

ATASCOSA CSR 1739-2-12

INDEX OF SHEETS

SHT NO. DESCRIPTION

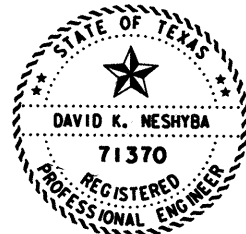
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STANDARD SHEETS BELOW

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20 MBGF-95A (M)
21-23 MB-96
24 SMD (1-5) - 97 (M)
25 WZ (SL) 97 (M)
26 WZ (TFDS) - 97 (M)
27 WZ (STPM) - 97 (M)
28 TCP NOTES - 97 (M)
29 TCP (2-2) - 97 (M)
30 PM (1) - 95A (M)
31 PM (2) - 95 (M) DIST. STANDARD
32 RPM (1) - 92 (M)
33-34 EC (1), EC (2) - 95 (M)
35 BC (NOTES) - 97 (M)
36-45 BC (1-10) - 97 (M)

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE
HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE
SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

David K. Neshyba 3/5/98
DAVID K. NESHYBA, P.E. DATE



SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,
MARCH 1, 1995 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS,
SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE
PROJECTS. (000-422)

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT STATE PROJECT

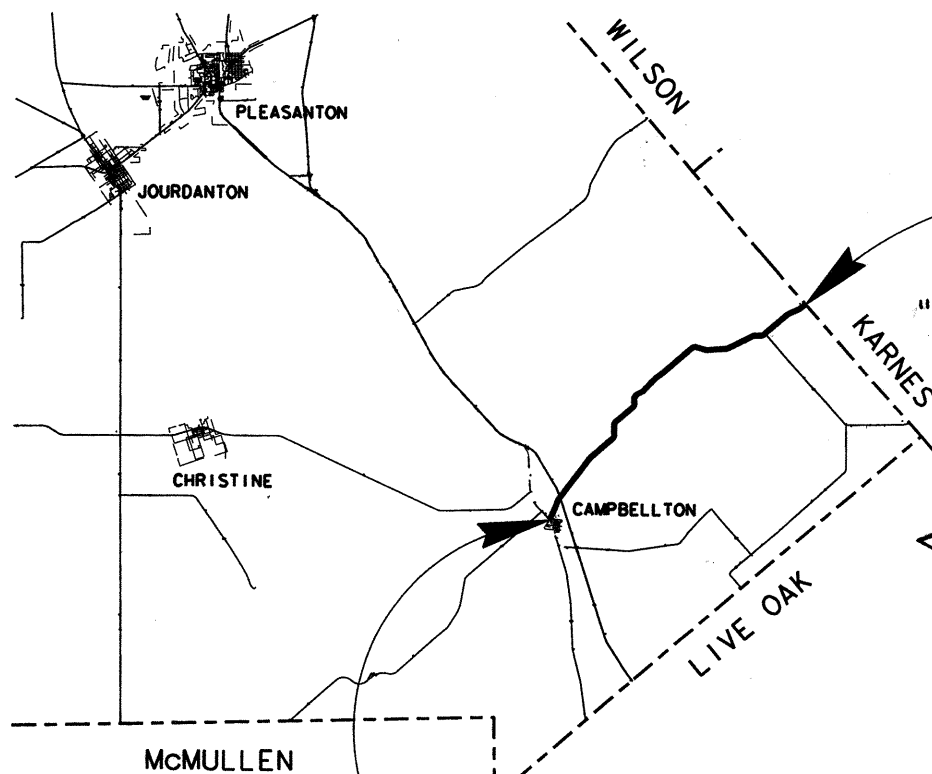
ATASCOSA COUNTY
F.M. 791

PROJECT : CSR 1739-2-12
CONTROL : 1739-02-012

FROM : U.S. 281-A, IN CAMPBELLTON, EAST
TO : ATASCOSA / KARNES COUNTY LINE

NET LENGTH : 19332.229 m - 97.536 m = 19.234 km

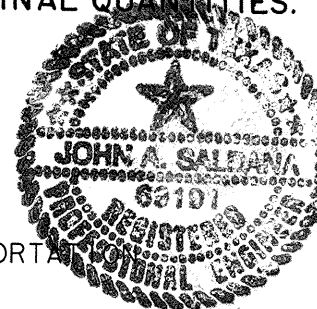
FOR THE CONSTRUCTION OF RESTORATION CONSISTING OF CEMENT TREATMENT
FOR BASE COURSE (EXT BS), FLEX BASE AND TWO COURSE SURFACE TREATMENT.



END PROJECT CSR 1739-2-12
CONTROL 1739-02-012
@ STA. 19+332.229
REF.MRK. 520 +0.175

"THIS PROJECT WAS BUILT ACCORDING TO THE PLANS AND
SPECIFICATIONS. THESE FINAL PLANS REFLECT THE
WORK DONE AND THE QUANTITIES SHOWN THEREON
AND ON THE FINAL ESTIMATE ARE FINAL QUANTITIES."

John A. Saldana P.E. 9/11/00
AREA ENGINEER



TEXAS DEPARTMENT OF TRANSPORTATION

CONCURRENCE
☐

SUBMITTED FOR LETTING: *David K. Neshyba*
AREA ENGINEER

APPROVED FOR LETTING: 3/6/98
John P. Kelly
DISTRICT ENGINEER

APPROVED FOR LETTING: ☐
DIRECTOR, BRIDGES & STRUCTURES

APPROVED FOR LETTING: 4-22-98
Robert B. Stone
for DIRECTOR, DESIGN DIVISION

NO SCALE

DESIGN SPEED = N/A
DISTURBED AREA = 20.00 ha
(PAVEMENT AREA INCLUDED)
ADT. = 300
EST.ADT = 520 (2016)

FED. RD. DIV. NO.	STATE PROJECT NO.			SHEET NO.
6	CSR 1739-2-12			1
STATE	STATE DIST.	COUNTY		
TEXAS	SAT	ATASCOSA		
CONT.	SECT.	JOB	HIGHWAY NO.	
1739	02	012	F.M. 791	

FINAL PLANS

LETTING DATE: JUNE 3, 1998

DATE WORK BEGAN: SEPTEMBER 28, 1998

DATE WORK ACCEPTED: OCTOBER 22, 1999

FINAL CONTRACT COST: \$1,634,231.31

CONTRACTOR: E.E. HOOD & SONS, INC.

NO EQUATIONS

EXCEPTION LIMITS (BRIDGE)

STA. 1+198.199

STA. 1+295.735

LENGTH = 97.536 meters

NO RAILROAD CROSSING

COUNTY NO. PROJ. NO.
HWY. NO. LETTING DATE
DATE ACCEPTED

CHANGE ORDERS

1. CHANGE ORDER NO.1

Decrease Item : 247-5110-007 Flex Base (Rdwy Del) (Ty A Gr 6 Cl 2)
Add Item : 9000-0001-000 Load, Haul & Blend Reclaim Asph Pv (Stkpl)

2. CHANGE ORDER NO.2

Add Items: 110-5002 Excav (Channel)
Increase Items: 164-5009 Cell Fib Seed (Temp) (Cool)
168-5001 Vegetative Watering
Add Items: 169-5001 Soil Ret Blnkt (Cl 1) (Ty A)
400-5008 Cut and Restore Pavement
400-5005 Structural Excavation
402-5001 Trench Excavation Protection
432-5001 Riprap (Conc) (Cl B)
464-5003 RC Pipe (Cl III) (450 mm)
464-5005 RC Pipe (Cl III) (600 mm)
466-5435 Headwall (CH-PW-45) (600mm) (Mod)
467-5069 SET (Ty II) (450mm) (RC Pipe) (1:3)
467-5070 SET (Ty II) (600mm) (RC Pipe) (1:3)
502-5001 Barricades, Signs and Traf Handling
Increase Items: 5002-5001 Rock Filter Dams (Ty I)
5002-5003 Rock Filter Dams (Remov)
5005-5001 Bkhoe (Erosn Cont) (Cl 1)
5012-5001 Temp Sedmt Cont Fence
5012-5003 Temp Sedmt Cont Fence (Remov)
Decrease Item: 5012-5002 Temp Sedmt Cont Fence (Remov & Replac)

3. CHANGE ORDER NO.3

Add Item: 9003-0003 Driveway (Special)

4. CHANGE ORDER NO.4

Add Items: 100-5002 Prep ROW
502-5001 Barricades, and Signs and Traf Handle

5. CHANGE ORDER NO.5

Add Item: 9275-0005 Force Account-Hydraulic Cement

6. CHANGE ORDER NO.6

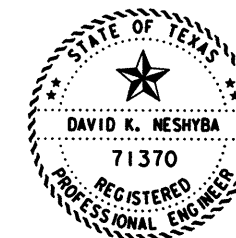
ADD ITEM: 9002-000 FORCE ACCOUNT-CELLULAR PHONE

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		1-A
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	FM 791

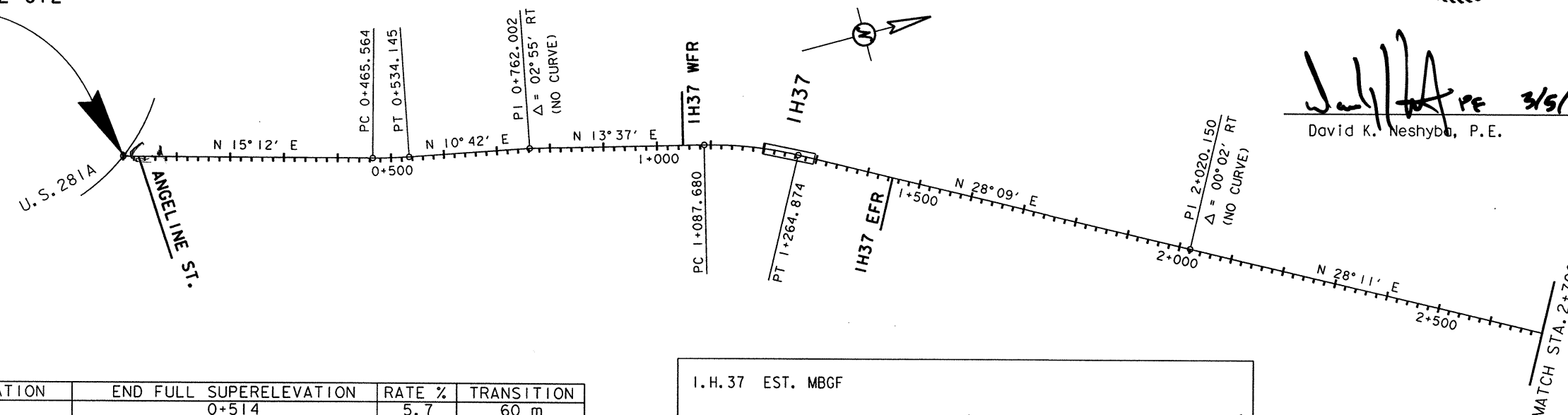
BEGIN PROJECT CSR 1739-2-12
BEGIN CONTROL 1739-02-012
@ STA. 0+000.000
REF MRK 510-3.063

①
PI STATION = 0+499.872
DELTA = 4° 30' 00.00" (LT)
TANGENT = 34.308 m
LENGTH = 68.581 m
RADIUS = 873.197 m
X = 690,003.8448
Y = 4,127,871.9892

②
PI STATION = 1+176.755
DELTA = 14° 32' 00.00" (RT)
TANGENT = 89.075 m
LENGTH = 177.194 m
RADIUS = 698.563 m
X = 690,150.1633
Y = 4,128,532.6913



David K. Neshyba PE 3/5/98
David K. Neshyba, P.E. Date



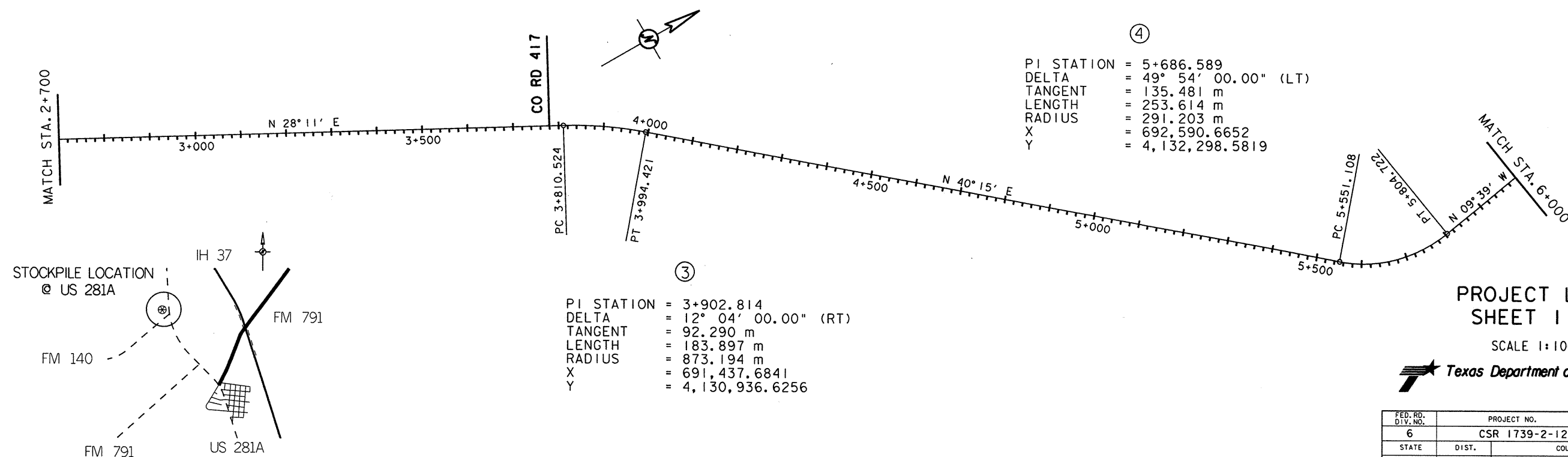
	BEGIN FULL SUPERELEVATION	END FULL SUPERELEVATION	RATE %	TRANSITION
1	0+485	0+514	5.7	60 m
2	1+107	1+244	5.7	60 m
3	3+830	3+973	5.7	60 m
4	5+576	5+779	8.0	75 m

NOTE: USE REVERSE PARABOLA TO OBTAIN SUPERELEVATION

I.H. 37 EST. MBGF

BRIDGE APPROACH ~ EST. @ 27 m ✓ REMOVE MBGF @ 152 m ✓
BRIDGE DEPART ~ EST. @ 38 m ✓ REMOVE TAS @ 4 ea ✓
TOTAL MBGF ~ EST. @ 130 m ✓

SGT ~ EST. @ 2 ea ✓ SEE ITEM 542 OF GENERAL NOTES
TAS ~ EST. @ 2 ea ✓ FOR RAIL STOCKPILE INFORMATION.



④
PI STATION = 5+686.589
DELTA = 49° 54' 00.00" (LT)
TANGENT = 135.481 m
LENGTH = 253.614 m
RADIUS = 291.203 m
X = 692,590.6652
Y = 4,132,298.5819

③
PI STATION = 3+902.814
DELTA = 12° 04' 00.00" (RT)
TANGENT = 92.290 m
LENGTH = 183.897 m
RADIUS = 873.194 m
X = 691,437.6841
Y = 4,130,936.6256

PROJECT LAYOUT
SHEET 1 OF 3

SCALE 1:1000



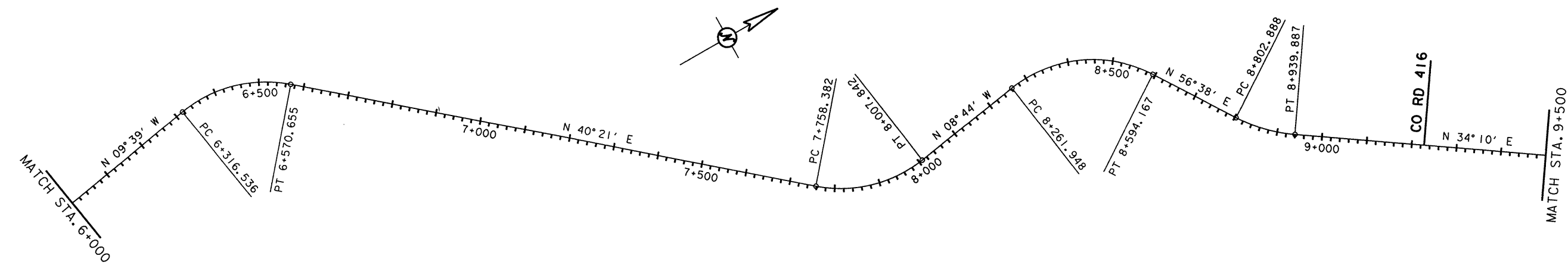
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	CSR 1739-2-12	2
STATE	DIST.	COUNTY
TEXAS	SAT	ATASCOSA
CONT.	SECT.	JOB
1739	02	012
		F.M. 791

⑤
PI STATION = 6+452.324
DELTA = 50° 00' 00.00" (RT)
TANGENT = 135.788 m
LENGTH = 254.118 m
RADIUS = 291.198 m
X = 692,459.3977
Y = 4,133,070.5844

⑥
PI STATION = 7+891.345
DELTA = 49° 05' 00.00" (LT)
TANGENT = 132.963 m
LENGTH = 249.460 m
RADIUS = 291.199 m
X = 693,402.4018
Y = 4,134,180.5715

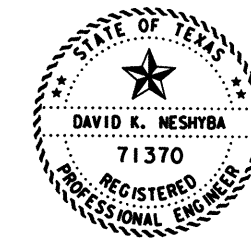
⑦
PI STATION = 8+448.775
DELTA = 65° 22' 00.00" (RT)
TANGENT = 186.827 m
LENGTH = 332.219 m
RADIUS = 291.199 m
X = 693,315.2638
Y = 4,134,747.8136

⑧
PI STATION = 8+872.279
DELTA = 22° 28' 00.00" (LT)
TANGENT = 69.391 m
LENGTH = 136.999 m
RADIUS = 349.383 m
X = 693,703.5659
Y = 4,135,003.5277

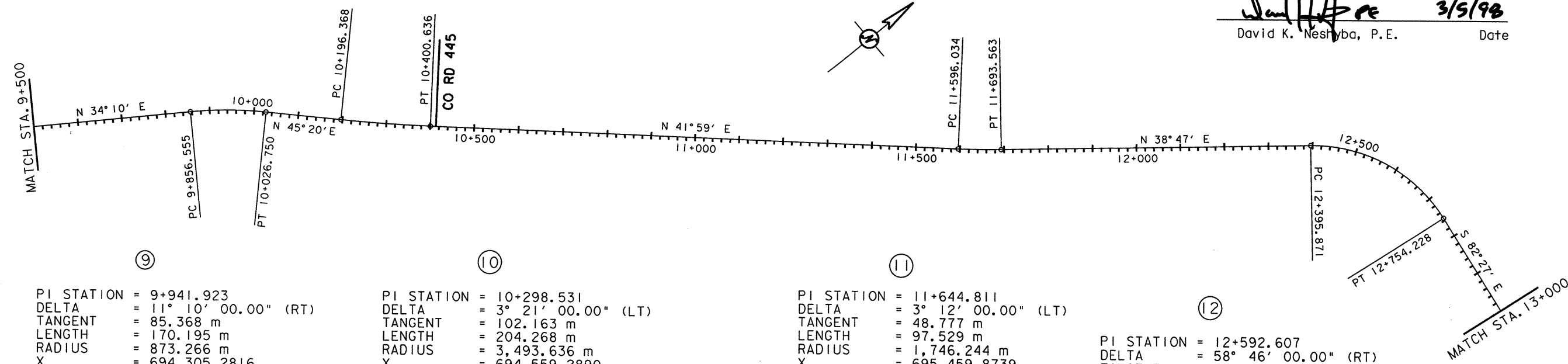


	BEGIN FULL SUPERELEVATION	END FULL SUPERELEVATION	RATE %	TRANSITION
5	6+341	6+545	8.0	75 m
6	7+783	7+982	8.0	75 m
7	8+287	8+569	8.0	75 m
8	8+827	8+915	8.0	75 m
9	9+876	10+006	5.7	60 m
10	10+216	10+380	3.5	60 m
11	11+616	11+673	4.8	60 m
12	12+420	12+729	8.0	75 m

NOTE: USE REVERSE PARABOLA TO OBTAIN SUPERELEVATION



David K. Neshyba 3/5/98
David K. Neshyba, P.E. Date



⑨
PI STATION = 9+941.923
DELTA = 11° 10' 00.00" (RT)
TANGENT = 85.368 m
LENGTH = 170.195 m
RADIUS = 873.266 m
X = 694,305.2816
Y = 4,135,890.0344

⑩
PI STATION = 10+298.531
DELTA = 3° 21' 00.00" (LT)
TANGENT = 102.163 m
LENGTH = 204.268 m
RADIUS = 3,493.636 m
X = 694,559.2890
Y = 4,136,141.1034

⑪
PI STATION = 11+644.811
DELTA = 3° 12' 00.00" (LT)
TANGENT = 48.777 m
LENGTH = 97.529 m
RADIUS = 1,746.244 m
X = 695,459.8739
Y = 4,137,141.8895

⑫
PI STATION = 12+592.607
DELTA = 58° 46' 00.00" (RT)
TANGENT = 196.736 m
LENGTH = 358.357 m
RADIUS = 349.388 m
X = 696,053.5673
Y = 4,137,880.7351



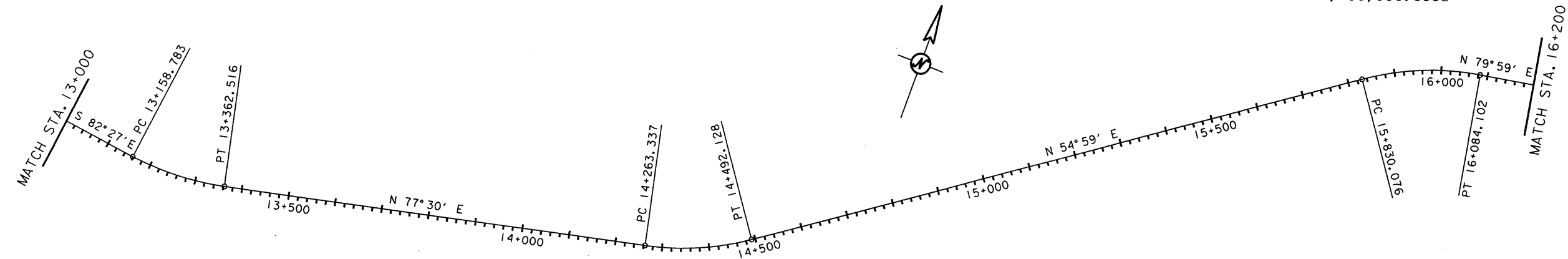
PROJECT LAYOUT
SHEET 2 OF 3
SCALE 1:1000

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	CSR 1739-2-12	3
STATE	DIST.	COUNTY
TEXAS	SAT	ATASCOSA
CONT.	SECT.	JOB
1739	02	012
		HIGHWAY NO.
		F.M. 791

(13)
PI STATION = 13+261.702
DELTA = 20° 03' 00.00" (LT)
TANGENT = 102.919 m
LENGTH = 203.733 m
RADIUS = 582.197 m
X = 696,751.6722
Y = 4,137,788.2080

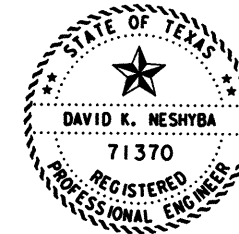
(14)
PI STATION = 14+379.228
DELTA = 22° 31' 00.00" (LT)
TANGENT = 115.891 m
LENGTH = 228.791 m
RADIUS = 582.181 m
X = 697,844.7634
Y = 4,138,030.5405

(15)
PI STATION = 15+959.143
DELTA = 25° 00' 00.00" (RT)
TANGENT = 129.067 m
LENGTH = 254.026 m
RADIUS = 582.184 m
X = 699,141.1400
Y = 4,138,938.8352



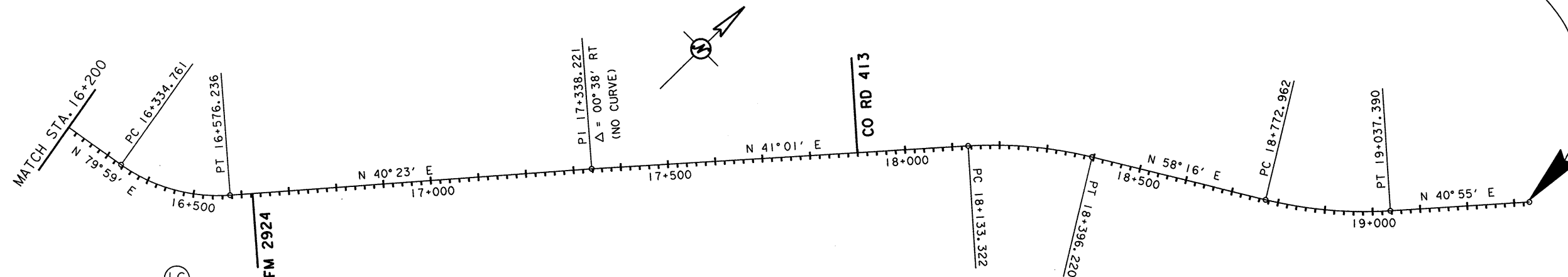
	BEGIN FULL SUPERELEVATION	END FULL SUPERELEVATION	RATE %	TRANSITION
13	13+181	13+339	8.0	70 m
14	14+286	14+469	8.0	70 m
15	15+853	16+061	8.0	70 m
16	16+360	16+551	8.0	75 m
17	18+153	18+376	5.7	60 m
18	18+793	19+017	5.7	60 m

NOTE: USE REVERSE PARABOLA TO OBTAIN SUPERELEVATION



David K. Neshyba 3/5/98
David K. Neshyba, P.E. Date

END PROJECT CSR 1739-2-12
END CONTROL 1739-02-012
@ STA. 19+332.229
REF MRK 520+0.175



(16)
PI STATION = 16+460.546
DELTA = 39° 36' 00.00" (LT)
TANGENT = 125.785 m
LENGTH = 241.475 m
RADIUS = 349.381 m
X = 699,638.9456
Y = 4,139,026.7611

(17)
PI STATION = 18+265.773
DELTA = 17° 15' 00.00" (RT)
TANGENT = 132.451 m
LENGTH = 262.898 m
RADIUS = 873.214 m
X = 700,822.8628
Y = 4,140,402.8547

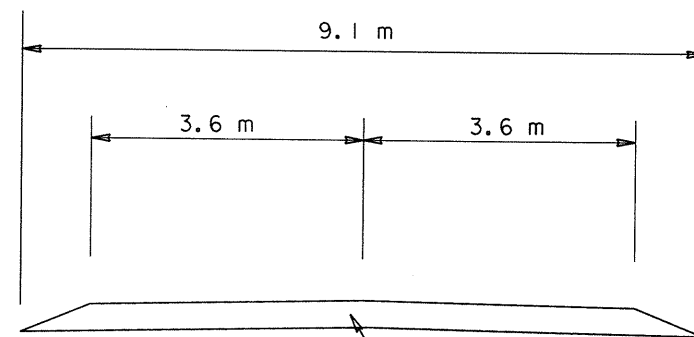
(18)
PI STATION = 18+906.196
DELTA = 17° 21' 00.00" (LT)
TANGENT = 133.234 m
LENGTH = 264.429 m
RADIUS = 873.236 m
X = 701,369.2503
Y = 4,140,740.7498

PROJECT LAYOUT
SHEET 3 OF 3

SCALE 1:1000

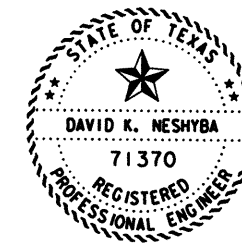


FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	CSR 1739-2-12	4
STATE	DIST.	COUNTY
TEXAS	SAT	ATASCOSA
CONT.	SECT.	JOB
1739	02	012
		HIGHWAY NO.
		F.M. 791

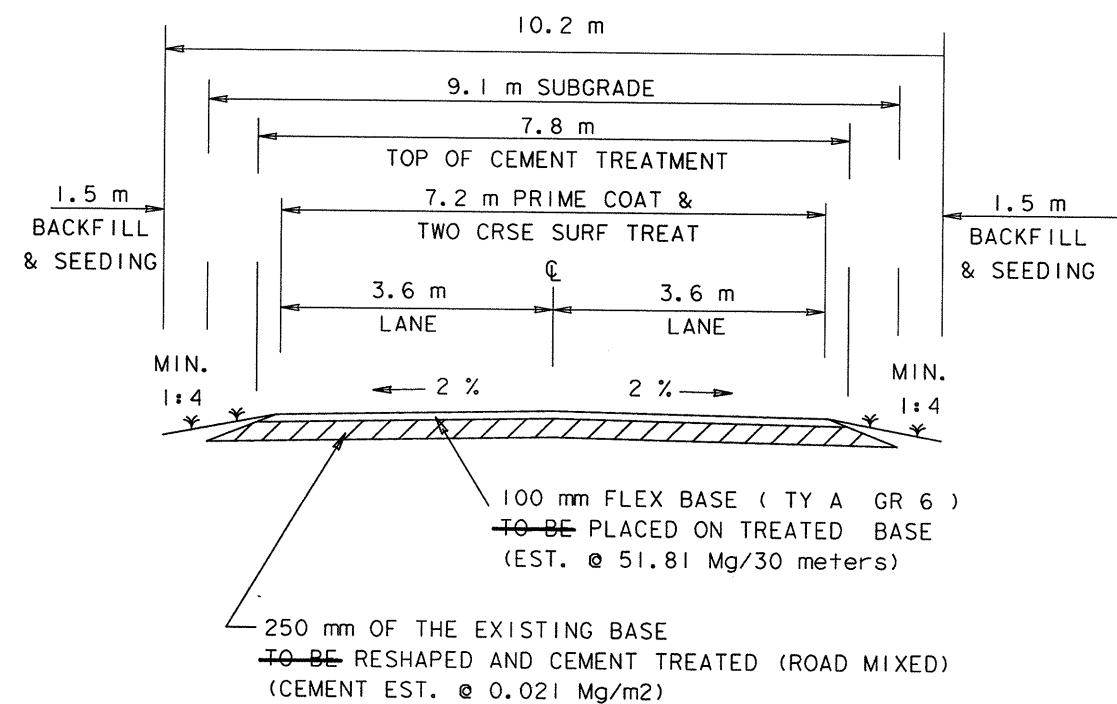


APPROX. 250 mm FLEX BASE

EXISTING SECTION



David K. Neshyba ^{PE} ^{3/5/98}
 DAVID K. NESHYBA P.E. Date



EXCEPTION AT THE I.H.37 OVERPASS (97.536 m)
 THE CONTRACTOR SHALL MATCH THE EXISTING GRADES
 AT THE BRIDGE ENDS.

PROPOSED TYPICAL SECTION

STA. 0+009 to STA. 1+198.199
 STA. 1+295.735 TO STA. 19+332

TYPICAL SECTIONS



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		5
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F. M. 791

GRADING SUMMARY									
** STA TO STA	ROAD GRADER WORK (ORD COMP)	CEMENT TREAT BASE	TERM ANCHOR SECTION (2.67mm)	MTL BM GD FEN (TIM POST) (2.67mm)	REMOV METAL BEAM GUARD FENCE	REMOV TERMINAL-ANCHOR SECTION	MAILBOX INSTAL (SINGLE)	MAILBOX INSTAL (MULTIPLE)	SINGLE GDRAIL TERM
	km	m2	* ea	* m	* m	* ea	ea	ea	* ea
0+000 - 19+332.229	0.300 3.45	158198 162,926.900	2 ✓	130 ✓	152 ✓	4 ✓	6 ✓	1 ✓	2 ✓
	0.300	162,926.900							
TOTAL	3.45	158198	2 ✓	130 ✓	152 ✓	4 ✓	6 ✓	1 ✓	2 ✓

* I.H. 37 OVERPASS

# ROAD GRADER WORK		
BEGIN	END	meters
STA. 0+425	STA. 0+575	150
STA. 1+047	STA. 1+197	150
STA. 3+827	STA. 3+977	150
STA. 5+575	STA. 5+780	205
STA. 6+340	STA. 6+545	205
STA. 7+783	STA. 7+983	200
STA. 8+285	STA. 8+570	285
STA. 8+795	STA. 8+945	150
STA. 9+866	STA. 10+016	150
STA. 10+215	STA. 10+380	165
STA. 11+570	STA. 11+720	150
STA. 12+420	STA. 12+730	310
STA. 13+180	STA. 13+340	160
STA. 14+285	STA. 14+470	185
STA. 15+855	STA. 16+060	205
STA. 16+360	STA. 16+550	190
STA. 18+155	STA. 18+375	220
STA. 18+795	STA. 19+015	220
	TOTAL	3450

FOR CONTRACTOR'S INFORMATION ONLY

# ROCK FILTER DAM	
LOCATION	STATION
LT / RT	5+486
LT / RT	13+693
LT / RT	16+863
LT / RT	17+198
LT / RT	17+564
LT / RT	17+869
LT / RT	18+112
LT / RT	18+356
LT / RT	18+570
LT / RT	19+149
LT / RT	19+301

FOR CONTRACTOR'S INFORMATION ONLY
(3 m LENGTH AT EACH LOCATION)

FLEXIBLE BASE SUMMARY			
	LOCATION	QUANTITY CALCULATION	Mg
**	STA. 0+009 to STA. 19+332	144210 m2 X 0.2305 Mg/m2.	33239.00
			30,720.160
			30,720.160
		TOTAL	33239.00

** EXCEPTION (97.536 m) @ I.H. 37 OVERPASS

GRADING SUMMARY AND
FLEX BASE SUMMARY



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		6
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F.M. 791

GENERAL NOTES AND SPECIFICATION DATA--

GRADING REQUIREMENTS FOR: ITEM 247 FLEX BASE (TY A GR 6)							SOIL CONSTANTS			WET BALL
(MM)	45	31.75	22.40	9.50	4.75	0.425	LL MAX	PI MAX	PI MIN	MILL MAX
PERCENT RETAINED ON EACH SIEVE (247)	0-10	-	-	-	45-75	65-85	45	15	-	*55
* THE MAXIMUM INCREASE IN MATERIAL PASSING THE 0.425 MM SIEVE SHALL NOT EXCEED 20.										

===== COMPACTION REQUIREMENTS =====			
ITEM	MATERIAL	COURSE	DENSITY
247	FLEX BASE	FINAL	100 % MINIMUM
275	CMT TRT FOR BS CRS	EXIST	98 % MINIMUM

===== BASIS OF ESTIMATE =====			
ITEM	DESCRIPTION	RATE	QUANT UNIT
134	BACKFILL (TY A)		19.223 KM
164	CELL FIBER SEED (TEMP) (COOL)		57669 M2
168	VEGETATIVE WATERING	135 L/M2	7785 KL
275	CEMENT	83.65 KG/M3	3308 MGR
310	EMULS ASPH (MC-30)	1.15 L/M2	161584 L
510	ONE-WAY TRAFFIC CONTROL		50 H
662	WRK ZN PAV MRK SH TRM		4087 EA
666	REFL PAV MRK TY I (W) (SLD) 600 MM		29 M
666	REFL PAV MRK TY I (Y) (SLD) 100 MM		19455 M
666	REFL PAV MRK TY I (Y) (BRK) 100 MM		3356 M
666	REFL PAV MRK TY II (W) (SLD) 600 MM		29 M
666	REFL PAV MRK TY II (Y) (SLD) 100 MM		19455 M
666	REFL PAV MRK TY II (Y) (BRK) 100 MM		3356 M
672	RAIS PAV MRKR CL B (REFL) TY II-A-A		3525 EA
5002	ROCK FILTER DAM (TY 1)	22 LOC @ 3 M EA	66 M
5002	ROCK FILTER DAM (REMOV) (TY 1)		66 M
5004	TEMP SEDMT CONT FENCE	26 LOC @ 8 M EA	208 M
5004	TEMP SEDMT CONT FENCE (REMOV & REPLAC)		104 M
5004	TEMP SEDMT CONT FENCE (REMOV)		208 M
5005	BKHOE WORK (EROSN CONT) (CL 1)		10 H

- THE FOLLOWING IS FOR CONTRACTOR'S INFORMATION ONLY - NON PAY

SPECIFICATION DATA

04/23

SHEET A

GENERAL NOTES AND SPECIFICATION DATA--

166	FERT (16-8-8)	0.05 KG/M2
213	ROLL (MED B) (SURF TREAT)	1 H/1670 M2
===== SURFACE TREATMENT DATA =====		
DESCRIPTION	1ST COURSE	2ND COURSE
AREA	140,508 M2	140,508 M2
ASPH--TYPE	----- SEE GEN NOTES -----	
ASPH--RATE (L/M2)	1.45/1 = 203737 L	1.35/1 = 189686 L
AGGR--TYPE/GR	TY PB GR 4	TY PB GR 3
AGGR--RATE (M3/M2)	1/120 = 1171 M3	1/126 = 1115 M3

ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE UTILITY COMPANIES AT LEAST 48 HOURS BEFORE COMMENCING ANY WORK THAT WOULD EFFECT UNDERGROUND UTILITIES. FOR UTILITY LOCATORS, THE CONTRACTOR MAY ALSO USE THE LOCAL ONE CALL (1-800-344-8377) (CALL US BEFORE YOU DIG) FOR THE TEXAS EXCAVATION SAFETY SYSTEM.

ALL EXISTING RAISED PAVEMENT MARKINGS SHALL BE REMOVED BY THE CONTRACTOR AS THE WORK PROGRESSES, AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS. MATERIALS REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR FOR PROPER DISPOSAL.

THE EXISTING TOPSOIL AND GRASS SHALL BE PLACED IN WINDROWS ALONG THE EDGE OF THE GRADING OPERATIONS OR AS DIRECTED/APPROVED BY THE ENGINEER. AFTER GRADING OPERATIONS ARE COMPLETED, THE TOPSOIL AND GRASS SHALL BE SPREAD UNIFORMLY ON ALL SLOPES AND DITCHES. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

MATERIALS LARGER THAN 100 MM IN SIZE WITHIN THE CONSTRUCTION LIMITS AND NOT INCORPORATED INTO THE ROADWAY CONSTRUCTION SHALL BE REMOVED FROM THE RIGHT OF WAY AND DISPOSED OF IN A PROPER MANNER ACCEPTABLE TO THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.

IF WASTE AREAS OR MATERIAL SOURCE AREAS ARE REQUIRED FOR THE COMPLETION OF THIS PROJECT, SUCH AREAS SHALL NOT BE VISIBLE FROM ANY HIGHWAY ON THE TXDOT SYSTEM UNLESS APPROVED IN ADVANCE IN WRITING BY THE ENGINEER.

SPECIFICATION DATA

04/23

SHEET B

GENERAL NOTES AND SPECIFICATION DATA--

THE CONTRACTOR SHALL MAINTAIN THE RIGHT OF WAY IN A SATISFACTORY APPEARANCE AS SHOWN IN THE PLANS AND/OR AS DETERMINED/APPROVED BY THE ENGINEER.

--ITEM 5--
THE CONTRACTOR SHALL BE RESPONSIBLE FOR REFERENCING ALL EXISTING ALIGNMENTS AND PAVEMENT MARKINGS IN A MANNER WHICH WILL ALLOW THESE ALIGNMENTS AND MARKINGS TO BE RE-ESTABLISHED.

--ITEM 8--
THE CONTRACTOR SHALL PROSECUTE THE WORK FOR THIS PARTICULAR PROJECT IN ACCORDANCE WITH THE FOLLOWING SEQUENCE OF WORK UNLESS AN ALTERNATE SEQUENCE IS APPROVED BY THE ENGINEER IN WRITING.

- 1) SET BARRICADES AND INSTALL THE REQUIRED SW3P MEASURES.
- 2) BLADE SOIL AND GRASS AWAY FROM THE EDGE OF PAVEMENT.
- 3) CEMENT TREAT EXISTING 250 MM BASE (PHASE I).
- 4) PLACE 100 MM OF NEW BASE (PHASE II).
- 5) PLACE PRIME COAT, 1ST CRS OF (AC-10) SURFACE TREATMENT (PHASE III) & BACKFILL OF PAVEMENT EDGES.
- 6) BLADE BACK SOIL AND GRASS.
- 7) PLACE 2ND CRS OF (AC-10) SURFACE TREATMENT.
- 8) BEGIN SEEDING OPERATION AND WATERING OF SEEDED AREA.
- 9) PLACE PAVEMENT MARKINGS AND MARKERS.
- 10) FINAL CLEANUP.

--ITEM 134--
COMPACTION OF THE BACKFILL MATERIAL WILL BE IN ACCORDANCE TO ITEM 132 "EMBANKMENT" (ORDINARY COMPACTION). ALL BACKFILL SOURCES SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OPERATIONS.

SHOULDER DROP-OFF SIGNS (FCW8-9) SHALL BE PLACED AT THE START OF THE PHASE II OPERATIONS AND REMAIN IN PLACE UNTIL AFTER THE BACKFILL OPERATIONS IS COMPLETED.

--ITEM 152--
THE WORK PERFORMED UNDER THIS ITEM IS INTENDED BUT MAY NOT BE LIMITED TO THE LIMITS SHOWN ON THE PLANS. IT SHALL BE USED TO REWORK AND RESHAPE THE IDENTIFIED SUPERELEVATION SECTIONS TO THE NEEDED REQUIREMENTS OR AS DIRECTED/APPROVED BY THE ENGINEER.

SPECIFICATION DATA

04/23

SHEET C

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 164--
FOR CELLULOSE FIBER MULCH SEEDING: THE SEED AND FERTILIZER MAY BE MIXED TOGETHER AND PLACED IN ONE OPERATION BUT THE PLACEMENT OF THE MULCH SHALL BE ACCOMPLISHED BY A SECOND OPERATION. IT IS DESIRED THAT THE FERTILIZER USED HAVE AN ANALYSIS OF 16-8-8.

THE SEEDED AREA SHALL BE WATERED AND MAINTAINED FOR A PERIOD OF NOT LESS THAN 45 CALENDAR DAYS FOLLOWING PLANTING OR AS DIRECTED /APPROVED BY THE ENGINEER.

--ITEM 247--
FLEXIBLE BASE MATERIAL SHALL COME FROM A SOURCE APPROVED BY THE ENGINEER. IF THE FLEXIBLE BASE COMES FROM A STOCKPILE, THE STOCKPILE SHALL BE TESTED BEFORE DELIVERY TO THE PROJECT. THE STOCKPILE SHALL BE BUILT IN LIFTS NOT TO EXCEED 600 MM AND IN A MANNER AS TO OBTAIN A MINIMUM WORKING FACE OF NOT LESS THAN 3 M AND A MAXIMUM WORKING FACE OF NOT MORE THAN 6 M. FINAL ACCEPTANCE OF FLEXIBLE BASE MATERIAL WILL BE FROM TESTS MADE FROM WINDROW SAMPLES AND/OR THE STOCKPILE.

--ITEM 275--
REWORKING THE BASE MATERIAL SHALL CONFORM TO TYPE D AS SHOWN IN ITEM 251.

--ITEM 302--
PREVIOUSLY TESTED AGGREGATES DELIVERED TO THE PROJECT, WHICH ARE FOUND TO CONTAIN EXCESSIVE QUANTITIES OF DUST (MORE THAN 0.5 PERCENT PASSING THE 0.425 MM SIEVE) DURING PRECOATING, STOCKPILING OR HAULING OPERATIONS, MAY BE REJECTED BY THE ENGINEER. TEST METHOD TEX-200-F, PART I SHALL BE USED FOR TESTING.

THE MODIFIED GRADATION FOR THE GRADE 4 AGGREGATE IS AS SHOWN ON SPECIAL PROVISION 302--010.

--ITEM 310--
IT IS THE INTENT TO USE MC-30 OR AE-P FOR THE PRIME COAT. THE RATES SHOWN ARE FOR ESTIMATE PURPOSE ONLY AND MAY BE ADJUSTED BY THE ENGINEER.

--ITEM 316--
IT IS THE INTENT TO USE AC-10 (LATEX) OR HFRS-2P. MATERIAL RATES SHOWN ARE BASED ON AC AND MAY BE ADJUSTED BY THE ENGINEER DEPENDING ON THE

SPECIFICATION DATA

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SHEET D

F.R. DIV.6	TEXAS	CSR 1739-2-12	SHEET 8A
ATASCOSA	COUNTY	HWY FM 791	CONT 1739-2-12, ETC

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 316--. CONT'D
MATERIAL USED. IN THE EVENT EMULSIONS ARE USED, A MINIMUM 24 HOUR CURING PERIOD SHALL ELAPSE BEFORE PLACING ANY SUBSEQUENT ASPHALT COURSES. BECAUSE OF THE REQUIRED CURING PERIOD, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER BEFORE USING EMULSIONS.

WHEN USING LATEX ASPHALT, THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO AVOID DRIFTING OF ASPHALT ONTO TRAFFIC AND ADJACENT PROPERTIES.

THE CONTRACTOR WILL BE REQUIRED TO SET A STRING LINE FOR ALL SURFACE TREATMENT OPERATIONS UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE LOCATION OF AGGREGATE STOCKPILES AT THE PROJECT SHALL BE APPROVED BY THE ENGINEER. THE AGGREGATE SHALL BE FREE OF EXCESS SURFACE MOISTURE, AS DETERMINED BY THE ENGINEER, BEFORE APPLICATION.

IF THE AGGREGATES TO BE PRECOATED ARE FOUND TO HAVE STRIPPING CHARACTERISTICS, THE ENGINEER MAY REQUIRE THE ADDITION OF A LIME SLURRY. LIME MEETING THE REQUIREMENTS OF ITEM 264 SHALL BE ADDED TO THE AGGREGATE AT THE RATE OF 1% HYDRATED LIME BY MASS OF AGGREGATE. THE LIME SHALL BE ADDED TO THE AGGREGATE IN SLURRY FORM AT THE COLD FEED. THE COST OF THE LIME SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM. IF APPROVED BY THE ENGINEER, THE LIME SLURRY MAY BE ADDED AT THE STOCKPILE BUT NOT MORE THAN 24 HOURS IN ADVANCE OF USE.

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE ASPHALT USED FOR PRECOATING THE AGGREGATE AT THE PLANT AND THE ASPHALT USED FOR THE SURFACE TREATMENT AT THE PROJECT SITE WILL NOT RESULT IN A REACTION THAT MAY ADVERSELY EFFECT THE BONDING OF THE AGGREGATE AND ASPHALT DURING THE SURFACE TREATMENT OPERATION.

THE ADDITION OF BAGHOUSE FINES WILL NOT BE PERMITTED IN THE PRODUCTION OF PRECOATED MATERIAL.

MIXES THAT DO NOT MAINTAIN FLOW QUALITIES WHERE THE PRECOATED AGGREGATE CAN NOT BE SATISFACTORILY SPREAD BY APPROVED MECHANICAL SPREADING DEVICES WILL NOT BE ACCEPTABLE.

STOCKPILES OF AGGREGATE PRECOATED WITH AC MAY GENERATE EXCESSIVE HEAT BUILD-UP RESULTING IN DAMAGE TO THE ASPHALT AND/OR AGGREGATES IF ADEQUATE COOLING HAS NOT BEEN INITIALLY PROVIDED. STOCKPILES SHOWING EVIDENCE OF EXCESSIVE HEAT BUILD-UP CAN BE REJECTED BY THE ENGINEER.

AGGREGATES USED AS THE FINAL SURFACE ON THE DRIVING LANES SHALL HAVE A FLAKINESS INDEX NOT TO EXCEED 15 AND SHALL BE SUBJECTED TO 5 CYCLES OF

SPECIFICATION DATA

05/21

SHEET E

F.R. DIV.6	TEXAS	CSR 1739-2-12	SHEET 8A
ATASCOSA	COUNTY	HWY FM 791	CONT 1739-2-12, ETC

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 316--. CONT'D
THE SOUNDNESS TEST IN ACCORDANCE WITH TEST METHOD TEX-411-A. THE PERCENT LOSS SHALL NOT BE GREATER THAN 30 WHEN MAGNESIUM SULPHATE IS USED. THIS TEST WILL NOT APPLY TO BLENDS WITH CRUSHED TRAP ROCK, CRUSHED RHYOLITE, CRUSHED LIMESTONE ROCK ASPHALT OR LIGHTWEIGHT AGGREGATE.

--ITEM 500--
"MATERIALS ON HAND" PAYMENTS WILL NOT BE CONSIDERED IN DETERMINING PERCENTAGES USED TO COMPUTE PAYMENT FOR ITEM "MOBILIZATION".

--ITEM 502--
THE TRAFFIC CONTROL PLAN PHASES I, II, AND III REQUIRE THE USE OF FLAGGERS AT EACH END OF THE WORK ZONE. THE USE OF THE FLAGGERS AND EQUIPMENT IS SUBSIDIARY TO ITEM 502. "BARRICADES, SIGNS AND TRAFFIC HANDLING". ITEM 510, "ONE-WAY TRAFFIC CONTROL", WILL REQUIRE THE USE OF A PILOT CAR AND WILL BE AT THE APPROVAL OF THE ENGINEER.

WHEN ADVANCED WARNING FLASHING ARROW PANEL (S) IS/ARE SPECIFIED FOR USE ON THE PROJECT, THE CONTRACTOR SHALL BE REQUIRED TO FURNISH ONE STANDBY UNIT IN GOOD CONDITION AT THE JOB SITE READY FOR IMMEDIATE USE.

THE CONTRACTOR SHALL PROVIDE TRUCK MOUNTED ATTENUATORS ON ALL SHADOW VEHICLES IN ACCORDANCE WITH THE TCP, B&C AND TEXAS MUTCD. THE TRUCK MOUNTED ATTENUATORS SHALL BE ONE OF THE FOLLOWING MODELS OR APPROVED EQUAL:

- 1) ALPHA 1000 MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC.
- 2) REN-GARD CK-1128 MANUFACTURED BY RENCO, INC.
- 3) SYRO-45 MANUFACTURED BY SYRO
- 4) MODEL MPS 350 III TMA MANUFACTURED BY SYRO

STRIPING, IF USED, ON THE BACK OF ALL TRUCK MOUNTED ATTENUATORS SHALL BE 200 MM RED AND WHITE STRIPES PLACED IN AN INVERTED "V" DESIGN. SHEETING SHALL CONFORM WITH DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.

AFTER THE CONTRACTOR HAS BEEN NOTIFIED IN WRITING BY THE ENGINEER, THE TIME FRAME FOR THE CONTRACTOR TO PROVIDE PROPERLY MAINTAINED TRAFFIC CONTROL DEVICES IN COMPLIANCE WITH THE CONTRACT REQUIREMENTS, BEFORE THEY ARE CONSIDERED TO BE IN NON-COMPLIANCE WITH THIS ITEM, IS 48 HOURS REGARDLESS OF THE DAYS OF THE WEEK INVOLVED. IF THE CONTRACTOR DOESN'T TAKE THE NECESSARY STEPS APPROVED BY THE ENGINEER TO ELIMINATE THE NON-COMPLIANCE CONDITIONS WITHIN THE 48 HOURS ESTABLISHED ABOVE, NO PAYMENT WILL BE MADE FOR THIS ITEM FOR THE MONTH(S) IN NON-COMPLIANCE AS COVERED IN SECTION 502.4(7).

SPECIFICATION DATA

Rev. 05/21

SHEET F

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 504--
THE CONTRACTOR WILL BE REQUIRED TO FURNISH ONE FIELD OFFICE TYPE E. THE SITE/LOCATION PROPOSED BY THE CONTRACTOR FOR THE FIELD OFFICE HAS TO BE APPROVED BY THE ENGINEER. THE FIELD OFFICE SHALL BE AT LEAST 37 M2 IN SIZE AND SHALL BE PARTITIONED INTO AT LEAST 2 WORKROOMS. SHALL HAVE WINDOWS AND DOORS. SHALL BE PROVIDED WITH THE NECESSARY PLAN TABLES, SHELVES, AND LOCKERS REQUIRED AND CONSTRUCTED AS DIRECTED/APPROVED BY THE ENGINEER AND SHALL CONTAIN THE FACILITIES OF A TOILET AND LAVATORY.

THE FIELD OFFICE PARKING AREA SHALL BE OF ADEQUATE MATERIAL, SHAPE AND SIZE TO ACCOMMODATE 5 VEHICLES AS APPROVED BY THE ENGINEER. WHEN DIRECTED BY THE ENGINEER (DEPENDING ON THE LOCATION), THE FIELD OFFICE AND THE PARKING AREA SHALL BE ENCLOSED WITH A FENCE AS DESCRIBED IN THIS ITEM.

THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING THE NECESSARY OFFICE FURNITURE CONSISTING OF DESKS, CHAIRS, FILING CABINETS, ETC. AS DIRECTED/APPROVED BY THE ENGINEER.

THE CONTRACTOR WILL BE REQUIRED TO CLEAN THE FIELD OFFICE AND/OR LABORATORY AS NEEDED BUT NO LESS THAN ONCE A WEEK. THIS WILL INCLUDE, BUT NOT LIMITED TO SWEEPING AND MOPPING FLOORS, CLEANING THE TOILET AND LAVATORY, AND EMPTYING WASTE BASKETS.

--ITEM 540--
RAIL ELEMENTS AND HARDWARE REMOVED SHALL REMAIN THE PROPERTY OF THE STATE. THE CONTRACTOR SHALL STOCKPILE THE RAIL ELEMENTS AND HARDWARE AT A LOCATION ADJACENT TO THE INTERSECTION OF US 281-A AND FM 140, LOCATED APPROX. 2 KM NORTH OF THE PROJECT.

