

B-681-9

IPE No. 898

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
5	TEXAS	IR 35-2(181)161	1
STATE DIST. NO.	COUNTY	STATE PROJECT NO.	SECTION NO.
15	BEXAR	17-10-147	1435

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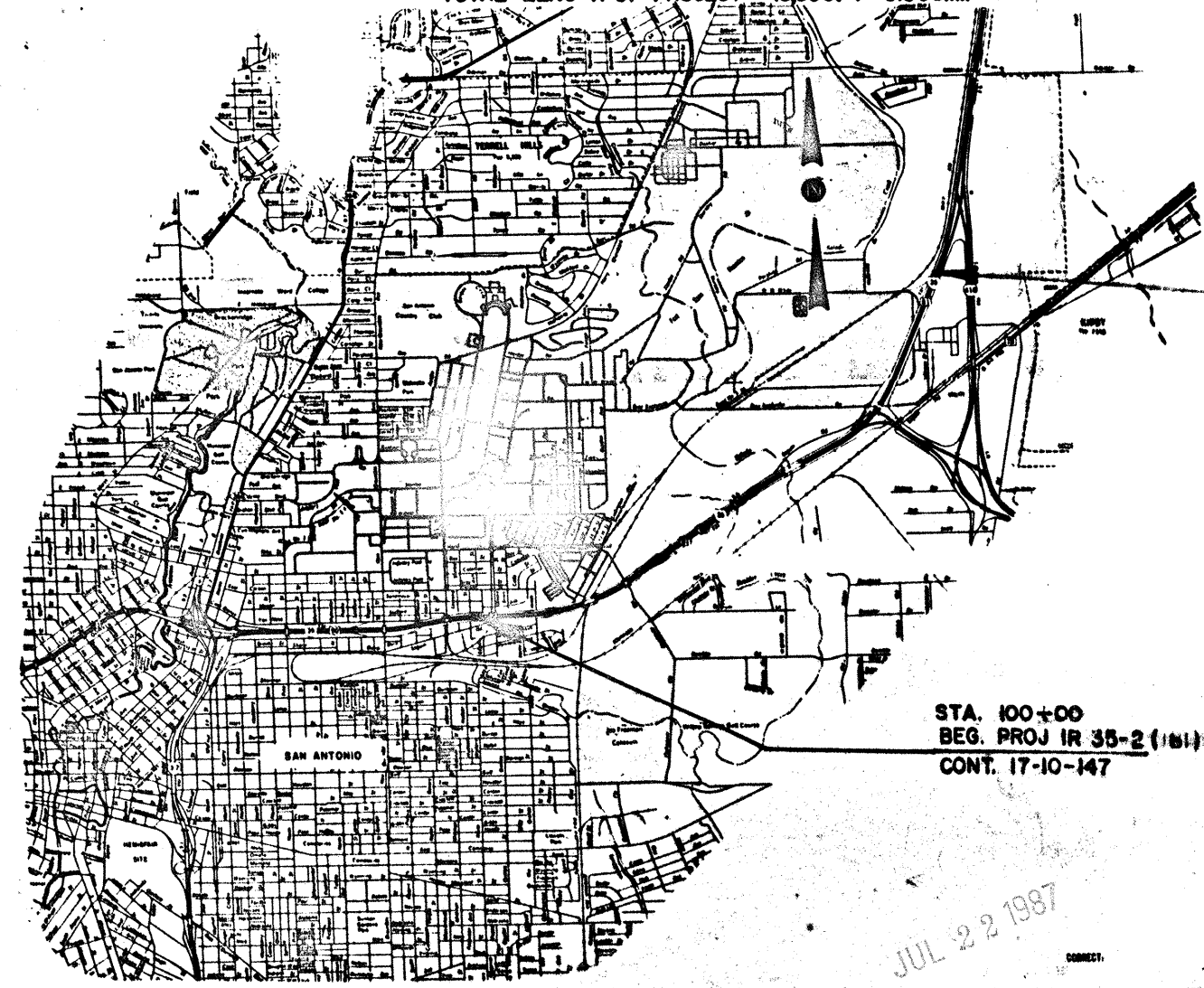
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STATE OF TEXAS
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

BEXAR COUNTY
PROJECT: IR 35-2(181)161
CONTROL No. 17-10-147
I H 35

RAMP ADDITIONS E. OF COLISEUM RD.
GRADING, FLEX BASE, ONE COURSE SURFACE TREATMENT, ASPHALT CONCRETE PAVEMENT, DRAIN STRUCTURES & SIGNING
FROM EDGAR STREET
TO 0.15M. NORTH OF HOLBROOK
TOTAL LENGTH OF PROJECT 18800 FT = 3.560 MI.



NO FIELD CHANGES
OR
SUPPLEMENTAL AGREEMENTS
MADE.

STA 288+00
END PROJ. IR 35-2(181)161
CONT. 17-10-147

I HEREBY CERTIFY THAT THESE PLANS HAVE BEEN
REVISED AND SHOW THE PROJECT AS ACTUALLY CONSTRUCTED.

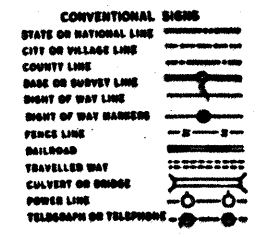
1-22-87
DATE

Robert E. Mager
SUPERVISING RESIDENT ENGINEER

STA. 100+00
BEG. PROJ IR 35-2(181)161
CONT. 17-10-147

EQUATIONS: NONE
EXCEPTIONS: NONE

SPECIFICATIONS ADOPTED BY THE STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, SEPTEMBER 1, 1982 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM PR-1273, SEPTEMBER, 1978)



LAYOUT SCALE: 1 IN. = 2640 FT.

JUL 22 1987

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

CORRECT: 9-21-84

RECOMMENDED FOR APPROVAL: 9-21-84

DISTRICT ENGINEER: R. E. Stotgen, Jr.

RECOMMENDED FOR APPROVAL: 9-21-84

APPROVED FOR LETTING: 10-15-84

DISTRICT DESIGN ENGINEER: Garrett H. Wilson, Jr.

FOR CHIEF ENGINEER: J. B. Davis

HIGHWAY DESIGN

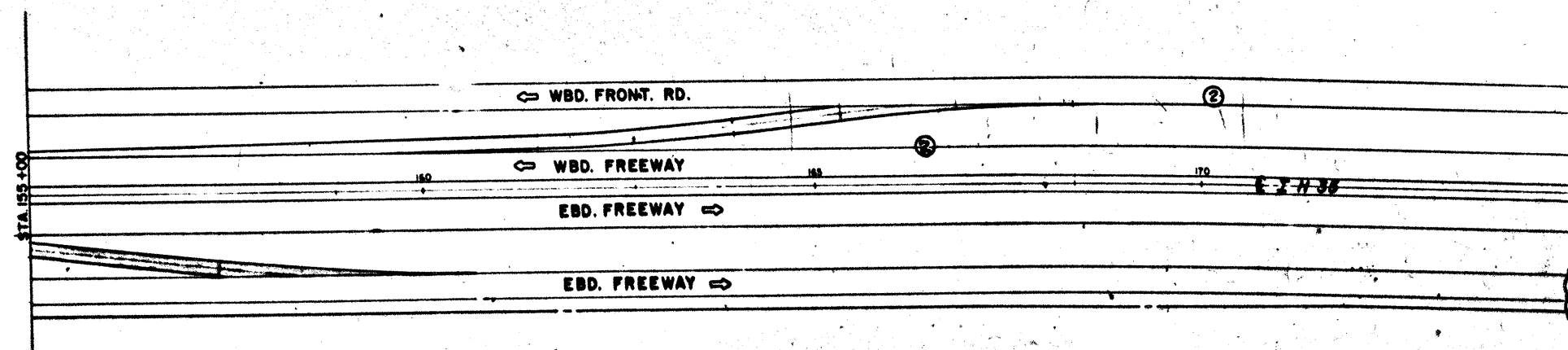
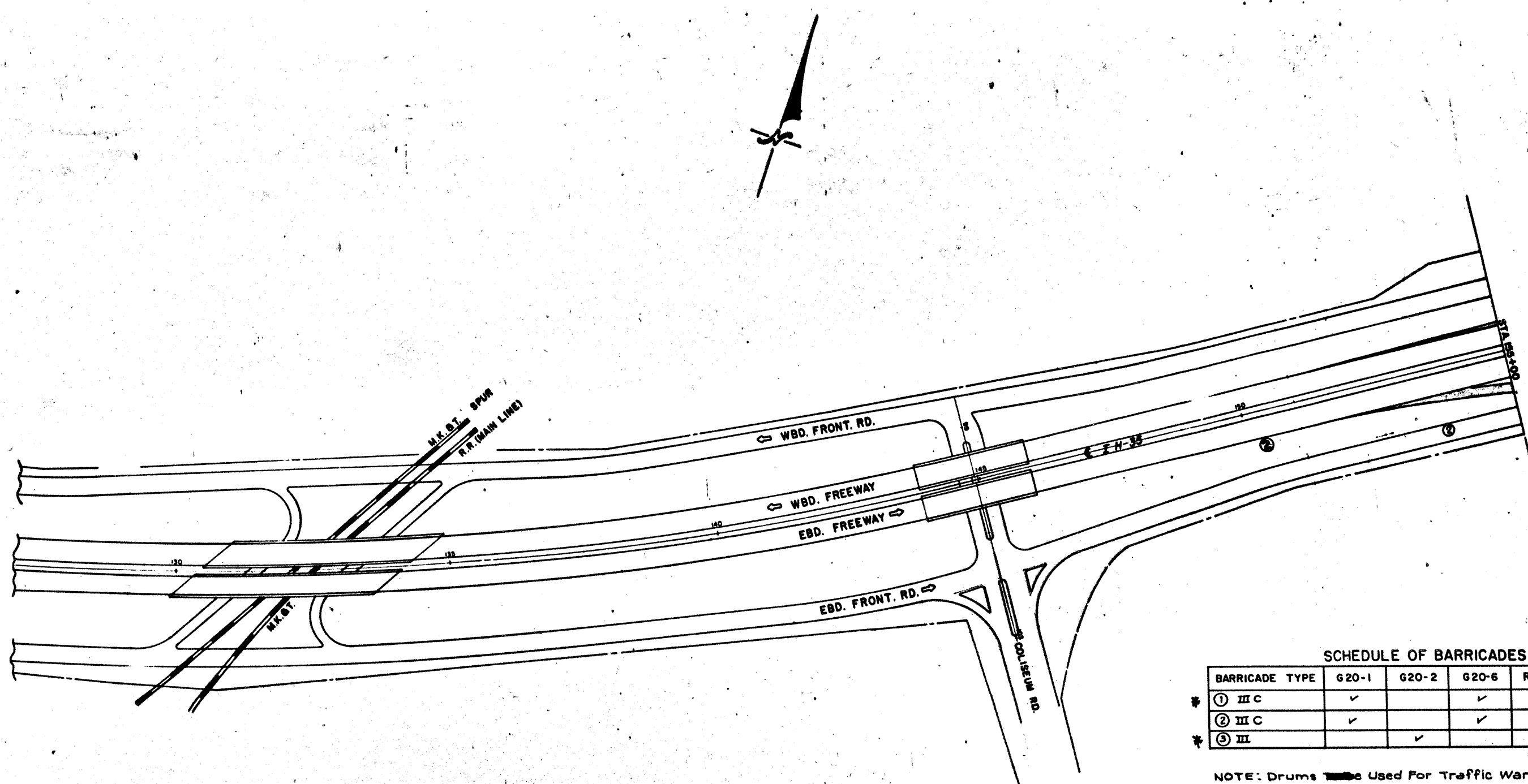
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: [Signature]

ADMINISTRATOR: [Signature]

DATE: 9-11-84

6
7671
FINAL
1
79
4
Bexar
IR 35-2(181)161
COUNTY: BEXAR
HWY. NO.: 17-10-147
DATE ACCEPTED: 7-17-87



SCHEDULE OF BARRICADES

BARRICADE TYPE	G20-1	G20-2	G20-6	R20-3	CW20			
					-1A	-1B	-1C	-1D
① III C	✓		✓	✓	✓	✓	✓	✓
② III C	✓		✓	✓			✓	✓
③ III		✓						

NOTE: Drums ~~are~~ Used For Traffic Warning & Channelization When Working Adjacent To The Front. Rd & Mainline.

ADDITIONAL SIGNS & BARRICADES ~~are~~ PROVIDED BY THE CONTRACTOR WHEN NEEDED OR REQUIRED BY THE ENGINEER.

* ~~are~~ PLACED AT BEGINNING AND END OF PROJECT.

PROJECT LAYOUT,
SHEET 1 OF 3

ITEM NO.	STATE	PROJECT NO.	SHEET NO.
1	TEXAS	IR 35-2 (161) 161	2
STATE DIST. NO.	COUNTY	DATE	BY
15	BEAR	17 10 147	L.M. 30

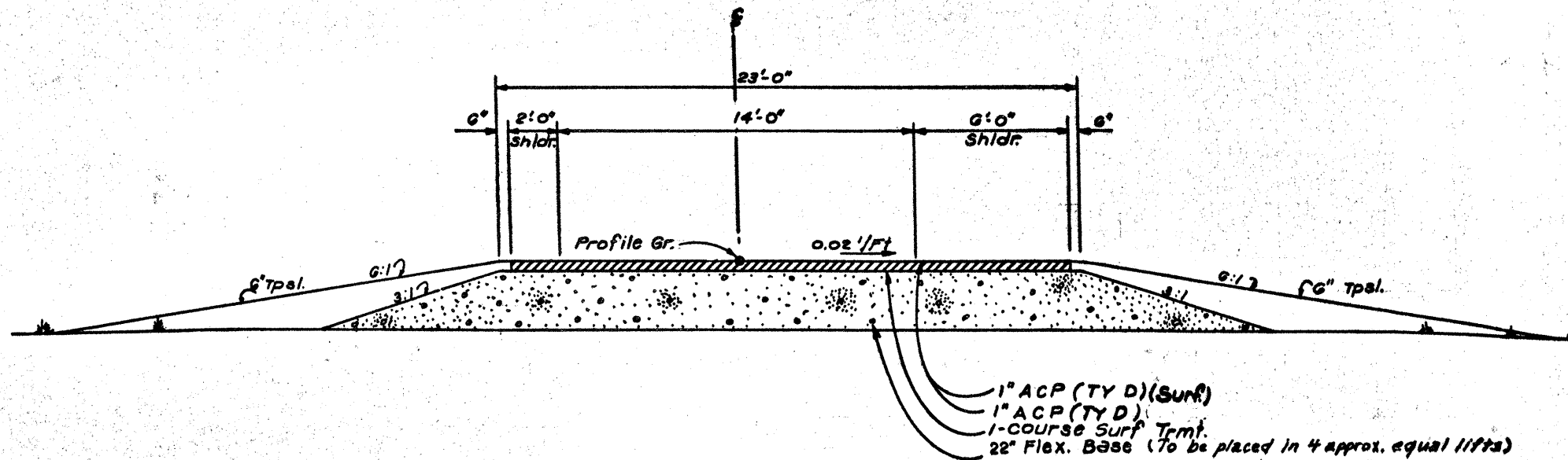
GRADING SUMMARY

STATION TO STATION	PREP. R.O.W.	RDWY. EXCAV.	EMB #	FLEX. BASE	FURN. PLACE	BRDST. SEED	FERT (16-8-8)	RELOC. RDWY.	RDWY. ILL. ASSM	GROUND BOX	ELECT. CONDR.	COND'T. (RM)	DROP INLET	GRATE	REMOV. METAL
					(TOPSOIL)	(BERMUDA)		ILL. ASSEM.	FND. (TY A)		(NO. 6 x HHW)	(1 1/4" DIA.)	(TY. 3)	(TY. 2)	(BM. GD. FENG.)
	(STA.)	(C.Y.)	(C.Y.)	(C.Y.)	(S.Y.)	(S.Y.)	TON	(EA.)	(EA.)	(EA.)	(L.F.)	(L.F.)	(EA.)	(EA.)	(L.F.)
STA 10+00 TO END (ENTRANCE RAMP)	10	2280	750	2670	1000	1000	0.05	0	0	1	2142	1172	0	0	324
STA 10+00 TO END (EXIT RAMP)		1250	425	1140	510	510	0.03	1	1	0	780	386	1	1	200
TOTAL	10	3510	1175	2846	3541	3541	0.100	7	7	13	3184	1572	1	1	525

SUMMARY OF SMALL STRUCTURE

STATION TO STATION	PLAC.MTL.BM.	TERM.ANCH.SECT	GAL. STL. PIPE	GAL. STL. PIPE	CONC. CURB
	GD. FENCE	(12 GA)	(3 IN)	CASING (5 IN)	(4 IN)
	(LF)	(EA)	(LF)	(LF)	(LF)
STA 10+00 TO END (ENTRANCE RAMP)	325	1	0	0	38
STA 10+00 TO END (EXIT RAMP)	200	1	800	790	30
TOTAL	525	2	704	678	210

** For Contractor's information only.*



TYPICAL SECTION

SUMMARY & TYPICAL SECTION

GENERAL NOTES AND SPECIFICATION DATA--

GRADING REQUIREMENTS FOR ITEM 249 FLEX BASE (TY A OR 1 MOD)					SOIL CONSTANTS		WET BALL MILL
PERCENT RETAINED ON EACH SIEVE					L.L. MAX	PI. MAX	MAX
1 3/4"	7/8"	3/8"	#4	#40			
0	10-35	35-55	45-70	70-85	35	10	40

* THE REQUIREMENTS FOR FLEX BASE (TY A OR 1) ARE MODIFIED IN RESPECT TO GRADATION ONLY.

***** BASIS OF ESTIMATE *****

THE FOLLOWING FOR CONTRACTOR'S INFORMATION ONLY- NON PAY

204	SPRINK (EMB)	75 GAL/CV
204	SPRINK (SEEDING)	30 GAL/SV
211	ROLL (EMB)	1 HR/250 CV
213	ROLL (MED-B) (EMB)	1 HR/250 CV
213	ROLL (MED-B) (SURF TREAT)	1 HR/3000 SV/CRSE

***** ASPHALTIC CONCRETE PAVEMENT *****					
TYPE	LOCATION	DEPTH	RATE	AREA-SV	QUANT-CV
ACP-SURF	RAMP	1"	.0278 CV/SV	3354	93.0
ACP	RAMP	1"	.0278 CV/SV	3354	93.0

***** COMPACTION REQUIREMENTS *****			
ITEM	MATERIAL	COURSE	DENSITY
249	FLEX BSE(TY A OR 1 MOD)	ALL	98 % (MIN)

***** ONE COURSE SURFACE TREATMENT DATA *****

AREA	3515 SV
ASPH--TYPE	SEE GEN NOTES
ASPH--RATE (GAL/SV)	0.30 = 1055 GAL
AGGR--TYPE/GR	PB - 4
AGGR--RATE (CV/SV)	1:100 = 35 CV

ITEM 5
THE CONTRACTOR SHALL ESTABLISH AND BE RESPONSIBLE FOR THE CORRECTNESS OF ALIGNMENT, ELEVATION AND POSITION OF ALL CONSTRUCTION REQUIRED BY THE CONTRACT IN ACCORDANCE WITH THE REQUIREMENTS OF SPECIAL PROVISION TO ITEM 5 (005---001).

ITEM 7
UPON COMPLETION OF ALL WORK PROVIDED FOR IN THE CONTRACT FOR ANY INDIVIDUAL PROJECT, THE ENGINEER WILL MAKE AN INSPECTION AND IF THE WORK IS FOUND TO BE SATISFACTORY THE CONTRACTOR WILL BE RELEASED FROM FURTHER MAINTENANCE ON THAT PROJECT. SUCH PARTIAL ACCEPTANCE WILL BE MADE IN WRITING AND SHALL IN NO WAY VOID OR ALTER ANY TERMS OF THE CONTRACT.

ALL PAVEMENT MARKINGS SHALL ACCORDANCE WITH THE TEXAS M.U.T.C.D.

IN THOSE INSTANCES WHERE FIXED FEATURES REQUIRE, THE GOVERNING SLOPES INDICATED HEREIN SHALL VARY FROM BETWEEN THE LIMITS AND TO THE EXTENT DETERMINED BY THE ENGINEER.

THE LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, SHOWN WITHIN THE RIGHT OF WAY ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR BEFORE BEGINNING CONSTRUCTION OPERATIONS.

CONSTRUCTION CROSS SECTIONS ARE AVAILABLE TO THE CONTRACTOR AT THE OFFICE OF THE ENGINEER.

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

MATERIALS LARGER THAN 4 INCHES IN SIZE WITHIN THE LIMITS OF THE RIGHT OF WAY AND NOT INCORPORATED IN THE FINISHED ROADWAY SECTION SHALL BE REMOVED FROM THE RIGHT OF WAY OR DISPOSED OF IN A MANNER SUITABLE TO THE ENGINEER AT THE ENTIRE EXPENSE OF THE CONTRACTOR.

ANY MATERIALS (OLD SIGNS, TEXT, BORDERS, ARROWS, SHIELDS, HARDWARE, SIGN WALKWAY, ETC.) REMOVED AND NOT REUSED ON THIS PROJECT AND CONSIDERED SALVAGEABLE BY THE ENGINEER SHALL BE RETAINED BY THE STATE AND SHALL BE STOCKPILED ON THE RIGHT OF WAY AS DIRECTED BY THE ENGINEER. ALL MATERIAL NOT CONSIDERED SALVAGEABLE SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

OVERHEAD SIGN LIGHTING SHALL BE IN OPERATION NO LATER THAN TWO WORKING DAYS AFTER THE SIGN PANELS HAVE BEEN LOCATED IN THEIR FINAL POSITION UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE COVERS FOR THE SIGN LIGHTING GROUND BOXES SHALL BE CAST IRON WITH "SIGN LIGHTING" INCISED IN 1" HIGH LETTERS.

ANY SIGN PANELS THAT ARE TO BE ADJUSTED AND/OR REMOVED AND REPLACED, SHALL BE DONE IN THE SAME WORKDAY AS APPROVED BY THE ENGINEER.

SPECIFICATION DATA

SHEET A

GENERAL NOTES AND SPECIFICATION DATA--

SMALL SIGNS ON RAMPS AND FRONTAGE ROADS SHALL BE PLACED AT A LATERAL CLEARANCE OF 8 TO 12 FEET FROM THE EDGE OF PAVEMENT OR AS DIRECTED BY THE ENGINEER.

SIGN TYPES FOR WHICH DESIGN DETAILS ARE NOT SHOWN IN THESE PLANS SHALL CONFORM WITH THE "TEXAS TRAFFIC SIGN DESIGN STANDARDS, 1980", AS SPECIFIED IN THE "TEXAS M.U.T.C.D."

THE REFLECTORIZED REMOVABLE LEGEND FOR THIS PROJECT SHALL BE COATED WITH POLYVINYLIDENE FLUORIDE PLASTIC THERMOSETTING AS PER DEPARTMENTAL SPECIFICATION D-9-8400 "REFLECTORIZED REMOVABLE LEGEND". THERMOSETTING POLYESTER COATING SHALL NOT BE USED ON LEGEND FOR THIS PROJECT.

OSHA REGULATIONS PROHIBIT OPERATIONS THAT WILL BRING PERSONS OR EQUIPMENT WITHIN 10 FEET OF AN ENERGIZED LINE. WHERE WORKMEN AND/OR EQUIPMENT HAVE TO WORK CLOSE TO AN ENERGIZED ELECTRICAL LINE, THE CONTRACTOR SHALL NOTIFY THE ELECTRICAL POWER COMPANY INVOLVED AND MAKE WHATEVER ADJUSTMENTS NECESSARY TO ENSURE THE SAFETY OF THOSE WORKMEN WORKING NEAR THE ENERGIZED ELECTRICAL LINES.

---ITEM 110---
SPRINKLING AND ROLLING SHALL CONFORM TO ITEMS 204, 211 AND 213 EXCEPT FOR MEASUREMENT AND PAYMENT.

HAULING OF MATERIALS, INCLUDING WASTE, WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

---ITEM 164---
ALL AREAS THAT RECEIVE TOP SOIL SHALL BE SEEDED AND FERTILIZED. BERMUDAGRASS SEED SHALL BE APPLIED AT THE RATE OF 0.4 LB/100 SV. PLANTING DATES SHALL BE DIRECTED BY THE ENGINEER.

---ITEM 249---
FLEXIBLE BASE MATERIAL SHALL COME FROM A SOURCE APPROVED BY THE ENGINEER. FINAL ACCEPTANCE OF BASE MATERIAL WILL BE FROM TESTS MADE FROM WINDROW SAMPLES OR THE STOCKPILE.

TOLERANCES, AS OUTLINED IN THE STANDARD SPECIFICATIONS, ARE PERMITTED.

---ITEM 320---
BETWEEN SEPTEMBER 1 AND MAY 1 NO ASPHALT MATERIAL SHALL BE APPLIED UNLESS, DUE TO UNUSUAL SITUATIONS, IT IS SPECIFICALLY AUTHORIZED OTHERWISE IN WRITING BY THE ENGINEER.

IT IS THE INTENT TO USE AC-10, AC-20 OR HFRS-2. MATERIAL RATES SHOWN ARE BASED ON AC AND MAY BE ADJUSTED BY THE ENGINEER DEPENDING ON THE MATERIAL USED. IN THE EVENT EMULSIONS ARE USED, A CURING PERIOD APPROVED BY THE ENGINEER SHALL ELAPSE BEFORE PLACING ANY SUBSEQUENT ASPHALT COURSES.

NO ASPHALT SHALL BE APPLIED WHEN THE AIR TEMPERATURE, AT ANY TIME, HAS BEEN BELOW 60 DEGREES F DURING THE PRECEDING 24 HOUR PERIOD UNLESS AUTHORIZED BY THE ENGINEER. THE CONTRACTOR'S ATTENTION IS CALLED TO THE STANDARD SPECIFICATION ITEM 320.1, LAST SENTENCE, "ASPHALT MATERIAL SHALL NOT BE PLACED WHEN GENERAL WEATHER CONDITIONS, IN THE OPINION OF THE ENGINEER, ARE NOT SUITABLE".

ALL PAVEMENT SHALL BE SURFACED IN LANE WIDTHS OR AS DIRECTED BY THE ENGINEER.

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

ASPHALT AND AGGREGATE RATES ARE FOR ESTIMATING PURPOSES ONLY AND MAY BE VARIED BY THE ENGINEER. AGGREGATE RATES SHALL BE KEPT TO A MINIMUM AS DIRECTED BY THE ENGINEER.

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

PRECOATED AGGREGATES, OTHER THAN LRA, MAY BE PRECOATED WITH AC-10, AC-20, MS-1 OR CSS-1 EXCEPT THAT WHEN EMULSIONS ARE TO BE PLACED, AC-10 OR AC-20 SHALL NOT BE USED AS THE PRECOAT MATERIAL. FLUX OIL OR EMULSIONS MAY BE USED FOR PRECOATING LRA. WHEN AC-10 OR AC-20 IS USED AS THE PRECOAT MATERIAL, THE AMOUNT USED SHALL NOT EXCEED 1.0 PERCENT BY WEIGHT.

WARNING TO CONTRACTORS: 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 WILL BE REJECTED.

---ITEM 340---
BETWEEN NOVEMBER 1 AND MARCH 1, NO ASPHALTIC CONCRETE PAVEMENT SHALL BE PLACED UNLESS, DUE TO UNUSUAL SITUATIONS, IT IS SPECIFICALLY AUTHORIZED BY THE ENGINEER IN WRITING.

NO HOT MIX ASPHALTIC MIXTURE SHALL BE PLACED WHEN THE AIR TEMPERATURE IS BELOW 50 F OR HAS BEEN BELOW 50 F DURING THE PRECEDING 24 HOURS UNLESS AUTHORIZED BY THE ENGINEER. MAT THICKNESSES OF 1 1/2 INCHES AND LESS SHALL BE PLACED WHEN THE TEMPERATURE OF THE SURFACE ON WHICH THE MAT IS TO BE PLACED IS BELOW 50 F.

ASPHALT CONCRETE PAVEMENT SHALL BE PLACED WITH A SPREADING AND FINISHING MACHINE EQUIPPED WITH AUTOMATIC SCREED CONTROL DEVICES UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.

VEHICLES OF THE HIGH DUMP SEMI-TRAILER TYPE WILL NOT BE ALLOWED TO DUMP DIRECTLY INTO THE FINISHING MACHINE UNLESS SPECIFICALLY AUTHORIZED BY THE ENGINEER.

SPECIFICATION DATA

SHEET B

GENERAL NOTES AND SPECIFICATION DATA--

---ITEM 340---, CONT'D
IN-PLACE COMPACTION CONTROL IS REQUIRED. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THREE (3) EACH, 4 INCH DIAMETER UNDISTURBED CORES, FOR THE FULL DEPTH OF THE PREVIOUS DAY'S PLACEMENT AT A POINT DIRECTED BY THE ENGINEER.

THE USE OF A SINGLE DRUM VIBRATORY ROLLER FOR BREAKDOWN ROLLING WILL NOT BE ALLOWED.

THE CONTRACTOR MAY ELECT TO USE STONE SCREENINGS FOR FINE AGGREGATE AS OUTLINED IN ITEM 340.2 (1)(C). IF STONE SCREENINGS ARE USED, THE MAXIMUM AMOUNT OF COARSE AGGREGATE CONTAINED IN THE FINE AGGREGATE STOCKPILES IS INCREASED FROM 20% TO 30%.

FOR COARSE AGGREGATES FURNISHED UNDER ITEM 340, IF THE AMOUNT OF MATERIAL PASSING THE NO. 10 SCREEN IS 5% OR LESS, THE PI TEST REQUIREMENT IS WAIVED.

THE TOTAL OF THE MATERIALS RETAINED BETWEEN THE 40-80 AND 80-200 SIEVES SHALL NOT BE LESS THAN 20% OF THE PAVING MIXTURE.

AUTOMATIC PROPORTIONING DEVICES WILL BE REQUIRED ON ALL PLANTS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

ASPHALT LAYING MACHINE ~~SHALL~~ NOT ~~BE~~ SERVED BY MORE THAN ONE PLANT AT A TIME. CHANGING PLANTS DURING A LAYING OPERATION WILL NOT BE PERMITTED UNLESS APPROVED BY THE ENGINEER IN WRITING.

THE LONGITUDINAL JOINTS IN ONE LAYER SHALL OFFSET THAT IN THE OTHER LAYER IMMEDIATELY BELOW BY APPROXIMATELY 3 INCHES OR MORE; HOWEVER, THE JOINTS IN THE TOP LAYER SHALL BE AT THE LANE LINES OR AS DIRECTED BY THE ENGINEER.

THE COARSE AGGREGATE USED IN THE MAT DESIGNATED ACP (SURF) ~~SHALL~~ HAVE A MINIMUM POLISH VALUE OF 32. IF FLINTROCK OR TRAPROCK IS USED THE POLISH VALUE WILL BE WAIVED, PROVIDING THE FOLLOWING CRITERIA IS MET: THAT PORTION OF THE FLINTROCK OR TRAPROCK RETAINED ON THE NO. 10 SIEVE SHALL COMPRISE AT LEAST 30 % BY VOLUME OF THE TOTAL AGGREGATE. IN ADDITION, IF BLENDED, THE BLENDED AGGREGATES SHALL CONTAIN AT LEAST 50 % FLINTROCK OR TRAPROCK RETAINED ON THE NO. 4 SIEVE.

CRUSHED LIMESTONE OR CRUSHED DOLOMITE MAY NOT BE USED AS THE POLISH VALUE AGGREGATE.

THE COARSE AGGREGATE USED IN THE SURFACE COURSE OF THE TRAVEL LANES ~~SHALL~~ HAVE AN ABRASION LOSS OF NOT MORE THAN 37% BY WEIGHT WHEN SUBJECTED TO THE LOS ANGELES ABRASION TEST.

THE AGGREGATE USED IN THE SURFACE COURSE OF THE TRAVEL LANES WILL BE SUBJECTED TO 4 CYCLES OF THE SOUNDNESS TEST IN ACCORDANCE WITH TEST METHOD TEX-411-A. THE LOSS ~~SHALL~~ NOT BE GREATER THAN 30% WHEN MAGNESIUM SULPHATE IS USED. THIS TEST WILL NOT APPLY TO BLENDS WITH CRUSHED TRAP ROCK OR CRUSHED FLINT ROCK.

ONLY AC-20 ~~SHALL~~ USED.

THE COARSE AGGREGATE MAY BE SAMPLED DURING DELIVERY TO THE PLANT, FROM THE STOCKPILE, FROM THE COLD BINS, OR FROM THE HOT BINS AS DIRECTED BY THE ENGINEER.

IF THE MATERIALS FURNISHED 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 COARSE AGGREGATE AT THE RATE OF 1 % HYDRATED LIME BY WEIGHT OF AGGREGATE. THE LIME ~~SHALL~~ BE ADDED TO THE AGGREGATE IN SLURRY FORM AT THE COLD FEED. AN ACCURATE METER SHALL BE PLACED IN THE LIME SLURRY LINE LEADING TO THE SPRAY BAR SO THAT THE CUMULATIVE AMOUNT OF LIME MAY BE ACCURATELY DETERMINED AND THE ADDITION RATE MONITORED. THE COST OF THE LIME ~~SHALL~~ BE CONSIDERED SUBSIDIARY TO THIS ITEM AND WILL NOT BE PAID FOR DIRECTLY. IF APPROVED BY THE ENGINEER, THE LIME SLURRY MAY BE ADDED AT THE STOCKPILE BUT NOT MORE THAN 24 HOURS IN ADVANCE OF USE.

---ITEM 506---
ANY REQUIRED TEMPORARY EROSION CONTROL WORK WILL BE HANDLED AS CONTRACTOR FORCE ACCOUNT OR AGREED UNIT PRICE WORK UNDER THIS ITEM.

---ITEM 530---
CONCRETE TEST BEAMS WILL NOT BE REQUIRED FOR CURB CONSTRUCTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

WITH PRIOR APPROVAL OF THE ENGINEER, GRADE 7 COARSE AGGREGATES ~~SHALL~~ BE USED IN THE CONSTRUCTION OF CURB.

---ITEMS 540 & 542---
RAIL ELEMENTS, POSTS AND FITTINGS REMOVED UNDER ITEM 542 ~~SHALL~~ BE REUSED FOR INSTALLATION OF GUARD FENCE UNDER ITEM 540.

---ITEM 437---
HIGH RANGE WATER REDUCERS WILL BE USED ONLY TO MEET SPECIAL REQUIREMENTS AND WILL REQUIRE THE WRITTEN APPROVAL OF THE ENGINEER ON EACH SPECIFIC PROJECT. A SATISFACTORY WORK PLAN FOR CONTROL SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL AND AN EVALUATION OF THE CONCRETE CONTAINING THE ADMIXTURE WILL BE PERFORMED BY THE ENGINEER.

---ITEM 416 & 656---
ANY HOLES DRILLED THROUGH EXISTING RIPRAP FOR GUARDFENCE POSTS AND/OR SIGN FOUNDATIONS ~~SHALL~~ BE DONE WITH A CIRCULAR SAW, CORE BARREL OR OTHER SIMILAR MEANS APPROVED BY THE ENGINEER TO PROVIDE A NEAT CIRCULAR HOLE.

SPECIFICATION DATA

SHEET C

GENERAL NOTES AND SPECIFICATION DATA--

---ITEM 416 & 656---, CONT'D

IN PREPARING HOLES FOR POST AND/OR FOUNDATION FOR SIGNS, CARE ~~SHALL~~ BE TAKEN SO AS NOT TO RUPTURE EXISTING DRAINAGE STRUCTURES, SPRINKLER SYSTEMS, ELECTRICAL CONDUITS AND PUBLIC UTILITIES.

WHERE SIGN FOUNDATIONS PROTRUDE THROUGH CONCRETE SLABS, THE FOUNDATIONS ~~SHALL~~ BE WRAPPED WITH A MATERIAL APPROVED BY THE ENGINEER PRIOR TO PLACING CONCRETE.

---ITEM 616---
THE CONTRACTOR ~~SHALL~~ FURNISH MILL TEST REPORTS FOR ANCHOR BOLTS.

---ITEM 618---
EXCAVATING AND BACKFILLING ~~SHALL~~ BE IN ACCORDANCE WITH ITEM 401, EXCEPT FOR MEASUREMENT AND PAYMENT.

---ITEM 626 & 628---
AT THE LOCATION OF STRUCTURES E-1 AND E-3, THE CONTRACTOR ~~SHALL~~ REMOVE THE EXISTING METER POLES AND LEAVE THE EXISTING SERVICE POLES IN PLACE. THE EXISTING RELAYS, ETC., ~~SHALL~~ BE REMOVED AND A CIRCUIT PROTECTOR ASSEMBLY TYPE B SHALL BE INSTALLED ON EACH EXISTING SERVICE POLE. AT THE LOCATION OF STRUCTURE E-2, THE EXISTING POWER STATION ~~SHALL~~ BE ABANDONED AND THE METER POLE AND SERVICE POLE REMOVED BY THE CONTRACTOR. AT THE NEW LOCATION SHOWN IN THE PLANS, THE CONTRACTOR ~~SHALL~~ INSTALL A NEW SERVICE POLE TYPE "B". ON EACH EXISTING STRUCTURE (E-1, E-2, AND E-3), THE CONTRACTOR ~~SHALL~~ ATTACH A CIRCUIT PROTECTOR ASSEMBLY TYPE "A". ~~SHALL~~ BE ELECTRICAL ENCLOSURE, AS SHOWN ON SL(1) (MOD), CONTAINING A CIRCUIT BREAKER, M-O-A SWITCH, FUSE AND CONTACTOR. ~~SHALL~~ BE LOCATED ON ONE OF THE I-BEAM SUPPORTS.

ALL WORK, MATERIALS, THE REMOVAL OF SERVICE POLES, METER POLES, PULLING OF EXISTING WIRE, AND ANY INCIDENTALS NECESSARY TO ATTACH THE CIRCUIT PROTECTOR ASSEMBLIES COMPLETE AND IN PLACE AND SET THE SERVICE POLE COMPLETE AND IN PLACE WILL NOT BE PAID FOR SEPARATELY, BUT ~~SHALL~~ BE CONSIDERED SUBSIDIARY TO THE ITEMS ABOVE.

UNLESS APPROVED OTHERWISE BY THE ENGINEER, THE ROADWAY ILLUMINATION SYSTEM ~~SHALL~~ REMAIN IN OPERATION DURING NIGHTTIME HOURS THROUGHOUT THE DURATION OF THE PROJECT.

---ITEM 634 & 636---
A SIGN IDENTIFICATION DECAL ~~SHALL~~ BE AFFIXED TO THE BACK OF ALL GROUND MOUNTED SIGNS IN ACCORDANCE WITH ITEM 6154.

SCREWS TO ATTACH ROUTE MARKERS TO PLYWOOD GUIDE SIGNS AS SHOWN ON IM(2) ~~SHALL~~ BE 5/8" LONG.

---ITEM 642---
THE CONTRACTOR MAY UTILIZE THE EXISTING SUPPORT BRACKETS AS PROVIDED BELOW. THE EXISTING HARDWARE, CONDUIT AND WIRING DETERMINED REUSABLE IN THE FIELD, UPON APPROVAL BY THE ENGINEER.

THE SUPPORT BRACKETS MAY BE FIELD CUT TO SHORTEN EACH BRACKET. HOWEVER EACH EXISTING SUPPORT BRACKET MAY NOT BE EXTENDED OR LENGTHENED, A NEW BRACKET ~~SHALL~~ BE REQUIRED. IF AN EXISTING BRACKET IS FIELD CUT, THE BRACKET ~~SHALL~~ BE CLEANED AND TREATED WITH AN APPROVED ZINC SOLDER MEETING FEDERAL SPECIFICATION, D-0-33 (STICK ONLY)

ADDITIONAL SIGN ATTACHMENT HARDWARE, SUPPORT BRACKETS, SIGN ADJUSTMENTS NECESSARY FOR COMPATIBILITY WITH SPECIFIED SIGN PANEL POSITIONING SHOWN ON THE PLANS AS REQUIRED AND TO BE FURNISHED BY THE CONTRACTOR, ~~SHALL~~ BE CONSIDERED SUBSIDIARY TO ITEM 642.

ALL ELECTRICAL MATERIAL FURNISHED AND/OR INSTALLED ~~SHALL~~ BE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE SPECIFICATIONS.

THE 17'- 6" MINIMUM HEIGHT ~~SHALL~~ BE MAINTAINED FOR BOTH NEW AND EXISTING SIGNS, WHICH IS FROM THE BOTTOM OF THE LOWEST SIGN LIGHT BRACKET TO THE HIGHEST POINT ON THE ROADWAY. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS.

---ITEM 650---
THE FOUNDATIONS FOR NEW OVERHEAD SIGN SUPPORTS STRUCTURES ARE BASED ON A PENETROMETER VALUE AS INDICATED ON THE VARIOUS LAYOUT SHEETS.

---ITEM 652---
GLARE SHIELDS WILL BE REQUIRED FOR ALL MERCURY VAPOR SIGN LIGHTING FIXTURES. THE GLARE SHIELDS SHALL NOT BE PAID FOR DIRECTLY BUT ~~SHALL~~ BE CONSIDERED INCIDENTAL TO THIS ITEM.

FINAL ACCEPTANCE OF THE SIGN LIGHTING SYSTEM WILL NOT BE GIVEN UNTIL THE LIGHT SYSTEM HAS BEEN IN OPERATION FOR A PERIOD OF NOT LESS THEN 14 DAYS AND ALL CIRCUITS TEST CLEAR OF FAULTY GROUNDS AND OPEN CIRCUITS. DURING THE 14 DAY OPERATION, THE CONTRACTOR WILL BE FULLY RESPONSIBLE FOR THE SIGN LIGHT SYSTEM AND ~~SHALL~~ MAKE ANY ADJUSTMENTS OR REPAIRS WHICH MAY BE REQUIRED. THIS PERIOD OF TEST OPERATION SHALL INCLUDE EXISTING STRUCTURES AS WELL AS NEW STRUCTURES.

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE NORMAL EXISTING VOLTAGE AS 240 VOLTS.

MERCURY VAPOR LIGHT SETTING ~~SHALL~~ BE AS FOLLOWED; NUT-ART 22 DEGREES AND GENERAL ELECTRIC 0 DEGREES.

SPECIFICATION DATA

SHEET D

F.R. DIV.6	TEXAS	IR 35-2(181)161	SHEET 4B
BEXAR	COUNTY	HWY IH 35	CONT 0017-10-147

GENERAL NOTES AND SPECIFICATION DATA--

---ITEM 672, 674 & 676---
RAISED PAVEMENT MARKERS OR TRAFFIC BUTTONS SHALL NOT BE PLACED UNTIL THE ASPHALT CONCRETE PAVEMENT SURFACE HAS CURED A MINIMUM OF 45 CALENDAR DAYS OR AS DIRECTED BY THE ENGINEER.

IF THE CONTRACTOR HAS COMPLETED ALL OTHER ACP OPERATIONS ON THE PROJECT, AND IF THE CURING TIME PERIOD HAS NOT YET ELAPSED, THE CONTRACT TIME WILL BE SUSPENDED UNTIL THE CURING TIME HAS BEEN MET.

SPECIAL PROVISIONS 000---456 AND 000---457
THE FOLLOWING GOALS ARE ESTABLISHED FOR THIS PROJECT:
DBE: 12.0% WBE: 1.0% TOTAL: 13.0%

SPECIAL PROVISION 000---006
THE NUMBER OF JOB TRAINEES FOR THIS CONTRACT IS TWO (2).

SPECIFICATION DATA

SHEET E

4B
SHEET 4B
BEXAR IR 35-2(181)161

ESTIMATE SUMMARY

								BEXAR COUNTY		ALT	ITEM- CODE			DESCRIPTION	UNIT	TOTAL	
								1R35-2(181)161								EST.	FINAL
								17-10-147 ROADWAY			ITEM NO	DESC CODE	QTY NO				
EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL								
								19.000			100	002	002	PREP R O W	STA	19.000	19.000
								3510.000			110	002		RD EXCAV (ORD COMP)	CY	3510.000	3,510.000
								1510.000			160	002	001	FURN AND PLAC TPSL	SY	1510.000	3,541.650
								1510.000			164	016	001	BRDCST SEED (BERMUDA)	SY	1510.000	3,541.650
								0.080			166	002	001	FERT (16-8-8)	TON	0.080	0.100
								3810.000			249	049		FLEX BASE (DEL) (DC) (TY A GRI MOD CL 3)	CY	3810.000	2,830.000
								1055.000			320	001	001	ASPH	GAL	1055.000	1,960.000
								35.000			320	015	001	AGGR (TY PB, GR 4)	CY	35.000	70.000
								93.000			340	020	032	ASPH CONC (TY D)	CY	93.000	117.450
								93.000			340	023	032	ASPH CONC (TY D) (SURF)	CY	93.000	157.600
								49.000			416	010		DRILL SHAFT (NON-REINF) (12IN) (SIGN MTS)	LF	49.000	49.000
								127.000			416	011		DRILL SHAFT (24 IN) (SIGN MTS)	LF	127.000	127.000
								88.000			416	012		DRILL SHAFT (30 IN) (SIGN MTS)	LF	88.000	88.000
								1.000			470	235		INLET (COMPL) (TY 3)	EA	1.000	1.000
								1.000			471	007		GRATE (TY 2)	EA	1.000	1.000
								.100			500	001		MOBILIZATION	LS	.100	0.180
								68.000			530	008		CONC CURB	LF	68.000	210.000
								525.000			540	010	006	METAL BEAM GD FENCE (12 GA) (TIM POST)	LF	525.000	525.000
								2.000			540	011	006	TERM-ANCH SECT (12 GA)	EA	2.000	2.000
								525.000			542	001		REMOV METAL BEAM GD FENCE	LF	525.000	525.000
								900.000			582	001		WTR MAIN (GALV STEEL PIPE) (3 IN)	LF	900.000	704.000
								790.000			582	006		CASING (GALV STL) (5 IN)	LF	790.000	678.000
								7.000			612	001		RELOC RDWY ILL ASSEM	EA	7.000	7.000
								7.000			616	001		RDWY ILL ASSEM FND (TY A)	EA	7.000	7.000
								1558.000			618	003		CONDT (RM) (1 1/4 IN)	LF	1558.000	1,572.000
								190.000			618	055		CONDT (RM) (2 IN) (PUSHED OR BORED)	LF	190.000	204.000
								210.000			618	059		CONDT (PVC) (SCH 40) (1 1/4 IN)	LF	210.000	210.000
								1155.000			620	031		ELEC CONDR (NO. 8) (TY XHHW)	LF	1155.000	1,155.000
								3194.000			620	032		ELEC CONDR (NO. 6) (TY XHHW)	LF	3194.000	3,194.000
								11.000			624	002		GROUND BOX (CONC)	EA	11.000	13.000
								5.000			626	001		CIRCT PROT ASSEM TYPE A	EA	5.000	5.000
								2.000			626	002		CIRCT PROT ASSEM TYPE B	EA	2.000	2.000
								3.000			628	002		SERV POLE TYPE B	EA	3.000	3.000
								1720.500			634	001	001	PLYWOOD SIGNS (TYPE A)	SF	1720.500	1,720.500
								125.050			636	001		ALUMINUM SIGNS (TYPE A)	SF	125.050	125.040
								1708.750			642	001		ALUMINUM SIGNS (TYPE O)	SF	1708.750	1,708.750
								6435.000			648	001		RDSO TRAF SGN SUPPT (STRUCTURAL STEEL)	LB	6435.000	6,740.000
								2.000			650	014		OVHD SGN SUPPT (BR) (80 FT SPAN) (17-6HT)	EA	2.000	2.000
								32.000			652	001		HWY SGN LIGHTING FIXTURE (MV) (100 WATT)	EA	32.000	32.000
								11.000			658	001		DELIN & OBJECT MARKERS (D-SY) (A)	EA	11.000	11.000
								23.000			658	002		DELIN & OBJECT MARKERS (D-SW) (A)	EA	23.000	25.000
								24.000			658	008		DELIN & OBJECT MARKERS (D-DW) (A)	EA	24.000	21.000
								1.000			658	015		DELIN & OBJECT MARKERS (OM-2HP)	EA	1.000	1.000
								58.000			660	007		WINGED CHAN POSTS (1.12 LB) (7.0 FT)	EA	58.000	57.000
								1.000			660	009		WINGED CHAN POSTS (1.12 LB) (3.0 FT)	EA	1.000	1.000
								35.000			668	006		RETR PREFAB PAV MARK (24IN) (WHITE) SOLID	LF	35.000	22.000
								1082.000			672	004		JIGGLE BAR TILE (TY W)	EA	1082.000	908.000
								28.000			674	003		PAV MARK (REFLECT) (TY 1R)	EA	28.000	28.000

ESTIMATE & QUANTITY SHEET

REV. 1-24-86
REVISED 11-9-84

STATE DIST. NO.	COUNTY	PROJECT NO.	SHEET NO.
15	BEXAR	1R 35-2(181)161	5

ESTIMATE SUMMARY

[illegible]

ESTIMATE & QUANTITY SHEET

REV. 1-24-86
REVISED 11-9-84

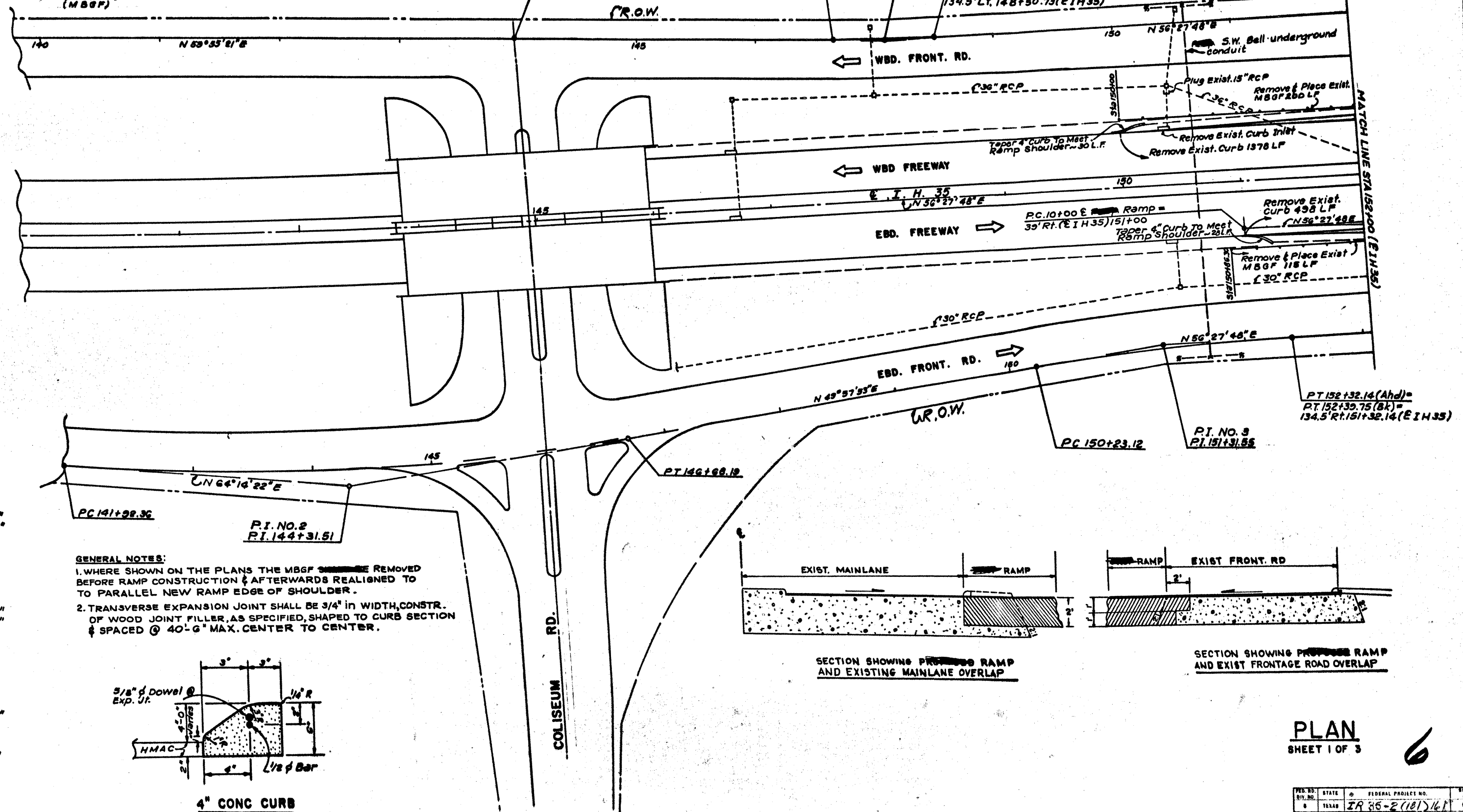
5A

STATE DIST. NO.	COUNTY	PROJECT NO.	SHEET NO.
15	BEXAR	IR 35-2(181)161	5A

LEGEND

- Proposed Construction
- Exist. Curb Inlet
- Exist. Inlet & RCP
- Shoulder
- Exist. Conc. Riprap
- Metal Beam Guard Fence

P.O.T. 143+96.96 Wbd. Fr. Rd.
P.O.T. 98+46.47 Coliseum Rd.



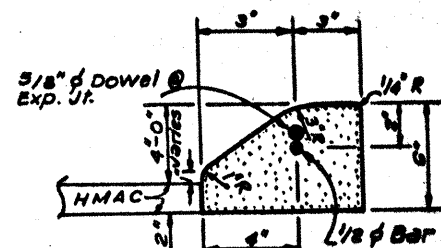
P.I. NO. 1
A = 3° 27' 33"
D = 4° 00' 00"
T = 43.25'
E = 0.65'
L = 86.48'
R = 1432.40'

P.I. NO. 2
A = 14° 16' 29"
D = 3° 00' 00"
T = 239.15'
E = 15.08'
L = 475.83'
R = 1909.86'

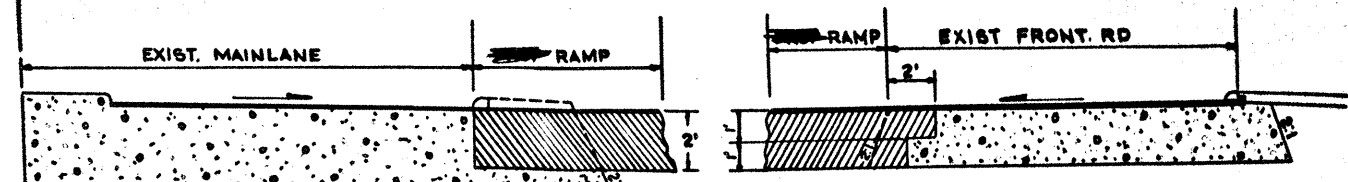
P.I. NO. 3
A = 6° 29' 55"
D = 3° 00' 00"
T = 108.43'
E = 3.08'
L = 216.62'
R = 1909.86'

GENERAL NOTES:

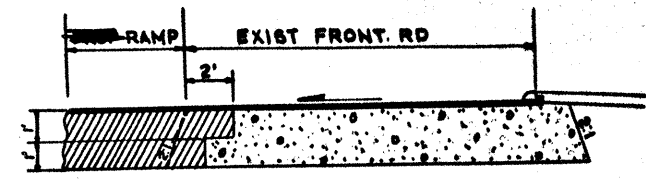
- WHERE SHOWN ON THE PLANS THE MBGF ~~SHOULD BE~~ REMOVED BEFORE RAMP CONSTRUCTION & AFTERWARDS REALIGNED TO TO PARALLEL NEW RAMP EDGE OF SHOULDER.
- TRANSVERSE EXPANSION JOINT SHALL BE 3/4" IN WIDTH, CONSTR. OF WOOD JOINT FILLER, AS SPECIFIED, SHAPED TO CURB SECTION & SPACED @ 40'-6" MAX. CENTER TO CENTER.



4" CONC CURB



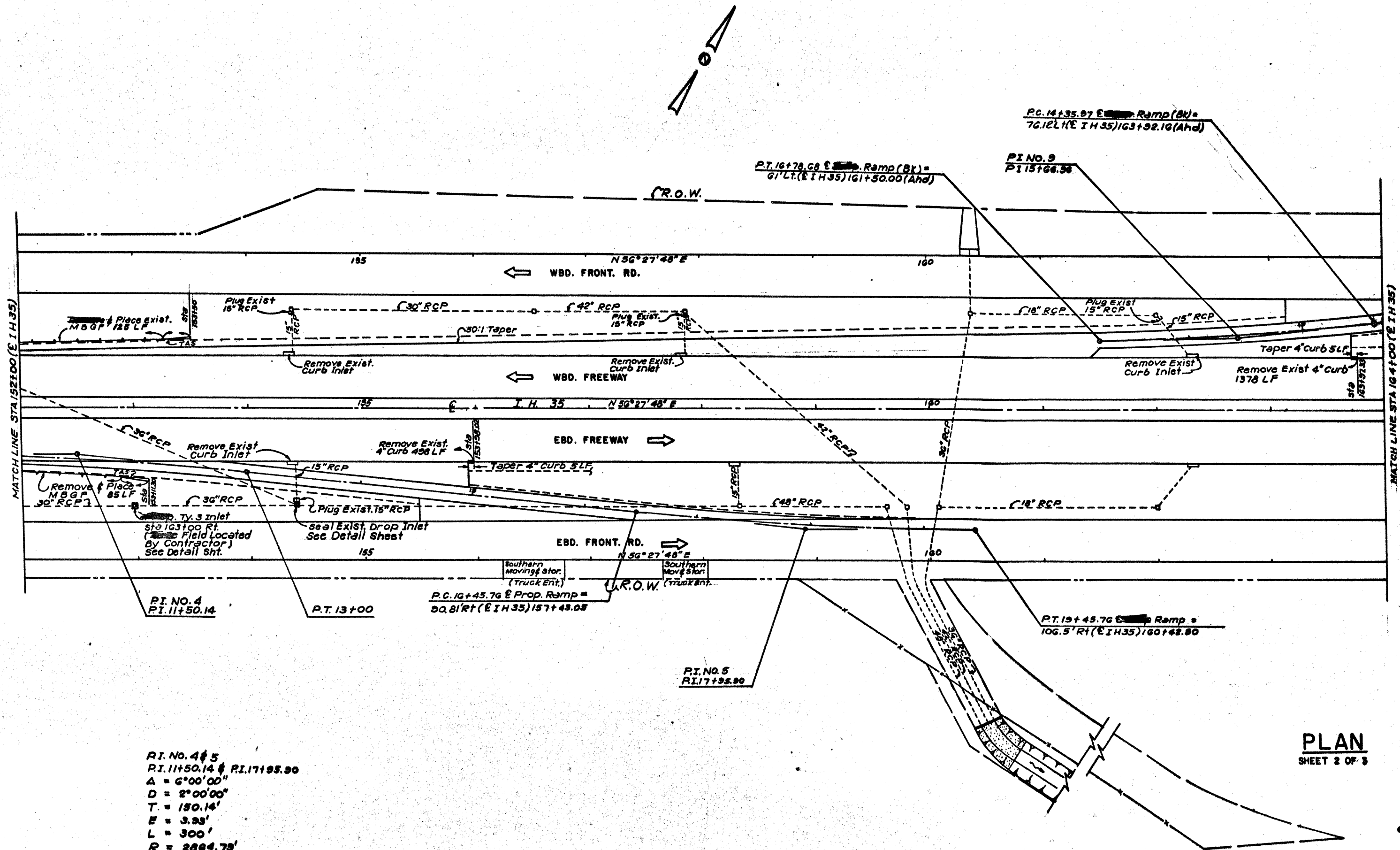
SECTION SHOWING PROPOSED RAMP AND EXISTING MAINLANE OVERLAP



SECTION SHOWING PROPOSED RAMP AND EXIST FRONTAGE ROAD OVERLAP

PLAN
SHEET 1 OF 3

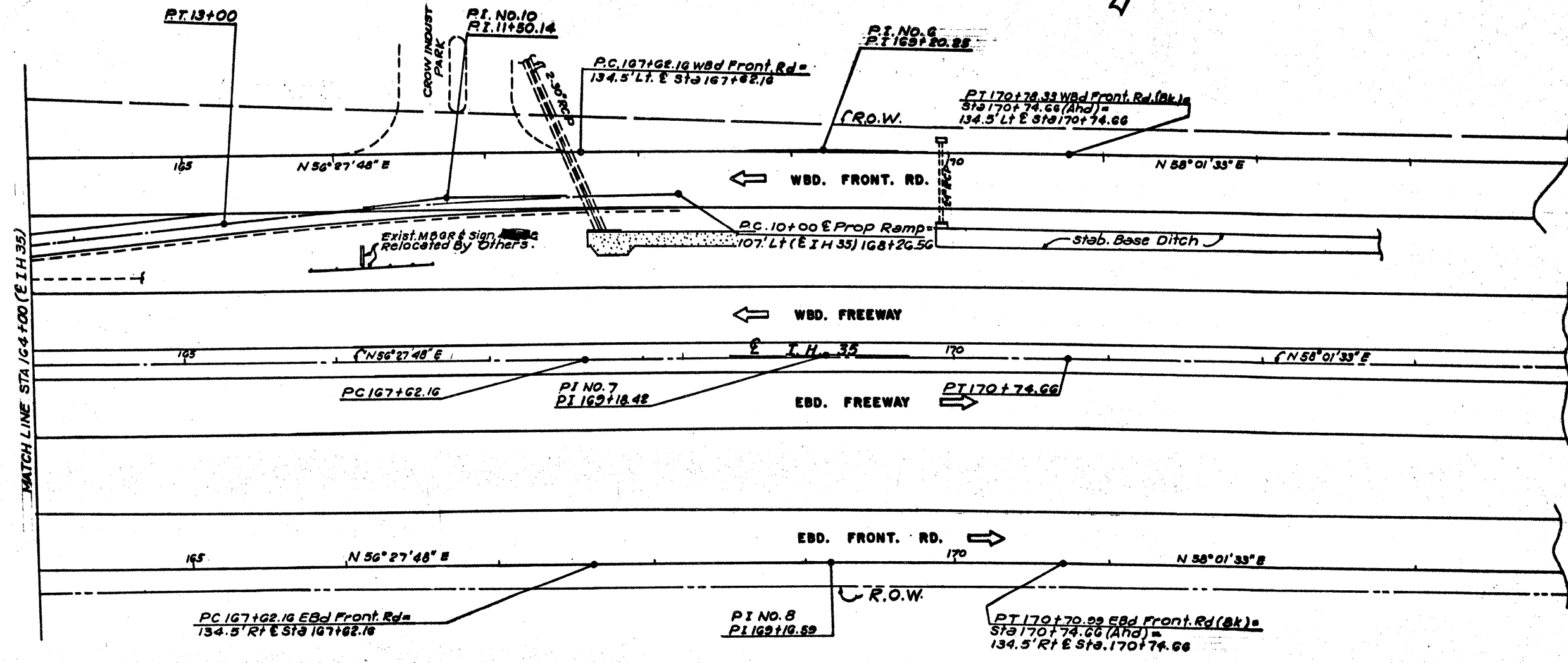
REV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
1	TEXAS	IA 35-2(181)161	6
STATE DIST. NO.	COUNTY	CONTRACT NO.	JOB NO.
15	SEAR	17	10 147 1435



P.I. NO. 4 & 5
 P.I. 11+50.14 & P.I. 17+95.90
 $\Delta = 6^{\circ}00'00''$
 $D = 2^{\circ}00'00''$
 $T = 150.14'$
 $E = 3.33'$
 $L = 300'$
 $R = 2884.79'$

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (181) 161	7
COUNTY	CITY	JOB	DATE
BEXAR	17	10	147 1485

P.I. NO. 6	P.I. NO. 7	P.I. NO. 8	P.I. NO. 9	P.I. NO. 10
P.I. 169+20.25	P.I. 169+18.42	P.I. 169+16.59	P.I. 15+66.96	P.I. 11+50.14
$\Delta = 1^{\circ}33'45''$	$\Delta = 1^{\circ}33'45''$	$\Delta = 1^{\circ}33'45''$	$\Delta = 4^{\circ}51'15''$	$\Delta = 6^{\circ}00'00''$
$D = 0^{\circ}29'39''$	$D = 0^{\circ}30'00''$	$D = 0^{\circ}30'21''$	$D = 2^{\circ}00'00''$	$D = 2^{\circ}00'00''$
$T = 158.09'$	$T = 156.26'$	$T = 154.43'$	$T = 121.43'$	$T = 150.14'$
$E = 1.08'$	$E = 1.07'$	$E = 1.05'$	$E = 2.57'$	$E = 3.33'$
$L = 316.17'$	$L = 312.50'$	$L = 308.83'$	$L = 242.71'$	$L = 300.00'$
$R = 11593.66'$	$R = 11499.16'$	$R = 11324.66'$	$R = 2864.79'$	$R = 2864.79'$



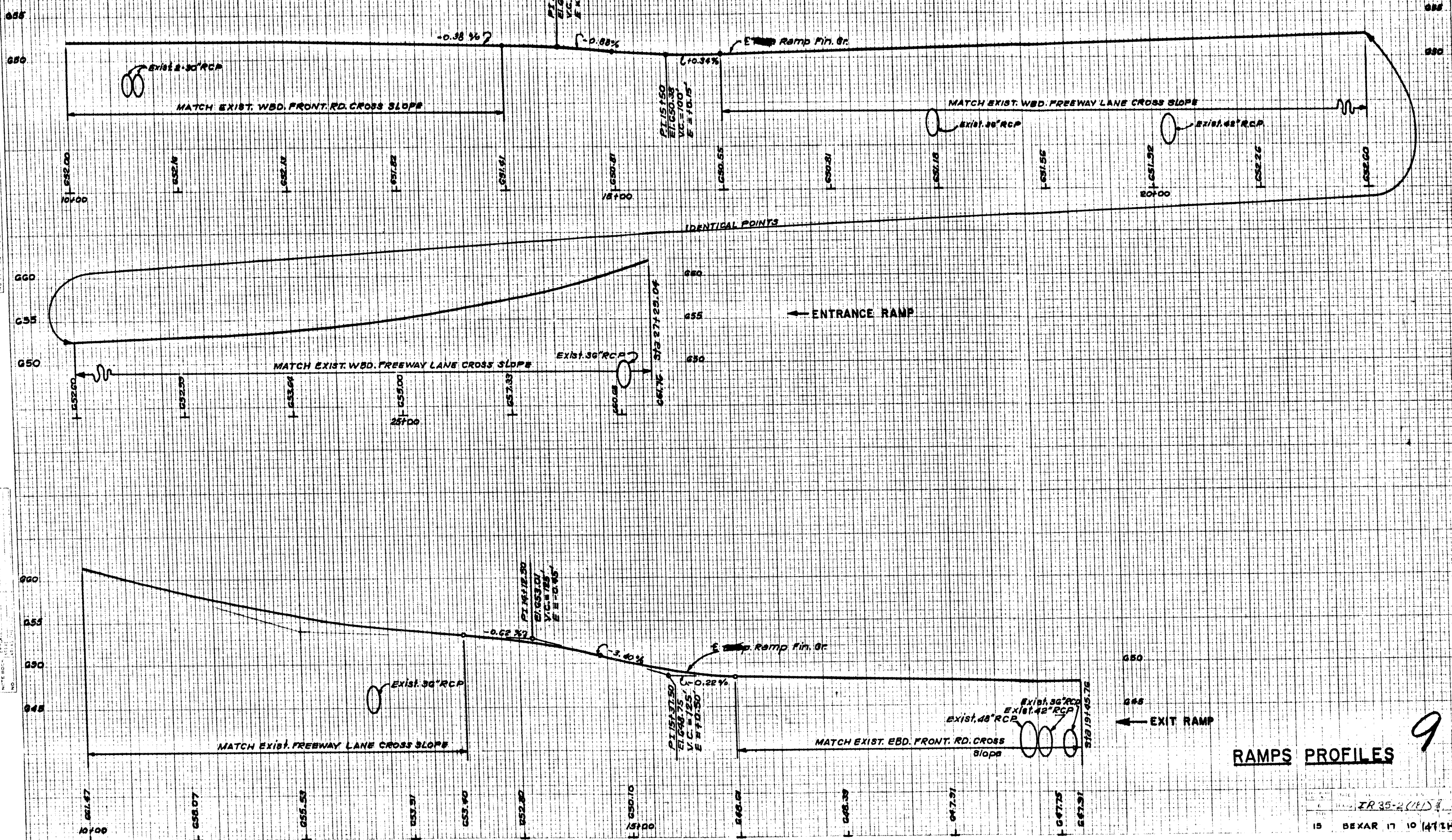
PLAN
SHEET 3 OF 3

8

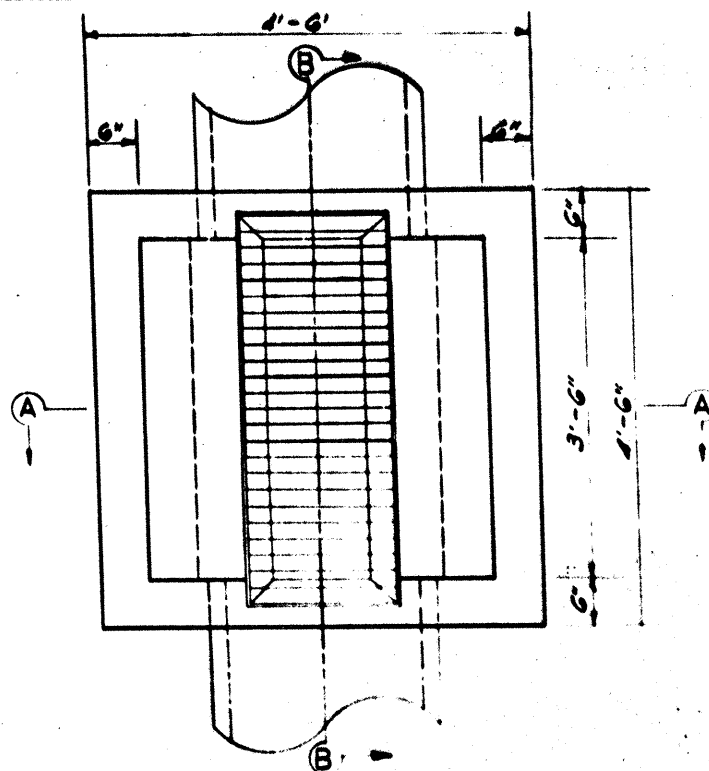
FED. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (10/15/61)	8
STATE PROJ. NO.	COUNTY	CONTRACT NO.	SECTION NO.
15	BEXAR	17	10
			147

FINAL
SURVEY
NOTES
NO.

