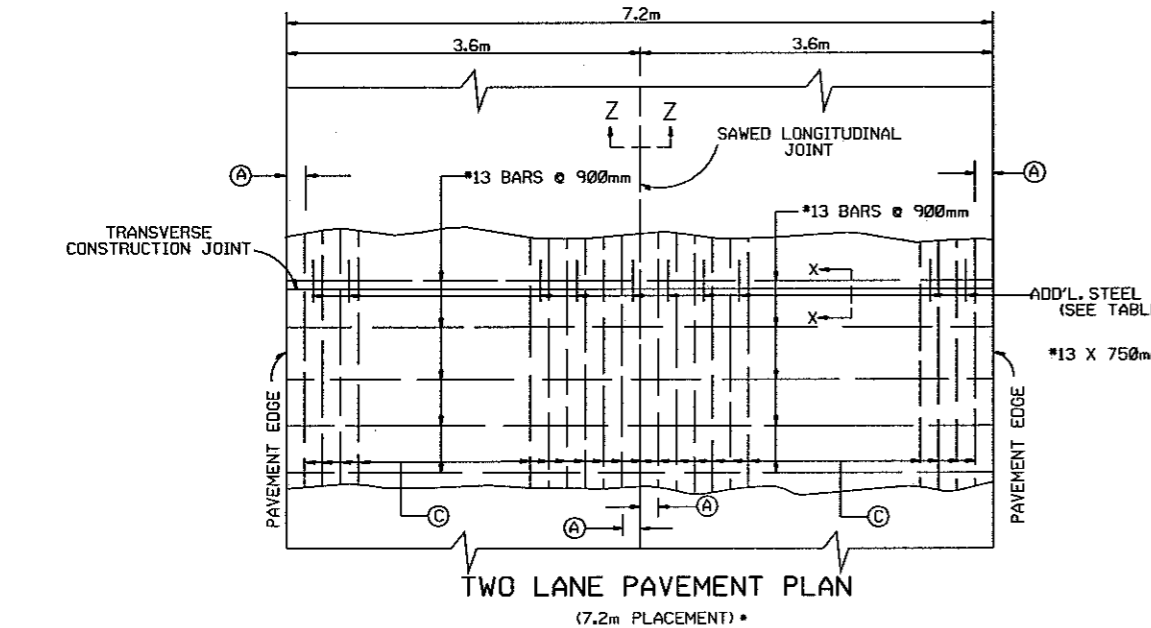
WITHIN ANY AREA BOUNDED BY 0.6m PAVEMENT LENGTH, MEASURED PARALLEL TO THE CENTERLINE; AND 3.6m OF PAVEMENT WIDTH, MEASURED PERPENDICULAR TO THE PAVEMENT CENTERLINE, NOT OVER 33% OF THE REGULAR LONGITUDINAL STEEL SHALL BE SPLICED.

MINIMUM SPLICE REQUIREMENT: 25 TIMES THE NOMINAL DIAMETER OF THE BAR OR 0.4m WHICHEVER IS LONGER.

AT TRANSVERSE CONSTRUCTION JOINTS THE REGULAR LONGITUDINAL BARS SHALL EXTEND EITHER SIDE OF THE JOINT SUCH THAT THE BAR SPLICES FOR THE REGULAR LONGITUDINAL BARS SHALL BE A MINIMUM OF 1.2m FROM THE CONSTRUCTION JOINT. AT LONGITUDINAL CONSTRUCTION JOINT, IF THE CONTRACTOR ELECTS TO CONTINUE THE REGULAR TRANSVERSE STEEL THROUGH THE JOINTS, THE #13 TIE BARS SHOWN HEREON MAY BE DELETED.

CHAIR DETAILS SHOWN HEREON ARE EXAMPLES ONLY; OTHER APPROVED TYPES WHICH WILL SATISFY THE REQUIREMENTS NOTED HEREIN, WILL BE PERMITTED. CHAIR SPACINGS SHALL NOT BE GREATER THAN 0.9m C-C (LONGITUDINAL) AND 1.2m C-C (TRANSVERSE), ADDITIONAL CHAIRS SHALL BE USED IF NECESSARY TO MEET PLACEMENT REQUIREMENTS.

AT ALL LAP SPLICES OCCURRING WITHIN 2.4m BEYOND THE CONSTRUCTION JOINTS, IN THE DIRECTION OF PAVING AND 1.2m BACK OF THE CONSTRUCTION JOINTS, THE LENGTH OF LAP SHALL BE DOUBLE THAT NORMALLY SPECIFIED OR EACH SPLICE SHALL BE STRENGTHENED BY SPLICING IN, SYMMETRICALLY WITH THE LAP, A 1.8m LENGTH OF DEFORMED BAR OF THE SAME NOMINAL SIZE AS THE LONGITUDINAL REINFORCEMENT.



**TABLE OF EQUIVALENT LONGITUDINAL REINFORCEMENT**

PAVEMENT THICKNESS mm	BAR SIZE	7.2m PLACEMENT WIDTH		STEEL ① kg/ m sq.	3.6m PLACEMENT WIDTH		STEEL ① kg/ m sq.	ADD'L STEEL @ TRANS. CONSTR. JOINT		WEIGHT kg./m			
		SPACING (C-C) A	SPACING (C-C) C		SPACING (C-C) A	SPACING (C-C) C		SIZE * X m	AVG. SPACING mm		NO. PER LANE		
150	*16	138	175	40	9.79	138	175	20	9.78	*16 X 1.8	350	10	7.83
200	*19	113	188	38	13.15	113	188	19	13.08	*19 X 1.8	375	10	11.27
225	*19	94	163	44	14.99	94	163	22	14.97	*19 X 1.8	325	11	12.39
250	*22	100	213	34	15.82	100	213	17	15.81	*22 X 1.8	425	8	12.27
275	*22	113	188	38	17.56	113	188	19	17.54	*22 X 1.8	375	10	15.33
300	*22	138	175	40	18.42	138	175	20	18.41	*22 X 1.8	350	10	15.33

NOTE: WHERE THE PROPOSED PLACEMENT WIDTHS VARY FROM THE BASIC DESIGN WIDTH SHOWN, THE SPACING 'A' AND THE ADJACENT SPACING 'C' SHALL BE ADJUSTED TO ACCOMMODATE A REINFORCEMENT ARRANGEMENT EQUAL TO OR SLIGHTLY HEAVIER THAN THAT SHOWN AS DIRECTED BY THE ENGINEER.

① INCLUDES BOTH REGULAR LONGITUDINAL AND TRANSVERSE BARS, BASED UPON 0.3m PAVEMENT FOR THE WIDTH INDICATED. ALL TRANSVERSE STEEL IS #13 BARS AT 0.9m CENTERS. FOR ESTIMATING PURPOSES IT IS ASSUMED THAT LONGITUDINAL BARS ARE SPLICED AT 9.6m INTERVALS.

② THIS SHALL BE MINIMUM NUMBER OF ADDITIONAL STEEL BARS TO BE PLACED PER LANE. THE SPACING OF THE ADDITIONAL STEEL BARS SHALL BE VARIED AS DIRECTED IN ORDER TO PROVIDE A MINIMUM CLEARANCE OF 63mm FROM EACH REGULAR LONGITUDINAL REINFORCING BAR.

\* LANE WIDTHS ARE FOR ILLUSTRATIVE PURPOSES ONLY AND SHOULD NOT BE USED IF IN CONFLICT WITH TYPICAL CROSS SECTIONS SHOWN ELSEWHERE IN THE PLANS.

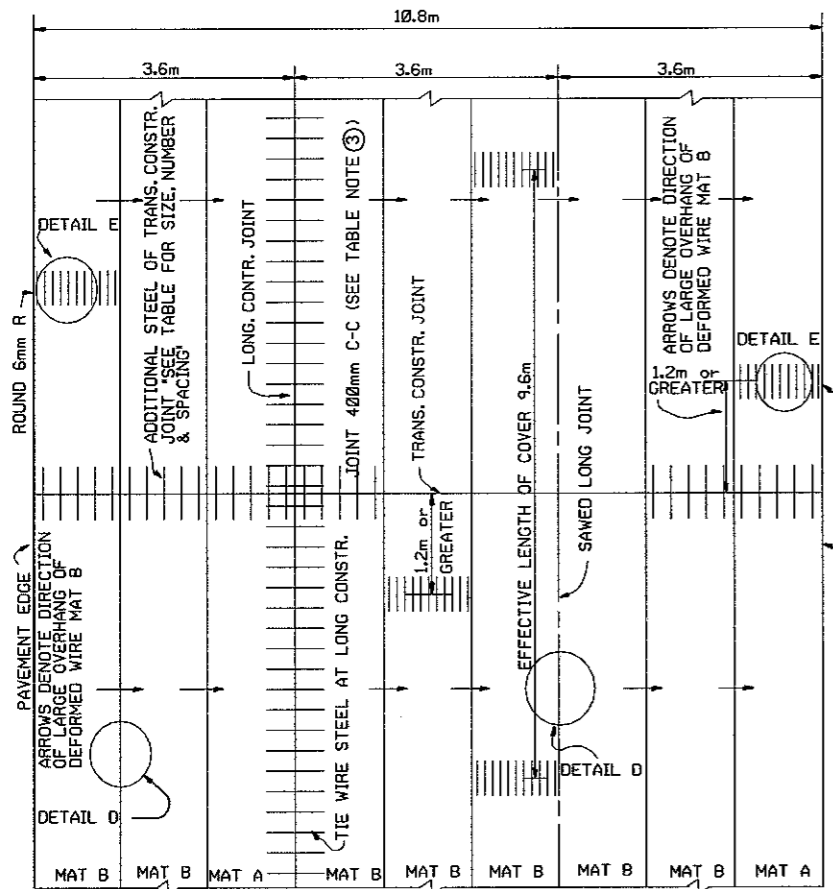
NOTE: FOR DIMENSIONS A & C SEE TABLE ON RT.

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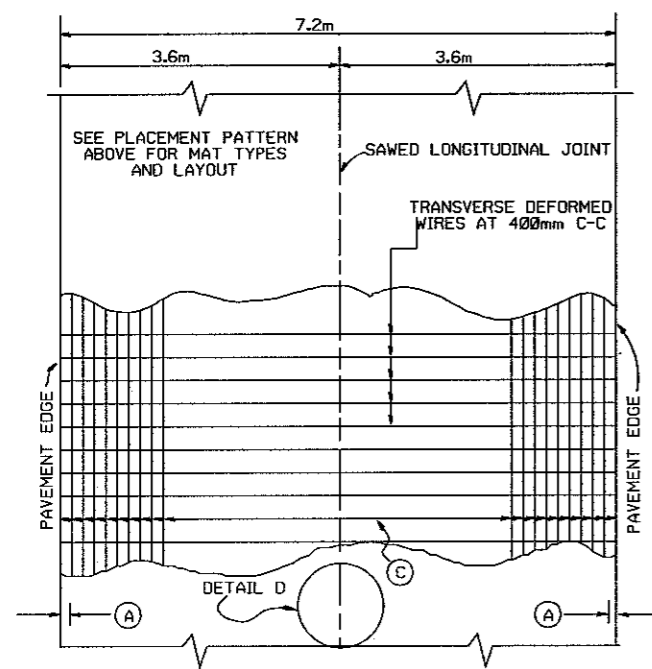
DETAILS OF CONCRETE PAVEMENT CONTINUOUSLY REINFORCED

4-3-97	REVISED STEEL BARS TO METRIC		
10-9-96	CORRECTED SPELLING		
7-20-95	CONVERTED TO METRIC		
DATE	REVISION	DATE	FILED

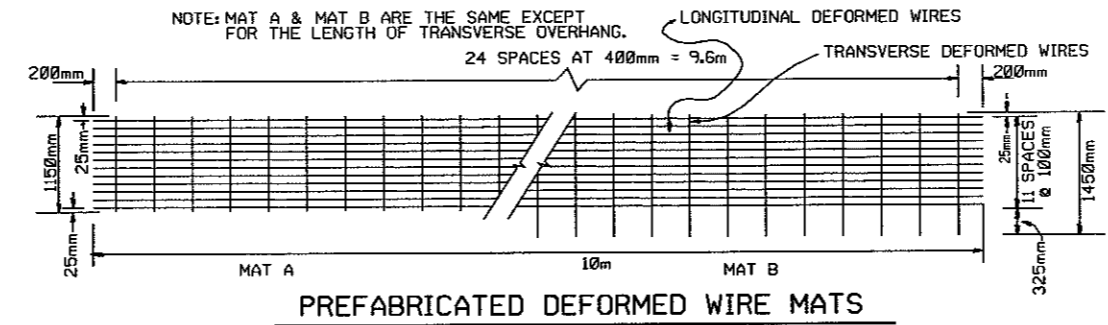
STANDARD DRAWING CPCR-1 (M) METRIC



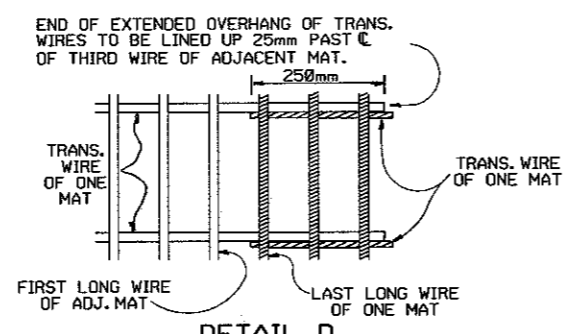
**THREE LANE PAVEMENT PLAN**  
(3.6m AND 7.2m PLACEMENT)



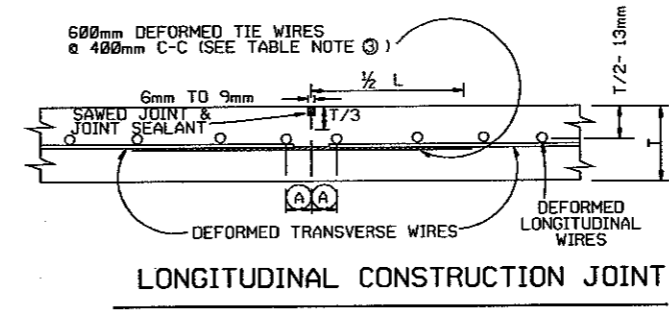
**TWO LANE PAVEMENT PLAN**  
(7.2m PLACEMENT)



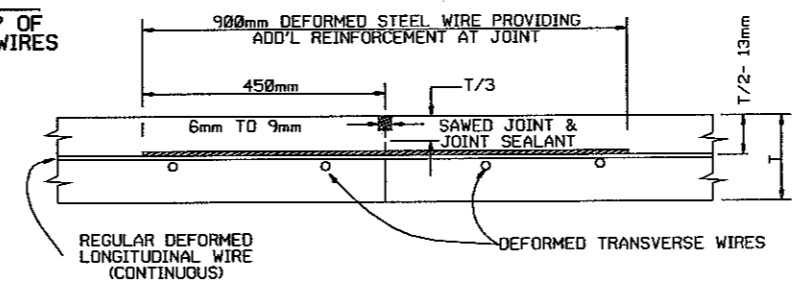
**PREFABRICATED DEFORMED WIRE MATS**



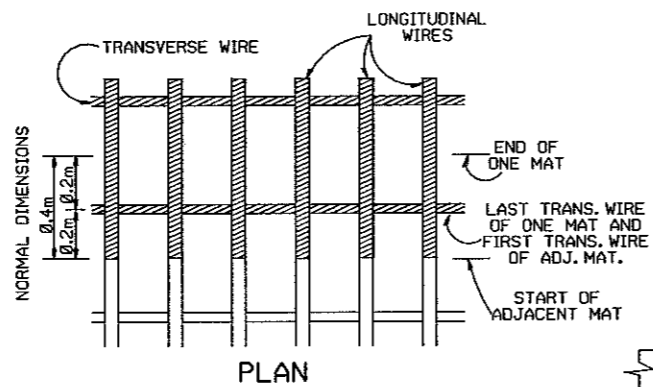
**DETAIL D**  
TYPICAL LAP OF TRANSVERSE WIRES



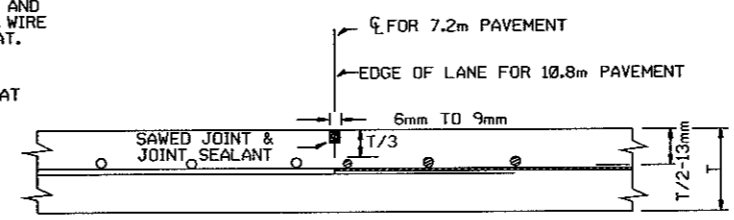
**LONGITUDINAL CONSTRUCTION JOINT**



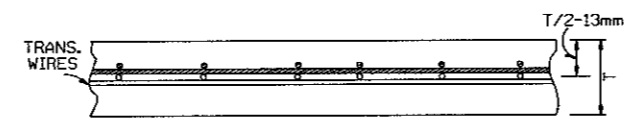
**TRANSVERSE CONSTRUCTION JOINT**



**PLAN**



**SAWED LONGITUDINAL JOINT**



**SECTION**

**DETAIL E**  
TYPICAL LAP OF LONGITUDINAL WIRES

**GENERAL NOTES**

- NO EXPANSION JOINTS WILL BE USED EXCEPT AT STRUCTURAL ENDS OR FIXED OBJECTS AS SHOWN ELSEWHERE IN THE PLANS.
- JOINT AND JOINT SEAL DETAILS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
- CONSTRUCTION JOINTS MAY BE FORMED BY THE USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE NOMINAL DEPTH OF THE PAVEMENT, OR BY OTHER MEANS WHICH HAVE BEEN APPROVED BY THE ENGINEER PRIOR TO THEIR USE.
- REFER TO TYPICAL SECTION FOR PAVEMENT WIDTH, THICKNESS, AND CROWN.
- IT IS THE INTENT OF THIS DESIGN THAT THE LONGITUDINAL STEEL BE AT THE CENTER OF THE SLAB. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO TAKE ALL NECESSARY PRECAUTIONS TO INSURE THAT THE FINAL POSITION OF THE STEEL IS NOT BELOW THE CENTER OF THE SLAB.
- WITHIN ANY AREA BOUNDED BY 0.6m OF PAVEMENT LENGTH MEASURED PARALLEL TO THE CENTERLINE, AND 3.6m OF PAVEMENT WIDTH MEASURED PERPENDICULAR TO THE PAVEMENT CENTERLINE, NOT OVER 33% OF THE REGULAR LONGITUDINAL STEEL SHALL BE SPLICED.
- ALL SPLICES SHALL BE A MINIMUM OF 0.4m FOR LONGITUDINAL STEEL AND 0.25m FOR TRANSVERSE STEEL.
- AT TRANSVERSE CONSTRUCTION JOINTS THE REGULAR LONGITUDINAL STEEL SHALL EXTEND A MINIMUM OF 1.2m ON EITHER SIDE OF THE JOINT.
- IF WIDTHS GREATER THAN TYPICAL WIDTHS OCCUR, INDIVIDUAL WIRES MAY BE ADDED TO OBTAIN ADDITIONAL WIDTH, PROVIDED THE C-C SPACING IS NOT EXCEEDED AND LAP REQUIREMENTS ARE MET.
- AT ALL LAP SPLICES OCCURRING WITHIN 2.4m BEYOND THE CONSTRUCTION JOINT, IN THE DIRECTION OF PAVING AND 1.2m BACK OF THE CONSTRUCTION JOINT, THE LENGTH OF LAP SHALL BE DOUBLE THAT NORMALLY SPECIFIED OR EACH SPlice SHALL BE STRENGTHENED BY SPLICING, SYMMETRICALLY WITH THE LAP, A 1.8m LENGTH OF DEFORMED BAR OF THE SAME NOMINAL SIZE AS THE LONGITUDINAL REINFORCEMENT.
- SAWED JOINT AND JOINT SEALANT FOR TRANSVERSE CONSTRUCTION JOINT, LONGITUDINAL CONSTRUCTION JOINT AND SAWED LONGITUDINAL JOINT SHALL CONFORM TO THE DETAILS SHOWN FOR SAWED LONGITUDINAL JOINT ON STANDARD DRAWING CPTJ-6A(M).

PAVEMENT THICKNESS (T) mm	WIRE SIZE	LONGITUDINAL REINFORCEMENT								TRANS. REINF. FOR LONG. CONSTR. JOINT			
		7.2m PLACEMENT		3.6m PLACEMENT		ADDITIONAL STEEL TRANS. CONSTR. JOINT				WIRE SIZE	TIE WIRES ③		
		SPACING C-C ② mm	① STEEL kg/m sq.	SPACING C-C ② mm	① STEEL kg/m sq.	WIRE SIZE	LENGTH mm	NO. PER LANE	WEIGHT kg./m OF WIDTH				
200	D-19.2	50	100	11.03	50	100	10.99	D-19.2	900	16	3.92	D-8	0.612
150	D-14.4	50	100	7.98	50	100	7.96	D-14.4	900	16	2.94	D-4	0.306

**TABLE NOTE**

- ① INCLUDES BOTH LONGITUDINAL AND TRANSVERSE WIRES BASED ON THE WIDTH INDICATED AND AN EFFECTIVE COVER LENGTH OF 9.6m. (ESTIMATING QUANTITIES INCLUDE SPLICES)
- ② THIS SHALL BE THE MINIMUM NUMBER OF ADDITIONAL STEEL WIRES TO BE PLACED PER LANE. THE ADDITIONAL STEEL WIRES SHALL BE PLACED EQUIDISTANT BETWEEN TWO REGULAR LONGITUDINAL REINFORCING WIRES AT AS NEAR A UNIFORM SPACING ACROSS THE LANE AS POSSIBLE.
- ③ AT THE OPTION OF THE CONTRACTOR, #13 BARS X 0.75m AT 0.75m C-C MAY BE USED IN LIEU OF THE DEFORMED TIE WIRES AT 0.4m C-C SHOWN, PROVIDED WRITTEN APPROVAL HAS BEEN RECEIVED FROM THE ENGINEER.

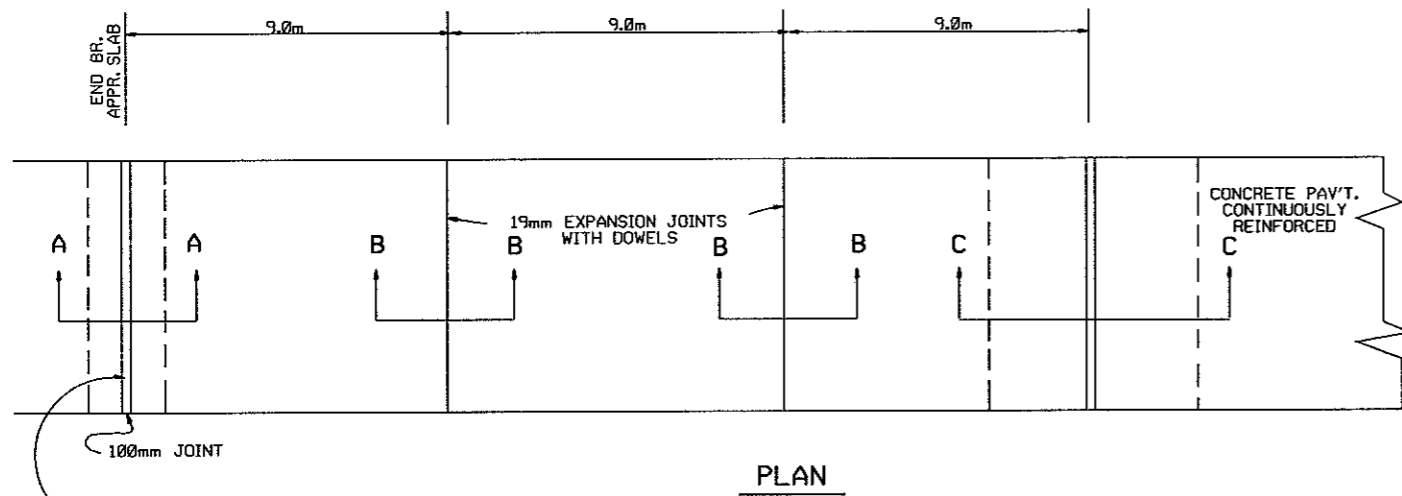
ARKANSAS STATE HIGHWAY COMMISSION

**DETAILS OF CONCRETE PAVEMENT CONTINUOUSLY REINFORCED DEFORMED WIRE MAT**

STANDARD DRAWING CPCR-2 (M)

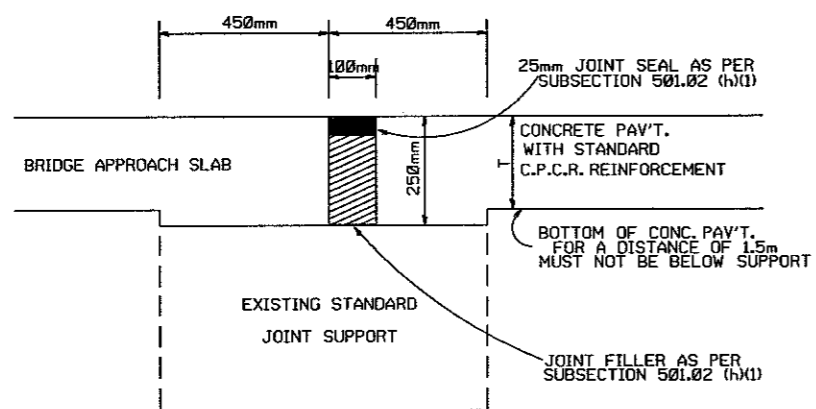
4-3-97	REVISED STEEL BARS TO SOFT METRIC		
7-20-95	CONVERTED TO METRIC		



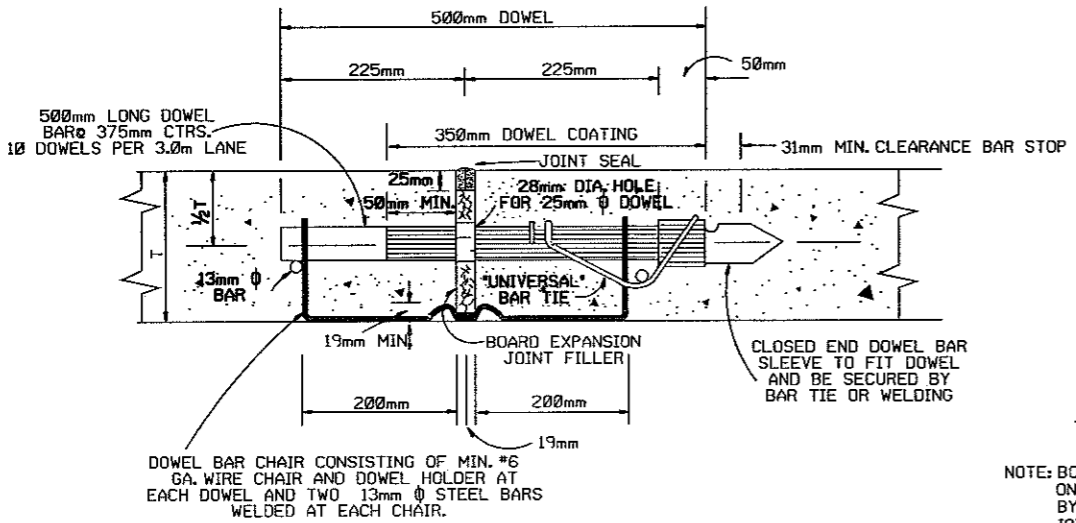


PLAN

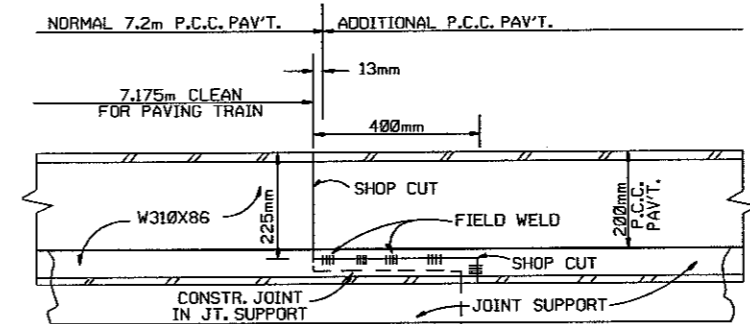
WHEN THIS JOINT CONNECTS TO CONVENTIONAL PAVEMENT USE STANDARD CONSTRUCTION JOINT REFER TO STD. DWG. NOS. CPCR-1(M) OR CPCR-2(M)



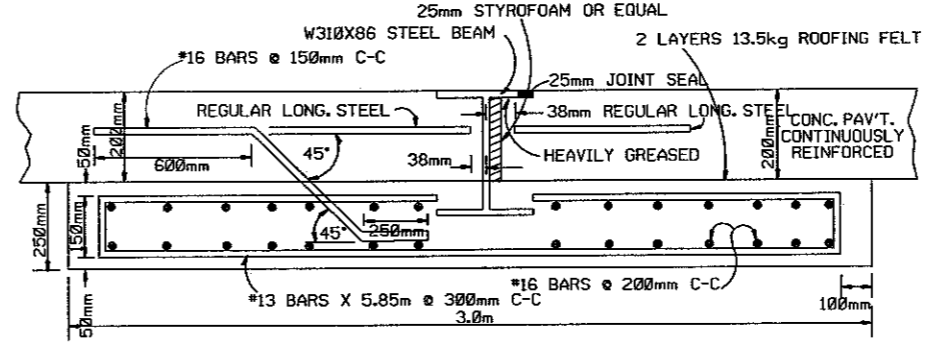
SECTION A-A



SECTION B-B  
DETAIL OF EXPANSION JOINT



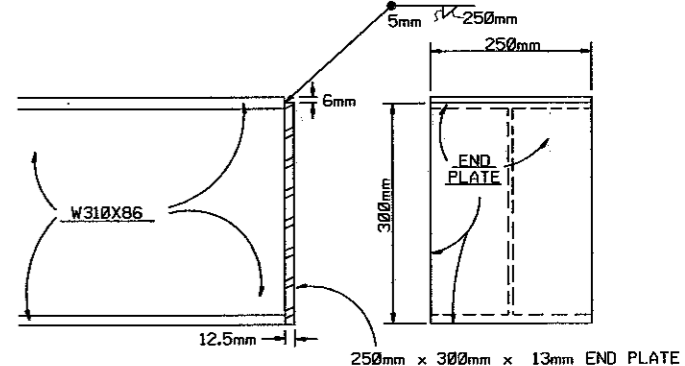
TRANSVERSE SECTION THROUGH WF BEAM AND JOINT SUPPORT



SECTION C-C

DETAIL OF WIDE FLANGE BEAM & JOINT SUPPORT

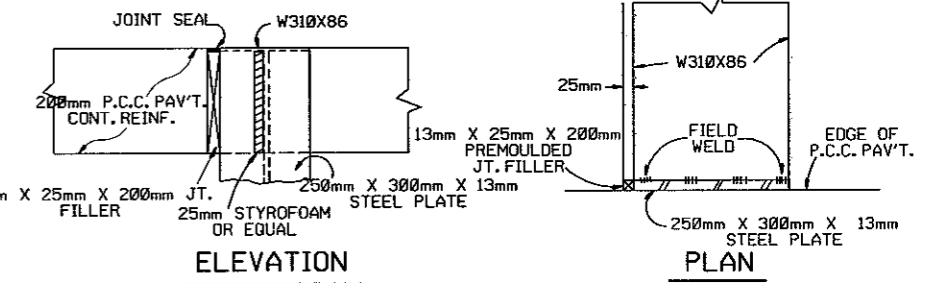
NOTE: WELD 300mm X 250mm X 13mm STEEL PLATE TO ENDS OF BEAM AFTER PLACEMENT OF CONCRETE PAVEMENT.



DETAIL OF END PLATE ATTACHMENT TO WIDE FLANGE BEAM

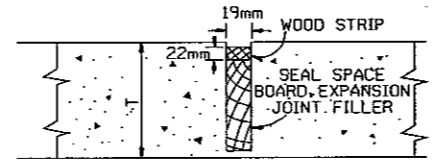
STRUCTURAL EXCAVATION	CLASS A CONCRETE	REINFORCING STEEL	STRUCTURAL STEEL
	cu. m	kg	
0.24	0.24	20.79	26.10

NOTE: APPROXIMATE QUANTITIES PER 300mm OF PAVEMENT WIDTH.



ELEVATION

PLAN



SEAL SPACE FOR EXPANSION JOINT

NOTE: BOARD JOINT FILLER OF SPECIFIED TYPE SHALL BE SECURED ON SUBGRADE IN EXACT POSITION AND LINE AS ILLUSTRATED OR BY OTHER APPROVED DEVICE. JOINT ASSEMBLY SHALL BE SECURELY FASTENED INTO PLACE PRIOR TO PLACING CONCRETE. AFTER SECOND PASSAGE OF FINISHING MACHINE REMOVE CONCRETE TO 25mm BELOW TOP OF BOARD AND NAIL 19mm X 22mm WOOD STRIP TO TOP OF BOARD FILLER TO FORM JOINT SEAL SPACE. REPLACE CONCRETE AND FINISH WITH LONGITUDINAL FLOAT. THE WOOD STRIP SHALL NOT BE REMOVED UNTIL IMMEDIATELY PRIOR TO POURING JOINT SEAL.

GENERAL NOTES  
OTHER TYPES OF EXPANSION JOINTS MAY BE CONSTRUCTED AT THE OPTION OF THE CONTRACTOR AFTER APPROVAL BY THE ENGINEER.  
LOAD TRANSMISSION UNITS AND DOWELS SHALL BE SECURED PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINE.  
ALL EXPANSION JOINTS, INCLUDING ALL MATERIALS, DEVICES, AND WORK REQUIRED SHALL BE CONSIDERED AS SUBSIDIARY WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PORTLAND CEMENT CONCRETE PAVEMENT. NO DIRECT PAYMENT WILL BE MADE FOR ANY MATERIAL, BAR CHAIR, STEEL OR ANY OTHER DEVICE SHOWN, NOR FOR ITS INSTALLATION.  
\*T\* DENOTES THICKNESS OF SLAB.

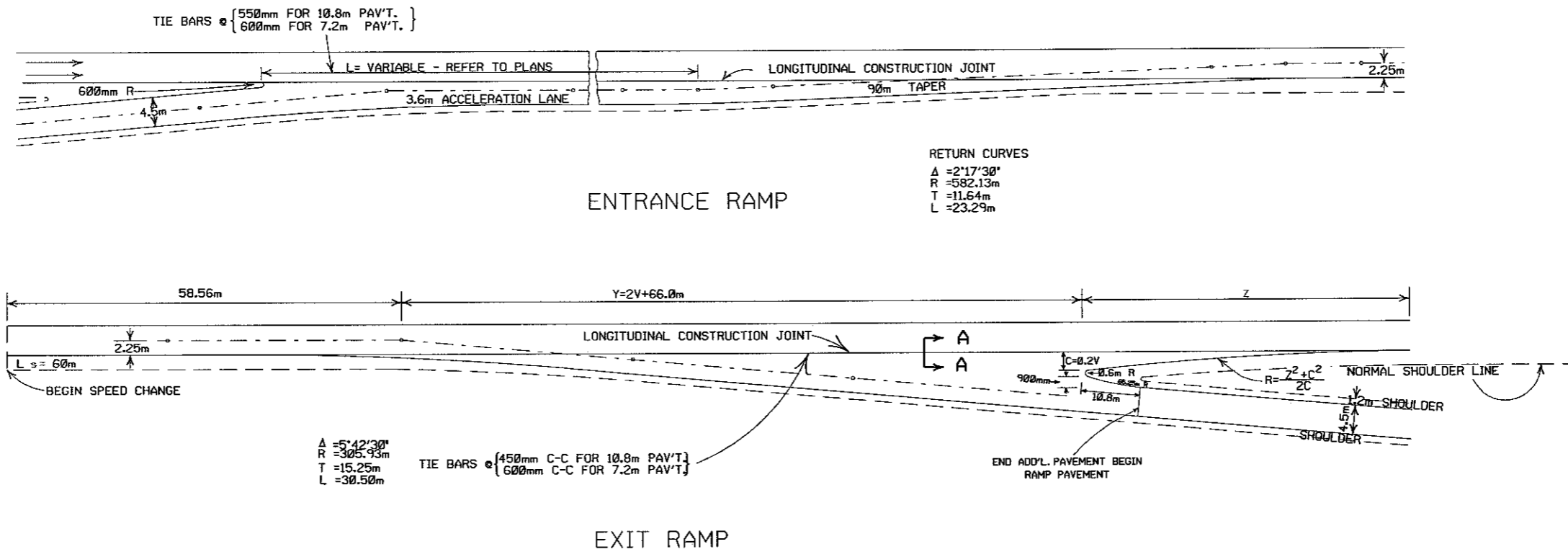
ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF TERMINAL JOINTS FOR CONCRETE PAVEMENT CONTINUOUSLY REINFORCED

STANDARD DRAWING CPCR-3(M)

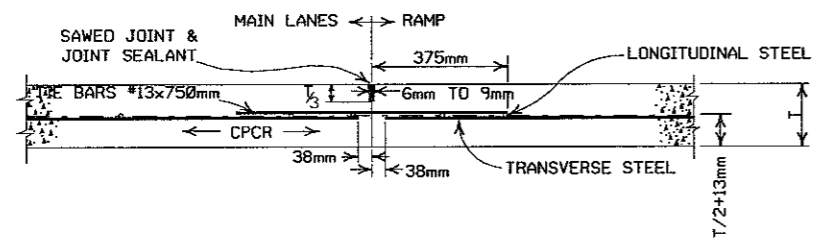
DATE	REVISION	BY	CHKD
4-3-97	REVISED STEEL BARS TO SOFT METRIC		
10-10-96	CORRECTED SUBSECTION & SPELLING		
4-26-96	DELETED DOWEL BAR NOTE		
7-20-95	CONVERTED TO METRIC		



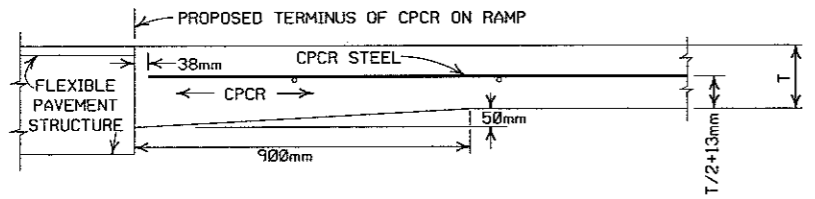


DESIGN SPEED V	Y	NOSE OFFSET C	LENGTH NOSE TAPER Z	RETURN RADIUS R	ADD'L. SURFACING
km/hr	m	m	m	m	sq. m
60	90.0	2.40	28.8	174.0	506.04
80	96.0	3.00	36.0	217.5	577.32
100	102.0	3.60	50.4	354.6	664.06
110	108.0	4.20	63.0	474.6	757.91

NOTE: ON GRADES IN EXCESS OF 4%, THE LENGTHS \*Y\* & \*L\* MAY BE VARIED TO FIT THE CASE IN THE RATION OF  $\frac{1 \pm 2\% \text{ GRADE}}{2}$  (LENGTH AS SHOWN).



LONGITUDINAL CONSTRUCTION JOINT SECTION A - A



DETAIL FOR JUNCTION WITH FLEXIBLE TYPE PAVEMENT STRUCTURE

GENERAL NOTES

THE SEQUENCE OF OPERATION IN PLACING THE RAMP SHALL BE AS DIRECTED BY THE ENGINEER. THE LONGITUDINAL STEEL SHALL BE PLACED IN A DIRECTION APPROXIMATELY PARALLEL TO THE DIRECTION OF THE RAMP.

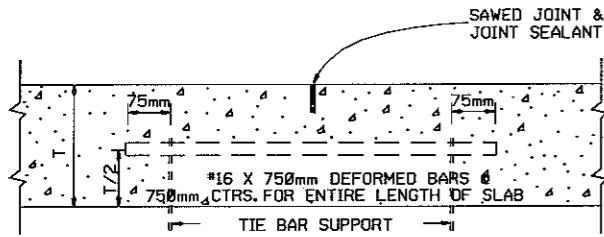
SAWED JOINT AND JOINT SEALANT FOR LONGITUDINAL CONSTRUCTION JOINT SHALL CONFORM TO THE DETAILS SHOWN FOR SAWED LONGITUDINAL JOINT ON STANDARD DRAWING CPTJ-6A(M).

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF ENTRANCE & EXIT RAMP FOR CONCRETE PAVEMENT CONTINUOUSLY REINFORCED

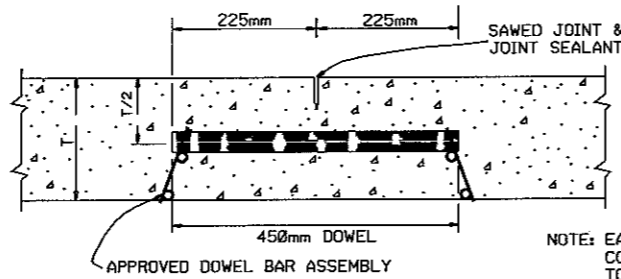
DATE	REVISION	DATE FILMED
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
7-20-95	CONVERTED TO METRIC	

STANDARD DRAWING CPCR-4(M) METRIC

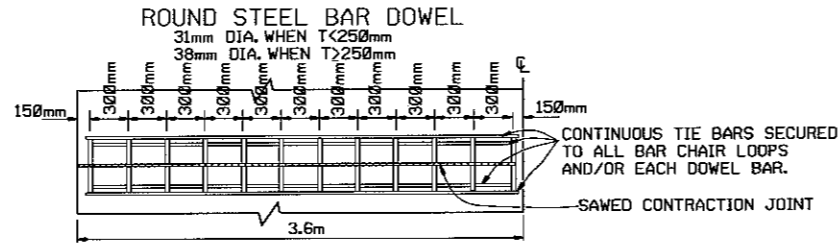


**LONGITUDINAL JOINT**

NOTE: THE TIE BAR SUPPORT SHOWN ABOVE MAY BE ELIMINATED IF OTHER APPROVED METHODS FOR PLACING AND SUPPORTING THE TIE BARS ARE PROVIDED.  
TIE BARS SHALL BE 375mm FROM TRANSVERSE JOINTS.



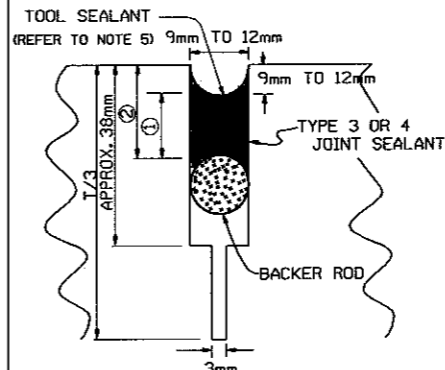
NOTE: EACH DOWEL TO BE COATED ACCORDING TO SECTION 502 OF THE STANDARD SPECIFICATIONS.



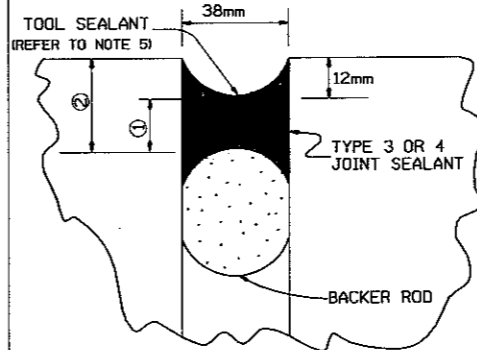
**ONE-HALF 7.2m PAVEMENT  
12 DOWELS  
PLAN**

NOTE: FOR 6m PAVEMENT USE 20 DOWELS @ 300mm CTRS. WITH 150mm SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR.  
FOR 4.5m PAVEMENT USE 15 DOWELS @ 300mm CTRS. WITH 150mm SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR.  
FOR 7.8m PAVEMENT USE 26 DOWELS @ 300mm CTRS. WITH 150mm SPACING FROM C.L. AND EDGE OF SLAB TO FIRST BAR.  
FOR PAVEMENT WIDTHS OTHER THAN THOSE SHOWN ABOVE, USE DOWELS AT 300mm CTRS. WITH 150mm MAX. SPACING FROM C.L. TO FIRST BAR. DISTANCE FROM EDGE OF SLAB TO FIRST BAR SHALL BE ADJUSTED TO MAINTAIN 300mm DOWEL BAR SPACING

**CONTRACTION JOINT DETAILS**



**DETAIL OF SAWED CONTRACTION JOINT**



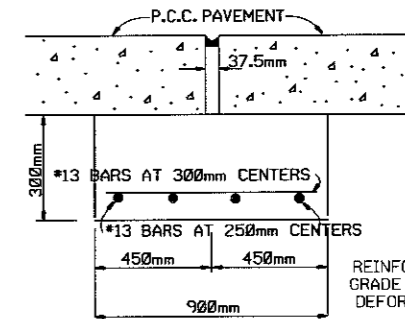
**DETAIL OF EXPANSION JOINT**

**JOINT CONFIGURATION FOR  
TYPE 3 OR 4 JOINT SEALANT**

JOINT WIDTH	SEALANT THICKNESS ①	BACKER ROD DIAMETER	BACKER ROD PLACEMENT DEPTH ②
6	6	9	12
9	6	12	12
12	6	15	12
15	8	19	14
18	9	21	21
38	19	50	31

**JOINT CONFIGURATION FOR  
TYPE 5 JOINT SEALANT**

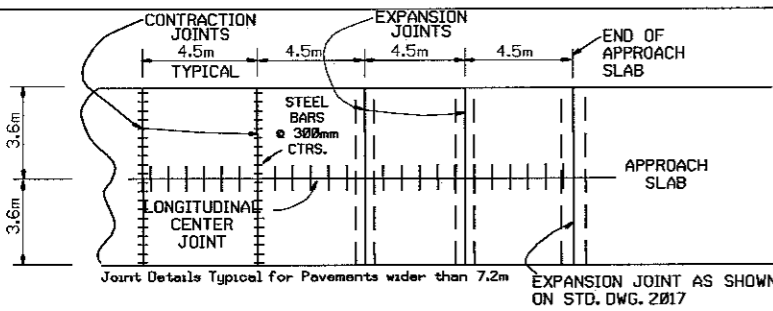
JOINT WIDTH	SEALANT THICKNESS ①	BACKER ROD DIAMETER	BACKER ROD PLACEMENT DEPTH ②
6	12	9	18
9	18	12	24



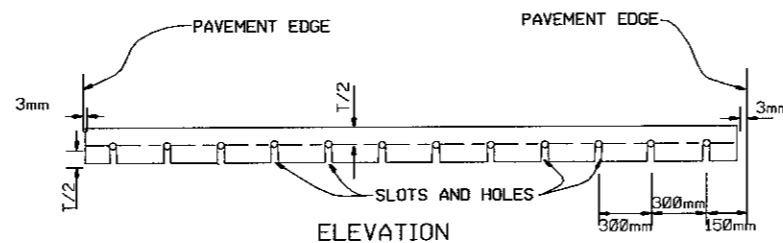
**DETAIL OF JOINT SUPPORT  
FOR EXPANSION JOINTS**

**GENERAL NOTES**

- \*T\* DENOTES THICKNESS OF SLAB.
- DOWEL BARS SHALL BE PLACED IN ACCORDANCE WITH THE DIMENSIONS SHOWN. A TOLERANCE OF PLUS OR MINUS 25mm WILL BE ALLOWED FOR THE VERTICAL AND LATERAL PLACEMENT AND A TOLERANCE OF PLUS OR MINUS 6.25mm WILL BE ALLOWED FOR THE TILT AND SKEW. DOWEL BARS SHALL BE FIELD COATED FOR A MINIMUM DISTANCE OF 50mm GREATER THAN HALF THE LENGTH OF THE BAR WITH AN APPROVED GREASE AS A BOND BREAKER JUST PRIOR TO PLACEMENT OF CONCRETE.
- THE EXPANSION JOINT SUPPORT MAY BE CONSTRUCTED WITH CLASS 'A', 'S' OR PAVING CONCRETE. PAYMENT FOR THE JOINT SUPPORT SHALL BE FOR THE CONTRACT UNIT PRICE BID FOR THE CLASS OF CONCRETE SPECIFIED IN THE PLANS. PAYMENT FOR ALL OTHER WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE JOINT SUPPORT SHALL BE INCLUDED IN THE PRICE BID FOR THE ABOVE ITEMS.
- CONTRACTION JOINTS SHALL BE CONSTRUCTED ON 4.5m CENTERS.
- TOOLING NOT REQUIRED FOR SELF-LEVELING SILICONE.
- UNLESS OTHERWISE SPECIFIED IN THE PLANS, CONCRETE SHOULDERS SHALL BE CONSTRUCTED ACCORDING TO THE DETAILS SHOWN HEREON. CONTRACTION JOINTS SHALL MATCH CONTRACTION JOINTS IN THE LANES.
- TIE WIRES IN DOWEL BAR ASSEMBLIES SHALL NOT BE CUT PRIOR TO PLACEMENT OF PAVING CONCRETE.

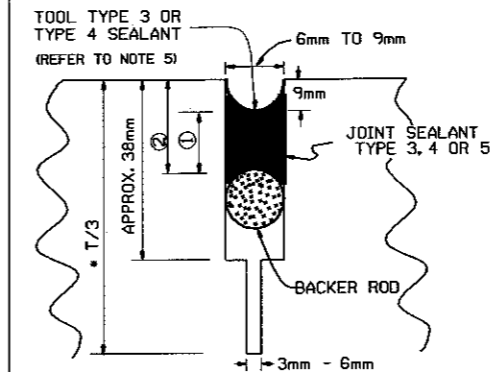


**PLAN SHOWING EXPANSION JOINTS AT  
BRIDGE APPROACH SLABS**



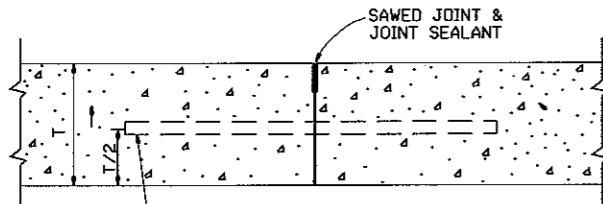
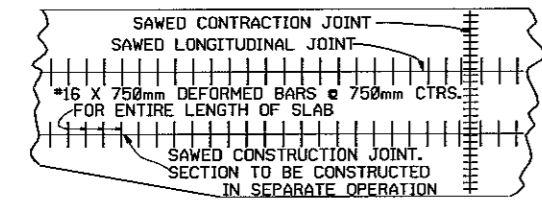
**ELEVATION**

NOTE: ALL DOWEL BARS SHALL CONFORM TO THE DETAILS FOR CONTRACTION JOINTS.

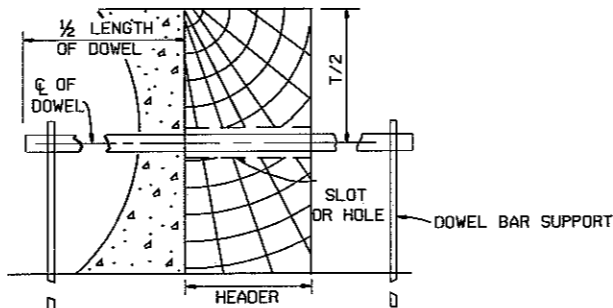


\*NOTE: T/3 SAW CUT NOT REQUIRED FOR LONGITUDINAL CONSTRUCTION JOINT.

**DETAIL OF SAWED  
LONGITUDINAL JOINT  
AND LONGITUDINAL CONSTRUCTION JOINT**



\*16 X 750mm DEFORMED BARS @ 750mm CTRS. FOR ENTIRE LENGTH OF SLAB  
NOTE: TIE BARS SHALL BE 375mm FROM TRANSVERSE JOINTS.  
**LONGITUDINAL CONSTRUCTION JOINT**



**SECTION**

**TRANSVERSE  
CONSTRUCTION JOINT**

DATE	REVISION	DATE FORW.
5-25-06	ADDED GENERAL NOTE T	
10-9-03	REMOVED THE BAR COATING & REVISED GENERAL NOTES	
8-16-03	ADDED TOOL SEALANT & NOTE S; REV NOTE 3	
4-3-97	REVISED STEEL BARS TO SOFT METAL	
10-18-96	CORRECTED SPELLING	
4-28-96	REVISED CONTRACTION JOINT NOTE	
7-20-95	CONVERTED TO METRIC	

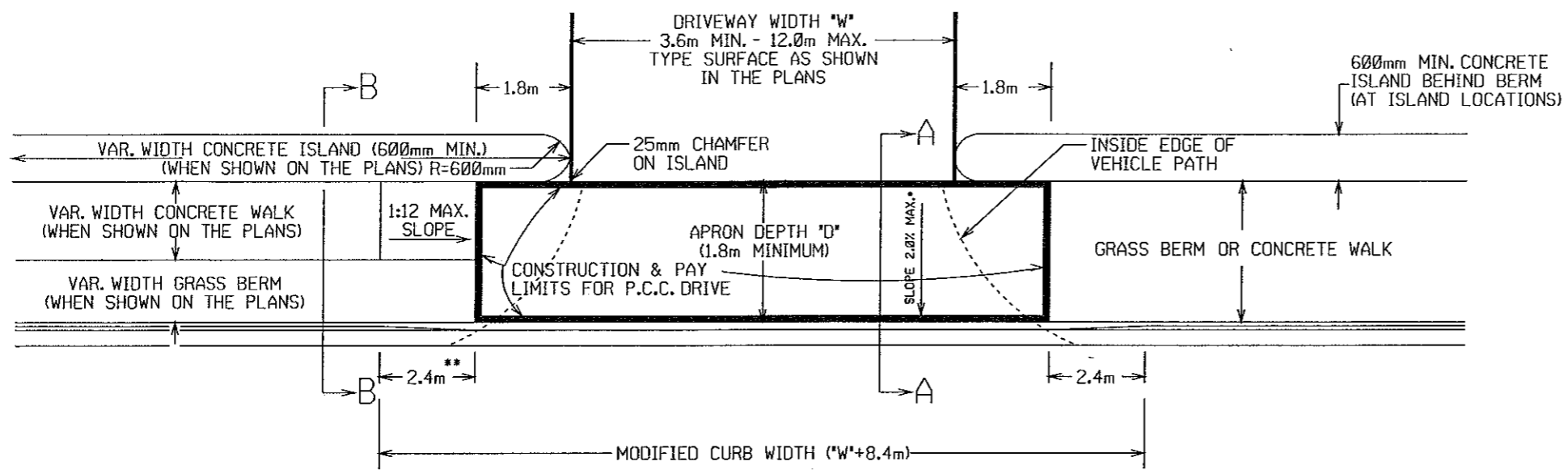
ARKANSAS STATE HIGHWAY COMMISSION

**TRANSVERSE & LONGITUDINAL  
JOINTS FOR CONCRETE PAVEMENT  
(NON-REINFORCED)**

STANDARD DRAWING CPTJ-6A(M)

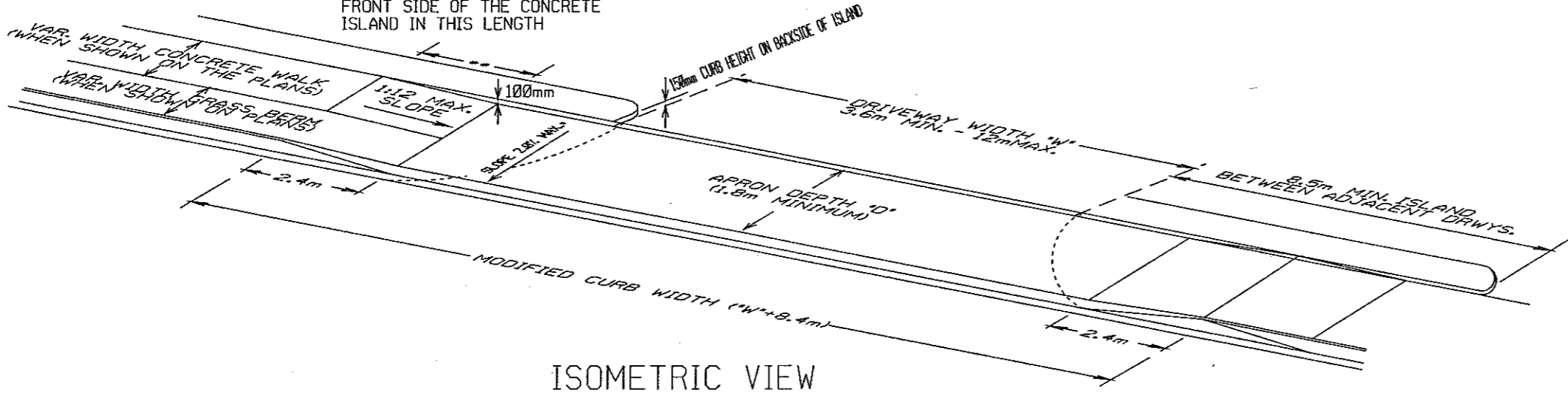




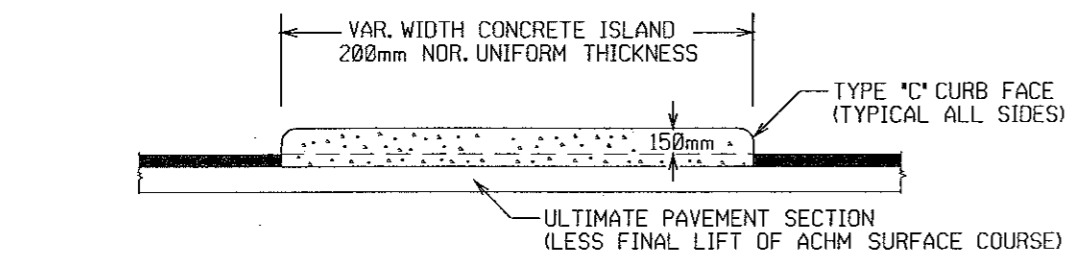
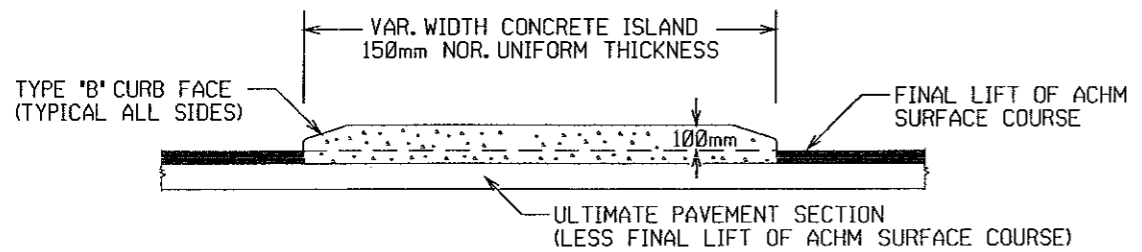


PLAN VIEW

\*\* TRANSITION FROM A 0mm TO A 100mm TYPE 'D' CURB FACE ON THE FRONT SIDE OF THE CONCRETE ISLAND IN THIS LENGTH

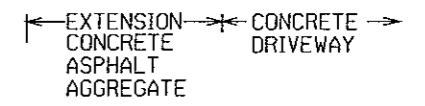


ISOMETRIC VIEW



CURBED ISLANDS FOR CHANNELIZATION

REFER TO PLANS FOR TYPE OF CURB FACE TO BE USED. NO DIRECT PAYMENT WILL BE MADE FOR THE CURB FACES SHOWN ON THE ISLAND DETAILS. PAYMENT FOR THE CURB FACE WILL BE INCLUDED IN THE UNIT PRICE BID FOR THE ITEM 'CONCRETE ISLAND'.

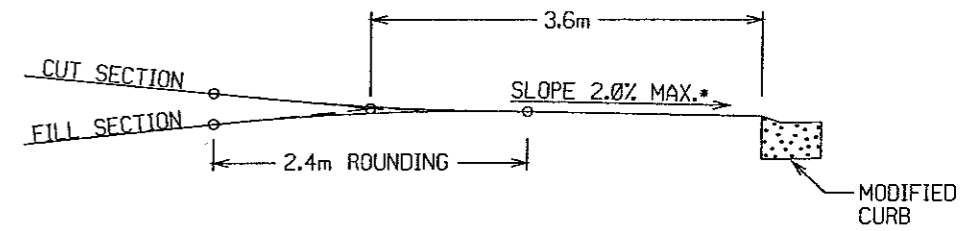


EXTENSION TYPICAL SECTIONS

- 1: CONCRETE - 150mm P.C. CONCRETE DRIVEWAY
- 2: ASPHALT - 50mm ACHM SURFACE COURSE (12.5mm)  
100mm ACHM BINDER COURSE (25mm) OR  
100mm ACHM BASE COURSE (37.5mm)
- 3: ASPHALT - 50mm ACHM SURFACE COURSE (12.5mm)  
175mm AGGREGATE BASE COURSE
- 4: AGGREGATE - 150mm AGGREGATE BASE COURSE

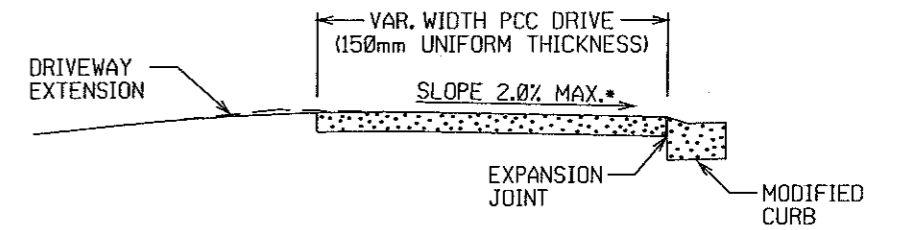
THE TYPE OF EXTENSION SHALL BE AS SHOWN IN THE PLANS. THE CONTRACTOR MAY, WITH THE APPROVAL OF THE ENGINEER, SUBSTITUTE A LOWER NUMBERED TYPE OF EXTENSION IN LIEU OF THE TYPE SPECIFIED IN THE PLANS, BUT AT NO ADDITIONAL COST TO THE DEPARTMENT.

DRIVEWAY EXTENSION DETAILS

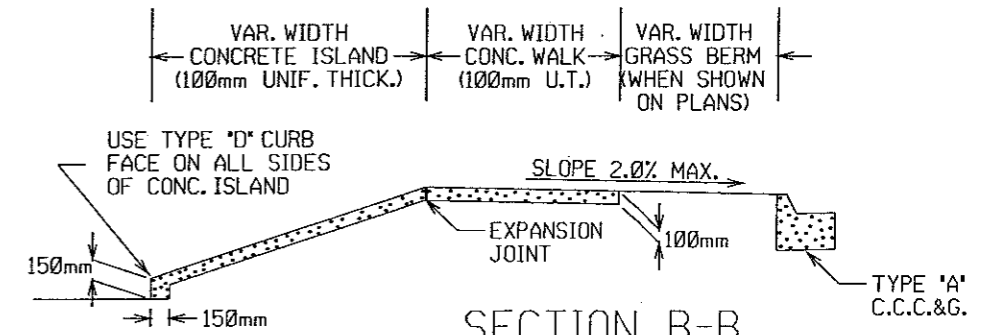


DRIVEWAY VERTICAL ALIGNMENT DETAILS

\* NOTE: DRIVEWAYS MAY NOT BE SLOPED AWAY FROM THE ROADWAY UNLESS APPROVED BY THE ENGINEER.



SECTION A-A

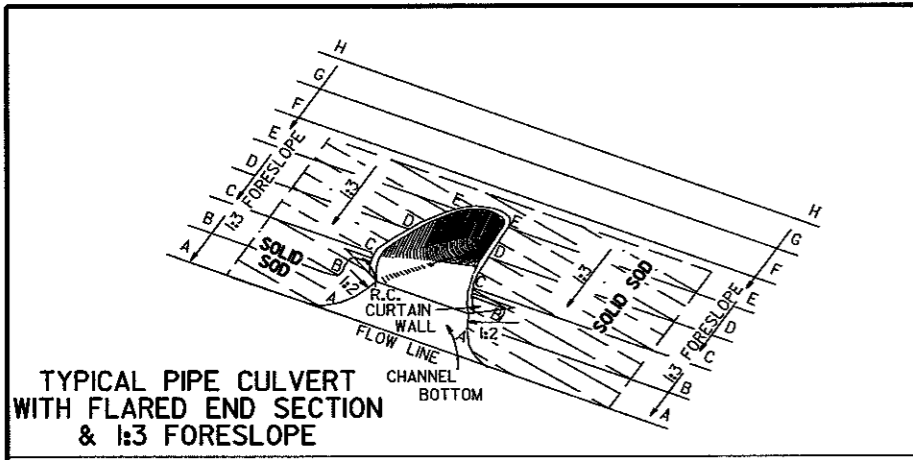


SECTION B-B  
CURBED ISLAND BEHIND WALK

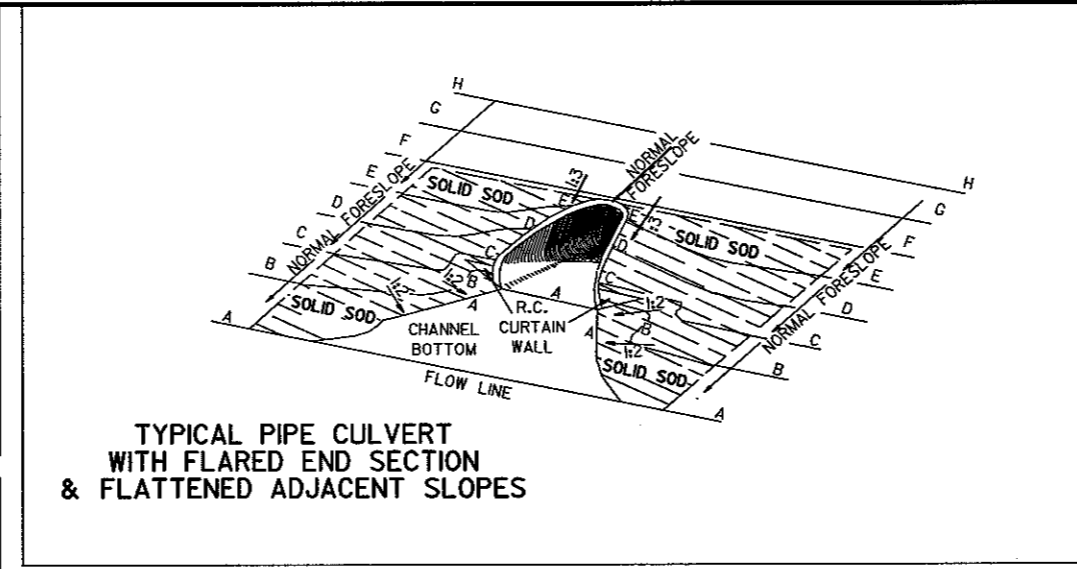
DATE	REVISED	DESCRIPTION
11-29-07		ADDED CHANNELIZATION ISLAND W/TY. C CURB FACE & REVISED DRIVEWAY SLOPE NOTE & VERTICAL ALIGNMENT DETAIL
11-10-05		REV. APRON SLOPE & DEPTH OF AGG. BASE
8-22-02		REVISED ISLAND AND NOTES
3-30-00		REV. MOD. CURB & TRANS. NOTES
1-12-00		CORRECTED DIMENSION ON PLAN VIEW
11-19-98		REVISED NOTES
11-18-98		REDRAWN AND REISSUED

ARKANSAS STATE HIGHWAY COMMISSION  
DETAILS OF DRIVEWAYS & ISLANDS  
STANDARD DRAWING DR-1(M)

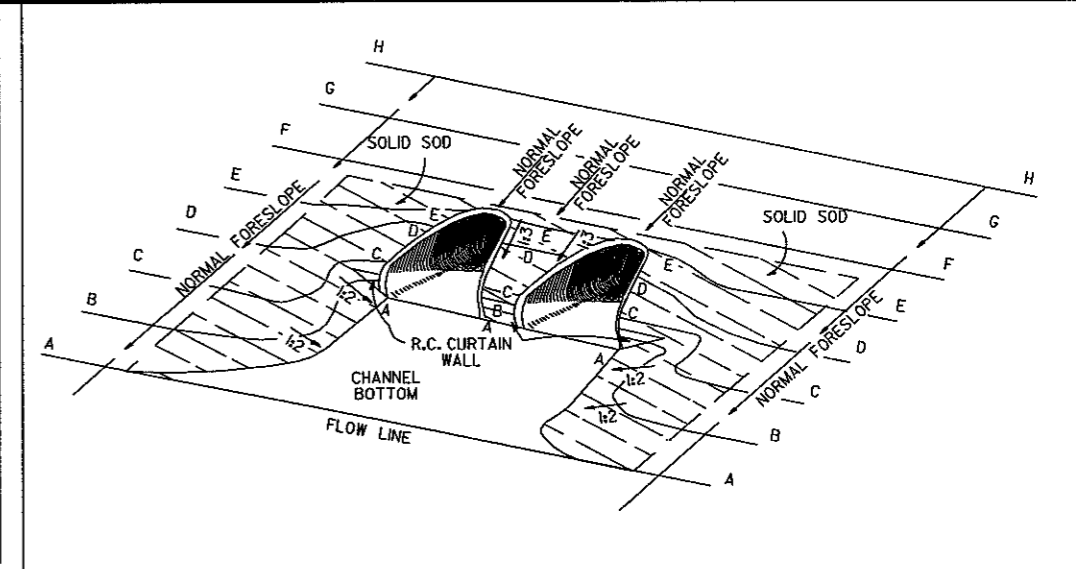




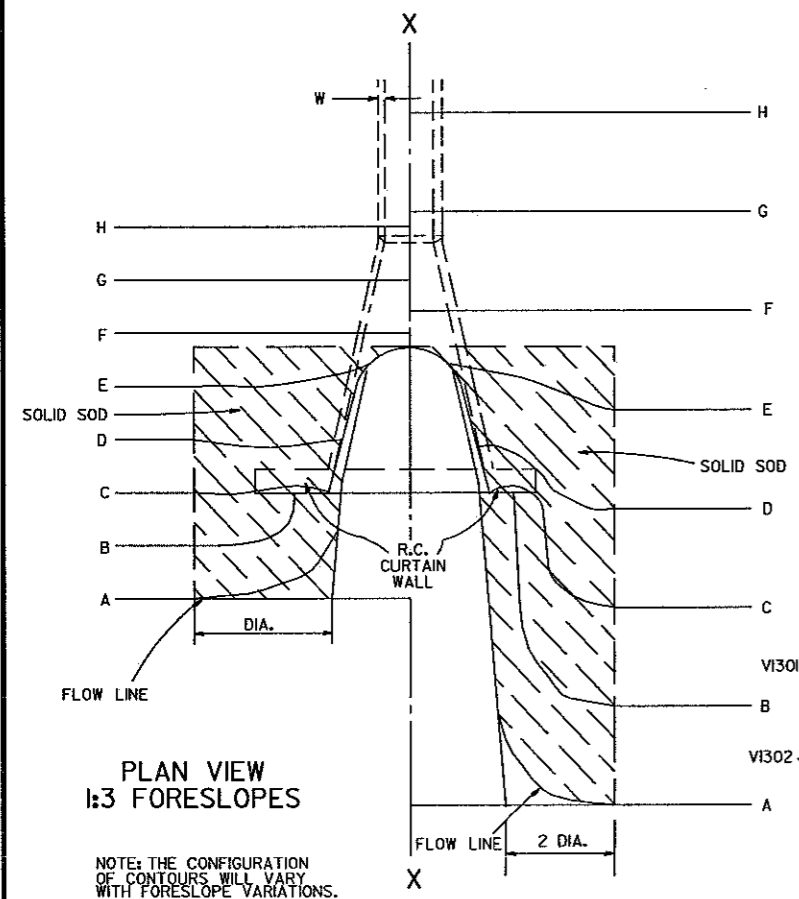
TYPICAL PIPE CULVERT WITH FLARED END SECTION & 1:3 FORESLOPE



TYPICAL PIPE CULVERT WITH FLARED END SECTION & FLATTENED ADJACENT SLOPES



TYPICAL MULTIPLE PIPE CULVERT WITH FLARED END SECTIONS & FLATTENED ADJACENT SLOPES



PLAN VIEW 1:3 FORESLOPES

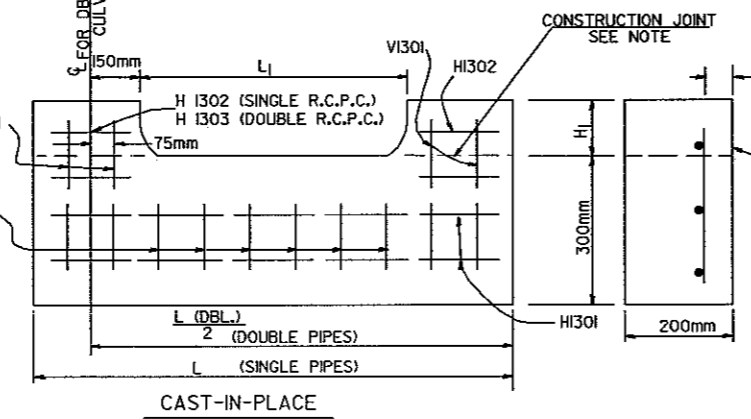
NOTE: THE CONFIGURATION OF CONTOURS WILL VARY WITH FORESLOPE VARIATIONS.

PLAN VIEW FLATTENED FORESLOPES

R.C. CURTAIN WALL DIMENSIONS & QUANTITIES

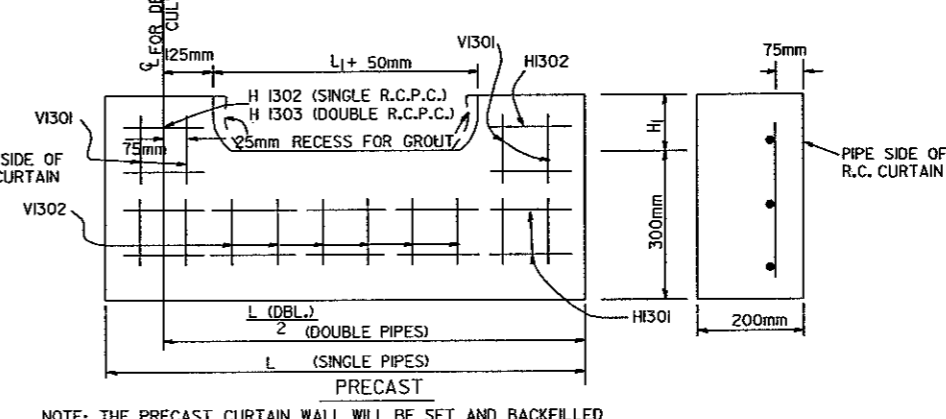
PIPE DIA.	H <sub>1</sub>	L <sub>1</sub>	L	L (DBL.) / 2	SINGLE R.C.P.C.		DOUBLE R.C.P.C.	
					CONC.	REINF. STEEL	CONC.	REINF. STEEL
					C.M.	KG.	C.M.	KG.
450	287.5	1025	2400	1875	0.24	17.5	0.34	25.0
600	312.5	1350	2850	2250	0.28	21.1	0.41	30.4
750	387.5	1675	3300	2700	0.34	24.7	0.51	37.3
900	475.0	2000	3900	3150	0.44	33.3	0.63	46.8
1050	637.5	2175	4650	3600	0.63	48.8	0.84	63.7
1200	725.0	2350	5100	3900	0.75	60.1	0.97	76.2
1350	837.5	2525	5550	4200	0.89	73.3	1.12	91.0
1500	1000.0	2700	6150	4650	1.12	94.8	1.41	114.1
1800	1325.0	3250	7650	5550	1.77	147.2	2.09	171.5

NOTE: QUANTITIES SHOWN ARE FOR ONE (1) CURTAIN WALL.



CAST-IN-PLACE

NOTE: THE PORTION OF THE R.C. CURTAIN WALL BENEATH THE FLARED END SECTION (LOWER 300mm) SHALL BE PLACED MONOLITHICALLY. THE FLARED END SECTION SHALL THEN BE SET IN PLACE & THE REMAINING PORTIONS OF THE R.C. CURTAIN WALL PLACED.



PRECAST

NOTE: THE PRECAST CURTAIN WALL WILL BE SET AND BACKFILLED WITH COMPACTED MATERIAL. THE FLARED END SECTION SHALL THEN BE SET IN PLACE AND THE 25mm RECESS FILLED WITH GROUT. WHERE "L" EXCEEDS 3300mm THE CURTAIN WALL MAY BE CAST IN TWO (2) OR MORE SECTIONS. THE METHOD OF JOINING THE SECTIONS FOR INSTALLATION SHALL BE APPROVED BY THE ENGINEER.

R.C. CURTAIN WALL DETAILS

GENERAL NOTES

1. A CAST-IN-PLACE OR PRECAST CURTAIN WALL MAY BE USED. PAYMENT FOR THE CURTAIN WALL SHALL BE CONSIDERED TO BE INCLUDED IN THE UNIT PRICE BID EACH FOR FLARED END SECTIONS OF THE SEVERAL SIZES, WHICH PRICE SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIALS INCLUDING REINFORCING STEEL AND CONCRETE; FOR FORMS, MIXING AND PLACING; FOR EXCAVATION AND BACKFILL, AND FOR ALL LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED 19mm.
3. CONCRETE FOR CURTAIN WALL SHALL MEET THE REQUIREMENTS FOR CLASS A OR S CONCRETE AS PROVIDED IN SECTION 802 OF THE STANDARD SPECIFICATIONS OR FOR PAVING CONCRETE AS PROVIDED IN SECTION 501 OF THE STANDARD SPECIFICATIONS.
4. WELDED WIRE MESH 76mm X 76mm MW65 X MW65 MAY BE USED IN LIEU OF REINFORCING BARS.

REINFORCING STEEL SCHEDULE

PIPE DIA.	SINGLE R.C. PIPE CULVERT								DOUBLE R.C. PIPE CULVERT									
	H1301		H1302		V1301		V1302		H1301		H1302		H1303		V1301		V1302	
	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.
450	2300	2	587.5	4	487.5	8	200	8	3650	2	587.5	4	200	2	487.5	10	200	14
600	2750	2	650	4	512.5	10	200	9	4400	2	650	4	200	2	512.5	12	200	18
750	3200	2	712.5	4	587.5	10	200	12	5300	2	712.5	4	200	2	587.5	14	200	22
900	3800	2	850	6	675	12	200	14	6200	2	850	6	200	3	675	14	200	28
1050	4550	2	1137.5	8	837.5	16	200	15	7100	2	1137.5	8	200	4	837.5	18	200	30
1200	5000	2	1275	10	925	18	200	16	7700	2	1275	10	200	5	925	20	200	32
1350	5450	2	1412.5	12	1037.5	20	200	17	8300	2	1425	12	200	6	1037.5	22	200	34
1500	6050	2	1625	14	1200	24	200	18	9200	2	1625	14	200	7	1200	26	200	36
1800	7550	2	2200	18	1525	30	200	20	11000	2	2200	18	200	9	1525	33	200	40

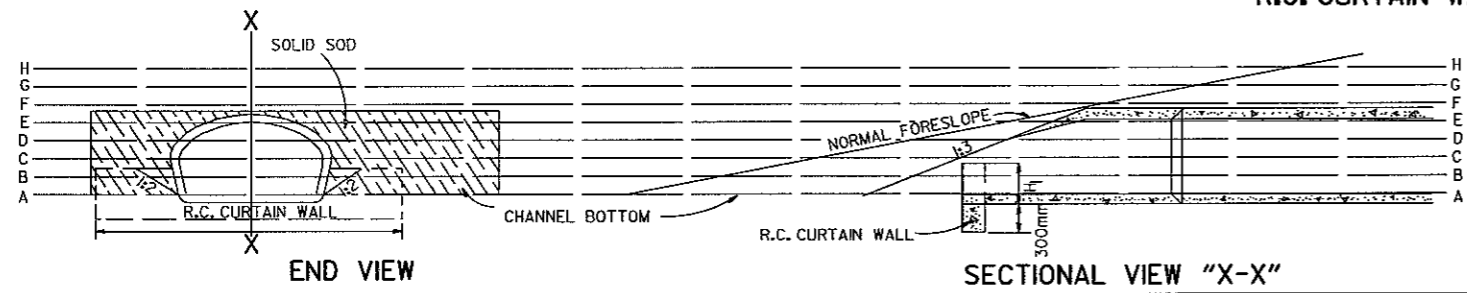
ALL REINFORCING STEEL #13 BARS @ 150mm O.C.

SOLID SODDING

PIPE DIA.	SINGLE R.C.P.C.						DOUBLE R.C.P.C.					
	1:3		1:4		1:6		1:3		1:4		1:6	
	SQ. M.						SQ. M.					
450	4	6	10	5	7	11	8	12	20	10	15	25
600	7	10	16	8	11	17	12	16	28	14	21	36
750	11	15	24	12	16	25	16	21	40	20	28	48
900	14	22	34	15	23	36	20	27	52	26	36	60
1050	19	29	46	21	31	48	26	34	68	34	48	84
1200	24	39	57	26	40	59	32	42	88	42	57	108
1350	29	48	71	31	49	73	38	50	108	50	67	132
1500	38	62	94	40	61	96	48	64	144	64	88	180
1800	54	87	130	56	87	133	72	96	216	96	132	252

NOTE: QUANTITIES SHOWN ABOVE ARE FOR ONE (1) END OF F.E.S.

NOTE: ALL DIMENSIONS ARE IN mm's.



END VIEW

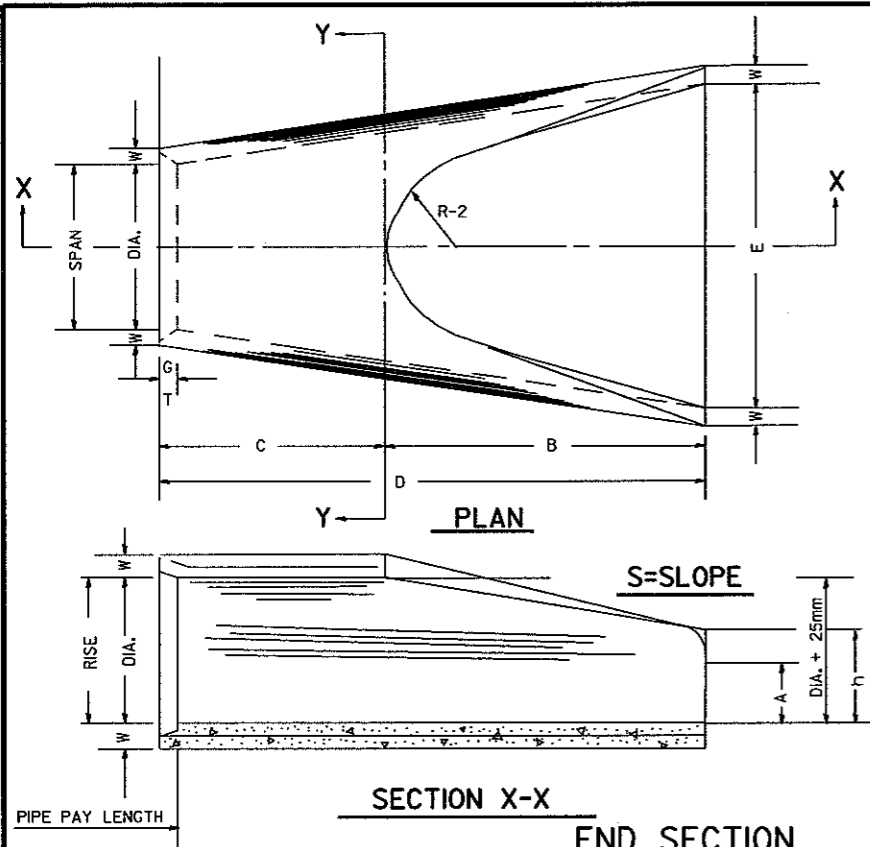
SECTIONAL VIEW "X-X"

DATE	REVISION	DATE FILED
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
10-6-96	ADDED NOTE TO SOLID SODDING	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION

FLARED END SECTION

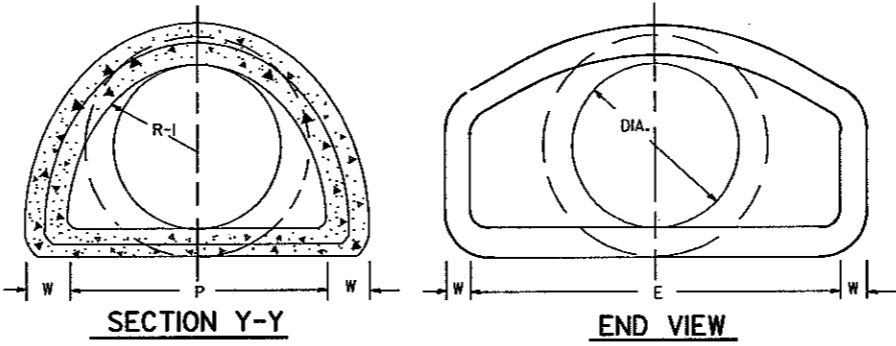
STANDARD DRAWING FES-1 (M) METRIC



### TABLE OF DIMENSIONS

DIA. mm	WALL	A	B	C	D	E	S	DIA.+ 25mm	P	R-1	R-2	G-T	WT. Kg	h
450	63	225	675	1150	1825	900	1:3	475	725	388	300	50	455	313
600	75	238	1088	750	1838	1200	1:3	625	830	420	350	63	727	338
750	88	300	1350	494	1844	1500	1:3	775	925	463	375	81	882	416
900	100	375	1575	869	2444	1800	1:3	925	1195	608	500	88	1864	500
1050	113	525	1575	875	2450	1950	1:3	1075	1347	688	550	88	2445	663
1200	125	600	1800	650	2450	2100	1:3	1225	1413	713	550	88	2977	750
1350	138	700	1950	550	2500	2250	1:3	1375	1638	828	600	100	3977	863
1500	150	850	1950	550	2500	2400	1:3	1525	1813	917	600	100	4214	1025
1800	175	1150	1950	550	2500	2700	1:3	1825	1945	973	600	125	6023	1350

ALL DIMENSIONS ARE IN MILLIMETERS.