--ITEM 560--
THE EXISTING MAILBOXES SHALL BE MOVED AND MAINTAINED IN A MANNER THAT WILL PROVIDE FOR A SAFE AND UNINTERRUPTED DELIVERY AND PICKUP OF ALL MAIL SERVICES, PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK.

--ITEM 666--
TY I MATERIAL SHALL BE TY B-ALKYD AS SPECIFIED IN DEPARTMENT MATERIALS SPECIFICATION D-9-8220.

AFTER THE SURFACE HAS BEEN CLEANED AND PREPARED ACCORDING TO THE SPECIFICATIONS AND TO THE SATISFACTION OF THE ENGINEER, ALL THERMOPLASTIC MARKINGS SHALL BE APPLIED IN ACCORDANCE WITH THE PLANS.

SPECIFICATION DATA

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 666--. CONT'D
TEXAS MUTCD AND AS DIRECTED/APPROVED BY THE ENGINEER. THE THERMOPLASTIC MARKINGS MAY BE APPLIED DIRECTLY OVER EXISTING PAINTED PAVEMENT MARKINGS WHERE APPLICABLE.

THE THERMOPLASTIC MARKINGS SHALL BE APPLIED SO AS TO CONSTANTLY MAINTAIN A TRUE AND ACCEPTABLE ALIGNMENT THROUGHOUT BOTH STRAIGHT AND HORIZONTALLY CURVED SECTIONS OF HIGHWAY. THIS ALIGNMENT SHALL BE IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER.

EQUIPMENT USED SHALL BE CAPABLE OF PLACING A MINIMUM ONE HUNDRED MILLIMETER (100 MM) AND/OR TWO HUNDRED MILLIMETER (200 MM) SOLID OR BROKEN LINE AND SHALL BE CAPABLE OF PLACING A MINIMUM OF 18,000 METERS OF MARKING PER WORK DAY. THE EQUIPMENT SHALL BE CONSIDERED IN UNSATISFACTORY WORKING CONDITION IF IT FAILS TO HAVE AN AVERAGE HOURLY PLACEMENT RATE OF 2,100 METERS OF ACCEPTABLE ONE HUNDRED MILLIMETER (100 MM) AND/OR TWO HUNDRED MILLIMETER (200 MM) OF SOLID OR BROKEN LINES OVER FIVE CONSECUTIVE WORKING DAYS OF SEVEN HOURS OR MORE DUE TO EQUIPMENT MALFUNCTION.

FOR TY I MARKINGS, THE MINIMUM THICKNESS OF SPRAY-APPLIED MARKINGS, AS MEASURED ON A FLAT PLATE BY MICROMETER OR SIMILAR DEVICE SHALL BE 3.0 MM FOR ALL STOP BARS, LEGENDS AND SYMBOLS. THE THICKNESS FOR ALL OTHER LINES SHALL BE AS SHOWN IN THE STANDARD SPECIFICATION. THESE THICKNESSES ARE REQUIRED FOR THE FULL WIDTH OF THE LINE BEING PLACED.

--ITEM 672--
RAISED PAVEMENT MARKERS SHALL NOT BE PLACED UNTIL THE ASPHALTIC CONCRETE PAVEMENT OR SURFACE TREATMENT HAS CURED A MINIMUM OF 48 HOURS.

THE BITUMINOUS ADHESIVE SHALL BE HEATED WITH EQUIPMENT APPROVED BY THE ENGINEER. THE EQUIPMENT SHALL BE CAPABLE OF HEATING AND MAINTAINING THE ADHESIVE AT A TEMPERATURE OF 200 DEGREES C. PLUS OR MINUS 5 DEGREES OR IN ACCORDANCE WITH THE MANUFACTURE'S RECOMMENDED TEMPERATURE. IT SHALL ALSO BE CAPABLE OF AGITATING THE MATERIAL TO MAINTAIN A UNIFORM CONSISTENCY AND TEMPERATURE.

IF ANY ADHESIVE IS BURNED DUE TO OVERHEATING, IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. THE ADHESIVE WILL BE PACKAGED IN CARDBOARD CONTAINERS WITH A MASS LESS THAN 45 KG.

ADHESIVE DISPENSING EQUIPMENT SHALL BE TRUCK OR TRAILER MOUNTED. ALL ADHESIVE MATERIAL SHALL BE PLACED DIRECTLY FROM THE HEATED DISPENSER TO

SPECIFICATION DATA

F.R. DIV.6	TEXAS	CSR 1739-2-12	SHEET 80
ATASCOSA	COUNTY	HWY FM 791	CONT 1739-2-12, ETC

GENERAL NOTES AND SPECIFICATION DATA--

--ITEM 672--. CONT'D
THE PAVEMENT. PORTABLE OR NON-HEATED CONTAINERS WILL NOT BE ALLOWED FOR
THE PLACEMENT OF THE ADHESIVE MATERIAL.

THE ADHESIVE APPLICATION SHALL BE OF SUFFICIENT THICKNESS SO THAT WHEN
THE MARKERS ARE PRESSED INTO THE ADHESIVE. 3 MM OR MORE ADHESIVE WILL
REMAIN UNDER 100% OF THE MARKER. THE ADHESIVE SHOULD EXTEND NOT LESS
THAN 10 MM BUT NOT MORE THAN 40 MM BEYOND THE PERIMETER OF THE MARKER.

--ITEM 5012--
THE SW3P FOR THIS PROJECT SHALL CONSIST OF TEMPORARY SEDIMENT CONTROL
FENCE AND ROCK FILTER DAM (TY 1) AS DIRECTED/APPROVED BY THE ENGINEER.

--ITEM 5162--
THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER ONE TRANSPORTABLE CELLULAR
PHONE (TCP) FOR USE BY STATE INSPECTION PERSONNEL.

SPECIFICATION DATA

04/23

SHEET I

ESTIMATE	SUMMARY
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								CSR 1739-2-12		ALT	ITEM-CODE			DESCRIPTION	UNIT	TOTAL	
								1739-02-012			ITEM NO	DESC CODE	SP NO			EST.	FINAL
						ROADWAY FM 791											
EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL							EST.	FINAL
								19.223	19.253	134	5001		BACKFILL (TY A)	KM		19.223	19.253
								3.450	0.300	152	5003		ROAD GRADER WORK (ORD COMP)	KM		3.450	0.300
							* *	57669.000	65569.500	164	5009	002	CELL FIB SEED (TEMP) (COOL)	M2		57669.000	65569.500
							* *	7785.000	2,151.613	168	5001		VEGETATIVE WATERING	KL		7785.000	2,151.613
							*	33239.000	30720.160	247	5110	007	FL BS (ROWY DEL) (TY A GR6 CL 2)	MGR		33239.000	30720.160
								3308.000	3337.127	275	5005		CEMENT	MGR		3308.000	3337.127
								158198.000	162926.900	275	5039		CEM TRT (EXIST MATL) (STR-0) (DC) (250MM)	M2		158198.000	162926.900
								161584.000	93,874.000	310	5001		ASPH MATRL (MC-30)	L		161584.000	93,874.000
								1171.000	1,181.522	316	5028	001	AGGR (TY PB, GR 4)	M3		1171.000	1,181.522
								1115.000	1,335.537	316	5054	001	AGGR (TY PB GR3)	M3		1115.000	1,335.537
						/		393423.000	436,652.085	316	5115	001	ASPH (AC-10 W/LATEX OR HFRS-2P)	L		393423.000	436,652.085
								1.000	1.000	500	5001		MOBILIZATION	LS		1.000	1.000
								8.000	8.000	502	5001		BARRICADES, SIGNS AND TRAF HANDLE	MO		8.000	8.000
								50.000	87.500	510	5001		ONE-WAY TRAF CONTRL	H		50.000	87.500
								939.000	882.390	530	5051		TURNOUTS (SURF TRT) (TY I)	M2		939.000	882.390
								356.000	357.591	530	5053		TURNOUTS (SURF TRT) (MAILBOX)	M2		356.000	357.591
								790.000	1,251.779	530	5082		TURNOUTS (SURF TRT) (TY II)	M2		790.000	1,251.779
								130.000	130.000	540	5001	002	MTL BEAM GD FEN (2.67 MM)	M		130.000	130.000
								2.000	2.000	540	5005	002	TERM ANCHOR SECT (2.67 MM)	EA		2.000	2.000
								152.000	152.000	542	5001		REMOV METAL BEAM GUARD FENCE	M		152.000	152.000
								4.000	4.000	542	5003		REMOV TERMINAL-ANCHOR SECTION	EA		4.000	4.000
								6.000	6.000	560	5001		MAILBOX INSTAL (SINGLE)	EA		6.000	6.000
								1.000	1.000	560	5003		MAILBOX INSTAL (MULTIPLE)	EA		1.000	1.000
								4087.000	4,087.000	662	5083	001	WRK ZN PAV MRK SH TRM (TAB) TY Y-2	EA		4087.000	4,087.000
								29.000	33.100	666	5012	007	REFL PAV MRK TY I (W) (SLD) (600 MM)	M		29.000	33.100
								19455.000	19,455.000	666	5024	007	REFL PAV MRK TY I (Y) (SLD) (100 MM)	M		19455.000	19,455.000
								3356.000	3,356.000	666	5025	007	REFL PAV MRK TY I (Y) (BRK) (100 MM)	M		3356.000	3,356.000
								29.000	33.100	666	5044	007	REFL PAV MRK TY II (W) (SLD) (600 MM)	M		29.000	33.100
								19455.000	38,910.000	666	5056	007	REFL PAV MRK TY II (Y) (SLD) (100 MM)	M		19455.000	38,910.000
								3356.000	6,712.000	666	5057	007	REFL PAV MRK TY II (Y) (BRK) (100 MM)	M		3356.000	6,712.000
								3525.000	3,811.000	672	5009	004	RAIS PAV MRKR CL B (REFL) TY II-A-A	EA		3525.000	3,811.000
							* *	66.000	72.800	5002	5001		ROCK FILTER DAMS (TY 1)	M		66.000	72.800
							* *	66.000	72.800	5002	5003		ROCK FILTER DAMS (REMOV) (TY 1)	M		66.000	72.800
							* *	10.000	26.000	5005	5001		BKHOE WORK (EROSN CONT) (CL 1)	H		10.000	26.000
							* *	208.000	743.400	5012	5001		TEMP SEDMT CONT FENCE	M		208.000	743.400
							* *	104.000	34.000	5012	5002		TEMP SEDMT CONT FENCE (REMOV & REPLAC)	M		104.000	34.000
							* *	208.000	743.400	5012	5003		TEMP SEDMT CONT FENCE (REMOV)	M		208.000	743.400
								2.000	2.000	5013	5001		SINGLE GDRAIL TERM	EA		2.000	2.000
									</								

ESTIMATE & QUANTITY SHEET

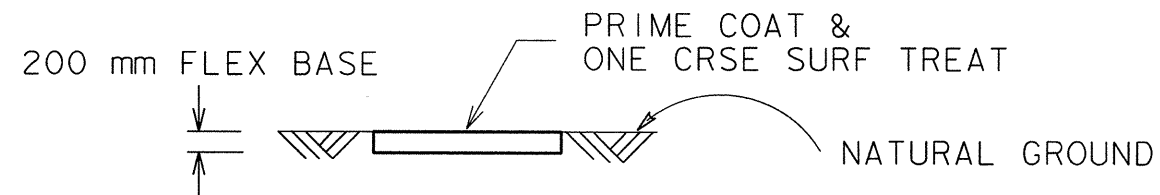
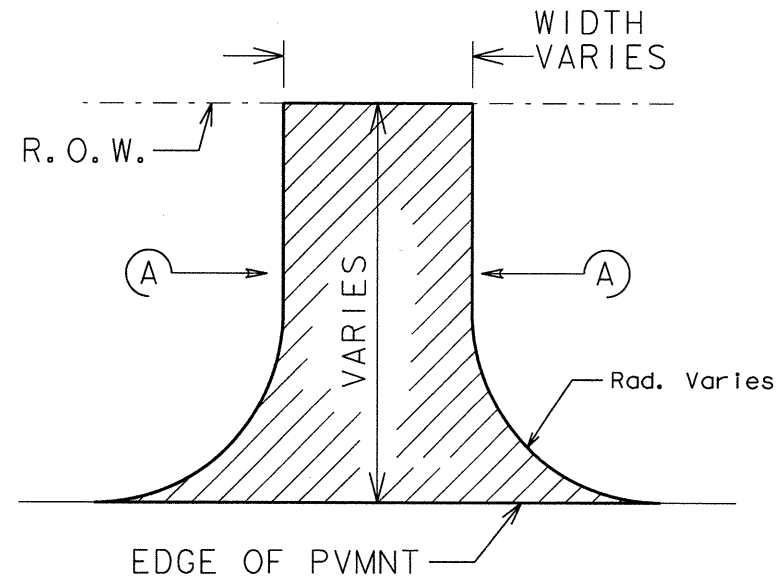
STATE DIST. NO.	COUNTY	PROJECT NO.	SHEET NO.
15	ATASCOSA	CSR 1739-2-12	9

ESTIMATE SUMMARY

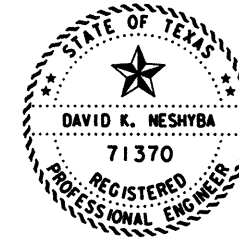
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ESTIMATE & QUANTITY SHEET

STATE DIST. NO.	COUNTY	FEDERAL AID PROJECT NO.	SHEET NO.
15	ATASCOSA	CSR 1739-2-12	9-A



TURNOUT
(SURF TRT) (TY 1)
SECTION A-A



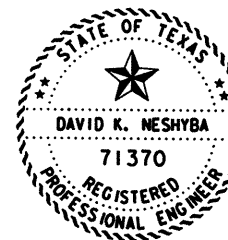
David K. Neshyba 3/5/98
DAVID K. NESHYBA, P.E. Date

SUMMARY OF TURNOUTS (TY 1)						
Road No.	Location	LENGTH m	WIDTH m	RADIUS m	RADIUS m	AREA m ²
Angeline St.	RT STA. 0+028.85	6.4 6.9	6.5 10.2	10	15	140.150 111.345
Co. Rd. 417	LT STA. 3+779.52	4.5 13.4	5.5 5.4	10	10	115.280 122.670
Co. Rd. 416	LT STA. 9+227.720	2.0 5.1	4.5 7.1	10	10	79.130 96.920
Co. Rd. 445	LT STA. 10+413.390	8.5 4.9	5.5 4.9	10	10	24.010 89.670
F.M. 2924	RT STA. 16+623.220	15.0 7.2	10.0 9.8	30	15	311.990 391.425
Co. Rd. 413	LT STA. 17+899.290	12.0 20.3	7.0 ✓	10	10 15	211.850 126.920
Totals						939.00

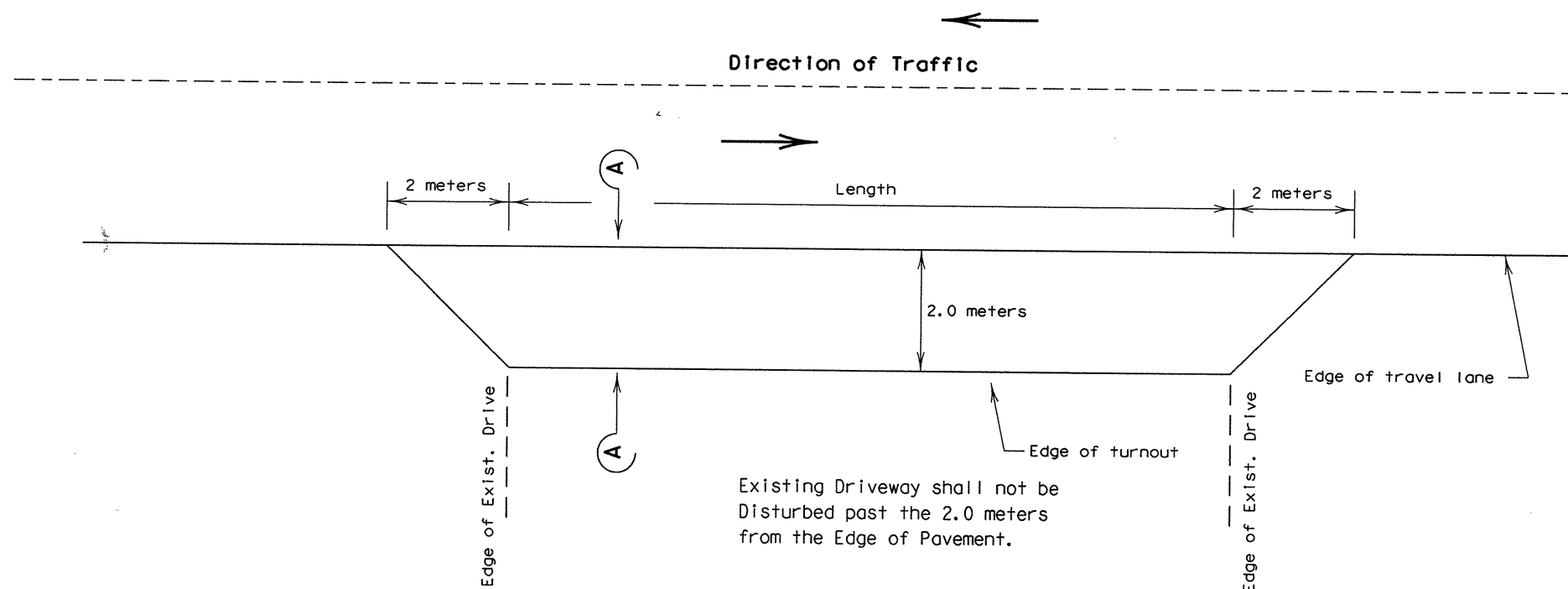
TURNOUT (TY 1) DETAILS AND SUMMARY



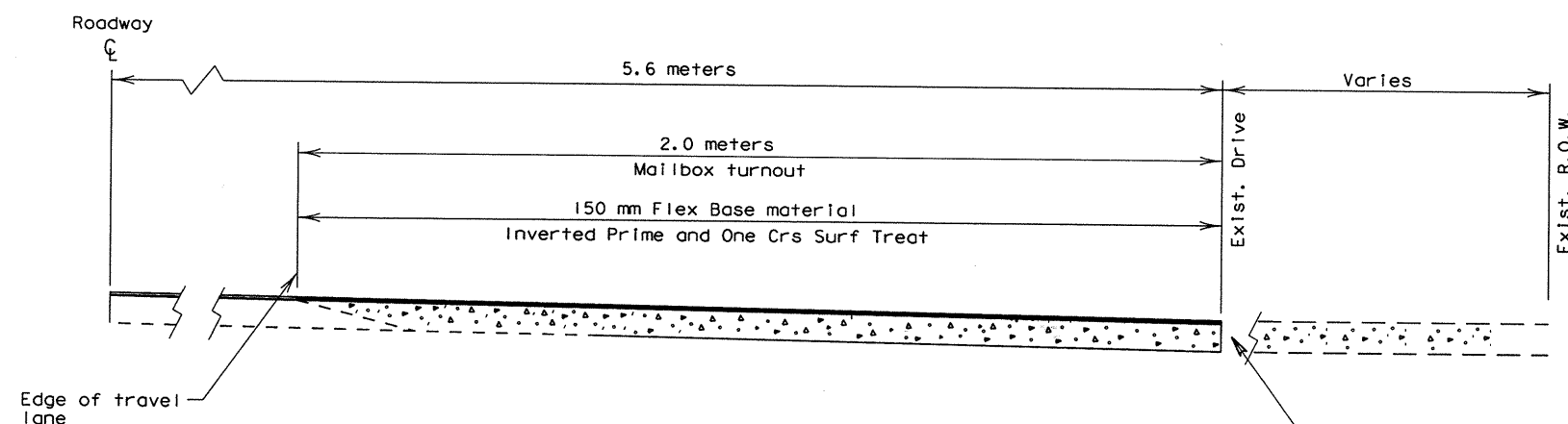
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6	CSR 1739-2-12		10
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F.M. 791



David K. Neshyba 3/5/98
DAVID K. NESHYBA, P.E. Date



PLAN



TYPICAL SECTION
SECTION A-A

CONTRACTOR SHALL MATCH
EXISTING DRIVEWAY ELEVATIONS
SO AS TO NOT AFFECT THE
EXISTING FLOW LINES.

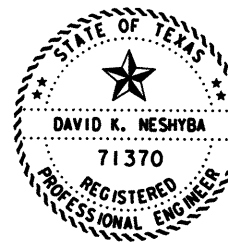
SUMMARY OF DRIVEWAY TURNOUTS (TY 11)			
Location	LENGTH m	FLARE m	AREA m2
1 LOCATION @	3.5	2	11.00
2 LOCATIONS @	4	2	12.00
28 LOCATIONS @	5	2	14.00
3 LOCATIONS @	6	2	16.00
1 LOCATION @	8	2	20.00
1 LOCATION @	9	2	22.00
2 LOCATIONS @	12	2	28.00
2 LOCATIONS @	19	2	42.00
* 1 LOCATION @	22.8	3.9	53.50
* 1 LOCATION @	32.85	6.83	79.50
Totals			1251.779 790.00

* I. H. 37 FRONTAGE ROAD

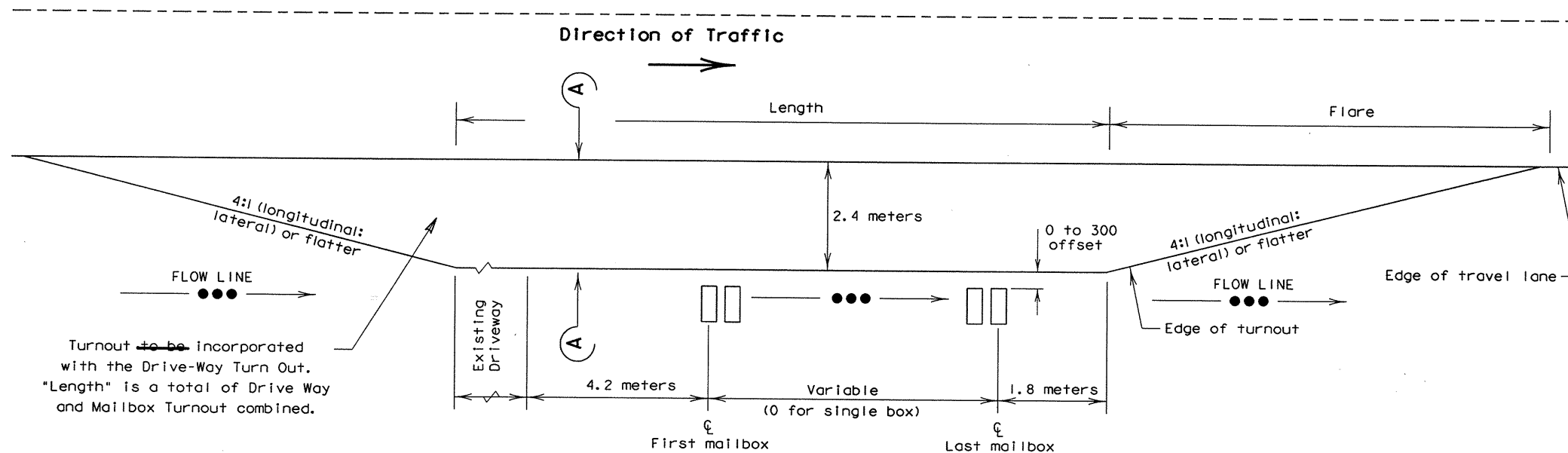
TURNOUT (TY 11) DETAILS AND SUMMARY



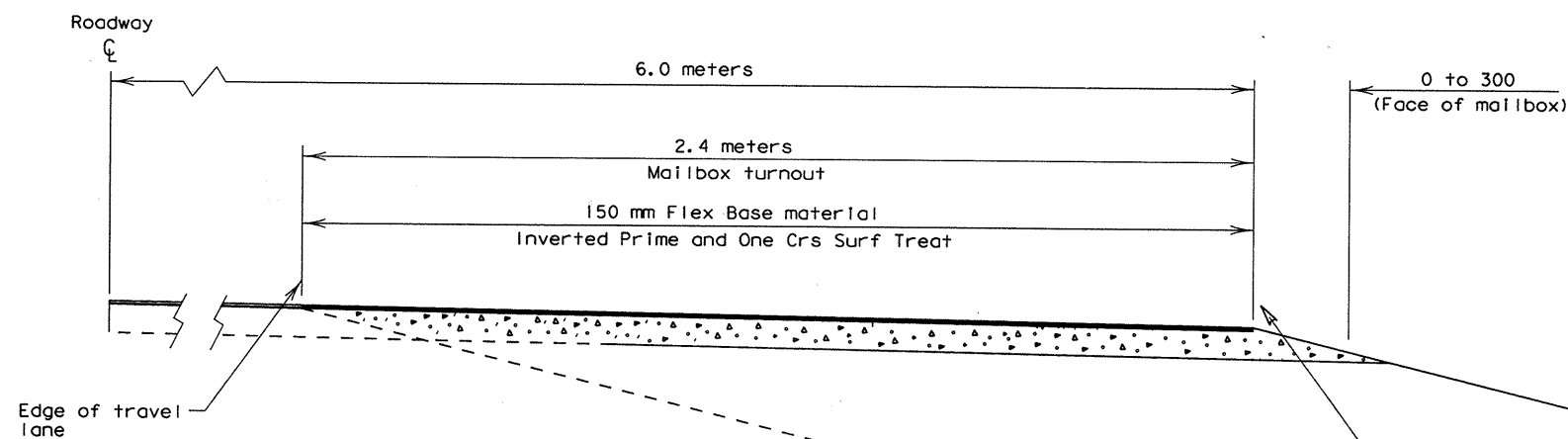
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		11
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F. M. 791



[Signature] 3/5/98
DAVID K. NESHYBA, P.E. Date



PLAN



TYPICAL SECTION
A-A

CONTRACTOR SHALL MATCH EXISTING DRIVEWAY ELEVATIONS AND MUST MAINTAIN ADEQUATE DRAINAGE SO AS TO NOT AFFECT THE EXISTING FLOW LINES.

SUMMARY OF MAILBOX TURNOUTS			
Location	LENGTH m	FLARE m	AREA m2
LT. STA. 3+168	10 15.8	9.6 3.3	47.04 45.84
LT. STA. 4+439	12 15.6	9.6 5.8	51.84 51.36
LT. STA. 4+735	10 8	9.6 8.1	47.04 38.64
LT. STA. 7+135	14	9.6	✓ 56.64
LT. STA. 10+410	10	9.6	✓ 35.52
LT. STA. 14+808	15	9.6	✓ 59.04
LT. STA. 15+173	15	9.6	✓ 59.04
Totals			357.60 356.16


SEE GENERAL NOTES FOR ITEM 560 (MAILBOX ASSEMBLIES)

TYPICAL MAILBOX TURNOUTS DETAILS AND SUMMARY

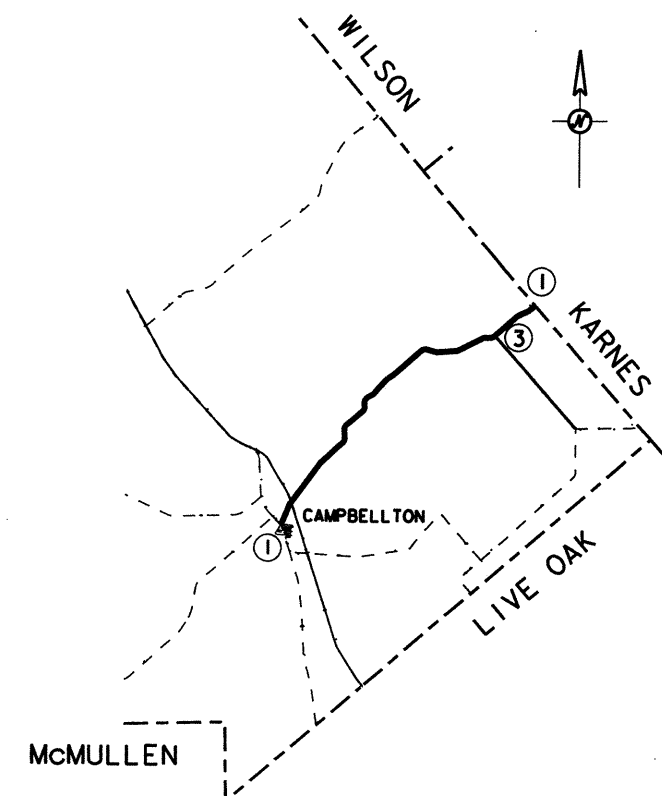


R = Radius
D = Diameter
All unit-less
dimensions are
millimeters

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		12
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
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SCHEDULE OF BARRICADES																			
LOCATION	ROAD WORK NEXT 12 MI	END ROAD WORK	NAME AND ADDRESS	ROAD WORK ← NEXT 10 MILES NEXT 2 MILES →	ROAD WORK AHEAD	ONE LANE ROAD XXX FT	SHLDR DROP OFF	UNEVEN LANES	DO NOT PASS	VERT PANEL	BE PREPARED TO STOP		PVMT ENDS	NO CENTER STRIPE	PASS WITH CARE	REDUCE SPEED AHEAD	SPEED LIMIT XX	WORK ZONE	TRAFFIC FINES DOUBLE
	G20-1	G20-2a	G20-6	G20-1a	CW20 -1D	CW20 -4	CW8 -9a	CW8 -11	R4-1		CW20 -7b	CW20 -7a	SCW8 -3	CW8 -12	R4-2	R2-5a	R2-1	G20-9	R20-5
	1	x	x	x		x													x
2		x			x														
3		x		x															
4					x	x	x	x	x	x	x	x	x	x	x	x	x		

NOTE:
(2) TO BE PLACED AT ALL INTERSECTING ROADS
(4) TO BE PLACED IN ACCORDANCE WITH THE TRAFFIC
CONTROL PLAN AND/OR AS DIRECTED BY ENGINEER.
Signs are based on the T.M.U.T.C.D., Part 6, Rev. No. 6



GENERAL NOTES - BARRICADES :

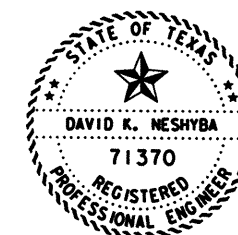
PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR MAY SUBMIT TO THE ENGINEER IN WRITING A PROPOSED CONSTRUCTION SEQUENCE AND PROVISIONS FOR TRAFFIC CONTROL. NO CONSTRUCTION WILL BE INITIATED PRIOR TO THE ENGINEER'S APPROVAL OF THIS PLAN.


ALL TRAFFIC SHALL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC.
AT TIMES WHEN IT IS NECESSARY FOR THE CONTRACTOR'S VEHICLES TO STOP, UNLOAD OR CROSS ROADWAY UNDER TRAFFIC, WARNING SIGNS AND FLAGGERS SHALL BE PROVIDED AS NECESSARY TO ADEQUATELY PROTECT PUBLIC TRAVEL.
A MINIMUM OF 1 Km OF NORMAL 2-WAY TRAFFIC SHALL BE MAINTAINED BETWEEN WORK AREAS.

THE CONTRACTOR MAY, WITH THE APPROVAL OF AND AS DIRECTED BY THE ENGINEER, BE REQUIRED TO VARY THE NUMBER AND LOCATION OF SIGNS AND BARRICADES FROM, OR FURNISH ADDITIONAL SIGNS AND BARRICADES TO, THOSE INDICATED ON THE PLANS IN ORDER TO MAINTAIN A SAFE AND UNINTERRUPTED FLOW OF TRAFFIC, PARTICULARLY IN THOSE AREAS OF IMMEDIATE WORK, AND COMPLY WITH THE GUIDLINES SET FORTH IN THE MUTCD, AT THE CONTRACTOR'S EXPENSE.

THE MOVABLE BARRICADES AND TEMPORARY SIGNS SHALL BE ERECTED IMMEDIATELY BEFORE THE BEGINNING OF CONSTRUCTION OPERATIONS EACH WORKING DAY AND SHALL BE REMOVED FROM THE ROAD AND SHOULDERS AT THE CLOSE OF EACH WORKING DAY AND PAVEMENT LEFT IN SUCH CONDITION AS TO OFFER NO HAZARD TO THE TRAVELING PUBLIC.

NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THE WORK REQUIRED BY THE PROVISIONS, SUCH WORK SHOULD BE CONSIDERED AS SUBSIDIARY TO THE VARIOUS ITEMS FOR WHICH BIDS ARE REQUIRED AND ITS COST INCLUDED IN THE UNIT PRICES BID, EXCEPT AS OTHERWISE SHOWN ON THE PLANS.

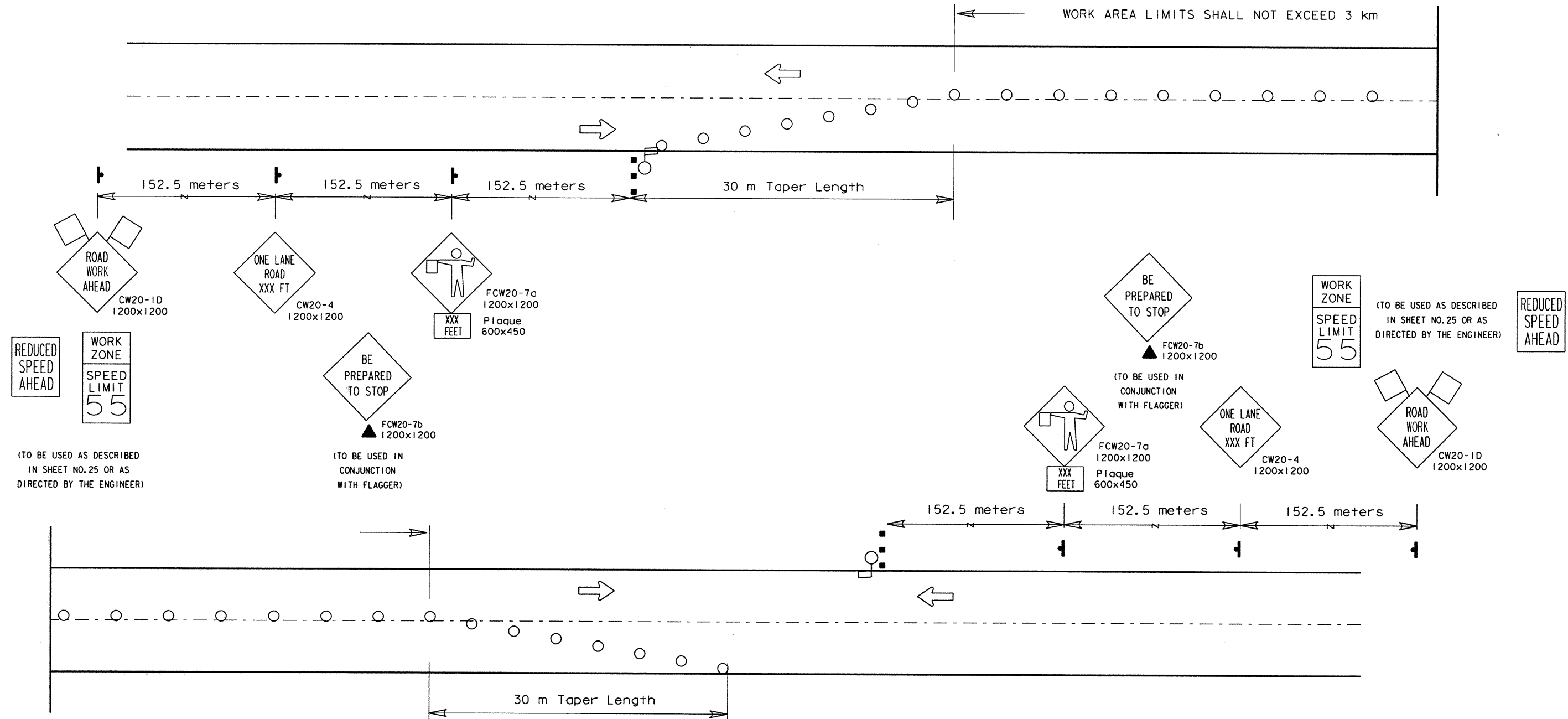


 **3/5/98**
DAVID K. NESHYBA, P.E. Date

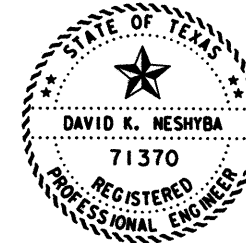
BARRICADE SUMMARY



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		13
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F.M. 791



- 1) The Contractor shall set required project barricades and SW3P measures before beginning of construction.
- 2) The Contractor shall blade soil away from shoulders and subgrade a width of 1.5 meters but shall not exceed a length of 3 km as measured along the base line of the project.
- 3) Phase I will be the Cement Treat (Road Mix) of 250 mm of existing base material. The length of the work area shall not exceed 3 km. The work shall be done under traffic, using One-Lane Two-Way taper. Flaggers shall be stationed at each end of the work taper. Flaggers shall be trained in safe traffic control practices. The use of radios will be required even when visual contact is possible. A taper length of 30 meters shall be used to guide traffic into the one-way section. Access to properties adjacent to the work area must be provided and maintained for the duration of the project.
- 4) The Cement Treat operation will be done in a manner so that the road will be open to traffic at the end of the working day. In order to avoid excessive exposure to the traveling public of unfinished longitudinal joints, the Contractor shall not cement treat more than one full day's production on any given travel lane pass. The operation may be continued forward in that travel lane only after the adjacent travel lane is completed up to the end point of the previous day's run. The treated material will be cured a minimum of 3 days prior to the taking of densities or as directed by the Engineer.

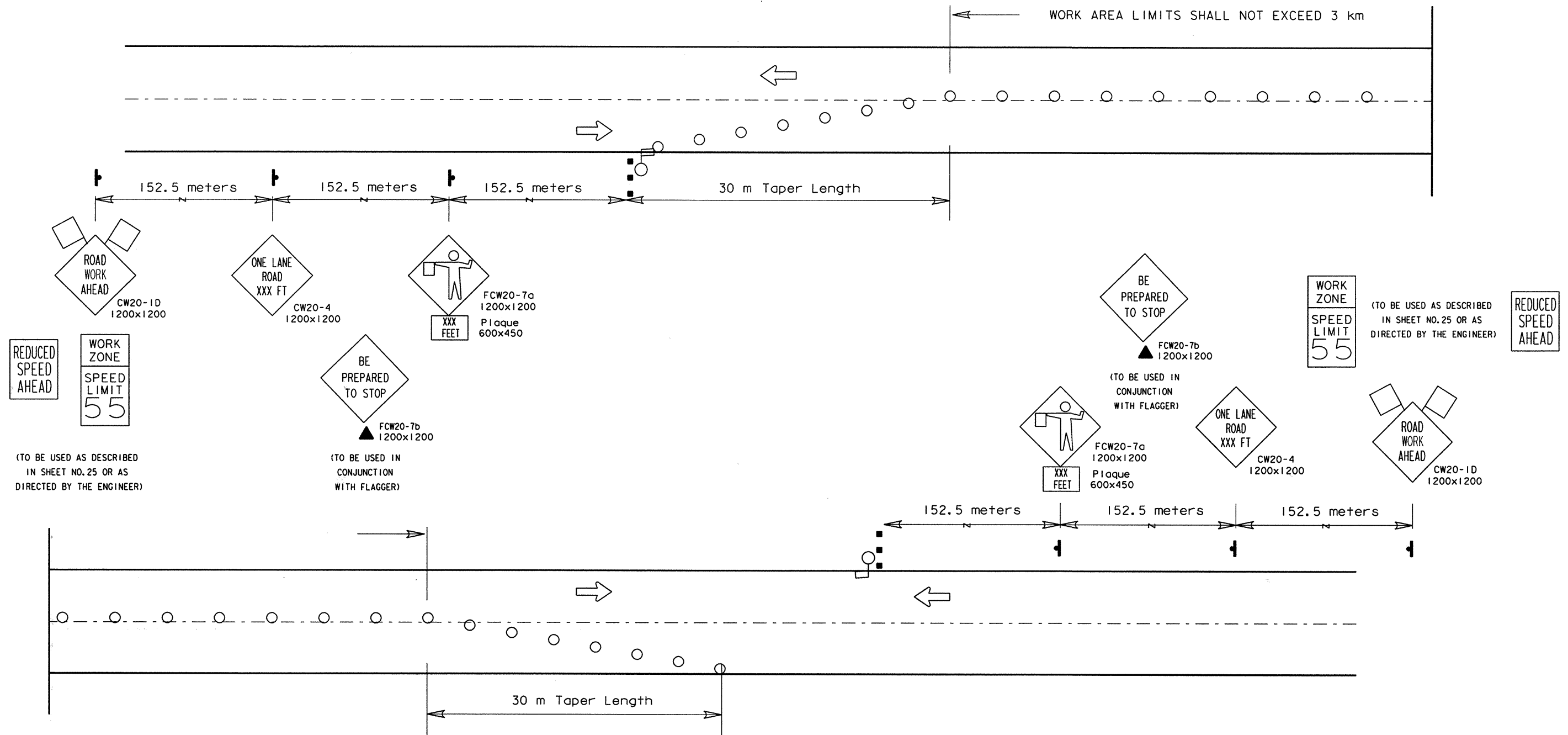


David K. Neshyba 3/5/98
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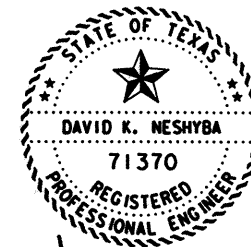
TRAFFIC CONTROL PLAN PHASE I



FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		14
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	FM 791



- 1) The Contractor shall not begin Phase II until density is met on the previous Phase I work area.
- 2) Phase II will be the Placement and Working of Flex Base material at a depth of 100 mm. The length of the work area shall not exceed 3 km. The work shall be done under traffic, using One-Lane Two-Way taper. Flaggers shall be stationed at each end of the work taper. Flaggers shall be trained in safe traffic control practices. The use of radios will be required even when visual contact is possible. A taper length of 30 meters shall be used to guide traffic into the one-way section. Access to properties adjacent to the work area must be provided and maintained for the duration of the project.
- 3) The Base working operation will be done in a manner so that the road will be open to traffic at the end of the working day. The Contractor shall not dump more material than can be work and laid back in a full day's production. The Base shall be worked in a manner so that at the end of the working day there shall be no uneven adjacent lanes.
- 4) The Contractor must meet the density requirements prior to beginning Phase III (Seal Coat Operation).

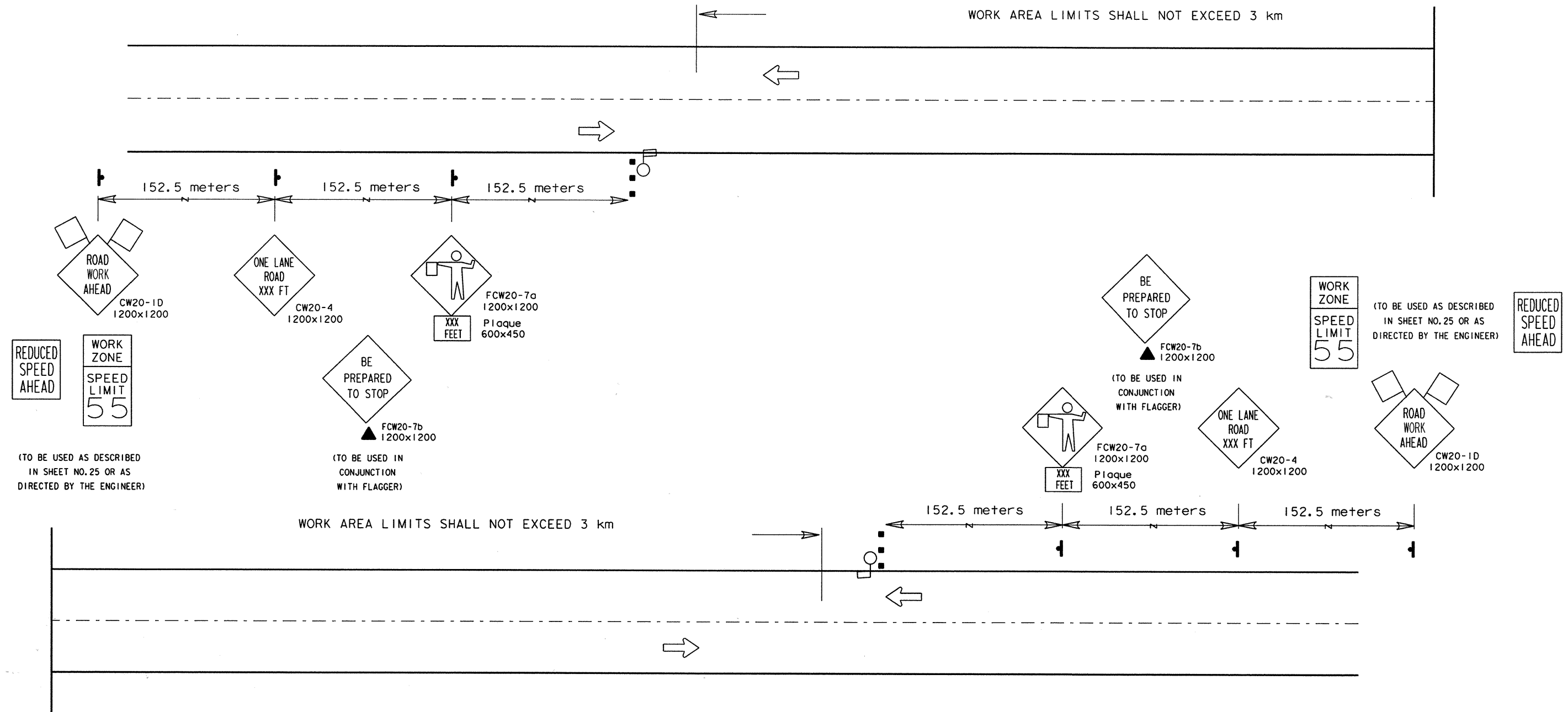


DAVID K. NESHYBA, P.E. 3/5/98 Date

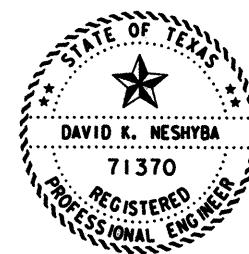
TRAFFIC CONTROL PLAN PHASE II

Texas Department of Transportation

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		15
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	FM 791



- 1) The Contractor shall not begin Phase III until density is met on the previous Phase II work area.
- 2) Phase III will be the Placement of a Prime Coat and the First Course of the Seal Coat using Ty PB Gr 4 aggregate. The length of the work area shall not exceed 3 km. The work shall be done under traffic, using One-Way Traffic Control (Pilot Car). Flaggers shall be stationed at each end of the work area and at any intersection that may be located within the work area. Flaggers shall be trained in safe traffic control practices. The use of radios will be required even when visual contact is possible. Access to properties adjacent to the work area must be provided and maintained for the duration of the project.
- 3) Upon completion of the First Course (Seal Coat) and/or as directed by the Engineer, the Contractor shall begin the Backfilling of Pavement Edges, as described in Item 134. Upon completion of the backfill operation, the Contractor shall blade back the topsoil and grass that was removed in Phase I construction.
- 4) Upon completion of the soil placement or/and as directed by the Engineer, the Contractor shall begin the Second Course of the Surface Treatment which will also use a Pilot Car for traffic control.



David K. Neshyba 3/5/98
DAVID K. NESHYBA, P.E. Date

TRAFFIC CONTROL PLAN PHASE III



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STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	FM 791

SITE DESCRIPTION

PROJECT LIMITS: From :U.S. 281-A in Campbellton, East
To : Atascosa / Karnes County Line.

PROJECT DESCRIPTION: Cement Treat (Exist) Base, Flex Base
and Two Course Surface Treatment.

MAJOR SOIL DISTURBING ACTIVITIES: Blading soil away from Subgrade 1.5 meters, Backfill
and blading soil back on shoulders.

TOTAL PROJECT AREA: 47.14 ha

TOTAL AREA TO BE DISTURBED: 20 ha (Pavement Area Included)

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): 0.41

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: The existing soil types for this project are Amphlon - Floresville - Imogene , (located at the west end) which is a gently sloping loamy soil and Monteola-Welgang-Campbellton , (located at the east end) which is a nearly level to moderately steep, clayey and loamy soil which are covered 90% to 95% with various grasses which are in good condition.

NAME OF RECEIVING WATERS: The receiving waters of the project are the Lipan and Borrego Creeks which flow into the Atascosa River which eventually contributes to the Nueces River located approximately 50 km downstream of the project. Several small streams which contribute to the above mentioned streams are located within the projects limit as well. (Segment 2107)

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- X BUFFER ZONES
- X PRESERVATION OF NATURAL RESOURCES

OTHER: Disturbed areas on which construction activity has ceased (temporarily or permanently) shall be stabilized within 14 days unless activities are scheduled to resume and do within 21 days.

STRUCTURAL PRACTICES:

- X TEMPORARY SEDIMENT CONTROL FENCE
- HAY BALES
- ROCK BERMS
- X DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- PIPE SLOPE DRAINS
- PAVED FLUMES
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- CHANNEL LINERS
- SEDIMENT TRAPS
- SEDIMENT BASINS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES
- CURBS AND GUTTERS
- STORM SEWERS
- X VELOCITY CONTROL DEVICES

OTHER: Rock Filter Dams

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

- The order of activities will be as follows:
- Blade soil away from shoulders and subgrade 1.50 meters.
 - Cement treat 250 mm Existing base during Phase I of construction.
 - Place 100 mm new Flex base during Phase II of construction.
 - Place Prime Coat, One Crs Surf Treat and Backfill during Phase III of construction.
 - Blade soil back onto edge of pavement, prior to seeding.
 - Place Second Course of Surface Treatment.
 - Place seed and water disturbed area.

STORM WATER MANAGEMENT:

Storm water runoff will be across grass buffer zones. If necessary, Sediment Control Fence will be erected as directed by the Engineer.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: An inspection will be performed by a TxDOT Inspector every week as well as after every half inch or more of rain (as recorded on a non-freezing rain gauge to be located at the Project Site). An Inspection and Maintenance Report will be made per each inspection. Based on the inspection results, the controls shall be revised per the inspection report.

WASTE MATERIALS: All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all state and local city solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulations and the trash will be hauled to a local dump. No construction waste material will be buried on site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): At a minimum, any products in the following categories are considered to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the Contractor shall contact the Engineer immediately. The Engineer will then contact the District Spill Coordinator.

SANITARY WASTE: All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.

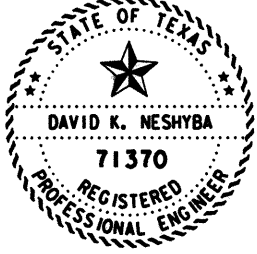
OFFSITE VEHICLE TRACKING:

- X HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPULIN
- X EXCESS DIRT ON ROAD REMOVED ON A REGULAR BASIS
- STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)



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STATE	DIST.	COUNTY	
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CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F.M. 791

GENERAL NOTES

- The type of SGT unit will be specified elsewhere in the plans. (Numbers in circles indicate post position.)

	Post & Tube	Post Only
Type I	Posts ① thru ②	Posts ③ thru ⑧
Type II	Posts ① thru ④	Posts ⑤ thru ⑧
Type III	Posts ① thru ⑧	None
- Wood posts are required with this guardrail end treatment.
- All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
- For non-curb installations, the MBGF will be flared at a rate of 25:1 over the first 15240 mm of the system to prevent the terminal head from encroaching on the shoulder. The flare may be decreased or eliminated for specific installations if directed by the Engineer. A 25:1 flare rate will be used at curb sections, beginning at post number 5 and ending at post number one.
- The steel tubes shall not protrude more than 100 mm above ground. Site grading may be necessary to meet this requirement.
- The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
- When rock excavation is encountered, a 305 mm diameter post hole, 510 mm deep may be used if approved by the Engineer. Granular material will be placed in the bottom of the hole approximately 65 mm deep to provide drainage. The steel tube sleeves will be field cut to 510 mm in length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks.
- For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).
- A special site evaluation should be considered, prior to using this end treatment where there is less than 7620 mm between the outlet side of the end treatment and any adjacent driving lane.