ORIGINAL
SURVEY
NOTES
NO.

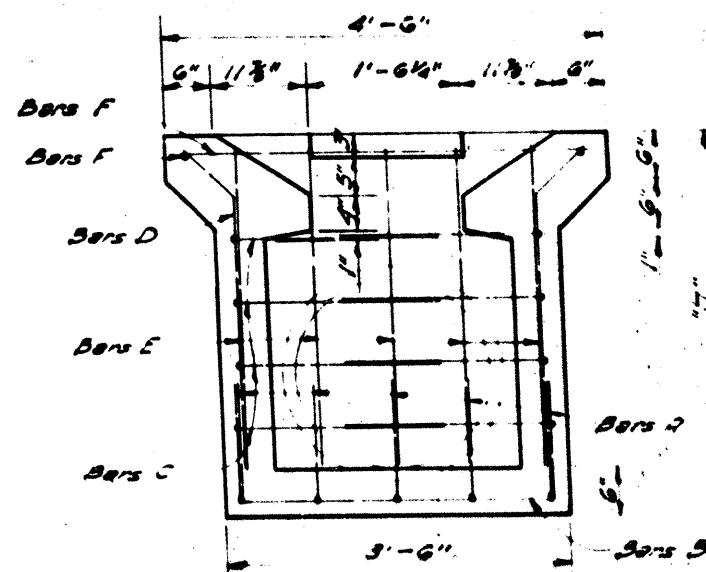


RAMPS PROFILES

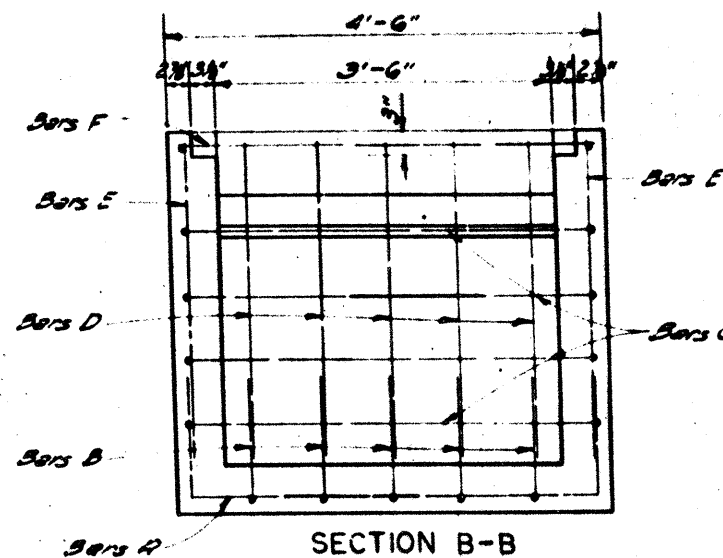


PLAN

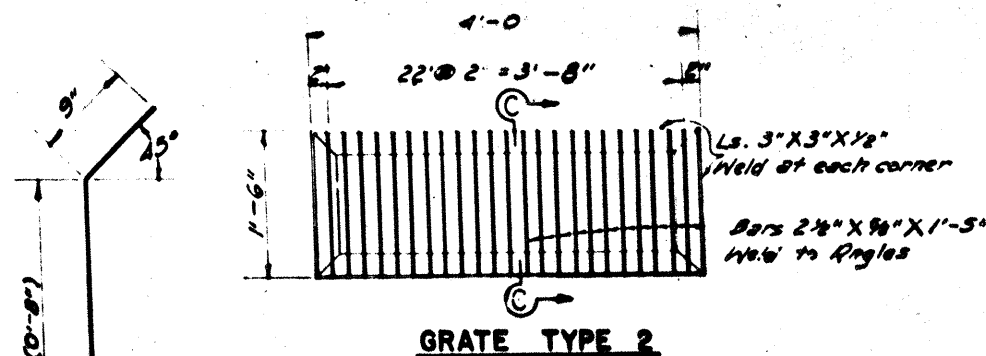
REINFORCING STEEL					
Bar	No.	Size	Spacing	Length	Weight
A	5	#4	9"x2"	6'-8"	22
B	5	#4	9"	3'-8"	19
C	Varies	#4	8"	8'-6"	Varies
D	10	#4	9"	Varies	Varies
E	10	#4	9"	Varies	Varies
F	4	#4	~	4'-2"	11



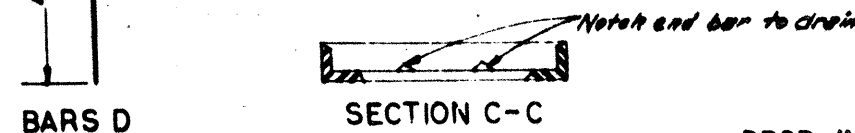
SECTION A-A



SECTION B-B

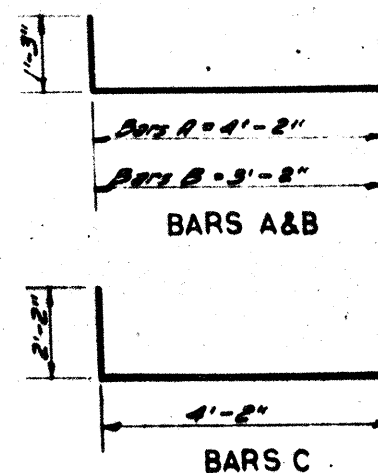


GRATE TYPE 2



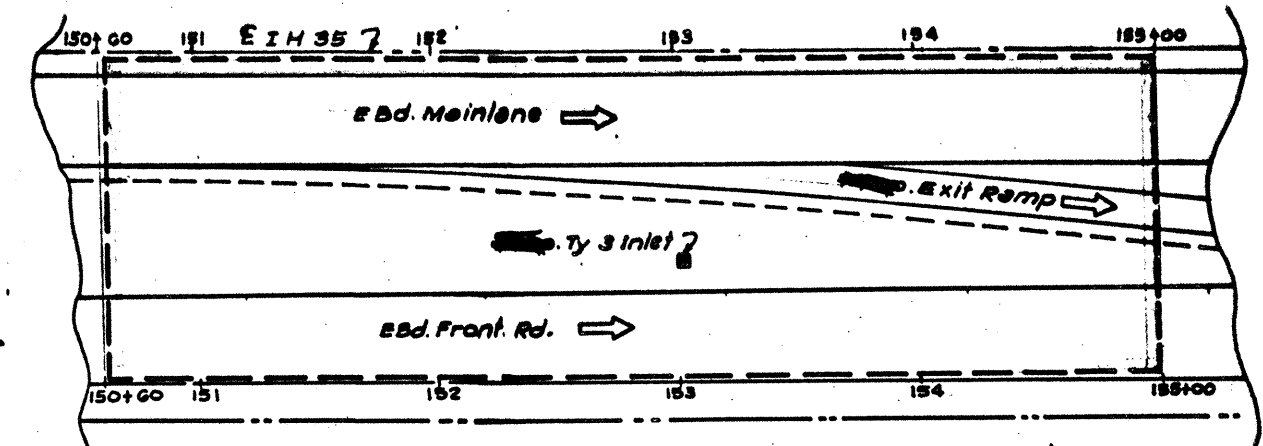
SECTION C-C

DROP INLET TYPE 3



BARS A&B

BARS C



DRAINAGE AREA MAP
1" = 40'-0"

DRAINAGE AREA (ACRES)	RUNOFF COEFF		CA	Tc (MIN)	I ₅₀ (IN / HR)	Q ₅₀ (CFS)
1.4	0.05	0.12	1.07	15	8.59	~10

Q (For Ty 3 grate):

$$Q = CA \sqrt{E_g h}$$

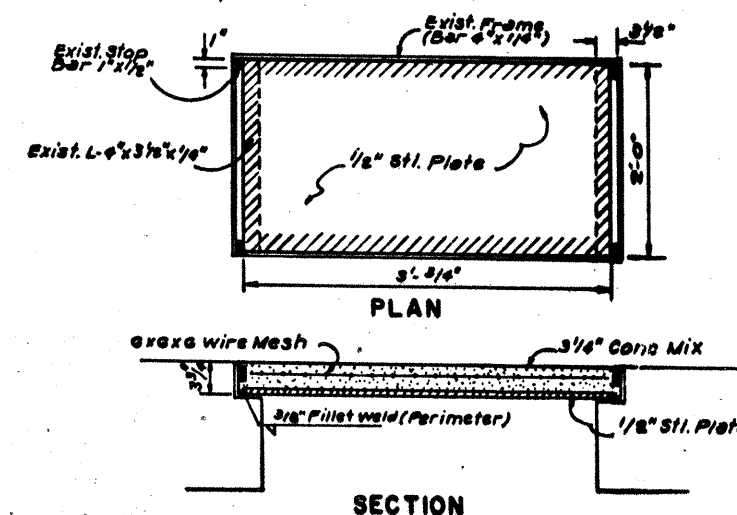
$$= 0.7(2.4063 \text{ ft}^2) \sqrt{2(32.2 \text{ ft/sec}^2)(1.0 \text{ ft})} + 0.7(2.419 \text{ ft}^2) \sqrt{2(32.2 \text{ ft/sec}^2)(1.4553 \text{ ft})}$$

$$= 13.5 \text{ CFS} + 16.4 \text{ CFS}$$

$$= 29.9 \text{ CFS}$$

ASSUME 50% CLOGGED

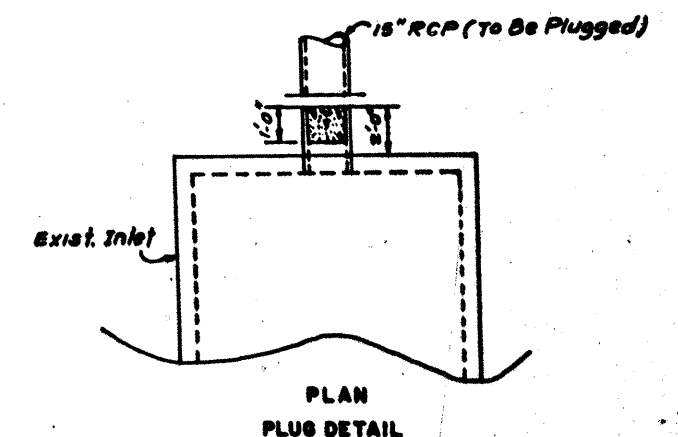
$$Q = 0.5(29.9 \text{ CFS}) = 15 \text{ CFS} > 10 \text{ CFS}$$



SECTION

- NOTES:
1. All Dimensions to be Verified in The Field.
 2. After The Stl. Plate Is Secured, Cover & Level with Conc. Mix As Approved & Directed by The Engineer.
 3. Work Done Is Subsidiary To The Other Bid Items.

INLET SEAL DETAIL



PLAN
PLUG DETAIL

- NOTE:
1. Excavate Down & Expose 15" RCP Near Inlet. Cut The Pipe, Leaving A 2' stub & Fill with 1' of Conc. Mix As Approved & Directed By The Engineer.
 2. Work Done Subsidiary To Other Bid Items.

DRAINAGE

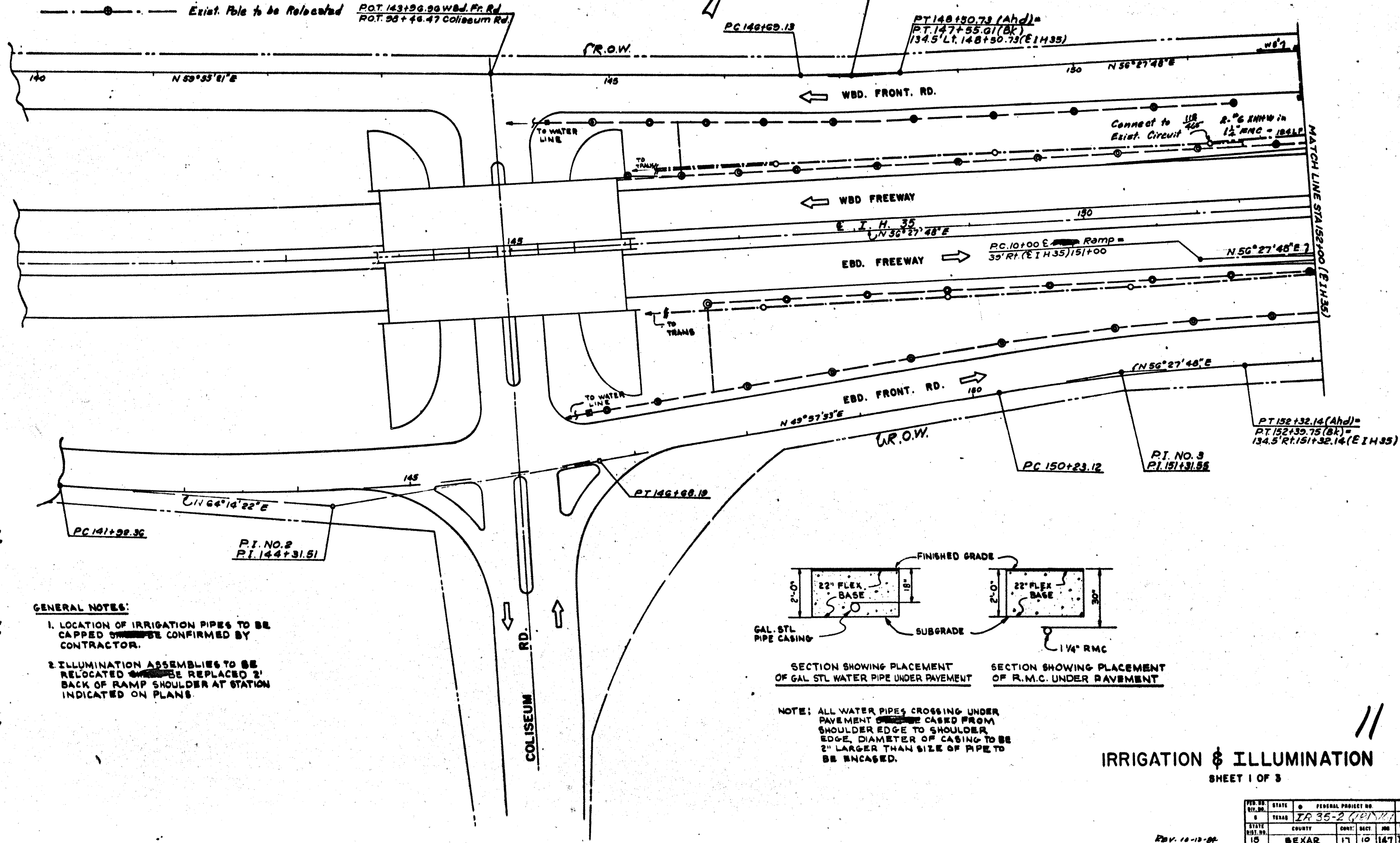
DROP INLET DETAILS

STATE	COUNTY	DIST.	SECTION	DATE	BY
15	DEKAR	17	10	1/7	

LEGEND

- Exist. Irrigation
- Exist. Illumination Pole to Remain
- Relocated Illumination Pole
- Exist. Pole to be Relocated

P.O.T. 143+96.96 Wbd. Fr. Rd.
P.O.T. 98+46.47 Coliseum Rd.



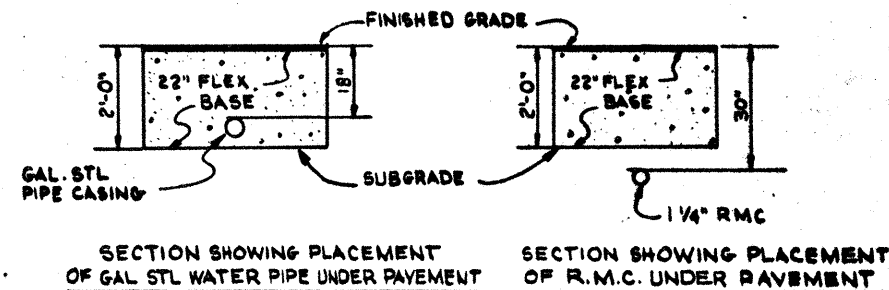
P.I. NO. 1
 $\Delta = 3^\circ 27' 33''$
 $D = 4^\circ 00' 00''$
 $T = 43.25'$
 $E = 0.65'$
 $L = 86.48'$
 $R = 1432.40'$

P.I. NO. 2
 $\Delta = 14^\circ 16' 29''$
 $D = 3^\circ 00' 00''$
 $T = 239.15'$
 $E = 15.08'$
 $L = 475.83'$
 $R = 1303.86'$

P.I. NO. 3
 $\Delta = 6^\circ 29' 58''$
 $D = 3^\circ 00' 00''$
 $T = 108.43'$
 $E = 3.08'$
 $L = 216.62'$
 $R = 1303.86'$

GENERAL NOTES:

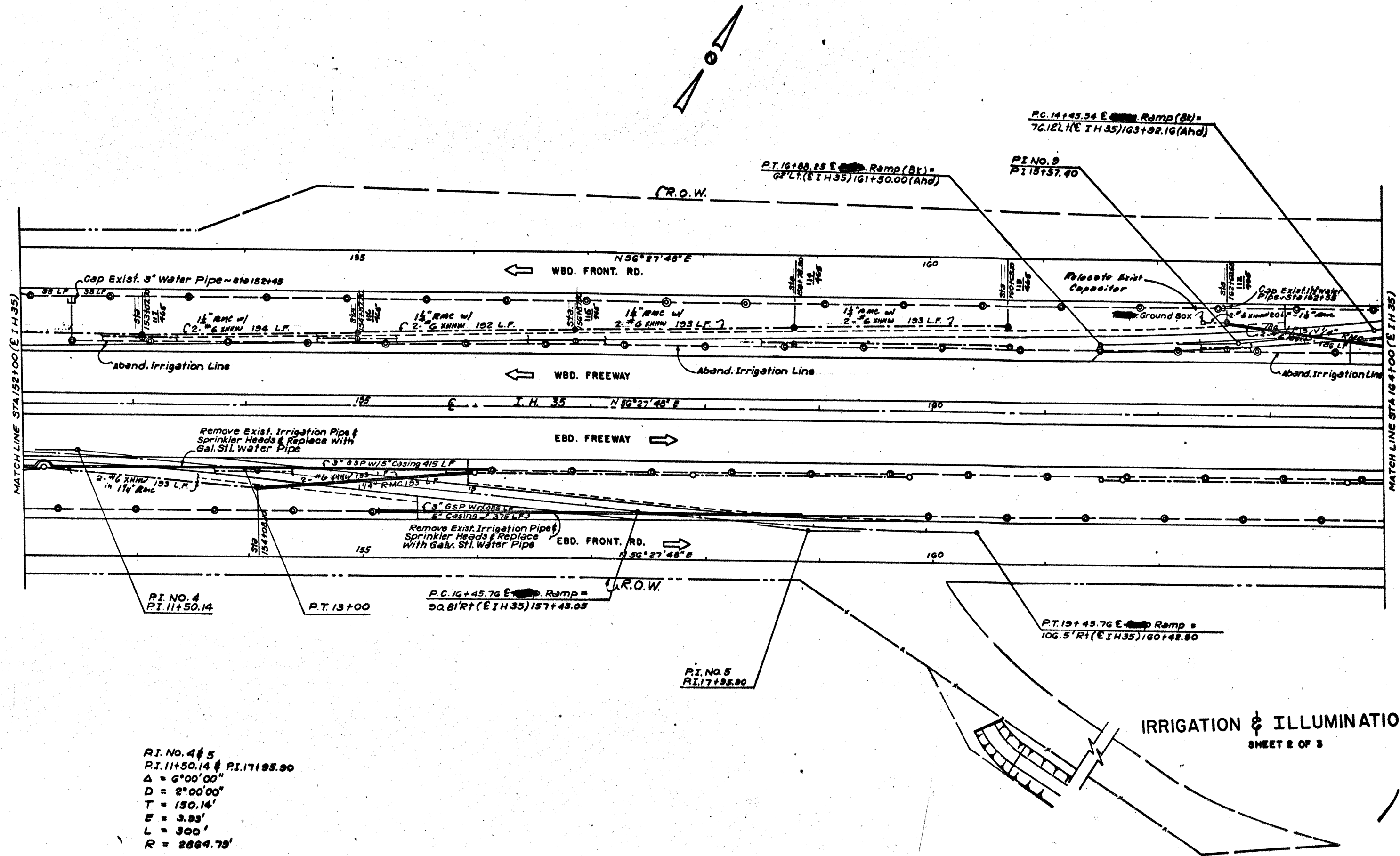
1. LOCATION OF IRRIGATION PIPES TO BE CAPPED ~~SHOULD~~ BE CONFIRMED BY CONTRACTOR.
2. ILLUMINATION ASSEMBLIES TO BE RELOCATED ~~SHOULD~~ BE REPLACED 2' BACK OF RAMP SHOULDER AT STATION INDICATED ON PLANS.



NOTE: ALL WATER PIPES CROSSING UNDER PAVEMENT ~~SHOULD~~ BE CASED FROM SHOULDER EDGE TO SHOULDER EDGE. DIAMETER OF CASING TO BE 2" LARGER THAN SIZE OF PIPE TO BE ENCASED.

IRRIGATION & ILLUMINATION SHEET 1 OF 3

REV.	DATE	BY	CHKD.	APP'D.	REVISION
1	10-10-84	IR	35-2	(10/11/84)	11
2	10-10-84	IR	35-2	(10/11/84)	11
3	10-10-84	IR	35-2	(10/11/84)	11
4	10-10-84	IR	35-2	(10/11/84)	11
5	10-10-84	IR	35-2	(10/11/84)	11



P.I. NO. 4 & 5
 P.I. 11+50.14 & P.I. 17+95.90
 $\Delta = 6^{\circ}00'00''$
 $D = 2^{\circ}00'00''$
 $T = 150.14'$
 $E = 3.93'$
 $L = 300'$
 $R = 2864.79'$

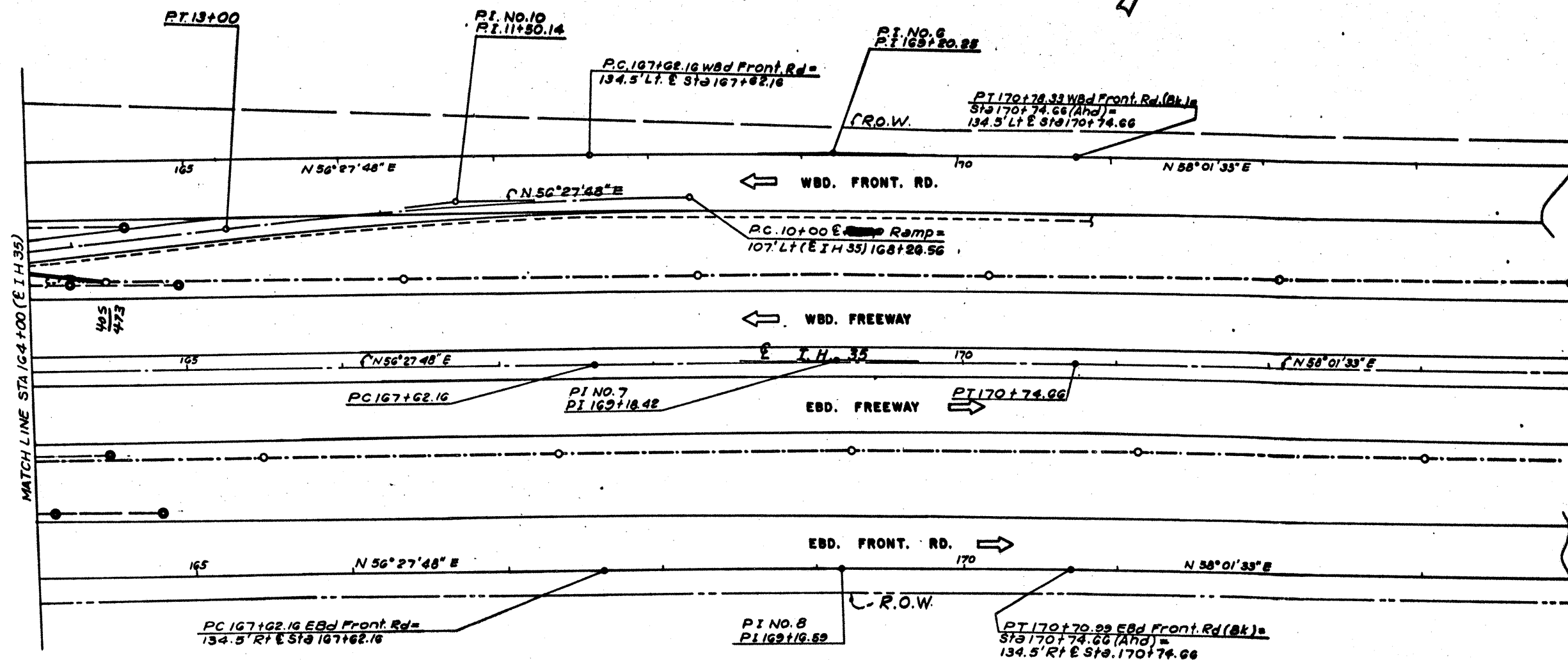
IRRIGATION & ILLUMINATION
 SHEET 2 OF 3

12

Rev. 10/12/04

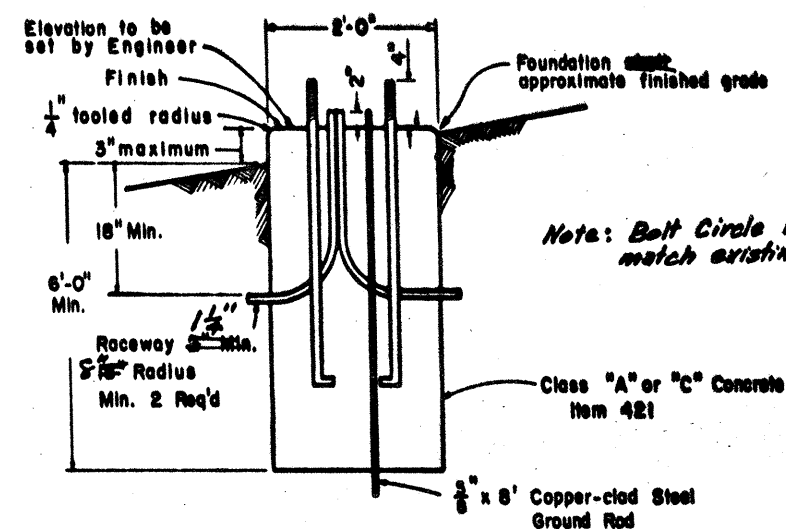
FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
0	TEXAS	IR 35-2	12
STATE DIST. NO.	COUNTY	CONTRACT NO.	SECTION NO.
15	BEXAR	1710	14TH35

P.I. NO. 6 P.I. 169+20.25 $\Delta = 1^{\circ}33'45''$ $D = 0^{\circ}29'33''$ $T = 158.09'$ $E = 1.08'$ $L = 316.17'$ $R = 11593.66'$	P.I. NO. 7 P.I. 169+18.42 $\Delta = 1^{\circ}33'45''$ $D = 0^{\circ}30'00''$ $T = 156.26'$ $E = 1.07'$ $L = 312.50'$ $R = 11459.16'$	P.I. NO. 8 P.I. 169+16.59 $\Delta = 1^{\circ}33'45''$ $D = 0^{\circ}30'21''$ $T = 154.43'$ $E = 1.05'$ $L = 308.83'$ $R = 11324.66'$	P.I. NO. 9 P.I. 15+66.96 $\Delta = 4^{\circ}51'15''$ $D = 2^{\circ}00'00''$ $T = 121.43'$ $E = 2.57'$ $L = 242.71'$ $R = 2864.79'$	P.I. NO. 10 P.I. 11+50.14 $\Delta = 6^{\circ}00'00''$ $D = 2^{\circ}00'00''$ $T = 150.14'$ $E = 3.93'$ $L = 300.00'$ $R = 2864.79'$
---	---	---	---	--

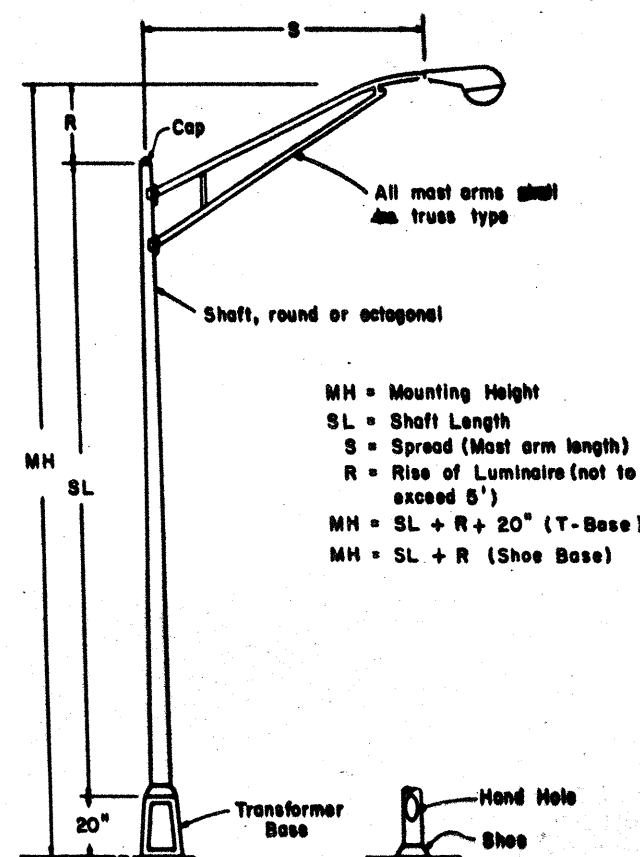


IRRIGATION & ILLUMINATION
SHEET 3 OF 3

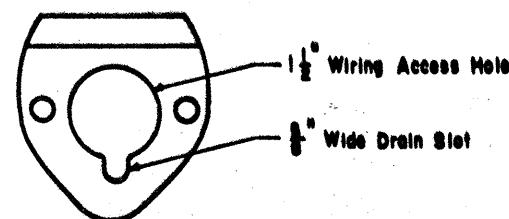
PRO. NO.	STATE	FEDERAL PROJECT NO.	DATE
0	TEXAS	IR 35-2 (1) M	13
STATE DIST. NO.	COUNTY	CONT. DIST. NO.	DATE
15	BEXAR	17 10	147 E.H. 35



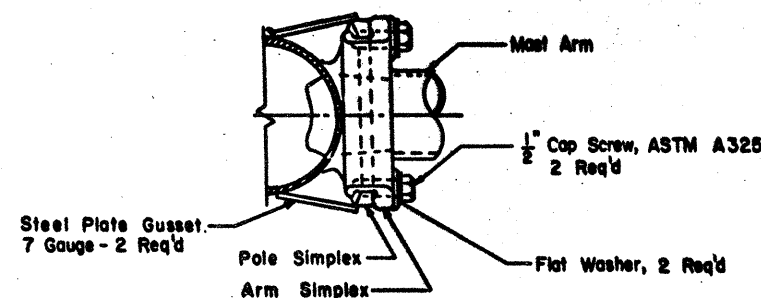
FOUNDATION DETAIL
(TYPE A)



ROADWAY ILLUMINATION ASSEMBLY

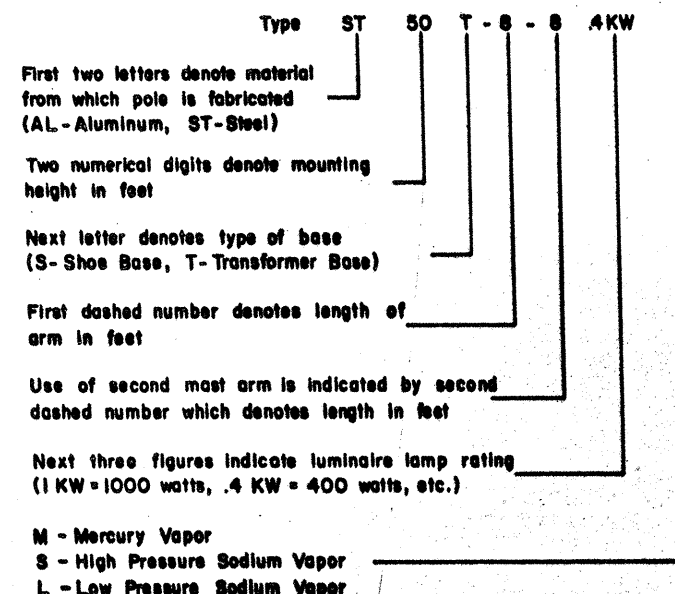


MAST ARM CONNECTOR



MAST ARM TO POLE SHAFT CONNECTION

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS



GENERAL NOTES:

I SCOPE

Details herein apply to roadway lighting installations bid under the following Specification Items: Roadway Illumination Assemblies, Roadway Illumination Assembly Foundations, Electrical Conductor, Duct Cable, Circuit Protector Assembly, Service Poles, Transformer Stations and Special Specifications relating to lighting and electrical items. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment and installation will be considered justification for rejection. Materials and installation shall comply with the applicable provisions of the National Electrical Code and National Electrical Manufacturers Association standards.

II MATERIALS

A. General. All materials shall be new and unused and shall be of the latest design.

B. Roadway Illumination Assembly

1. Structural Support Design for Mast-Arm Mounted Luminaires

Lighting standards shall be designed in accordance with the latest issue of AASHTO's "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", using wind loads based on a 50-year mean recurrence interval. The Engineer may require design calculations to be submitted.

2. Slip Joint Poles. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1 1/2 times the shaft diameter at the lap joint. The longitudinal seam weld within 13 inches of the slip joint shall be a full penetration weld.

3. Mast Arm Attachments. All poles shall be designed to support the various mast arm-luminaire combinations. All mast arms for supporting high pressure luminaires shall be designed for a 55-pound luminaire having an effective projected area of 2.4 square feet. All mast arms for supporting low pressure sodium luminaires shall be designed for a 60-pound luminaire having an effective projected area of 3.96 square feet.

4. Minor Damage Repair. The finished pole shall have a smooth, uniform finish free of pits, blisters or other defects. Scratched, chipped, or damaged areas on galvanized poles and mast arms shall be thoroughly cleaned by wire brushing. The cleaned area shall be painted with two coats of zinc dust-zinc oxide paint conforming to the requirements of Federal Specifications TT-P-641b, or repaired by the application of repair compounds meeting Federal Specification O-G93 (stick only) in accordance with the manufacturer's recommendations.

5. Straightness of Shaft. At any time prior to erection the pole shaft may be inspected for straightness. A deviation in excess of 1/4 inch in ten feet shall be considered cause for rejection.

6. Pole Bonding Means. All poles for shoe base mounting, including poles on concrete traffic barriers, shall have a grounding lug with 1/2-13 NC threads inside the pole near the hand hole.

7. Hand Holes. All poles for shoe base mounting shall have hand holes with reinforcing frames and covers. The openings on all poles shall be approximately 4" x 6 1/2" located approximately 10" from the bottom of the pole and, except for poles mounted on concrete traffic barrier, shall be placed 90 degrees to mast arm unless otherwise noted on the plans.

8. CTB Poles. Poles installed on concrete traffic barrier shall meet the requirements of CTB details.

		STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION		14		
		ROADWAY ILLUMINATION DETAILS				
		RID (1)-82 MOD.				
DN	DRAW NO	DATE	FED NO	STATE	FEDERAL PROJECT NO.	SHEET NO.
CA	ORIGINAL	5-5-82	6	TEXAS	IR 35-2011/161	14
DN	REVISED	7-1-82	6	TEXAS	IR 35-2011/161	14
CA	REVISED	9-14-82	6	TEXAS	IR 35-2011/161	14
CA	REVISED	9-14-82	6	TEXAS	IR 35-2011/161	14
CA	REVISED	9-14-82	6	TEXAS	IR 35-2011/161	14
CA	REVISED	9-14-82	6	TEXAS	IR 35-2011/161	14

GENERAL NOTES:

9. Steel Poles

a. Steel poles shall be fabricated in accordance with the Item "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. The pole shaft to base flange connection shall be open-ended to allow proper draining during galvanizing. All welding shall be in accordance with Departmental Construction Bulletin C-5. Two-section poles joined by circumferential welds will not be permitted.

b. Pole components shall be constructed using the following materials:

Shaft: ASTM A-370 Grade 45 or ASTM A-607 Grade 45 or ASTM A-595 galvanized in accordance with ASTM A-123.

Base Flange: ASTM A-27 Grade 65-35 or ASTM A-36 - galvanized in accordance with ASTM A-123.

Mast Arm Fittings: ASTM A-27 Grade 65-35 - galvanized in accordance with ASTM A-153.

Mast Arms: Steel Pipe ASTM A-53 Grade A or B - galvanized in accordance with ASTM A-123.

Pole Cap: ASTM A-27 or ASTM A-48, galvanized in accordance with ASTM A-153; or aluminum alloy ASTM B-26 or B-108 B-443.0, secured by three machine screws.

Pole Hardware: All fasteners except mast arm connection bolts shall be stainless steel or standard steel machine bolt galvanized ASTM A-153. Mast arm connection bolts shall be ASTM A-325, ASTM A-321 or ASTM A-193 Grade B-7, galvanized ASTM A-153. Lock washers shall be provided for mast arm connection bolts. Nuts and washers shall be compatible with the bolts and shall be stainless steel or steel, galvanized ASTM A-153.

Alternate material equal to or better than those specified may be substituted with the approval of the Engineer.

10. Aluminum Poles

a. Aluminum poles shall be fabricated in accordance with AASHTO's "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."

b. Pole components shall be constructed using the following material:

Shaft: ASTM B-221 or B-241 6063-T6, ASTM B-209 5086-H34; ASTM B-221 6003-T5.

Base Flange: ASTM B-108 or B-26 356.0-T6; ASTM B-108 A356.0-T6.

Mast Arm Attachments: ASTM B-209 6061-T6; ASTM B-221 6003-T5.

Mast Arms: ASTM B-241 6061-T6 or 6063-T6.

Cap: ASTM B-209 5086-H32; ASTM B-108 or B-26 356.0-T6.

Bolts: Stainless Steel AISI 300. Bolts threading into aluminum threads shall be treated with anti-seize compound; Never-Seez Compound or Permatex 133K or equal.

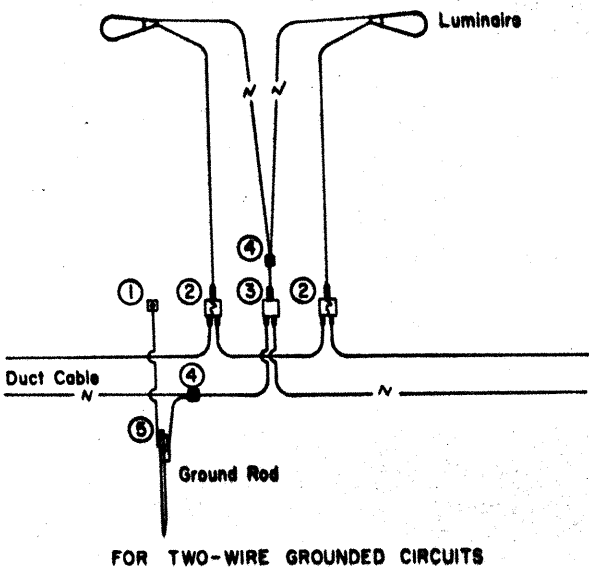
Alternate material equal to or better than those specified may be substituted with the approval of the Engineer.

C. Foundations

- Concrete for foundations will be included for payment under Item "Roadway Illumination Assembly Foundations" only.
- Anchor bolts for all poles except CTB-mounted poles shall be steel, ASTM A-36. Anchor bolts for CTB-mounted poles shall be steel, ASTM A-325. The top 8" of anchor bolts shall be galvanized. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
- Anchor bolts shall be 1 1/2" x 48" with top threaded not less than 5 inches and furnished with galvanized hexagon nuts, flat and lock washers. The lower end of the bolt shall be bent at a right angle or threaded and furnished with nut and washer. When bolts with rolled threads are furnished, bolt body need not be full size.
- The bolt circle in foundations for shafts 36 feet and less shall be 15 inches in diameter. The bolt circle in foundations for shafts in excess of 36 feet shall be 17 1/2 inches in diameter if a transformer base is used and 15 inches if a shoe base mounting is used. Poles placed on existing bridge brackets or foundations shall be coordinated with anchor bolts in place.

D. Transformer Base

- Transformer base shall be cast from aluminum alloy ASTM B-108 or B-26 356.0T6 and shall be furnished with four galvanized anchor lugs 1/2 inch thick (minimum) and shaped to conform with the transformer base flange. Transformer base shall have a bolt circle at the bottom to match bolt circle of the foundation and a bolt circle at the top to match bolt circle of the pole. The transformer base shall be approximately 20 inches high and shall have a door approximately 13" x 8" x 9 1/2". Screws or bolts for attachment of door to base shall be treated with anti-seize compound: Never-Seez Compound, Permatex 133K or equal. Four machine bolts with four nuts, eight flat washers and four lock washers, galvanized ASTM A-153, shall be provided with each transformer base. A 1/2-13 NC grounding lug shall be provided inside the transformer base.



NOTES:

① Pole Bonding Connector - Blackburn TTC3 or Weaver * TGC3 or equal.

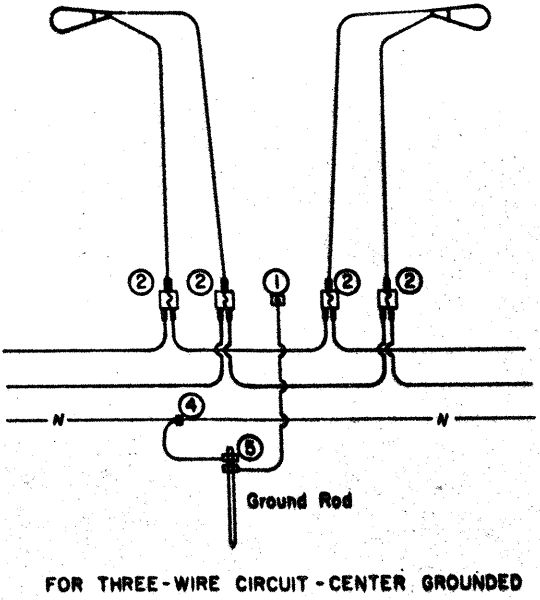
② Fused Connector - Elastimold 82S, Joy X8919 or equal.

* ③ Un-fused Connector - Elastimold 83S, Joy X8920 or equal.

④ Split Bolt Connector.

⑤ Ground Rod Clamp - 2 Required - Blackburn GG 5/8H, Burndy GKP635 or equal.

* For Transformer Base Poles. On Shoe Base Poles, connect Luminaire neutral to Pole Bonding Connector.



TYPICAL WIRING - ROADWAY ILLUMINATION ASSEMBLY
Twin Luminaire Shown - Single Luminaire Similar

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION									
ROADWAY ILLUMINATION DETAILS									
RID (2)-82 MOD.									
DR	DRAWING	DATE	REV NO	STATE	FEDERAL PROJECT NO	SHEET			
CR	DN	ORIGINAL	5-5-82	8	TEXAS	IR 35-2(111)161	14A		
CR	DW	REVISED	9-14-82						
CR	DW	REVISED		STATE	COUNTY	CONT	RECT	JOB	NO
CR	TR	REVISED		15	BEYAR	17	10	1473435	

GENERAL NOTES:

2. Transformer bases shall meet the breakaway requirements of AASHTO's "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 1975 edition, and shall have been tested by FHWA-approved methods. Bases shall also have been tested to meet the design load for a 15-foot mast arm pole in a 90 mph wind. Certification for both tests shall be submitted with the shop drawings.

E. All Luminaires

1. The luminaire housing shall be cast or drawn from a non-ferrous alloy and shall be free of cracks and excessive porosity. All nuts, screws, clips, washers and attaching hardware shall be made of stainless steel or steel electro-zinc-plated, minimum thickness 0.0002 inch with olive drab or yellow chromate conversion coating, except that brackets may be made from pre-galvanized steel. All threaded surfaces used in the housing shall be lubricated with a silicone grease.
2. The slipfitter shall securely clamp the luminaire to the mast arm. A positive means of vertical adjustment shall be provided. The refractor shall be crystal-clear pressed glass. The optic assembly shall be provided with resilient gaskets and so constructed that a positive seal against weather and other contaminants will be maintained. The luminaire shall be designed to permit ready removal of the refractor from the luminaire but shall provide a positive means of preventing an unintentional separation. The latch shall provide a positive means of maintaining closure of the luminaire. The socket shell shall be rigidly attached to a high grade porcelain base which shall extend and completely enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp.
3. Mast-arm mounted luminaires shall be provided with a leveling device which is clearly visible from the ground. Unless otherwise directed by the Engineer, mast-arm mounted luminaires will be tested and installed in the level position.
4. The underpass luminaire shall have mounting provisions to attach the luminaire directly to the wall or to an outlet box. Wiring entries into the luminaire shall be made through threaded holes or water-tight hubs. Luminaire housing, raceway fittings and attaching hardware shall be installed in such a manner as to prevent water entry into the luminaire or ballast housing. A protective guard shall be provided for the refractor.

F. High Pressure Sodium Vapor Luminaires

1. Photometrics

- a. The 250-watt luminaire, when mounted 40 feet above the midpoint of either long side of a rectangular area 200 feet by 50 feet, shall provide a measured minimum intensity of 0.1 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 20 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.8 footcandle in any ten-foot interval along the aforementioned line from 10 to 70 feet on both sides of the luminaire.

The uniformity factor "F" shall be not less than 7.0 when calculated from the equation:

$$F = \frac{L (I \text{ Min.})}{I \text{ Max.}}$$
 Where: F = the uniformity factor
L = 200
I Min. = minimum measured intensity within the rectangle
I Max. = maximum measured intensity within the rectangle

- b. The 400-watt luminaire, when mounted 50 feet above the midpoint of either long side of a rectangular area 250 feet by 80 feet, shall provide a measured minimum intensity of 0.1 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 30 feet in from the long side of the previously defined rectangle above which the luminaire is mounted shall decrease at a rate not to exceed 0.8 footcandle in any ten-foot interval along the aforementioned line from 10 to 70 feet on both sides of the luminaire.

The uniformity factor "F" shall be not less than 7.0 when calculated from the equation:

$$F = \frac{L (I \text{ Min.})}{I \text{ Max.}}$$
 Where: F = the uniformity factor
L = 250
I Min. = minimum measured intensity within the rectangle
I Max. = maximum measured intensity within the rectangle

- c. The luminaires shall meet the photometric requirements of paragraphs F.1a or F.1b when energized at 90 percent of rated line voltage.

2. Ballasts

- a. The ballast shall be regulated-type with isolated windings and shall be designed to operate high pressure sodium lamps.
- b. When the circuit voltage indicated in the plans is applied, the ballast input wattage during fluctuations of the test voltage of +5 and -10 percent shall not exceed the following:

Nominal Lamp Rating, Watts	Maximum Wattage Input
150	220
250	400
400	552

- c. During fluctuation of the test voltage of +5 and -10 percent, the lamp wattage fluctuation shall not exceed a total of 20 percent and ballast shall maintain lamp wattage within the following limits:

Nominal Lamp Watts	Minimum Lamp Watts	Maximum Lamp Watts
150	110	180
250	175	370
400	280	475

- d. The power factor of any ballast when tested at circuit voltage indicated in the plans shall be not less than 90 percent.
- e. The electronic starting aid shall provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum. The pulse width shall be a minimum of 0.8 microseconds at 2250 volts. The pulse shall occur when the open-circuit voltage is equal to or greater than 90 percent of peak open-circuit voltage. Pulse repetition rate shall be a minimum of one per cycle and pulse current shall be a minimum of 0.18 amperes. Electronic starting aids for mast-arm mounted poles shall be replaceable without the use of tools.
- f. Ballasts shall permanently and clearly indicate the following: lamp type, catalog number, voltage rating, connection diagram, and manufacturer. Capacitors in all luminaires shall be non-PCB type.

3. Lamps

- a. All lamps shall be new and shall have been manufactured within six months of the date the project is awarded.
- b. High Pressure Sodium vapor lamps in the wattage range of 200 to 400 watts inclusive shall have a lamp voltage not greater than 108 volts when tested after thirty minutes' burn-in.

4. Testing

- a. Ballasts and luminaires will be tested using a lamp furnished for the same project.
- b. Luminaires, ballasts, and lamps will be sampled and tested in accordance with the Texas Highway Department Manual of Testing Procedures.

G. Wood Poles. For projects requiring more than 10 transformer and/or service poles, poles shall be creosote-treated to eight pounds per cubic foot-retention, or pentachlorophenol-treated to 0.4 pounds per cubic foot-retention in accordance with Item "Timber Preservative and Treatment."

For projects requiring ten or fewer poles, treatment shall be as stated above and Contractor may purchase poles locally if source and treatment are documented. Poles shall meet the requirements of ANSI 05.1-1972.

H. Electrical Conductors

1. All conductors shall be of annealed copper meeting the requirements of ASTM B-3 or B-33 and the NEC. All insulated conductors shall be stranded. Bare conductors No. 8 AWG and smaller shall be solid.
2. Insulated conductors shall be NEC Types THW, THWN, or XHHW. Where project plans specify Type THW or THWN, conductors in circuits containing two or more insulated conductors shall be color-coded throughout the entire circuit. Color-coding will be required on pre-conduitized duct cable containing two or more insulated conductors.
3. Insulated conductors shall be marked in accordance with Article 310 of the NEC, and shall meet the requirements of Underwriters Laboratories' Standards.

I. Conduit and Fittings

1. Conduit must be UL Approved for the intended use shown on plan sheets. Aluminum conduit will not be permitted. Where project plans call for rigid metal conduit, NEC Type IMC conduit may be substituted, unless prohibited by plan note.
2. Fittings for Steel conduit shall be steel or malleable iron, threaded or threadless, rain-tight. Die cast, set screw, indenter or push-on (socks) fittings will not be permitted.
3. Insulating-type fittings shall be used on all metallic conduit entries into sheet metal boxes or enclosures.
4. Expansion joints for metallic conduit shall be provided with a grounding strap. Expansion joints shall be Appleton UNYL 50 Series, OZ AX Series or equal, with expansion capacity as shown in plans.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION									
ROADWAY ILLUMINATION DETAILS									
RID (3) - 82 MOD.									
DN	DRAWING	DATE	PROJECT NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.			
CH	DN	ORIGINAL	9-8-82	6	TEXAS	IR 35-2(18)761	148		
OW	REVISED								
CK	DW	REVISED			COUNTY	CONTRACT	SECTION	JOB	REVISION
TR					15	BEXAR	17	10	187
CH	TR								3435

GENERAL NOTES:

J. Ground Boxes

- 1. Precast concrete ground boxes ~~shall have~~ minimum inside dimensions of approximately 10" x 17" and at least 10" deep. Boxes ~~shall be~~ constructed of reinforced concrete with minimum wall thickness of 1". The cover ~~shall be~~ cast iron with "ILLUMINATION HIGH VOLTAGE" incised in 1" high letters. A minimum gravel fill of 18 inches ~~shall be~~ provided under each ground box.
- 2. A plastic ground box meeting the following requirements may be used if permitted by plan note:
 - a. It ~~shall be~~ manufactured from Reinforced Plastic Mortar (RPM) composed of borosilicate glass fiber, a catalyzed polyester resin and an aggregate.
 - b. Minimum inside dimensions (LxWxH) for Type I: 21" x 12" x 18"; for Type II: 29" x 16" x 26".
 - c. RPM ground box ~~shall be~~ designed for a 5000-pound single-wheel load over a 10" x 10" area in accordance with AASHTO specifications.
 - d. Cover ~~shall be~~ bolt-down with "ELECTRIC" imprint.
 - e. A minimum gravel fill of 18 inches ~~shall be~~ placed under each ground box.

K. Junction Boxes.

- 1. Junction boxes ~~shall be~~ cast iron or steel, hot-dipped galvanized, unless otherwise noted on plans.
- 2. Surface-mounted junction boxes for conduit 1 1/2" and larger ~~shall be~~ Crouse Hinds Type WAB, OZ Type Y8, with mounting lugs, minimum size 6" x 6" x 4", or approved equal. For conduit 1" or smaller, surface-mounted boxes ~~shall be~~ 4 1/2" round and approximately 2" deep, Crouse Hinds Type GRFX, Appleton Type JBDX or approved equal.
- 3. Flush-mounted junction boxes installed in concrete structures ~~shall be~~ Crouse Hinds, Appleton or approved equal, similar to boxes described above, but for flush mounting.
- 4. Conduit entry into junction boxes ~~shall be~~ made weathertight using threaded fittings or hubs, or with sealing locknuts inside and out.

L. Connectors and Splices

- 1. Quick-disconnect connectors for connecting lighting pole conductors to line ~~shall be~~ Elastimold, Joy or equal.
- 2. Connector for connecting bonding wire to pole ~~shall be~~ stud-type, Blackburn TTC3, Weaver TGC3 or equal.
- 3. Connections to neutral or grounded line conductor ~~shall be~~ made with split-bolt or compression connectors. Only two conductors will be allowed per connector.
- 4. Splices, where permitted by the Engineer, ~~shall be~~ made with approved compression sleeves, insulated with thermo-setting compound kit or with heavy-wall heat shrink tubing containing factory-applied sealant.

III CONSTRUCTION METHODS

A. General. The location of poles, conductors, conduits, junction boxes, transformer stations and service poles is diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

B. Roadway Illumination Assemblies

- 1. Roadway illumination assembly poles ~~shall be~~ erected plumb and true. Top of foundation ~~shall be~~ struck level and shims used to plumb pole, except that for shoe base poles leveling nuts may be used. Grout will not be placed between base flange and the foundation unless noted on plans. If grout is required by plan note, two 3/8" drain holes will be provided in the grouting.
- 2. In each pole, continuous, color-coded stranded No. 12 AWG Copper Type ~~TH~~ ^{XNNW} conductors in accordance with paragraph H.2. ~~shall be~~ connected to the line side of each ballast.
- 3. A fused connector assembly or fuse-holder as specified ~~shall be~~ connected in each hot wire on the line side of each ballast. Luminaires on poles will be fused using quick-disconnect fuse-holders as shown in details. Underpass luminaires ~~shall be~~ fused internally. All fuses ~~shall be~~ time-delay type.
- 4. For median-mounted poles placed on concrete median barrier, all access plates (hand holes) ~~shall be~~ on same side of the median.
- 5. Acorn nuts will not be allowed for attaching pole to transformer base or foundation.

C. Duct Cable

- 1. Duct cable ~~shall be~~ placed by the open trench method, except where otherwise noted, at a depth of approximately 18 inches unless otherwise indicated.
- 2. Ends of all ducts ~~shall be~~ sealed with duct sealing compound. All ducts entering ground boxes ~~shall be~~ securely lashed together in a vertical position.

D. Conduit

- 1. Continuous runs of conduit in excess of 150 feet attached to structures ~~shall have~~ expansion joints at mid-span or 150-foot intervals and at structure expansion joints or as shown in plans.
- 2. Spacing of conduit hangers ~~shall be~~ as specified in the current issue of the NEC. Hangers ~~shall be~~ Unistrut Series J1200, Globe Series 450 or equal unless otherwise indicated in the plans.
- 3. Conduit hangers shall not be attached directly to prestressed concrete girders.
- 4. Conduit placement beneath existing paved surfaces ~~shall be~~ accomplished by jacking or boring in accordance with the pertinent provisions of Article 476.3 "Construction" of the Item "Jacking, Boring or Tunneling Pipe," unless otherwise noted on plans. Jacking, boring, or trenching will not be paid for directly but will be subsidiary to the Item "Conduit." Duct cable ~~shall be~~ extended through the conduit in one continuous length or conductors ~~shall be~~ encased in a continuous length of conduit where passing under an existing roadway. Direct burial of conductor will not be allowed.

E. Circuits and Connections

- 1. After installation and prior to connecting ends, each continuous run of insulated conductor ~~shall be~~ minimum D.C. insulation resistance of one megohm when tested at 500 volts D.C.
- 2. All or part of conductor system may be tested at the Engineer's option. Conductors exhibiting an insulation resistance of less than one megohm ~~shall be~~ replaced by the Contractor at his own expense.

F. Bonding and Grounding

- 1. Contractor ~~shall~~ insure that all exposed metal containing electrical conductors is bonded and grounded, using ground rods, grounding bushings and locknuts and other fittings as necessary.
- 2. Metallic conduit, lighting poles, and luminaires on bridge structures ~~shall be~~ grounded. At each end of the structure a 5/8" x 8' copper-clad ground rod ~~shall be~~ driven in the ground and a No. 8 AWG copper grounding conductor ~~shall be~~ installed from the ground rod to the grounded conductor of the lighting circuit. The grounding conductor ~~shall be~~ bare or, if insulated, ~~shall be~~ green. Ground rods, connectors and grounding conductors will not be paid for separately, but will be subsidiary to the various bid items.
- 3. Lightning arrester grounding conductor ~~shall be~~ tied directly to the pole-grounding conductor.



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS

14C

RID (4) - 82 MOD.

DATE	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	DATE
CH DN	ORIGINAL	5-5-82	6	TEXAS	IR 35-21111 161	14C
CH DN	REVISED					
CH DN	REVISED					
TR			STATE DIST. NO.	COUNTY	CONT. SECT.	JOB
CH TR			15	BEYAR	17	10 147 1425

SUMMARY DATA

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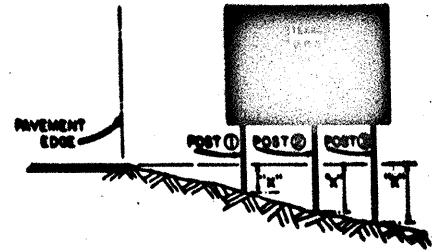
SUMMARY DATA 15

REV. 10-12-84
REV. 11-9-84

PER TO DIV. NO.	STATE	FEDERAL PROJECT NO.				POST NO.
0	TEXAS	IR 35-2 (M) 101				15
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	WEEKLY NO.	
15	BEKAR	17	10	147	I.H. 35	

SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	GROUND MOUNT SUBSTRATE	ALUMINUM TYPE A	OVERHEAD SUBSTRATE	TYPE OF MOUNT	"X" DIMENSION			GALVANIZED PIPE POSTS				GALVANIZED STRUCTURAL STEEL				DRILLED SHAFT				NON-PART.	
						PLYWOOD TYPE 'A'		TYPE 'O'		POST ①	POST ②	POST ③	LINEAR FEET				SIZE	POST ①	POST ②	POST ③	TOTAL WEIGHT LBS.	LINEAR FEET				
						SQUARE FEET		SQUARE FEET					1 1/2"	2"	2 1/2"	3"						12"	24"	30"		36"
21	3A	EI-5C	GREEN	EXIT 160	9'-0" x 2'-0"	18.00			320	1.8	1.5					W6 x 12	15.8	15.5		456		13.0				
	3	F3-2A		Salado Creek - Turnaround	17'-6" x 7'-6"	131.25																				
				1 MILE																						
22	4A	EI-5d		EXIT 159 B	10'-6" x 2'-0"	21.00			320	1.0	3.7					W6 x 9	13.0	15.7		325		11.0				
	4	F3-2A		Walters St - V4 MILE	14'-6" x 5'-6"	79.75																				
	6A	EI-5d		EXIT 159 B	10'-6" x 2'-0"	21.00			320	1.3	4.6					W6 x 12	15.3	18.6		487		13.0				
	6	F2-2R		St. Phillips-College - NEXT RIGHT	14'-0" x 7'-6"	105.00																				
	10A	EI-5C		EXIT 160	9'-0" x 2'-0"	18.00			320	1.4	6.1					W6 x 15	15.4	20.1		568		15.0				
	10	F3-2A		Salado Creek - Turnaround	17'-6" x 7'-6"	131.25																				
				1/2 MILE																						
	13	FR2-1	WHITE	SPEED LIMIT 55	48" x 60"	20.00			G	0.2	1.2					S4 x 7.7	16.7	17.7		335	7.0					
		FR2-4	WHITE	MINIMUM SPEED 45	48" x 60"	20.00																				
	18A	EI-5C	GREEN	EXIT 161	9'-0" x 2'-0"			18.00	PROPOSED O.S.B. STR. NO. 1 - SEE SHEET NOS. 36, 65, 66, 67															46.0		
	18	F3-2A		Binz - Englemann - Rd.	21'-6" x 7'-6"			161.25																		
				1 MILE																						
	19A	EI-5C		EXIT 160	9'-0" x 2'-0"			18.00																		
	19	FI-4		Salado Creek	21'-0" x 6'-0"			126.00																		
				Turnaround																						
	21	F3-2A		SOUTH-Interstate 35-Interstate 37	10'-0" x 11'-0"	110.00	7.18		320	1.5	3.8					W6 x 12	19.0	21.3		564		13.0				
				Laredo - 2 1/4 MILES			7.18																			
23	8	FR2-1	WHITE	SPEED - LIMIT - 55	48" x 60"	20.00			G	0.4	0.8					S4 x 7.7	16.9	17.3		334	7.0					
		FR2-4	WHITE	MINIMUM-SPEED-45	48" x 60"	20.00																				
	10A	E5-2C	GREEN	160	5'-0" x 2'-0"	10.00			320	2.0	3.2					S3 x 5.7	13.5	14.7		162	7.0					
	10	E5-1		EXIT -	6'-0" x 5'-0"	30.00																				
	15A	EI-5C		EXIT 161	9'-0" x 2'-0"	18.00			320	0.3	0.7					W6 x 12	16.3	16.7		477		13.0				
	15	F2-2R		FM 78	13'-0" x 9'-6"	123.50	13.50																			
				Kirby - NEXT RIGHT																						
	18	F4-2		NORTH	17'-6" x 9'-6"		7.18	166.25	PROPOSED O.S.B. STR. NO. 2 - SEE SHEET NOS. 37, 65, 66, 67															42.0		
				Interstate 35 - Interstate 410			9.41																			
				Austin																						
	19A	EI-5C		EXIT 162	9'-0" x 2'-0"			18.00																		
	19	F3-2A		SOUTH	12'-0" x 8'-6"		9.41	102.00																		
				Interstate 410 - 1 MILE																						
24	2A	E5-2C		160	5'-0" x 2'-0"	10.00			USE EXIST. MOUNT																	
	2	E5-1		EXIT -	6'-0" x 5'-0"	30.00																				
	4	F4-2		SOUTH	16'-6" x 9'-6"		7.18	156.75	EXISTING O.S.B. STR. NO. E-1 - SEE SHEET NOS. 38, 39																	
				Interstate 35 - San Antonio																						
	5A	EI-5d		EXIT 159 B	10'-6" x 2'-0"			21.00																		
	5	F3-2A		Walters St	14'-6" x 5'-6"			79.75																		
				1 1/4 MILES																						
	6A	EI-5C		EXIT 160	9'-0" x 2'-0"			18.00																		
	6	FI-4		Coliseum	12'-0" x 7'-6"			90.00																		
				Rd																						
	10	FI7-1		Salado Creek	5'-0" x 3'-0"	15.00			320	0.7	1.8					S3 x 5.7	10.2	11.3		180	7.0					
	12A	EI-5C		EXIT 160	9'-0" x 2'-0"	18.00			320	1.1	3.4					W6 x 12	15.6	17.9		483		13.0				
	12	F3-2A		Coliseum Rd	16'-6" x 6'-0"	99.00																				
				1/4 MILE																						
CONTROL 17-10-						SHEET TOTAL		1068.75	61.04	975.00										4371	28.0	91.0	88.0			



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GENERAL NOTES:

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ALL SIGNS ~~SHOULD~~ BE ERECTED ACCORDING TO THE STATION NUMBER SHOWN ON THE PLAN AND PROFILE SHEETS EXCEPT THAT THE ENGINEER MAY SHIFT A SIGN IN ORDER TO SECURE A MORE DESIRABLE LOCATION. THE ENGINEER WILL STAKE ALL SIGN LOCATIONS, AND NO CHANGES IN THOSE LOCATIONS ~~SHOULD~~ BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER.