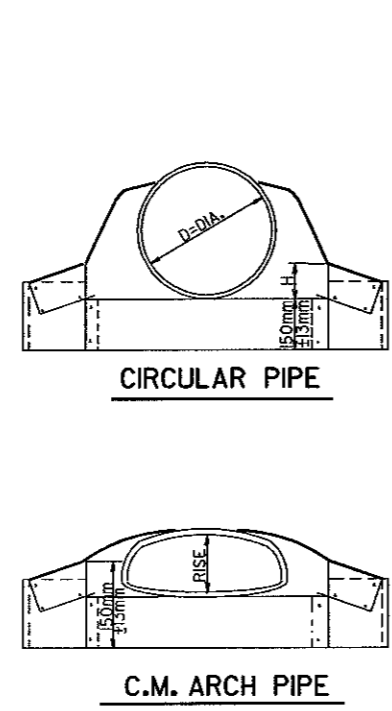
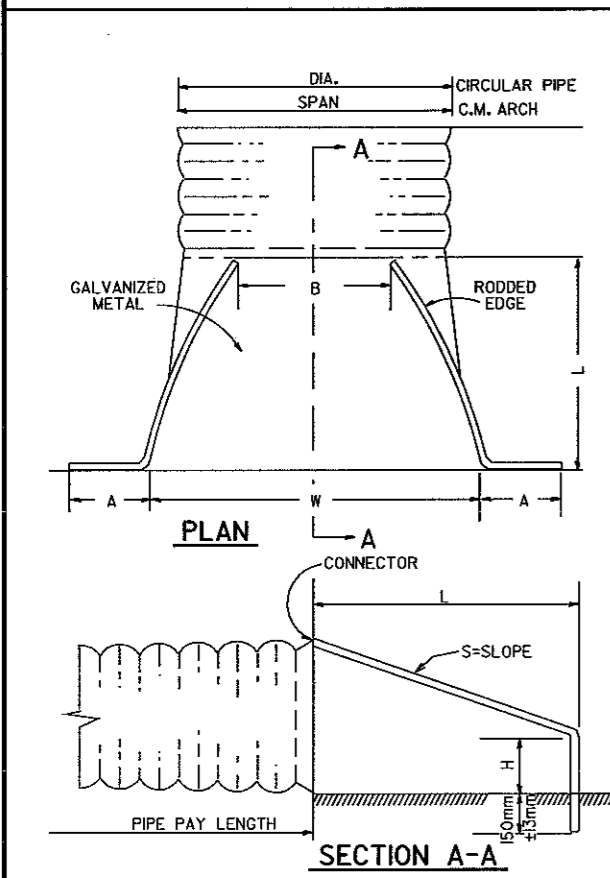
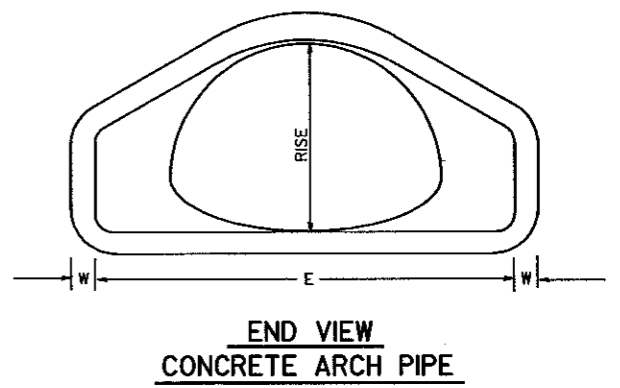


NOTE: TONGUE END ON UPSTREAM SECTION  
GROOVE END ON DOWNSTREAM SECTION

### ARCH PIPE

EQUIV. DIA.	SPAN		RISE		W	A	B	C	D	E	P	R2	G-T	S
	AASHTO M 206	AHD NOMINAL	AASHTO M 206	AHD NOMINAL										
millimeters														
375	460	450	280	275	50	100	600	1200	1800	900	725	300	38	1:2 1/2
450	560	550	345	350	63	125	600	1225	1825	1050	803	325	63	1:2 1/2
600	725	725	460	450	75	225	675	1150	1825	1500	920	375	63	1:2 1/2
750	920	900	570	575	88	250	925	913	1838	1800	1195	500	75	1:2 1/2
900	1100	1100	675	675	100	263	1200	638	1838	1950	1358	550	88	1:2 1/2
1050	1300	1275	795	775	113	288	1375	556	1931	2150	1488	575	94	1:2 1/2
1200	1485	1475	915	900	125	375	1575	869	2444	2350	1758	600	106	1:2 1/2
1350	1650	1625	1015	1000	138	475	1575	875	2450	2550	1802	600	119	1:2 1/4
1500	1855	1825	1145	1125	150	550	1650	800	2450	2700	1945	600	125	1:2 1/4

• THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PER CENT FROM THE VALUES SPECIFIED BY AASHTO M 206.



### CIRCULAR PIPE

D. DIA.	THICK- NESS	A 25mm±	B. MAX.	H 25mm±	L 38mm±	W 50mm±	S
300	1.63	150	150	150	525	600	1:2 1/2
375	1.63	175	200	150	650	750	1:2 1/2
450	1.63	200	250	150	775	900	1:2 1/2
600	1.63	250	325	150	1025	1200	1:2 1/2
750	2.01	300	400	200	1275	1500	1:2 1/2
900	2.01	350	475	225	1500	1800	1:2 1/2
1050	2.77	400	550	275	1725	2100	1:2 1/2
1200	2.77	450	675	300	1950	2250	1:2 1/4
1350	2.77	450	750	300	2100	2550	1:2
1500	2.77	450	825	300	2175	2850	1:1 1/4
1650	2.77	450	900	300	2175	3000	1:1 1/2
1800	2.77	450	975	300	2175	3150	1:1 1/3

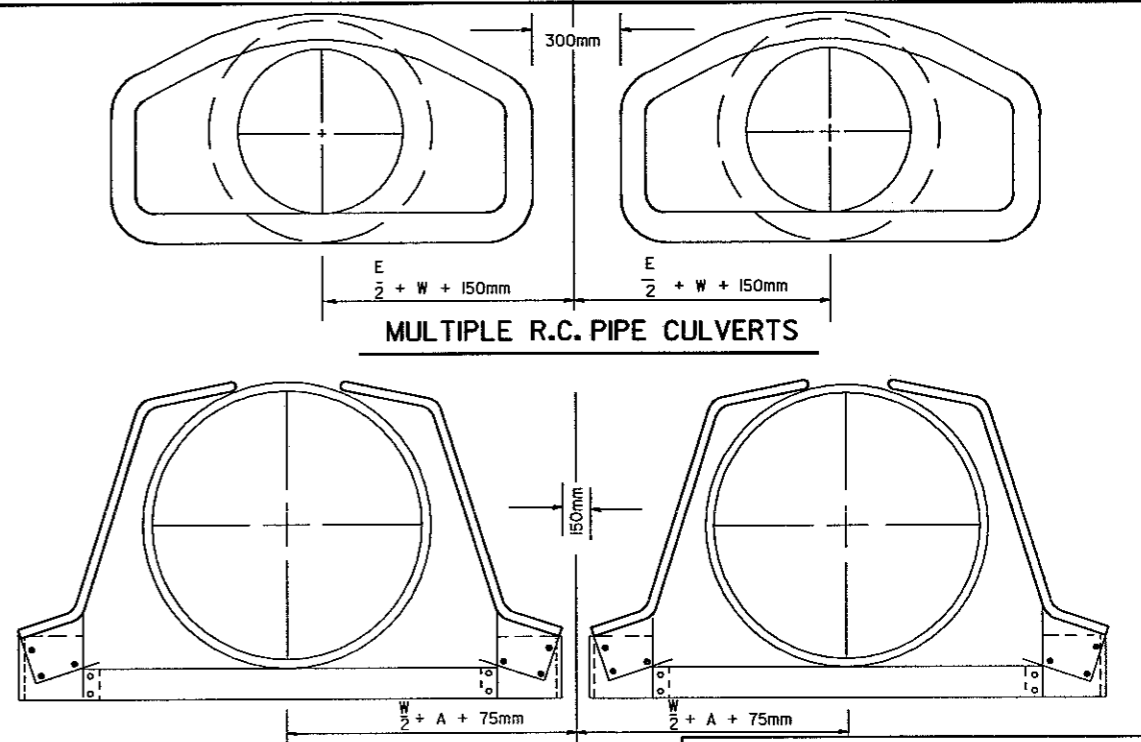
  

### C.M. ARCH PIPE

EQUIV. DIA.	SPAN	RISE	A 25mm±	B MAX.	H 25mm±	L 38mm±	W 50mm±	S	GAUGE
375	430	330	175	225	150	475	750	1:2 1/2	16
450	530	380	175	250	150	575	900	1:2 1/2	16
600	710	510	225	350	150	800	1200	1:2 1/2	16
750	885	610	250	400	150	975	1500	1:2 1/2	14
900	1060	740	300	450	200	1150	1875	1:2 1/2	14
1050	1240	840	325	525	225	1325	2125	1:2 1/2	12
1200	1440	970	450	650	300	1575	2250	1:2 1/2	12
1350	1620	1100	450	750	300	1750	2550	1:2 1/4	12
1500	1800	1200	450	825	300	1925	2850	1:2 1/4	12

NOTE: ALTERNATE CONNECTIONS TO THE PIPE CULVERTS, IN ACCORDANCE WITH MANUFACTURER'S STANDARD PRACTICES, MAY BE MADE SUBJECT TO THE APPROVAL OF THE ENGINEER.

### END SECTIONS FOR CORRUGATED METAL PIPE CULVERTS



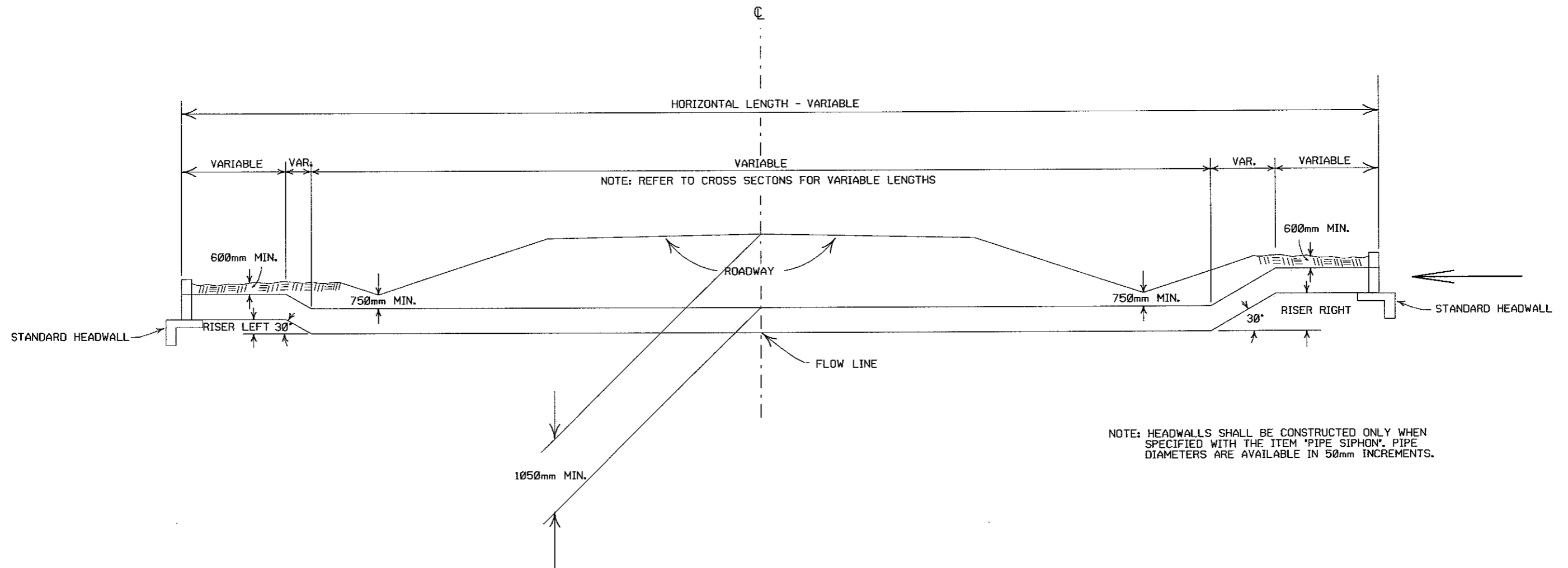
NOTE: ALL DIMENSIONS ARE IN mm'S, UNLESS OTHERWISE NOTED.

NO.	REVISION	DATE
10-N-26	REVISED ASTM REF. TO AASHTO	
1-22-95	CONFORMED TO ENGLISH VERSION	
7-20-95	CONVERTED TO METRIC	
		7-20-95

ARKANSAS STATE HIGHWAY COMMISSION

FLARED END SECTION

STANDARD DRAWING FES-2 (M)

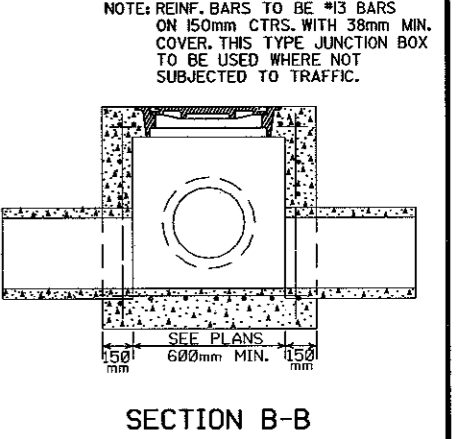
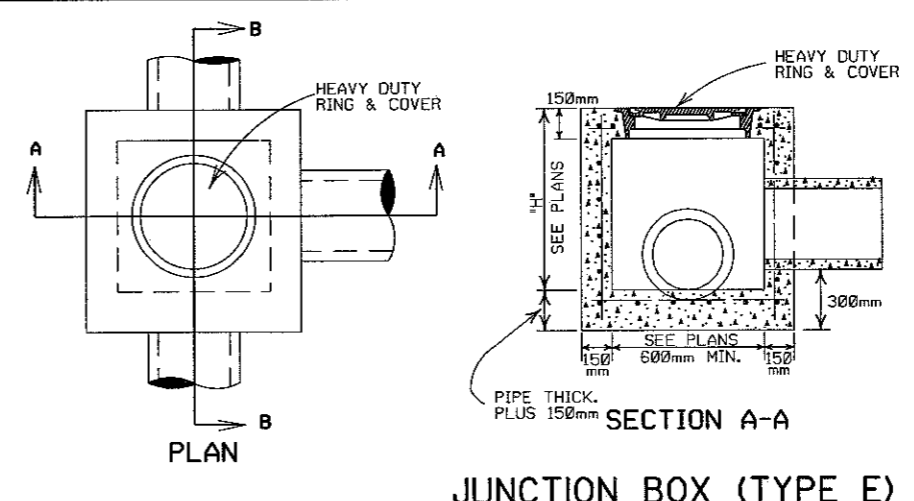
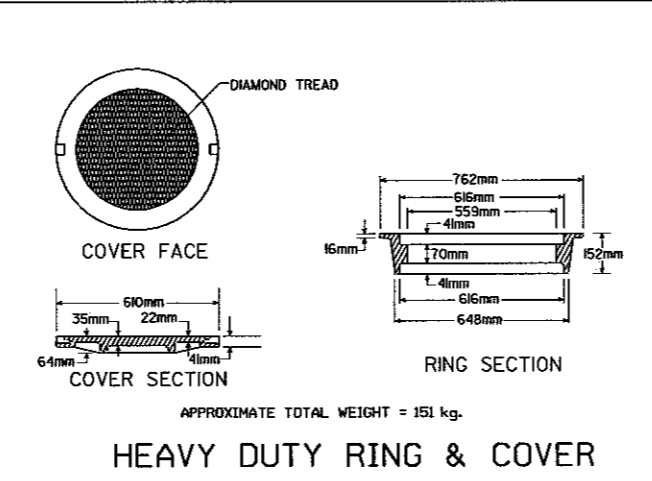
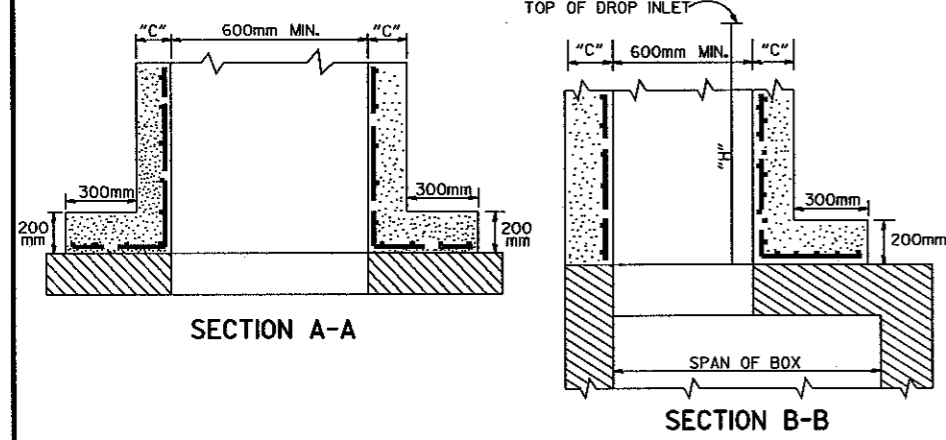
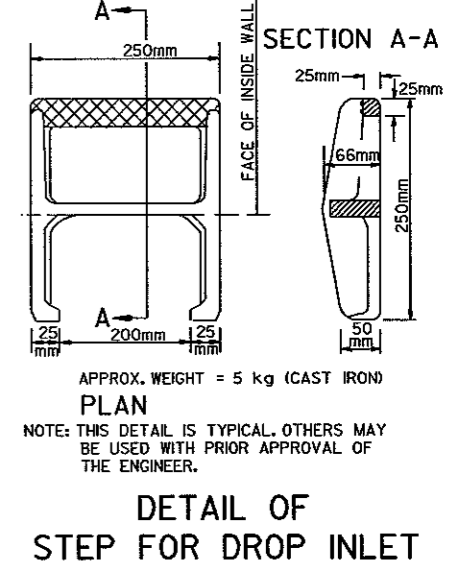
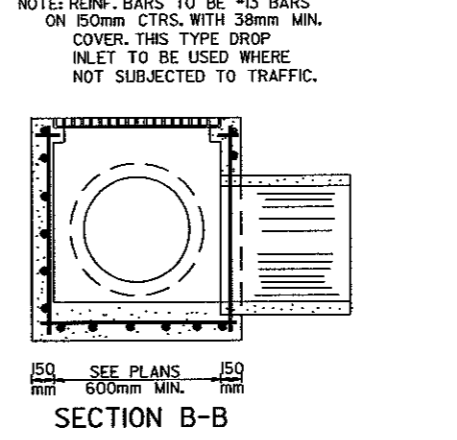
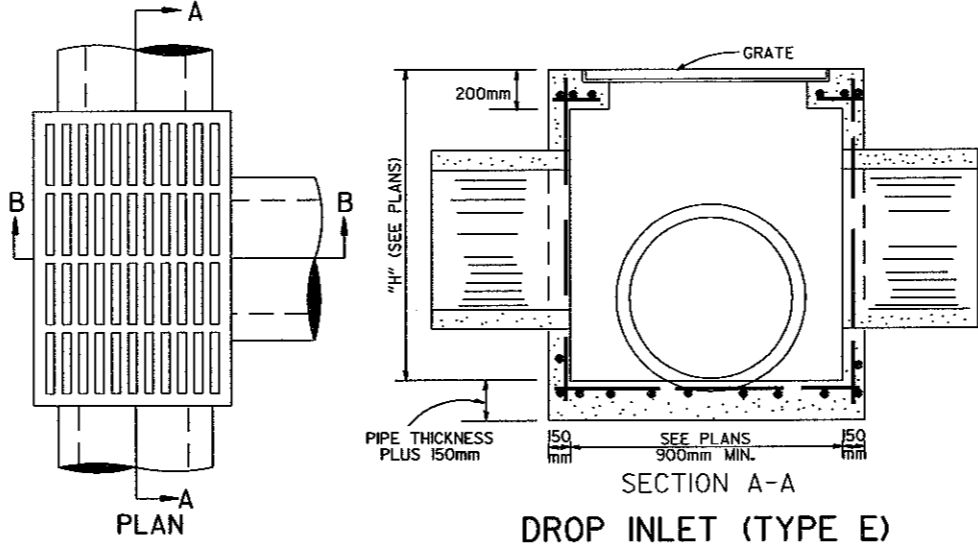
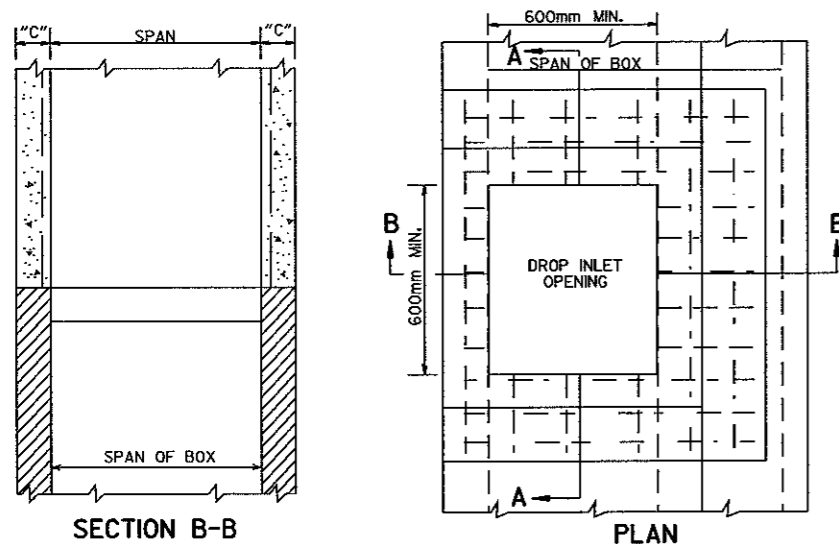


NOTE: HEADWALLS SHALL BE CONSTRUCTED ONLY WHEN SPECIFIED WITH THE ITEM 'PIPE SIPHON'. PIPE DIAMETERS ARE AVAILABLE IN 50mm INCREMENTS.

ARKANSAS STATE HIGHWAY COMMISSION	
PIPE SIPHON	
STANDARD DRAWING FPC-2A (M)	

1-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE PLANNED

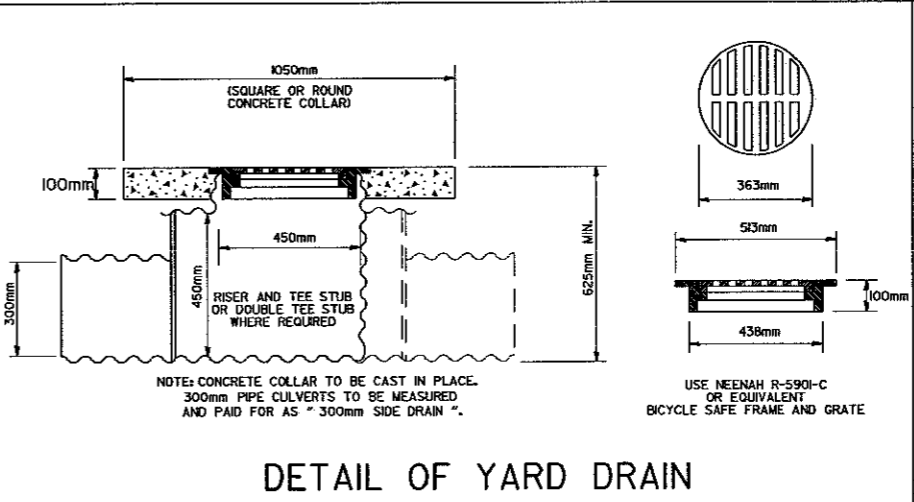
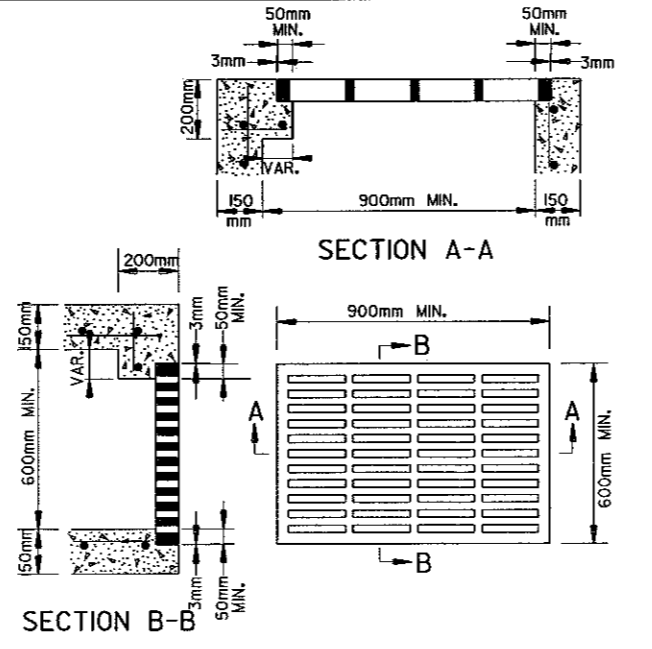
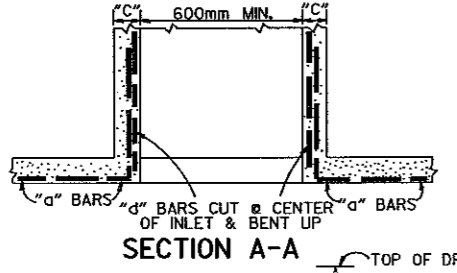




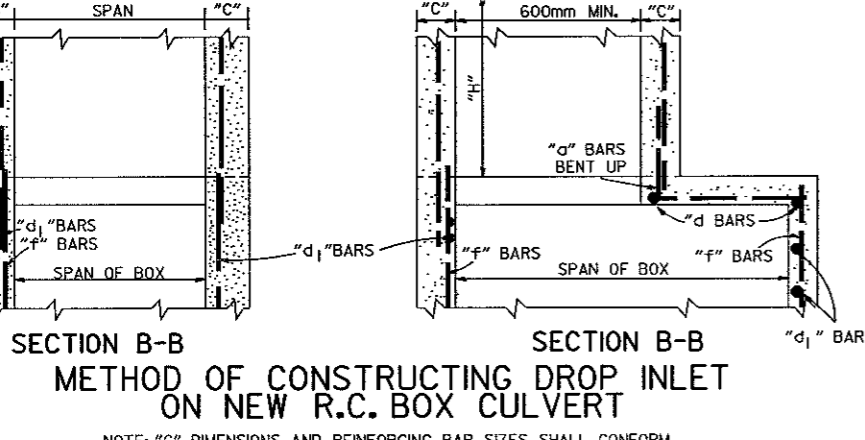
METHOD OF CONSTRUCTING DROP INLET ON EXISTING R.C. BOX CULVERT

HEAVY DUTY RING & COVER

JUNCTION BOX (TYPE E)



- GENERAL NOTES:
1. ALL EXPOSED CORNERS SHALL BE 19mm CHAMFERED.
  2. STEPS SHALL BE INSTALLED ON 400mm CENTERS ON ALL INLETS 1200mm HIGH OR OVER, OR AS APPROVED BY THE ENGINEER.
  3. EXPANSION JOINT MATERIAL SHALL BE 19mm PREFORMED FIBER.
  4. GRATE OR GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105 CLASS 35B. GRATE MAY BE USED WITHOUT FRAME.
  5. GRATE AND FRAME SHALL NOT BE PAINTED.
  6. GRATE SHALL BE BICYCLE SAFE.
  7. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH FLANGE ON TOP.
  8. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M105 CLASS 35B & AASHTO M306.
  9. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.
  10. DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

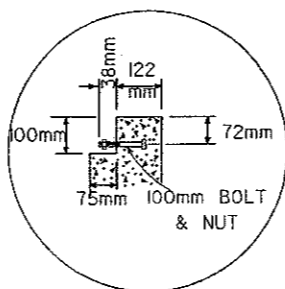
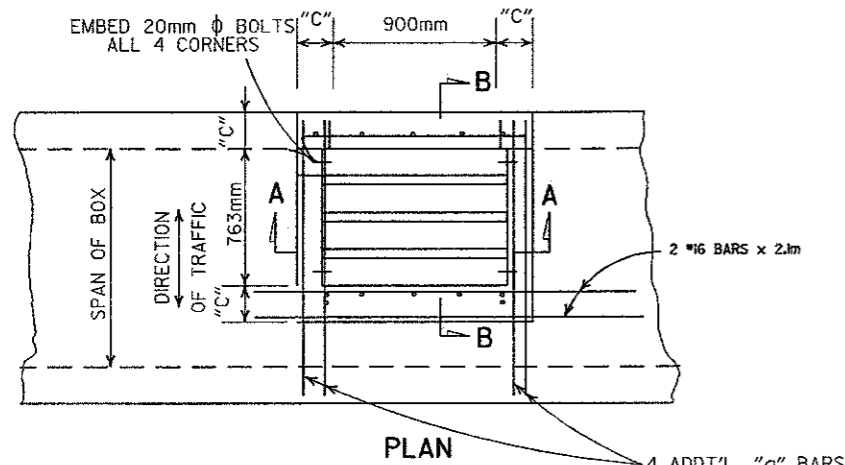


GRATE FOR TYPE E DROP INLET

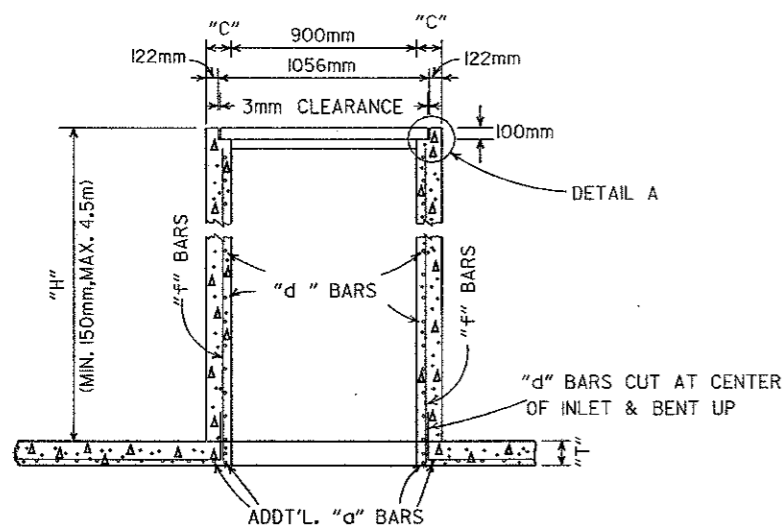
DETAIL OF YARD DRAIN

ARKANSAS STATE HIGHWAY COMMISSION  
 DETAILS OF DROP INLETS  
 & JUNCTION BOXES  
 STANDARD DRAWING FPC-9(M)

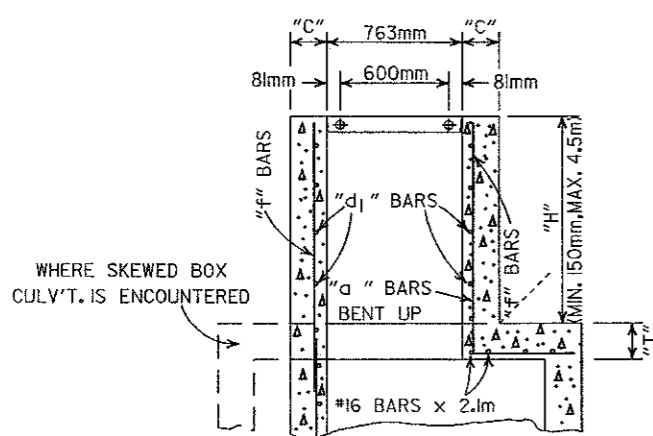
DATE	REV.	REVISION	DATE FILMED
11-16-01		ADDED NOTE 10	
1-12-00		REVISED HEAVY DUTY RING AND COVER	
7-02-98		CHANGED GRATE DETAIL, DELETED DI (TYPE D), REPLACED RING & COVER W/HEAVY DUTY RING & COVER, ADDED JUNCTION BOXES (TYPE E)	7-02-98
4-3-97		REVISED STEEL BARS TO SOFT METRIC	4-3-97
10-18-96		ADDED DETAIL OF YARD DRAIN	
7-20-95		CONVERTED TO METRIC	



DETAIL A



SECTION A-A

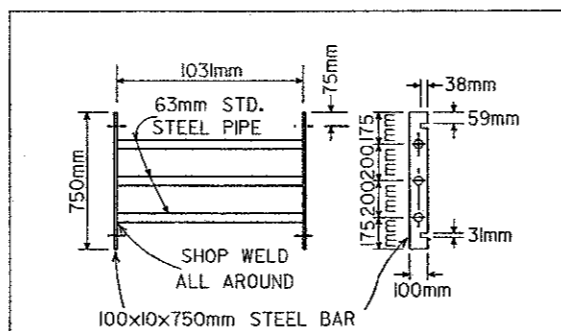


SECTION B-B

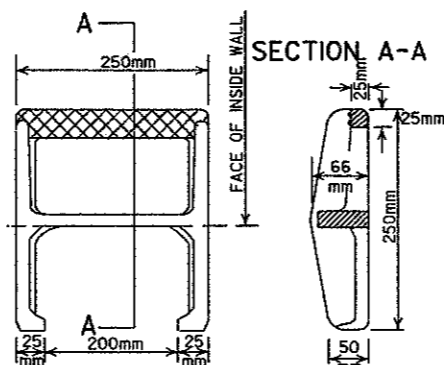
NOTE: ADD'L. REINF. STEEL TO BE INCLUDED IN UNIT PRICE BID PER TYPE "TM" D.I.

DIMENSIONS & REINF. BARS FOR D.I. TO BE THE SAME AS THOSE SHOWN ON APPLICABLE STD. BARREL DRAWING FOR R.C. BOX CULVERTS.

**DROP INLET TYPE "TM" FOR REINFORCED CONC. BOX CULVERTS**



GRATE DETAIL



APPROX. WEIGHT = 5kg (CAST IRON)

PLAN

NOTE: THIS DETAIL IS TYPICAL. OTHERS MAY BE USED WITH PRIOR APPROVAL OF THE ENGINEER.

**DETAIL OF STEP FOR DROP INLET**

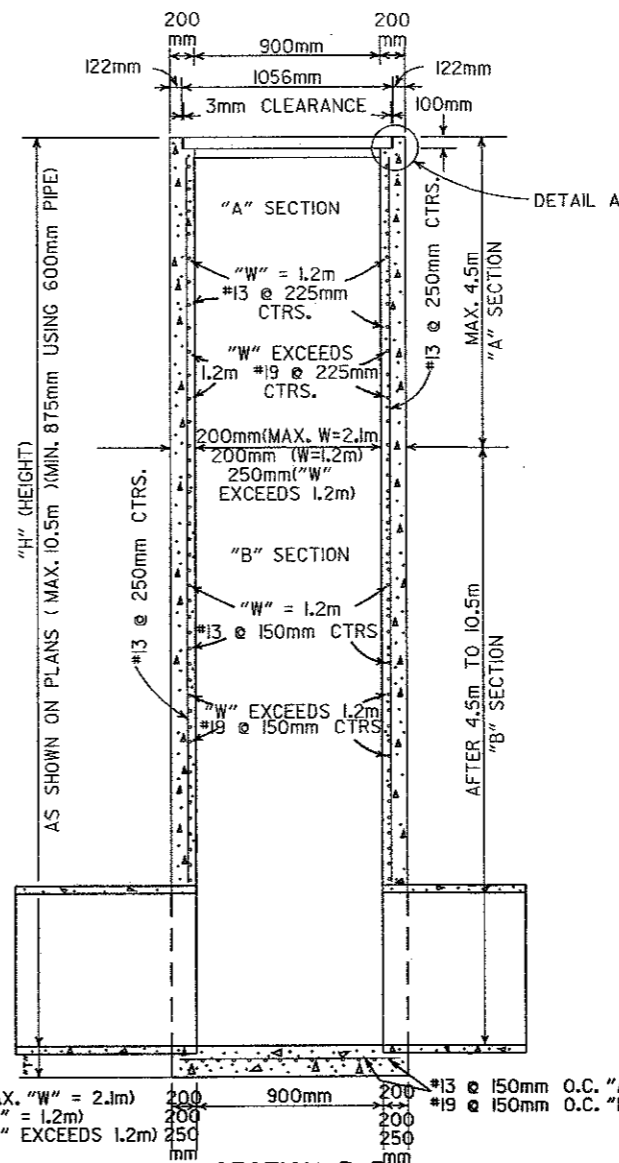
GENERAL NOTES:

1. STEEL PIPE FOR GRATES AND BOLTS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 807. BOLTS SHALL CONFORM TO ONE OF THE FOLLOWING: ASTM A193, GRADE B8 CLASS 10R 2, ASTM A307 OR AASHTO M 164.
2. STEEL PIPE FOR GRATES SHALL BE "STANDARD WEIGHT" PIPE CONFORMING TO ASTM A53 NATIONAL STANDARD PIPE.
3. BOLTS, NUTS, WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232 OR AASHTO M 298, CLASS 40 OR 50.
4. ALL EXPOSED CORNERS TO HAVE 19mm CHAMFER.
5. ALL #13 AND #16 REINFORCING BARS TO HAVE 38mm COVER. LARGER SIZES TO HAVE 50mm COVER.
6. THE COMPLETE PIPE GRATE SHALL BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

**TABLE OF "W" DIMENSIONS**

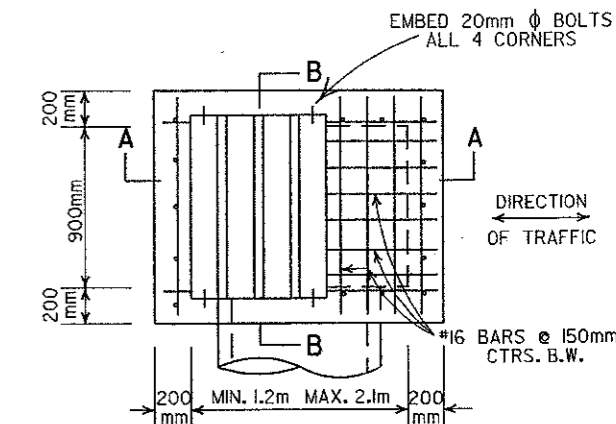
I.D. PIPE	SKEW OF CROSS DRAIN		
	STRAIGHT	30°	45°
600	1.2	1.2	1.2
750	1.2	1.2	1.33
900	1.2	1.28	1.58
1050	1.28	1.48	1.83
1200	1.45	1.68	2.08

NOTE: DIMENSIONS SHOWN ABOVE ARE FOR PIPES INTERSECTING DROP INLET ON ONE SIDE ONLY. FOR SKEWED PIPES INTERSECTING BOTH SIDES OF DROP INLET, "W" WILL NEED TO BE INCREASED OR AXIS OF INTERSECTING PIPES WILL NEED TO BE SHIFTED.

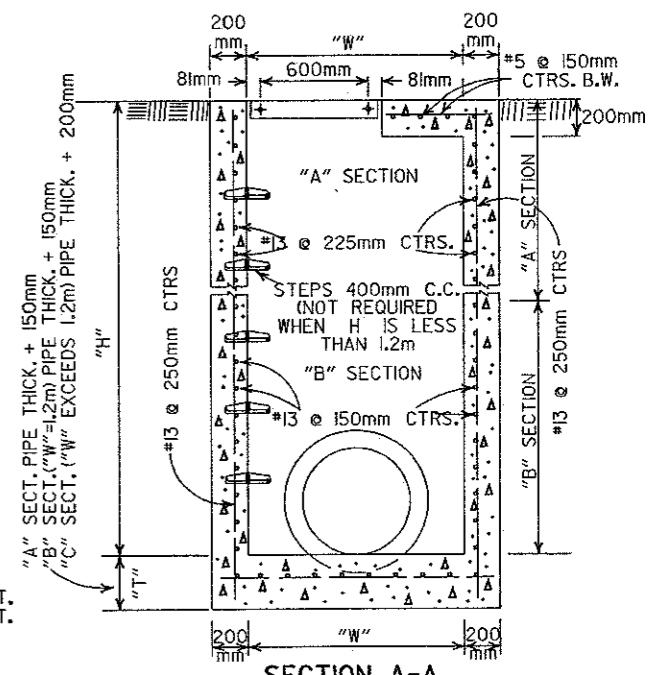


SECTION B-B

"A" SECT. (MAX. "W" = 2.1m)  
 "B" SECT. ("W" = 1.2m)  
 "C" SECT. ("W" EXCEEDS 1.2m)



PLAN



SECTION A-A

**DROP INLET (TYPE RM)**

ARKANSAS STATE HIGHWAY COMMISSION

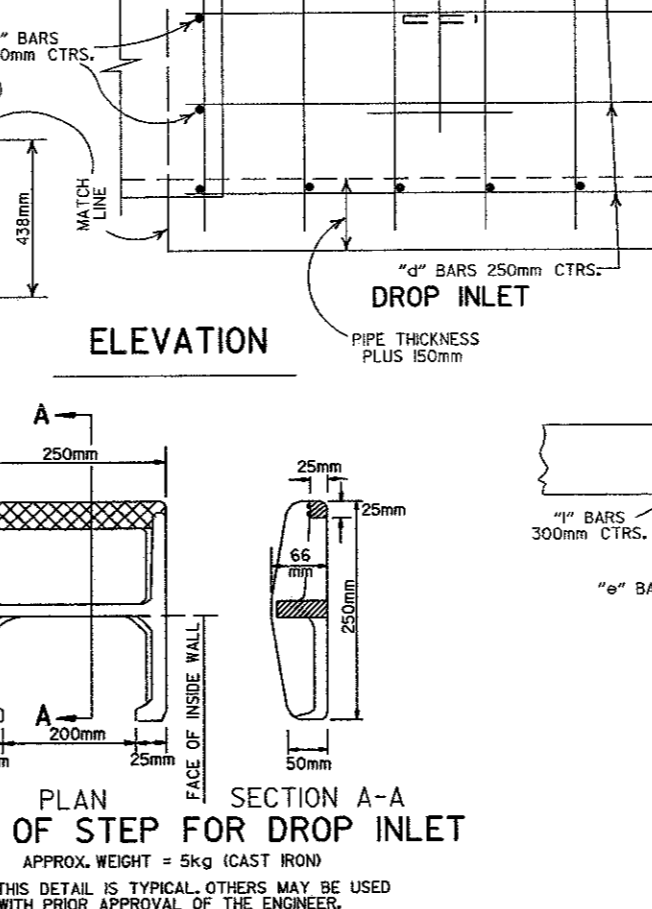
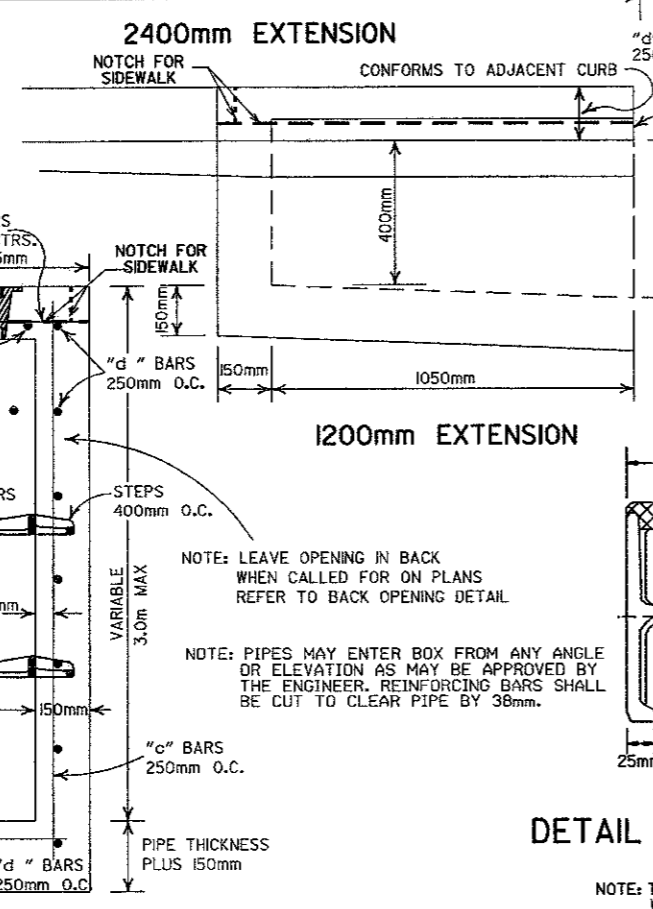
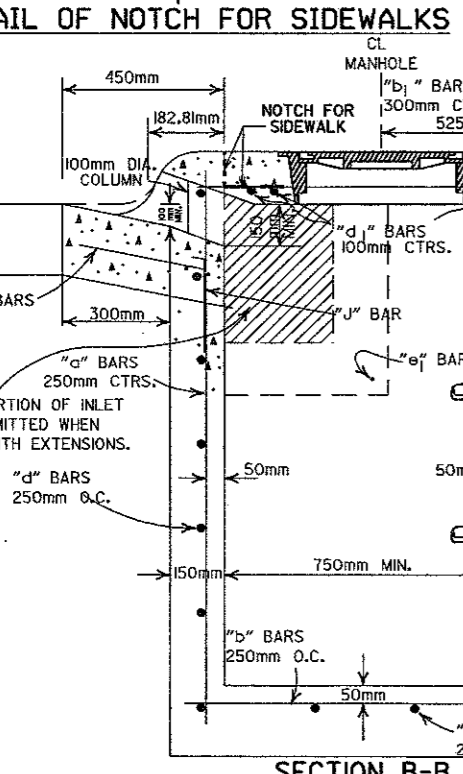
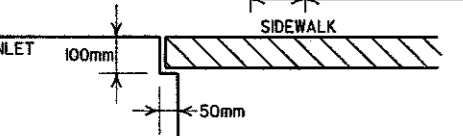
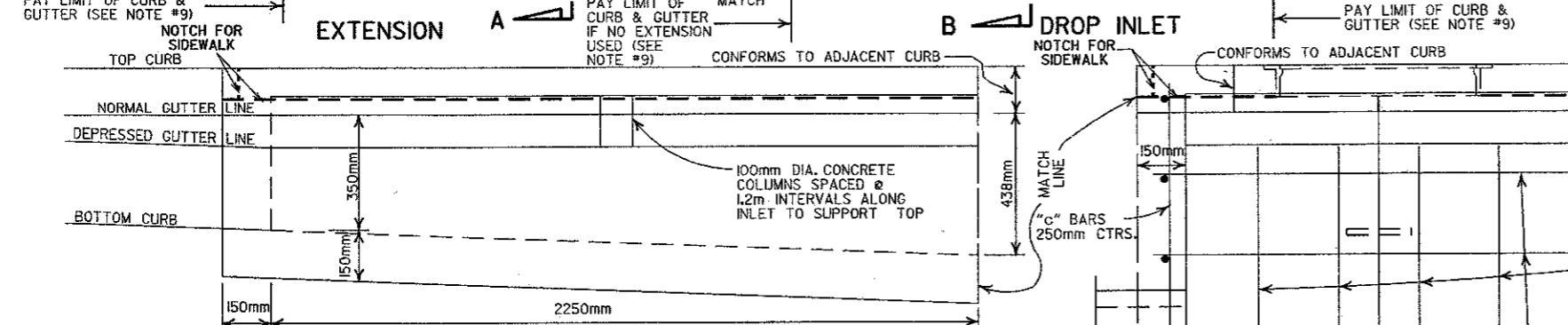
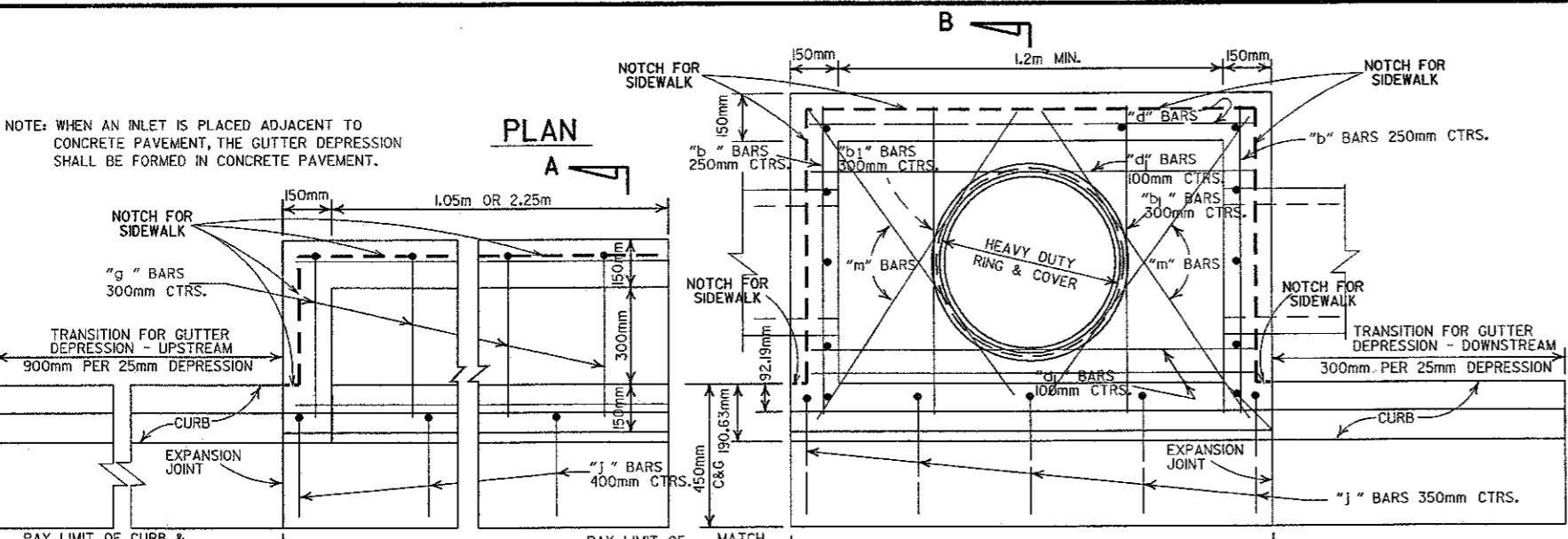
**DETAILS OF DROP INLETS**

STANDARD DRAWING FPC-90(M) METRIC

8-22-02	REVISED DIMENSION ON SECTION A-A
1-2-00	CORRECTED DIMENSION ON SECTION B-B
8-06-97	ADDED DIMENSION TO SECTION A-A
4-3-97	REVISED STEEL BARS TO SOFT METRIC
10-18-96	REV. ASTM REF. TO AASHTO AND ADDED NOTE TO TABLE OF "W" DIMENSIONS
7-20-95	CONVERTED TO METRIC



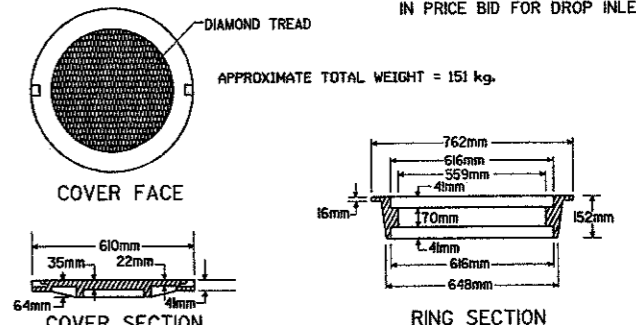
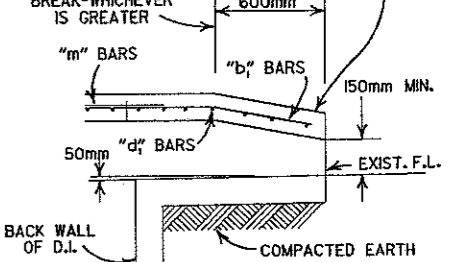
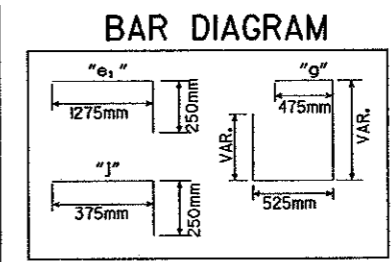
NOTE: WHEN AN INLET IS PLACED ADJACENT TO CONCRETE PAVEMENT, THE GUTTER DEPRESSION SHALL BE FORMED IN CONCRETE PAVEMENT.



PIPE SIZE	MIN. WIDTH	HEIGHT 1.5m		PLUS OR MINUS PER m OF HEIGHT		1.2m		2.4m	
		CLASS A CONC.	REINF. STEEL	CLASS A CONC.	REINF. STEEL	CLASS A CONC.	REINF. STEEL	CLASS A CONC.	REINF. STEEL
mm	mm	cu m	kg	cu m	kg	cu m	kg	cu m	kg
450	750	1.35	70.8	0.21	10.0	0.44	17.2	0.66	32.7
600	750	1.36	70.8	0.21	10.0				
750	950	1.82	93.0	0.23	11.8				
900	1100	2.00	107.1	0.24	12.7				
1050	1300	2.24	113.4	0.26	13.6				
1200	1450	2.44	120.2	0.27	14.5				
						DEDUCT FROM QUANTITY COMPUTED FOR EACH EXTENSION ADDED.			
						0.03	1.4		

NOTE: QUANTITIES ARE APPROXIMATE AND ARE SHOWN FOR BACK OF D.I. SIDEWALK, CONC. ISLAND OR SLOPE BREAK-WHICHEVER IS GREATER. SLOPE AS NEEDED TO MATCH EXIST. F.L.

INSIDE DIA. PIPE	CLASS A CONC.	REINF. STEEL
mm	cu m	kg
450	0.04	0.90
600	0.07	1.35
750	0.10	1.80
1050	0.18	3.60



**HEAVY DUTY RING & COVER**

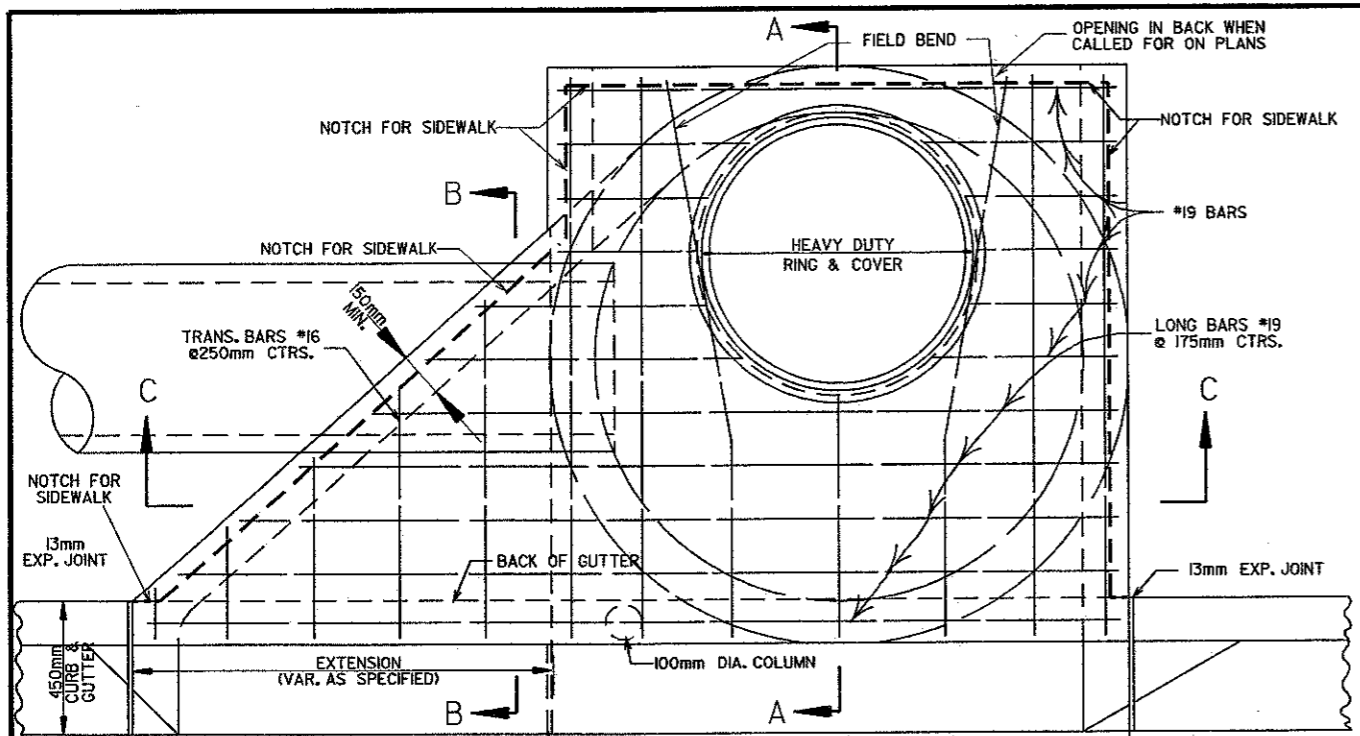
- GENERAL NOTES:
1. ALL EXPOSED CORNERS TO HAVE 19mm CHAMFER.
  2. STEPS SHALL BE INSTALLED IN ALL INLETS 1.2m HIGH AND OVER OF AS APPROVED BY THE ENGINEER.
  3. ALL REINF. BARS SHALL BE #13 AND HAVE 38mm COVER.
  4. DROP INLETS AND EXTENSION ON CURVED SECTIONS SHALL CONFORM TO THE CURVATURE OF THE CURB.
  5. THIS DROP INLET MAY BE CONSTRUCTED ON NEW OR EXISTING R.C. BOX CULVERT AS SHOWN ON F.P.C.-9(M).
  6. WHEN PLANS CALL FOR DROP INLET OVER 3.0m HIGH, FLOOR AND WALLS SHALL BE CONSTRUCTED AS SHOWN FOR TYPE "RM" DROP INLET (F.P.C.-9(M)).
  7. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH THE FLANGE ON TOP.
  8. DURING CONSTRUCTION OF THE ROADWAY THE CONTRACTOR SHALL MAINTAIN DRAINAGE INTO OR AROUND THE DROP INLET AS APPROVED BY THE ENGINEER.
  9. PAYMENT FOR CURB AND/OR CURB AND GUTTER WITHIN THE LIMITS OF DROP INLETS AND DROP INLET EXTENSIONS SHALL BE CONSIDERED INCLUDED IN PAYMENT MADE FOR DROP INLETS AND/OR DROP INLET EXTENSIONS.
  10. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M105 CLASS 35B & AASHTO M306.
  11. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.
  12. 100mmx50mm NOTCH SHALL BE FORMED IN ALL DROP INLETS TO SUPPORT SIDEWALK CONSTRUCTION. REFER TO DETAIL OF NOTCH FOR SIDEWALKS.
  13. DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

ARKANSAS STATE HIGHWAY COMMISSION  
**DETAILS OF DROP INLETS (TYPE C)**  
 STANDARD DRAWING FPC-9E(M)

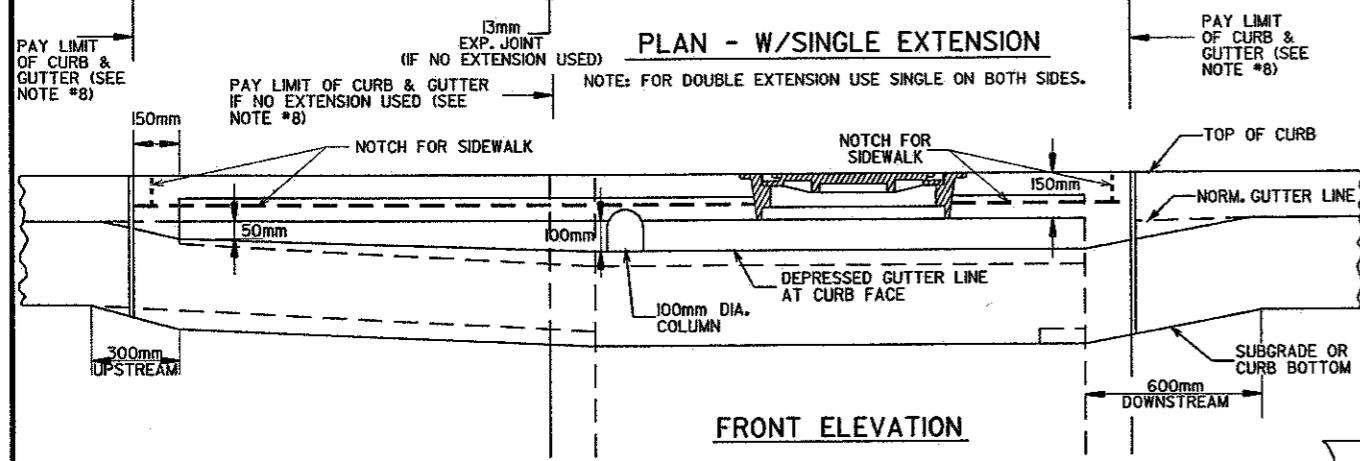
0-22-02	ADDED PAY LIMIT CURB NOTES TO SECTIONS A-A & B-B
1-15-01	ADDED NOTE TO REVISED SECTION B-B
1-18-00	CORRECTED DIMENSIONS & REV. RING & COVER
5-23-99	ADDED DETAIL OF NOTCH FOR SIDEWALKS
7-02-98	REPLACED RING & COVER WITH HEAVY DUTY RING & COVER. ADDED NOTES 3.0.0.0
4-3-97	REVISED STEEL BARS TO SOFT METRIC
10-20-96	CORRECTED SPELLING
4-28-96	ADDED NOTE & 100mm(200mm)
7-20-95	CONVERTED TO METRIC

PLAN SECTION A-A  
 DETAIL OF STEP FOR DROP INLET  
 APPROX. WEIGHT = 5kg (CAST IRON)  
 NOTE: THIS DETAIL IS TYPICAL. OTHERS MAY BE USED WITH PRIOR APPROVAL OF THE ENGINEER.

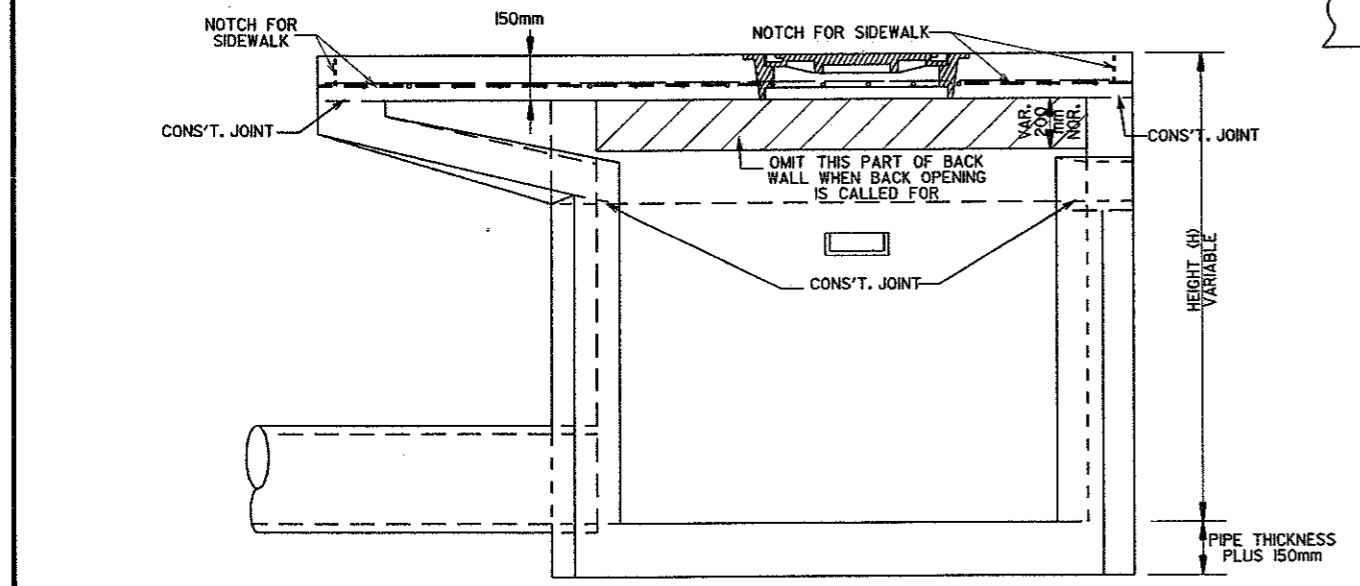




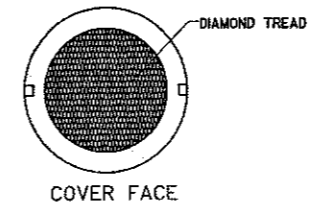
PLAN - W/SINGLE EXTENSION



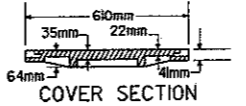
FRONT ELEVATION



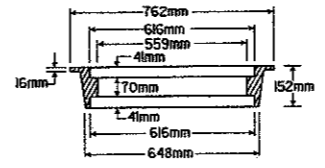
SECTION C-C



COVER FACE



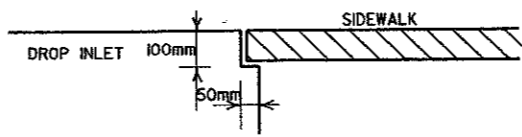
COVER SECTION



RING SECTION

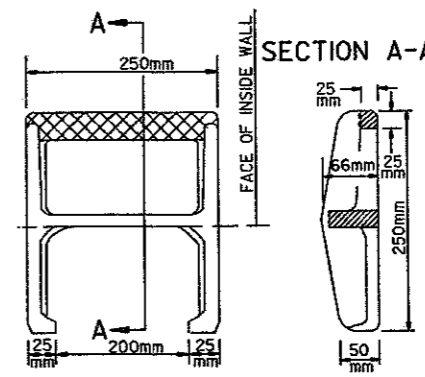
APPROXIMATE TOTAL WEIGHT = 151 kg.

HEAVY DUTY RING & COVER



DETAIL OF NOTCH FOR SIDEWALKS

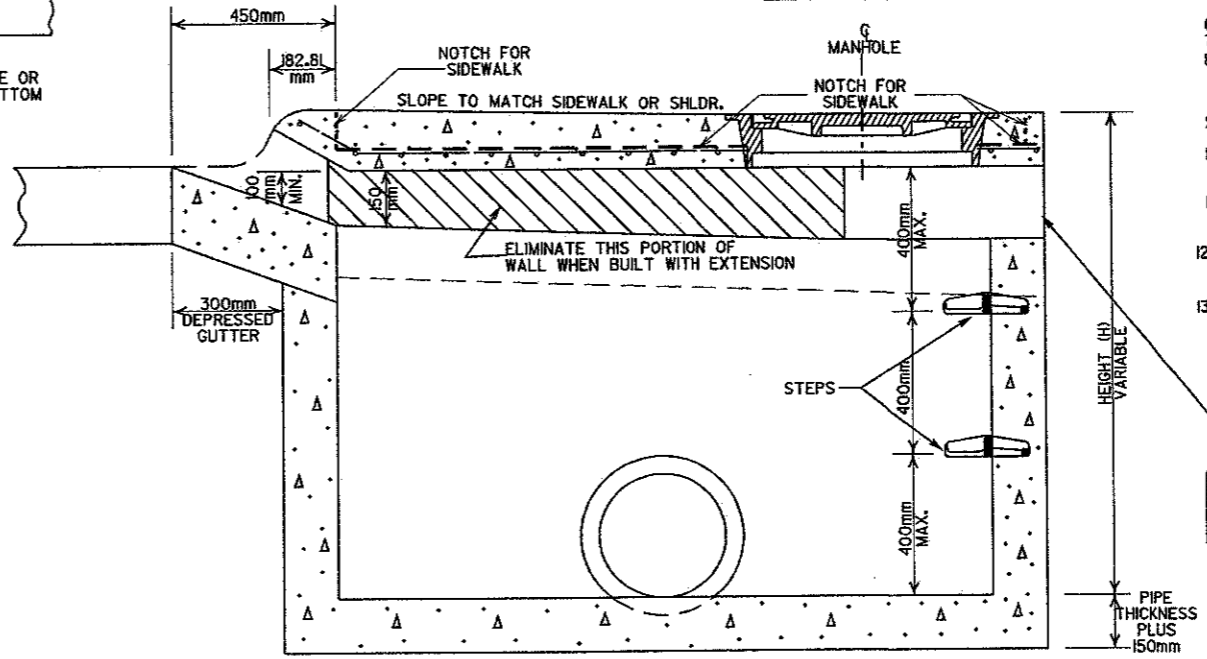
GENERAL NOTES (HEAVY DUTY RING & COVER):  
 1. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.  
 2. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.  
 3. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH FLANGE ON TOP.



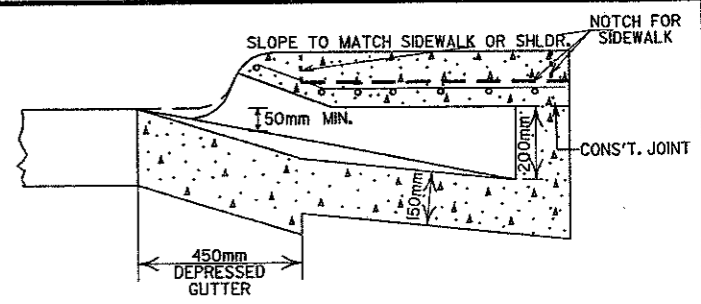
SECTION A-A

APPROX. WEIGHT = 5 kg (CAST IRON)  
 PLAN  
 NOTE: THIS DETAIL IS TYPICAL. OTHERS MAY BE USED WITH PRIOR APPROVAL OF THE ENGINEER.

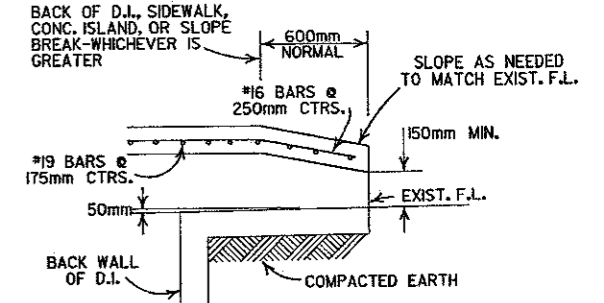
DETAIL OF STEP FOR DROP INLET



SECTION A-A



SECTION B-B



BACK OPENING

WHEN OPENING IN BACK IS CALLED FOR ON PLANS EXTEND OPENING AS SHOWN IN DETAIL. PAYMENT TO BE INCLUDED IN PRICE BID FOR DROP INLET (TYPE MO).

- GENERAL NOTES:
- ALL EXPOSED CORNERS TO HAVE 19mm CHAMFER.
  - STEPS SHALL BE INSTALLED IN ALL INLETS 1200mm HIGH AND OVER OR AS DIRECTED BY THE ENGINEER.
  - ALL REINFORCING BARS SHALL BE GRADE 300 AND HAVE MIN. 38mm COVER.
  - DROP INLETS AND EXTENSION ON CURVED SECTIONS SHALL CONFORM TO THE CURVATURE OF THE CURB.
  - 100mm DIA. COLUMNS SPACED AT MAX. 1200mm INTERVALS SHALL BE INSTALLED ALONG INLET AND EXTENSION TO SUPPORT TOP.
  - BASE AND INLET WALLS SHALL BE CAST MONOLITHICALLY.
  - THE THROAT SHALL BE CAST INTEGRALLY WITH THE GUTTER.
  - PAYMENT FOR CURB AND/OR CURB AND GUTTER WITHIN THE LIMITS OF DROP INLETS AND DROP INLET EXTENSIONS SHALL BE CONSIDERED INCLUDED IN PAYMENT MADE FOR DROP INLETS AND/OR DROP INLET EXTENSIONS.
  - PIPES MAY ENTER DROP INLET FROM ANY ANGLE OR ELEVATION AS MAY BE APPROVED BY THE ENGINEER.
  - APPROPRIATE SIZE TYPE C DROP INLETS MAY BE SUBSTITUTED FOR TYPE MO DROP INLETS AS APPROVED BY THE ENGINEER. PAYMENT TO BE AS DROP INLET (TYPE MO).
  - DURING CONSTRUCTION OF THE ROADWAY THE CONTRACTOR SHALL MAINTAIN DRAINAGE INTO OR AROUND THE DROP INLET AS APPROVED BY THE ENGINEER.
  - 100mm x 50mm NOTCH SHALL BE FORMED IN ALL DROP INLETS TO SUPPORT SIDEWALK CONSTRUCTION. REFER TO DETAIL OF NOTCH FOR SIDEWALKS.
  - DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

LEAVE OPENING IN BACK WHEN CALLED FOR ON PLANS REFER TO BACK OPENING DETAIL

MINIMUM WALL THICKNESS			
DIA. OF D.I.	DIA. OF OUTLET PIPE	CAST IN PLACE	PRECAST
1200mm I.D.	300mm THRU	150mm	125mm
1500mm I.D.	1750mm THRU	200mm	150mm
1800mm I.D.	1200mm THRU	200mm	175mm

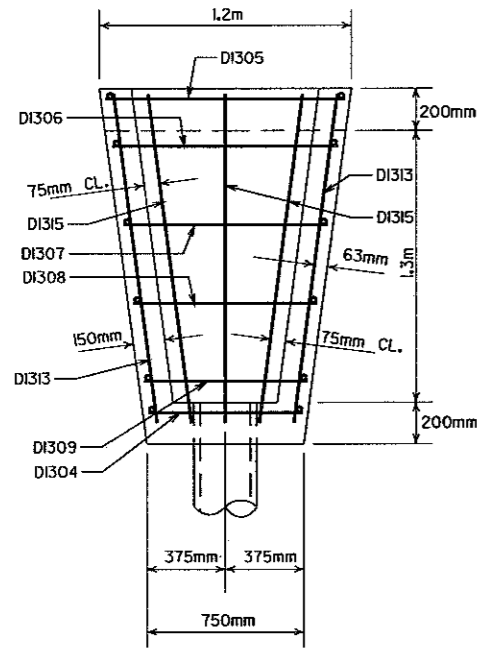
8-22-02	ADDED PAY LIMIT CURB NOTES TO SECTIONS A-A & B-B
8-16-01	ADDED NOTE 13
1-12-00	REVISED HEAVY DUTY RING & COVER
5-13-99	ADDED NOTCH DETAIL FOR SIDEWALKS
7-02-98	REP. NOTE 8, REA. PLAN DETAIL, REV. PICTURE FOR NEW RING & COVER DETAIL, ADDED HEAVY DUTY RING & COVER AND DETAIL OF STEP FOR DROP INLET
4-3-97	REVISED STEEL BARS TO SOFT METRIC
4-25-95	ADDED NOTE & ALL OPENING DIMENSION
10-12-95	CORRECTED #20 BAR SPACING
7-20-95	CONVERTED TO METRIC

ARKANSAS STATE HIGHWAY COMMISSION

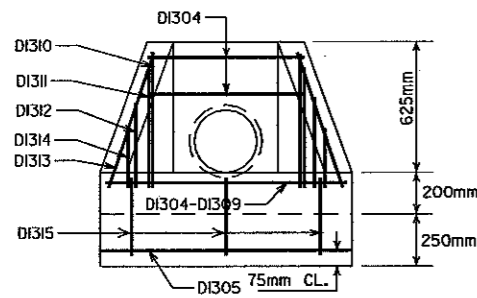
DETAILS OF DROP INLET (TYPE MO)

STANDARD DRAWING FPC-9M (M)

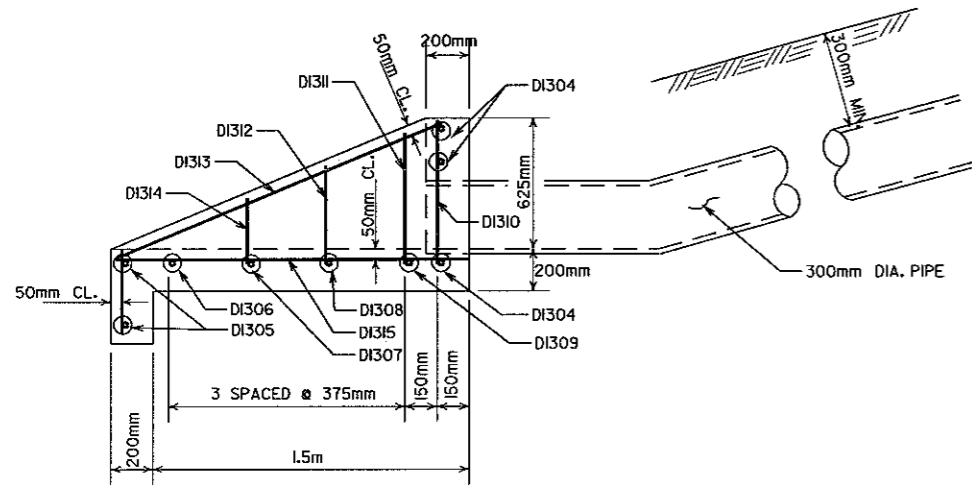




PLAN



FRONT ELEVATION

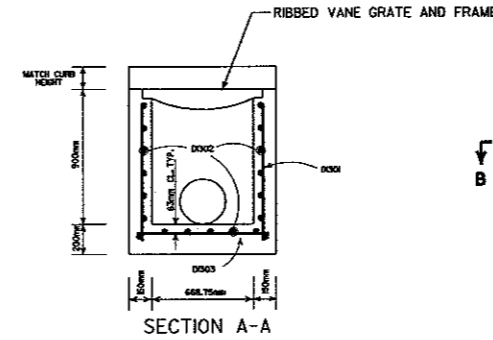


SIDE ELEVATION  
CONCRETE SPILLWAY

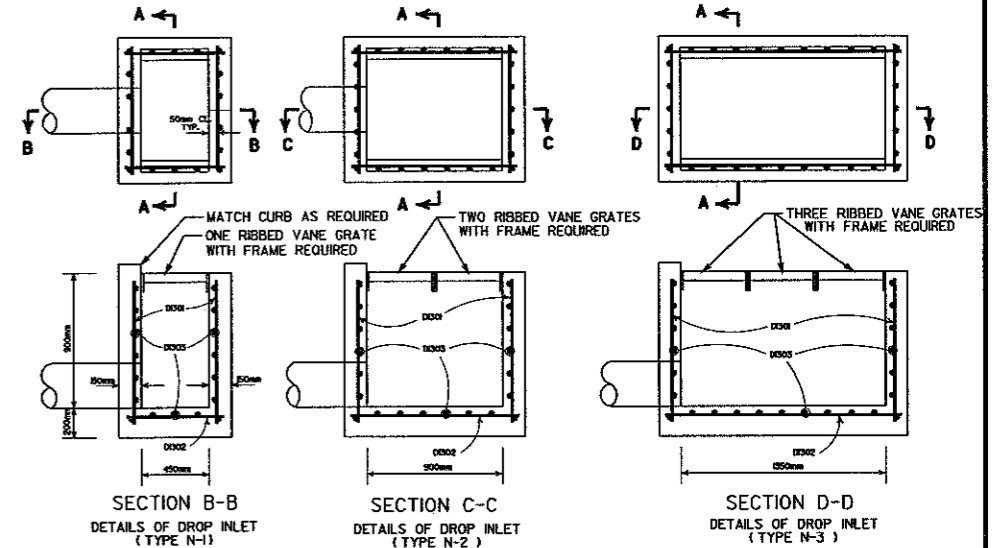
BAR LIST  
(CONCRETE SPILLWAY)

MARK	NO. REQ'D.	LENGTH mm	BENDING DIAGRAM
DI304	3	650	
DI305	2	1100	
DI306	1	1025	
DI307	1	925	
DI308	1	825	
DI309	1	725	
DI310	2	725	
DI311	2	650	
DI312	2	525	
DI313	2	1650	
DI314	2	350	
DI315	3	1925	

DETAILS OF CONCRETE SPILLWAY (TYPE A)



SECTION A-A

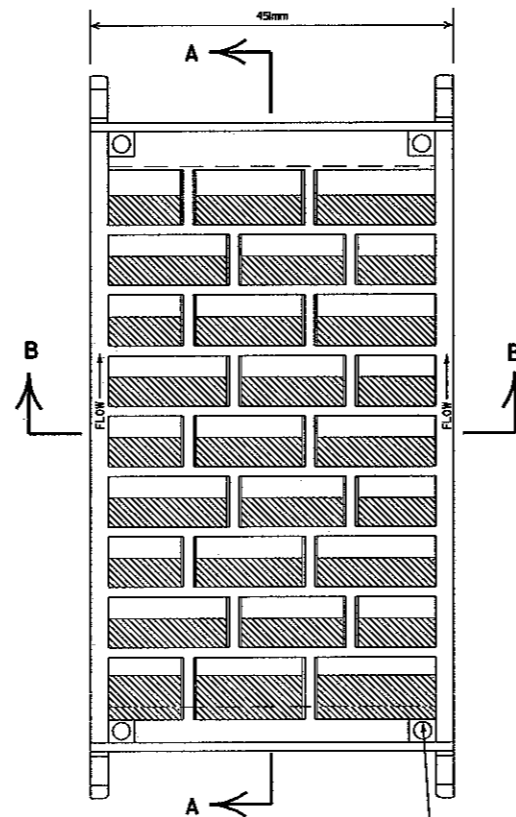


DETAILS OF DROP INLET

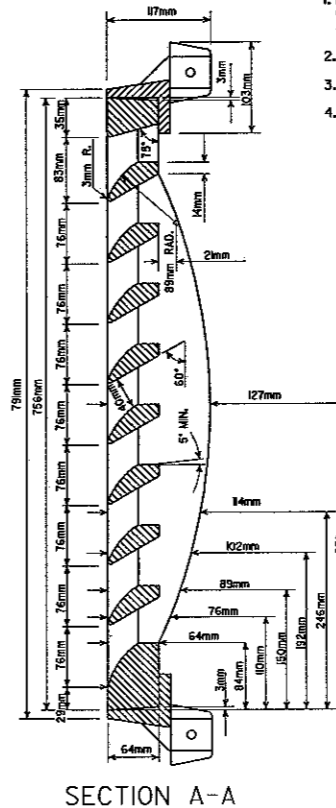
BAR LIST (DROP INLET)

MARK	TYPE N-1		TYPE N-2		TYPE N-3	
	NO. REQ'D.	LENGTH mm	NO. REQ'D.	LENGTH mm	NO. REQ'D.	LENGTH mm
DI301	20	900	26	900	32	900
DI302	19	650	19	1100	19	1550
DI303	17	875	20	875	23	875

ALL BARS #13 @ 150mm SPACING

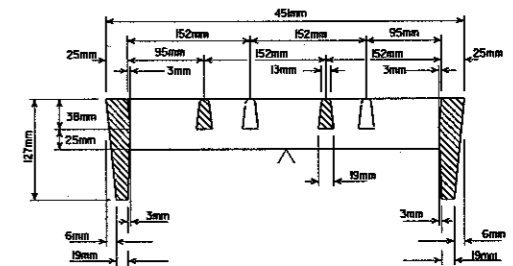


DETAILS OF RIBBED VANE GRATE AND FRAME



SECTION A-A

- GENERAL NOTES (GRATE & FRAME)
- RIBBED VANE GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105 CLASS 35B & AASHTO M 306.
  - GRATE AND FRAME SHALL NOT BE PAINTED.
  - GRATE AND FRAME SHALL BE INSTALLED IN DROP INLET IN ASSEMBLED POSITION.
  - APPROXIMATE WEIGHT OF GRATE SHALL BE 77kg.



SECTION B-B

SECTION THRU FRAME

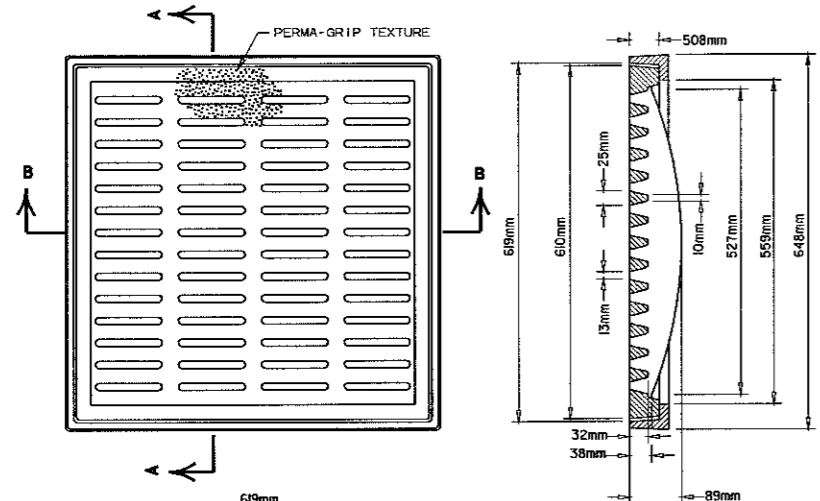
ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF DROP INLETS AND  
SPILLWAY OUTLET

STANDARD DRAWING FPC-9N(M)

DATE	REVISION	DATE FILED
7-02-98	REVISED SECT. A-A DETAIL OF D.I. ADDED AASHTO REF. TO NOTE L REVISED GRATE	
4-03-97	REVISED STEEL BARS TO SOFT METRIC	
10-18-96	REVISED ASTM REF. TO AASHTO	
7-20-95	CONVERTED TO METRIC	

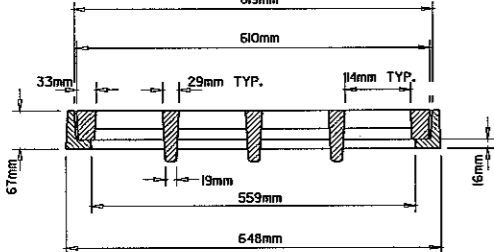




SECTION A-A

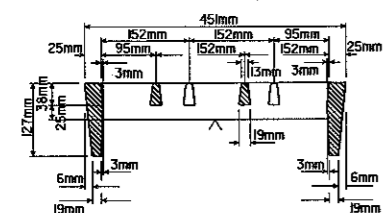
**GENERAL NOTES (PEDESTRIAN GRATE & FRAME)**

1. THE PEDESTRIAN GRATE SHALL BE ORIENTED IN THE TOP OF THE DROP INLET SO THAT THE 13mm OPENINGS ARE PERPENDICULAR TO THE PATH OF PEDESTRIAN TRAVEL.
2. THE PEDESTRIAN GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
3. THE GRATE AND FRAME SHALL NOT BE PAINTED.
4. THE GRATE AND FRAME SHALL BE INSTALLED IN THE DROP INLET IN THE ASSEMBLED POSITION.
5. THE APPROXIMATE WEIGHT OF THE GRATE AND FRAME SHALL BE 96 kg.
6. THE MINIMUM WATERWAY OPENING SHALL BE .079 SQ. METER.