BILL OF MATERIAL

Code #	Type I Qty.	Type II Qty.	Type III Qty.	DESCRIPTION
E1200	1	1	1	#1 Deep Beam Guardrail (8090 mm) (12 Ga.)
E1205	1	1	1	#2 Deep Beam Guardrail (7938 mm) (12 Ga.)
E730	2	2	2	Steel Tube - 203 x 152 x 5 x 1980
E735	0	2	6	Steel Tube - 203 x 152 x 5 x 1370
SP600	0	2	6	Soil Plate - 460 x 610 x 6
P650	2	4	8	Wood Posts - 140 x 190 x 1145
P671	6	4	0	Wood CRT Posts - 150 x 200 x 1830
P675	6	6	6	Wood Blockouts - 150 x 200 x 360
E740	1	1	1	Pipe Sleeve - 50 mm Std. Pipe x 140 mm
E750	1	1	1	Bearing Plate - 16 x 200 x 200
E761	1	1	1	Cable Anchor Box
E770	1	1	1	Cable Assembly
E780	1	1	1	Groundline Strut
E3005	1	1	1	Impact Head
HARDWARE				
B580754	2	6	14	5/8" x 7 1/2" Hex Hd. Bolt
B580954	2	4	8	5/8" x 9 1/2" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	5/8" Washers
B581002	1	1	1	5/8" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	5/8" x 1 1/4" HGR Splice Bolt
B581802	6	6	6	5/8" x 18" HGR Post Bolt (Posts ③ thru ⑧)
N050	27	33	45	5/8" HGR Nut (16-Spl, 7-Posts, 2-Strut, 2 ea. at Tube ③ thru ⑧)
E350	2	2	2	3/8" x 3" Lag Screw
N100	2	2	2	1" Hex Nut (Anchor Cable)
W100	2	2	2	1" Washer (Anchor Cable)
E3151	1	1	1	Object Marker - (450 x 450)

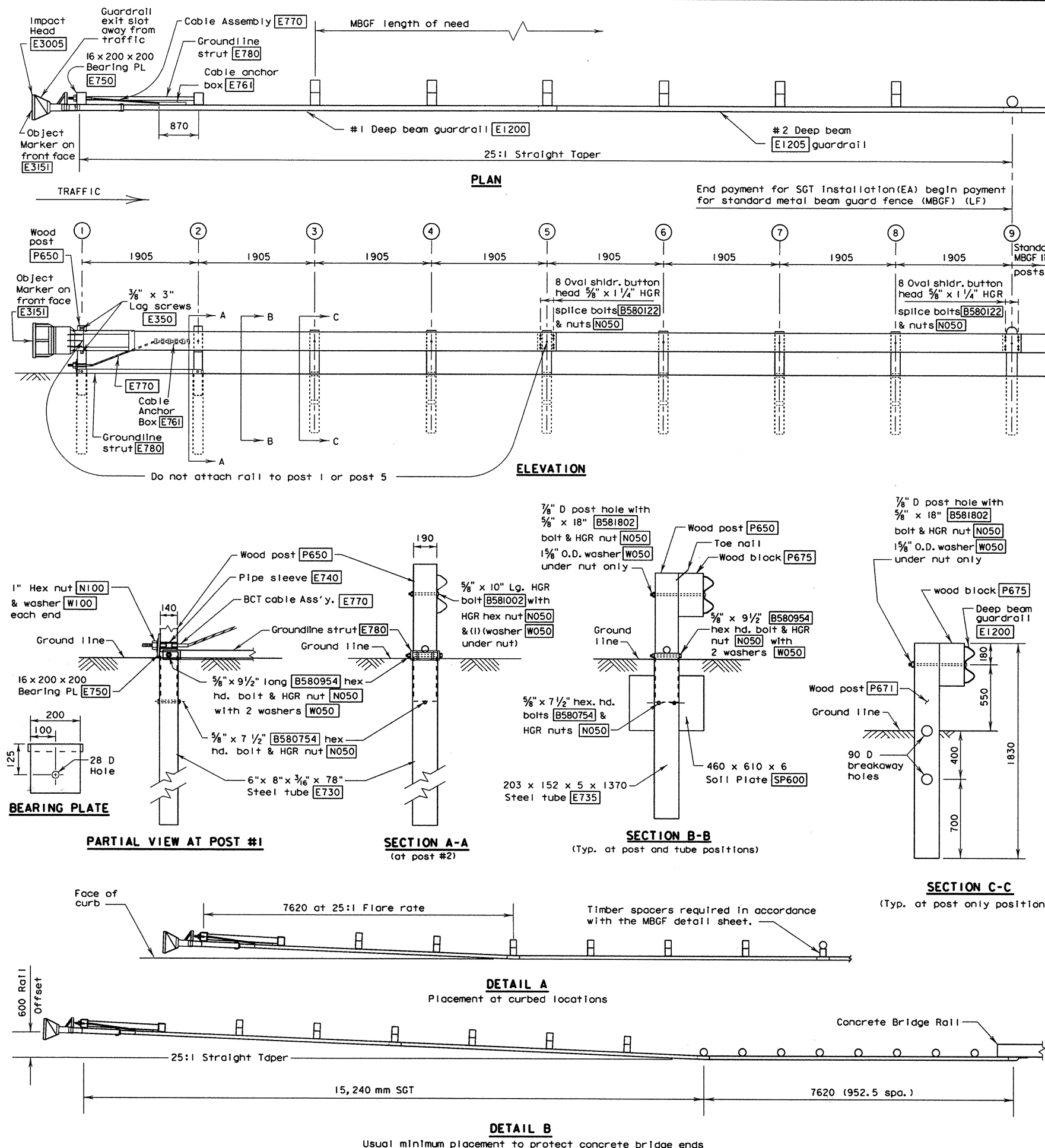
Type I - post ① thru ②
 Type II - post ① thru ④
 Type III - post ① thru ⑧
 All measurements should be taken from bottom of posts.

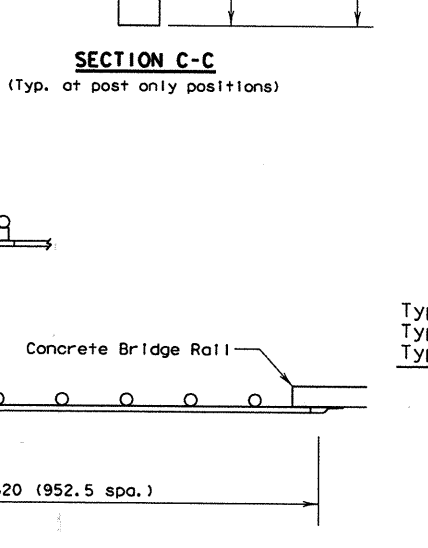
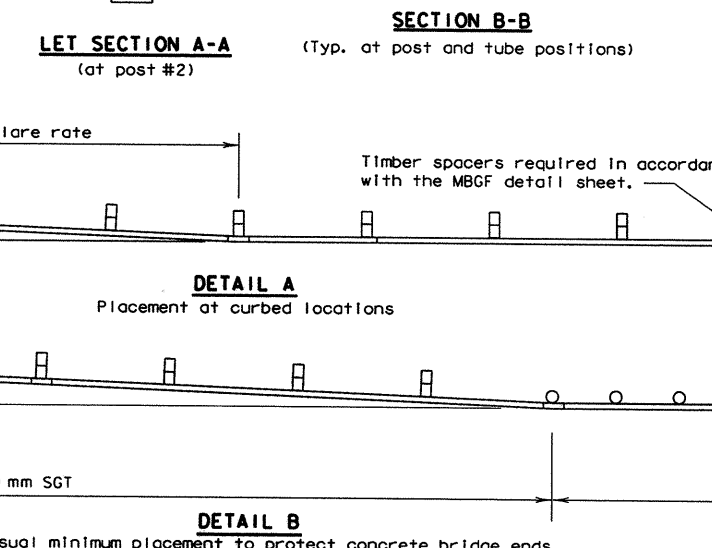
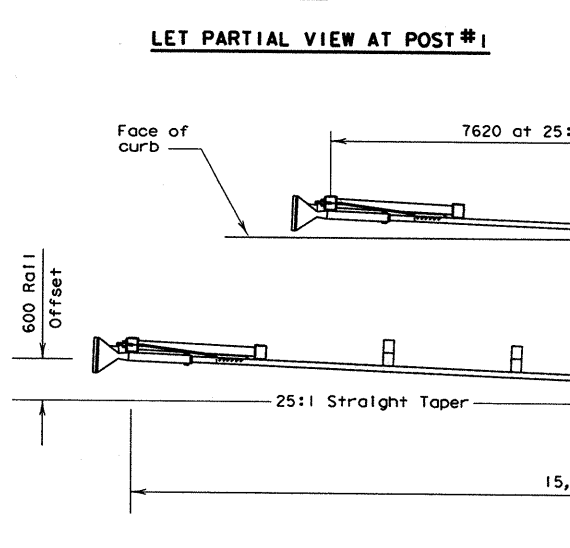
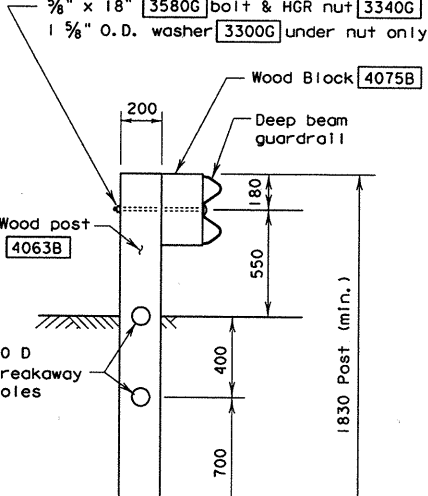
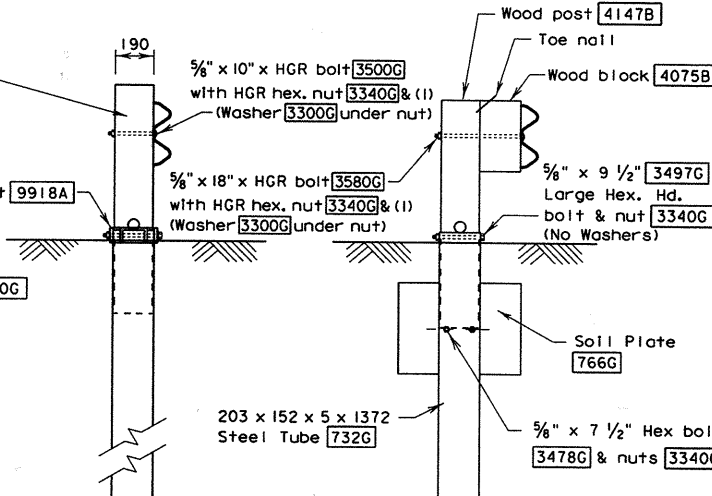
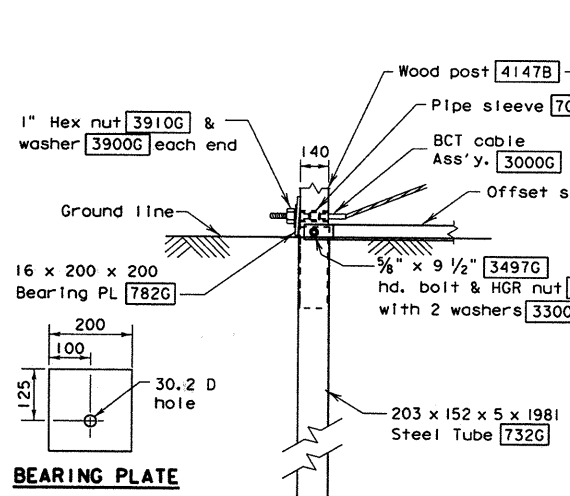
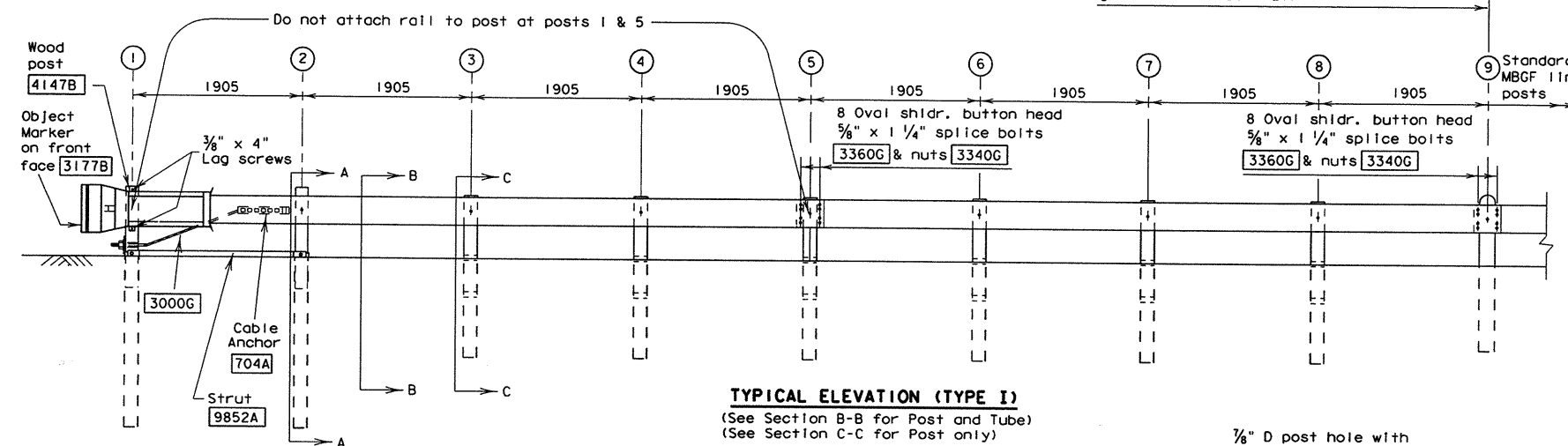
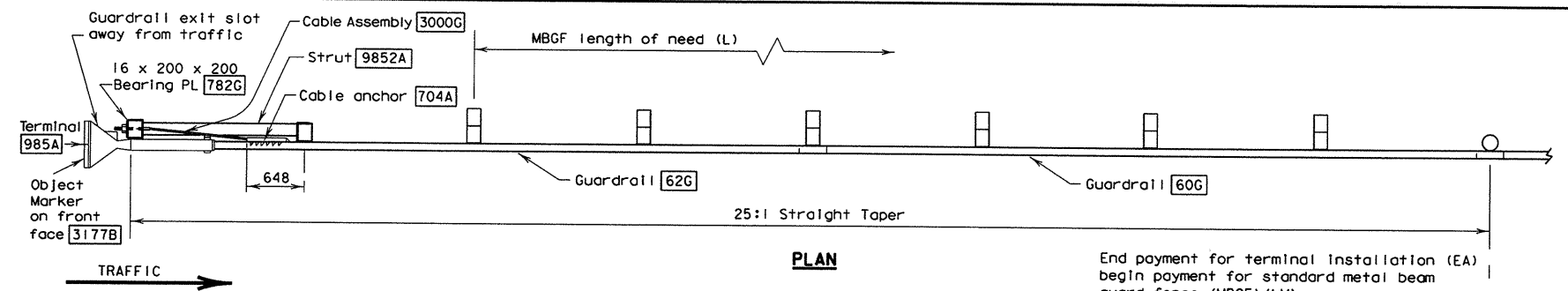
Texas Department of Transportation
 Design Division (Roadway)
SINGLE GUARDRAIL TERMINAL
 (BEST 350)

SGT (5) -97 (M)

FILE#	SGT597M.dgn	DN#	MAM	CK#	MAM	DN#	BR	CK#	MAM	NEG#	
ORIG DATE#	FEBRUARY 1997	DIST	FED REG	FEDERAL AID PROJECT							SHEET
REVISIONS											
		SAT	6	CSR	1739-2-12						18
		COUNTY	ATASCOSA	CONTROL	1739	SECT	02	JOB	012	HIGHWAY	FM 791

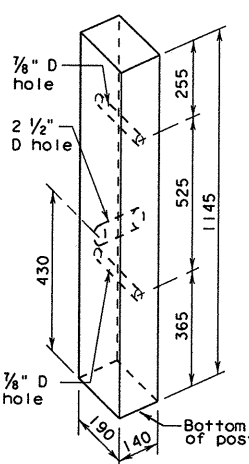
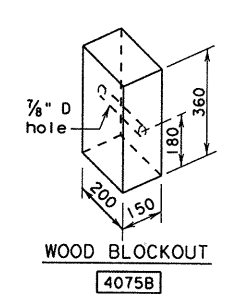
R = Radius
 D = Diameter
 All unit-less dimensions are millimeters





- GENERAL NOTES**
- The type of SGT unit will be specified elsewhere in the plans. (Numbers in circles indicate post position.)

	Post & Tube	Post Only
Type I	Posts ① thru ②	Posts ③ thru ⑥
Type II	Posts ① thru ④	Posts ⑤ thru ⑥
Type III	Posts ① thru ⑥	None
 - Wood posts are required with this guardrail end treatment.
 - All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
 - For non-curb installations, the MBGF will be flared at a rate of 25:1 over the first 15240 mm of the system to prevent the terminal head from encroaching on the shoulder. The flare may be decreased or eliminated for specific installations if directed by the Engineer. A 25:1 flare rate will be used at curb sections, beginning at post number 5 and ending at post number one.
 - The steel tubes shall not protrude more than 100 mm above ground. Site grading may be necessary to meet this requirement.
 - The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
 - When rock excavation is encountered, a 305 mm diameter post hole, 510 mm deep may be used if approved by the Engineer. Granular material will be placed in the bottom of the hole approximately 65 mm deep to provide drainage. The steel tube sleeves will be field cut to 510 mm in length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
 - The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
 - The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks.
 - For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
 - An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).
 - A special site evaluation should be considered, prior to using this end treatment where there is less than 7620 mm between the extrusion side of the end treatment and any adjacent driving lane.



Type I - post ① thru ②
 Type II - post ① thru ④
 Type III - post ① thru ⑥
 All measurements should be taken from bottom of posts.

Code #		LET-2000			ET-2000			DESCRIPTION
		Type I Qty.	Type II Qty.	Type III Qty.	Type I Qty.	Type II Qty.	Type III Qty.	
62G	1	1	1	1	1	1	1	#1 Deep Beam Guardrail (12 Ga) at 7620 mm
60G	1	1	1	1	1	1	1	#2 Deep Beam Guardrail (12 Ga) at 7620 mm
732G	2	2	2	2	-	-	-	Steel Tube - 203 x 152 x 5 x 1981
740G	0	2	6	4	8	-	-	Steel Tube - 203 x 152 x 5 x 1372
766G	0	2	6	4	8	-	-	Soil Plate - 460 x 610 x 6
4147B	2	4	8	4	8	-	-	Wood Posts - 140 x 190 x 1145
4063B	6	4	0	4	0	-	-	Wood CRT Posts - 150 x 200 x 1830
4075B	6	6	6	7	7	-	-	Wood Block - 150 x 200 x 360
705G	1	1	1	1	1	1	1	Pipe Sleeve - 50 mm std. pipe x 140 mm
782G	1	1	1	1	1	1	1	Bearing Plate - 16 x 200 x 200
704A	1	1	1	1	1	1	1	Cable Anchor
3000G	1	1	1	1	1	1	1	Cable Assembly (19 x 1981)
9852A	1	1	1	1	-	-	-	Inline Strut
9918A	-	-	-	-	1	1	1	Offset Strut
985A	1	1	1	1	1	1	1	ET-2000 Guardrail Terminal
HARDWARE								
3497G	2	4	8	4	8	-	-	5/8" x 9 1/2" Hex Hd. Bolt (Top of tubes)
3300G	11	11	11	11	11	-	-	5/8" Washers
3478G	2	4	8	8	16	-	-	5/8" x 7 1/2" Hex Bolt
3500G	1	1	1	-	-	-	-	5/8" x 10" Post Bolt (Post 2 of LET)
3580G	6	6	6	7	7	-	-	5/8" x 18" HGR Post Bolt (posts ③ thru ⑥)
3360G	16	16	16	16	16	-	-	5/8" x 1 1/4" HGR Splice Bolt
3340G	27	31	39	35	47	-	-	5/8" HGR Nut (16-spl., 7-posts, 2-strut, 2 each at tube ③ thru ⑥)
4228G	2	2	2	2	2	-	-	3/8" x 4" Lag Screw
3910G	2	2	2	2	2	-	-	1" Hex Nut (Anchor Cable)
3900G	2	2	2	2	2	-	-	1" Washer (Anchor Cable)
3177B	1	1	1	1	1	-	-	Object Marker (450 x 450)

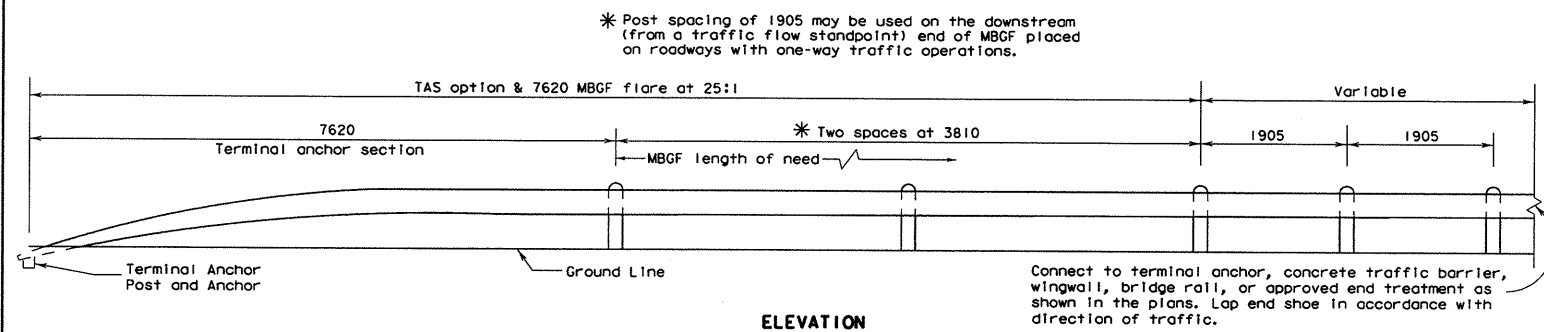
Texas Department of Transportation
 Design Division (Roadway)

SINGLE GUARDRAIL TERMINAL
 (LET-2000 & ET-2000)

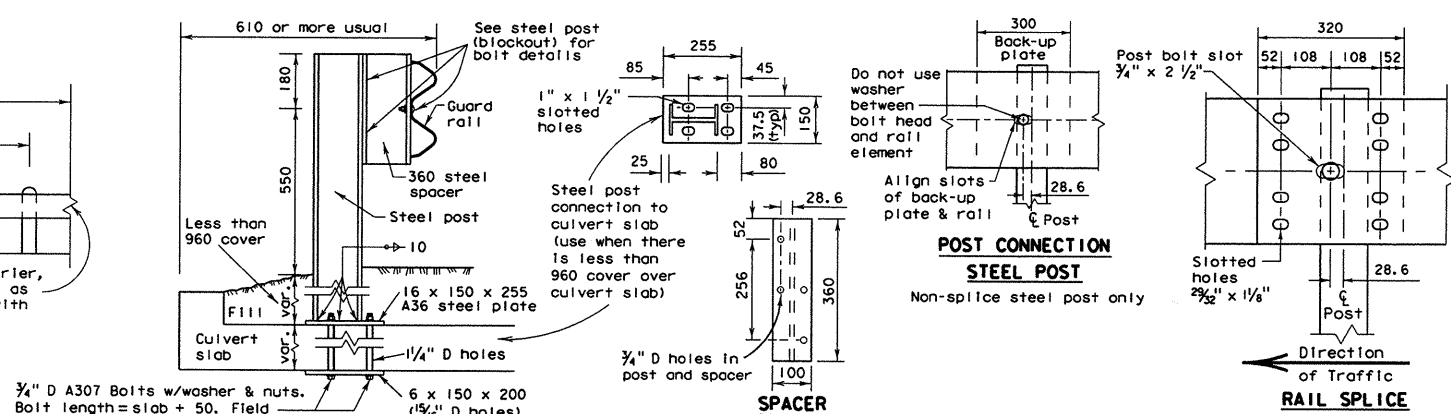
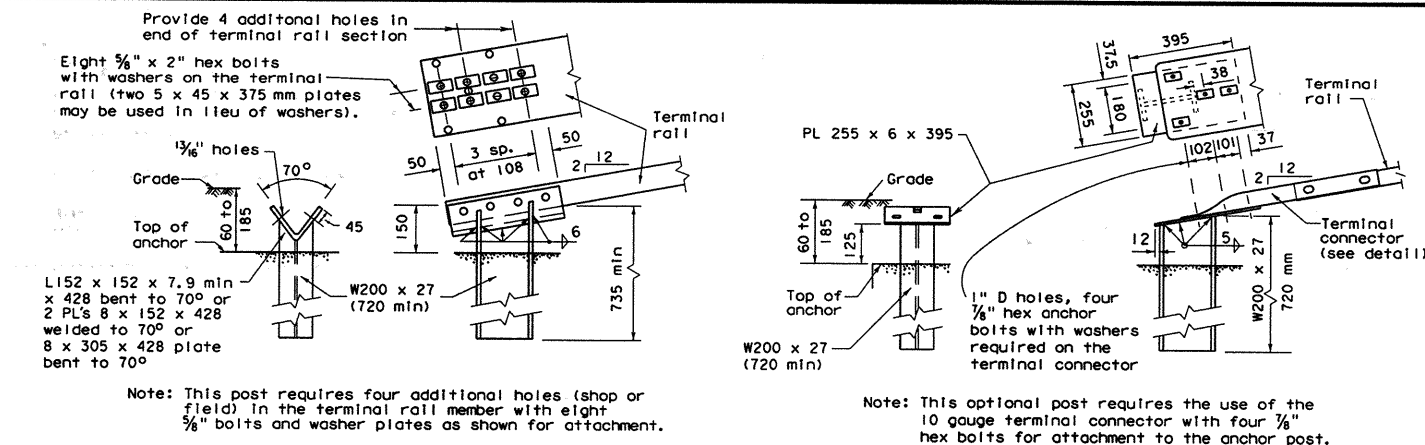
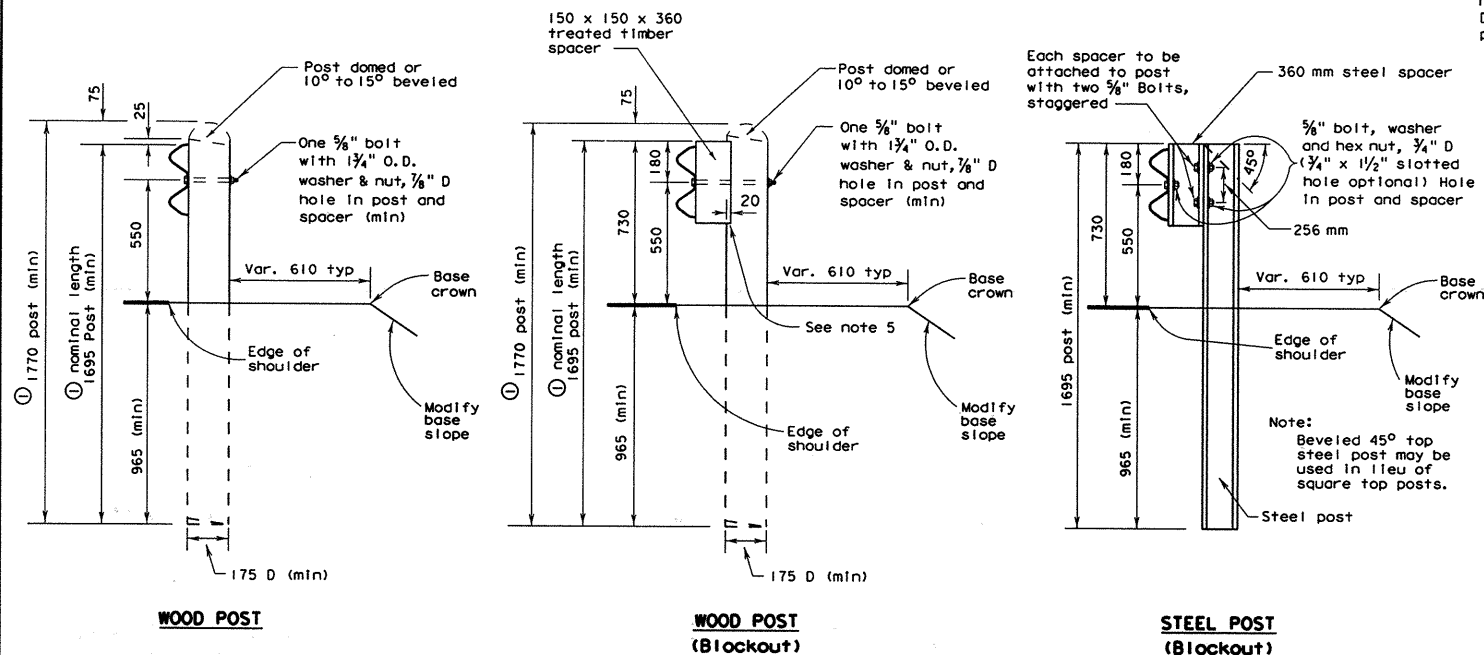
SGT (6) -97 (M)

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REVISIONS	SAT		6	CSR	1739-2-12	19				
COUNTY		CONTROL		SECT	JOB	HIGHWAY				
ATASCOSA		1739		02	012	FM 791				

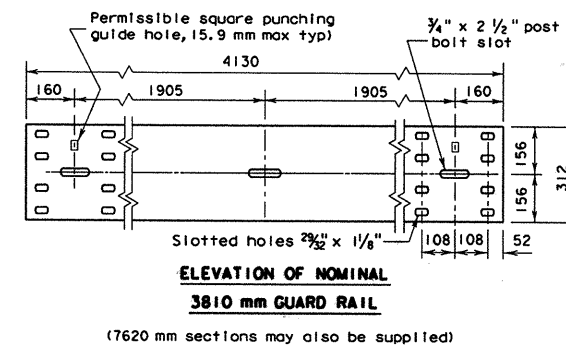
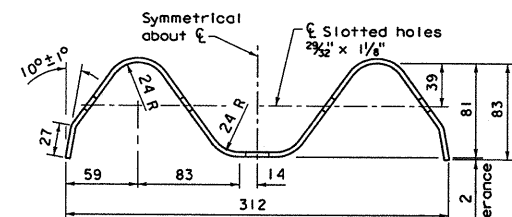
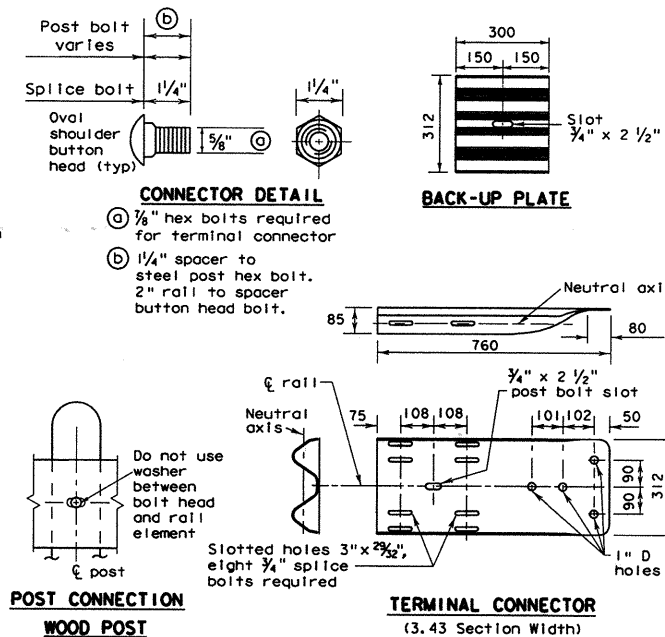
R = Radius
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 All unit-less dimensions are millimeters



Note ①: Where a nominal length of 1830 is specified as acceptable elsewhere in the plans, these dimensions shall be increased by 135. The additional length should be specified only on roadways where future ACP overlays and adjustments of the rail height on the same posts are likely.



LOW FILL CULVERT POST MOUNTING OPTION



- The exact position of guard fence shall be as shown elsewhere on the plans or as directed by the Engineer. Guard fence shall be transitioned to a smooth connection with other guard fence or structure railing as shown elsewhere on plans.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be blocked out so that the face of curb is located directly below or behind the face of rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 550 mm above the gutter pan or roadway surface.
- Unless otherwise shown in the plans, MBGF shall be placed with the face of rail directly above the shoulder edge (or curbface) except the 7620 mm Terminal Anchor Section and adjacent 7620 mm of MBGF shall be flared at 25:1 (longitudinally) to provide a 600 mm offset between buried anchor and shoulder edge (or curbface). Flaring the 7620 mm Terminal Anchor and adjacent 7620 mm MBGF is optional for one-way traffic conditions on the downstream end of guard fence.
- At the option of the Contractor, the rail elements for the guard fence may be furnished in either 3810 mm or 7620 mm nominal lengths with post bolt slots for connection to posts.
- Timber posts may be beveled from 10 to 15 degrees on the top of both ends with high side of top of post placed toward the roadway or they may be domed. When blockout guard fence is specified elsewhere in the plans, a 150 mm x 150 mm x 360 mm treated timber spacer of yellow pine shall be used with wood posts. When "blocked out", the upper portion of the post shall be notched 20 mm to provide flat surface for timber spacer. A tolerance of ±3 mm will be permitted on the notched portion of the post. Routing the timber spacer may be used in lieu of notching the post. The depth of routing shall be 20 mm at the center of radius ±3 mm.
- Steel posts shall be blocked out. Steel posts and spacers shall meet the requirements of ASTM A-36 (W150 x 13.5 or W150 x 12.6). Bolt holes shall be placed as indicated on Spacer detail.
- Post spacing will be 1905 mm except that the first post will be 7620 mm from the terminal anchor post and the next two posts spaced at 3810 mm with a minimum of 8 posts adjacent to structures spaced at 952.5 mm and posts adjacent to Type T6 bridge rail are spaced at 1905 mm. Post spacing adjacent to structures may vary as shown on bridge rail details or as directed by the Engineer.
- The upper 250 mm (minimum) of the terminal anchor post and all steel fittings thereon shall be galvanized.
- The terminal anchor post shall be set in Class "A" concrete (unless otherwise shown on plans) in accordance with Item, "Portland Cement Concrete". Concrete shall be subsidiary to the bid item requiring construction of the terminal rail section and anchorage system.
- An anchor other than to a terminal anchor post shall consist of a connection similar to the rail splice or similar to the terminal connector.
- Back-up plates shall be provided at intermediate (non-splice) steel posts. Back-up plates shall conform to the materials and galvanizing requirements specified for the rail element, and shall be of the same nominal thickness as the rail element used.
- Washers used with the eight 3/8" splice bolts and nuts that are provided for terminal connectors and/or anchor posts shall be 3/4" x 3" x 3/8" rectangular washers (ASTM A 36) or as designated by the Engineer.
- The 10 Gauge terminal connectors must be used with the optional terminal anchor post. Either anchor post may be used with either concrete anchor.
- Welded steel posts and spacers shall meet the requirements of ASTM A-36. The flange width and thickness, web thickness, and depth of welded posts and spacers shall equal or exceed the dimensions of a standard rolled W150 x 13.5 or W150 x 12.6.
- Special fabrication will be required at installations having a curvature of less than 45 meter radius.
- Bolts shall be of sufficient length to extend through the full thickness of the nut and no more than 20 mm beyond it. (Button head bolts may be used instead of hex bolts when specified by the Engineer.) Fittings (bolts, nuts, and washers) shall be in accordance with Item, "Metal For Structures". Fittings shall be subsidiary to the bid item requiring construction of MBGF or Terminal Anchor Section.
- Crown will be widened to accommodate guard fence.
- Where solid rock is encountered or where shown on the plans, the diameter of the holes shall be approximately 305 mm, the backfilling shall be with a cohesionless material, and embedment depth shall be 460 mm or more as directed by the Engineer. Timber posts shall not be set in concrete.

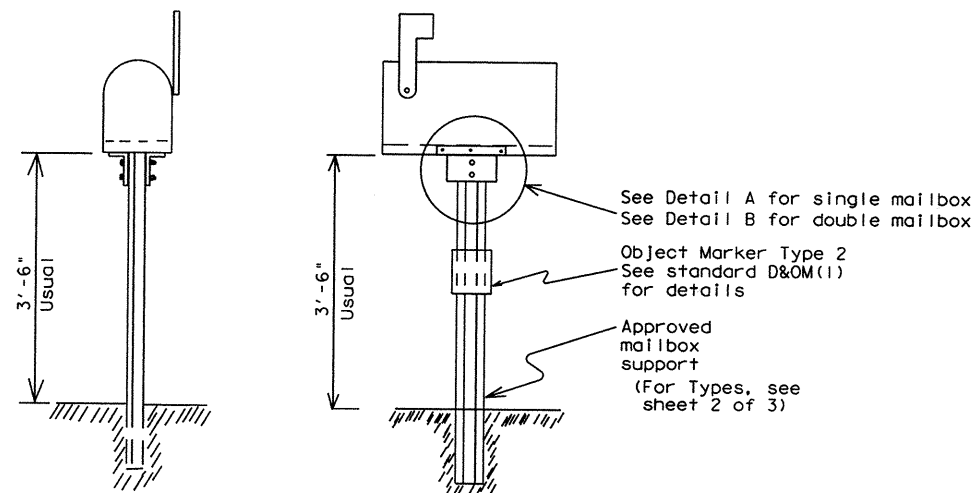
Texas Department of Transportation
Design Division (Roadway)

METAL BEAM GUARD FENCE MBGF-95A (M)

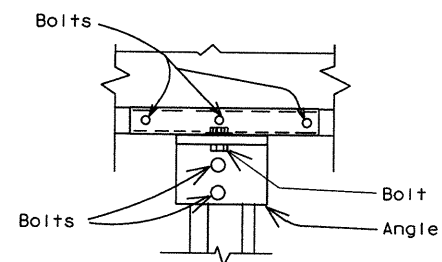
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REVISIONS	SAT	6	CSR 1739-2-12		20
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ATASCOSA	1739	02	012	FM 791

R = Radius
D = Diameter

All unit-less dimensions are millimeters

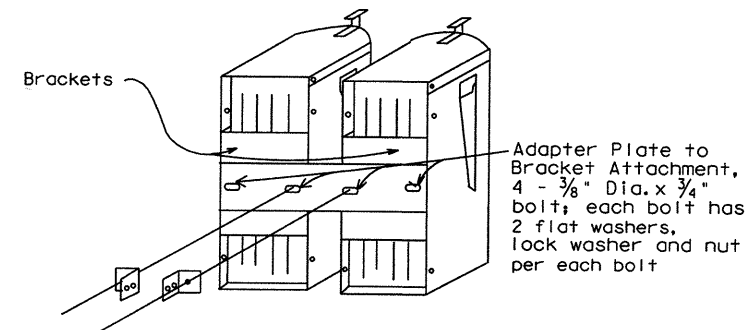


SINGLE AND DOUBLE MAILBOX MOUNT

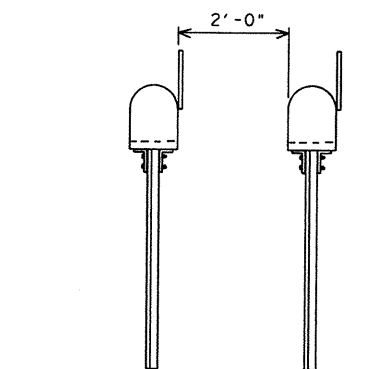


For bolt sizes see notes for
Standard Mailbox Attachment Details

**DETAIL A
SINGLE MAILBOX MOUNT**

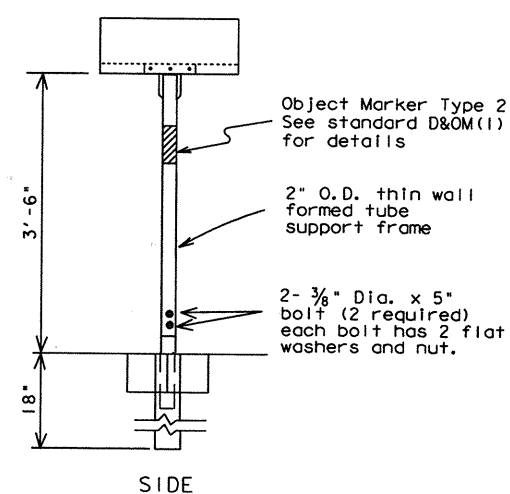
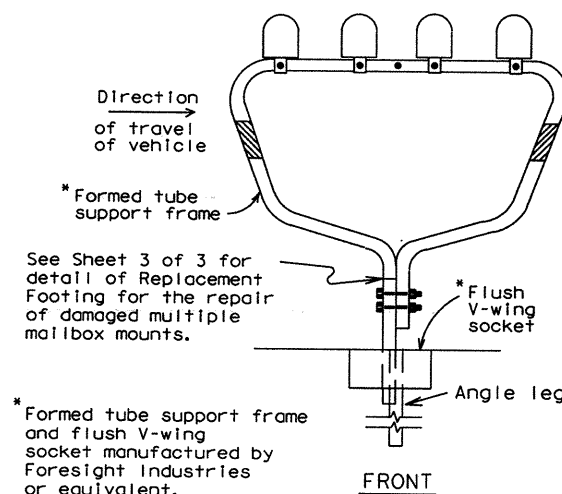


**DETAIL B
DOUBLE MAILBOX MOUNT**
(Not permitted for No. 2 Mailboxes)

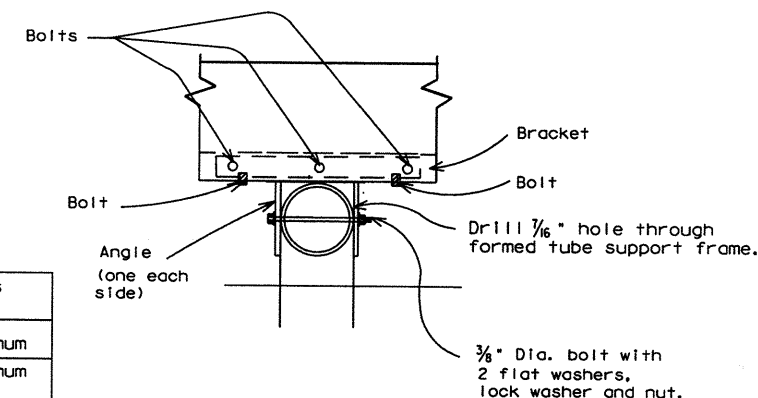


**TWO SINGLE
MAILBOX INSTALLATIONS**

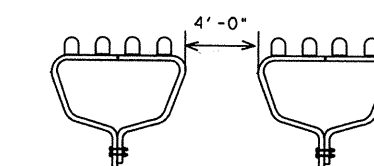
2' Clear Distance
between installations



Permissible Number of Mailboxes on Multiple Support:	
All Size No. 1	- 5 Maximum
Combination Various Sizes - with no more than 2 Size No. 2	- 4 Maximum
All Size No. 2	- 3 Maximum



SECTION B-B
For bolt sizes see notes for
Standard Mailbox Attachments Details



**TWO OR MORE MULTIPLE
MAILBOX INSTALLATIONS**

4' Clear Distance
between installations.

For General Notes See sheet 2 of 3.

See Sheet 3 of 3 for Adapter
Plate, Angle Bracket and Bracket
Extension Hardware Details.

Bracket may be installed with edge
down on size No. 1 mailboxes.

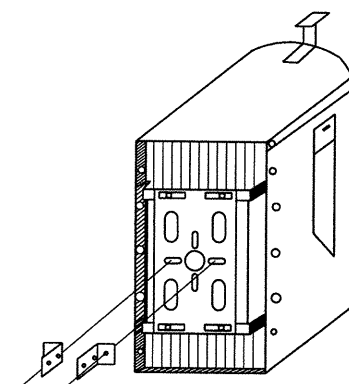
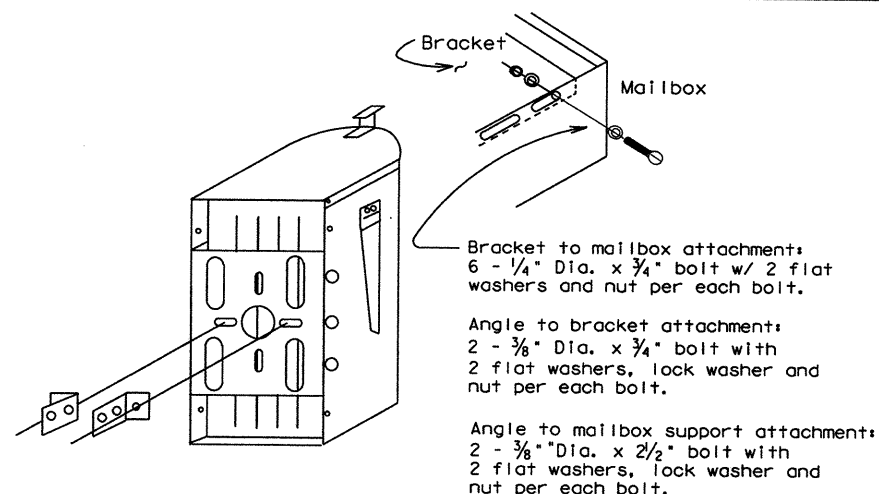
Texas Department of Transportation
Construction & Maintenance Division (Maintenance)

MAILBOX MOUNTING DETAILS

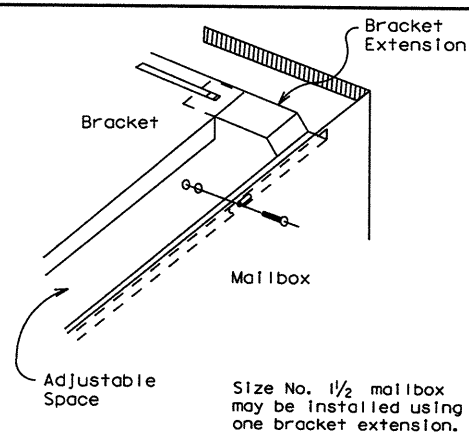
MB-96

Sheet 1 of 3

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REVISIONS		SAT	6	CSR 1739-2-12	21	
		COUNTY	CONTROL	SECT	JOB	HIGHWAY
		ATASCOSA	1739	02	012	FM 791



SIZE NO. 1 1/2 AND NO. 2 MAILBOX



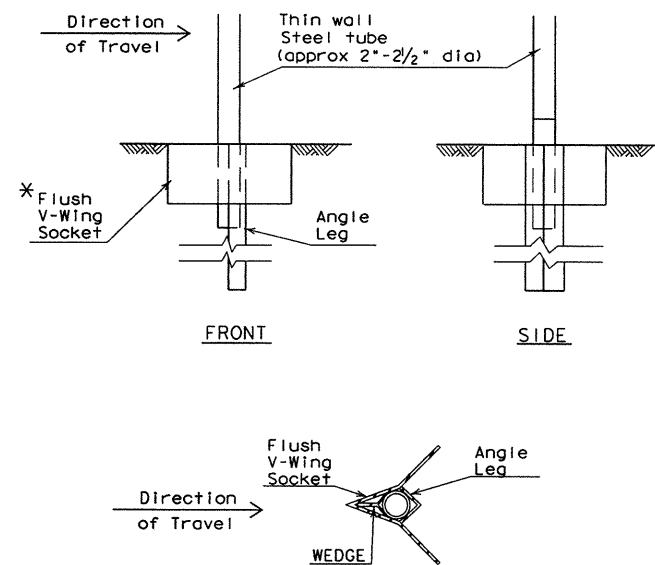
Bracket to mailbox attachment:
6 - 1/4" Dia. x 3/4" bolt w/2 flat
washers and nut per each bolt.

Bracket to bracket extension attachment:
2 - 1/4" Dia. x 3/4" carriage bolt w/
flat washer, lock washer and
nut per bolt (4 bolts required if 2
bracket extensions are used).

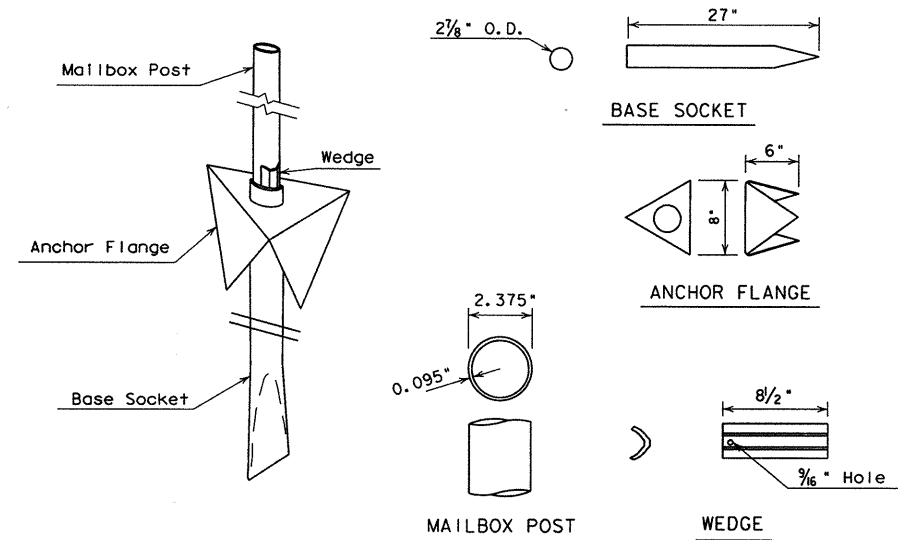
Angle to bracket attachment:
2 - 3/8" Dia. x 3/4" bolt w/2 flat
washers, lock washer and nut per each
bolt.

Angle to mailbox support attachment:
2 - 3/8" Dia. x 2 1/2" bolt w/2 flat
washers, lock washer, and nut per each
bolt.

STANDARD MAILBOX ATTACHMENT DETAILS



TYPE 1 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



All dimensions may be varied to fit 2 inch thin wall steel tube post if approved by Engineer

TYPE 2 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ANCHOR FLANGE

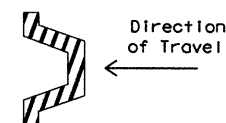
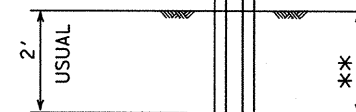
NOTES FOR TYPE 2 SUPPORT/FOUNDATION

1. The Base Socket is formed from 2 7/8" O.D. x 12 gauge galvanized pipe.
2. The Anchor Flange is formed from 12 gauge galvanized steel made to A-525. Only needed for soft soils as determined by the Engineer.
3. The Wedge is formed from 11 gauge galvanized steel made to ASTM A-525.
4. The Mailbox Post is 2.375" O. D. 0.095" thin wall steel tubing.
5. Steel Support Foundation unit shall be made from new material and shall be corrosion resistant. The unit shall be galvanized in accordance with ASTM designation A-123, A-525, G-90 or better. In addition, steel members of the support that are in direct contact with earth must be galvanized to ASTM Designation G-90 and coated with one mil of clear approved coating, or galvanized in accordance with ASTM Designation A-123.

GENERAL NOTES

1. Bolts, nuts, washers and other miscellaneous hardware shall be galvanized in accordance to ASTM Designation: A-153, Class C or D, or B-454, Class 40. All bolts shall meet ASTM designation A-307.
2. Foundation and post must be driven plumb. Recommended procedure is to drive post or foundation about 10"-12", stop and check for straightness, front to back, side to side. Make adjustments, continue to drive an additional 10"-12", repeat check, make final adjustments, complete installation.
3. The 2 lbs/ft. winged channel posts for the Type 3 support shall conform to the requirements of departmental materials specification D-9-7130.
4. Hardware for mounting mailboxes to support/foundation furnished by Foresight Industries or equivalent may be used when approved by the Engineer.
5. Where more than two mailboxes are to be mounted at one location a multiple mailbox mount shall be used.
6. The formed tube support frame for the multiple mailbox mount and the Type 1 mailbox support system are patented and manufactured by Foresight Products Inc.
7. Any support or foundation on these standards may be used for mounting single or double mailboxes.

Winged Channel Post
(2 lbs/ft)



DELINEATOR POST
2 lbs/ft

Recommended orientation to facilitate attachment of Object Marker.

TYPE 3 SUPPORT/FOUNDATION
DELINEATOR POST

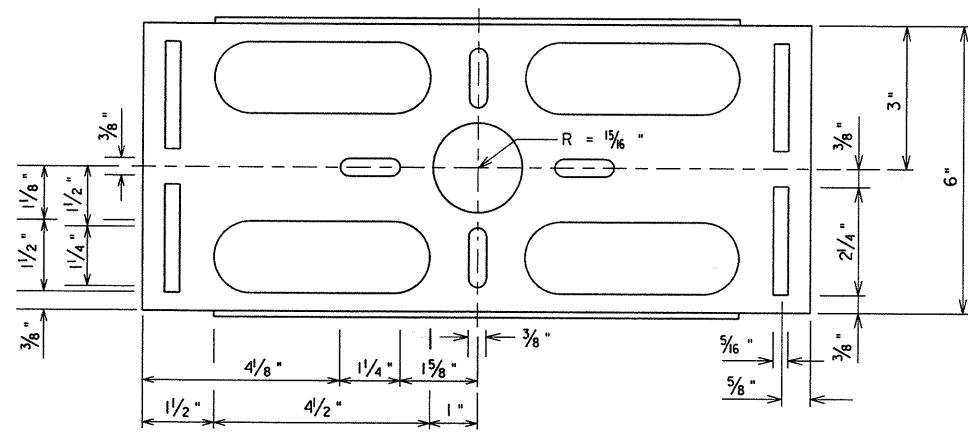
Texas Department of Transportation
Construction & Maintenance Division (Maintenance)

**MAILBOX SUPPORT/
FOUNDATION DETAILS**

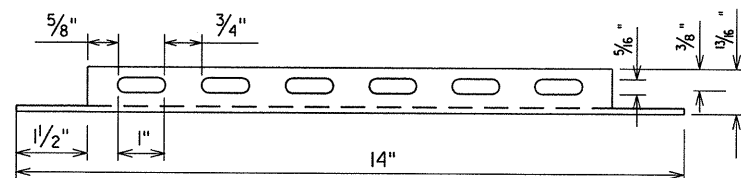
MB-96

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FILE#	MB96.DGN	DN#	CK#	DN#	CK#	NEG#
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		ATASCOSA	1739	02	012	FM 791

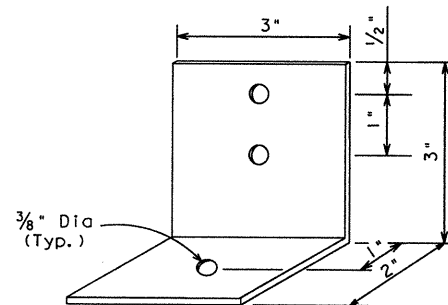


PLAN VIEW

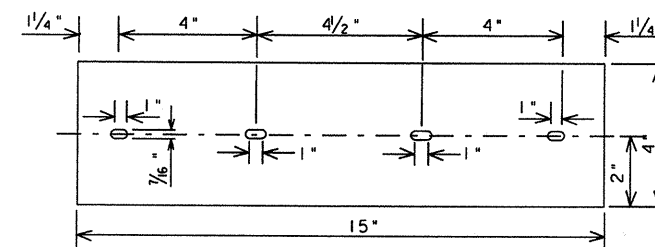


SIDE VIEW

BRACKET

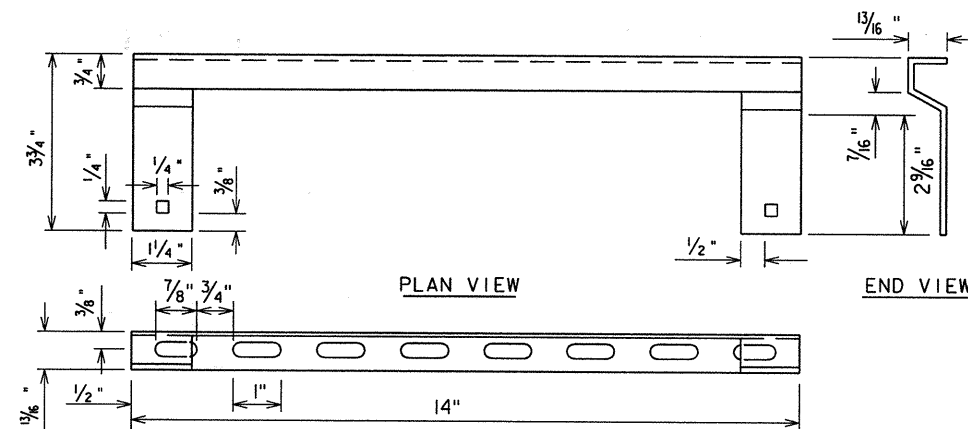


ANGLE



Holes Shall Have a Diameter of 1/16".