THE POST LENGTHS LISTED HERE ARE APPROXIMATIONS. THE CORRECTED POST LENGTHS WILL BE FURNISHED BY THE ENGINEER AFTER THE CONTRACTOR HAS PLACED THE STUD POSTS.

TOWER HEIGHTS ~~SHOULD~~ BE VERIFIED WITH THE ENGINEER BEFORE FABRICATION.

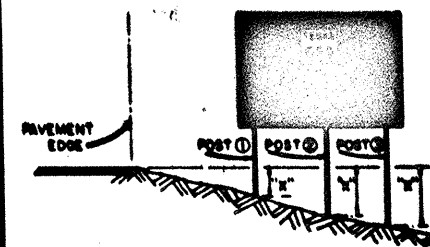
SUMMARY OF LARGE SIGNS

SHEET 1 OF 5

DATE	PROJECT	DESIGNER	CHECKER	INCHES
15	6	16	16	16
DATE	PROJECT	DESIGNER	CHECKER	INCHES
BEXAR	17	10	147	38

SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	GROUND MOUNT SUBSTRATE PLYWOOD TYPE "A" SQUARE FEET	ALUMINUM TYPE A SQUARE FEET	OVERHEAD SUBSTRATE TYPE "O" SQUARE FEET	TYPE OF MOUNT	"X" DIMENSION			GALVANIZED PIPE POSTS				GALVANIZED STRUCTURAL STEEL				DRILLED SHAFT				NON-PART								
										POST ①	POST ②	POST ③	LINEAR FEET				SIZE	LINEAR FEET			TOTAL WEIGHT LBS.	LINEAR FEET											
													1 1/2"	2"	2 1/2"	3"		POST ①	POST ②	POST ③		NON-REINFORCED 12"	24"	30"		36"							
24	13	F22-5	BLUE	CAMPING	16'-6" x 2'-0"	33.00			---	SIGN TO BE MOUNTED BELOW SIGN NO. 12																							
	15A	E1-5C	GREEN	EXIT 161	9'-0" x 2'-0"	18.00			---	330	1.9	3.8	5.5					W6 x 9	16.2	18.1	19.8	587			16.5								
	15	F3-2A		Binz - Englemann Rd	21'-6" x 7'-6"	161.25			---																								
				1/4 MILE					---																								
	17	F17-1		Salado Creek	5'-0" x 3'-0"	15.00			---	320	0.1	0.7						S3 x 5.7	9.6	10.2		161	7.0										
	21	F4-2		NORTH Interstate 35 - Interstate 410 Austin	17'-6" x 9'-6"		7.18 9.41	166.25	---	EXISTING O.S.B. STR. NO. E-2 ~ SEE SHEET NOS. 38, 39																							
	22A	E1-5C		EXIT 162	9'-0" x 2'-0"			18.00	---																								
	22	F3-2A		SOUTH Interstate 410 1/4 MILE	12'-0" x 8'-6"		9.41	102.00	---																								
	23A	E1-5C		EXIT 161	9'-0" x 2'-0"			18.00	---																								
	23	F1-4		Binz - Englemann Rd	21'-6" x 7'-6"			161.25	---																								
25	3A	E1-5C		EXIT 160	9'-0" x 2'-0"	18.00			---	USE EXIST. MOUNT																							
	3	F3-2A		Coliseum Rd 1 MILE	16'-6" x 6'-0"	99.00			---																								
	5A	E5-2C		161	5'-0" x 2'-0"	10.00			---	320	0.0	0.0						S3 x 5.7	11.5	11.5		189	7.0										
	5	E5-1		EXIT -	6'-0" x 5'-0"	30.00			---																								
	6A	E1-5C		EXIT 162	9'-0" x 2'-0"	18.00			---	330	0.5	1.9	3.8						W6 x 12	16.8	18.2	20.1	782			19.5							
	6	F2-2R		LOOP - 13 W.W. White Rd. - NEXT RIGHT	21'-0" x 9'-6"	199.50	12.00		---																								
	10	F4-2		NORTH Interstate 35 - Interstate 410 Austin	17'-6" x 9'-6"		7.18 9.41	166.25	---	EXISTING O.S.B. STR. NO. E-3 ~ SEE SHEET NOS. 39, 40																							
	11A	E1-5C		EXIT 162	9'-0" x 2'-0"			18.00	---																								
	11	F1-4		SOUTH Interstate 410 -	12'-0" x 7'-0"		9.41	84.00	---																								
	16	FR2-1	WHITE	SPEED LIMIT - 55	48" x 60"	20.00			---	G	0.9	1.7							S4 x 7.7	17.4	18.2		345	7.0									
		FR2-4	WHITE	MINIMUM SPEED 45	48" x 60"	20.00			---																								
	17	E5-2C	GREEN	162 (EXIST. EXIT SIGN)	5'-0" x 2'-0"	10.00			---	USE EXIST. MOUNT																							
CONTROL 17-10- SHEET TOTAL						651.75	64.00	733.75															2064	21.0	36.0								
CONTROL 17-10- GRAND TOTAL						1720.50	125.04	1708.75																6435	49.0	127.0	88.0						



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TOWER HEIGHTS ~~SHALL BE~~ VERIFIED WITH THE ENGINEER BEFORE FABRICATION.

SUMMARY OF LARGE SIGNS

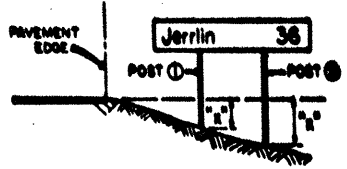
SHEET 2 OF 5

STATE DISTRICT	FEDERAL REG-NO	FEDERAL AID PROJECT	0	CHRG
15	6	IR 35-2	691561	17
COUNTY		REPORT	SECTION	JOB
REYAR		17	10	147

SUMMARY OF SMALL SIGNS

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	PLYWOOD TYPE A	ALUMINUM TYPE A	TYPE OF MOUNT										"X" DIMENSION		NON-PART.		
							A	A-1	B	C	D-1	D-2	D-3	D-4	D-5	D-6	F	MP	MW		
21	1	FW4-IR	MERGE	48" x 48"	✓												✓			1.6	
	5	FW4-IR	MERGE	48" x 48"	✓												✓			1.5	
																		✓			
	22	1	DIO-G	MILE 160		✓											✓			0.7	
	2	FW12-2T	FT IN	48" x 48"	✓																
22	2A	PLAQUE	CLEARANCE	24" x 18"	✓													✓			
	9	DIO-G	MILE 160	12" x 48"		✓															
	11	SM3-1B	NORTH	30" x 15"																	
	15	SM3-2a	INTERSTATE-TEXAS-35	36" x 36"	✓												✓			0.1	
			SYM. YIELD AHEAD	48" x 48"	✓												✓				
			YIELD-AHEAD	24" x 18"	✓												✓			1.5	
																	✓				
	16	SW3-2a	SYM. YIELD AHEAD	48" x 48"	✓												✓			1.9	
			YIELD-AHEAD	24" x 18"	✓												✓			2.0	
	17	W13-2	EXIT 30 MPH	48" x 60"	✓												✓				
	20	SR5-1a	WRONG-WAY	48" x 36"	✓												✓			0.8	
																	✓				
	2	FW4-IR	MERGE	48" x 48"	✓												✓			1.2	
	7	DIO-G	MILE 161	12" x 48"	✓												✓			-0.2	
	9	SR5-1	DO NOT-ENTER	48" x 48"	✓												✓				
	12	FR1-2	YIELD	60" x 60"	✓												✓				
	12A	SPL.	TO EXIT-RAMP	36" x 18"	✓												✓			0.0	
																	✓			1.1	
	13	SR5-1a	WRONG-WAY	48" x 36"	✓												✓			0.4	
	14	SR5-1	DO NOT-ENTER	48" x 48"	✓												✓				
																	✓				
	17	FW12-2T	FT IN	48" x 48"	✓																
	17A	PLAQUE	CLEARANCE	24" x 18"	✓												✓			1.7	
	22	DIO-G	MILE 161	12" x 48"	✓												✓			0.0	
	23	FW4-IR	MERGE	48" x 48"	✓																
	24	M3-3B	SOUTH	24" x 12"	✓																
			INTERSTATE-TEXAS-35	24" x 24"	✓															0.0	
				21" x 15"	✓																
	25	M3-3B	SOUTH	24" x 12"	✓												✓			0.5	
			INTERSTATE-TEXAS-35	24" x 24"	✓												✓			-0.1	
				21" x 15"	✓												✓			0.8	
	9	W13-2	EXIT 30 MPH	48" x 60"	✓												✓				
	18	W13-2	EXIT 30 MPH	48" x 60"	✓												✓				
	4	DIO-G	MILE 162	12" x 48"	✓												✓				
	7	W13-2	EXIT 40 MPH	48" x 60"	✓																
	14	DIO-G	MILE 162	12" x 48"	✓																
																	17				
																	6				
			CONTROL 17-10 - GRAND TOTAL				2														



THE "X" DIMENSION IS THE ELEVATION DIFFERENCE AT THE POST BETWEEN THE GROUND AND THE EDGE OF PAVEMENT OR TOP OF CURB. THESE ARE APPROXIMATIONS ONLY SUBJECT TO CORRECTION FOR FINAL GRADES OF SIDE SLOPES.

GENERAL NOTES:

ALL SIGNS ~~SHOULD~~ BE ERECTED ACCORDING TO THE STATION NUMBER SHOWN ON THE PLAN AND PROFILE SHEETS EXCEPT THAT THE ENGINEER MAY SHIFT A SIGN IN ORDER TO SECURE A MORE DESIRABLE LOCATION. THE ENGINEER WILL STAKE ALL SIGN LOCATIONS, AND NO CHANGES IN THOSE LOCATIONS ~~SHOULD~~ BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER.

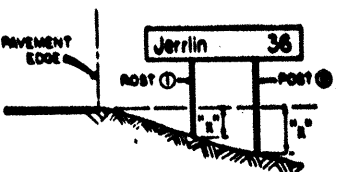
SUMMARY OF SMALL SIGNS

SUMMARY OF LARGE SIGNS (WITH REMOVABLE COPY)

SUMMARY OF LARGE SIGNS										SIGNS TO BE REMOVED					SIGNS TO BE REMOVED AND REPLACED				
PLAN SIGN SHEET NO.	SIGN TYPE	SIGN DIMENSIONS	PLAN SIGN SHEET NO.	SIGN TYPE	SIGN DIMENSIONS	EXISTING TYPE OF MOUNT	EXISTING POST SIZE	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE	PLAN SIGN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN DIMENSIONS	EXISTING TYPE OF MOUNT	EXISTING POST	EXISTING DRILL SHAFT SIZE			
SIGN ONLY										EXISTING ROADSIDE SIGNS TO BE REMOVED					REMOVING AND REPLACING GROUND-MOUNTED SIGNS				
SIGN ONLY										SIGN AND MOUNT					REMOVING OVHD GUIDE SIGN				
24	1	FI-1	6'-0" x 5'-0"	22	3	F2-2R	13'-0" x 5'-0"	5'-1-BEAM	✓										
					5	F8-1	12'-0" x 6'-0"	4'-1-BEAM	✓										
				23	1	F3-2A	10'-0" x 11'-0"	6'-1-BEAM	✓										
					11	F8-3	16'-0" x 8'-0"	6'-6" x 20	✓										
				24	11	F22-6	9'-6" x 4'-0"	3'-1-BEAM	✓										
					16	IG-10	26'-0" x 5'-6"	8'-6" x 31	✓										
25	2	IG-9	16'-6" x 6'-0"																
					1	IG-9	16'-6" x 6'-0"	6'-6" x 20	✓										
CONTROL 17-D- SHEET TOTAL			2	EA.			CONTROL 17-10- SHEET TOTAL			7	EA.								

SUMMARY OF SMALL SIGNS (WITHOUT REMOVABLE COPY)

SIGNS TO BE REMOVED										SIGNS TO BE REMOVED AND REPLACED									
PLAN SHEET NO.	SIGN TYPE	SIGN DIMENSIONS	PLAN SHEET NO.	SIGN TYPE	SIGN DIMENSIONS	EXISTING TYPE OF MOUNT	EXISTING POST SIZE	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE	PLAN SHEET NO.	SIGN TYPE	SIGN DIMENSIONS	EXISTING TYPE OF MOUNT	EXISTING POST	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE	EXISTING DRILL SHAFT SIZE
REMOVING EXISTING SIGN PANELS										REMOVING AND REPLACING GROUND-MOUNTED SIGNS									
SIGN ONLY																			
EXISTING ROADSIDE SIGNS TO BE REMOVED																			
SIGN AND MOUNT																			
21	2	FW4-IR	48"x48"	FW4-IR	48"x48"	F	3" PIPE	✓											
	4	FW4-IR	48"x48"	FW4-IR	48"x48"	F	3" PIPE	✓											
	6	DIO-6	12"x48"	DIO-6	12"x48"	DELIN. POST													
	7	DIO-6	12"x48"	DIO-6	12"x48"	DELIN. POST													
	22	7	FR2-1	FR2-1	48"x60"	G	4"x7.7"	✓											
			FR2-4	FR2-4	48"x60"	G	4"x7.7"	✓											
	14	FR2-1	48"x60"	FR2-1	48"x60"	G	4"x7.7"	✓											
			FR2-4	FR2-4	48"x60"	G	4"x7.7"	✓											
	23	5	FR2-1	FR2-1	48"x60"	G	4"x7.7"	✓											
			FR2-4	FR2-4	48"x60"	G	4"x7.7"	✓											
	6	DIO-6	12"x48"	DIO-6	12"x48"	DELIN. POST													
	16	FR2-1	48"x60"	FR2-1	48"x60"	G	4"x7.7"	✓											
			FR2-4	FR2-4	48"x60"	G	4"x7.7"	✓											
	20	DIO-6	12"x48"	DIO-6	12"x48"	DELIN. POST													
	21	FW4-1	48"x48"	FW4-1	48"x48"	F	3" PIPE	✓											
	24	3	W13-2	W13-2	48"x60"	F	3" PIPE	✓											
			MI-1B2	MI-1B2	36"x36"	A-1	2" PIPE	✓											
	24	W13-2	48"x60"	W13-2	48"x60"	F	3" PIPE	✓											
	25	1	DIO-6	DIO-6	12"x48"	DELIN. POST													
			W13-2	W13-2	48"x60"	F	3" PIPE	✓											
	13	DIO-6	12"x48"	DIO-6	12"x48"	DELIN. POST													
	15	FR2-1	48"x60"	FR2-1	48"x60"	G	4"x7.7"	✓											
			FR2-4	FR2-4	48"x60"	G	4"x7.7"	✓											
CONTROL 17-10 SHEET TOTAL 2 EA										CONTROL 17-10 SHEET TOTAL 12 EA									
CONTROL 17-10 GRAND TOTAL 4 EA										CONTROL 17-10 GRAND TOTAL 12 EA									



THE "X" DIMENSION IS THE ELEVATION DIFFERENCE AT THE POST BETWEEN THE GROUND AND THE EDGE OF PAVEMENT OR TOP OF CURB.

GENERAL NOTES:

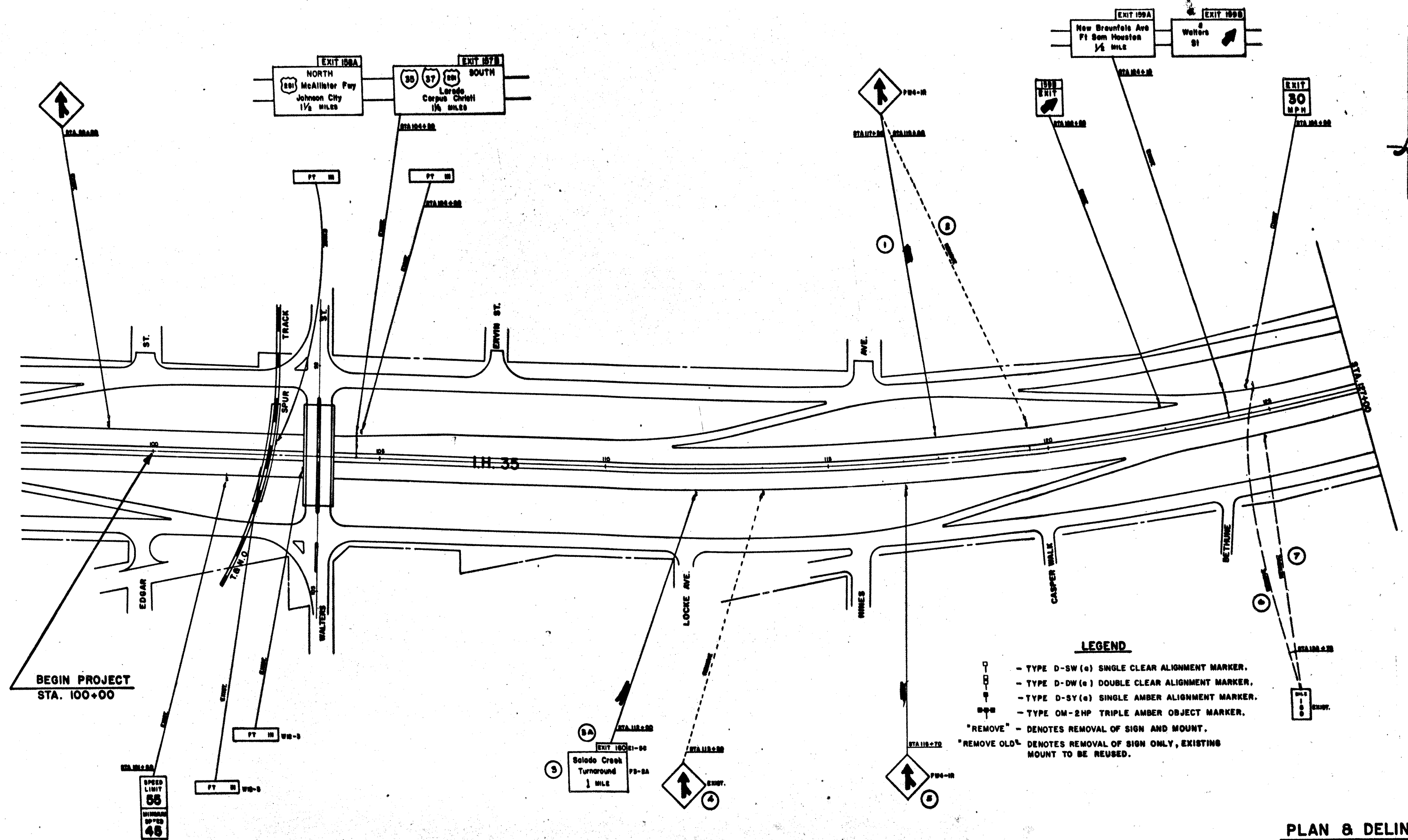
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THE CONTRACTOR SHALL VERIFY WITH THE ENGINEER ALL VERTICAL CLEARANCE PRIOR TO THE FABRICATION OF D-25 CLEARANCE SIGNS.

SIGNS TO BE REMOVED

SUMMARY OF SMALL SIGNS (WITHOUT REMOVABLE COPY) 20



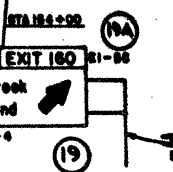
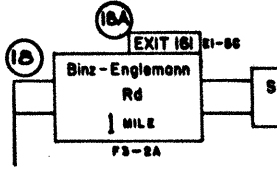
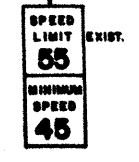
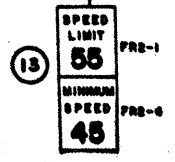
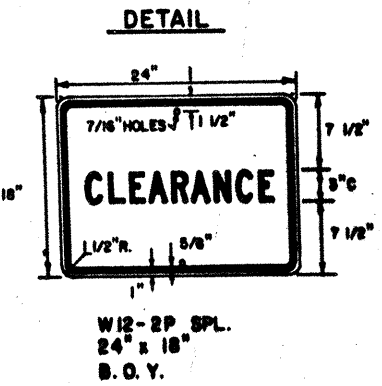
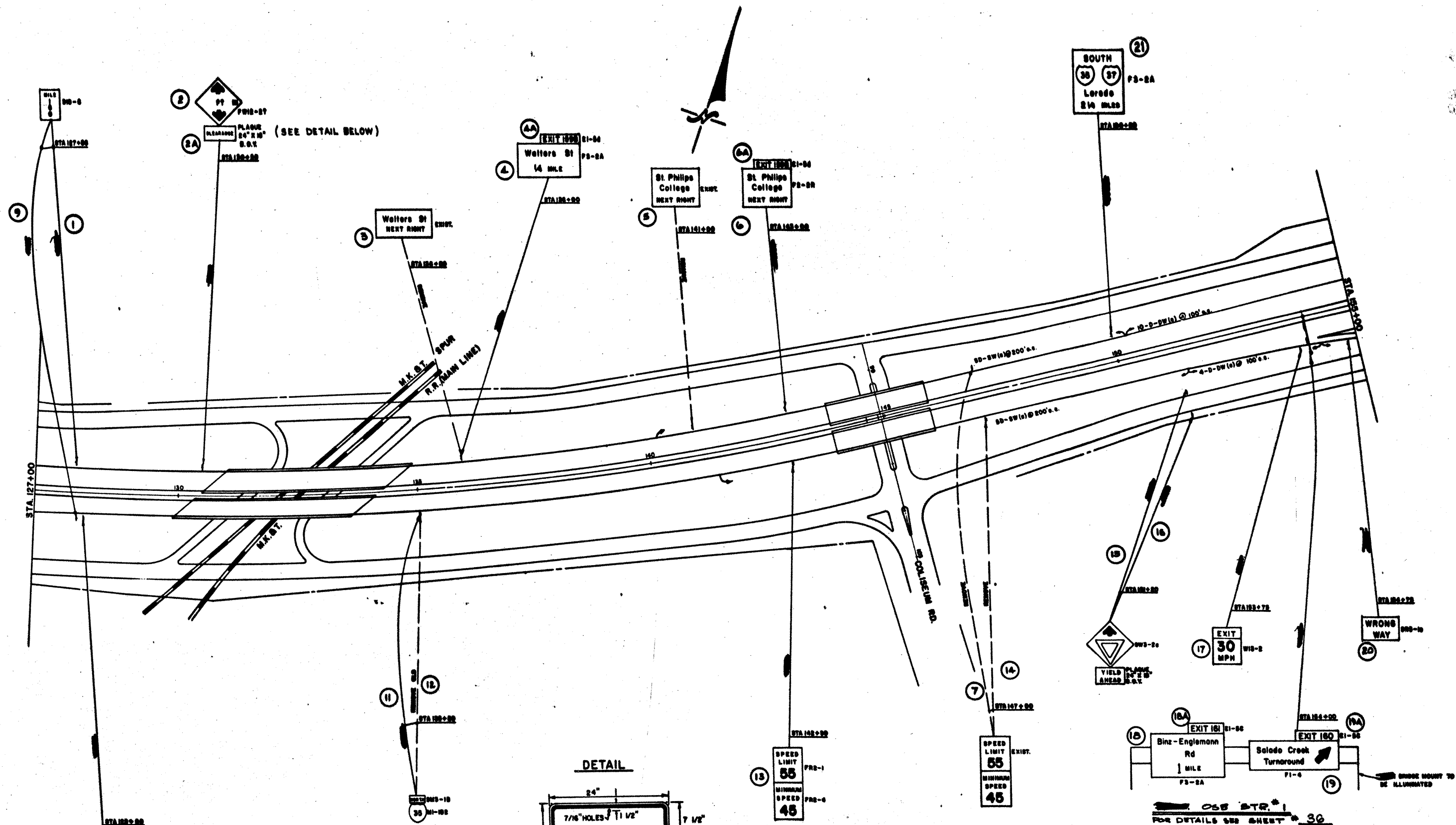
PLAN & DELINEATION

SCALE: 1"=100'

SHEET 1 OF 7

LAST SIGN NO. 7

FED RD DIST NO	STATE	FEDERAL PROJECT NO				SHEET NO.
6	TEXAS	IR 35-2 (18) 41				21
STATE DIST NO	COUNTY		CONTRACT	SECT	POB	SECTION NO.
16	DEKAR		17	10	147	L.H. 38



PLAN & DELINEATION

SCALE: 1"=100'

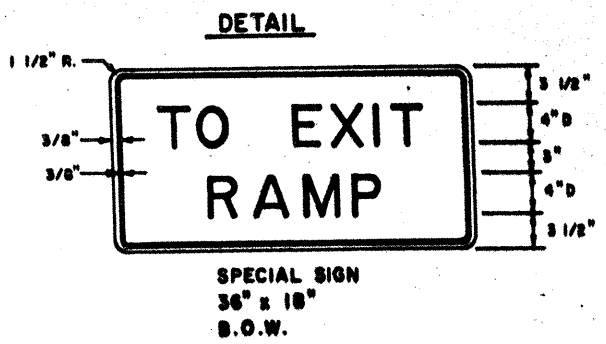
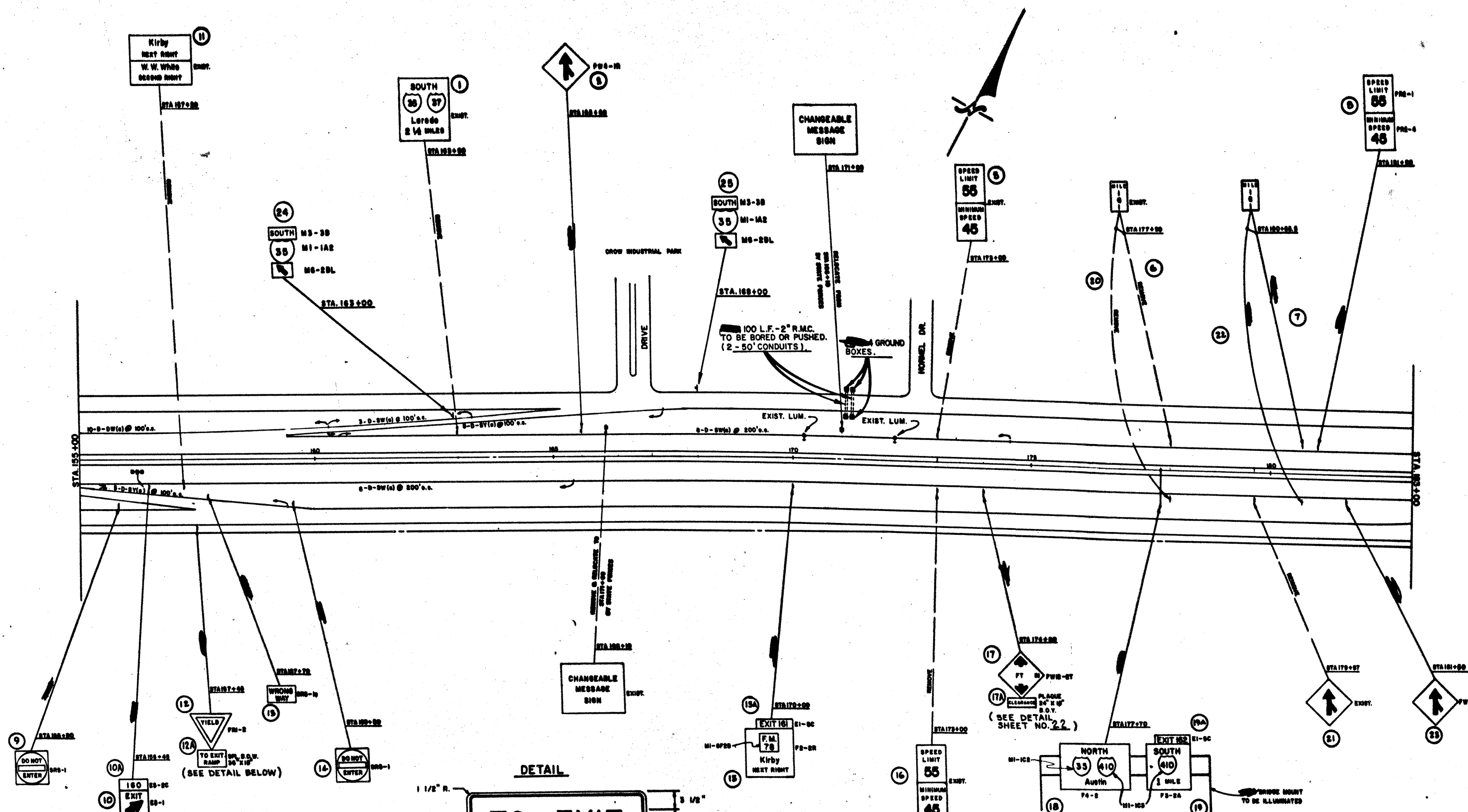
DELINEATORS	DELINEATOR POSTS		
	EA.	3 FT. EA.	7 FT. EA.
D-SW (a)	10		10
D-DW (a)	14		14

SIGN NO. 8 DELETED
LAST SIGN NO. 21

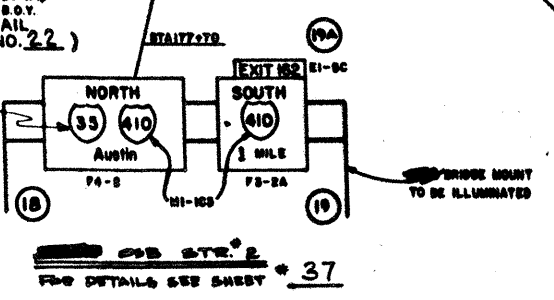
SHEET 2 OF 7

18	BEAR	17	10	147	1.1.88
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22



DELINEATORS	DELINEATOR POSTS		
	EA.	3 FT. EA.	7 FT. EA.
D-SW (a)	13		13
D-DW (a)	10		10
D-SV (a)	11		11
OM-2HP	1	1	



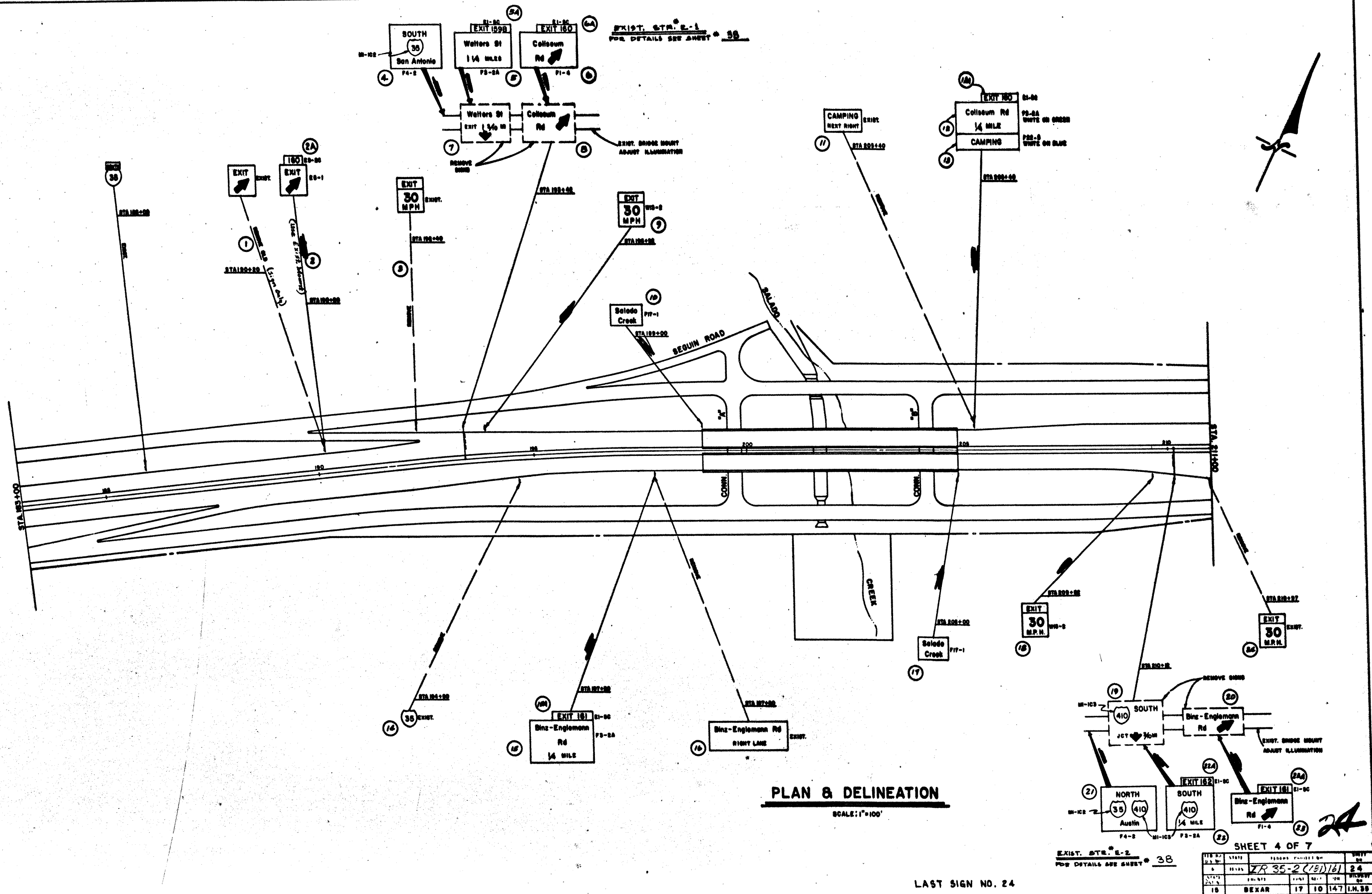
PLAN & DELINEATION
SCALE: 1"=100'

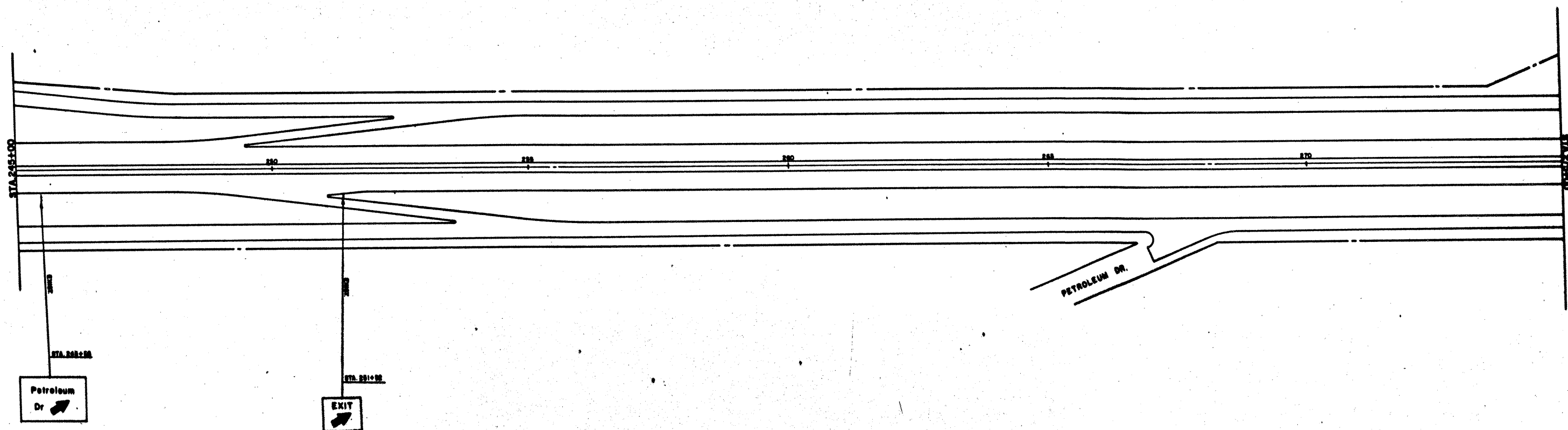
SIGN NOS. 3, 4 DELETED
LAST SIGN NO. 25

SHEET 3 OF 7 **23**

15	16	17	18	19	20	21	22	23	24	25
15	16	17	18	19	20	21	22	23	24	25

15 16 17 18 19 20 21 22 23 24 25





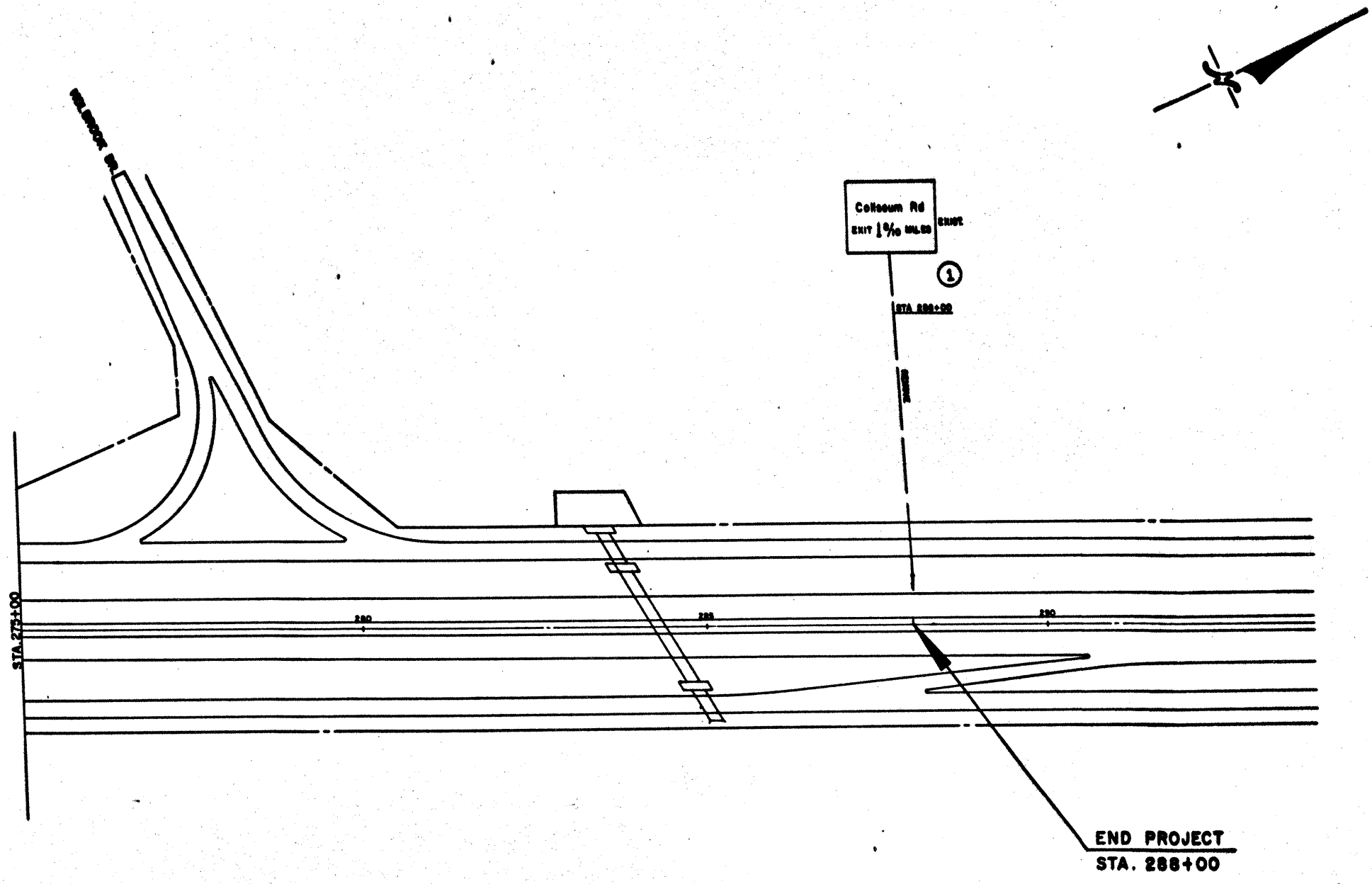
PLAN & DELINEATION

SCALE: 1" = 100'

SHEET 6 OF 7

26

ITEM NO.	STATE	FEDERAL PROJECT NO.	DATE
1	TEXAS	2A 35-2 (1/15/61)	26
STATE	COUNTY	CONTRACT NO.	SECTION NO.
18	DEKAR	17 10 147	18-98



PLAN & DELINEATION

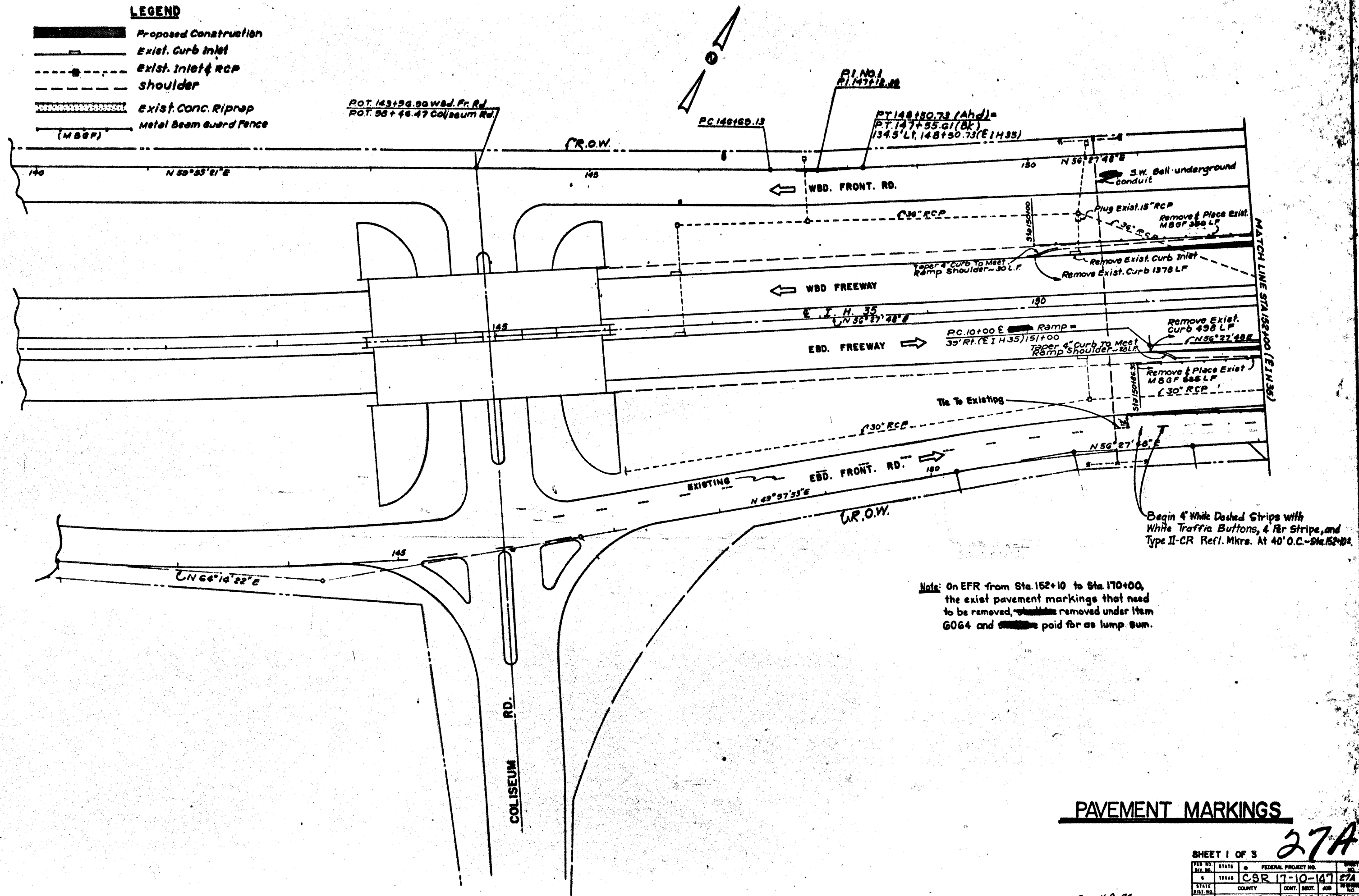
SCALE: 1"=100'

SHEET 7 OF 7 **27**

LAST SIGN NO. 1

FILE NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	7R 35-2 (181) 161	27
STATE DIST. NO.	COUNTY	CONTRACT NO.	SECTION NO.
15	BEAR	17 10 147	14.38

Proposed Construction
 Exist. Curb Inlet
 Exist. Inlet & RCP
 Shoulder
 Exist. Conc. Riprap
 Metal Beam Guard Fence
 (MBGF)

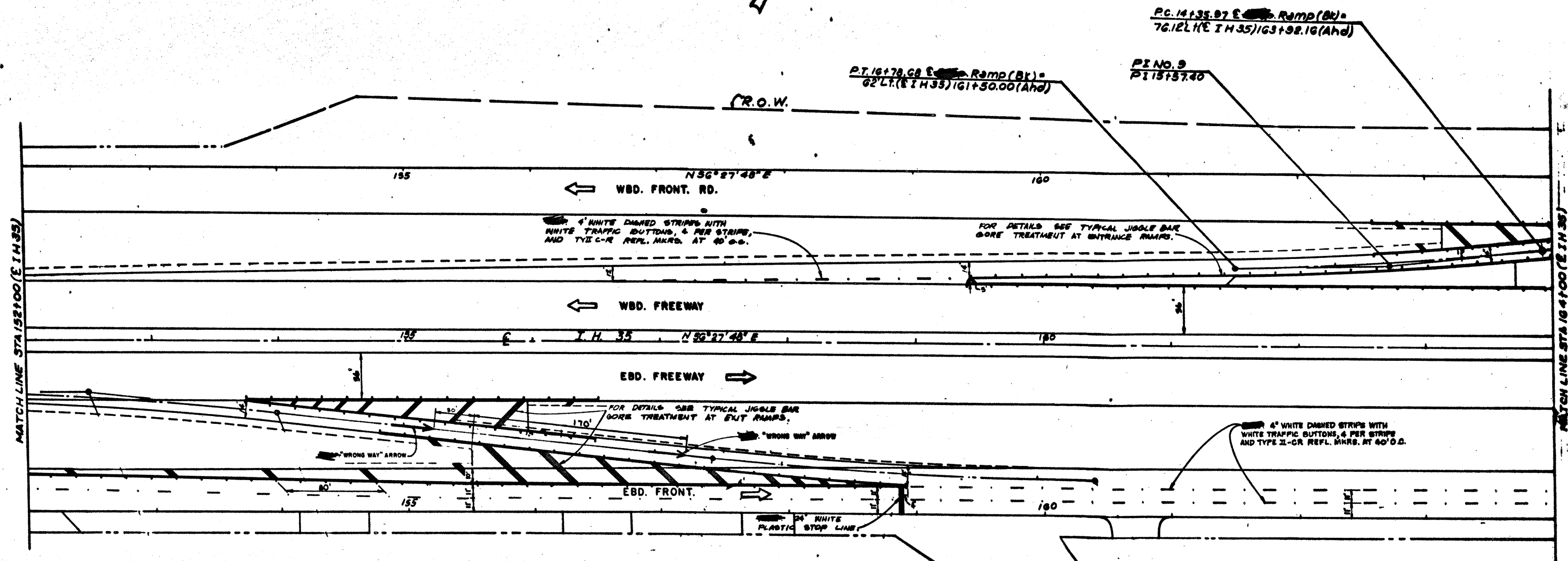


PAVEMENT MARKINGS

SHEET 1 OF 3

FILE NO. 15	STATE TEXAS	FEDERAL PROJECT NO.			ENTRY NO. 274
STATE DIST. NO. 15	COUNTY BEXAR	CONT. 17	SECT. 10	JOB 147	INSTRUMENT NO. 1H-98

Rev. 11-9-84



PAVEMENT MARKINGS

Quantities shown on this sheet.

PAVEMENT MARKINGS	
JIGGLE BARS	1082 EA
TYPE II-OR	241 EA
24" STOP LINE	95 LP
TYPE I-R (ARROWS)	28 EA
WHITE BUTTONS 4"	296 EA

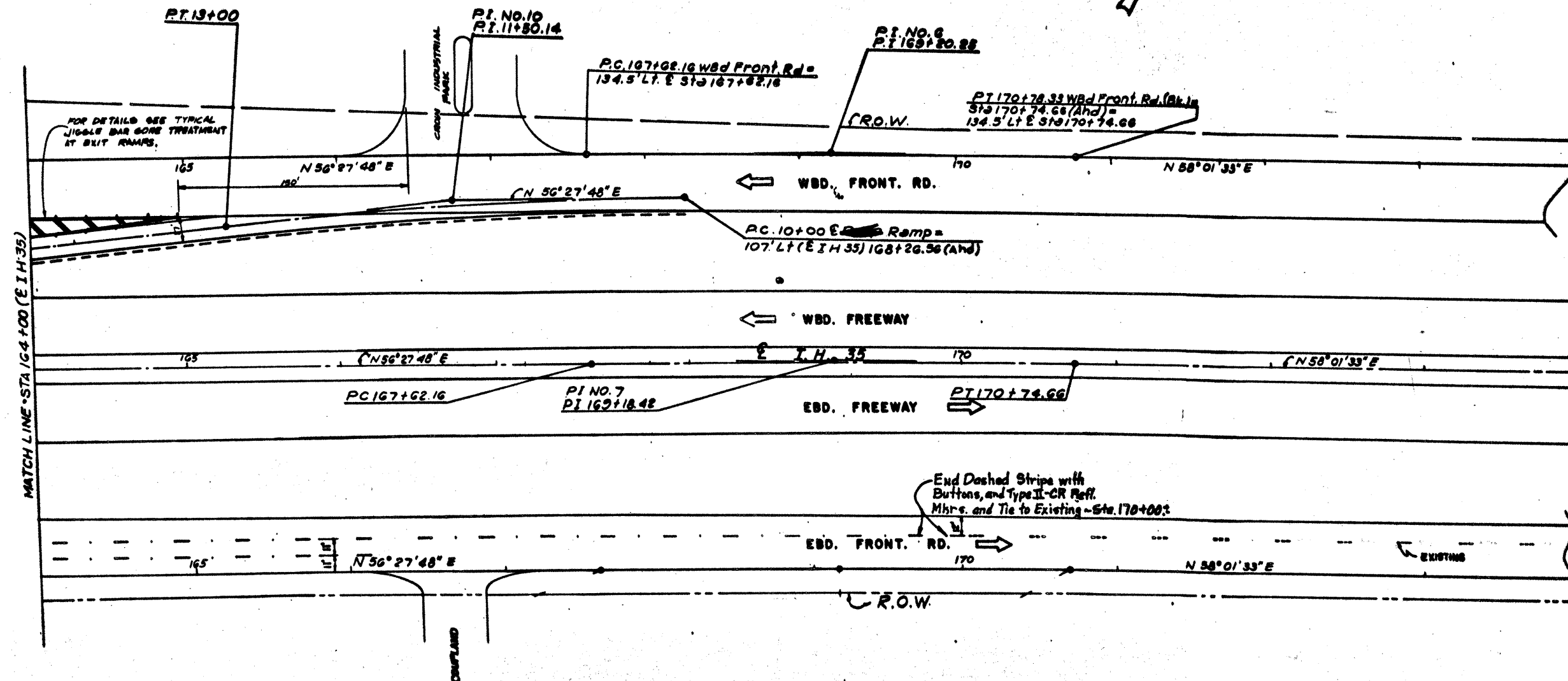
SHEET 2 OF 3

SCALE: 1" = 40'	STATE	FEDERAL PROJECT NO.	SHEET NO.
0	TEXAS	CSR 17-10-147	28
STATE	COUNTY	DATE	NO.
15	BEXAR	17	10/147

Rev. 11-9-84

28

P.I. NO. 6	P.I. NO. 7	P.I. NO. 8	P.I. NO. 9	P.I. NO. 10
P.I. 169+20.25	P.I. 169+18.42	P.I. 169+16.59	P.I. 15+66.96	P.I. 11+80.14
$\Delta = 1^{\circ}33'45''$	$\Delta = 1^{\circ}33'45''$	$\Delta = 1^{\circ}33'45''$	$\Delta = 4^{\circ}51'15''$	$\Delta = 6^{\circ}00'00''$
$D = 0^{\circ}29'39''$	$D = 0^{\circ}30'00''$	$D = 0^{\circ}30'21''$	$D = 2^{\circ}00'00''$	$D = 2^{\circ}00'00''$
$T = 158.08'$	$T = 156.26'$	$T = 154.43'$	$T = 121.43'$	$T = 150.14'$
$E = 1.08'$	$E = 1.07'$	$E = 1.05'$	$E = 2.57'$	$E = 3.33'$
$L = 316.17'$	$L = 312.50'$	$L = 308.83'$	$L = 242.71'$	$L = 300.00'$
$R = 11593.66'$	$R = 11499.16'$	$R = 11324.66'$	$R = 2864.79'$	$R = 2864.79'$



PAVEMENT MARKINGS

SHEET 3 OF 3

STATE	STATE	FEDERAL PROJECT NO.	
15	TEXAS	CSR 17-10-147	
15	15	17	10/147

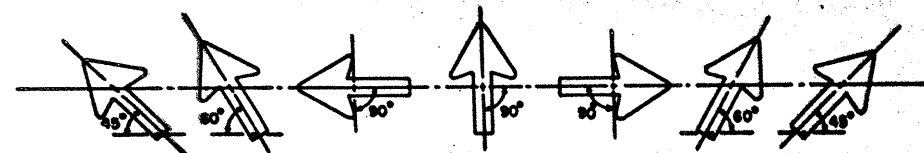
REV. 11-9-84

29

GENERAL NOTES

FOR REMOVABLE COPY REFLECTORIZED SIGNS:

- 1.) THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND WORDS ~~SHALL~~ CONFORM WITH THE NATIONAL JOINT COMMITTEE ON UNIFORM TRAFFIC CONTROL DEVICES STANDARD ROUNDED CAPITAL LETTER ALPHABETS WITH ANY APPLICABLE MODIFICATIONS BY THE FEDERAL HIGHWAY ADMINISTRATION'S MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS - 1980. LATERAL SPACING OF TEXT ~~SHALL~~ BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.
- 2.) ALL LETTERS, NUMERALS, ARROWS, SYMBOLS AND BORDERS ~~SHALL~~ BE REFLECTORIZED REMOVABLE COPY CONFORMING WITH THE SPECIFICATIONS. THE BACKGROUND ~~SHALL~~ BE OF INTERSTATE GREEN FLAT SURFACE REFLECTIVE SHEETING FOR GUIDE SIGNS AND INTERSTATE BLUE FLAT SURFACE REFLECTIVE SHEETING FOR INFORMATION SIGNS.
- 3.) ALL REMOVABLE COPY LETTERS, NUMERALS, ARROWS, SYMBOLS AND BORDERS USED ON SIGNS FOR THIS CONTRACT ~~SHALL~~ BE OF THE SAME MANUFACTURE.
- 4.) THE SIGN AREA OUTSIDE THE CORNER RADIUS NEED NOT BE TRIMMED. PLYWOOD SIGNS (TYPE A) ARE THOSE HAVING SIGN BLANKS MADE FROM HIGH DENSITY PLYWOOD AND HAVING SIGN FACES REFLECTORIZED WITH FLAT SURFACE REFLECTIVE SHEETING.



B-1 ARROWS

B-1 ARROWS MAY BE SPECIFIED IN ANY OF THE ABOVE DIRECTIONS AND ~~SHALL~~ BE CENTERED ON THE LINE OF TEXT.

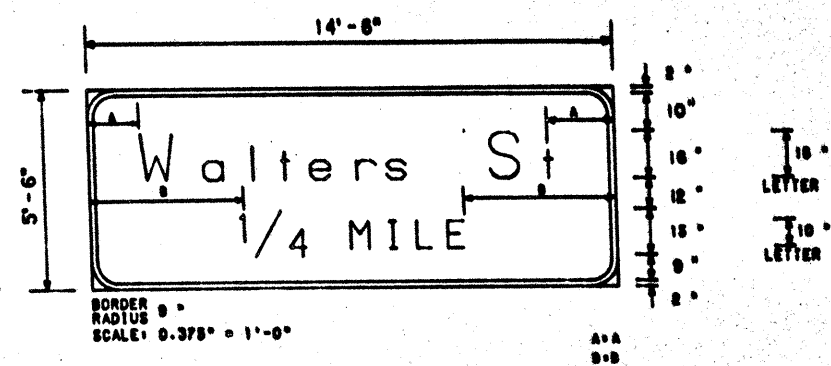
USE 12" LOWER CASE LETTERS WITH 16" UPPER CASE LETTERS.
USE 10" LOWER CASE LETTERS WITH 13.3" UPPER CASE LETTERS.
USE 6" LOWER CASE LETTERS WITH 8" UPPER CASE LETTERS.

STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

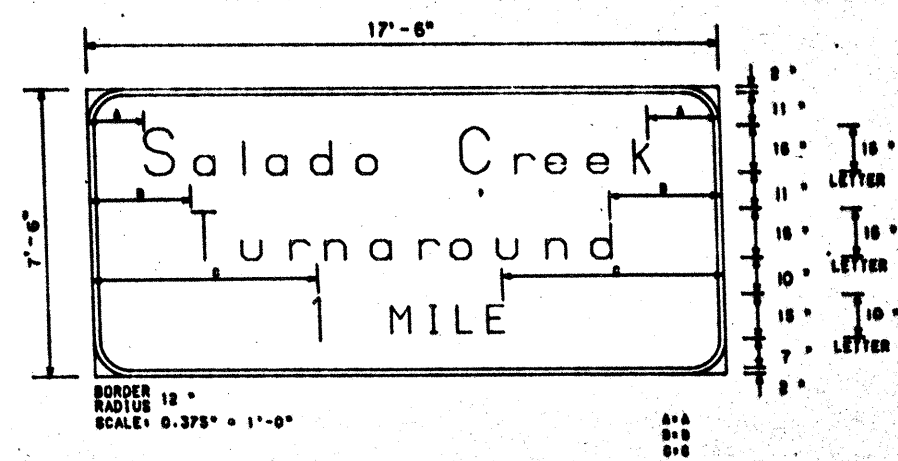
JUNE 1983

SHEET 1 OF 6

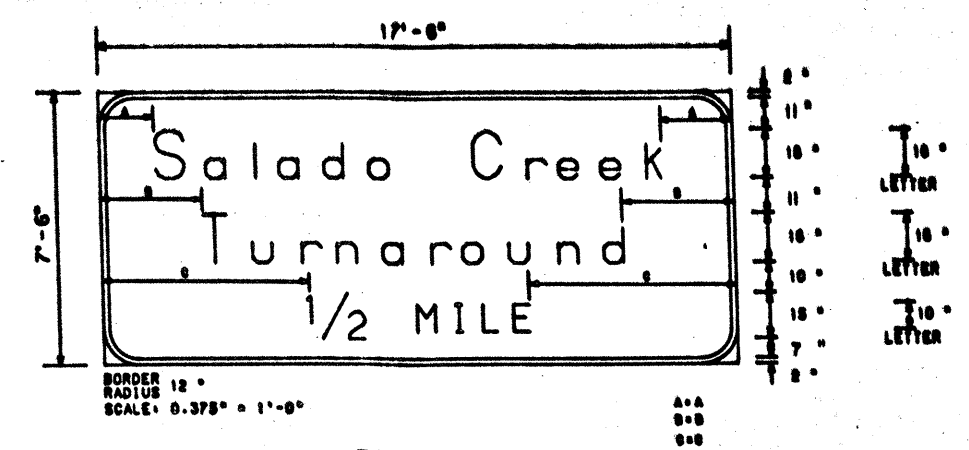
FILE NO.	STATE	PROJECT NO.	
0	TEXAS	IR 35-2 (161)	30
COUNTY	CDIST.	CDIST.	CDIST.
15	BEXAR	17	10 147 IN. 35



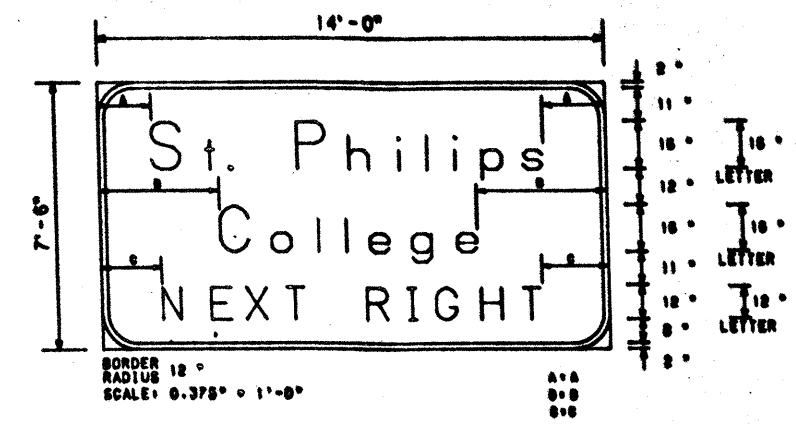
F3-2A
STA. 136+00
SIGN NO. 4
SHEET NO. 22



F3-2A
STA. 112+00
SIGN NO. 3
SHEET NO. 21



F3-2A
STA. 128+00
SIGN NO. 10
SHEET NO. 22



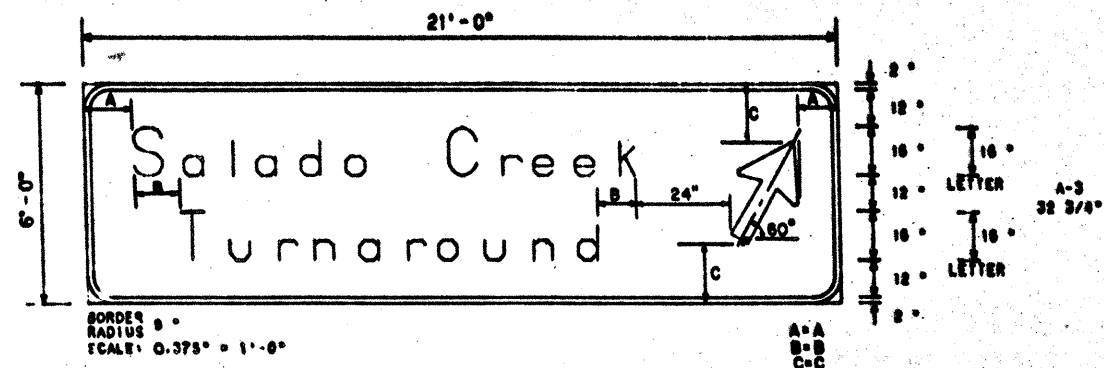
F2-2R
STA. 143+00
SIGN NO. 6
SHEET NO. 22

STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

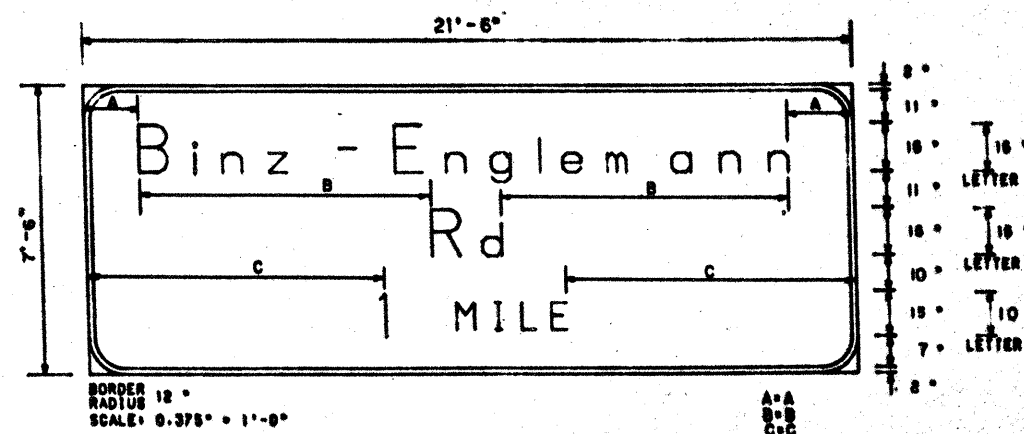
SHEET 2 OF 6

STATE	COUNTY	ROUTE	POST MILE	POST MILE	POST MILE	POST MILE
TEXAS	BEXAR	17	10	14	14	14

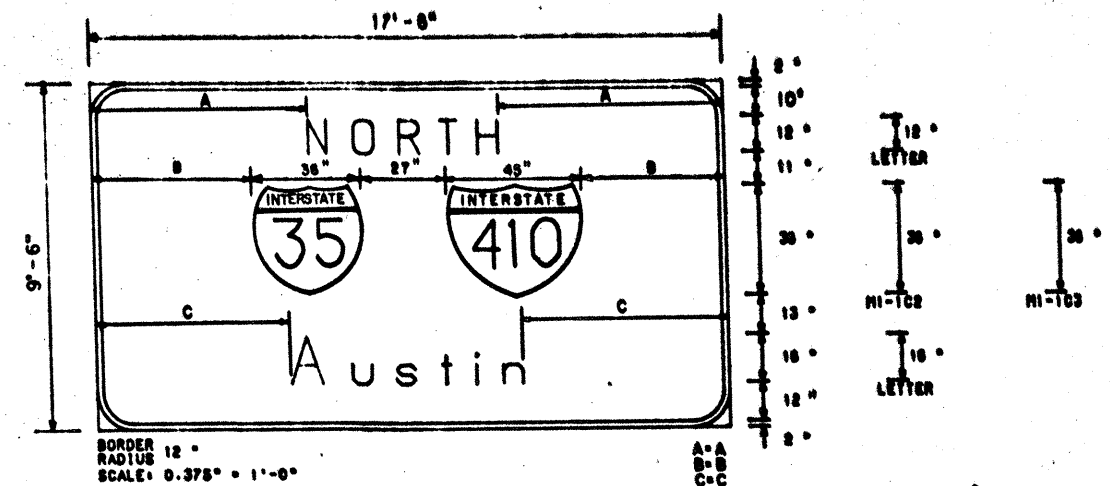
31



F1-4
STA. 154+00
SIGN NO. 19
SHEET NO. 24



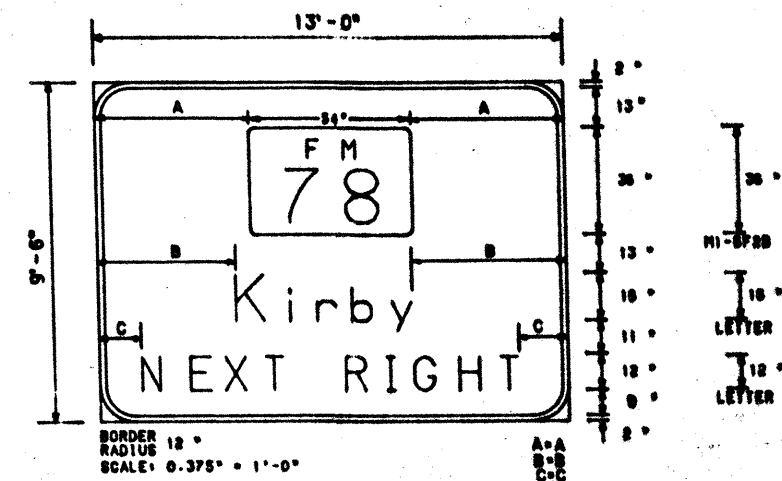
F3-2A
STA. 154+00
SIGN NO. 18
SHEET NO. 22



F4-2
STA. 177+70
SIGN NO. 18
SHEET NO. 24

F4-2
STA. 210+12
SIGN NO. 21
SHEET NO. 25

F4-2
STA. 226+00
SIGN NO. 10
SHEET NO. 25

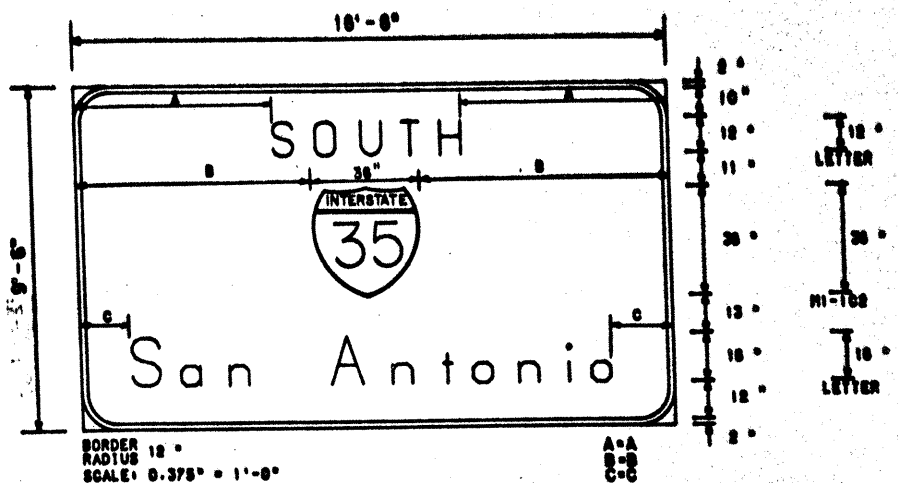


F2-2R
STA. 170+00
SIGN NO. 15
SHEET NO. 22

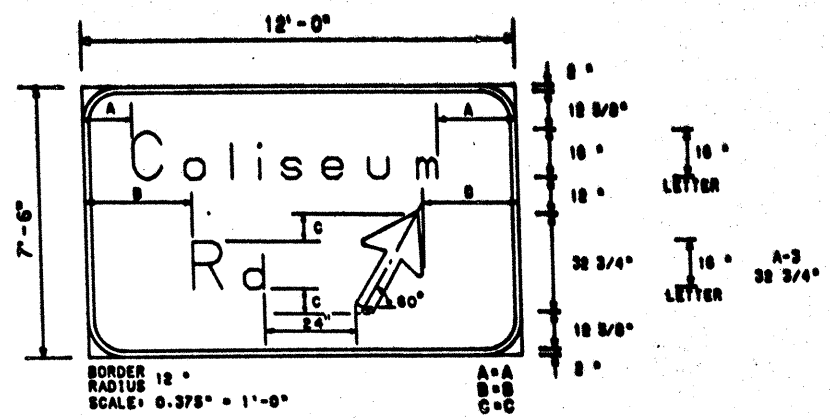
STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

SHEET 3 OF 6

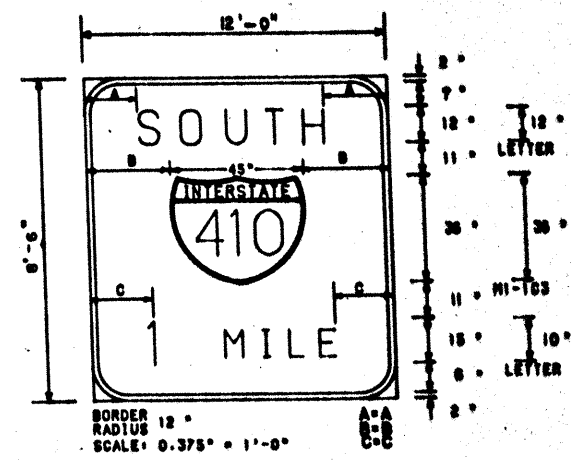
STATE	COUNTY	PROJECT NO.	DATE	BY
15	BEXAR	17 10 147	11/35	32



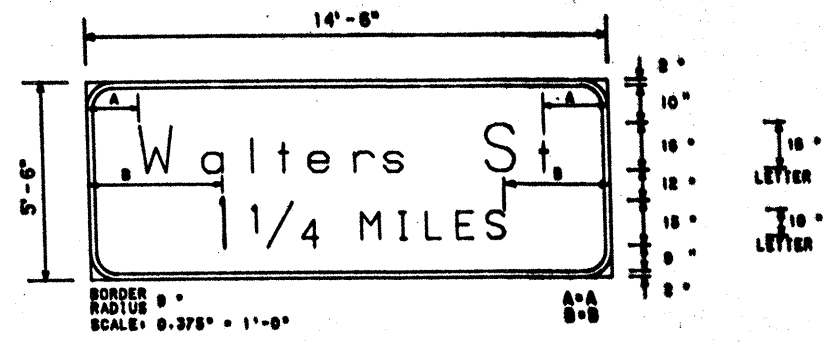
F4-2
STA. 193+42
SIGN NO. 4
SHEET NO. 24



F1-4
STA. 193+42
SIGN NO. 6
SHEET NO. 24



F3-2A
STA. 177+70
SIGN NO. 19
SHEET NO. 24



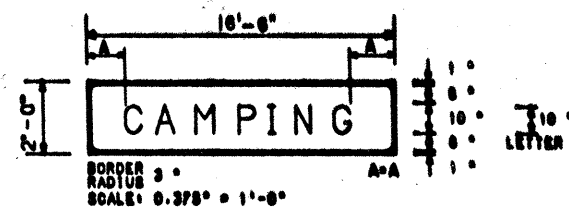
F3-2A
STA. 193+42
SIGN NO. 8
SHEET NO. 24

STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

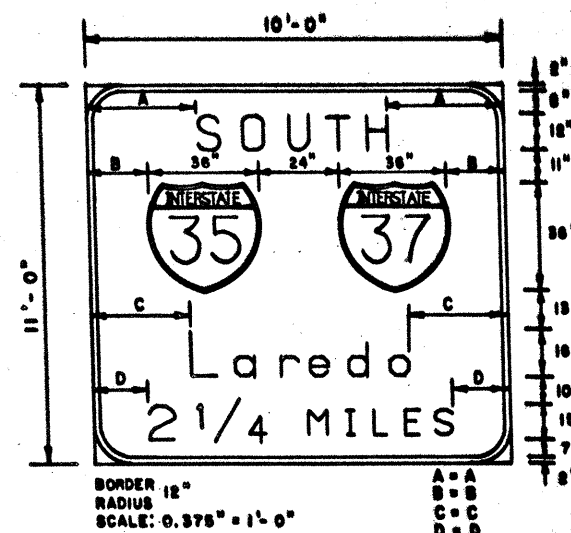
SHEET 4 OF 6

FILE NO.	STATE	PROJECT NO.	SHEET NO.
0	TEXAS	IP 35-2 (181) 161	38
STATE	COUNTY	POST	POST
15	BEXAR	17	10 147

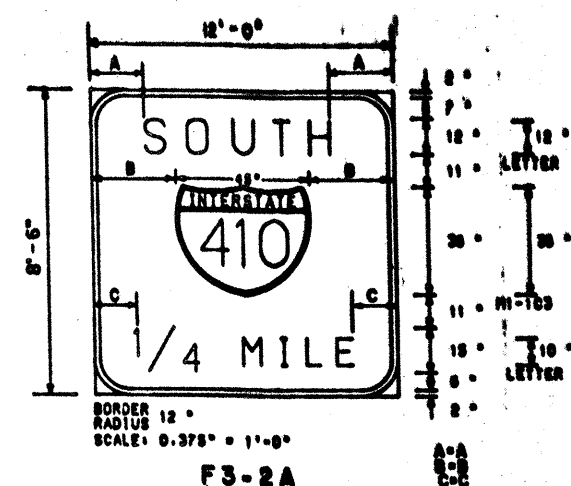
22



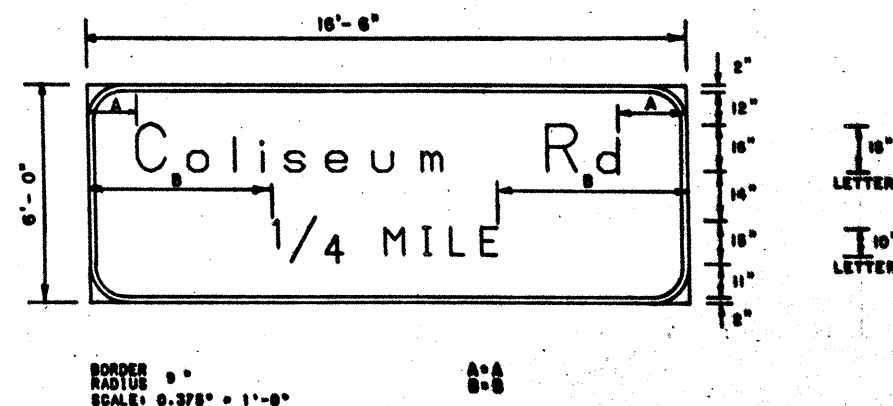
F22-5 (WHITE on BLUE)
STA. 205+40
SIGN NO. 13
SHEET NO. 24



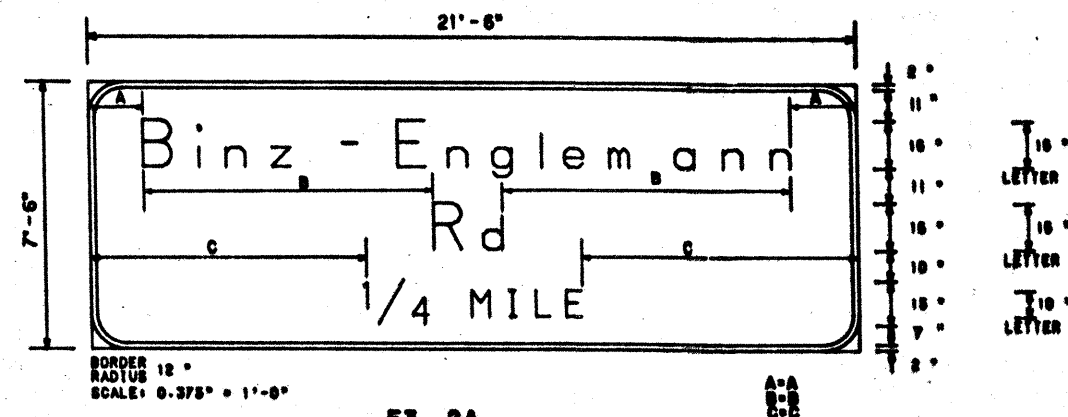
F3-2A
STA. 150+00
SIGN NO. 21
SHEET NO. 22



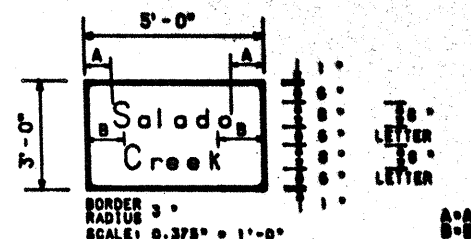
F3-2A
STA. 210+12
SIGN NO. 22
SHEET NO. 24



F3-2A
STA. 205+40
SIGN NO. 12
SHEET NO. 24



F3-2A
STA. 197+80
SIGN NO. 15
SHEET NO. 24



F17-1
STA. 199+00
SIGN NO. 10
SHEET NO. 24

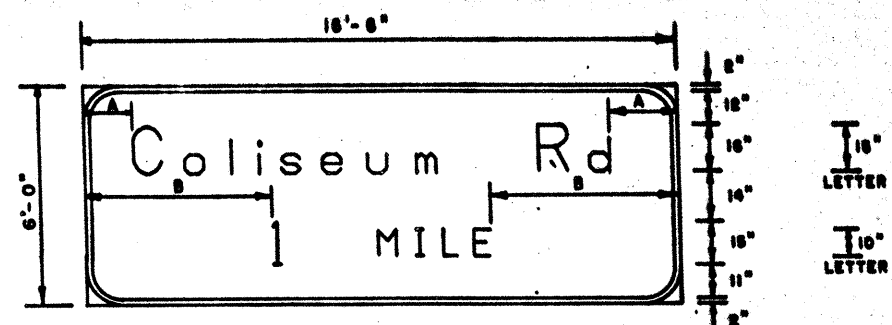
F17-1
STA. 205+00
SIGN NO. 17
SHEET NO. 24

STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

24

SHEET 5 OF 6

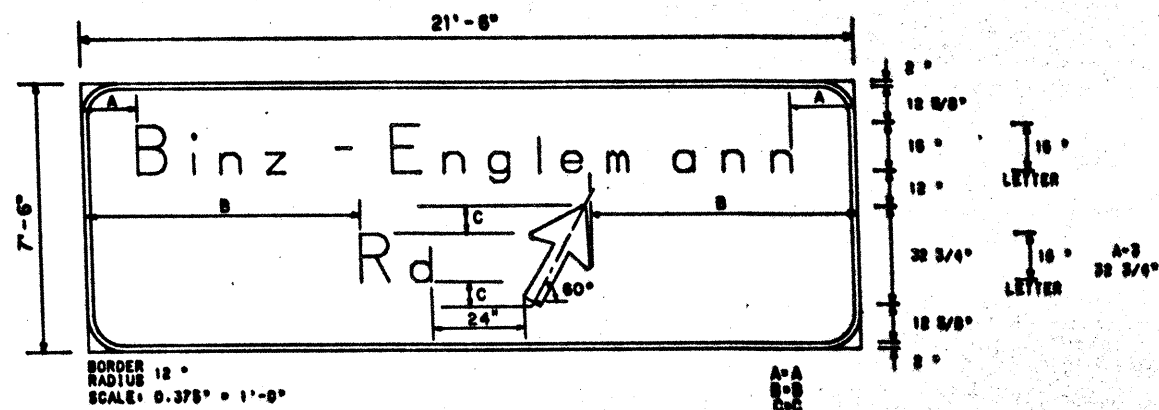
FED. RD. DIST. NO.	STATE	PROJECT NO.	SHEET NO.
5	TEXAS	IR 35-2 (18) 141	34
STATE DIST. NO.	COUNTY	POST. DIST. NO.	ROUTE NO.
15	BEYAR	17 10	147 RM. 35



BORDER 12" RADIUS
SCALE: 0.375" = 1'-0"

A-A
B-B
C-C

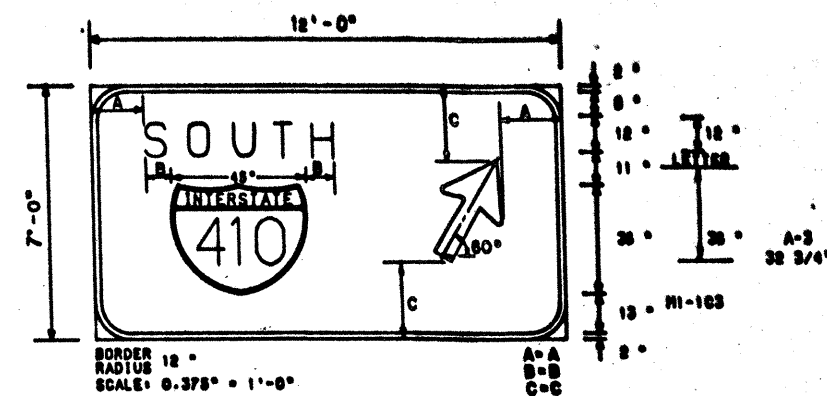
F3-2A
STA. 233+30
SIGN NO. 3
SHEET NO. 25



BORDER 12" RADIUS
SCALE: 0.375" = 1'-0"

A-A
B-B
C-C

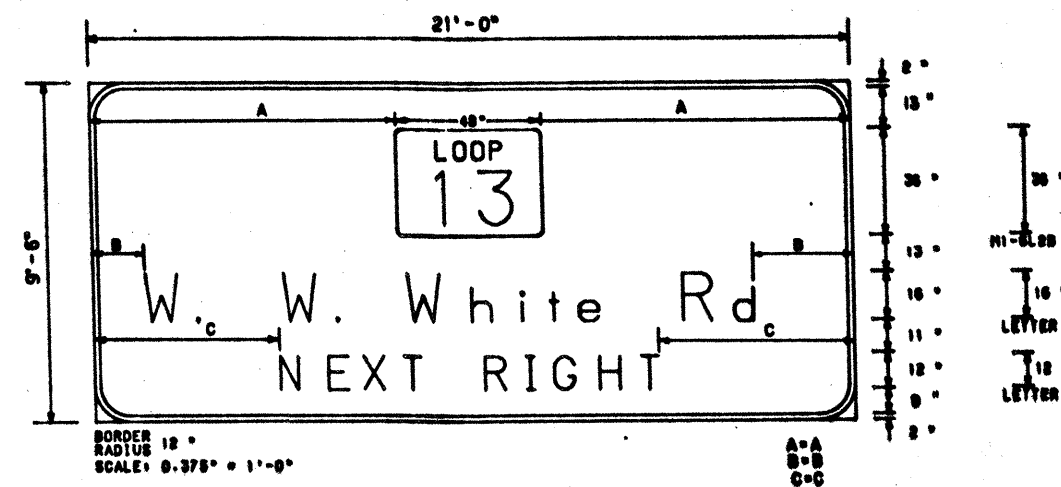
F1-4
STA. 210+12
SIGN NO. 23
SHEET NO. 24



BORDER 12" RADIUS
SCALE: 0.375" = 1'-0"

A-A
B-B
C-C

F1-4
STA. 228+00
SIGN NO. 11
SHEET NO. 25



BORDER 12" RADIUS
SCALE: 0.375" = 1'-0"

A-A
B-B
C-C

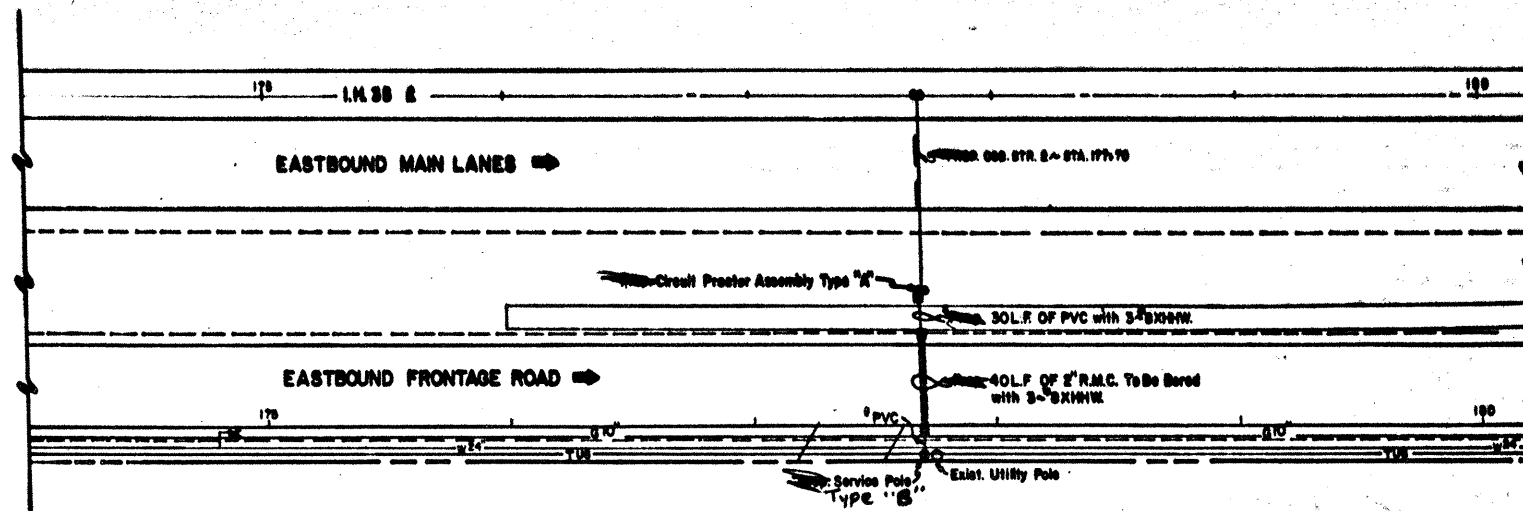
F2-2R
STA. 221+70
SIGN NO. 6
SHEET NO. 25

STANDARD INTERSTATE SIGNS
REMOVABLE COPY REFLECTORIZED SIGNS
FOR OVERHEAD & GROUND MOUNT GUIDE SIGNS

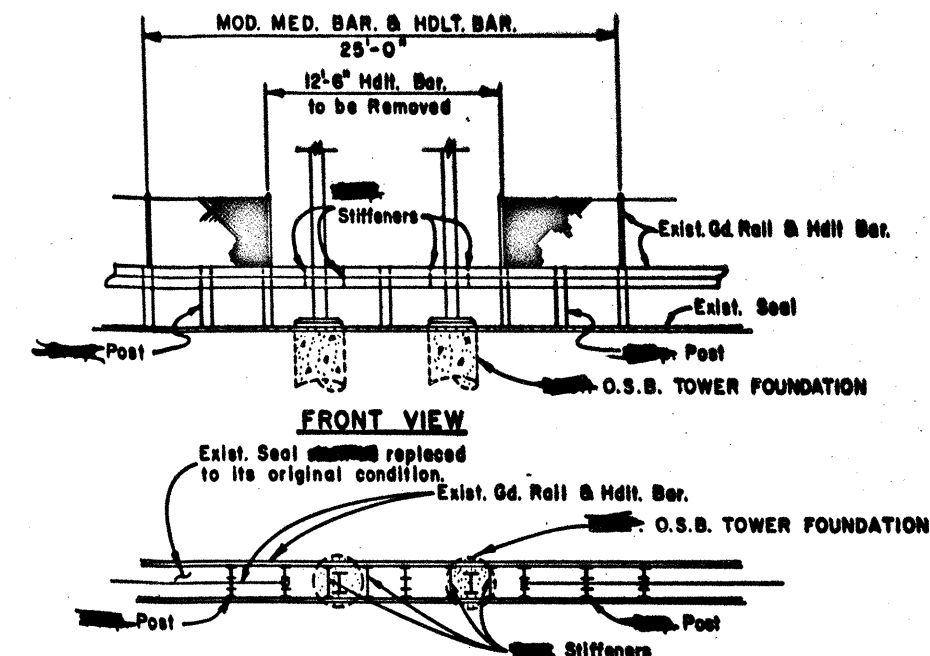
SHEET 6 OF 6

STATE	COUNTY	DIST	DEPT	JOB	DATE
TEXAS	BEXAR	17	10	147	1938

35



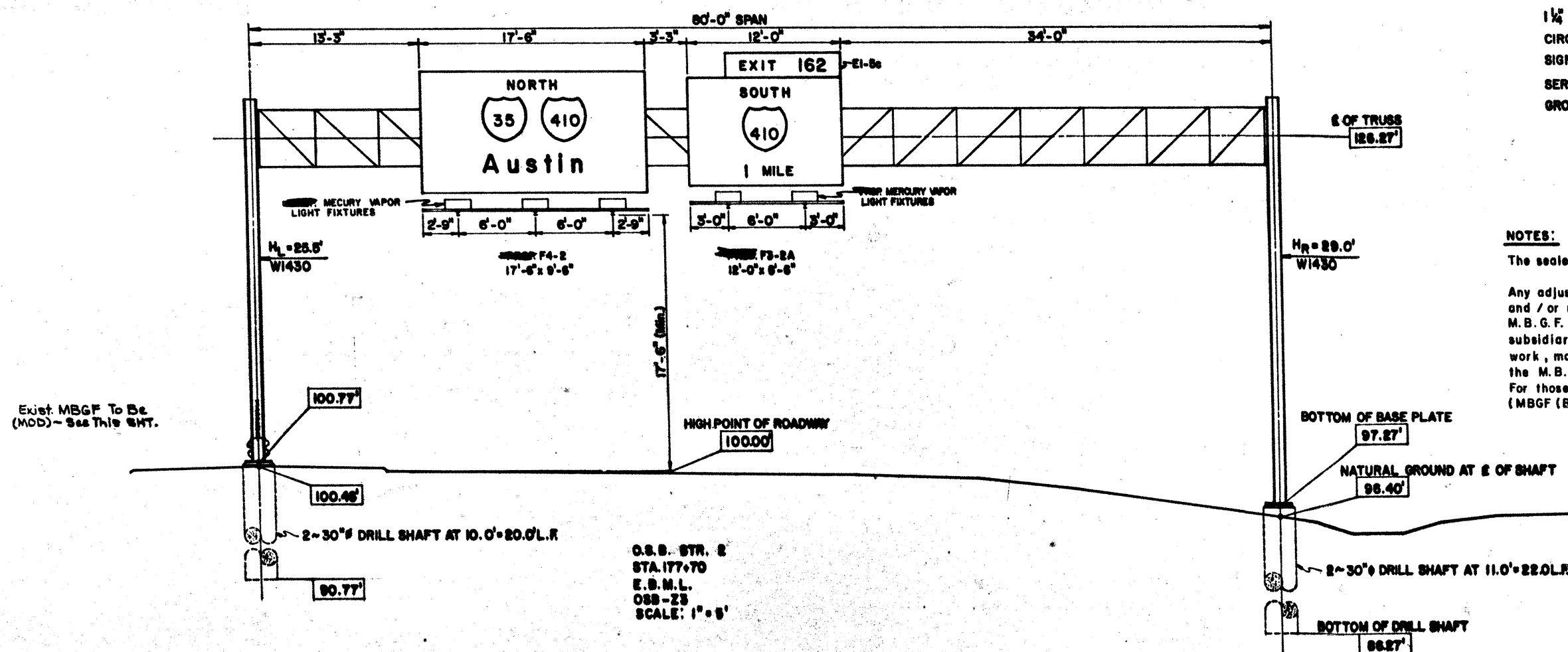
ELECTRICAL & UTILITY LAYOUT
SCALE: 1" = 40'



MODIFIED MEDIAN BARRIER DETAIL

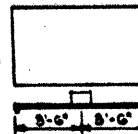
SHEET QUANTITIES	
ELECTRICAL CONDUCTOR No. 8 XHHW	210 LF.
2" RIGID METAL CONDUIT (Bored/Pushed)	40 LF.
1 1/2" CONDT (PVC) (SCH 40)	30 LF.
CIRCUIT PROTECTOR ASSEMBLY-TYPE "A"	1 EA.
SIGN LIGHT FIXTURES - TYPE (MV) (10KW)	5 EA.
SERVICE POLE-TYPE "B"	1 EA.
GROUND BOX	2 EA.

NOTES:
The sealed median ~~was~~ placed back to its original condition.
Any adjustment to the illumination cable, additional hardware and / or material that may be required to modify the existing M.B.G.F. will not be paid for separately, but ~~will~~ considered subsidiary to Item 5149, which ~~will~~ full payment for all work, materials, labor, and incidentals necessary to modify the M.B.G.F. as indicated hereon as approved by the Engineer. For those details required and not shown hereon, see sheet 71 (MBGF (B) - 74) and sheet 72 (MBGF (B) OBS - 74).

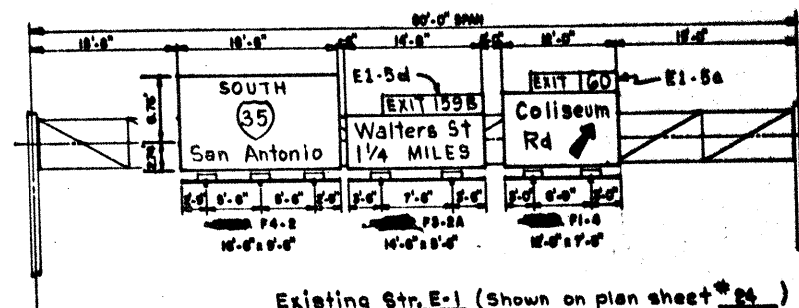


**OVERHEAD SIGN AND LIGHT
FIXTURE SUPPORT LAYOUT**

Existing 7'x4' 'WRONG WAY' sign mounted on back of bridge to remain.



- A) Remove Existing (6'-0") fluorescent light fixture.
- B) ~~Remove~~ One (1) Mercury Vapor light fixture as shown.

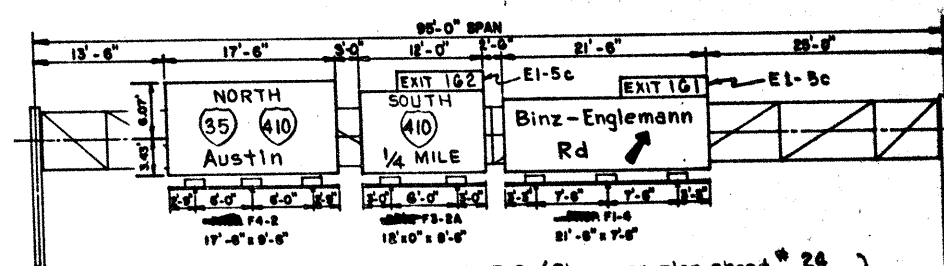


Existing Str. E-1 (Shown on plan sheet # 24)
Sta. 193+42

- A) ~~Remove~~ 16'-0"x8'-0" Sign Panel and place as shown.
- B) ~~Remove~~ three (3) Mercury Vapor light fixtures and place as shown.

- A) Remove Existing 17'-0"x7'-0" Sign Panel and three (3) 4'-0" fluorescent light fixtures.
- B) ~~Remove~~ 14'-0"x5'-0" Sign Panel and place as shown.
- C) ~~Remove~~ two (2) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 14'-0" walkway.

- A) Remove Existing 15'-0"x8'-0" Sign Panel and two (2) 6'-0" fluorescent light fixtures.
- B) ~~Remove~~ 12'-0"x7'-0" Sign Panel and place as shown.
- C) ~~Remove~~ two (2) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 13'-0" walkway.

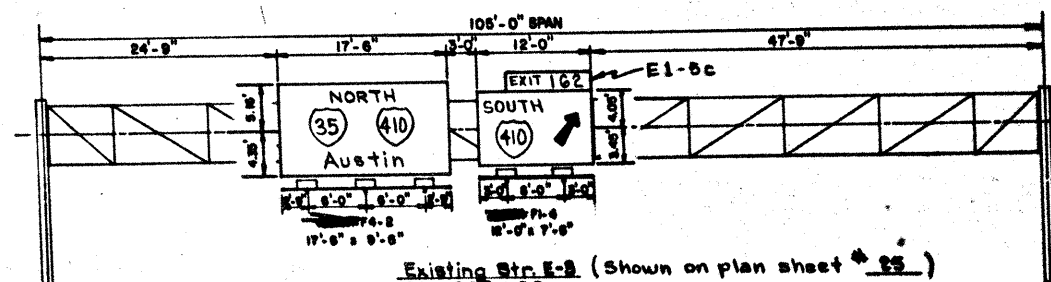


Existing Str. E-2 (Shown on plan sheet # 24)
Sta. 210+12

- A) ~~Remove~~ 17'-0"x8'-0" Sign Panel and place as shown.
- B) ~~Remove~~ three (3) Mercury Vapor light fixtures and place as shown.

- A) Remove Existing 15'-0"x8'-0" Sign Panel and two (2) 6'-0" fluorescent light fixtures.
- B) ~~Remove~~ 12'-0"x8'-0" Sign Panel and place as shown.
- C) ~~Remove~~ two (2) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 13'-0" walkway.

- A) Remove Existing 25'-0"x6'-0" Sign Panel and two (2) 6'-0" fluorescent and two (2) 4'-0" fluorescent light fixtures.
- B) ~~Remove~~ 21'-0"x7'-0" Sign Panel and place as shown.
- C) ~~Remove~~ three (3) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 25'-0" walkway.



Existing Str. E-3 (Shown on plan sheet # 25)
Sta. 228+00

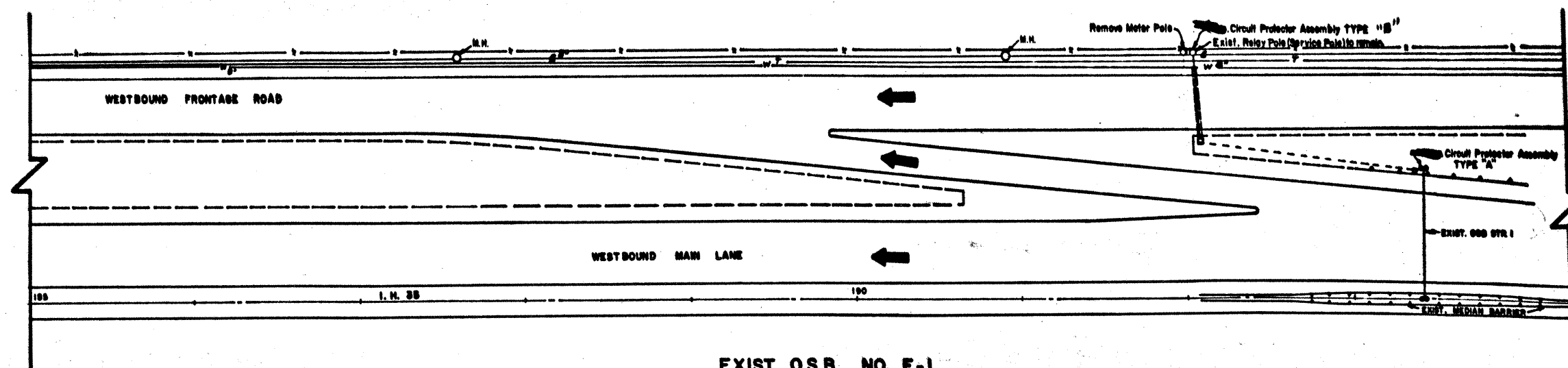
- A) Remove Existing 15'-0"x8'-0" Sign Panel and three (3) 4'-0" fluorescent light fixtures.
- B) ~~Remove~~ 17'-0"x8'-0" Sign Panel and place as shown.
- C) ~~Remove~~ three (3) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 14'-0" walkway.

- A) Remove Existing 12'-0"x8'-0" Sign Panel and two (2) 4'-0" fluorescent light fixtures.
- B) ~~Remove~~ 12'-0"x7'-0" Sign Panel and place as shown.
- C) ~~Remove~~ two (2) Mercury Vapor light fixtures and place as shown.
- D) Remove exist. 9'-0" walkway.

MODIFYING EXISTING OVERHEAD SIGN AND FIXTURE SUPPORT LAYOUT

38

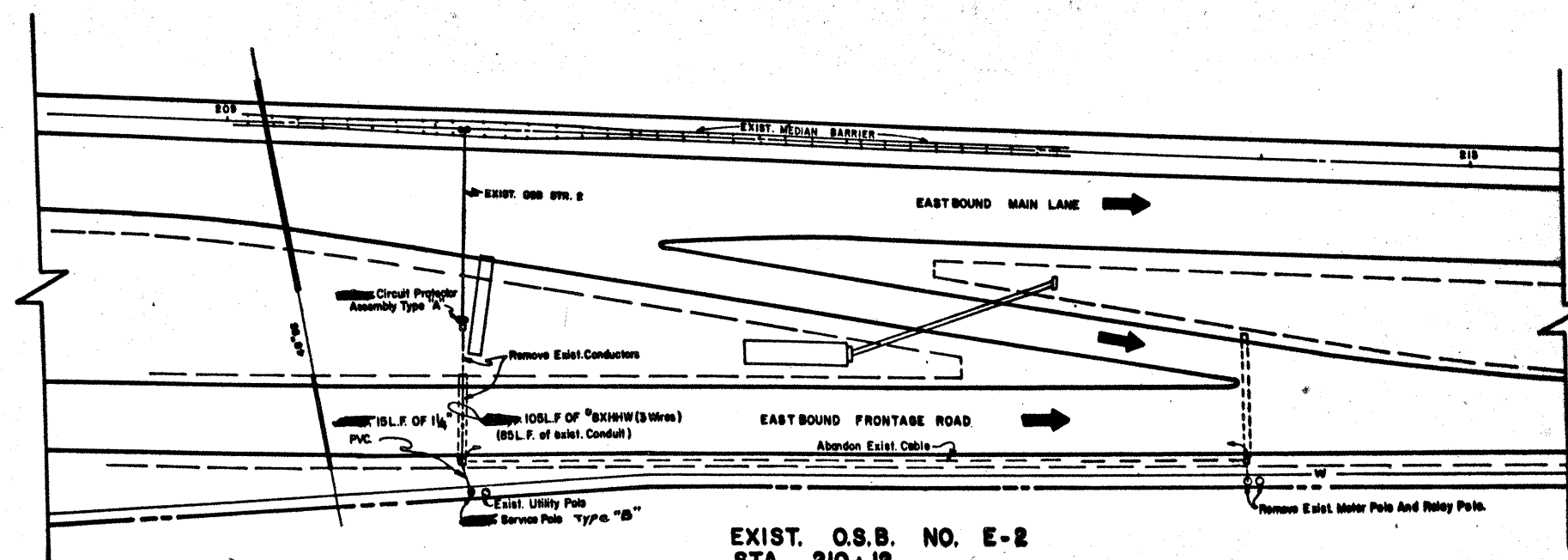
PER. NO.	STATE	PROJECT NO.	SHEET NO.
0	TEXAS	35-2 (H) 161	38
STATE DIST. NO.	COUNTY	CONF. SECT.	JOB NO.
15	BEXAR	17 10 147	14.55



EXIST. O.S.B. NO. E-1
STA. 193+42

ELECTRICAL CONDUCTOR-NO. 6 XHHW
1 1/4" CONDT. (PVC) (SCH 40)
CIRCUIT PROTECTOR ASSEMBLY-TYPE "A"
SIGN LIGHT FIXTURES-TYPE (MV)(10KW)
CIRCUIT PROTECTOR ASSEMBLY TYPE "B"

~ LP
~ LP
~ EA
~ EA
~ EA



EXIST. O.S.B. NO. E-2
STA. 210+12

ELECTRICAL CONDUCTOR-NO. 6XHHW
1 1/4" CONDT. (PVC) (SCH 40)
CIRCUIT PROTECTOR ASSEMBLY-TYPE "A"
SIGN LIGHT FIXTURES-TYPE (MV)(10KW)
SERVICE POLE TYPE "B"

315 LP
30 LP
EA
EA
EA

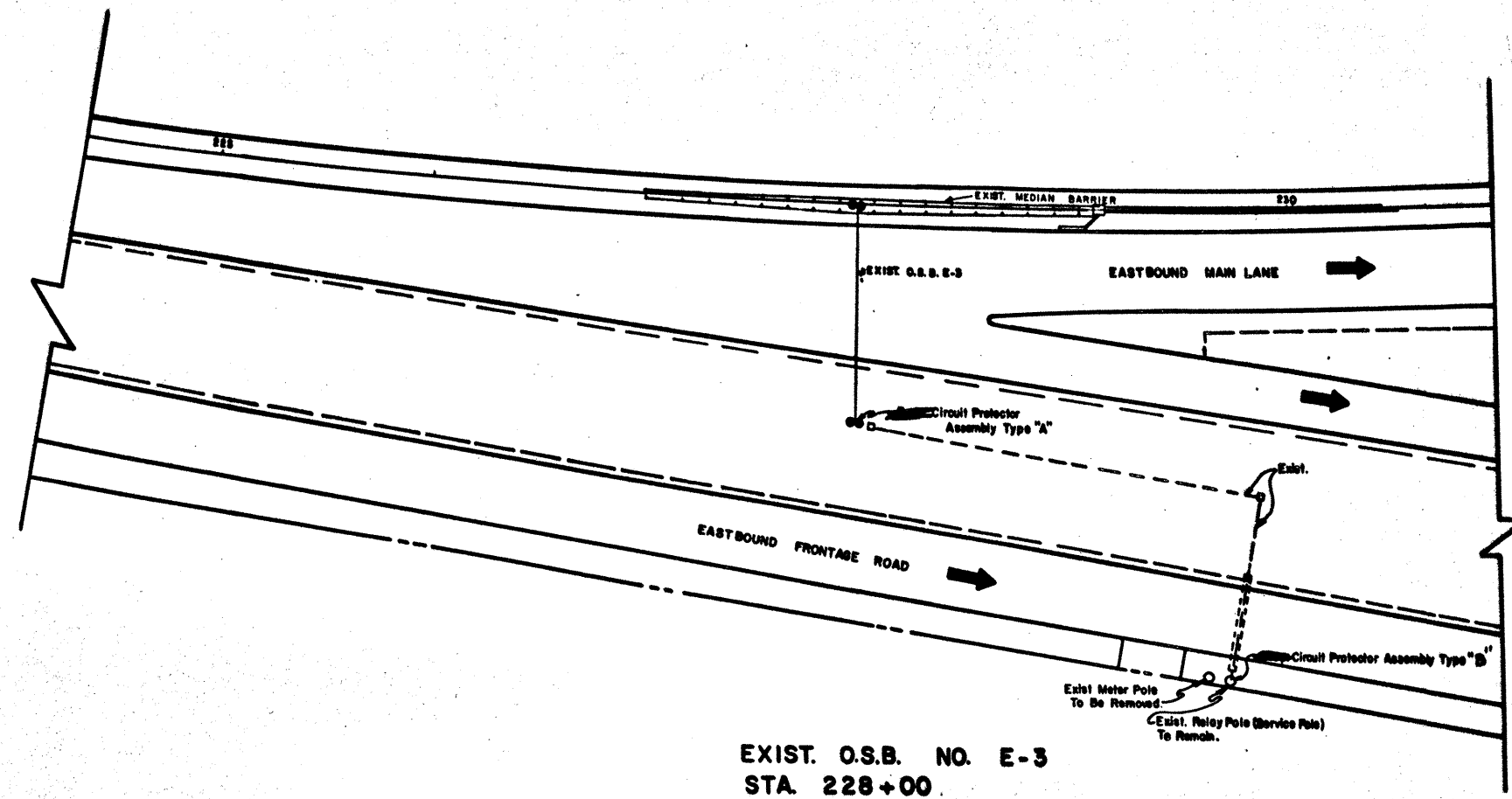
ELECTRICAL AND UTILITY LAYOUT

SCALE: 1" = 40'

SHEET 1 OF 2 39

DES. NO.	STATE	PROJECT NO.	SHEET NO.
15	TEXAS	IR 35-2 (11/11)	39
COUNTY	CONT.	SECT.	JOB
BEXAR	17	10	141
			LM. 35

Rev. 10/2/84

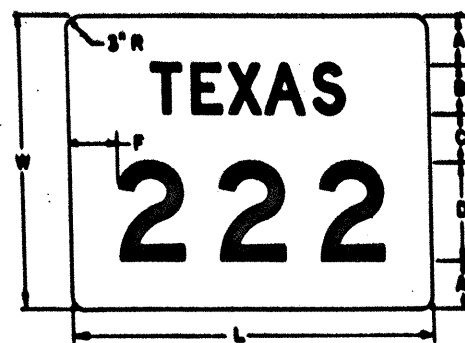


EXIST. O.S.B. NO. E-3
STA. 228+00

ELECTRICAL CONDUCTOR-NO. 6 THW (EXIST)
1/4" CONDT (PVC) (SCH 40)
CIRCUIT PROTECTOR ASSEMBLY-TYPE "A"
SIGN LIGHT FIXTURES-TYPE (MV) (.10KW)
CIRCUIT PROTECTOR ASSEMBLY TYPE "B"

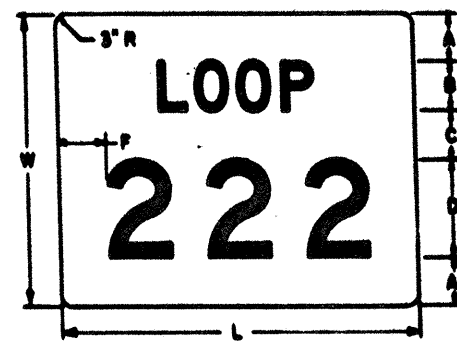
LP
LP
EA
EA
EA

ELECTRICAL AND UTILITY LAYOUT
SCALE: 1" = 40'

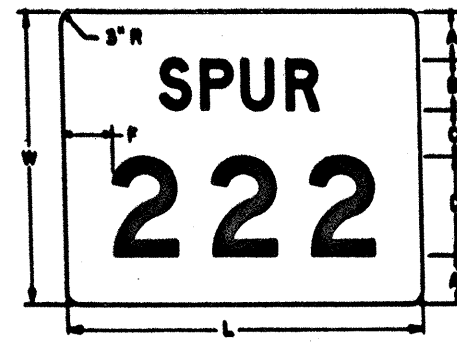


Sign Type	Digits	W
MI-6T4A	4	24
MI-6T4B	4	36
MI-6T4C	4	48
MI-6T3A	3	24
MI-6T3B	3	36
MI-6T3C	3	48
MI-6T2A	2	24
MI-6T2B	2	36
MI-6T2C	2	48
MI-6T1A	1	24
MI-6T1B	1	36
MI-6T1C	1	48

VERTICAL SPACING
AT RIGHT



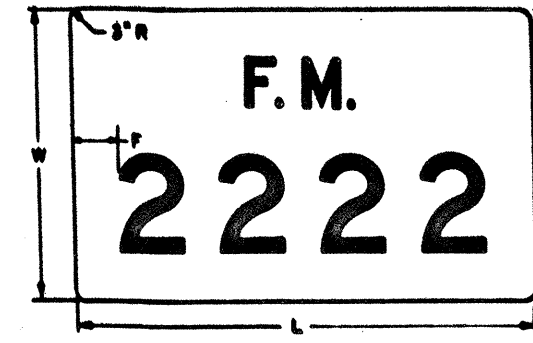
Sign Type	Digits	W
MI-6L4A	4	24
MI-6L4B	4	36
MI-6L4C	4	48
MI-6L3A	3	24
MI-6L3B	3	36
MI-6L3C	3	48
MI-6L2A	2	24
MI-6L2B	2	36
MI-6L2C	2	48
MI-6L1A	1	24
MI-6L1B	1	36
MI-6L1C	1	48



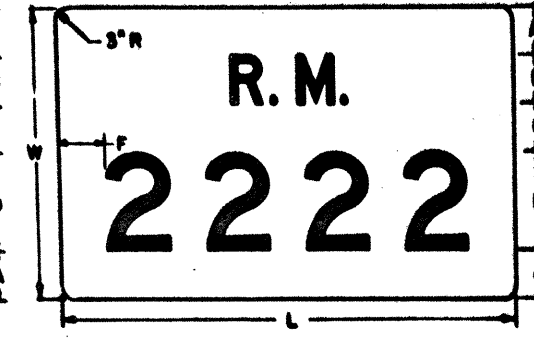
Sign Type	Digits	W
MI-6S4A	4	24
MI-6S4B	4	36
MI-6S4C	4	48
MI-6S3A	3	24
MI-6S3B	3	36
MI-6S3C	3	48
MI-6S2A	2	24
MI-6S2B	2	36
MI-6S2C	2	48
MI-6S1A	1	24
MI-6S1B	1	36
MI-6S1C	1	48



Sign Type	Digits	W
MI-6P4A	4	24
MI-6P4B	4	36
MI-6P4C	4	48
MI-6P3A	3	24
MI-6P3B	3	36
MI-6P3C	3	48
MI-6P2A	2	24
MI-6P2B	2	36
MI-6P2C	2	48
MI-6P1A	1	24
MI-6P1B	1	36
MI-6P1C	1	48



Sign Type	Digits	W
MI-6F4A	4	24
MI-6F4B	4	36
MI-6F4C	4	48
MI-6F3A	3	24
MI-6F3B	3	36
MI-6F3C	3	48
MI-6F2A	2	24
MI-6F2B	2	36
MI-6F2C	2	48
MI-6F1A	1	24
MI-6F1B	1	36
MI-6F1C	1	48



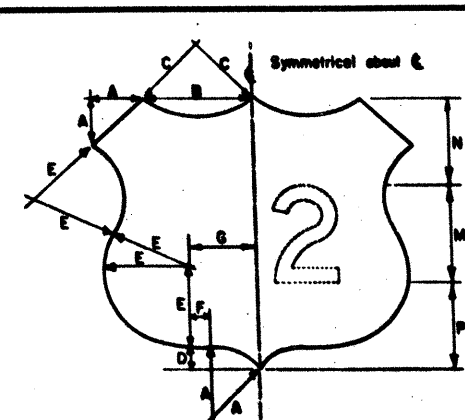
Sign Type	Digits	W
MI-6R4A	4	24
MI-6R4B	4	36
MI-6R4C	4	48
MI-6R3A	3	24
MI-6R3B	3	36
MI-6R3C	3	48
MI-6R2A	2	24
MI-6R2B	2	36
MI-6R2C	2	48
MI-6R1A	1	24
MI-6R1B	1	36
MI-6R1C	1	48

VERTICAL SPACING
FOR
STATE ROUTE MARKERS

W	A	B	C	D
24	24	4	3	12
36	4	6	4	18
48	6	6	6	24

F (minimum)
5 1/2" for 12" numeral
6 1/2" for 18" numeral
11" for 24" numeral

M 1-6 STATE ROUTE MARKERS FOR GUIDE SIGN USE



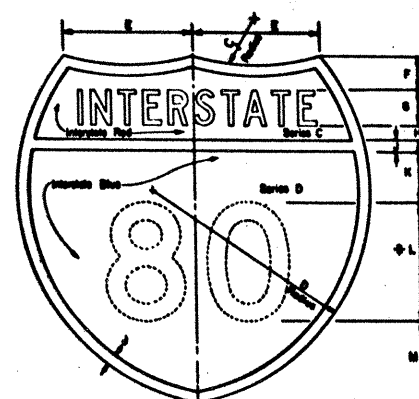
SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	AREA
MI-4D2 12" NUMERALS 2 DIGIT	24x24	5	7	5	2	7	1	5	12	5 1/2	6 1/2	3.18				
MI-4D3 12" NUMERALS 3 DIGIT	30x24	5	10	9	2	7	4	8	12	5 1/2	6 1/2	4.05				
MI-4E2 18" NUMERALS 2 DIGIT	36x36	7 1/2	10 1/2	7 1/2	3	10 1/2	1 1/2	7 1/2	18	8 1/2	9 1/2	7.15				
MI-4E3 18" NUMERALS 3 DIGIT	45x36	7 1/2	15	13 1/2	3	10 1/2	6	12	18	8 1/2	9 1/2	9.11				
MI-4F2 24" NUMERALS 2 DIGIT	48x48	10	14	10	4	14	2	10	24	11	13	12.70				
MI-4F3 24" NUMERALS 3 DIGIT	60x48	10	20	18	4	14	8	16	24	11	13	16.20				

ALL LENGTHS SHOWN ARE IN INCHES, ALL AREAS ARE IN SQUARE FEET.

NOTES:

- DIMENSIONS FOR THE U.S. ROUTE MARKER OUTLINES ARE SCALE DIMENSIONS AND MAY BE ADJUSTED SLIGHTLY WHERE NECESSARY FOR CLOSURE OF THE OUTLINES.
- IN A FEW CASES NUMERALS CANNOT BE ACCOMMODATED WITHIN THE SPACE AVAILABLE. FOR THESE CASES, THE STANDARD SERIES D MAY BE REDUCED TO SERIES C, OR AS A SECOND CHOICE REDUCED TO THE NEXT SMALLER HEIGHT COMMONLY AVAILABLE.

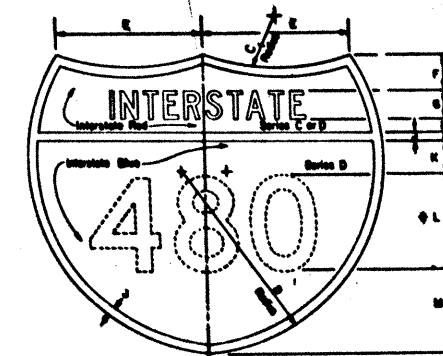
U.S. ROUTE MARKERS FOR GUIDE SIGN USE



MI-1C2
36" x 36"

MI-1D2
48" x 48"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND (UPPER PORTION) - RED REFLECTIVE
BACKGROUND (LOWER PORTION) - BLUE REFLECTIVE



ALSO FOR TWO DIGITS AND SUFFIX LETTER

MI-1C3
45" x 36"

MI-1D3
60" x 48"

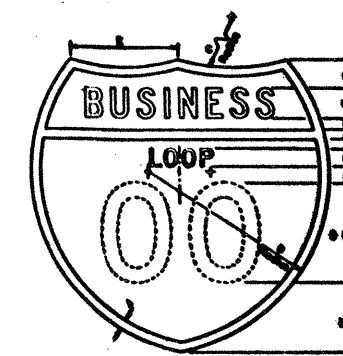
LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND (UPPER PORTION) - RED REFLECTIVE
BACKGROUND (LOWER PORTION) - BLUE REFLECTIVE

IN A FEW CASES NUMERALS CANNOT BE ACCOMMODATED WITHIN THE SPACE AVAILABLE. FOR THESE CASES, THE STANDARD SERIES D MAY BE REDUCED TO SERIES C, OR AS A SECOND CHOICE REDUCED TO THE NEXT SMALLER HEIGHT COMMONLY AVAILABLE.

SIZE	C	D	E	F	G	H	I	J	K	L	M	N	AREA
MI-1C2 18" NUMERALS 2 DIGIT	36x36	22 1/2	22 1/2	13 1/2	3	3 1/2	1 1/2	1 1/2	1 1/2	18D	8 1/2	7.18	
MI-1D2 24" NUMERALS 2 DIGIT	48x48	30	30	17 1/2	4	5C	1	1	2	24D	11	12.76	
MI-1C3 18" NUMERALS 3 DIGIT	45x36	36	25 1/2	20 1/2	3	3 1/2	1 1/2	1 1/2	1 1/2	18D	8 1/2	9.41	
MI-1D3 24" NUMERALS 3 DIGIT	60x48	48	34	26 1/2	4	5D	1	1	2	24D	11	16.74	
MI-2C2 15" NUMERALS 2 DIGIT	36x36	22 1/2	22 1/2	13 1/2	3	3 1/2	1 1/2	1 1/2	1 1/2	15D	9	7.18	
MI-2D2 20" NUMERALS 2 DIGIT	48x48	30	30	17 1/2	4	5C	1	1	1	20D	12	12.76	
MI-3C2 15" NUMERALS 3 DIGIT	36x36	22 1/2	22 1/2	13 1/2	3	3 1/2	1 1/2	1 1/2	1 1/2	15D	9	7.18	
MI-3D2 20" NUMERALS 3 DIGIT	48x48	30	30	17 1/2	4	5C	1	1	1	20D	12	12.76	

ALL LENGTHS SHOWN ARE IN INCHES, ALL AREAS ARE IN SQUARE FEET.

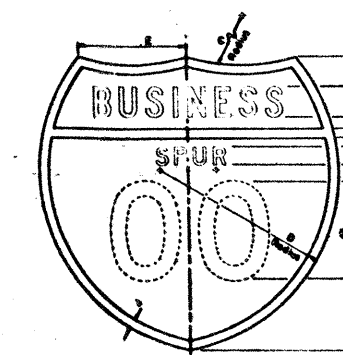
INTERSTATE ROUTE MARKERS FOR GUIDE SIGN USE



MI-2C2
36" x 36"

MI-2D2
48" x 48"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE



MI-3C2
36" x 36"

MI-3D2
48" x 48"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

GENERAL NOTES:
THE ALPHABETS AND LATERAL PLACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THEREOF. LATERAL SPACING OF TEXT SHOULD BE SUCH AS TO PROVIDE A BALANCED APPEARANCE. THE FACE OF ALL U.S. AND STATE ROUTE MARKERS SHALL BE WHITE REFLECTIVE SHEETING CONFORMING WITH THE ITEM "FLAT SURFACE REFLECTIVE SHEETING". THE LETTERS AND NUMERALS FOR THE U.S. AND STATE ROUTE MARKERS SHALL BE BLACK AND APPLIED TO THE REFLECTIVE MATERIAL BY THE SCREEN PROCESS. THE SIGN BLANKS SHOWN ON THIS SHEET ARE ONE PIECE SHEET ALUMINUM ALLOY 0.003 INCH THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".
THE FACE OF ALL INTERSTATE ROUTE MARKERS SHALL BE WHITE COLORED TRANSPARENT INK APPLIED OVER FLAT SURFACE REFLECTIVE SHEETING BY THE REVERSE SCREEN PROCESS. THE SIGN BLANKS SHOWN ON THIS SHEET ARE ONE PIECE SHEET ALUMINUM ALLOY 0.003 INCH THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".
ALL SIGN BLANKS ON THIS SHEET ARE ATTACHED TO THE GUIDE SIGN AS DETAILED ON STANDARD SHEET 10(1).



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

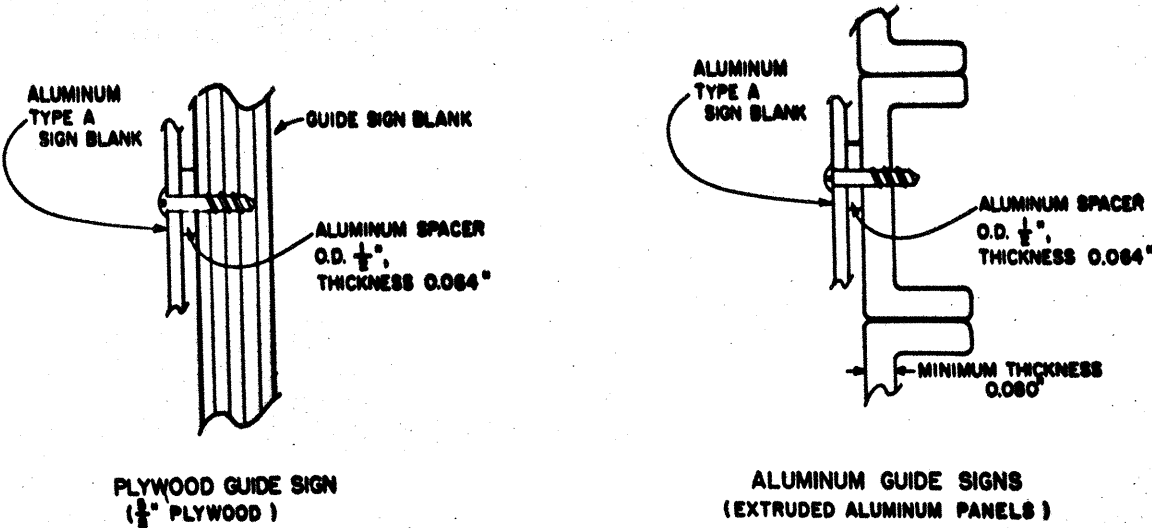
INTERSTATE, U.S. AND STATE
ROUTE MARKERS

FOR ATTACHMENT TO GUIDE SIGNS

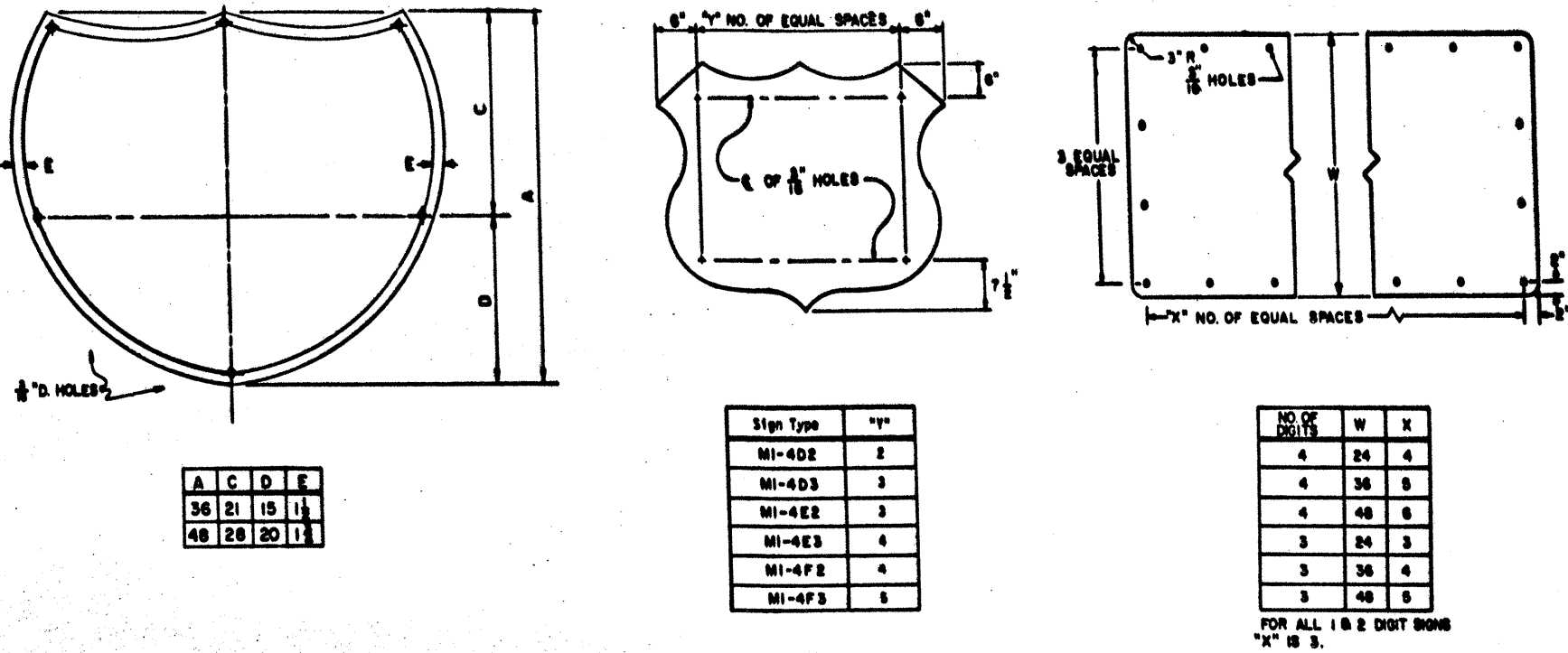
IM(1)

DRAWING DATE:	7-72	STATE:	FEDERAL:	FEDERAL AID PROJECT:	SHEET:
DATE:	8-73: notes and borders	15	6	IR 35-2(18) 1/1	42
DATE:	4-78: add "G" for US markers				
DATE:	1-81: Sign Numbers				
		COUNTY:	CONTROL SECTION:	JOB:	INCHES:
		Bexar	17	10	147
					35

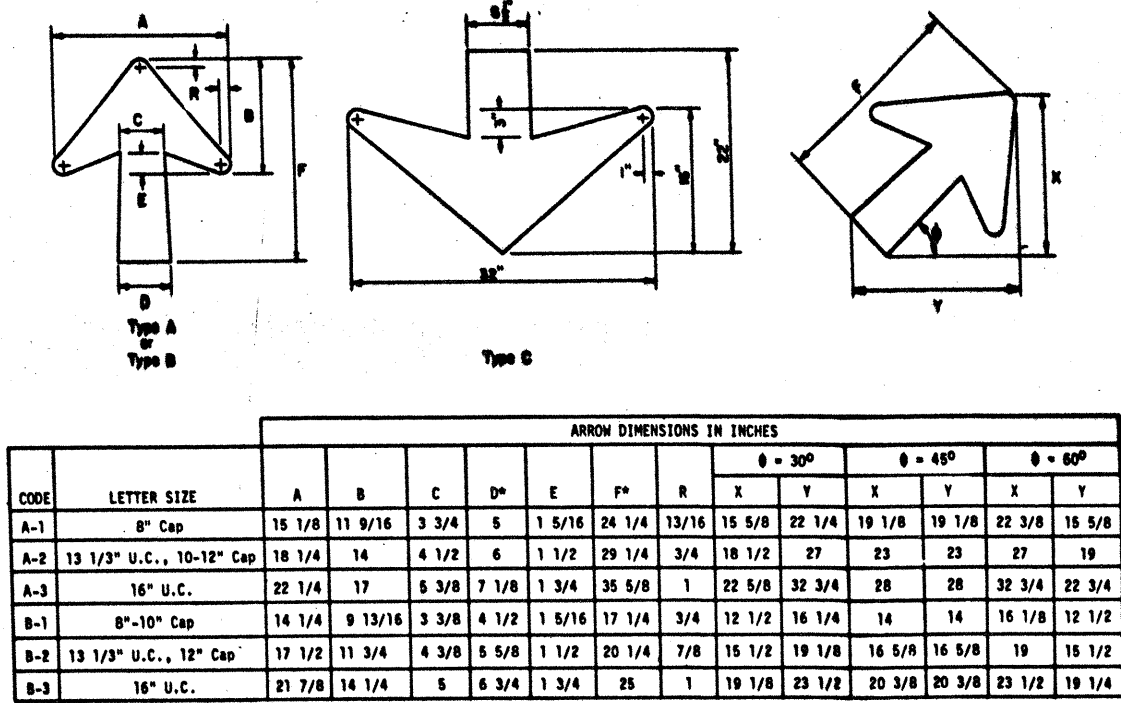
TYPICAL ATTACHMENT OF ROUTE MARKERS AND "EXIT ONLY" PANELS TO GUIDE SIGNS



- NOTES:
- (1) ROUTE MARKERS ATTACHED TO GUIDE SIGNS ~~SHOULD BE~~ TYPE A ALUMINUM, AS REQUIRED BY THE PLANS. SKETCHES SHOWN ABOVE ARE EXAMPLES ONLY.
- (2) SCREWS OR BOLTS, NUTS AND WASHERS ~~SHOULD BE~~ EITHER STAINLESS STEEL, GALVANIZED STEEL, OR ALUMINUM.
- (3) ROUTE MARKERS OR "EXIT ONLY" PANELS ~~SHOULD BE~~ ATTACHED TO PLYWOOD AND ALUMINUM SIGNS OF THE ABOVE TYPES WITH SCREWS OF SUFFICIENT LENGTH TO HOLD THE BLANK FIRMLY IN PLACE. THE SCREWS FOR PLYWOOD SIGNS ~~SHOULD~~ NOT PROTRUDE THROUGH THE BACK OF THE SIGN. ALL HOLES REQUIRED IN THE PUNCHING DETAIL OF THE BLANK SIGN ~~SHOULD BE~~ SCREWS.