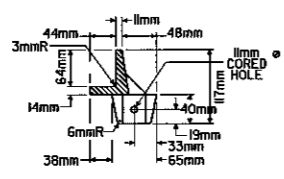


SECTION B-B

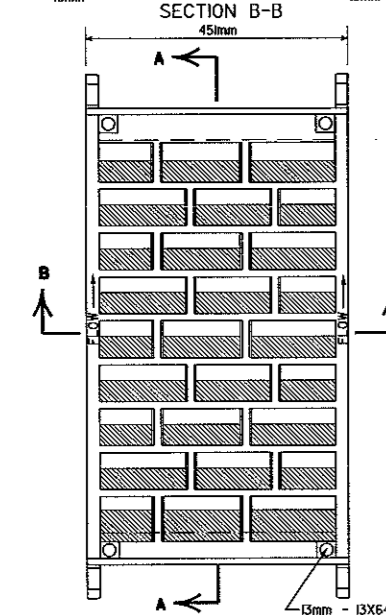
**DETAILS OF PEDESTRIAN GRATE AND FRAME**



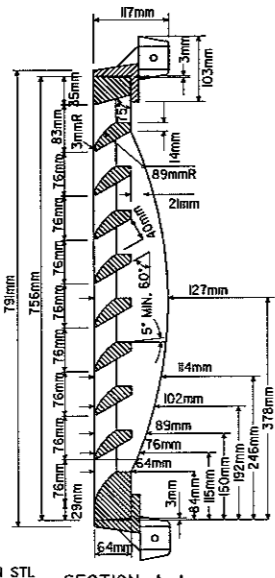
SECTION B-B



SECTION THRU FRAME



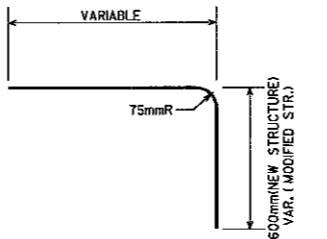
**DETAILS OF RIBBED VANE GRATE AND FRAME**



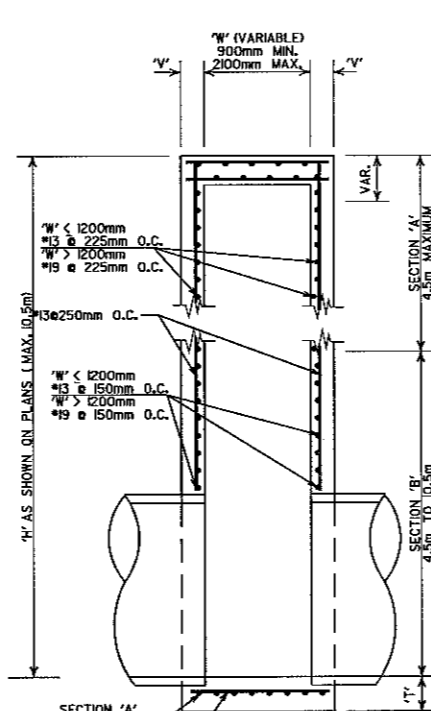
SECTION A-A

**GENERAL NOTES (RIBBED VANE GRATE & FRAME)**

1. RIBBED VANE GRATE AND FRAME SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
2. GRATE AND FRAME SHALL NOT BE PAINTED.
3. GRATE AND FRAME SHALL BE INSTALLED IN DROP INLET IN ASSEMBLED POSITION.
4. APPROXIMATE WEIGHT OF GRATE SHALL BE 17 kg.

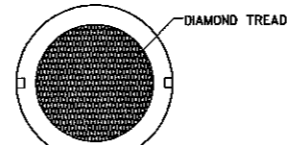


**DETAIL OF BENT "b" BAR**

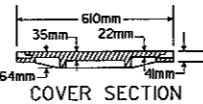


SECTION A-A

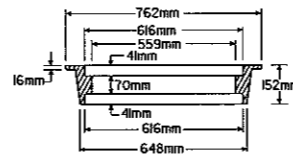
**DETAILS OF DROP INLET (TYPE ST)**



COVER FACE



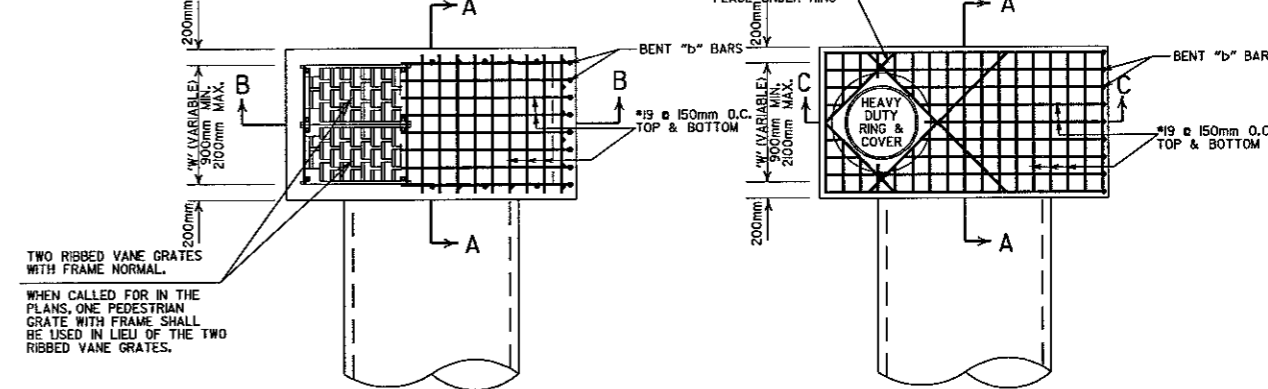
COVER SECTION



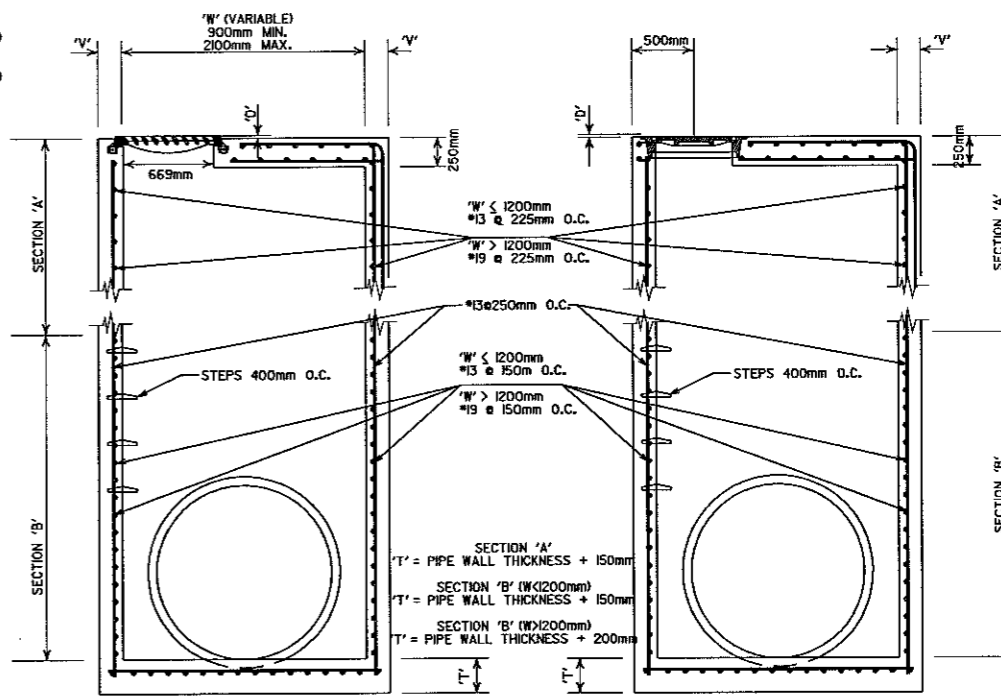
RING SECTION

**HEAVY DUTY RING & COVER**

APPROXIMATE TOTAL WEIGHT = 151 kg.



SECTION 'A' 'V' = 200mm  
SECTION 'B' (W < 200mm) 'V' = 200mm  
SECTION 'B' (W > 200mm) 'V' = 250mm



SECTION B-B

SECTION C-C  
**DETAILS OF JUNCTION BOX (TYPE ST)**

**GENERAL NOTES (TYPE ST DROP INLET & JUNCTION BOX)**

1. THE 'D' DIMENSION SHALL MATCH THE FINAL LIFT OF ACRM SURFACE COURSE SHOWN IN THE PLANS WHEN ASPHALT PAVING SURROUNDS THE GRATE & RING COVER, AND SHALL BE 0" AT OTHER INSTALLATIONS.
2. THE STEPS SHALL BE OMITTED WHERE 'H' IS LESS THAN 1200mm.
3. ALL EXPOSED CORNERS ARE TO HAVE A 19mm CHAMFER.
4. ALL #13 & #16 REINFORCING BARS ARE TO HAVE A MIN. 38mm COVER. ALL LARGER SIZE BARS ARE TO HAVE A 50mm MIN. COVER.

**GENERAL NOTES (HEAVY DUTY RING & COVER)**

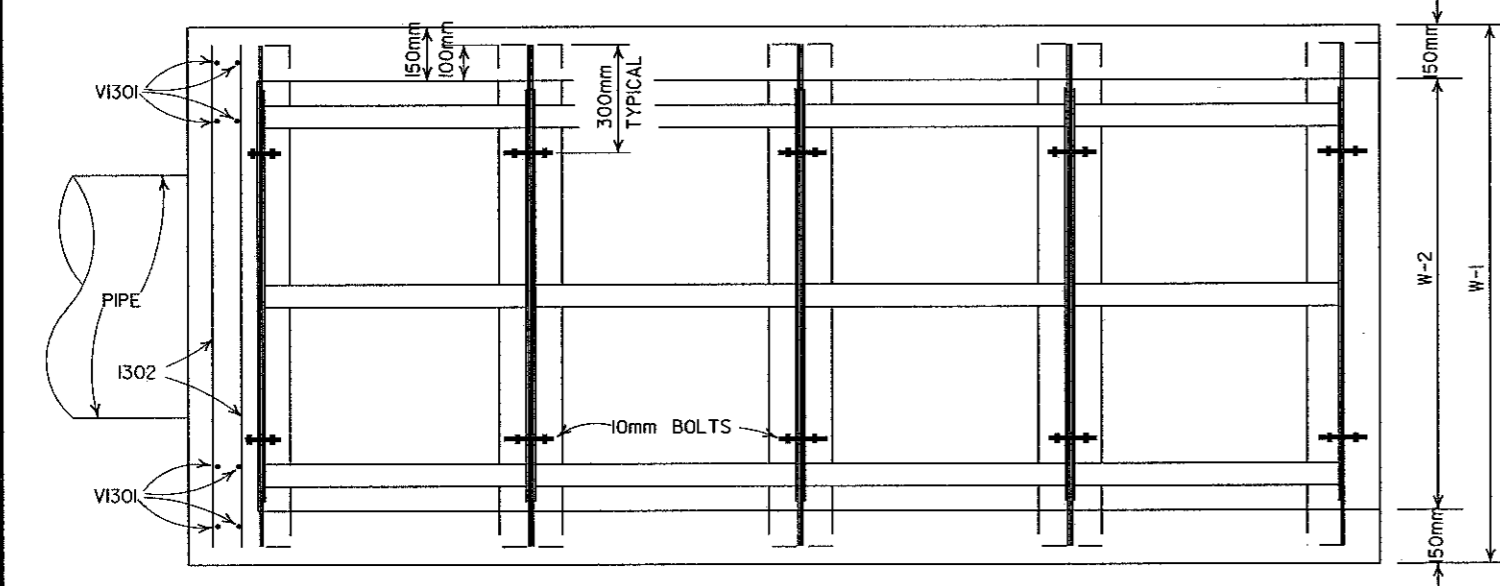
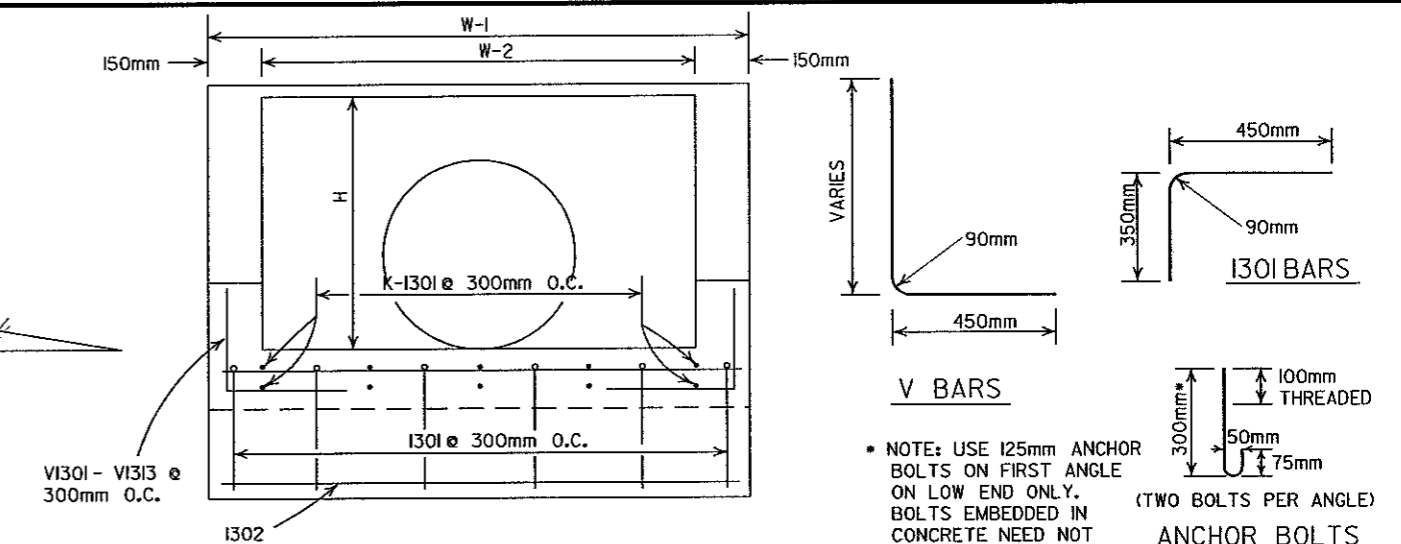
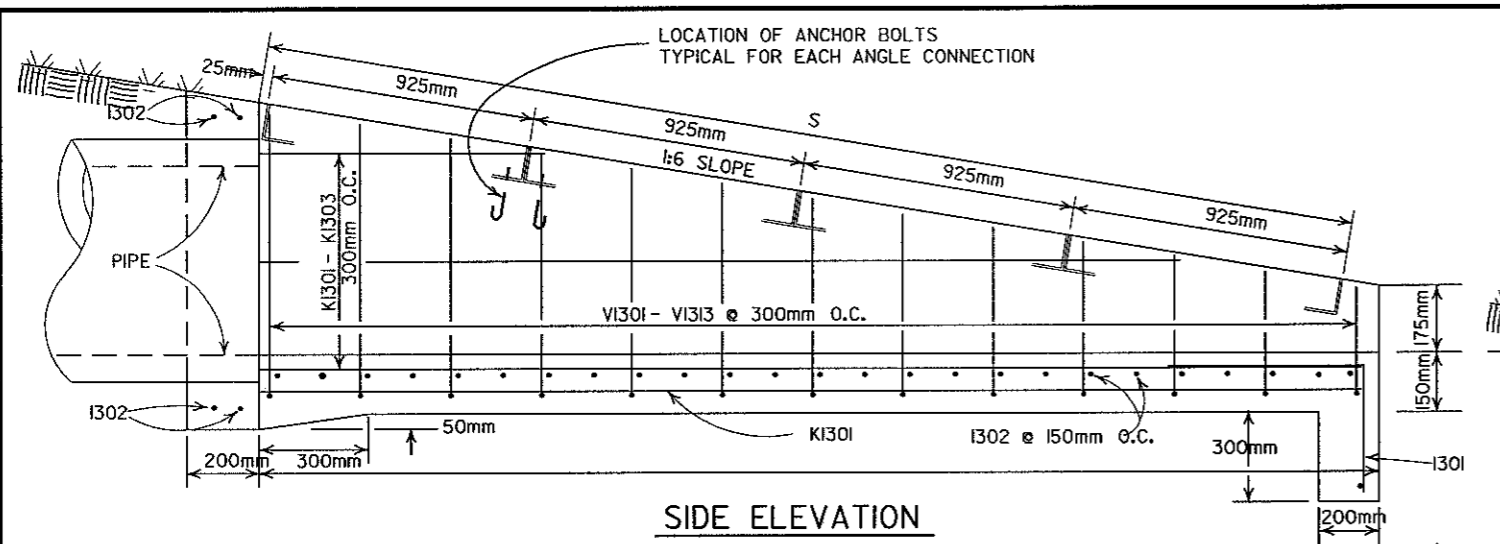
1. HEAVY DUTY RING AND COVER SHALL BE CONSTRUCTED OF CAST IRON AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS AASHTO M 105, CLASS 35B, & AASHTO M 306.
2. HEAVY DUTY RING AND COVER SHALL NOT BE PAINTED.
3. HEAVY DUTY RING SHALL ALWAYS BE INSTALLED WITH FLANGE ON TOP.
4. DIMENSIONS SHOWN FOR RING AND COVER ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR CASTINGS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR CASTING DESIGNS MAY BE MADE BY REFERRING TO PREVIOUSLY APPROVED DRAWINGS.

ARKANSAS STATE HIGHWAY COMMISSION

**DETAILS OF DROP INLET & JUNCTION BOX (TYPE ST)**

STANDARD DRAWING FPC-9S(M) METRIC

10-9-03	REVISED DIMENSION ON DETAILS OF DROP INLET SECTION B-B		
9-16-01	ADDED NOTE 4		
1-2-00	REVISED HEAVY DUTY RING & COVER		
5-0-99	ADDED PEDESTRIAN FRAME/GRATE		
7-02-98	REMOVED NOTES, REV. DIMENSION, ADDED HEAVY DUTY RING & COVER, ADDED AASHTO REF. REVISED GRATE		
4-3-97	REVISED STEEL PIPES TO SPPY METRIC		
10-28-96	REVISED ASTM REF. TO AASHTO		
7-20-96	CONVERTED TO METRIC		
DATE	REVISION		DATE FILMED



END ELEVATION

BENDING DIAGRAM  
(DIMENSIONS ARE OUTSIDE TO OUTSIDE)

QUANTITIES & DIMENSIONS - ONE GRATE COMPLETE

PIPE DIA.	W - 1	W - 2	L	S	H	PANEL SIZE	NUMBER OF PANELS	ANGLE DIMEN. D	APPROX. CONC. QUANT.
	m	m	m	m	m				
450	1.5	1.2	2.85	2.89	0.65	888x150	3	100x88x9	1.35
600	1.5	1.2	3.75	3.80	0.80	888x150	4	100x88x9	1.79
750	1.5	1.2	4.65	4.71	0.95	888x150	5	100x88x9	2.35

BAR LISTS - ONE HEADWALL

600mm PIPE

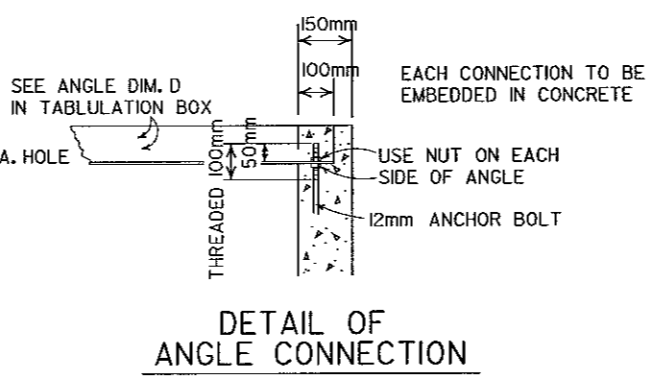
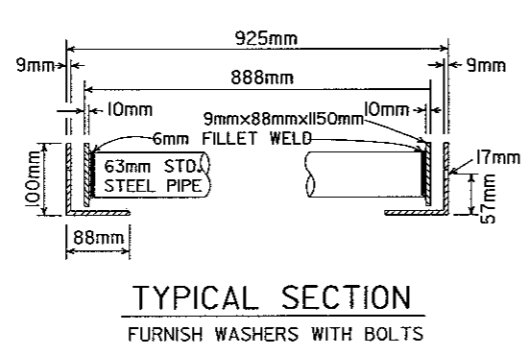
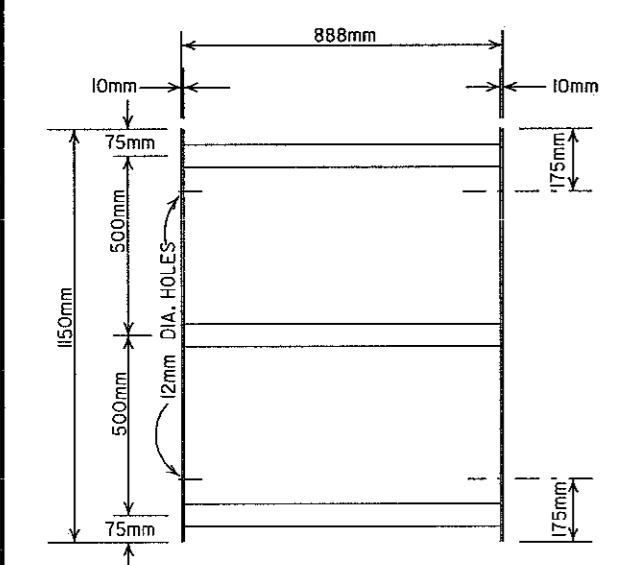
MRK	LENGTH mm	NO.
I301	800	6
I302	1400	30
KI301	3650	10
KI302	3075	2
KI303	1275	2
VI301	1325	10
VI302	1225	2
VI303	1175	2
VI304	1125	2
VI305	1075	2
VI306	1025	2
VI307	975	2
VI308	925	2
VI309	875	2
VI310	825	2
VI311	775	2
VI312	725	2
VI313	675	2

750mm PIPE

MRK	LENGTH mm	NO.
I301	800	6
I302	1400	36
KI301	4550	10
KI302	3975	2
KI303	2175	2
KI304	375	2
VI301	1475	10
VI302	1375	2
VI303	1325	2
VI304	1275	2
VI305	1225	2
VI306	1175	2
VI307	1125	2
VI308	1075	2
VI309	1025	2
VI310	975	2
VI311	925	2
VI312	875	2
VI313	825	2
VI314	775	2
VI315	725	2
VI316	675	2

450mm PIPE

MARK	LENGTH mm	NO.
I301	800	6
I302	1400	24
KI301	2750	10
KI302	2175	2
KI303	375	2
VI301	1175	10
VI302	1075	2
VI303	1025	2
VI304	975	2
VI305	925	2
VI306	875	2
VI307	825	2
VI308	775	2
VI309	725	2
VI310	675	2



STANDARD GRATE PANEL

NOTE: 63mm STANDARD STEEL PIPE TO BE VENTED FOR GALVANIZING.

TYPICAL SECTION  
FURNISH WASHERS WITH BOLTS

DETAIL OF ANGLE CONNECTION

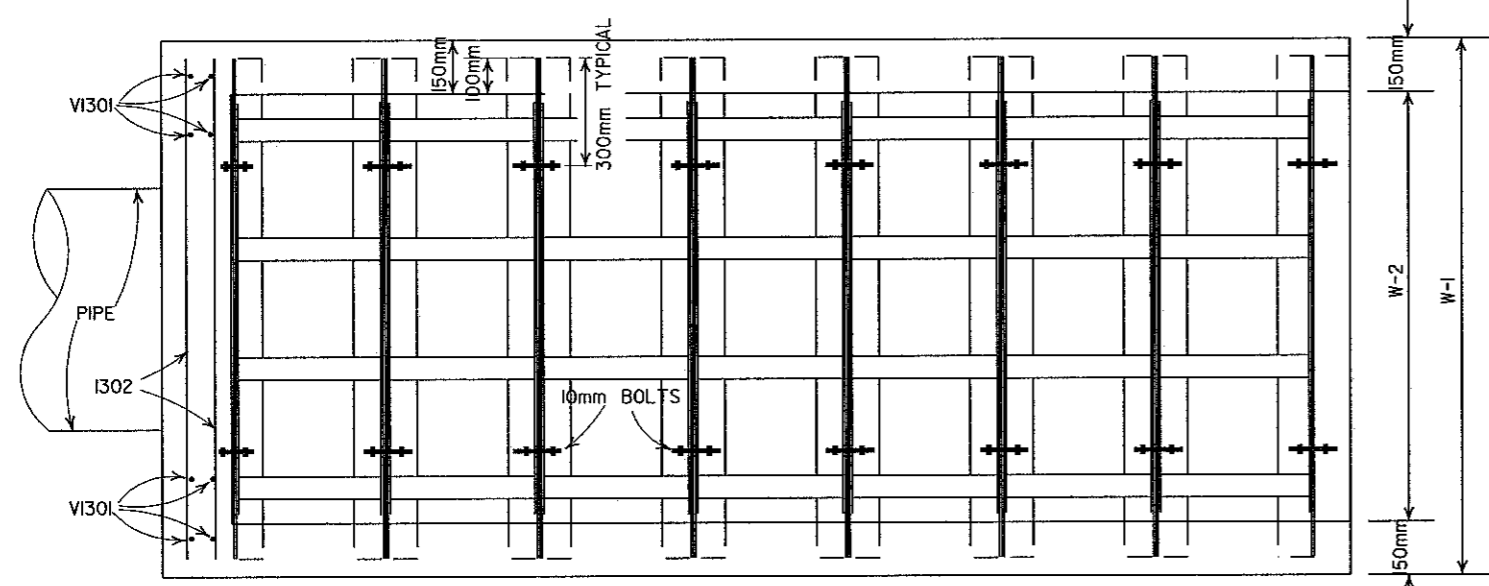
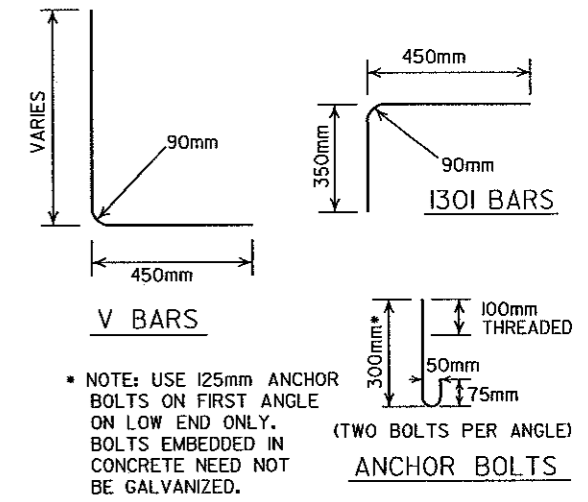
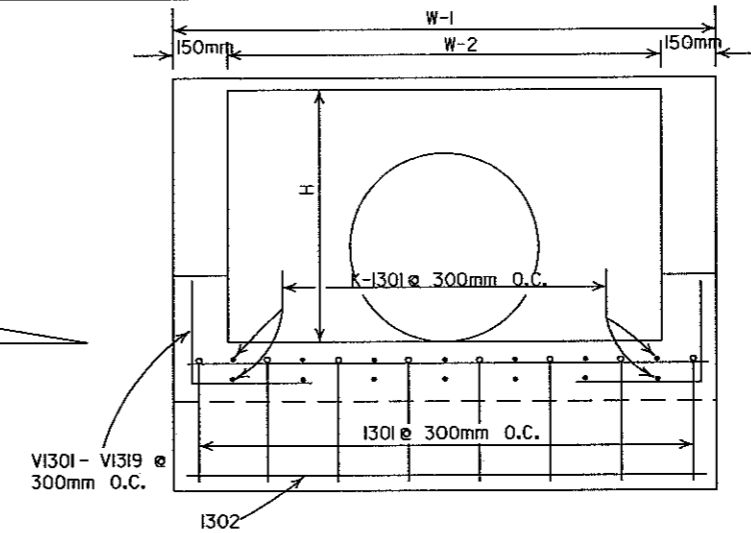
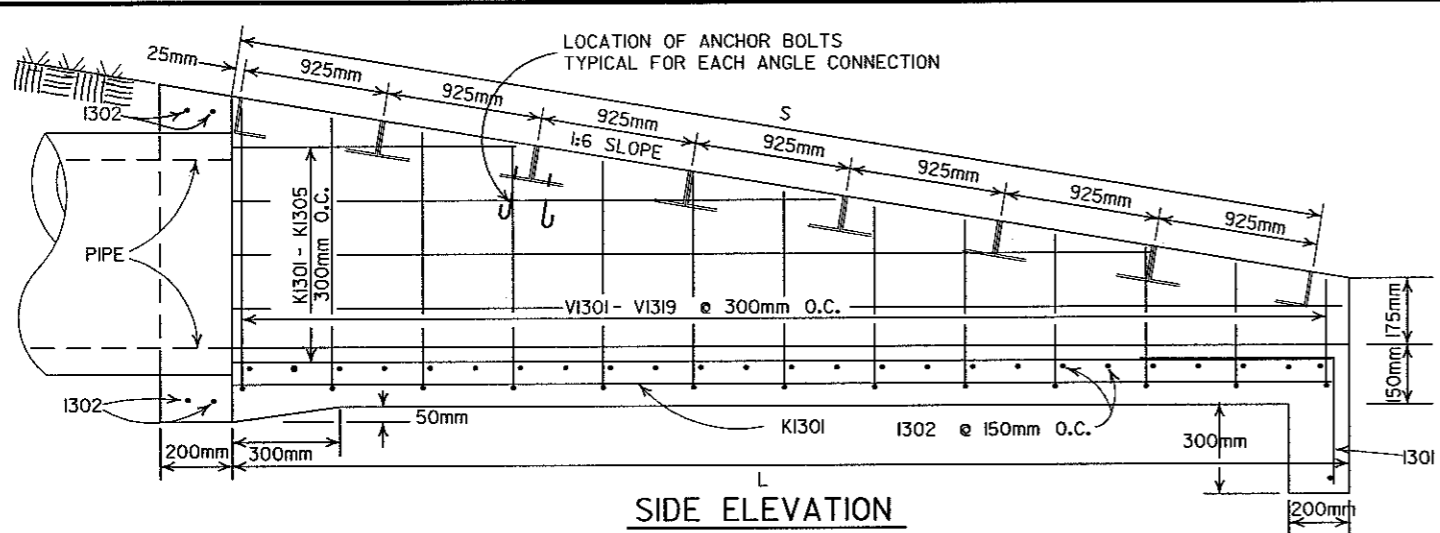
ARKANSAS STATE HIGHWAY COMMISSION

STEEL GRATE ASSEMBLY (TYPE 1)

STANDARD DRAWING G-1(M)

DATE	REVISION	DATE	REVISION
4-03-57	REVISED STEEL BARS TO METRIC		
7-20-56	CONVERTED TO METRIC		





END ELEVATION

BENDING DIAGRAM  
(DIMENSIONS ARE OUTSIDE TO OUTSIDE)

QUANTITIES & DIMENSIONS - ONE GRATE COMPLETE

PIPE DIA.	W - 1	W - 2	L	S	H	PANEL SIZE mm	NUMBER OF PANELS	ANGLE DIMEN. D	APPROX. CONC. QUANT.
	m	m	m	m	m			mm	
900	2.1	1.8	5.55	5.625	1.10	888x1750	6	100x100x8	3.46
1050	2.1	1.8	6.48	6.563	1.25	888x1750	7	100x100x8	4.08
1200	2.1	1.8	7.40	7.500	1.40	888x1750	8	100x100x8	4.73

BAR LISTS - ONE HEADWALL

900 PIPE

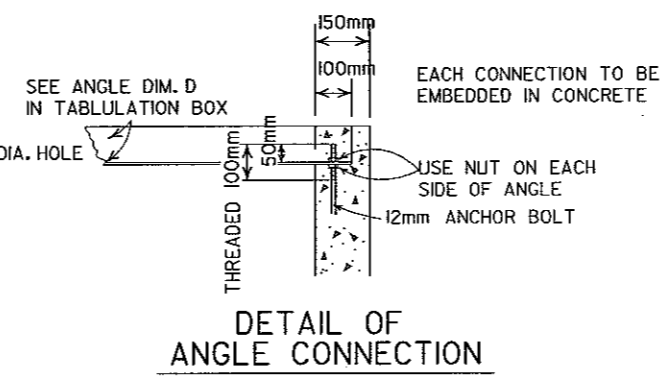
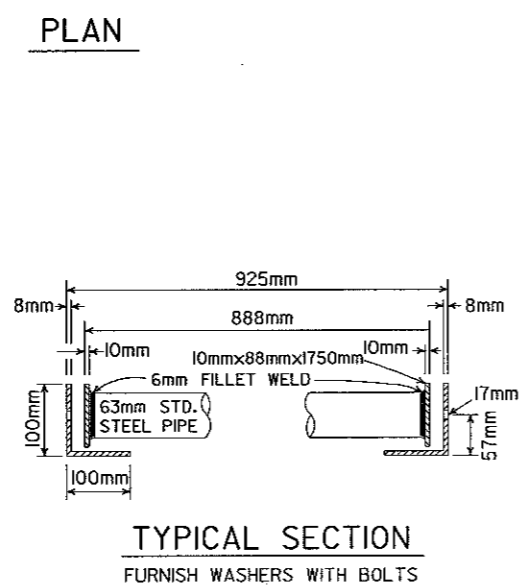
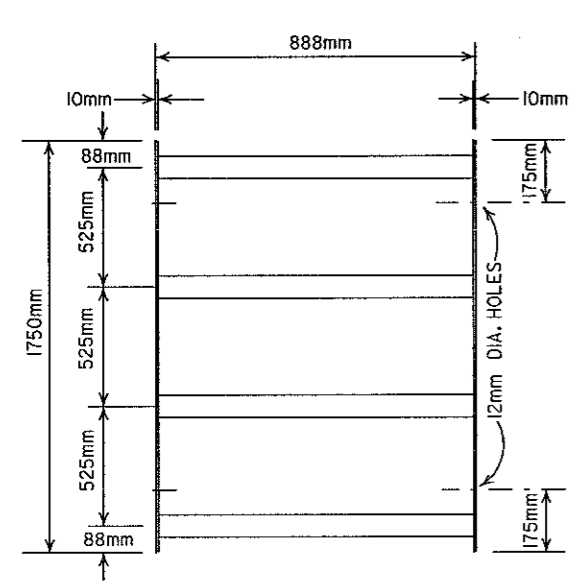
MARK	LENGTH mm	NO.
I301	800	8
I302	2000	42
K1301	5450	14
K1302	4875	2
K1303	3075	2
K1304	1275	2
V1301	1625	10
V1302	1525	2
V1303	1475	2
V1304	1425	2
V1305	1375	2
V1306	1325	2
V1307	1275	2
V1308	1225	2
V1309	1175	2
V1310	1125	2
V1311	1075	2
V1312	1025	2
V1313	975	2
V1314	925	2
V1315	875	2
V1316	825	2
V1317	775	2
V1318	725	2
V1319	675	2

1050 PIPE

MARK	LENGTH mm	NO.
I301	800	8
I302	2000	48
K1301	6375	14
K1302	5775	2
K1303	3975	2
K1304	2175	2
K1305	375	2
V1301	1775	10
V1302	1675	2
V1303	1625	2
V1304	1575	2
V1305	1525	2
V1306	1475	2
V1307	1425	2
V1308	1375	2
V1309	1325	2
V1310	1275	2
V1311	1225	2
V1312	1175	2
V1313	1125	2
V1314	1075	2
V1315	1025	2
V1316	975	2
V1317	925	2
V1318	875	2
V1319	825	2
V1320	775	2
V1321	725	2
V1322	675	2

1200 PIPE

MARK	LENGTH mm	NO.
I301	800	8
I302	2000	54
K1301	7300	14
K1302	6675	2
K1303	4875	2
K1304	3075	2
K1305	1275	2
V1301	1925	10
V1302	1825	2
V1303	1775	2
V1304	1725	2
V1305	1675	2
V1306	1625	2
V1307	1575	2
V1308	1525	2
V1309	1475	2
V1310	1425	2
V1311	1375	2
V1312	1325	2
V1313	1275	2
V1314	1225	2
V1315	1175	2
V1316	1125	2
V1317	1075	2
V1318	1025	2
V1319	975	2
V1320	925	2
V1321	875	2
V1322	825	2
V1323	775	2
V1324	725	2
V1325	675	2



STANDARD GRATE PANEL

NOTE: 63mm STANDARD STEEL PIPE TO BE VENTED FOR GALVANIZING.

TYPICAL SECTION  
FURNISH WASHERS WITH BOLTS

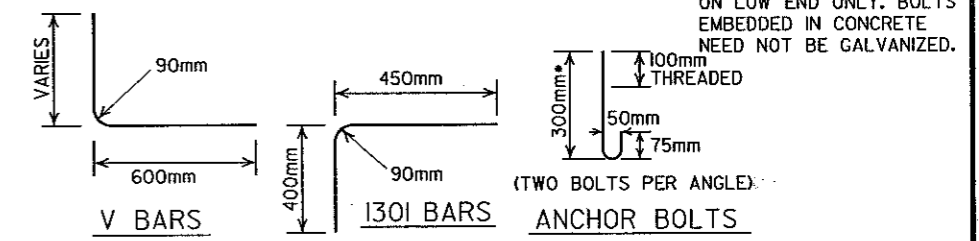
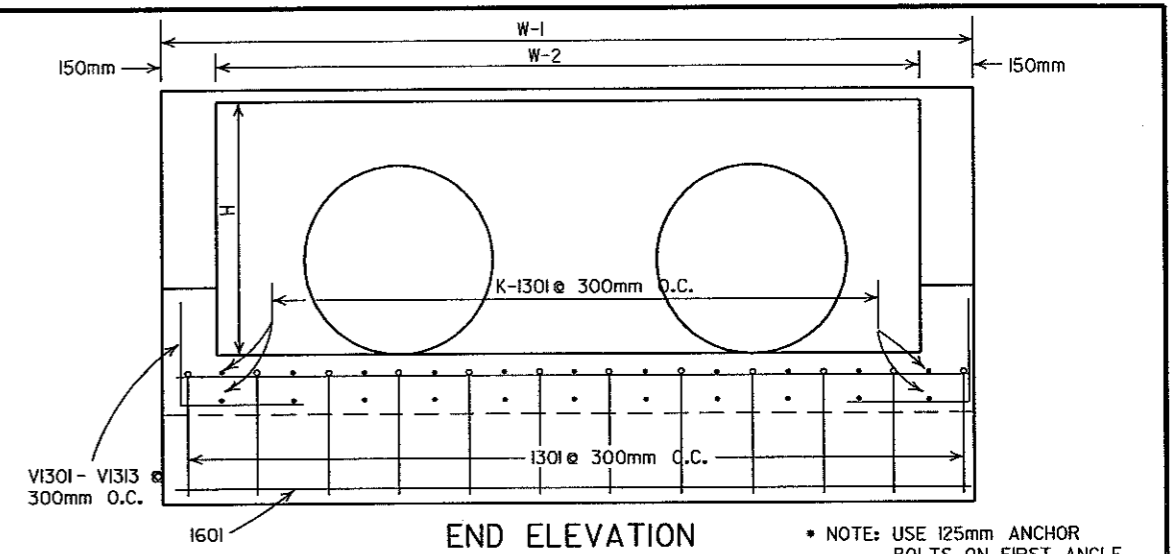
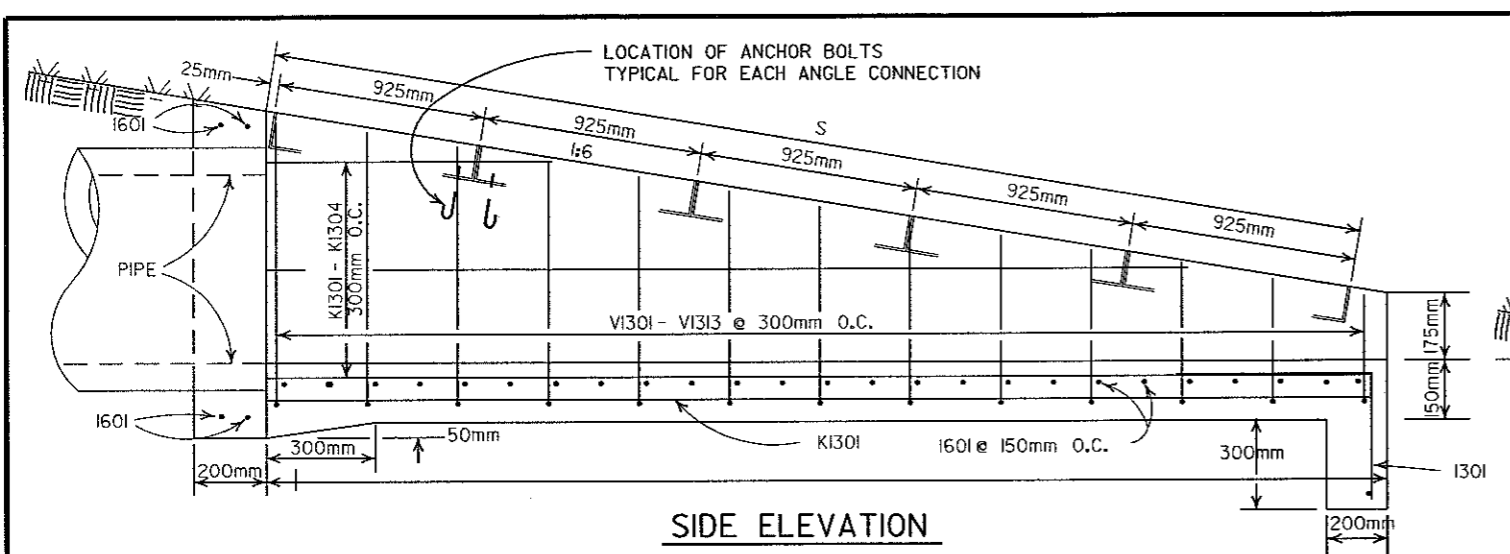
DETAIL OF ANGLE CONNECTION

ARKANSAS STATE HIGHWAY COMMISSION

STEEL GRATE ASSEMBLY (TYPE 1)

STANDARD DRAWING G-2(M) METRIC

DATE	REVISION	DATE FILLED
4-03-97	REVISED STEEL BARS TO SOFT METRIC	
7-20-95	CONVERTED TO METRIC	

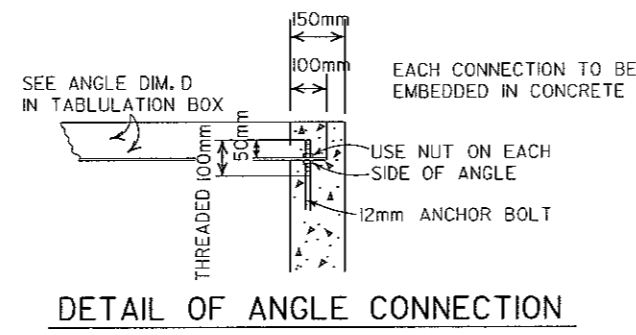
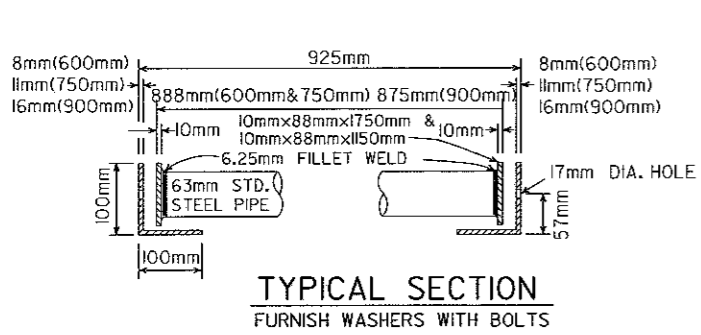
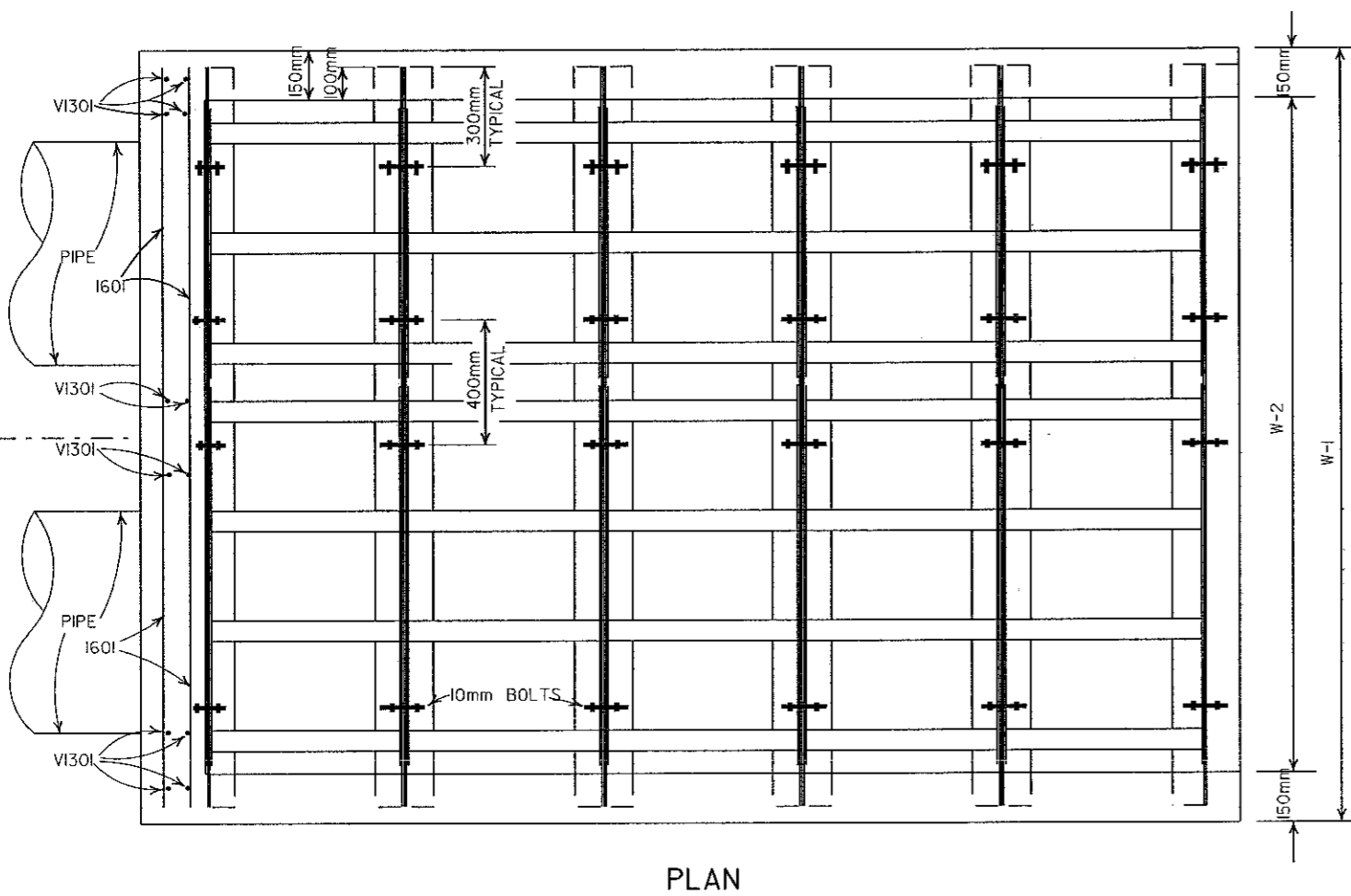
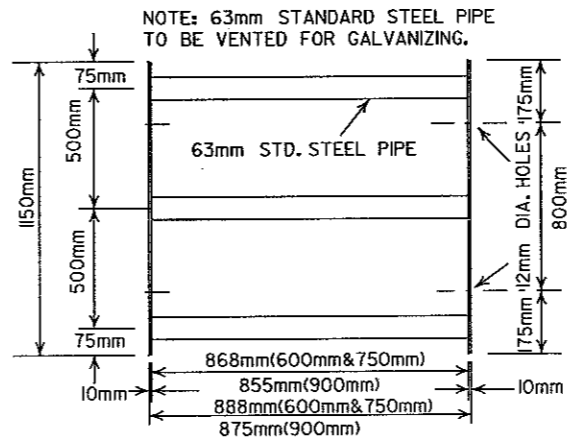
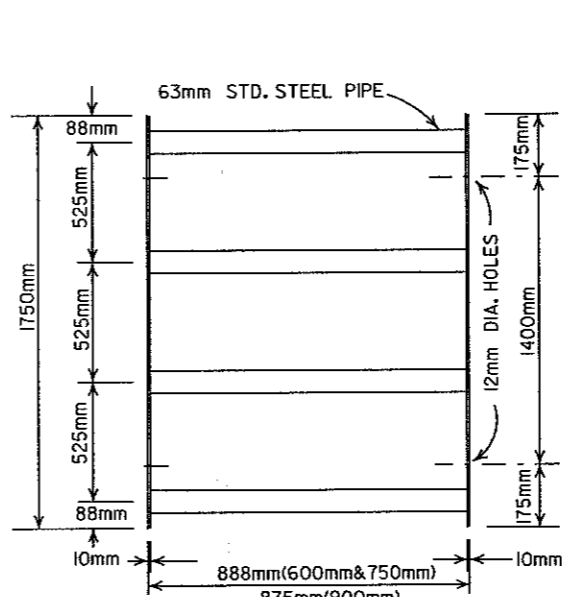


**QUANTITIES & DIMENSIONS - ONE GRATE COMPLETE**

PIPE DIA. mm	W-1 m	W-2 m	L m	S m	H m	PANEL SIZE mm	NUMBER OF PANELS	ANGLE DIMEN. D mm	APPROX. CONC. QUANT. cu m
DBL 600	2.70	2.40	3.75	3.80	0.80	888x150	8	100x100x8	3.27
DBL 750	3.30	3.00	4.65	4.71	0.95	888x150	5	100x100x11	4.78
DBL 900	3.90	3.60	5.55	5.63	1.10	888x150	2	100x100x16	6.61

**BAR LISTS - ONE HEADWALL**

DBL. 600mm PIPE			DBL. 750mm PIPE			DBL. 900mm PIPE		
MARK	LENGTH mm	NO.	MARK	LENGTH mm	NO.	MARK	LENGTH mm	NO.
I301	850	10	I301	850	12	I301	850	14
I601	2600	30	I601	3200	36	I601	3800	42
K1301	3650	18	K1301	4550	22	K1301	5450	26
K1302	3075	2	K1302	3975	2	K1302	4875	2
K1303	1275	2	K1303	2175	2	K1303	3075	2
K1304	1275	2	K1304	2175	2	K1304	3075	2
V1301	1525	14	V1301	1675	14	V1301	1825	14
V1302	1425	2	V1302	1575	2	V1302	1725	2
V1303	1375	2	V1303	1525	2	V1303	1675	2
V1304	1325	2	V1304	1475	2	V1304	1625	2
V1305	1275	2	V1305	1425	2	V1305	1575	2
V1306	1225	2	V1306	1375	2	V1306	1525	2
V1307	1175	2	V1307	1325	2	V1307	1475	2
V1308	1125	2	V1308	1275	2	V1308	1425	2
V1309	1075	2	V1309	1225	2	V1309	1375	2
V1310	1025	2	V1310	1175	2	V1310	1325	2
V1311	975	2	V1311	1125	2	V1311	1275	2
V1312	925	2	V1312	1075	2	V1312	1225	2
V1313	875	2	V1313	1025	2	V1313	1175	2
			V1314	975	2	V1314	1125	2
			V1315	925	2	V1315	1075	2
			V1316	875	2	V1316	1025	2
			V1317	825	2	V1317	975	2
			V1318	775	2	V1318	925	2
			V1319	725	2	V1319	875	2

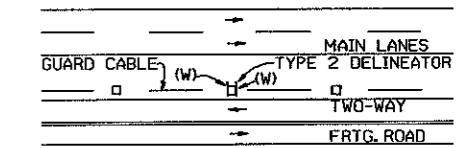
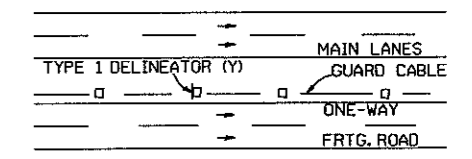
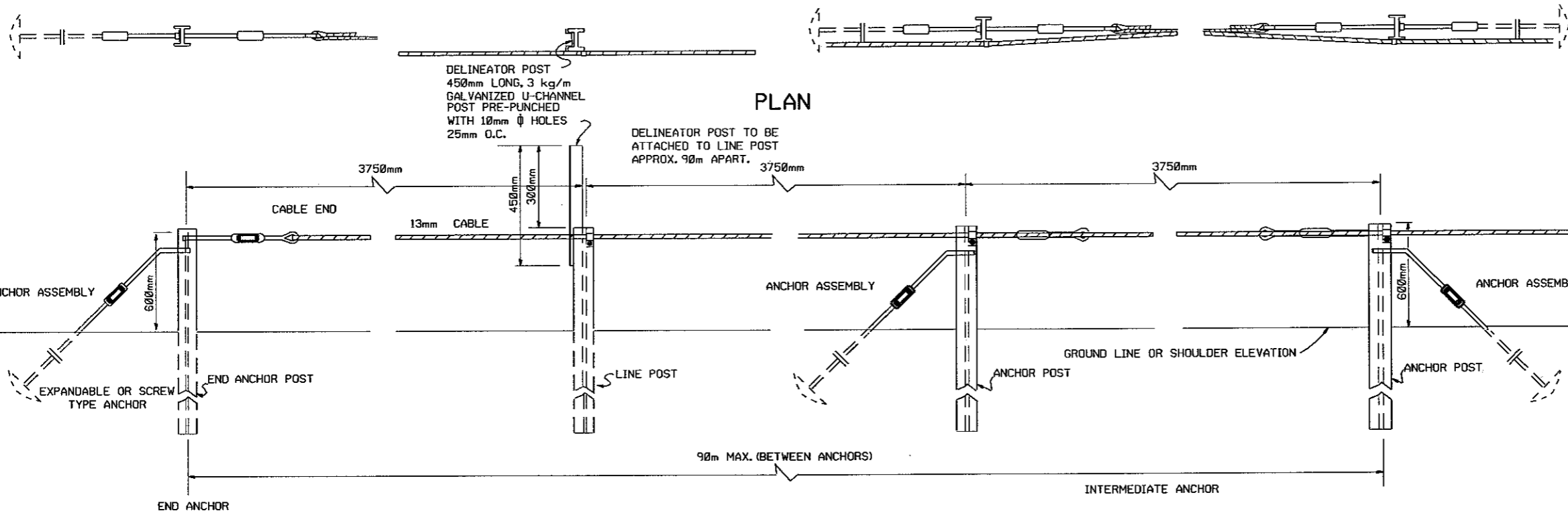


ARKANSAS STATE HIGHWAY COMMISSION

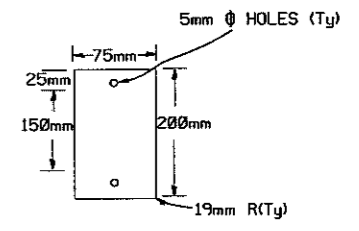
**STEEL GRATE ASSEMBLY (TYPE I)**

STANDARD DRAWING G-3(M) METRIC

NO.	DATE	REVISION
4-03-97		REVISED STEEL BARS TO SOFT METRIC
7-20-95		CONVERTED TO METRIC



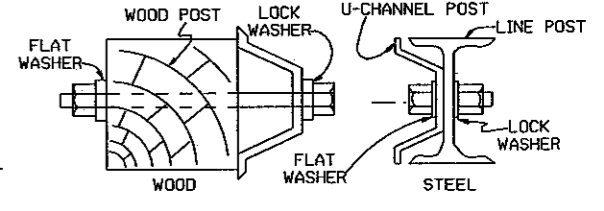
**DELINEATOR PLACEMENT**



(W)WHITE OR (Y)YELLOW

NOTE: DELINEATORS ARE TO BE MOUNTED TO POST USING PIN AND COLLAR (FASTENERS) WHICH ARE 6061 ALUMINUM ALLOY. PIN LENGTH SHOULD NOT EXTEND FURTHER THAN 3mm PAST THE COLLAR. TYPE 2 DELINEATOR CONSIST OF 2 REFLECTORS MOUNTED BACK-TO-BACK ON A SINGLE POST.

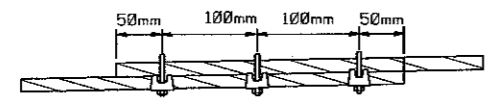
**TYPE 1 & 2 DELINEATORS**



NOTE: USE 8mm Ø HEX. HEAD BOLT AND NUT (A307) WITH 1 FLAT WASHER AND 1 LOCK WASHER. BOLT, NUT AND WASHERS TO BE GALV. (AASHTO M 232) BOLT SHALL NOT EXTEND MORE THAN ONE(1) BOLT DIA. PAST NUT.

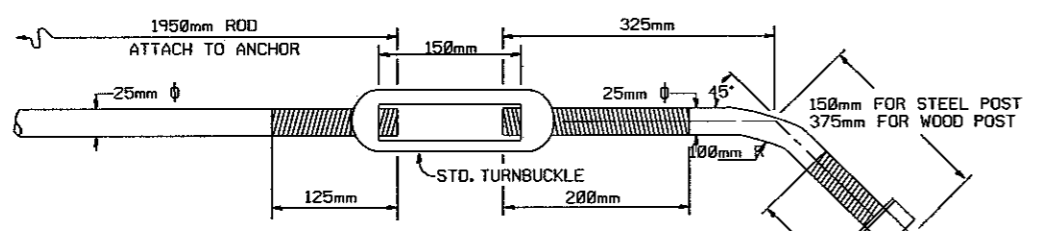
**DELINEATOR POST DETAIL**

NOTE: IN LIEU OF THE U-CHANNEL DELINEATOR POST THE CONTRACTOR SHALL HAVE THE OPTION OF EXTENDING THE GUARD CABLE LINE POST 300mm TALLER WHERE DELINEATOR POSTS ARE REQUIRED. FOR WOOD POSTS, DELINEATORS MAY BE MOUNTED ON THE ANCHOR POSTS AT SPECIFIED INTERVALS.

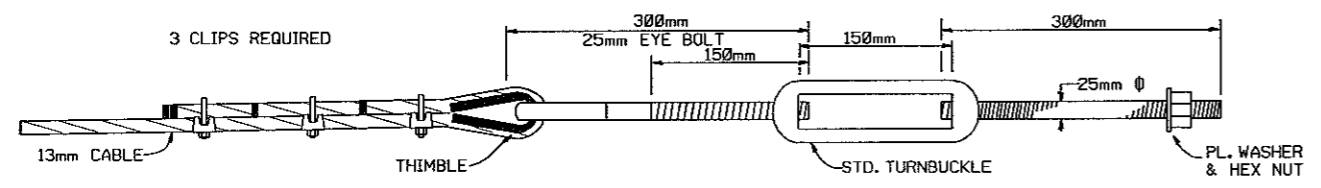


ONLY ONE SPLICE PERMITTED BETWEEN ANCHORS, LOCATED BETWEEN LINE POSTS ONLY. SPLICES WILL NOT BE PERMITTED IN SPANS ADJACENT TO THE ANCHOR AND CABLE END ASSEMBLIES. GUARD CABLE GREATER THAN 90m IN LENGTH REQUIRES AN INTERMEDIATE ANCHOR AS SHOWN.

**SPLICE DETAIL**

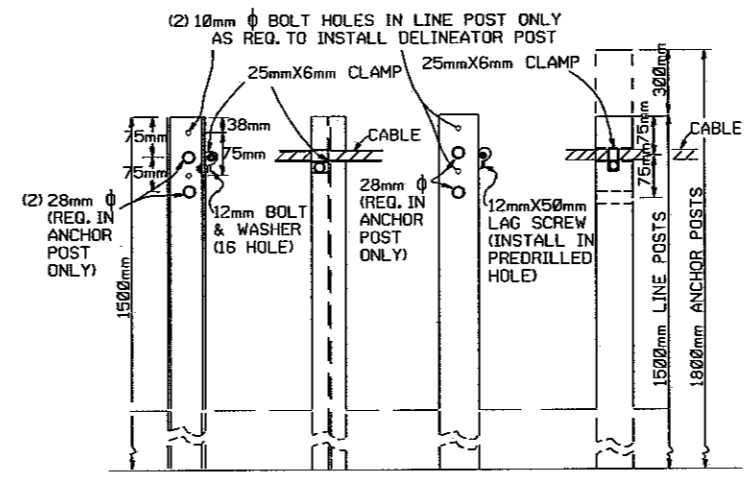


**ANCHOR ROD ASSEMBLY**



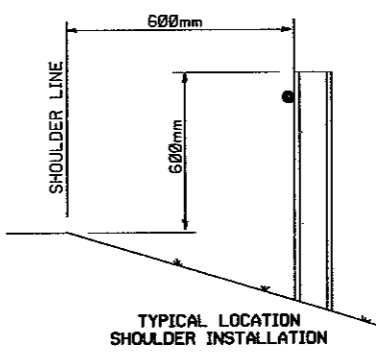
**CABLE END**

**ELEVATION**



**STEEL POST**  
S 3X5.7 OR WELDED CONSTRUCTION (ASTM A769)

**WOOD POST**  
88mmX88mm SQUARE (100mmX100mm NOMINAL) OR 100mm ROUND SOUTHERN PINE INSPECTION BUREAU TIMBER, NO. 1 1350 f SOUTHERN PINE OR WEST COAST LUMBER INSPECTION BUREAU, POSTS AND TIMBERS, DENSE NO. 1 STRUCTURAL OR BETTER 9.7 f (1400 f).



**POST DETAILS**

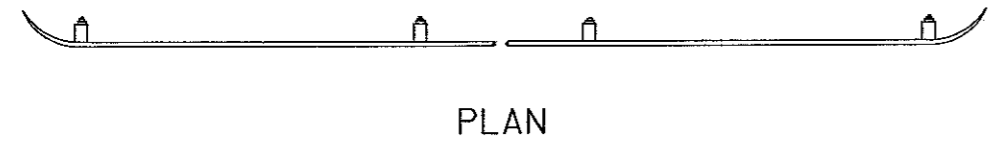
NOTE: POST MAY BE WOOD OR STEEL. IN GENERAL, ONLY ONE MATERIAL WILL BE ALLOWED WITHIN A SINGLE PROJECT. HOWEVER, WITH APPROVAL OF THE ENGINEER, POSTS MAY BE MIXED ON A JOB PROVIDED DEFINITE LIMITS ARE ESTABLISHED AND ALL POSTS ARE OF THE SAME TYPE WITHIN THOSE LIMITS. ONLY ONE TYPE POST MAY BE USED WITHIN A SINGLE ASSEMBLY.

ARKANSAS STATE HIGHWAY COMMISSION

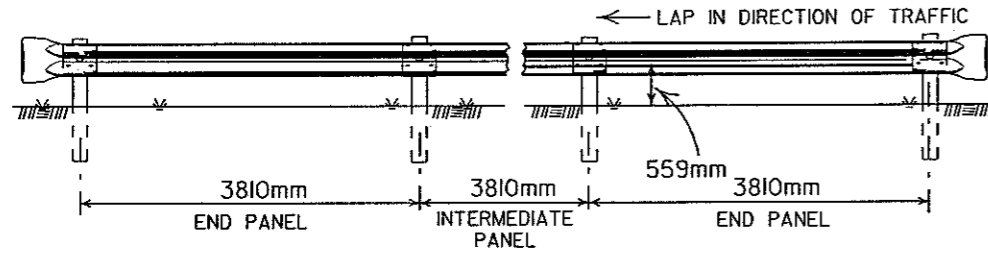
GUARD CABLE

STANDARD DRAWING GC-1(M) METRIC

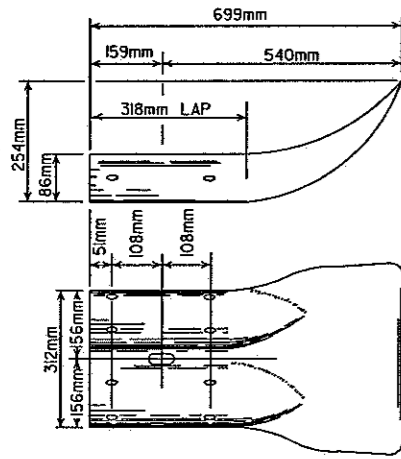
10-8-86	REV. ASTM REF. TO AASHTO & CHANGED WOOD POST NOTE		
1-20-88	CONVERTED TO METRIC		
	REVISION		DATE FILED



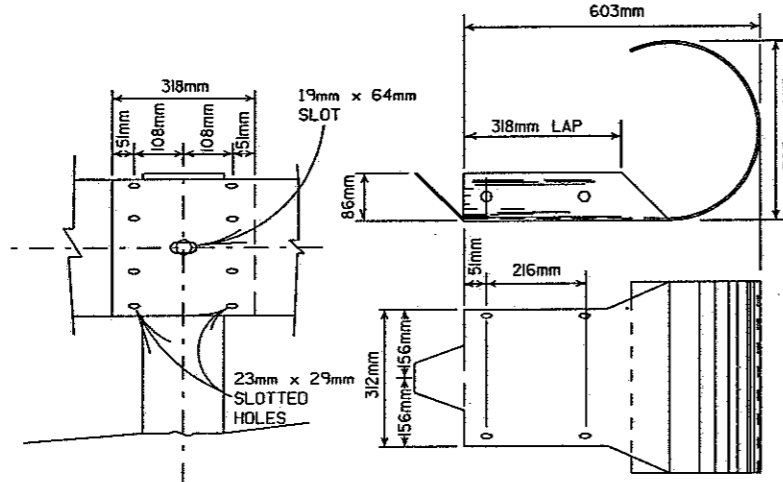
PLAN



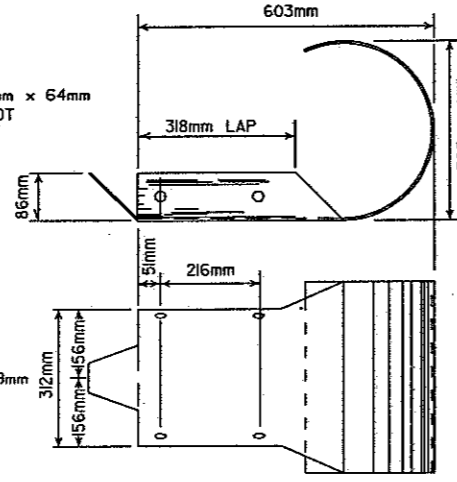
ELEVATION



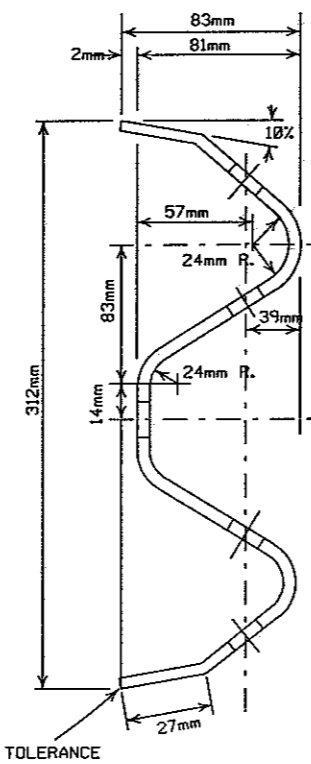
TERMINAL SECTION



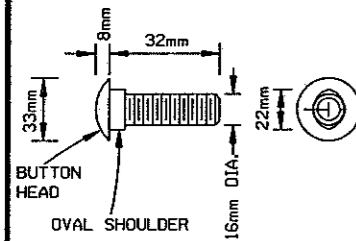
RAIL SPLICE



TERMINAL SECTION

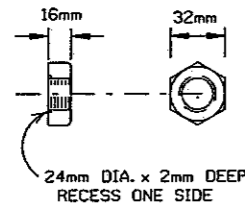


SECTION THRU RAIL

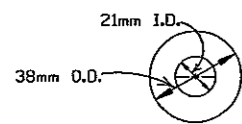


SPLICE BOLT

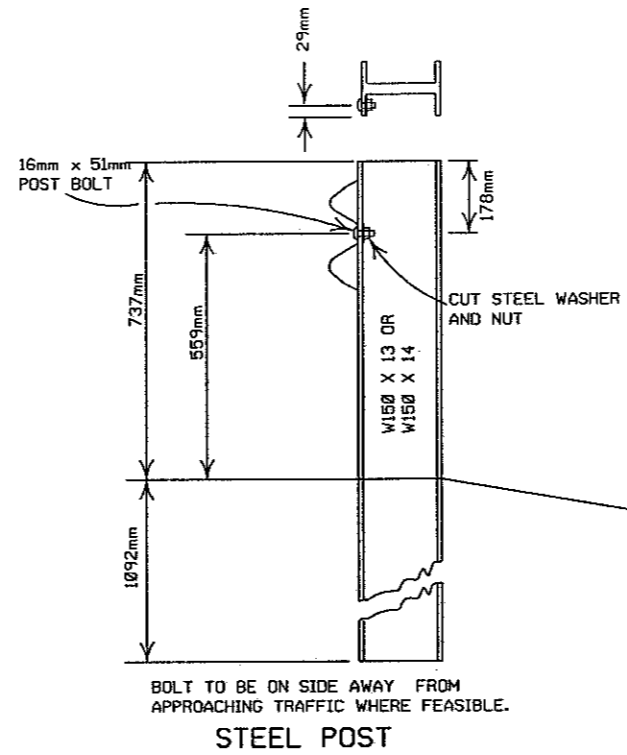
NOTE: POST BOLT SAME EXCEPT LENGTH.



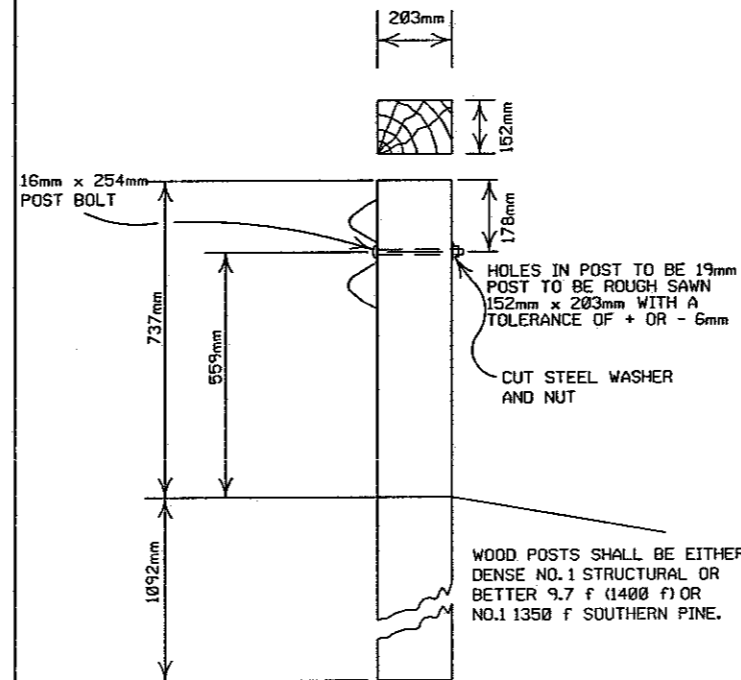
NUT



CUT STEEL WASHER



STEEL POST



WOOD POST

DETAILS OF POST CONNECTIONS

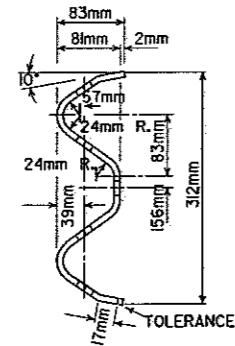
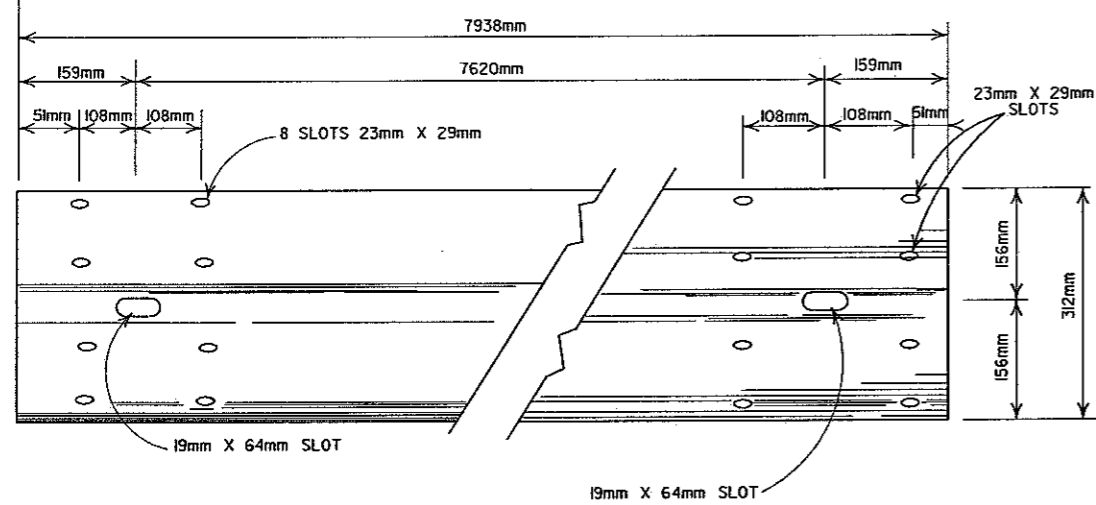
ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS  
(TYPE C)  
STREET / ROAD BARRICADE OR  
TEMPORARY INSTALLATION

DATE	REVISION	DATE FILLED
7-14-10	RAISED HEIGHT OF GUARD RAIL 26mm	
8-22-02	REVISED DIMENSION ON STEEL POST	
11-16-01	REVISED STEEL AND WOOD POST	
8-12-98	REMOVED CONCRETE POST	
10-18-96	CHANGED WOOD POST NOTE	10-18-96
7-20-95	CONVERTED TO METRIC	

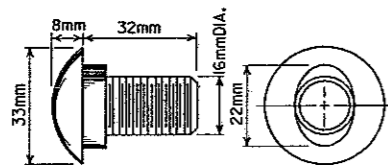
STANDARD DRAWING GR-7(M)



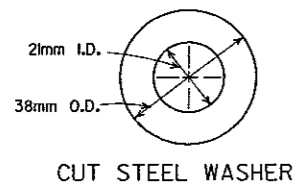


DETAIL OF W-BEAM GUARD RAIL

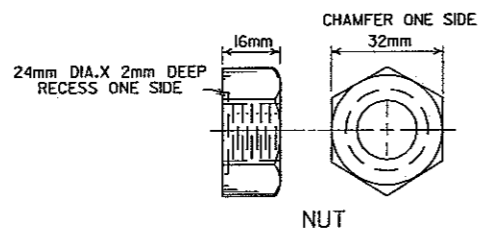
RAIL SECTION OF CLOSELY SIMILAR DIMENSIONS AND COMPARABLE STRENGTH MAY BE SUBSTITUTED IF APPROVED BY THE ENGINEER.



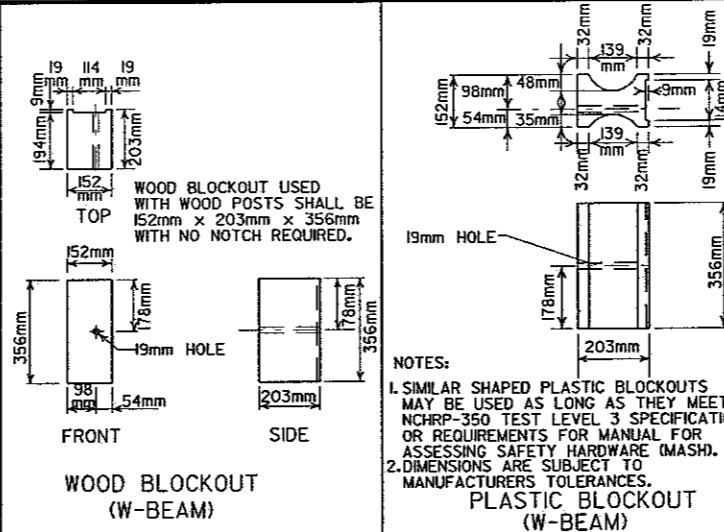
SPLICE BOLT  
POST BOLT - SAME EXCEPT LENGTH



CUT STEEL WASHER

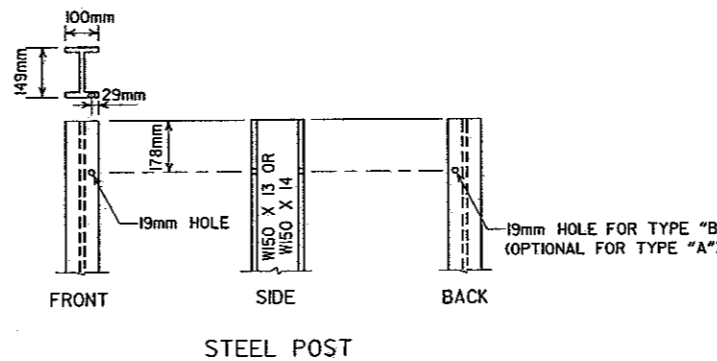


NUT

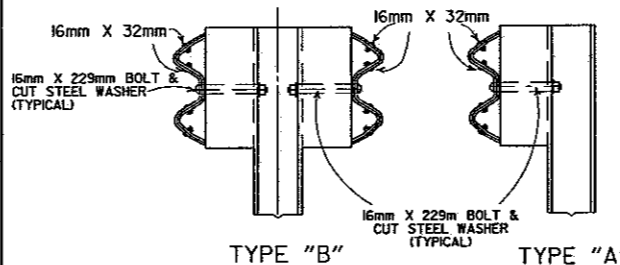


WOOD BLOCKOUT  
(W-BEAM)

PLASTIC BLOCKOUT  
(W-BEAM)



STEEL POST



TYPE "B"

TYPE "A"

DETAILS OF STEEL LINE POST CONNECTIONS  
(W-BEAM)

-GENERAL NOTES-

ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 19mm BEYOND IT.

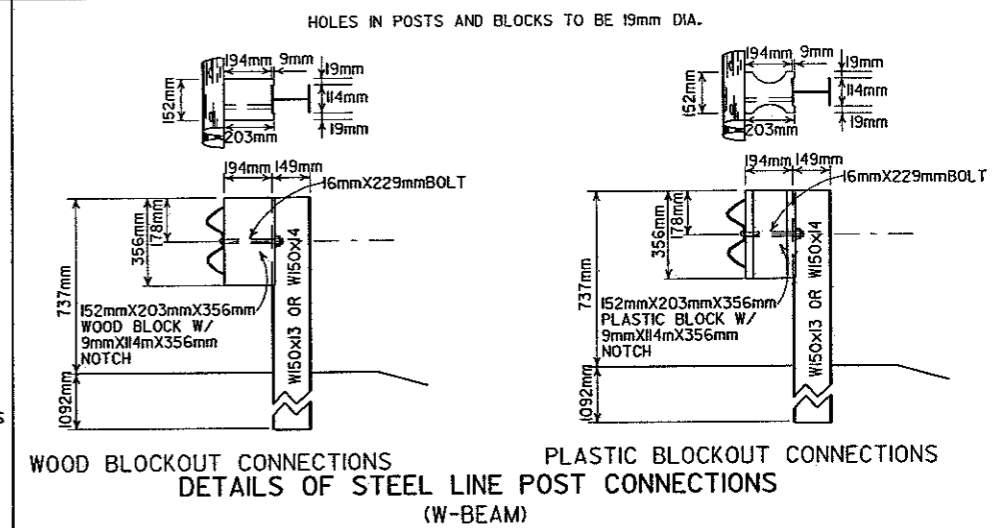
WHERE GUARD RAIL CONTINUES, THE INTERMEDIATE SECTIONS SHALL HAVE A POST SPACING OF 1905mm UNLESS OTHERWISE NOTED.

W-BEAM GUARD RAIL REPRESENTING INTERMEDIATE SECTIONS WILL BE MEASURED ALONG THE ROADWAY FACE FROM CENTERLINE OF POST TO CENTERLINE OF POST.

USE W-BEAM GUARD RAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB. FOR EXTENSIONS OR MODIFICATION OF EXISTING GUARD RAIL, W-BEAM GUARD RAIL COMPONENTS OF THE SAME TYPE AS THOSE EXISTING SHALL BE USED.

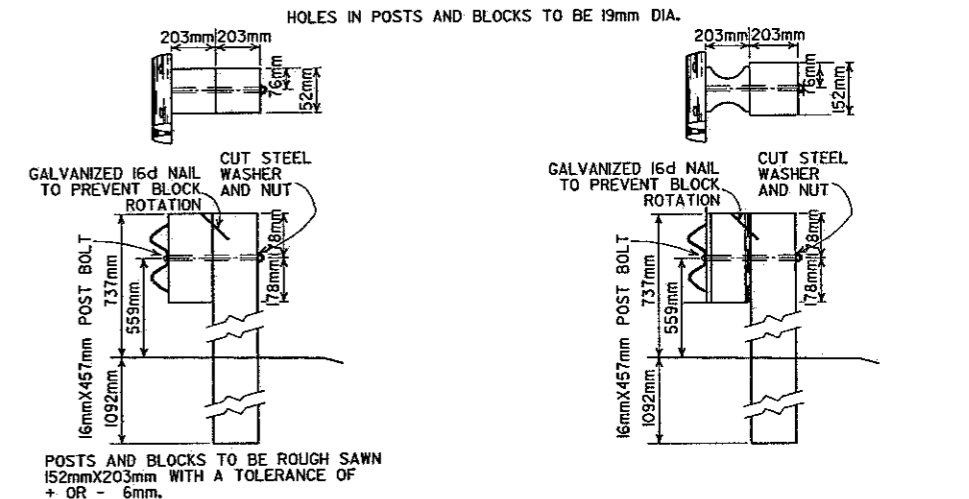
ANY BACKFILLING UNDER OR AROUND POST SHALL BE DAMP SAND THOROUGHLY TAMPED IN PLACE. WOOD POSTS & BLOCKS SHALL BE EITHER DENSE NO.1 STRUCTURAL OR BETTER 9.7 f (1400 F) OR NO.1 1350 F SOUTHERN PINE.

CONTRACTOR SHALL HAVE THE OPTION OF USING WOOD BLOCKOUTS OR PLASTIC BLOCKOUTS, AS LONG AS BLOCKOUT USED MEETS NCHRP-350 TEST LEVEL 3 SPECIFICATIONS OR REQUIREMENTS FOR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).



WOOD BLOCKOUT CONNECTIONS  
DETAILS OF STEEL LINE POST CONNECTIONS

PLASTIC BLOCKOUT CONNECTIONS  
(W-BEAM)



WOOD BLOCKOUT CONNECTIONS

PLASTIC BLOCKOUT CONNECTIONS

DETAILS OF WOOD LINE POST CONNECTIONS

(W-BEAM)

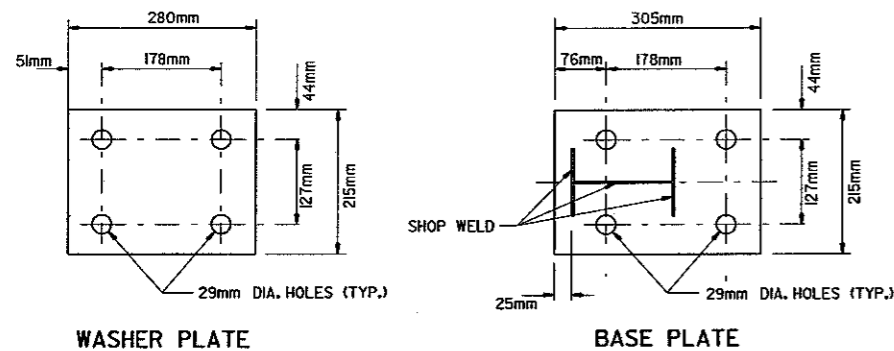
DATE	REVISION	DATE FILMED
7-11-10	RAISED HEIGHT OF GUARD RAIL 26mm	
10-15-09	ADDED REFERENCE TO MASH	
4-10-03	REVISED GENERAL NOTES	
8-22-02	REVISED DIMENSION ON WOOD & PLASTIC BLOCKOUT CONNECTIONS & ON STEEL POST	
8-16-01	REVISED WOOD BLOCKOUT AND DETAILS OF WOOD LINE POST CONNECTIONS	
3-30-00	REMOVED GUARD RAIL AT BRIDGE ENDS	
1-2-00	ADDED PLASTIC BLOCKOUT	
8-12-98	REV. BLOCKOUTS TO WOOD, DELETED CONC. POST & REV. GENERAL NOTE, DELETED DET. OF GUARD RAIL REPLACE BEHIND CURB & DET. OF POST PLACE IN SOLID ROCK, & ADDED DET. OF STEEL LINE POST CONNECTIONS, REMOVED BACK-UP PLATE & REVISED HOLES IN STEEL POST	
8-06-97	CHANGED DEPTH DIMENSION FOR STEEL POST	
4-3-97	REMOVED "LAP IN DIRECTION OF TRAFFIC" NOTE & PLACED ARROWS ON WASHERS	
10-18-96	REVISED WOOD POST NOTE	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION

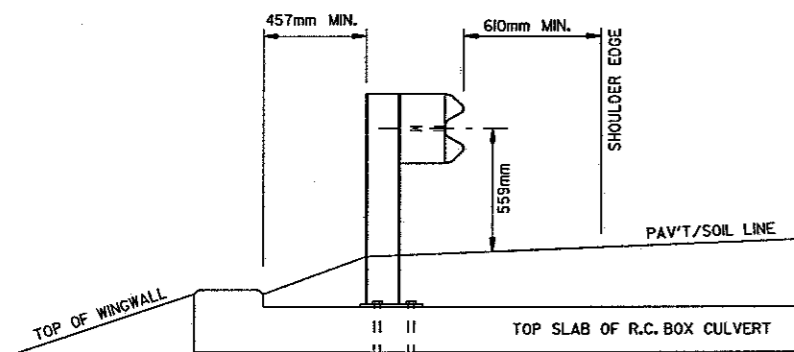
GUARD RAIL DETAILS

STANDARD DRAWING GR-8(M) METRIC

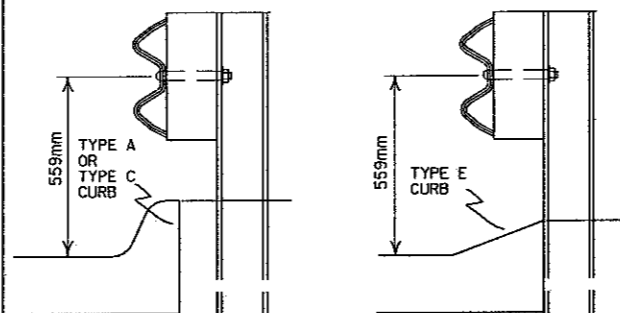




Note: Bolts, nuts, washers and plates shall be galvanized in accordance with Section 807 of the Standard Specifications.