ADAPTER PLATE



PLAN VIEW

END VIEW

SIDE VIEW

BRACKET EXTENSION

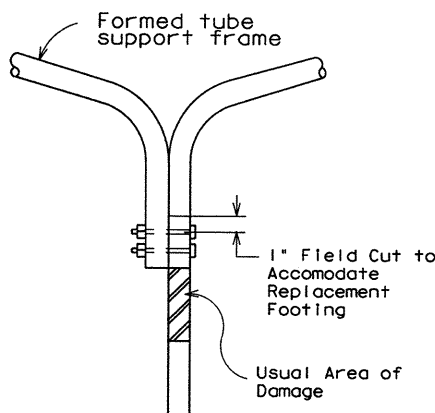
Object Marker Notes:

Object Markers for mailbox support should be the OM-2SR or OM-2VP (6" x 12"). Object markers shall conform to Department Material Specification D-9-8600. Attachment of Object Marker to support may be:

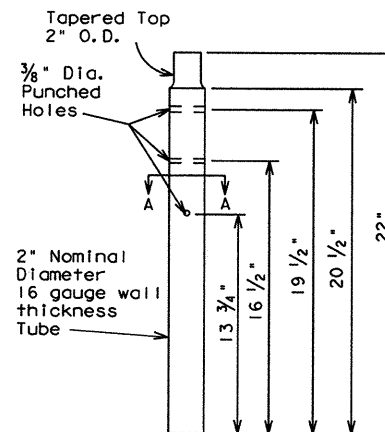
- 1) For round or tubular support, with pressure sensitive adhesive.
- 2) For winged channel support, with reflective material on aluminum or plastic substrate and attached by nut/bolt with washers or pop rivet.

The marker is to be placed between 6" and 8" below the bottom of the mailbox.

On two-way two lane highways, a marker is to be placed on each side of the support.



TYPICAL MULTIPLE MAILBOX MOUNT

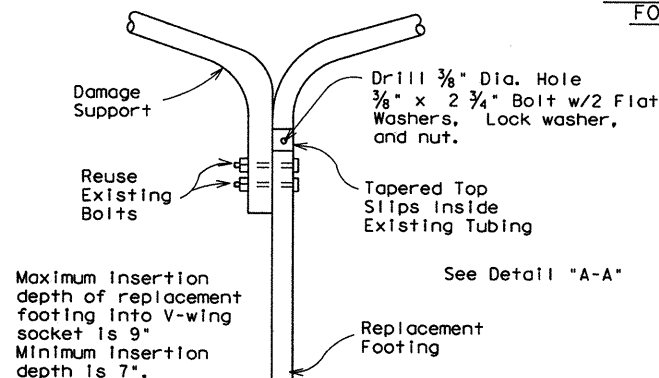


REPLACEMENT FOOTING

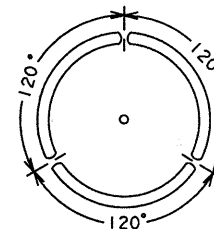
NOTES:

Only damaged multiple mailbox mounts having no visible damage other than to the portion of the footing that is to be discarded may be repaired.

Material for the repair footing is to be AISI-1008 hot rolled carbon steel. The unit shall be galvanized.



REPAIR DETAIL



DETAIL "A-A"

DETAIL OF REPLACEMENT FOOTING FOR REPAIR OF MULTIPLE MAILBOX MOUNT

Hardware for mounting mailboxes to support/foundation furnished by Foresight Industries or equivalent may be used when approved by the Engineer.

The bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet conforming to ASTM A-525(G-90).

The angle shall be constructed of 14 gauge steel sheet and the adapter plate shall be constructed of 12 gauge steel sheet. The angle and adapter plate shall be fabricated in accordance with ASTM A-123 or constructed of galvanized steel sheet conforming to ASTM A-525(G-90).

Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



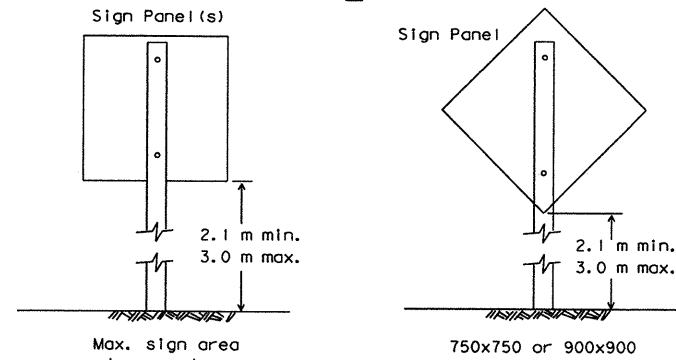
STANDARD MAILBOX HARDWARE

MB-96

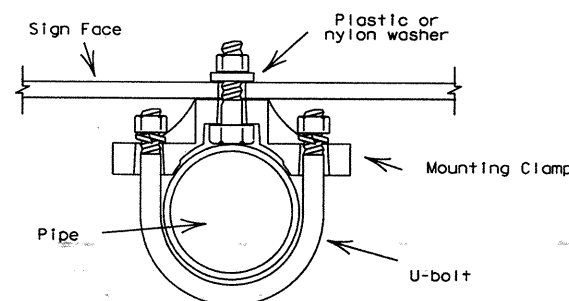
Sheet 3 of 3

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		COUNTY	CONTROL	SECT	JOB	HIGHWAY
		ATASCOSA	1739	02	012	FM 791

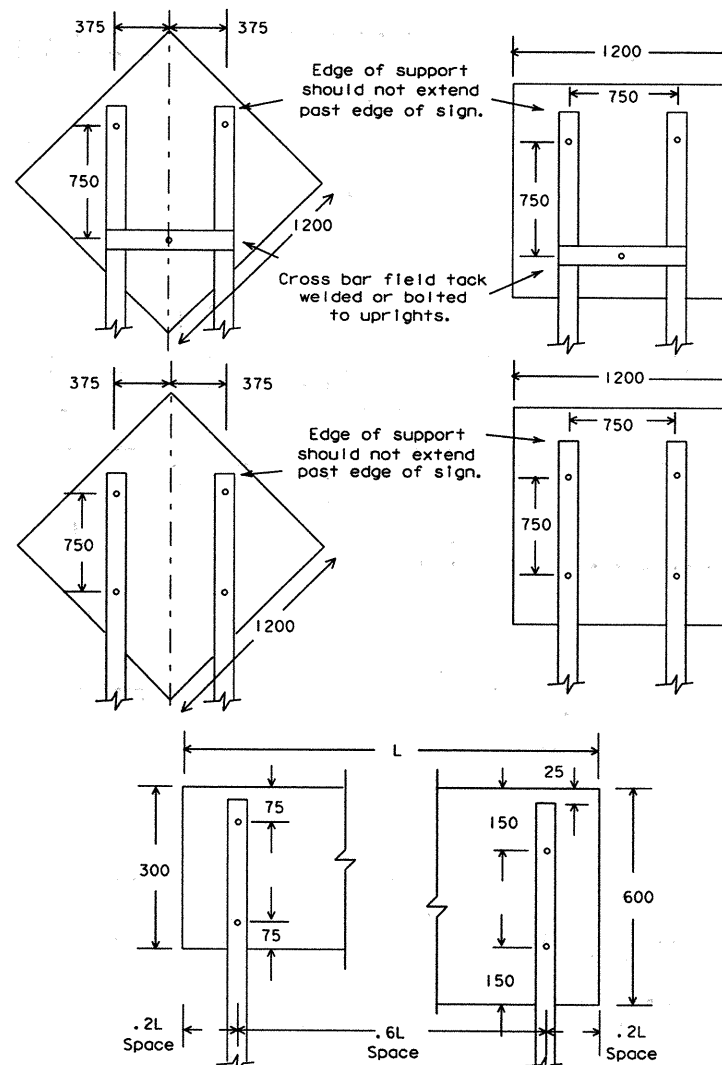
SINGLE POST INSTALLATION TYPE I



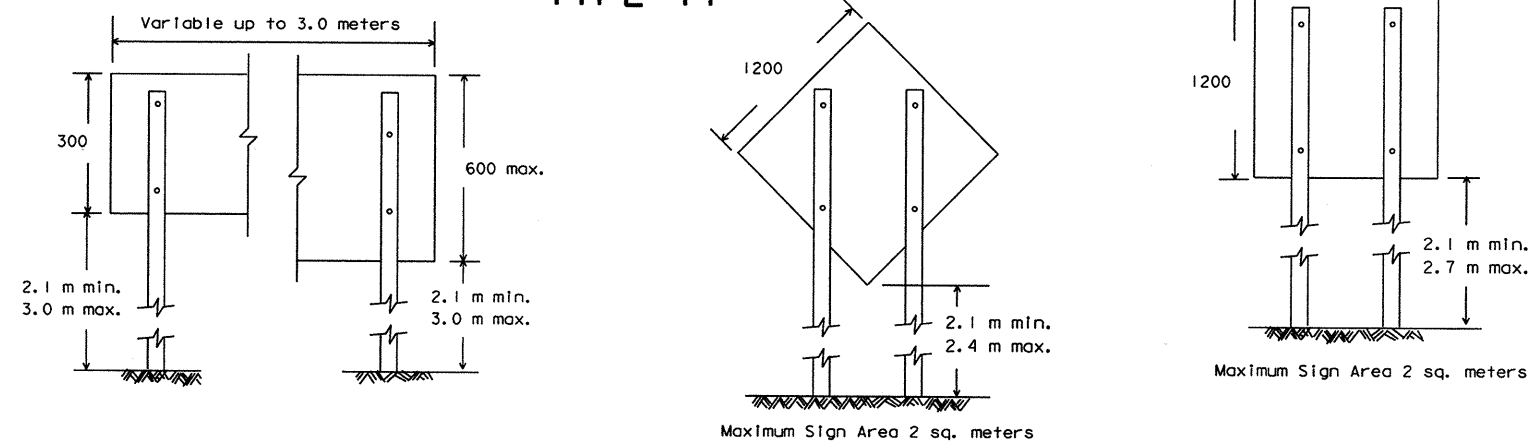
TYPICAL CLAMP DETAIL



SIGN ATTACHMENT DETAILS

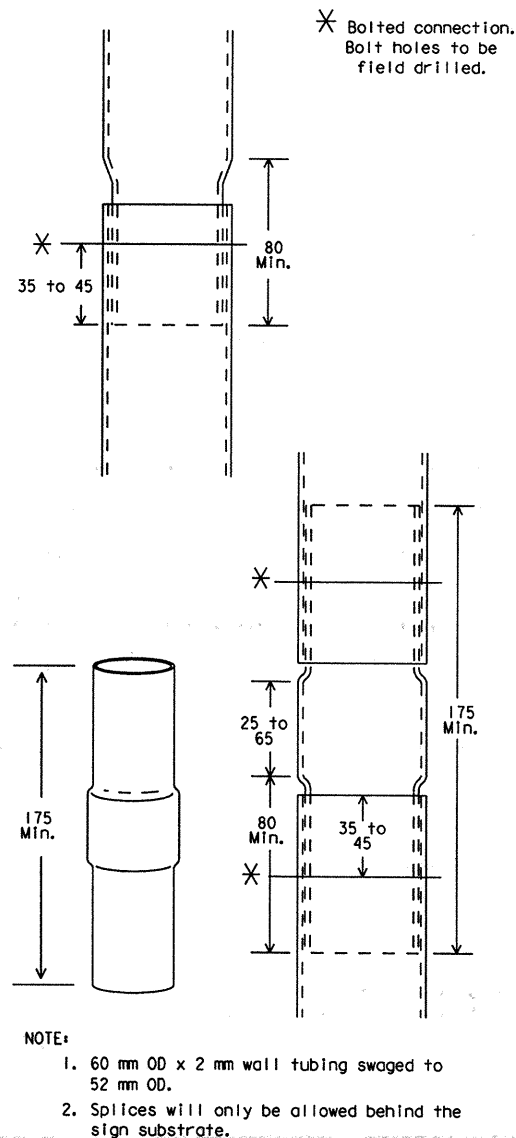


DOUBLE POST INSTALLATION TYPE II

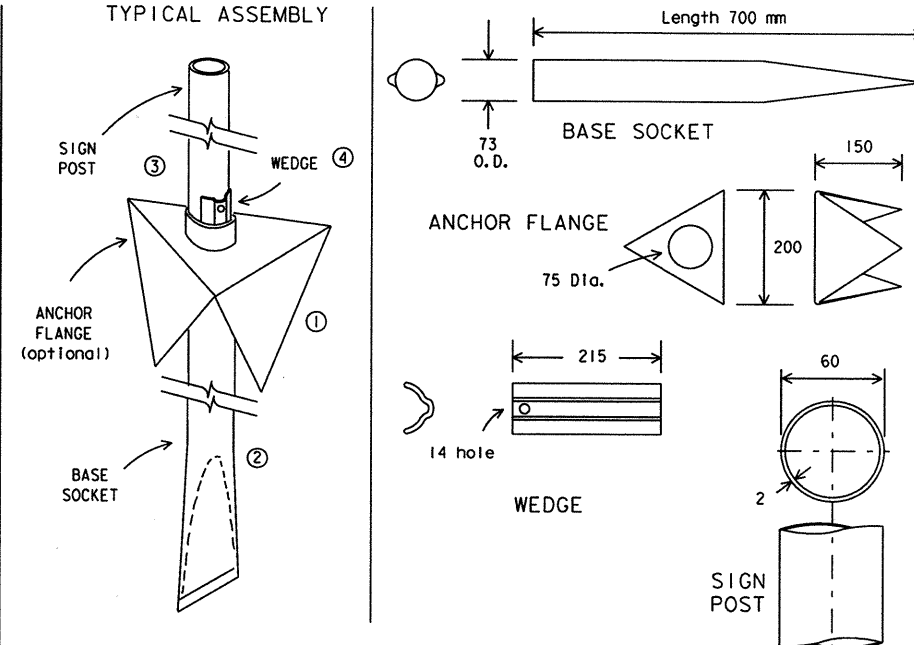


1. This sheet should be used with SMD(1-2) (M) and SMD(1-4) (M).
2. See standard sheet SMD(1-2) (M) and TMUTCD for horizontal and vertical clearances.
3. Type I or Type II supports may be used for various sign combinations and or shapes not to exceed the specified maximum sign area.
4. A cross bar between supports and/or behind sign may be used to prevent supports from leaning in areas of soft soils.
5. Cross bars may be made of winged channel post 1.67 kg/m, 2.98 kg/m or other similar material.
6. Educational plaques may be installed below parent signs or single supports for sign areas up to 0.84 sq. meter.

SPLICE TECHNIQUES THIN WALL TUBE



TYPICAL ASSEMBLY



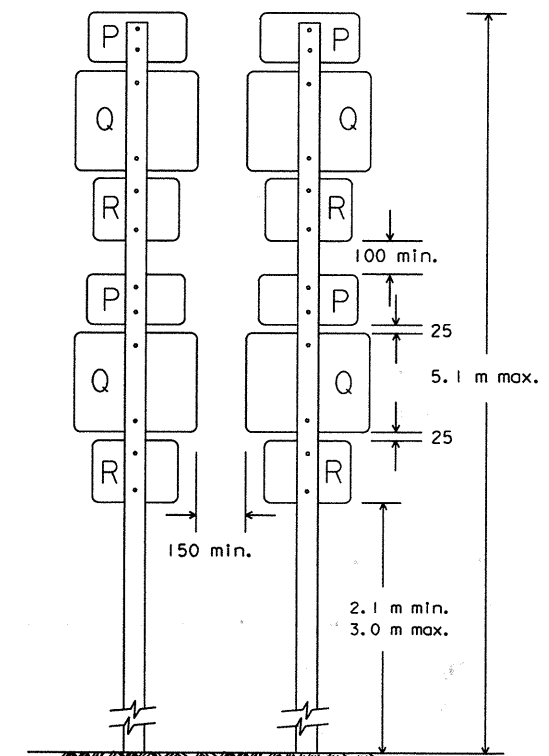
GENERAL NOTES FOR POS-LOC THIN WALL TUBE TYPE SIGN SUPPORT:

1. The BASE SOCKET is formed from 73 mm O.D. x 12 gauge galvanized pipe.
2. The ANCHOR FLANGE is formed from 12 gauge steel galvanized per ASTM A525. The ANCHOR FLANGE may only be needed for soft soils as determined by the Engineer.
3. The WEDGE is formed from 11 gauge steel galvanized per ASTM A525.
4. The SIGN POST is 60 mm O.D. x 2 mm thin wall steel tubing.
5. Steel Supports shall be made from new material and shall be corrosion resistant. Steel supports shall be galvanized in accordance with ASTM Designations A123 or A525 (G-90 or better).
6. Supports shall be straight within 4 mm per meter of length and shall have a smooth, uniform finish free from defects affecting strength or appearance. Any bolt holes and sheared ends shall be free from burrs. Bases of multisection supports shall not extend more than 125 mm above ground when installed.
7. Bolts, nuts, screws, washers and other miscellaneous hardware shall be galvanized in accordance to ASTM Designation: A153 Class C or D, or B695 Class 50.

RECOMMENDED ASSEMBLY PROCEDURE

- ① The Engineer may require the ANCHOR FLANGE to prevent leaning in softer soils.
- ② Drive the BASE SOCKET into the ground until the top of BASE SOCKET is approximately flush with ground level. A flanged tool placed on top of the BASE SOCKET may be helpful. BASE SOCKET MUST be driven plumb.
- ③ Insert SIGN POST into BASE SOCKET and align the sign face with the roadway.
- ④ Drive the WEDGE between the BASE SOCKET and SIGN POST, thereby locking the SIGN POST inside the BASE SOCKET.

ROUTE MARKER ASSEMBLY FOR TWO POST SUPPORT



- P1 = 600x300 Cardinal Direction Marker
 Q1 = 600x600 Interstate, U.S. or State Route Marker
 Q2 = 750x600 Interstate or U.S. Route Marker
 R = 525x375 Direction Arrow
 P2 = 750x375 Cardinal Direction Marker
 Q3 = 900x900 (2) digit Interstate Route Marker
 Q4 = 1125x900 (3) digit Interstate Route Marker

EQUIV. SIGN AREA SQ. METERS	EQUIV. SIGN AREA SQ. METERS
P1 = .093	P2 = .279
Q1 = .279	Q3 = .558
Q2 = .372	Q4 = .651
R = .093	

TYPICAL MARKER COMBINATIONS FOR EACH SUPPORT	EQUIV. AREA
2P1 + 2Q1 + 2R	.93 sq. meters
P1 + 2Q1 + 2R	.837 sq. meters
2Q1 + 2P1	.744 sq. meters
Q1 + R	.372 sq. meters
P2 + Q3	.837 sq. meters
P1 + Q1 + R	.465 sq. meters
P2 + Q4	.93 sq. meters

Marker combinations not to exceed .93 sq. meters for each support used.

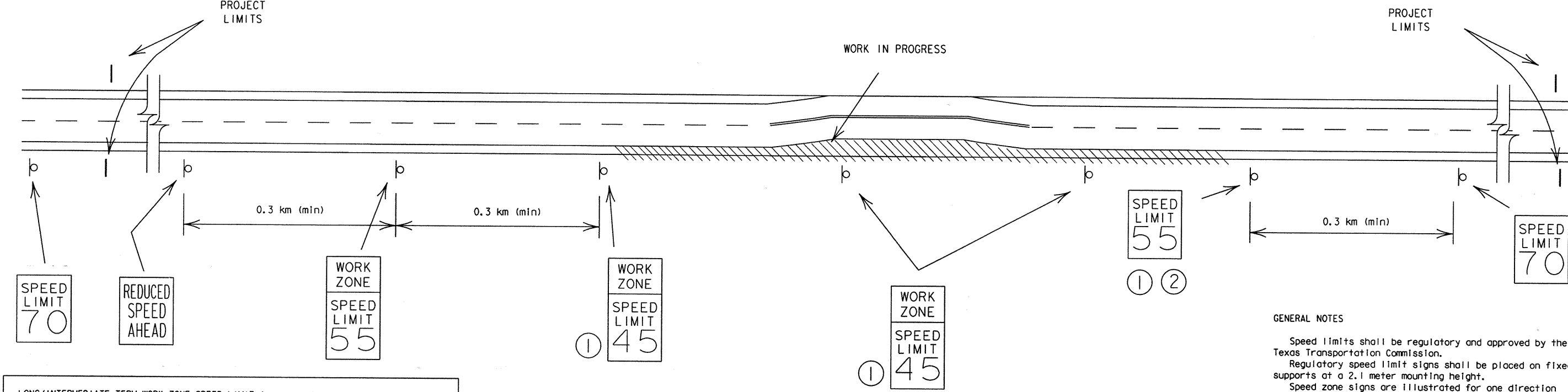
All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
 Traffic Operations Division

SIGN MOUNTING DETAILS- SMALL ROADSIDE SIGNS DRIVEABLE SUPPORT SMD(1-5)-97(M)

DATE: AUGUST 1995	DN-LR	CR-	DN-DN	CR-MT	NEG NO.
1-97	SAT	6	CSR 1739-2-12		24
	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
	ATASCOSA	1739	02	012	

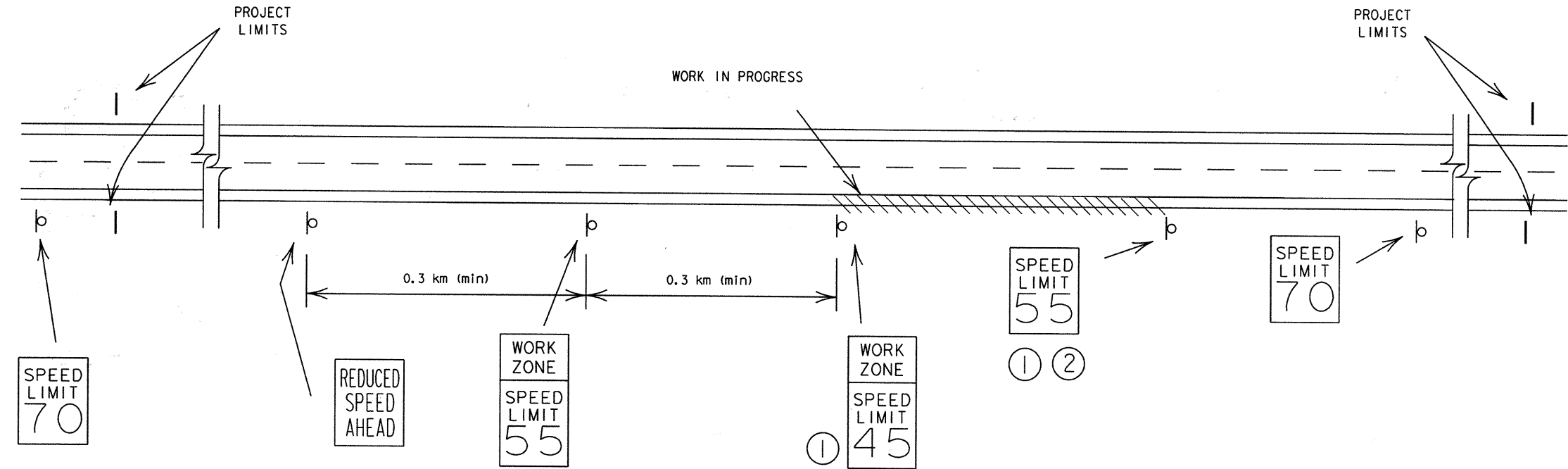
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS



LONG/INTERMEDIATE-TERM WORK ZONE SPEED LIMIT is a speed zone with reduced speed limit signs visible to the motorists at all times. Work activity in the area of reduced speed zone should be greater than 12 consecutive hours per day. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- a) rough road or damaged pavement surface
- b) substantial alteration of roadway geometrics (diversions), and/or
- c) detours

LONG/INTERMEDIATE-TERM WORK ZONE SPEED LIMIT



SHORT TERM WORK ZONE SPEED LIMIT is a speed zone with reduced speed limit signs visible to the motorists only when work activity is present. Work activity in the area of reduced speed should be less than 12 consecutive hours. When work activity is not present, signs should be covered with another sign, approved sign cover, or removed* from work area. Minimum mounting height of speed limit signs shall be 2.1 meters.

SHORT TERM WORK ZONE SPEED LIMIT

GENERAL NOTES

Speed limits shall be regulatory and approved by the Texas Transportation Commission.
Regulatory speed limit signs shall be placed on fixed supports at a 2.1 meter mounting height.
Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
Reduced speeds should only be posted in the vicinity of work being performed and not throughout the entire project.
Minimum length of a speed zone is 0.3 kilometer.
Frequency of speed limit signs should be:

40 mph and greater	0.3 to 3.2 kilometers
35 mph and less	0.3 to 1.6 kilometers

Regulatory speed limit signs shall have black legend and border on a white reflective background. See BC(6) (M) for WORK ZONE plaque sign detail.

- ① Locations of speed limit signs shall be shown in the plans or as directed by the Engineer.
- ② A regulatory speed limit sign should be placed at the end of each speed zone to indicate the end of the reduced speed.

Fabrication, erection and maintenance of REDUCED SPEED AHEAD sign, WORK ZONE plaque and SPEED LIMIT signs shall not be paid for directly, but shall be considered subsidiary to Item 502 Barricades, Signs and Traffic Handling.

*-WHEN SPEED ZONE SIGNS ARE REMOVED FROM WORK AREA, SIGNS AND SUPPORTS SHALL BE DISASSEMBLED AND REMOVED. TURNING OF SIGNS PARALLEL TO TRAFFIC WILL NOT BE ALLOWED.

All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS			
TEXAS DEPARTMENT OF TRANSPORTATION			
Traffic Operations Division			
WORK ZONE			
SPEED LIMIT			
WZ (SL) -97 (M)			
ORIG. DRAW. DATE: January 1997	DN: MT	CK: DN	REC. NO.:
REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT	SHEET
SAT	6	CSR 1739-2-12	25
COUNTY	CONTROL SECTION	JOB	HIGHWAY
ATASCOSA	1739 02	012	FM 791

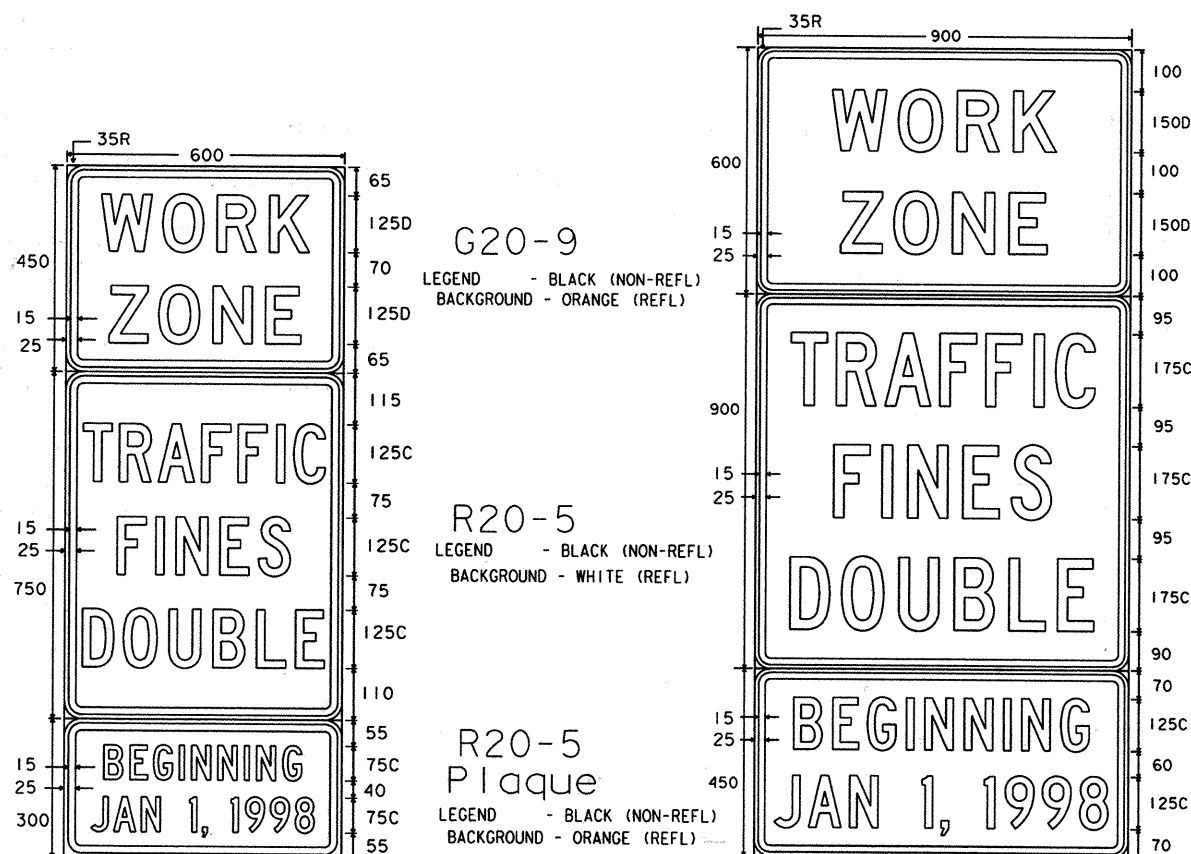
Diagram illustrating the placement of advance warning signs and project limit signs for road work on divided roadways.

The diagram shows three scenarios for road work placement:

- Scenario 1 (Top):** A single-lane road with one direction of travel. Advance warning signs (G20-1 or SG20-1) are placed (See BC sheets for X distance). Project limit signs (G20-6 or SG20-6) are placed at the end of the work zone.
- Scenario 2 (Middle):** A two-lane road with two directions of travel. Advance warning signs (G20-1 or SG20-1) are placed. Project limit signs (G20-2a or SG20-2a) are placed at the end of the work zone.
- Scenario 3 (Bottom):** A divided roadway with two directions of travel. Advance warning signs (G20-1 or SG20-1) are placed (450 m). Project limit signs (G20-6 or SG20-6) are placed at the end of the work zone.

The diagram also includes a table for the project limit signs:

NAME	ADDRESS	CITY	STATE	CONTRACTOR
ROAD WORK NEXT X MILES				



- ① OBSERVE WARNING SIGNS - STATE LAW is removed.
- ② TRAFFIC FINES DOUBLE sign is installed at previous position of ①.

AUTHORITY

HB 981, passed by the 75th Texas Legislature and signed by Governor George W. Bush in June, 1997, allows judicial authorities to double the fines for traffic violations in work zones. The legislation becomes effective January 1, 1998, and applies to all work zones along all state, county and city public roadways.

DISPLAY

The Traffic Fines Double Sign Assembly (TFDSA) shall consist of the WORK ZONE (G20-9) sign, TRAFFIC FINES DOUBLE (R20-5) sign, BEGINNING JAN. 1, 1998 plaque and supports. Orange warning flags may be attached at the top of the TFDSA as required by the Engineer.

After April 1, 1998, the BEGINNING JAN. 1, 1998 plaque should be removed and discarded; however, the WORK ZONE and TRAFFIC FINES DOUBLE signs shall remain for the duration of the project.

FABRICATION AND ERECTION

The TFDSA shall be fabricated and erected in accordance with Department and BC-97 Standards.

PLACEMENT

The TFDSA shall be placed as an integral part of the advance warning signs along major roadway approaches. Typical placement locations are illustrated. The preferred method is to remove and replace the OBSERVE WARNING SIGN-STATE LAW sign with the TFDSA. The Engineer may use alternate locations as necessary.

MEASUREMENT AND PAYMENT

Existing projects shall issue a Change Order to include TFDSA within the project. Removal of the OBSERVE WARNING SIGN-STATE LAW sign shall not be paid for directly, but shall be considered subsidiary to ITEM 502, "Barricades, Signs and Traffic Handling."


For purposes of measurement and payment, the WORK ZONE (G20-9) sign, TRAFFIC FINES DOUBLE (R20-5) sign, BEGINNING JAN. 1, 1998 plaque and supports shall be considered as components of the TFDISA. The TFDISA shall be measured and paid for by the each as small (SM) or large (LG) under ITEM 644, "Small Roadside Sign Assemblies" with the following bid codes:

0644	5036	SMALL	RDSD	SGN	ASSM	(TY SPL)	(DBL FN)	SM	EA
0644	5037	SMALL	RDSD	SGN	ASSM	(TY SPL)	(DBL FN)	LG	EA

EXPIRATION DATE

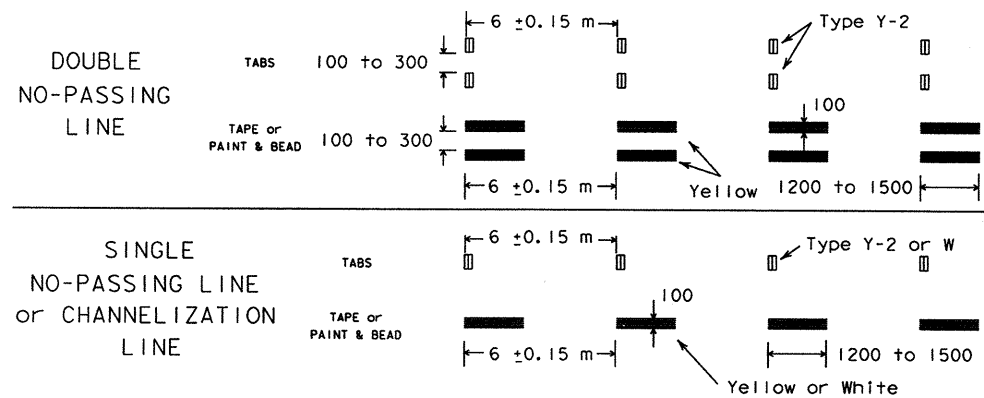
When the BC-98 Standards become effective (exact date to be announced), the TFDSA will become part of the BC-98 Standards and then be considered subsidiary to ITEM 502, "Barriacades, Signs and Traffic Handling." WZ (TFDS)-97 Standard will no longer be needed nor included in projects awarded after the effective date of the BC-98 Standards.

The metric dimensions shown on this sheet have been rounded, and should be considered equivalent to the English dimensions in the "1980 Standard Highway Sign Designs for Texas" manual. All dimensions are in millimeters unless otherwise noted.

		STANDARD PLANS TEXAS DEPARTMENT OF TRANSPORTATION <i>Traffic Operations Division</i>				
<h1 style="margin: 0;">TRAFFIC FINES</h1> <h1 style="margin: 0;">DOUBLE SIGNS</h1>						
<h2 style="margin: 0;">WZ (TFDS) - 97 (M)</h2>						
ORIG DRAW DATE: June 1997	DN: - MT	CK: -	DN: - DN	CK: - MT	REG NO.:	
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET	
	SAT	6	CSR 1739-2-12		26	
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ATASCOSA		1739	02	012	FM 791

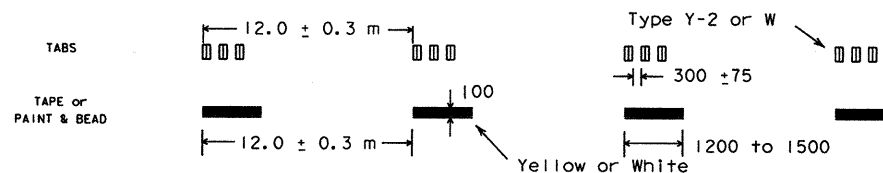
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES



BROKEN LINE

(FOR CENTER LINE OR LANE LINE.)



NOTES:

- Short term pavement markings may be paint and beads, prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans. Paint and beads shall not be used as removable short term pavement markings.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 6 mm, unless otherwise noted.
- Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without standard pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until standard pavement markings are in place. When the Contractor is responsible for placement of standard pavement markings, no segment of roadway shall remain without standard pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Standard pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the TMUTCD and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Standard pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one silver reflective surface with white body). Additional details may be found on BC(8).
- Tabs shall meet requirements of Department Material Specification D-9-8242.
- The body of Tabs shall consist of a base and vertical wall made of polyurethane, polyester elastomer or other material approved by the Materials and Tests Division.
- The reflective material shall be protected with an easily removable heat resistant transparent cover capable of withstanding and protecting reflective material from application of 205 degree Celsius asphalt. Stapling or clipping devices used to retain the protective cover shall not protrude through reflective material.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Materials and Tests Division to determine specification compliance.
 - Select five (5) tabs and submit to the following test. Affix five (5) tabs at 600 millimeter intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.
- When dry, tabs shall be visible for a minimum distance of 60 meters during normal daylight hours and when illuminated by automobile low-beam headlight at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 300 meters of line shall be missing or fail to meet the visual performance requirements of note 6.

REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

- Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on list of approved materials covered by Materials and Tests Divisions Specification: D-9-8241.

NON REMOVABLE - PREFABRICATED PAVEMENT MARKINGS (FOIL BACK)

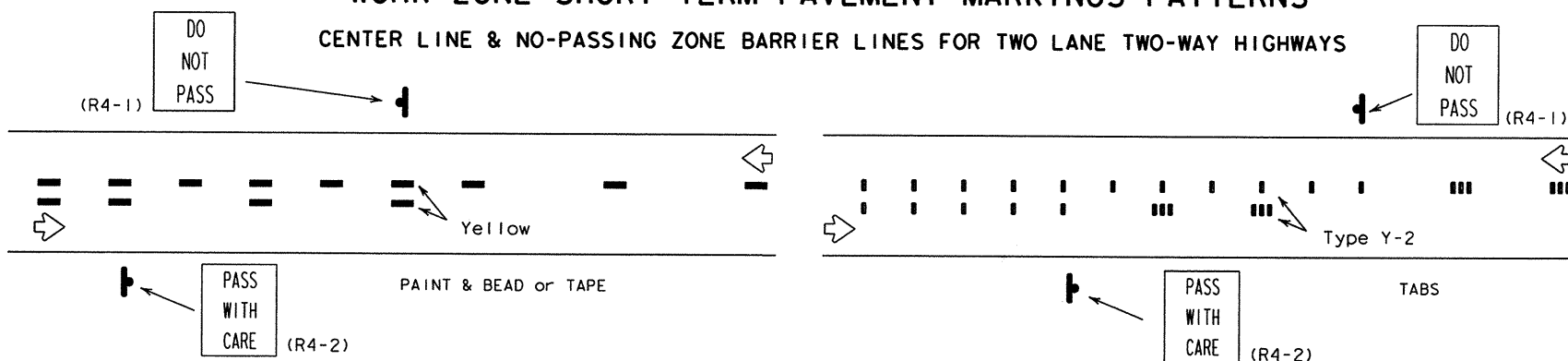
- Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on list of approved material covered by Specification TxDOT- 550-74-01.

RAISED PAVEMENT MARKERS

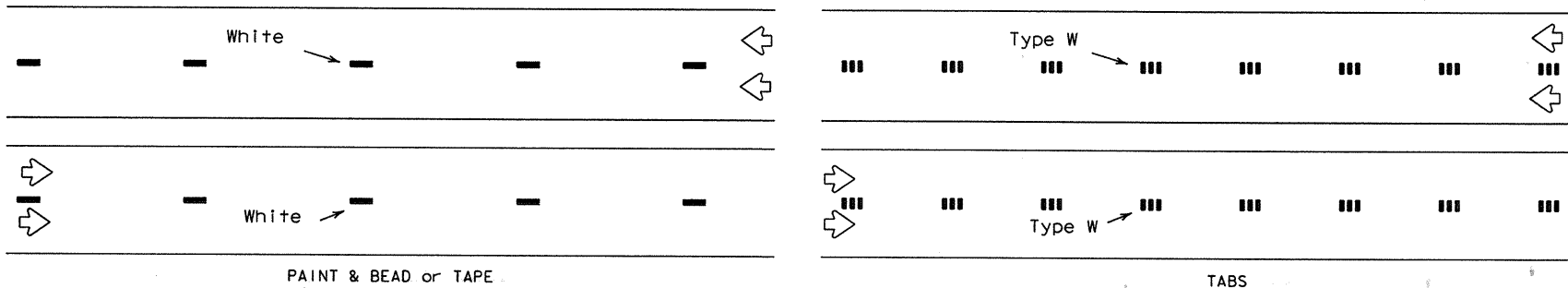
- Raised pavement markers used to supplement short term removable pavement markings shall meet the requirements of Item "RAISED PAVEMENT MARKERS".

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS

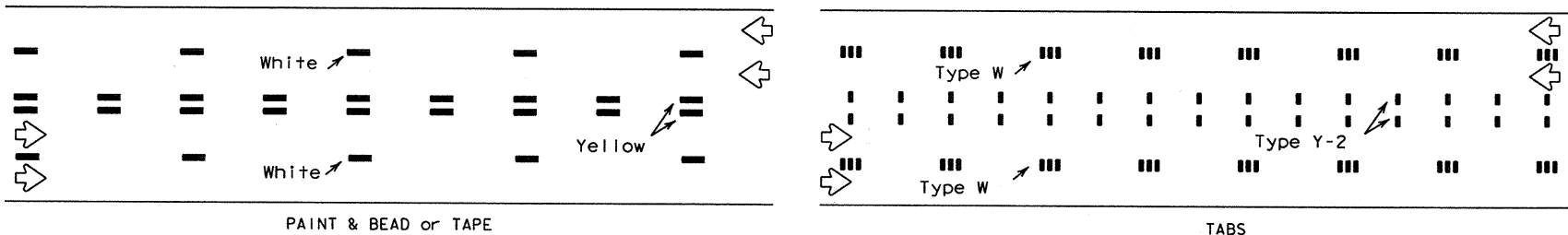
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



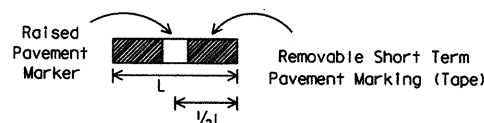
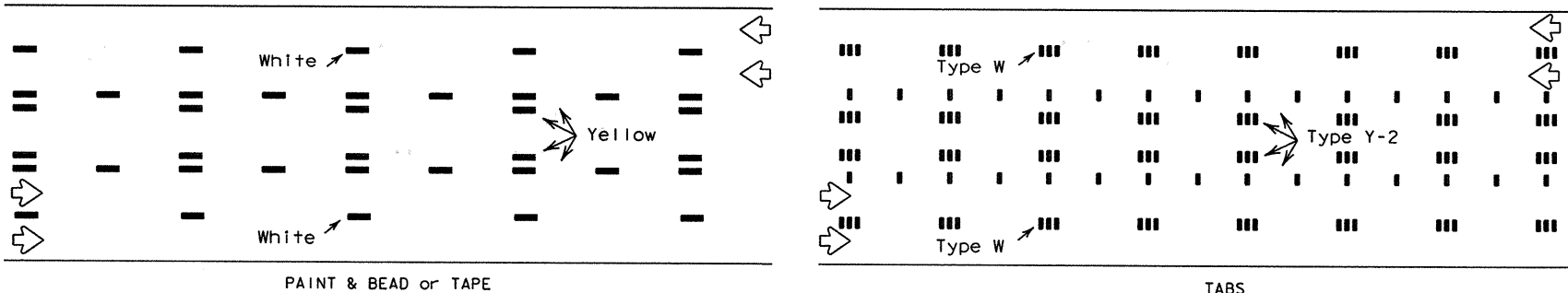
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATIONS	
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	D-9-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	D-9-8242
PAVEMENT MARKERS (REFLECTORIZED)	D-9-4200

All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ (STPM) - 97 (M)

ORIG. DRAW. DATE	REV.	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
APRIL 1992	1-97	SAT	6	CSR 1739-2-12	27
		COUNTY	CONTROL	SECTION	JOB
		ATASCOSA	1739	02	012 FM 791

GENERAL NOTES

1. Additional details may be provided in the plans concerning sign size, type of channelization devices, sequence of work details, and required measures needed to control traffic during changes in the sequence of work.
2. All traffic control devices shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD), and shall be maintained as directed by the Engineer. Additional guidelines for traffic control devices may be found in the TMUTCD.
3. All distance and spacing shown on the TCP(M) Standards are approximate.
4. All traffic control devices used during nighttime shall be reflectorized, illuminated from within or externally illuminated.
5. Additional information for fabrication, erection and usage of the following traffic control devices is found in the (TMUTCD) and Barricade and Construction (BC)(M) Standards:
- | | |
|---------------------|--|
| BARRICADES | BC(2)(M) and BC(3)(M) |
| CONES | BC(3)(M) |
| BARRIER DELINEATION | WZ(BD)(M) |
| DRUMS | BC(3)(M) |
| PAVEMENT MARKINGS | BC(9)(M) and BC(10)(M) |
| SIGNS | WZ(STPM)(M) or TCP(7-1)(M) if applicable
BC(1)(M), BC(2)(M), BC(4)(M), BC(5)(M), BC(6)(M), BC(7)(M), BC(8)(M) |
6. Work area operations are defined as follows:
Long-term stationary - Work that occupies a location more than 3 days.
Intermediate-term stationary - Work that occupies a location overnight to 3 days.
Short-term stationary - Daytime work that occupies a location from 1 to 12 hours.
Short Duration - Work that occupies a location up to 1 hour.
Mobile - Work that moves intermittently or continuously.

SIGNS

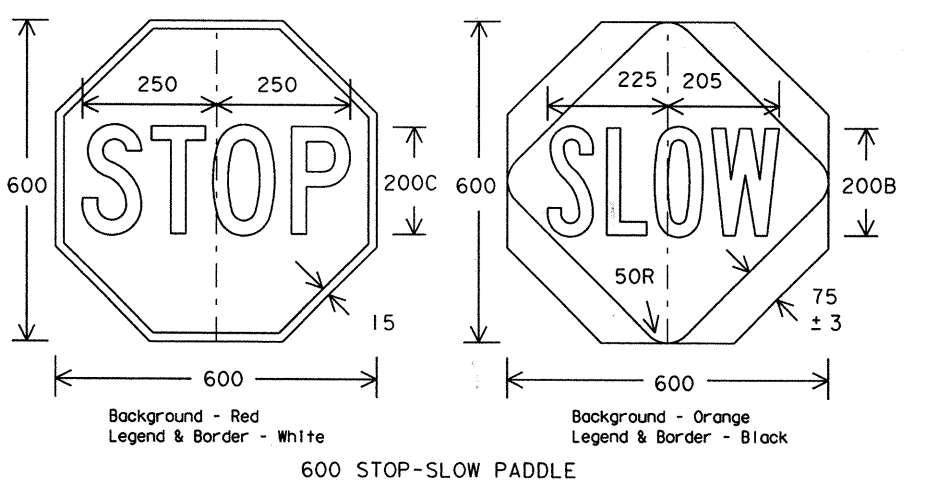
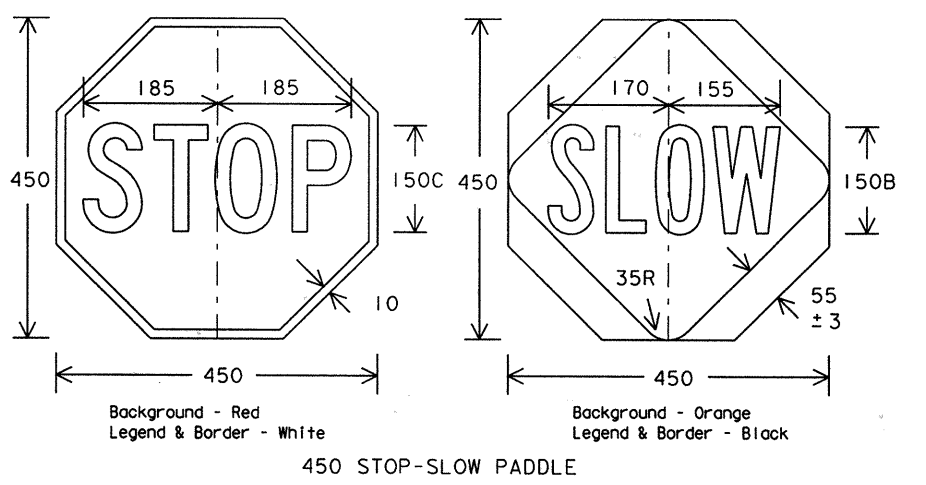
1. Selection of sign size should be based on Table 1.
2. Flashing warning lights, channelizing devices and/or flags may be required to call attention to the advance warning signs.
3. The words UTILITY, SIGNAL, BRIDGE, LIGHTING, SIGN, STREET or RAMP may be substituted for ROAD in all signs where applicable.
4. Advisory speed plaques, if used in conjunction with warning signs, speeds shall be determined in the field by the Engineer.
5. Regulatory signs shall be mounted at 2.1 meter minimum mounting height.
6. Warning signs may be mounted on the approved types of supports at the minimum mounting heights as stated on BC(4)(M):
- | | |
|----------|--------------|
| Portable | (300 mm) |
| Fixed | (2.1 meters) |

CHANNELIZING DEVICES

1. The maximum spacing between channelizing devices in a taper should be approximately equal in meters to the speed limit (S) x 0.3.
2. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 3 meters is recommended. The 3 meter channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
3. Channelizing device spacing should be reduced when placed on curves, hills or next to potential hazards. At least three channelizing devices should be in view at all times.
4. MERGING taper (lane closure with merging traffic) =L
SHIFTING taper (traffic diverted to adjacent lane) =1/2 L
SHOULDER taper (shoulder closed to traffic) =1/3 L
5. DOWNSTREAM taper usage is optional. When used it should be 30 meter minimum length per lane. Devices should be spaced at approximately 6 meter intervals.
6. ONE LANE, TWO-WAY taper is intended for a portion of the road controlled by STOP, YIELD traffic signals or flagger and used alternately by traffic in each direction. It should be 15-30 meter length with devices spaced at approximately 6 meter intervals.
7. The selection of channelizing devices should be based on degree of hazard associated with the work area. The selection priority of channelizing devices, in the order of increasing hazard recognition are:
- portable mounted delineators
 - 700 mm cones
 - 900 mm or more tubular cones
 - portable mounted vertical panels
 - 900 mm cones
 - Type I Barricade
 - Type II Barricade
 - plastic drums
 - MBGF, fixed or barrel mounted
 - concrete traffic barrier
8. Arrow panels used on two-way, two-lane roadways should flash in the four corner CAUTION display.

FLAGGER CONTROL

1. Flagger shall wear orange safety vests. Flaggers should wear safety hats to provide a professional image to the motorist and to protect the head from flying objects.
2. STOP/SLOW paddles shall be used as the primary method to control traffic by flaggers. The STOP/SLOW paddle minimum size is 450x450 mm. Paddles may be attached to a 1500 mm staff for easier handling. The larger size (600x600 mm) should be attached to a 1500 mm staff.
3. The 600 mm paddle should be used when the posted speed is 45 MPH or greater.
4. Flags are only used to control traffic for emergency situations and the STOP/SLOW paddles are not available. Flags shall be 600 mm square and securely fastened to a staff approximately 900 mm long.
5. Flaggers may carry hand held air horns to alert workers of an emergency condition.
6. For one lane two-way traffic control, one or more flaggers should be used where traffic density, road conditions or motorists' sight distance justify their use. If flaggers are used, the taper should be reduced to 15-30 meters. When flaggers are used to control traffic, the FLAGGER symbol sign (FCW20-7a) shall be used. When flaggers are used, the BE PREPARED TO STOP sign (CW20-7b) should be used. Proper spacing between signs should be maintained.
7. When flaggers are used to draw attention to traffic control devices, the FLAGGER symbol sign should be used. Proper spacing should be maintained.
8. When more than one flagger is used, a chief flagger should be assigned the responsibility of making decisions concerning traffic control.
9. The contractor has the option to use a flashing Stop/Slow Paddle conforming to Departmental Materials Specification D-9-8620.