SIGN BLANK PUNCHING DETAILS FOR ROUTE MARKERS WHEN ATTACHED TO GUIDE SIGN



WHERE A REMOVABLE REFLECTORIZED ARROW IS REQUIRED ON A GUIDE SIGN WHICH HAS A DEPTH OF 2' - 0" AND WHICH IS USUALLY ERECTED ON RAMP AND CROSSROADS AT INTERCHANGES, THE ARROW ~~SHOULD BE~~ A TYPE B - 1.

* RECOMMENDED DIMENSIONS: TAPER ~~SHOULD BE~~ HELD CONSTANT FOR LONGER OR SHORTER SHAFT LENGTHS.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

INTERSTATE, U.S. AND STATE
ROUTE MARKERS 42
FOR ATTACHMENT TO GUIDE SIGNS
IM(2)

DRAWING DATE: 1-81

REVISIONS

STATE/FEDERAL DISTRICT/REGION

FEDERAL AID PROJECT

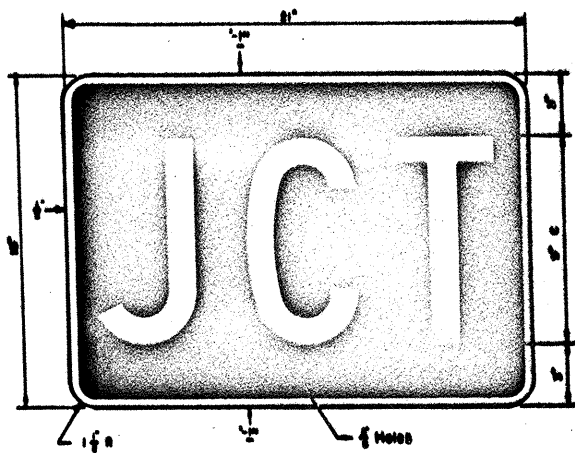
COUNTY

CONTROL SECTION

JOB

REVISION

SHEET

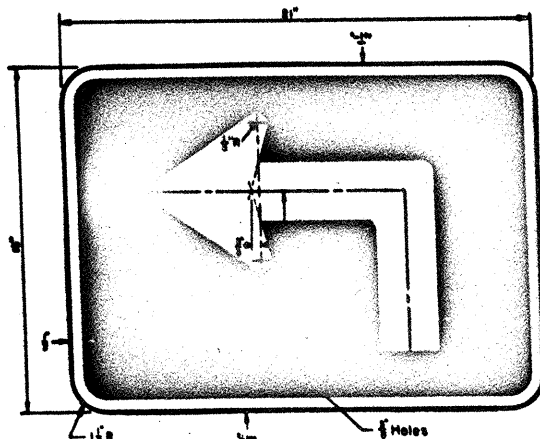


M2-1B
21" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M2-1G
21" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

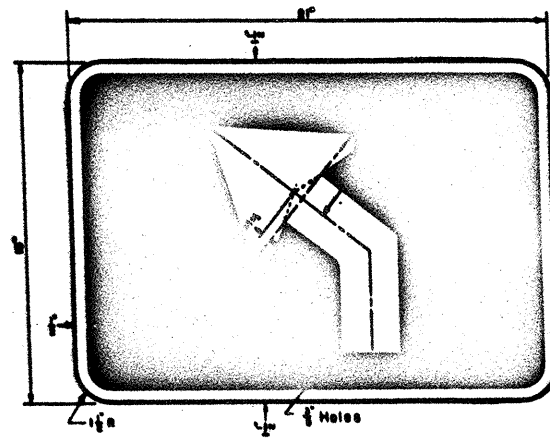


M5-1BL (AS SHOWN)
M5-1BR (OPP. HAND)
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M5-1GL
M5-1GR
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

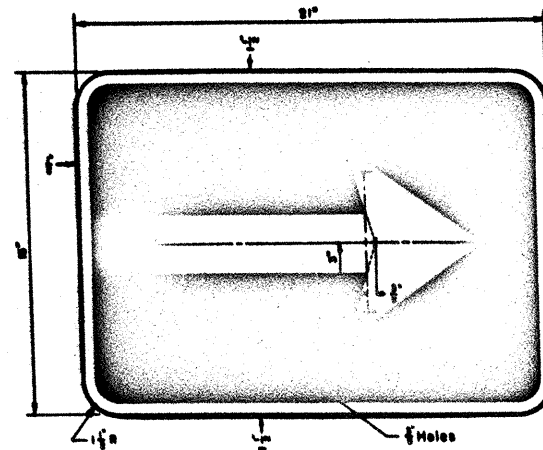


M5-2BL (AS SHOWN)
M5-2BR (OPP. HAND)
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M5-2GL
M5-2GR
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

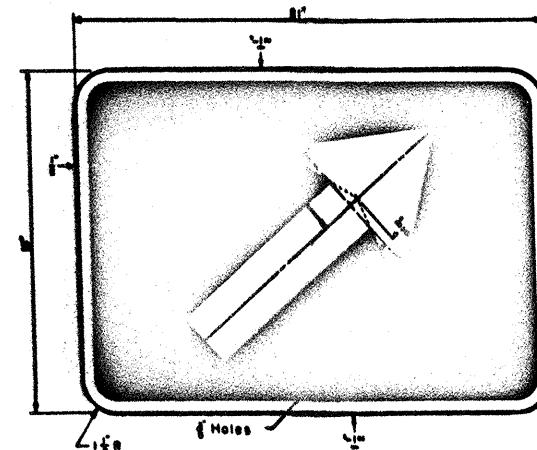


M6-1B
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M6-1G
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

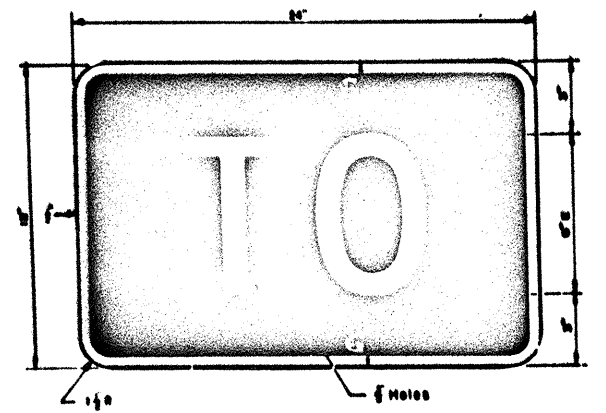


M6-2BR (AS SHOWN)
M6-2BL (OPP. HAND)
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M6-2GR
M6-2GL
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

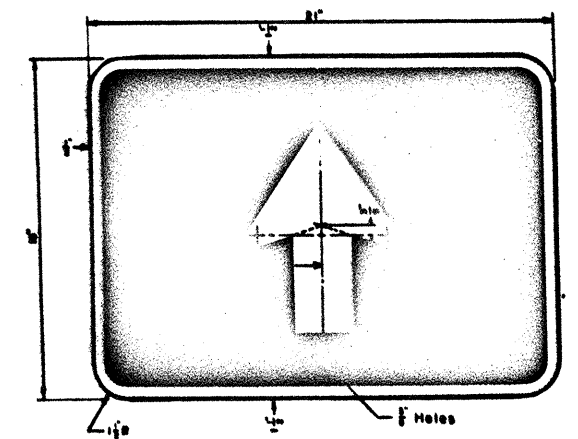


M4-5B
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M4-5G
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

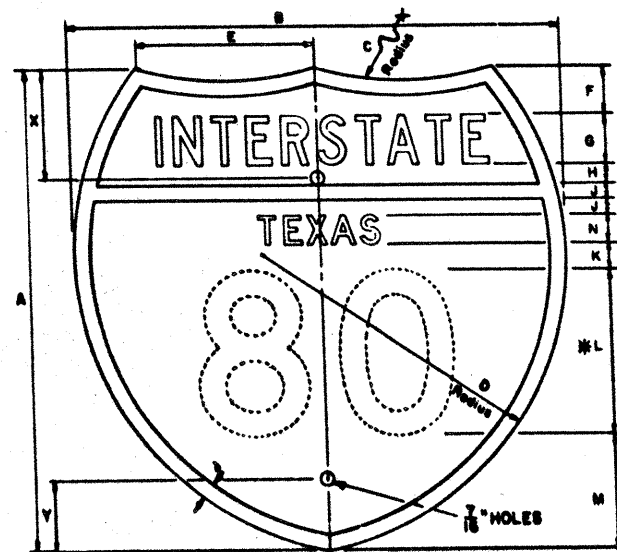


M6-3B
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M6-3G
21" x 15"

SYMBOL - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE



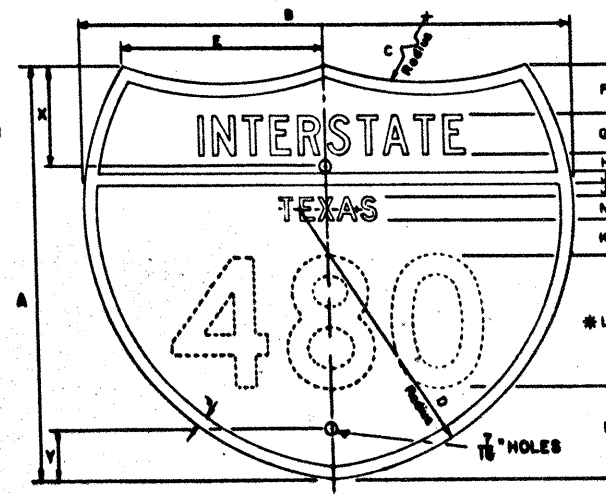
MI-1A2
24" x 24"
X=4 1/2" Y=4"

MI-1B2
36" x 36"
X=7 1/2" Y=6"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND (UPPER PORTION) - RED REFLECTIVE
BACKGROUND (LOWER PORTION) - BLUE REFLECTIVE

	MI-1A2 10" NUMERALS 2 DIGIT	MI-1B2 15" NUMERALS 2 DIGIT
A	24	36
B	24	36
C	15	22-1/2
D	15	22-1/2
E	6-7/8	13-1/8
F	2	3
G	2-1/2 C	3-3/4 C
H	1/2	3/4
J	1/2	3/4
K	1/2	3/4
L	10 D	15 D
M	6	9
N	1-1/2 D	2-1/4 D
AREA	3.18	7.18

NOTE: In a few cases numerals cannot be accommodated within the available space. For these cases, the standard series D numeral may be reduced to series C, or as a second choice to the next smaller height commonly available.



ALSO FOR TWO DIGIT WITH SUFFIX LETTER

MI-1A3
30" x 24"
X=4 1/2" Y=4"

MI-1B3
45" x 36"
X=7 1/2" Y=6"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND (UPPER PORTION) - RED REFLECTIVE
BACKGROUND (LOWER PORTION) - BLUE REFLECTIVE

	MI-1A3 10" NUMERALS 3 DIGIT	MI-1B3 15" NUMERALS 3 DIGIT
A	24	36
B	30	45
C	24	36
D	17	25-1/2
E	13-3/8	20-1/8
F	2	3
G	2-1/2 C	3-3/4 C
H	1/2	3/4
J	1/2	3/4
K	1/2	3/4
L	10 D	15 D
M	6	9
N	1-1/2 D	2-1/4 D
AREA	4.18	9.41

GENERAL NOTES:

ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THEREOF. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE. SIGNS SHALL BE COLORED TRANSPARENT INK OVER FLAT SURFACE REFLECTIVE SHEETING USING THE REVERSE SCREEN PROCESS. THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.008 INCH THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)", EXCEPT MI-1B3 WHICH SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.008 INCH THICK CONFORMING WITH THE SPECIFICATION ITEM "ALUMINUM SIGNS (TYPE A)".



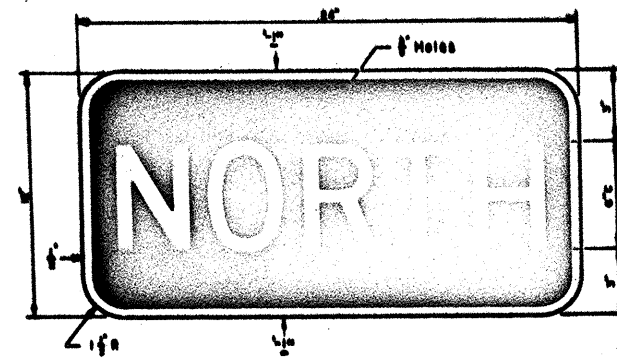
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

INTERSTATE MARKERS
FOR INDEPENDENT MOUNTING

44

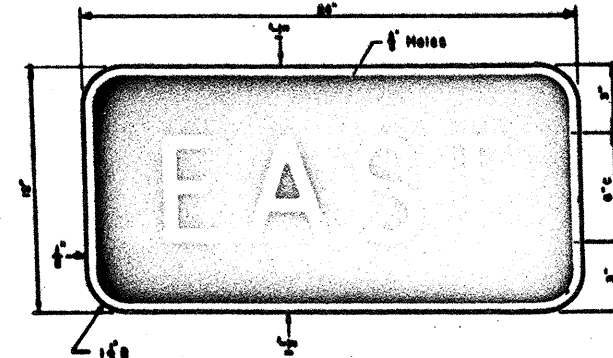
IM(3)

DRAWING DATE: 7-72	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
1-81: Sign Numbers, Notes	15	6	IR 35-2 (18) 161	44
	COUNTY	CONTRACT	SECTION	ADDITION
	18x42	17	10	147
				4



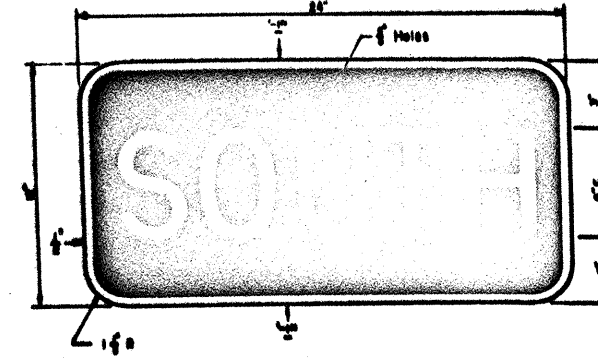
M3-1B
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



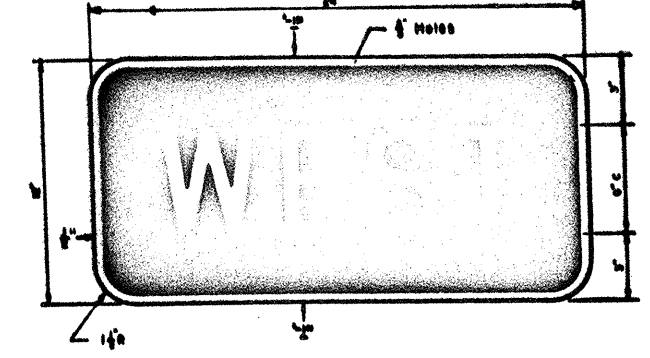
M3-2B
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



M3-3B
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



M3-4B
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

M3-1G
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

M3-2G
24" x 12"

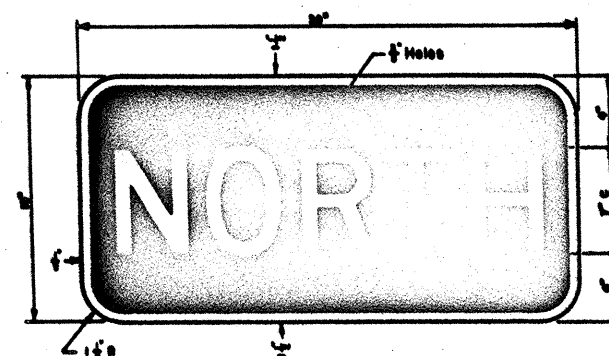
LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

M3-3G
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

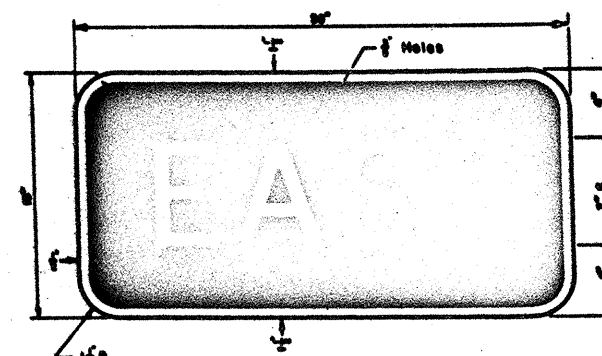
M3-4G
24" x 12"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE



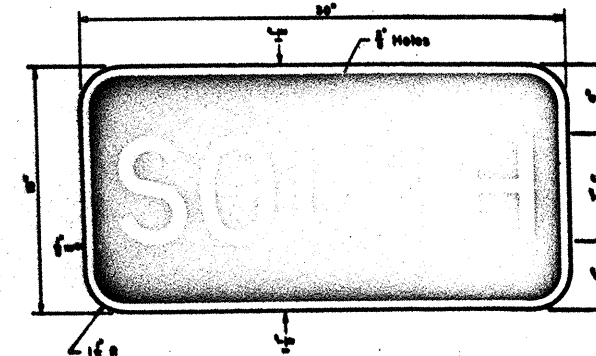
SM3-1B
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



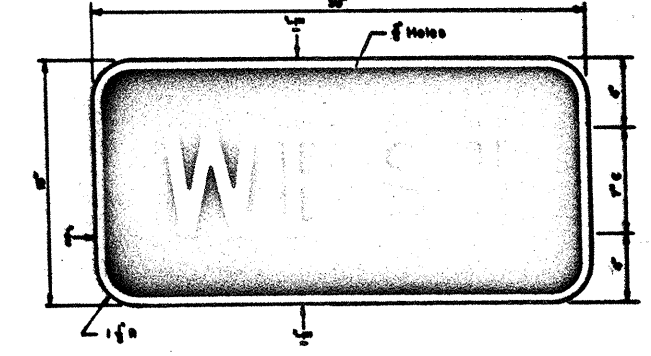
SM3-2B
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



SM3-3B
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE



SM3-4B
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - BLUE REFLECTIVE

SM3-1G
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

SM3-2G
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

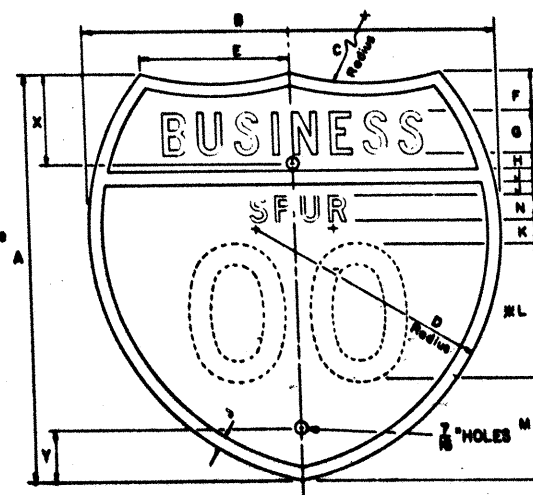
SM3-3G
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

SM3-4G
30" x 15"

LETTERS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

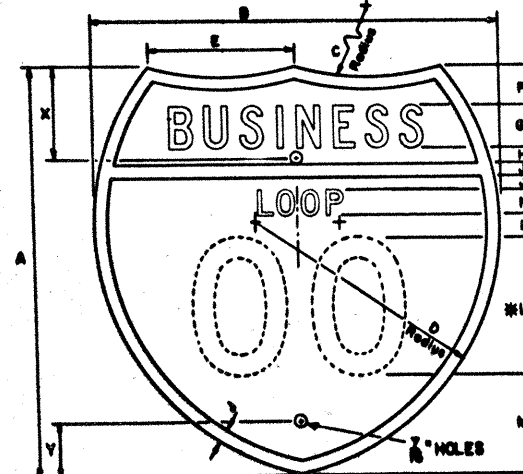
NOTE: In a few cases numerals cannot be accommodated within the space available. For these cases, the standard series D numeral may be reduced to series C, or as a second choice to the next smaller height commonly available.



MI-3A2
24" x 24"
X=4 1/2" Y=4"

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

	MI-3A2 10" NUMERALS 2 DIGITS	MI-3B2 16" NUMERALS 2 DIGITS
A	24	36
B	24	36
C	15	22-1/2
D	15	22-1/2
E	8-7/8	13-1/8
F	2	3
G	2-1/2 C	3-3/4 C
H	1/2	3/4
J	1/2	3/4
K	1/2	3/4
KL	10D	15D
N	6	9
N	1-1/2 D	2-1/4 D
AREA	3.19	7.18



MI-2A2
24" x 24"
X=4 1/2" Y=4"

	MI-2A2 10" NUMERALS 2 DIGITS	MI-2B2 16" NUMERALS 2 DIGITS
A	24	36
B	24	36
C	15	22-1/2
D	15	22-1/2
E	8-7/8	13-1/8
F	2	3
G	2-1/2 C	3-3/4 C
H	1/2	3/4
J	1/2	3/4
K	1/2	3/4
KL	10D	15D
N	6	9
N	1-1/2 D	2-1/4 D
AREA	3.19	7.18

LETTERS - WHITE REFLECTIVE
NUMERALS - WHITE REFLECTIVE
BORDER - WHITE REFLECTIVE
BACKGROUND - GREEN REFLECTIVE

GENERAL NOTES:

ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THEREOF. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE. SIGNS SHALL BE COLORED TRANSPARENT INK OVER FLAT SURFACE REFLECTIVE SHEETING USING THE REVERSE SCREEN PROCESS. THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 8.000 INCH THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".

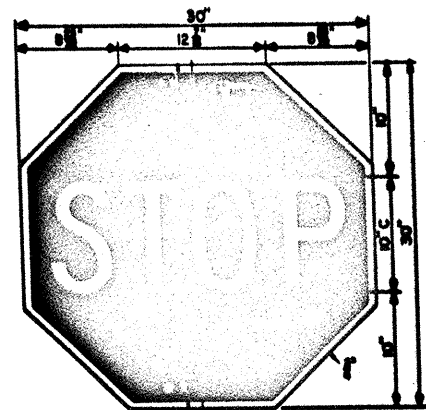


STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

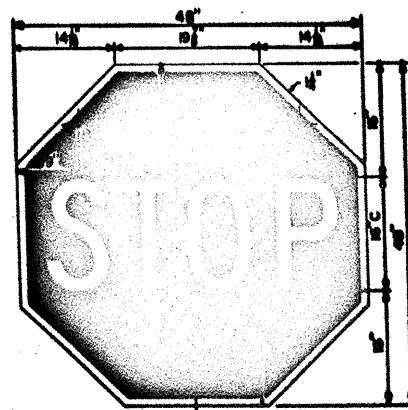
INTERSTATE MARKERS
FOR INDEPENDENT MOUNTING

45 IM(4)

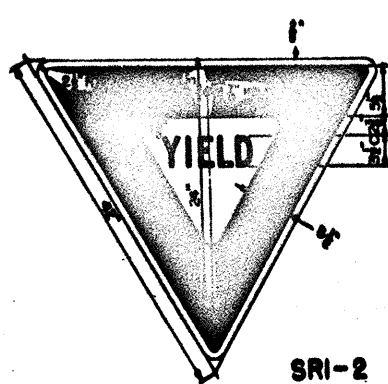
DRAWING DATE: 7-72	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
10-73: notes & sign borders	15	6	IA35-2(18)/16	45
1-81: Sign Numbers, Notes.	COUNTY	CONTROL SECTION	JOB	HIGHWAY
	35x02	17	10 147	135



R1-1
30" x 30"
Letters - White Reflective
Border - White Reflective
Background - Red Reflective

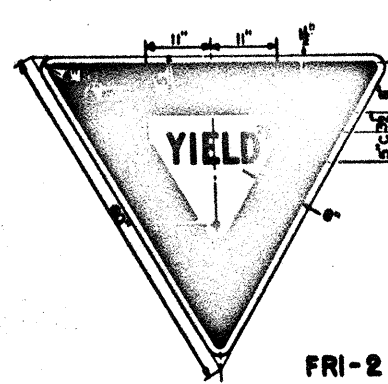


SR1-1
48" x 48"
Letters - White Reflective
Border - White Reflective
Background - Red Reflective



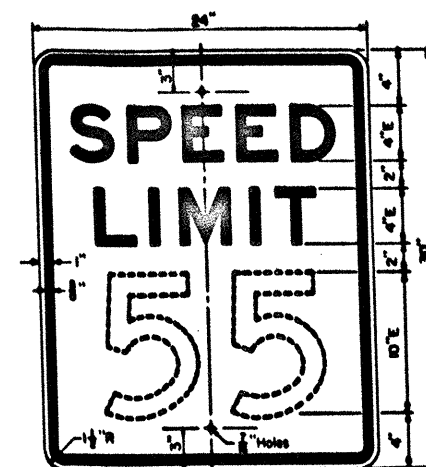
SRI-2
42" x 42" x 42"

Letters - Red Reflective
Border Band - Red Reflective
Background - White Reflective



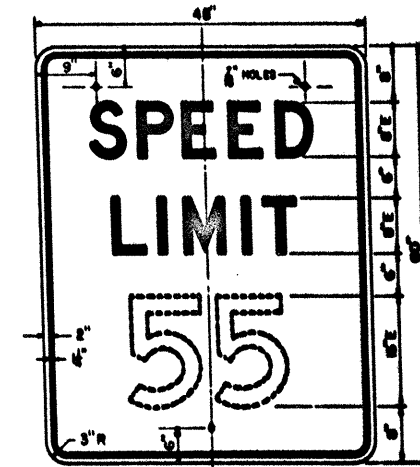
FRI-2
60" x 60" x 60"

Letters - Red Reflective
Border Band - Red Reflective
Background - White Reflective



R2-1
24" x 30"

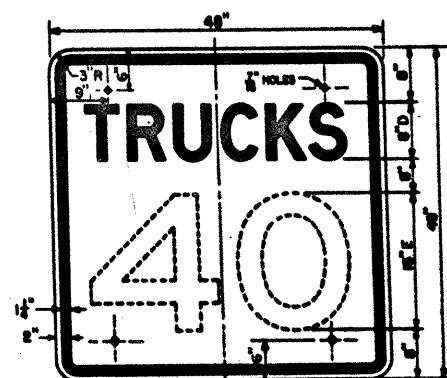
Letters - Black
Numerals - Black
Border - Black
Background - White Reflective



FR2-1
48" x 60"

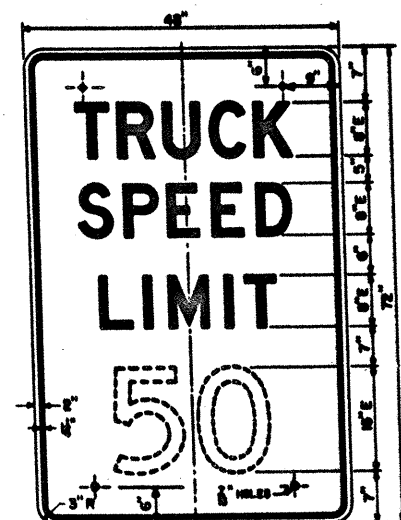
Letters - Black
Numerals - Black
Border - Black
Background - White Reflective

NOTE: WHEN FR2-1 IS MOUNTED ON A TYPE B MOUNT, SEE SHEET 2002, THERE SHALL BE A 7/16" DIAMETER HOLE IN EACH CORNER LOCATED AS DIMENSIONED IN THE UPPER LEFT CORNER OF THIS BLANK.



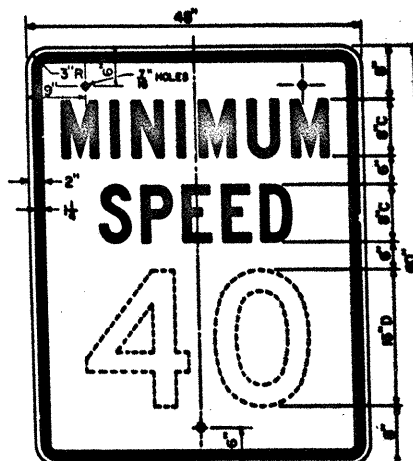
FR2-2
48" x 48"

Letters - Black
Numerals - Black
Border - Black
Background - White Reflective



FR2-2A
48" x 72"

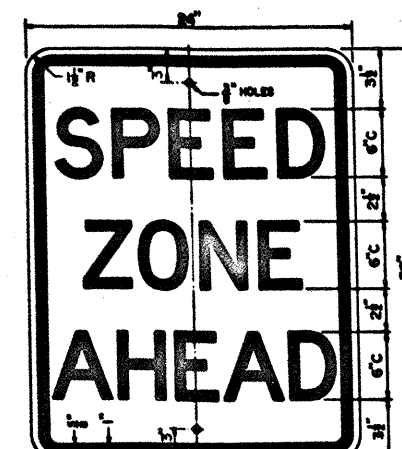
Letters - Black
Numerals - Black
Border - Black
Background - White Reflective



FR2-4
48" x 60"

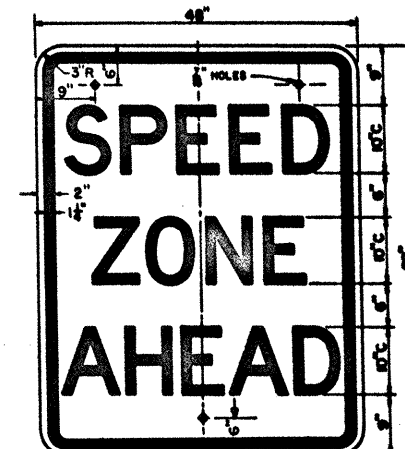
Letters - Black
Numerals - Black
Border - Black
Background - White Reflective

WHEN FR2-4 IS MOUNTED ON A TYPE B MOUNT, SEE SHEET 2002, THERE SHALL BE A 7/16" DIAMETER HOLE IN EACH CORNER LOCATED AS DIMENSIONED IN THE UPPER LEFT CORNER OF THIS BLANK.



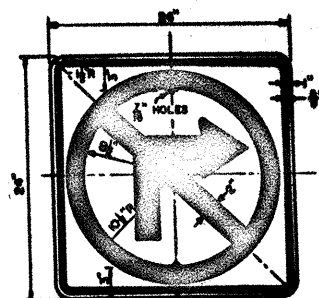
R2-50
24" x 30"

Letters - Black
Border - Black
Background - White Reflective



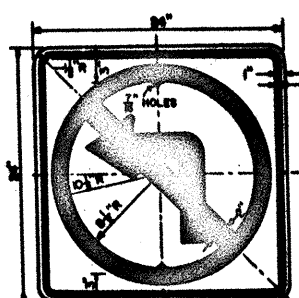
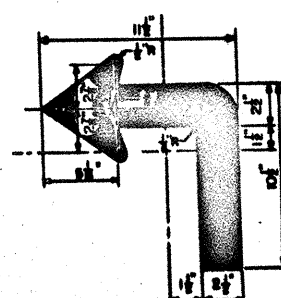
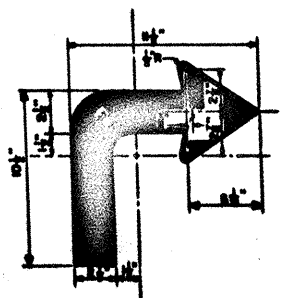
FR2-50
48" x 60"

Letters - Black
Border - Black
Background - White Reflective



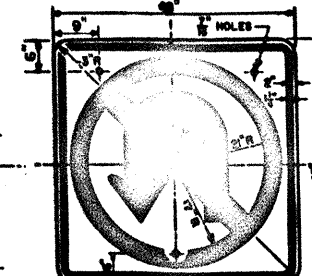
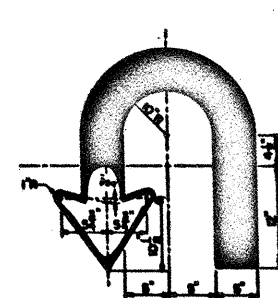
R3-1
24" x 24"

Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective



R3-2
24" x 24"

Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective



SR3-4
48" x 48"

Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective

GENERAL NOTES:

ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.

SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING, CONFORMING WITH THE SPECIFICATIONS. SIGNS CONTAINING A RED COLOR MUST BE MADE OF FLAT SURFACE REFLECTIVE SHEETING USING THE REVERSE SCREEN PROCESS.

THE SIGN BLANKS SHALL BE ONE PIECE 5/8 INCH THICK PLYWOOD (TYPE A) CONFORMING WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.



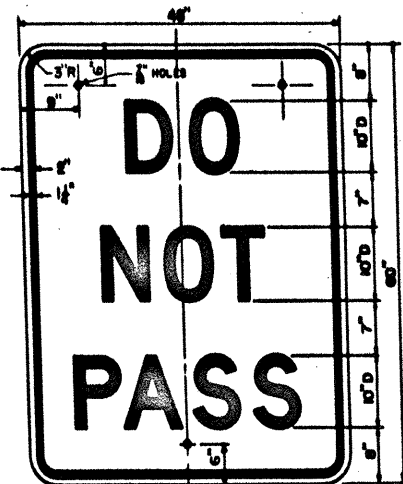
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

REGULATORY SIGNS

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R(1)

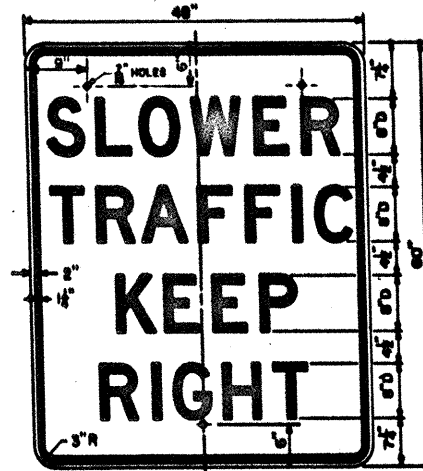
DRAWING DATE: 2-76		STATE	FEDERAL	FEDERAL AID PROJECT	SHEET
DATE	REVISION	15	6	IR 35-2(181) 161	46
CL-1	1-79 SPEED SIGNS	COUNTY		CONTROL SECTION	JOB
CL-2	1-81 RIGHT SPEED SIGNS; TURN PROHIBITION	COUNTY		CONTROL SECTION	JOB
CL-3	1-82 EDUCATIONAL PLACQUES, SAN NO. 5	COUNTY		CONTROL SECTION	JOB
		COUNTY		CONTROL SECTION	JOB



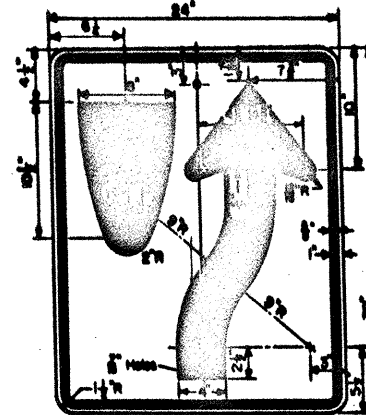
FR4-1
48" x 60"
Letters - Black
Border - Black
Background - White Reflective



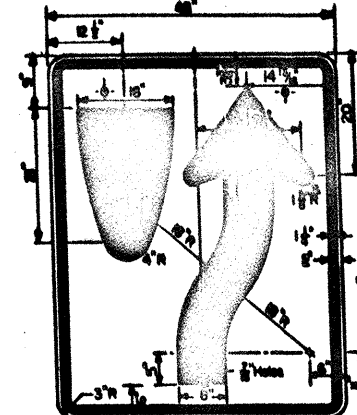
FR4-2
48" x 60"
Letters - Black
Border - Black
Background - White Reflective



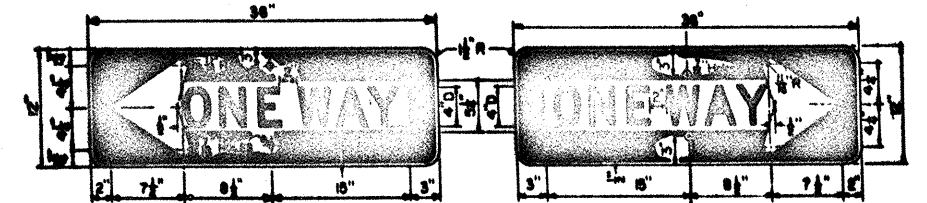
FR4-3
48" x 60"
Letters - Black
Border - Black
Background - White Reflective



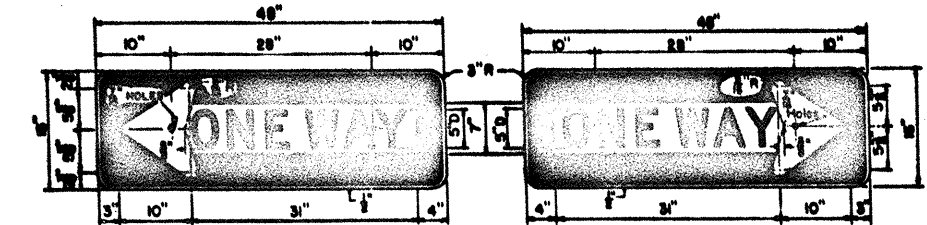
R4-7
24" x 30"
Letters - Black
Symbol - Black
Border - Black
Background - White Reflective



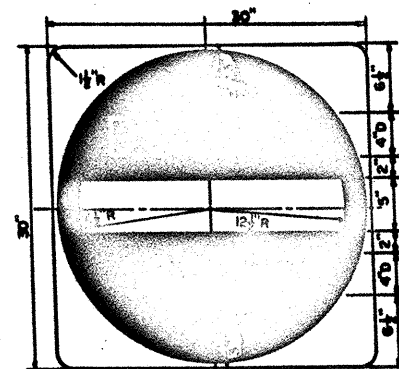
FR4-7
48" x 60"
Letters - Black
Symbol - Black
Border - Black
Background - White Reflective



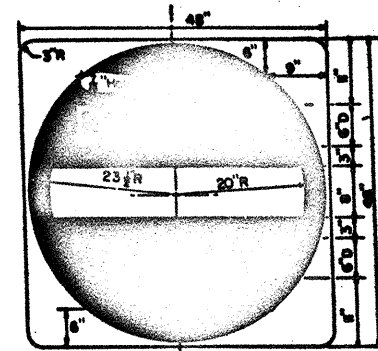
R6-1L
36" x 12"
Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black
R6-1R
36" x 12"
Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black



FR6-1L
48" x 16"
Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black
FR6-1R
48" x 16"
Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black

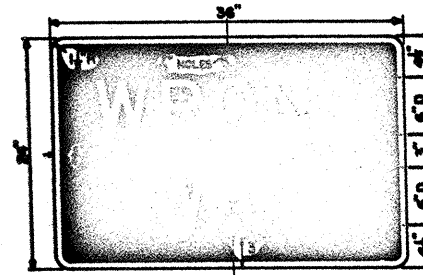


R5-1
30" x 30"
Letters - White Reflective
Bar - White Reflective
Border - White Reflective
Background - Red Reflective

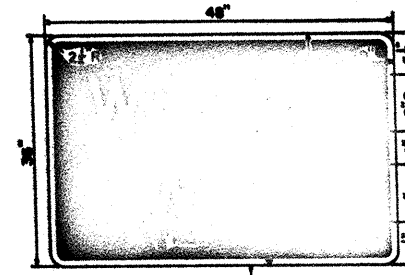


SR5-1
48" x 48"
Letters - White Reflective
Bar - White Reflective
Border - White Reflective
Background - Red Reflective

WHEN SR5-1 IS MOUNTED ON A TYPE B MOUNT, SEE SHEET 0000, THERE SHOULD BE A 7/16" DIAMETER HOLE IN EACH CORNER LOCATED AS DIMENSIONED IN THE UPPER RIGHT CORNER OF THIS BLANK.

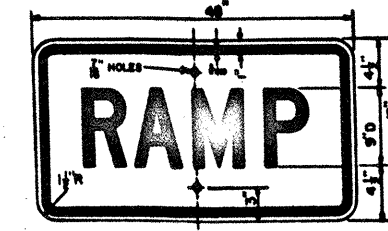


R5-1a
36" x 24"
Letters - White Reflective
Bar - White Reflective
Border - White Reflective
Background - Red Reflective



SR5-1a
48" x 36"
Letters - White Reflective
Bar - White Reflective
Border - White Reflective
Background - Red Reflective

WHEN SR5-1a IS MOUNTED ON A TYPE B MOUNT, SEE SHEET 0000, THERE SHOULD BE A 7/16" DIAMETER HOLE IN EACH CORNER LOCATED AS DIMENSIONED IN THE UPPER CORNER OF THIS BLANK.

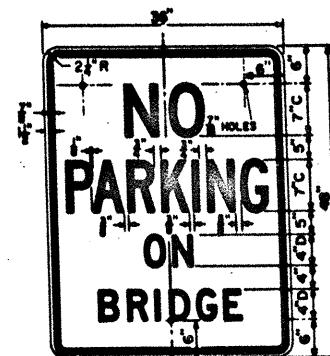


R5-1T
48" x 18"
Letters - Red Reflective
Bar - Red Reflective
Border - White Reflective
Background - White Reflective

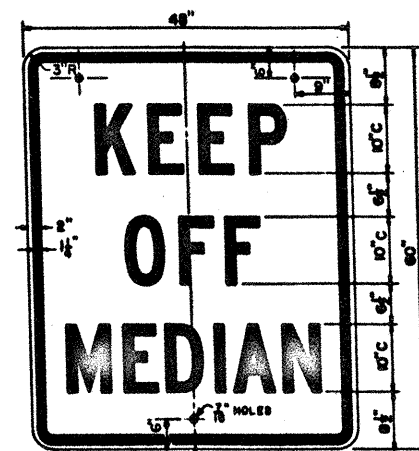


FR8-4
48" x 36"
Letters - Black
Border - Black
Background - White Reflective

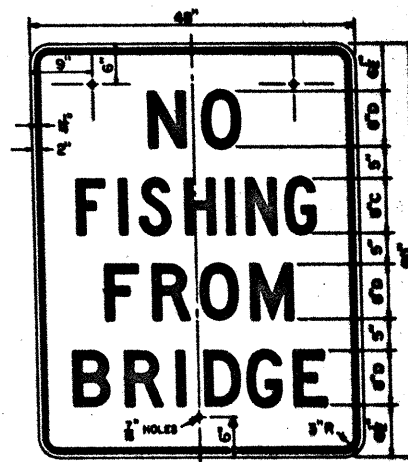
STOPPING FR8-7



ER8-1T
36" x 48"
Letters - Red Reflective
Border - Red Reflective
Background - White Reflective



FR11-1
48" x 60"
Letters - Black
Border - Black
Background - White Reflective



SR19-7
48" x 60"
Letters - Black
Border - Black
Background - White Reflective

GENERAL NOTES:

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SIGN BACKGROUNDS SHOULD BE OF FLAT SURFACE REFLECTIVE SHEETING, CONFORMING WITH THE SPECIFICATIONS.

SIGN LEGENDS SHOULD BE APPLIED BY THE SCREENING PROCESS.

THE SIGN BLANKS SHOWN ARE ONE PIECE 5/8 INCH THICK PLYWOOD (TYPE A) CONFORMING WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.



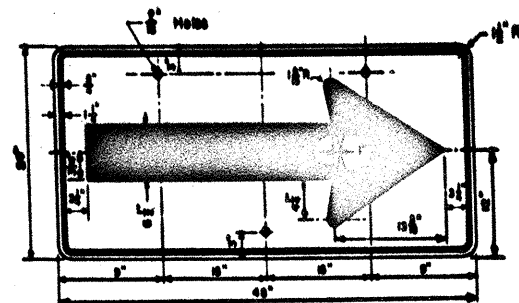
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

REGULATORY SIGNS

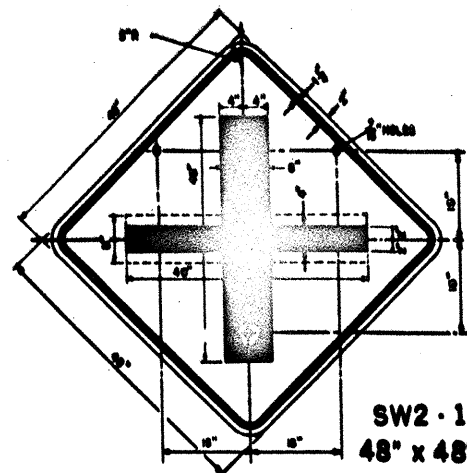
47

R(2)

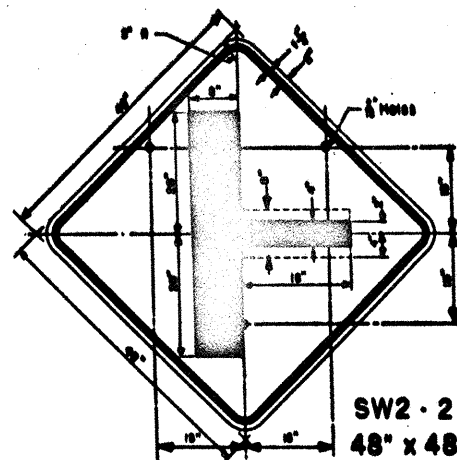
DRAWING DATE: 2-76		FEDERAL AID PROJECT		SHEET
15	6	1A35-2(18)161	47	47
COUNTY	CONTROL SECTION	JOB	REMARKS	
BEXAR	17	10	147	135



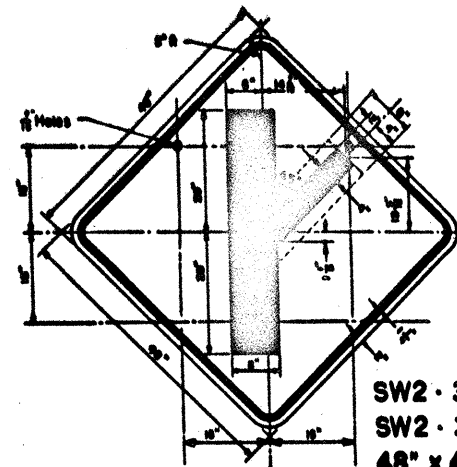
W1-6
48" x 24"



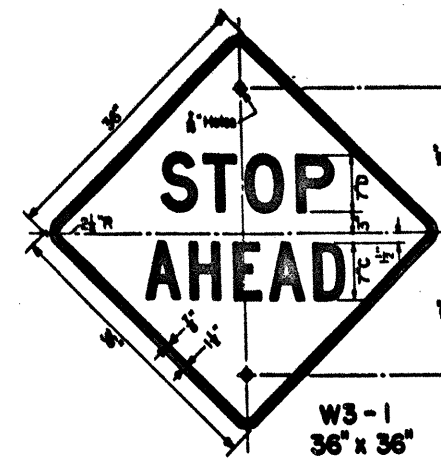
SW2-1
48" x 48"



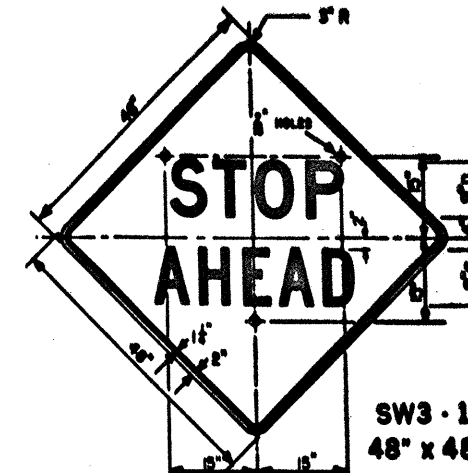
SW2-2
48" x 48"



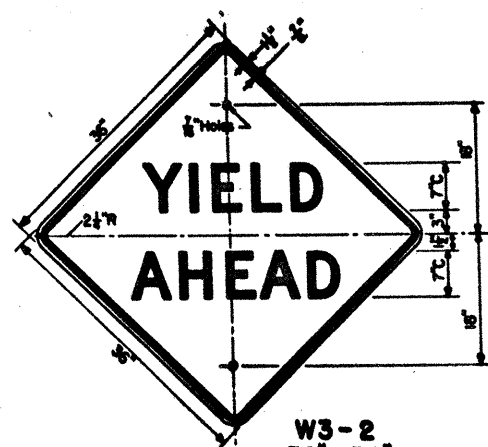
SW2-3R
SW2-3L
48" x 48"



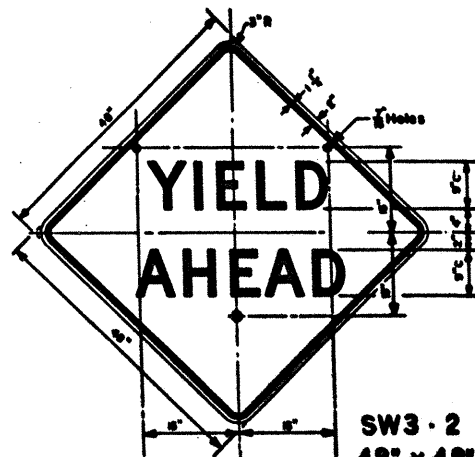
W3-1
36" x 36"



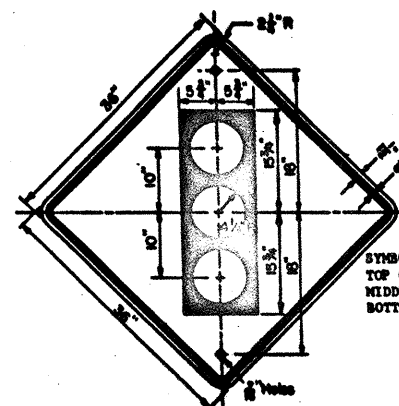
SW3-1
48" x 48"



W3-2
36" x 36"

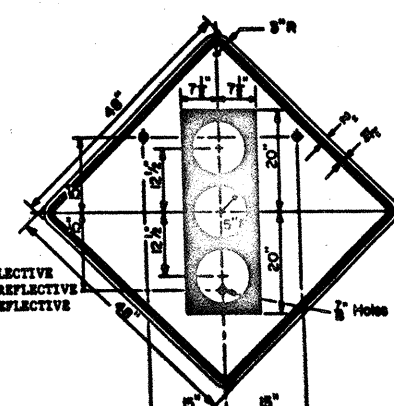


SW3-2
48" x 48"

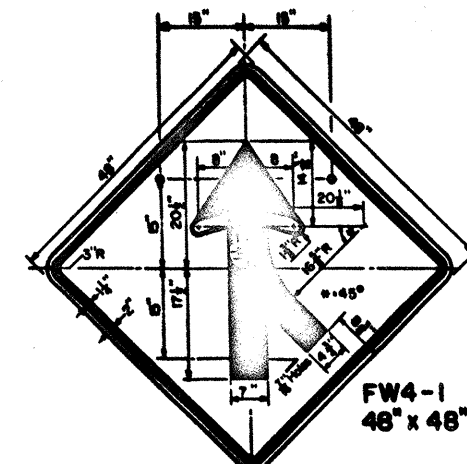


W3-3
36" x 36"

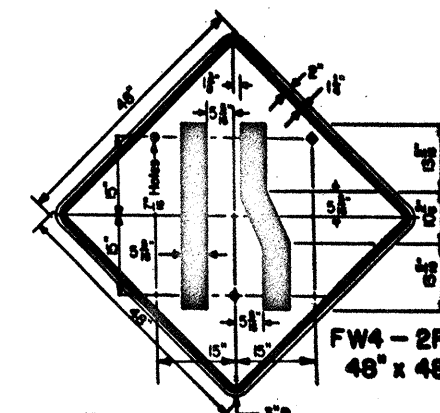
NOTE:
SYMBOL - BLACK
TOP CIRCLE - RED REFLECTIVE
MIDDLE CIRCLE - YELLOW REFLECTIVE
BOTTOM CIRCLE - GREEN REFLECTIVE



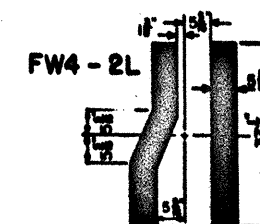
SW3-3
48" x 48"



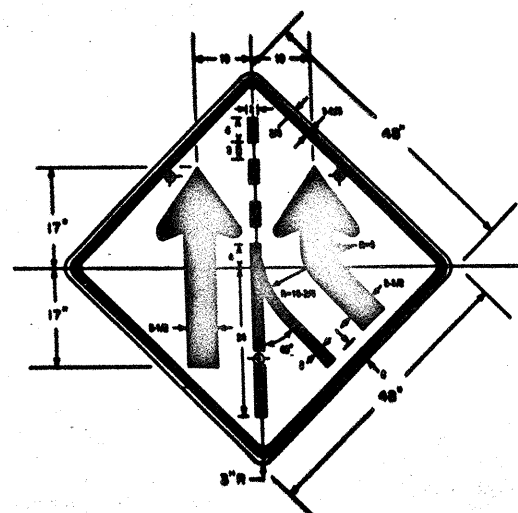
FW4-1
48" x 48"



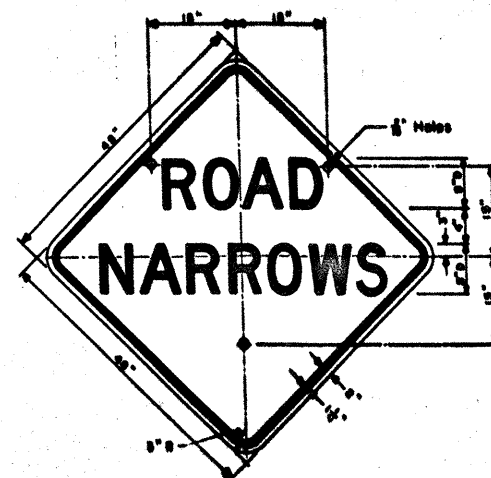
FW4-2R
48" x 48"



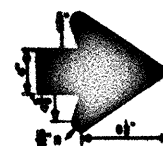
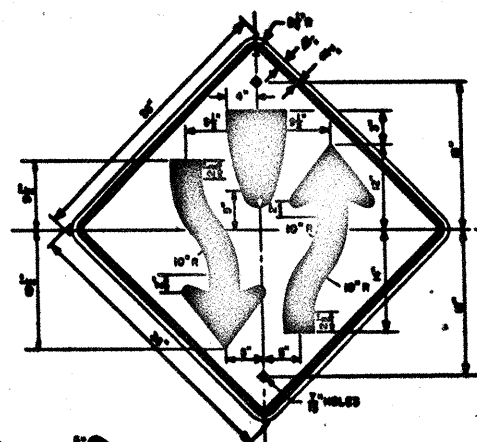
FW4-2L



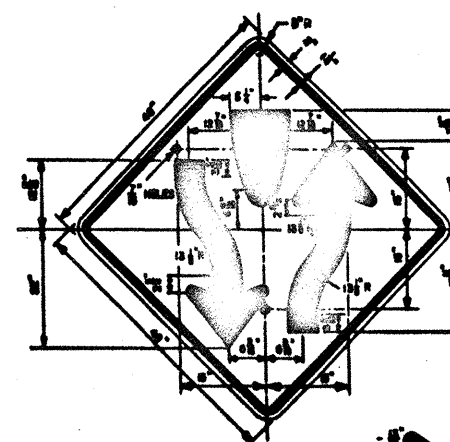
FW4-3
48" x 48"



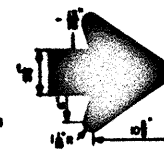
SW5-1
48" x 48"



W6-1
36" x 36"



SW6-1
48" x 48"



GENERAL NOTES:
THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.
THE SYMBOLS (EXCEPT WHERE NOTED), LETTERS, AND BORDERS SHALL BE BLACK, AND THE BACKGROUND SHALL BE INTERSTATE YELLOW REFLECTIVE CONFORMING WITH THE SPECIFICATIONS.
LETTERS, SYMBOLS, AND BORDERS SHALL BE APPLIED TO THE SURFACE OF THE SIGN BY THE SCREEN PROCESS.
THE SIGN BLANKS SHALL BE ONE PIECE 3/8 INCH THICK PLYWOOD (TYPE A) CONFORMING WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.



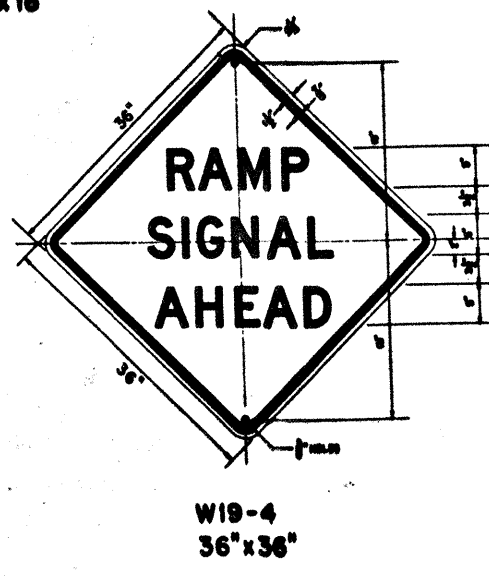
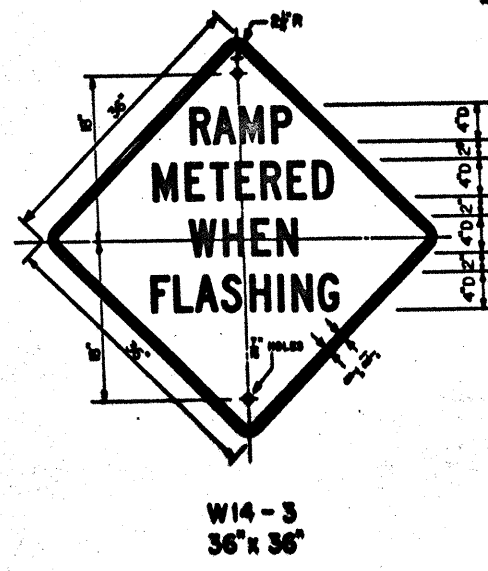
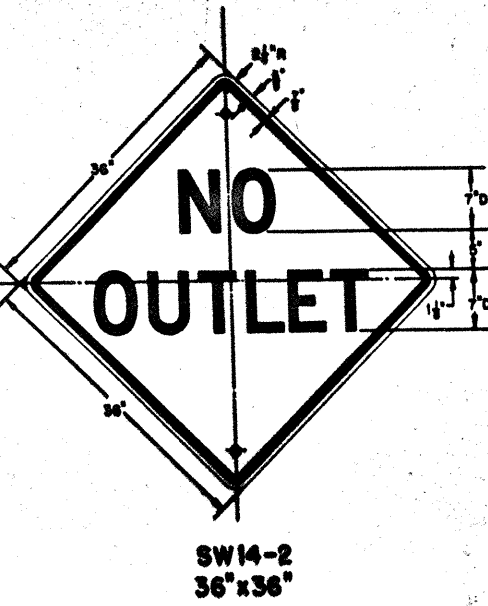
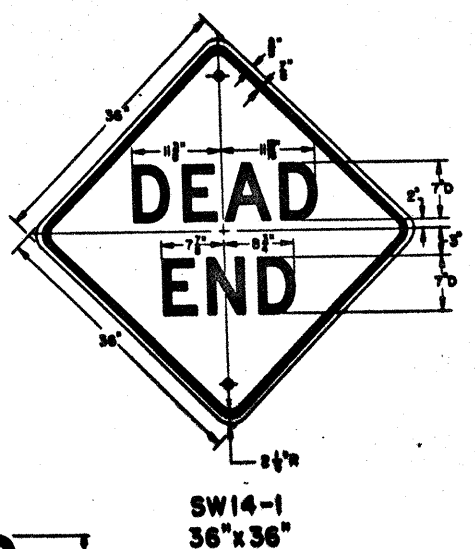
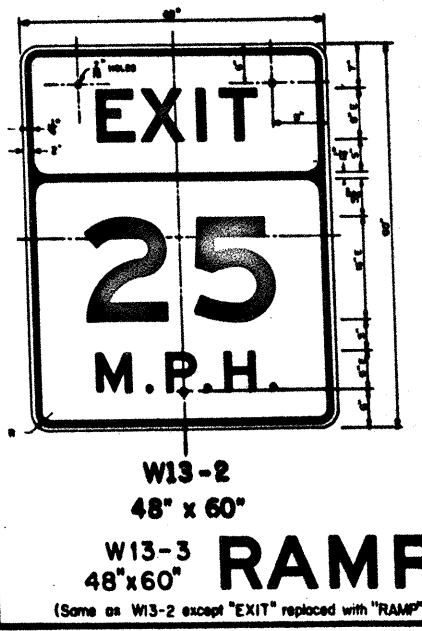
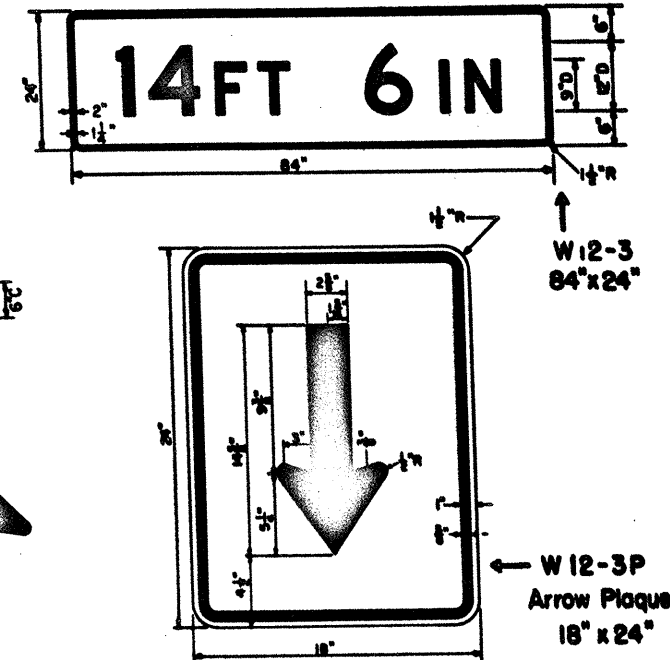
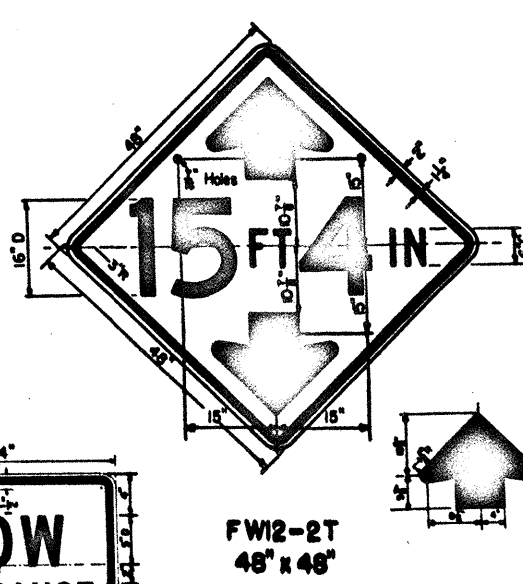
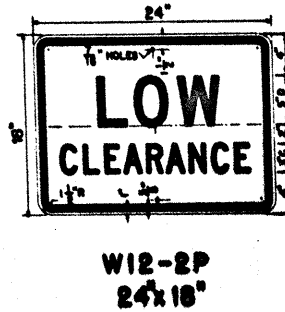
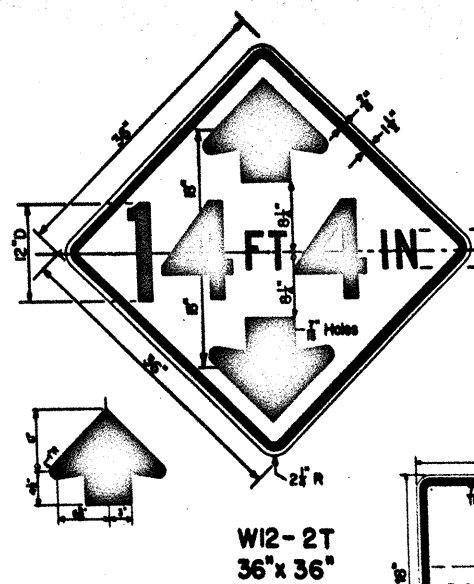
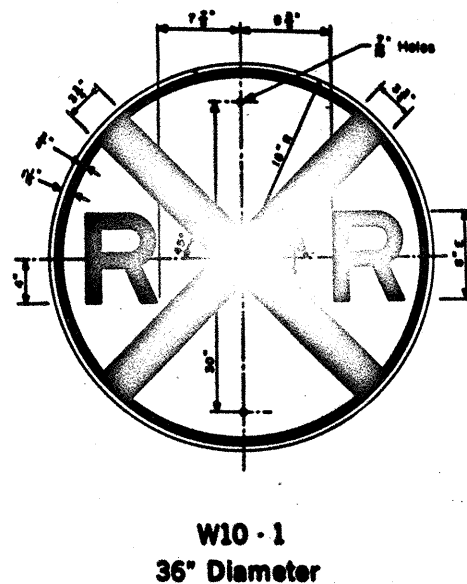
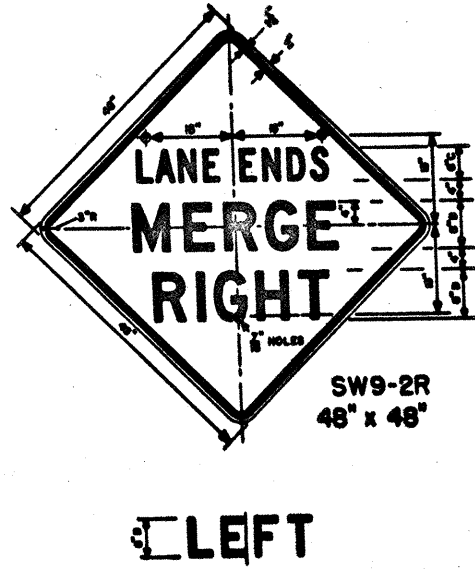
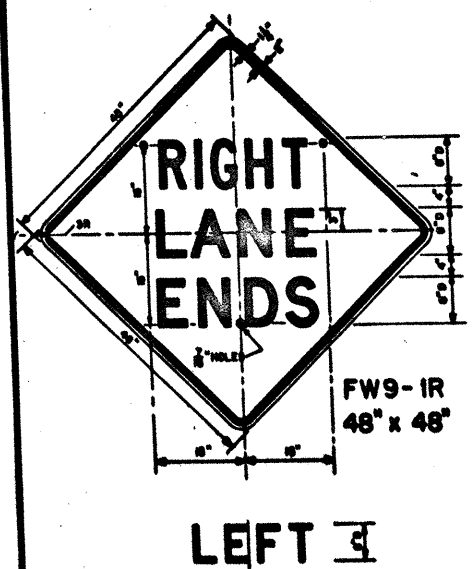
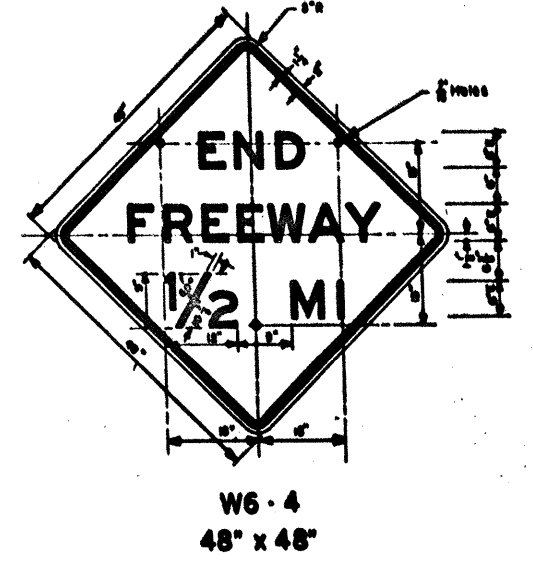
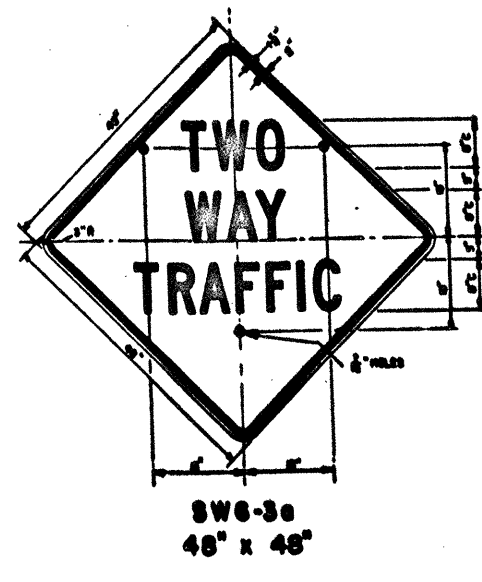
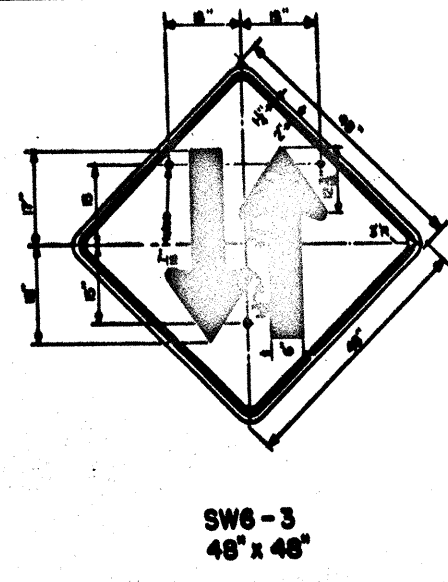
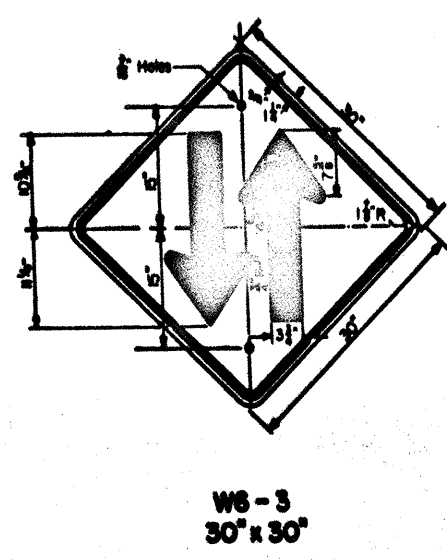
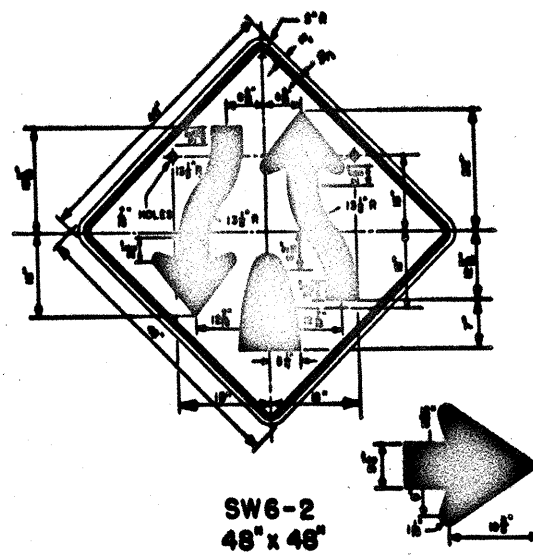
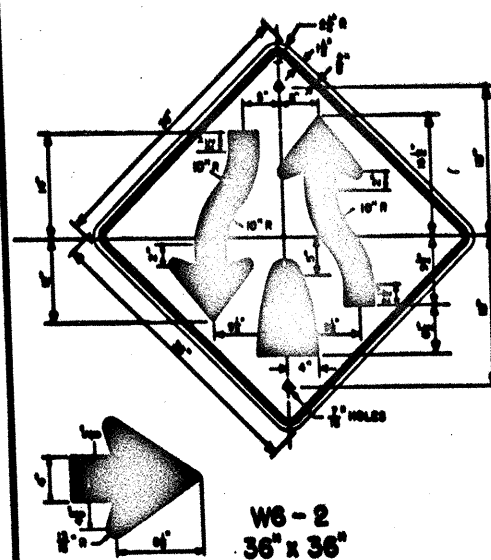
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

WARNING SIGNS

48

W(1)

DRAWING DATE: 1-81		STATE FEDERAL	FEDERAL AID PROJECT	SHEET
DESIGNED BY	1-82	13	6	45
CHECKED BY				
DATE		COUNTY	CONTROL SECTION	JOB
DATE		BEXAR	17	10
				47
				33
				10



GENERAL NOTES:

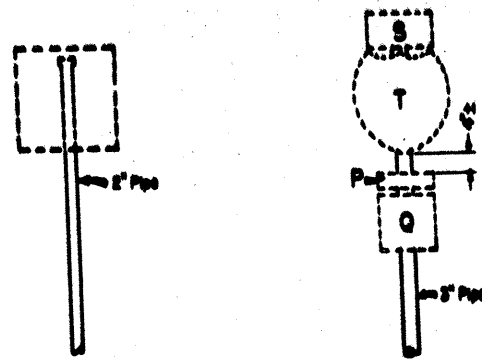
THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION, AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT, WHERE SUCH AS TO PROVIDE A BALANCED APPEARANCE.