SECTION A-A

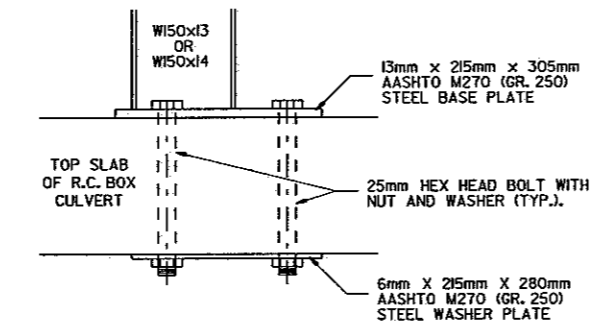


FOR DESIGN SPEEDS OF 80 KMPH OR LESS  
ALIGN FACE OF GUARD RAIL WITH FACE OF CURB

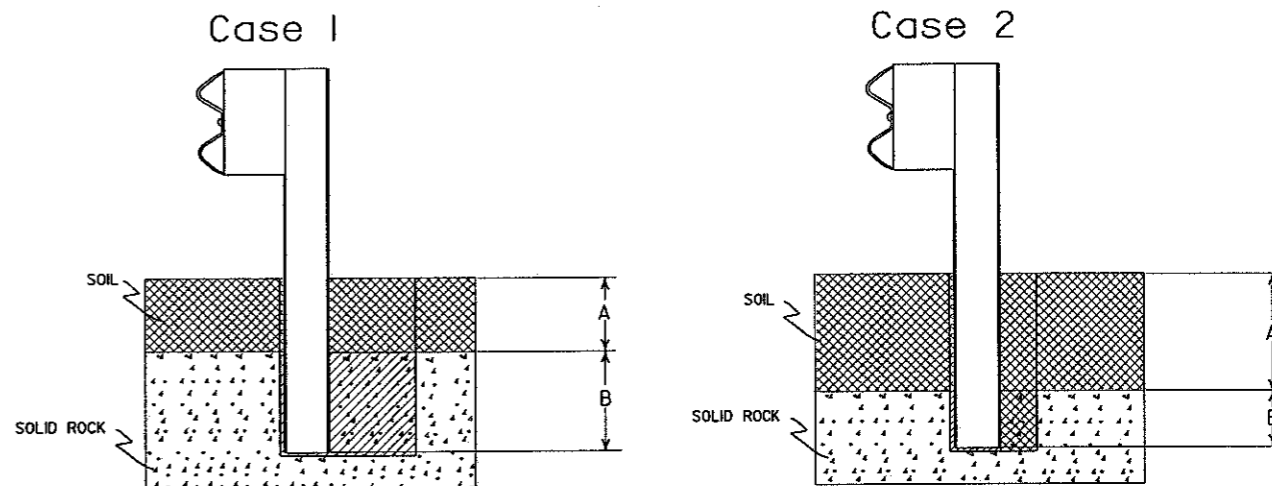
FOR DESIGN SPEEDS OF 90 KMPH OR MORE  
PLACE GUARD RAIL POSTS AGAINST BACK OF CURB

**DETAIL OF GUARD RAIL PLACEMENT BEHIND CURB (W-BEAM)**

FOR DESIGN SPEEDS OF 80 KMPH OR LESS ALL CURB FACES, AS SHOWN ON STD. DRWG. CG-1(M), MAY BE USED. FOR DESIGN SPEEDS OF 90 KMPH OR MORE TYPE "E" CURB FACE SHALL BE USED.

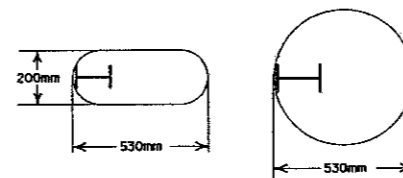


DETAIL OF CONNECTION



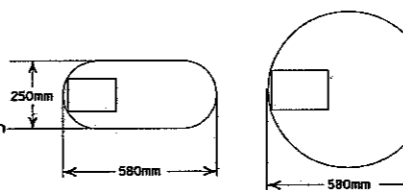
Plan View Steel Posts

Either hole configuration acceptable



Plan View Wood Posts

Either hole configuration acceptable



Notes: For overlying soil depths (A) ranging from 0 to 460mm, the depth of required drilling (B) is equal to 610mm.

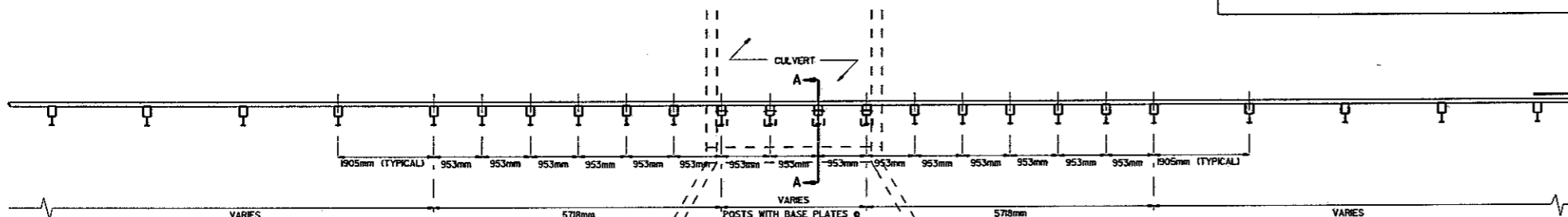
Zone A:  
Backfill according to Section 617.03(a).

Zone B:  
Backfill hole in 150mm lifts with material meeting the requirements of Section 802.02(a) - Alternate gradation. Compact to 95% maximum dry density per ASTM D-698.

DETAIL OF POST PLACEMENT IN SOLID ROCK (W-BEAM)

Notes: For overlying soil depths (A) ranging from 460mm to 118mm, the depth of required drilling (B) is equal to either 305mm or 118mm minus the depth of soil whichever is less.

Zone A & B:  
Backfill according to Section 617.03(a).



PLAN LAYOUT OF TYPE A GUARD RAIL AT LOW-FILL CULVERTS

NOTE: THIS DETAIL IS TO BE USED ONLY WHEN THE COVER OVER THE CULVERT DOES NOT PERMIT FULL EMBEDMENT OF GUARD RAIL POSTS AS SHOWN ON STD. DRWG. GR-8.

NOTE: WHEN POSSIBLE, POSTS SHALL BE SPACED TO AVOID INTERIOR AND EXTERIOR WALLS OF CULVERT. WHEN THIS IS NOT POSSIBLE AND POSTS MUST BE INSTALLED OVER AN INTERIOR OR EXTERIOR WALL, ANCHOR BOLTS SHALL BE INSTALLED BY DRILLING AND EPOXYING USING METHODS AND MATERIALS APPROVED BY THE ENGINEER.

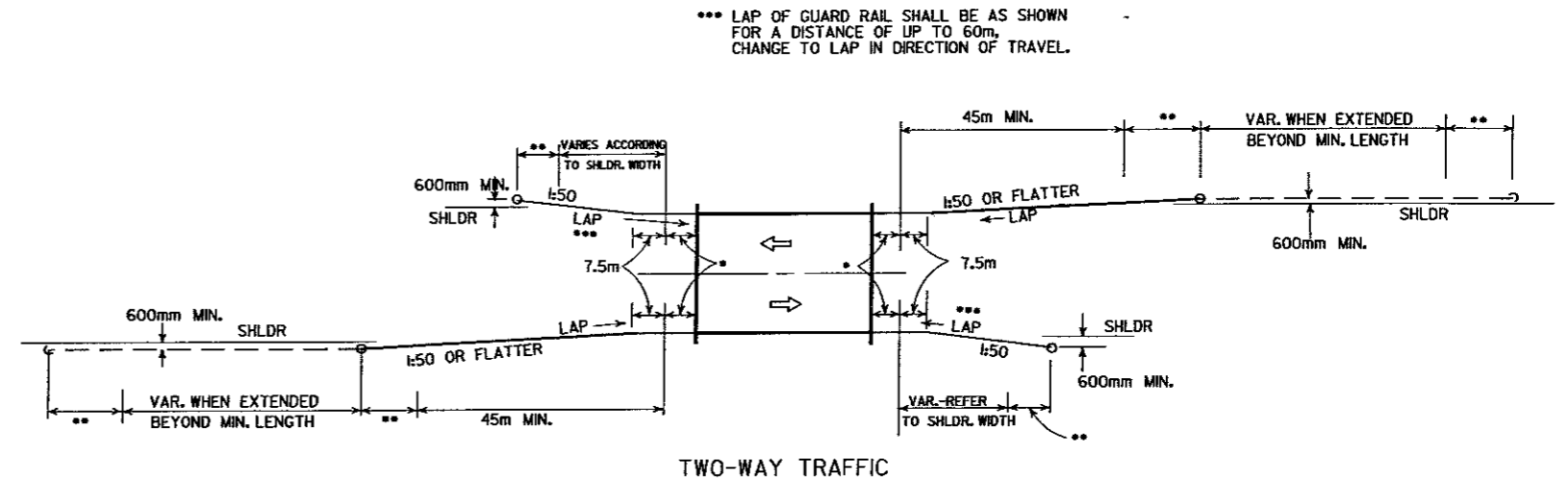
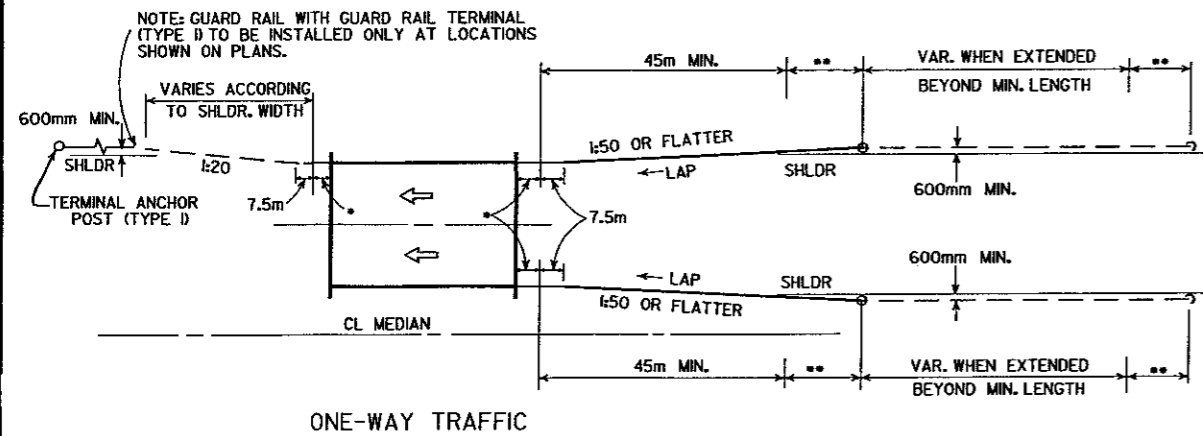
7-11-10	RAISED HEIGHT OF GUARD RAIL 26mm	
4-12-07	REVISED DETAIL OF GUARD RAIL PLACEMENT BEHIND CURB	
1-10-05	ADDED GUARD RAIL PLACEMENT BEHIND CURB; REVISED DETAIL OF CONNECTION	
1-18-04	REVISED POST PLACEMENT IN ROCK & CULVERT CONNECTION DETAILS. ADDED DETAIL FOR GUARD RAIL PLACEMENT AT LOW-FILL CULVERTS	
3-30-00	REMOVED CONCRETE INSERT ANCHOR ASSEMBLY	
8-12-98	CHANGED STEEL SPACER BLOCK TO WOOD BLOCKOUT & ADDED DETAILS OF GUARD RAIL CONNECTION TO R.C. BOX CULVERT. DELETED DET. OF STEEL LINE POST (CONV.) & ADDED DET. OF GUARD RAIL PLACE BEHIND CURB & DET. OF POST PLACE IN SOLID ROCK	
4-3-97	LABELLED CUT STEEL WASHERS	
10-18-96	REVISED ASTM TO AASHTO	
4-26-96	TO MATCH DETAIL ON BRIDGE DRAWING 36525	
11-22-95	ADDED OPTIONAL HOLES	
7-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE FILMED

ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

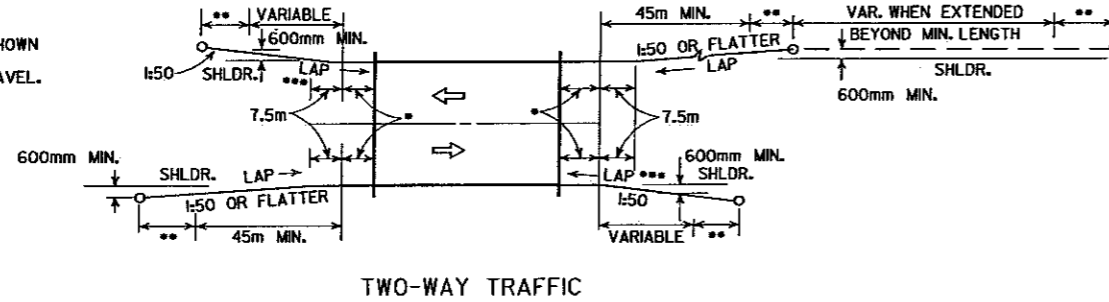
STANDARD DRAWING GR-8A(M)



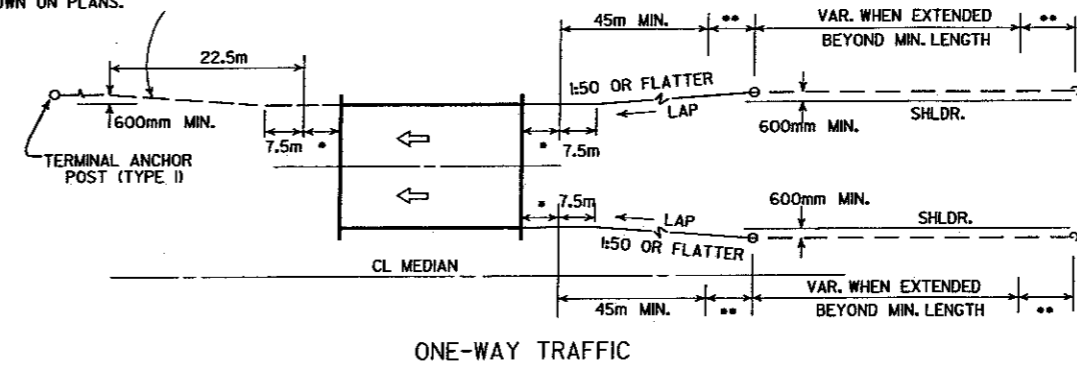


METHODS OF INSTALLATION OF GUARD RAIL AT LESS THAN FULL SHOULDER WIDTH BRIDGES USING GUARD RAIL TERMINAL (TYPE 2)

\*\*\* LAP OF GUARD RAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 60m, CHANGE TO LAP IN DIRECTION OF TRAVEL.

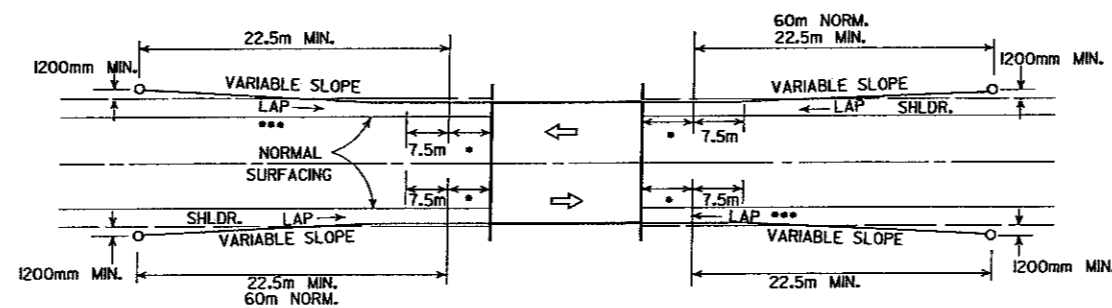


NOTE: GUARD RAIL WITH GUARD RAIL TERMINAL (TYPE I) TO BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



METHOD OF INSTALLATION OF GUARD RAIL AT FULL SHOULDER WIDTH BRIDGES USING GUARD RAIL TERMINAL (TYPE 2)

\*\*\* LAP OF GUARD RAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 60m, CHANGE TO LAP IN DIRECTION OF TRAVEL.



LEGEND

- THREE BEAM GUARD RAIL TERMINAL
- GUARD RAIL TERMINAL (TYPE 2)

METHOD OF INSTALLATION OF GUARD RAIL USING GUARD RAIL TERMINAL (TYPE I) (FULL SHOULDER WIDTH OR LESS BRIDGES)

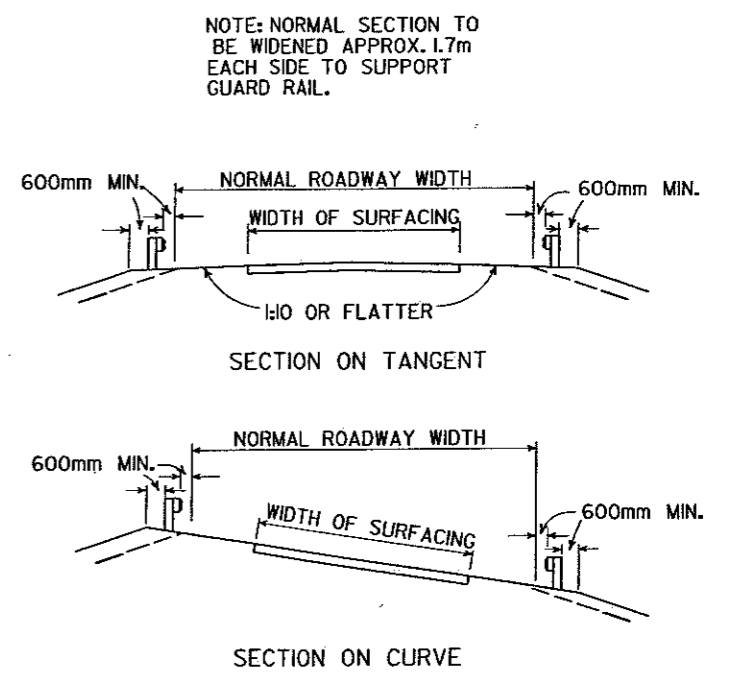
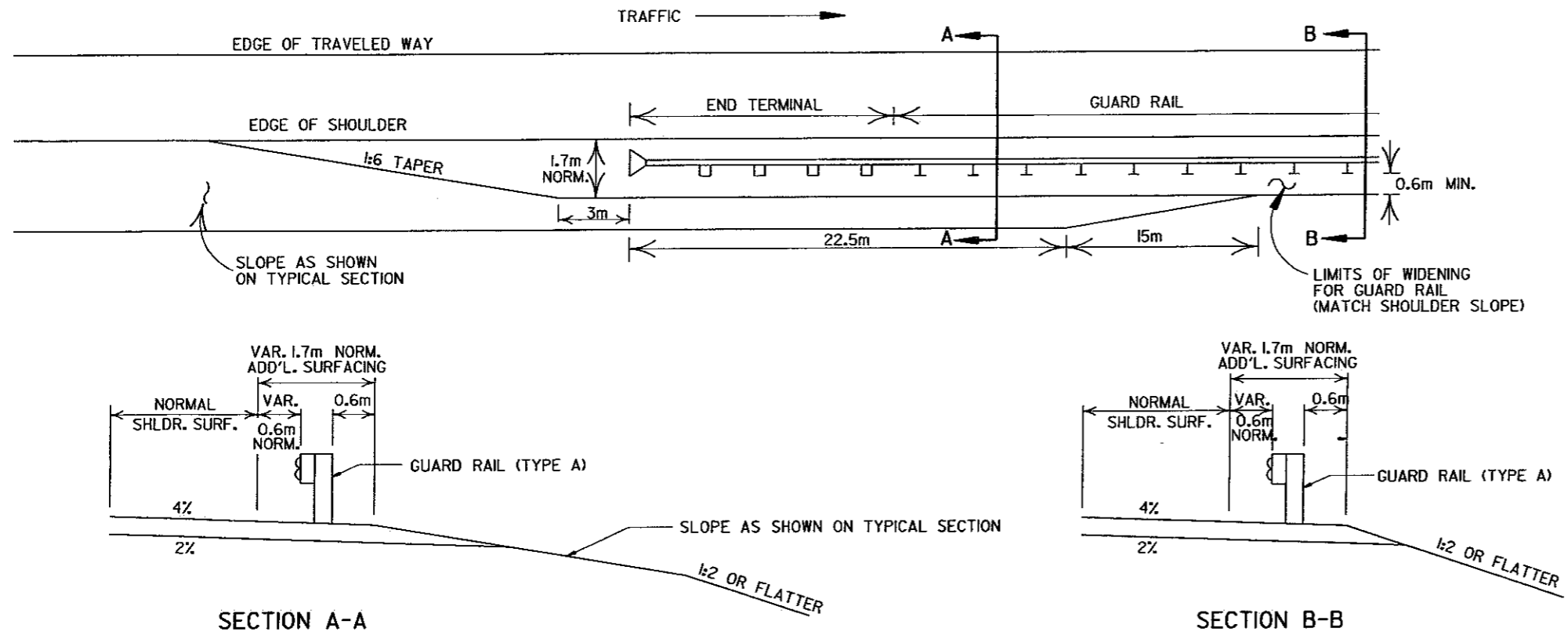
ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

DATE	REVISION	BY	FILED
4-11-08	REVISED LAYOUTS		
8-10-05	REMOVED GUARD RAIL NOTES AND DETAILS		
8-16-01	DELETED NOTE-METHOD OF INSTALLATION OF GUARD RAIL USING GUARD RAIL TERMINAL (TYPE I)		
1-12-00	ADDED CONSTRUCTION NOTE		
6-26-97	REVISED LAYOUT		
7-20-95	CONVERTED TO METRIC		

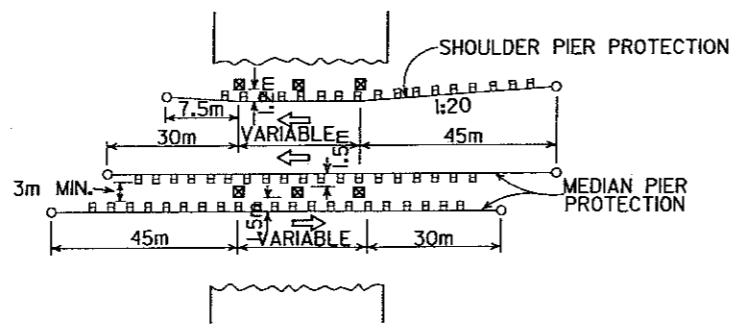
STANDARD DRAWING GR-9(M) METRIC





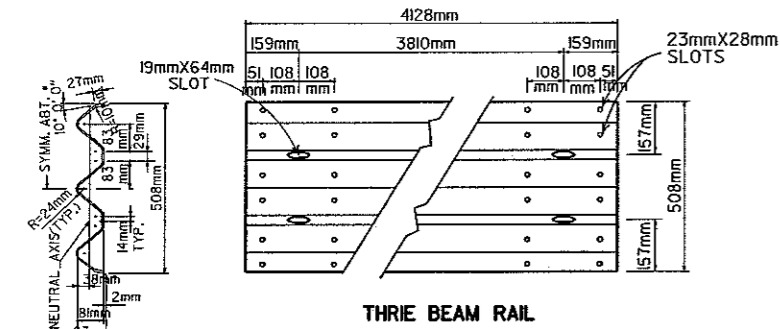
DETAILS OF WIDENING FOR GUARD RAIL

DETAILS SHOWING POSITION OF GUARD RAIL ON HIGHWAY

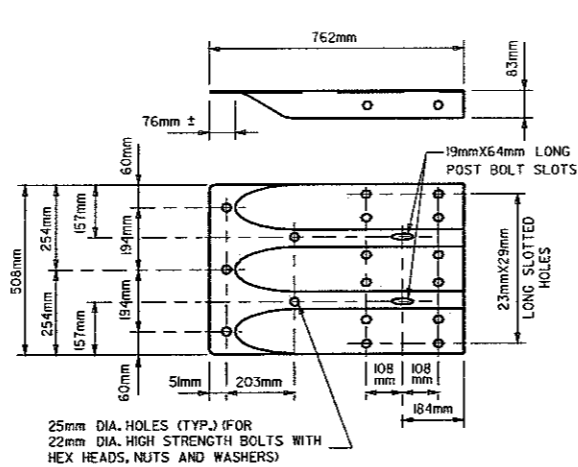


METHOD OF INSTALLATION OF GUARD RAIL AT FIXED OBSTACLE

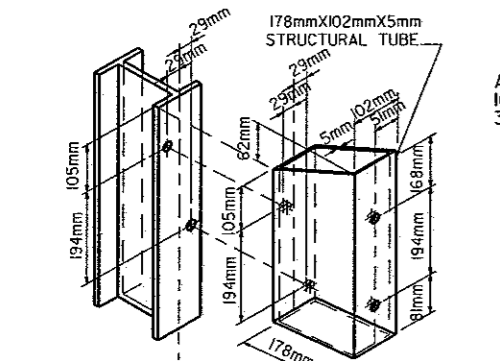
ARKANSAS STATE HIGHWAY COMMISSION			
GUARD RAIL DETAILS			
STANDARD DRAWING GR-9A(M)			
4-17-08	MINOR REVISION		
11-10-05	DRAWN		
DATE	REVISION	DATE	FILM



SECTION THRU THRIE BEAM RAIL



SPECIAL END SHOE

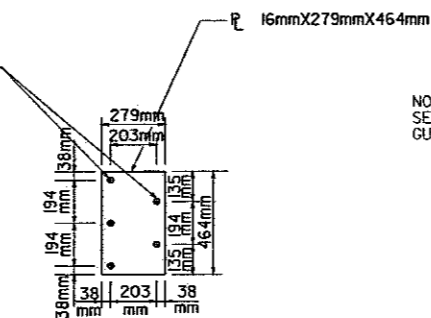


ALL HOLES DRILLED OR PUNCHED 2mm DIA.

STRUCTURAL STEEL TUBING BLOCKOUT DETAIL

ATTACH BLOCKOUT TO POST USING 16mm DIA. HEX HEAD BOLTS WITH 38mm CUT STEEL WASHERS AND NUT.

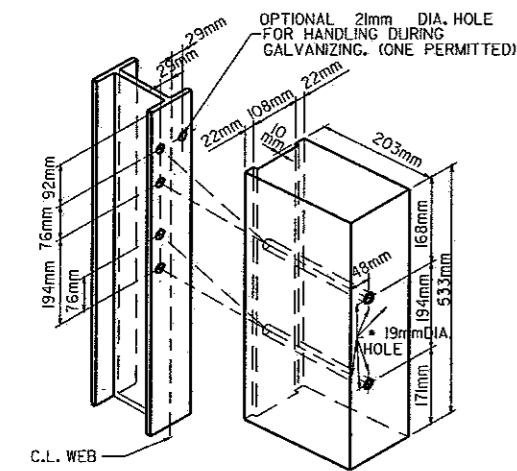
25mm DIA. HOLES (TYP.) FOR 22mm DIA. HIGH-STRENGTH BOLTS



NOTE: SEE STANDARD DRAWING GR-10A(M) FOR GUARD RAIL POST EMBEDMENT DEPTHS.

CONNECTOR PLATE

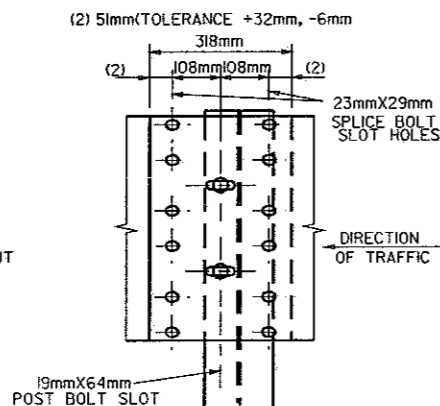
CONNECTOR PLATE SHALL BE AASHTO M270, GR. 36 AND SHALL BE GALVANIZED AFTER FABRICATION. GALVANIZING SHALL CONFORM TO SUBSECTION 807.19 OF THE STANDARD SPECIFICATIONS. CONNECTOR PLATE TO BE BOLTED TO SPECIAL END SHOE USING 22mm DIA. HIGH STRENGTH BOLTS, WITH THE HEADS PLACED ON THE TRAFFIC FACE. WASHERS SHALL BE USED UNDER THE HEAD AND NUT. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND SHALL CONFORM TO SUBSECTION 807.06.



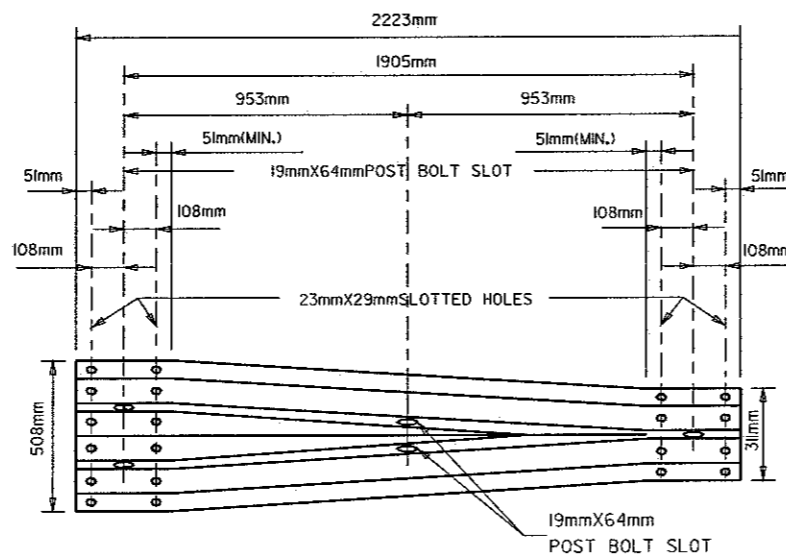
ALL HOLES 2mm DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL FOR STEEL POST & WOOD OR PLASTIC BLOCKOUTS

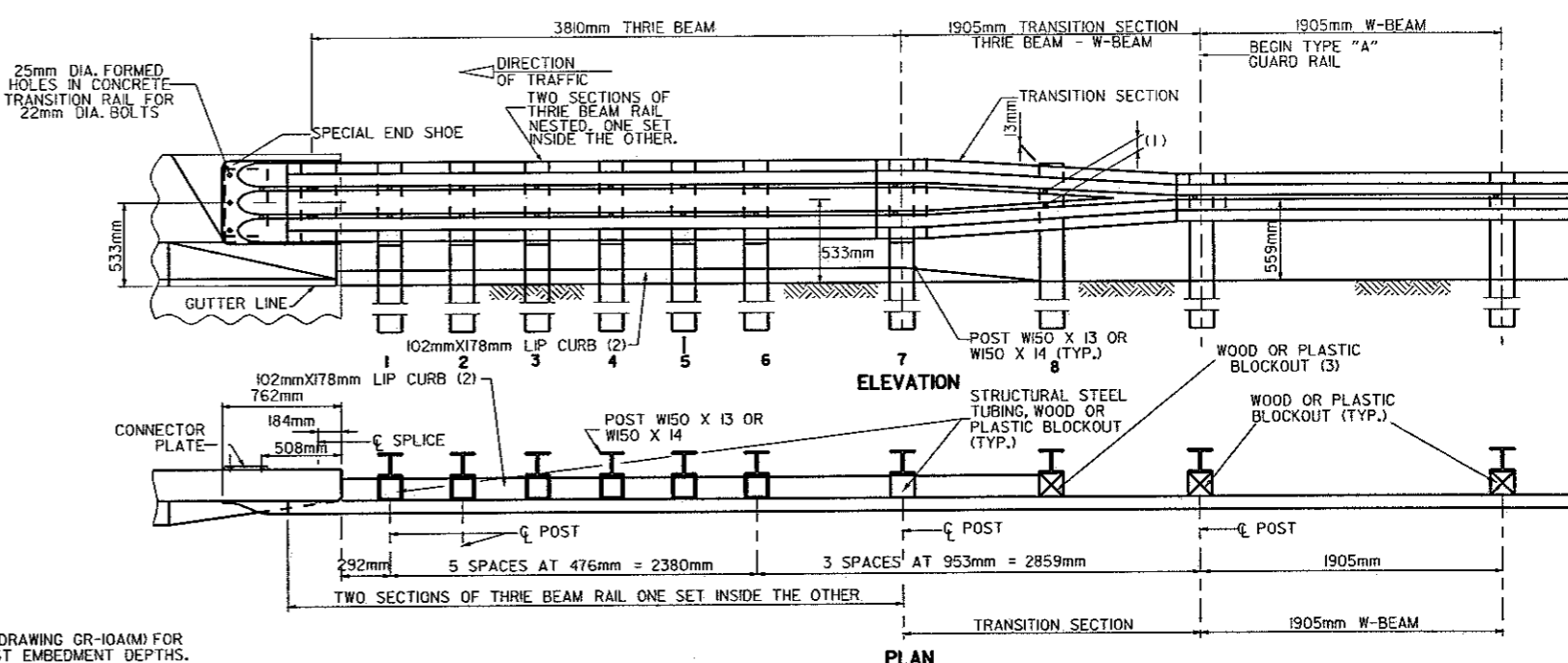
NOTE: BLOCKS SHALL BE THE SAME TYPE THROUGHOUT THE PROJECT LIMITS.



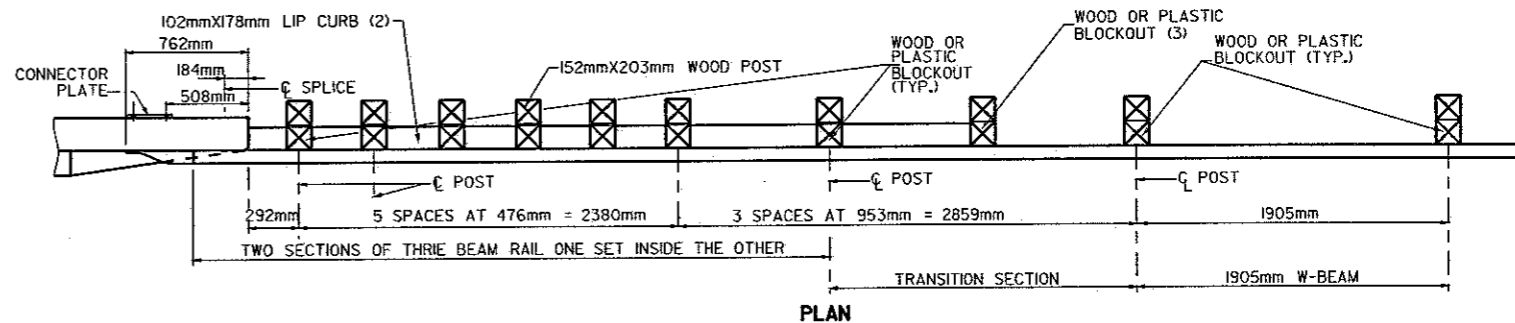
THRIE BEAM RAIL SPLICE AT POST



TRANSITION SECTION



ELEVATION



PLAN

- (1) VERIFY BOLT SPACING FROM RAIL TRANSITION PRODUCER.
- (2) REFER TO APPROACH GUTTER DETAILS.
- (3) LENGTH OF BLOCKOUT ON POST 8 TO BE MODIFIED TO FIT RAIL WIDTH.

THRIE BEAM GUARD RAIL CONNECTION AT BRIDGE ENDS

GENERAL NOTES:

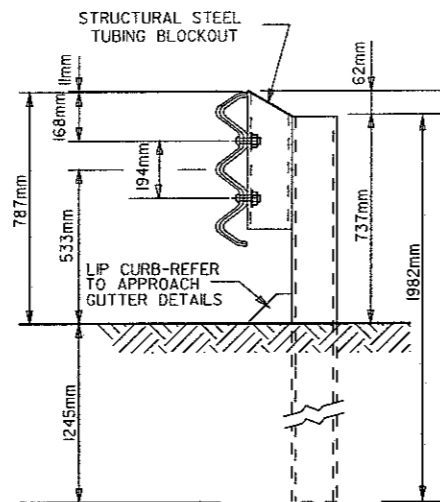
- THE THRIE BEAM RAIL, SPECIAL END SHOE, AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE. ZINC COATING SHALL BE TYPE 1.
- RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.
- ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 19mm BEYOND IT.
- ALL LAP SPLICES, INCLUDING SPECIAL END SHOES, SHALL BE MADE IN THE DIRECTION SHOWN ON STANDARD DRAWING GR-9(M) & GR-10(M).
- WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 9.7F (400 F) OR NO. 1 1350 F SOUTHERN PINE.
- REFER TO STD. DRWG. GR-10A FOR POST DETAILS.
- USE THRIE BEAM GUARD RAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB.
- THRIE BEAM POSTS SHALL BE SAME MATERIAL AS W-BEAM POSTS FOR ENTIRE JOB.

7-14-10	RAISED HEIGHT OF W-BEAM 26mm	
11-29-07	ADDED PLASTIC BLOCKOUTS	
11-10-05	ADDED NOTE FOR ATTACHING STEEL BLOCKOUT	
11-18-04	REVISED GENERAL NOTES	
10-9-03	REVISED GENERAL NOTES	
4-10-03	REVISED GENERAL NOTES	
8-22-02	REVISED NOTE (2)	
6-29-00	MOVED DIMENSION LINES	
5-18-00	ADDED NOTE	
3-30-00	DRAWN & ISSUED	
DATE	REVISION	DATE FILM

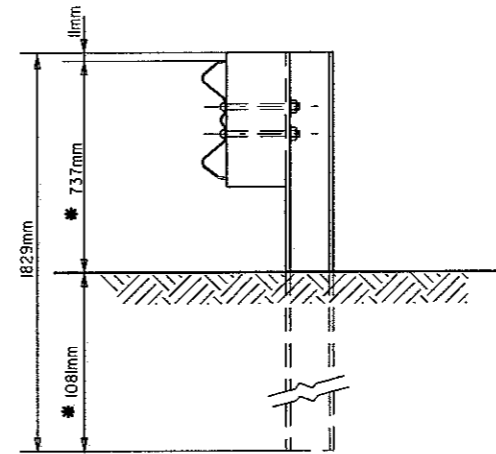
ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

STANDARD DRAWING GR-10(M)

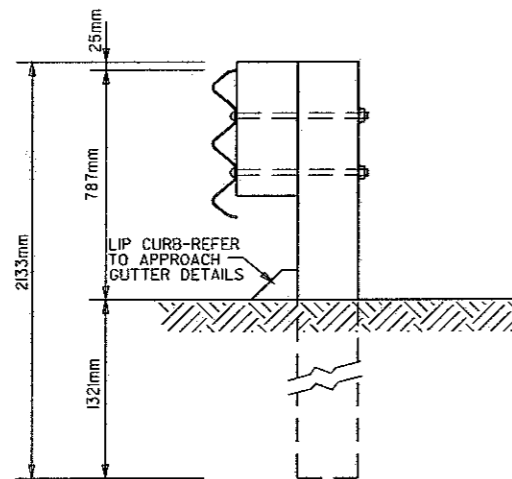


THRIE BEAM RAIL WITH STEEL TUBING BLOCKOUT AND STEEL POST  
POSTS 1-7

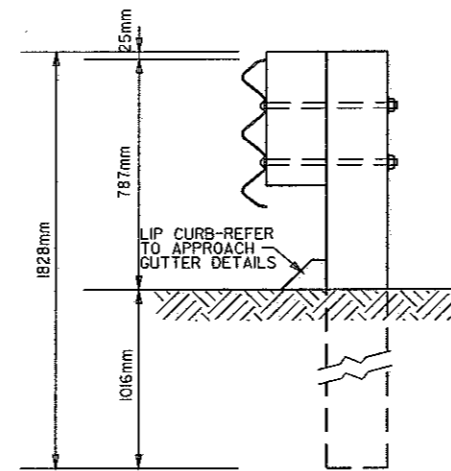


W-BEAM TO THRIE BEAM TRANSITION RAIL WITH WOOD OR PLASTIC BLOCKOUT AND STEEL POST  
POST 8

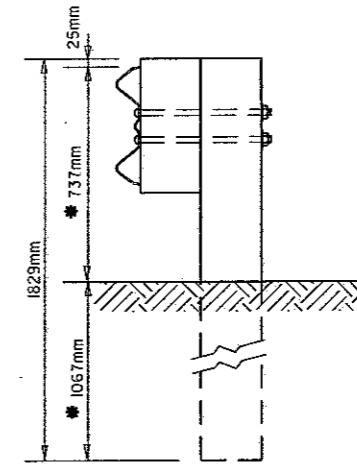
\* NOTE:  
THESE DIMENSIONS WILL NEED TO BE ADJUSTED IN THE FIELD TO MAKE THE TRANSITION FROM 533mm MID POINT OF THRIE BEAM TO 559mm MID POINT OF W-BEAM.



THRIE BEAM RAIL WITH WOOD OR PLASTIC BLOCKOUTS & WOOD POSTS  
POSTS 1-6



THRIE BEAM RAIL WITH WOOD OR PLASTIC BLOCKOUT & WOOD POST  
POST 7



W-BEAM TO THRIE BEAM TRANSITION RAIL WITH WOOD OR PLASTIC BLOCKOUT & WOOD POST  
POST 8

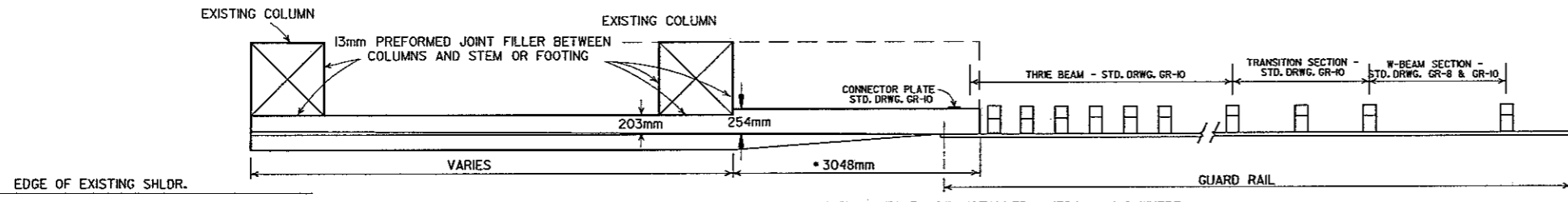
GENERAL NOTES:  
RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.  
WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 9.7f (1400 f) OR NO. 1 1350 f SOUTHERN PINE.

ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

STANDARD DRAWING GR-10A(M)

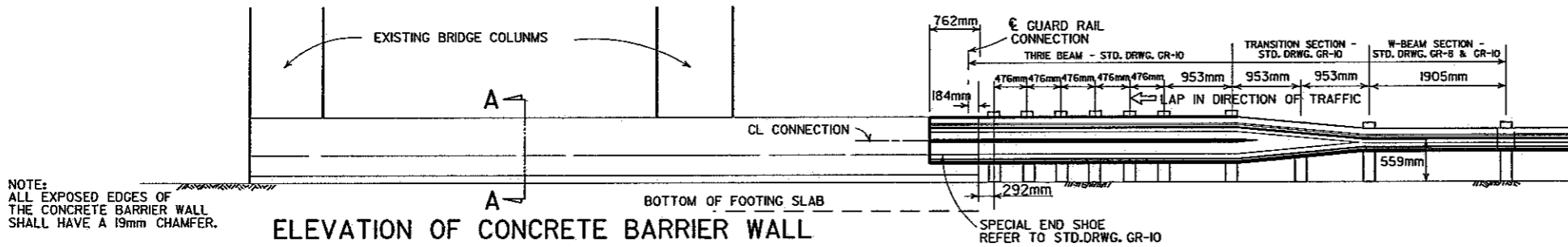
7-14-10	REVISED POST 8 DIMENSIONS	
11-29-07	ADDED PLASTIC BLOCKOUTS	
8-22-02	REVISED LIP CURB NOTE	
3-30-00	DRAWN & ISSUED	
DATE	REVISION	DATE FILED



AT LEAST ONE 13mm JOINT SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL. JOINTS SHALL BE EQUALLY SPACED AT A MAXIMUM OF 7620mm O.C. FILL JOINT WITH PREFORMED JOINT FILLER.

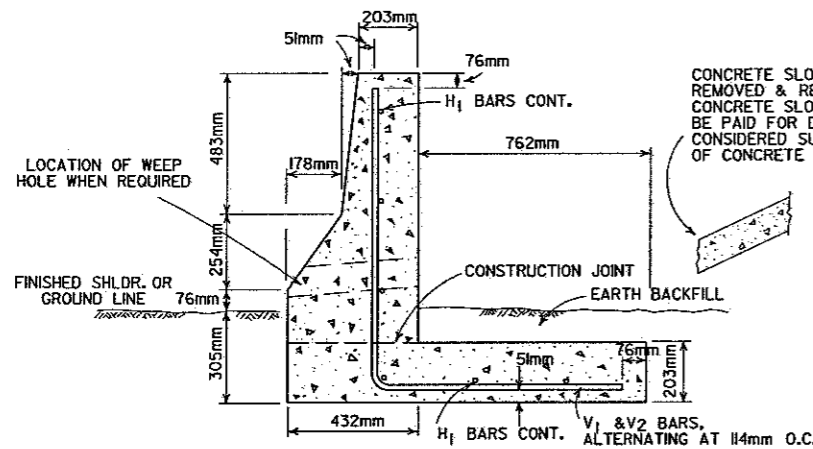
PLAN OF CONCRETE BARRIER WALL

WEEP HOLES TO BE INSTALLED @ 1524mm O.C. WHERE NECESSARY DUE TO EMBANKMENT SPILL-OVER UNDER BRIDGES

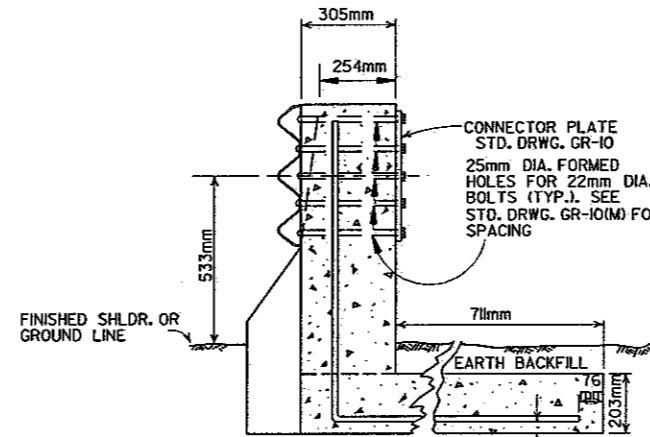


NOTE: ALL EXPOSED EDGES OF THE CONCRETE BARRIER WALL SHALL HAVE A 19mm CHAMFER.

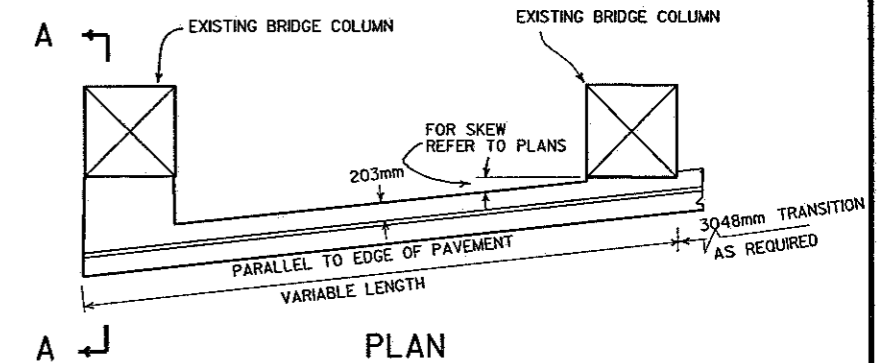
ELEVATION OF CONCRETE BARRIER WALL



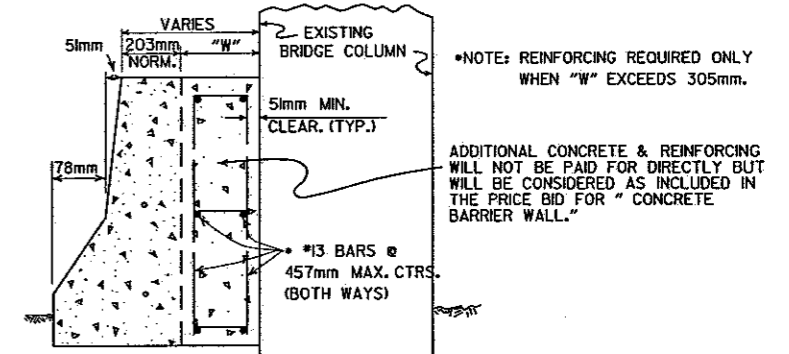
SECTION A-A



SECTION THRU CONNECTION



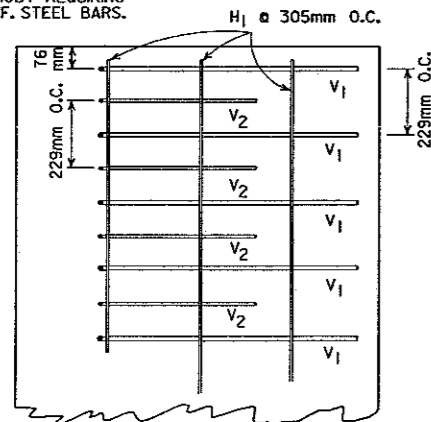
PLAN



SECTION A-A

DETAILS OF CONCRETE BARRIER WALL WHEN PIERS ARE SKEWED TO ROADWAY

IF FOR ANY REASON IT IS NECESSARY TO CONSTRUCT THE FOOTING AT A LOWER ELEVATION THAN IS SHOWN, THE STEM MAY BE LENGTHENED 305mm BETWEEN FIN. SHLDR. AND TOP OF FOOTING WITHOUT REQUIRING HEAVIER REINF. STEEL BARS.

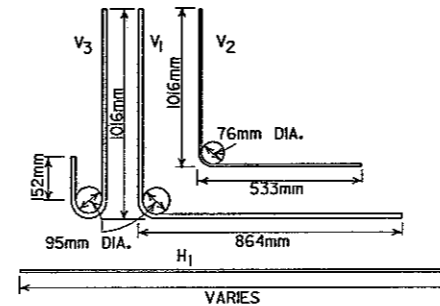


PLAN OF REINFORCING STEEL IN FOOTING

BAR LIST

MARK	NO.	SIZE	LENGTH mm
V1		16	1886
V2		13	1549
V3		16	1248
H1	6	13	VAR.

THE V3 BARS SHALL BE USED IN PLACE OF THE V1 & V2 BARS IN FRONT OF PIERS.



BEND DIAGRAMS

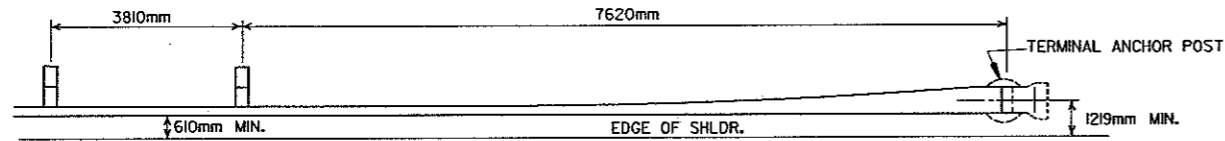
ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE BARRIER WALL (PIER PROTECTION TYPE A)

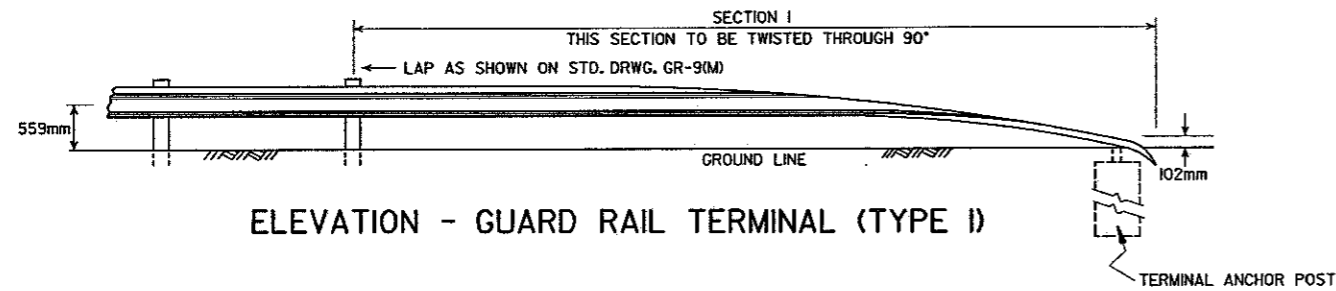
STANDARD DRAWING GR-11(M)



DATE	REVISION	BY	DATE
7-14-10	RAISED HEIGHT OF W-BEAM 26mm		
8-22-02	REVISED SECTION A-A OF DETAILS OF CONCRETE BARRIER WALL		
11-16-01	REVISED STD DRWG NO. UNDER PLAN OF CONCRETE BARRIER WALL		
6-29-00	MOVED DIMENSION LINE		
5-18-00	ADDED NOTE		
3-30-00	REVISED TO INCLUDE THRIE BEAM		
7-02-98	CORRECTED SPELLING		
4-3-97	REVISED STEEL BARS TO SOFT METRIC		
7-20-95	CONVERTED TO METRIC		

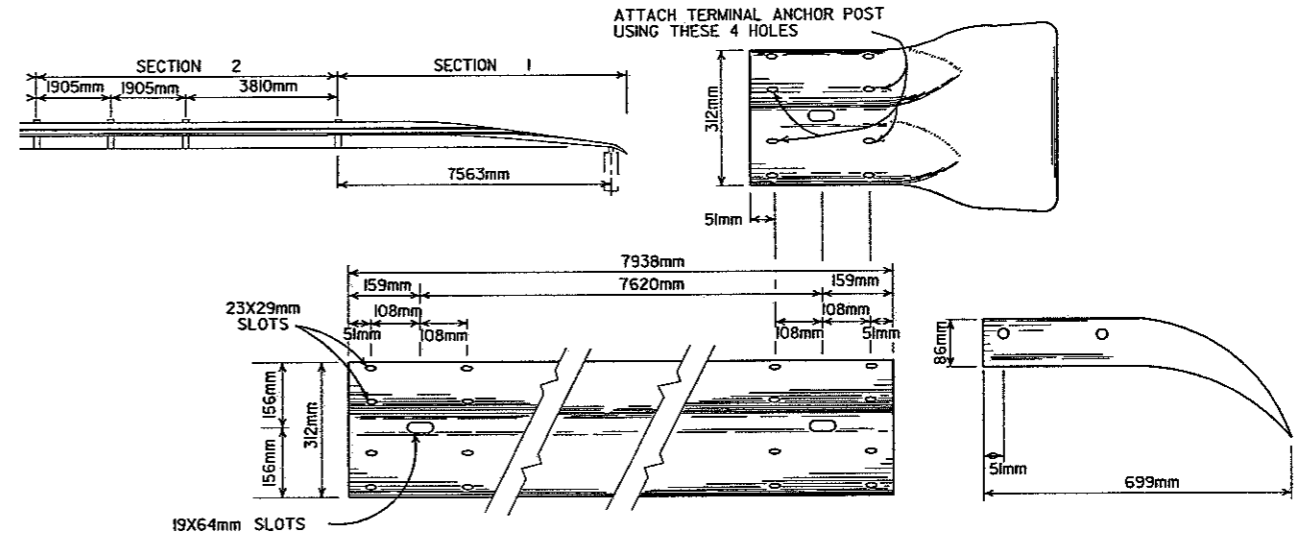


PLAN - GUARD RAIL TERMINAL (TYPE I)



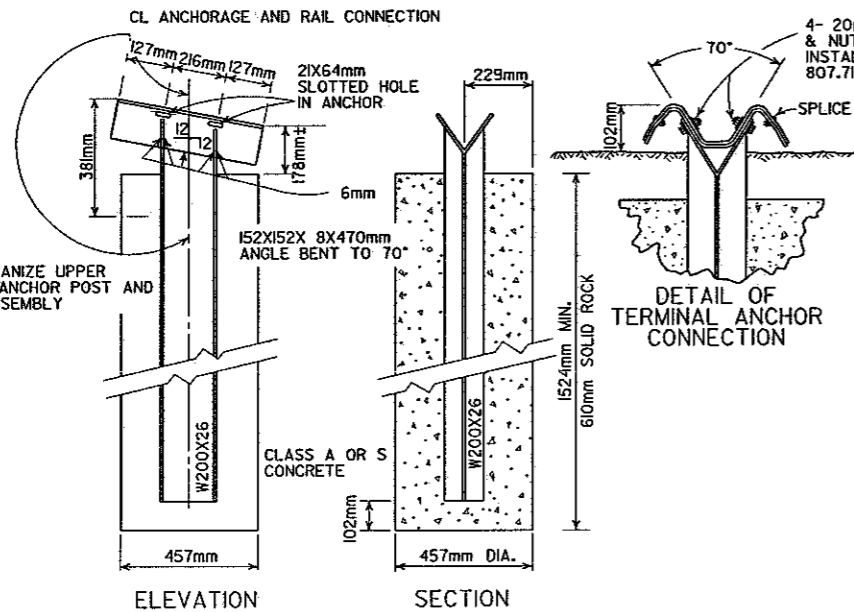
ELEVATION - GUARD RAIL TERMINAL (TYPE I)

NOTE:  
SECTIONS 1 AND 2 OF GUARD RAIL TERMINAL  
SHALL BE PAID FOR AT THE PRICE BID PER METER  
OF THE TYPE OF GUARD RAIL SPECIFIED.



SECTION 1

TERMINAL SECTION



ELEVATION

SECTION

DETAIL OF TERMINAL ANCHOR POST (TYPE I)

NOTE: GALVANIZE UPPER 381mm OF ANCHOR POST AND ANCHOR ASSEMBLY

NOTE: RAIL MEMBERS MAY BE BOLTED TO ANGLE AT TERMINAL ANCHOR AND THE TWO ASSEMBLIES POSITIONED TO PROPER ALIGNMENT PRIOR TO PLACING CONCRETE AROUND W200X26 POST IF CONTRACTOR SO DESIRES.

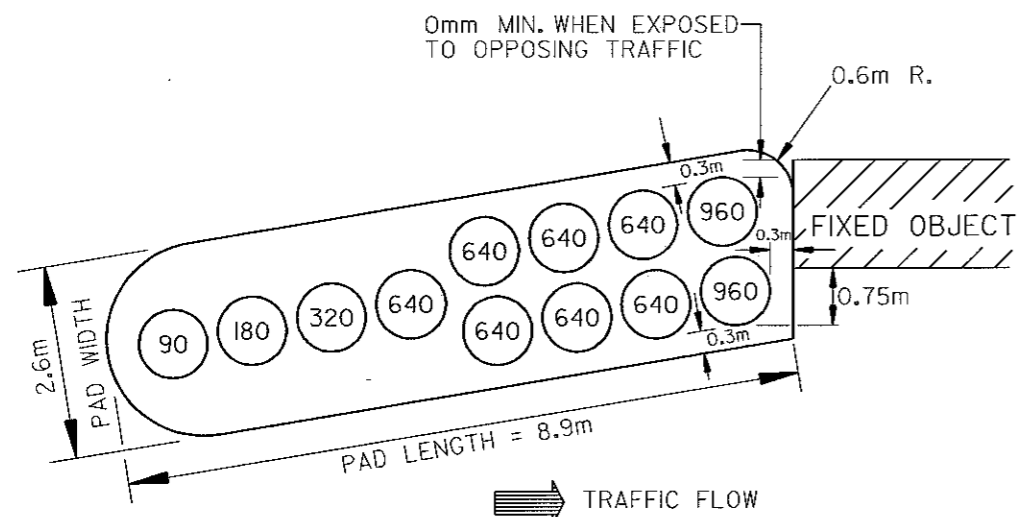
ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

STANDARD DRAWING GRT-1(M)

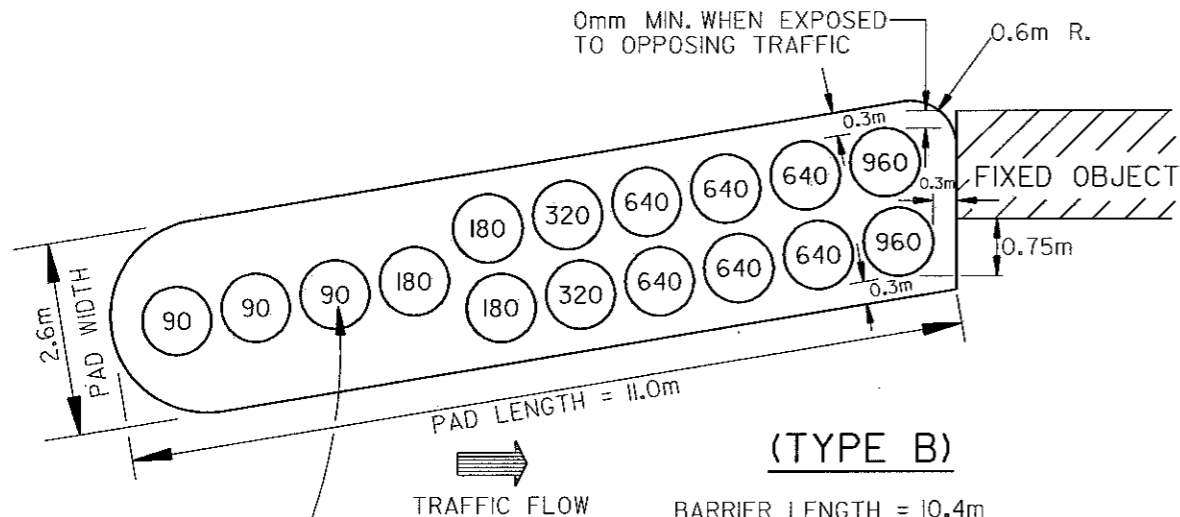
7-14-10	RAISED HEIGHT OF GUARD RAIL 26mm	
6-26-97	REVISED LAP NOTE	
10-18-96	REVISED ASTM REF. TO AASHTO	
7-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE FILED





**(TYPE C)**

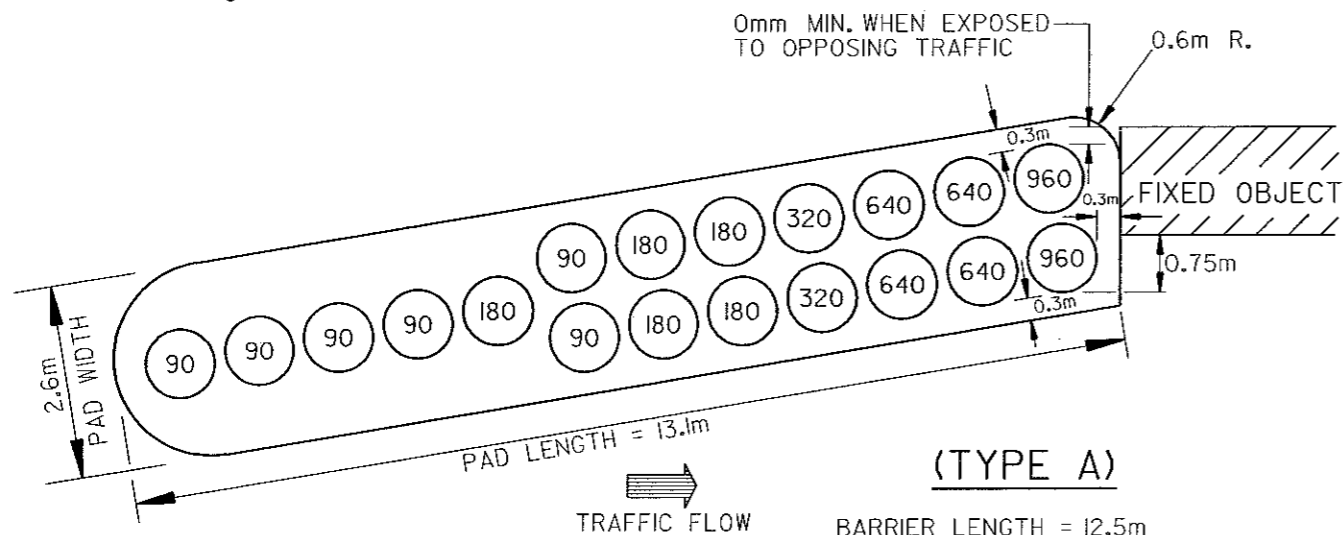
BARRIER LENGTH = 8.3m  
 DESIGN IMPACT SPEED = 80 kmph = 21.99 mps



**(TYPE B)**

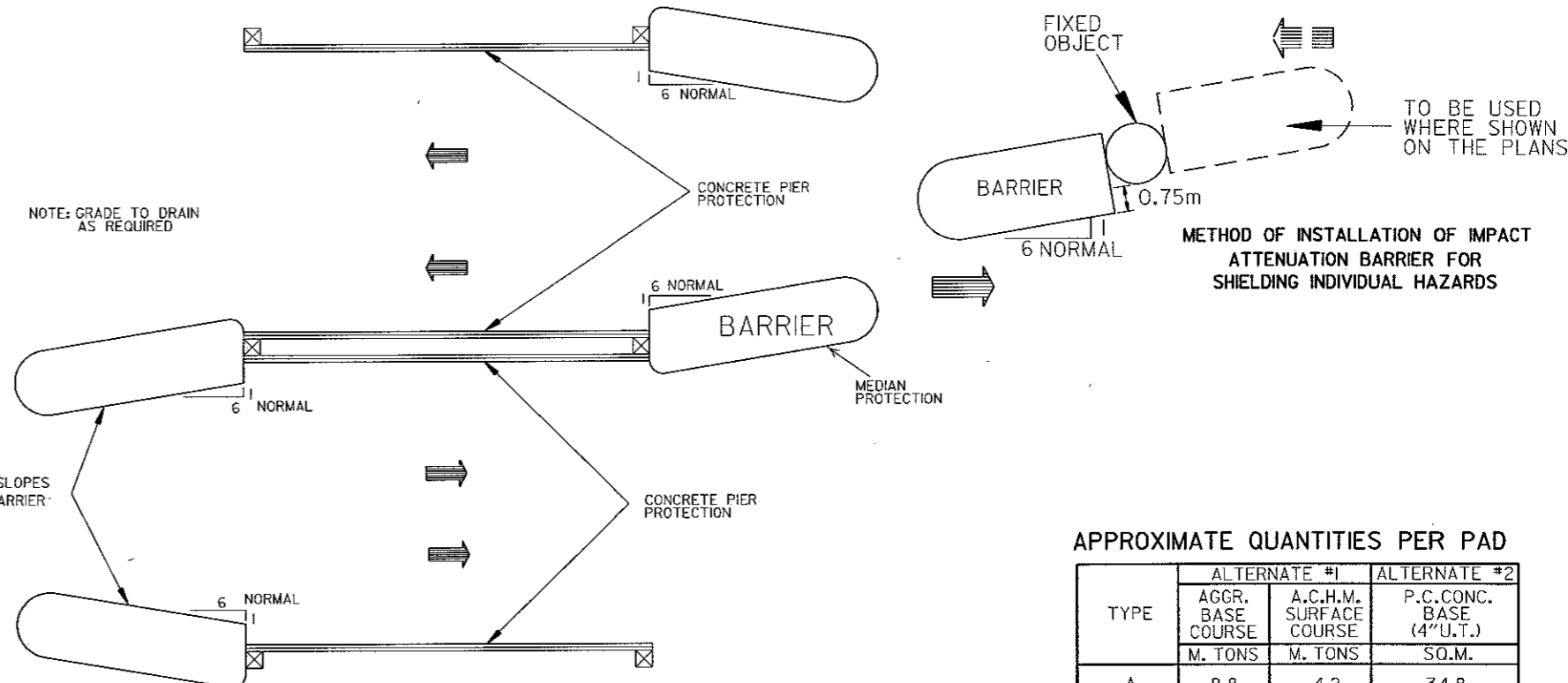
BARRIER LENGTH = 10.4m  
 DESIGN IMPACT SPEED = 96 kmph = 26.4 mps

NUMBERS INDICATE WEIGHT OF MODULE IN kg (TYPICAL)



**(TYPE A)**

BARRIER LENGTH = 12.5m  
 DESIGN IMPACT SPEED = 112 kmph = 30.9 mps



**METHOD OF INSTALLATION OF IMPACT ATTENUATION BARRIER FOR PIER PROTECTION**

**GENERAL NOTES**

1. DIMENSIONS SHOWN ARE TO TOP OF PLASTIC MODULES.
2. SPACING BETWEEN PLASTIC MODULES SHALL NOT EXCEED 150mm AT THE TOP.
3. PLASTIC MODULES SHALL MEET THE REQUIREMENTS OF NCHRP-350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).

**APPROXIMATE QUANTITIES PER PAD**

TYPE	ALTERNATE #1		ALTERNATE #2
	AGGR. BASE COURSE M. TONS	A.C.H.M. SURFACE COURSE M. TONS	P.C. CONC. BASE (4" U.T.) SQ.M.
A	8.8	4.2	34.8
B	7.4	3.4	29.2
C	6.0	2.8	23.7

NOTE: APPROXIMATE QUANTITIES SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. PAYMENT TO BE INCLUDED IN UNIT PRICE BID FOR IMPACT ATTENUATION BARRIER.

ALTERNATE #1  
 AVG. 2.6m A.C.H.M. SURF. COURSE (12.5mm)  
 120 kg./ sq. m. &  
 AGGREGATE BASE COURSE  
 (100mm COMPACTED DEPTH)

OR ALTERNATE #2  
 AVG. 2.6m PORTLAND CEMENT CONCRETE BASE (100mm U.T.)

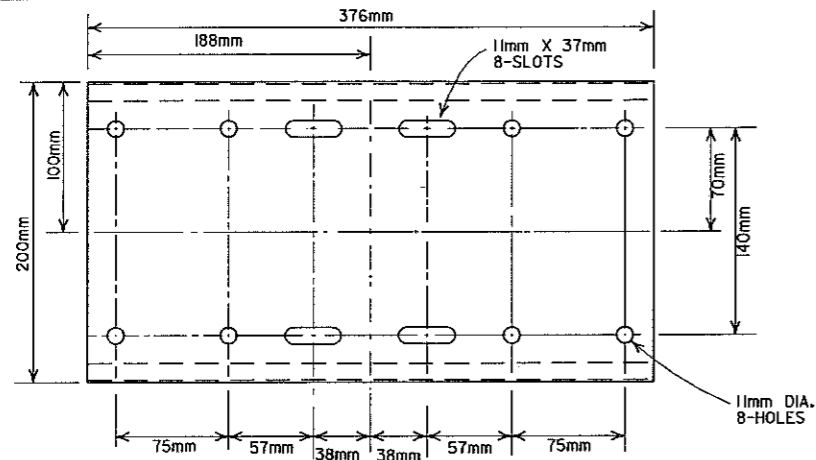


**DETAIL OF BARRIER PAD**

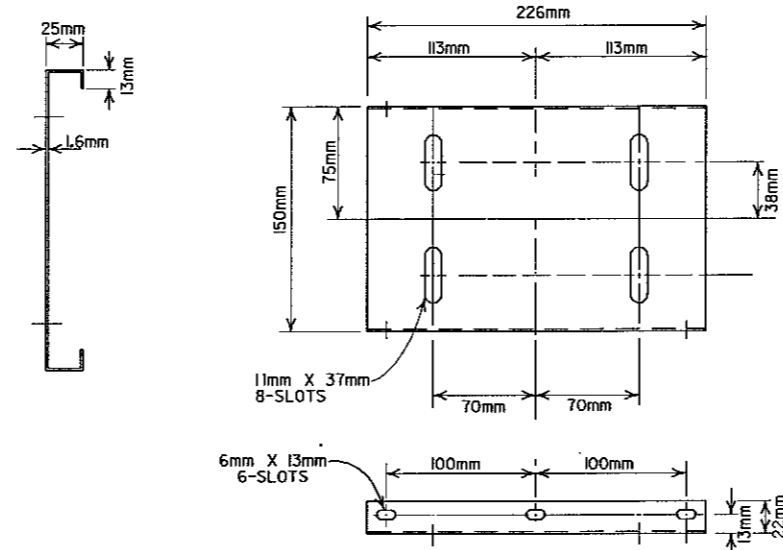
NOTE: BARRIER PAD TO BE SKEWED TOWARD ONCOMING TRAFFIC A MAXIMUM OF 1:6 WITH 1:6 BEING NORMAL

10-15-09	ADDED REFERENCE TO MASH		ARKANSAS STATE HIGHWAY COMMISSION
11-29-07	REVISED TY. A & TY. C ARRAYS		
11-19-98	REVISED FIXED OBJECTS		
11-18-98	REV. NOTES & TYPE A MOD. WTS.		
10-18-96	REDRAWN		
7-15-88	CONFORMED TO 1988 SPECS		
7-29-87	REDRAWN		
DATE	REVISION	DATE FILMED	STANDARD DRAWING IB-1(K)

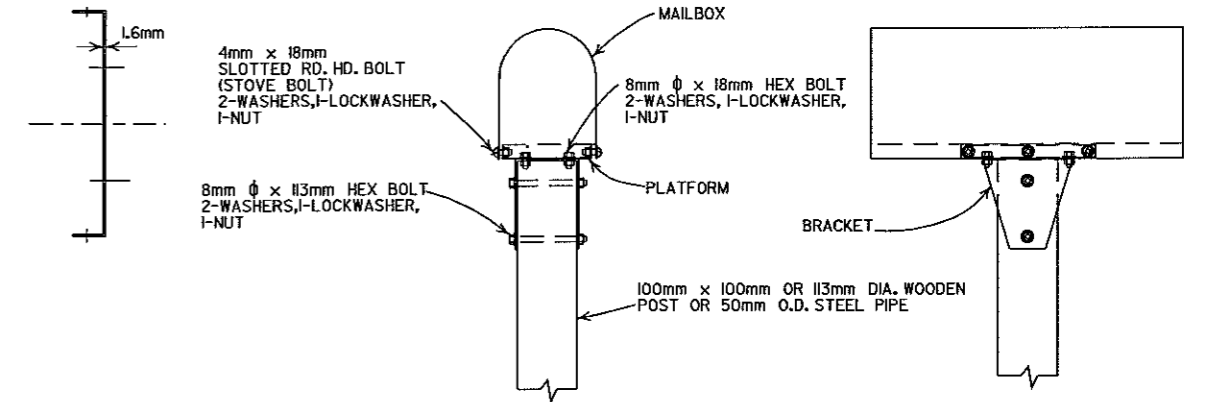




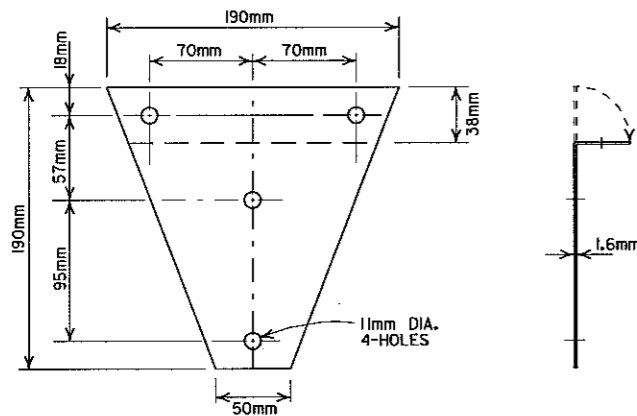
SHELF



PLATFORM



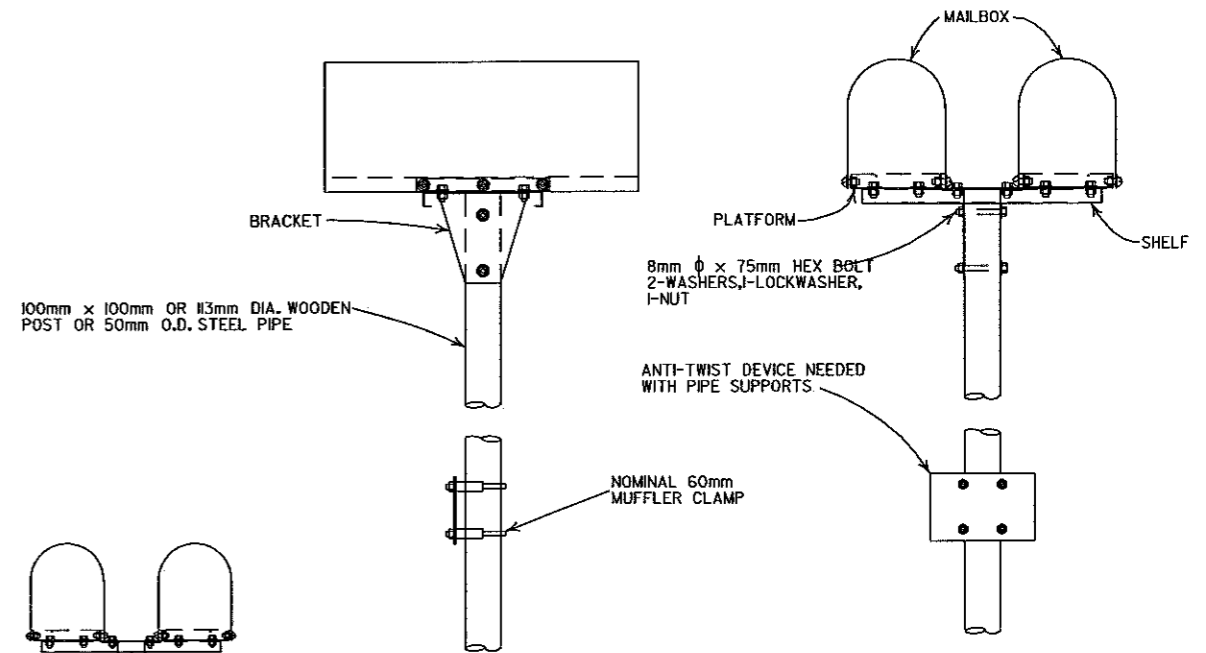
SINGLE INSTALLATION



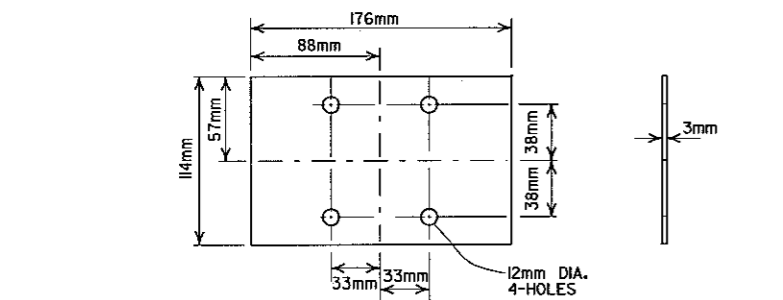
BRACKET

GENERAL NOTES

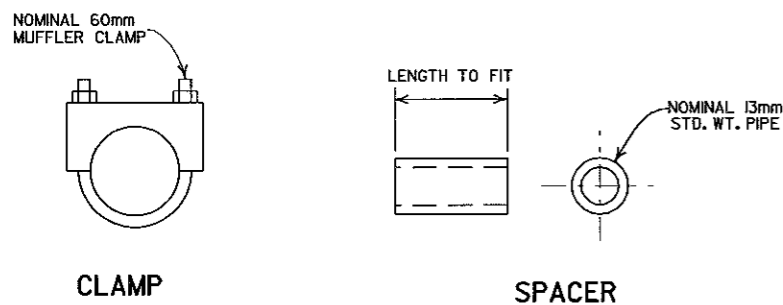
1. MAILBOX POSTS MAY BE WOOD OR METAL. WOOD POSTS SHALL BE PRESSURE TREATED FOR GROUND CONTACT IN ACCORDANCE WITH SECTION 637.02 OF THE STANDARD SPECIFICATIONS.
2. ANTI-TWIST PLATES SHALL BE USED ONLY ON METAL POSTS.
3. MAILBOX SHELF, BRACKET & PLATFORM SHALL BE GALVANIZED OR PAINTED STEEL, HOWEVER TREATED WOOD MAY BE USED WITH WOODEN POSTS. THE WOODEN SHELF, BRACKET & PLATFORM SHALL BE A MINIMUM OF 3/4" THICK AND SHALL BE ASSEMBLED WITH BOLTS OF THE APPROPRIATE LENGTH WITH SIX 8 X 3/4" FLATHEAD WOOD SCREWS USED TO ATTACH THE MAILBOX TO THE PLATFORM.
4. THE MAILBOX SHELF AND PLATFORM THAT IS SHOWN IS FOR STANDARD SIZE MAILBOXES. THE SHELF AND PLATFORM SIZE SHALL BE MODIFIED TO FIT MAILBOXES OF A DIFFERENT SIZE.
5. METAL PIPE FOR MAILBOX SUPPORT SHALL BE 2" OUTSIDE DIAMETER STEEL WITH A WALL THICKNESS OF 0.145" AND A WEIGHT OF 2.72 LBS PER FT. OUTSIDE DIAMETER AND WEIGHT SHALL HAVE A TOLERANCE OF +/- 5% ACCORDING TO AASHTO M 181.
6. MAILBOX SUPPORT SYSTEM DIFFERING FROM THOSE SHOWN MAY BE USED, PROVIDED THEY ARE ON THE AHTD QUALIFIED PRODUCTS LIST FOR MAILBOX SUPPORTS.



DOUBLE INSTALLATION

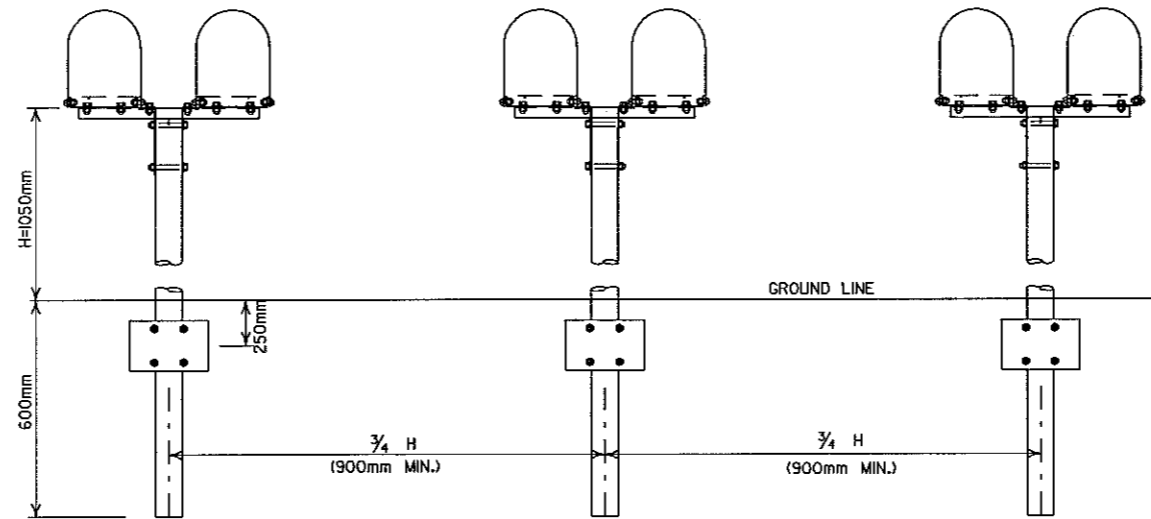


ANTI-TWIST PLATE



CLAMP

SPACER



SPACING FOR MULTIPLE POST INSTALLATION

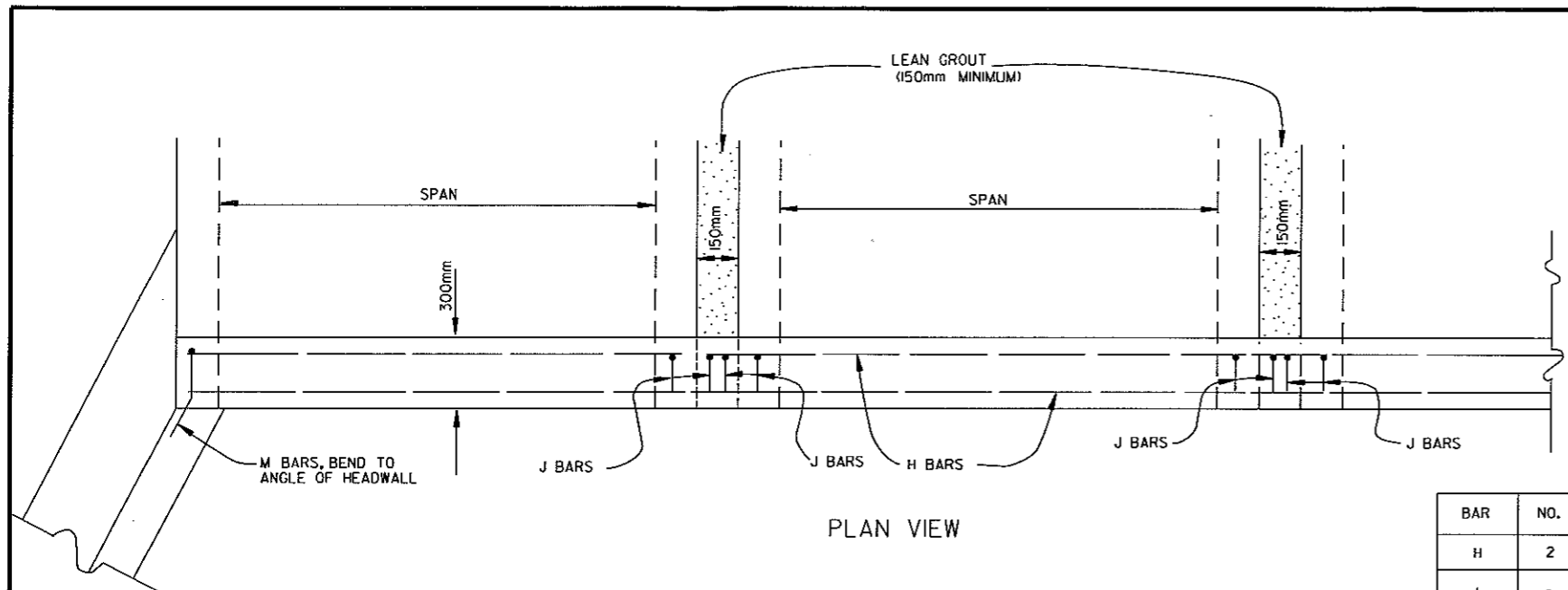
ARKANSAS STATE HIGHWAY COMMISSION

MAILBOX DETAILS

STANDARD DRAWING MB-1(M)



DATE	REVISION	BY	CHKD.
8-18-04	REVISED NOTES		
10-9-03	REVISED NOTE 5		
8-22-02	REVISED NOTE 5		
10-8-96	CORRECTED AASHTO		
7-20-85	CONVERTED TO METRIC		



BAR LIST

BAR	NO.	SIZE	LENGTH	BAR BENDING DIAGRAM
H	2	#13	•	
I	•	#13	•	
J	•	#13	425mm	
L	•	#13	950mm	
M	•	#13	500mm	

• NOTE: LENGTH AND NUMBER OF BARS VARIES WITH SIZE OF CULVERT

GENERAL NOTES

WINGS, CURTAIN WALLS AND APRONS SHALL BE TIED TO THE PRECAST CULVERT SECTION BY CASTING BARS IN CULVERT END SECTIONS AS SHOWN OR BY DOWELING AND GROUTING. J BARS AND M BARS SHALL BE EMBEDDED A MINIMUM OF 250mm IN PRECAST BOX.