WORKER SAFETY

1. Workers exposed to traffic should wear orange safety vests.
2. Work vehicles within 9 meters of the traveled way should have strobe lights or rotating beacons in use.
3. When work vehicles are used to shadow the work area, the vehicle should be parked 9 meters or more from the work area, transmission in gear (or set in PARK), emergency brake set on, and front wheels turned away from work area. Shadow vehicles shall be equipped with truck mounted attenuators.
4. Inactive work vehicles, including workers' private vehicles, should be parked away from the work area and as close to the right-of-way line as possible.

Table 1

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

Roadway Classification	Posted Speed	Sign Spacing "X"	Long-term Stationary Or Intermediate-term Stationary Approach Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW21 Series		Other Warning Signs
			Standard mm	Minimum mm	Standard mm	Minimum mm	
Conven.	30	40	1200x1200	900x900 ↓ Use Standard Size	750x750 or 900x900 ↓ 1200x1200	600x600 or 750x750 ↓ Use Standard Size	750x750 or 900x900 ↓ 1200x1200
	35	50					
	40	75					
	45	100					
	50	120					
	55	150 ²					
	60	180 ²					
	65	210 ²					
	70	240 ²					
Exp or Frwy	*	* ³	↓		**	**	**

- * For typical sign spacings on expressways and freeways, see TMUTCD typical application diagrams or TCP(M) Standard Sheets.
- ▲ Minimum distance from work area to 1st Advance Warning sign and/or distance between each additional sign.
- ** Smaller sign sizes may be used where sign designs have not been included in the "Standard Highway Sign Design for Texas" manual.
- General Notes:
1. Special or larger size signs may be used as may be necessary.
2. Distance between signs should be increased as required to have 460 meters advance warning.
3. Distance between signs should be increased as required to have 800 meters or more advance warning.
4. For use only on secondary roads or city streets where speeds are low.
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
7. Where two sizes are listed, see sign size listing in TMUTCD, Appendix A for proper size.

All dimensions are in millimeters unless otherwise noted.

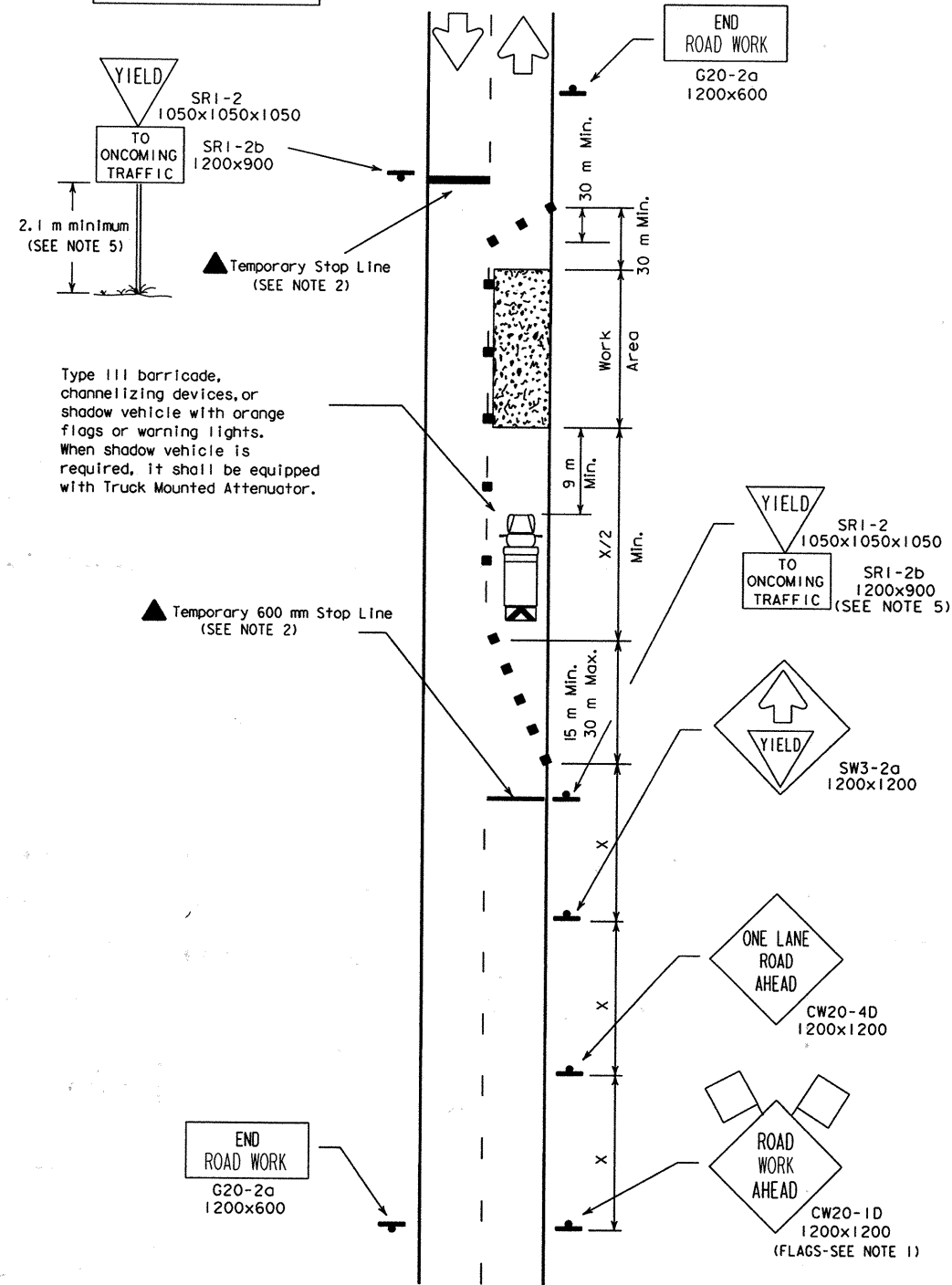
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP NOTES-97(M)

ORIG DRAW DATE: February 1994	DN- MT	CR-	DN- DN	CR- DM	REG NO.
REVISIONS					
8-95	SAT	6	CSR	1739-2-12	28
1-97					
COUNTY		CONTROL	SECTION	JOB	HIGHWAY
ATASCOSA		1739	02	012	FM 791

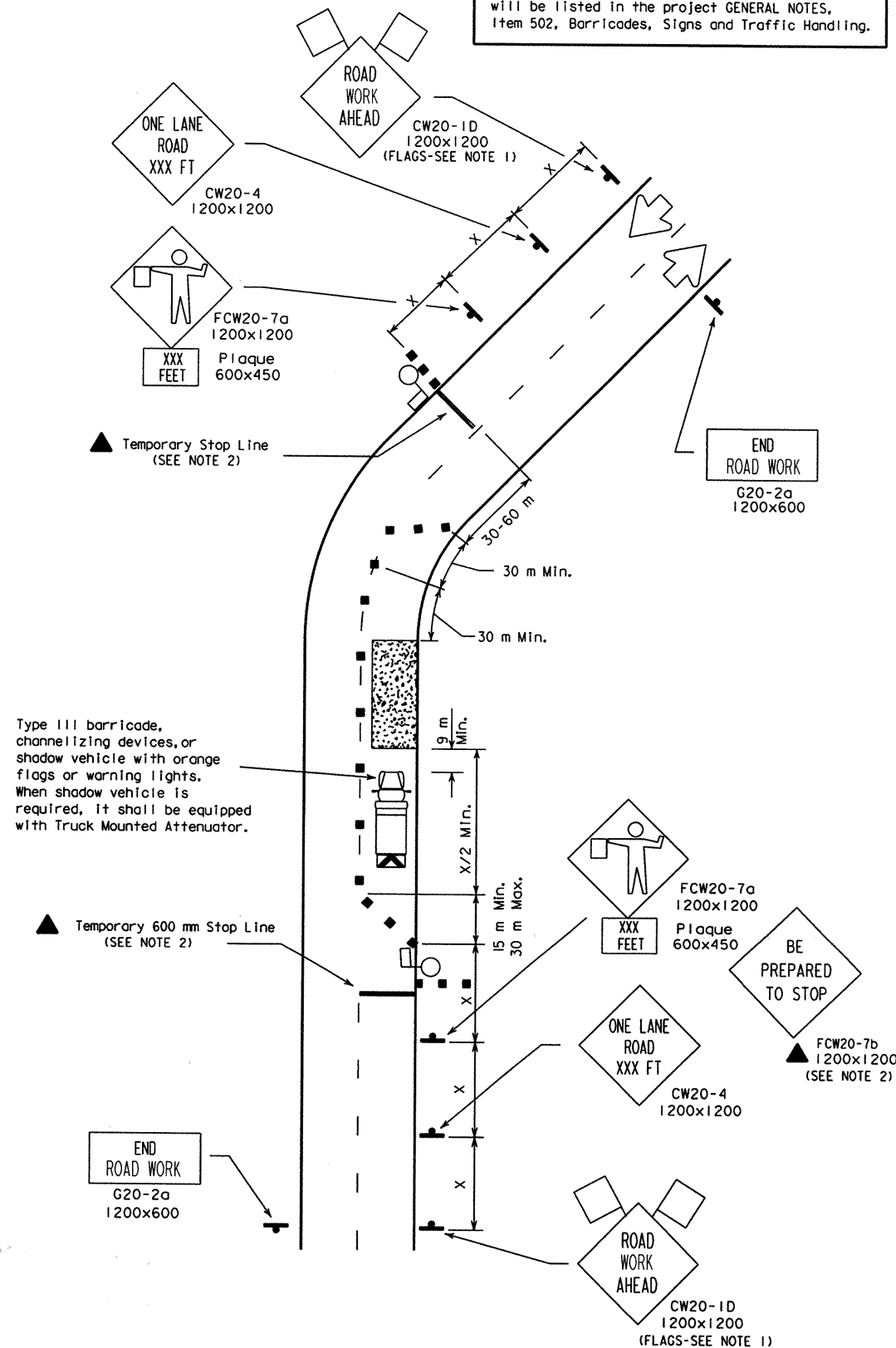
Warning Sign Sequence
in Opposite Direction
same as below.



TCP (2-2a) (M)

2-Lane Roadway Without Paved Shoulders
One Lane Closed
Adequate Field of View

The requirement for shadow vehicles
will be listed in the project GENERAL NOTES,
Item 502, Barricades, Signs and Traffic Handling.



TCP (2-2b) (M)

2-Lane Roadway Without Paved Shoulders
One Lane Closed
Inadequate Field of View

LEGEND

- Type III Barricade ■ Channelizing Devices □ Flag
Heavy Work Vehicle Truck Mounted Attenuator
Trailer Mounted Flashing Arrow Panel Portable Changeable Message Sign
Flagger Sign Post

Posted Speed %	Formula	Minimum Desirable Taper Lengths %			Suggested Maximum Spacing of Device		Minimum Sign Spacing X Distance (meters)
		3.0 m Offset (meters)	3.3 m Offset (meters)	3.6 m Offset (meters)	On a Taper (meters)	On a Tangent (meters)	
30	$L = \frac{WS^2}{60}$	45	50	55	9	15-20	40
35		65	70	75	10	20-25	50
40		80	90	100	12	25-30	75
45	L=WS	135	150	165	13	25-30	100
50		150	165	180	15	30-35	120
55		165	185	200	16	35-40	150
60		180	200	220	18	40-45	* 180
65		195	215	235	19	40-50	* 210
70		210	235	255	20	40-50	* 240

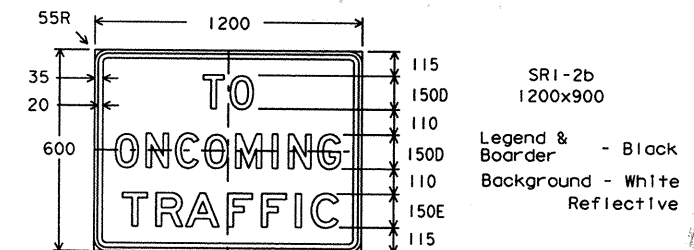
* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper (m) W=Width of Offset (m) S=Posted Speed (MPH)

TYPICAL USAGE:				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES:

- Flags attached to signs are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- The BE PREPARED TO STOP sign may be installed after the ONE LANE ROAD XXX FT sign, but proper sign spacing shall be maintained.
- YIELD sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work zones should be no longer than one half city block. In rural areas on roadways with less than 4000 ADT and work areas should be no longer than 120 meters.
- YIELD TO ONCOMING TRAFFIC sign shall be placed on a support at a 2.1 m minimum mounting height.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work area should be based on the ability of flaggers to communicate.
- See TCP (NOTES) (M), CHANNELIZING DEVICES, note #2 for recommended 3 meter channelizing device spacing.



All dimensions are in millimeters unless otherwise noted.



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP (2-2) - 97 (M)

DATE: December 1985	BY: LR	CHK: MT	DN: DN	CHK: MT	REC NO: 1
REVISIONS	STATE DISTRICT	FEDERAL PROJECT	SHEET		
4-90	SAT	6	CSR 1739-2-12	29	
2-94	COUNTY		CONTROL SECTION	JOB	HIGHWAY
8-95	ATASCOSA		1739 02	012	FM 791
1-97					

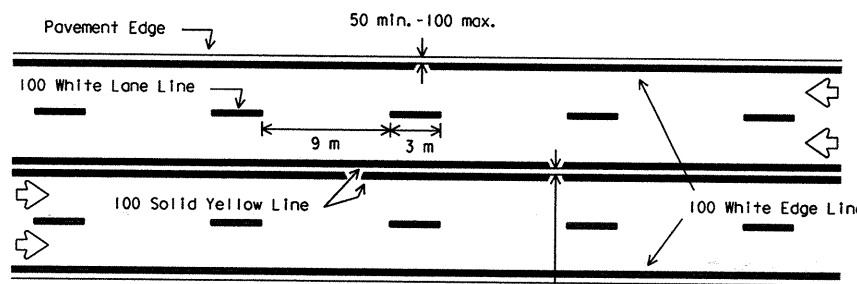
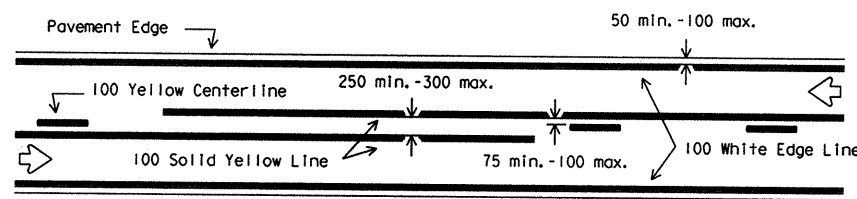
The diagram illustrates two road cross-sections with various lane markings and dimensions. The top cross-section shows a road with a 100 Yellow Center Line, a 100 White Edge Line, and a 50 min. - 100 max. dimension. The bottom cross-section shows a road with a 100 Yellow Center Line, a 100 Solid Yellow Line, a 100 White Edge Line, and dimensions of 50 min. - 100 max. and 75 min. - 100 max. Arrows indicate the direction of traffic flow.

Top Cross-Section:

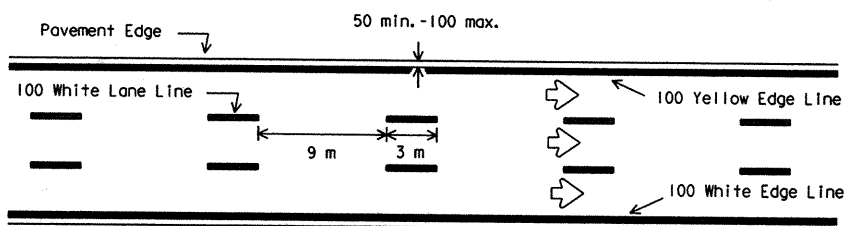
- Pavement Edge:** Indicated by an arrow pointing to the top edge of the road.
- 100 Yellow Center Line:** Indicated by an arrow pointing to the center line.
- 100 White Edge Line:** Indicated by an arrow pointing to the edge line.
- Dimensions:**
 - 50 min. - 100 max. (Distance from center line to edge line)
 - 9 m (Distance from center line to edge line)
 - 3 m (Distance from center line to edge line)

Bottom Cross-Section:

- Pavement Edge:** Indicated by an arrow pointing to the top edge of the road.
- 100 Yellow Center Line:** Indicated by an arrow pointing to the center line.
- 100 Solid Yellow Line:** Indicated by an arrow pointing to the solid yellow line.
- 100 White Edge Line:** Indicated by an arrow pointing to the edge line.
- Dimensions:**
 - 50 min. - 100 max. (Distance from center line to edge line)
 - 75 min. - 100 max. (Distance from solid yellow line to edge line)
 - 9 m (Distance from center line to edge line)
 - 3 m (Distance from center line to edge line)



75 min.-100 usual
300 max. (for pavement
widths greater than
14.4 m only)



1.2 m min.
9 m max.

50 m.
100 max.

STOP LINES
Solid White
Width: 300 min.
600 max.

EDGE LINE
100 Solid White

CENTERLINE *
100 Yellow
Length: 3 m
Gap: 9 m

* OPTIONAL
100 Solid Yellow line
on approaches to
intersections
(150 m min.)

WIDTH ≥ 6.6 m

1.2 m min.
9 m max.

WIDTH $4.8 \text{ m} \leq W < 6.6 \text{ m}$

The diagram illustrates a T-intersection with the following lane markings and dimensions:

- Top Approach Lane:**
 - 100 White Edge Line
 - 100 Yellow Edge Line
- Left Approach Lane:**
 - 100 Yellow Edge Line
 - 200 Solid White Channelizing Line
 - 100 White Edge Line
- Through Lane (Right Side):**
 - 100 White Lane Line
 - 100 Solid Yellow Line
 - 300-600 White Stop Line
 - 100 White Lane Line
- Dimensions:**
 - 250 min. - 300 max. (Width of the intersection area)
 - 600 min. (Length of the approach lane)

100 or 200 White

100 Minimum 300 Desirable

Bridge Rail or Face of Curb

50

50

50

White Jiggle Bar Tile (Optional)

Raised Pavement Marker or Traffic Button Type I-C

300 min.

45°

100 or 200 White

6 m-7.5 m

15 m min.

(L)

Less than 7.9 m

Lane width greater than or equal to 3.3 m

White edgeline

MEDIAN (median width)

NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 150 m long.
2. 300 mm crosshatching is optional. See plan quantities.
3. For taper length (L) see Table I.

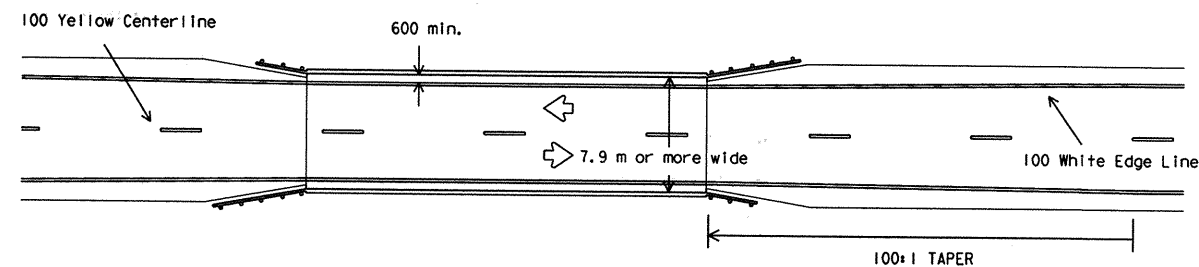


TABLE I
TYPICAL TRANSITION LENGTHS
(METERS)

		Minimum Desirable Taper Lengths **		
Posted Speed *	Formula	3.0 m Offset	3.3 m Offset	3.6 m Offset
30	$L = \frac{WS^2}{60}$	45	50	55
35		65	70	75
40		80	90	100
45	L = WS	135	150	165
50		150	165	180
55		165	185	200
60		180	200	220
65		195	215	235

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. (MPH)
 **Taper lengths have been rounded.

All dimensions are in millimeters unless otherwise noted.


STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

PM (I) - 95A (M)

ORIG DATE DATA		NOV. 1978		DN - LR	CK -	DN - DN	CK -	REC NO. 1	
REVIEWS				STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
2-82	7-92			SAT	6	CSR 1739-2-12			30
11-85	8-95								
7-86	1-96								
4-92									
					COUNTY	CONTROL	SECTION	JOB	HIGHWAY
					ATASCOSA	1739	02	012	FM 791

DISCLAIMER: The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

CK: CW
DW: DN
CK: MT

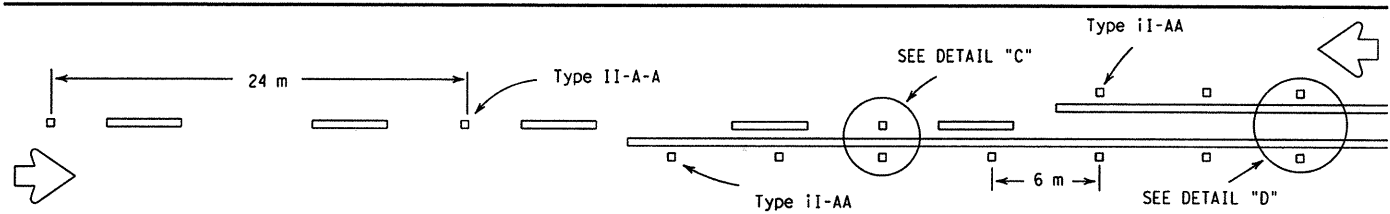
ACC: d58hp1c/usc/d580504
FILE: 1718120212232456627282333132
33435583788394041243444544748
435051526354555657585960616263

Raised pavement markers supplement painted lines

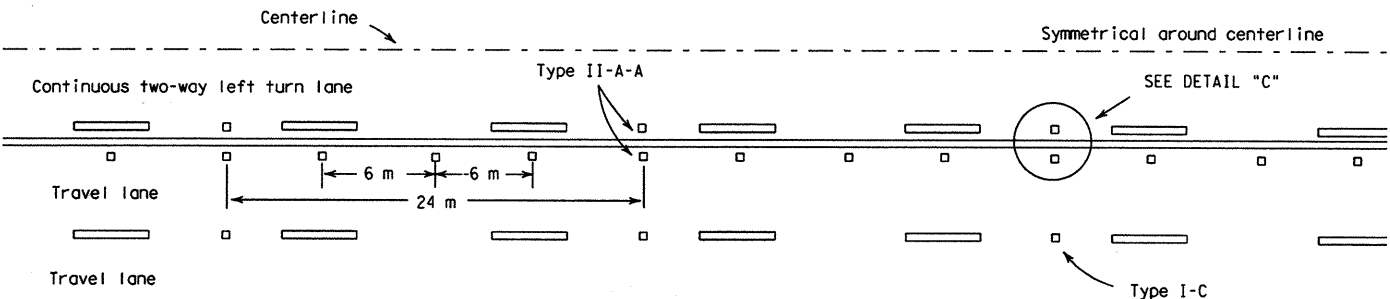
CENTERLINE & NO-PASSING LINES
FOR TWO LANE TWO-WAY HIGHWAYS

Raised pavement markers as vehicle positioning guides

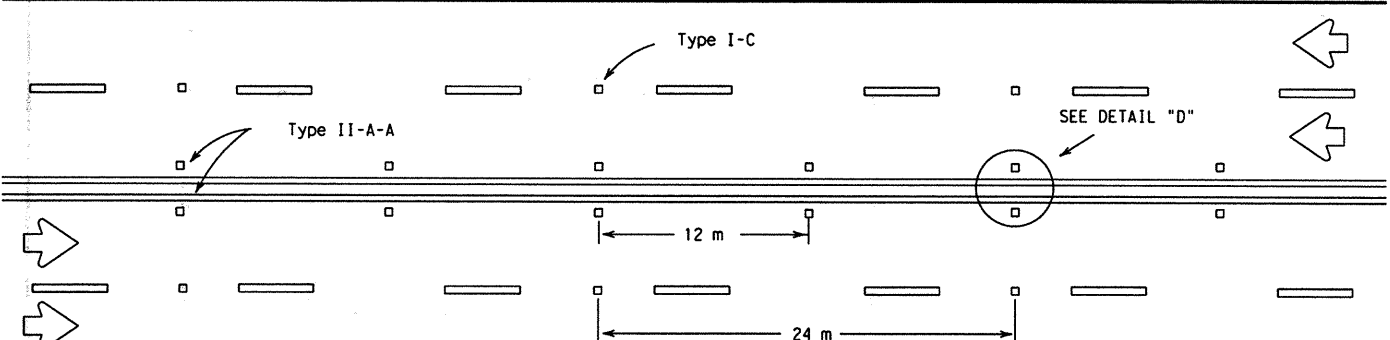
CONDITION TWO (2) SHALL BE USED
FOR ROADWAYS 6.7m OR LESS IN WIDTH.



CONDITION ONE (1)

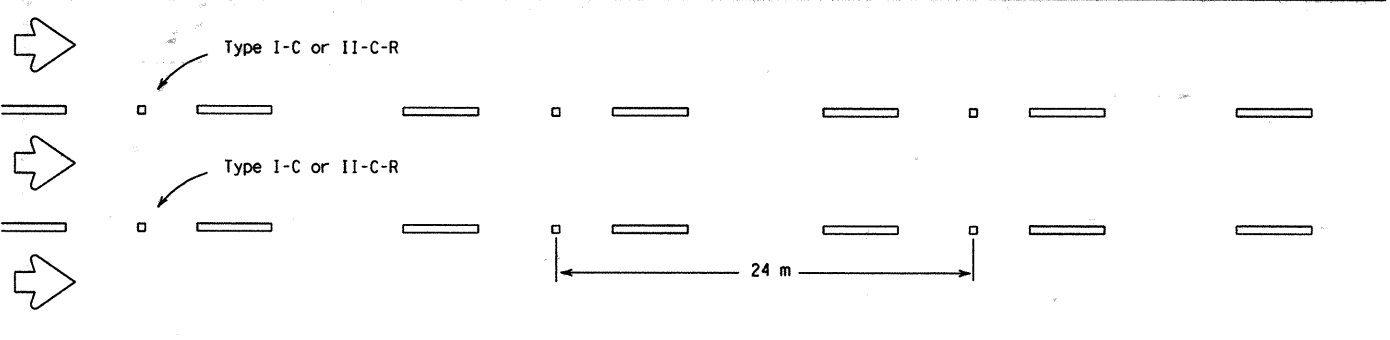


TWO-WAY LEFT TURN LANE



CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 24 m centers.

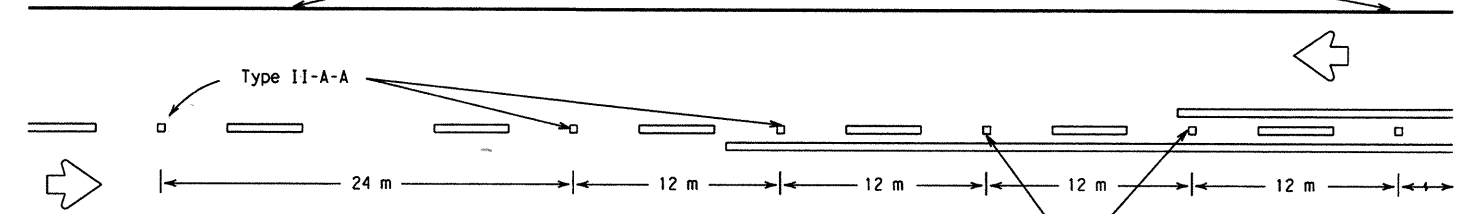


LANE LINES
FOR ONE-WAY ROADWAY

Raised pavement markers Type II-C-R, clear face toward normal traffic and red face toward wrong-way traffic, shall be spaced on 24 m centers.

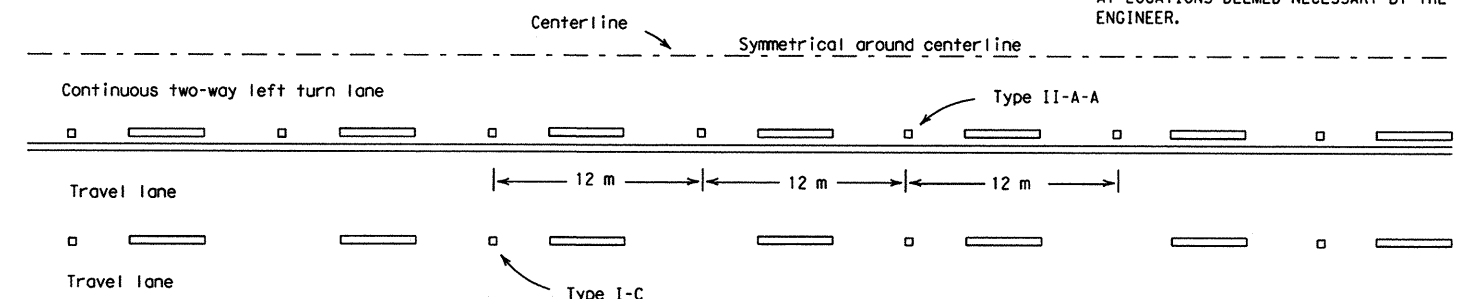
As required by the Engineer or shown elsewhere in the plans, Type II-C-R markers shall be placed on 12 m centers for the below listed conditions:

1. Vertical curves with grades over 2 percent and less than 300 m long,
2. horizontal curves,
3. or continuously illuminated sections.



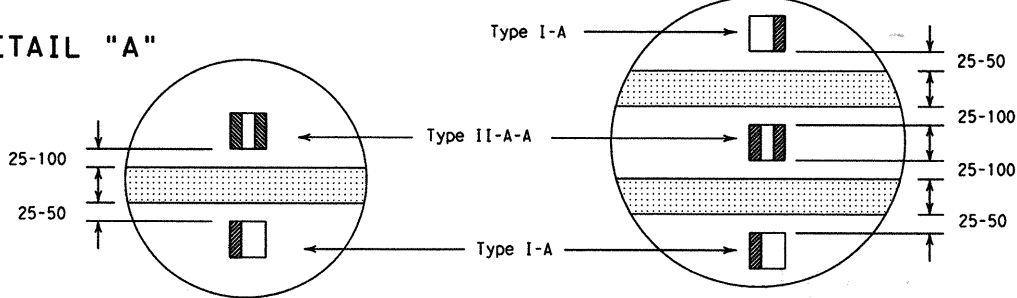
CONDITION TWO (2)

TYPE II-A-A MAY BE PLACED AT 12-METER O.C. ON THE CENTER LINE ADJACENT TO NO PASSING ZONES FOR EITHER LANE AND AT LOCATIONS DEEMED NECESSARY BY THE ENGINEER.



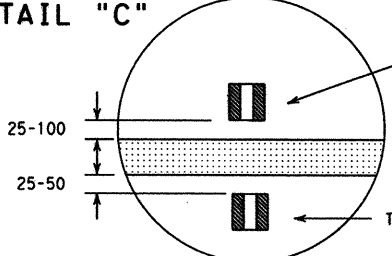
TWO-WAY LEFT TURN LANE

DETAIL "A"

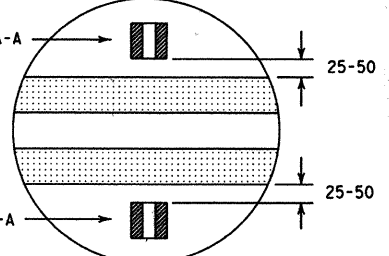


DETAIL "B"

DETAIL "C"



DETAIL "D"



GENERAL NOTES:

All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.

First and last raised pavement markers in a no-passing line are to be located adjacent to either the midpoint of the gap of the centerline marking or the midpoint of the broken line of the centerline marking.

On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

All dimensions are in millimeters unless otherwise noted.

Added condition two (2) for roadways 6.7m or less in width.

TEXAS DEPARTMENT OF TRANSPORTATION

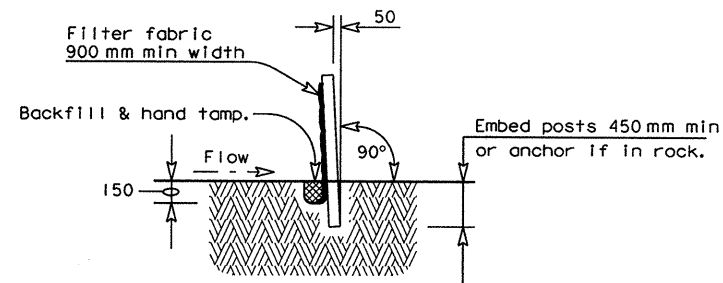
TYPICAL STANDARD
PAVEMENT MARKINGS
WITH RAISED
PAVEMENT MARKERS
SAN ANTONIO DISTRICT STANDARD

PM(2) - 95 (M)

ORIG. DRAW. DATE: APRIL 1977	DWG. - L.R.	CK: -	DWG. - DN	CK: -	NEG. NO. 1
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET	
2-82 4-92	SA	6	CSR 1739-2-12	31	
11-85 10-95	COUNTY		CONTROL SECTION JOB	HIGHWAY	
7-86	ATASCOSA		1739 02 012 FM 79		
10-86					

REV. 10/96

Matrix



SECTION A-A

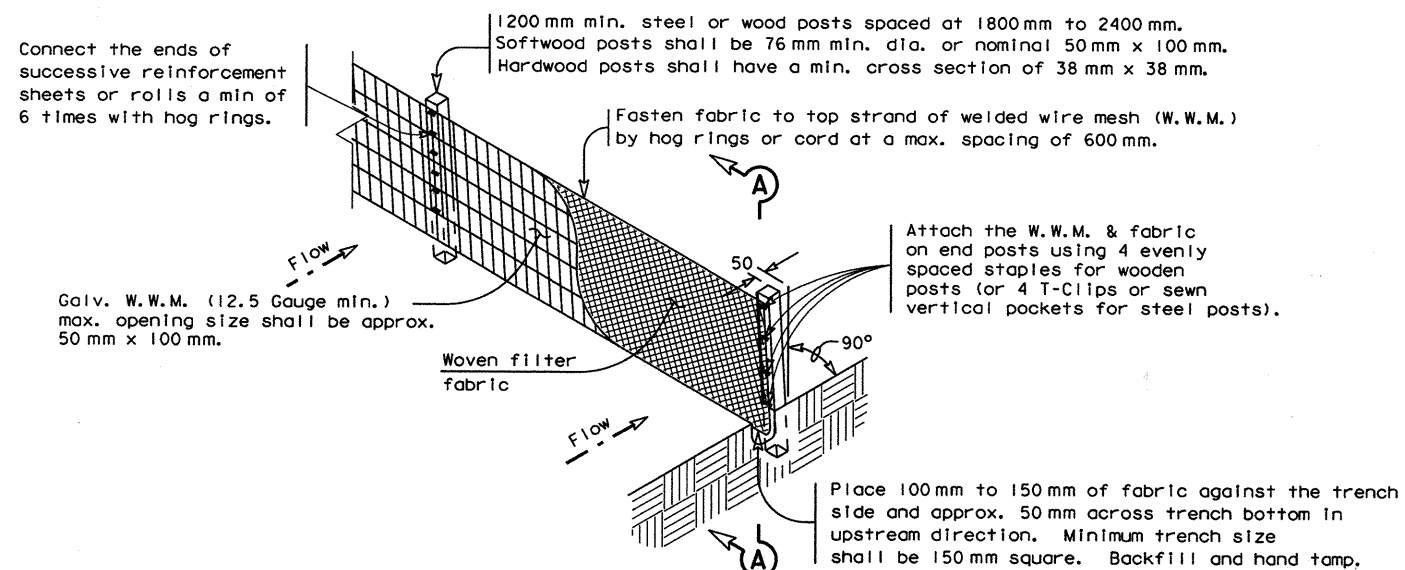
SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

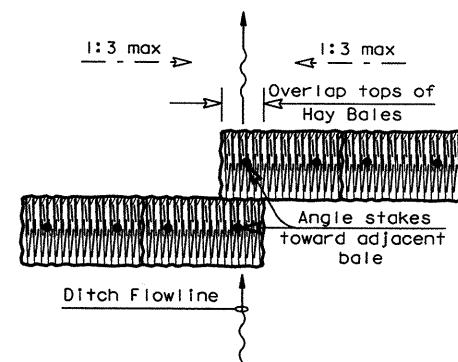
Sediment control fence should be sized to filter a max. flow through rate of $0.07 \frac{\text{m}^3/\text{sec}}{\text{m}^2}$. Sediment control fence is not recommended to control erosion from a drainage area larger than .8 ha.

GENERAL NOTES

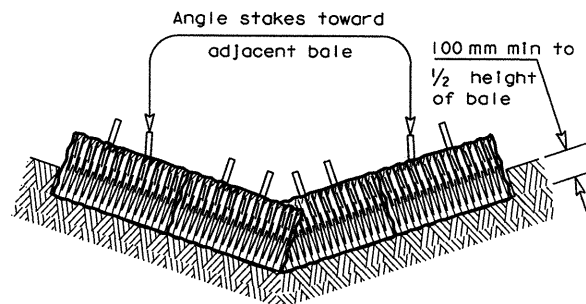
1. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



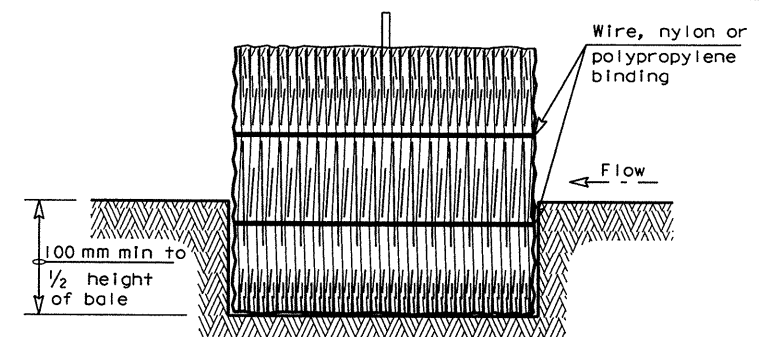
TEMPORARY SEDIMENT CONTROL FENCE



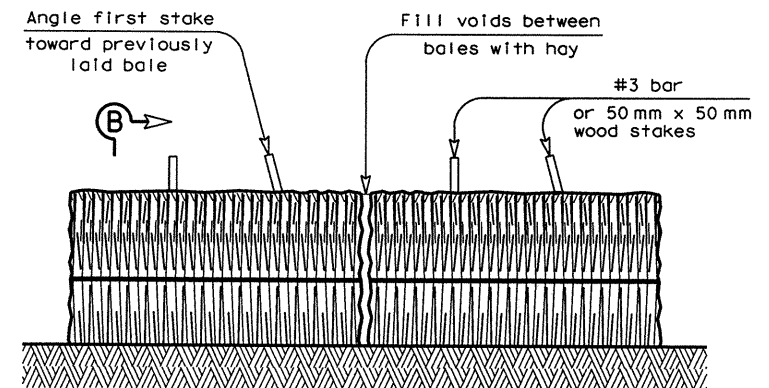
PLAN VIEW



PROFILE VIEW



SECTION B-B



BALED HAY FOR EROSION CONTROL

GENERAL NOTES

1. Hay bales shall be a minimum of 750 mm in length and weigh a minimum of 22.5 kilograms.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetable matter.
3. Hay bales shall be embedded in the soil a minimum of 100 mm and where possible one-half the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with #3 bar or 50 mm x 50 mm wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown herein are suggestions only and may be modified by the Engineer.

BALED HAY USAGE GUIDELINES

A Baled Hay Installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of $0.004 \frac{\text{m}^3/\text{sec}}{\text{m}^2}$ of cross sectional area. Baled Hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 30 meters. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 15 meters.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than .2 ha.

For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overtopping drainage when sediment has filled to the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.

R = Radius
D = Diameter

All unit-less

All unit-less dimensions are millimeters

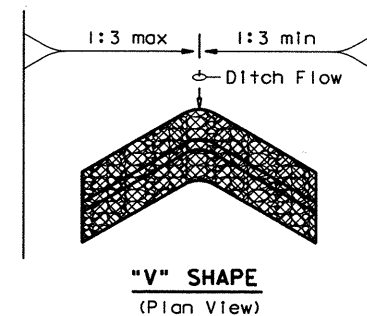
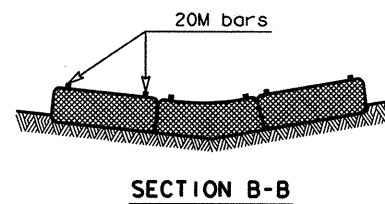
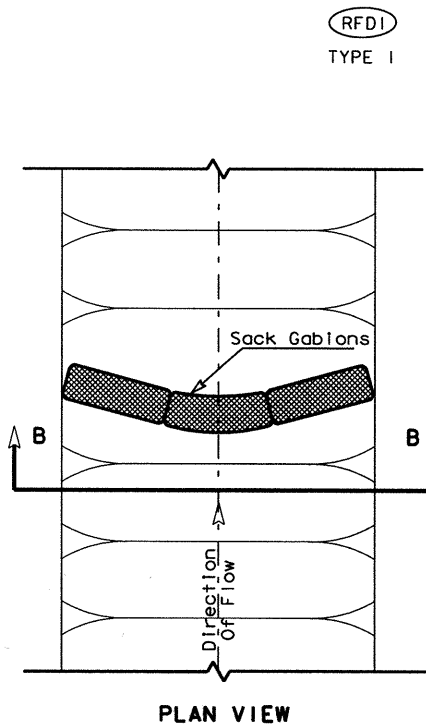
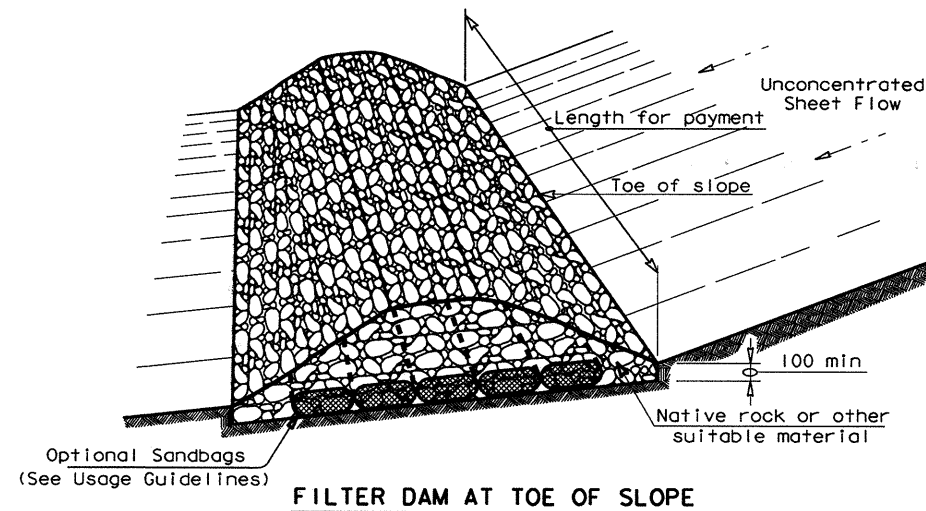


TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & BALED HAY

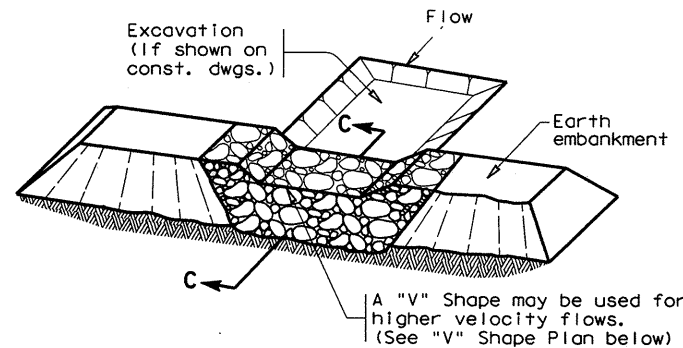
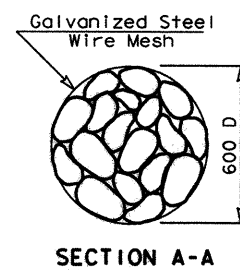
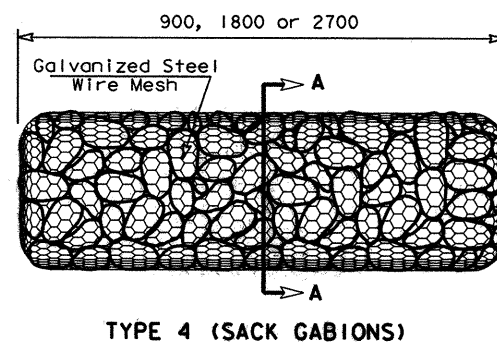
EC (1) - 95 (M)

FILE#	EC195M.DGN	DN#	HEJ	CK#	HEJ	DW#	BGD	CK#	NEG#
ORIG DATE#	JUNE 1993	DIST	FED REG	FEDERAL AID PROJECT				•	SHEET
REVISIONS		SAT	6	CSR 1739-2-12				33	
COUNTY				CONTROL	SECT	JOB	HIGHWAY		
ATASCOSA				1739	02	012	EW 791		



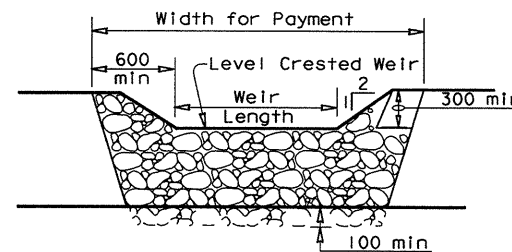
PLANS SHEET LEGEND

- (RFD1) Type 1 Rock Filter Dam
(RFD2) Type 2 Rock Filter Dam
(RFD3) Type 3 Rock Filter Dam

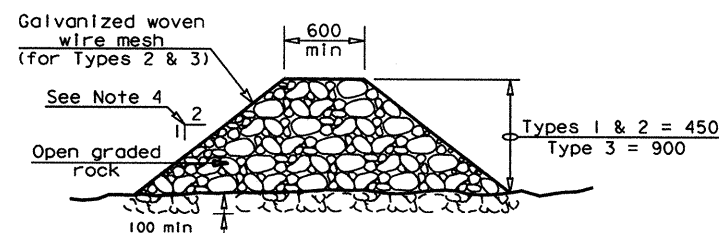


FILTER DAM AT SEDIMENT TRAP

- (RFD1) OR (RFD2)
TYPE 1 OR TYPE 2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

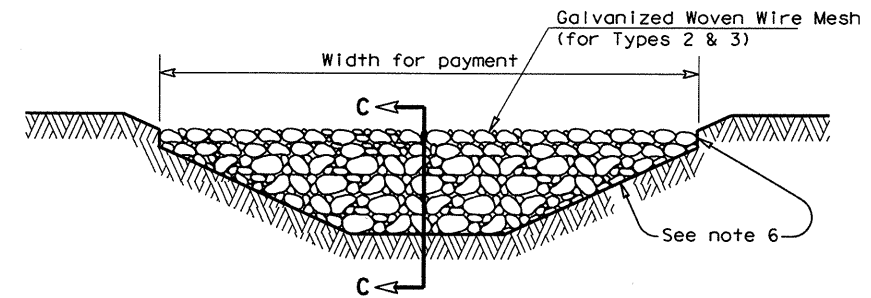
Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of $0.04 \frac{m^3/sec}{m^2}$ of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (450 mm high with no wire mesh): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 2 ha. or less. Type 1 may not be used in concentrated high velocity flows (approx. 2.4 m/sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (100 mm deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (450 mm high with wire mesh): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (900 mm high with wire mesh): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions): Type 4 May be used in ditches and smaller channels to form an erosion control dam.



FILTER DAM AT CHANNEL SECTIONS

- (RFD1) OR (RFD2) OR (RFD3)
TYPE 1 OR TYPE 2

GENERAL NOTES

- If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
- Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
- The rock filter dam dimensions shall be as indicated on the SW3P plans.
- Side slopes should be 1:2 (vertical:horizontal) or flatter. Dams within the safety zone shall have sideslopes of 1:6 or flatter.
- Maintain a minimum of 300mm between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
- Filter dams should be embedded a minimum of 100 mm into existing ground.
- The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
- Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 25 mm diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. In stream use the mesh should be secured or staked to the stream bed prior to aggregate placement.
- Sack Gabions should be staked down with #6 bars.
- Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

R = Radius
D = Diameter

All unit-less
dimensions are
millimeters

Texas Department of Transportation
Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC (2) -95 (M)

FILE#	EC295M.DGN	DN#	HEJ	CK#	HEJ	DN#	BGD	CK#	NEG#
ORIG DATE#	JUNE 1993	DIST	FED REG	PROJECT	SAT	6	CSR	1739-2-12	34
REVISIONS		COUNTY	CONTROL	SECT	JOB	HIGHWAY			
		ATASCOSA	1739	02	012	FM 791			

SPECIAL NOTICE TO TxDOT PROJECT ENGINEERS & CONTRACTORS:
TxDOT WILL IMPLEMENT SIGNIFICANT CHANGES TO WORK ZONE DEVICES
BEGINNING WITH CONTRACTS AWARDED IN 1998. (exact date to be announced.)

SIGNS

1) Until BC-98 is issued and becomes effective, it is the contractor's option to substitute previous sign designs for the signs listed below.

TMUTCD
Part VI
(January 1996 edition)

Previous Sign
Designation
& Design

W3-1a	STOP AHEAD symbol (yellow bkgd)	CW3-1a	STOP AHEAD symbol (orange bkgd)
W3-2a	YIELD AHEAD symbol (yellow bkgd)	CW3-2a	YIELD AHEAD symbol (orange bkgd)
W3-3	SIGNAL AHEAD symbol (yellow bkgd)	CW3-3	SIGNAL AHEAD symbol (orange bkgd)
CW8-9a	SHOULDER DROP OFF	CW21-13	SHOULDER DROP OFF (symbol & word message plaque)
CW8-11	UNEVEN LANES	CW21-14	UNEVEN LANES (symbol & word message plaque)
CW20-1D	ROAD WORK AHEAD	CW21-4D	ROAD CONSTRUCTION AHEAD*
CW20-5	RIGHT (or LEFT) TWO LANES CLOSED with distance plaque	CW20-5	RIGHT (or LEFT) LANE CLOSED* with distances within sign border
		and/or	
		CW4-2	RIGHT (or LEFT) LANE CLOSED symbol**
CW20-5a	RIGHT (or LEFT) TWO LANES CLOSED	CW23-7	TWO RIGHT (or LEFT) LANES CLOSED*
CW20-7b	BE PREPARED TO STOP	CW21-8	BE PREPARED TO STOP
CW21-7D	UTILITY WORK AHEAD	CW20-UT-1D	UTILITY WORK AHEAD
CW22-2a	TURN OFF 2-WAY RADIOS & TELEPHONES	CW22-2a	TURN OFF 2-WAY RADIOS
G20-1	ROAD WORK NEXT 5 MILES	G20-1	ROAD CONSTRUCTION NEXT 5 MILES
SG20-1	ROAD WORK NEXT 5 MILES (1200 x 450 with orange bkgd as detailed on BC(6)-97(M))	G20-1	ROAD CONSTRUCTION NEXT 5 MILES
G20-1a	ROAD WORK \Leftarrow NEXT 5 MILES NEXT 3 MILES \Rightarrow	G20-1a	ROAD CONSTRUCTION \Leftarrow NEXT 5 MILES NEXT 3 MILES \Rightarrow
G20-1bL	ROAD WORK \Leftarrow NEXT 5 MILES	G20-1bL	ROAD CONSTRUCTION \Leftarrow NEXT 5 MILES
SG20-6	CONTRACTOR NAME & ADDRESS (1200 x 750 with orange bkgd as detailed on BC(6)-97(M))	G20-6	CONTRACTOR NAME & ADDRESS

* - When used in a series, all signs should have consistent text, design and message.
EXAMPLE: ROAD WORK AHEAD and ROAD CONSTRUCTION AHEAD signs should not be used in sequence.

** - CW4-2 LANE CLOSED symbol sign may only be used as the last sign in the lane closure signing sequence.

PROPOSED CHANGES TO:
BARRICADES

- 2) Type II and Type III wood barricade designs will no longer be allowed. New Type II and Type III barricade designs will be fabricated from tubular steel, plastic, and other lightweight materials.
- 3) Barricades will not be required at the project limits. Signs erected at the project limits will be independently mounted.
- 4) Type I, II and III Barricades will not be allowed as sign supports.

PROPOSED CHANGES TO:
SIGN SUPPORTS

- 5) Sign supports must be tested and approved as crashworthy.
- 6) Barricades, tripods and "easels" will not be allowed as sign supports.

To receive a free copy of the proposed BC-98 standards, please write or FAX:

Standards Engineer
Traffic Operations Division-TE
TxDOT
125 East 11th Street
Austin, Texas 78701-2483

FAX (512)416-3161

All dimensions are in millimeters unless otherwise noted.