THE LETTERS, SYMBOLS, AND BORDERS SHALL BE BLACK, AND THE BACKGROUND SHALL BE OF INTERSTATE YELLOW FLAT SURFACE REFLECTIVE SHEETING, CONFORMING WITH THE SPECIFICATIONS.

LETTERS, SYMBOLS, AND BORDERS SHALL BE APPLIED DIRECT TO THE SURFACE OF THE REFLECTIVE MATERIAL BY THE SCREEN PROCESS.

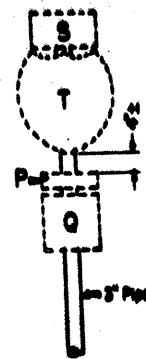
THE SIGN BLANKS SHALL BE ONE PIECE 5/8 INCH THICK PLYWOOD (TYPE A) CONFORMING WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION	
WARNING SIGNS	
49 W(2)	
DRAWING DATE: 1-81	FEDERAL AID PROJECT
1-82	15 6 1235-2(18) 16 49
COUNTY	CONTROL SECTION JOB
BEXAR	17 10 147 135
11	



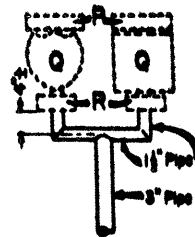
Type A

THIS TYPE PIPE MOUNT TO BE USED FOR ANY SIGN OR COMBINATION OF SIGNS WHEN THE SIGN AREA DOES NOT EXCEED 16 SQUARE FEET EXCEPT FR-1 AND W-1 SIGNS (SEE TYPE D-1). THE AREA OF THE REGULATORY OR WARNING SIGN SUPPLEMENTARY PLACQUES ~~SHOULD~~ NOT BE USED IN DETERMINING THE ABOVE SIGN AREA.



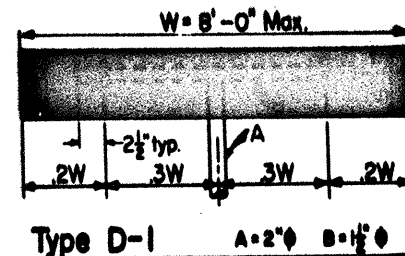
Type A-1

THIS TYPE PIPE MOUNT TO BE USED FOR A 36" OR 48" INTERSTATE ROUTE MARKER WITH A 24" OR 30" ROUTE MARKER ON MAIN LANES OR AS A SPECIFIED OPTIONAL SUBSTITUTE FOR TYPE B.



Type B

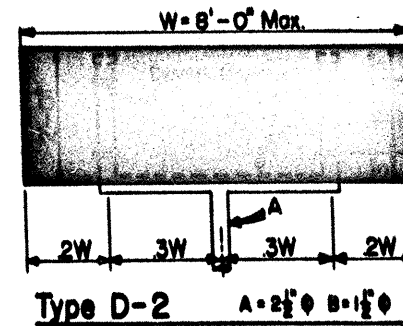
THIS TYPE PIPE MOUNT TO BE USED WHEN 2 ROUTE MARKERS OF THE SAME TYPE OR 2 ROUTE MARKERS OF DIFFERENT TYPES ARE REQUIRED.



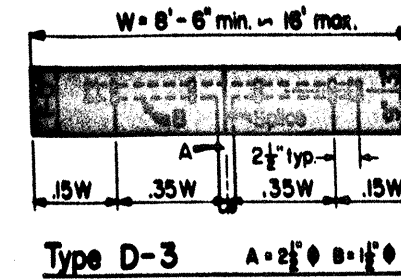
Type D-1 A=2'-0" B=1'-0"

NOTE:

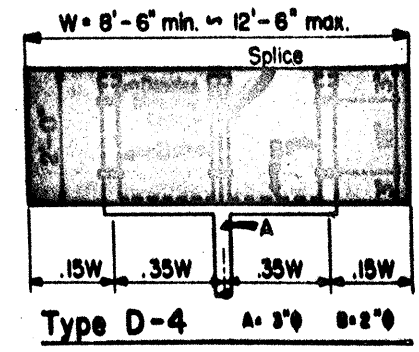
- FOR FR-1 SIGN, MOUNTING CLAMPS ARE SPACED 36" APART AND TOP OF FR-1 SIGN IS 5" ABOVE CENTERLINE OF PIPE B.
- FOR W-1 SIGN, MOUNTING CLAMPS ARE SPACED 36" APART.



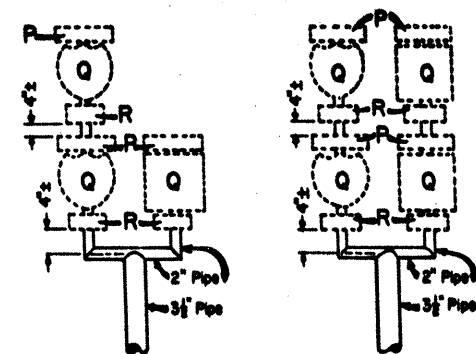
Type D-2 A=2'-0" B=1'-0"



Type D-3 A=2'-0" B=1'-0"

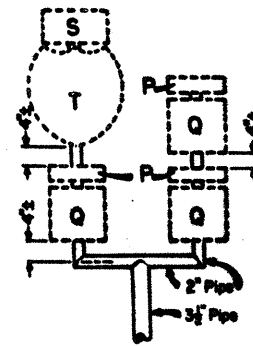
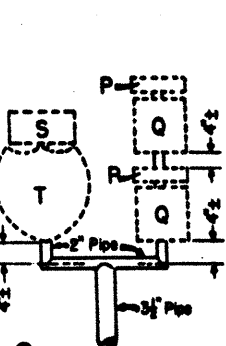


Type D-4 A=2'-0" B=2'-0"

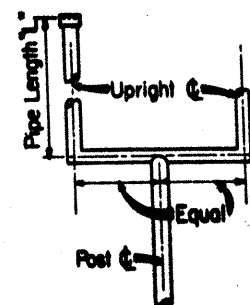


Type C

THIS TYPE PIPE MOUNT TO BE USED:
1. WHEN 5 OR 4 ROUTE MARKERS ARE REQUIRED; OR
2. FOR A 24" OR 48" INTERSTATE ROUTE MARKER WITH 2 OR 3 24" AND/OR 30" ROUTE MARKERS.



P = 24" x 12" Cardinal Direction Marker
Q₁ = 24" x 24" Interstate, U.S. or State Route Marker
Q₂ = 30" x 24" Interstate or U.S. Route Marker
R = 21" x 15" Direction Arrow
S = 30" x 15" Cardinal Direction Marker
T₁ = 36" x 36" (2) digit Interstate Route Marker
T₂ = 45" x 36" (3) digit Interstate Route Marker

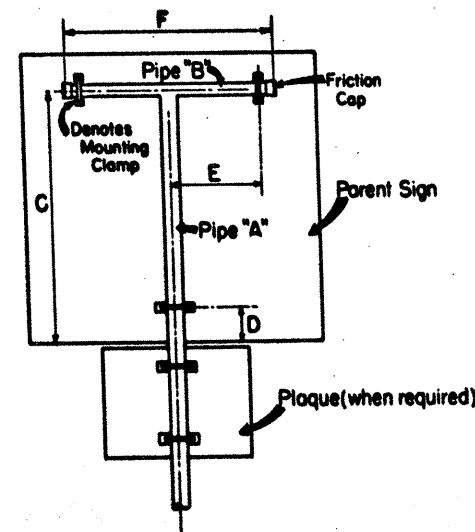


See table at right for values of "L"

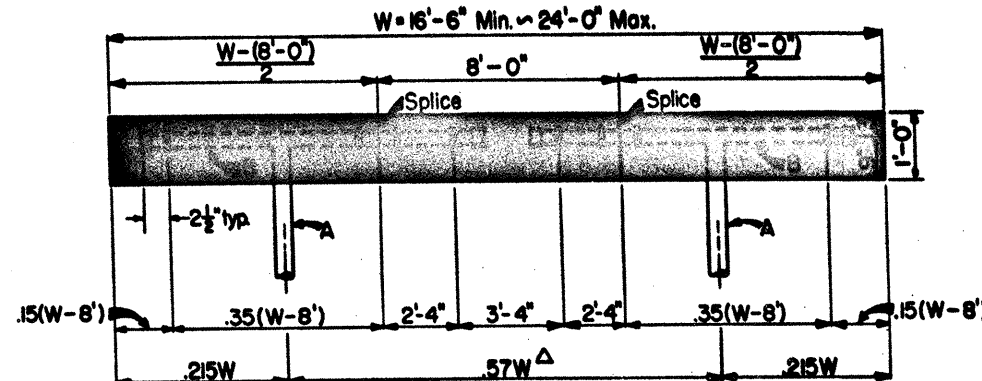
DIMENSION "S" EQUALS THE DISTANCE FROM THE C OF UPRIGHT TO THE C OF CLEARANCE BETWEEN SIGN GROUP.

"S" = 1'-4" for Q₁
"S" = 1'-7" for Q₂
"S" = 1'-10" for T₁
"S" = 2'-3" for T₂

Marker Combinations	"L"
2P + 2Q + 2R + 7"	9'-1"
P + 2Q + 2R + 7"	8'-1"
2Q + 2P + 7"	6'-7"
Q + R + 3"	3'-6"
S + T + 3"	4'-6"
P + Q + R + 3"	4'-6"
P + Q + S + T + 7"	7'-10"

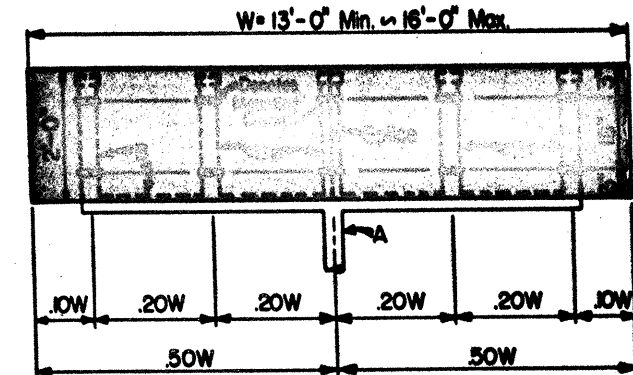


Type F Mount



Type D-5 A=2'-0" B=1'-0"

Δ POST SPACING MAY VARY ± 5% OF TOTAL SIGN WIDTH TO FIT FIELD CONDITIONS.



Type D-6 A=2'-0" B=2'-0"

NOTES: (FOR TYPES D-1 THROUGH D-6)

- SPICE PLATES REQUIRED AT SPICE POINTS.
- THE SIGN BLANKS ~~SHOULD~~ BE 5/8" THICK PLYWOOD (TYPE A) CONFORMING WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.

Type F Mount Dimensions

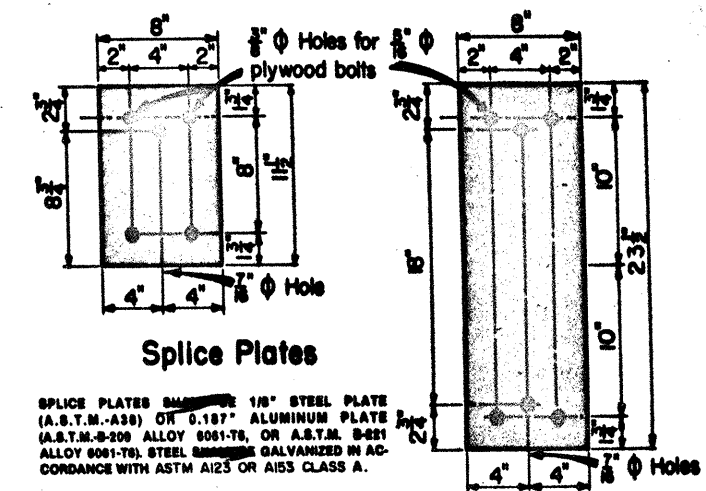
Type of Sign	Pipe "A"	Pipe "B"	C	D	E	F
Regulatory Signs						
SRI-1	3"φ	2"φ	39"	9"	15"	35"
FRI-1	3"φ	2"φ	43"	21"	11"	27"
36" x 48"	3"φ	2"φ	42"	6"	12"	29"
48" x 36"	3"φ	2"φ	30"	6"	15"	35"
48" x 48"	3"φ	2"φ	42"	6"	15"	35"
48" x 60"	3"φ	2"φ	54"	6"	15"	35"
Warning Signs						
48" x 48"	3"φ	2"φ	47 1/2"	17 1/2"	15"	35"
48" x 60"	3"φ	2"φ	54"	6"	15"	35"

Δ INCLUDES PARENT SIGNS OF THIS SIZE WHICH HAVE SUPPLEMENTARY PLAQUE. WHEN RS-1T IS MOUNTED WITH RS-1, THE RS-1 ~~SHOULD~~ BE MOUNTED AS A 48" X 48" REGULATORY SIGN WITH THE RS-1T MOUNTED AS A PLAQUE.

Δ FR-2, FR-3, AND FR-4 ARE TO BE MOUNTED ONLY IN COMBINATION WITH FR-1 ON A TYPE G MOUNT; ALSO FR-2A IS TO BE MOUNTED ON A TYPE G MOUNT (SEE STANDARD SHEET SMD-1). ALSO WHEN RS-1A IS MOUNTED WITH AN RS-1, A TYPE G MOUNT ~~SHOULD~~ BE USED.

GENERAL NOTES FOR SIGN SUPPORT TYPES A, B, C, D, E, F

- PIPE COLLAR COUPLING ~~SHOULD~~ BE USED FOR ALL SIGNS SUPPORTED ON 2" AND 2-1/2" PIPE POSTS.
- TRIANGULAR SLIP BASE ~~SHOULD~~ BE USED FOR SIGNS SUPPORTED ON 3" AND 3-1/2" PIPE POSTS.
- MOUNTING CLAMP, VERTICAL CLEARANCE AND LATERAL CLEARANCE DETAILS ARE SHOWN ON SHEET SMD(1-2).
- WELDED PIPE MOUNT, FRICTION CAP, PIPE COLLAR COUPLING, TRIANGULAR SLIP BASE AND FOUNDATION DETAILS ARE SHOWN ON SHEET SMD(1-3).



Splice Plates

SPICE PLATES ~~SHOULD~~ BE 1/8" STEEL PLATE (A.S.T.M.-A36) OR 0.107" ALUMINUM PLATE (A.S.T.M.-B-209 ALLOY 5051-T6, OR A.S.T.M. B-221 ALLOY 5051-T6). STEEL ~~SHOULD~~ BE GALVANIZED IN ACCORDANCE WITH ASTM A123 OR A153 CLASS A.



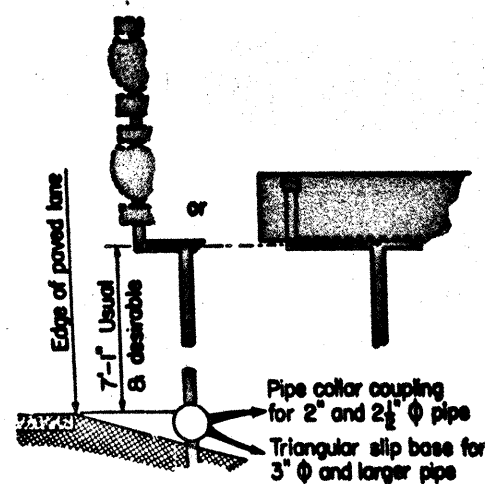
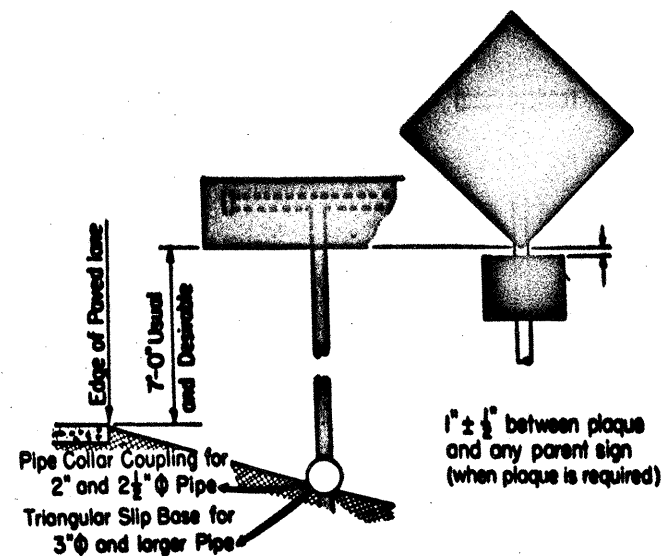
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PIPE MOUNTING DETAILS FOR SMALL ROADSIDE SIGNS

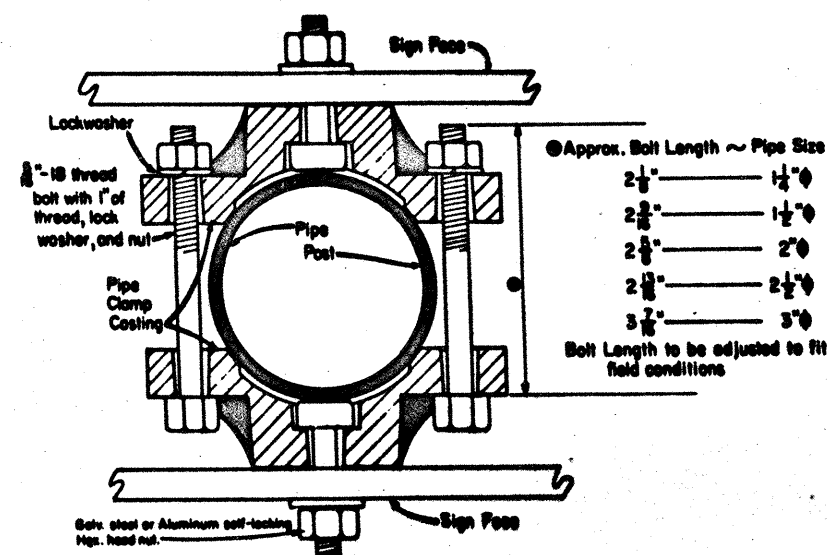
50

SMD(1-1)

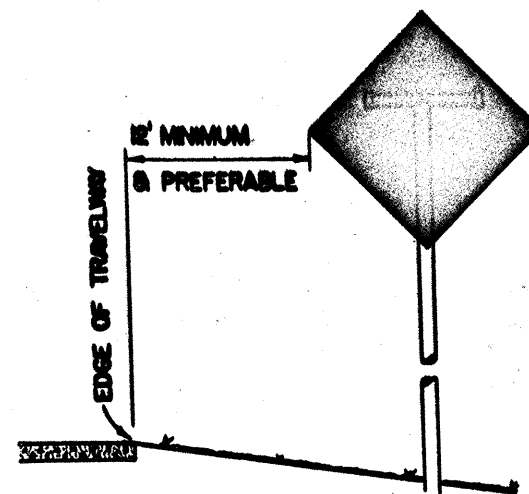
DRAWING DATE: 4-78		STATE	FEDERAL	FEDERAL AID PROJECT		SHEET
DEL.:	2-82	15	6	IR 35-2 (18) 161	17	10
CAL.:						
DEL.:						
CAL.:						
DIVISION		COUNTY	CONTROL	SECTION	JOB	HIGHWAY
		GENOA				135
						12



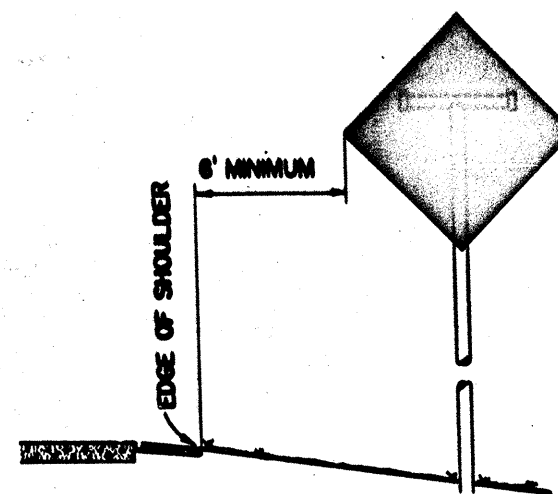
VERTICAL CLEARANCE OF SMALL SIGNS ALL TYPES OF ROADWAYS



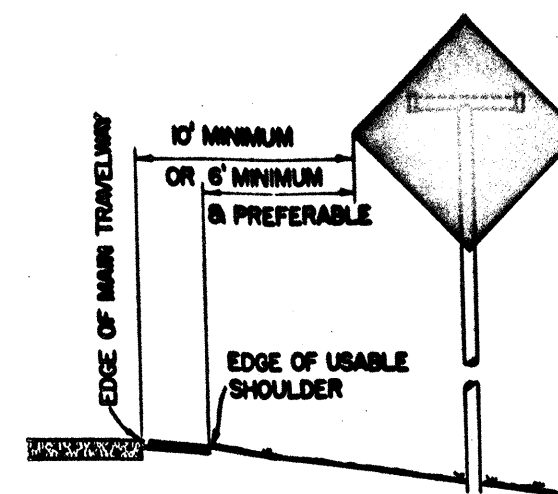
Typical Detail of
Back To Back Mounting Of Signs



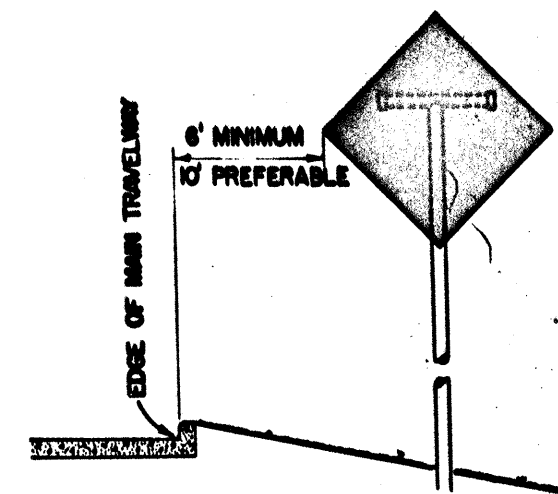
ROADWAY WITHOUT SHOULDER
RURAL CONVENTIONAL HIGHWAY



ROADWAY WITH SHOULDER
RURAL CONVENTIONAL HIGHWAY

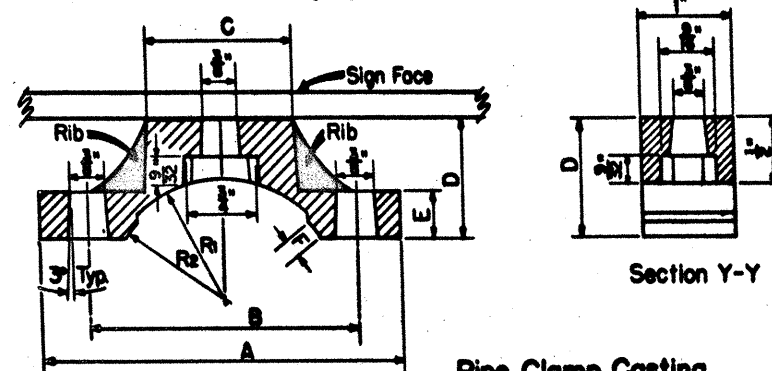
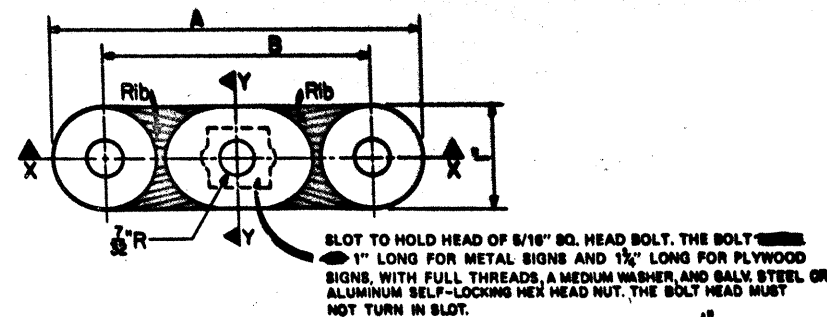


EXPRESSWAYS OR FREEWAYS
WITHOUT CURB OR WITH MOUNTABLE CURB



EXPRESSWAYS OR FREEWAYS
WITH UNMOUNTABLE CURB

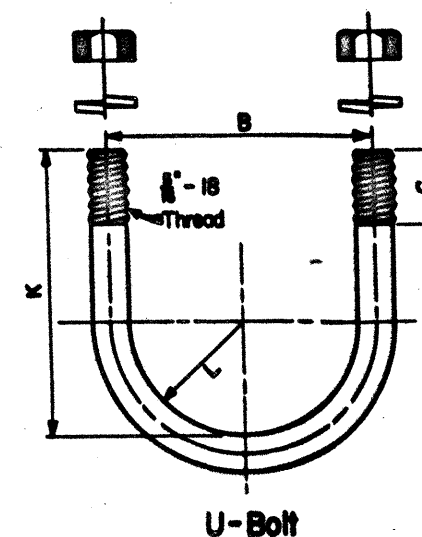
LATERAL CLEARANCE OF SMALL SIGNS TO THE RIGHT OR LEFT SIDE OF ROADWAY



Pipe Clamp Casting

PIPE CLAMP CASTING - ALUMINUM ALLOY A44.0 OR 356.0-F.
ALL SIGN MOUNTING CLAMP PARTS NOT MADE FROM ALUMINUM GALVANIZED STEEL IN CONFORMANCE WITH ASTM A153 OR STAINLESS STEEL.

MOUNTING CLAMP DETAILS



U-BOLT TO BE MADE IN ACCORDANCE WITH STANDARD MANUFACTURING PROCEDURE. 9/32" DIA. STOCK IS PERMISSIBLE. AMERICAN STANDARD REGULAR SEMI-FINISHED HEX. NUTS & SPRING LOCKWASHERS.

Dimensions for Mounting Clamp

Standard Pipe Size	A	B	C	D	E	F	G	K	L	R ₁	R ₂
1 1/4"	3 5/8"	2 5/8"	3/4"	1 5/8"	7/8"	1 1/8"	5/8"	2 5/8"	27 3/32"	27 3/32"	23 1/8"
1 1/2"	3 3/4"	2 3/4"	1"	1 1/8"	7/8"	1 1/8"	5/8"	2 7/8"	23 1/8"	23 1/8"	18 1/8"
2"	3 3/4"	2 3/4"	1 1/2"	1 1/8"	1 1/8"	1 1/8"	1"	2 7/8"	15 1/2"	15 1/2"	14 1/8"
2 1/2"	4 1/2"	3 1/2"	2"	1 1/4"	1 1/4"	1 1/4"	1"	3 1/8"	15 1/2"	15 1/2"	14 1/8"
3"	4 7/8"	3 7/8"	2 1/2"	1 3/8"	1 3/8"	1 3/8"	1"	3 1/8"	15 1/2"	15 1/2"	14 1/8"

- NOTES:
- EXCEPT AS NOTED, ALL CLEARANCES APPLY TO BOTH RURAL AND URBAN LOCATIONS.
 - GENERALLY, WHERE PHYSICAL FEATURES OF THE ROADWAY WILL PERMIT, MAXIMUM LATERAL CLEARANCES ARE THE MORE DESIRABLE. FOR FRONTAGE ROADS, RAMPS AND OTHER CONNECTING ROADWAYS, LESSER CLEARANCES MAY BE USED, BUT GENERALLY NOT LESS THAN SIX FEET IS RECOMMENDED BETWEEN THE EDGE OF THE TRAVELWAY AND THE EDGE OF THE SIGN. AT INTERSECTIONS, SIGNS SHOULD BE POSITIONED IN THE MOST OPTIMUM LOCATION FOR VIEWING BY TRAFFIC.
 - WHERE NECESSARY, AN ALLOWABLE MINIMUM CLEARANCE OF TWO FEET MAY BE USED IN URBAN LOCATIONS ON CONVENTIONAL HIGHWAYS.
 - WHERE A SIGN IS TO BE LOCATED BEHIND GUARDRAIL, THE ALLOWABLE MINIMUM CLEARANCE MAY BE USED, MEASURED FROM THE FACE OF THE GUARDRAIL TO THE NEAR EDGE OF THE SIGN.
 - LATERAL CLEARANCES OF SIGNS MOUNTED ON LEFT SIDE OF ROADWAY ARE THE SAME AS SHOWN ABOVE WHERE SPACE WILL PERMIT.



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

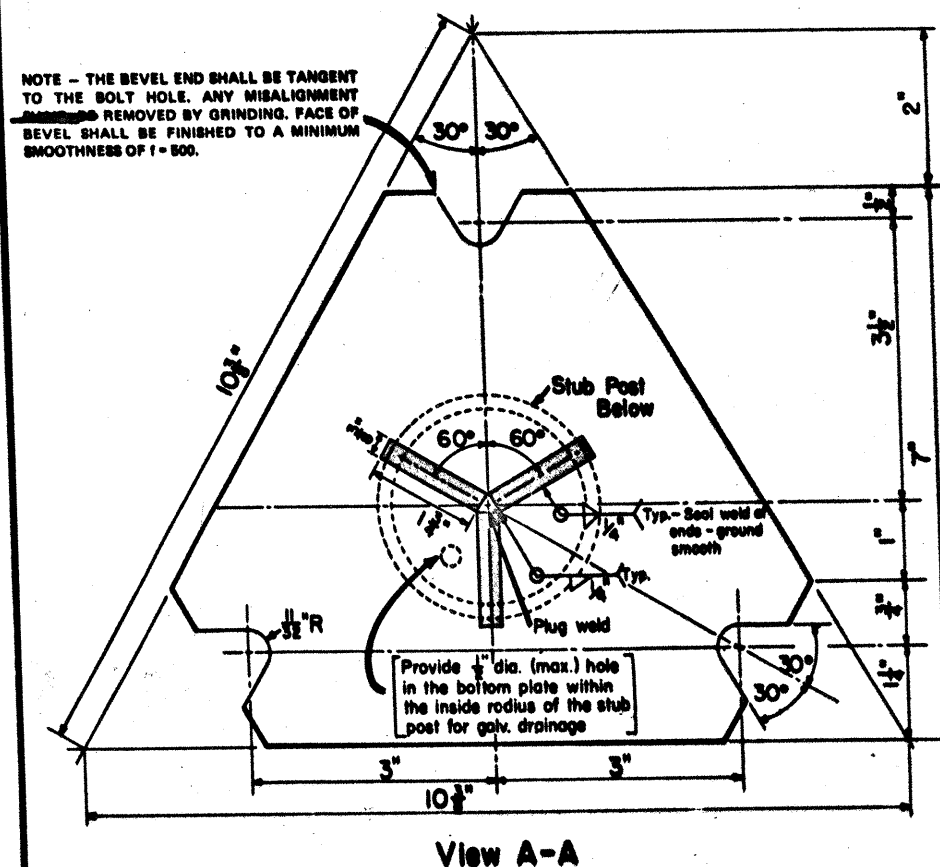
PIPE MOUNTING DETAILS FOR SMALL ROADSIDE SIGNS

SMD(1-2)

DATE: 4-78	STATE PROJECT: 15	FEDERAL PROJECT: IR35-2(18)161	SHEET: 5
2-82	COUNTY: BEXAR	CONTROL SECTION: 10	JOB: 135
			13

Sign Post & Stub Post Elevation

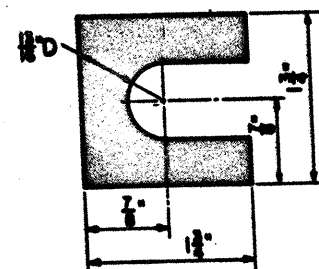
TRIANGULAR SLIP BASE



- TRIANGULAR SLIP BASE NOTES:**
- ① THE LIFTING DEVICE MAY CONSIST OF WELDED RAMPS OR A CONICAL SHAPE FORMED INTO THE CENTER OF THE BOTTOM BASE PLATE.
 - ① THE TOP PLATE OF THE TRIANGULAR SLIP BASE ~~SHOULD~~ HAVE THE SAME EXTERIOR DIMENSIONS AS THE BOTTOM PLATE. THE LIFTING DEVICE ~~SHOULD BE~~ A PART OF THE BOTTOM PLATE ONLY. A HOLE EQUAL TO THE INSIDE DIAMETER OF THE BORN POST ~~SHOULD BE~~ CUT THROUGH THE CENTER OF THE TOP PLATE WITH THE HOLE EDGE REVEALED AS DETAILD.
 - ① THE TOP AND BOTTOM BASE PLATES AND LIFTING DEVICE ~~SHOULD~~ CONFORM WITH THE REQUIREMENTS OF A.B.T.M. -A326; A441 OR A572 GRADE 90.
 - ① ALL STRUCTURAL STEEL ~~SHOULD BE~~ GALVANIZED IN ACCORDANCE WITH ASTM A153. THE ENTIRE SUPPORT ~~SHOULD BE~~ GALVANIZED FROM THE TOP DOWN TO A MINIMUM DEPTH OF 8" INTO THE FOUNDATION. ALL NUTS, BOLTS AND WASHERS ~~SHOULD BE~~ GALVANIZED IN ACCORDANCE WITH THE ZINC SPECIFICATION OF ASTM B454.
 - ① ALL HIGH STRENGTH BOLTS ~~SHOULD~~ CONFORM TO ASTM-A328 (ASTM-A449 MAY BE SUBSTITUTED FOR ASTM-A328 PROVIDED-SD PROPER BOLT HEAD, NUT AND/OR WASHER CLEARANCES ARE MAINTAINED). ALL HIGH STRENGTH NUTS ~~SHOULD BE~~ OF SUCH CAPACITY AS TO DEVELOP THE BOLT STRENGTH.

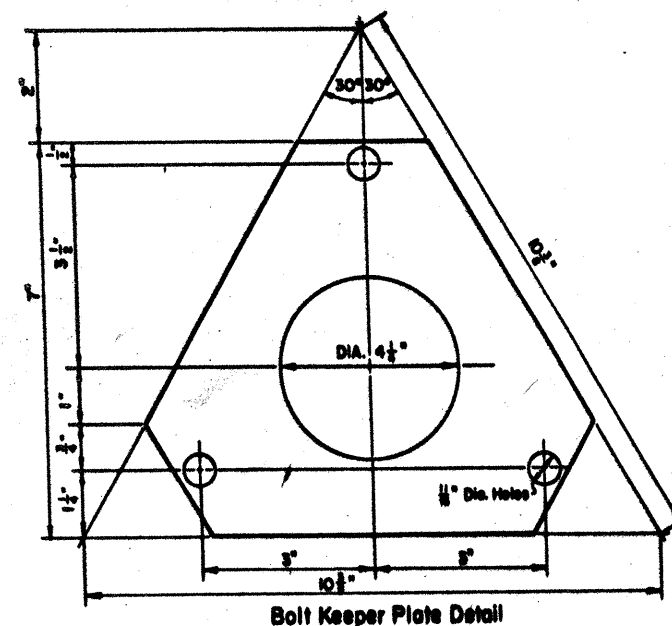
BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. ASSEMBLE POST TO STUD WITH BOLTS AND WITH ONE FLAT WASHER ON EACH BOLT BETWEEN PLATES AS SHOWN.
2. SHIM AS REQUIRED TO FLUSH POST.
3. TIGHTEN ALL BOLTS TO THE MAXIMUM POSSIBLE WITH 15" TO 18" WRENCH TO BEAT WASHERS AND SHIMS AND TO CLEAN BOLT THREADS, THEN LOOSEN EACH BOLT IN TURN AND RETIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE OF 400 INCH-POUNDS, DO NOT OVERTIGHTEN.
4. BURN THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

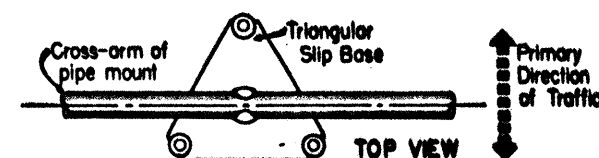


SHIM DETAIL

FURNISH 2-.012"± THICK AND 2-.032"± THICK SHIMS PER POST. SHIMS SHALL BE FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO A.S.T.M. -B36.

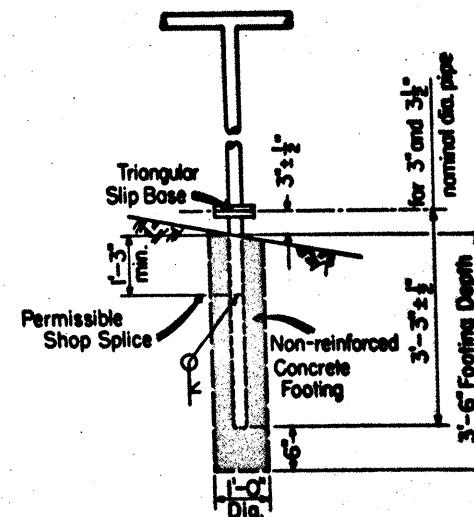


Bolt Keeper Plate 400000030 ea. galvanized sheet steel



The cross-arm of the pipe mount should be parallel to one side of the triangular slip base, and approximately perpendicular to the direction of traffic.

ORIENTATION OF TRIANGULAR SLIP BASE



Triangular Slip Base Foundation Details

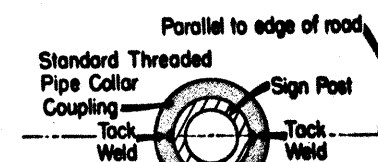
TRIANGULAR SLIP BASE ~~SHOWN~~
USED FOR SIGNS SUPPORTED ON 3
DIAMETER AND LARGER PIPE POSTS.

GENERAL NOTES:

DESIGN CONFORMS WITH A.A.S.H.T.O. SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS.

MATERIAL AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS.

WHERE SOLID ROCK IS ENCOUNTERED, FOOTING ~~SHALL~~ PLAN DEPTH OR
EXTEND TWO FEET MINIMUM INTO THE ROCK.

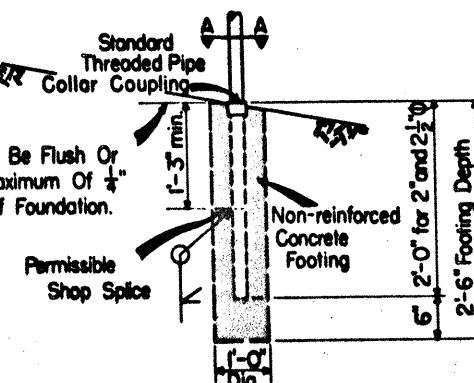


Task Welds to b

Section A-A

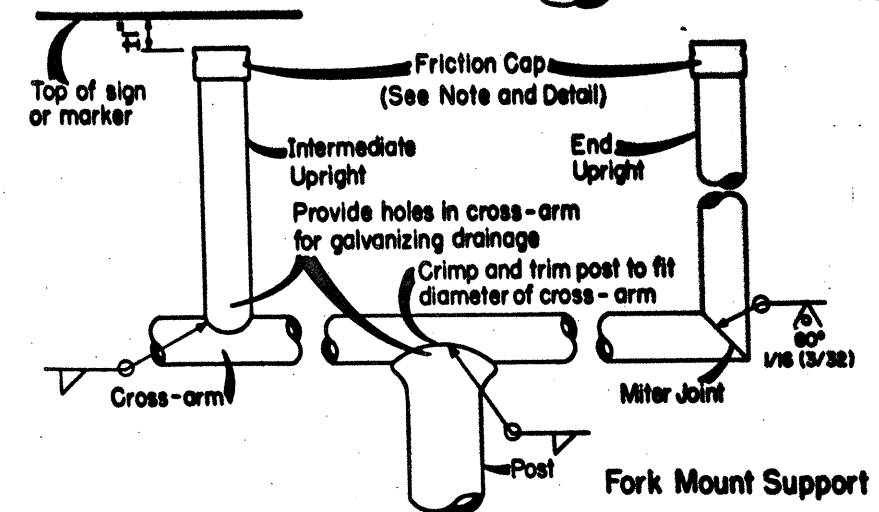
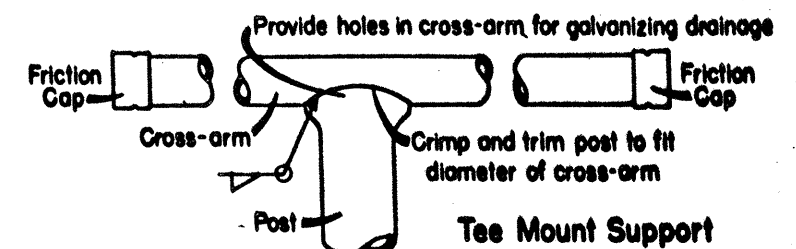
Section A-A

Coupling Shall Be Flush Or
Projecting a maximum of 1/4"
Above Top Of Foundation.



BREAKAWAY PIPE COLLAR COUPLING

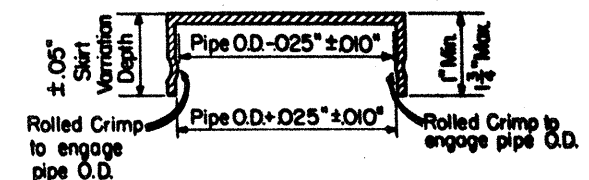
PIPE COLLAR COUPLING USED FOR ALL SIGNS SUPPORTED ON 2" and 2 1/2" DIAMETER PIPE POSTS.



WELDED PIPE MOUNT DETAILS

NOTE: THE CONTRACTOR AT HIS OPTION MAY FURNISH STANDARD WEIGHT PIPE CONFORMING TO ASTM SPECIFICATION A-333, A-501 OR ANY OTHER STANDARD WEIGHT STEEL PIPE, EITHER OF ELECTRIC RESISTANCE WELDED OR SEAMLESS TYPE, WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI AND A MINIMUM ELONGATION OF 15 PERCENT IN 2 INCHES; AND ~~STANDARD~~ OUTSIDE DIAMETERS AND WALL THICKNESSES WHICH ARE EQUIVALENT TO OR BETTER THAN THOSE SPECIFIED HEREON.

ALL PIPES TO BE WELDED SHALL BE OF WELDABLE QUALITY.



Friction Cap Details

NOTES:
FRICTION CAPS MAY BE MANUFACTURED FROM EITHER HOT ROLLED OR COLD ROLLED STEEL SHEETS. FOR ALL PIPE SIZES THE MINIMUM SHEET METAL THICKNESS SHALL BE 24 GAUGE.

THE RIM EDGES SHOULD BE REASONABLY STRAIGHT AND SMOOTH. CAPS SHOULD BE SIZED AND FORMED IN SUCH A MANNER AS TO PRODUCE A DRIVE-ON FRICTION FIT AND HAVE NO TENDENCY TO ROCK WHEN SEATED ON THE PIPE. THE DEPTH SHOULD BE SUFFICIENT TO GIVE POSITIVE PROTECTION AGAINST ENTRANCE OF RAINWATER. THEY SHOULD BE FREE OF SHARP CREASES OR INDENTATIONS AND SHOW NO EVIDENCE OF METAL FRACTURE.

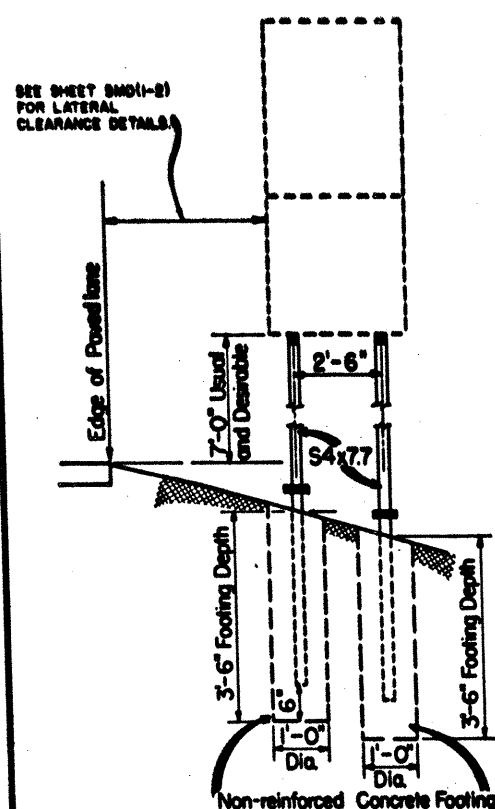
CAPS ~~SHOULD BE~~ AN ELECTRODEPOSITED COATING OF ZINC IN ACCORDANCE WITH THE REQUIREMENTS OF A.S.T.M. SPECIFICATION A104, TYPE GS.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

PIPE MOUNTING DETAILS FOR SMALL ROADSIDE SIGNS

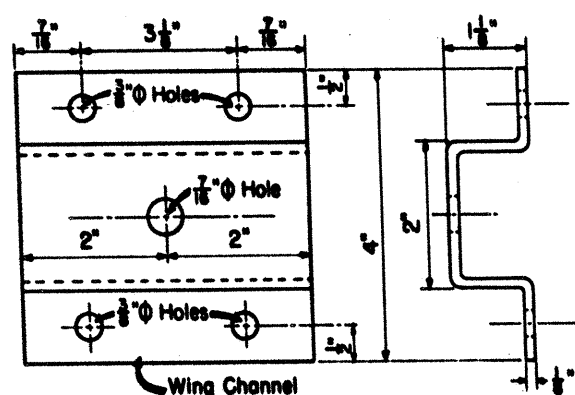
52 SMD(1-3)

DRAWING DATE: 4-78		STATE	FEDERAL	FEDERAL AID PROJECT		SHEET
DISTRICT		5	6	IR35-2(1B)161		52
DN:-	REVISION 1-B1 LIFTING RAMP	COUNTY		CONTROL SECTION	JOB	NO.
CR:-	1-B2	BEXAR		7	10	147
DW:-						
CE:-						



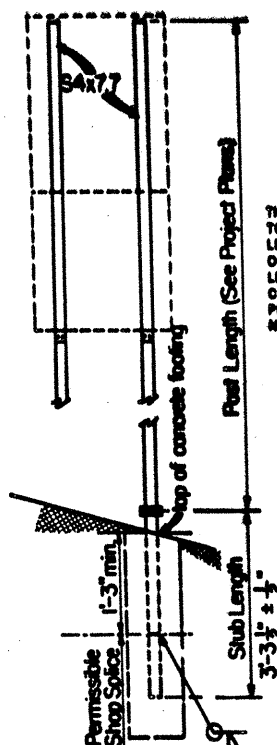
TYPE G MOUNT

- THIS TYPE BEAM MOUNT TO BE USED:
- (1) FOR SPEED LIMIT SIGN PRS-1 WHEN USED IN COMBINATION WITH PRS-2, AND PRS-4, OR FOR PRS-2A.
 - (2) FOR DO NOT ENTER SIGN SR-1 WHEN USED WITH WRONG WAY SIGN SR-2-LS-1-118 MOUNTED ABOVE SR-1.



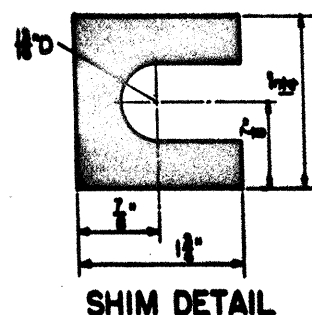
WING CHANNEL, 4" WIDTH x 1 1/8" DEPTH x 1/8" THICKNESS, SHALL BE ALUMINUM (ASTM B-221 6061-T6 OR 6306 6061-T6), GALV. STEEL (ASTM A-36) OR STAINLESS STEEL (ASTM A-167 TYPE 304, NO. 2B FINISH).

WING CHANNEL CLAMP DETAIL
FOR HOLDING SIGNS TO TYPE G MOUNT



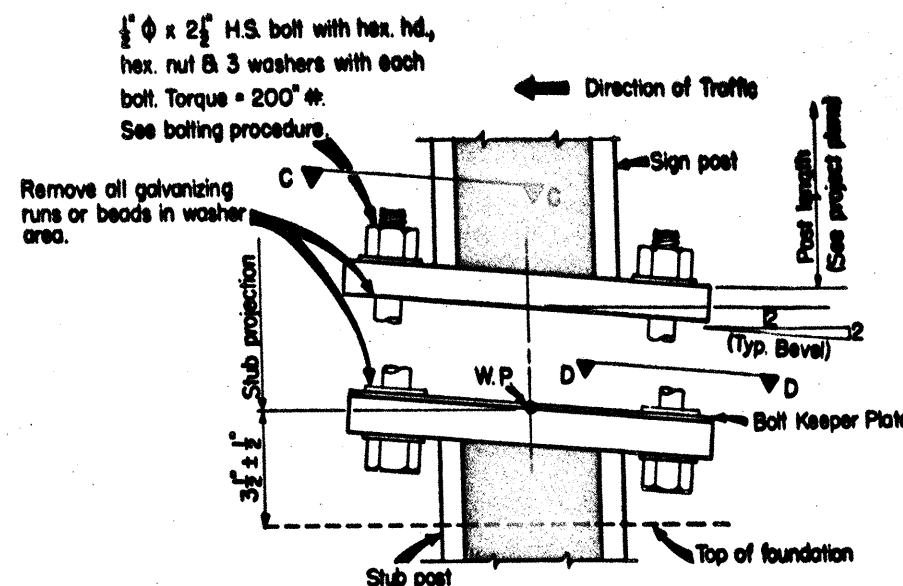
Post Weight Data
And
Permissible Shop Splice

THE WEIGHT OF ONE 8 1/2" POST IS EQUAL TO 112.5 LBS. PLUS 7.7 LBS. PER FT. POST LENGTH IN FEET MINUS 10 FT. THE WEIGHT OF 112.5 LBS. INCLUDES 10' OF POST LENGTH, POST FOUNDATION STUB, RELATED CONNECTION PLATES, FRICTION FUSE PLATE, AND ALL HIGH STRENGTH BOLTS, NUTS, AND WASHERS.

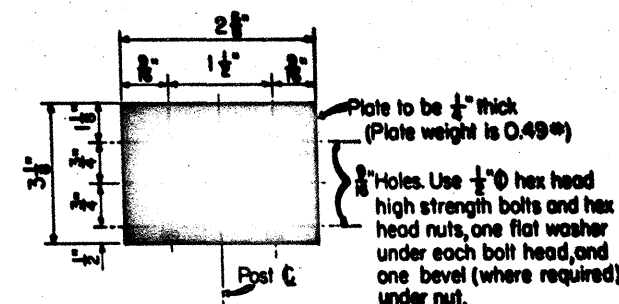


FURNISH 2" x 12" x 1/8" THICK AND 2" x 22" x 1/8" THICK SHIMS PER POST. SHIMS SHALL BE FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO A.S.T.M. -B36.

- BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:
1. ASSEMBLE POST TO STUB WITH BOLTS AND WITH ONE FLAT WASHER ON EACH BOLT BETWEEN PLATES.
 2. SHIM AS REQUIRED TO PLUMB POST.
 3. TIGHTEN ALL BOLTS THE MAXIMUM POSSIBLE WITH 12" TO 15" WRENCH TO BED WASHERS AND SHIMS AND TO CLEAN BOLT THREADS, THEN LOOSEN EACH BOLT IN TURN AND RETIGHTEN BOLTS IN A SYSTEMATIC ORDER TO 200' TORQUE. DO NOT OVERTIGHTEN.
 4. BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

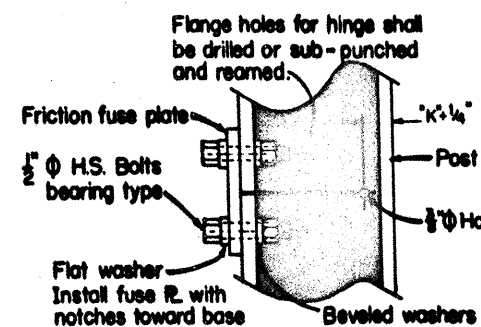


SIGN POST AND STUB POST ELEVATION
FOR TYPE G MOUNT



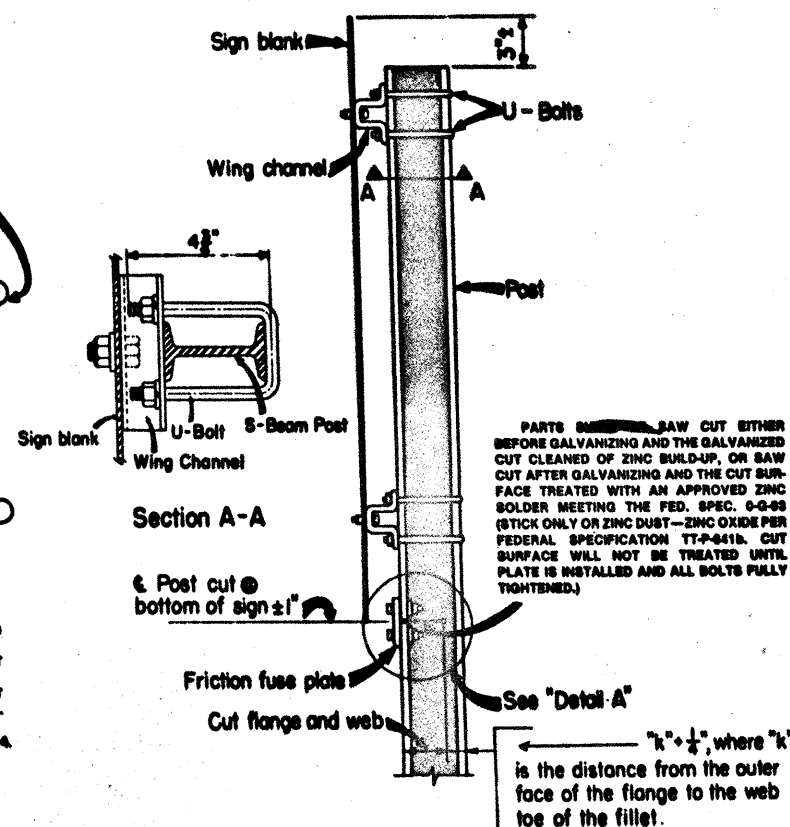
Friction Fuse Plate Detail

NOTCHED STEEL FRICTION FUSE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM-A441. (ASTM-A572 GRADE 50 OR ASTM-A588 MAY BE SUBSTITUTED FOR A441 AT THE OPTION OF THE FABRICATOR). ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS, HOWEVER, PLANE CUTTING IS PERMITTED PROVIDED ALL EDGES ARE GRIND. METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE PERMITTED.

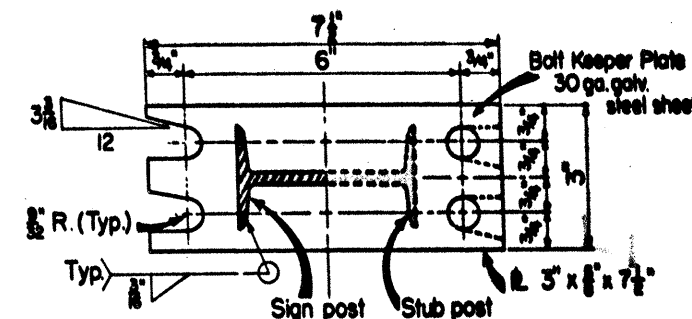


Detail "A" Hinge

FABRICATOR NOTE: IMPORTANT—ALL FRICTION FUSE BOLTS SHALL BE TIGHTENED IN THE SHOP FOLLOWING A METHOD APPROVED BY THE ENGINEER. TIGHTENING SHALL BE TO SUCH A DEGREE AS TO OBTAIN 12,000 LBS. OF MINIMUM RESIDUAL TENSION IN EACH 1/2" DIAMETER BOLT.



TYPICAL SIDE VIEW OF TYPE G MOUNT



Section C-C Section D-D

NOTE: Sections shown are for installations on right shoulder and in gore. Plate slot bevels are opposite hand from that shown for installations on left shoulder.

- GENERAL NOTES:
1. DESIGN CONFORMS WITH A.A.S.H.T.O. SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS.
 2. MATERIALS AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS.
 3. ALL HIGH STRENGTH BOLTS, NUTS, AND WASHERS SHALL CONFORM TO ASTM-A588 (ASTM-A449 MAY BE SUBSTITUTED FOR ASTM-A588 PROVIDED PROPER BOLT HEAD, NUT AND/OR WASHER CLEARANCES ARE MAINTAINED).
 4. ALL BOLTS OTHER THAN HIGH STRENGTH BOLTS SHALL CONFORM TO ASTM-A307 CLASS A (ASTM-A394, A395 OR A449 MAY BE SUBSTITUTED FOR ASTM-A307 PROVIDED PROPER BOLT HEAD, NUT AND/OR WASHER CLEARANCES ARE MAINTAINED).
 5. ALL STRUCTURAL STEEL, EXCEPT GALVANIZED ASTM A158 OR A159 CLASS A STRUCTURAL STEEL, TO BE GALVANIZED AFTER FABRICATION EXCEPT AS NOTED.
 6. STRUCTURAL STEEL SHALL CONFORM WITH THE REQUIREMENTS OF ASTM SPECIFICATION A441 (ASTM-A572 GRADE 50 OR ASTM-A588 MAY BE SUBSTITUTED FOR A441 AT THE OPTION OF THE FABRICATOR).
 7. ALL POSTS SHALL BE GALVANIZED FROM THE TOP DOWN TO A DEPTH OF 6" MINIMUM INTO THE FOUNDATION.
 8. WHERE SOLID ROCK IS ENCOUNTERED, FOOTING SHALL BE PLAN DEPTH OR EXTEND TWO FEET MINIMUM INTO THE ROCK.
 9. ALL BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AS PER THE ZINC SPECIFICATION OF ASTM B484.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION		STRUCTURAL 53	
MOUNTING DETAILS		FOR LARGE REGULATORY SIGNS	
SMD(2)			
DRAWING DATE: 1-81		STATE FEDERAL PROJECT SHEET	
1-81: Sign Numbers, Notes		15 6 7835-2(181) 161 53	
1-82		COUNTY CONTROL SECTION JOB MONTH	
		6EX42 FT 10 147 335	
		15	



NOTE:

1. A TOLERANCE OF PLUS OR MINUS 1/4 INCH [REDACTED] PERMITTED IN THE PLAN DIMENSIONS FOR FABRICATION OF EACH SINGLE INCREMENT SIGN PANEL WHEN NECESSARY FOR SQUAREING. A TOLERANCE OF PLUS OR MINUS 1/4 INCH [REDACTED] PERMITTED FOR EACH INCREMENT OF A MULTI-INCREMENT SIGN PANEL WHERE NECESSARY TO SECURE SQUARE, THIRTY-FITTING BOLTS.
2. PLYWOOD BOLTS 5/16" ± 1/2" PLAT HEAD ELEVATOR TYPE STEEL BOLT WITH 3/4" MINIMUM THREAD LENGTH. THE HEAD [REDACTED] A MINIMUM DIAMETER OF 3/4" AND [REDACTED] A MINIMUM OF TWO RIBS ON THE UNDERSIDE. EACH BOLT [REDACTED] PROVIDED WITH ONE 5/16" STEEL HEX NUT. ONE 5/16" STEEL PLAT WASHER, AND ONE 5/16" STEEL LOCK WASHER. BOLTS, NUTS, AND WASHERS [REDACTED] GALVANIZED AS PER ZINC SPECIFICATION OF ASTM A454.
3. SPICE BRASS [REDACTED] SECURED WITH 5/8" LONG x NO. 10 ROUND HEAD CADMIUM PLATED, BRASS WOOD SCREWS SPACED AT 8" MAXIMUM ALONG DOUBLE ROW SPACING WITH THE EXCEPTION AT EXTREME ENDS OF SPICE BRASS, ALONG OUTSIDE EDGE OF SIGN, WHERE PLYWOOD BOLTS [REDACTED] USED AS SHOWN. A MAXIMUM OF ONE HORIZONTAL JOINT PER VERTICAL SECTION [REDACTED] PERMITTED USING A 1/8" GAP BETWEEN PANELS.
4. SPICES [REDACTED] KEPT TO A MINIMUM. PANELS 4"x8" OR LARGER [REDACTED] USED TO THE MAXIMUM EXTENT POSSIBLE IN THE FABRICATION OF ANY SIGN. SIGNS OR SIGN SECTIONS WHICH CANNOT BE FABRICATED FROM AT LEAST A 4"x8" PANEL [REDACTED] OF ONE PIECE CONSTRUCTION.