WINGS, FOOTING, APRONS AND CURTAIN WALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE STANDARD WING DRAWING. STEEL AND CONCRETE QUANTITIES WILL BE ADJUSTED TO FIT IN-PLACE WIDTH & HEIGHT OF THE PRECAST CONCRETE BOX CULVERTS.

ALL EXPOSED CORNERS TO HAVE 19mm CHAMFERS.

WINGWALLS AND FOOTINGS MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.

ALL CONCRETE, REINFORCING STEEL, LEAN GROUT, MEMBRANE WATERPROOFING, DRAINAGE FILL MATERIAL, GEOTEXTILE FILTER FABRIC, LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR INSTALLING PRECAST BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR THE ITEMS AS SPECIFIED IN SECTION 607 OF THE STANDARD SPECIFICATIONS.

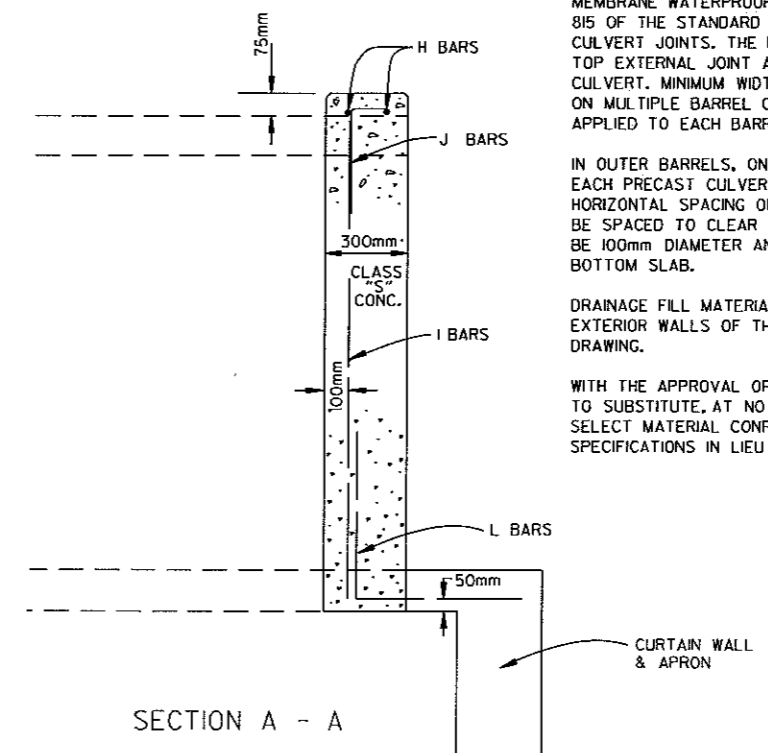
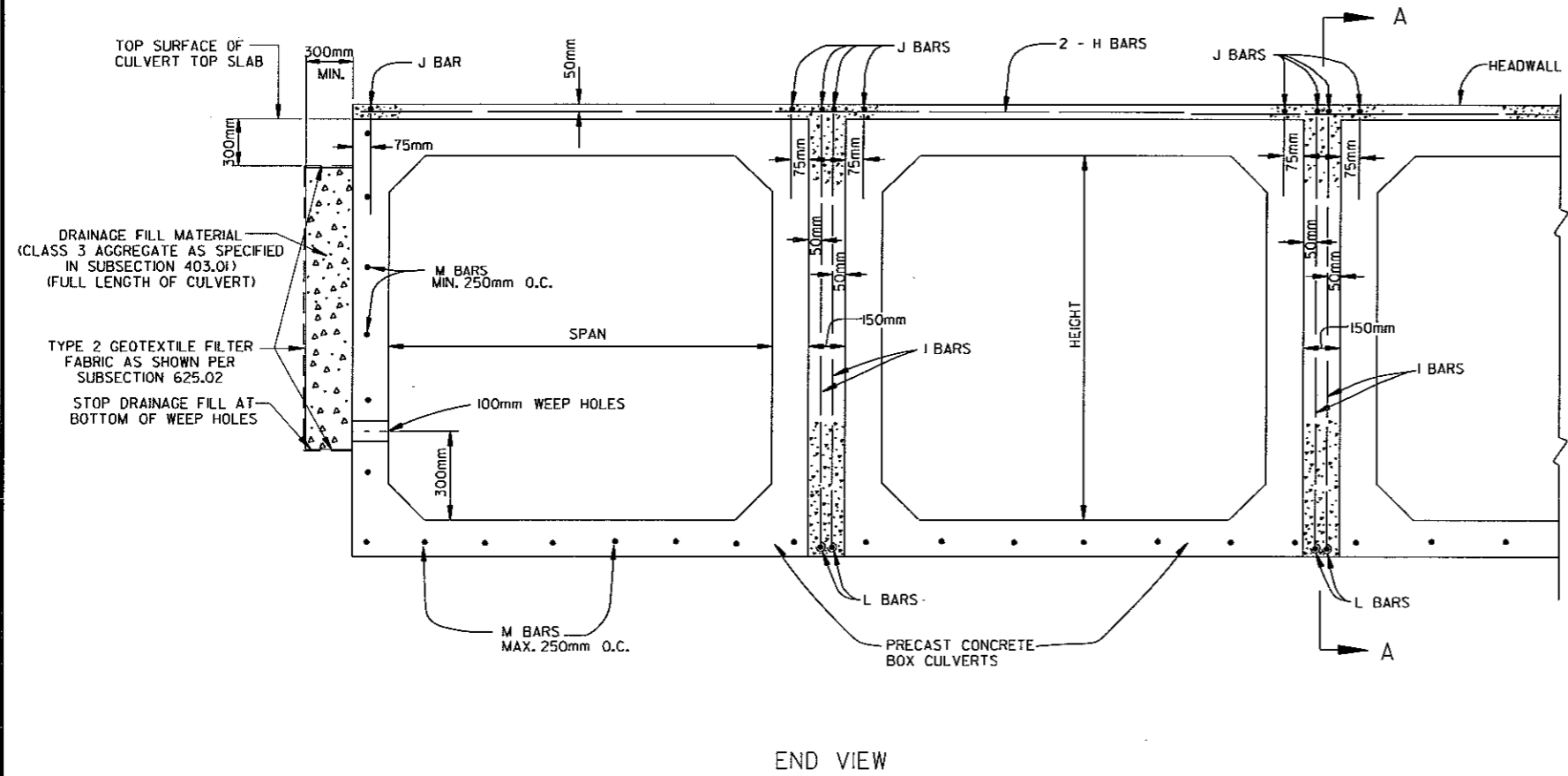
LEAN GROUT SHALL CONSIST OF A SAND CEMENT MIXTURE MEETING THE FOLLOWING REQUIREMENTS:  
 PORTLAND CEMENT SHALL BE TYPE I AND SHALL MEET THE REQUIREMENTS OF AASHTO M 85.  
 SAND SHALL MEET THE REQUIREMENTS OF FINE AGGREGATE AS SPECIFIED IN SECTION 802.02 OF THE STANDARD SPECIFICATIONS.  
 THE SAND CEMENT MIXTURE SHALL CONSIST OF NOT LESS THAN 70kg OF PORTLAND CEMENT PER METRIC TON OF MATERIAL MIXTURE.  
 THE MIXTURE SHALL CONTAIN SUFFICIENT WATER TO HYDRATE THE CEMENT.  
 THE SAND CEMENT MIXTURE SHALL BE PLACED IN MAXIMUM 200mm THICK LIFTS, LOOSE MEASURE, AND THOROUGHLY RODDED AND TAMPED AROUND BOX TO THOROUGHLY FILL ALL VOIDS.

MEMBRANE WATERPROOFING CONFORMING TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS SHALL BE APPLIED TO ALL BOX CULVERT JOINTS. THE MEMBRANE WATERPROOFING WILL BE REQUIRED ON THE TOP EXTERNAL JOINT AND SHALL EXTEND 300mm DOWN THE SIDES OF THE CULVERT. MINIMUM WIDTH SHALL BE 300mm (150mm ON EACH SIDE OF JOINT). ON MULTIPLE BARREL CULVERTS, MEMBRANE WATERPROOFING SHALL BE APPLIED TO EACH BARREL AS DESCRIBED ABOVE.

IN OUTER BARRELS, ONE WEEP HOLE IS REQUIRED IN EXTERIOR WALLS OF EACH PRECAST CULVERT SECTION. WEEP HOLES SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 3000mm IN THE ASSEMBLED CULVERT AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 100mm DIAMETER AND SHALL BE PLACED 300mm ABOVE THE TOP OF THE BOTTOM SLAB.

DRAINAGE FILL MATERIAL WITH GEOTEXTILE FABRIC IS REQUIRED AT THE EXTERIOR WALLS OF THE ASSEMBLED CULVERT, SEE DETAILS ON THIS DRAWING.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, FLOWABLE SELECT MATERIAL CONFORMING TO SECTION 206 OF THE STANDARD SPECIFICATIONS IN LIEU OF LEAN GROUT.



DATE	REVISION	DATE FILMED
7-26-12	ADDED NOTE & DTLS FOR WEEP HOLE AND DRAINAGE FILL	
12-15-11	ADDED NOTE & DTLS FOR WEEP HOLE AND DRAINAGE FILL	
10-15-09	ADDED GENERAL NOTE	
11-10-05	REVISED SPACING OF "M" BARS	
4-10-03	REVISED GENERAL NOTES	
4-3-97	REVISED STEEL PIPES TO SOFT METRIC	
10-18-96	CORRECTED AASHTO REF.	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION

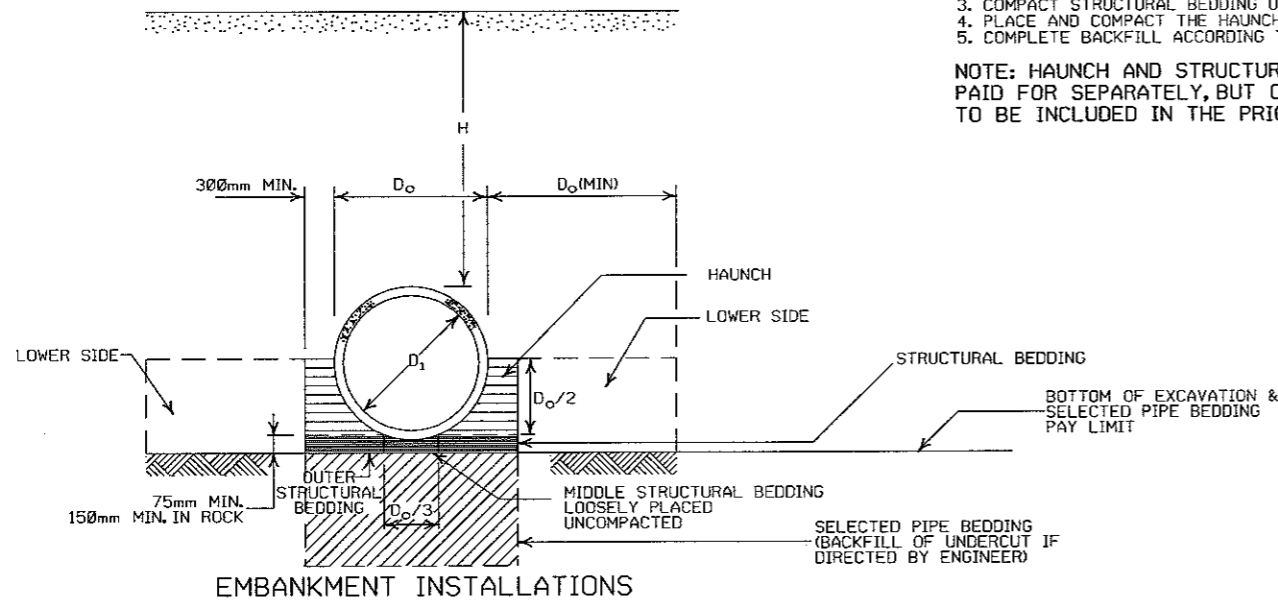
PRECAST CONCRETE BOX CULVERTS

STANDARD DRAWING PBC-1 (M)

### CONSTRUCTION SEQUENCE

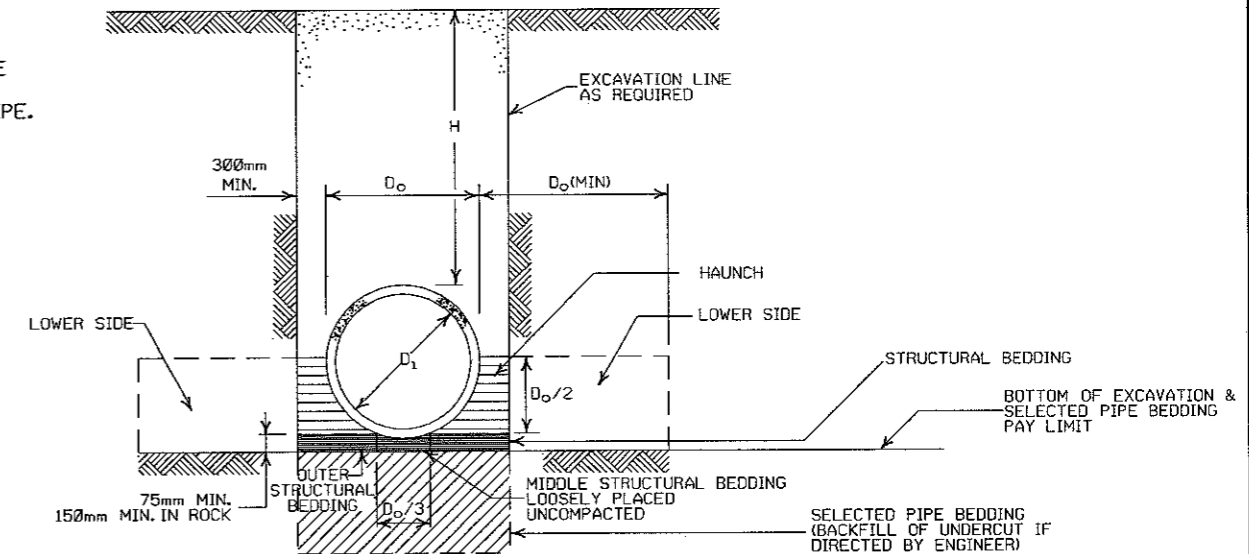
1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE MIDDLE OF THE PIPE.
5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

NOTE: HAUNCH AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER METER OF CONCRETE PIPE.



EMBANKMENT INSTALLATIONS

1. MATERIAL IN THE LOWER SIDE, HAUNCH, AND OUTER STRUCTURAL BEDDING SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.



TRENCH INSTALLATIONS

1. MATERIAL IN THE HAUNCH AND OUTER STRUCTURAL BEDDING SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.
2. FOR TRENCHES WITH WALLS OF NATURAL SOIL, THE DENSITY OF THE SOIL IN THE LOWER SIDE ZONE SHALL BE AS FIRM AS THE 95% DENSITY REQUIRED FOR THE HAUNCH. IF THE EXISTING SOIL DOES NOT MEET THIS CRITERIA, IT SHALL BE REMOVED AND RECOMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OF MATERIAL USED.

### REINFORCED CONCRETE ARCH PIPE DIMENSIONS

EQUIV. DIA.	*SPAN		*RISE	
	AASHTO M 206	AHD NOMINAL	AASHTO M 206	AHD NOMINAL
mm	mm			
375	460	450	280	275
450	560	550	345	350
525	660	650	395	400
600	725	725	460	450
750	920	900	570	575
900	1110	1100	675	675
1050	1300	1275	795	775
1200	1485	1475	915	900
1350	1650	1625	1015	1000
1500	1855	1825	1145	1125
1800	2235	2200	1370	1350
2100	2590	2550	1575	1550
2250	2920	2875	1830	1800
2400	3100	3050	1960	1925
2700	3505	3450	2215	2175
3000	3910	3850	2460	2425
3300	4285	4225	2705	2675

\* THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ±2 PERCENT FROM THE VALUES SPECIFIED BY AASHTO M 206.

INSTALLATION TYPE	* MATERIAL REQUIREMENTS FOR HAUNCH AND STRUCTURAL BEDDING
TYPE 1	AGGREGATE BASE COURSE (CLASS 5 OR CLASS 7)
TYPE 2	SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-3) OR TYPE 1 INSTALLATION MATERIAL
TYPE 3	AASHTO CLASSIFICATION A-1 THRU A-6 SOIL OR TYPE 1 OR 2 INSTALLATION MATERIAL

\* MATERIAL SHALL NOT INCLUDE ORGANIC MATERIALS OR STONES LARGER THAN 75mm.

### MAXIMUM HEIGHT OF FILL OVER R.C. PIPE CULVERTS

INSTALLATION TYPE	CLASS OF PIPE		
	CLASS III	CLASS IV	CLASS V
METERS			
TYPE 1	6.4	9.8	15.2
TYPE 2	5.2	8.2	12.5
TYPE 3	4.0	6.1	9.7

NOTE: IF FILL HEIGHT EXCEEDS 15.2m, A SPECIAL DESIGN CONCRETE PIPE WILL BE REQUIRED USING TYPE 1 BEDDING.

### GENERAL NOTES

1. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
2. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 600mm.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
4. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 600mm BETWEEN STRINGS OF PIPE.
5. REFER TO STD. DWG. FES-21M FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
6. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
7. NOT MORE THAN ONE LIFTING HOLE MAY BE PROVIDED IN CONCRETE PIPE TO FACILITATE HANDLING. HOLE MAY BE CAST IN PLACE, CUT INTO THE FRESH CONCRETE AFTER FORMS ARE REMOVED, OR DRILLED. THE HOLE SHALL NOT BE MORE THAN 50mm IN DIAMETER OR 50mm SQUARE. CUTTING OR DISPLACEMENT OF REINFORCEMENT WILL NOT BE PERMITTED. SPALLED AREAS AROUND THE HOLE SHALL BE REPAIRED IN A WORKMANLIKE MANNER. LIFTING HOLE SHALL BE FILLED WITH MORTAR, CONCRETE, OR OTHER METHOD AS APPROVED BY THE ENGINEER.
8. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS 'STRUCTURAL BEDDING' ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS 'SELECTED PIPE BEDDING.'
9. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS THE HAUNCH), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF 'SELECTED PIPE BACKFILL.'

### - LEGEND -

- D<sub>1</sub> = NORMAL INSIDE DIAMETER OF PIPE
- D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE
- H = FILL COVER HEIGHT OVER PIPE (METERS)
- MIN. = MINIMUM
- UNDISTURBED SOIL

DATE	REVISION	DATE FILMED
5-18-00	REVISED TYPE 3 BEDDING & ADDED NOTE	
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE PIPE CULVERT  
FILL HEIGHTS & BEDDING

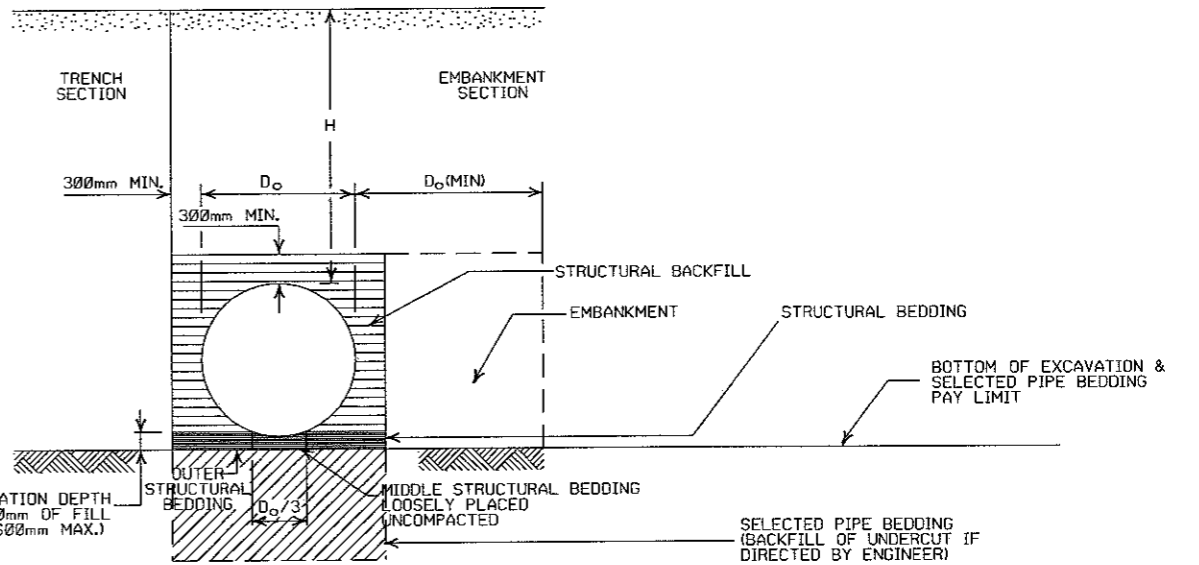
STANDARD DRAWING PCC-1(M)

**CORRUGATED STEEL PIPE (ROUND) H-2Ø LOADING**

PIPE DIAMETER (mm)	MINIMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (mm)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (meters)							
		METAL THICKNESS IN mm							
		1.63	2.01	2.77	3.51	4.27			
68mm BY 12mm CORRUGATION RIVETED, WELDED, OR HELICAL									
300	300	25.6	27.7						
375	300	20.4	22.3						
450	300	17.1	18.6						
600	300	12.8	14.0	18.0					
750	300	10.4	11.0	14.3					
900	300		9.1	11.9	12.5				
1050	300		13.1	14.0	20.4	14.6	21.3	15.2	22.3
1200	300		11.3	13.7	17.7	14.0	18.6	14.3	19.5
75mm BY 25mm OR 125mm BY 25mm CORRUGATION ** RIVETED, WELDED, HELICAL, OR BOLTED									
900	300	14.6	18.3	23.8	26.8	27.1	33.8	30.8	39.9
1050	300	12.5	15.5	19.5	21.9	21.6	27.4	24.1	31.1
1200	300	11.0	13.7	17.4	19.5	18.6	23.5	20.1	25.9
1350	300	9.8	12.2	15.8	18.0	16.8	21.6	18.0	24.1
1500	300	8.8	11.0	14.9	16.2	15.5	19.5	16.5	21.6
1650	300	7.9	10.1	14.3	14.9	17.7	15.5	19.5	
1800	300	7.3	9.1	13.4	14.3	16.2	14.9	18.0	
1950	300		8.5	12.5	14.0	14.9	14.3	16.5	
2100	300		7.9	11.6	13.7	14.9	14.0	15.5	
2250	300		7.3	10.7	13.1				
2400	300		6.7	10.1	12.2				
2550	600			9.5	11.6			12.8	
2700	600			9.1	10.7			11.9	
2850	600			8.5	10.4			11.3	
3000	600			8.2	9.8			10.7	

\* MAX. FILL CAN BE INCREASED IN THESE DIAMETER PIPES BY USING THE NEXT LARGER CORRUGATION. REFER TO 'CORRUGATED METAL PIPE', REVISED 1970, PUBLISHED BY U.S. DEPARTMENT OF TRANSPORTATION, F.H.W.A., B.P.R.

\*\* WHERE THE STANDARD 68mm x 13mm CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A 75mm x 25mm OR 125mm x 25mm CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.



**TYPE 2 EMBANKMENT AND TRENCH INSTALLATIONS**

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

**CORRUGATED ALUMINUM PIPE (ROUND) H-2Ø LOADING**

PIPE DIAMETER (mm)	MINIMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (mm)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (meters)				
		METAL THICKNESS IN mm				
		1.52	1.91	2.67	3.43	4.17
68mm BY 12mm CORRUGATION RIVETED OR HELICAL						
300	300	13.7	13.7			
450	300	9.1		15.9		
600	300	6.7	6.7	11.9	12.5	
750	300	5.5	5.5	9.5	9.8	10.4
900	300		4.6	7.9	8.2	8.5
1050	300		7.9	13.1	13.1	13.4
1200	300			12.2	11.3	11.6
1350	300			10.7	10.1	10.4
1500	300				9.1	9.5
1650	300					8.8

**EQUIVALENT METAL THICKNESSES AND GAUGES**

METAL THICKNESS IN mm			GAUGE NUMBER
STEEL			
ZINC COATED	UNCOATED	ALUMINUM	
1.63	1.52	1.52	16
2.01	1.90	1.91	14
2.77	2.66	2.67	12
3.51	3.42	3.43	10
4.27	4.18	4.17	8
4.78	4.67		7
5.54	5.45		5
6.32	6.23		3
7.11	7.01		1

**CONSTRUCTION SEQUENCE**

- PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
- INSTALL PIPE TO GRADE.
- COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
- COMPLETE STRUCTURAL BACKFILL OPERATION BY WORKING FROM SIDE TO SIDE OF THE PIPE. THE SIDE TO SIDE STRUCTURAL BACKFILL DIFFERENTIAL SHALL NOT EXCEED 600mm OR 1/3 THE SIZE OF THE PIPE, WHICHEVER IS LESS.

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	*SELECTED MATERIALS (CLASS SM-1, SM-2 OR SM-3)

\* AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL.

NOTE: STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER METER OF METAL PIPE.

**CORRUGATED METAL PIPE ARCHES (H - 2Ø LOADING)**

EQUIV. DIA. (mm)	PIPE DIMENSION SPAN X RISE (mm)	MINIMUM CORNER RADIUS (mm)	MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE FOR 19.5 m <sup>2</sup> /sq meter (mm)	STEEL			ALUMINUM		
				MINIMUM THICKNESS REQUIRED	MAX. FILL HEIGHT ABOVE TOP OF PIPE (IN METERS) FOR THE FOLLOWING CORNER BEARING PRESSURE IN metric ton PER sq meter		MINIMUM THICKNESS REQUIRED	MAX. FILL HEIGHTS ABOVE TOP OF PIPE (IN METERS) FOR THE FOLLOWING CORNER BEARING PRESSURE IN metric ton PER sq meter	
					1.81m t	2.72m t <sup>1</sup>		mm	1.81m t
68mm BY 12mm CORRUGATION RIVETED, WELDED, OR HELICAL									
375	430x330	75	300	1.63	3.96	4.57+	1.52	4.57	
450	530x380	75	300	1.63	3.66	4.57+	1.52	4.27	
525	610x460	75	300	1.63	3.05	4.57+	1.52	3.66	4.57+
600	710x510	75	300	1.63	3.05	4.57	1.52	3.05	4.57+
750	885x610	75	300	2.01	2.74	4.27	1.91	2.74	4.27
900	1060x740	86	300	2.01	2.74	3.96	1.91	2.74	3.96
1050	1240x840	100	300	2.01	2.44	3.66	2.67	2.44	3.66
1200	1440x970	125	300	2.77	2.44	3.66	3.43	2.44	3.66
1350	1620x1100	150	300	2.77	2.44	3.66	3.43	2.44	3.66
1500	1800x1200	175	300	3.51	2.44	3.66	4.17	2.44	3.66
1650	1950x1320	200	300	4.27	2.44	3.66	4.17	2.44	3.66
1800	2100x1450	225	300	4.27	2.74	3.96			
75mm BY 25mm OR 125mm BY 25mm CORRUGATION ** RIVETED, WELDED, OR HELICAL									
900	1010x790	125	300	2.01	4.57	4.57+			
1050	1160x920	150	300	2.01	4.57	4.57+			
1200	1340x1050	175	300	2.01	4.57	4.57+			
1350	1520x1170	200	300	2.01	4.57	4.57+			
1500	1670x1300	225	300	2.01	4.57	4.57+			
1650	1850x1400	300	300	2.01	4.57	4.57+			
1800	2050x1500	350	300	2.01	4.57	4.57+			
1950	2200x1620	350	450	2.01	4.27	4.57+			
2100	2400x1720	400	450	2.77	3.96	4.57+			
2250	2600x1820	400	450	2.77	3.66	4.57+			
2400	2840x1920	450	450	2.77	3.35	4.57+			
2550	2970x2020	450	600	2.77	3.05	4.57			
2700	3240x2120	450	600	3.51	2.74	4.27			

<sup>1</sup> WHERE BEARING PRESSURE EXCEEDING 19.5 metric tons PER sq meter IS REQUIRED FOR GIVEN FILL HEIGHTS, THE FOUNDATION MATERIAL SHALL BE INVESTIGATED TO DETERMINE THE BEARING CAPACITY.

\*\* WHERE THE STANDARD 68mmx13mm CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A 75mmx25mm OR 125mmx25mm CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.

**GENERAL NOTES**

- ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
- THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 600mm.
- THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
- MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 600mm BETWEEN STRINGS OF PIPE.
- REFER TO STD. DWG. FES-2(M) FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
- IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
- WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS 'STRUCTURAL BEDDING' ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS 'SELECTED PIPE BEDDING'.
- WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED AS 'STRUCTURAL BACKFILL'), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF 'SELECTED PIPE BACKFILL.'

**- LEGEND -**

- D<sub>o</sub> = OUTSIDE DIAMETER OF PIPE
- MAX. = MAXIMUM
- MIN. = MINIMUM
- [Pattern] = STRUCTURAL BACKFILL MATERIAL
- [Pattern] = UNDISTURBED SOIL
- ELONG. = ELONGATED
- EQUIV. DIA. = EQUIVALENT DIAMETER
- H = FILL COVER HEIGHT OVER PIPE (METER)

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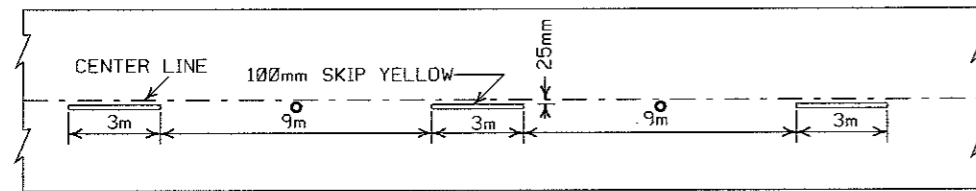
**METAL PIPE CULVERT  
FILL HEIGHTS & BEDDING**

STANDARD DRAWING PCM-1(M)

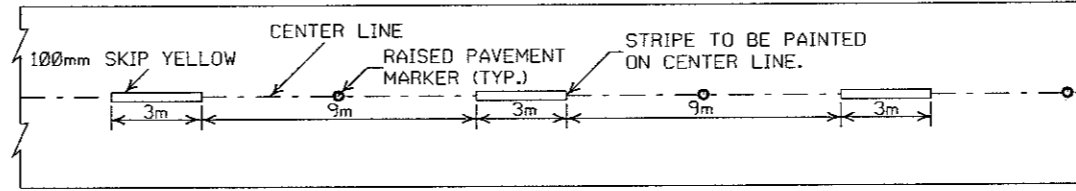
DATE: \_\_\_\_\_ REVISION: \_\_\_\_\_ DATE FILMED: \_\_\_\_\_

NOTES:

1. ALL LINES SHALL HAVE A WIDTH OF 100mm.
2. THE THICKNESS AND RATE OF PAINT APPLICATION SHALL BE AS SPECIFIED IN SECTION 718 OF THE STANDARD SPECIFICATIONS.
3. THIS DRAWING SHALL BE USED IN CONJUNCTION WITH THE LATEST REVISED ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
4. RAISED PAVEMENT MARKERS SHALL BE CENTERED BETWEEN SKIP LINES ON 12m SPACING UNLESS OTHERWISE SHOWN ON THE PLANS.

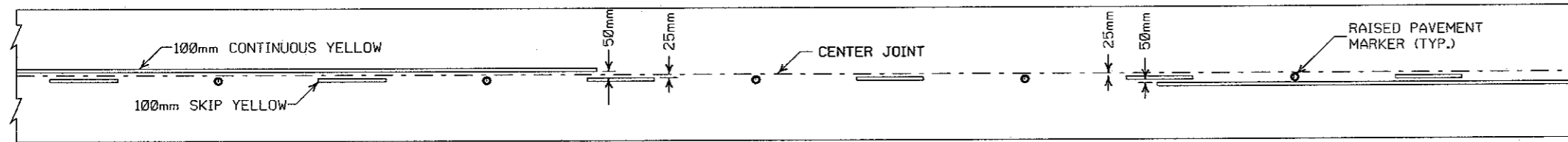


CONCRETE PAVEMENT

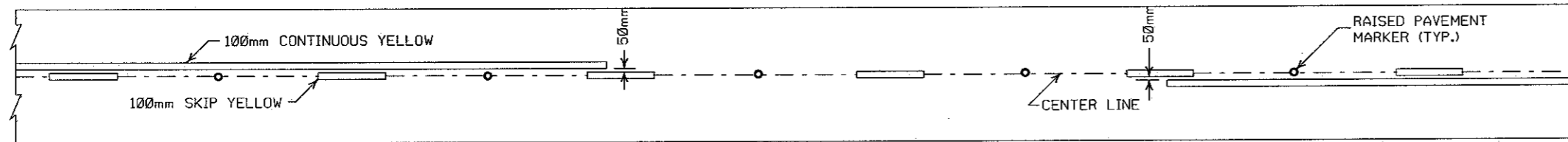


ASPHALT PAVEMENT

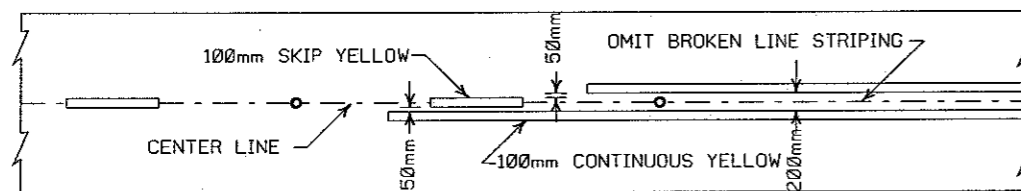
**BROKEN LINE STRIPING**



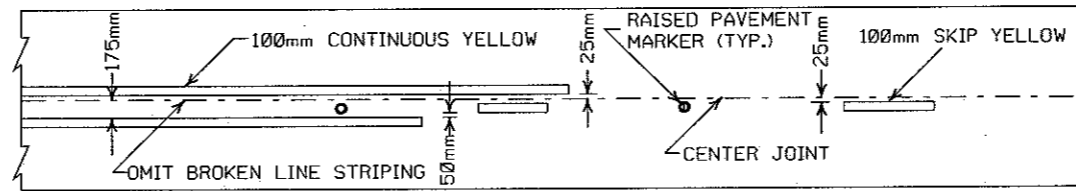
**SOLID LINE STRIPING ON CONCRETE PAVEMENT**



**SOLID LINE STRIPING ON ASPHALT PAVEMENT**



ASPHALT PAVEMENT



CONCRETE PAVEMENT

**STRIPING AT ADJACENT NO PASSING LANES**

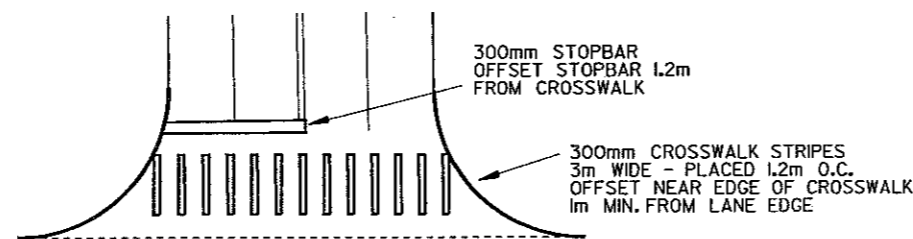
GENERAL NOTES:

THIS DRAWING SHOULD BE CONSIDERED AS TYPICAL ONLY AND THE FINAL LOCATION OF THE STRIPING AND RAISED PAVEMENT MARKERS SHALL BE DETERMINED BY THE ENGINEER.

THIS DRAWING SHOULD BE USED IN CONJUNCTION WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST REVISION.

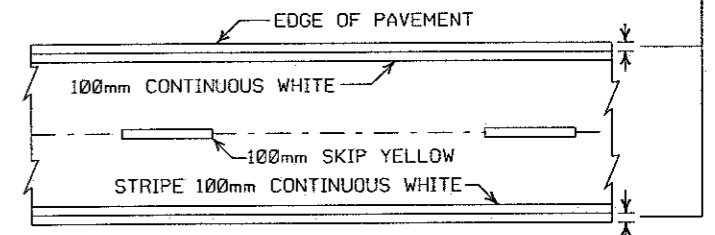
NOTE:

DIMENSIONS SHOWN FOR RAISED PAVEMENT MARKERS ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR MARKERS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR SIMILAR MARKERS MAY BE MADE BY REFERRING TO THE AHTD QUALIFIED PRODUCTS LIST.

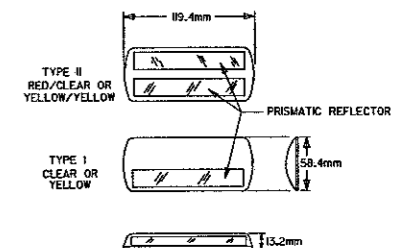


**CROSSWALK AND STOPBAR DETAILS**

50mm FOR ASPHALT OR CONCRETE PAVEMENT  
150mm FOR BITUMINOUS SURFACE TREATMENT



**PAVEMENT EDGE LINE MARKING**



NOTE: THE RED LENS OF THE TYPE II R.P.M. SHALL FACE THE INCORRECT TRAFFIC MOVEMENT.

DETAIL OF STANDARD RAISED PAVEMENT MARKERS

DATE	REVISION	DATE EXPIRES
8-17-10	REVISED NOTE 2 & REMOVED FLOWABLE PAVEMENT MARKERS	
8-18-04	REVISED NOTE 2 & GENERAL NOTES	
8-22-02	ADDED CROSSWALK & STOPBAR DETAILS	
7-02-98	ADDED DETAIL OF STD. RAISED PAVT. MARKERS	
4-26-96	REV. NOTES 3&4 ADDED R.P.M.	
12-20-95	CONVERTED TO METRIC	

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PAVEMENT MARKING DETAILS

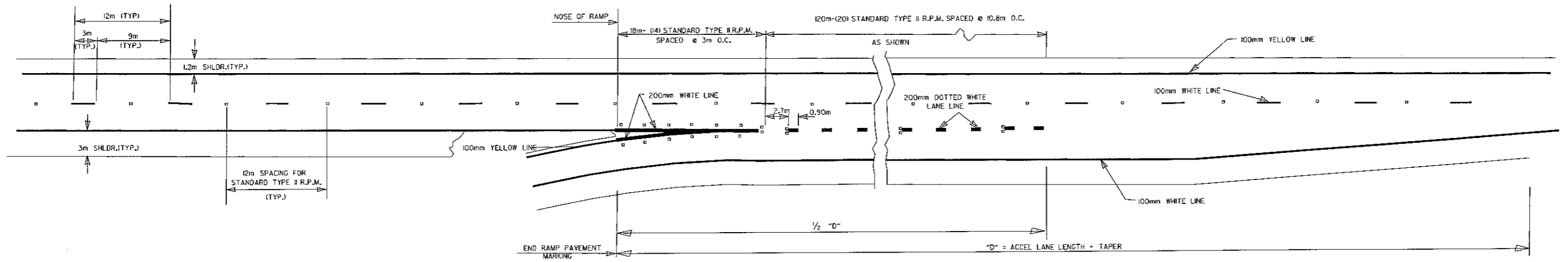
STANDARD DRAWING PM-1 (M)



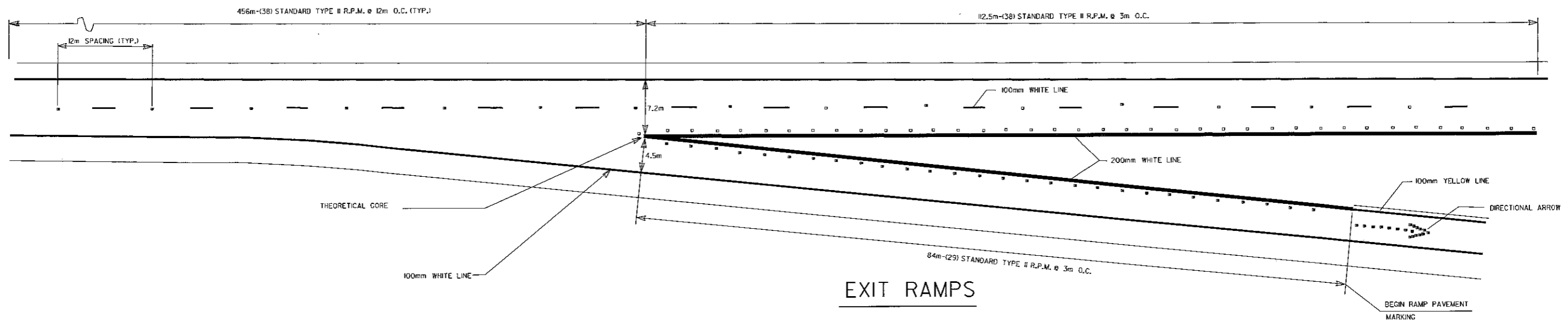
PAYEMENT MARKING QUANTITIES  
(BASED ON 210m ACCEL LANE + 90m TAPER)

ENTRANCE RAMP  
200mm WHITE = 68m  
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 38 EACH

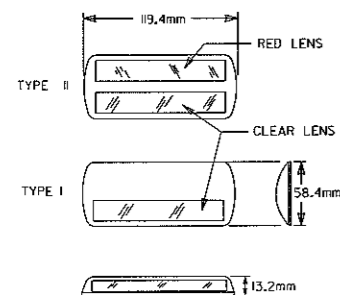
EXIT RAMP  
100mm WHITE = 84m  
200mm WHITE = 196.5m  
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 38 EACH  
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 48 EACH  
RAISED PAVEMENT MARKERS TYPE II (WHITE/RED) = 38 EACH



### ENTRANCE RAMPS

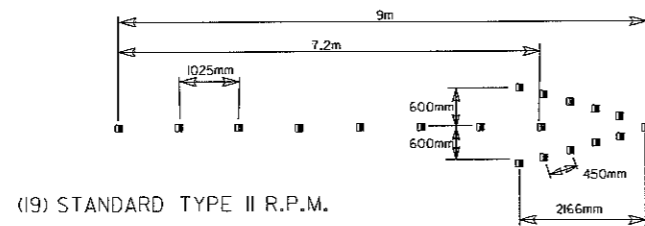


### EXIT RAMPS



DETAIL OF STANDARD RAISED PAVEMENT MARKERS

NOTE:  
THE RED LENS OF THE TYPE II R.P.M. SHALL FACE THE INCORRECT TRAFFIC MOVEMENT.



(19) STANDARD TYPE II R.P.M.

DIRECTIONAL ARROWS

GENERAL NOTES:  
THIS DRAWING SHOULD BE CONSIDERED AS TYPICAL ONLY AND THE FINAL LOCATION OF THE STRIPING AND PAVEMENT MARKERS SHALL BE DETERMINED BY THE ENGINEER.

THIS DRAWING SHOULD BE USED IN CONJUNCTION WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST REVISION.

NOTE:  
DIMENSIONS SHOWN FOR PLOWABLE PAVEMENT MARKERS AND RAISED PAVEMENT MARKERS ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR MARKERS WITH THE APPROVAL OF THE ENGINEER, REQUESTING APPROVAL FOR SIMILAR MARKERS MAY BE MADE BY REFERRING TO THE AHTD QUALIFIED PRODUCTS LIST.

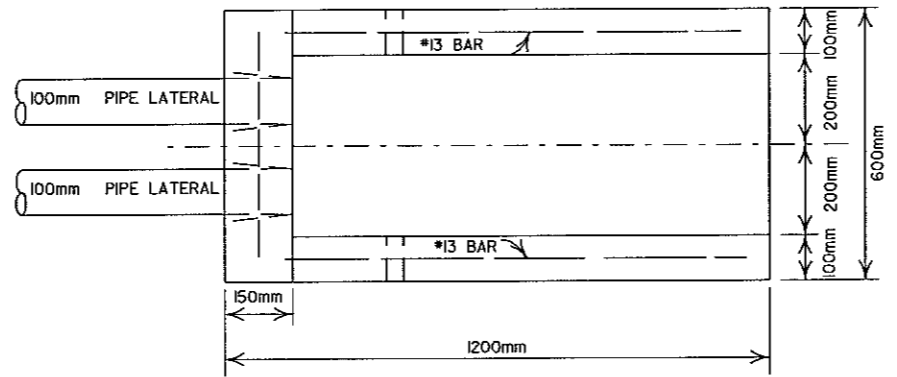
DATE	REVISION	FILMED
12-15-11	REVISED RPMs ACCORDING TO LATEST POLICY	
11-17-10	REMOVED PLOWABLE PVMT MRKRS	
6-3-10	REVISED PER 2009 MUTCD	
11-18-04	REVISED NOTES	
8-22-02	ADDED & REVISED NOTES; REV. ENTRANCE & EXIT RAMPS	
5-18-00	REMOVED HASHMARKS	
7-02-98	CHANGED TYPES TO ROMAN NUMERALS	
4-26-96	ADDED DIMENSIONS & QUANTITIES; REV. LANE WIDTH ON EXIT RAMP	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION  
PERMANENT PAVEMENT MARKING  
ON ACCESS CONTROLLED ROADWAYS

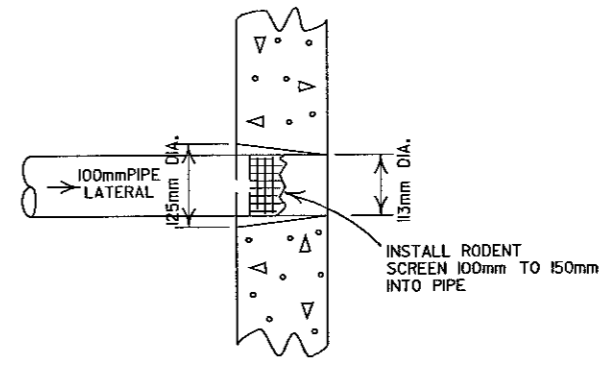
STANDARD DRAWING PM-21(M)



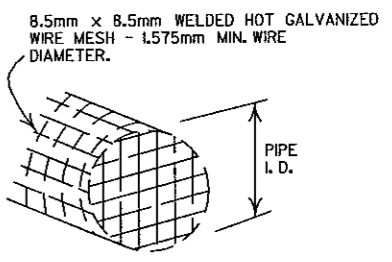
NOTE:  
 1. GRANULAR BACKFILL TO BE SUBSIDIARY TO PIPE UNDERDRAIN.  
 2. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE UNDERDRAIN COVER SHALL BE THOROUGHLY COMPACTED EARTH AND SHALL BE SUBSIDIARY TO PIPE UNDERDRAIN.  
 3. GRANULAR MATERIAL SHALL BE WRAPPED WITH GEOTEXTILE FABRIC, LAP FABRIC 300mm OR THE WIDTH OF THE TRENCH AT THE TOP.



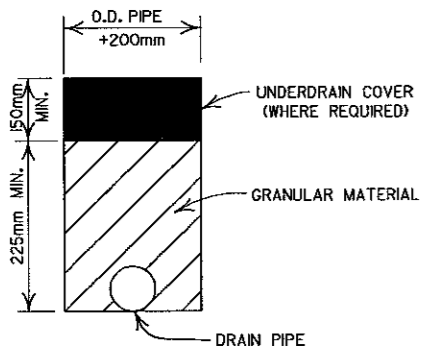
PLAN VIEW



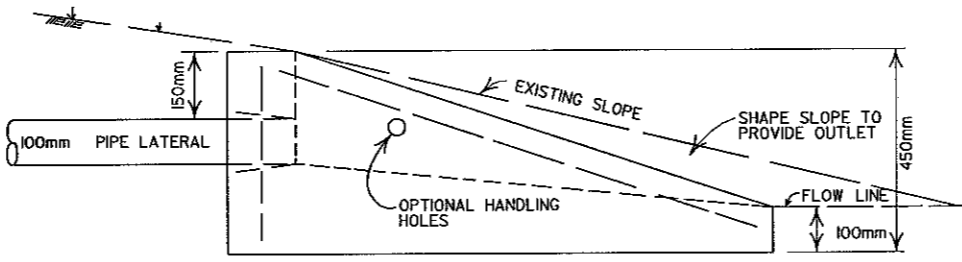
DETAIL OF HOLE FOR 100mm PIPE



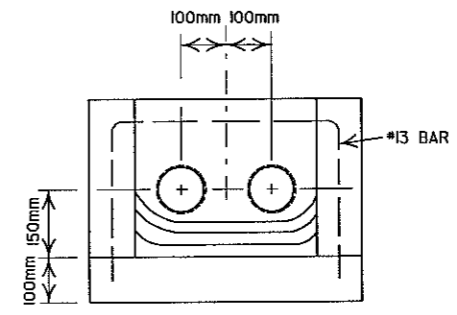
DETAIL OF RODENT SCREEN



DRAIN PIPE

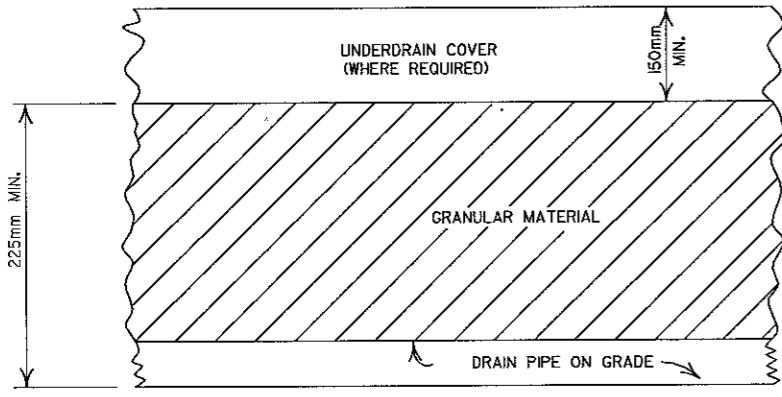


SIDE VIEW

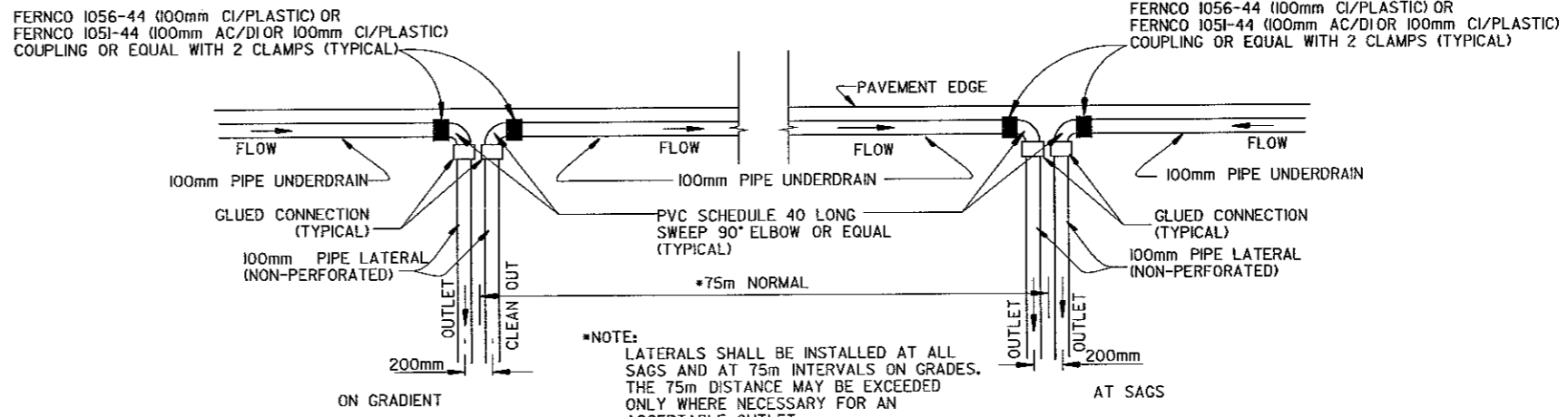


FRONT VIEW

UNDERDRAIN OUTLET PROTECTORS



DETAILS OF PIPE UNDERDRAIN



\*NOTE:  
 LATERALS SHALL BE INSTALLED AT ALL SAGS AND AT 75m INTERVALS ON GRADES. THE 75m DISTANCE MAY BE EXCEEDED ONLY WHERE NECESSARY FOR AN ACCEPTABLE OUTLET.

DETAIL OF PIPE UNDERDRAIN LATERALS WHEN PLACED ALONG PAVEMENT EDGE  
 NOTE: PVC PIPE FOR LATERALS SHALL MEET THE REQUIREMENTS OF ASTM D 1785 (LATEST REVISION) FOR SCHEDULE 40 PIPE.

4-10-03	REVISED NOTE 3
1-12-00	REVISED DETAIL OF UNDERDRAIN LATERALS
8-18-98	REVISED NOTE
7-02-98	CORRECTED SPELLINGS
4-3-97	REVISED STEEL PIPES TO SOFT METRIC
10-18-96	REVISED MINIMUM DEPTH & GEOTEXTILE FABRIC
4-26-96	ADDED LATERAL NOTES 137mm TO 125mm
8-22-95	REVISED LATERALS
7-20-95	CONVERTED TO METRIC
DATE	REVISION

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF PIPE UNDERDRAINS

STANDARD DRAWING PU-1 (M)

**REINFORCED CONCRETE BOX CULVERT GENERAL NOTES**

CONCRETE SHALL BE CLASS S WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 24 MPa.

REINFORCING STEEL SHALL BE GRADE 420.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CONSTRUCTION AND MATERIALS FOR WINGWALL DRAINAGE, INCLUDING WEEP HOLES AND GRANULAR MATERIAL, SHALL BE SUBSIDIARY TO THE BID ITEM, "CLASS S CONCRETE".

MEMBRANE WATERPROOFING SHALL CONFORM TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS.

MEMBRANE WATERPROOFING SHALL BE APPLIED TO ALL CONSTRUCTION JOINTS IN THE TOP SLAB AND THE SIDEWALLS OF R.C. BOX CULVERTS AS DIRECTED BY THE ENGINEER. NO PAYMENT SHALL BE MADE FOR THIS ITEM, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS BID FOR THE R.C. BOX CULVERT.

REINFORCING STEEL TOLERANCES: THE TOLERANCES FOR REINFORCING STEEL SHALL MEET THOSE LISTED IN "MANUAL OF STANDARD PRACTICE" PUBLISHED BY CONCRETE REINFORCING STEEL INSTITUTE (CRSI) EXCEPT THAT THE TOLERANCE FOR TRUSS BARS SUCH AS FIGURE 3 ON PAGE 7-4 OF THE CRSI MANUAL SHALL BE MINUS ZERO TO PLUS 12.5mm.

WEEP HOLES IN BOX CULVERT WALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 3m AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 100mm DIAMETER AND SHALL BE PLACED 300mm ABOVE THE TOP OF THE BOTTOM SLAB.

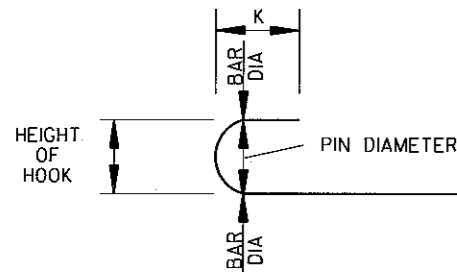
WEEP HOLES IN WINGWALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 3m AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THERE SHALL BE A MINIMUM OF TWO (2) WEEP HOLES IN EACH WINGWALL. THE DRAIN OPENING SHALL BE 100mm DIAMETER AND SHALL BE PLACED 300mm ABOVE THE TOP OF THE WINGWALL FOOTING.

THE REQUIREMENTS SHOWN ON THIS DRAWING SHALL SUPERCEDE THE CORRESPONDING REQUIREMENTS ON ALL REINFORCED CONCRETE BOX CULVERT STANDARD DRAWINGS.

**STEEL FABRICATION:** REINFORCING STEEL FABRICATION SHALL CONFORM TO THE DIMENSIONS LISTED IN THE TABLE BELOW:

BAR SIZE	PIN DIAMETER	HOOK EXTENSION "K"
10	57	110
13	76	120
16	95	130
19	114	160
22	133	180
25	152	210
29	228	260

IF THE OVERALL HEIGHT OF THE HOOK (SEE DIAGRAM BELOW) FOR A "b", "b1", "b2" or "b3" BENT BAR IS GREATER THAN THE CORRESPONDING TOP OR BOTTOM SLAB THICKNESS, LESS 70mm, EACH BENT BAR SHALL BE REPLACED WITH ONE HOOKED BAR AND ONE STRAIGHT BAR, USING LENGTHS AS SHOWN IN THE TABLE BELOW. THE TWO BARS SHALL BE THE SAME DIAMETER AS, AND PLACED AT THE SAME SPACING AS, THE "b", "b1", "b2" OR "b3" BENT BARS THEY REPLACE.



NOTE: DIMENSIONS OF BARS ARE MEASURED OUT TO OUT OF BARS.

**OVERALL HEIGHT OF HOOKED BAR DIAGRAM**

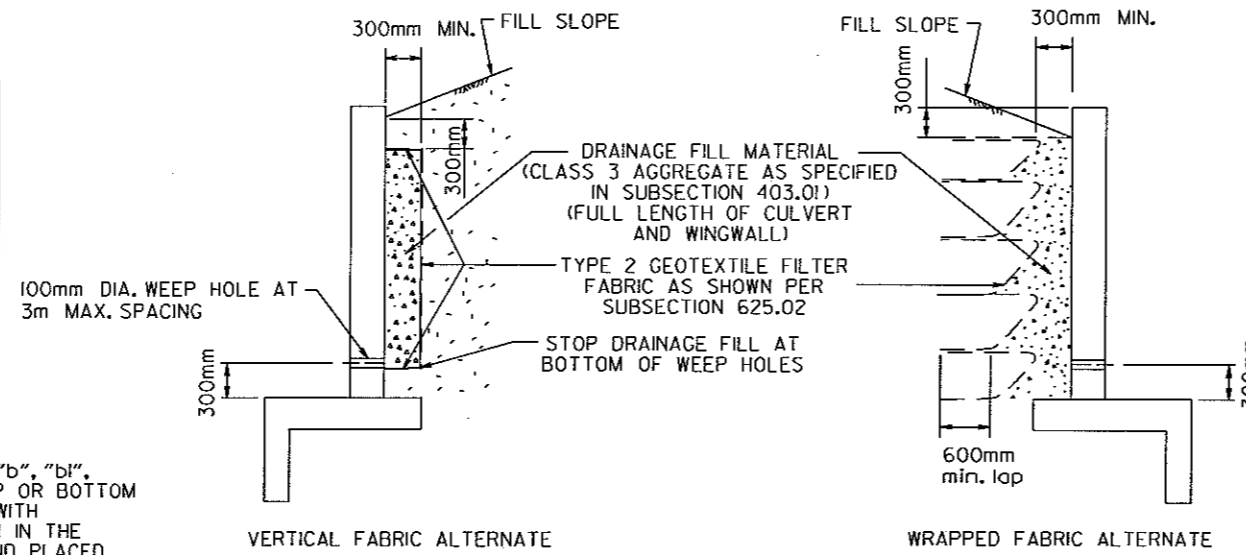
THE HOOKED BARS SHALL BE PLACED IN THE BOTTOM OF THE TOP SLAB AND THE TOP OF THE BOTTOM SLAB. THE STRAIGHT BARS SHALL BE PLACED IN THE TOP OF THE TOP SLAB AND THE BOTTOM OF THE BOTTOM SLAB. SEE TABLE BELOW FOR LENGTHS OF REPLACEMENT HOOKED AND STRAIGHT BARS.

FOR SKEWED CULVERTS, THE REPLACEMENT STRAIGHT BAR MAY HAVE TO BE CUT IN FIELD TO FIT.

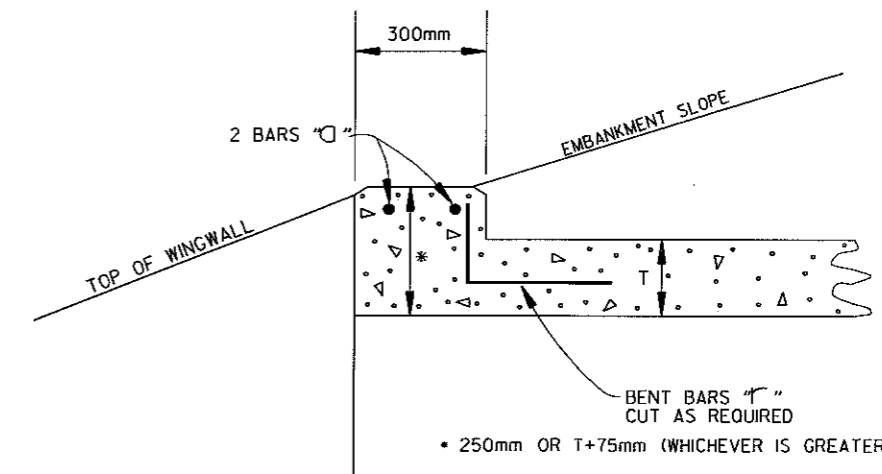
**REPLACEMENT BAR LENGTHS TABLE**

BAR SIZE: "b", "b1", "b2" OR "b3"	LENGTH OF HOOKED BAR	LENGTH OF STRAIGHT BAR
#10	L+276mm	SEE "c" BAR LENGTH
#13	L+316mm	SEE "c" BAR LENGTH
#16	L+354mm	SEE "c" BAR LENGTH
#19	L+434mm	SEE "c" BAR LENGTH
#22	L+492mm	SEE "c" BAR LENGTH
#25	L+572mm	SEE "c" BAR LENGTH
#29	L+756mm	SEE "c" BAR LENGTH

L = "OW" - 80mm



**WINGWALL & CULVERT DRAINAGE DETAIL**



NOTE: FOR ALL SKEWED R.C. BOX CULVERTS THE LENGTH "K" OF THE MODIFIED HEADWALL SHALL BE EQUAL TO THE ROADWAY LENGTH "RL". THE ENDS OF THE HEADWALL SHALL BE CONSTRUCTED PARALLEL TO THE SKEW ANGLE OF THE BOX CULVERT.

**R.C. BOX CULVERT HEADWALL MODIFICATIONS**

DATE	REVISION	DATE FILMED
7-26-12	REV. DRAINAGE FILL MATERIAL & DETAIL	
12-15-11	REQUIRE WEEP HOLES IN BOX CULVERT WALLS	
5-25-06	REV. GEN. NOTES & DETAIL FOR WEEP HOLES; BAR DIAGRAM	
11-16-01	REVISED GEN. NOTE; ADDED WINGWALL DRAINAGE	
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
10-18-96	REV. ATM REF. TO AASHTO & ADDED BAR DIAGRAM	
7-20-95	CONVERTED TO METRIC	

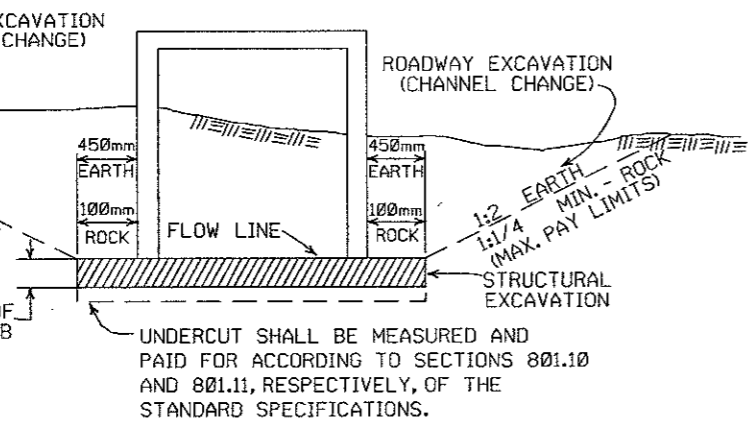
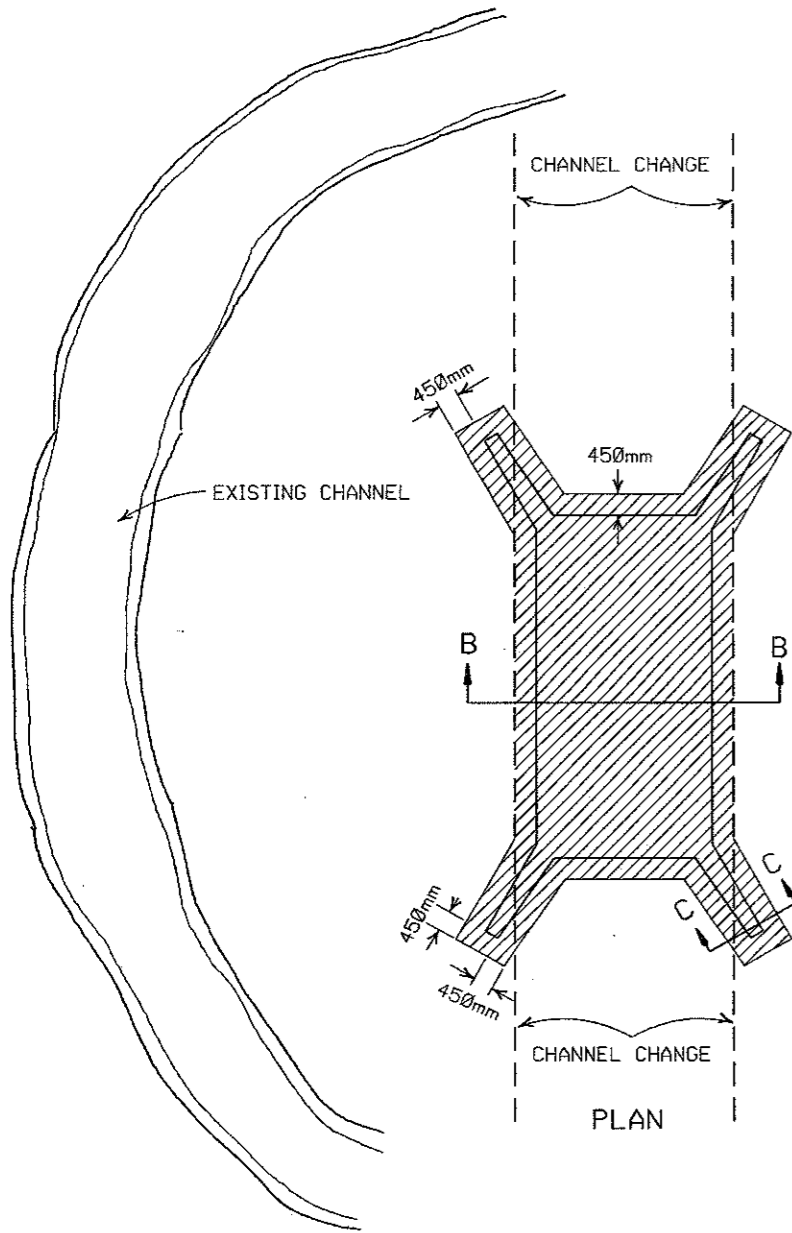
ARKANSAS STATE HIGHWAY COMMISSION

**REINFORCED CONCRETE BOX CULVERT DETAILS**

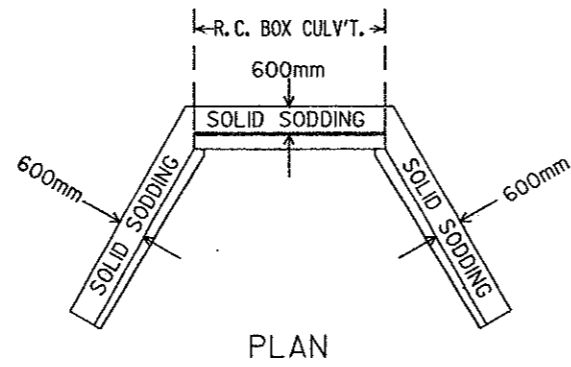
STANDARD DRAWING RCB-1 (M)





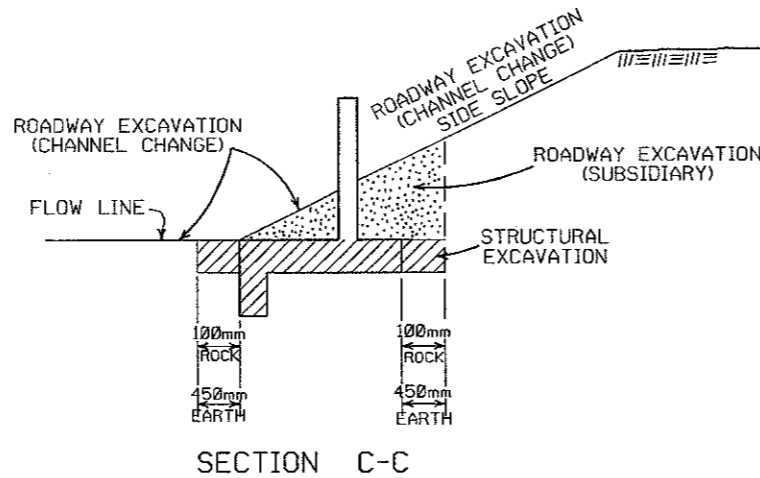


SECTION B-B  
EXCAVATION PAY LIMITS  
DETAILS FOR BOX CULVERTS  
THROUGH NEW CHANNELS



PLAN  
PARTIAL SECTION SHOWING SOLID SODDING  
AT HEADWALLS AND WING WALLS

NOTE: LENGTH MEASURED ALONG THE CENTER OF  
600mm STRIP OF SOLID SODDING.



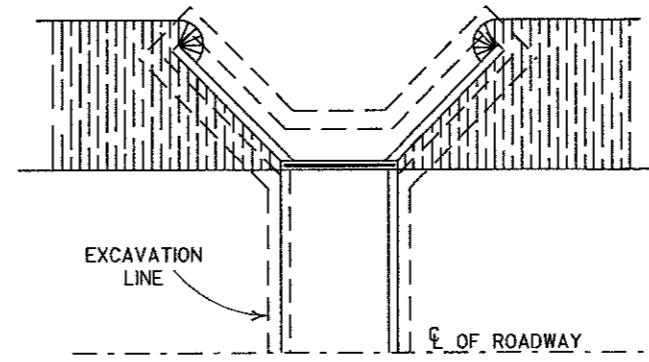
SECTION C-C

GENERAL NOTES:

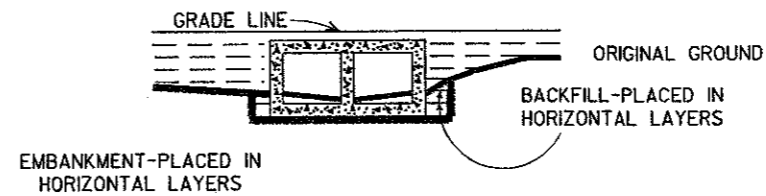
ROADWAY EXCAVATION (CHANNEL CHANGE) WILL BE PAID FOR AT R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS ACTUALLY CUT AND WILL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS ABOVE THE FLOW LINE. ROADWAY EXCAVATION (CHANNEL CHANGE) SHALL BE MEASURED BY CROSS SECTIONS AND VOLUMES COMPUTED BY AVERAGE END AREA METHOD. ALL CHANNEL CHANGES SHALL BE BROUGHT TO GRADE PRIOR TO MAKING ANY EXCAVATION FOR STRUCTURES.

EXCAVATION FOR STRUCTURES WILL BE PAID FOR AT ALL R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS SHOWN AND SHALL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS BELOW THE CHANNEL FLOW LINE.

ROADWAY EXCAVATION SHOWN IN SECTION C-C ABOVE AS SUBSIDIARY WILL NOT BE MEASURED OR PAID FOR DIRECTLY, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS OF EXCAVATION.

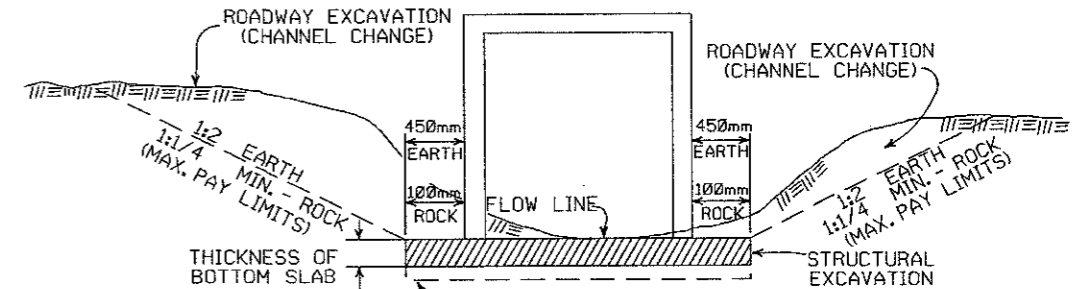
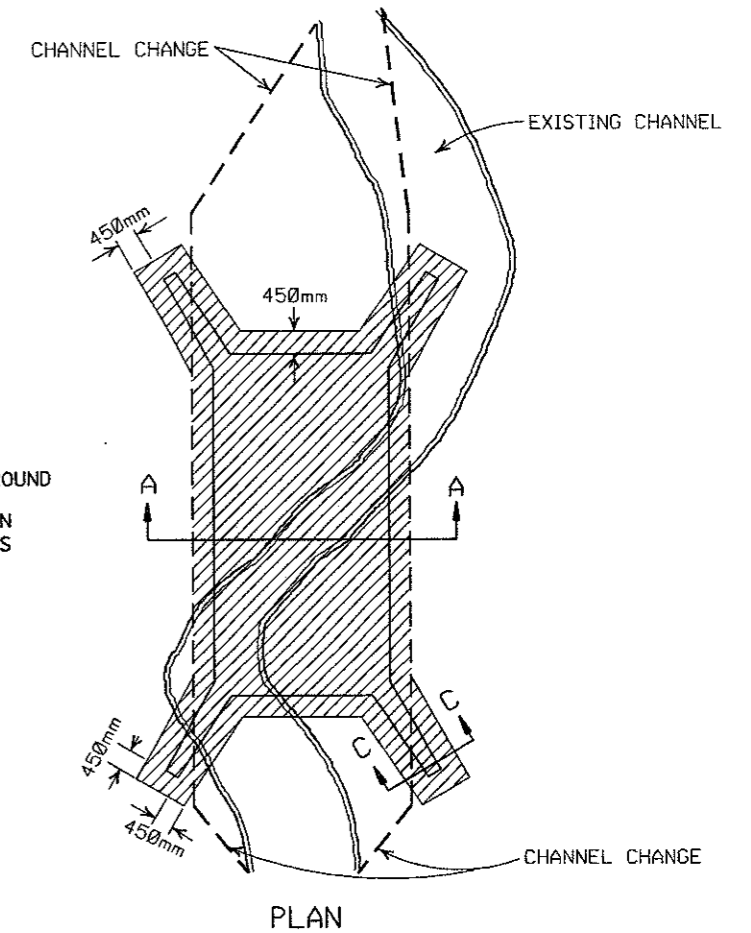


PLAN



LONGITUDINAL SECTION

BACKFILL DETAILS FOR  
BOX CULVERT



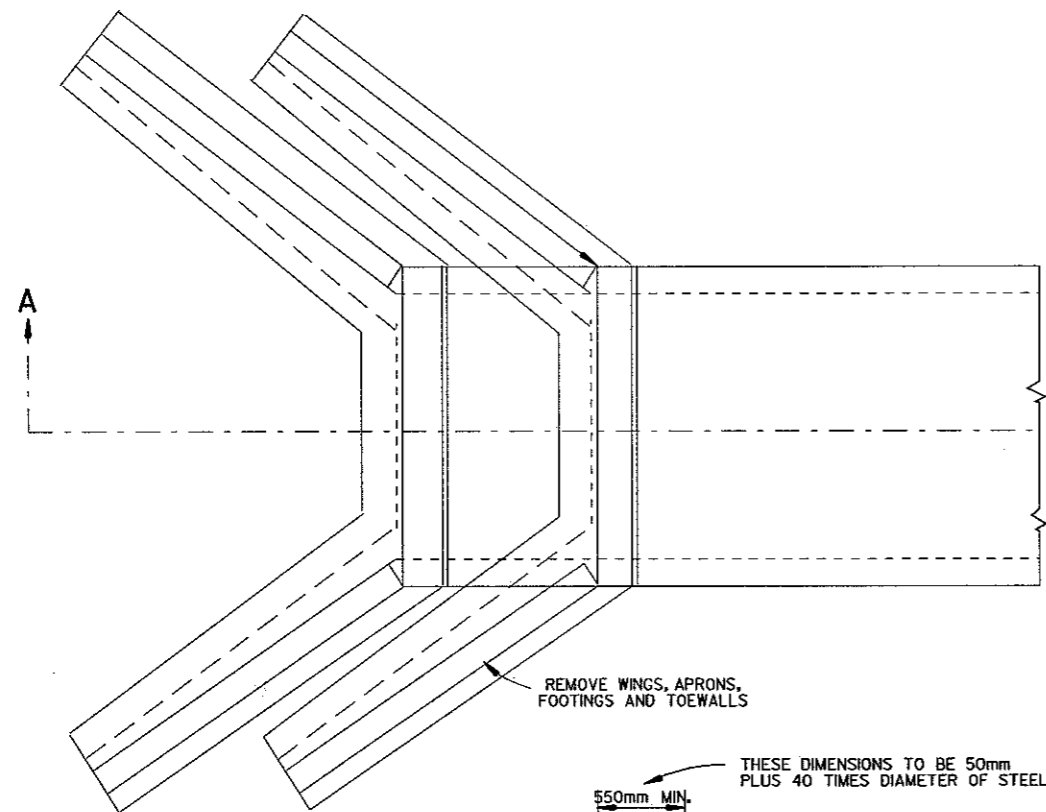
SECTION A-A

EXCAVATION PAY LIMITS  
DETAILS FOR BOX CULVERTS  
THROUGH EXISTING CHANNELS

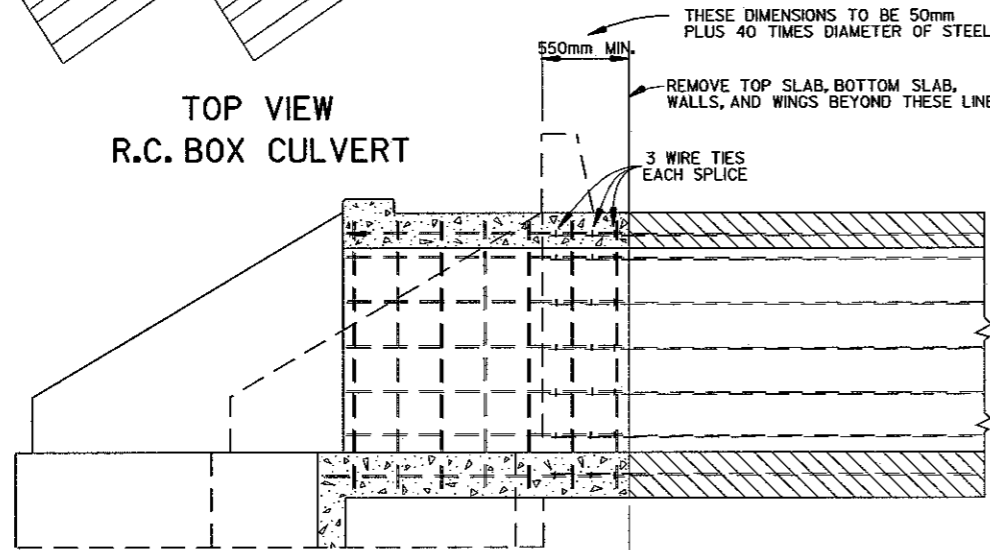
ARKANSAS STATE HIGHWAY COMMISSION

EXCAVATION PAY LIMITS, BACKFILL,  
& SOLID SODDING  
FOR BOX CULVERTS

1-20-03	REVISED SECTION A-A NOTE
8-22-02	REVISED SECTION B-B NOTE
7-20-95	ADDED DETAILS FROM 8084

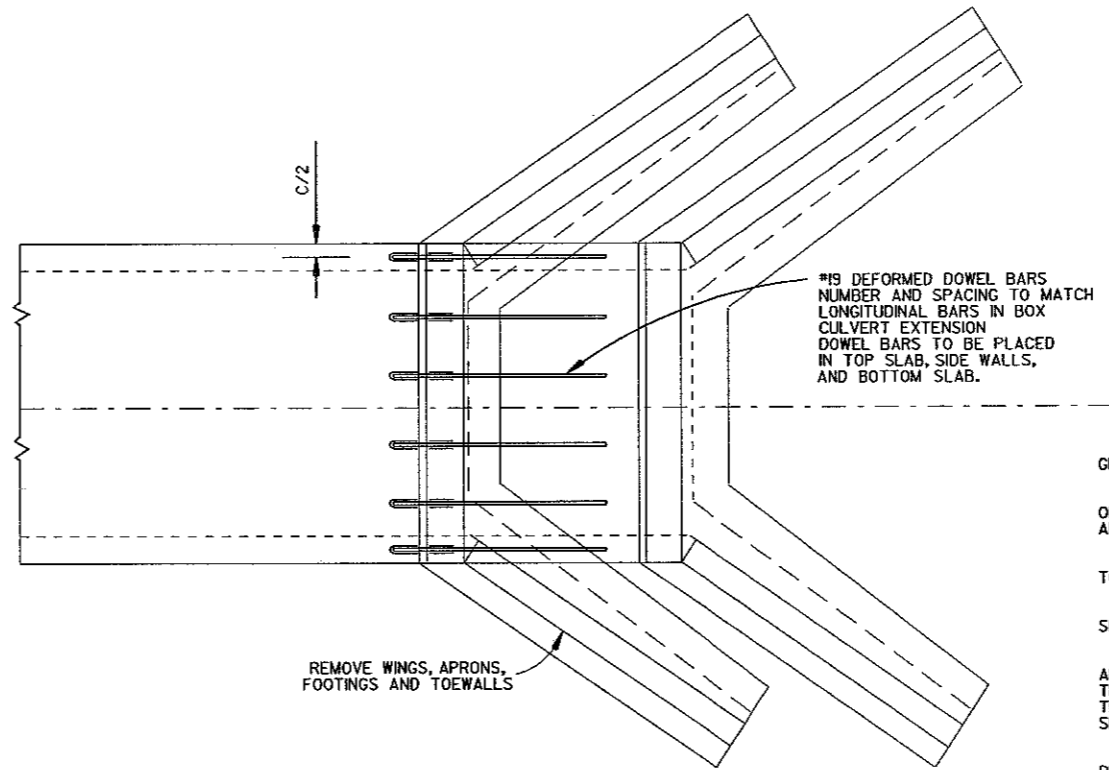


TOP VIEW  
R.C. BOX CULVERT

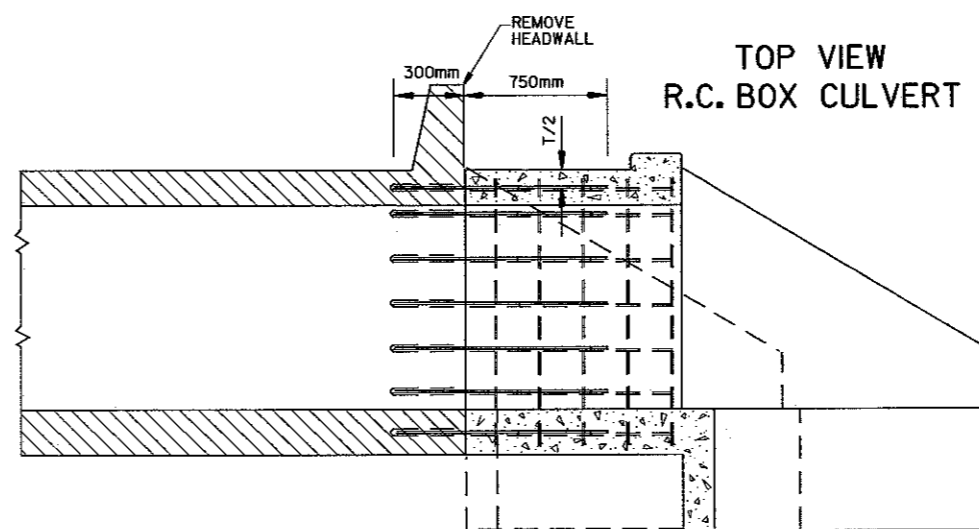


REINFORCING DETAILS AND CULVERT DIMENSIONS  
SAME AS STANDARD CULVERT DRAWINGS

SECTION A-A  
METHOD 1



TOP VIEW  
R.C. BOX CULVERT



REINFORCING DETAILS AND CULVERT DIMENSIONS  
SAME AS STANDARD CULVERT DRAWINGS

SECTION A-A  
METHOD 2

GENERAL NOTES:

1 THE RESIDENT ENGINEER WILL MAKE INDIVIDUAL CALCULATIONS OF QUANTITIES FOR EACH STRUCTURE LENGTHENED, MAKING NO ALLOWANCE FOR OVERBREAKAGE BEYOND THE LINES INDICATED.