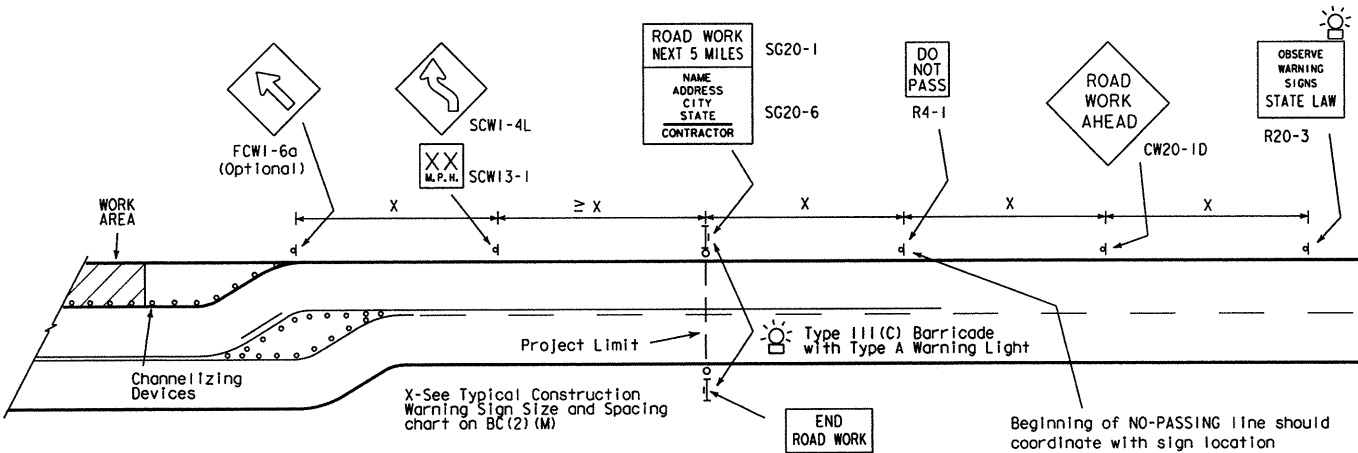
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION
NOTES

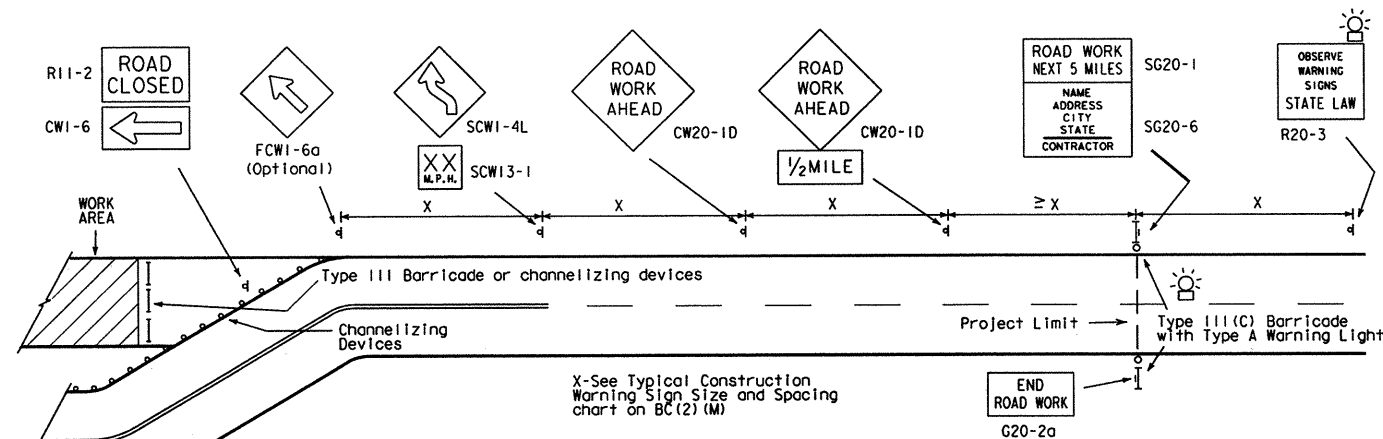
BC NOTES-97(M)

ORIG DRAW DATE: January 1997	DN: MT	CK: *	DN: DN	CK: MT	REC NO: *
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET	
	SAT	6	CSR 1739-2-12	35	
	COUNTY	CONTROL SECTION	JOB	HIGHWAY	
	ATASCOSA	1739 02	012	FM 791	

PROJECT LIMIT TRAFFIC CONTROL DEVICES



PROJECT LIMITS ADJACENT TO WORK AREA
(Less than 600 meters between project limits and work area)



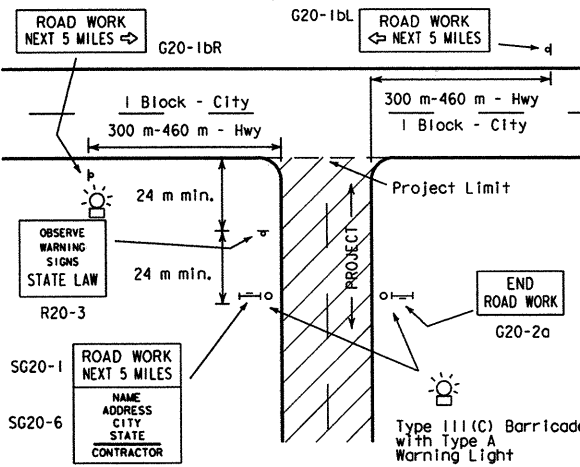
PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 600 meters but not more than one mile between project limits and work area)

PROJECT LIMIT GENERAL NOTES

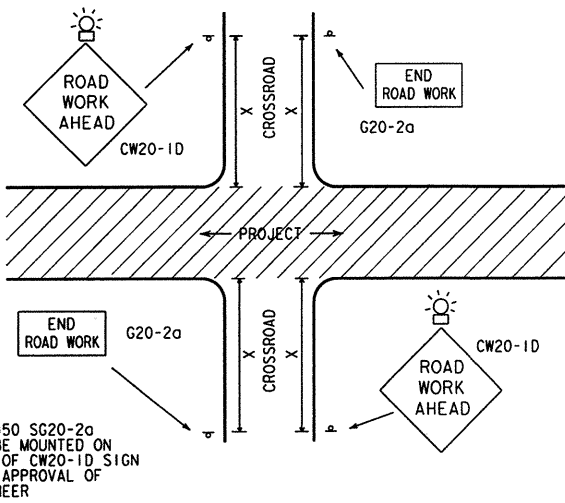
SIGNS AND WARNING LIGHTS

1. Except when specified elsewhere in the plans, a warning light for a sign may be attached to the sign support.
2. Appropriate standard traffic control devices shall be used as required by the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the contractor's responsible person.
3. As a general rule, additional traffic control devices in advance of the project limits should only be used in those cases where a work area, a detour, or a potentially hazardous location is less than 600 meters inside the project limits.
4. The traffic control devices used in the above illustrations are examples only. Field conditions should dictate the most appropriate traffic control devices to be used.
5. As detailed above and on sheet BC(2) (M), the ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the project limits and the OBSERVE WARNING SIGNS STATE LAW sign shall be erected in advance of the project limits. These signs should be adjusted to provide adequate spacing to other signs.
6. With the agreement of an adjacent project Engineer, the Engineer(s) may allow the omission of END ROAD WORK, OBSERVE WARNING SIGNS, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the contractor will erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer.
7. Duplicate construction warning signs should be erected on the median side of divided highways where median width will permit and traffic density justifies the signing.
8. Except for devices required by Note 5, traffic control devices should be in place only while work is actually in progress or a definite need exists.
9. Sign size should be based on the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD).

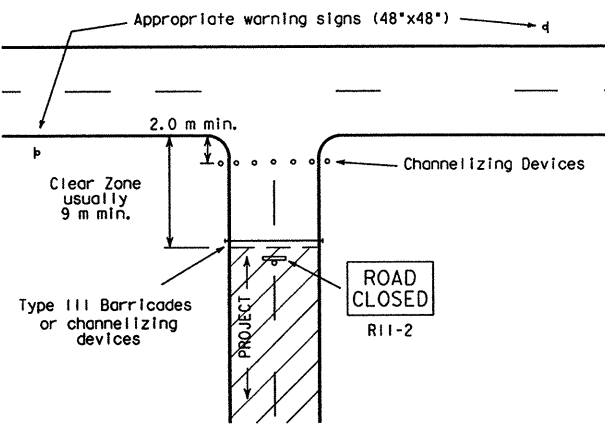


PROJECT LIMITS AT T-INTERSECTION

1. The ROAD WORK NEXT X MILES sign should be erected on the intersected highway as detailed above.
2. On the intersected roadway, additional traffic control devices, such as a flagger and accompanying signs or other signs, should be used when work is being performed at or near the intersection.

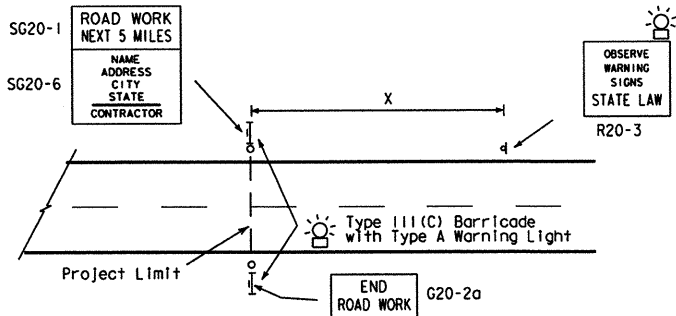


CROSSROAD SIGNING AND BARRICADING



PROJECT LIMITS FOR CLOSED ROADWAY

Barricades shall be erected completely across roadway. Channelizing Devices may be drums, vertical panels or cones as specified in the plans.



PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 1.6 km between project limits and work area)

It is the intent of these plans to provide positive guidance to motorists throughout the project limits by the use of signs, pavement markings, delineation devices and/or channelizing devices. All traffic control devices shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."



Required Warning Lights unless otherwise specified in the plans, or as directed by the Engineer.

CROSSROAD SIGNING AND BARRICADING

1. Except as noted elsewhere in plans, the usual minimum signing on a crossroad approach should be one CW20-1D ROAD WORK AHEAD sign and G20-2a END ROAD WORK sign. Where speeds and volumes are relatively low, a smaller ROAD WORK AHEAD sign may be used.
- When approved by the Engineer, on low volume crossroads, advance warning signs may be the reduced size 900 x 900 "ROAD WORK AHEAD" (CW20-1D) sign mounted back to back with the reduced size 600 x 450 "END ROAD WORK" (SG20-2a) sign. See the SHSD manual and BC(6) (M) for sign design details. Advance signing may be omitted if approved by the Engineer.
- Additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs may be required. When additional signs are required, such signs will be considered part of the minimum requirements.
2. The G20-1a sign shall be required on major crossroads to advise motorists of the length of construction in either direction from the intersection.
3. On higher volume crossroads additional traffic control devices may be noted elsewhere in the plans.
4. When work occurs in the intersection area, appropriate traffic control devices shall be in place.

WARNING LIGHTS

Flashing and steady burn warning light usage shall be as specified elsewhere in the plans, these standard sheets or as directed by the Engineer. Warning lights shall meet the requirements of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

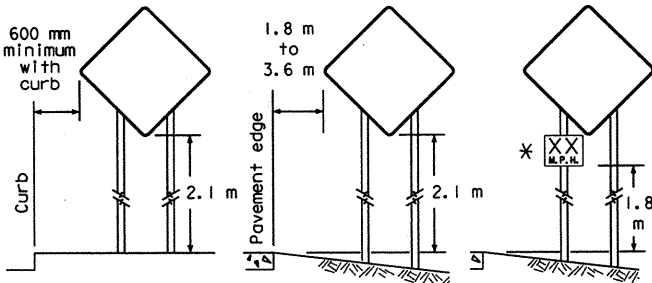
Type A-Low Intensity Flashing Warning Lights are commonly mounted on signs and/or barricades. They are intended to warn of an approaching potentially hazardous area. Flashing warning lights shall not be used in a series.

Type B-High Intensity Flashing Warning Lights are normally used at/or approaching potentially hazardous site conditions within the construction area. As these lights are effective in daylight as well as dark, they are designed to operate 24 hours per day. Flashing warning lights shall not be used in a series.

Type-C Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices.

When required by the Engineer the Contractor shall furnish a copy of the warning lights certification. The certification will be by the manufacturer, stating the lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.

TYPICAL MINIMUM SIGN CLEARANCES
FIXED SIGN SUPPORTS



* Supplemental plaque shall be same color as parent sign, (See BC(4) (M)).

All dimensions are in millimeters unless otherwise noted.

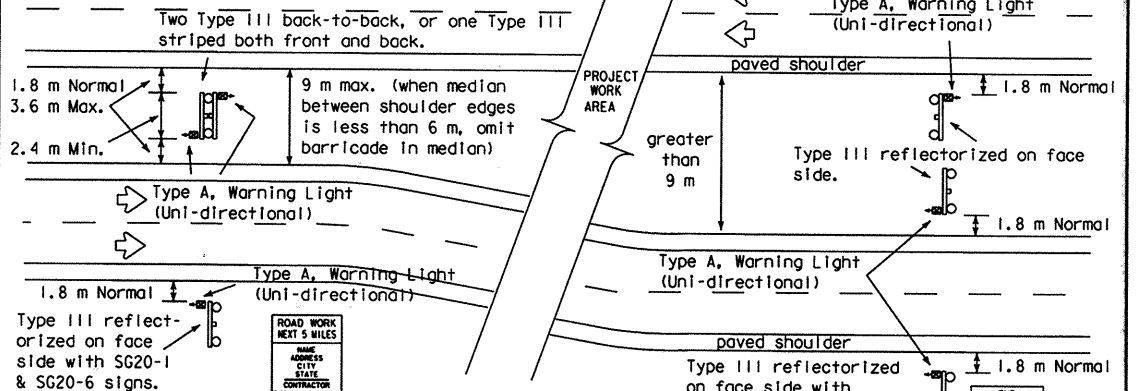
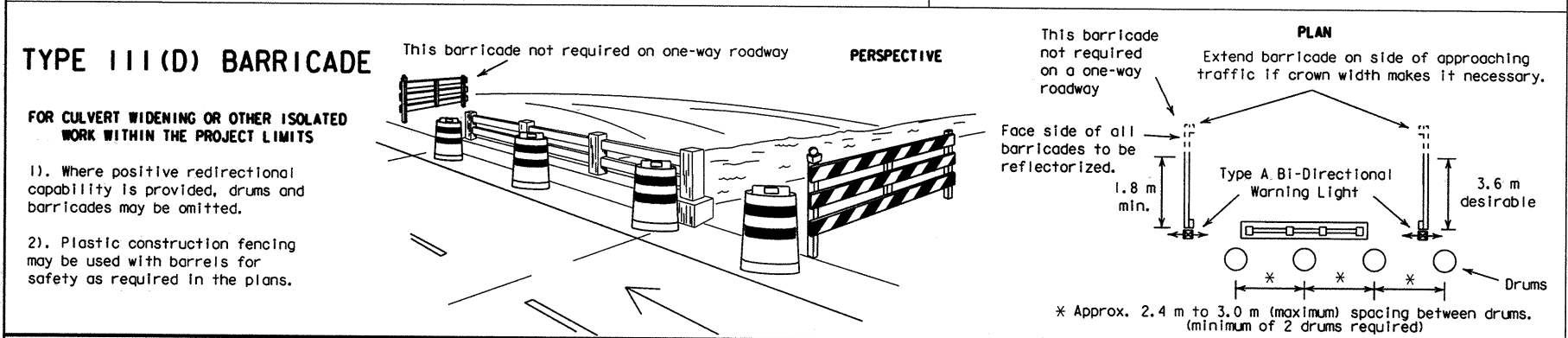
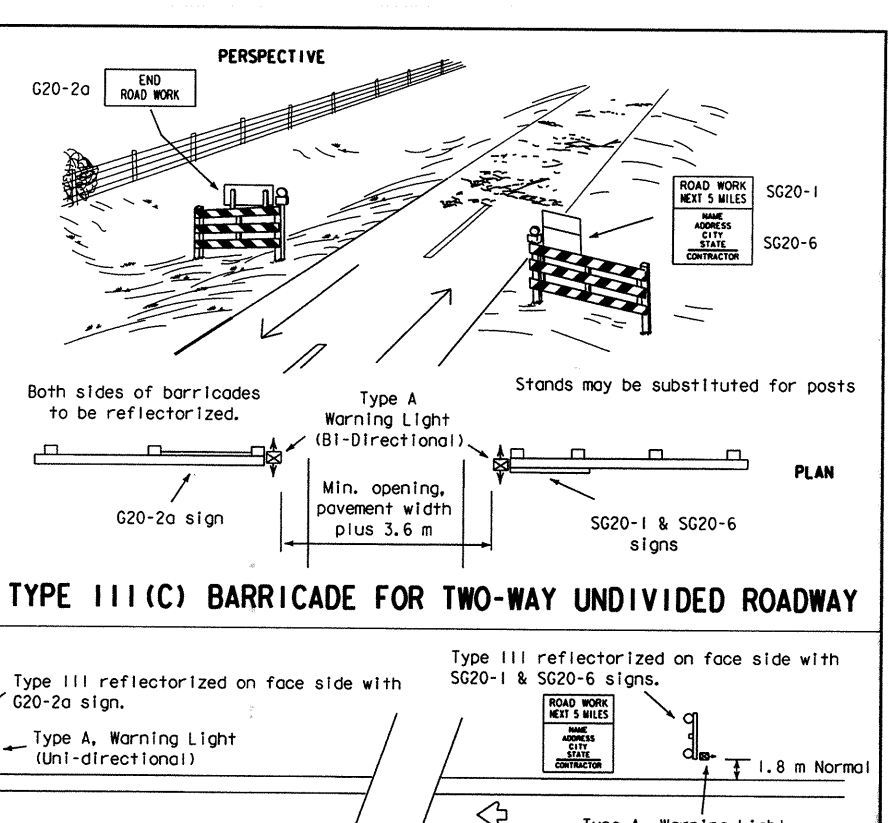
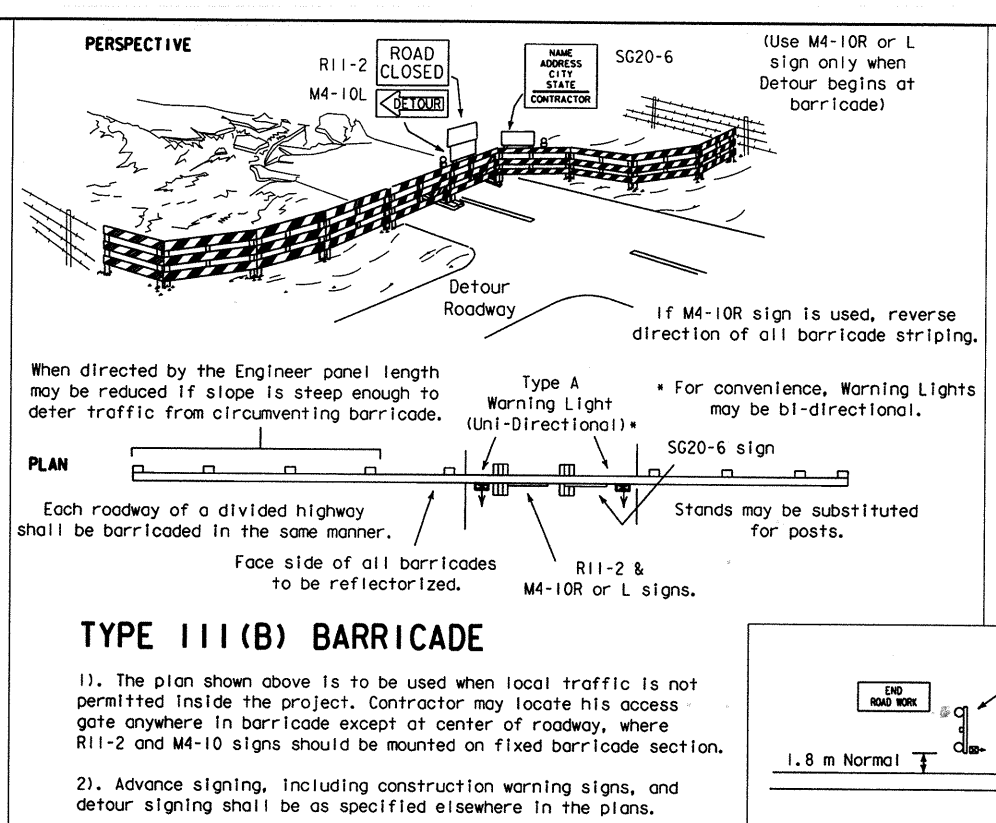
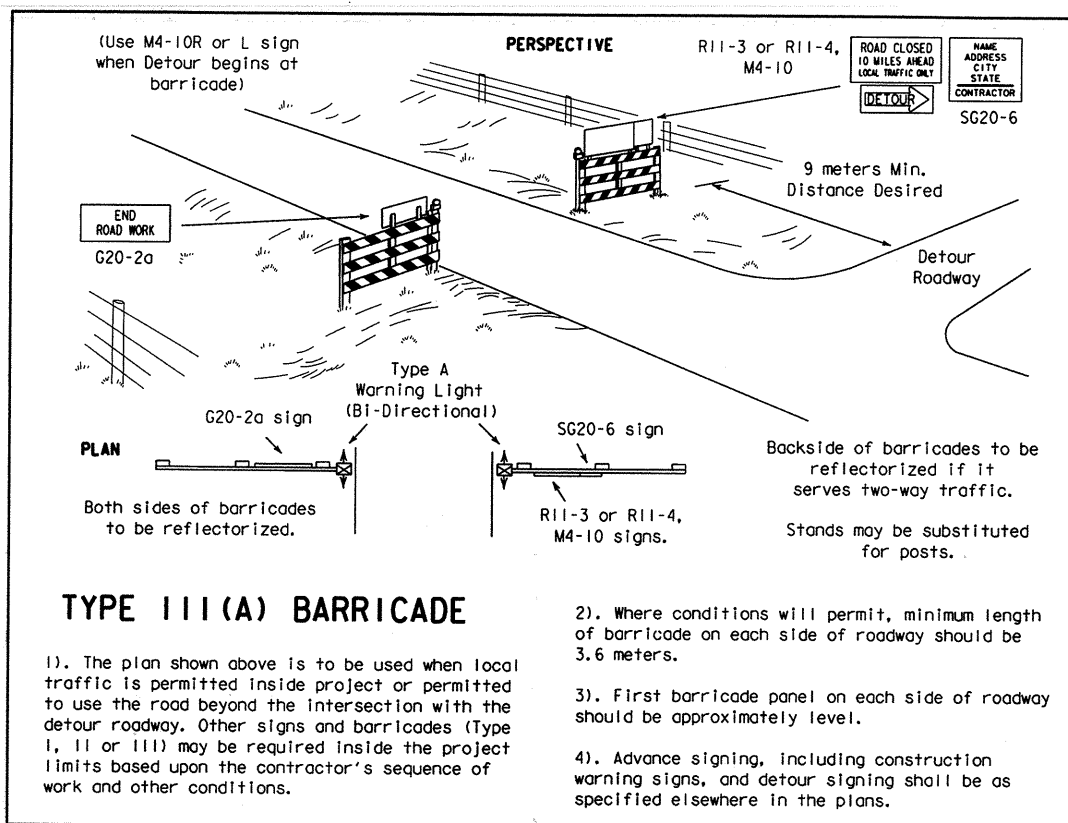
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION
STANDARDS

ADVANCE SIGNING
CROSSROAD SIGNING
WARNING LIGHTS

BC(1)-97(M)

ORIG DRAW DATE: APRIL 1988	DN: 1-97	CK: 6	DN: DN	CK: CW	NEG NO: 1
6-88	7-89	4-92	2-94	STATE DISTRICT: SAT	FEDERAL REGION: 6
				COUNTY: ATASCOSA	FEDERAL AID PROJECT: CSR 1739-2-12
				CONTROL SECTION: 1739 02	JOB: 012
					HIGHWAY: FM 791
					SHEET: 36



GENERAL NOTES FOR TYPES I, II & III BARRICADES

Type I or II Barricades (see BC(3)(M)) are for temporary use to control traffic within the limits of a project whenever it is necessary to confine traffic to a specific area because of a particular construction operation. Type I Barricades should normally be used on conventional roads or urban streets and arterials. Type II Barricades have more reflective area, and are intended for use on expressways, freeways or other high speed roadways.

Type III(A) Barricades and accompanying signs are to be used at each end of construction projects closed to all but local traffic.

Type III(B) Barricades and accompanying signs are to be used at each end of construction projects closed to all traffic.

Type III(C) Barricades and accompanying signs are to be used at each end of construction project where traffic is maintained through the project. Type III(C) Barricades may also be used where traffic from other highways, county roads or city streets is permitted to enter the project area. Typical signing for Type III(C) Barricades is shown on Sheet BC(1)(M).

Type III(D) Barricades are to be used on culvert widening projects where traffic is routed over the structure. They shall be erected so as to provide the maximum roadway width for traffic and to allow sufficient space for construction operations behind the barricades. For dimensions of barricade panels see Sheet BC(3)(M).

Warning Lights placed on Type III(A), (B) or (C) barricades should be mounted to the top, left side of the rail facing traffic. Barricades used at each end of the project shall be supplemented with warning lights as detailed on this sheet.

Warning Lights placed on Type III(A), (B), (C) or (D) barricades should be mounted at a minimum mounting height of 1.5 m and may be attached to the barricade.

Warning lights on barricades will be installed by the Contractor as determined in the plans, or as directed by the Engineer.

Warning lights will be maintained as directed by the Engineer.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING 1.5,6

Roadway Classification	Posted Speed	Sign Spacing "X"	Long-term Or Intermediate-term Stationary Approach Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW21 Series		Other Warning Signs
			Standard mm	Minimum ⁴ mm	Standard mm ⁷	Minimum ⁴ mm ⁷	
Conven. <div style="text-align: center;">↓</div>	30	40	1200x1200 <div style="text-align: center;">↓</div>	900x900 <div style="text-align: center;">↓</div>	750x750 or 900x900 <div style="text-align: center;">↓</div>	600x600 or 750x750 <div style="text-align: center;">↓</div>	750x750 or 900x900 <div style="text-align: center;">↓</div>
	35	50		Use Standard Size <div style="text-align: center;">↓</div>	1200x1200 <div style="text-align: center;">↓</div>	Use Standard Size <div style="text-align: center;">↓</div>	
	40	75					
	45	100					
	50	120					
	55	150 ²					
	60	180 ²					
	65	210 ²		1200x1200 <div style="text-align: center;">↓</div>	1200x1200 <div style="text-align: center;">↓</div>		
70	240 ²						
Exp or Frwy	*	* ³	<div style="text-align: center;">↓</div>	<div style="text-align: center;">↓</div>	**	**	**

* For typical sign spacings on expressways and freeways, see TMUTCD typical application diagrams or TCP Standard Sheets.

▲ Minimum distance from work area to 1st Advance Warning sign and/or distance between each additional sign.

** Smaller sign sizes may be used where sign designs have not been included in the "Standard Highway Sign Design for Texas" manual.

General Notes:

- Special or larger size signs may be used as may be necessary.
- Distance between signs should be increased as required to have 460 meters advance warning.
- Distance between signs should be increased as required to have 810 meters or more advance warning.
- For use only on secondary roads or city streets where speeds are low.
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
- Where two sizes are listed, see sign size listing in TMUTCD, Appendix A for proper size.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

BARRICADES
SIGN SIZE AND SPACING
BC (2) -97 (M)

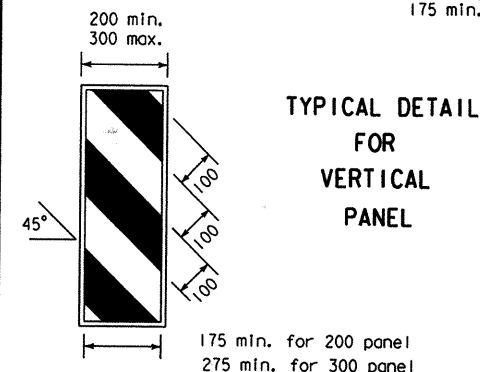
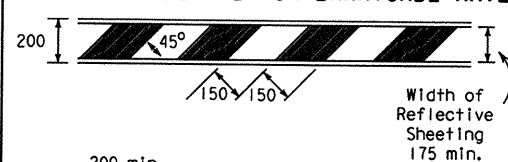
ORIG. DRAW. DATE: APRIL 1988

REVISIONS

6-88	1-97	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
7-89		SAT	6	CSR 1739-2-12	37
4-92		COUNTY		CONTROL SECTION	JOB
2-94		ATASCOSA		1739 02	012 FM 791

STRIPING

TYPICAL DETAIL FOR BARRICADE RAIL



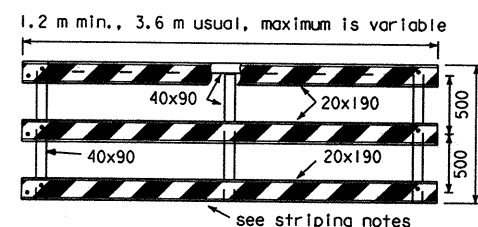
TYPICAL DETAIL FOR VERTICAL PANEL

BARRICADES

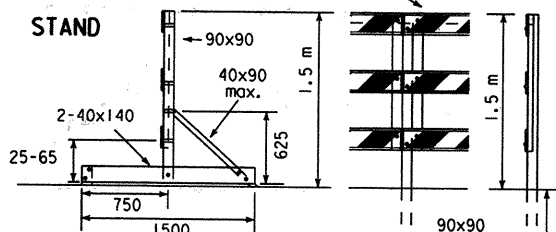
TYPE III

The three (3) rails on Type III barricades shall be reflective orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

PANEL



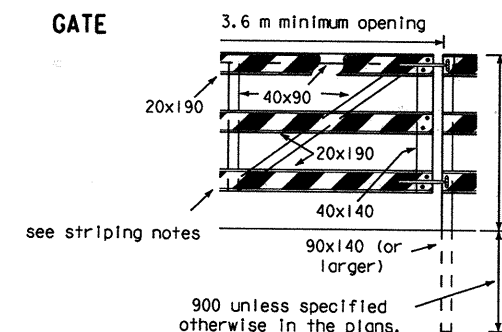
see striping notes



Typical fasteners are 3/8", 1/2" or 5/8" bolt with washers or lag screws.

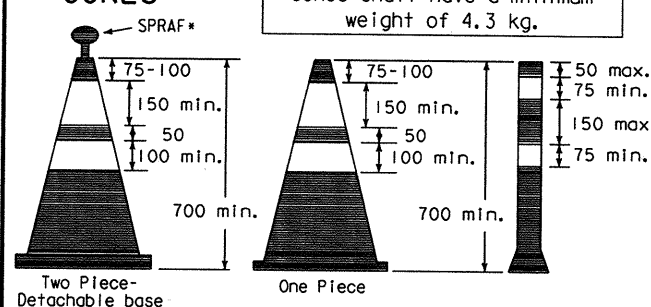
900 unless specified otherwise in the plans.

GATE



900 unless specified otherwise in the plans.

CONES



Traffic cones and tubular markers shall be a minimum 700 mm in height. Orange shall be the predominant color on cones and tubular markers. They should be kept clean and bright for maximum visibility.

For nighttime use they shall be reflectorized or equipped with lighting devices for maximum visibility. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night.

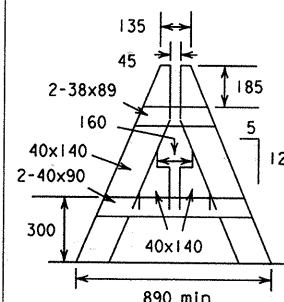
Reflectorization of tubular markers shall be a minimum of two 75 mm bands placed a maximum of 50 mm from the top with a maximum of 150 mm between bands. Reflectorization of cones shall be provided by a minimum 150 mm band placed a maximum of 75 mm from the top, supplemented by a 100 mm band spaced a minimum of 50 mm below the 150 mm band.

Cones or tubular markers are generally suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels or drums for long term usage. Care should be taken to insure that they remain in their proper location and in an upright position.

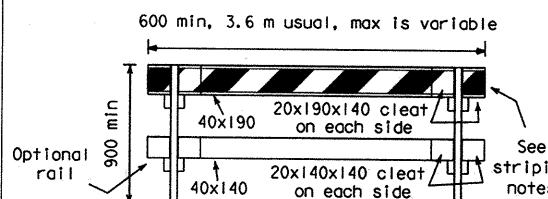
The weight of a two piece cone and detachable base may be combined to meet the 4.3 kg minimum weight. Detachable base shall be fabricated from non-rigid materials such as rubber or plastic.

*-SPRAF (stacking/removal assistance feature) may be designed as a handle, hook or other shape, fabricated from non-rigid materials similar to the cone material, and may extend up to a maximum of 200 mm above the top of cone. The length of SPRAF shall not be considered with regard to the 700 mm minimum height.

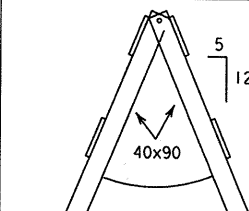
TYPE I



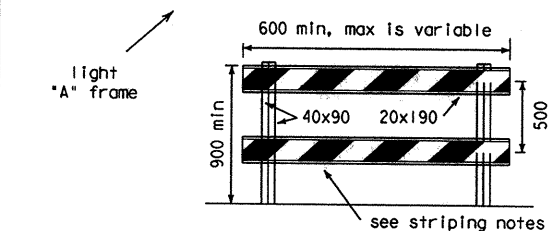
For Type I Barricades, both sides of the top rail shall have reflective orange and reflective white striping.



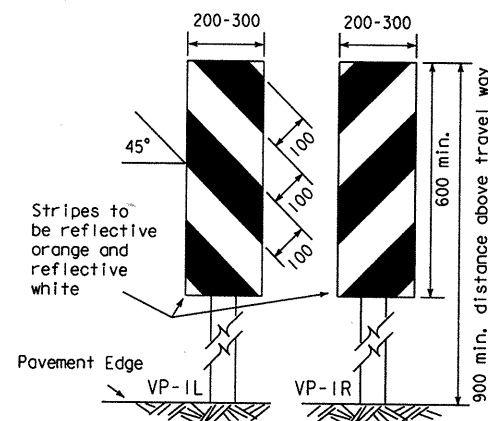
TYPE II



For Type II Barricades, all four (4) rail faces shall have reflective orange and reflective white striping.



VERTICAL PANELS (VP)



Base and support may be made of various materials such as plastic, fiberglass, recycled rubber and/or wood.

Vertical Panels are normally used as channelizing devices to indicate tangent or nearly tangent roadway alignment where good target value of a device is needed in daytime as well as the nighttime. In addition, vertical panels should be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation may be required. Vertical panels should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes should always slope downward toward the traveled way. Material used to weight devices shall be sand. Nails may be used in the final construction of VP support. Vertical Panels used on expressways, freeways, and other high speed roadways shall have a minimum of .18 square meters of retroreflective area facing traffic.

BARRICADE NOTES

Barricades extending across a roadway, should have stripes slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided for, the chevron striping may slope downward in both directions from the center of the barricade.

Striping of rails, panels and gates for the right side of the roadway, is illustrated. For the left side of the roadway, striping should slope downward to the right.

Identification markings may be shown only on back side of barricade rails. Maximum height of letters shall be 25 mm.

Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided (see BC(1)(M)). Barricades may be designed and constructed from wood, or any other suitable material in a manner approved by the Engineer.

When signs are placed on barricades, a maximum number of 2 signs per barricade section will be permitted.

Barricades are to be constructed in a first-class workmanship manner of clean sound material. All surfaces above ground, which are not striped, shall be white except the unpainted galvanized metal or aluminum components. Components made of lumber shall be painted with a minimum of two coats of an approved brand of white paint to insure thorough coverage and a uniform white color.

Barricades inside the project shall be removed upon completion of the work and/or the elimination of the hazard on any section.

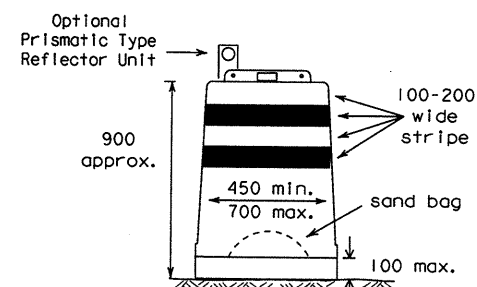
When Wood Barricades are used and when orange and white stripes are required on the backside, a 40 x 190 rail may be used in lieu of the 20 x 190 rail and 40 x 90 stiffener. Otherwise the rail should be fabricated as detailed.

BARRICADE DETAILS

All lumber sizes are nominal dimensions. Fabrication details are plus or minus 10 mm.

Nails may be used in the construction of the barricade, however, all connections will have an approved fastener.

PLASTIC DRUMS



Metal drums used as a channelizing device or sign support shall not be allowed.

Drums used for traffic warning or channelization shall be constructed of lightweight, flexible and deformable materials and be a minimum of 900 mm in height, and have at least an 450 mm minimum width, regardless of orientation. The markings on drums shall be horizontal, circumferential, alternating orange retroreflective and white retroreflective stripes 100 to 200 mm wide. The first stripe should start within 100 mm of top of the drum. Each drum shall have a minimum of two orange and two white stripes. Any non-retroreflective space between stripes shall not exceed 50 mm in width. Color of drums before retroreflective materials are added shall be orange.

Drums shall have closed tops that will not allow collection of water, trash or other debris. Tops may have a hand grip.

Delineators may be placed on drums used in series for traffic channelization as specified in the plans or as directed by the Engineer. Color of delineators shall conform to the TMUTCD requirements.

When warning lights are attached to drums, they shall be attached as per the manufacturer's recommendations.

Signs or chevrons attached to the top of drums shall be a maximum size of 450 mm by 600 mm, and shall be fabricated from 2.0 mm thick aluminum, 5 mm fiberglass reinforced plastic, or lightweight plastic.

Drums should be ballasted or weighted with a minimum of 13.6 kg and a maximum of 34 kg of sand placed in one or two sand bags or a sand filled or crumb rubber base. Other ballasting devices may be used as approved by the Engineer. Drums should not be weighted with heavy objects or water. Ballast for drums should not be any material that would make them hazardous to motorists, pedestrians, or workers. When they are used in regions susceptible to freezing, they should have drainage holes in the bottom so water will not accumulate and freeze, causing a hazard if struck by a motorist. Ballast shall not be placed on top of the drum.

Adhesives may be used to secure base of drums to pavement.

BARRICADE CHARACTERISTICS

TYPE*	I	II
Width of Rail	200 min-300 max	200 min-300 max
Length of Rail	600 mm min	600 mm min
Width of Stripes**	150 mm	150 mm
Height	900 mm min	900 mm min
Number of Reflecterized Rail Faces	2 (one each direction)	4 (two each direction)

TYPE*	III
Width of Rail	200 min-300 max
Length of Rail	1200 mm min
Width of Stripes	150 mm
Height	1500 mm min
Number of Reflecterized Rail Faces	3 If facing traffic In one direction 6 If facing traffic In two directions

* For wooden barricades nominal lumber dimension will be satisfactory

** For rails less than 900 mm long, 100 mm wide stripes shall be used

RETROREFLECTIVE SHEETING

Type A = Engineer Grade
Type B = Super Engineer Grade
Type C = High Specific Intensity
as defined in Material Specification D-9-8300

GENERAL NOTES

REFLECTORIZATION

The reflectorized white and reflectorized orange stripes for channelizing devices such as barricades, drums and vertical panels shall be constructed of retroreflective sheeting meeting the color and reflectivity requirements of Material Specification, D-9-8300, Type C, unless otherwise specified in the plans. Channelizing devices used only during daylight hours, may use any type sheeting meeting the color and reflectivity requirements of Material Specification, D-9-8300.

All dimensions are in millimeters unless otherwise noted.



BARRICADE AND CONSTRUCTION STANDARDS

CHANNELIZING DEVICES BC (3) -97 (M)

ORIG. DATE	APRIL 1988	DN	DN	DN	DN	DN	DN	DN	DN
REVISIONS	1-97	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET				
6-88		SAT	6	CSR 1739-2-12	38				
7-89		COUNTY	ATASCOSA	1739	02	012	FM 791		
4-92									
2-94									

WORK ZONE SIGNS

GENERAL

Standard signs shall be used as required by the BC Standard sheets, the plans, or as directed by the Engineer to regulate, warn, and guide traffic. All sign usage and erection shall be in strict accordance with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD). The Contractor shall maintain each sign as directed by the Engineer.

The Contractor may use either the sign designs shown on the BC Standard Sheets, or those sign designs shown in the "Standard Highway Sign Designs for Texas" (SHSD). All work zone signs provided for in the TMUTCD but not detailed in the plans may be used when directed by the Engineer.

SIZE OF SIGNS

On secondary roads or city streets where speeds are low, smaller size construction warning signs may be used with the written approval of the Engineer and if the sign size is in accordance with the "Typical Construction Warning Sign Size and Spacing Chart" shown on page 6C-11 of the TMUTCD, Part VI.

MATERIALS

Construction signs shall be made from wood, metal, fiberglass, plastic, vinyl or other approved materials. The designation of metal, fiberglass, plastic, vinyl and wood as primary materials for signs shall not be interpreted to exclude other suitable rigid materials. Mesh materials will not be allowed. Non-rigid materials shall not be allowed for nighttime usage unless approved by the Engineer.

SIGN BLANK THICKNESS

Wood for signs shall be minimum 13 mm, medium density, outdoor grade plywood. Aluminum sign blanks shall have a minimum thickness of 2.0 mm, for sign areas up to 1.5 sq. meters. Sign areas greater than 1.5 square meters should use a minimum thickness of 2.5 mm.

SPLICES

All wood signs fabricated from 2 or more pieces shall have one or more plywood cleats, 13 mm thick by 150 mm wide, fastened to the back of the sign and extending fully across the sign.

Wood Sign posts shall not be spliced.

REFLECTIVE SHEETING

ReflectORIZED signs shall be constructed of retroreflective sheeting meeting the color and reflectivity requirements of Material Specification, D-9-8300 or D-9-8310. Day only is defined as a device that is used only during daylight hours.

Type A, B or C sheeting may be used for all, day only, applications.

Type A sheeting should be used for all, white background, regulatory signs.

Type C sheeting shall be used for all other applications.

The above applications of sheeting grades to different type signs will apply unless otherwise specified in the plans.

TYPE A = Engineer Grade

TYPE B = Super Engineer Grade

TYPE C = High Specific Intensity

SIGN LETTERS

All sign lettering shall be clear, open rounded type capital letters as approved by and as published by the Federal Highway Administration (FHWA). Signs and lettering shall be of first class workmanship equivalent to that of the Department standard signs.

SUPPLEMENTAL PLAQUES

Supplemental plaques erected in conjunction with regulatory, warning, construction warning or guide signs shall be the same color as the parent sign unless specified elsewhere in the plans. Supplemental plaques for nighttime use shall be the same type reflective sheeting (A, B, or C) as parent sign.

SUPPORTS AND MOUNTING HEIGHT

Regardless of the type of support used, or duration of work, regulatory signs should not be erected at heights less than 2.1 m above the pavement surface.

Wood sign post supports shall be painted white.

Signs may be erected on portable or fixed supports for use on construction projects to warn or guide traffic through and/or around the actual construction area.

PORTABLE - Signs erected on portable supports for use on construction projects normally mean signs which are used during the daytime to warn or guide traffic through and/or around the actual construction area, but at the end of the workday such signs are removed.

Portable supports shall be as shown on this sheet. Signs with portable supports may be used for short term, short duration and mobile operations. The bottom of the sign shall be a minimum of one 300 mm above the pavement surface.

FIXED - Signs erected on fixed supports for use on construction projects normally mean signs that are to remain in place for both daytime and nighttime usage to regulate, warn and guide traffic in advance of and within the limits of the project including the crossroad approaches. Signs erected on fixed supports should be at a minimum height of 2.1 meters.

SIGN SUPPORT WEIGHTS

Where sign supports require the use of weights to keep from turning over, the use of some type of sandbag is recommended. The use of pieces of rock, concrete, iron, steel or other solid objects will not be permitted. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.

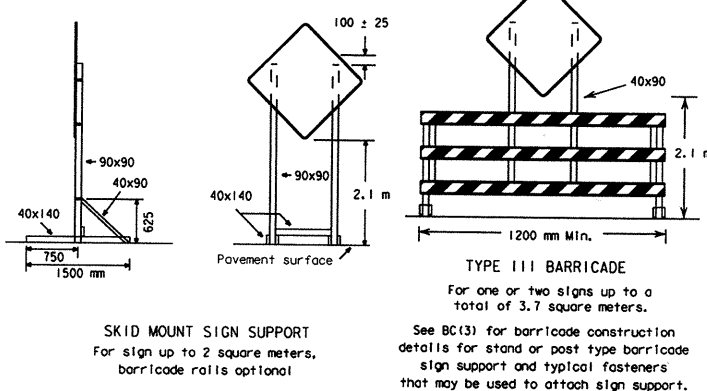
REMOVING OR COVERING

When sign messages may be confusing or no longer apply, the signs and supports shall be removed from roadway and shoulder, or the signs shall be completely covered. Turning signs from motorists view will not be allowed. When signs are covered the material used shall be opaque, such as heavy mil black plastic. Burlap shall not be used to cover signs. Signs shall be removed upon completion of the work.

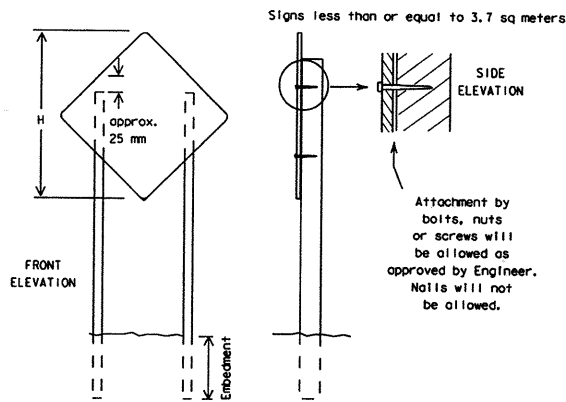
Duct tape or other adhesive material shall not be affixed to sign face.

TYPICAL SIGN SUPPORTS

FIXED SUPPORTS



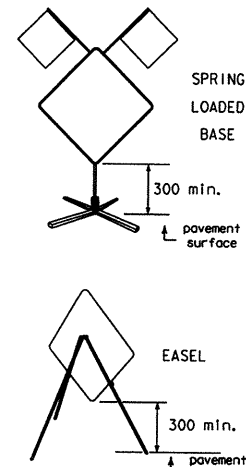
ATTACHMENT DETAILS



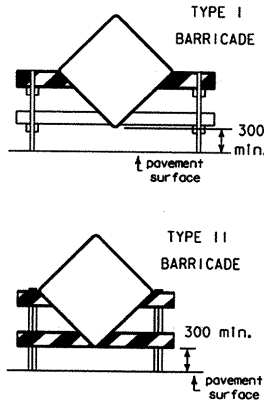
Nominal Size	No. of Posts	Sq. m of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required	Hole Dia. (A) and Vertical Spacings (B & C)
90 x 90	1	1.1	900 mm	no	n/a
90 x 90	2	2.0	900 mm	no	n/a
90 x 140	1	2.0	900 mm	YES	35 mm @ 100 & 450

Direction of Traffic

PORTABLE SUPPORTS



Sand bags may be used only if bag is resting on the ground. Other weights are not to be used. Other forms of attachment of weights to easel or sign shall not be used unless approved by the Engineer in writing.



USAGE OF CWI-6, ECWI-6a AND CWI-8 SIGNS

CWI-8

The CHEVRON sign (CWI-8) may be used to replace roadside delineation on curves or used in transitions or tapers.

ECWI-6a

An UPWARD SLOPING ARROW sign (ECWI-6a) is intended to be used to indicate the beginning of a curve or transition. It should be preceded with an appropriate curve sign when needed, and should not be used throughout the curve or transition. Advisory speed plaque is optional.

CWI-6

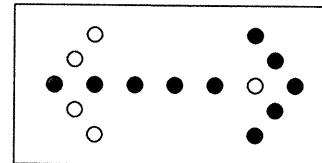
A LARGE ARROW sign (CWI-6) is intended to be used to give notice of a sharp change in alignment (turn) in the direction of travel. It should be preceded with an appropriate advance construction warning turn sign.

NOTES:

1. CWI-6, ECWI-6a & CWI-8 Signs may be mounted on temporary supports.
2. CHEVRON alignment signs, when used, are erected on the outside of a curve, sharp turn or on the far side of an intersection, in line with and at right angles to approaching traffic. Spacing of the signs should be such that three are visible throughout the change in horizontal alignment.
3. For two-way traffic, use same arrangement of signs on outside of curve for each direction of travel.
4. Appropriate advance warning CURVE or TURN sign with Advisory Speed plaque should be used when needed.

TYPICAL FLASHING ARROW PANEL

For traffic to move right.



REQUIREMENTS

TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	750 x 1500	13	1.2 km
C	1200 x 2400	15	1.6 km

ATTENTION: All arrow panels shall be equipped with automatic dimming devices.

1. The Advance Warning Flashing Arrow Panel should be used for all lane closures (multilane roadway), or slow moving maintenance or construction activities on the traveled way. Arrow panels should not be used on two-lane roadways, detours, diversions or work on shoulders unless the CAUTION mode is used.
2. Necessary signs, barricades or other traffic control devices should be used in conjunction with the Advance Warning Arrow Panel.
3. The Arrow panel should have the capability of the following mode selections: LEFT ARROW, RIGHT ARROW, LEFT and RIGHT ARROW and CAUTION. The CAUTION mode consists of four corner lamps flashing simultaneously.
4. The Arrow panel shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 times per minute nor more than 40 flashes per minute. The Advance Warning Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
5. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and 25 percent for the sequential chevron.
6. The TxDOT standard is the flashing arrow, however the sequential chevron may be used. The sequential arrow should NOT be used.

All dimensions are in millimeters unless otherwise noted.



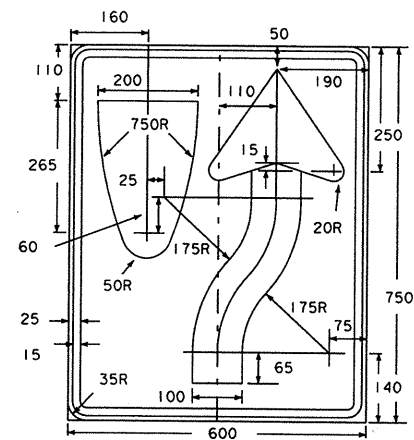
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

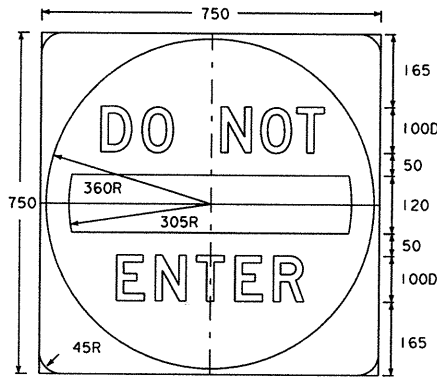
SIGN FABRICATION DETAILS
TYPICAL SIGN SUPPORTS
FLASHING ARROW PANELS

BC(4)-97(M)

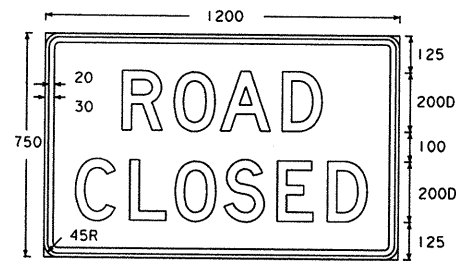
ORIG. DRAW. DATE	APRIL 1988	DN	DN	DN	DN	DN	DN	DN	DN
6-88	7-89	4-92	2-94	1-97	SAT	6	1739-2-12	39	FM 791
COUNTY		CONTROL		SECTION		JOB		HIGHWAY	
ATASCOSA		1739		02		012		FM 791	



R4-7
600x750
Symbol - Black
Border - Black
Background - White Refl.



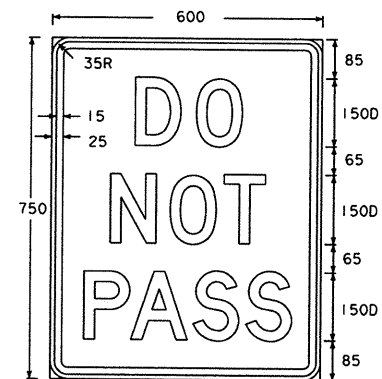
R5-1
750x750
Letters - White Refl.
Bar - White Refl.
Border - White Refl.
Background - Red Refl.



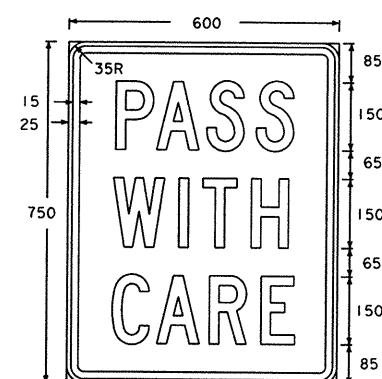
R11-2
1200x750
Letters - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

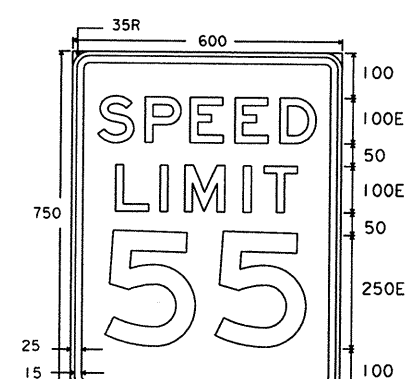
STREET 2000
RAMP 2000
BRIDGE 2000
R11-2S
R11-2R
R11-2B



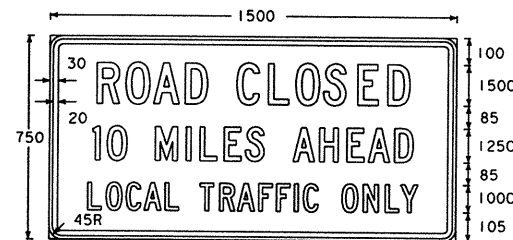
R4-1
600x750
Letters - Black
Border - Black
Background - White Refl.