WIND BEAM TABLES

NOTE: WIND BEAM SPACINGS FOR SIGN WIDTHS OTHER THAN EVEN FEET, SELECT FROM NEXT LONGER EVEN FEET.

ZONE 3 (Types 300)	Two Posts (320)	Three Posts (330)
Sign Width (W)	4' thru 18'	19' thru 28'
Max Wind Broom Span (A)	4'-0"	4'-0"



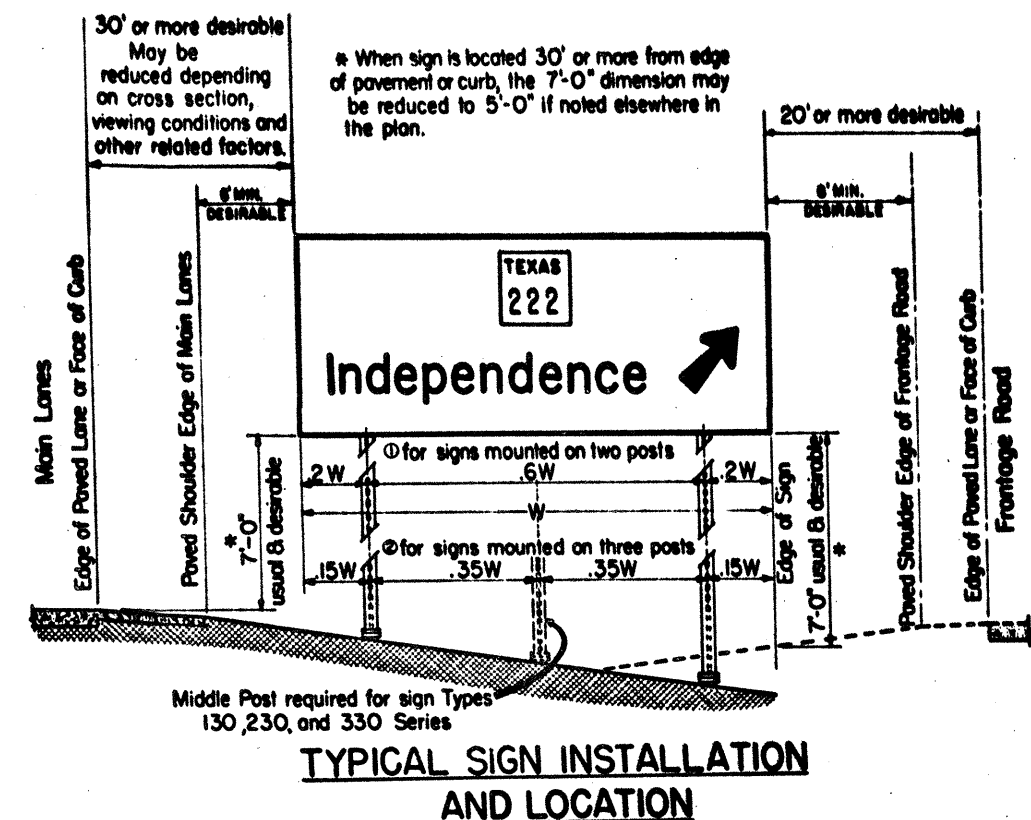
FABRICATOR NOTE: IMPORTANT - ALL FRICTION FUSE BOLTS ~~SHOULD~~
TIGHTENED IN THE SHOP FOLLOWING A METHOD APPROVED BY THE
ENGINEER. TIGHTENING ~~SHOULD~~ TO SUCH A DEGREE AS TO OBTAIN
THE FOLLOWING MINIMUM RESIDUAL TENSION IN EACH BOLT:

BOLT SIZE	MIN. RESIDUAL BOLT TENSION
1/2" Ø _____	12000 LBS.
5/8" Ø _____	16200 LBS.
3/4" Ø _____	22400 LBS.

SIGN TYPE...130

Wind Design Zone
Series No. (Zero Denotes Plywood)
No. of Posts

CODE



Middle Post required for sign Types
130, 230, and 330 Series

TYPICAL SIGN INSTALLATION AND LOCATION

LATERAL CLEARANCE NOTES:
LATERAL CLEARANCES OF SIGNS MOUNTED ON MEDIAN SIDE
OF MAIN LANES ARE THE SAME AS SHOWN ABOVE WHERE
SPACE WILL PERMIT.

POST SPACING NOTE:

1. POST SPACINGS MAY BE VARIED A MAXIMUM OF PLUS 15% TO MINUS 10% OF TOTAL SIGN WIDTH TO FIT FIELD CONDITIONS.
2. POST SPACINGS MAY BE VARIED A MAXIMUM OF PLUS 5% OF TOTAL SIGN WIDTH TO FIT FIELD CONDITIONS.

WHERE A SIGN IS TO BE LOCATED BEHIND GUARDRAIL, AN ALLOWABLE MINIMUM CLEARANCE OF TWO FEET MAY BE USED, MEASURED FROM THE FACE OF THE GUARDRAIL TO THE NEAR EDGE OF THE SIGN.

GENERAL NOTES:
DESIGN CONFORMS WITH A.A.S.H.T.O. SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF
STRUCTURAL SUPPORTS FOR HIGHWAY BRIDGES.
MATERIALS AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS
FOR STRUCTURAL STEEL. ~~STEEL~~ CONFORM TO ASTM-A441 (ASTM-A572 GRADE 50, OR ASTM-A500 MAY
BE SUBSTITUTED FOR A441 AT THE OPTION OF THE FABRICATOR).
ALL SHEET AND PLATE ALUMINUM ~~SHALL~~ CONFORM TO ASTM-B209 ALLOY 6061-T6. ALL EXTRUDED
ALUMINUM ~~SHALL~~ CONFORM TO ASTM-B221 ALLOY 6061-T6. CAST ALUMINUM POT CLAMPS ~~SHALL~~
CONFORM TO ASTM-B25 ALLOY 261.8, ASTM-B105 ALLOY 360.0, ASTM-B25 ALLOY 715.0, OR ASTM-B105
ALLOY 713.0.
ALL HIGH STRENGTH BOLTS, NUTS, AND WASHERS ~~SHALL~~ CONFORM TO ASTM-A325 (ASTM-A440 MAY
BE SUBSTITUTED FOR ASTM-A325 PROVIDED PROPER BOLT HEAD, NUT AND/OR WASHER CLEARANCES
ARE MAINTAINED).
ALL BOLTS OTHER THAN HIGH STRENGTH BOLTS ~~SHALL~~ CONFORM TO ASTM-A307 CLASS A (ASTM-
A304, A325 OR A440 MAY BE SUBSTITUTED FOR ASTM-A307 PROVIDED PROPER BOLT HEAD, NUT AND/OR
WASHER CLEARANCES ARE MAINTAINED).
ALL STRUCTURAL STEEL ~~SHALL~~ GALVANIZED ASTM A123 OR A153 CLASS A. STRUC-
TURAL STEEL TO BE GALVANIZED AFTER FABRICATION EXCEPT AS NOTED.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

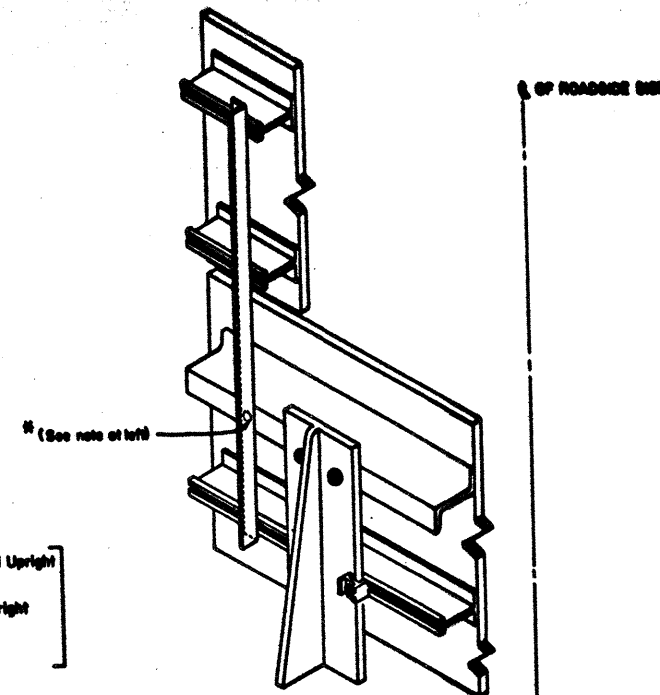
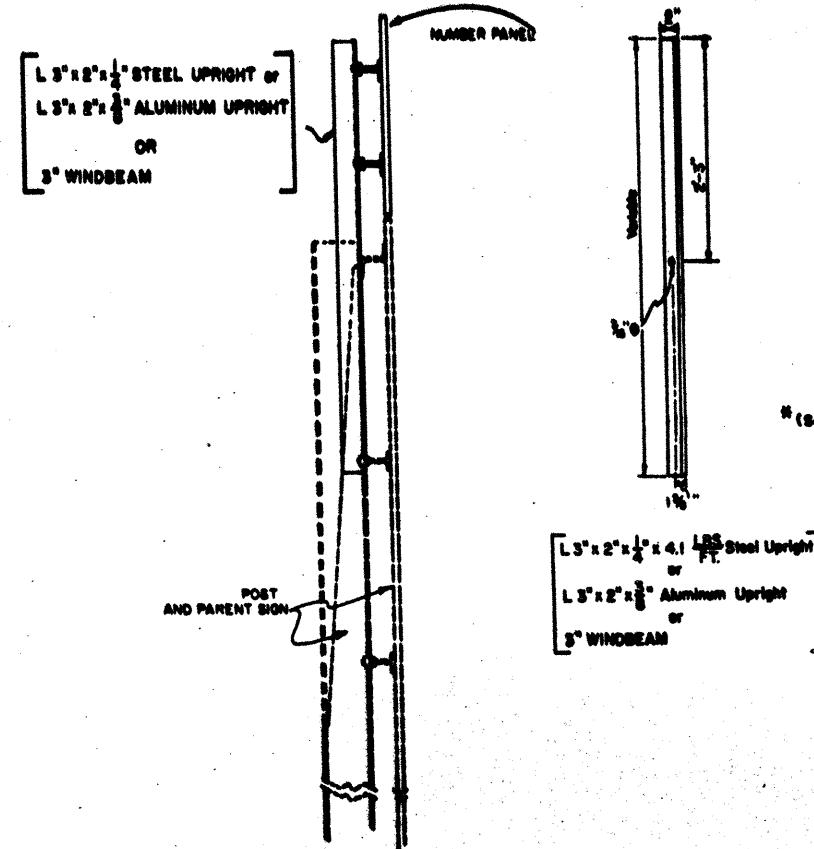
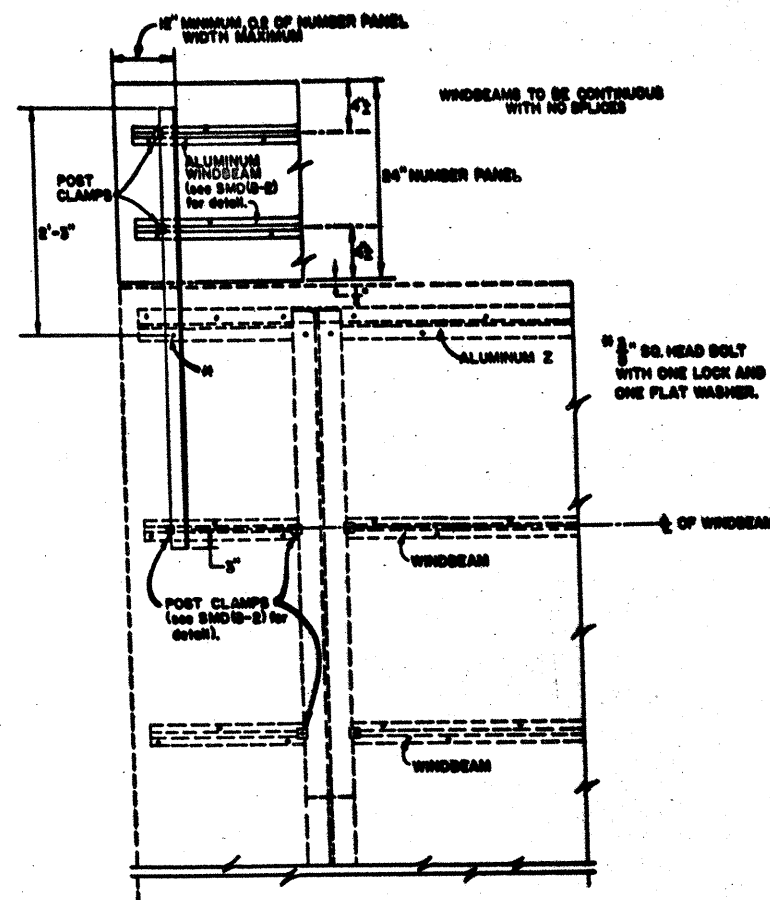
STRUCTURAL 54

MOUNTING DETAILS

FOR LARGE GUIDE SIGNS

SMD(8-1)

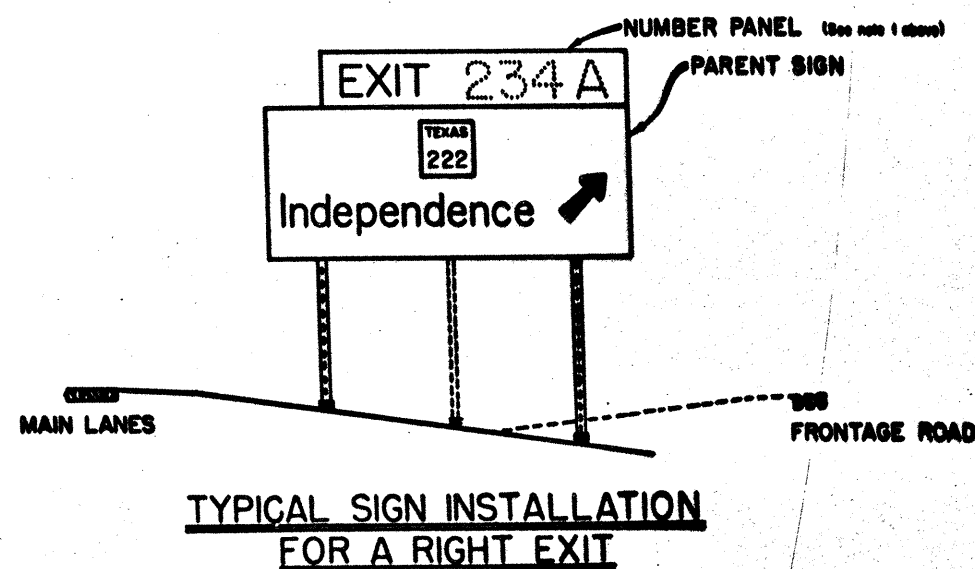
DRAWING DATE: 2-82		STATE	FEDERAL	FEDERAL AID PROJECT		NUMBER
REVISIONS		DISTRICT	REGION			
DN..	7-83	15	6	IABF-2(18)/161		54
CR..		COUNTY		CONTROL SECTIONS	JOB	WORTH
DN..		3EX0R		17	10	147
CR..						



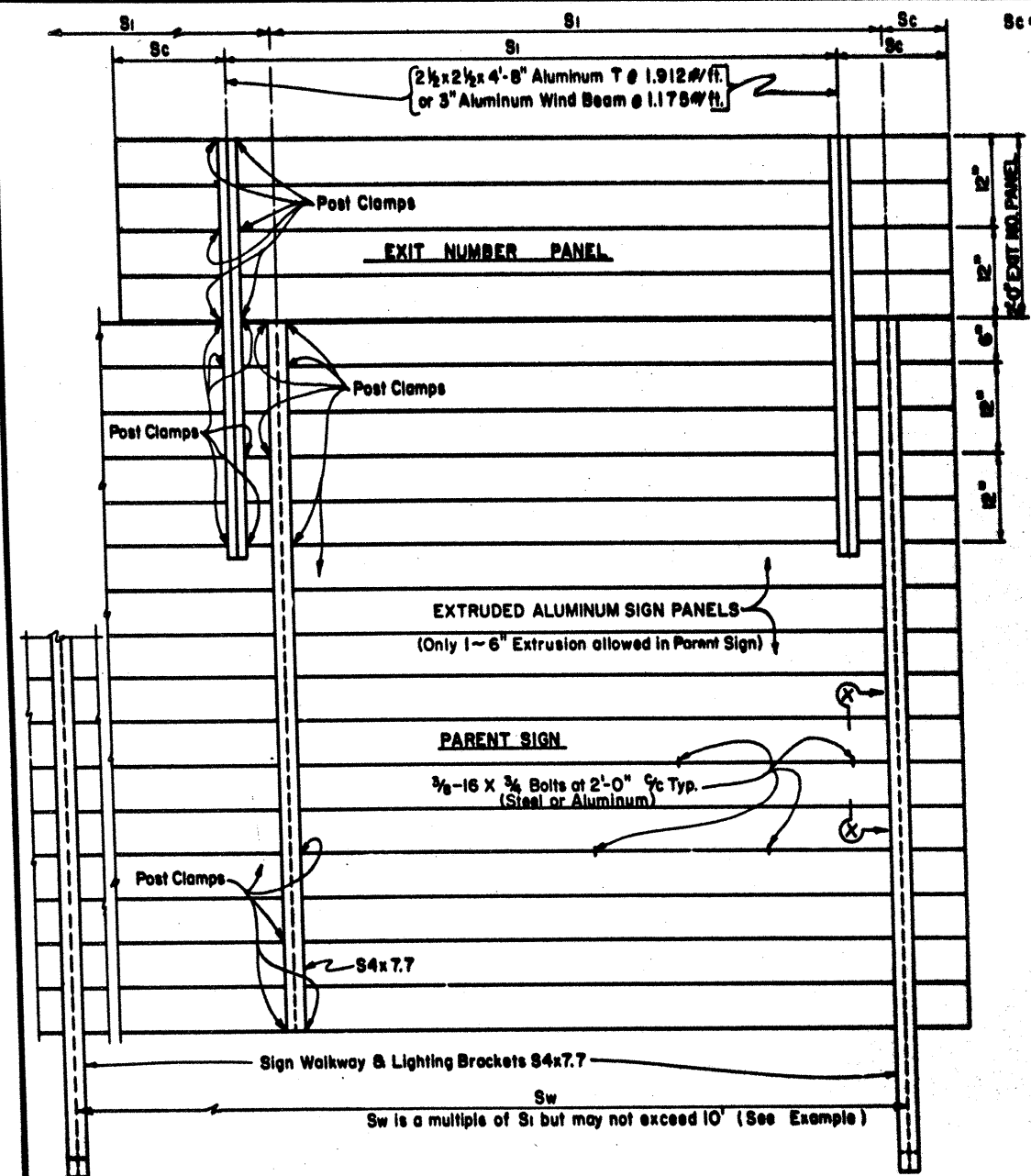
NOTES:

1. NUMBER PANEL ~~SHALL~~ BE MOUNTED TO THE RIGHT HAND SIDE OF THE PARENT SIGN FOR RIGHT EXITS AND TO THE LEFT FOR LEFT HAND EXITS. THE NUMBER PANEL ~~SHALL~~ BE MOUNTED WITH TWO (2) UPRIGHTS SO THAT ITS RIGHT EDGE IS EVEN WITH THE RIGHT EDGE OF THE PARENT SIGN OR VICE-VERSA FOR LEFT HAND EXITS.
2. UPRIGHTS TO BE SYMMETRICAL ABOUT NUMBER PANEL C.
3. UPRIGHT TO BE OF STRUCTURAL STEEL, ASTM-A36, AND GALVANIZED AFTER FABRICATION OR ALUMINUM 6061-T6 OR 3" EXTRUDED ALUMINUM WINDBEAM AS DETAILED ON SMD (8-2).
4. ALL BOLTS, NUTS, AND WASHERS ~~SHALL~~ BE GALVANIZED AS PER THE ZINC SPECIFICATION OF ASTM B454.
5. WHEN SPLICE BARS ARE REQUIRED TO FABRICATE THE NUMBER PANEL, THE SPLICE BAR DETAIL AS SHOWN FOR THE PARENT SIGN ON SHEET SMD(8-1) IS TO BE USED. SPLICE BAR OR BARS ON NUMBER PANEL NEED NOT ALIGN WITH SPLICE BAR OR BARS ON PARENT SIGN.
6. POSTS, PARENT SIGN PANELS AND NUMBER PANELS ~~SHALL~~ COMPLY WITH NOTES ON SHEETS SMD(8-1) AND SMD(8-2).
7. SIGNS (SUCH AS EXIT NUMBER PANELS) ATTACHED ABOVE A PARENT SIGN ~~SHALL~~ BE MADE OF THE SAME TYPE OF MATERIAL AS THE PARENT SIGN.
8. UPRIGHTS AND OTHER CONNECTION HARDWARE REQUIRED TO FASTEN EXIT NUMBER PANEL TO PARENT SIGN ~~SHALL~~ BE SUBSIDIARY TO THE SIGN BLANK.

NUMBER PANEL MOUNTING DETAILS

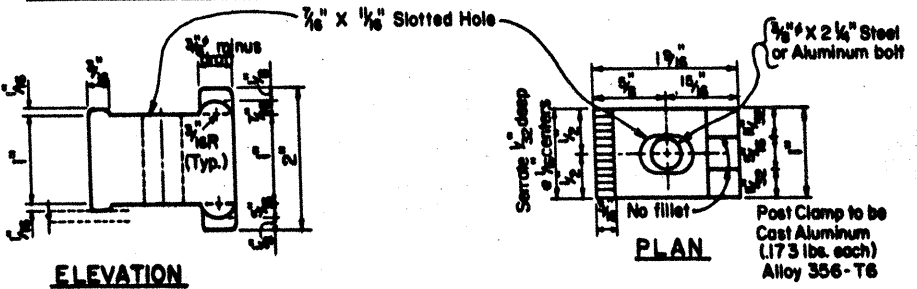


STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION		STRUCTURAL		56
MOUNTING DETAILS		FOR ROADSIDE GUIDE SIGNS		
SMD(8-3)				
DRAWING DATE: 4-78		STATE	FEDERAL	FEDERAL AID PROJECT
DEL.	2-82	15	6	1A85-2(181)161
CL.		COUNTY	CONTROL	SECTION
CL.		BEXAR	17	10
CL.				135
				18

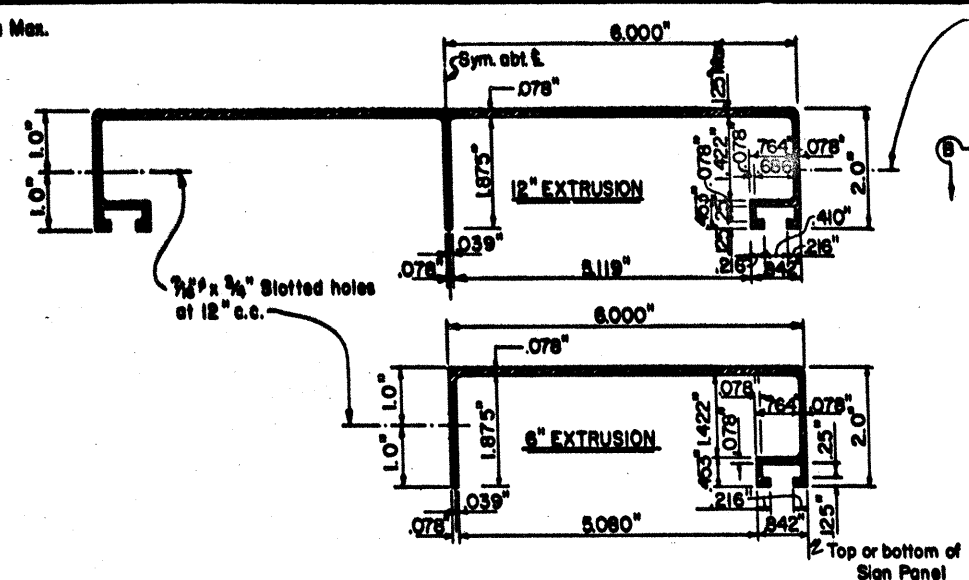


REAR VIEW

Deepest Sign In Group (Ft.)	MAXIMUM SIGN SUPPORT SPACING "S _i " (FEET)															
	WITH EXIT NUMBER PANELS								WITHOUT EXIT NUMBER PANELS							
	WITH WALKWAYS				WITHOUT WALKWAYS				WITH WALKWAYS				WITHOUT WALKWAYS			
	WIND ZONE	1	2	3	4	WIND ZONE	1	2	3	4	WIND ZONE	1	2	3	4	WIND ZONE
15	4.5	7	8	10	10	5	7	8	10	10	7	8	9	10	10	8.5
14	6	7.5	9.5	10	10	6	7.5	9.5	10	10	8	9	10	10	10	10
13	7.5	9	10	10	10	7.5	9	10	10	10	9	10	10	10	10	10
12	8.5	10	10	10	10	8.5	10	10	10	10	10	10	10	10	10	10
11 or less	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10



POST CLAMP DETAILS

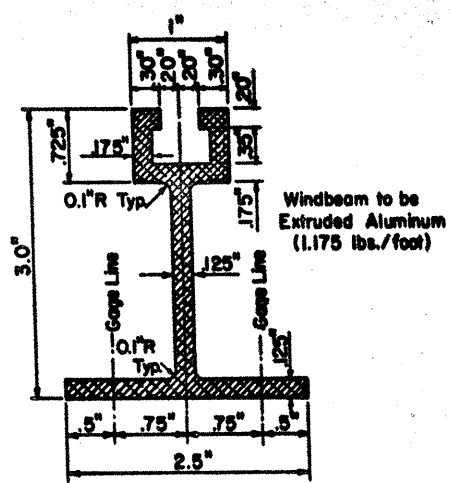


EXTRUSION DETAILS FOR ALUMINUM SIGN PANELS

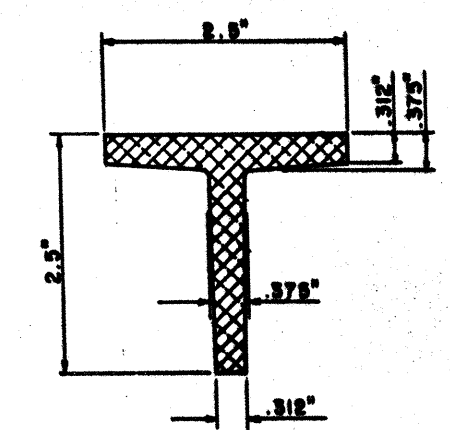
EXAMPLES (FOR DETERMINING S_i AND S_w)

NO.	ZONE	"d"	EXIT. PANEL	WALKWAY	S _i	S _w	COMMENT
①	1	15.0	YES	YES	4.5	9.0	S _w = 2x(S _i)
②	2	14.0	YES	NO	7.5	7.5	S _w = 1x(S _i)
③	1	15.0	NO	NO	8.5	8.5	S _w = 1x(S _i)
④	3	14.0	NO	YES	10.0	10.0	S _w = S _i

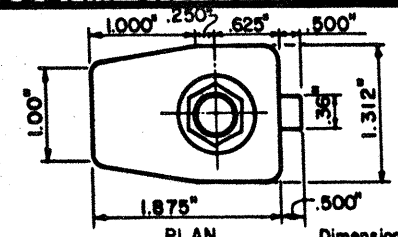
Values shown for S_i are maximum values. S_i may be varied for different sign lengths and Truss mounting conditions. S_w should not exceed two times S_i(Max.) or 10 feet.



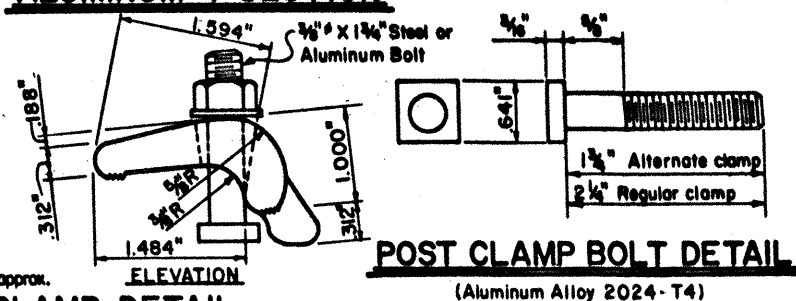
WINDBEAM CROSS SECTION



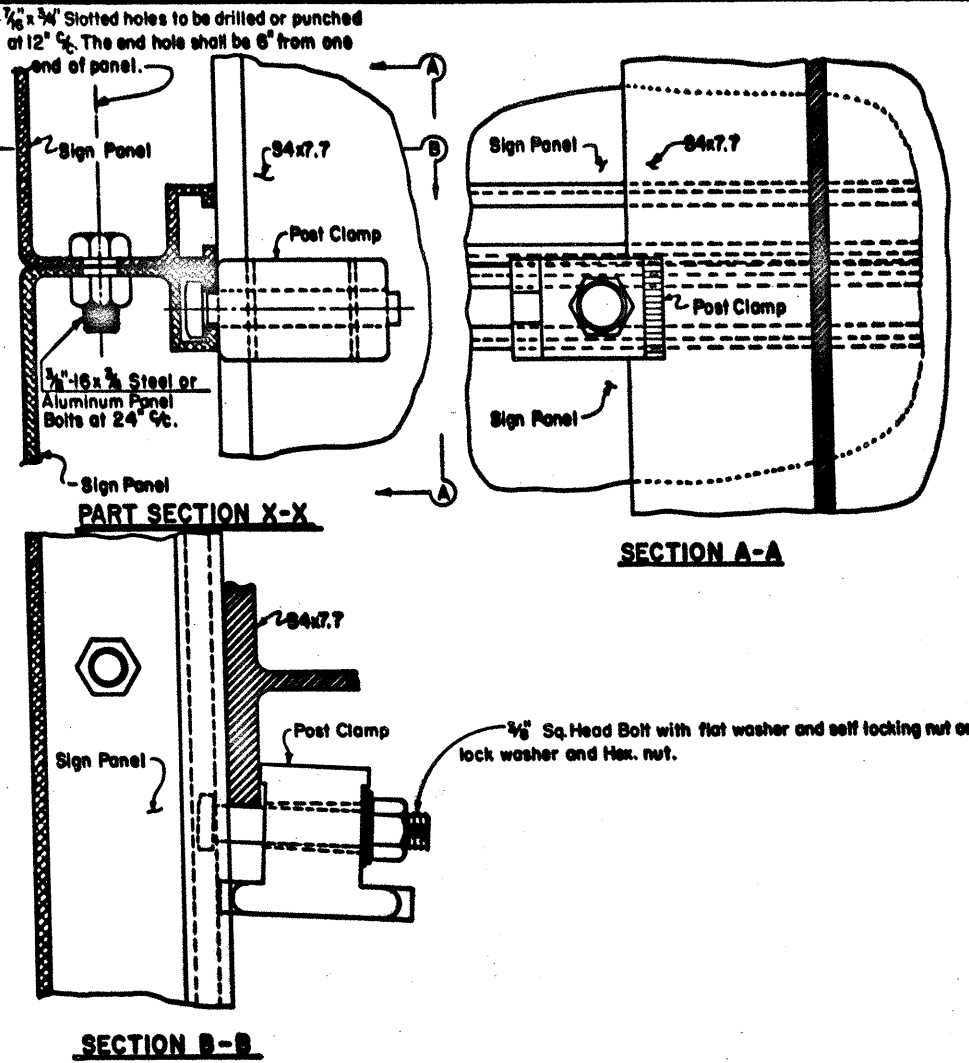
ALUMINUM T SECTION



ALTERNATE POST CLAMP DETAIL




POST CLAMP BOLT DETAIL
(Aluminum Alloy 2024-T4)



PANEL CONNECTION DETAILS

GENERAL NOTES:
 Materials, fabrication, construction and erection shall conform with the requirements of the Department's Standard Specifications.
 All structural steel, bolts, nuts and washers shall be galvanized after fabrication.
 Structural steel shall conform with A.S.T.M. Specification A-36.
 Steel bolts shall have square heads and hexagon nuts and conform with A.S.T.M. Specification A-307. Dimensions shall be in accordance with ANSI B 18.2.1.
 Aluminum Post Clamps shall be cast aluminum Alloy 356-T6.
 Aluminum bolts shall be Alloy 2024-T4.



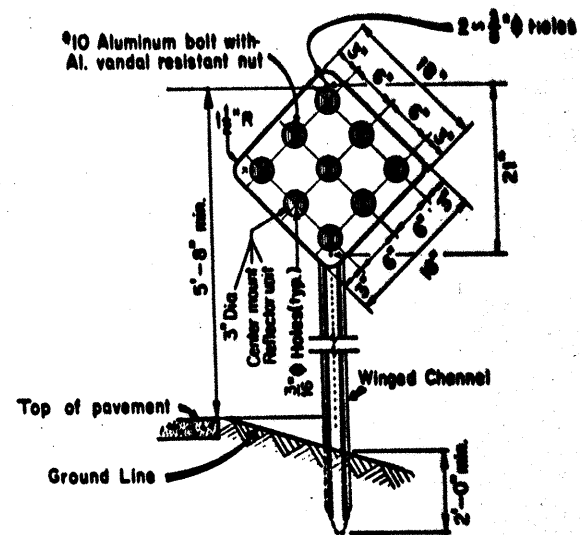
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

**STRUCTURAL MOUNTING
DETAILS FOR 57
OVERHEAD SIGN BRIDGES**

ALUMINUM SMD(A-1)

ORIGINAL DRAWING DATE: 2-82		STATE DEPARTMENT OF HIGHWAYS	FEDERAL AID PROJECT #	57
REVISIONS		15	6	IR 35-2 (18) 161
CR: CWC	DR: EDS	CH: CWC	DATE: 17	10
		17		10

Types 1 and 4 Object Marker

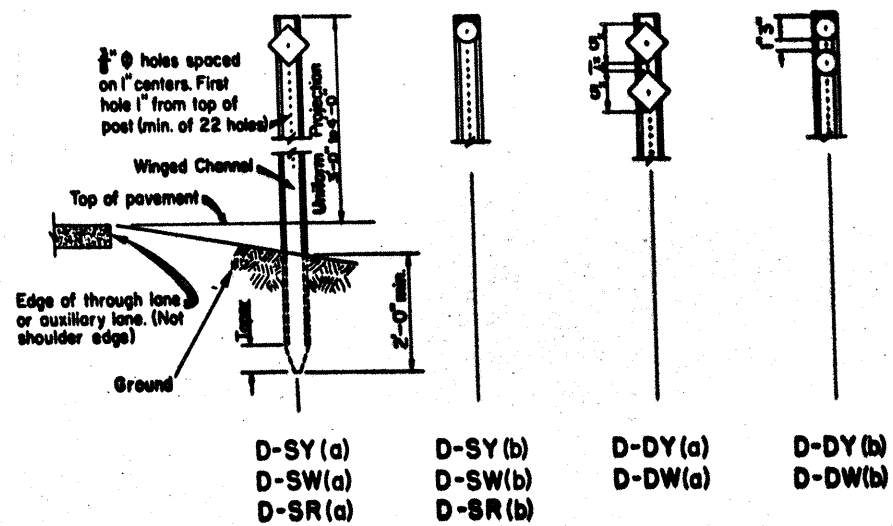


Types 1 and 4 Object Markers ~~shall~~ consist of Center Mount Reflector Units mounted on 0.080" thick sheet aluminum conforming with ASTM B-209 Alloy 6061-T6, or 12 gage sheet steel conforming with ASTM A-415.

TYPE 1 OM-1R
REFLECTOR UNIT - YELLOW
BACKGROUND (YELLOW - NON-
REFLECTIVE)

TYPE 4 OM-4R
REFLECTOR UNIT - RED
BACKGROUND - (RED NON-)
(REFLECTIVE)

Delineators

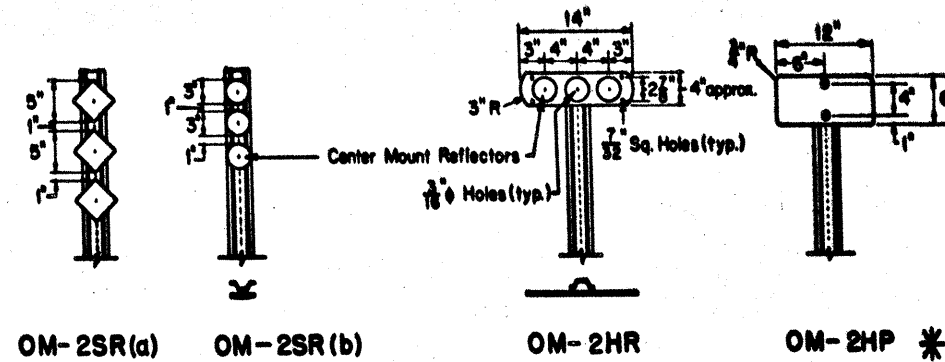


Single Reflectors Double Reflectors

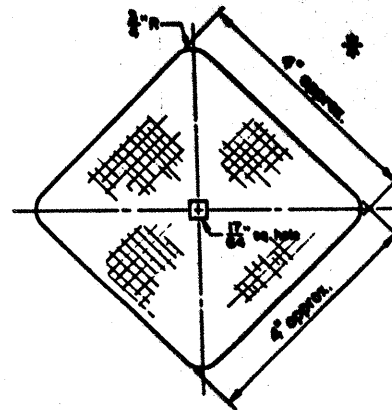
(Y-yellow, W-white, R-red)

Type 2 Object Markers

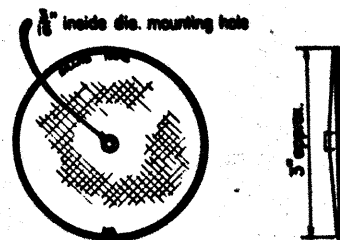
YELLOW
(R- reflector unit, P- panel)



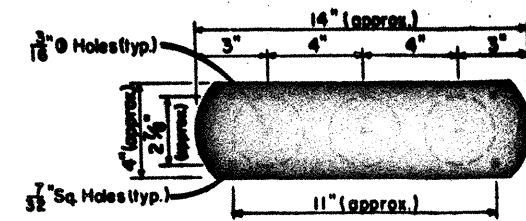
See Details Below



**TYPICAL
HIGH SPECIFIC INTENSITY
REFLECTOR UNIT
TYPE (a)**

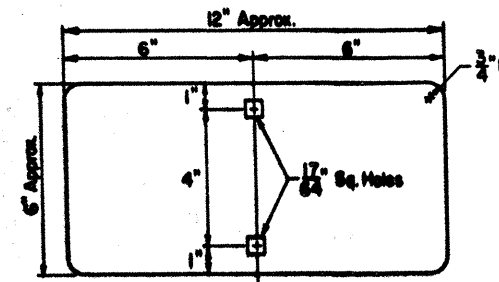


**TYPICAL
CENTER MOUNT
REFLECTOR UNIT
TYPE (b)**



The mounting plate ~~should be~~ 0.063" thick aluminum 3003-H-14 or similar aluminum.

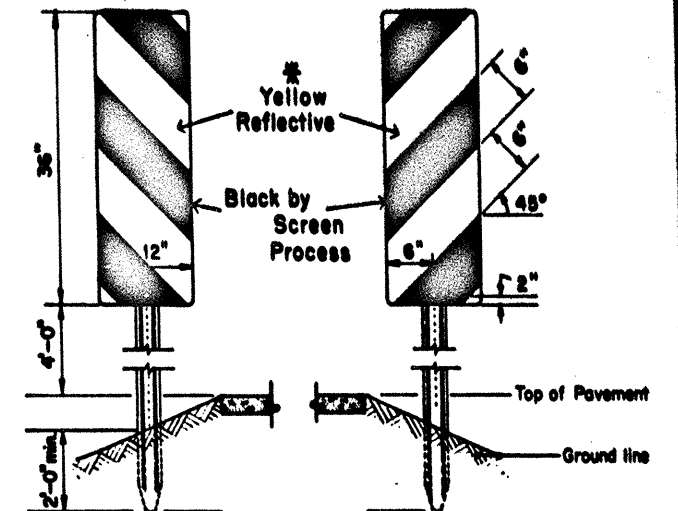
OM- 2HR HORIZONTAL MOUNTING PLATE
DETAIL



The plate ~~should be~~ 0.063" thick Aluminum
3003 H-14 or similar Aluminum

OM- 2HP HORIZONTAL PANEL DETAIL

Type 3 Object Markers



OM-3L

OM-3R

**SIGN BLANK TO BE .080" THICK SHEET ALUMINUM CONFORMING TO ASTM B209
ALLOY 8081-T6.**

* REFLECTIVE SHEETING ~~SHOULD~~ BE THE HIGH SPECIFIC INTENSITY TYPE IN ACCORDANCE WITH THE PROJECT SPECIFICATION.

GENERAL NOTES:
CENTER MOUNT AND HIGH SPECIFIC INTENSITY REFLECTOR UNITS ~~SHALL~~
CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

DELINEATORS SHALL BE UNIFORMLY PLACED NOT LESS THAN 2 FEET NOR MORE THAN 6 FEET FROM THE EDGE OF SHOULDER OR THE FACE OF UNMOUNTABLE CURB, OR THEY SHALL BE PLACED IN LINE WITH GUARDRAIL WHERE GUARDRAIL IS USED.

OBJECT MARKERS ~~SHALL BE~~ LOCATED AT POINTS DESIGNATED ON PLAN SHEETS.
HARDWARE ~~SHALL BE~~ GALVANIZED STEEL, STAINLESS STEEL, OR ALUMINUM, EX-
CEPT AS NOTED.

POSTS FOR SUPPORTING DELINEATORS AND OBJECT MARKERS ~~SHOWN~~ IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

DELINEATORS and OBJECT MARKERS

D & OM(1)

DRAWING DATE: 1-81		STATE DISTRICT	FEDERAL AID PROJECT	SHEET
DL--	2-82	15	6	IR 35-2 (181) 161
CL--		COUNTY		
EN--		CONTRACT SECTION JOB		
CL--		17 10 147 135		



**For Single and Double Delineators and
Object Marker types OM-2SR(a) & OM-2SR(b)**



The delineator spacing, S , on the curve is found from the formula $S = 3\sqrt{R - 50}$, where R is the radius of the curve in feet. The first spaces immediately in advance of and beyond the curve are $2.0 \times S$; the second spaces are $3.0 \times S$, and the third spaces are $6.0 \times S$ but not to exceed 300 feet. Distance for spaces rounded to nearest 5 feet.



Top of reflector units

Uniform Projection 3'-0" to 4'-0"

Min. 1.12 lb/ft Winged Channel

2"

2 1/8" approx.

• 10/24 thread x 1 1/2" long aluminum carriage bolts with aluminum vandal resistant nuts.

Top of pavement

Winged channel shall be embedded a minimum of 2'-0"

4"

Min. 1.12 lb/ft Winged Channel

Uniform Projection 3'-0" to 4'-0"

Center Mount Reflector Unit

Mounting plate
(see detail above)

11" approx.

3" approx.

.050" 3003 H-14 Aluminum or 16 gage galvanized steel brace C.

1/8"

1/4"

1/2"

1/4" A.I. bolt, hex. hd.
8 nut, with one plain washer and one lockwasher.

10 Aluminum bolt with Aluminum vandal resistant nut.

2- $\frac{3}{4}$ " \varnothing bolts with hex. hd., hex. nut, one plain washer, and one lockwasher for each bolt.

Min. 1 1/2 lb./ft. Winged Channel

2~1/4" Ø bolts with hex. hd., hex. nut, one plain washer, and one lockwasher for each bolt

Min. 2.0 lb./ft. Winged Channel

Object Marker

PLAN VIEW

Galvanized Winged Channel Stub cut from post

Galvanized Winged Channel Post.

5" ϕ Standard Galvanized or Zinc plated squares or hex. head machine bolt with nut.

PARTIAL ELEVATION

Winged Channel Post

Winged Channel Stub

Ground line

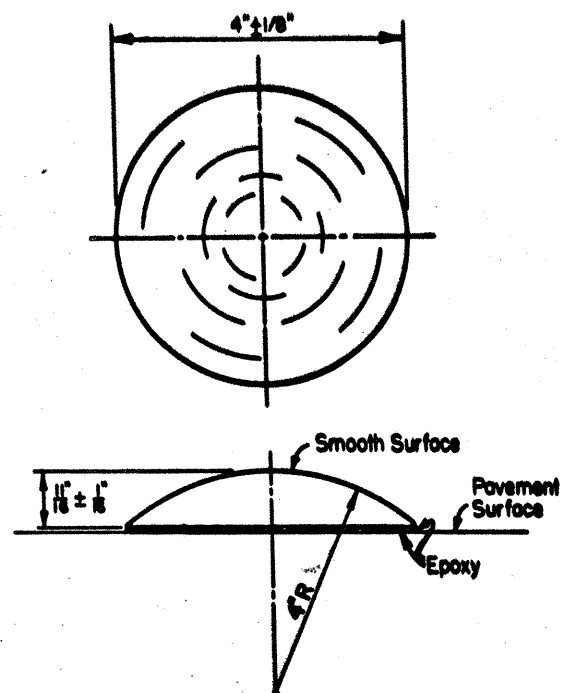
Dimensions: 2'-3", 1", 1", 2'-0" min.

**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

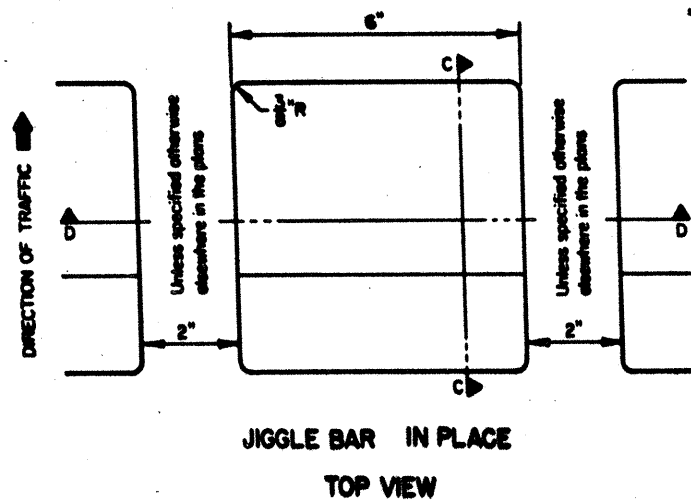
DELINEATORS and OBJECT MARKERS

D & OM (2)

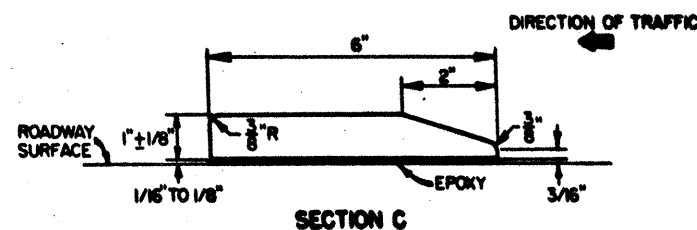
DRAWING DATE: 1-81		DATE 01/31/81	FEDERAL AGENCY		FEDERAL AND PROJECT		DRAWING NO.
DN-#	2-82	15	6	IR35-2(10)16		59	
CL-#		COUNTY		CONTROL	SECTION	JOB	
DN-#		BEXAR		17	10	147	
CL-#							



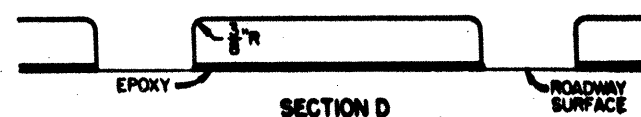
**TRAFFIC BUTTONS
(NON-REFLECTORIZED)**



**JIGGLE BAR IN PLACE
TOP VIEW**



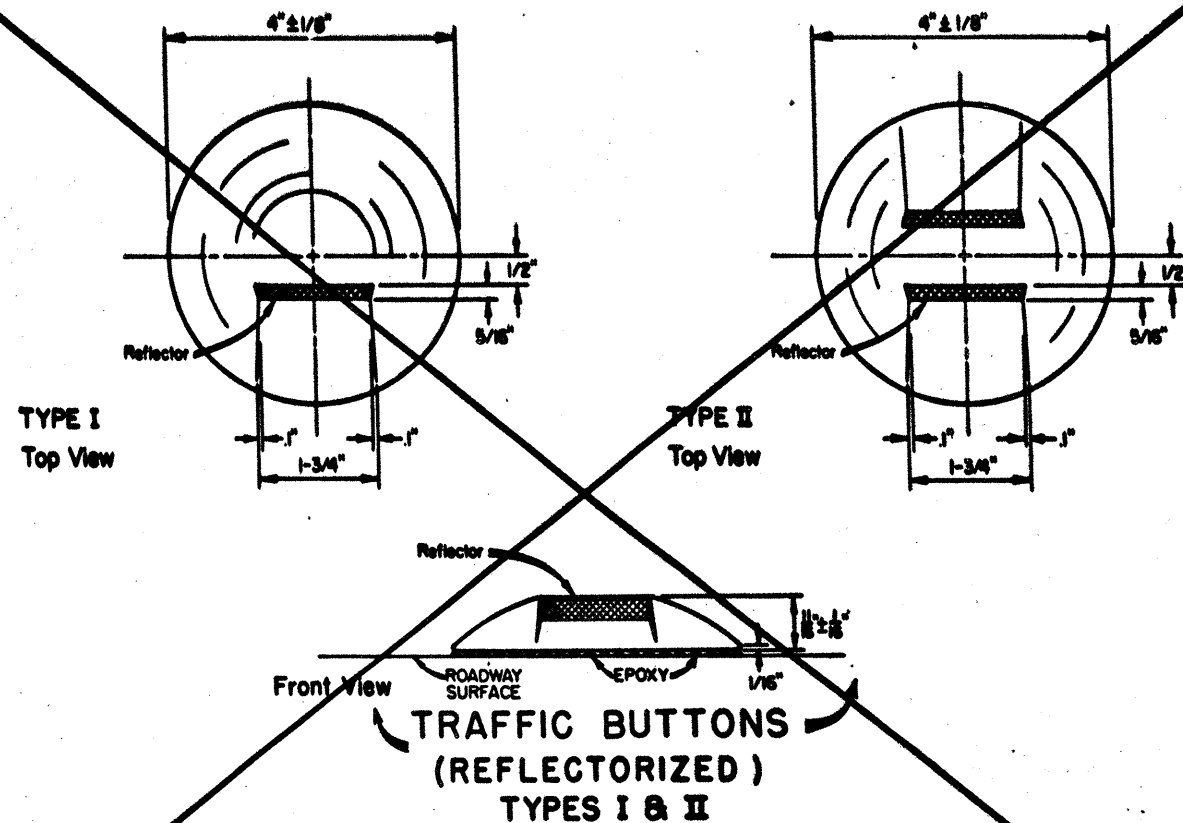
SECTION C



SECTION D

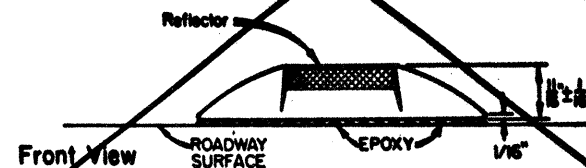
**JIGGLE BAR TILES
(NONREFLECTIVE)**

"JIGGLE BARS" CONSIST OF A NUMBER OF JIGGLE BAR TILES PLACED IN A LINEAR CONFIGURATION

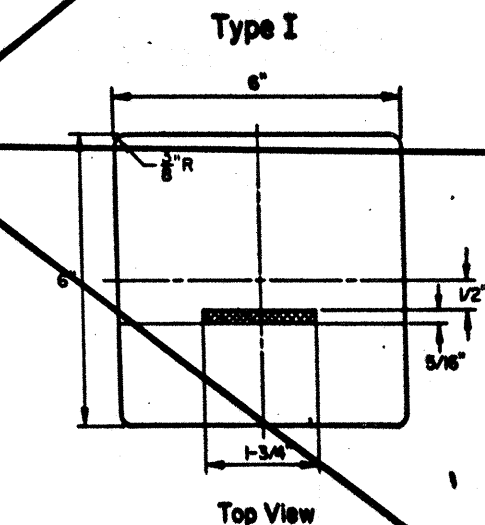


**TYPE I
Top View**

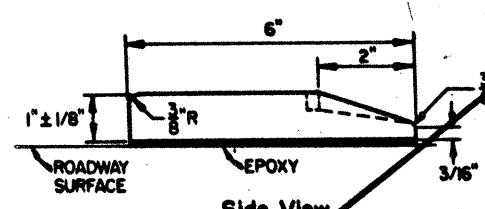
**TYPE II
Top View**



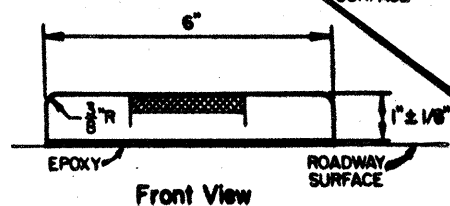
**TRAFFIC BUTTONS
(REFLECTORIZED)
TYPES I & II**



Top View

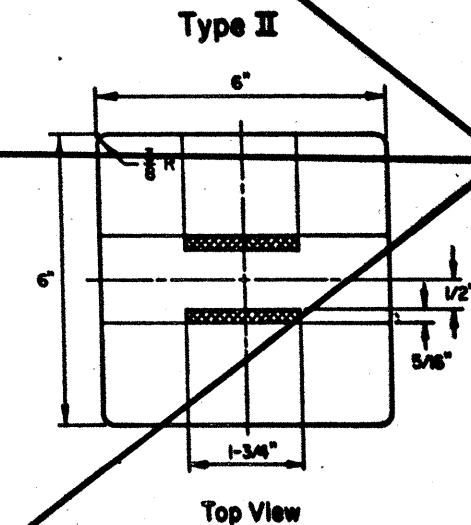


Side View

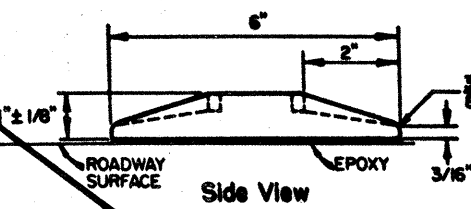


Front View

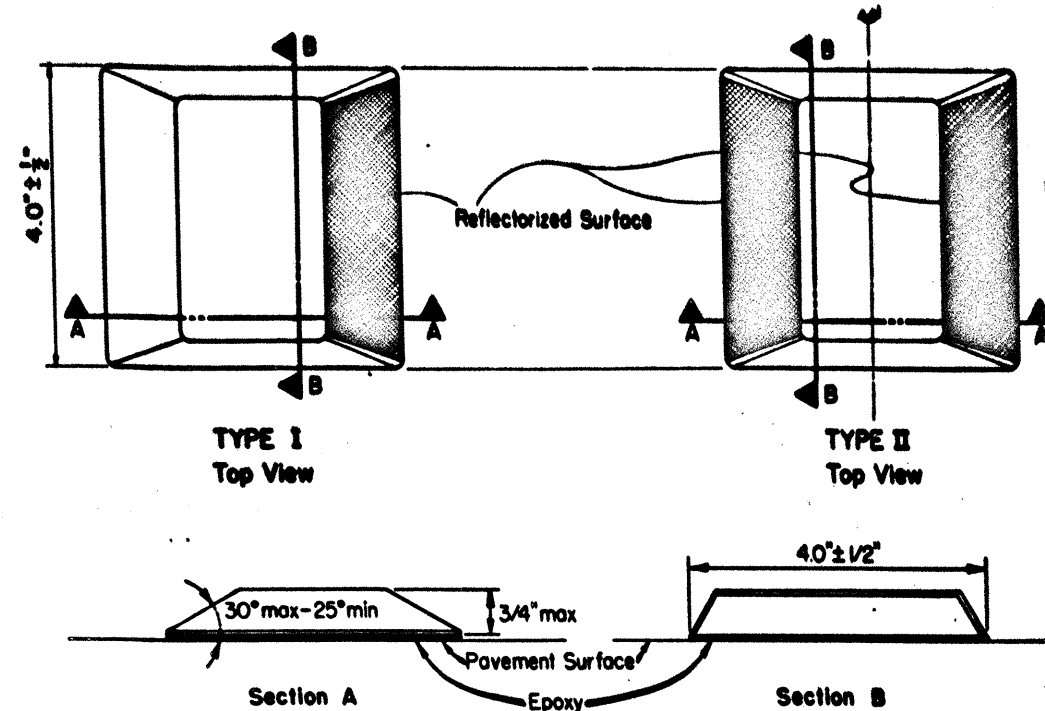
**JIGGLE BAR TILES
(REFLECTORIZED)
Types I & II**



Top View

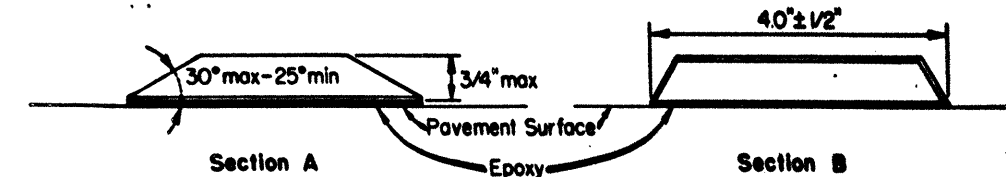


Side View



**TYPE I
Top View**

**TYPE II
Top View**

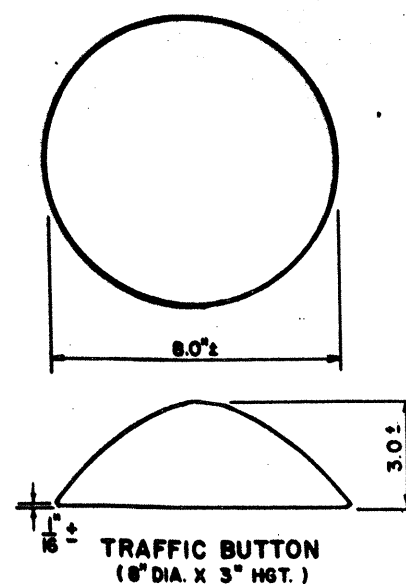


Section A

Section B

**PAVEMENT MARKERS
(REFLECTORIZED)
TYPES I & II**

Minimum area of markers exposed to traffic shall not less than 12.5 square inches.



**TRAFFIC BUTTON
(8" DIA. X 3" HGT.)**

NOTE
ALL DIMENSIONS ARE $\pm 1/8"$ UNLESS OTHERWISE SHOWN.

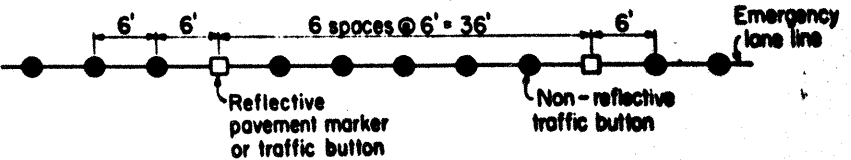
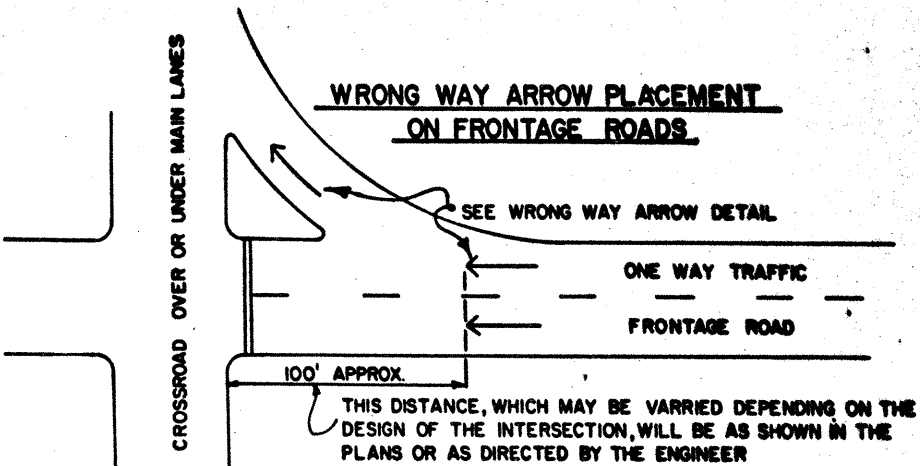
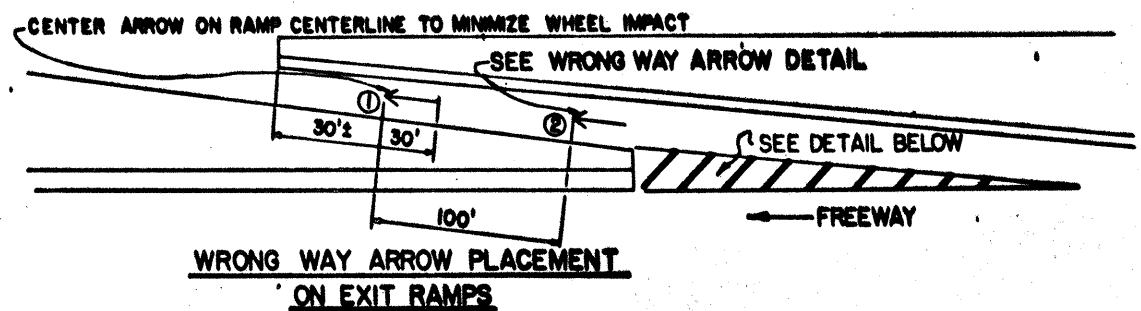
GENERAL NOTES:
THE PAVEMENT UPON WHICH THE TRAFFIC BUTTONS, PAVEMENT MARKERS, AND JIGGLE BAR TILES ARE TO BE PLACED SHALL BE PREPARED SUBJECT TO THE APPROVAL OF THE ENGINEER TO INSURE PROPER CLEANING OF THE PAVEMENT SURFACE. RPM'S SHALL BE BONDED TO THE ROADWAY SURFACE WITH EPOXY ADHESIVE CONFORMING WITH THE SPECIFICATION.
UNLESS SPECIFIED ELSEWHERE IN THE PLANS, THE USUAL JIGGLE BAR SPACING IS 60" ON MEDIAN PAVED SHOULDER, 100' ON OUTSIDE PAVED SHOULDER. JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO THE ROADWAY.
JIGGLE BARS SHALL BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN ON THE PLAN AND PROFILE SHEETS OR WHERE DIRECTED BY THE ENGINEER.
MARKERS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT.



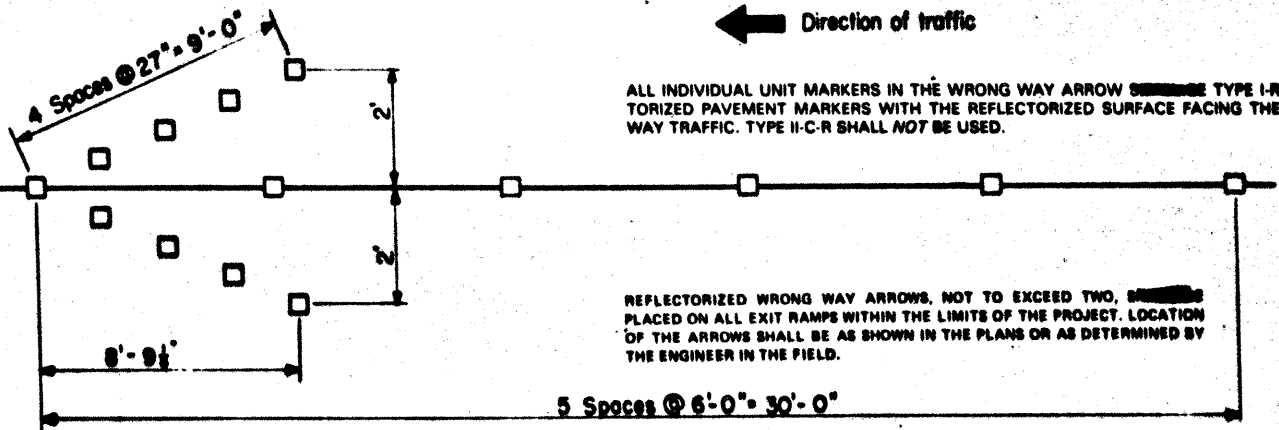
**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**
INDIVIDUAL UNIT PAVEMENT MARKINGS
**REFLECTIVE PAVEMENT MARKERS,
TRAFFIC BUTTONS &
JIGGLE BAR TILE**
IPM(1)(MOD.)