1 IN ALL INSTANCES, CONCRETE SHALL BE REMOVED SO AS TO PERMIT FULL 40 DIAMETER SPLICE OF REINFORCING STEEL.

1&2 REINFORCING STEEL REMOVED FROM EXISTING STRUCTURE SHALL NOT BE REUSED IN CONSTRUCTING EXTENSION.

1&2 ON R.C. BOX CULVERTS THAT HAVE AN EXISTING CONCRETE APRON; THE CONCRETE APRON SHALL BE REMOVED WITH THE WINGS. THE COST OF REMOVING ALL OLD CONCRETE WILL BE INCLUDED IN THE PRICE BID PER CUBIC METER FOR NEW CONCRETE OF THE CLASS SPECIFIED AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

2 MATERIALS FOR SECURING DOWEL BARS SHALL MEET THE REQUIREMENTS OF SECTION 507.02 OF THE STANDARD SPECIFICATIONS.

2 DOWEL BARS SHALL BE INSTALLED AS FOLLOWS: THE DRILLING PROCEDURE SHALL BE APPROVED BY THE ENGINEER, THE FILLING SYSTEM SHALL BE APPROVED BY THE ENGINEER, AND SHALL BE AN INJECTION-TYPE SYSTEM WHICH WILL INSURE THAT SUFFICIENT MATERIAL IS INJECTED SO IT COMPLETELY SURROUNDS THE BARS AND FILLS THE HOLES.

1&2 THE CONTRACTOR SHALL HAVE THE OPTION OF USING EITHER METHOD 1 OR METHOD 2. REGARDLESS OF WHICH METHOD IS USED, PAY QUANTITIES WILL BE CALCULATED BASED ON METHOD 1.

NOTE: NO PART OF THIS STANDARD IS TO BE USED FOR ANY DETAILS RELATIVE TO NEW CONSTRUCTION.

SEE STANDARD DRAWING LISTED IN TABULATION OF STRUCTURES FOR ALL NEW CONSTRUCTION DETAILS.

USE FOR METHOD

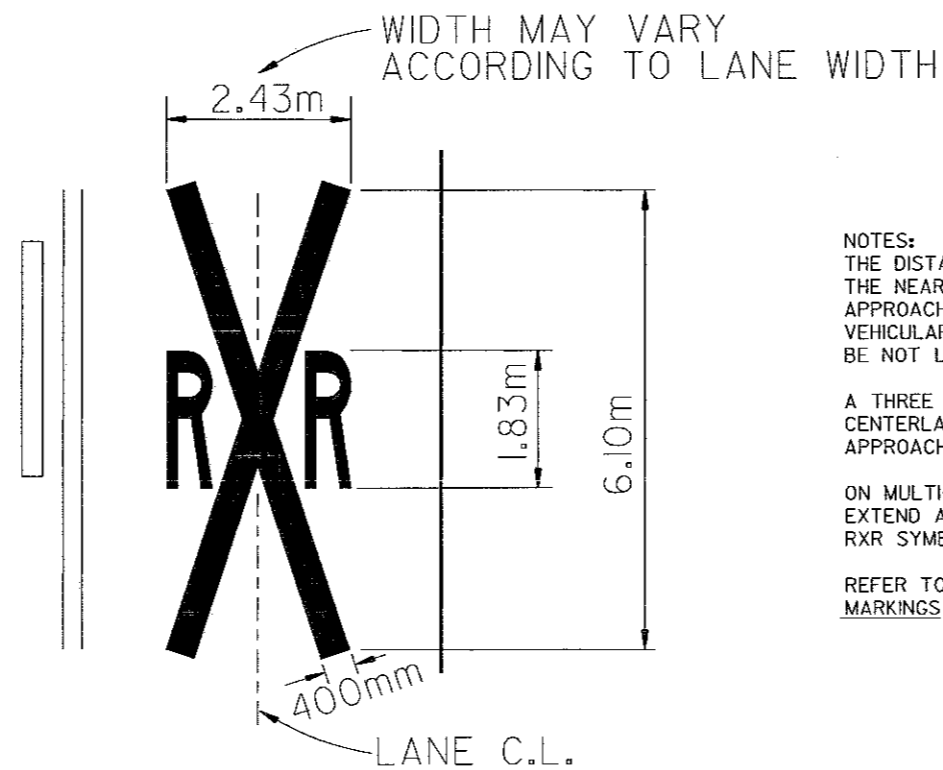
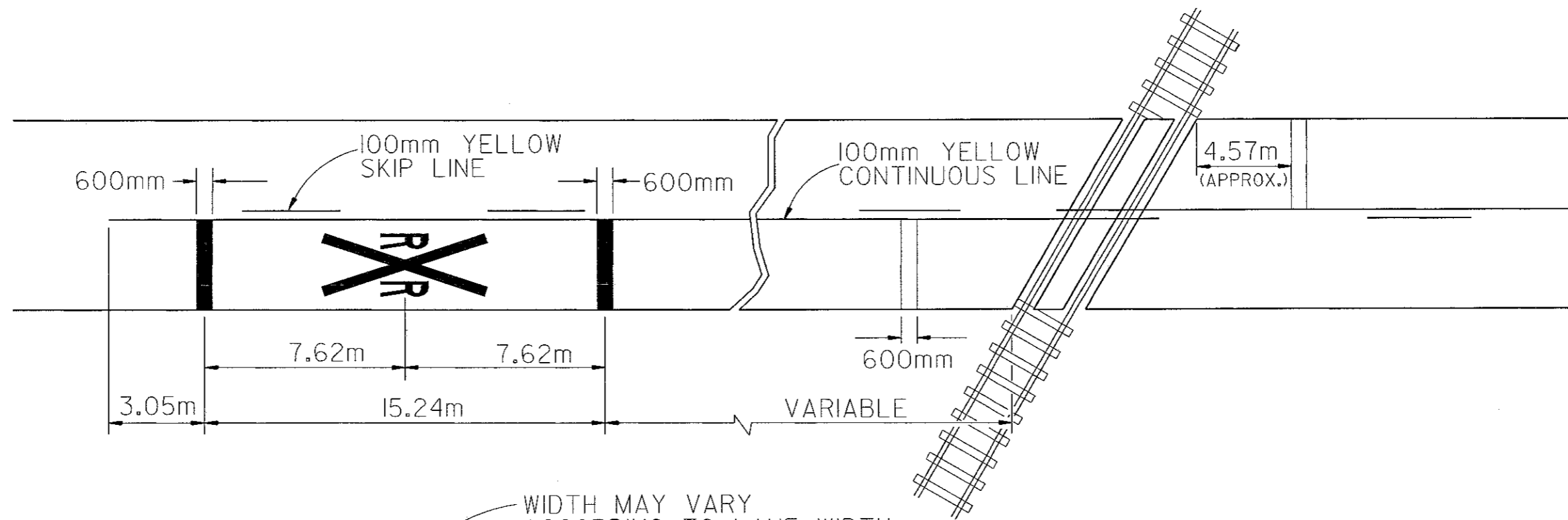
ARKANSAS STATE HIGHWAY COMMISSION

METHOD OF EXTENDING  
EXISTING R.C. BOX CULVERTS

STANDARD DRAWING RCB-3 (M)



4-3-97	REVISED STEEL BARS TO SOFT METRIC	
7-20-85	CONVERTED TO METRIC	
DATE	REVISION	DATE FILMED



NOTES:  
 THE DISTANCE FROM THE RAILROAD CROSSING MARKING TO THE NEAREST TRACK WILL VARY ACCORDING TO THE APPROACH SPEED AND THE SIGHT DISTANCE OF THE VEHICULAR TRAFFIC APPROACHING, BUT PROBABLY SHOULD BE NOT LESS THAN 15.24m.

A THREE LANE ROADWAY SHOULD BE MARKED WITH A CENTERLANE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING.

ON MULTI-LANE ROADS THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL RXR SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.

REFER TO STANDARD ALPHABET FOR HIGHWAY SIGNS AND MARKINGS FOR RXR SYMBOLS DETAILS.

DETAIL OF PAVEMENT MARKINGS FOR RAILROAD CROSSING


PAVEMENT MARKING TO BE SYMMETRICAL ABOUT RAILROAD

DATE	REVISION	DATE FILMED
11-20-08	CORRECTED SPELLING	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

PAVEMENT MARKING FOR RAILROAD CROSSING

STANDARD DRAWING RRS-1(M)



### SUPERELEVATION TABLE FOR ONE - WAY TRAFFIC

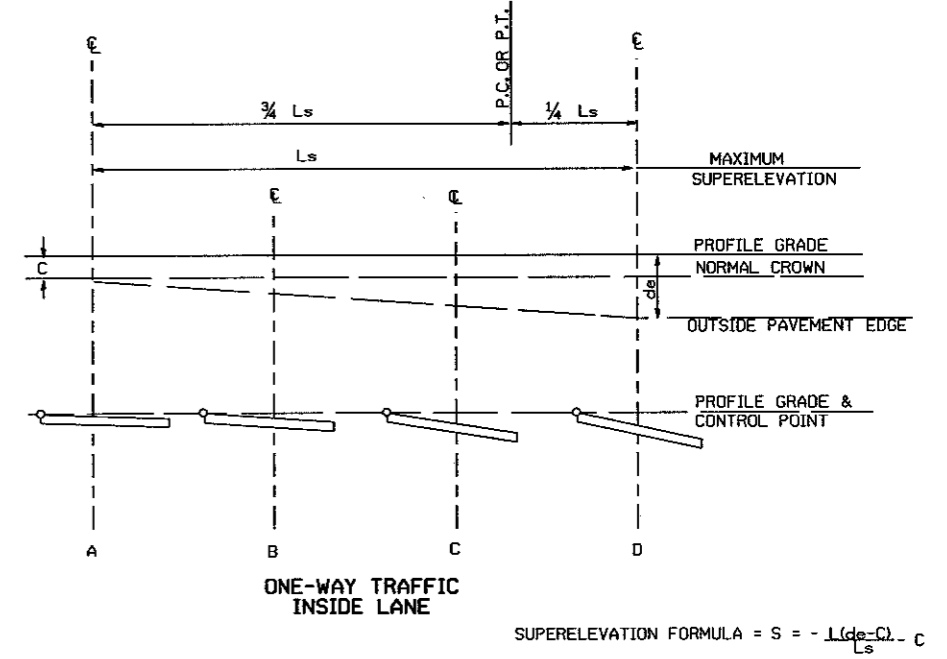
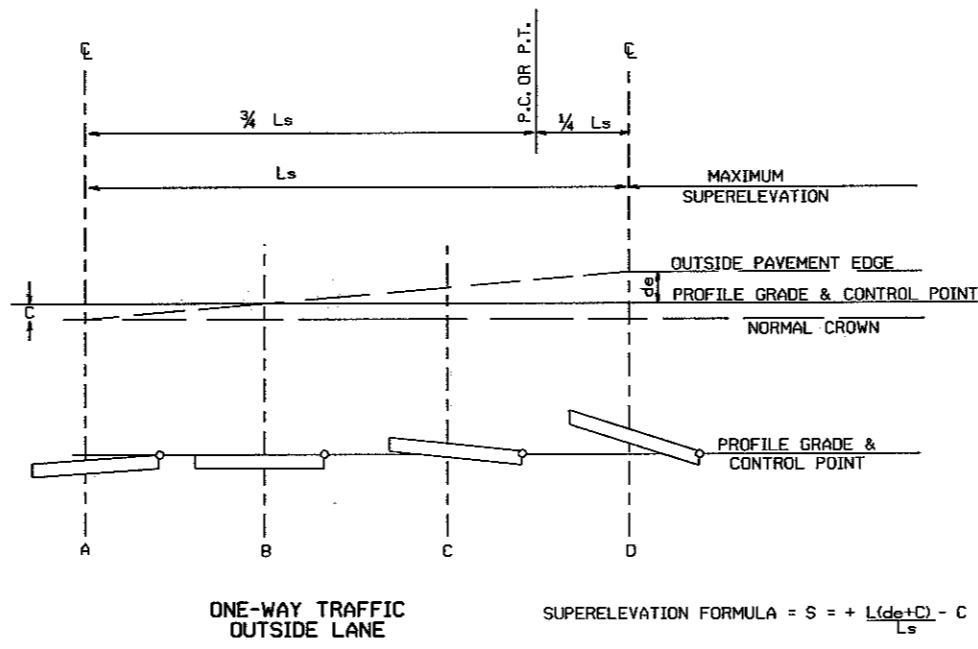
R (meters)	V <sub>d</sub> = 30 km/h		V <sub>d</sub> = 40 km/h		V <sub>d</sub> = 50 km/h		V <sub>d</sub> = 60 km/h		V <sub>d</sub> = 70 km/h		V <sub>d</sub> = 80 km/h		V <sub>d</sub> = 90 km/h		V <sub>d</sub> = 100 km/h		V <sub>d</sub> = 110 km/h		V <sub>d</sub> = 120 km/h		
	e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)		e (%)	L <sub>s</sub> (meters)	
		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE		MINIMUM	DESIRABLE
7000																					
5000																					
3000																					
2500																					
2000																					
1500																					
1400																					
1300	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0
1200																					
1000																					
900																					
800																					
700																					
600																					
500																					
400																					
300																					
250																					
200																					
175																					
150																					
140																					
130	4.5																				
120	4.8																				
110	5.1																				
100	5.4																				
90	5.8																				
80	6.4																				
70	6.9																				
60	7.5																				
50	8.2																				
40	9.1																				
30	9.9																				

- GENERAL NOTES**
- ON PAVEMENT WITH ONE-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE PROFILE GRADE POINT.
  - SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED OR SUBTRACTED FROM THE POINT OF CONTROL.
  - LENGTHS FOR L<sub>s</sub> MAY BE ROUNDED IN MULTIPLES OF 5m TO PERMIT SIMPLER CALCULATIONS.
  - MINIMUM L<sub>s</sub> VALUES MAY BE USED FOR RAMPS; DESIRABLE VALUES SHALL APPLY TO MAIN LANES.
  - DIVIDED PAVEMENTS WIDER THAN 4 LANES SHALL HAVE ADDITIONAL TRANSITION LENGTHS AS FOLLOWS:

6 LANE DIVIDED-----+20%  
8 LANE DIVIDED-----+50%

**ABBREVIATIONS**

- NC - NORMAL CROWN
- RC - REVERSE CROWN, SUPERELEVATION AT NORMAL CROWN SLOPE
- S - SUPERELEVATION
- L - DISTANCE FROM BEGINNING OF SUPERELEVATION TRANSITION TO ANY POINT (m)
- d - WIDTH OF PAVEMENT
- e - MAXIMUM RATE OF SUPERELEVATION (m PER m)
- L<sub>s</sub> - LENGTH OF SUPERELEVATION TRANSITION (m)
- C - NORMAL CROWN (m)



ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR ONE-WAY TRAFFIC

STANDARD DRAWING SE-1(M) METRIC

4-26-86	CORRECTED L TO L <sub>s</sub>	
7-23-85	CONVERTED TO METRIC	
DATE	REVISION	DATE FILMED

## SUPERELEVATION TABLE FOR TWO - WAY TRAFFIC

R (meters)	V <sub>d</sub> = 30 km/h		V <sub>d</sub> = 40 km/h		V <sub>d</sub> = 50 km/h		V <sub>d</sub> = 60 km/h		V <sub>d</sub> = 70 km/h		V <sub>d</sub> = 80 km/h		V <sub>d</sub> = 90 km/h		V <sub>d</sub> = 100 km/h		V <sub>d</sub> = 110 km/h		V <sub>d</sub> = 120 km/h	
	L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)		L <sub>s</sub> (meters)	
	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE
7000																				
5000																				
3000																				
2500																				
2000																				
1500																				
1400																				
1300	NC	0	0																	
1200																				
1000																				
900																				
800																				
700																				
600																				
500																				
400																				
300																				
250																				
200																				
175																				
150																				
140																				
130	4.5																			
120	4.8																			
110	5.1																			
100	5.5	36																		
90	5.9	38																		
80	6.4	41																		
70	6.9	43																		
60	7.5	46																		
50	8.2	49																		
40	9.1	54																		
30	9.9	57																		

R min. = 25

### GENERAL NOTES

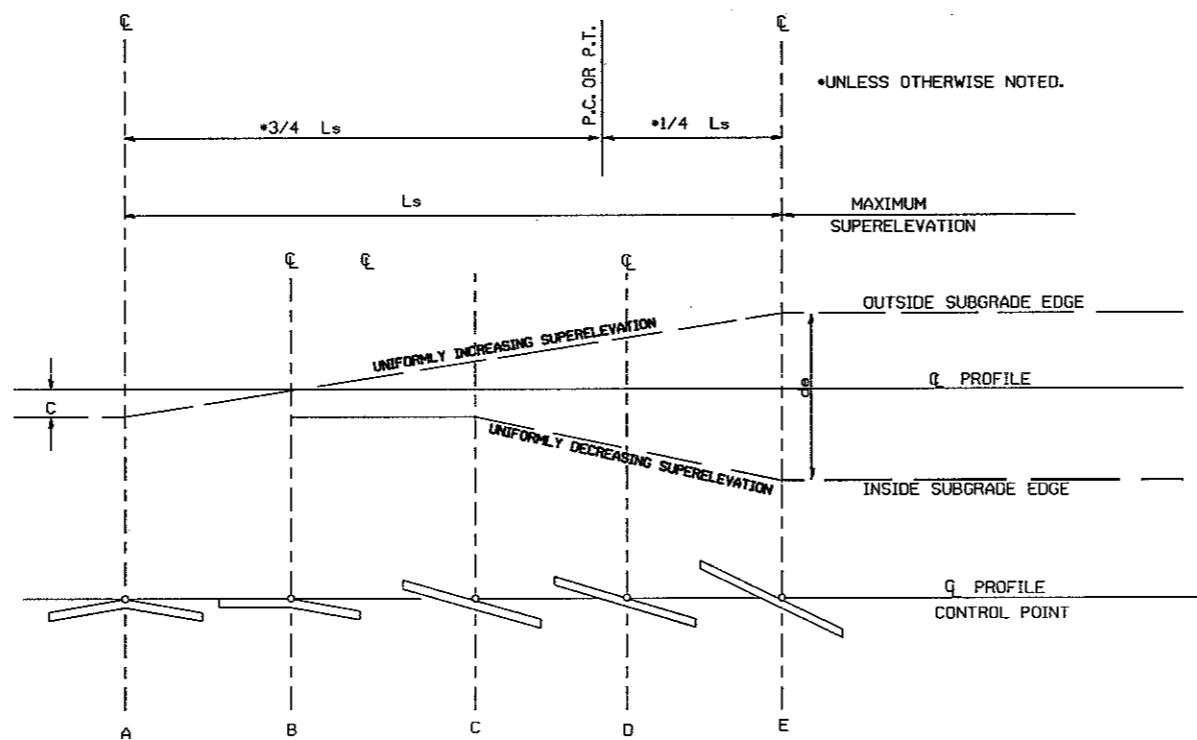
- ON PAVEMENT WITH TWO-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE INSIDE PAVEMENT EDGE UNLESS OTHERWISE NOTED ON THE PLANS
- SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED TO OR SUBTRACTED FROM THE POINT OF CONTROL.
- LENGTHS FOR L MAY BE ROUNDED IN MULTIPLES OF 5m TO PERMIT SIMPLER CALCULATIONS.
- PAVEMENTS WIDER THAN 2 LANES SHALL HAVE ADDITIONAL TRANSITION LENGTHS AS FOLLOWS:

- 3 LANE UNDIVIDED ----- +20%
- 4 LANE UNDIVIDED ----- +50%
- 5 LANE UNDIVIDED ----- +80%
- 6 LANE UNDIVIDED ----- +100%

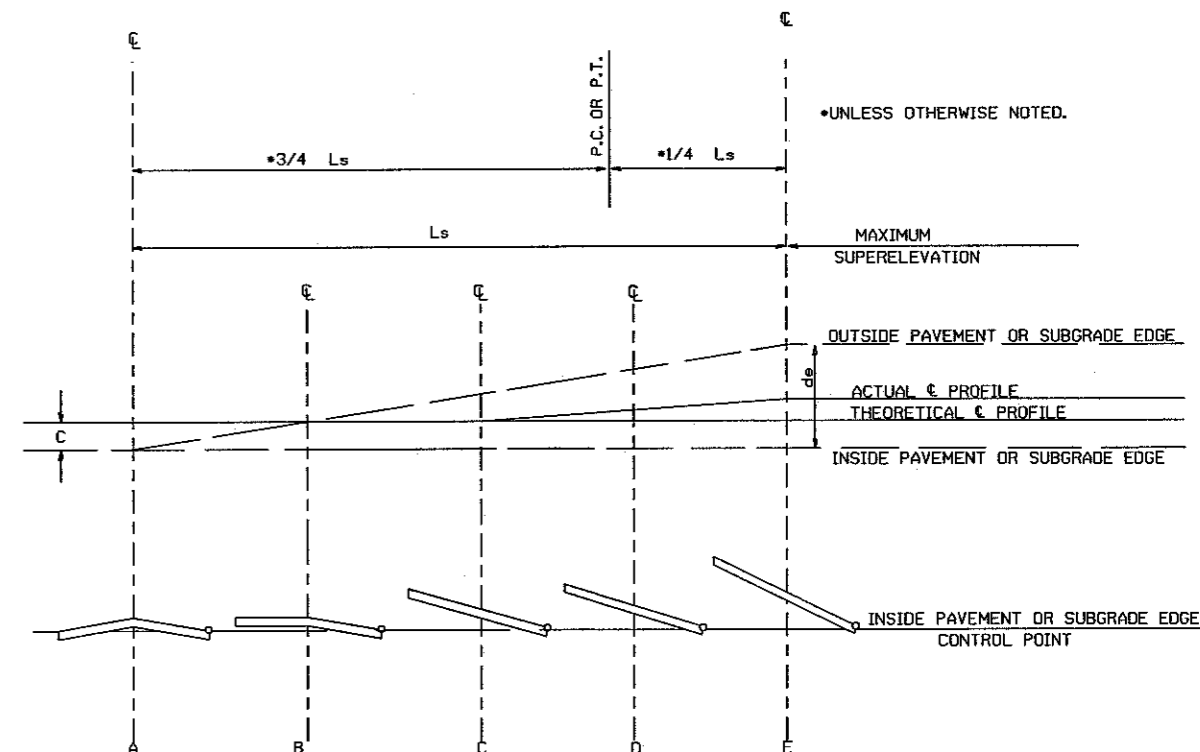
### ABBREVIATIONS

- NC - NORMAL CROWN
- RC - REVERSE CROWN, SUPERELEVATION AT NORMAL CROWN SLOPE
- e - RATE OF SUPERELEVATION (m PER m)
- L<sub>s</sub> - LENGTH OF SUPERELEVATION TRANSITION (m)
- L - DISTANCE FROM BEGINNING OF SUPERELEVATION TRANSITION TO ANY POINT (m)
- d - WIDTH OF PAVEMENT (m) OR WIDTH OF SUBGRADE (m)
- C - NORMAL CROWN (m)

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2%. RATE OF SUPERELEVATION SHALL BE COMPUTED ON STRAIGHT LINE METHOD USING APPLICABLE L<sub>s</sub>.



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND CENTER LINE



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND INNER SUBGRADE POINT OR INNER PAVEMENT EDGE

$$\text{SUPERELEVATION FORMULA} = \frac{Lde}{L_s}$$

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2%.

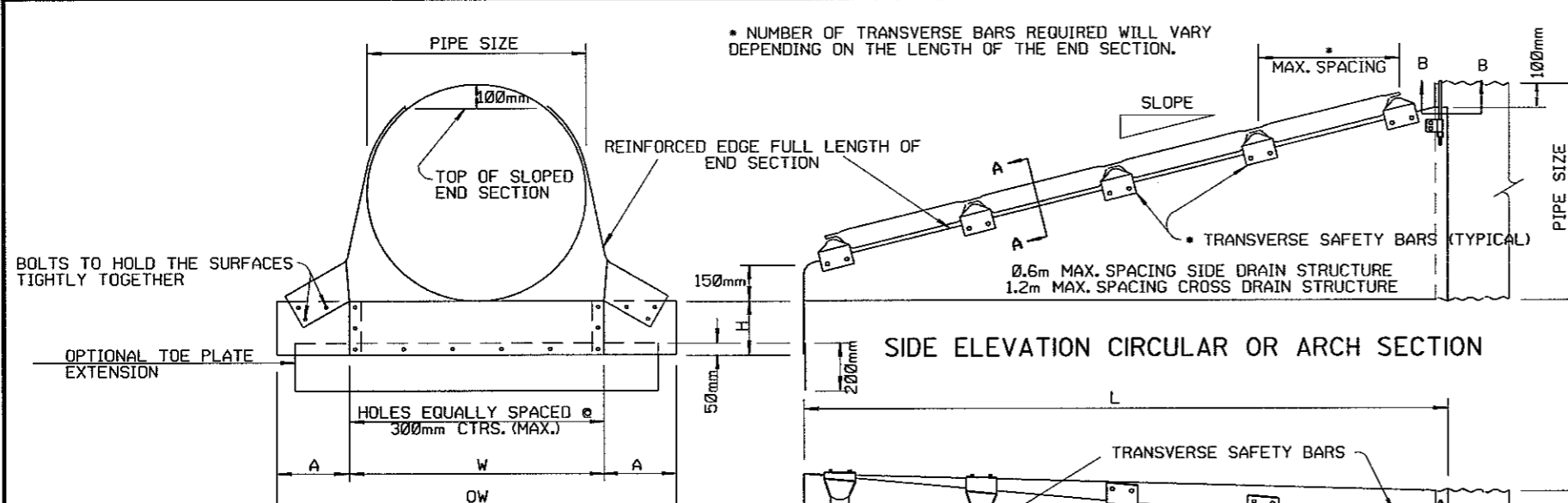
ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC

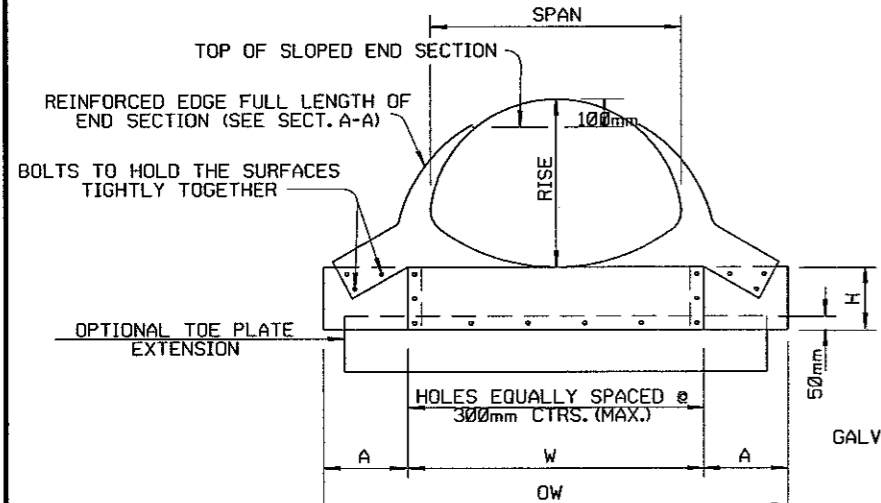
STANDARD DRAWING SE-2(M)

10-18-96	ADDED FORMULA	
4-25-96	CORRECTED L TO L <sub>s</sub>	
7-20-96	CONVERTED TO METRIC	
DATE	REVISION	DATE FILED

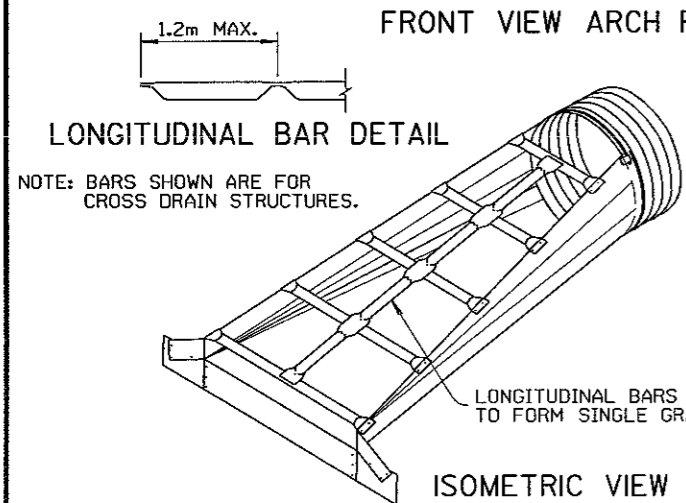




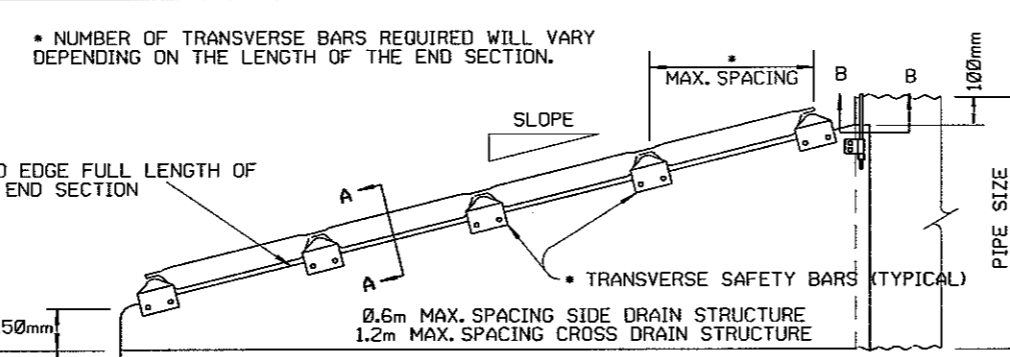
FRONT VIEW CIRCULAR PIPE



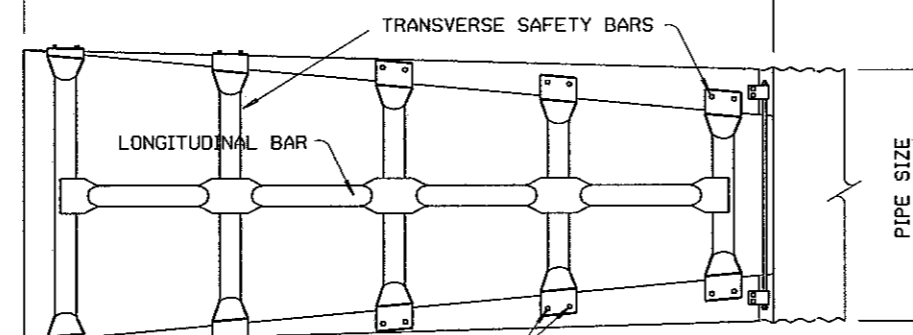
FRONT VIEW ARCH PIPE



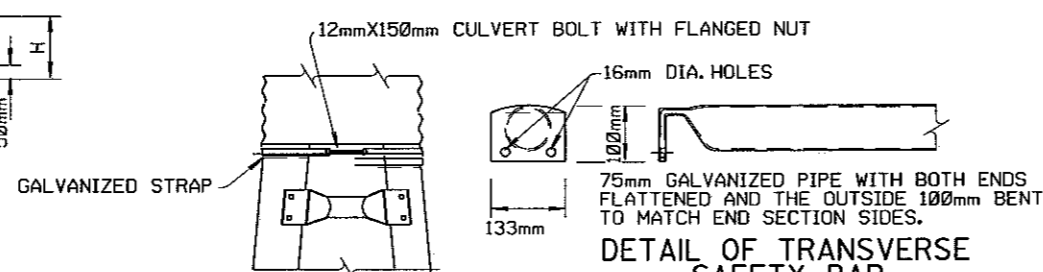
NOTE: BARS SHOWN ARE FOR CROSS DRAIN STRUCTURES.



SIDE ELEVATION CIRCULAR OR ARCH SECTION

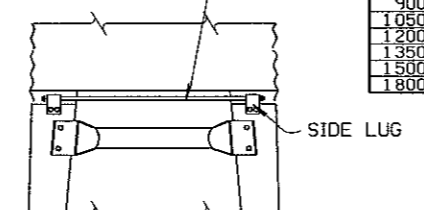


TOP VIEW CIRCULAR OR ARCH SECTION

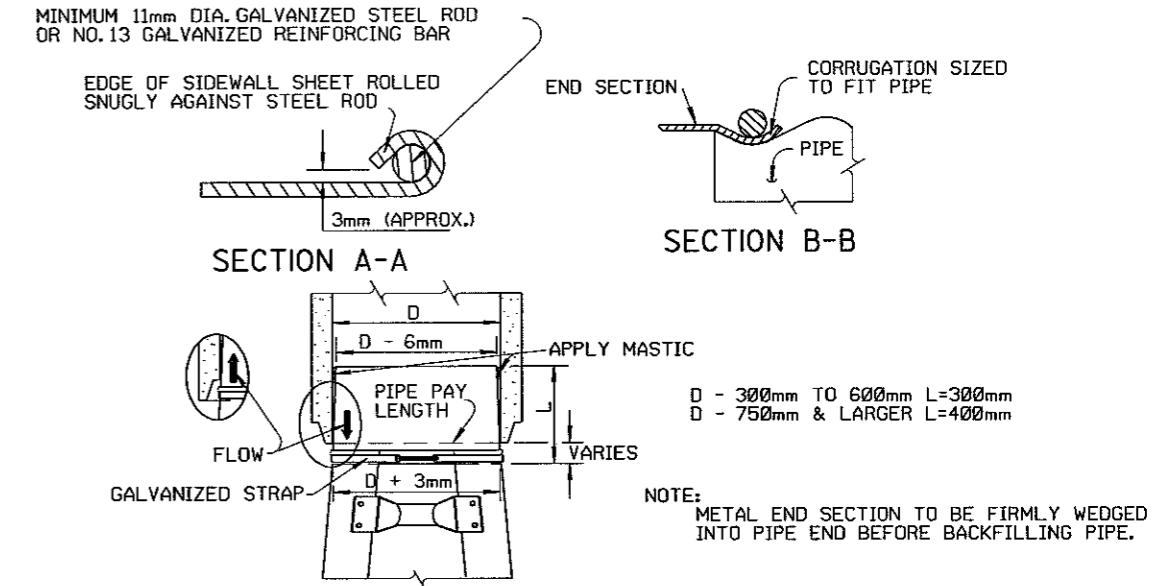


TYPE #1 CONNECTOR DETAIL FOR 375mm THRU 600mm PIPE

12mm THREADED ROD WITH FLANGED NUTS. FORM OVER TOP OF END SECTION. SIDE LUGS TO BE BOLTED TO END SECTION.



TYPE #2 CONNECTOR DETAIL FOR 750mm AND LARGER ROUND PIPES & 525X375mm THRU 1600X1075mm ARCH PIPES



STEEL END SECTION FOR CONCRETE PIPE (Alternate for Concrete End Section)

GENERAL NOTES

END SECTIONS SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SUBSECTION 606.02 (C)(1) OF THE STANDARD SPECIFICATIONS. WHEN SPECIFIED OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED AND BOLTED TO THE END SECTION APRON LIP WITH 8mm DIAMETER GALVANIZED BOLTS. STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 150mm BY 200mm HIGH. ATTACHMENT TO CIRCULAR PIPES 375mm THROUGH 600mm DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 RODS AND LUGS. SAFETY BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL WORK AND MATERIALS REQUIRED FOR CONSTRUCTION AND INSTALLATION OF SAFETY END SECTION SHALL BE INCLUDED IN THE PRICE BID EACH FOR SAFETY END SECTIONS FOR PIPE CULVERTS. LONGITUDINAL AND TRANSVERSE BARS WILL BE REQUIRED FOR CROSS DRAIN STRUCTURES WHEN SPAN IS GREATER THAN 750mm. NO SAFETY BARS WILL BE REQUIRED FOR 750mm SPAN OR LESS WHEN USED ON CROSS DRAIN STRUCTURES. TRANSVERSE BARS WILL BE REQUIRED FOR ALL SIZES OF SIDE DRAIN STRUCTURES. CLASS 1 SAFETY END SECTIONS SHALL BE END SECTIONS WITH A 1:4 SLOPE. CLASS 2 SAFETY END SECTIONS SHALL BE END SECTIONS WITH A 1:6 SLOPE.

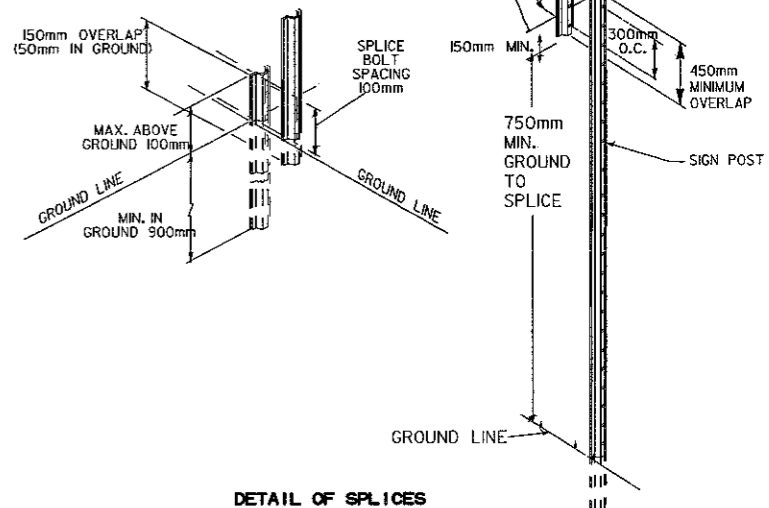
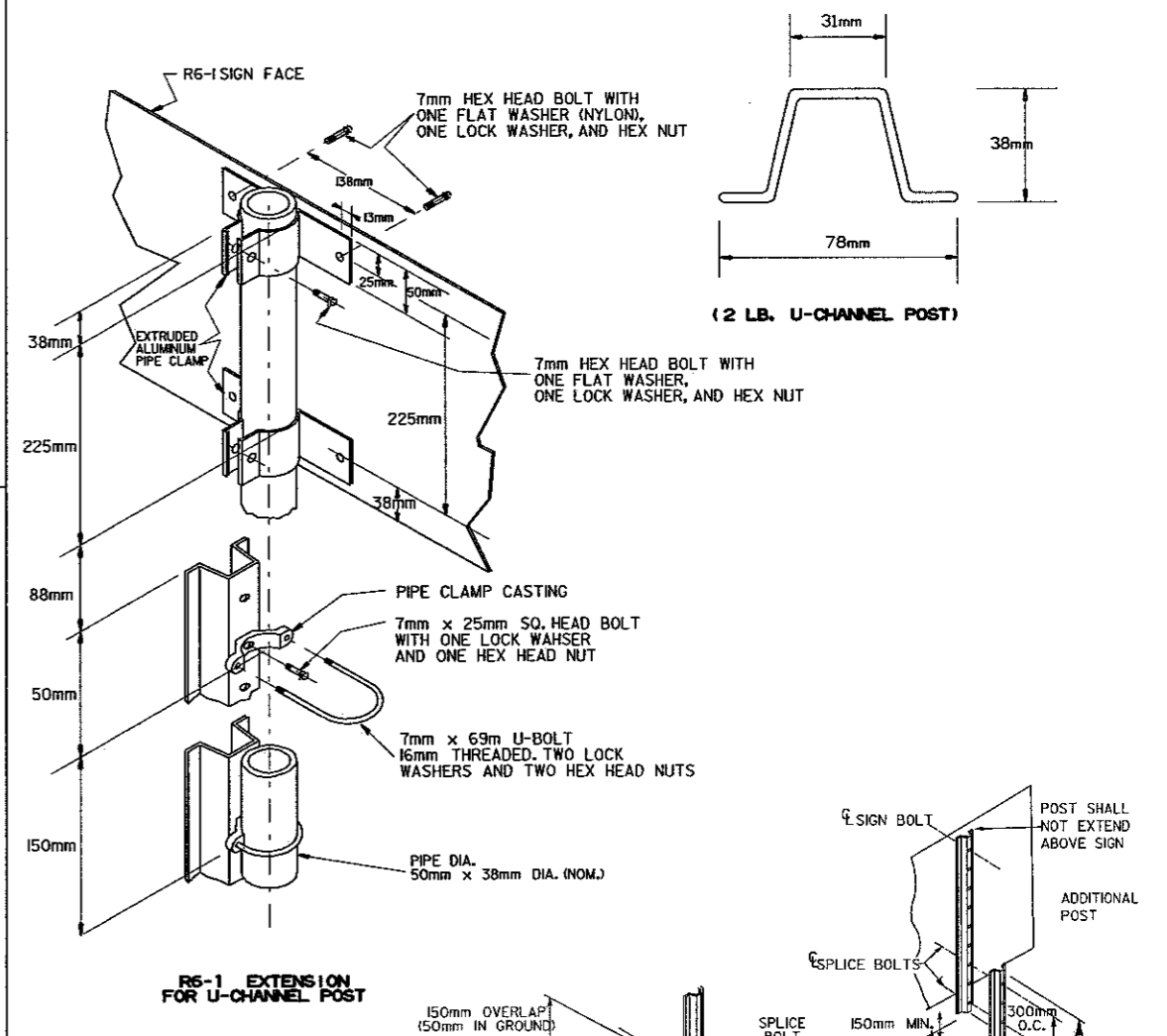
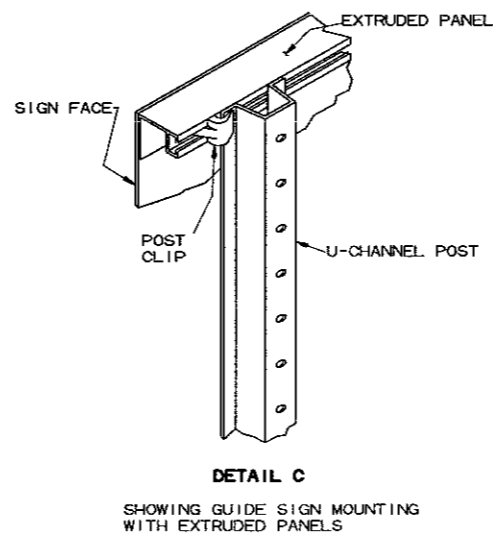
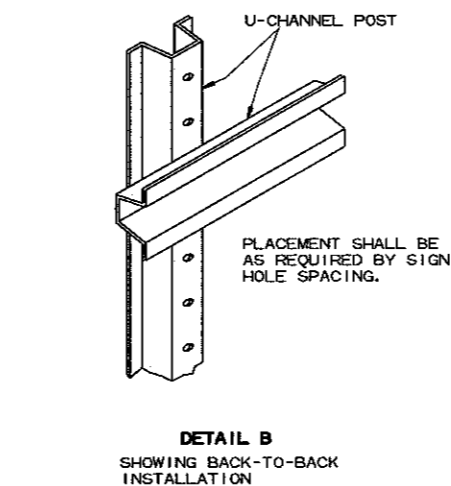
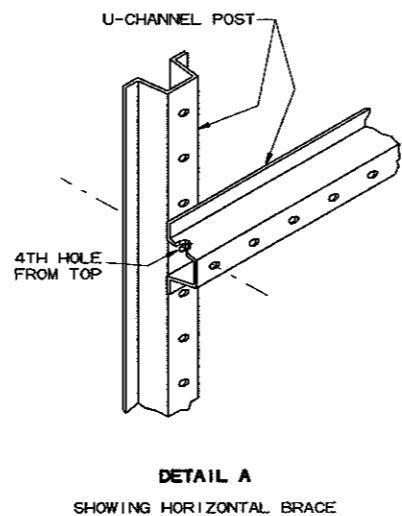
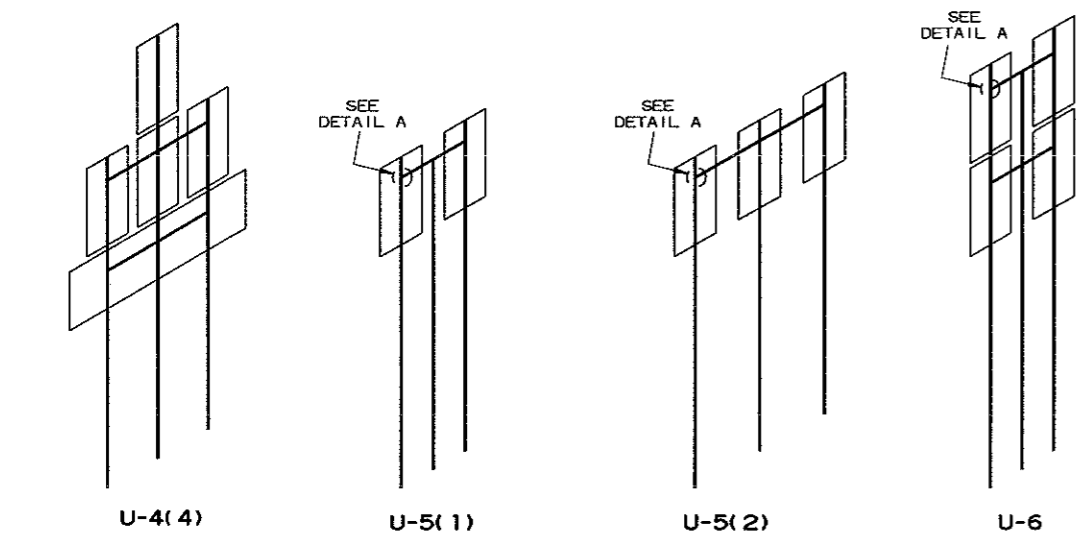
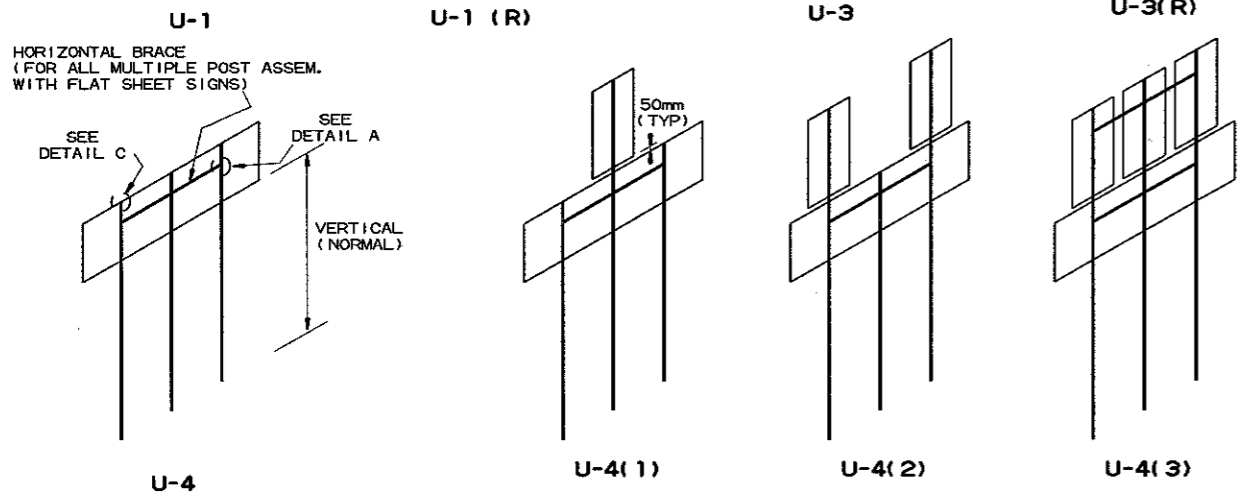
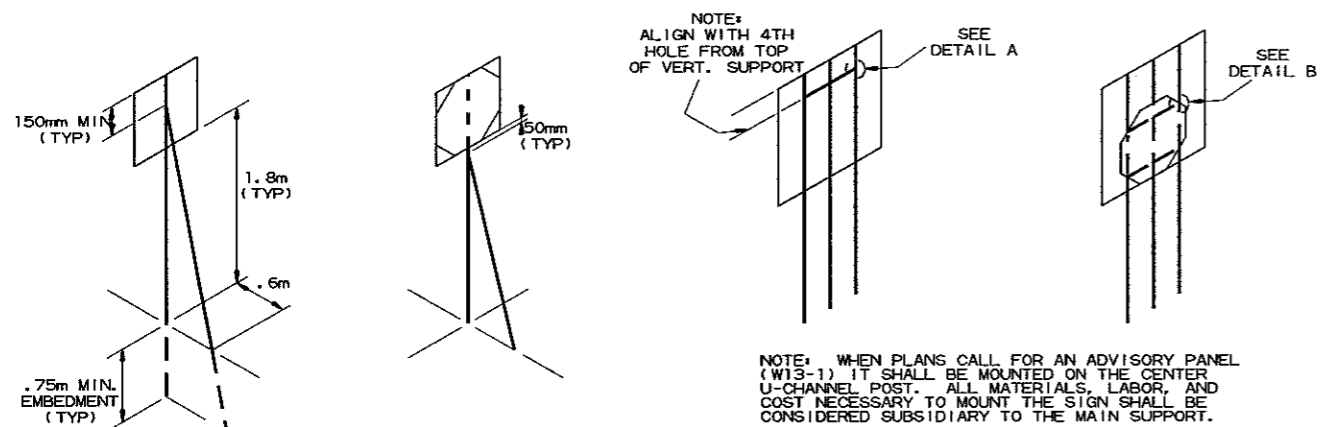
EQUIV. DIA.	NOM. W.W. AREA sq. m	SAFETY END SECTION FOR ARCH PIPES										SAFETY END SECTION FOR CIRCULAR PIPES										
		PIPE ARCH		MIN. GAUGE END SECTION	DIMENSIONS IN mm				SLOPE	L (mm)	SLOPE	L (mm)	PIPE DIA.	MIN. GAUGE ENDS	DIMENSIONS IN mm				SLOPE	L (mm)	SLOPE	L (mm)
		SPAN (mm)	RISE (mm)		A	H	W	DW							A 25mm TOLER.	H 25mm TOLER.	W 50mm TOLER.	DW				
450	1.44	525	375	16	200	150	675	1075	1:4	500	1:6	750	375	16	200	150	525	925	1:4	500	1:6	750
525	1.98	600	450	16	200	150	750	1150	1:4	800	1:6	1200	450	16	200	150	600	1000	1:4	800	1:6	1200
600	2.26	700	500	16	200	150	850	1250	1:4	1000	1:6	1500	525	16	200	150	675	1075	1:4	1100	1:6	1650
750	4.05	875	600	14	300	225	1050	1650	1:4	1400	1:6	2100	600	16	200	150	750	1150	1:4	1400	1:6	2100
900	5.85	1050	725	12	300	225	1200	1800	1:4	1900	1:6	2850	750	12	300	225	900	1500	1:4	2000	1:6	3000
1050	8.01	1225	825	12	400	300	1400	2200	1:4	2300	1:6	3450	900	12	300	225	1050	1650	1:4	2600	1:6	3900
1200	10.44	1425	950	12	400	300	1600	2400	1:4	2800	1:6	4200	1050	12	400	300	1200	2000	1:4	3200	1:6	4800
1350	13.23	1600	1075	12	400	300	1775	2575	1:4	3300	1:6	4950	1200	12	400	300	1350	2150	1:4	3800	1:6	5700
1500	16.29	1775	1175	12	400	300	1950	2750	1:4	3700	1:6	5550	1350	12	400	300	1500	2300	1:4	4400	1:6	6600
1800	23.40	2075	1425	12	400	300	2250	3050	1:4	4700	1:6	7050	1500	12	400	300	1650	2450	1:4	5000	1:6	7500

ARKANSAS STATE HIGHWAY COMMISSION

SAFETY END SECTION FOR CIRCULAR AND ARCH PIPES

STANDARD DRAWING SES-1(M)

4-3-91	REVISED STEEL BARS TO SOFT METRIC
10-8-96	REVISED ASTM REF. TO AASHTO
7-20-95	CONVERTED TO METRIC
10-11-90	REVISED



NOTES:

USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES.

NORMAL INSTALLATIONS WILL REQUIRE 6mm DIA. BOLTS TO MOUNT SIGNS TO POST AND 7mm DIA. BOLTS TO ASSEMBLE THE VARIOUS POST SUPPORTS. EACH OF THESE BOLTS SHALL BE CARRIAGE BOLTS.

SIGN POSTS SHALL BE PAINTED GREEN; SIGNS SHALL NOT BE PAINTED, AND ALL SIGN POSTS SHALL BE PLUMB.

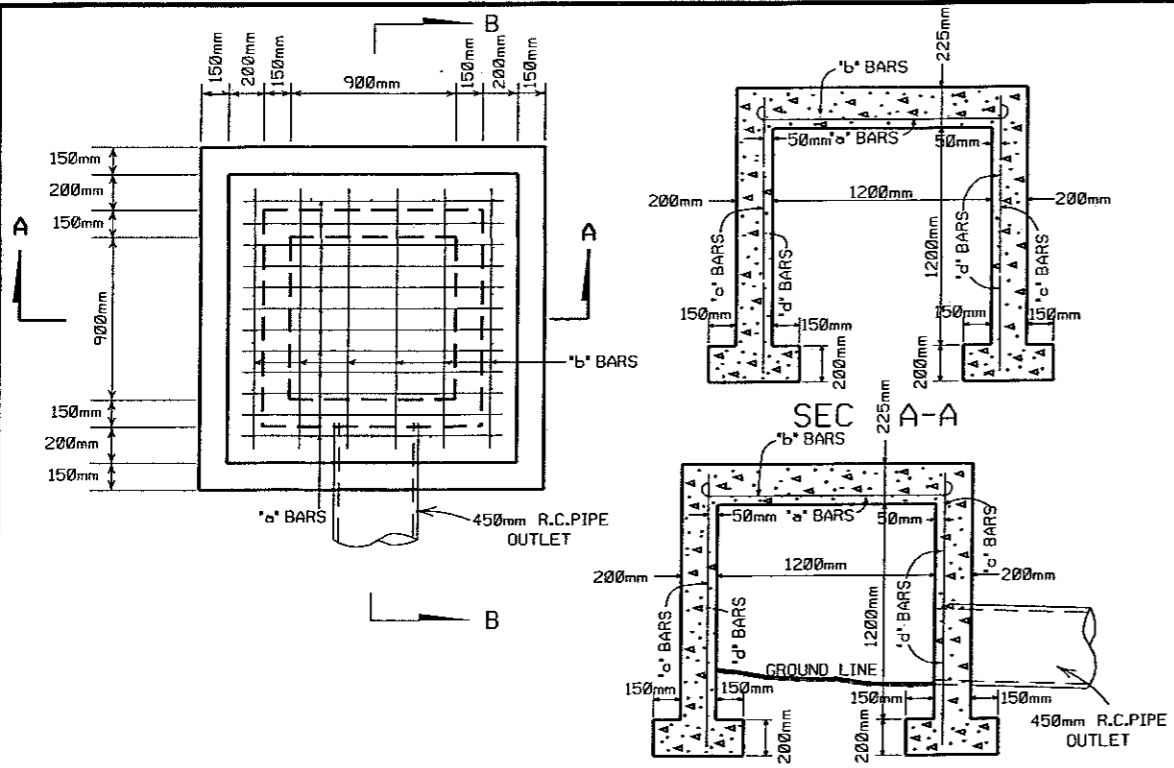
THREE .9kg POSTS WITHIN 2.1m SHALL REQUIRE A GROUND SPLICE.

ARKANSAS STATE HIGHWAY COMMISSION

U-CHANNEL POST ASSEMBLIES

STANDARD DRAWING SHS-2(M)

DATE	REVISION	
10-12-95	CONVERTED TO METRIC AND MOVED UPPER SPLICE	
6-8-95	REVISED SPLICE DETAIL	6-8-95
2-2-95	REDRAWN	2-2-95
		FILMED



**STEEL SCHEDULE**

BARS	NUMBER	LENGTH mm	SPACING mm
'a'	11	1800	125
'b'	6	1800	250
'c'	16	1525	300
'd'	16	1500	300

**QUANTITIES**  
 CONCRETE 2.58m<sup>3</sup>  
 REINFORCING STEEL 79 kg.

**GENERAL NOTE:**  
 THE PAY ITEMS FOR REINFORCED CONCRETE SPRING BOXES SHALL BE FOR THE QUANTITIES OF CONCRETE OF THE CLASS SPECIFIED, REINFORCING STEEL, EXCAVATION FOR STRUCTURES AND 450mm R.C. PIPE CULVERT.

**REINFORCED CONCRETE SPRING BOX**

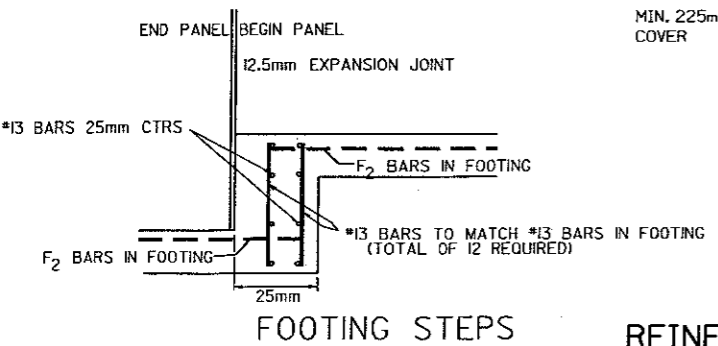
**GENERAL NOTES**

THE PAY ITEMS FOR THE CONSTRUCTION OF REINFORCED CONCRETE RETAINING WALL SHALL BE FOR THE QUANTITIES OF CONCRETE OF THE CLASS SPECIFIED, REINFORCING STEEL AND EXCAVATION FOR STRUCTURES.

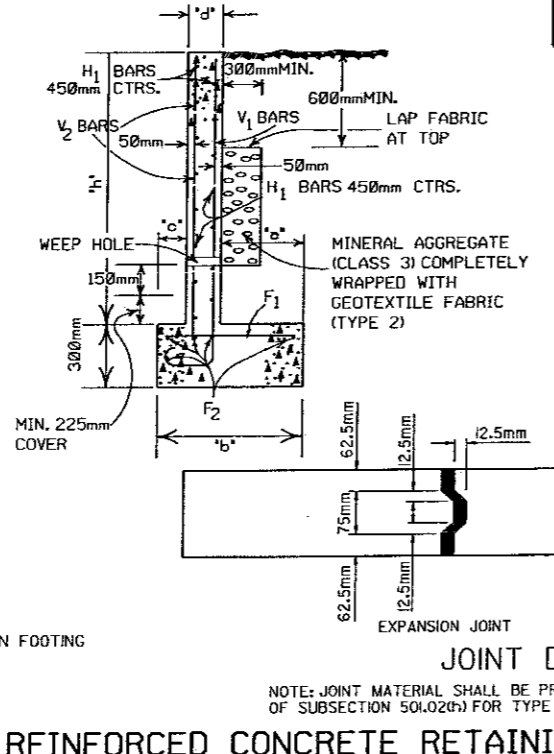
MINERAL AGGREGATE WRAPPED WITH GEOTEXTILE FABRIC (CONTINUOUS) TO BE PLACED 300mm IN WIDTH AND 300mm IN HEIGHT AS A SUBSIDIARY ITEM TO THE VARIOUS PAY ITEMS.

75mm WEEP HOLES (MAX. SPACING 3m CTRS.) TO BE PLACED WHERE SPECIFIED BY THE ENGINEER. THE CONTRACTOR WILL BE REQUIRED TO PLACE CONTRACTION JOINTS ON 6m CENTERS AND EXPANSION JOINTS ON 18m CENTERS.

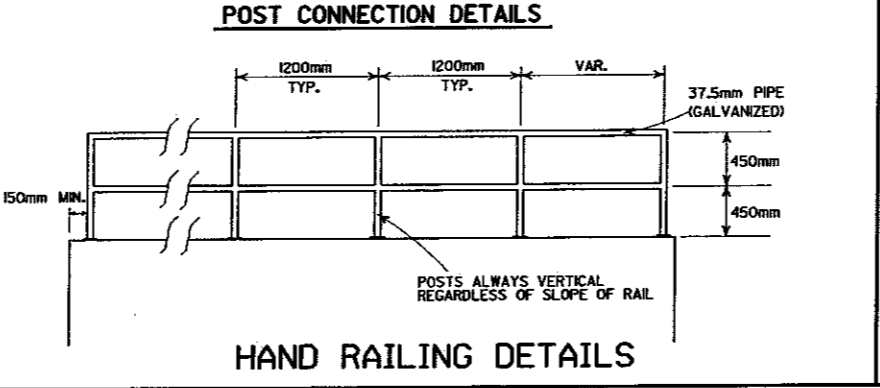
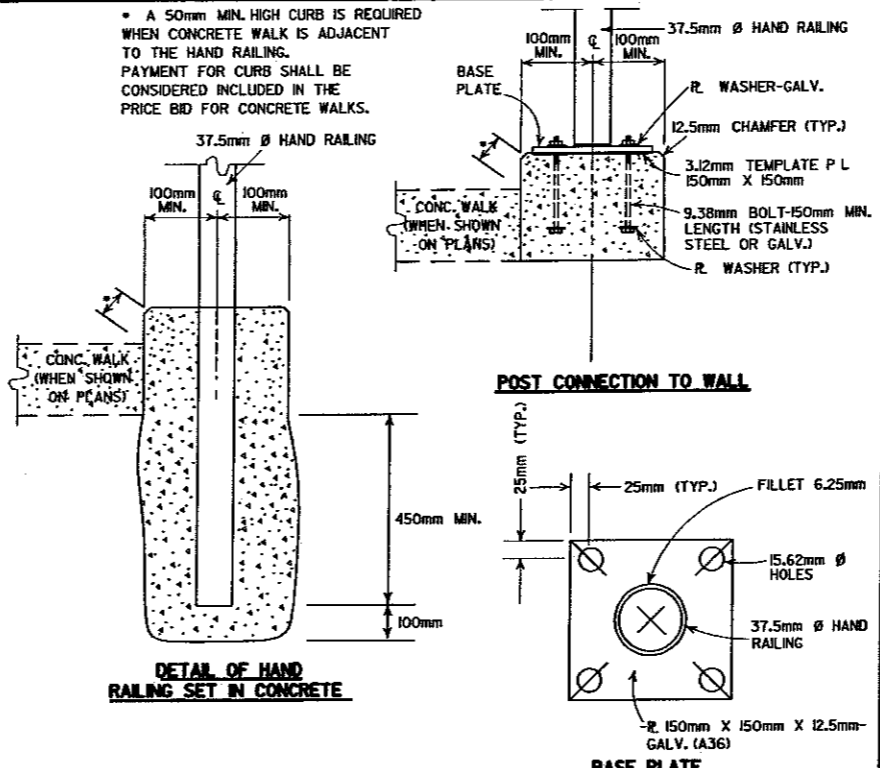
ALL EXPOSED EDGES TO BE CHAMFERED 19mm.



**FOOTING STEPS**



**REINFORCED CONCRETE RETAINING WALL**



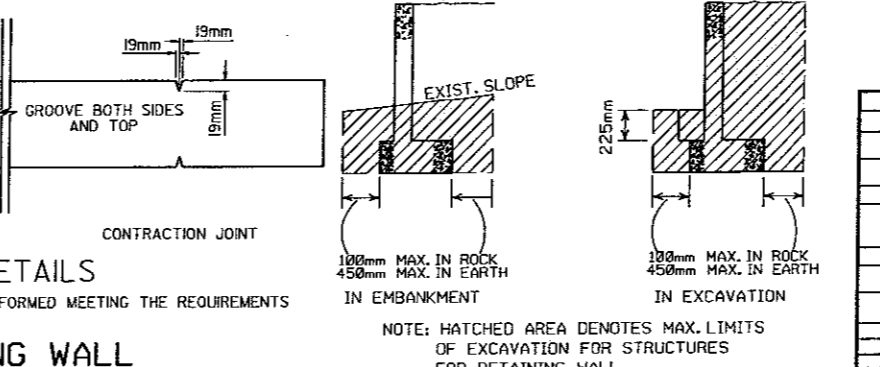
**BENDING DIAGRAM**

BAR SIZE	K	PIN DIA.
#13	120	76
#16	130	95

**STEEL SCHEDULE**

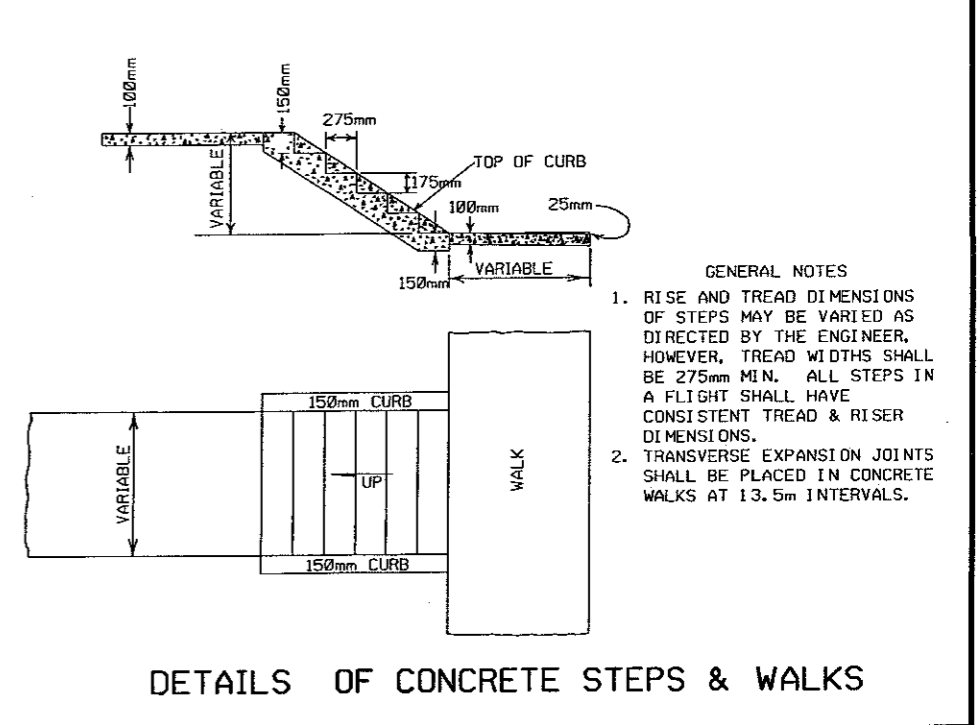
'c'	'd'	'h'	'a'	'b'	V <sub>1</sub> BARS		F <sub>1</sub> BARS		H <sub>1</sub>	V <sub>2</sub>	F <sub>2</sub>
					SIZE	SPACING	SIZE	SPACING	#13 BARS	NO.	
200	200	300	200	600	#13	300	#13	450	450	450	5
200	200	600	200	600	#13	300	#13	450	450	450	5
200	200	900	200	600	#13	300	#13	450	450	450	5
200	200	1200	350	750	#13	300	#13	300	450	450	5
200	200	1500	500	900	#13	225	#13	225	450	450	5
200	200	1800	650	1050	#13	150	#13	150	450	450	6
300	200	2100	700	1200	#13	200	#13	200	450	450	6
300	200	2400	850	1350	#13	150	#13	150	450	450	6
375	250	2700	875	1500	#13	125	#13	125	450	450	6
425	250	3000	975	1650	#16	150	#16	150	450	450	7

ALL DIMENSIONS IN mm.

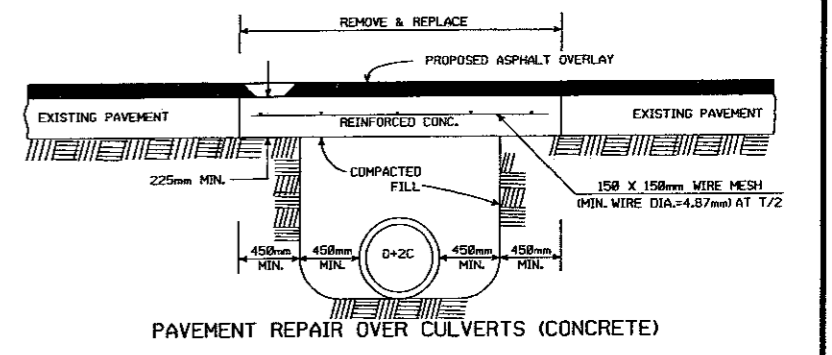


**JOINT DETAILS**

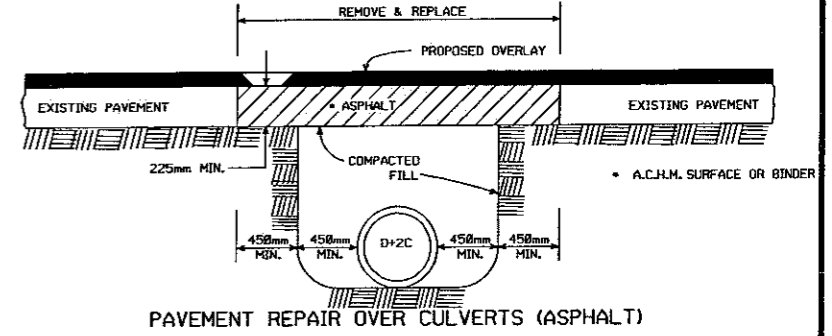
NOTE: JOINT MATERIAL SHALL BE PREFORMED MEETING THE REQUIREMENTS OF SUBSECTION 501.02(h) FOR TYPE 2



**DETAILS OF CONCRETE STEPS & WALKS**



**PAVEMENT REPAIR OVER CULVERTS (CONCRETE)**



**PAVEMENT REPAIR OVER CULVERTS (ASPHALT)**

**DETAIL SHOWING REPAIR OF EXISTING PAVEMENT AT CULVERT INSTALLATIONS**

4-7-08	REV. JOINT & FOOTING STEP DETAILS	
8-29-07	REVISED RETAINING WALL DRAINAGE	
5-25-06	REV. PAVT REPAIR OVER CULVERTS (CONC.)	
5-25-06	REV. REINFORCED CONCRETE SPRING BOX	
10-9-03	REVISED PIPE RAILING DETAILS TO HAND RAILING DETAILS	
8-22-02	ADDED HAND RAILING DETAIL	
8-16-01	REV. PAVT REPAIR OVER CULVERTS (CONC.)	
8-16-98	CORRECTED SPELLING IN GENERAL NOTES	
8-16-98	ADDED GENERAL NOTES TO CONCRETE STEPS & WALKS	
7-02-98	ENLARGED PIPE	
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
10-18-96	CORRECTED SPELLING	
4-26-96	ADD WEEP HOLES REV. JOINT SPAC. IN RET. WALL	
1-20-95	CONVERTED TO METRIC	


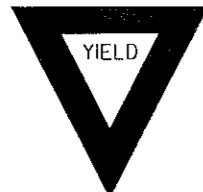

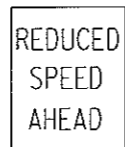

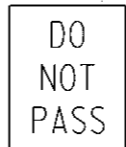



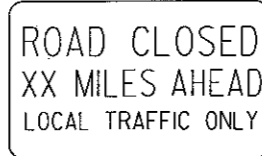
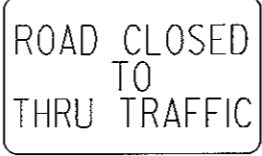





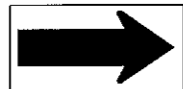

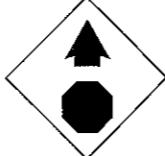

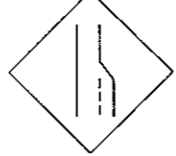

















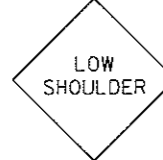
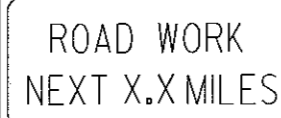
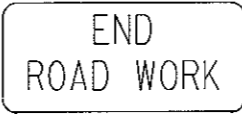
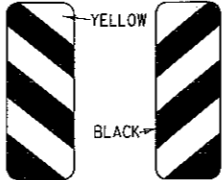


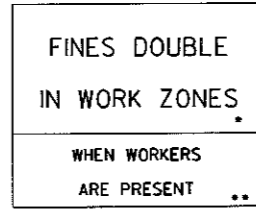
**ARKANSAS STATE HIGHWAY COMMISSION**

**DETAILS OF SPECIAL ITEMS**

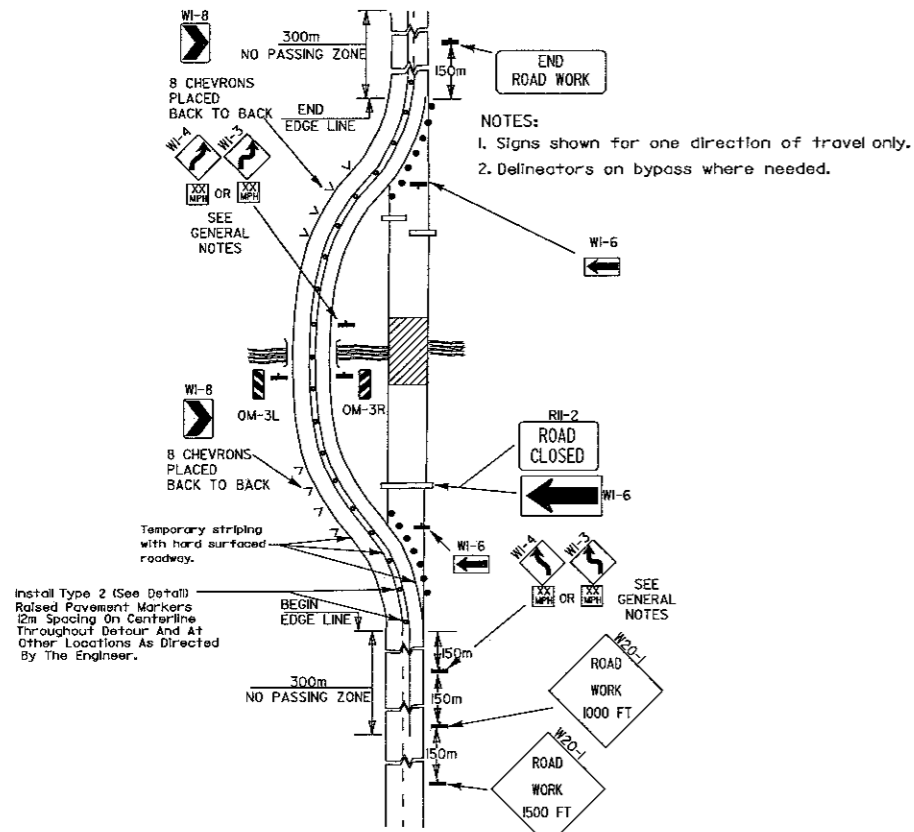
**STANDARD DRAWING SI-1 (M)**



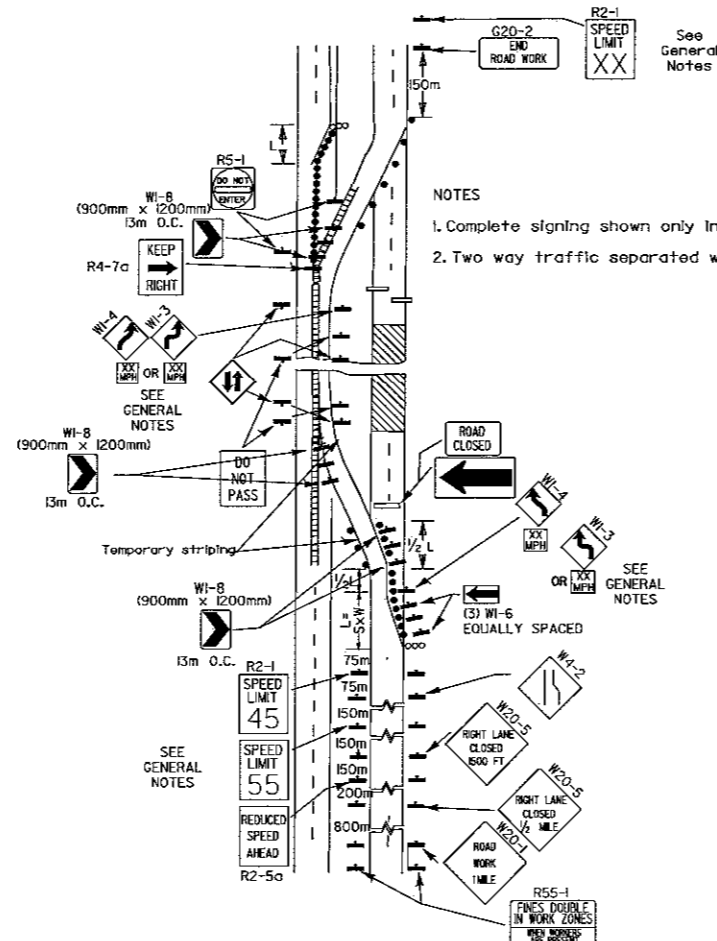


							ADVANCE DISTANCES (XXXX)	
<p>RI-1</p>  <p>750mm x 750mm 900mm x 900mm 1200mm x 1200mm</p>	<p>RI-2</p>  <p>900mm x 900mm x 900mm 1200mm x 1200mm x 1200mm 1500mm x 1500mm x 1500mm</p>	<p>R2-1</p>  <p>600mm x 750mm 900mm x 1200mm 1200mm x 1500mm</p>	<p>R2-5A</p>  <p>600mm x 750mm 900mm x 1200mm 1200mm x 1500mm</p>	<p>R2-5C</p>  <p>600mm x 750mm 900mm x 1200mm 1200mm x 1500mm</p>	<p>R4-1</p>  <p>600mm x 750mm 900mm x 1200mm 1200mm x 1500mm</p>	<p>R4-2</p>  <p>600mm x 750mm 900mm x 1200mm 1200mm x 1500mm</p>	<p>500 FT 1000 FT 1500 FT</p> <p>1/2 MILE 3/4 MILE 1 MILE AHEAD</p>	
<p>GENERAL NOTES:</p> <ol style="list-style-type: none"> <li>ALL TRAFFIC CONTROL DEVICES USED ON ROAD CONSTRUCTION SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AND TO THE STANDARD HIGHWAY SIGNS, LATEST EDITION, OR AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION.</li> <li>TRAFFIC CONTROL DEVICES SHALL BE SET UP JUST BEFORE THE START OF CONSTRUCTION OPERATIONS AND SHALL BE PROPERLY MAINTAINED DURING THE TIME SUCH CONDITIONS EXIST. THEY SHALL REMAIN IN PLACE ONLY AS LONG AS NEEDED AND REMOVED THEREAFTER.</li> <li>EXISTING SIGNS AND CONSTRUCTION SIGNS SHALL BE KEPT IN PROPER POSITION, AND BE CLEAN AND LEGIBLE AT ALL TIMES. SIGNS THAT DO NOT APPLY TO EXISTING CONDITIONS SHALL BE REMOVED. SIGNS THAT ARE DAMAGED, DEFACED, OR THAT ACCUMULATE DIRT DURING CONSTRUCTION SHALL BE CLEANED, REPAIRED, OR REPLACED.</li> <li>SIGNS ARE USUALLY MOUNTED ON A SINGLE POST, ALTHOUGH THOSE WIDER THAN 900mm OR LARGER THAN 1sq.m. SHALL BE MOUNTED ON TWO POSTS OR ABOVE A TYPE III BARRICADE.</li> <li>SIGN POSTS DIRECT BURIED IN SOIL SHALL BE 1.0 kg MINIMUM CHANNEL POST OR 100 mm x 100 mm WOOD POSTS. CHANNEL POSTS SHALL BE PAINTED GREEN. WOOD POSTS SHALL BE PAINTED WHITE. ALL POSTS SHALL BE NEATLY CONSTRUCTED, AND SHALL BE REPLUMBED, CLEANED, OR REPAIRED AS NEEDED FOR THE DURATION OF THE JOB. THERE SHALL NOT BE MORE THAN 2 POSTS IN A 2m PATH FOR WOOD OR CHANNEL POSTS. ANY CHANNEL POST SPLICE SHALL BE IN ACCORDANCE WITH STANDARD DRAWING TC-3.</li> <li>POST MOUNTED SIGNS IN RURAL AREAS SHALL BE CONSTRUCTED WITH THE NEAR EDGE OF THE SIGN FROM 2 TO 4 METERS FROM THE PAVEMENT EDGE. SIGNS IN URBAN AREAS AND BARRICADE MOUNTED SIGNS SHALL BE MOUNTED A MINIMUM OF 0.6m FROM THE PAVEMENT EDGE.</li> <li>ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN URBAN AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 2m FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE. ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN RURAL AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 2m FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE. EXCEPT A MINIMUM OF 1.5m SHALL BE USED WHEN MOUNTING AN ADVISORY SIGN BELOW A WARNING SIGN. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR INTERMEDIATE TERM STATIONARY WORK CONDITIONS. THE SIGNS MINIMUM MOUNTING HEIGHT SHALL BE 1.5 METERS. RETROREFLECTIVE DEVICES SHALL BE USED. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR SHORT-TERM, SHORT DURATION, AND MOBILE CONDITIONS. THEY SHALL BE NO LESS THAN 0.3 METER ABOVE THE TRAVELED WAY. LONG-TERM STATIONARY SIGNS SHALL BE DIRECT BURIED IN SOIL, UNLESS CONDITIONS NECESSITATE THE USE OF PORTABLE SIGNS, OR AS APPROVED BY THE ENGINEER. CONCRETE PADS, CONCRETE OR ROCK BALLAST, OR OTHER SOLID MATERIALS SHALL NOT BE UTILIZED WITH PORTABLE SIGN SUPPORTS.</li> <li>FLAGGERS SHALL USE REFLECTORIZED STOP-SLOW PADDLES. FLAGS MAY BE USED ONLY FOR EMERGENCY SITUATIONS.</li> <li>MOST OF THE SIGNS SHOWN ARE ORIENTED TO THE RIGHT. HOWEVER, THIS DOES NOT PRECLUDE THE USE OF MIRROR IMAGES OF THESE SIGNS WHERE THE REVERSE ORIENTATION MIGHT BETTER CONVEY TO MOTORISTS THE PROPER DIRECTION OF MOVEMENT.</li> <li>R55-1 SIGNS SHALL BE PLACED AT LEAST 450m BUT NOT MORE THAN 1.6km IN ADVANCE OF THE WORK ZONE. IF A SPEED LIMIT REDUCTION IS IN EFFECT, THE SIGN SHALL BE PLACED A MINIMUM OF 150m IN ADVANCE OF THE "REDUCED SPEED AHEAD" SIGN.</li> </ol>								
<p>R5-1</p>  <p>750mm x 750mm 950mm x 950mm 1200mm x 1200mm</p>	<p>R11-2</p>  <p>1200mm x 750mm</p>	<p>R11-3A</p>  <p>1500mm x 750mm</p>	<p>R11-4</p>  <p>1500mm x 750mm</p>	<p>RSP-1</p>  <p>1200mm x 750mm</p>	<p>WI-1</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>WI-2</p>  <p>900mm x 900mm 1200mm x 1200mm</p>		
<p>WI-3</p>  <p>1200mm x 1200mm</p>	<p>WI-4a</p>  <p>1200mm x 1200mm</p>	<p>WI-6</p>  <p>1200mm x 600mm 1500mm x 750mm</p>	<p>WI-8</p>  <p>450mm x 600mm 600mm x 750mm 750mm x 900mm 900mm x 1200mm</p>	<p>W3-1</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W3-2</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W4-2</p>  <p>900mm x 900mm 1200mm x 1200mm</p>		
<p>W5-1</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W6-3</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W8-7</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W9-2</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W13-1</p>  <p>600mm x 600mm</p>	<p>W20-1</p>  <p>1200mm x 1200mm</p>	<p>W20-2</p>  <p>1200mm x 1200mm</p>	<p>W20-3</p>  <p>1200mm x 1200mm</p>	
<p>W20-4</p>  <p>1200mm x 1200mm</p>	<p>W20-5</p>  <p>1200mm x 1200mm</p>	<p>W20-7a</p>  <p>450 500 FEET 600 900mm x 900mm 1200mm x 1200mm</p> <p>W16-2</p>	<p>W21-2</p>  <p>750mm x 750mm 900mm x 900mm</p>	<p>W21-5</p>  <p>750mm x 750mm 900mm x 900mm</p>	<p>W24-1</p>  <p>900mm x 900mm</p>	<p>WI-4b</p>  <p>1200mm x 1200mm</p>	<p>R56-1</p>  <p>450mm x 450mm</p>	
<p>W8-11</p>  <p>900mm x 900mm 1200mm x 1200mm</p>	<p>W8-9</p>  <p>900 x 900mm 1200mm x 1200mm</p>	<p>G20-1</p>  <p>1500mm x 600mm</p>	<p>G20-2</p>  <p>1200mm x 600mm</p>	<p>OM-3L OM-3R</p>  <p>300mm x 900mm</p>	<p>M4-9</p>  <p>750mm x 600mm 1200mm x 900mm 1500mm x 1200mm</p>	<p>M4-10</p>  <p>1200mm x 450mm</p>	<p>R55-1</p>  <p>900mm x 1500mm * USE 150mm C LETTERS ** USE 100mm D LETTERS</p>	

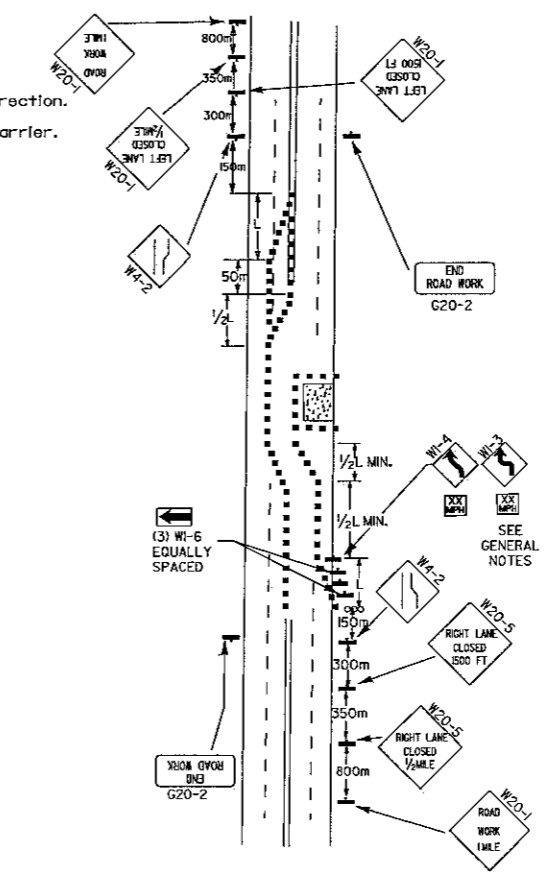
DATE	REVISION	FILED
12-15-81	REVISED #24-1	
11-17-10	DELETED W8-9a & ADDED W8-9	
10-15-09	ADDED REFERENCE TO MASH & ADDED SIGN #24-1	
4-17-08	REVISED SIGN DESIGNATIONS	
1-18-04	REVISED NOTES	
10-9-03	REVISED NOTE 1	
11-16-01	REVISED NOTE 7	
9-28-00	REVISED NOTE	
11-18-98	ADDED NOTE	
6-26-97	REVISED NOTE 5	
4-03-97	REVISED NOTE 5	
10-18-96	ADDED CONTROLLED ACCESS HWY. SIGN & TO NOTE 7	
11-22-95	ADDED NOTE #10	
10-12-95	ADDED R55-1 AND mm TO ALL DIMENSIONS	
7-20-95	ADDED METRIC LOGO, DELETED PAGE NUMBER	
6-8-95	REVISED PER PART VI, MUTCD SEPT. 3, 1993	
6-18-93	CONVERTED TO METRIC	
DATE	REVISION	FILED



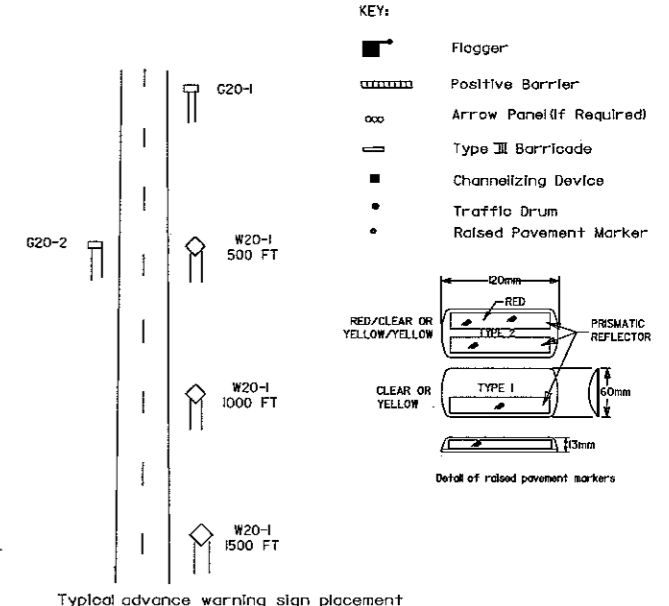
(A) Typical application of traffic control devices on a 2-lane highway where the entire roadway is closed and a bypass detour is provided.