R4-2
600x750
Letters - Black
Border - Black
Background - White Refl.



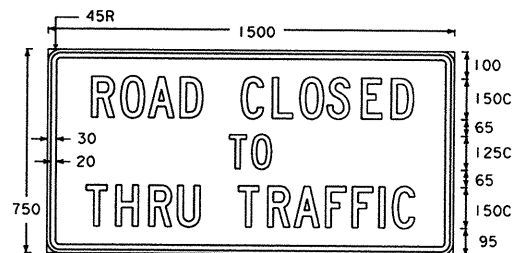
R2-1
600x750
Letters - Black
Border - Black
Background - White Refl.



R11-3a
1500x750
Letters - Black
Numerals - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

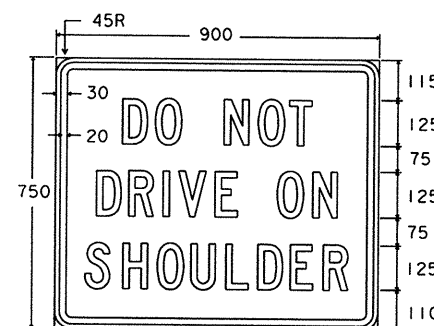
BRIDGE OUT 150C
R11-3b



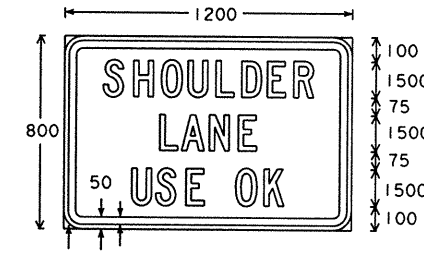
R11-4
1500x750
Letters - Black
Border - Black
Background - White Refl.



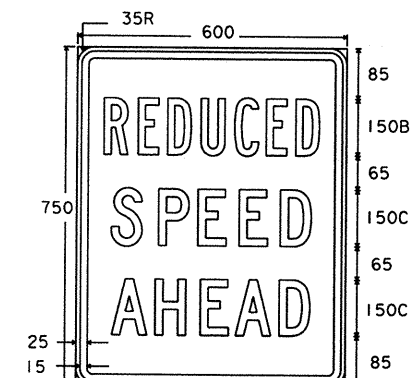
R20-3
1200x1050
Letters - Black
Border - Black
Background - White Refl.



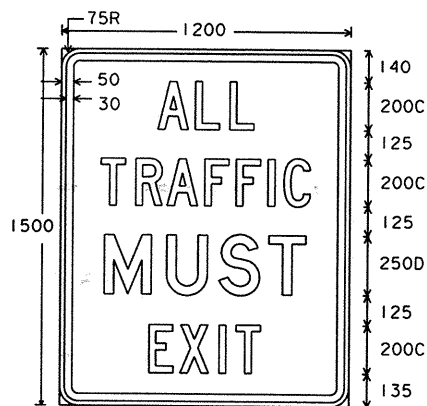
R4-3A
900x750
Letters - Black
Border - Black
Background - White Refl.



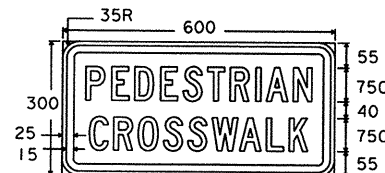
R4-3d
1200x800
Letters - Black
Border - Black
Background - White Refl.



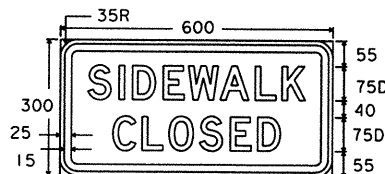
R2-5a
600x750
Letters - Black
Border - Black
Background - White Refl.



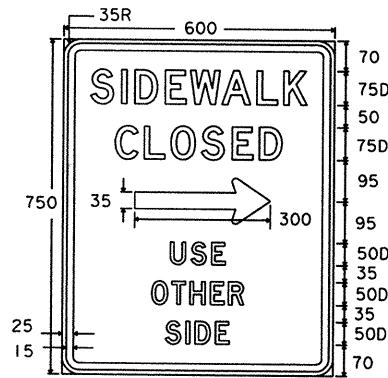
R3-22
1200x1500
Letters - Black
Border - Black
Background - White Refl.



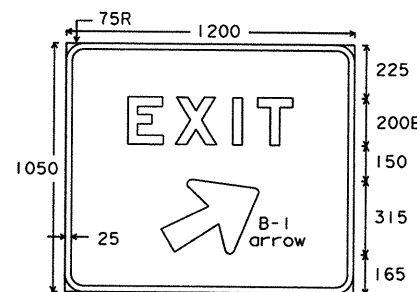
R5-7
600x300
Letters - Black
Border - Black
Background - White Refl.



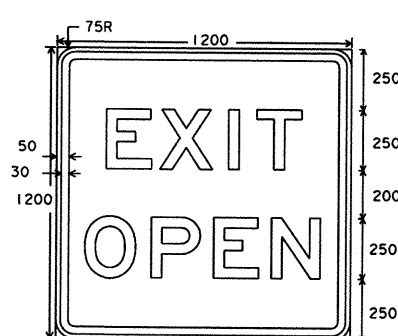
R5-8
600x300
Letters - Black
Border - Black
Background - White Refl.



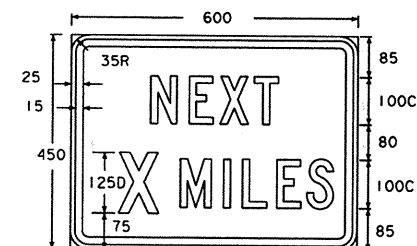
R5-8T
600x750
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.



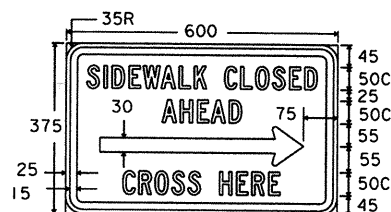
E5-1a
1200x1050
Letters - White Refl.
Numerals - White Refl.
Symbol - White Refl.
Background - Green Refl.



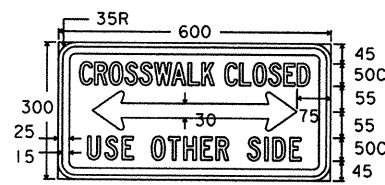
E5-2
1200x1200
Letters - Black
Border - Black
Background - Orange Refl.



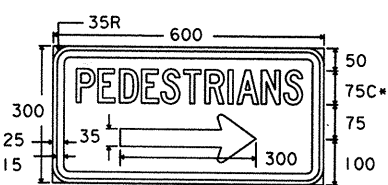
R20-1
600x450
Letters - Black
Border - Black
Background - White Refl.



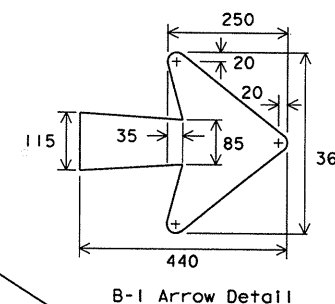
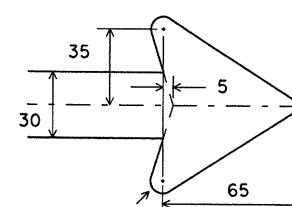
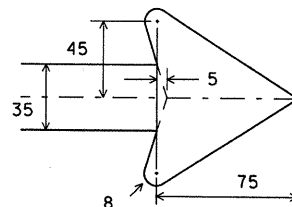
R5-9a
600x375
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.



R5-9
600x300
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.



R5-7T
600x300
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.



B-1 Arrow Detail

All dimensions are in millimeters unless otherwise noted.

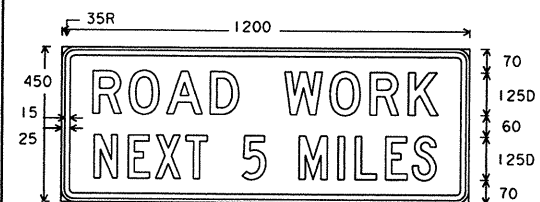


STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

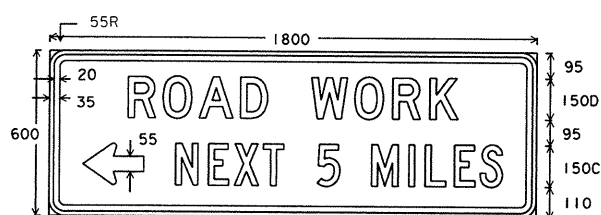
REGULATORY AND GUIDE SIGNS **BC(5)-97(M)**

ORIG. DRAW. DATE:	1996	STATE DISTRICT	MT	FEDERAL REGION	CS	DN	DN	CS	REG. NO.	
1-97		SAT	6	CSR	1739-2-12					
		COUNTY	ATASCOSA	CONTROL	SECTION	JOB				



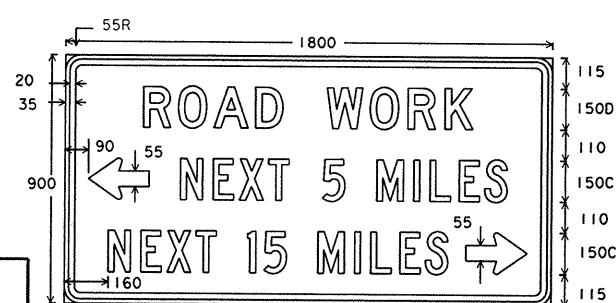
SG20-1
1200x450

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



G20-1bL
1800x600

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.

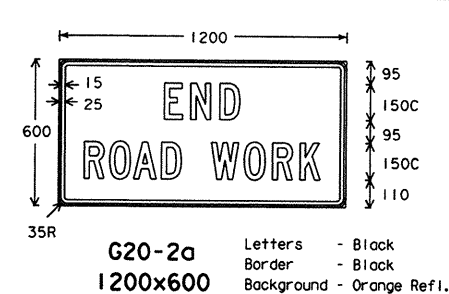


G20-1a
1800x900

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.

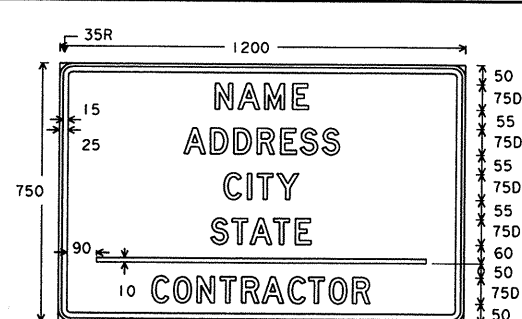
NOTE:

G20-1 Series signs shall show distances rounded to nearest whole mile. Fractions and decimal miles will not be used.



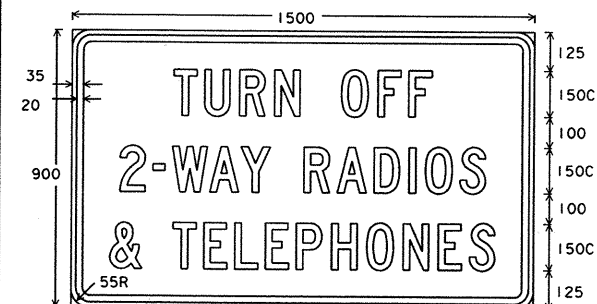
G20-2a
1200x600

Letters - Black
Border - Black
Background - Orange Refl.



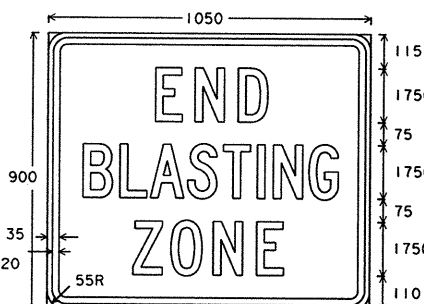
SG20-6
1200x750

Letters - Black
Border - Black
Background - Orange Refl. or White Refl. (optional)



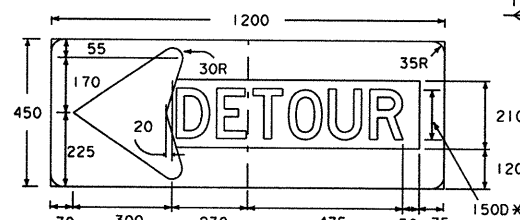
CW22-2a
1500x900

Letters - Black
Number - Black
Border - Black
Background - Orange Refl.



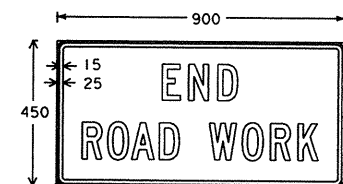
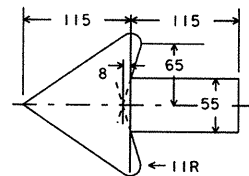
CW22-3
1050x900

Letters - Black
Border - Black
Background - Orange Refl.



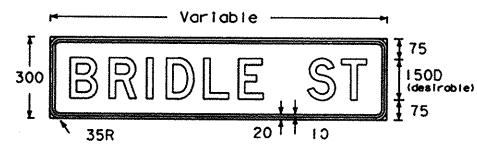
M4-10R
M4-10L
48" X 18"

Letters - Black
Arrow - Orange Refl.
Background - Black



SG20-2a
900x450

Letters - Black
Border - Black
Background - Orange Refl.

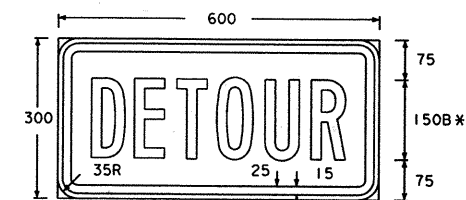


M4-9N
Variable X 300

Letters - Black
Border - Black
Background - Orange Refl.

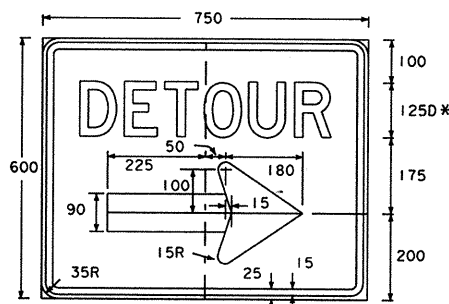
The M4-9R, L or S sign is to be used to detour local streets or roads that are not a State or Federal numbered highway, however, it should not be used in lieu of the M4-10 sign at the beginning of the de-

tour or to detour State or Federal numbered routes. Also, when the M4-9R, L or S sign is used, a sign (M4-9N) with the name of the street being detoured may be mounted above it.



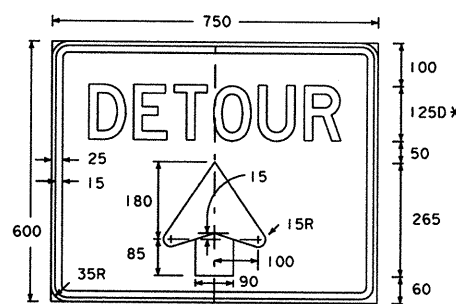
M4-8
600x300

Letters - Black
Border - Black
Background - Orange Refl.



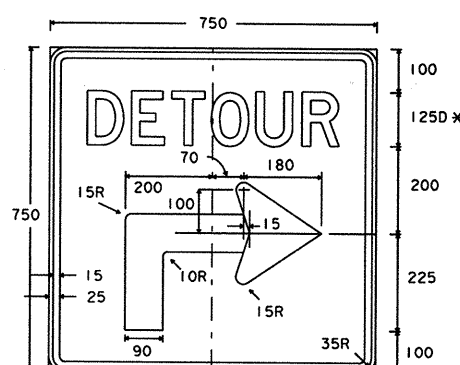
M4-9R
M4-9L
750x600

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.



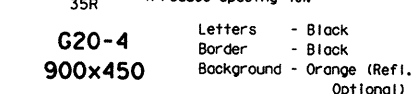
M4-9S
750x600

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.



M4-9AR
M4-9AL
750x750

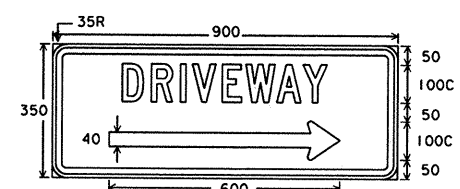
Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.



D70S
1050x350

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

*Alternate first line legend
RESTAURANT D70R
BUSINESS D70B
MOTEL D70M
GAS D70G

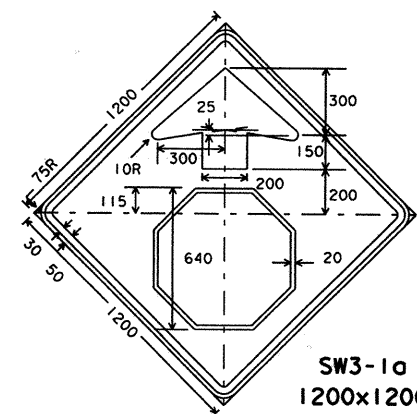


D-70
900x350

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

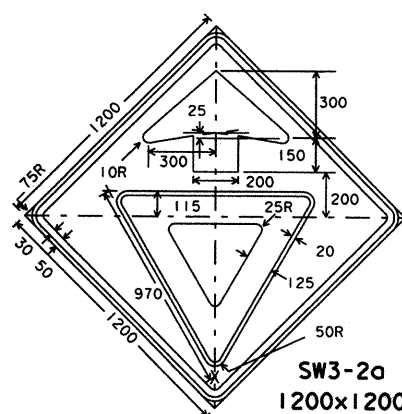
NOTE:

STOP, YIELD, and SIGNAL AHEAD symbol signs should be yellow background. Orange background signs will be considered acceptable until BC-98 becomes effective.



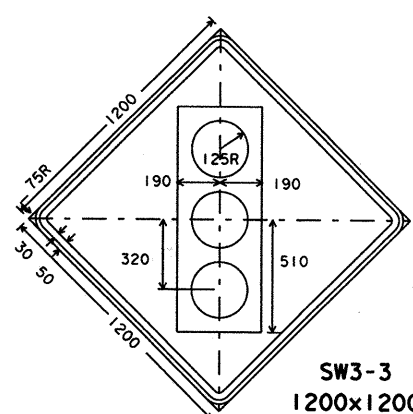
SW3-1a
1200x1200

Border and Arrow - Black
Symbol - White Border on Red Background (Refl)
Background - Yellow Reflective



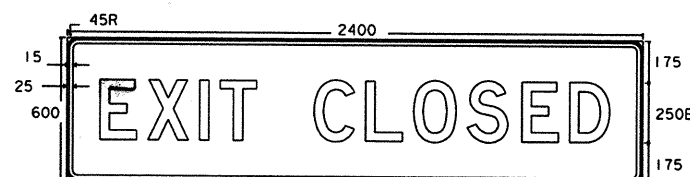
SW3-2a
1200x1200

Border and Arrow - Black
Symbol - Red Border Band on White Background (Refl)
Background - Yellow Reflective



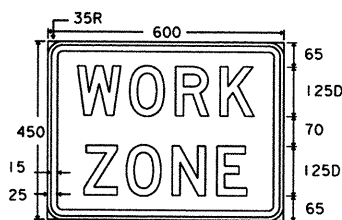
SW3-3
1200x1200

Symbol and Border - Black
Top Circle - Red Reflective
Bottom Circle - Green Reflective
Background - Yellow Reflective



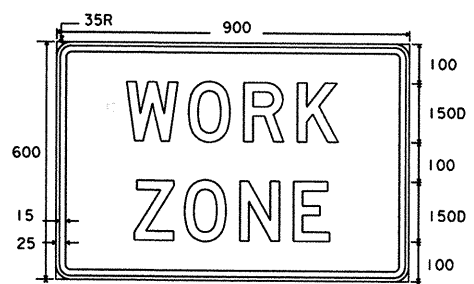
CW26-1T
2400x600

Letters - Black
Border - Black
Background - Orange Refl.



G20-9
600x450

Letters - Black
Border - Black
Background - Orange Refl.



EG20-9
900x600

Letters - Black
Border - Black
Background - Orange Refl.

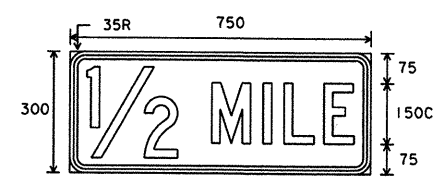
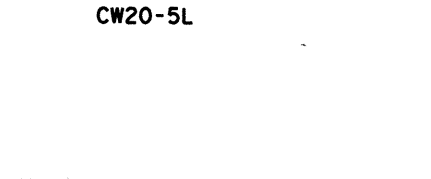
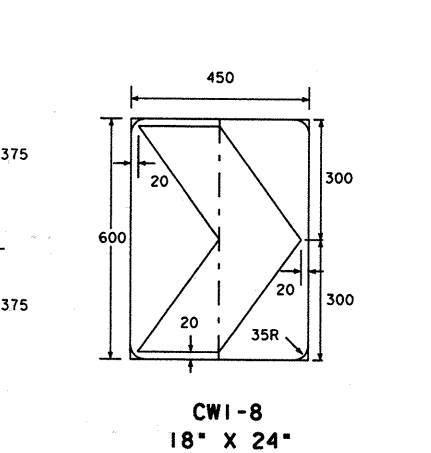
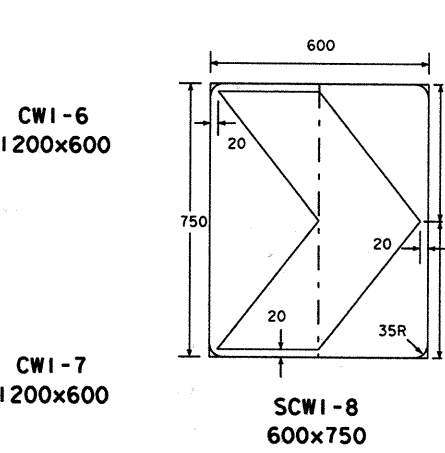
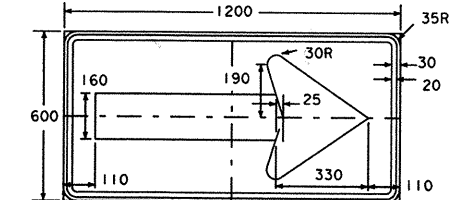
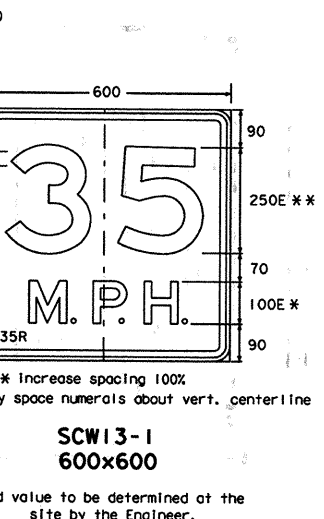
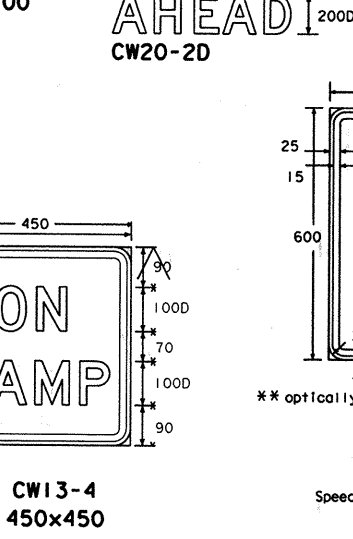
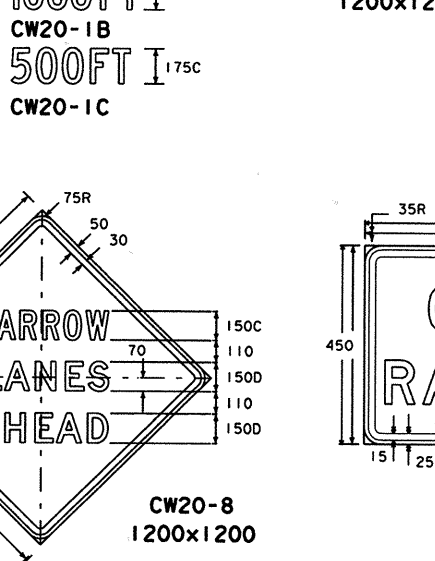
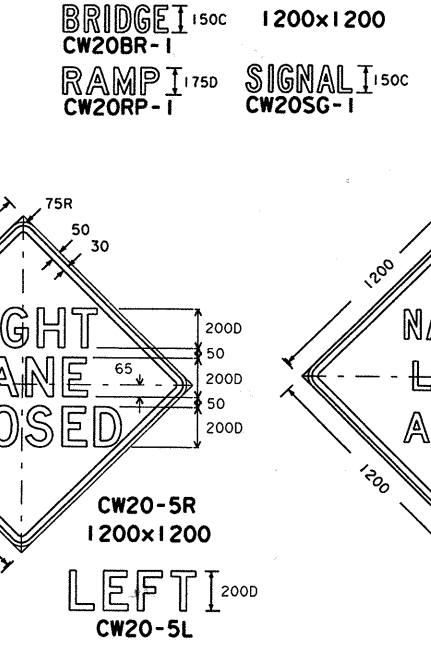
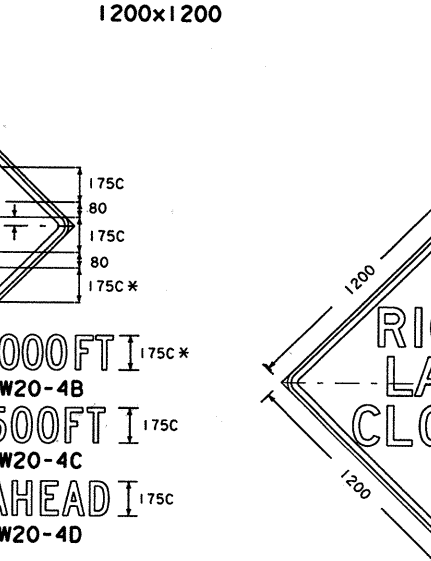
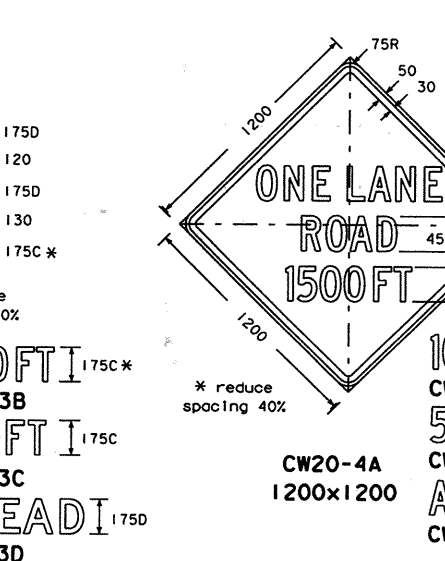
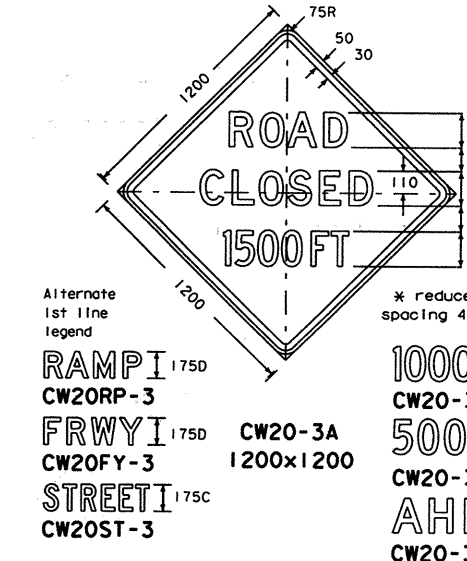
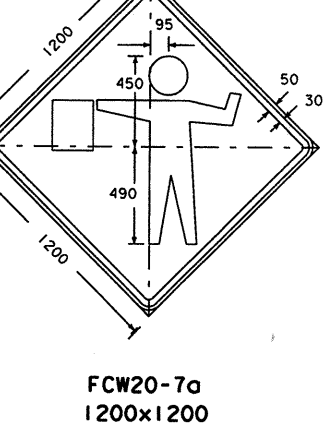
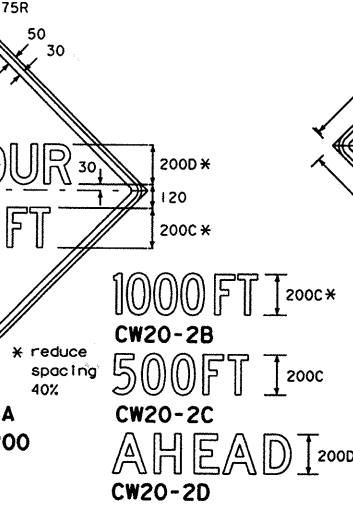
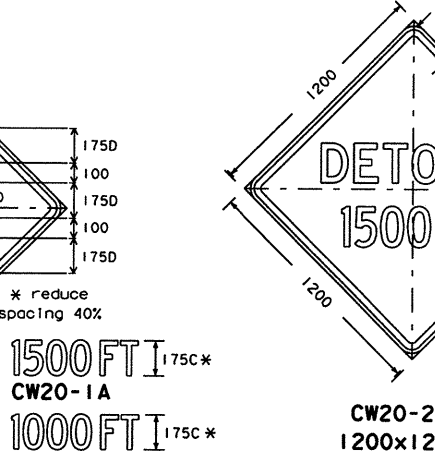
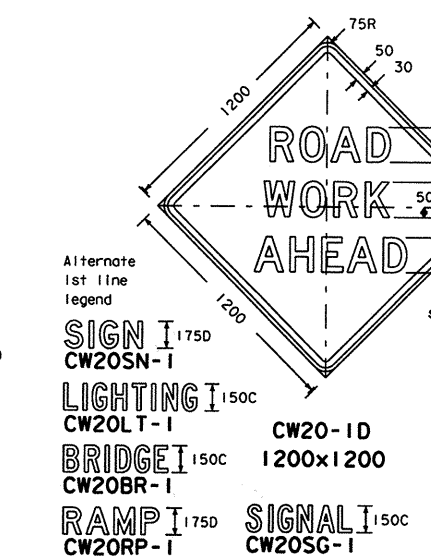
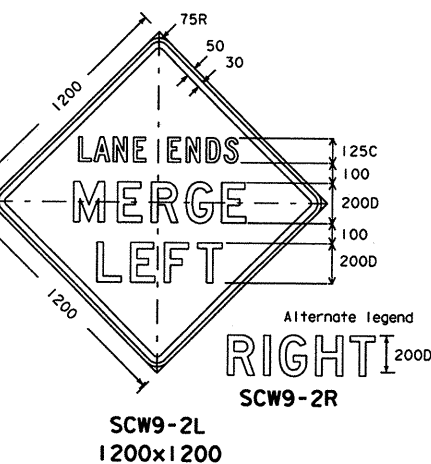
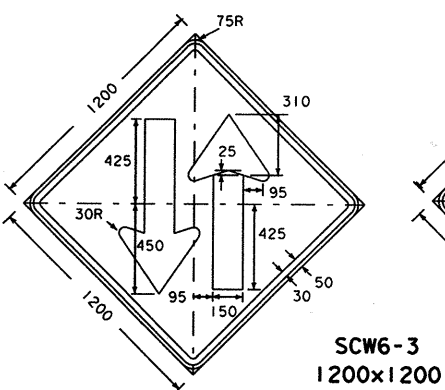
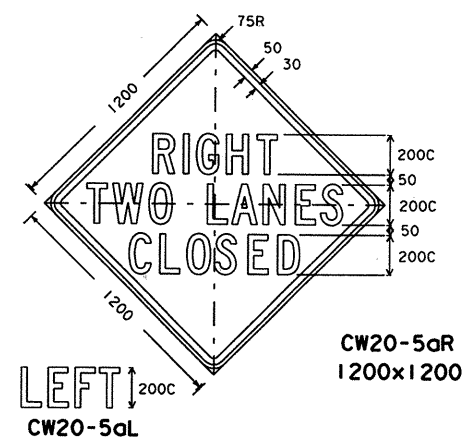
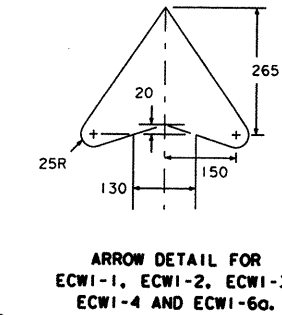
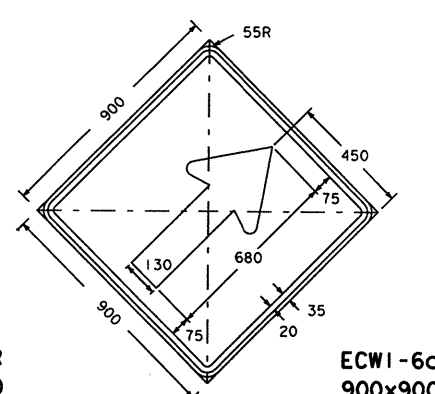
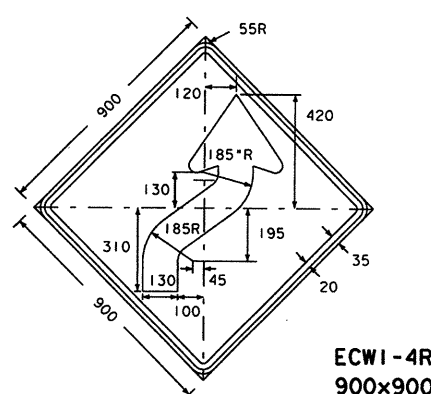
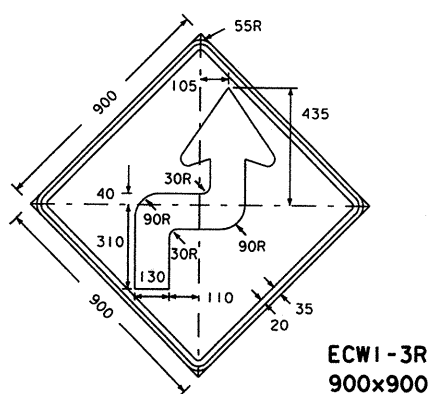
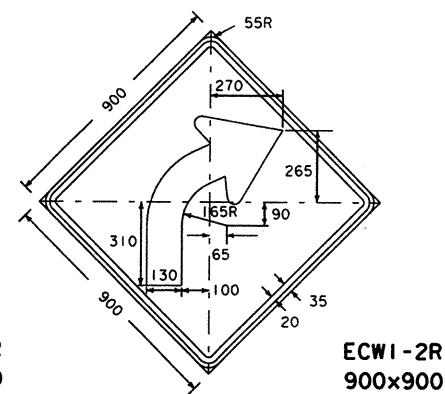
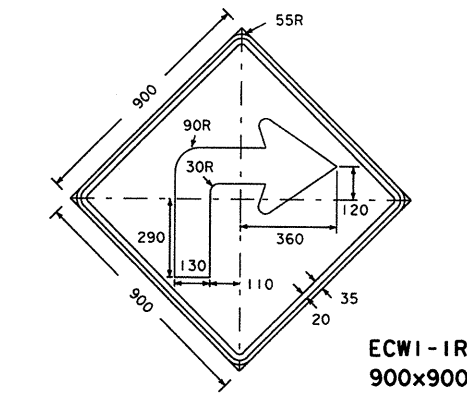
All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION
STANDARDS

CONTRACTOR INFORMATION, DETOURS & WARNING SIGNS BC (6) - 97 (M)

ORIG. DRAW. DATE:	1996	DN: MT	CK: *	DN: DN	CK: MT	NEG. NO. *
1-97	REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT	SHEET		
	SAT	6	CSR 1739-2-12	41		
	COUNTY	CONTROL SECTION	JOB	HIGHWAY		
	ATASCOSA	1739	02	012		



GENERAL NOTES:
All signs detailed on this sheet shall have Black border, legend and/or symbol on an orange Type C reflective background.

1 MILE 150C 1000 FT 150C
1500 FT 150C 500 FT 150C

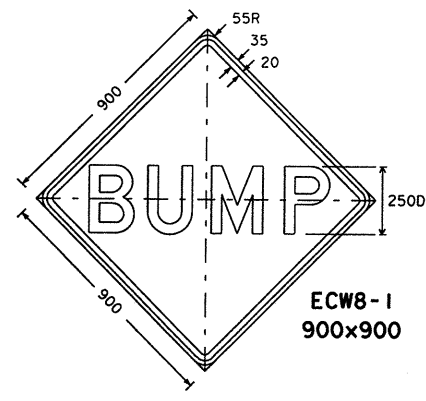
All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

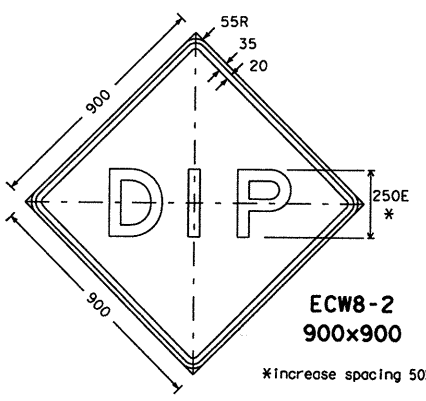
BARRICADE AND CONSTRUCTION STANDARDS

CONSTRUCTION WARNING SIGNS BC(7)-97(M)

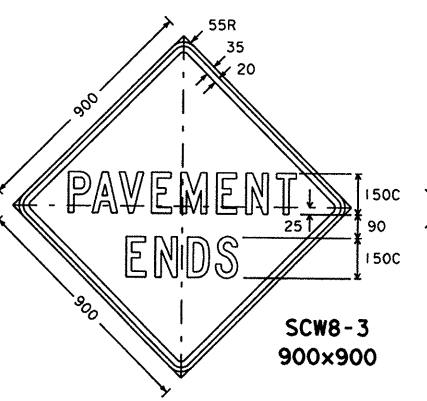
ORIG. DATE: APRIL 1988	REVISED:	STATE DISTRICT: SAT	FEDERAL REGION: 6	FEDERAL AID PROJECT: CSR 1739-2-12	SHEET: 42
7-89	4-92	2-94	1-97	COUNTY: ATASCOSA	CONTROL SECTION: 1739 02
				JOB: 012	HIGHWAY: FM 791



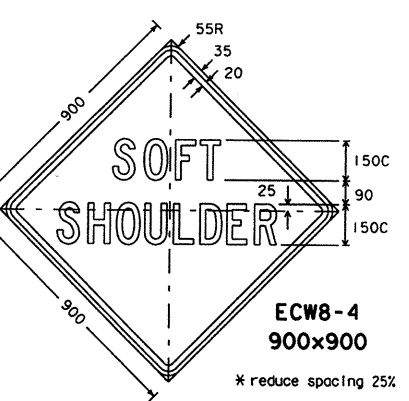
ECW8-1
900x900



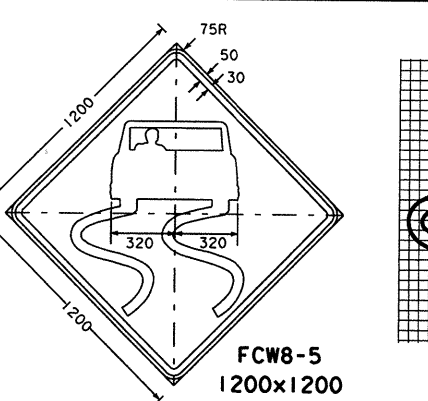
ECW8-2
900x900
*increase spacing 50%



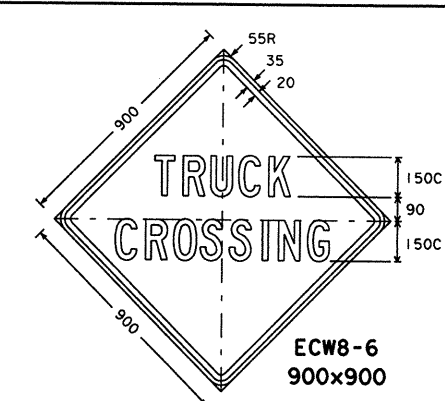
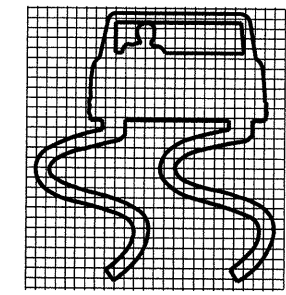
SCW8-3
900x900



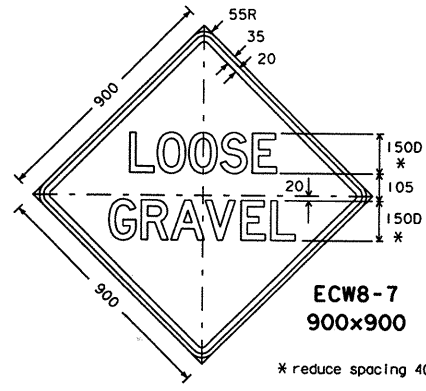
ECW8-4
900x900
*reduce spacing 25%



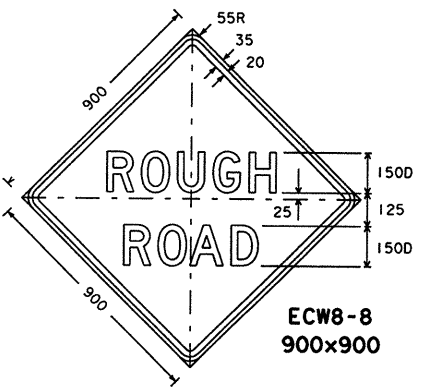
FCW8-5
1200x1200



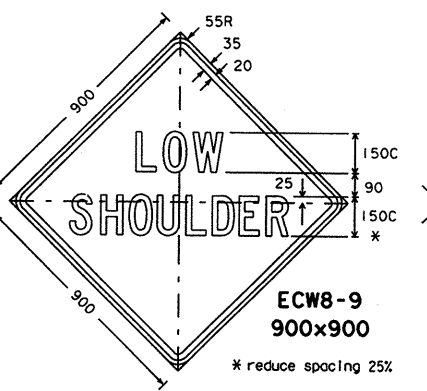
ECW8-6
900x900



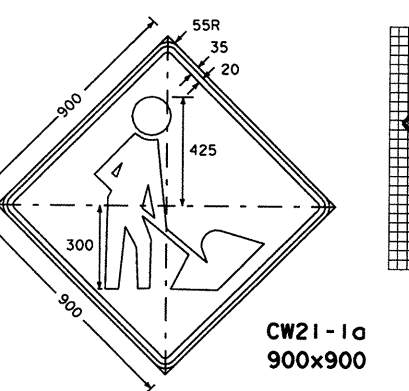
ECW8-7
900x900
*reduce spacing 40%



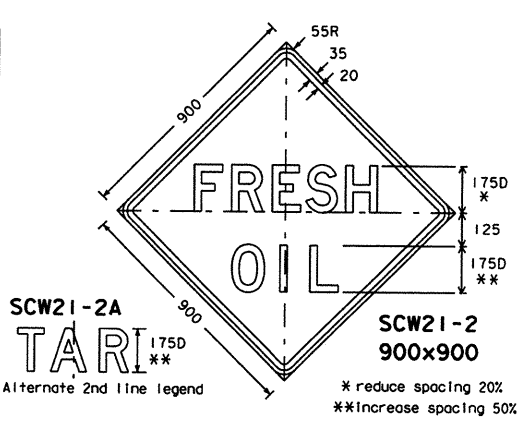
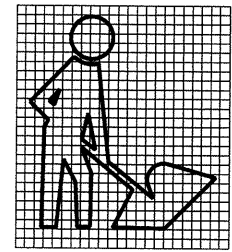
ECW8-8
900x900



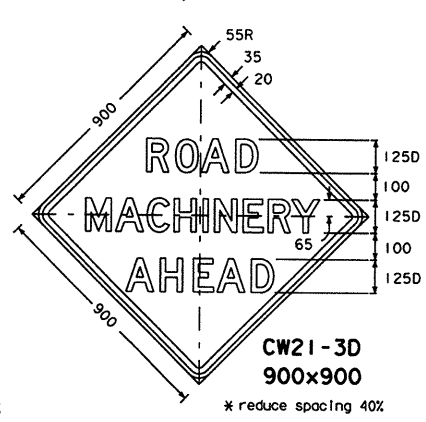
ECW8-9
900x900
*reduce spacing 25%



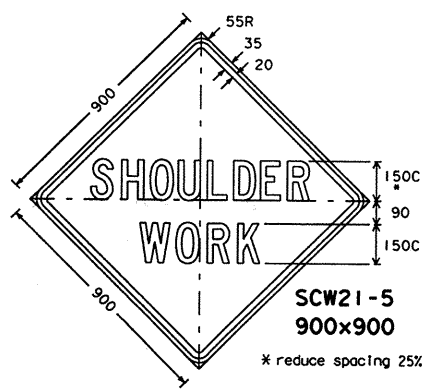
CW21-1a
900x900



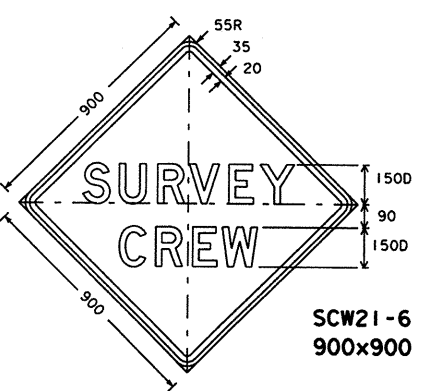
SCW21-2
900x900
*reduce spacing 20%
**increase spacing 50%



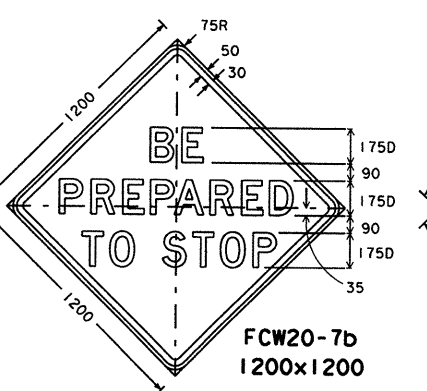
CW21-3D
900x900
*reduce spacing 40%



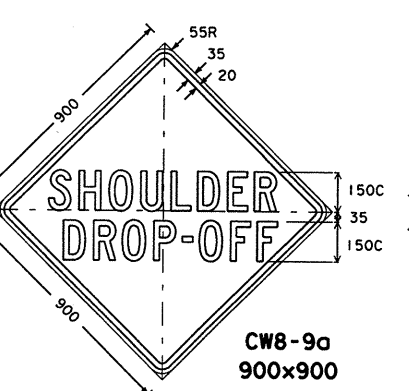
SCW21-5
900x900
*reduce spacing 25%



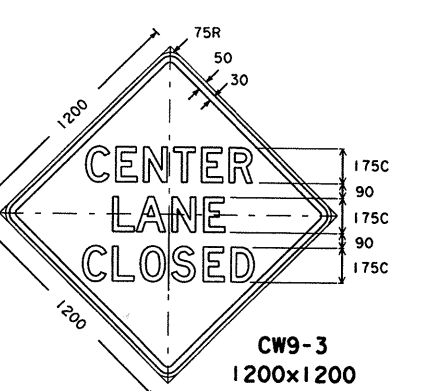
SCW21-6
900x900



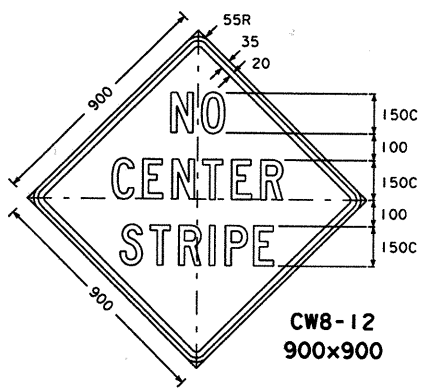
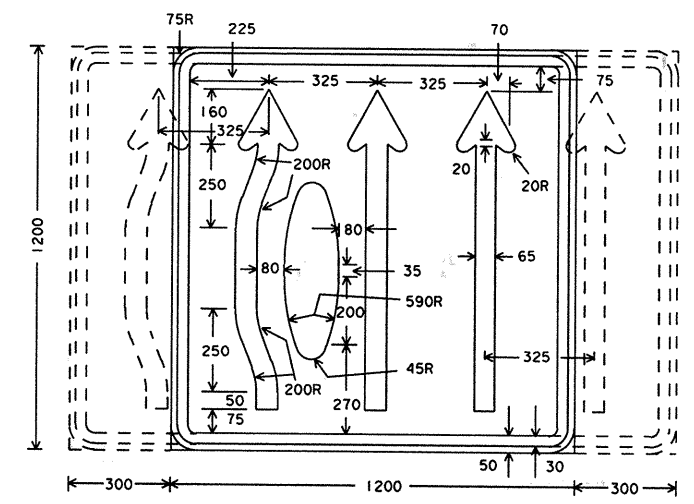
FCW20-7b
1200x1200



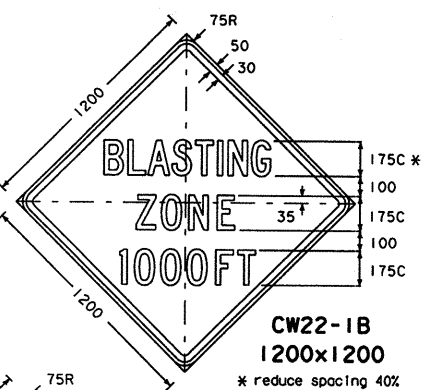
CW8-9a
900x900



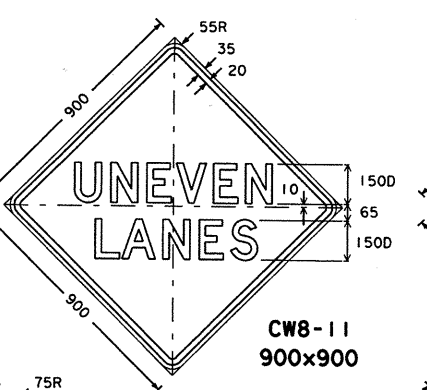
CW9-3
1200x1200



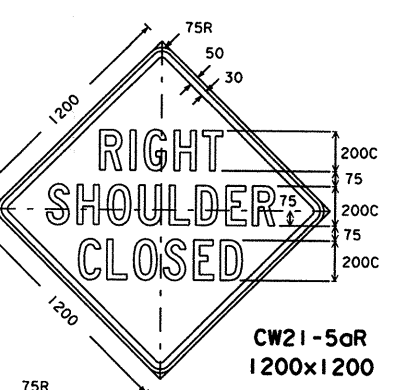
CW8-12
900x900



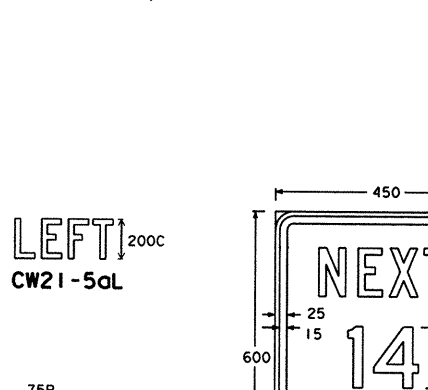
CW22-1B
1200x1200
*reduce spacing 40%



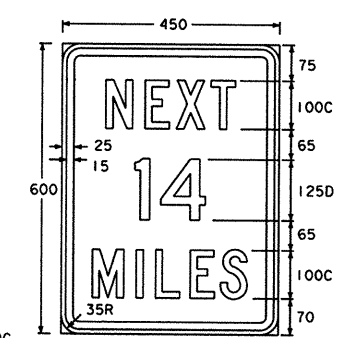
CW8-11
900x900



CW21-5aR
1200x1200



LEFT
CW21-5aL

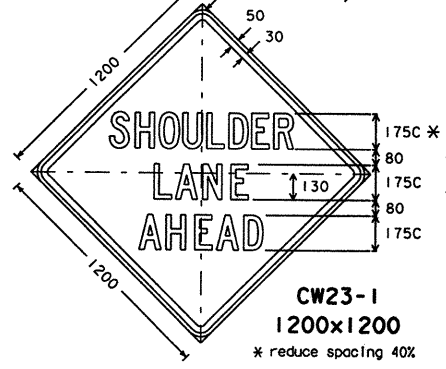


CW21-16
450x600

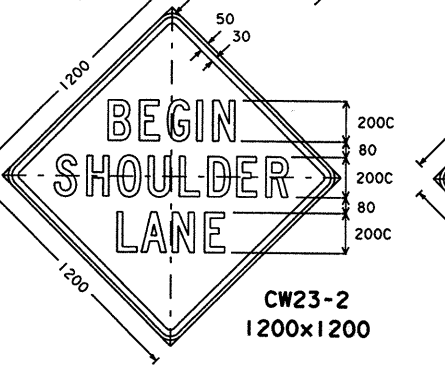
CW24-2
Var. X 1200
A mirror image may be used to show proper lane alignment.

All dimensions are in millimeters unless otherwise noted.

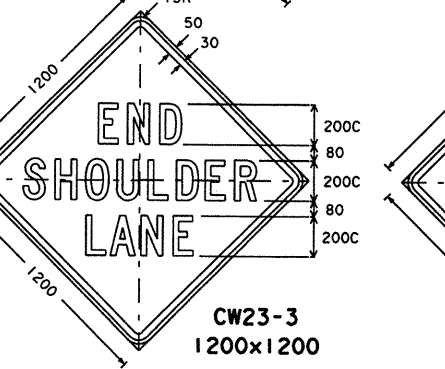
GENERAL NOTES:
All signs detailed on this sheet shall have black border, legend and/or symbol on an orange Type C reflective background.