(B) Typical application - 4-lane divided roadway where one roadway is closed.

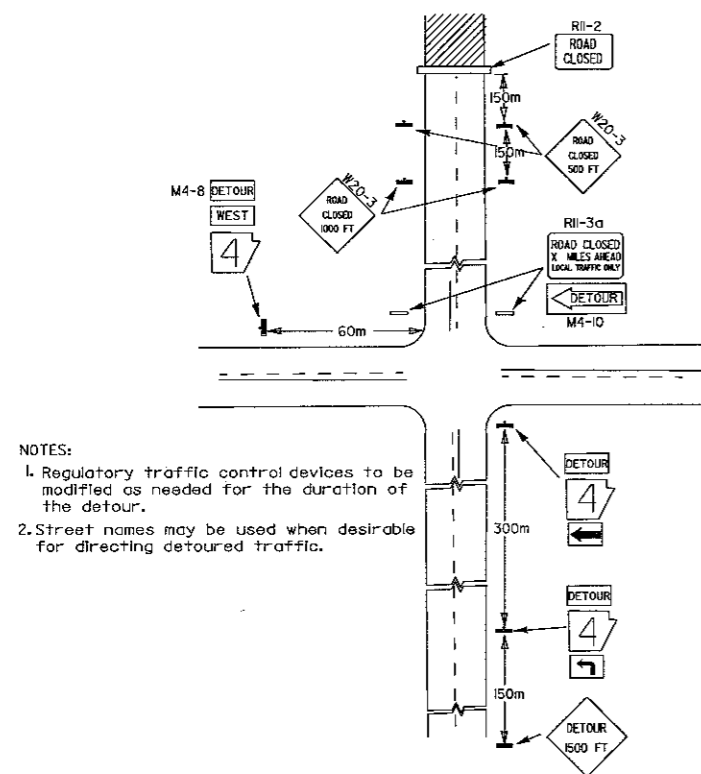


(C) Typical application - 4-lane undivided roadway where half of the roadway is closed.

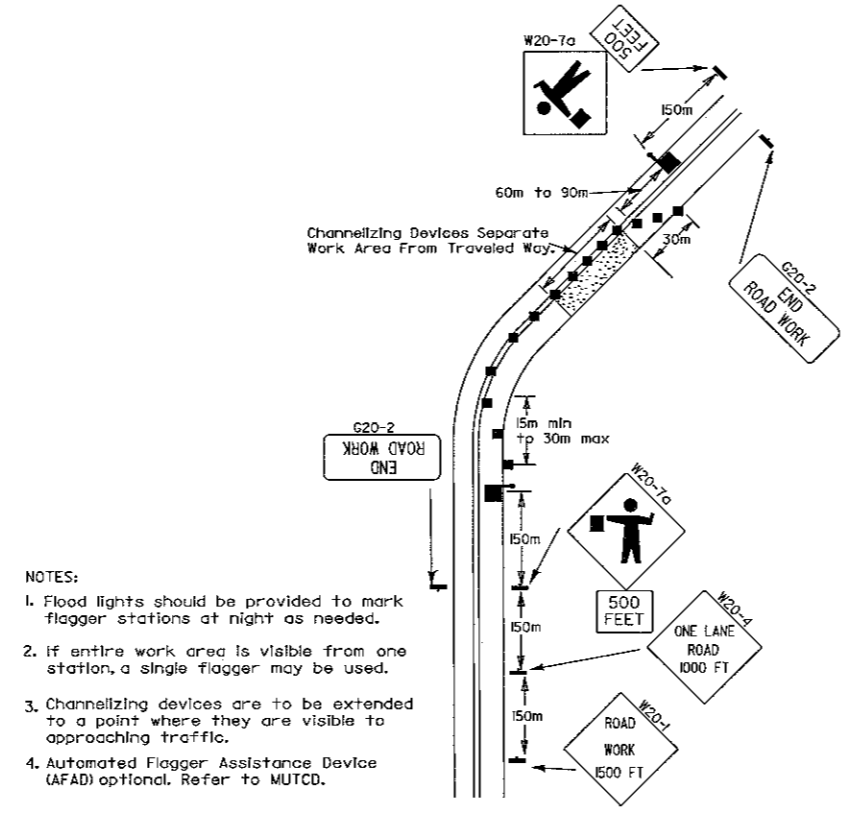


Taper formulae:  
 $L = (0.625S)W$  for speeds of 45mph/70kmph or more.  
 $L = \frac{W(0.625S)^2}{60}$  for speeds of 40mph/60kmph or less.  
 Where:  
 L = Minimum length of taper (meters).  
 S = Numerical value of posted speed limit prior to work or 85th percentile speed (kmph).  
 W = Width of offset (meters).

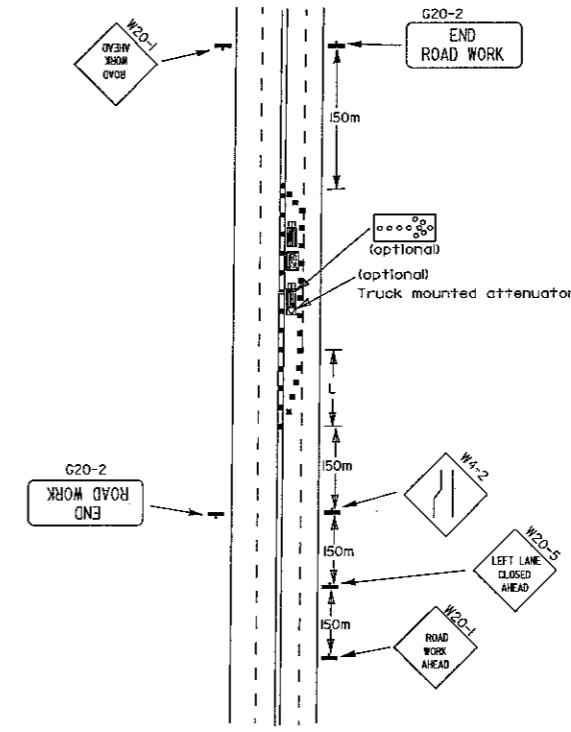
- GENERAL NOTES:
- Advisory speed posted on W1-3 or W1-4 curve warning signs to be determined at site. Use W1-4 when speed is greater than 30mph and W1-3 when 30mph or less.
  - When the existing speed limit is 55mph and the plans require a speed limit of 45mph, the R2-1(55) shall be omitted and the R2-5A shall be installed at that location. Additional R2-1(45mph) speed limit signs shall be installed at a maximum of 1.6km intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
  - When the existing speed limit is 65mph and the plans require a speed limit of 55mph, the R2-1(65) shall be omitted. Additional R2-1(55mph) speed limit signs shall be installed at a maximum of 1.6km intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
  - Warning lights and/or flags may be mounted to signs or channelizing devices at night as needed.
  - Pavement markings no longer applicable which might create confusion in the minds of vehicle operators shall be removed or obliterated as soon as practicable.
  - Trailer mounted devices such as arrow panels and portable changeable message signs shall be delineated by affixing conspicuity material in a continuous line on the face of the trailer. When placed on or adjacent to the shoulder and not behind a positive barrier, these devices shall be delineated by placing five (5) traffic drums, equally spaced along the traffic side of the device.



(D) Typical application - roadway closed beyond detour point.

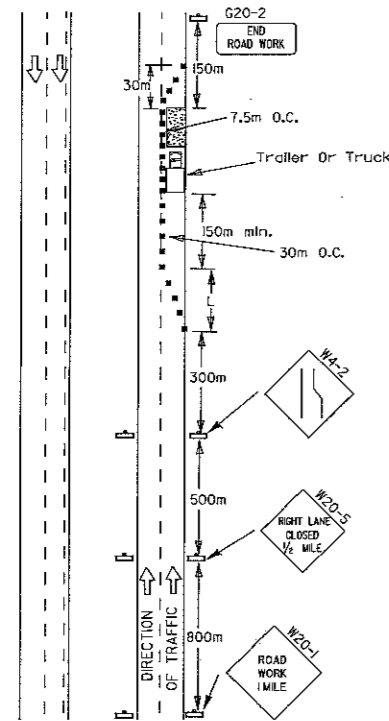


(E) Typical application of traffic control devices on 2-lane highway where one lane is closed and flagging is provided.

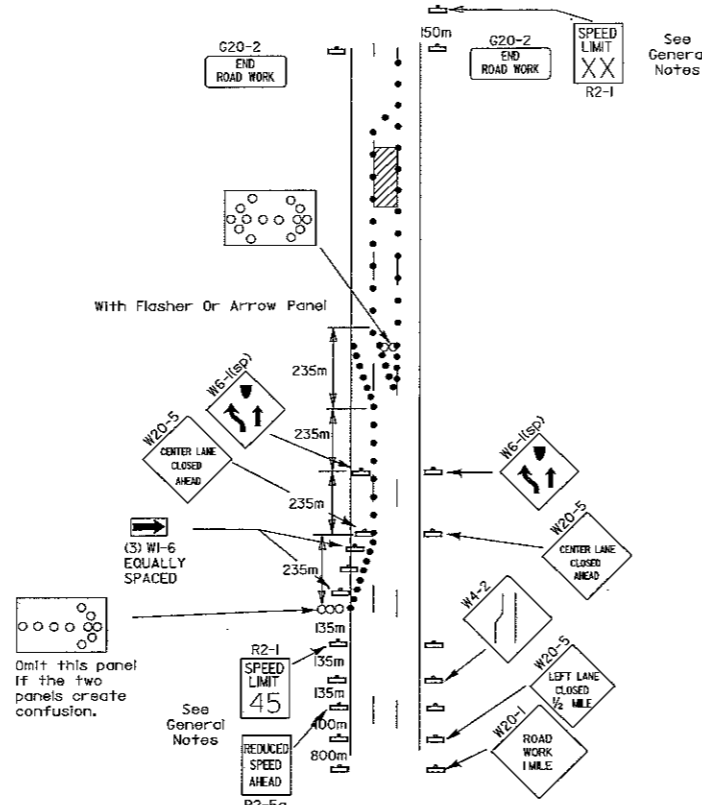


(F) Typical application - 4-lane undivided roadway with inside lane closed.

DATE	REVISION	FILMED
3-8-10	ADDED (AFAD)	
1-20-08	REVISED SIGN DESIGNATIONS	
11-18-04	ADDED GENERAL NOTE	
10-18-96	ADDED R55-1	
7-20-95	ADDED METRIC LOGO, DELETED PAGE NUMBER	7-20-95
6-8-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
6-18-93	CONVERTED TO METRIC	



(A) Typical application - daytime maintenance operations of short duration on a 4-lane divided roadway where half of the roadway is closed.

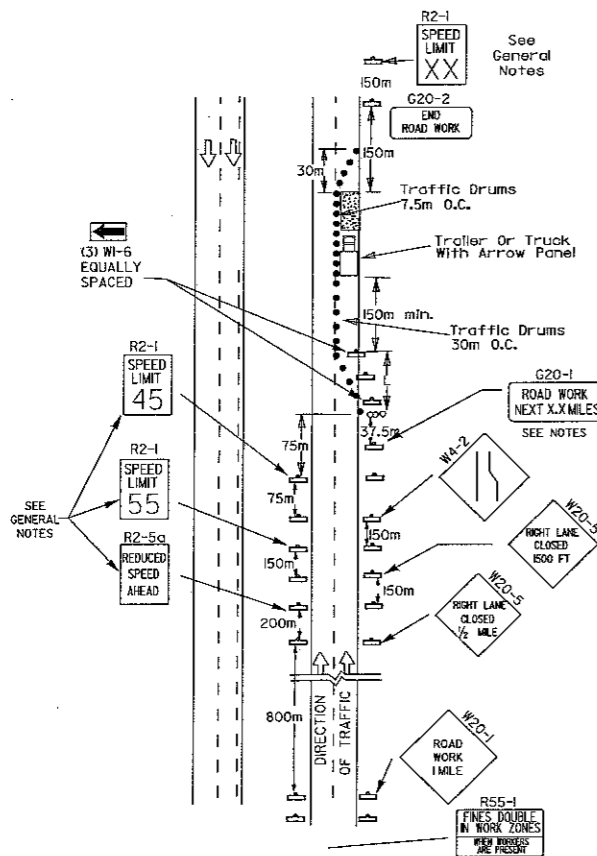


(B) Typical application - 3-lane oneway roadway where center lane is closed.

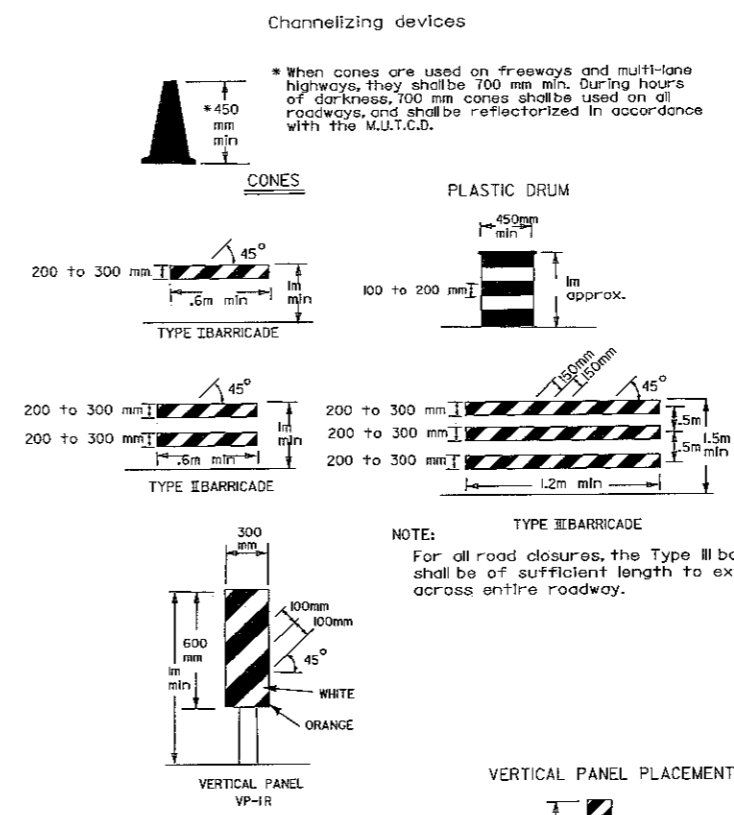
- KEY:
- Arrow Panel (If Required)
  - Channelizing Device
  - Traffic drum

GENERAL NOTES:

1. A speed limit reduction may be implemented ONLY when designated in the plan or when recommended by the Roadway Design Division.
2. When the existing speed limit is 55 mph and the plans require a speed limit of 45 mph, the R2-1(55) shall be omitted and the R2-5a shall be installed at that location. Additional R2-1(45 mph) speed limit signs shall be installed at a maximum of 1.6 km intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
3. When the existing speed limit is 65 mph and the plans require a speed limit of 55 mph, the R2-1(45) shall be omitted. Additional R2-1(55 mph) speed limit signs shall be installed at a maximum of 1.6 km intervals. At the end of the work area, a R2-1(XX) shall be installed to match original speed limit.
4. Warning lights and/or flags may be mounted to signs or channelizing devices at night as needed.
5. Pavement markings no longer applicable which might create confusion in the minds of vehicle operators shall be removed or obliterated as soon as practicable.
6. The G20-1 sign will be required on jobs of over 3 km in length. When the lane closure is not at the beginning of the project, the G20-1 sign shall be erected 37.5m in advance of the job limit. Additional W20-1(1 mile) signs are not required in advance of lane closures that begin inside the project limits.
7. Flaggers shall use STOP/SLOW paddles for controlling traffic through work zones. Flags may be used only for emergency situations.
8. All plastic drums and cones shall meet the requirements of NCHRP-350 or Manual for Assessing Safety Hardware (MASH).
9. Trailer mounted devices such as arrow panels and portable changeable message signs shall be delineated by affixing conspicuity material in a continuous line on the face of the trailer. When placed on or adjacent to the shoulder and not behind a positive barrier, these devices shall be delineated by placing five (5) traffic drums, equally spaced along the traffic side of the device.

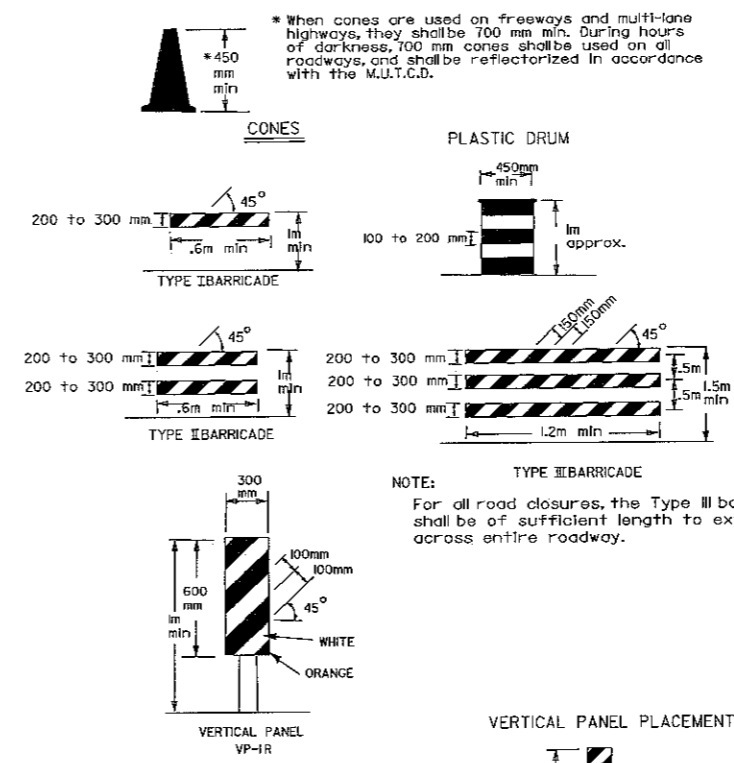


(C) Typical application - construction operations of intermediate to long term duration on a 4-lane divided roadway where half of the roadway is closed.



(D) Typical application - closing multiple lanes of a multilane highway.

Channelizing devices



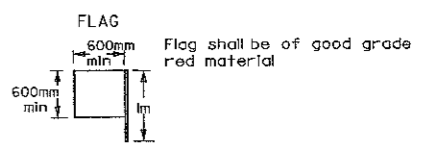
\* When cones are used on freeways and multi-lane highways, they shall be 700 mm min. During hours of darkness, 700 mm cones shall be used on all roadways, and shall be reflectorized in accordance with the M.U.T.C.D.

NOTE:  
For all road closures, the Type III barricades shall be of sufficient length to extend across entire roadway.

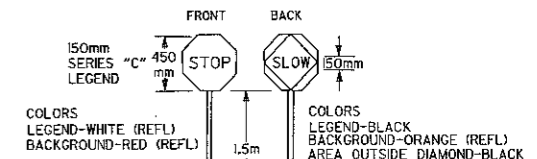
TRAFFIC CONTROL DEVICES FOR VERTICAL PAVEMENT DIFFERENTIALS

VERTICAL DIFFERENTIAL	LOCATIONS	TRAFFIC CONTROL
25 to 75mm	Centerline, lane lines	W8-11
25 to 75mm	Edge of shoulder	W8-9
Greater than 75mm	Lane lines	Standard lane closure required
Greater than 75mm	Edge of traveled lane	*RSP-land vertical panels, drums or concrete barrier
Greater than 75mm	Edge of shoulder	*Vertical panels, drums or concrete barrier

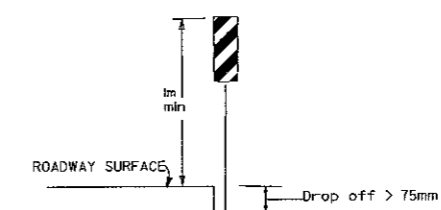
\* When shown on the plans concrete barrier will be used.  
When the shoulder area is used as part of the traveled lane and there is insufficient width to place drums on the remaining shoulder width, then vertical panels shall be used.



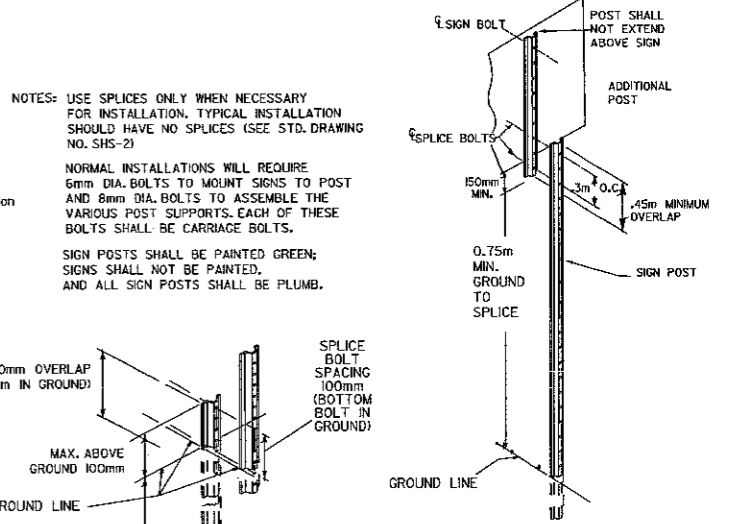
STOP/SLOW PADDLE



VERTICAL PANEL PLACEMENT



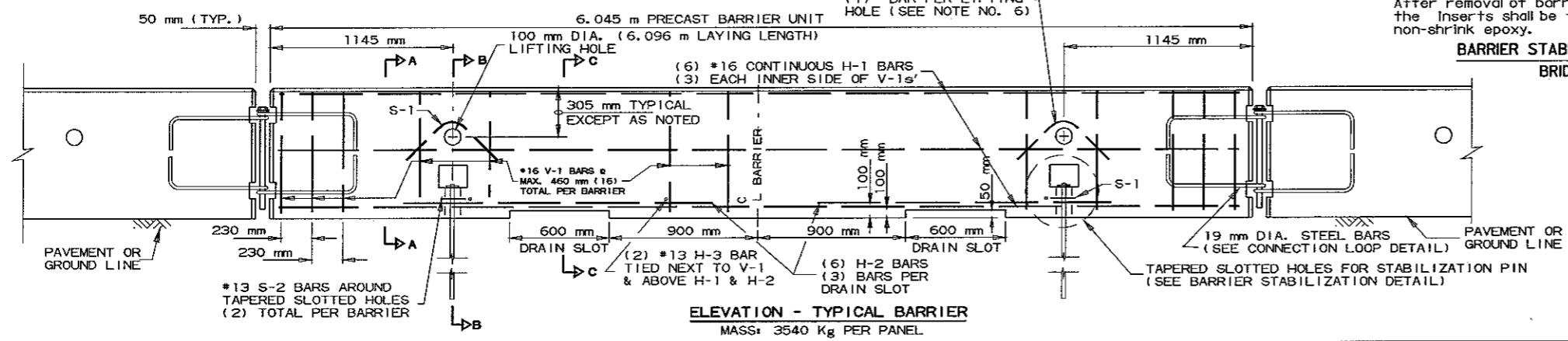
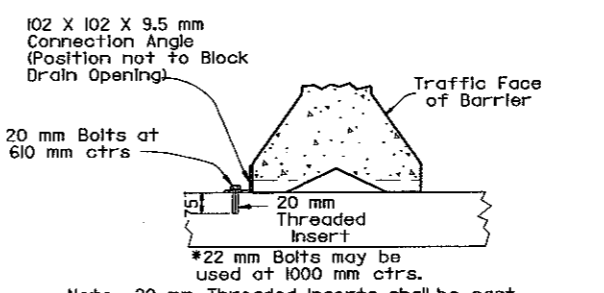
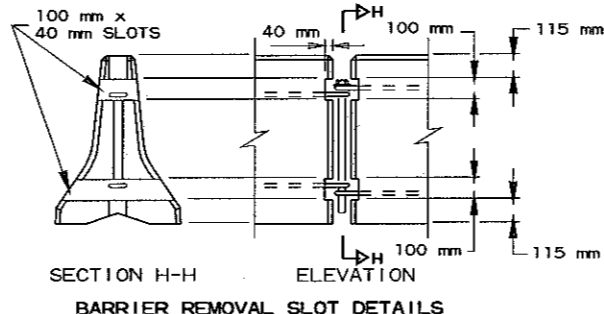
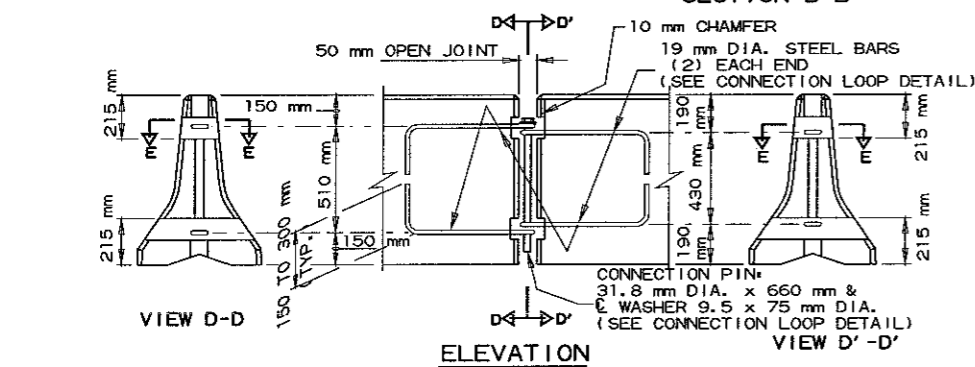
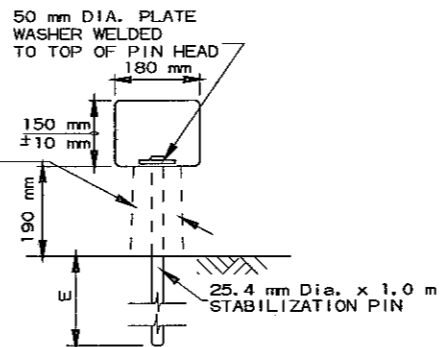
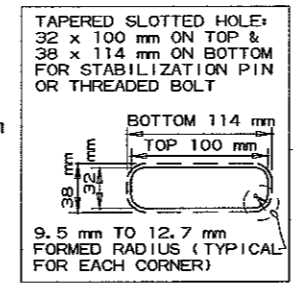
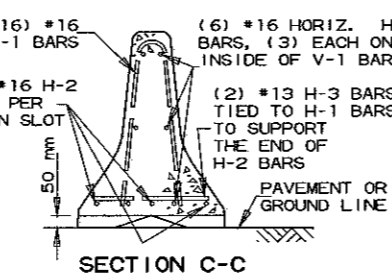
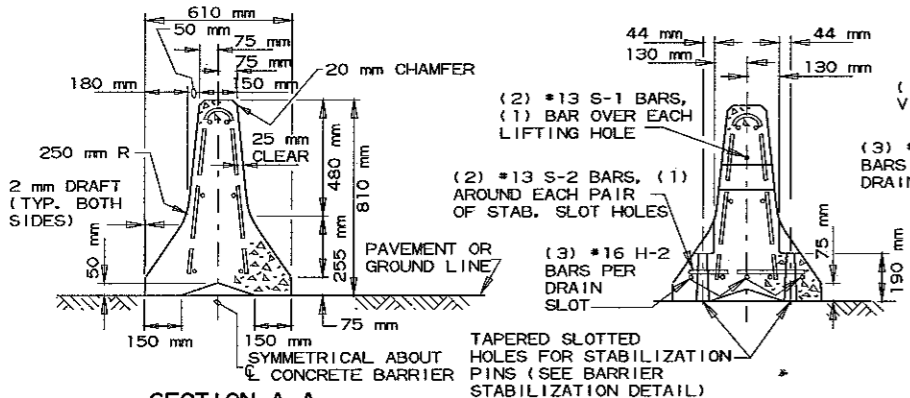
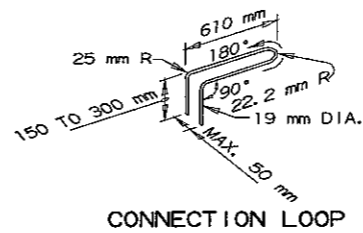
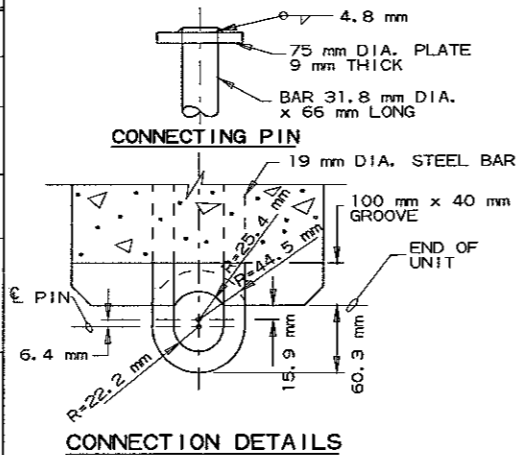
DETAIL OF SPLICES



NOTES:  
USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES (SEE STD. DRAWING NO. SHS-2)  
NORMAL INSTALLATIONS WILL REQUIRE 6mm DIA. BOLTS TO MOUNT SIGNS TO POST AND 8mm DIA. BOLTS TO ASSEMBLE THE VARIOUS POST SUPPORTS. EACH OF THESE BOLTS SHALL BE CARRIAGE BOLTS.  
SIGN POSTS SHALL BE PAINTED GREEN; SIGNS SHALL NOT BE PAINTED, AND ALL SIGN POSTS SHALL BE PLUMB.

DATE	REVISION	FILED
10-15-09	ADDED REFERENCE TO MASH	
11-20-08	REVISED SIGN DESIGNATIONS	
11-18-04	ADDED NOTE	
10-1-98	ADDED NOTE	
4-03-97	ADDED (SP) TO W6-1& REVISED TRAFFIC CONTROL DEVICES NOTE	
10-18-96	ADDED R55-1	
10-12-95	MOVED UPPER SPLICE	
7-20-95	ADDED METRIC LOGO, DELETED PAGE NUMBER	
6-8-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
6-18-93	CONVERTED TO METRIC	

REINFORCEMENT BAR TABLE PER BARRIER UNIT			
MARK	LOCATION	BAR SIZE	(NO. BARS)
H-1	HORIZONTAL IN BARRIER TIED INSIDE V-1 BARS	#16	(6)
H-2	CENTERED ABOVE DRAIN SLOTS LONG. & TRANSVERSELY	#16	(6)
H-3	TIED ABOVE H-1 BARS TO SUPPORT H-2, TIED TO V-1	#13	(2)
S-1	OVER LIFT HOLES	#13	(2)
S-2	HORIZ. AROUND SLOTS BETWEEN V-1'S & DRAIN SLOTS	#13	(2)
V-1	VERTICAL IN BARRIER (3) EACH END & (2) AT EACH DRAIN SLOT	#16	(16)

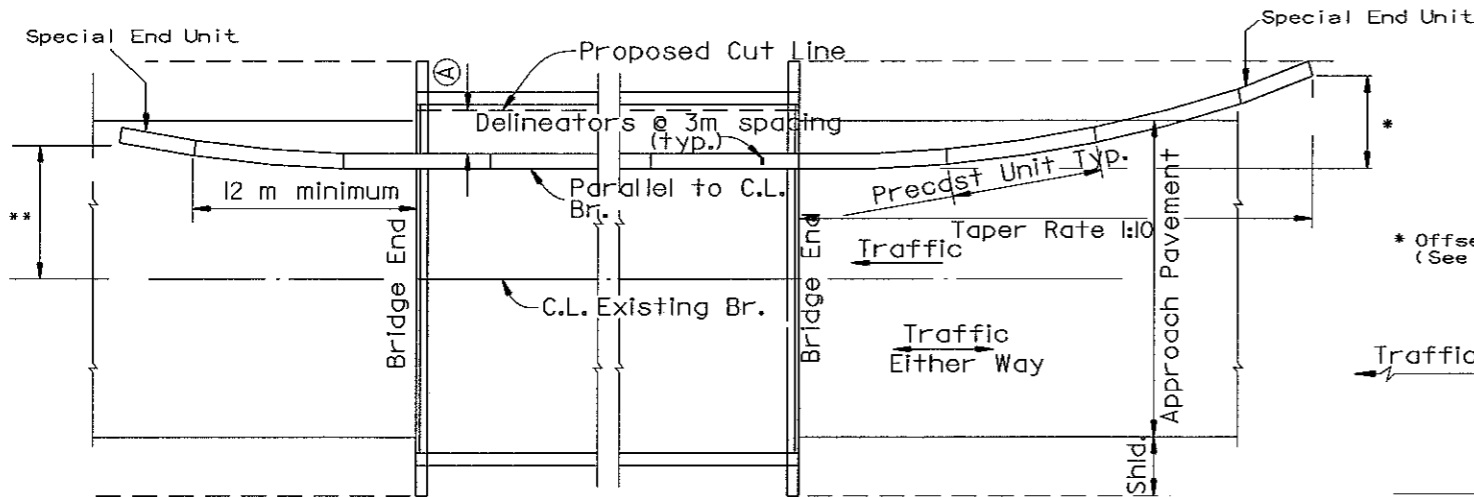


- GENERAL NOTES**
- All dimensions are in millimeters (mm) unless otherwise noted. The Contractor shall furnish the Precast Concrete Barrier Units and shall be responsible for the manufacture, shipment, storage, placement and removal. At the completion of the project, the precast units will remain the property of the Contractor.
  - Materials shall meet the following minimum requirements:  
 Concrete: 20 MPa compressive strength in 28 days  
 Reinforcing Steel: Grade 300 or 420 MPa  
 Structural Steel: AASHTO-M270 Grade 250 shall be used for the Connection Pin, Connection Loops, and Stabilization Pins. A One Piece Pin with a 75mm rounded top may be used in place of the detailed Connection Pin.  
 Delineator: Delineators shall be mounted at 3.0m spacing on top of precast barrier.  
 In applications where barrier wall is within 1.8m of a traffic lane, additional delineators shall be placed on the barrier at 3.0m spacing approximately .3m from the top of the barrier. Delineators shall be on the AHTD Qualified Products List for Construction Concrete Barrier Markers. Delineator color(s) shall be in accordance with the Manual on Uniform Traffic Control Devices.  
 Payment for delineators shall be considered included in the price bid per meter for "Furnishing and Installing Precast Concrete Barrier".  
 The Contractor shall certify to the Engineer that the material and the design used in the precast barrier units meets the requirements as shown on this standard drawing.
  - Other Precast Concrete Barriers that have been crash tested and approved by the Federal Highway Administration to meet the requirements of NCHRP-350 test level 3 or Manual For Assessing Safety Hardware (MASH) will be accepted in lieu of barrier shown. Drain slots shall be provided as needed or as directed by the Engineer. The Contractor shall furnish a certification of NCHRP Report 350 or Manual For Assessing Safety Hardware (MASH) compliance for any other types of precast barrier to be used. The certification shall state that the precast concrete barrier meets the requirements of NCHRP Report 350 or Manual For Assessing Safety Hardware (MASH) and include a copy of the Federal Highway Administration (FHWA) approval letter with all attachments. Precast Concrete Barrier Units shall be fabricated and installed in accordance with crash testing and documentation provided in the FHWA approval letter. Mixing of shapes will not be allowed in a continuous line of units.
  - Dowel holes in pavement or bridge slab that are to remain in place shall be filled. Holes in concrete pavement and bridge slabs shall be filled with an approved non-shrink epoxy grout. Holes in asphalt pavement shall be filled with an approved asphalt joint filler. Payment for drilling and filling holes to be included in the price for various barrier items.
  - Attach units to roadway surface with stabilization pins and to deck slabs using bolts when required.
  - A 100 mm White PVC Sleeve may be used to form the Lifting Hole and if used the Sleeve is to be left in place.

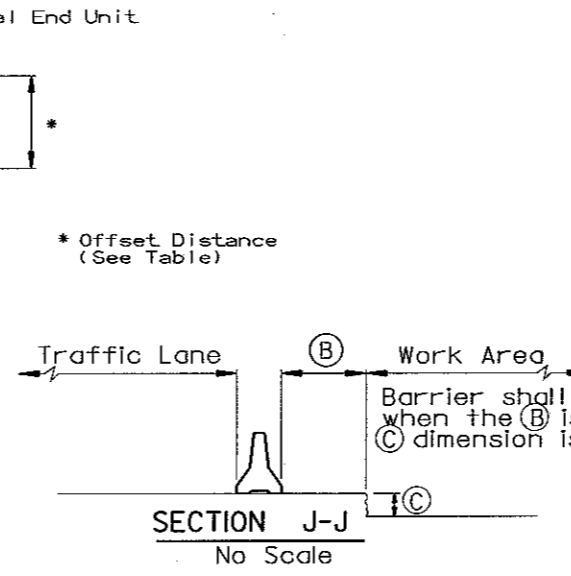
DATE	REVISION	DATE FILMED
10-15-09	ADDED REFERENCE TO MASH	
8-5-09	REVISED NOTE 3 CONCERNING DRAIN SLOTS	
11-29-07	REVISED NOTE 3	
5-25-06	DELETED GENERAL NOTE 7	
11-18-04	REVISED BARRIER STABILIZATION DETAIL BRIDGE DECKS	
4-10-03	REVISED GENERAL NOTE 2	
8-22-02	ISSUED NEW DRAWING	

ARKANSAS STATE HIGHWAY COMMISSION  
**STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION TEMPORARY PRECAST BARRIER**  
 STANDARD DRAWING TC-4 (M)  
 METRIC

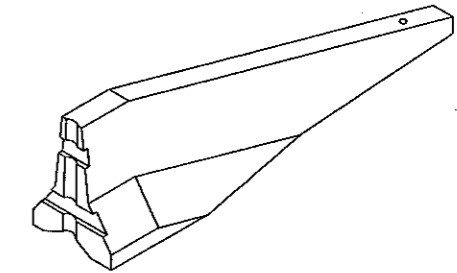
Ⓐ 1.2 meters or greater preferred. If less than 1.2 meters, Precast Units shall be connected to slab (SEE BARRIER STABILIZATION DETAIL-BRIDGE DECKS-STD. DRWG. TC-4(M)).



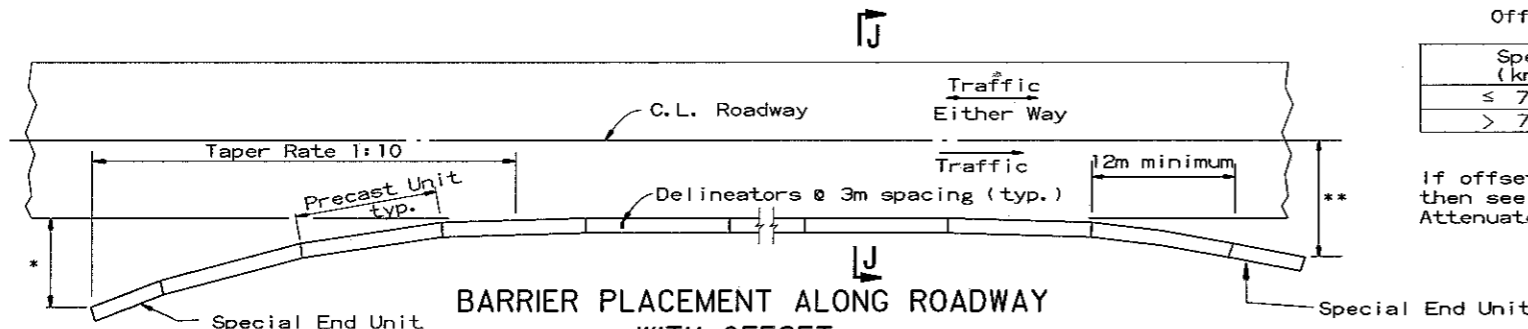
**BARRIER PLACEMENT ALONG BRIDGE WITH OFFSET**  
No Scale



**SECTION J-J**  
No Scale



\*\* Offset Distance For Two Way Traffic Only



**BARRIER PLACEMENT ALONG ROADWAY WITH OFFSET**  
No Scale

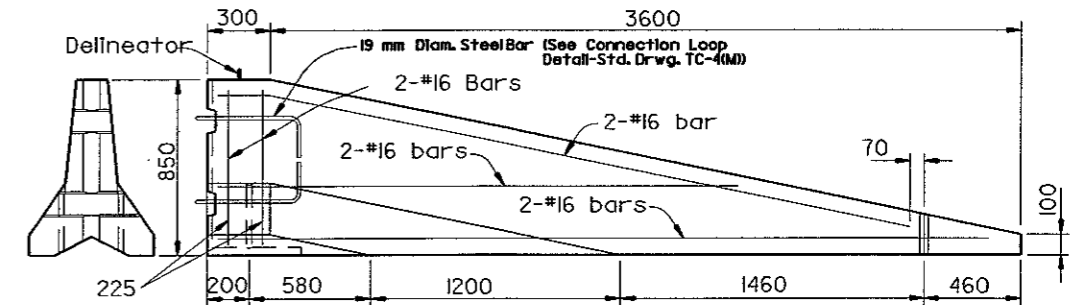
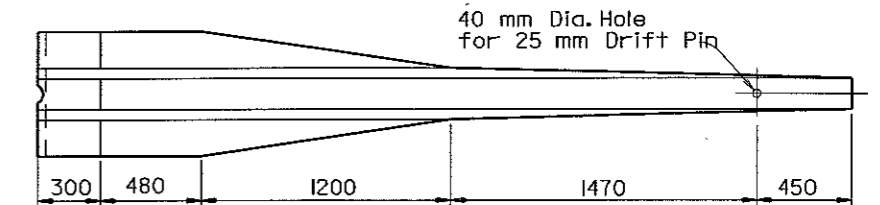
\*\* Offset Distance For Two Way Traffic Only

\* Offset Distance (See Table)

Offset Distance Table

Speed (km/h)	Offset Distance (m)
≤ 70	3.6
> 70	5.4

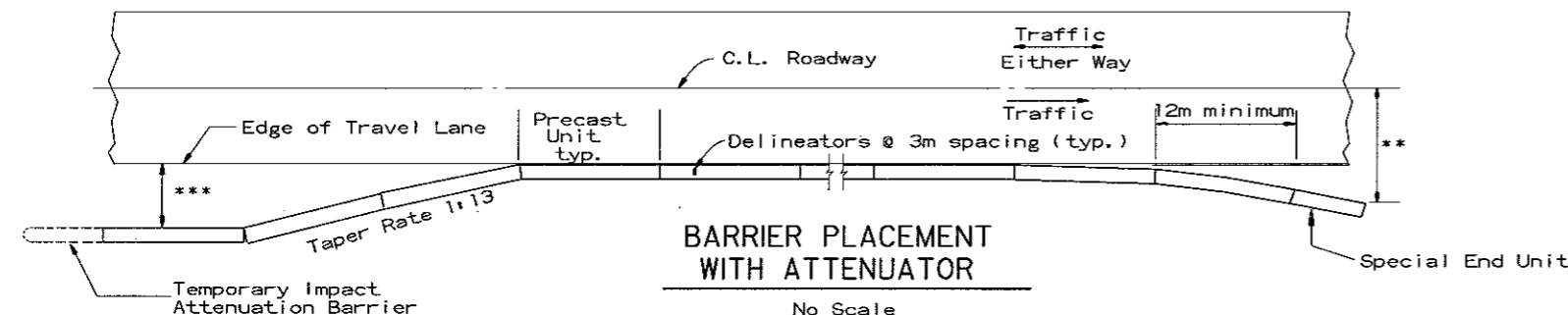
If offset distance is not attainable, then see "Barrier Placement with Attenuator" Detail shown below.



**SPECIAL END UNIT**  
No Scale

**General Notes**

When shown on the Plans, the ends of the Temporary Precast Concrete Barrier shall be protected with an NCHRP-350 or Manual For Assessing Safety Hardware (MASH) approved Crash Cushion. Payment for Crash Cushions shall be made under the item of "Temporary Impact Attenuation Barrier."



**BARRIER PLACEMENT WITH ATTENUATOR**  
No Scale

\*\* Offset Distance For Two Way Traffic Only

\*\*\* Min. 0.9m From Edge of Travel Lane to Nearest Edge of Attenuator

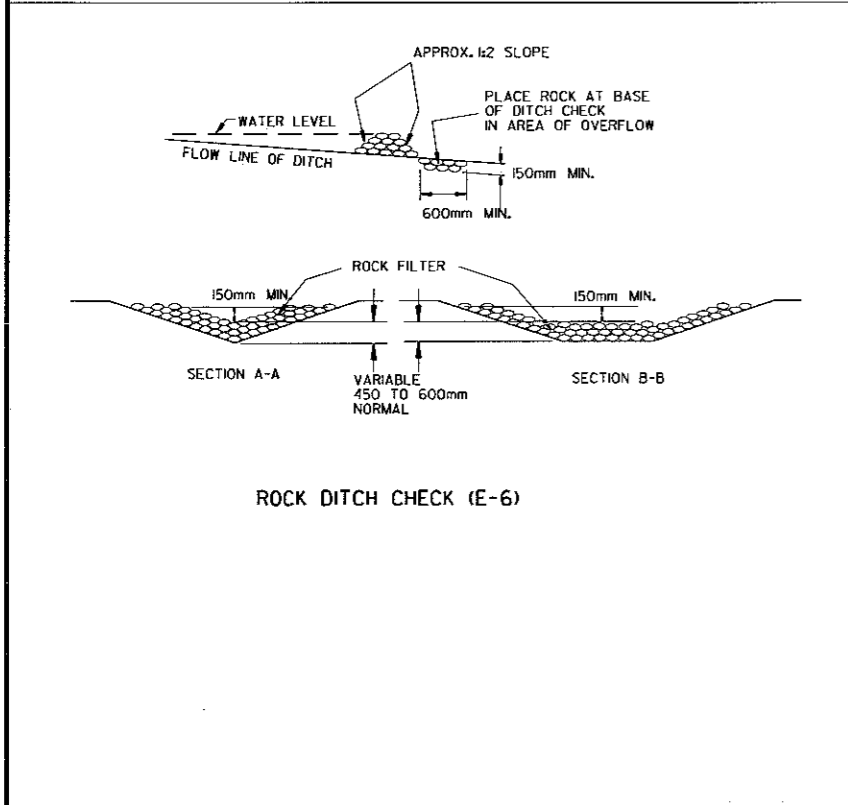
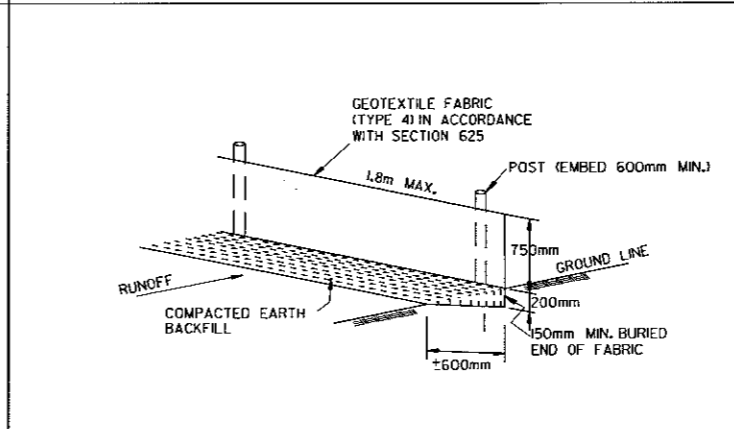
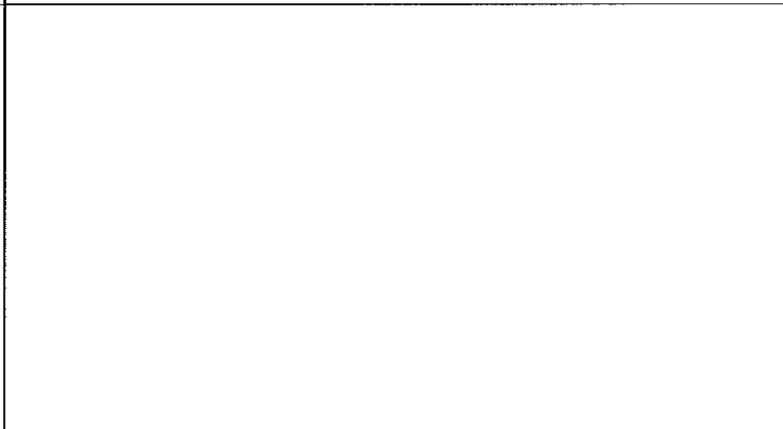
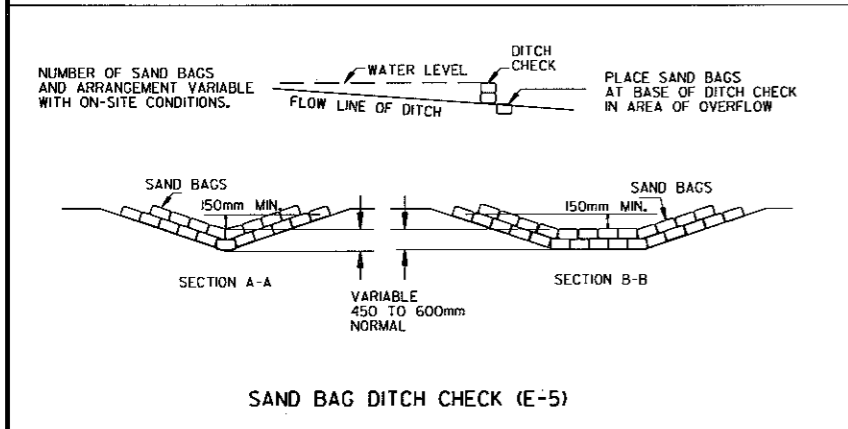
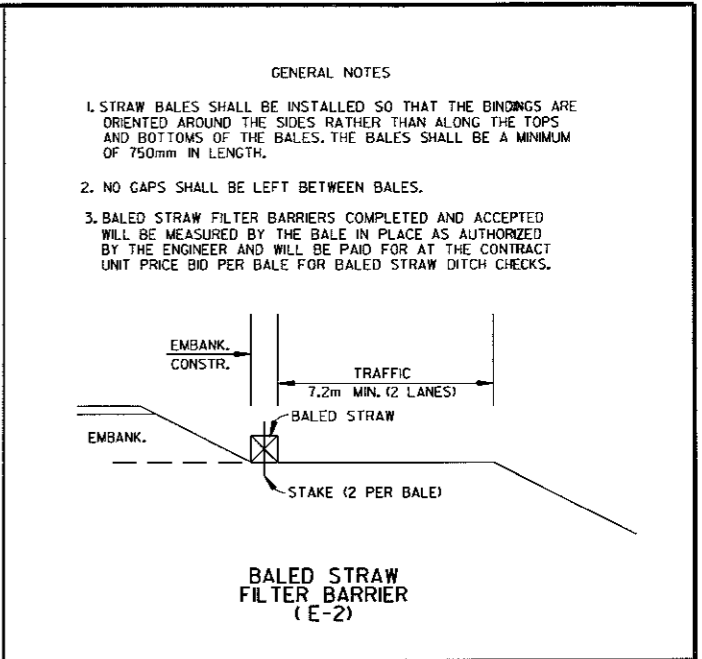
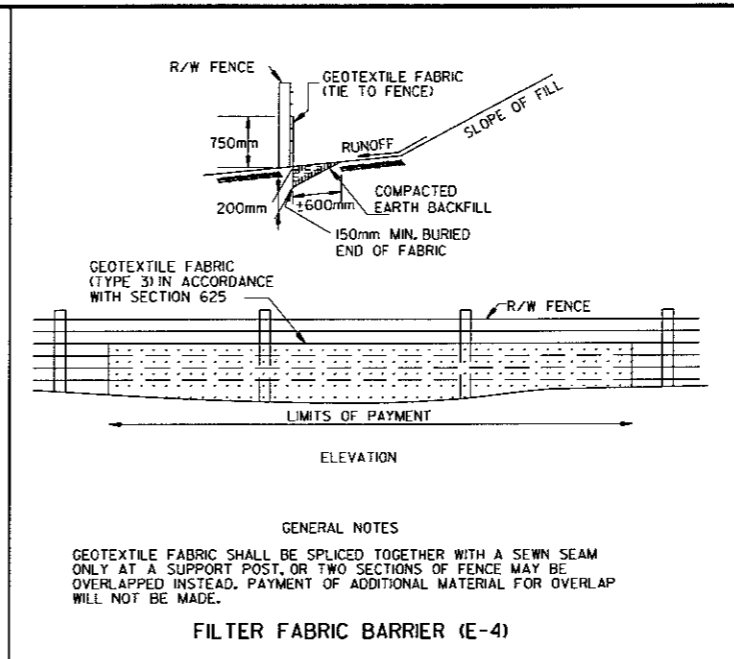
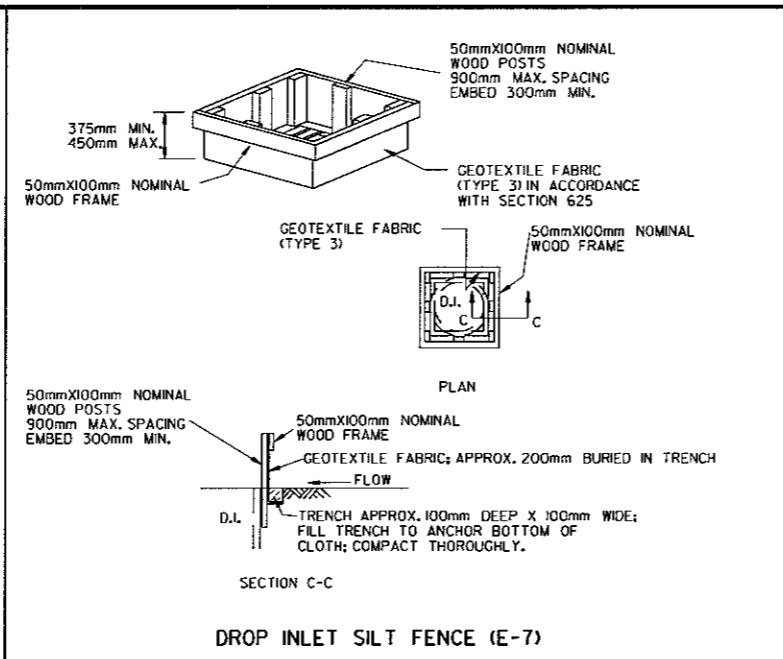
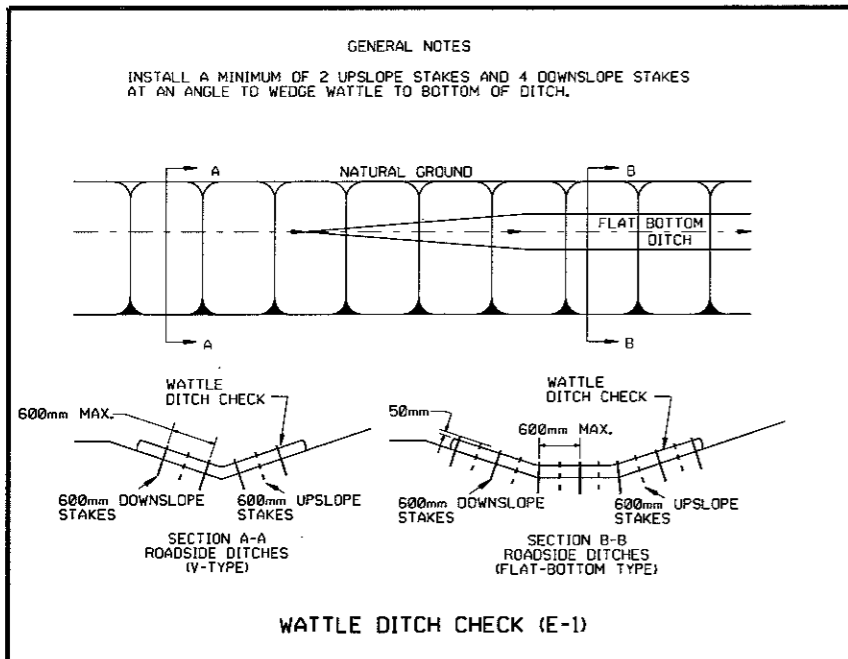
DATE	REVISION	FILED
10-15-09	ADDED REFERENCE TO MASH	
5-25-06	REVISED BARRIER PLACEMENT	
8-22-02	ISSUED NEW DRAWING	

ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS  
FOR HIGHWAY CONSTRUCTION -  
TEMPORARY PRECAST BARRIER

STANDARD DRAWING TC-5 (M)



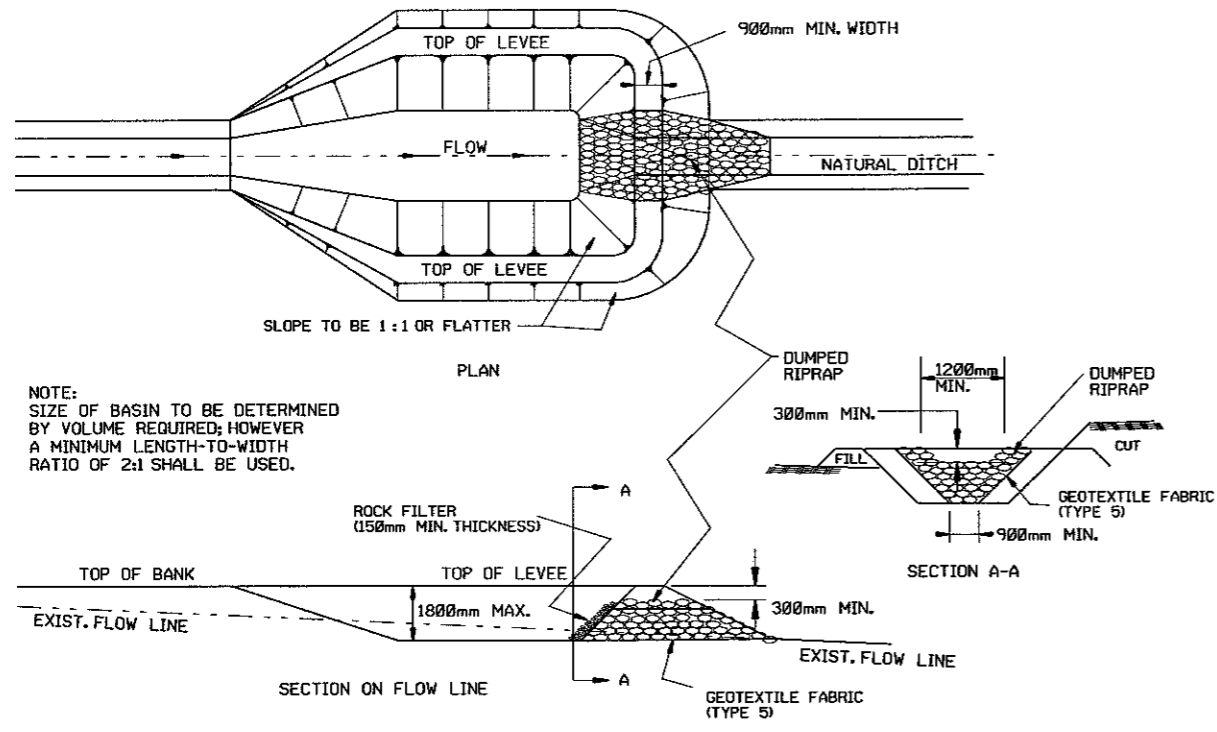


DATE	REVISION	DATE FILMED
12-15-11	DELETED BALED STRAW DITCH CHECK & ADDED WATTLE DITCH CHECK	
11-18-98	ADDED NOTE	
7-02-98	ADDED TYPE E-2 & REV. NAME OF E-1	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION

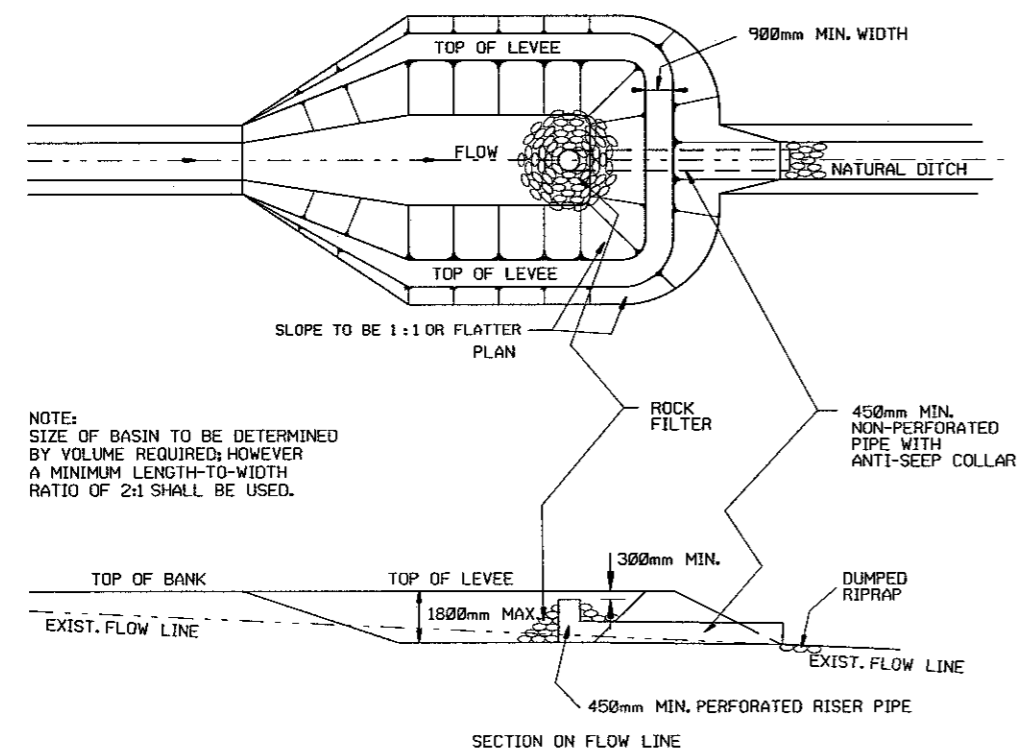
TEMPORARY EROSION CONTROL DEVICES

STANDARD DRAWING TEC-1 (M)



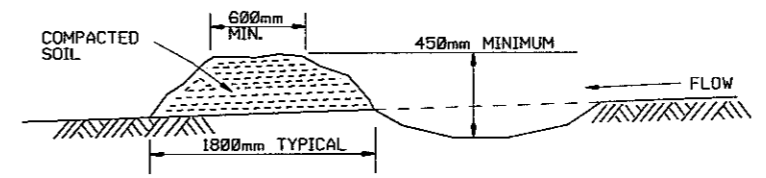
NOTE:  
 SIZE OF BASIN TO BE DETERMINED  
 BY VOLUME REQUIRED; HOWEVER  
 A MINIMUM LENGTH-TO-WIDTH  
 RATIO OF 2:1 SHALL BE USED.

SEDIMENT BASIN WITH RIPRAP OUTLET (E-9)

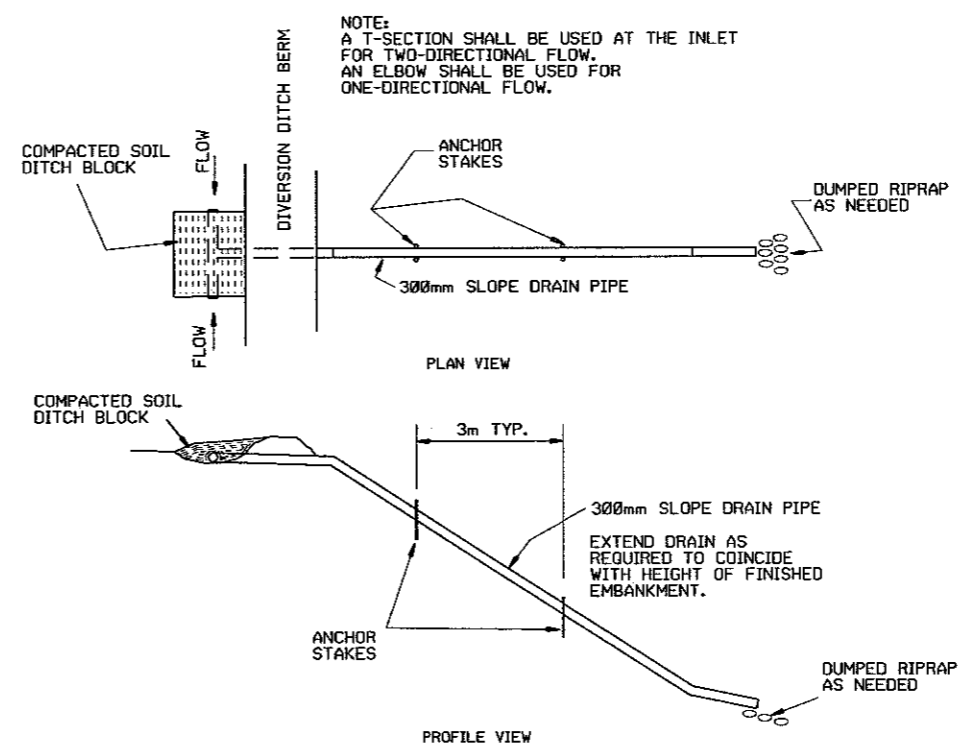


NOTE:  
 SIZE OF BASIN TO BE DETERMINED  
 BY VOLUME REQUIRED; HOWEVER  
 A MINIMUM LENGTH-TO-WIDTH  
 RATIO OF 2:1 SHALL BE USED.

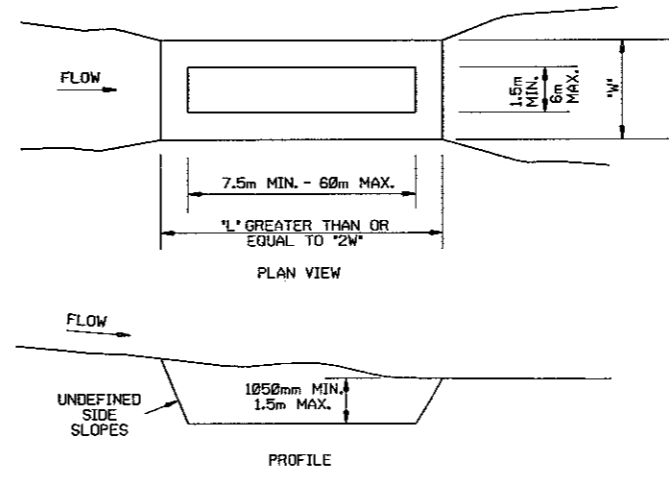
SEDIMENT BASIN WITH PIPE OUTLET (E-10)



DIVERSION DITCH (E-8)



SLOPE DRAIN (E-12)



SEDIMENT BASIN (E-14)

ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION  
 CONTROL DEVICES

STANDARD DRAWING TEC-2 (M)

7-20-95	CONVERTED TO METRIC
DATE	REVISION
	DATE PLUMED

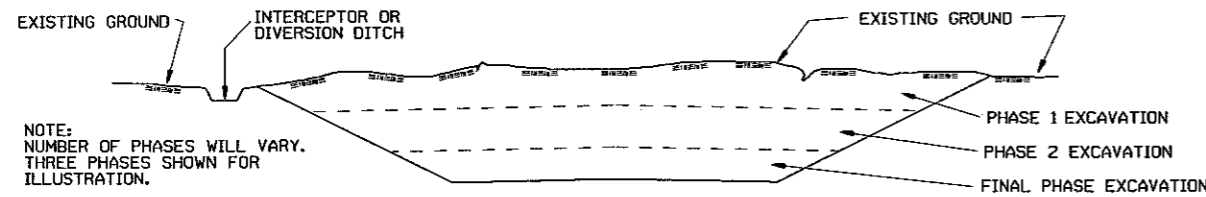


## CLEARING AND GRUBBING

### CONSTRUCTION SEQUENCE

1. PLACE PERIMETER CONTROLS (I.E. SILT FENCES, DIVERSION DITCHES, SEDIMENT BASINS, ETC.)
2. PERFORM CLEARING AND GRUBBING OPERATION.

## EXCAVATION



NOTE:  
NUMBER OF PHASES WILL VARY.  
THREE PHASES SHOWN FOR  
ILLUSTRATION.

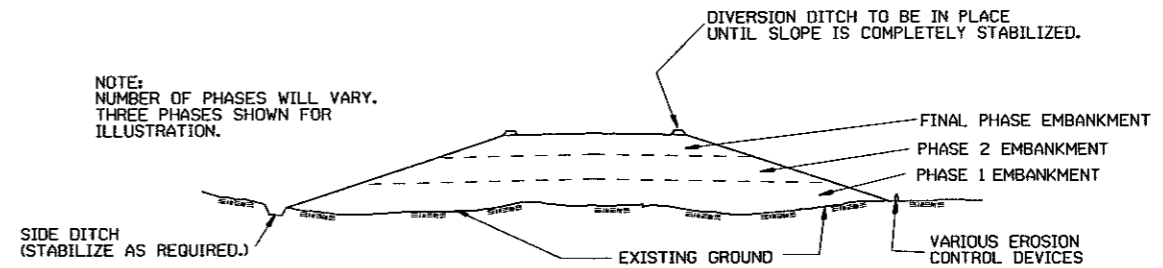
### GENERAL NOTE

ALL CUT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE EXCAVATED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 7.5 meters, MEASURED VERTICALLY.

### CONSTRUCTION SEQUENCE

1. EXCAVATE AND STABILIZE INTERCEPTOR AND/OR DIVERSION DITCHES.
2. PERFORM PHASE 1 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
3. PERFORM PHASE 2 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
4. PERFORM FINAL PHASE OF EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING. STABILIZE DITCHES. CONSTRUCT DITCH CHECKS, DIVERSION DITCHES, SEDIMENT BASINS, OR OTHER EROSION CONTROL DEVICES AS REQUIRED.

## EMBANKMENT



NOTE:  
NUMBER OF PHASES WILL VARY.  
THREE PHASES SHOWN FOR  
ILLUSTRATION.

### GENERAL NOTE

ALL EMBANKMENT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE CONSTRUCTED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 7.5 meters, MEASURED VERTICALLY.

### CONSTRUCTION SEQUENCE

1. CONSTRUCT DIVERSION DITCHES, DITCH CHECKS, SEDIMENT BASINS, SILT FENCES, OR OTHER EROSION CONTROL DEVICES AS SPECIFIED.
2. PLACE PHASE 1 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
3. PLACE PHASE 2 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
4. PLACE FINAL PHASE OF EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PLACE DIVERSION DITCHES AND SLOPE DRAINS AND MAINTAIN UNTIL ENTIRE SLOPE IS STABILIZED.

ARKANSAS STATE HIGHWAY COMMISSION

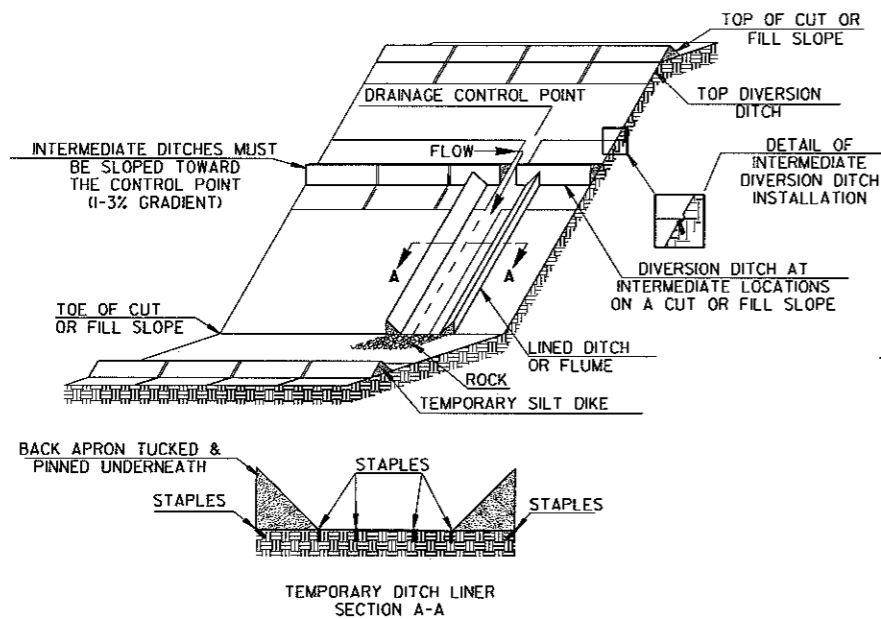
TEMPORARY EROSION  
CONTROL DEVICES

STANDARD DRAWING TEC-3 (M)

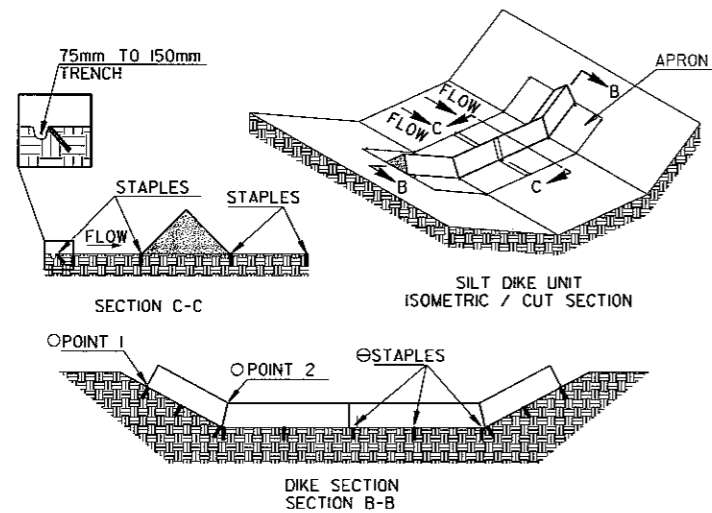


7-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE FILMED





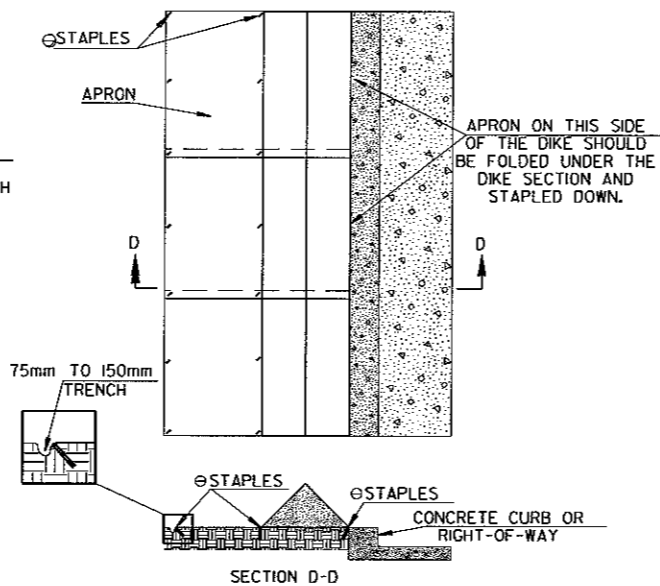
TRIANGULAR SILT DIKE INSTALLATION FOR DIVERSION DITCH AND/OR DITCH LINER



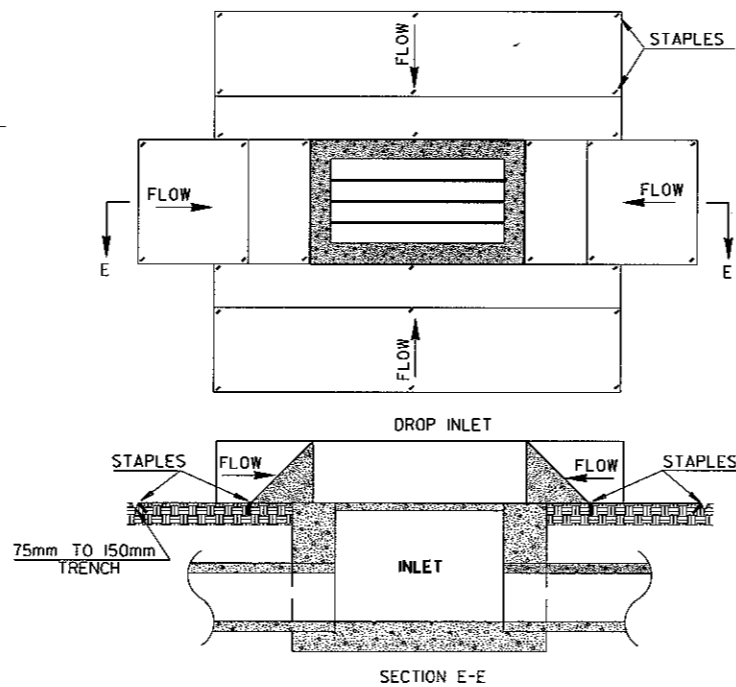
TRIANGULAR SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

○ POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.

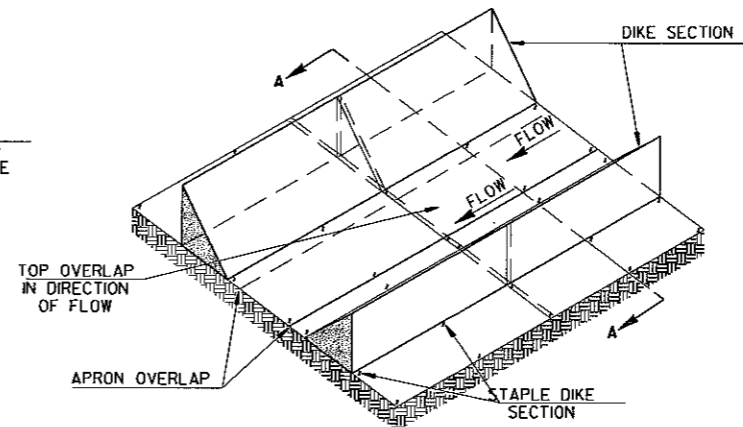
⊙ STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



TRIANGULAR SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER



TRIANGULAR SILT DIKE INSTALLATION FOR DROP INLETS

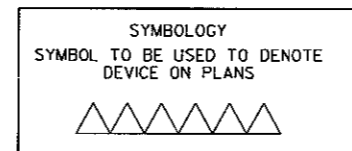


TRIANGULAR SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

GENERAL NOTES

1. THIS WORK SHALL CONSIST OF FURNISHING, INSTALLING, AND MAINTAINING THE TRIANGULAR SILT DIKE. THE DIKES SHALL BE USED AS A CONTINUOUS LINE BARRIER AT THE TOE OF SLOPE OR ACROSS THE ROADWAY DITCH TO CONTAIN SEDIMENT AND MINIMIZE EROSION, OR AS DIRECTED BY THE ENGINEER. THESE DIKES SHALL BE INSTALLED AND LOCATED AS SOON AS CONSTRUCTION WILL ALLOW OR AS DIRECTED BY THE ENGINEER.
2. TRIANGULAR SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST 200mm TO 250mm IN THE CENTER WITH EQUAL SIDES AND A 400mm TO 500mm BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL & ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE 600mm TO 900mm. THIS FABRIC SHOULD BE MILDEW RESISTANT, ROT-PROOF AND RESISTANT TO HEAT AND ULTRAVIOLET RADIATION MEETING REQUIREMENTS FOR SEDIMENT CONTROL IN AASHTO M288. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST 150mm TO 200mm LONG. STAPLES SHALL BE PLACED AS SHOWN ON THESE DETAILS.
3. ACCEPTED TRIANGULAR SILT DIKE, MEASURED AS PROVIDED ABOVE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID FOR TRIANGULAR SILT DIKE. PRICE BID WILL INCLUDE THE COST OF FURNISHING THE DIKES, INSTALLING, MAINTAINING AND REMOVAL WHEN DIRECTED BY THE ENGINEER.

THE CONTRACTOR SHALL INSPECT ALL DIKES AFTER EACH RAINFALL EVENT OF AT LEAST 13mm OR GREATER. ANY DEFICIENCIES OR DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED AND RELOCATED AS DIRECTED BY THE ENGINEER. IF THE DIKES ARE DAMAGED OR INADVERTENTLY MOVED DURING THE SILT REMOVAL PROCESS, THE CONTRACTOR SHALL IMMEDIATELY REPLACE AFTER DAMAGE OCCURS.



NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS.

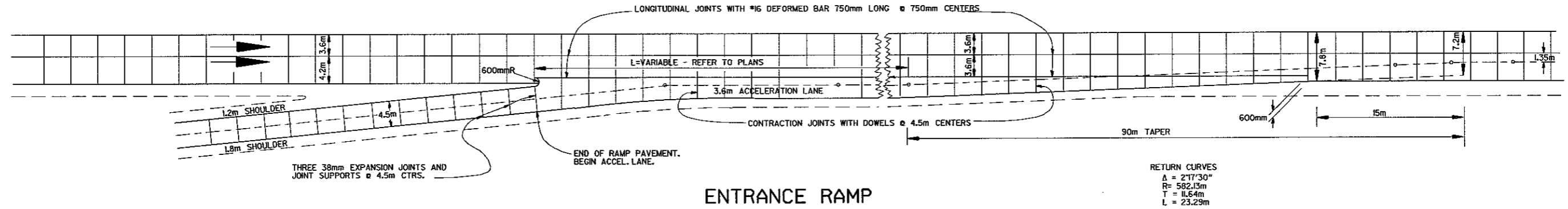
ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

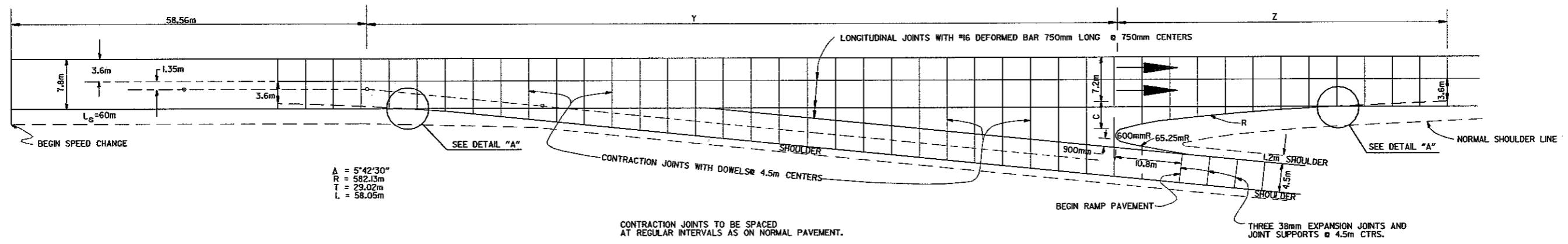
7-26-12	REVISED GENERAL NOTE 2.		
12-15-11	ISSUED		
DATE	REVISION		DATE FILMED

STANDARD DRAWING TEC-4 (M)

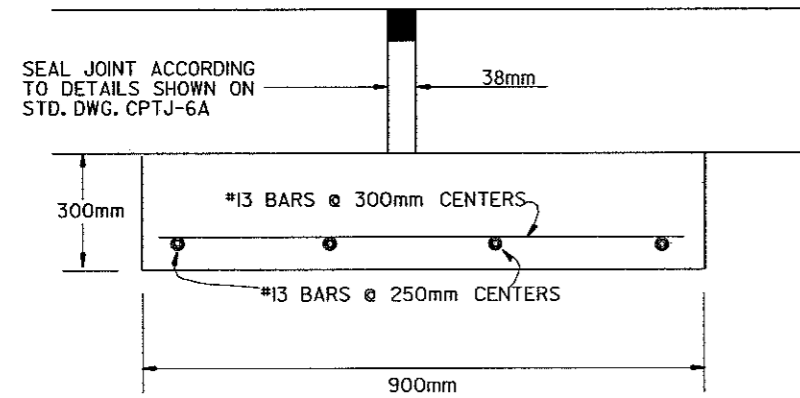




### ENTRANCE RAMP

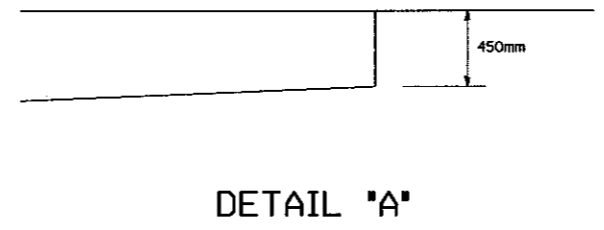


### EXIT RAMP



**DETAIL OF EXPANSION JOINT & JOINT SUPPORT**

NOTE: THE EXPANSION JOINTS SHALL BE MEASURED AND PAID FOR AS P.C.C. PAVEMENT (RAMP THICKNESS). THE JOINT SUPPORT MAY BE CONSTRUCTED WITH CLASS "A", "S", OR PAVING CONCRETE. PAYMENT FOR THE JOINT SUPPORT SHALL BE FOR THE CONTRACT UNIT PRICE BID FOR THE CLASS OF CONCRETE USED. ALL OTHER WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE JOINT SUPPORT SHALL BE SUBSIDIARY TO THE ABOVE ITEMS.



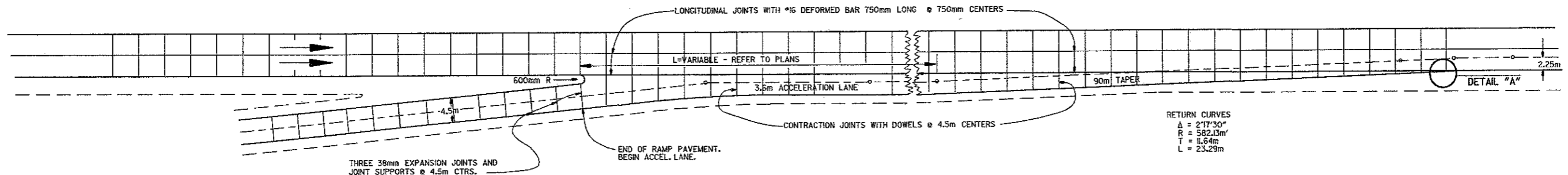
**DETAIL 'A'**

**EXIT RAMP**

DESIGN SPEED V	Y	NOSE OFFSET C	LENGTH NOSE TAPER Z	RETURN RADIUS R
km/hr.	m	m	m	m
60	90	2.4	28.8	174.0
80	96	3.0	36.0	217.5
100	102	3.6	50.4	354.6
110	108	4.2	63.0	474.6

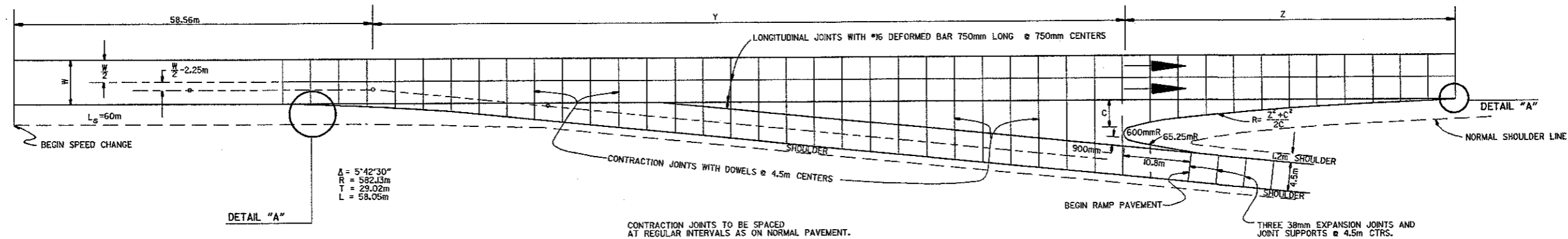
1-12-00	REDRAWN & REISSUED	
DATE	REVISION	DATE FIL'D

ARKANSAS STATE HIGHWAY COMMISSION  
 DETAILS OF STANDARD TURNOUT  
 FOR  
 ENTRANCE & EXIT RAMPS  
 STANDARD DRAWING TR-1(K)



### ENTRANCE RAMP

NOTE: JOINT SPACING ON THE MAIN LANES SHALL BE ADJUSTED AS NECESSARY TO CONFORM TO THESE JOINT LAYOUTS. THE MAIN LANE JOINT SPACING MAY BE REDUCED TO A 3.6m MINIMUM.

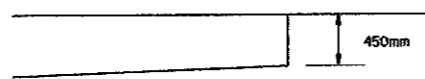


### EXIT RAMP

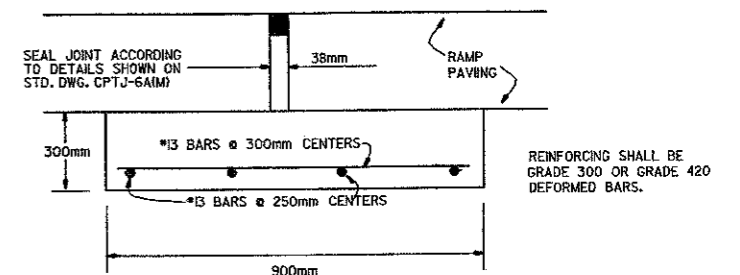
CONTRACTION JOINTS TO BE SPACED AT REGULAR INTERVALS AS ON NORMAL PAVEMENT.

### EXIT RAMP

DESIGN SPEED V	Y	NOSE OFFSET C	LENGTH NOSE TAPER Z	RETURN RADIUS R	ADDITIONAL SURFACING
km/hr.	m	m	m	m	sq. m
60	90	2.4	28.8	174.0	506.04
80	96	3.0	36.0	217.5	577.32
100	102	3.6	50.4	354.6	664.06
110	108	4.2	63.0	474.6	757.91



DETAIL 'A'



DETAIL OF EXPANSION JOINT & JOINT SUPPORT

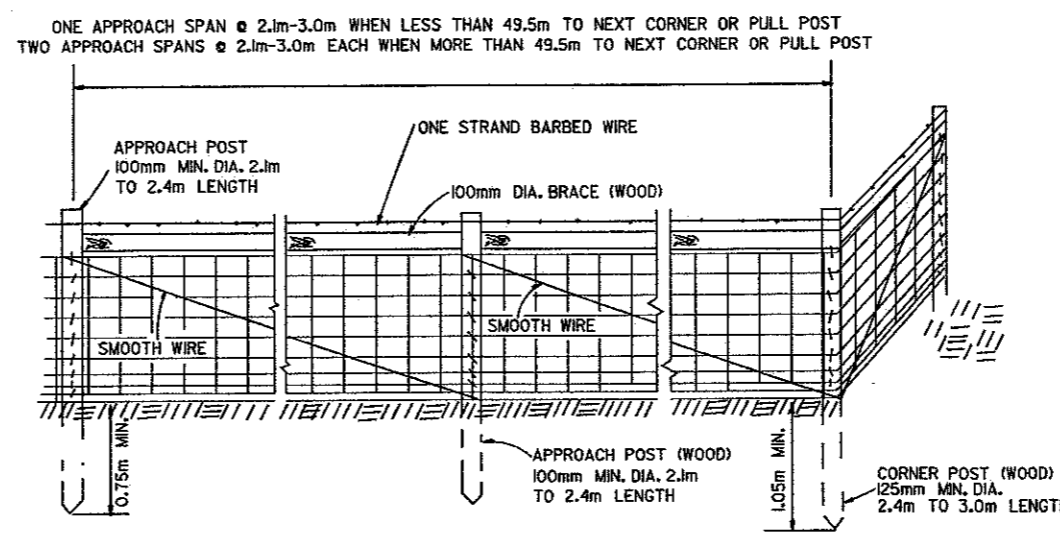
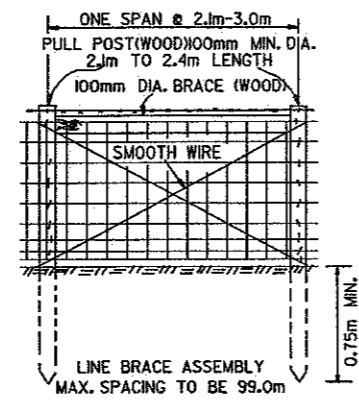
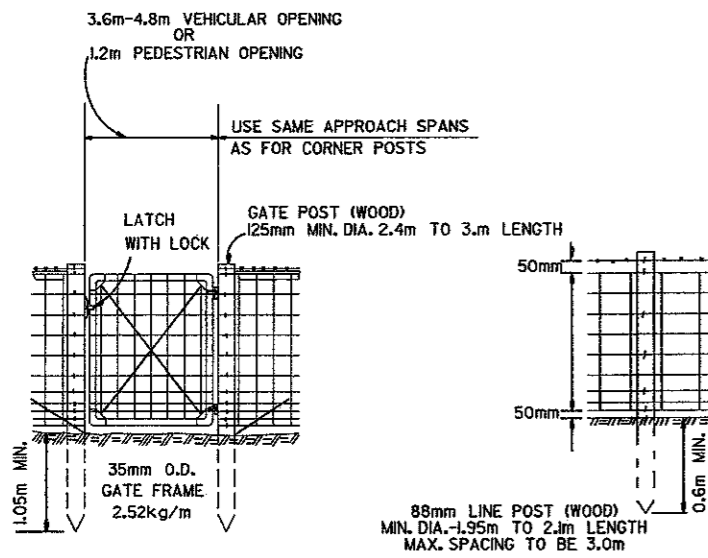
NOTE: THE EXPANSION JOINTS SHALL BE MEASURED AND PAID FOR AS P.C.C. PAVEMENT (RAMP THICKNESS) WHEN RAMP PAVING IS ASPHALT. EXPANSION JOINT IS NOT REQUIRED. THE JOINT SUPPORT MAY BE CONSTRUCTED WITH CLASS "A", "S", OR PAVING CONCRETE. PAYMENT FOR THE JOINT SUPPORT SHALL BE FOR THE CONTRACT UNIT PRICE BID FOR THE CLASS OF CONCRETE USED. ALL OTHER WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE JOINT SUPPORT SHALL BE INCLUDED IN THE PRICE BID FOR THE ABOVE ITEMS.

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD TURNOUT FOR ENTRANCE RAMPS & EXIT RAMPS (NON-REINFORCED)

STANDARD DRAWING TR-1A(M)

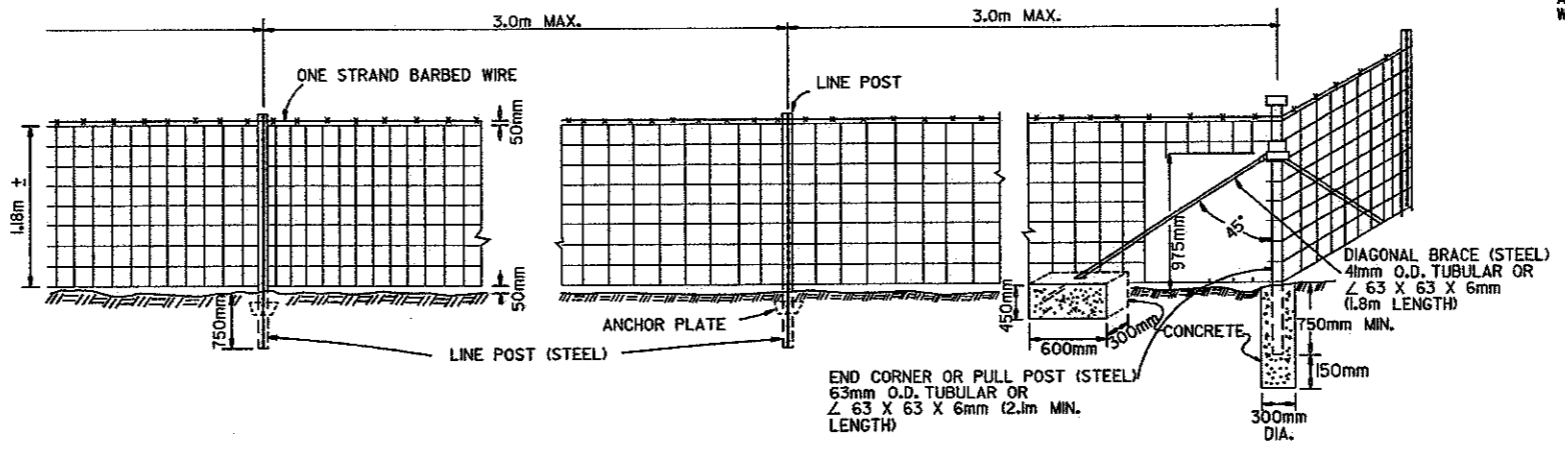
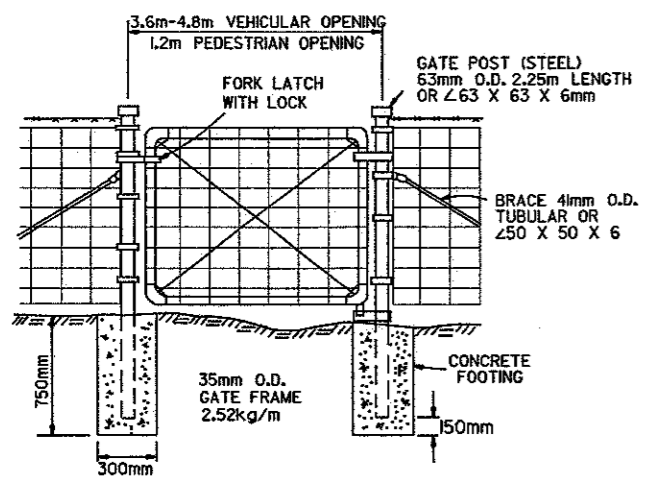
DATE	REVISION	DATE FILED
8-22-02	DELETED NOTE	
5-13-99	DELETED ** FORMULA, ADDED, EDITED & DELETED NOTES	
4-3-97	REVISED STEEL BARS TO SOFT METRIC	
10-12-95	ADJUSTED NOSE OFFSET TO	
7-20-95	CONVERTED TO METRIC	



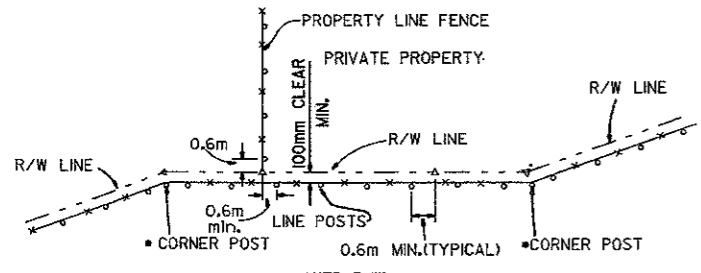
**GENERAL NOTES:**  
 STEEL LINE POSTS SHALL BE GALVANIZED, 2.1m IN LENGTH.  
 TUBULAR END, CORNERS, PULL, OR DIAGONAL BRACES MUST CONFORM TO THE DIMENSIONS AND WEIGHTS SPECIFIED ON STANDARD DRAWING WF-3 (CHAIN LINK).  
 THE CONTRACTOR SHALL FURNISH AT LEAST 25% OF WOOD LINE POSTS OF 2.1m LENGTHS IN ORDER TO PROVIDE SUFFICIENT SET IN SOFT GROUND OR SMALL DEPRESSIONS.  
 GATE HINGES AND LATCHES WITH LOCKS TO BE OF A TYPE APPROVED BY THE ENGINEER, DRIVEWAY GATES, EITHER SINGLE 3.6m OR 4.8m OR DOUBLE 1.8m TO 2.4m OPENINGS OF THE SAME TYPE AS THE PEDESTRIAN GATE, SHALL BE INSTALLED ON THE RIGHT SIDE OF EACH THROUGH LANE ROAD AT LARGE CULVERTS OR BRIDGE CROSS FENCE FOR USE BY MAINTENANCE EQUIPMENT. LOCATION OF GATES TO BE SHOWN ON THE PLANS OR AS DESIGNATED BY THE ENGINEER.

NOTE: STAPLE AT LEAST TOP, BOTTOM AND ALTERNATE WIRES OF WOVEN FABRIC FOR WOOD LINE POSTS.

**TYPE A FENCE (WOOD POSTS)**

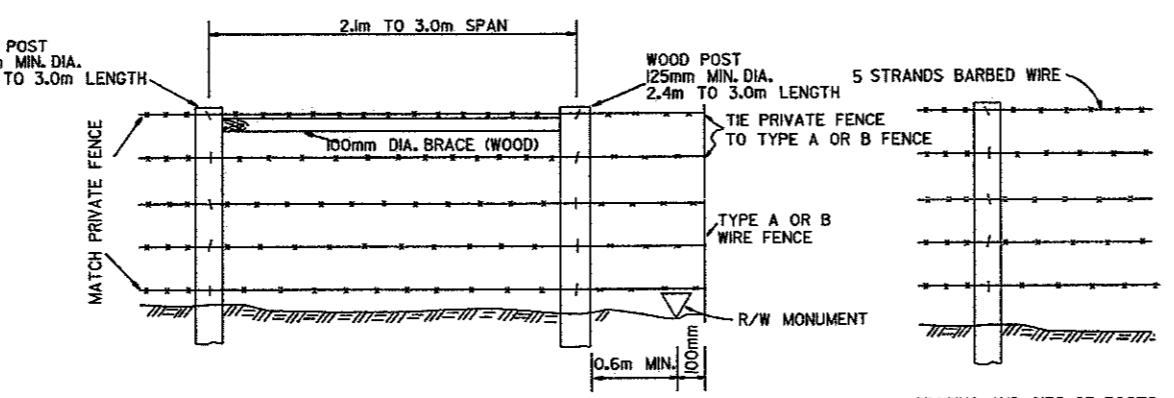


**TYPE A FENCE (STEEL POSTS)**



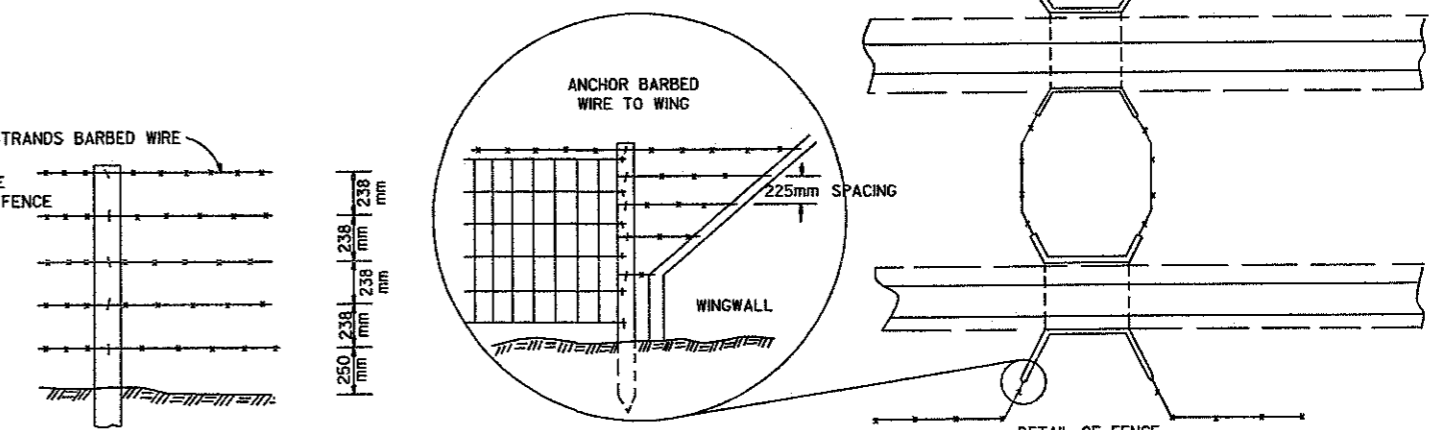
NOTE: RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY FENCE CONSTRUCTION. CORNER POSTS SHALL BE CONSTRUCTED .6m FROM THE RIGHT-OF-WAY MONUMENT OR AS DIRECTED BY THE ENGINEER.  
 ▲ - R/W MONUMENTS  
 ○ - FENCE POSTS

**RIGHT-OF-WAY FENCE LOCATION**



WHERE EXISTING PRIVATE FENCE CONSISTS OF STEEL POSTS, USE END POST ASSEMBLY AS SHOWN WITH TYPE A FENCE OR OTHER END POST ASSEMBLY AS APPROVED BY THE ENGINEER.

**PRIVATE FENCE TERMINAL INSTALLATION**



SPACING AND SIZE OF POSTS FOR TYPE B FENCE SHALL BE THE SAME AS TYPE A FENCE.

**TYPE B FENCE**

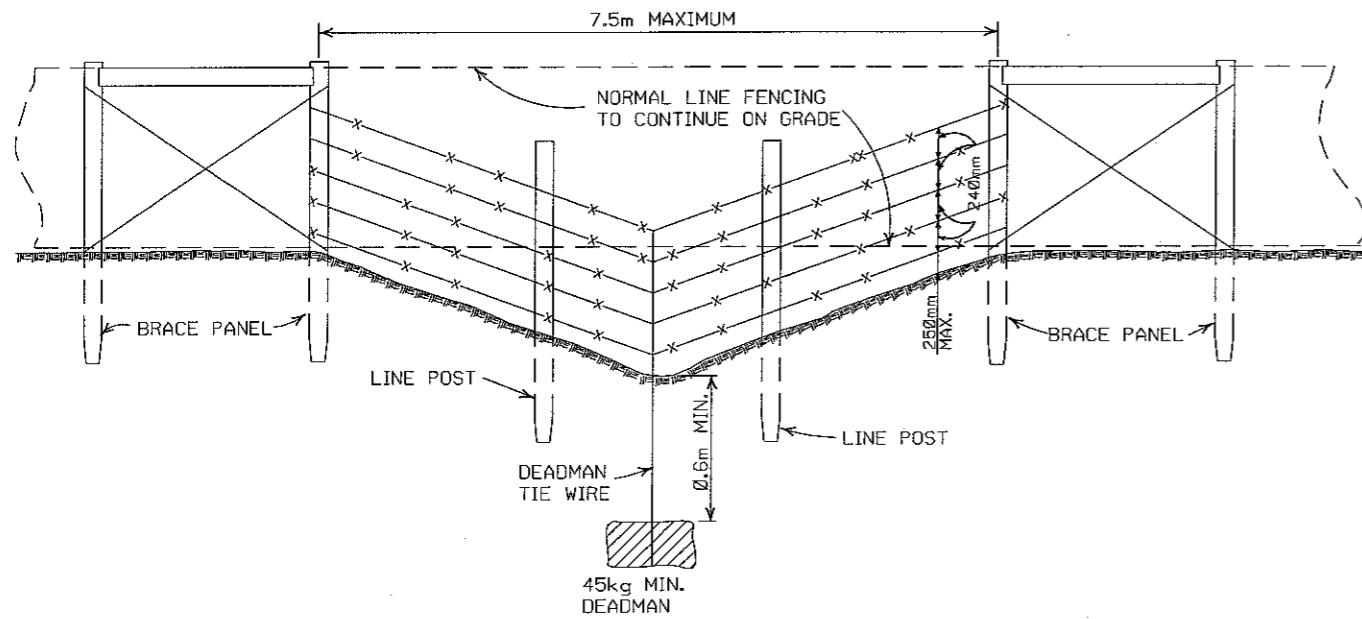
ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE  
TYPE A AND B

STANDARD DRAWING WF-1(M)

8-22-02	REVISED GENERAL NOTES	
10-19-96	REVISED ASTM REF. TO AASHTO	
1-22-95	REVISED R-O-W LOCATION DETAIL	
7-20-95	CONVERTED TO METRIC	7-20-95
DATE	REVISION	DATE





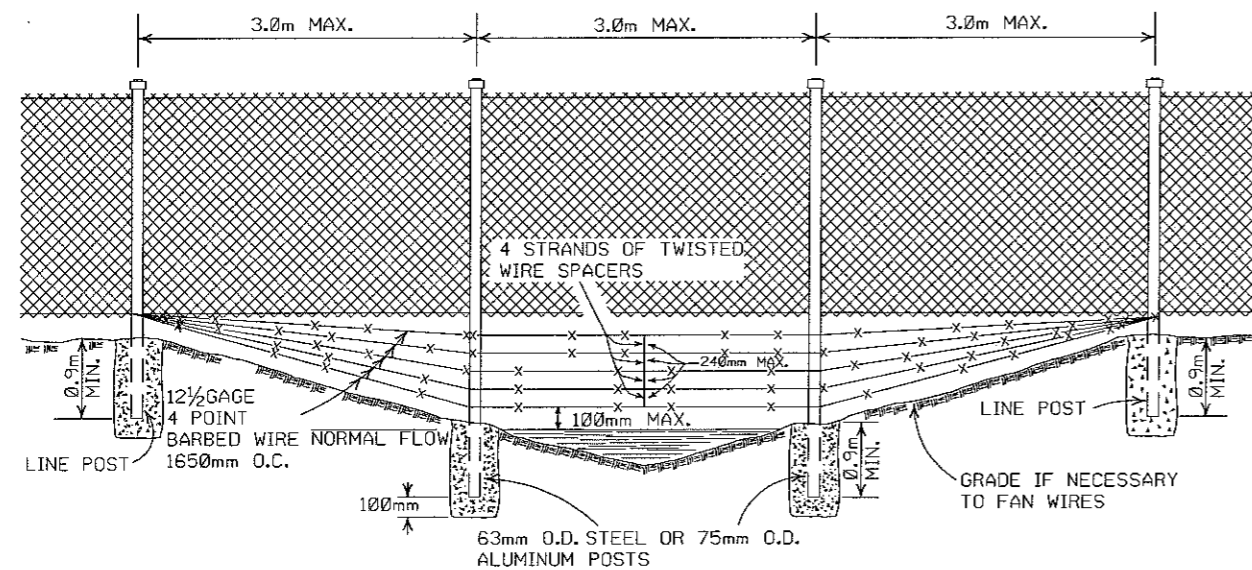
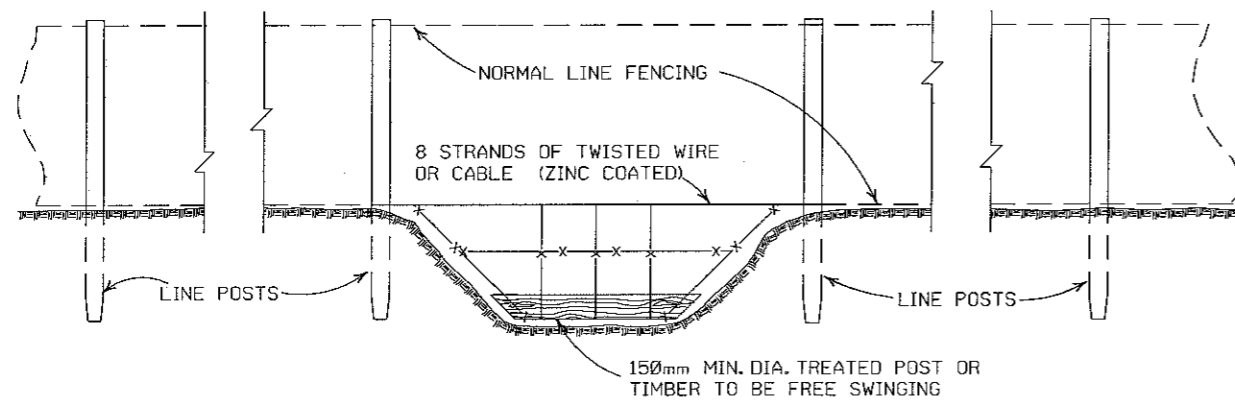
GENERAL NOTES:

THESE INSTALLATIONS TO BE USED WHERE NORMAL FENCING INSTALLATION WOULD CAUSE THE COLLECTING OF DRIFT IN THE CHANNEL OR THE DEPRESSION WILL NOT PERMIT NORMAL INSTALLATION. INSTALLATIONS WILL BE MADE ONLY WHERE DIRECTED BY THE ENGINEER.

WHEN A FENCE LINE APPROACHES A DITCH, GULLY, OR DEPRESSION; THE LAST POST ON LEVEL GROUND SHALL BE PLACED CLOSE ENOUGH TO THE EDGE OF THE DROP-OFF THAT THE FENCE MAY BE STRUNG TO THE POST IN THE DEPRESSION WITHOUT TOUCHING THE GROUND.

IN TERRAIN OF SUCH EXTREME IRREGULARITY THAT MINOR GRADING WILL NOT BE FEASIBLE, THE NORMAL FENCE SHALL CONTINUE ON GRADE AND THE GULLIES OR DEPRESSIONS TREATED BY AUXILIARY FENCES AS SHOWN.

PAYMENT FOR THE TYPE INSTALLATION USED WILL NOT BE MADE DIRECTLY, BUT WILL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR WIRE FENCE OR CHAIN LINK FENCE.



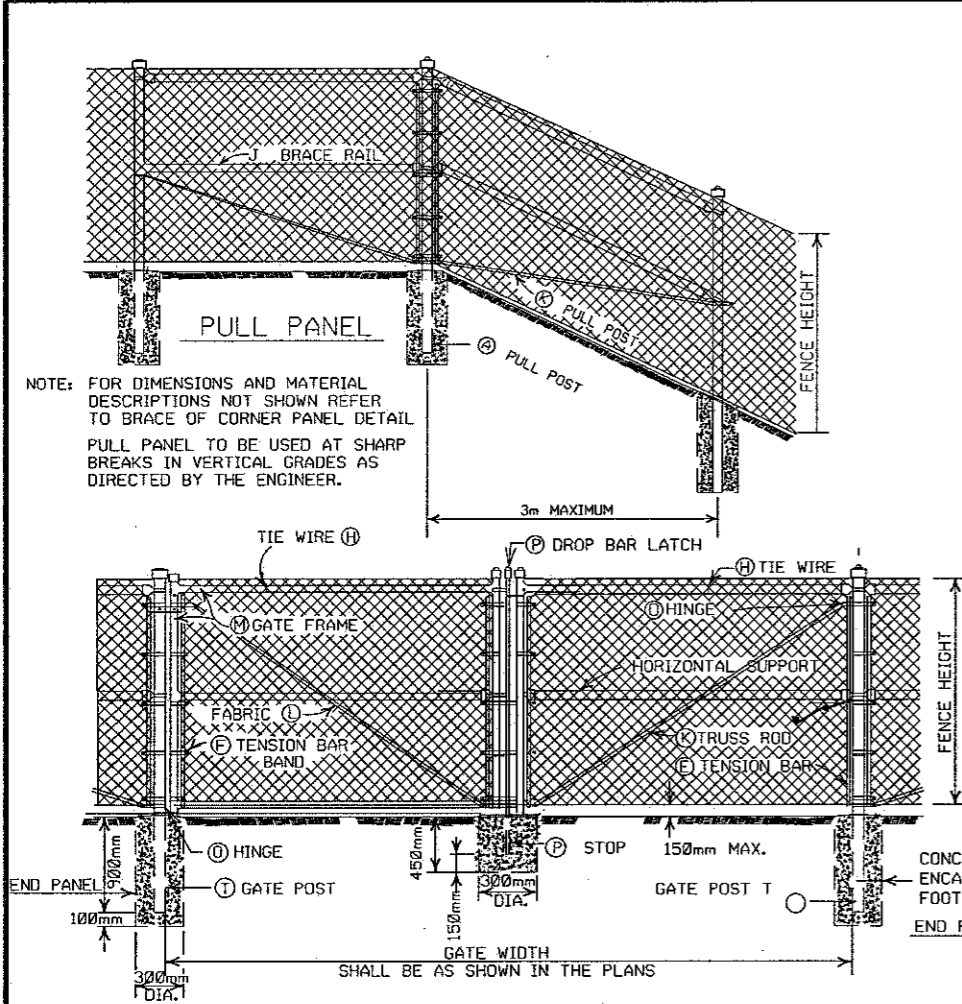
ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE WATER GAPS

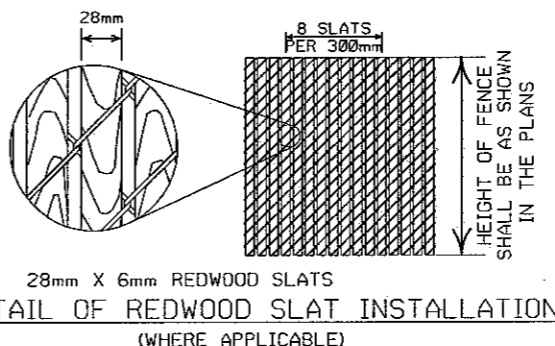
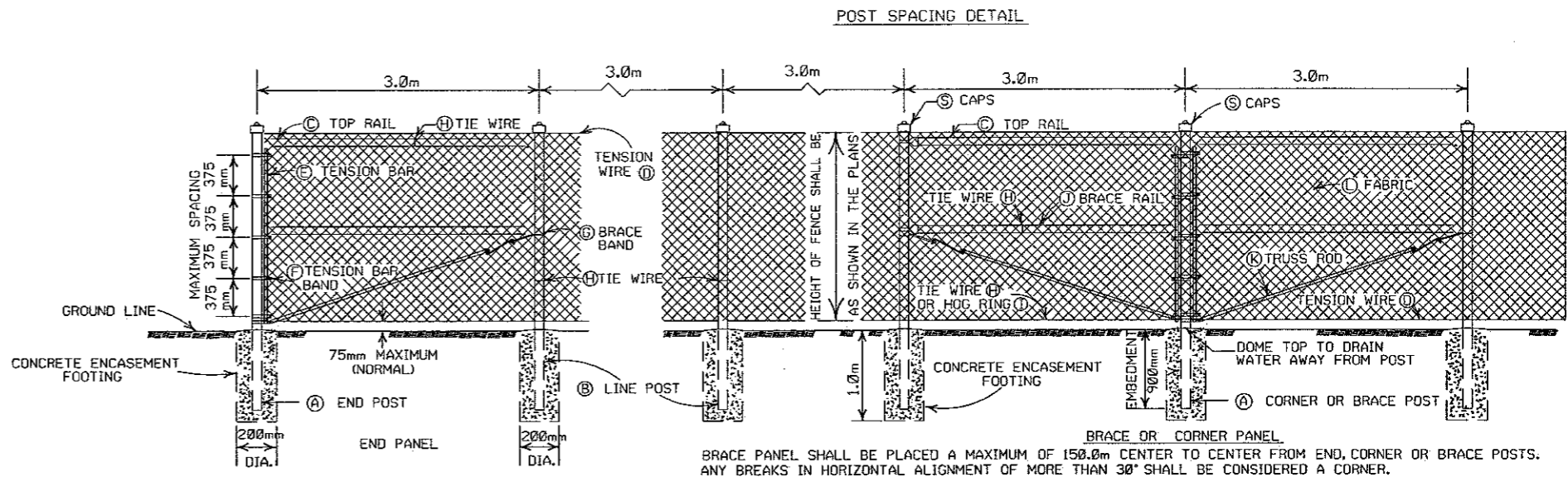
STANDARD DRAWING WF-2(M)



7-20-95	CONVERTED TO METRIC	
DATE	REVISION	DATE FILED



NOTE: FOR DIMENSIONS AND MATERIAL DESCRIPTIONS NOT SHOWN REFER TO BRACE OF CORNER PANEL DETAIL. PULL PANEL TO BE USED AT SHARP BREAKS IN VERTICAL GRADES AS DIRECTED BY THE ENGINEER.



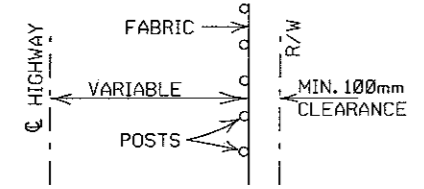
- GENERAL NOTES:**
- (C) CHAIN LINK FENCE BEING PLACED ON PRIVATE PROPERTY SHALL INCLUDE A TOP RAIL. ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER METER OF CHAIN LINK FENCE.
  - (D) TENSION WIRE: SHALL BE SECURE TO ALL TERMINAL, PULL, BRACE OR CORNER POSTS WITH TENSION BAR BANDS.
  - (J) BRACE RAIL: BRACE RAILS SHALL BE PROVIDED AT ALL TERMINAL, PULL, BRACE OR CORNER POSTS HALFWAY BETWEEN THE TOP RAIL AND GROUND LEVEL WHEN TOPRAIL IS SPECIFIED AND 300mm DOWN FROM TOP OF FABRIC WHEN TOPRAIL IS SPECIFIED. BRACE RAIL SHALL EXTEND FROM SUCH POST TO THE FIRST ADJACENT LINE POST.
  - (L) FABRIC: SHALL CONFORM TO REQUIREMENT OF THE SPECIFICATIONS.
  - (M) GATE FRAMES: SHALL BE CONSTRUCTED OF TUBULAR MEMBERS ASSEMBLED BY USE OF HEAVY PRESSED STEEL, MALLEABLE FITTING OR BY WELDING. ALL GATES SHALL HAVE ONE HORIZONTAL SUPPORT EXTENDING THE WIDTH OF THE GATE AT THE MIDPOINTS OF VERTICAL FRAME MEMBERS. THE COMPLETE FRAME SHALL BE RIGID AND HAVE AMPLE STRENGTH TO BE FREE FROM SAG AND TWIST.
  - (O) HINGES: SHALL BE OF HEAVY PATTERN, OF ADEQUATE STRENGTH FOR GATE, AND WITH LARGE BEARING SURFACES FOR CLAMPING IN POSITION. THE HINGE SHALL BE OF THE PROPER TYPE TO ALLOW FOR THE DESIGNATED DEGREE OF SWING. THE HINGE SHALL NOT TWIST OR TURN UNDER THE ACTION OF THE GATE. THE GATES SHALL BE CAPABLE OF BEING OPENED AND CLOSED EASILY BY ONE PERSON.
  - (P) LATCHES AND STOPS: SHALL BE PROVIDED FOR ALL GATES. GATES SHALL HAVE A DROP BAR LATCH. LATCHES SHALL BE ARRANGED FOR LOCKING. THE STOP FOR DROP BAR LATCHES SHALL BE SET IN CONCRETE AND ENGAGE THE PLUNGER OF THE BAR LATCH.
  - (S) CAPS: ALL POSTS, EXCEPT ROLL FORMED POSTS AND 'T' POSTS SHALL BE CAPPED OVER THE EXTERIOR OF THE POST, AND SHALL CONFORM TO ASTM F626.

HEIGHT OF FENCE FABRIC	(A) END, PULL CORNER OR BRACE POST		(B) LINE POSTS		(C) TOP RAIL			(D) TENSION WIRE		(E) TENSION BAR		(F) TENSION BAR BAND			(G) BRACE BAND	
	SIZE	TIE SPACING	SIZE	TIE SPACING	SIZE	TIE SPACING	MIN. LENGTH	SIZE	TIE SPACING	SIZE	LENGTH	SIZE	BOLT SIZE	SPACING	SIZE	BOLT SIZE
1.8m AND LESS	62.5mm O.D.	50mm O.D.	50mm O.D.	1 TIE EVERY 350mm OF FABRIC HEIGHT	40.63mm O.D.	1 TIE EVERY 600mm	3.0m	7 GAUGE COIL SPRING WIRE	1 TIE EVERY 300mm	MIN. OF 4.69mm x 18.75mm	MIN. OF 50mm FABRIC HEIGHT	18.75mm x 1.85mm	8mm x 31.25mm	1 BAND AT TOP AND BOTTOM 375mm MAX. INTERVAL BETWEEN BANDS	MIN. OF 18.75mm x 2.63mm	8mm x 31.25mm
OVER 1.8m TO 3.6m INCL.	75mm O.D.	62.5mm O.D.	62.5mm O.D.	1 TIE EVERY 350mm OF FABRIC HEIGHT	40.63mm O.D.	1 TIE EVERY 600mm	3.0m	7 GAUGE COIL SPRING WIRE	1 TIE EVERY 300mm	MIN. OF 4.69mm x 18.75mm	MIN. OF 50mm FABRIC HEIGHT	18.75mm x 1.85mm	8mm x 31.25mm	1 BAND AT TOP AND BOTTOM 375mm MAX. INTERVAL BETWEEN BANDS	MIN. OF 18.75mm x 2.63mm	8mm x 31.25mm

HEIGHT OF FENCE FABRIC	(H) TIE WIRE	(I) HOG RING	(J) BRACE RAIL		(K) TRUSS ROD	(L) FABRIC			(M) GATE FRAME		(N) HORIZONTAL SUPPORT	(O) HINGE TPE	(T) GATE POST		
	SIZE	SIZE	SIZE	TIE SPACING	SIZE	SIZE	MESH	SELVAGE	SIZE	TIE SPACING	SIZE	TIE SPACING	180° SWING	GATE WIDTH 3.6m & LESS	GATE WIDTH OVER 3.6m - 7.2m INCL.
1.8m AND LESS	MIN. OF 12 GA. STEEL OR 9 GA. ALUM.	SAME GAUGE AS FABRIC	40.63mm O.D.	1 TIE EVERY 600mm	MIN. OF 7.81mm ROUND WITH TIGHTENERS AND FITTINGS	9 GA.	50mm	KNUCK-ING AND/OR TWIST-ING	50mm O.D.	1 TIE EVERY 300mm	50mm O.D.	1 TIE EVERY 300mm	OFFSET	75mm O.D.	100mm O.D.
OVER 1.8m TO 3.6m INCL.	MIN. OF 12 GA. STEEL OR 9 GA. ALUM.	SAME GAUGE AS FABRIC	40.63mm O.D.	1 TIE EVERY 600mm	MIN. OF 7.81mm ROUND WITH TIGHTENERS AND FITTINGS	9 GA.	50mm	KNUCK-ING AND/OR TWIST-ING	50mm O.D.	1 TIE EVERY 300mm	50mm O.D.	1 TIE EVERY 300mm	OFFSET	75mm O.D.	100mm O.D.

NOTE: POST SIZES ARE FOR STEEL. WHERE ALUMINUM IS PROVIDED, LINE POSTS SHALL HAVE AN OUTSIDE DIAMETER OF 62.5mm FOR FENCE HEIGHT OF 1.8m AND LESS, AN OUTSIDE DIAMETER OF 75mm FOR FENCE HEIGHT OF 1.8m TO 3.6m. END, PULL, CORNER, AND BRACE POSTS SHALL HAVE AN OUTSIDE DIAMETER OF 75mm FOR FENCE HEIGHT OF 1.8m AND LESS, AN OUTSIDE DIAMETER OF 87.5mm FOR FENCE HEIGHTS OF 1.8m TO 3.6m. GATE POSTS WHERE GATE WIDTH IS 3.6m AND LESS SHALL HAVE AN OUTSIDE DIAMETER OF 87.5mm FOR FENCE HEIGHT OF 1.8m AND LESS. ALUMINUM TENSION WIRE SHALL BE 4.8mm IN DIAMETER, MINIMUM THICKNESS OF MATERIAL FROM WHICH EXPANSION SLEEVES SHALL BE MADE WILL BE 1.95mm. POSTS AND RAILS MAY HAVE ANY CROSS-SECTIONAL SHAPE THAT WILL MEET THE REQUIREMENTS OUTLINED IN THE SPECIFICATIONS.

OTHER DETAILS APPLY TO BOTH STEEL AND ALUMINUM FENCE.  
 ALL MISCELLANEOUS FITTINGS AND HARDWARE SHALL MEET THE REQUIREMENTS AND PRODUCTION TOLERANCES AS SET FORTH IN THE SPECIFICATIONS. 9 GAUGE ALUMINUM WIRE SHALL BE ACCEPTABLE FOR TIEING FABRIC TO TUBULAR AND ROLL FORMED MEMBERS OF STEEL FENCE.



INSTALLATION MAY BE MODIFIED AS SHOWN IN THE PLANS  
**TYPICAL INSTALLATION DIAGRAM**

POSTS AND RAILS

SIZE O.D. mm	GRADE 1 AND ALUMINUM ALLOY						GRADE 2		
	O.D. mm	WALL THICKNESS	KGS. PER METER		O.D. mm	WALL THICKNESS	KGS. PER METER		
			STEEL	ALUMINUM					
42	42	3.6	3.38	1.17	42	2.8	2.74		
50	48	3.7	4.05	1.40	48	3.0	3.39		
62.5	50	3.9	5.43	1.88	50	3.3	4.64		
75	73	5.2	8.62	2.96	73	4.0	6.90		
87.5	89.9	5.49	11.3	3.90	89.9	4.06	8.50		
100	102	5.7	13.56	4.67	102	4.1	9.76		

TOLERANCES ON DIMENSIONS AND WEIGHTS ACCORDING TO AASHTO M 181

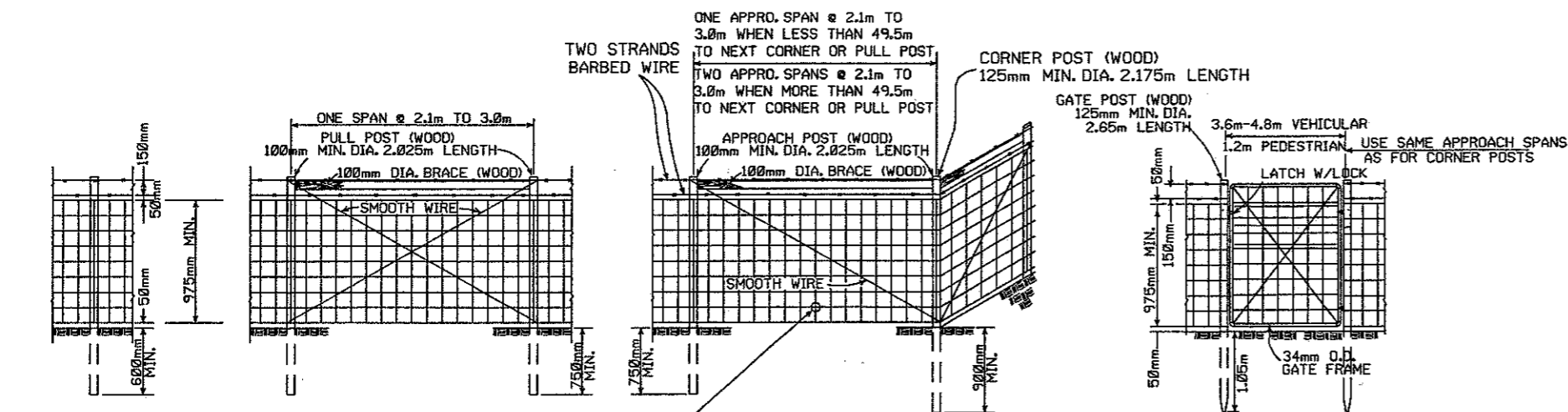
DATE	REVISION	DATE FILMED
11-17-10	REVISED TRUSS ROD	
12-10-09	REVISED POSTS & RAILS TABLE	
5-21-09	ADDED TABLE & GEN. NOTE (C)	
8-22-02	REVISED NOTES, REMOVED TABLE, & REMOVED FENCE ALTERNATE	
4-03-97	REVISED BRACE RAIL NOTE	
10-18-96	REVISED AASHTO & ASTM REF.	
7-20-95	CONVERTED TO METRIC	

ARKANSAS STATE HIGHWAY COMMISSION

**CHAIN LINK FENCE**

STANDARD DRAWING WF-3(M)





**GENERAL NOTES:**

STEEL LINE POSTS SHALL BE PAINTED OR GALVANIZED. TUBULAR END, CORNER, PULL, OR DIAGONAL BRACES MUST CONFORM TO THE DIMENSIONS AND WEIGHTS SPECIFIED ON STANDARD DRAWING WF-3 (CHAIN LINK). APPROVED ALTERNATES ARE ACCEPTABLE. AN ACCEPTABLE TOLERANCE IN LENGTH OF TUBULAR OR WOODEN POSTS SHALL BE - 25mm TO +50mm. TUBULAR POSTS MUST BE PAINTED OR GALVANIZED.

THE CONTRACTOR SHALL FURNISH AT LEAST 25% OF TIMBER LINE POSTS OF 2.1m LENGTHS IN ORDER TO PROVIDE SUFFICIENT SET IN SOFT GROUND OR SMALL DEPRESSIONS.

DRIVEWAY GATES, EITHER SINGLE 3.6m TO 4.8m OR DOUBLE 1.8m TO 2.4m OPENING OF THE SAME TYPE AS THE PEDESTRIAN GATE, SHALL BE INSTALLED ON THE RIGHT SIDE OF EACH THROUGH LANE ROAD AT LARGE CULVERTS OR BRIDGE CROSS FENCE, FOR USE OF MAINTENANCE EQUIPMENT. LOCATION OF GATES TO BE SHOWN ON PLANS OR AS DESIGNATED BY THE ENGINEER.

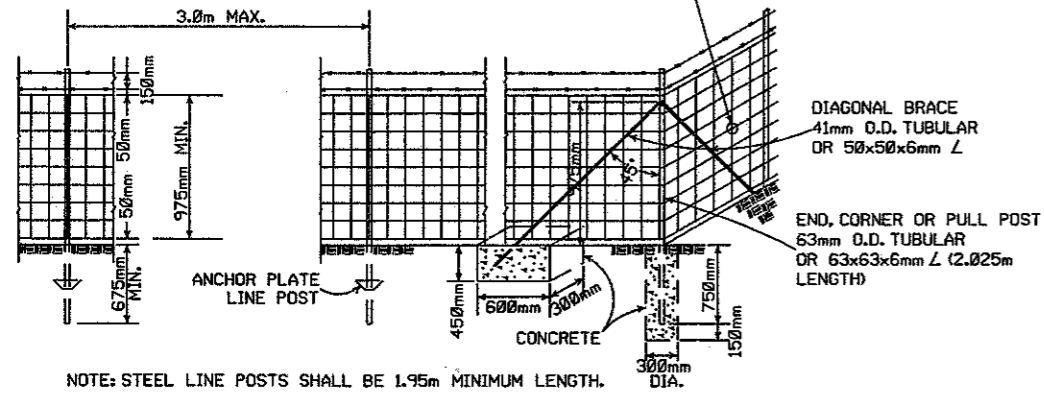
AT STREAM CROSSINGS, THE FENCE SHALL NOT BE CONSTRUCTED ACROSS LARGE STREAMS. WHERE CLEARANCE IS SUFFICIENT FROM THE TOP OF THE BANK TO THE BRIDGE STRUCTURE A CROSS CONNECTION SHALL BE CONSTRUCTED BETWEEN THE FENCE ON EACH SIDE OF THE ROAD. WHERE THE CLEARANCE IS NOT SUFFICIENT, THE FENCE SHALL BE TERMINATED WITH CROSS CONNECTIONS AND END POSTS ADJACENT TO BRIDGE ABUTMENTS OR CULVERT WINGWALLS.

LINE POST  
75mm MIN. DIA. 1.875m LENGTH  
MAX. SPACING TO BE 3.0m

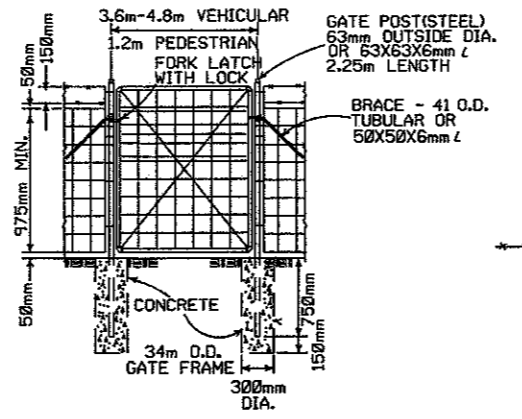
LINE BRACE ASSEMBLY  
MAX. SPACING TO BE 100m

**TYPE C FENCE (WOOD POSTS)**

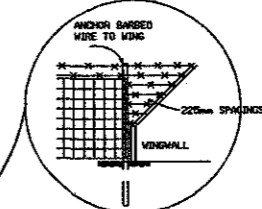
OTHER APPROVED TIES WILL BE PERMITTED



**TYPE C FENCE (STEEL POSTS)**



NOTE: USE 10 X 30mm LAG BOLT & SHIELD OR AS APPROVED BY THE ENGINEER.

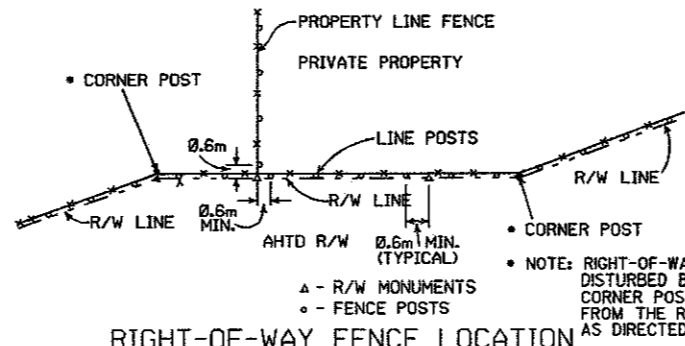


DETAIL OF FENCE CONSTRUCTION AT LARGE CULVERTS (1.5m HEIGHT AND OVER)

SPLICE FOR BARBED WIRE BETWEEN PULL POST ASSEMBLY SHALL BE BY THE 'EYE METHOD' AS DESCRIBED AS FOLLOWS: THE ENDS OF THE BARBED WIRE SHALL BE BENT TO FORM A LOOP. THE LOOPS SHALL BE CONNECTED. AFTER THE LOOPS ARE CONNECTED THE ENDS OF THE WIRE SHALL BE WRAPPED AROUND THE PROJECTING WIRES A MINIMUM OF 4 TIMES FOR EACH WIRE LOOP.

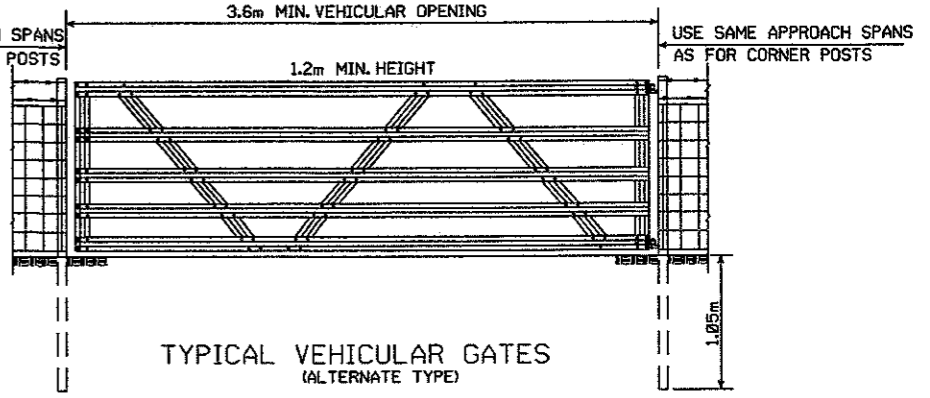
SPLICE FOR WOVEN WIRE BETWEEN PULL POST SHALL BE BY THE 'WESTERN UNION METHOD' AS DESCRIBED AS FOLLOWS: THE VERTICAL WIRES FOR EACH END OF THE FENCE FABRIC SHALL BE PLACED SIDE BY SIDE AND THE PROJECTING HORIZONTAL WIRES SHALL BE WRAPPED A MINIMUM OF 4 TIMES AROUND THE HORIZONTAL WIRES OF THE FIRST WEB.

STAPLE AT LEAST TOP, BOTTOM AND ALTERNATE WIRES OF WOVEN FABRIC FOR WOOD LINE POSTS.

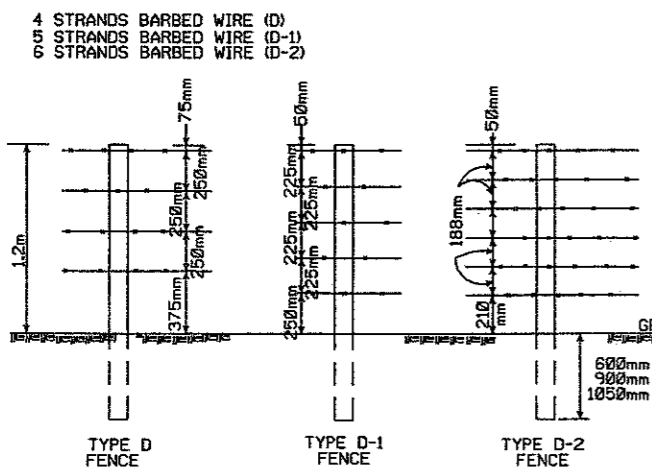


**RIGHT-OF-WAY FENCE LOCATION**

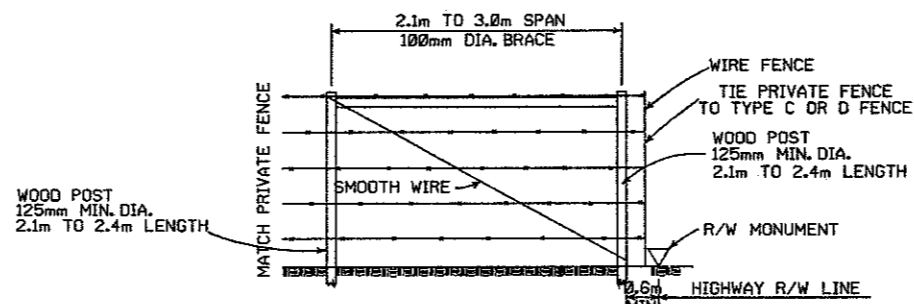
USE SAME APPROACH SPANS AS FOR CORNER POSTS



**TYPICAL VEHICULAR GATES (ALTERNATE TYPE)**



NOTE: SPACING AND SIZE (EXCEPT LENGTH) OF POSTS, APPROACH SPANS, PULL POST ASSEMBLIES, AND CORNER BRACING FOR TYPE D FENCE SHALL CONFORM TO TYPE C FENCE. USE GALVANIZED STAPLES ON WOOD POSTS AND APPROVED FASTENERS ON STEEL POSTS.



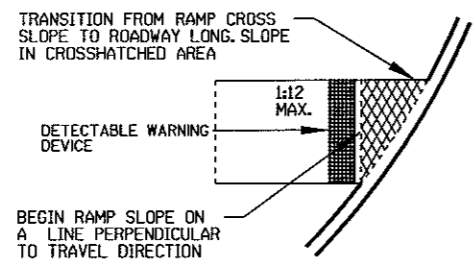
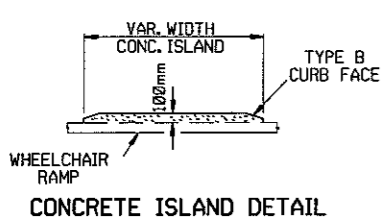
**PRIVATE FENCE TERMINAL INSTALLATION**  
WHERE EXISTING FENCE CONSISTS OF STEEL POSTS, USE END POST ASSEMBLY AS SHOWN IN TYPE C FENCE OR OTHER END POST ASSEMBLY AS APPROVED BY THE ENGINEER.

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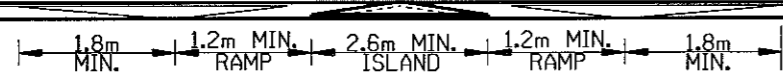
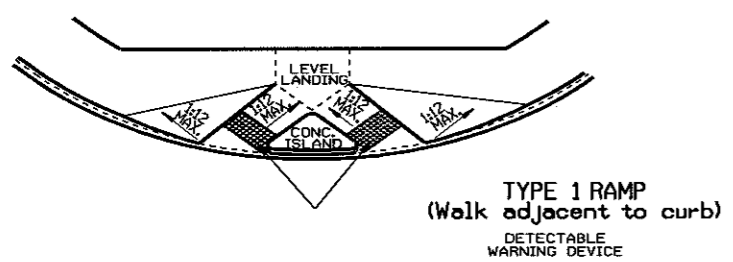
**WIRE FENCE TYPE C AND D**

8-22-02	REVISED GENERAL NOTES		
10-8-96	REVISED AASHTO		
8-22-95	REVISED R-O-W LOCATION DETAIL		
7-20-95	CONVERTED TO METRIC		
DATE	BY	DATE	FILED

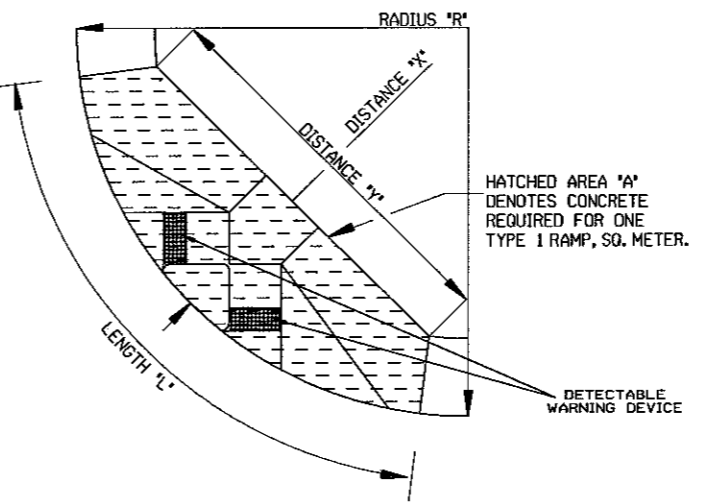
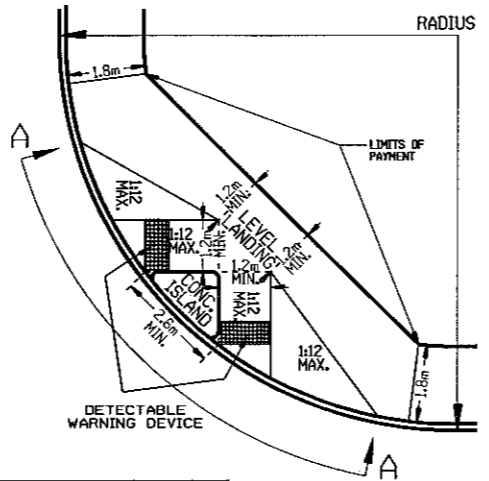
STANDARD DRAWING WF-4(M) METRIC



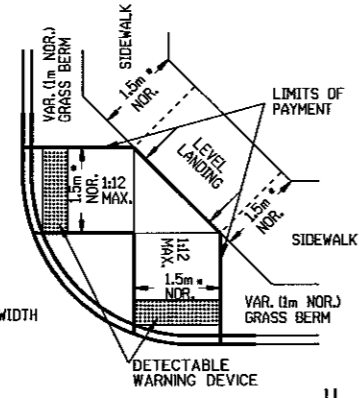
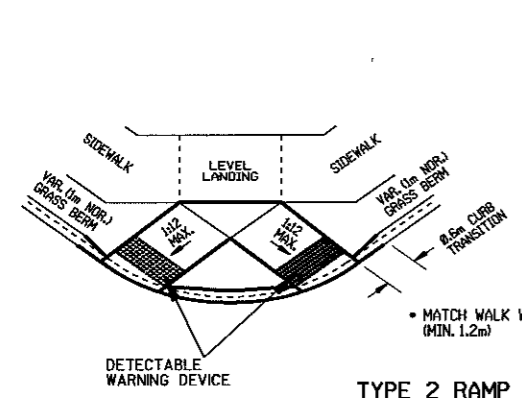
SLOPE TRANSITION DETAILS



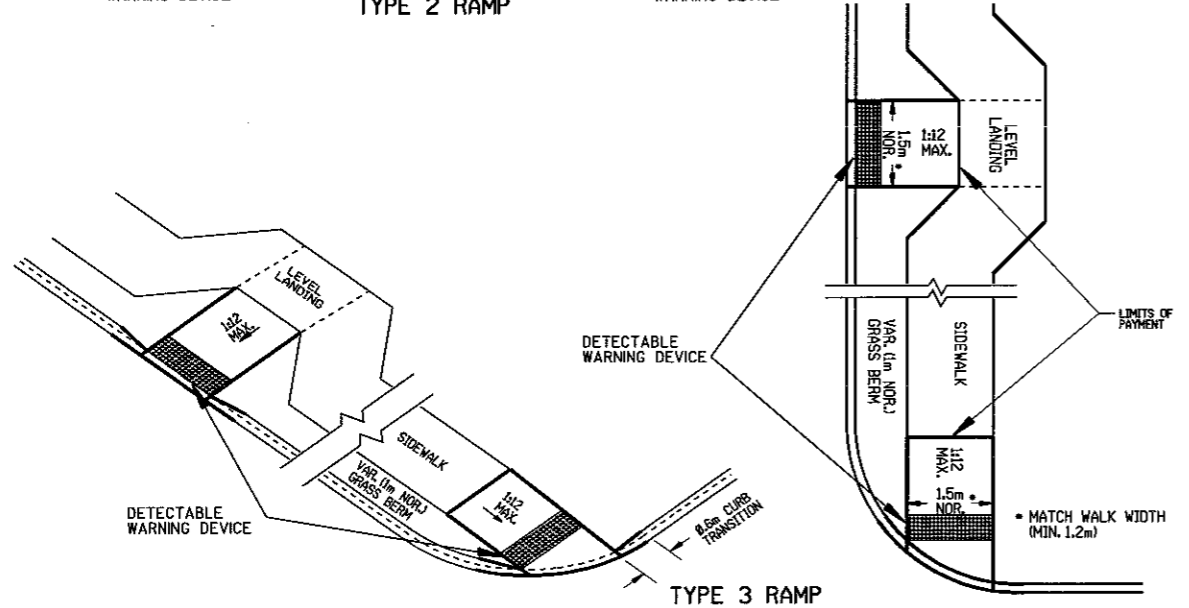
SECTION A-A



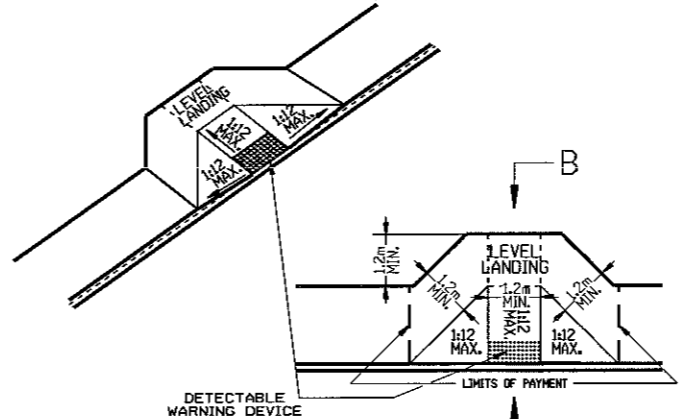
NOTE: THE CROSS SLOPE OF THE RAMPS, LEVEL LANDINGS, AND SIDEWALKS SHALL NOT EXCEED 2.0% UNLESS REQUIRED TO MATCH STREET LONGITUDINAL GRADE.



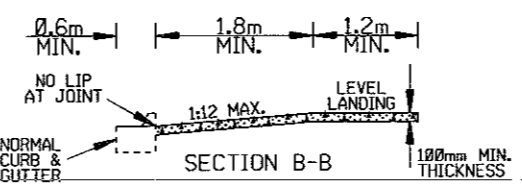
TYPE 2 RAMP



TYPE 3 RAMP



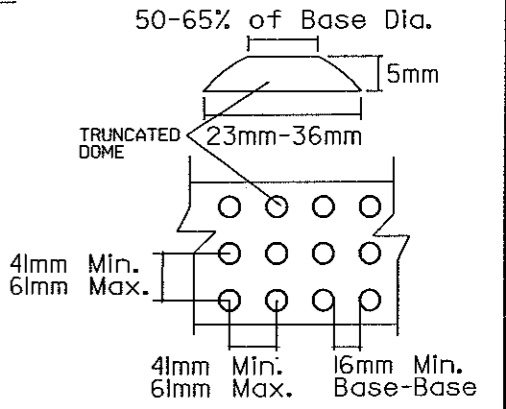
TYPE 4 RAMP (Walk adjacent to curb)



TYPE 1 RAMP DIMENSIONS AND QUANTITIES

RADIUS 'R' meter	DISTANCE 'D' meter	DISTANCE 'D' meter	LENGTH 'L' meter	RAMP AREA 'A' sq. meter
4.5	3.51	5.02	10.75	21.29
5	3.49	5.64	10.79	22.32
6	3.46	6.63	11.06	24.38
7	3.44	7.58	11.44	26.41
8	3.43	8.37	11.86	28.29
9	3.42	9.09	12.29	29.94
10	3.41	9.75	12.73	31.51
11	3.40	10.36	13.16	33.00
12	3.39	10.94	13.59	34.43
13	3.39	11.49	14.01	35.80
14	3.38	12.02	14.42	37.12
15	3.38	12.52	14.82	38.40
16	3.37	13.00	15.21	39.64
17	3.37	13.46	15.59	40.83
18	3.37	13.91	15.97	42.00
19	3.37	14.34	16.34	43.13
20	3.36	14.76	16.70	44.23

GENERAL NOTES FOR DETECTABLE WARNING DEVICES  
THE DETECTABLE WARNING DEVICE SHALL BE LOCATED SO THAT THE NEAREST EDGE OF THE DEVICE IS 150mm TO 205mm FROM THE FACE OF THE CURB. TRUNCATED DOMES IN THE DETECTABLE WARNING SURFACE SHALL MEET THE REQUIREMENTS OF THE GEOMETRIC CONFIGURATION SHOWN. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES. DETECTABLE WARNING DEVICE SHALL BE 610mm IN THE DIRECTION OF TRAVEL AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR FLUSH SURFACE. DETECTABLE WARNING DEVICE SHALL BE ON THE AHTD QUALIFIED PRODUCTS LIST FOR CAST-IN-PLACE TACTILE PANELS (ADA DETECTABLE WARNING).



DETECTABLE WARNING DEVICE DETAIL

GENERAL NOTES:

- IN NEW CONSTRUCTION, UNLESS OTHERWISE INDICATED ON THE PLANS, WHEELCHAIR RAMPS ARE TO BE PROVIDED AT ALL CORNERS OF CURBED STREET INTERSECTIONS AND MID-BLOCK CROSSWALK LOCATIONS.
- IN ALTERATIONS WHEELCHAIR RAMPS ARE TO BE PROVIDED AT CURBED STREET INTERSECTIONS WITH PEDESTRIAN TRAFFIC AND MID-BLOCK CROSSWALK LOCATIONS.
- THE LENGTH OF THE RAMP SHALL BE SUCH THAT THE SLOPE DOES NOT EXCEED 1:12. THE SURFACE TEXTURE OF THE RAMP SHALL CONFORM TO A CLASS 6 FINISH ACCORDING TO SECTION 802.19.
- THE NORMAL GUTTER GRADE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP.
- ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION.
- THE MINIMUM THICKNESS OF THE RAMP, WALK, & LANDING SHALL BE 100mm. THE MINIMUM WIDTH OF THE RAMPS SHALL BE THE EXISTING WALK WIDTH OR 900mm, WHICHEVER IS GREATER.
- RAMPS SHALL BE MODIFIED AS NECESSARY TO INSURE THAT THEY ARE PARALLEL TO A LINE DRAWN FROM THE CENTER OF ONE RAMP TO THE CENTER OF THE RAMP ON THE OPPOSITE SIDE OF THE INTERSECTION.
- THE DIMENSIONS AND QUANTITIES SHOWN ON THIS DRAWING ARE FOR A 90° INTERSECTION ONLY. DIMENSIONS AND QUANTITIES FOR SKEWED INTERSECTIONS WILL VARY, AND ARE TO BE DETERMINED BY THE ENGINEER.

RAMP SELECTION CRITERIA

CHOICE	DESCRIPTION
FIRST CHOICE	TYPE 1 CORNER LOCATIONS WITH THE WALK ADJACENT TO THE CURB (BOTH NEW CONSTRUCTION AND ALTERATIONS). TYPE 2 CORNER LOCATIONS WITH THE WALK OFFSET FROM THE CURB A DISTANCE INSUFFICIENT TO ALLOW THE REQUIRED RAMP SLOPE (BOTH NEW CONSTRUCTION AND ALTERATIONS). TYPE 3 CORNER LOCATIONS WITH THE WALK OFFSET FROM THE CURB A DISTANCE SUFFICIENT TO ALLOW THE REQUIRED RAMP SLOPE (BOTH NEW CONSTRUCTION AND ALTERATIONS). TYPE 4 TANGENT LOCATIONS (BOTH NEW CONSTRUCTION AND ALTERATIONS).
SECOND CHOICE	TYPE 5 TANGENT LOCATIONS (ALTERATIONS ONLY).
THIRD CHOICE	TYPE 6 CORNER LOCATIONS (ALTERATIONS ONLY). THIS RAMP MAY BE USED ONLY IF THE TYPE 5 RAMPS CANNOT BE PLACED AT THE ENDS OF THE RADIUS.
FOURTH CHOICE	IF SITE CONSTRAINTS PREVENT THE CONSTRUCTION OF ANY OF THE TYPES LISTED, THEN AND ONLY THEN CAN THE 1:12 MAX. SLOPE ON THE RAMP BE EXCEEDED TO PROVIDE ACCESS TO THE STREET LEVEL (ALTERATIONS ONLY). THE SLOPE CAN BE STEEPENED TO 1:10 MAX. FOR A MAX. LENGTH OF 1.5m OR A 1:8 MAX. FOR A MAX. LENGTH OF 0.6m. SLOPES STEEPER THAN 1:8 ARE NOT ALLOWED UNDER ANY CIRCUMSTANCES.

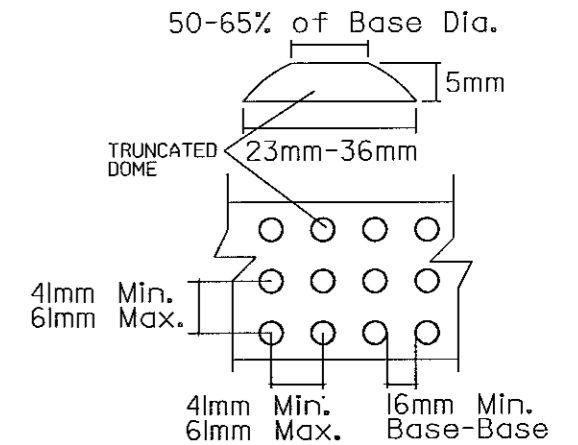
NOTE: IN ALTERATIONS, THE SELECTION OF THE TYPE OF WHEELCHAIR RAMP TO BE CONSTRUCTED SHALL BE BASED ON THE AMOUNT OF RIGHT-OF-WAY AVAILABLE, AND ON THE PRESENCE OF OTHER SITE CONSTRAINTS (UTILITIES, BUILDINGS, ETC.). THE TABLE ABOVE LISTS THE ORDER IN WHICH THE RAMPS ARE TO BE CONSIDERED. AN ALTERATION IS DEFINED AS A PROJECT THAT CHANGES OR AFFECTS THE USE OF A PEDESTRIAN PATHWAY (OVERLAYS, SIGNALIZATION PROJECTS, ETC.) BUT DOES NOT REQUIRE THE PURCHASE OF ADDITIONAL RIGHT-OF-WAY. ALL PROJECTS THAT REQUIRE THE PURCHASE OF ADDITIONAL RIGHT-OF-WAY WILL USUALLY BE CONSIDERED NEW CONSTRUCTION FOR THE PURPOSES OF THE CHART ABOVE.

DATE	REVISION	DATE	FILM
11-10-05	REVISED TO NEW SIDEWALK POLICY		
10-9-03	REVISED GEN. NOTES & ADDED NOTE		
4-10-03	REV. DETECTABLE WARNING DEVICES		
8-22-02	ADD DETECTABLE WARNING DEVICES		
3-30-00	ADD SLOPE TRANS. & REV. ISL. DIMS.		
11-18-98	REVISED NOTES		
8-12-98	REVISED TEXTURE		
7-02-98	REDRAWN & REISSUED		
10-18-96	CORRECTED DIMENSIONS		
7-20-95	CONVERTED TO METRIC		

ARKANSAS STATE HIGHWAY COMMISSION  
**WHEELCHAIR RAMPS  
NEW CONSTRUCTION  
AND ALTERATIONS**  
STANDARD DRAWING WR-1(KM)



**GENERAL NOTES FOR DETECTABLE WARNING DEVICES**  
 THE DETECTABLE WARNING DEVICE SHALL BE LOCATED SO THAT THE NEAREST EDGE OF THE DEVICE IS 150mm TO 205mm FROM THE FACE OF THE CURB. TRUNCATED DOMES IN THE DETECTABLE WARNING SURFACE SHALL MEET THE REQUIREMENTS OF THE GEOMETRIC CONFIGURATION SHOWN. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES. DETECTABLE WARNING DEVICE SHALL BE 610mm IN THE DIRECTION OF TRAVEL AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR FLUSH SURFACE. DETECTABLE WARNING DEVICE SHALL BE ON THE AHTD QUALIFIED PRODUCTS LIST FOR CAST-IN-PLACE TACTILE PANELS (ADA DETECTABLE WARNING).



**DETECTABLE WARNING DEVICE DETAIL**

**GENERAL NOTES:**

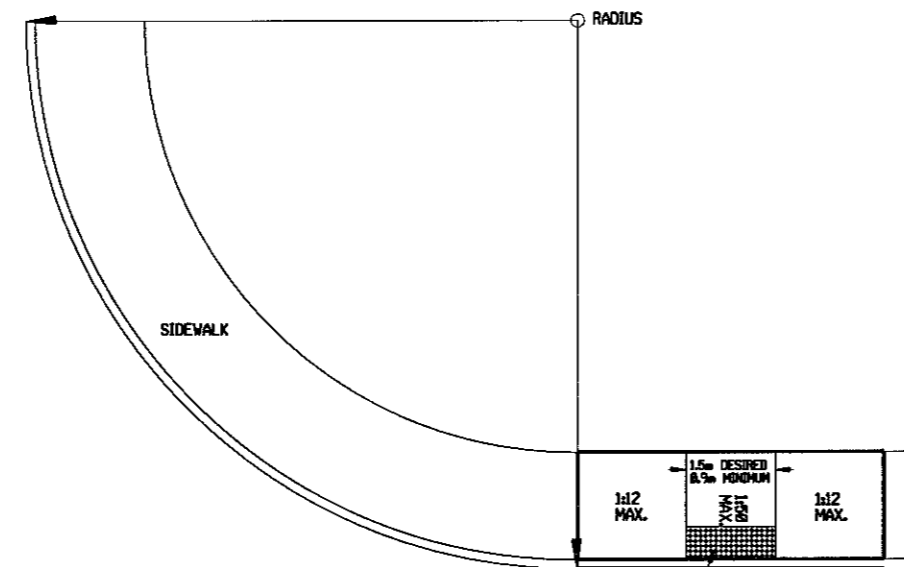
IN ALTERATIONS WHEELCHAIR RAMP ARE TO BE PROVIDED AT CURBED STREET INTERSECTIONS WITH PEDESTRIAN TRAFFIC AND MID-BLOCK CROSSWALK LOCATIONS. THE LENGTH OF THE RAMP SHALL BE SUCH THAT THE SLOPE DOES NOT EXCEED 1:12. THE SURFACE TEXTURE OF THE RAMP SHALL CONFORM TO A CLASS 6 FINISH ACCORDING TO SECTION 802.19. THE NORMAL GUTTER GRADE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION. THE MINIMUM THICKNESS OF THE RAMP, WALK, & LANDING SHALL BE 100mm. THE MINIMUM WIDTH OF THE RAMP SHALL BE THE EXISTING WALK WIDTH OR 900mm, WHICHEVER IS GREATER. MINOR MODIFICATIONS OF THESE DETAILS, AS APPROVED BY THE ENGINEER, MAY BE MADE TO ADJUST TO LOCAL CONDITIONS.

**RAMP SELECTION CRITERIA**

FIRST CHOICE	TYPE 1	CORNER LOCATIONS WITH THE WALK ADJACENT TO THE CURB (BOTH NEW CONSTRUCTION AND ALTERATIONS).
	TYPE 2	CORNER LOCATIONS WITH THE WALK OFFSET FROM THE CURB A DISTANCE INSUFFICIENT TO ALLOW THE REQUIRED RAMP SLOPE (BOTH NEW CONSTRUCTION AND ALTERATIONS).
	TYPE 3	CORNER LOCATIONS WITH THE WALK OFFSET FROM THE CURB A DISTANCE SUFFICIENT TO ALLOW THE REQUIRED RAMP SLOPE (BOTH NEW CONSTRUCTION AND ALTERATIONS).
	TYPE 4	TANGENT LOCATIONS (BOTH NEW CONSTRUCTION AND ALTERATIONS).
SECOND CHOICE	TYPE 5	TANGENT LOCATIONS (ALTERATIONS ONLY).
THIRD CHOICE	TYPE 6	CORNER LOCATIONS (ALTERATIONS ONLY). THIS RAMP MAY BE USED ONLY IF THE TYPE 5 RAMP CANNOT BE PLACED AT THE ENDS OF THE RADIUS.
FOURTH CHOICE		IF SITE CONSTRAINTS PREVENT THE CONSTRUCTION OF ANY OF THE TYPES LISTED, THEN AND ONLY THEN CAN THE 1:12 MAX. SLOPE ON THE RAMP BE EXCEEDED TO PROVIDE ACCESS TO THE STREET LEVEL (ALTERATIONS ONLY). THE SLOPE CAN BE STEEPENED TO 1:10 MAX. FOR A MAX. LENGTH OF 1.5m OR A 1:8 MAX. FOR A MAX. LENGTH OF 0.6m. SLOPES STEEPER THAN 1:8 ARE NOT ALLOWED UNDER ANY CIRCUMSTANCES.

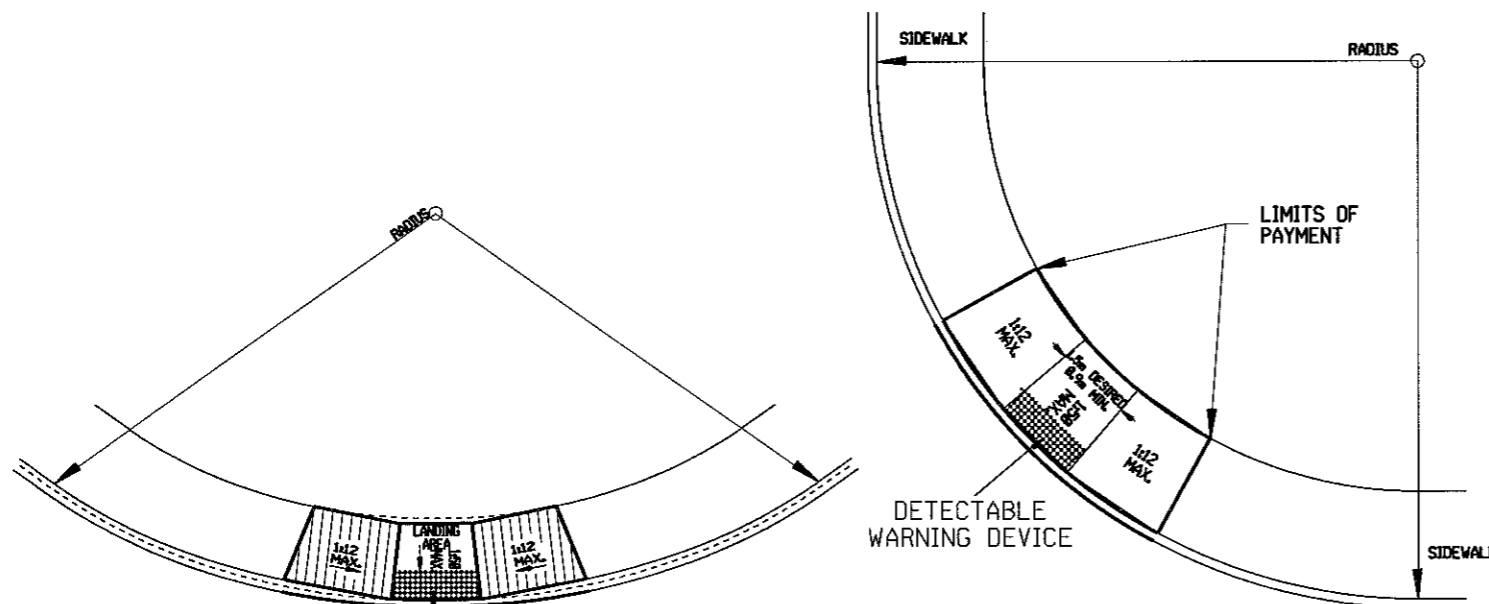
NOTE: IN ALTERATIONS, THE SELECTION OF THE TYPE OF WHEELCHAIR RAMP TO BE CONSTRUCTED SHALL BE BASED ON THE AMOUNT OF RIGHT-OF-WAY AVAILABLE, AND ON THE PRESENCE OF OTHER SITE CONSTRAINTS (UTILITIES, BUILDINGS, ETC.). THE TABLE ABOVE LISTS THE ORDER IN WHICH THE RAMP ARE TO BE CONSIDERED.

AN ALTERATION IS DEFINED AS A PROJECT THAT CHANGES OR AFFECTS THE USE OF A PEDESTRIAN PATHWAY (OVERLAYS, SIGNALIZATION PROJECTS, ETC.) BUT DOES NOT REQUIRE THE PURCHASE OF ADDITIONAL RIGHT-OF-WAY. ALL PROJECTS THAT REQUIRE THE PURCHASE OF ADDITIONAL RIGHT-OF-WAY WILL USUALLY BE CONSIDERED NEW CONSTRUCTION FOR THE PURPOSES OF THE CHART ABOVE.



**TYPE 5 RAMP**

NOTE: THE CROSS SLOPE OF THE RAMP AND SIDEWALKS SHALL NOT EXCEED 2.0% UNLESS REQUIRED TO MATCH STREET LONGITUDINAL GRADE.



**TYPE 6 RAMP**

DATE	REVISION	DATE FILM
10-9-03	REVISED GENERAL NOTES & ADDED NOTE.	
4-10-03	REVISED DETECTABLE WARNING DEVICE DETAIL	
8-22-02	ADDED DETECTABLE WARNING DEVICES DETAILS	
11-18-98	REV. 4TH CHOICE NOTE	
8-12-98	REVISED TEXTURE	
7-02-98	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

**WHEELCHAIR RAMP ALTERATIONS ONLY**

STANDARD DRAWING WR-2(M)