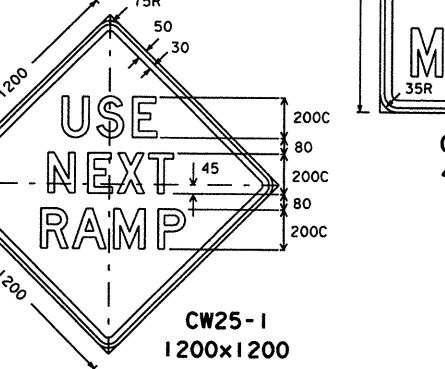
CW23-1
1200x1200
*reduce spacing 40%



CW23-2
1200x1200



CW23-3
1200x1200



CW25-1
1200x1200

STANDARD PLANS TEXAS DEPARTMENT OF TRANSPORTATION Traffic Operations Division							
BARRICADE AND CONSTRUCTION STANDARDS							
CONSTRUCTION WARNING SIGNS BC (8) - 97 (M)							
ORIG. DRAW DATE:	APRIL 1988	DN:	CK:	CW	DN:	CK:	MT
7-89		STATE DISTRICT		FEDERAL AID PROJECT		SHEET	
4-92		SAT		6		CSR 1739-2-12	
2-94		COUNTY		CONTROL SECTION		JOB	
1-97		ATASCOSA		1739 02		012 FM 791	

WORK ZONE PAVEMENT MARKINGS

GENERAL

The Contractor shall be responsible for maintaining work zone and existing pavement markings on all roadways open to traffic within the project limits unless otherwise stated in the plans. Color, patterns, and dimensions shall be in conformance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional supplemental pavement marking details may be found in the plans or specifications.

Work zone pavement markings shall consist of guidemarks, short term markings and/or standard pavement markings. Unless otherwise shown in the plans, materials used for work zone pavement markings shall be paint and beads, thermoplastic, raised pavement markers, prefabricated pavement marking material, temporary flexible-reflective roadway marker tabs or other materials approved by the Engineer. Paint and beads shall not be used for removable markings.

All roadways to be opened to traffic shall be marked with short term markings or standard markings as shown in the plans, at the end of each day's operation. Unless otherwise shown in the plans or approved in writing by the Engineer, all concrete surfaces shall have standard markings in place prior to opening to traffic.

Standard pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard WZ(STPM) (M).

All asphaltic surfaces which are to be opened to traffic shall be marked with guidemarks immediately following placement and final rolling of any course. Guidemarks shall consist of a single temporary flexible-reflective roadway marker tab or a single temporary construction raised pavement marker at 12 meter spacing.

Guidemarks shall be placed in proper alignment with the final location of future pavement markings. Any guidemarks not in alignment with pavement markings shall be removed by the Contractor at the Contractor's expense. Guidemarks shall not be used to simulate edgelines.

When inclement weather prohibits the application of short term markings or standard markings as called for on the plans, upon approval of the Engineer, guidemarks may be considered as temporary short term markings for asphaltic surfaces. The placement of pavement markings as shown on the plans may be delayed until such time that weather permits application of pavement markings.

When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of the sections where passing is permitted.

RAISED PAVEMENT MARKERS

Raised pavement markers are to be placed according to the patterns on BC(10) (M). Raised pavement markers used as standard pavement markings or to supplement removable markings shall meet the requirements of Item "RAISED PAVEMENT MARKERS".

Unless otherwise shown on the plans, raised pavement markers will not be allowed for words, symbols, and shapes, diagonal or transverse lines.

PREFABRICATED PAVEMENT MARKINGS

Removable prefabricated pavement markings shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Department Materials Specification D-9-8241.

Non-removable prefabricated pavement markings (foil back) shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Specification TxDOT 550-74-01.

The lists of approved prefabricated work zone pavement marking materials may be obtained from TxDOT General Services Division.

MAINTENANCE

The Contractor will be responsible for maintaining work zone pavement markings within the project limits. Work Zone Pavement Markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections. The markings should provide a visible reference for a minimum distance of 90 meters during normal daylight hours and 50 meters when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics. Markings failing to meet this criteria shall be replaced as required by the Engineer.

REMOVAL OF PAVEMENT MARKINGS

Removal of pavement markings includes centerline, channelizing lines, lane lines, edge lines, words, arrows, symbols and raised pavement markers.

Pavement markings that are no longer applicable and which may create confusion or direct a motorist toward or into the closed portion of the roadway, shall be removed or obliterated before the roadway is open to traffic. The above shall not apply to detours of a short duration of a few hours, where flagmen and/or sufficient channelizing devices are used in lieu of markings to outline the detour route and the detour is not to be maintained during nighttime.

Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernible marking, by any method that does not materially damage the surface or texture of the pavement. The removal of pavement markings may require resurfacing or seal coating portions of the roadway, normally full lane widths. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used. Blast cleaning may be used but will not be required unless specifically shown in the plans. Over-painting of the markings SHALL NOT BE permitted. Removal of raised pavement markers shall be as directed by the Engineer.

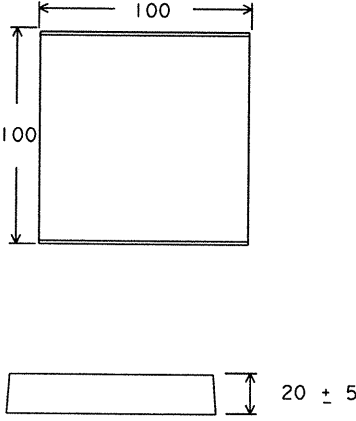
Removal of existing pavement markings and markers will be paid for directly in accordance with the Item "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS" unless otherwise stated elsewhere in the plans.

SPECIFICATION REFERENCE TABLE		
MATERIALS AND TESTS DIVISION SPECIFICATIONS		
JIGGLE BAR TILE		D-9-4100
PAVEMENT MARKERS (REFLECTORIZED)		D-9-4200
TRAFFIC BUTTONS		D-9-4300
EPOXY		D-9-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS		D-9-6130
PREFABRICATED PAVEMENT MARKINGS - REMOVABLE		D-9-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS		D-9-8242

PREQUALIFICATION PROCEDURES MAY BE OBTAINED BY WRITING:

GENERAL SERVICES DIVISION
TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)
125 EAST 11th STREET
AUSTIN, TX 78701-2483

Temporary Construction
Raised Pavement Markers
used as Guidemarks:



The above temporary construction raised pavement marker is shown for illustration purposes only and not intended to specify any particular product.

Temporary construction raised pavement markers used as guidemarks shall be of design and manufacture approved by the Engineer.

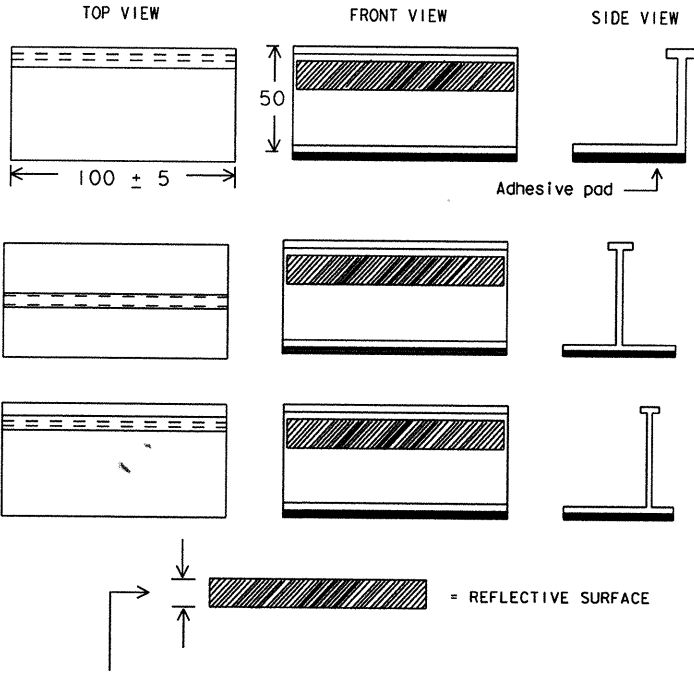
All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.

Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 5 millimeters, unless otherwise noted.

Temporary Flexible-Reflective
Roadway Marker Tabs



Height of sheeting will be determined by notes under MAINTENANCE. (Usually more than 5 millimeters and less than 25 millimeters.)

STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKERS TABS TO THE PAVEMENT SURFACE

Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of Departmental Material Specification D-9-8242.

Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.

- A) Select five (5) or more tabs at random from each lot or shipment and submit to the Materials and Tests Division to determine specification compliance.
- B) Select five (5) tabs and submit to the following test. Affix five (5) tabs at 600 mm intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.

All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

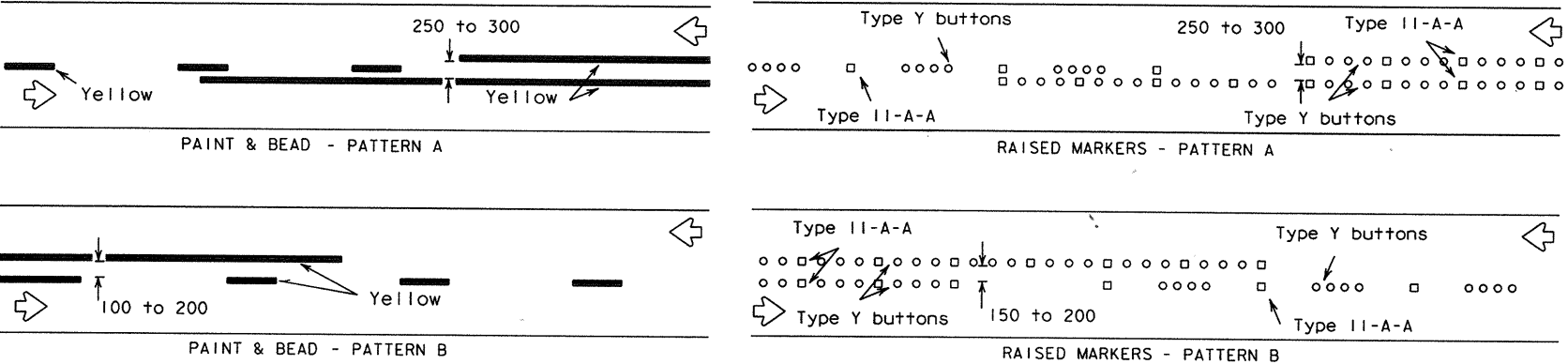
BARRICADE AND CONSTRUCTION
STANDARDS

PAVEMENT MARKINGS BC (9) - 97 (M)

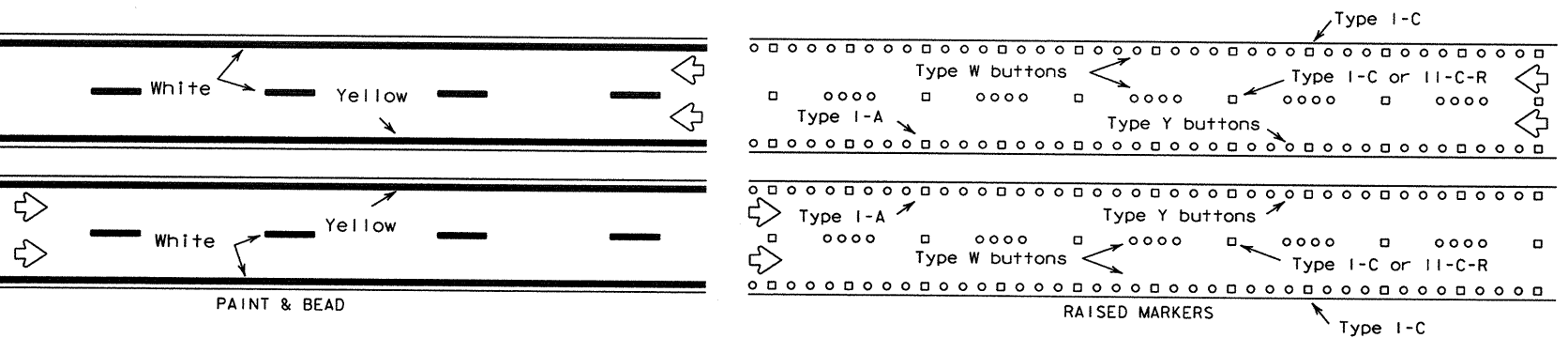
ORIG. DRAW DATE:	APRIL 1992	DN:	CK:	CW:	DN:	DN:	CK:	MT:	REC. NO.:
2-94									
1-97									
REVISIONS		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET			
		SAT	6	CSR 1739-2-12		44			
		COUNTY	CONTROL	SECTION	JOB	HIGHWAY			
		ATASCOSA	1739	02	012	FM 791			

PAVEMENT MARKING PATTERNS

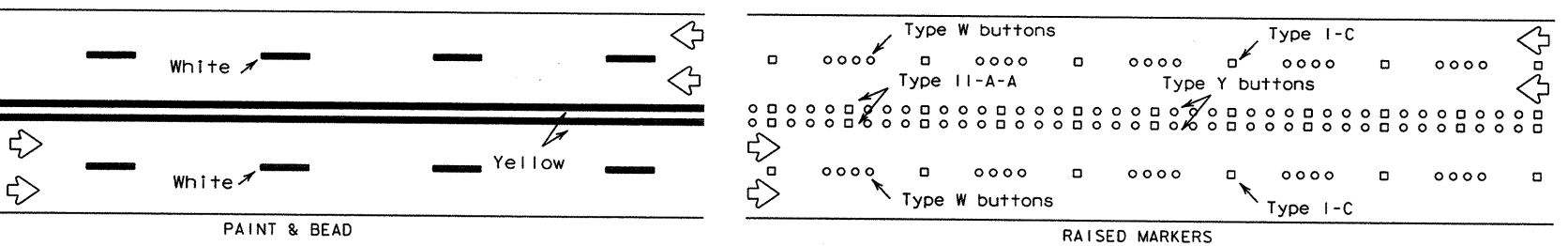
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



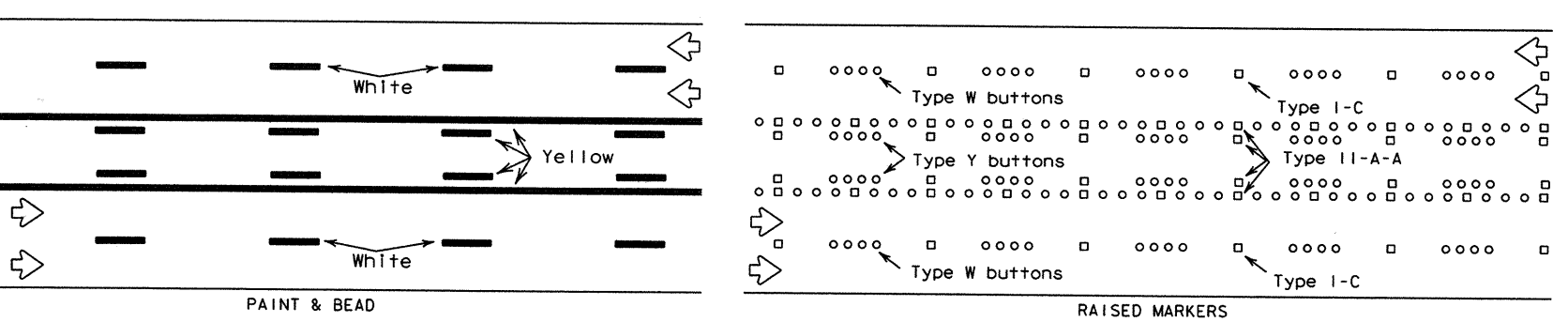
EDGE & LANE LINES FOR DIVIDED HIGHWAY



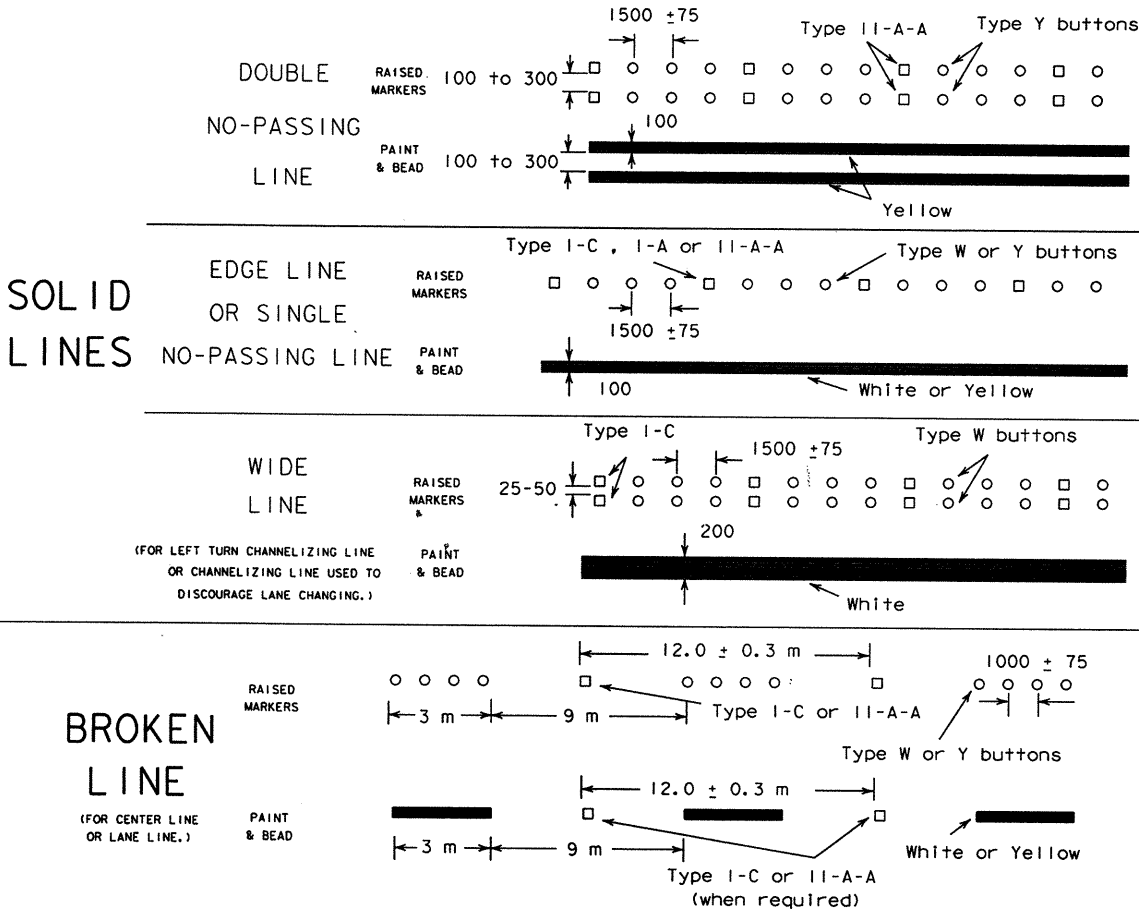
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE

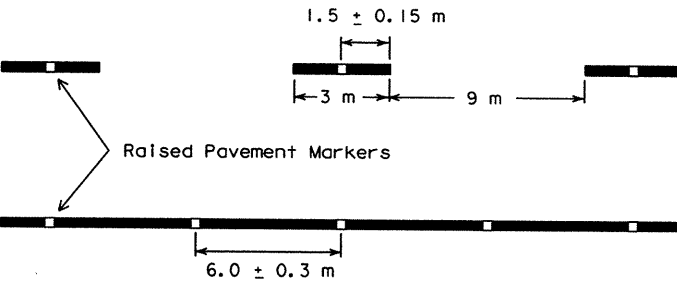


STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines and at approximately 6 meters spacing for solid lines. This allows an easier removal of raised markers and tape.



NOTES:
Pattern A is the Department Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for paint and beads.

Raised pavement markers used as standard pavement markings shall meet the requirements of items "RAISED PAVEMENT MARKERS" and "EPOXY."

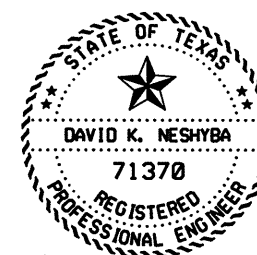
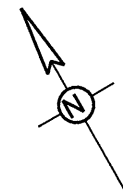
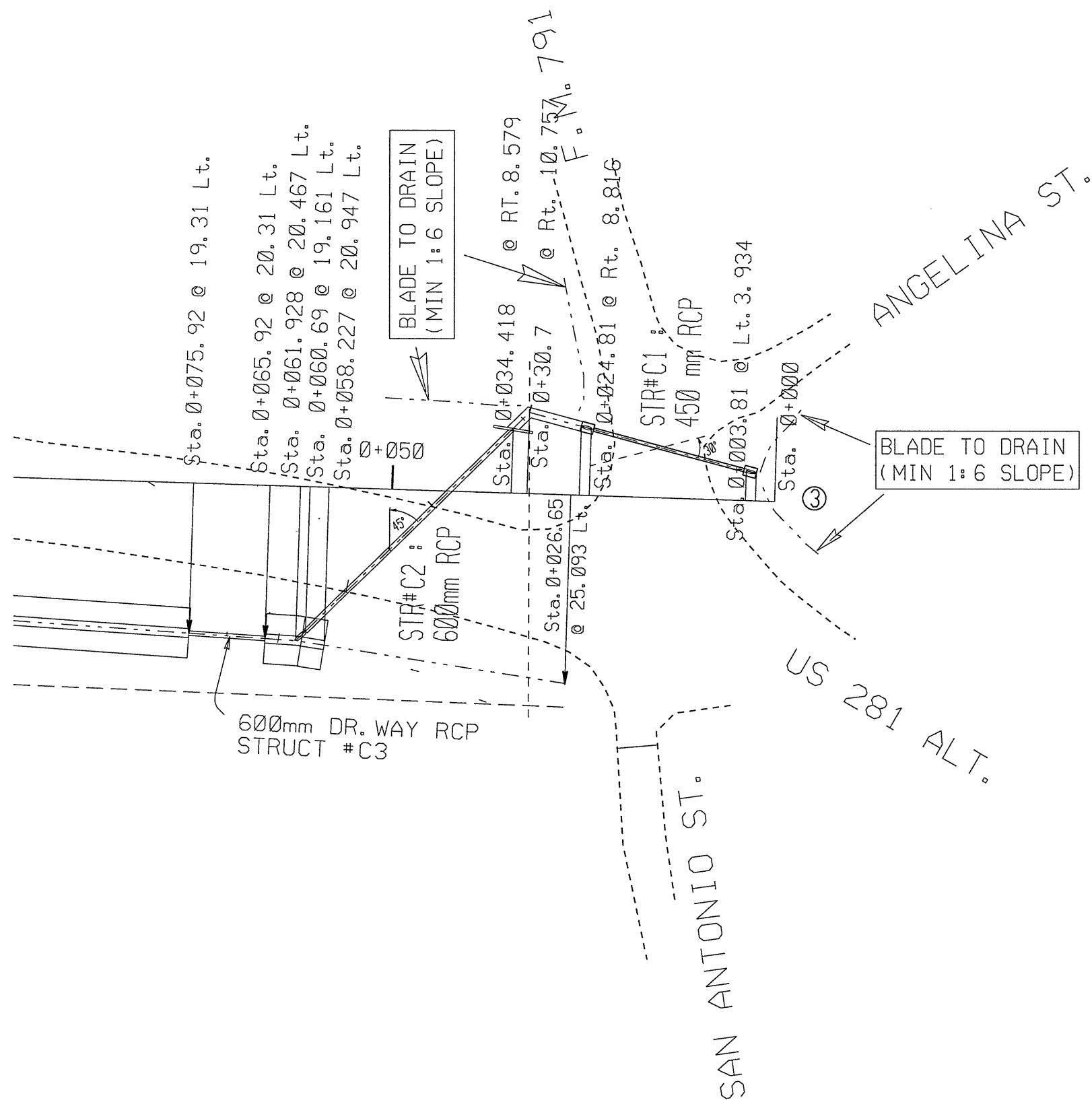
All dimensions are in millimeters unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

PAVEMENT MARKINGS BC(10)-97(M)

ORIG. DRAW. DATE: APRIL 1992	REV. NO. 1	STATE DISTRICT: SAT	FEDERAL REGION: 6	FEDERAL AID PROJECT: CSR 1739-2-12	SHEET: 45
COUNTY: ATASCOSA		CONTROL: 1739	SECTION: 02	JOB: 012	HIGHWAY: FM 791



[Signature]
David K. Neshyba P.E.

3/10/99
Date

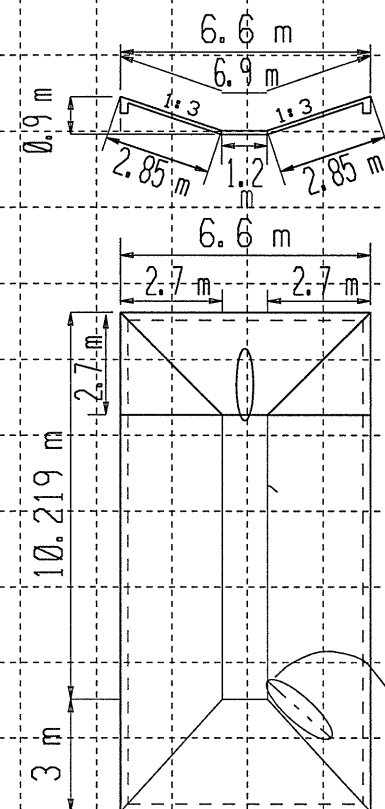
CHANGE ORDER NO. 2
DRAINAGE IMPROVEMENT
PLAN PROFILE



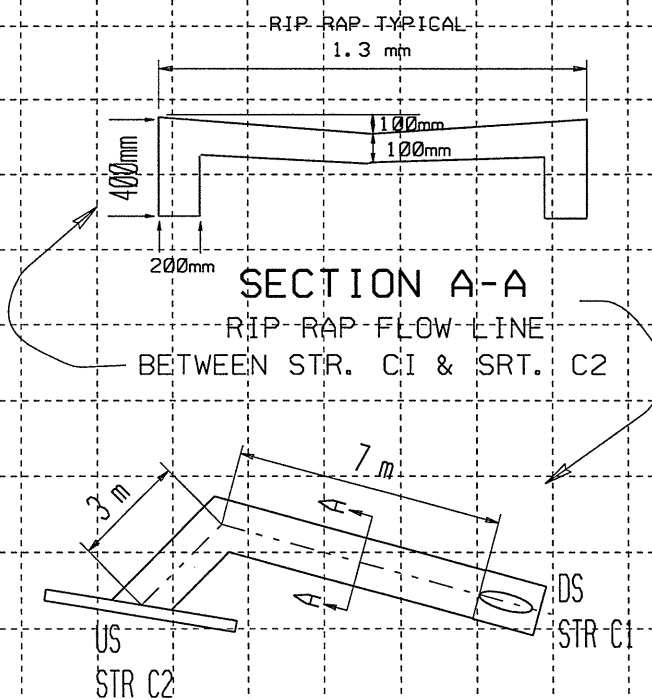
Texas Department
of Transportation

NOTE: SEE SHEET NO. 46
FOR MORE DETAIL

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		46 A
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	F.M. 140

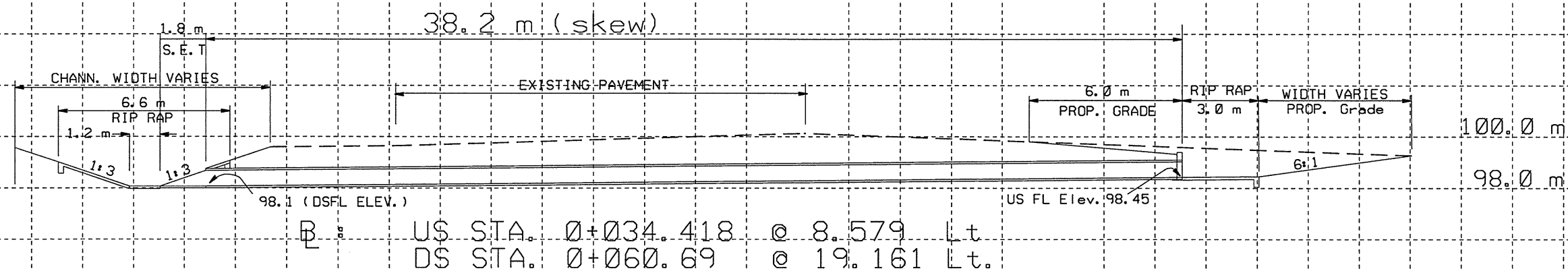


TOP & FRONT VIEW
FOR RIP RAP
@ DS OF STR C2



SECTION A-A

RIP RAP FLOW LINE
BETWEEN STR. C1 & STR. C2



US STA. 0+034.418 @ 8.579 Lt.
DS STA. 0+060.69 @ 19.161 Lt.

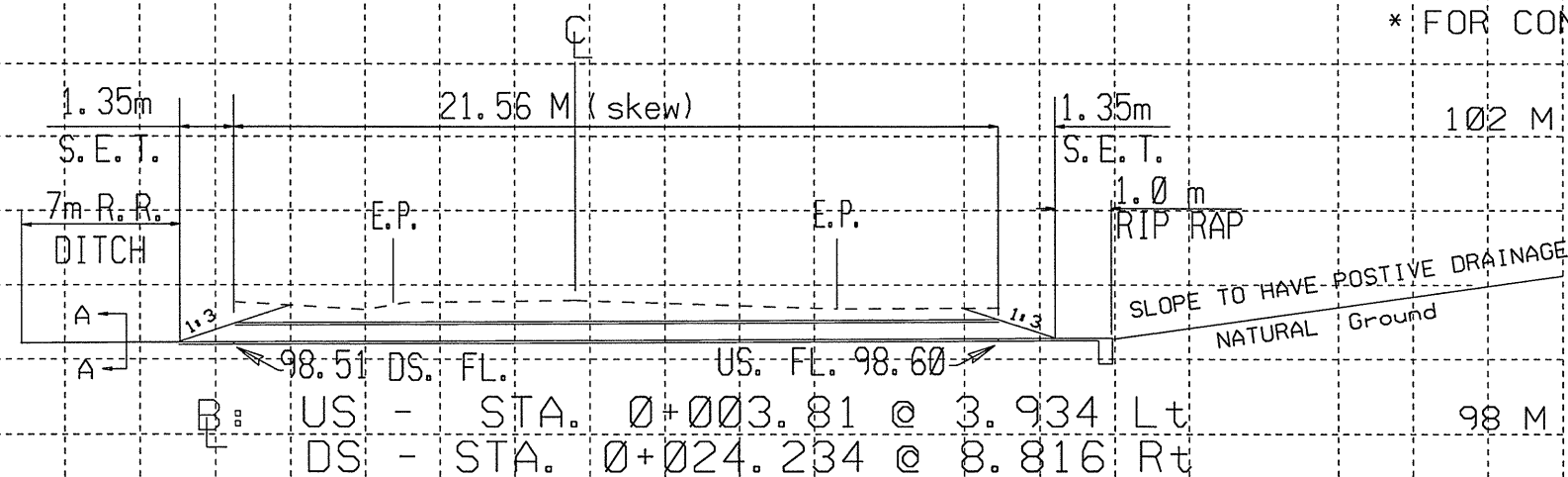
STRUCTURE No. C2

PROPOSED 600 mm x 38.2 m RC PIPE (CL III) (45° LFS)
WITH ; SET (TY II) (600 mm) (RCP) (1:3) @ DS END
AND (CH-PW-45°) (600mm) @ US END

ESTIMATED QUANTITIES

ITEM	UNIT	QUANT
RIPRAP (CONC) (CL. B)	m ²	18.0
RC PIPE (CL. III) (600 mm)	m	38.2
RC PIPE (CL. III) (450 mm)	m	21.56
SET (TY II) (600mm) (RCP) (1:3)	ea	3.0
SET (TY II) (450mm) (RCP) (1:3)	ea	2.0
* (RIP RAP : B/W STRS: C1&C2)	m ²	2.0
* (RIP RAP : @ DS OF STR C2)	m ²	10.8
* (RIP RAP : MISC. AS NEEDED)	m ²	5.2

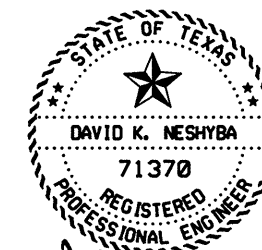
* FOR CONTRACTOR'S INFO ONLY



US - STA. 0+003.81 @ 3.934 Lt.
DS - STA. 0+024.234 @ 8.816 Rt

STRUCTURE No. C1

PROPOSED 450mm X 21.56m RC PIPE (CL III) (30° LFS)
WITH S.E.T. (TY II) (450mm) (RCP) (1:3) @ US and DS

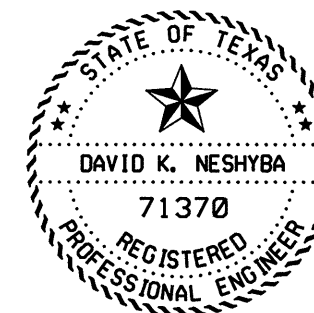
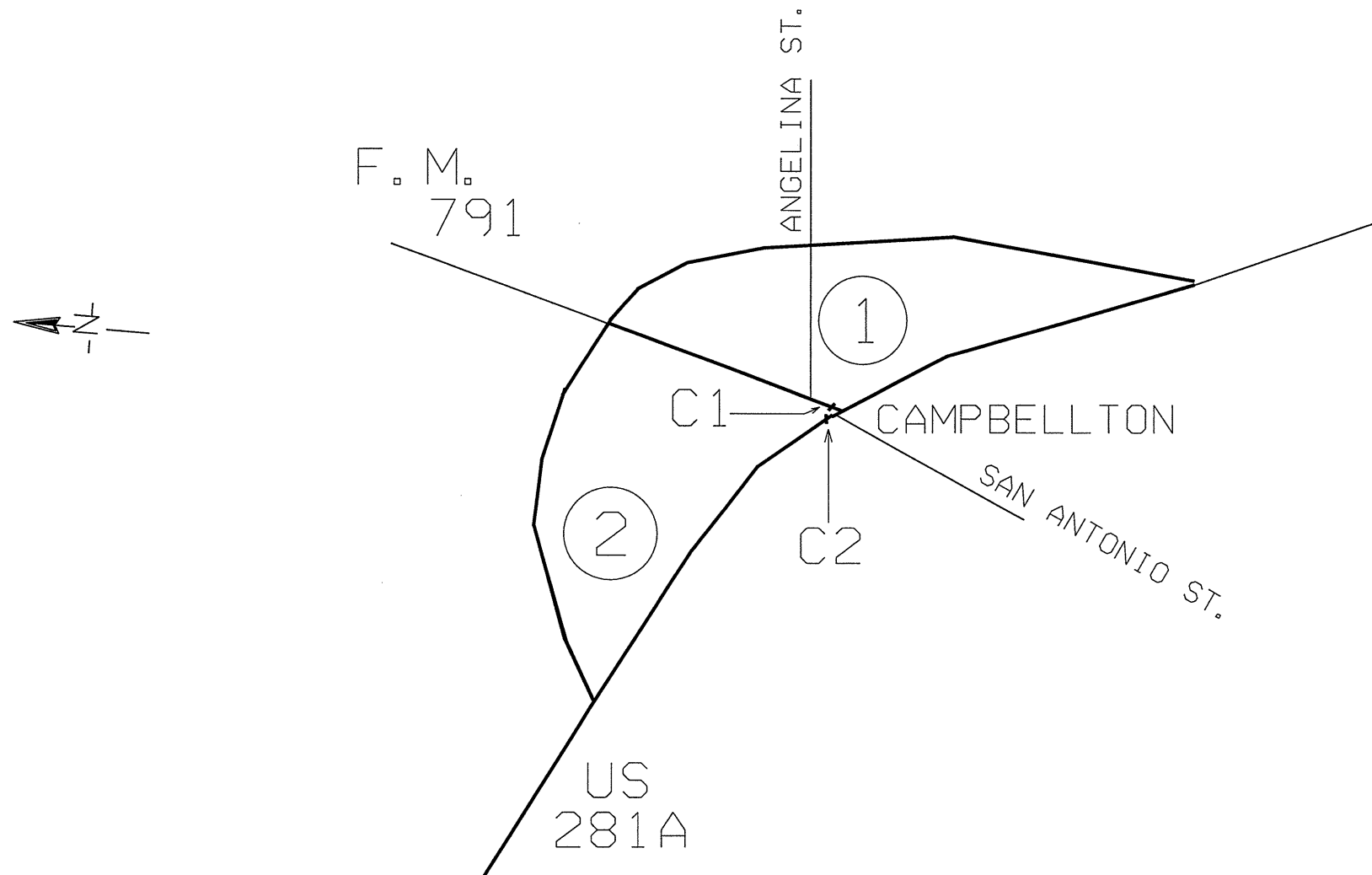


David K. Neshyba, P.E. 3/10/99
Date

CHANGE ORDER NO. 2 CULVERT LAYOUT

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6	CSR 1739-2-12	47
STATE	DIST.	COUNTY
TEXAS	SAT	ATASCOSA
CONT.	SECT.	JOB
1739	02	012
		HIGHWAY NO.
		F.M. 791




3/18/99
 David K. Neshyba, P.E. Date

CROSS DRAINAGE AREA DATA												
STATION LOCATE	STRUCT NO.	D. A. NO.	AREA ACRES	LENGTH FT.	VELOC. M/Sec	TIME MIN.	"C" Factor	I ₂₅	Q ₂₅ cfs	Q ₂₅ m ³ /s	Q ₁₀₀ cfs	Q ₁₀₀ m ³ /s
FM 791	C1	A1	7	1000	0.6	27	.15	5.7	5.99	0.169	7.387	0.208
US 281A	C2	A2	14	607	0.6	16.9	.15	7.35	15.435	0.437	18.9	0.535

C1 - D.A. - A1 GATHERING TO CROSS FM 791 STRUCTURE.

C2 - D.A. - A1 & A2 COMBINED TO CROSS US 281A.

NOT TO SCALE:

CHANGE ORDER NO. 2

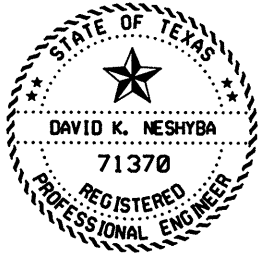
F.M. 791
AND U. S. 281
DRAINAGE AREA MAP

© 1998  Texas Department of Transportation

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	CSR 1739-2-12		48
STATE	STATE DIST. NO.	COUNTY	
TEXAS	15	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	002	012	F.M. 791

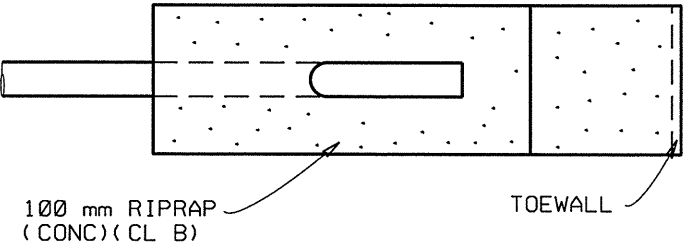
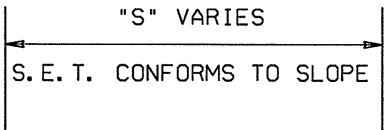
PRIVATE DRIVE STRUCTURES														
STRUCT. NO.		FLOW LINE LOCATIONS				* "L" LENGTH	SLOPE	* S. E. T. LENGTH		* "S" LENGTH		RC PIPE	SAFETY END TREAT (TY II)	* HT FILL
		UPSTREAM LOCATION & OFFSET	UPSTRM ELEV	DOWNSTREAM LOCATION & OFFSET	DNSTRM ELEV			UPSTRM END	DNSTRM END	UPSTRM END	DNSTRM END			
			FL		FL			m	m	m	m		600mm (1:3) EA	m
C3		0+071.383 - 21.081m	98.044	0+081.383 - 21.098m	97.953	13.60	0.665%	1.8	1.8	4.15	4.15	10.0	2	0.8

* FOR CONTRACTOR'S INFORMATION ONLY.

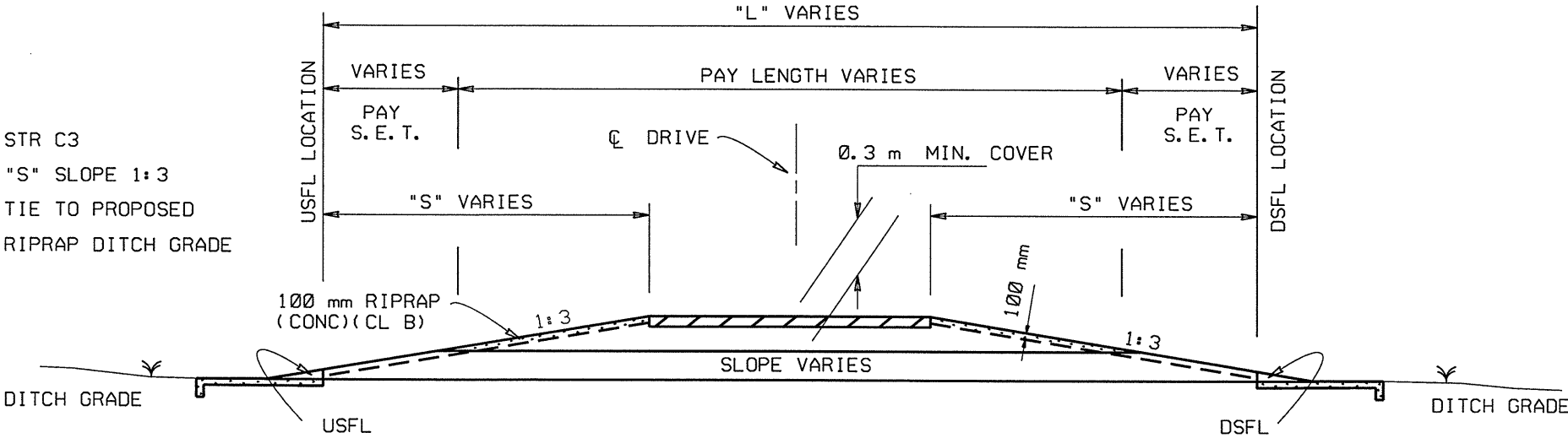


[Signature]
David K. Neshyba, P.E. 3/10/99 Date

NOTE : FOR RH SAFETY END TREAT DETAILS, SEE SHEET NO. 50, SAT-RH STANDARD.



PLAN VIEW
TYPICAL RH SAFETY END TREATMENT
RC PIPE (600mm)

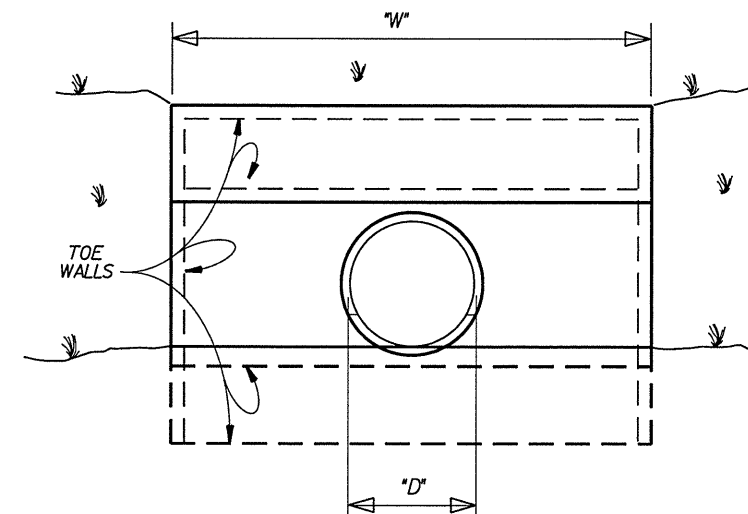
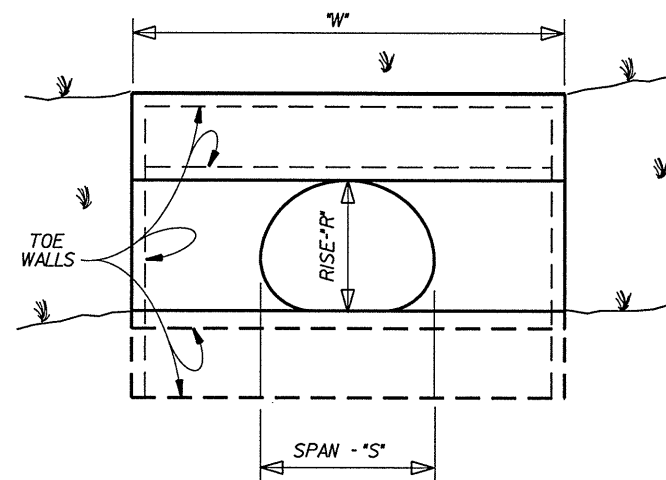
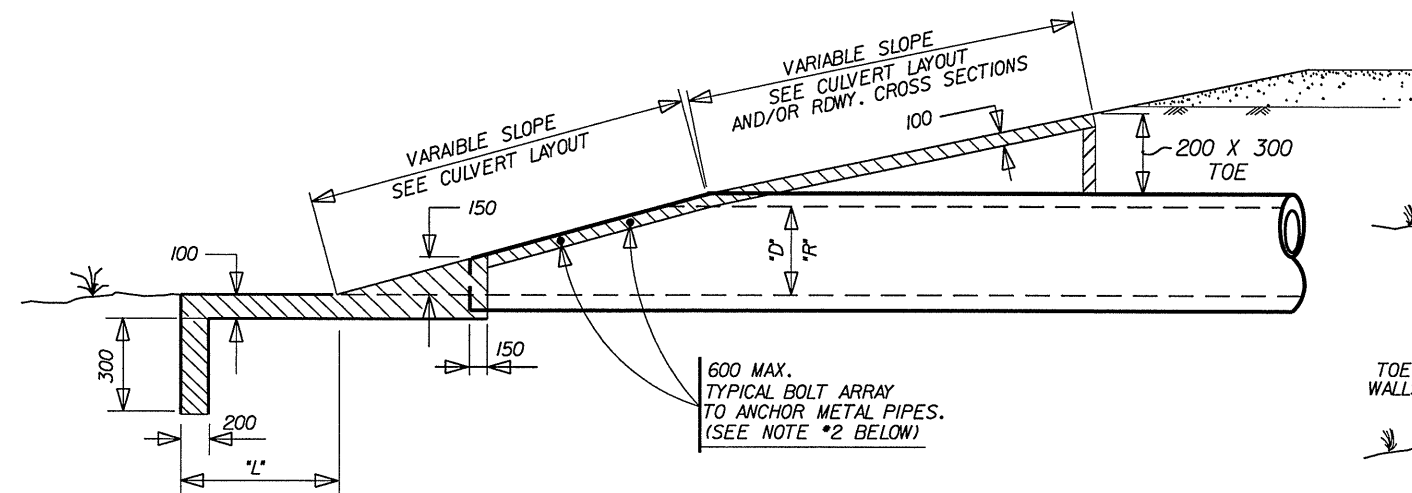


LAYOUT
TYPICAL PRIVATE DRIVE STRUCTURE

CHANGE ORDER NO. 2

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	CSR1739-2-12		49
STATE	DIST.	COUNTY	
TEXAS	SAT	ATASCOSA	
CONT.	SECT.	JOB	HIGHWAY NO.
1739	02	012	FM 791



DIMENSIONS FOR CIRCULAR (CMP and RCP) PIPE CULVERTS

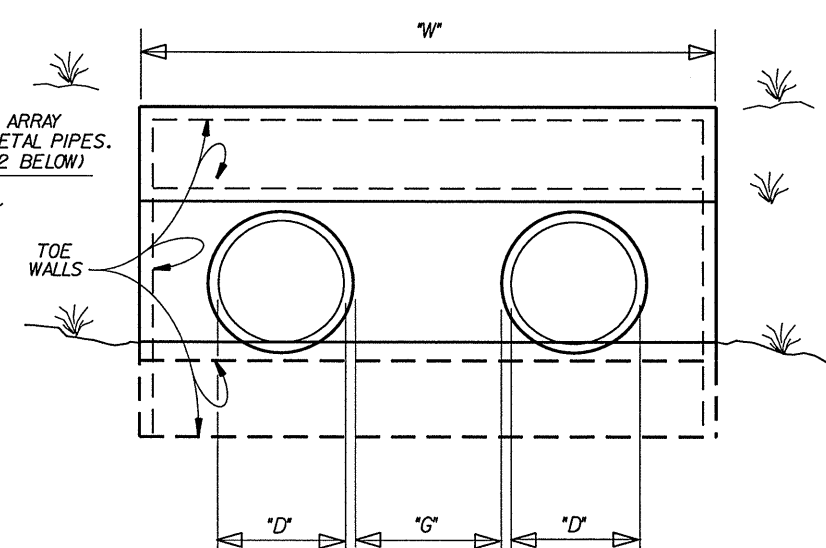
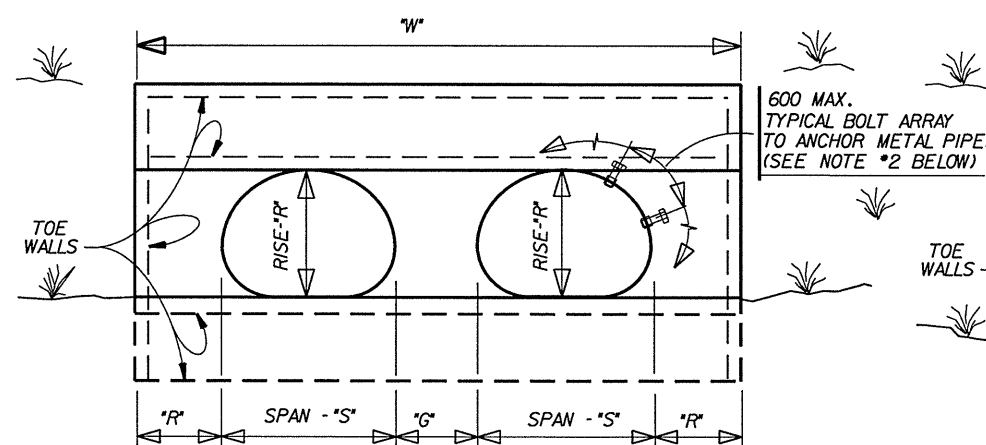
"D" INSIDE DIA. of PIPE	"L"	"G"		SINGLE	DOUBLE	TRIPLE	QUADRUPLE
		CGM	RCP				
450	600	360	225	1370	2185	3000	3810
550	750	380	250	1600	2540	3450	4065
600	900	430	275	1800	2855	3910	4965
750	1200	510	325	2250	3535	4820	6105
900	1500	580	375	2700	4205	5710	7215
1050	1800	660	425	3150	4885	6620	8355
1200	2100	740	475	3600	5565	7530	9495
1350	2400	860	575	4050	6285	8520	10755
1500	2700	970	600	4500	6995	9490	11985

"G" IS MEASURED BETWEEN THE OUTER SURFACES OF THE PIPES.

DIMENSIONS FOR C.M.P. ARCH PIPE CULVERTS

DESIGN SIZE	APPROX. ARCH DIM.		"L"	"G"	SINGLE	DOUBLE	TRIPLE	QUADRUPLE
	SPAN "S"	RISE "R"						
2	525	375	600	360	1300	2210	3120	4030
3	700	500	900	430	1725	2880	4035	5190
4	875	600	1200	510	2100	3510	4920	6330
5	1050	725	1500	580	2525	4180	5835	7490
6	1225	825	1800	660	2900	4810	6720	8630
7	1425	950	2100	740	3350	5540	7730	9920
8	1600	1075	2400	860	3775	6260	8745	11230
9	1775	1175	2700	970	4150	6920	9690	12460

BASED ON 68 X 13 CORRUGATION
"G" IS MEASURED BETWEEN THE OUTER SURFACES OF THE PIPES.



- NOTES:
- 1.) FOR RIPRAP QUANTITIES AND SLOPES, SEE CULVERT LAYOUT SHEET. CONCRETE SHALL BE CLASS B UNLESS OTHERWISE SHOWN IN THE PLANS.
 - 2.) ALL METAL PIPES (CIRCULAR AND/OR ARCH) SHALL HAVE 5/8" X 6" GALVANIZED BOLTS WITH 2 HEX NUTS AT 600 mm MAX. CENTERS TO ANCHOR THE PIPE TO THE CONCRETE. THIS WORK WILL BE SUBSIDIARY TO THE RIPRAP HEADWALL.
 - 3.) FOR CONCRETE ARCH PIPES, THE CMP ARCH PIPE CULVERT DIMENSIONS WILL HAVE TO BE ADJUSTED FOR THE PIPE WALL THICKNESS.
 - 4.) FOR PIPES LARGER THAN SHOWN, USE THE CLEAR DISTANCE BETWEEN PIPES SHOWN IN ITEMS 460 AND/OR 464.
 - 5.) IF THE SIDES OF THE HEADWALL IS ADJACENT TO A RIPRAP SLOPE AND IF THE TOP OF THE HEADWALL IS ADJACENT TO THE ROADWAY FOUNDATION OR RIPRAP SLOPE, THE SIDE AND TOP TOE WALLS MAY BE ELIMINATED IF APPROVED BY THE ENGINEER.
 - 6.) ALL DIMENSIONS ARE IN mm UNLESS SHOWN OTHERWISE.

SAN ANTONIO
DISTRICT STANDARD
RIPRAP HEADWALL (M)

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6	CSR 1739-2-12			50
STATE	STATE DISTRICT	COUNTY		
TEXAS	SAT	ATASCOSA		
CONT.	SECT.	JOB	HIGHWAY NO.	
1739	02	012	E. M. 791	

11/95