DRAWING DATE	1-81	DATE	15	6	2A 35-2	60
CL-1	2-82	COUNTY	BEAR	DISTRICT	11	10
CL-2		SECTION	147	147	147	147
CL-3		SECTION				

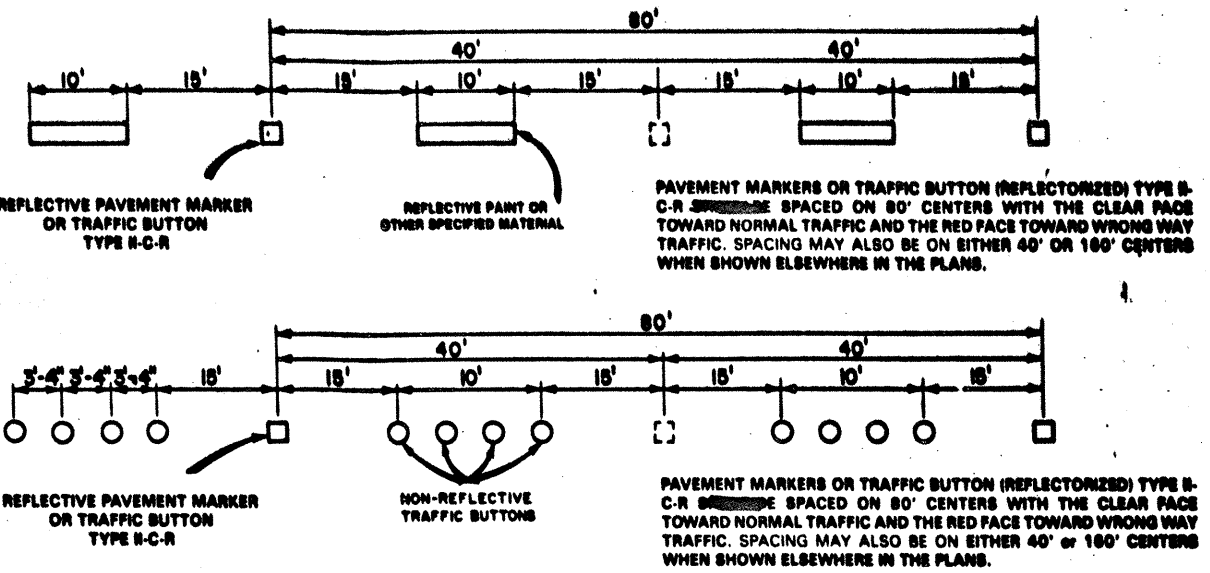
REFLECTORIZED ARROWS NOT TO EXCEED TWO, ~~SHALL~~ PLACED ON ALL EXIT RAMP WITHIN THE LIMITS OF THE PROJECT LOCATION OF ARROW ① ~~SHALL~~ AS SHOWN A SECOND ARROW ~~SHALL~~ BE PLACED AT LOCATION ②



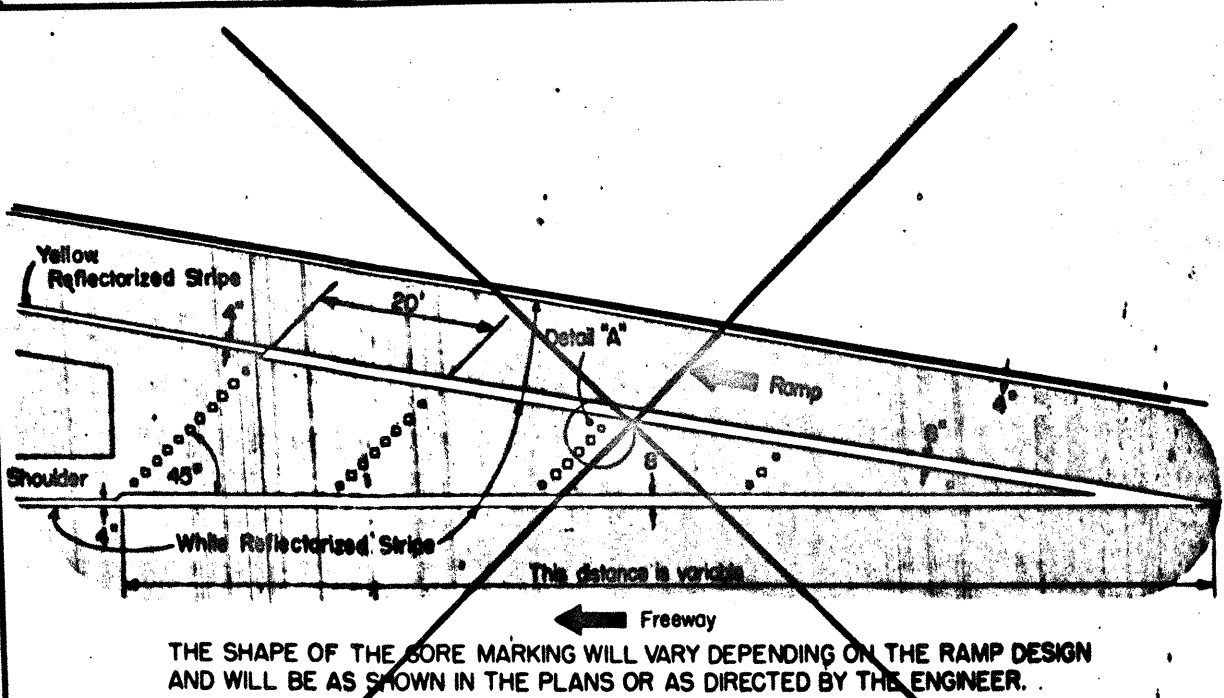
TRAFFIC BUTTONS FOR EMERGENCY LANE & SHOULDER EDGE LINES



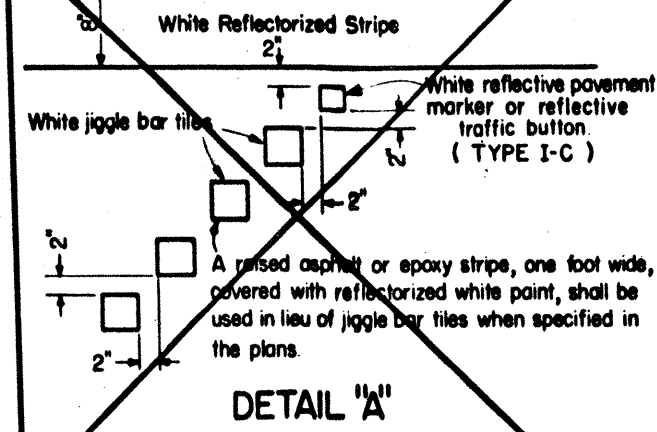
WRONG WAY ARROW DETAIL



TRAFFIC LANE LINE



TYPICAL EXIT RAMP GORE MARKING



REVISED 11-9-84

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

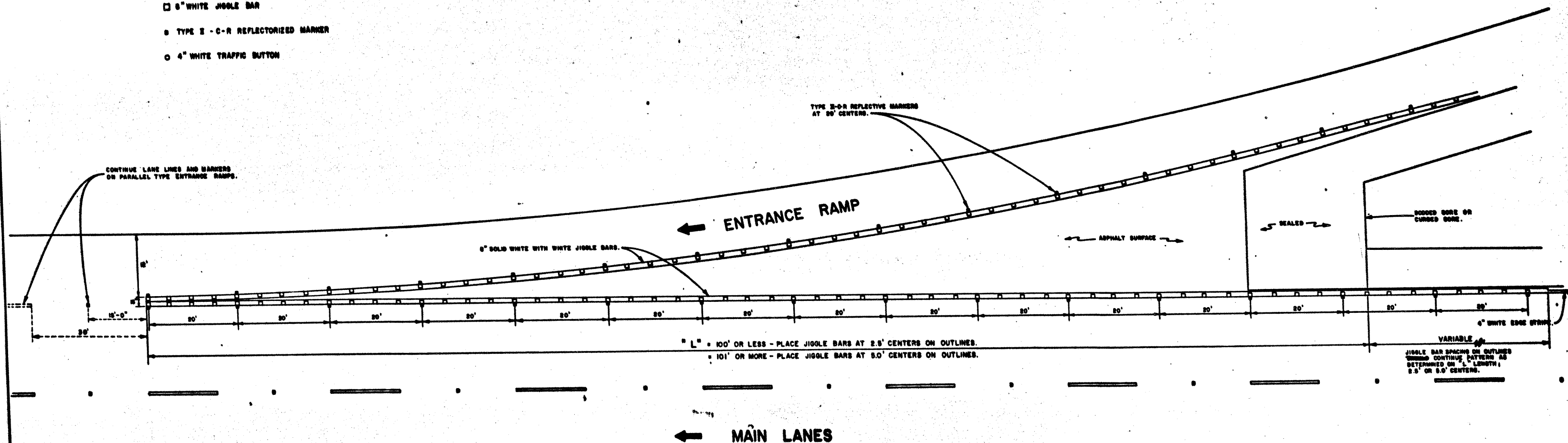
INDIVIDUAL UNIT PAVEMENT MARKINGS
REFLECTIVE PAVEMENT MARKERS,
TRAFFIC BUTTONS,
& JIGGLE BARS

IPM(2)(MOD.)

DRAWING DATE: 5-74		FEDERAL AID PROJECT		SHEET	
DR: 15	6	2R 35-2	61	6	1
CL: 2-82		COUNTY	DISTRICT	JOB	REVISION
DR: 15		BEXAR	17	10	47
CL: 15					218

LEGEND

- 6" WHITE JIGGLE BAR
- TYPE I - C-R REFLECTORIZED MARKER
- 4" WHITE TRAFFIC BUTTON

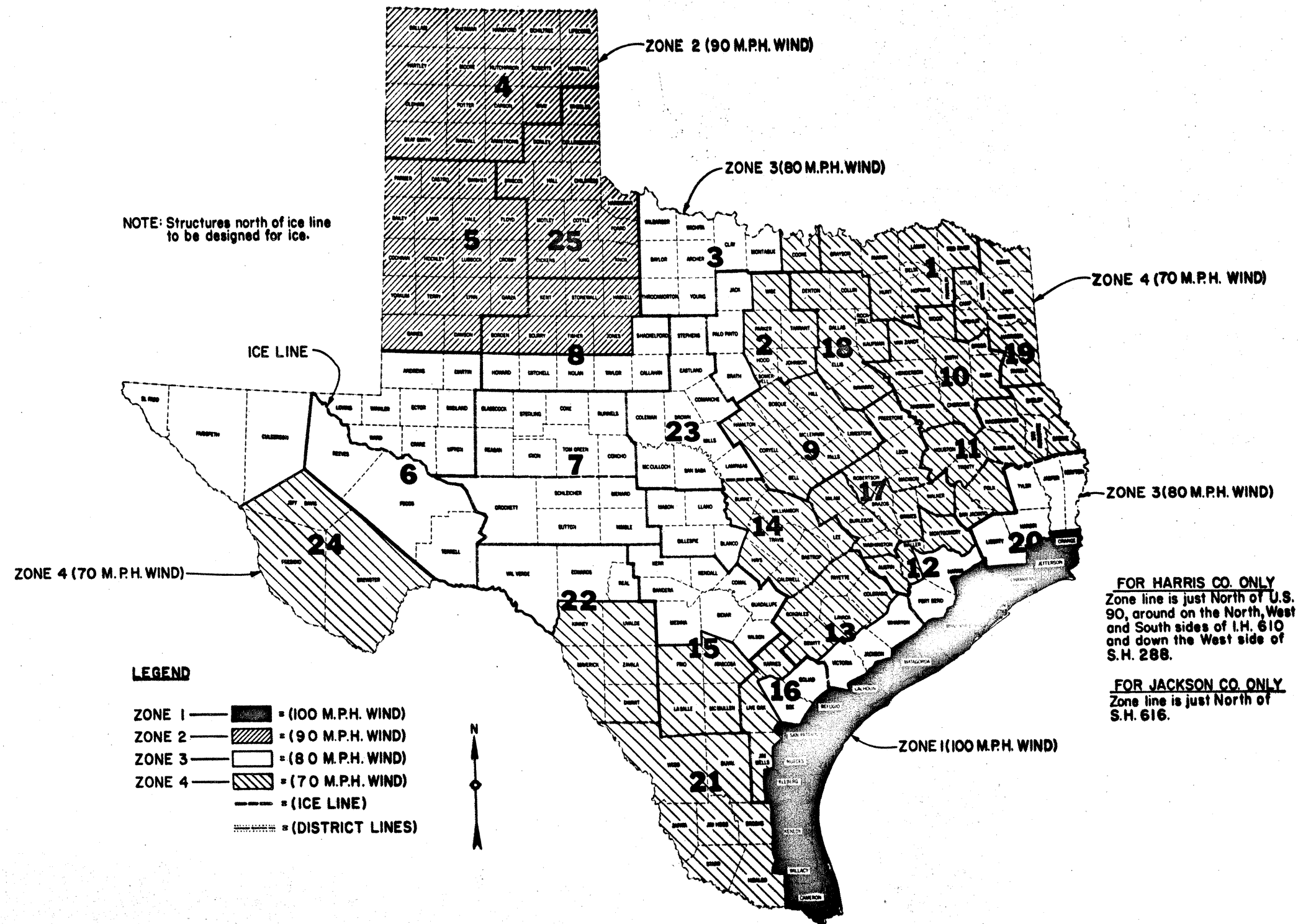


**TYPICAL JIGGLE BAR GORE TREATMENT
AT ENTRANCE RAMP**

OCT. 31 1979

FED. PROJ. NO.	STATE	FEDERAL PROJECT NO.
0	TEXAS	IA 35-2(18)10 62
STATE DIST. NO.	COUNTY	DIST. NO.
10	BEXAR	17 10 147 1185

62



**WIND VELOCITY & ICE ZONES FOR
OVERHEAD SIGN BRIDGES**

Based on 50 Year Mean Recurrence Interval



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

**WIND VELOCITY
AND
ICE ZONES**

WV & IZ

DRAWING DATE: 2-1-77		STATE	FEDERAL	FEDERAL AID PROJECT	SHEET
REVISIONS		15	2R35-2(12)161	64	
BY: -		COUNTY	SECTION	JOB	REVISION
BY: -		Bexar	17	10	17
BY: -					30

ZONE 3 NO ICE 80 M.P.H. WIND

TRUSS DETAILS

SPAN	40'	45'	50'	55'	60'	65'	70'	75'	80'	85'	90'	95'	100'	105'	110'
W x D = WIDTH x DEPTH	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.0 x 4.0	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD	3x3x 1/8 (3)	3x3x 1/8 (3)	3x3x 1/8 (4)	3x3x 1/8 (4)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)	3x3x 1/8 (5)
DEAD LOAD DIAGONAL	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)
WIND LOAD DIAGONAL	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)
DEAD LOAD VERTICAL	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)
WIND LOAD STRUT	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)	2 x 2 x 3/8 (1)
TOTAL DEF. & TRUSS D.L.	Δ=0.14" DL=387#	Δ=0.21" DL=387#	Δ=0.25" DL=437#	Δ=0.36" DL=457#	Δ=0.50" DL=457#	Δ=0.58" DL=507#	Δ=0.63" DL=527#	Δ=0.73" DL=577#	Δ=0.95" DL=617#	Δ=1.19" DL=617#	Δ=1.32" DL=677#	Δ=1.61" DL=677#	Δ=1.77" DL=767#	Δ=2.13" DL=767#	Δ=2.32" DL=827#

TOWER DETAILS

S = COLUMN SPACING	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	6.5'	6.5'	6.5'	6.5'	6.5'	6.5'	7.0'	7.0'	7.0'
HEIGHT	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
W1015 (18.0)	W1015 (20.1)	W1015 (22.1)	W1015 (24.2)	W1015 (26.2)	W1017 (25.8)	W1017 (27.9)	W1022 (29.8)	W1022 (31.7)	W1022 (33.6)	W1022 (35.5)	W1022 (37.5)	W1022 (39.0)	W1022 (40.1)	W1022 (41.5)	W1026 (43.2)	W1026 (45.1)
W1015 (19.3)	W1015 (21.5)	W1015 (23.7)	W1015 (25.9)	W1015 (28.1)	W1017 (27.6)	W1017 (29.9)	W1022 (31.8)	W1022 (33.8)	W1022 (35.8)	W1022 (37.8)	W1022 (39.8)	W1022 (41.8)	W1022 (43.8)	W1022 (45.8)	W1026 (47.8)	W1026 (49.8)
W1015 (20.6)	W1015 (23.0)	W1015 (25.3)	W1017 (27.6)	W1017 (29.9)	W1022 (29.4)	W1022 (31.7)	W1022 (33.7)	W1022 (35.7)	W1022 (37.7)	W1022 (39.7)	W1022 (41.7)	W1022 (43.7)	W1022 (45.7)	W1022 (47.7)	W1026 (49.7)	W1026 (51.7)
W1015 (21.9)	W1015 (24.4)	W1017 (26.9)	W1017 (29.3)	W1017 (31.8)	W1022 (31.3)	W1022 (33.8)	W1022 (36.1)	W1022 (38.4)	W1022 (40.6)	W1022 (42.9)	W1022 (45.1)	W1022 (47.4)	W1022 (49.6)	W1022 (51.9)	W1026 (54.1)	W1026 (56.4)
W1015 (23.3)	W1017 (25.9)	W1017 (28.5)	W1022 (31.1)	W1022 (33.7)	W1022 (36.3)	W1022 (38.9)	W1022 (41.5)	W1022 (44.1)	W1022 (46.7)	W1022 (49.3)	W1022 (51.9)	W1022 (54.5)	W1022 (57.1)	W1022 (59.7)	W1026 (62.3)	W1026 (64.9)
W1015 (24.6)	W1017 (27.4)	W1017 (30.1)	W1022 (32.8)	W1022 (35.5)	W1022 (38.2)	W1022 (40.9)	W1022 (43.6)	W1022 (46.3)	W1022 (49.0)	W1022 (51.7)	W1022 (54.4)	W1022 (57.1)	W1022 (59.8)	W1022 (62.5)	W1026 (65.2)	W1026 (67.9)
W1017 (25.9)	W1017 (28.9)	W1022 (31.7)	W1022 (34.6)	W1022 (37.1)	W1022 (39.9)	W1022 (42.8)	W1022 (45.7)	W1022 (48.6)	W1022 (51.5)	W1022 (54.4)	W1022 (57.3)	W1022 (60.2)	W1022 (63.1)	W1022 (66.0)	W1026 (68.9)	W1026 (71.8)
W1017 (27.3)	W1017 (30.4)	W1022 (33.3)	W1022 (36.4)	W1022 (39.0)	W1022 (41.8)	W1022 (44.6)	W1022 (47.4)	W1022 (50.2)	W1022 (53.0)	W1022 (55.8)	W1022 (58.6)	W1022 (61.4)	W1022 (64.2)	W1022 (67.0)	W1026 (69.8)	W1026 (72.6)
W1022 (28.7)	W1022 (31.9)	W1022 (35.0)	W1022 (38.4)	W1022 (41.3)	W1022 (44.2)	W1022 (47.1)	W1022 (50.0)	W1022 (52.9)	W1022 (55.8)	W1022 (58.7)	W1022 (61.6)	W1022 (64.5)	W1022 (67.4)	W1022 (70.3)	W1026 (73.2)	W1026 (76.1)
W1022 (30.1)	W1022 (33.4)	W1022 (36.6)	W1022 (39.9)	W1022 (43.2)	W1022 (46.5)	W1022 (49.8)	W1022 (53.1)	W1022 (56.4)	W1022 (59.7)	W1022 (63.0)	W1022 (66.3)	W1022 (69.6)	W1022 (72.9)	W1022 (76.2)	W1026 (79.5)	W1026 (82.8)
W1022 (31.4)	W1022 (34.9)	W1022 (38.3)	W1022 (41.7)	W1022 (45.1)	W1022 (48.5)	W1022 (51.9)	W1022 (55.3)	W1022 (58.7)	W1022 (62.1)	W1022 (65.5)	W1022 (68.9)	W1022 (72.3)	W1022 (75.7)	W1022 (79.1)	W1026 (82.5)	W1026 (85.9)
W1022 (32.9)	W1022 (36.5)	W1022 (40.0)	W1022 (43.5)	W1022 (46.6)	W1022 (49.7)	W1022 (52.8)	W1022 (55.9)	W1022 (59.0)	W1022 (62.1)	W1022 (65.2)	W1022 (68.3)	W1022 (71.4)	W1022 (74.5)	W1022 (77.6)	W1026 (80.7)	W1026 (83.8)
W1022 (33.7)	W1022 (38.0)	W1022 (41.8)	W1022 (45.4)	W1022 (49.0)	W1022 (52.6)	W1022 (56.2)	W1022 (59.8)	W1022 (63.4)	W1022 (67.0)	W1022 (70.6)	W1022 (74.2)	W1022 (77.8)	W1022 (81.4)	W1022 (85.0)	W1026 (88.6)	W1026 (92.2)
W1022 (35.1)	W1022 (39.6)	W1022 (43.4)	W1022 (47.2)	W1022 (51.0)	W1022 (54.8)	W1022 (58.6)	W1022 (62.4)	W1022 (66.2)	W1022 (70.0)	W1022 (73.8)	W1022 (77.6)	W1022 (81.4)	W1022 (85.2)	W1022 (89.0)	W1026 (92.8)	W1026 (96.6)
W1026 (37.1)	W1026 (41.6)	W1026 (45.7)	W1026 (50.0)	W1026 (54.3)	W1026 (58.6)	W1026 (62.9)	W1026 (67.2)	W1026 (71.5)	W1026 (75.8)	W1026 (80.1)	W1026 (84.4)	W1026 (88.7)	W1026 (93.0)	W1026 (97.3)	W1026 (101.6)	W1026 (105.9)
W1026 (38.6)	W1026 (42.8)	W1026 (47.4)	W1026 (51.6)	W1026 (55.6)	W1026 (59.7)	W1026 (63.8)	W1026 (67.9)	W1026 (72.0)	W1026 (76.1)	W1026 (80.2)	W1026 (84.3)	W1026 (88.4)	W1026 (92.5)	W1026 (96.6)	W1026 (100.7)	W1026 (104.8)

ZONE 3 NO ICE 80 M.P.H. WIND

TRUSS DETAILS

SPAN	115'	120'	125'	130'	135'	140'	145'	150'	155'
W x D	4.5 x 4.5	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0
CHORD	4x4x 1/2 (HS50) (2)	4x4x 1/2 (HS50) (2)	4x4x 1/2 (HS50) (2)	5x5x 1/2 (HS50) (4)	5x5x 1/2 (HS50) (4)	5x5x 1/2 (HS50) (4)	5x5x 1/2 (HS50) (4)	6x6x 1/2 (HS50) (8)	6x6x 1/2 (HS50) (8)
D.L. DIAG.	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)
W.L. DIAG.	3x3x 1/4 (3)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)	3x2 1/2 x 3/8 (2)
D.L. VERT.	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)
W.L. STRUT	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)	2 1/2 x 1 1/2 x 3/8 (2)
DEFL. & D.L.	Δ=2.54" DL=907#	Δ=2.54" DL=957#	Δ=3.03" DL=977#	Δ=3.22" DL=1037#	Δ=3.72" DL=1037#	Δ=3.96" DL=1147#	Δ=4.53" DL=1147#	Δ=4.65" DL=1297#	Δ=5.27" DL=1317#

TOWER DETAILS

S = COL. SPA.	7.0'	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'	7.5'
HEIGHT	5'	6'	7'	8'	9'	10'	11'	12'	13'
W1026 (41.1)	W1226 (39.9)	W1226 (41.5)	W1226 (43.1)	W1226 (44.7)	W1226 (46.1)	W1226 (47.9)	W1226 (49.3)	W1226 (51.1)	W1226 (52.9)
W1026 (44.0)	W1226 (42.7)	W1226 (44.5)	W1226 (46.2)	W1226 (48.0)	W1226 (49.4)	W1226 (51.3)	W1226 (53.2)	W1226 (55.1)	W1226 (57.0)
W1226 (47.1)	W1226 (45.6)	W1226 (47.4)	W1226 (49.3)	W1226 (51.2)	W1226 (52.7)	W1226 (54.6)	W1226 (56.5)	W1226 (58.4)	W1226 (60.3)
W1226 (50.1)	W1226 (48.5)	W1226 (50.4)	W1226 (52.4)	W1226 (54.4)	W1226 (56.1)	W1226 (58.0)	W1226 (59.9)	W1226 (61.8)	W1226 (63.7)
W1226 (53.1)	W1226 (51.4)	W1226 (53.4)	W1226 (55.4)	W1226 (57.4)	W1226 (59.1)	W1226 (61.0)	W1226 (62.9)	W1226 (64.8)	W1226 (66.7)
W1226 (56.0)	W1226 (54.3)	W1226 (56.3)	W1226 (58.3)	W1226 (60.3)	W1226 (62.0)	W1226 (63.9)	W1226 (65.8)	W1226 (67.7)	W1226 (69.6)
W1430 (59.6)	W1430 (57.7)	W1430 (60.0)	W1430 (62.3)	W1430 (64.7)	W1430 (66.7)	W1430 (68.9)	W1430 (71.1)	W1430 (73.3)	W1430 (75.5)
W1430 (62.6)	W1430 (60.7)	W1430 (63.1)	W1430 (65.5)	W1430 (67.8)	W1430 (70.2)	W1430 (72.5)	W1430 (74.8)	W1430 (77.1)	W1430 (79.4)
W1430 (65.7)	W1430 (63.7)	W1430 (66.2)	W1430 (68.8)	W1430 (71.3)	W1430 (73.6)	W1430 (75.9)	W1430 (78.2)	W1430 (80.5)	W1430 (82.8)
W1430 (67.8)	W1430 (65.8)	W1430 (68.3)	W1430 (70.7)	W1430 (73.1)	W1430 (75.4)	W1430 (77.7)	W1430 (80.0)	W1430 (82.3)	W1430 (84.6)
W1430 (69.9)	W1430 (67.9)	W1430 (70.4)	W1430 (72.8)	W1430 (75.1)	W1430 (77.4)	W1430 (79.7)	W1430 (82.0)	W1430 (84.3)	W1430 (86.6)
W1430 (71.8)	W1430 (69.8)	W1430 (72.3)	W1430 (74.7)	W1430 (77.0)	W1430 (79.3)	W1430 (81.6)	W1430 (83.9)	W1430 (86.2)	W1430 (88.5)
W1430 (73.9)	W1430 (71.9)	W1430 (74.4)	W1430 (76.8)	W1430 (79.1)	W1430 (81.4)	W1430 (83.7)	W1430 (86.0)	W1430 (88.3)	W1430 (90.6)
W1430 (75.9)	W1430 (73.9)	W1430 (76.4)	W1430 (78.8)	W1430 (81.1)	W1430 (83.4)	W1430 (85.7)	W1430 (88.0)	W1430 (90.3)	W1430 (92.6)
W1430 (77.9)	W1430 (75.9)	W1430 (78.4)	W1430 (80.8)	W1430 (83.1)	W1430 (85.4)	W1430 (87.7)	W1430 (90.0)	W1430 (92.3)	W1430 (94.6)
W1430 (79.9)	W1430 (77.9)	W1430 (80.4)	W1430 (82.8)	W1430 (85.1)	W1430 (87.4)	W1430 (89.7)	W1430 (92.0)	W1430 (94.3)	W1430 (96.6)
W1430 (81.9)	W1430 (79.9)	W1430 (82.4)	W1430 (84.8)	W1430 (87.1)	W1430 (89.4)	W1430 (91.7)	W1430 (94.0)	W1430 (96.3)	W1430 (98.6)
W1430 (83.9)	W1430 (81.9)	W1430 (84.4)	W1430 (86.8)	W1430 (89.1)	W1430 (91.4)	W1430 (93.7)	W1430 (96.0)	W1430 (98.3)	W1430 (100.6)
W1430 (85.9)	W1430 (83.9)	W1430 (86.4)	W1430 (88.8)	W1430 (91.1)	W1430 (93.4)	W1430 (95.7)	W1430 (98.0)	W1430 (100.3)	W1430 (102.6)
W1430 (87.9)	W1430 (85.9)	W1430 (88.4)	W1430 (90.8)	W1430 (93.1)	W1430 (95.4)	W1430 (97.7)	W1430 (100.0)	W1430 (102.3)	W1430 (104.6)
W1430 (89.9)	W1430 (87.9)	W1430 (90.4)	W1430 (92.8)	W1430 (95.1)	W1430 (97.4)	W1430 (99.7)	W1430 (102.0)	W1430 (104.3)	W1430 (106.6)
W1430 (91.9)	W1430 (89.9)	W1430 (92.4)	W1430 (94.8)	W1430 (97.1)	W1430 (99.4)	W1430 (101.7)	W1430 (104.0)	W1430 (106.3)	W1430 (108.6)
W1430 (93.9)	W1430 (91.9)	W1430 (94.4)	W1430 (96.8)	W1430 (99.1)	W1430 (101.4)	W1430 (103.7)	W1430 (106.0)	W1430 (108.3)	W1430 (110.6)

KEY TO TRUSS AND TOWER DETAILS

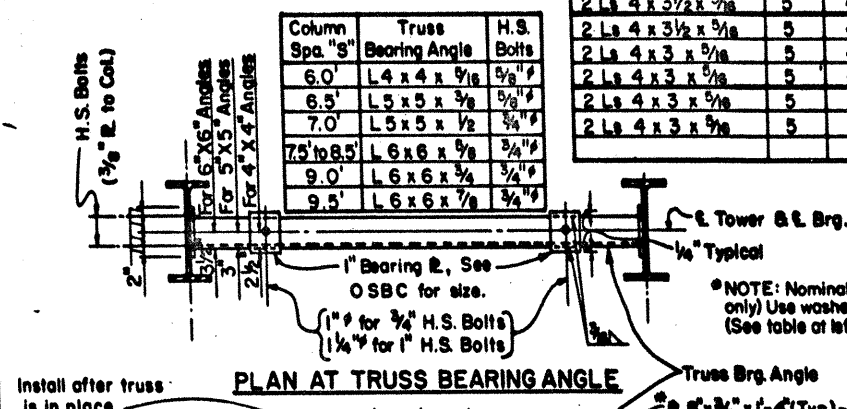
Normally, the maximum spacing for tower bracing is the same as column spacing; however, this spacing may be increased as follows: Determine required size column and spacing to satisfy height for the wind zone and truss span being used. $\text{Height} = \frac{H_1 + H_2}{2}$

Note the number of times this size column is shown for larger heights for the same span and wind zone.

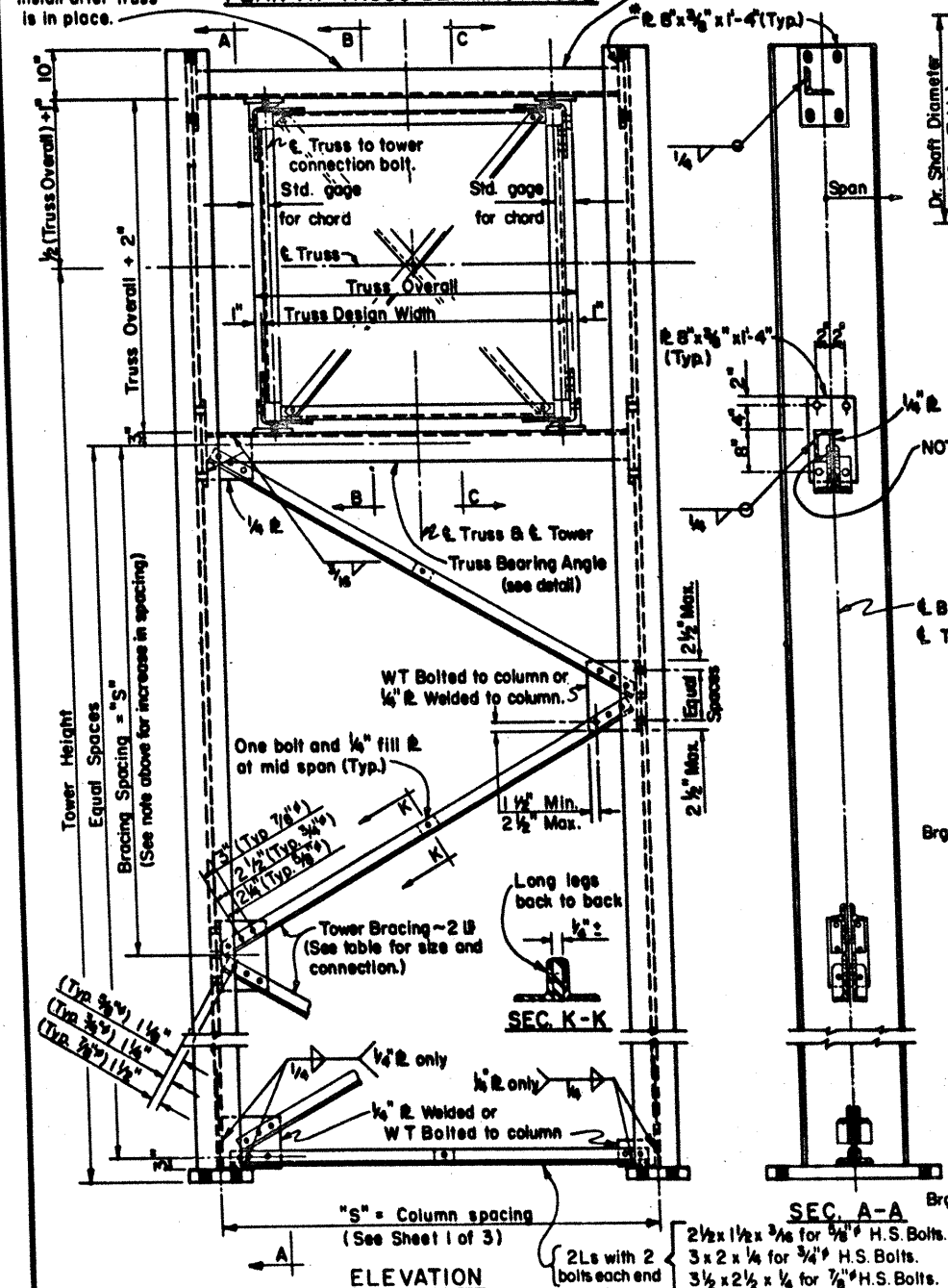
Spacing of bracing may be increased one foot for each time height is shown, except the increase ~~must~~ exceed five feet.

[illegible]

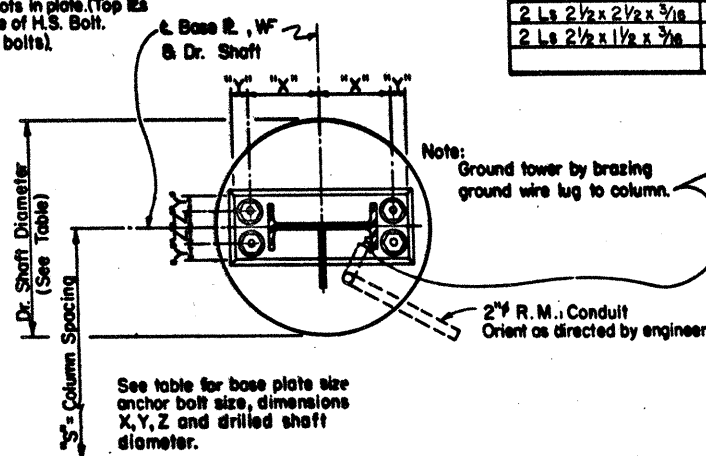
"X"	"Y"	"Z"	BASE PLATE SIZE	ANCHOR BOLT SIZE	FOUNDATION DATA	COLUMN SIZE
15 1/4	8	4	18" x 3 1/2" x 3'-4 1/2"	2 3/4" x 5'-8"	48" Shaft with 18" #11	W24117
15 1/4	8	4	18" x 3 1/2" x 3'-4 1/2"	2 3/4" x 5'-8"	48" Shaft with 18" #11	W24104
15 1/4	8	4	18" x 3" x 3'-4 1/2"	2 3/4" x 5'-8"	48" Shaft with 18" #11	W2494
15	4 1/2	3 3/4	16 1/2" x 3" x 3'-3"	2 1/2" x 5'-2"	48" Shaft with 14" #11	W2484
14 3/4	4 1/2	3 3/4	16 1/2" x 2 3/4" x 3'-2 1/2"	2 1/2" x 5'-2"	48" Shaft with 14" #11	W2476
14 3/4	4 1/2	3 3/4	16 1/2" x 2 3/4" x 3'-2 1/2"	2 1/2" x 5'-2"	48" Shaft with 14" #11	W2468
13 1/2	4 1/2	3 3/4	16 1/2" x 2 3/4" x 3'-0"	2 1/2" x 5'-2"	42" Shaft with 12" #11	W2168
13 1/2	4 1/2	3 3/4	16 1/2" x 2 1/2" x 3'-0"	2 1/2" x 5'-2"	42" Shaft with 12" #11	W2162
13	4	3 1/2	15" x 2 1/2" x 2'-10"	2 1/4" x 4'-9"	42" Shaft with 10" #11	W2157
11 3/4	4	3 1/2	15" x 2 1/2" x 2'-7 1/2"	2 1/4" x 4'-9"	42" Shaft with 10" #11	W1855
11 1/2	4	3 1/2	15" x 2 1/2" x 2'-7 1/2"	2 1/4" x 4'-9"	42" Shaft with 10" #11	W1850
11 1/2	3 1/2	3	13" x 2 1/2" x 2'-6"	2" x 4'-3"	42" Shaft with 8" #10	W1846
10 1/2	3 1/2	3	13" x 2 1/2" x 2'-4"	2" x 4'-3"	36" Shaft with 8" #10	W1849
10 1/4	3	2 3/4	11 1/2" x 2 1/2" x 2'-2 1/2"	1 3/4" x 3'-10"	36" Shaft with 8" #9	W1636
9 1/2	3	2 3/4	11 1/2" x 2 1/2" x 2'-1"	1 3/4" x 3'-10"	36" Shaft with 8" #9	W1434
9 1/4	3	2 3/4	11 1/2" x 2" x 2'-0 1/2"	1 3/4" x 3'-10"	36" Shaft with 8" #9	W1430
8	2 3/4	2 1/2	9 3/4" x 1 3/4" x 1'-9 1/2"	1 1/2" x 3'-4"	30" Shaft with 8" #8	W1226
7	2 1/2	2	9" x 1 3/4" x 1'-7"	1 1/2" x 3'-1"	30" Shaft with 8" #8	W1026
6 3/4	2 1/4	1 1/2	8 1/4" x 1 1/2" x 1'-6"	1 1/4" x 2'-11"	30" Shaft with 8" #6	W1023
6 3/4	2	1 1/2	7 1/4" x 1 1/2" x 1'-5 1/2"	1 1/2" x 2'-8"	24" Shaft with 8" #7	W1017
6 1/4	1 3/4	1 1/2	6 1/2" x 1 1/4" x 1'-4 1/2"	1" x 2'-5"	24" Shaft with 8" #7	W1018



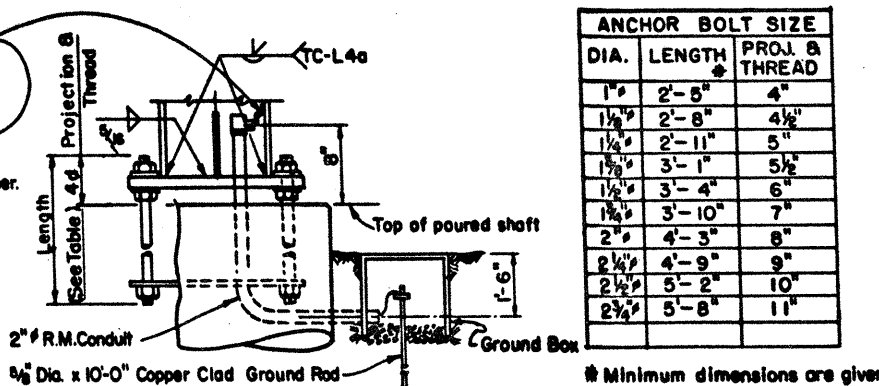
PLAN AT TRUSS BEARING ANGLE



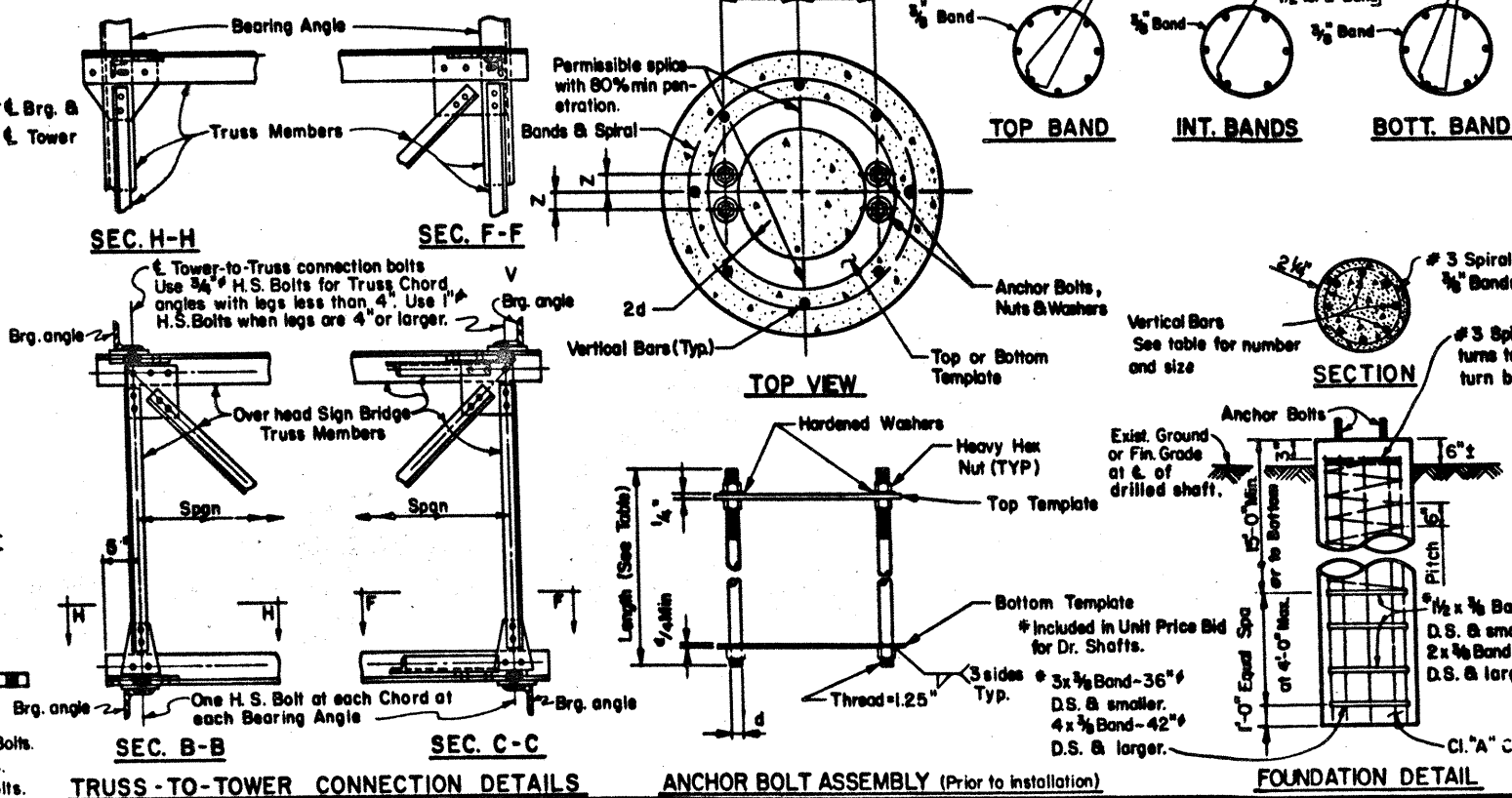
ELEVATION



BEARING SEAT PLAN



BEARING SEAT ELEVATION



TRUSS-TO-TOWER CONNECTION DETAILS

ANCHOR BOLT ASSEMBLY (Prior to installation)

ANCHOR BOLT SIZE		
DIA.	LENGTH	PROJ. & THREAD
1"	2'-5"	4"
1½"	2'-8"	4½"
1½"	2'-11"	5"
1½"	3'-1"	5½"
1½"	3'-4"	6"
1½"	3'-10"	7"
2"	4'-3"	8"
2½"	4'-9"	9"
2½"	5'-2"	10"
2½"	5'-8"	11"

* Minimum dimensions are given

ANCHOR BOLT DIA. d	WASHER DIMENSIONS				HOLE IN BASE PLATE
	OUTSIDE DIAMETER	HOLE DIAMETER	THICKNESS		
			MIN.	MAX.	
1½" or less	2d	d + ⅛"	0.136"	0.177"	d + ⅛"
1¾"	2d - ⅛"	d + ⅛"	0.178"	0.280"	d + ⅛"
2"	2d - ¼"	d + ⅛"	0.178"	0.280"	d + ⅛"
Over 2"	2d - ⅛"	d + ⅛"	0.240"	0.340"	d + ⅛"

GENERAL NOTES:

Design conforms to Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals for Design Heights up to 50'.
For size and spacing of columns see sheet 1 of 3.
At Contractor's option tower bracing connections may be high strength bolted or welded. If welded connections are used, length of connection ~~shall~~ be taken from table shown on sheet 3 of 3.
All connection bolts ~~shall~~ conform to ASTM A325 or A449. Washers ~~shall~~ conform to ASTM F436 - 76 B. Bolts, nuts and washers ~~shall~~ be galvanized.
All structural steel ~~shall~~ conform to ASTM A-36 except where noted. HS 50 ~~shall~~ conform to ASTM A441, ASTM A572 or ASTM A588. Structural steel ~~shall~~ be galvanized after fabrication.

Nuts for Anchor Bolts shall be heavy hex and ~~shall~~ conform to ASTM A193 Gr. 2H. Anchor bolts shall conform to ASTM A193-B7 or A667. Galvanize anchor bolt projection plus threads for anchor bolts and nuts ~~shall~~ 6UN threads.

Anchor bolts ~~shall~~ be rigidly held in position during concrete placement by using steel templates at the top and bottom. The bottom template and anchor plate assembly ~~shall~~ remain in place and shall not be damaged during concrete placement. The top template ~~shall~~ be removed after concrete has set.

Exposed nuts and washers ~~shall~~ be galvanized in accordance with the Specifications. Embedded nuts and top and bottom templates need not be galvanized.

Concrete ~~strength~~ Class "A".
Unless shown otherwise, welded steel bands may be replaced with sp
as noted on the foundation detail.

All vertical reinforcing ~~shall~~ carried to the bottom of the Drilled Shaft.

al, 3 flat
p, 1 flat
ttom.



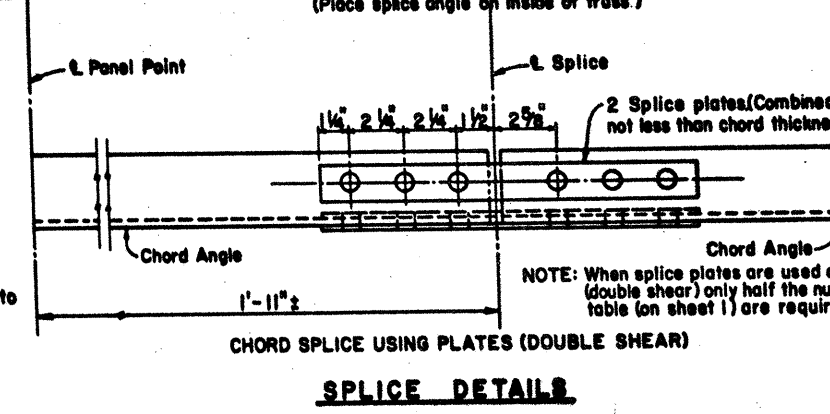
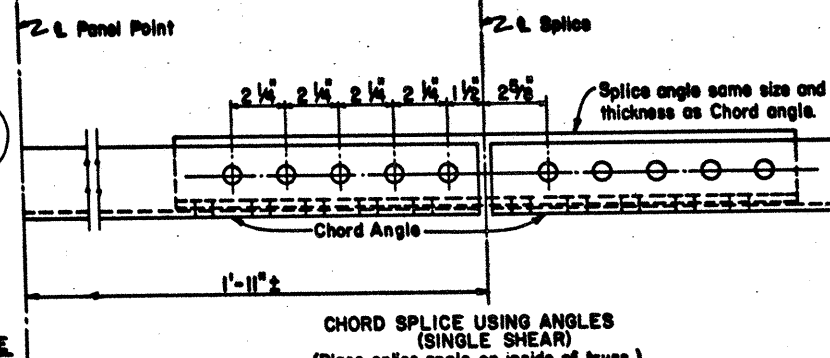
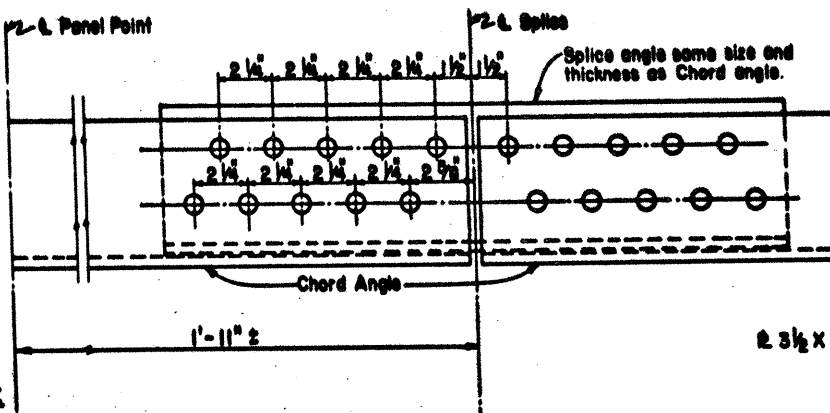
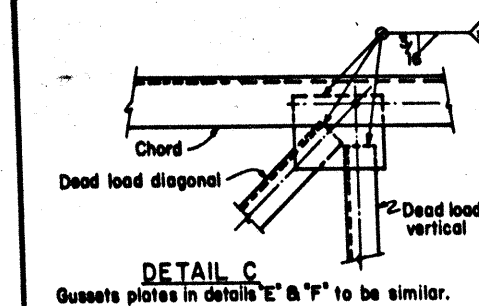
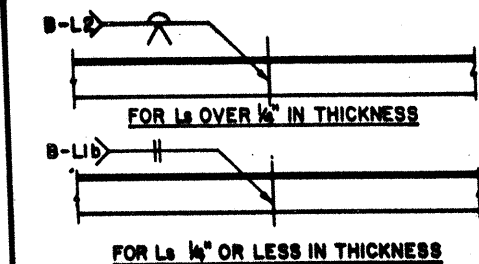
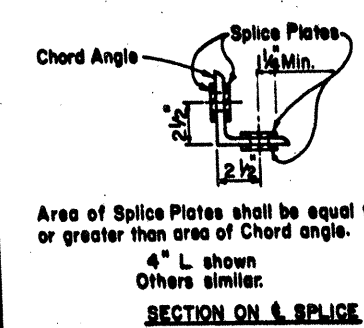
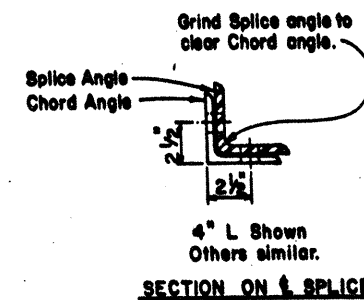
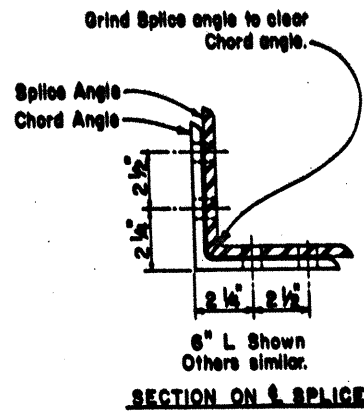
**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

OVERHEAD SIGN BRIDGE
TOWER DETAILS *LB*
OSBT

SHEET 2 OF 2

ORIGINAL DRAWING DATE 7-88		STATE	FEDERAL	FEDERAL AID PROJECT
DR: LEH	REVISIONS	15	6	IR35-2(18)161
CR: CWC		COUNTY	SCHOOL	SECTION JOB
DR: EDS		GEXAR	17	10 197
CR: LEH				

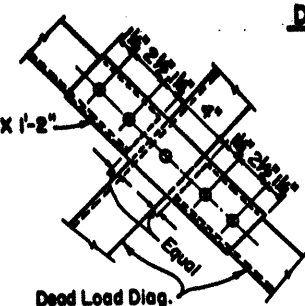
NOTE: When chord angles of different thickness are spliced, use shim plate and number of bolts required for thinner angle. For Splice Angle use thickness of the thinner angle.



DETAIL A

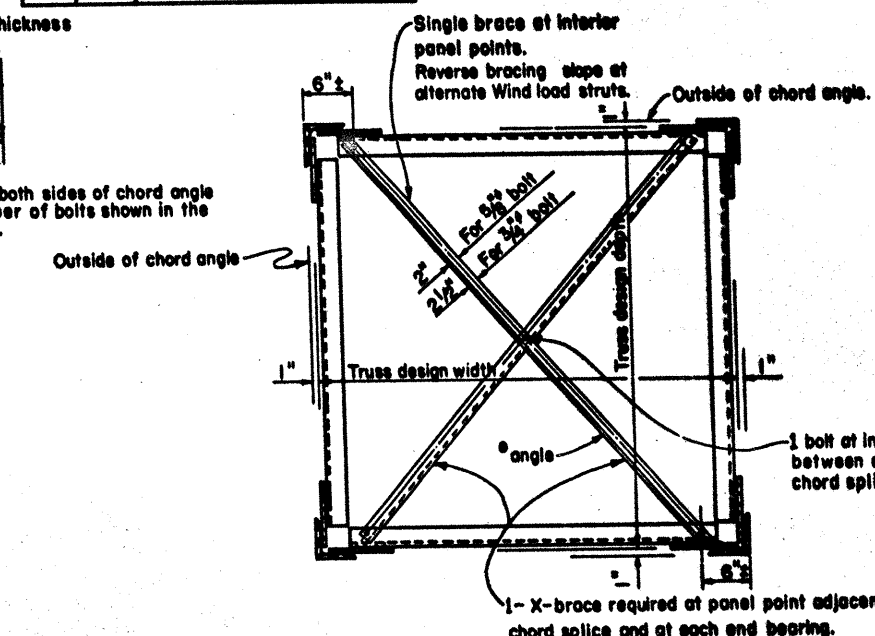
NUMBER OF BOLTS	MINIMUM LENGTH OF 3/16" FILLET WELD REQUIRED TO REPLACE 3/8" BOLTS	TO REPLACE 1/2" BOLTS
1	2"	3"
2	4"	6"
3	6"	9"
4	8"	11 1/2"
5	10"	14 1/2"
6	12"	17 1/2"
7	14"	20"

ALTERNATE WELDED SPlice AND CONNECTION DETAILS



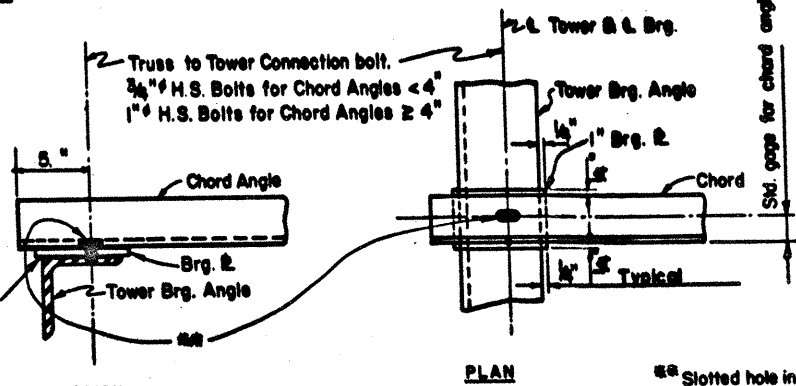
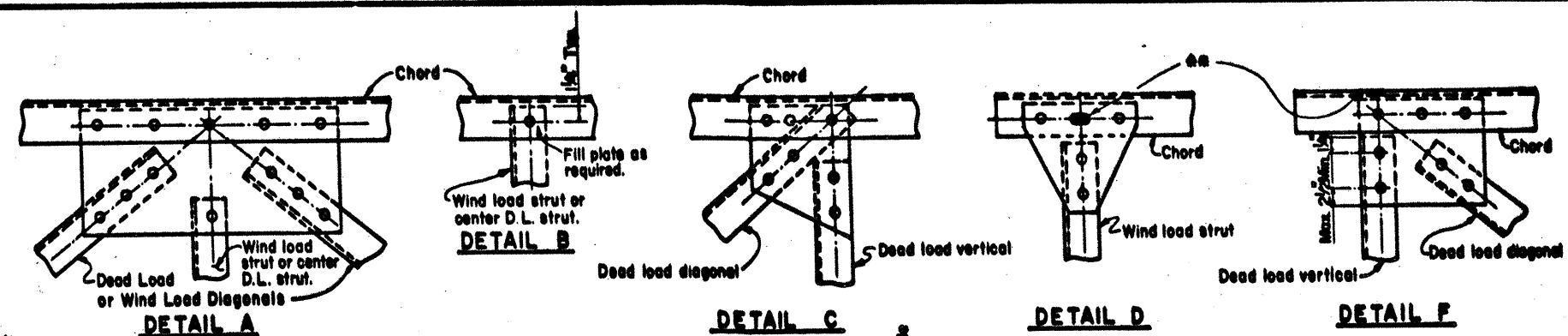
DETAIL H

TOTAL NO. OF BOLTS IN JOINT	NUMBER OF BOLTS REQ. IN GUSSET TO CHORD CONNECTION
0	2
2	2
3	3
4	3
5	4
6	4
8	5
10	6
12	6



2" x 1 1/2" x 3/8" angle for 3/8" bolts. ①
2 1/2" x 1 1/2" x 3/8" angle for 3/8" bolts. ①

TRUSS SECTION
(DIAGONALS NOT SHOWN)



BEARING PLATE DETAILS

Slotted hole in Gusset 2 and Chord Angle.
1" x 1 1/2" slot for 3/4" bolts.
1 1/4" x 2" slot for 1" bolts.
Use 1/2" washer on Gusset 2 side.

CONNECTION DETAILS

GENERAL NOTES:

All bolts ~~shall~~ high strength bolts conforming to ASTM A 325 or A 449.

The truss shall have an upward camber not less than the dead load deflections shown in the table on sheet 1 of 3 when blocked at the ends under dead load of the truss only.

Chord angles may be spliced in convenient lengths for galvanizing.

Connection and splice details are typical only; actual size of member and number of bolts will vary. The details shown on this sheet are intended as a guide only. See sheet 1 of 3 for number of bolts and size of members. Number of bolts shown for chord splice is based on single shear.

Gusset plates to be same thickness as thickest web member in connection.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

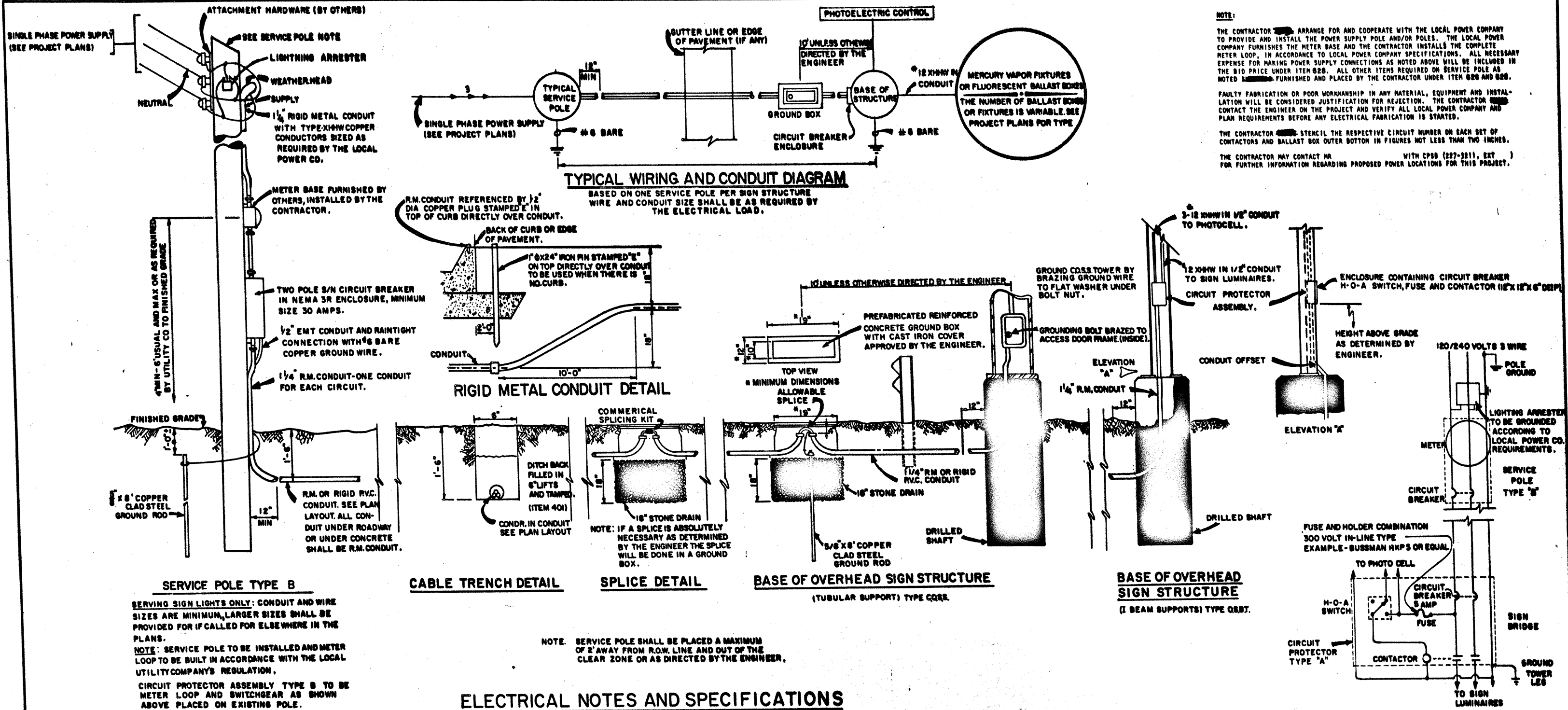
**OVERHEAD SIGN BRIDGE
TRUSS DETAILS**

OSBC

SHEET 3 OF 3

ORIGINAL DRAWING DATE: 7-83	STATE DISTRICT: 15	FEDERAL AID PROJECT: 6	COUNTY: 17
REVISIONS:	15	6	17
DATE: 10/16/87	BY: 17	10	147

67



GENERAL NOTES:

ALL WORK, MATERIALS AND SERVICES NOT SHOWN ON THE PLANS, WHICH MAY BE NECESSARY FOR COMPLETE AND PROPER CONSTRUCTION, ~~SHALL~~ BE PERFORMED, FURNISHED AND INSTALLED BY THE CONTRACTOR AT HIS OWN EXPENSE. THE LOCATION OF CONDUIT, CONDUIT, OTHER ELECTRICAL EQUIPMENT AND SERVICE POLE IS DIAGRAMMETRIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE LOCAL CONDITIONS. ALL WORK AND MATERIALS NOT COVERED HEREIN ~~SHALL~~ COMPLY WITH THE FOLLOWING STANDARD SPECIFICATION ITEMS: THE ITEM "CONDUIT", THE ITEM "ELECTRIC CONDUCTOR", THE ITEM "CIRCUIT PROTECTOR ASSEMBLY", AND THE ITEM "SERVICE POLE". ALL ELECTRICAL WORK ~~SHALL~~ BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND LOCAL CITY CODE.

CONDUCTORS:

UNINSULATED CONDUCTORS ~~SHALL~~ COMPLY TO ASTM SPECIFICATIONS B3. ALL CONDUCTORS ~~SHALL~~ BE COPPER AND ~~SHALL~~ MEET THE APPLICABLE REQUIREMENTS OF N.E.C. AND U.L. STANDARDS. CONDUCTORS LARGER THAN NO. 10 AWG ~~SHALL~~ BE CLASS B STRANDED. INSULATED CONDUCTORS ~~SHALL~~ BE TYPE XHHW. CONDUCTORS ~~SHALL~~ BE CONTINUOUS WITHOUT SPLICES FROM TERMINAL TO TERMINAL.

CONDUIT:

ALL INSULATED CONDUCTORS ABOVE GROUND, EXCEPT CONDUCTORS IN PIPE TOWER LEGS, ~~SHALL~~ BE INSTALLED IN RIGID METAL CONDUIT. CONDUIT ~~SHALL~~ BE PLACED ALONG AND ATTACHED TO THE POLE OR STRUCTURAL FRAME, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. HOWEVER, AT PLACES WHERE RIGID METAL IS NOT FEASIBLE, CONDUIT MAY, WITH THE APPROVAL OF THE ENGINEER, BE LIQUID-TIGHT FLEXIBLE CONDUIT. CONDUIT BURIED IN TRENCH OR CONCRETE ~~SHALL~~ BE EITHER RIGID METAL OR RIGID PVC AS INDICATED ON THE PLANS OR AS DETERMINED BY THE ENGINEER FROM THE SOIL CHARACTERISTICS. ALL BURIED CONDUIT ~~SHALL~~ BE STANDARD BUSHINGS AT THE EXTREMITIES.

CIRCUIT BREAKER

THE AMPERE RATING OF THE CIRCUIT BREAKER ~~SHALL~~ BE 125 TIMES THE CALCULATED CIRCUIT LOAD CURRENT. THE RATING OF THE ASSEMBLY ~~SHALL~~ BE CONSISTENT WITH THE LOAD SERVED AND ~~SHALL~~ BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE CIRCUIT BREAKERS SHALL BE DOUBLE POLE, FULLY MAGNETIC, RATED AT THE SUPPLIED VOLTAGE. THE BREAKER OPERATING HANDLE ~~SHALL~~ BE TRIP FREE SO CONTACT CANNOT BE HELD AGAINST SHORT CIRCUIT OR ABNORMAL OVERLOAD. THE SHORT CIRCUIT INTERRUPTING CAPACITY ~~SHALL~~ BE 10,000 AMPERES SYMMETRICAL AT 240 VOLTS AND 14,000 AT 480 VOLTS.

SERVICE POLE

THE POLE LENGTH ~~SHALL~~ BE 25 FEET UNLESS OTHERWISE NOTED ON THE PLANS. SERVICE POLE ~~SHALL~~ BE CREOSOTE-TREATED TO 8 POUNDS PER CUBIC FOOT RETENTION OR PANTACHLOROPHENOL TREATED TO 0.4 POUNDS PER CUBIC FOOT RETENTION IN ACCORDANCE WITH THE ITEM "TIMBER PRESERVATIVE AND TREATMENT". THE CONTRACTOR MAY PURCHASE POLES LOCALLY IF SOURCE AND TREATMENT ARE DOCUMENTED.

PHOTOELECTRIC CONTROL

CONTROL UNIT. STANDARD DUTY 3-POSITION (AUTO-MANUAL-OFF) CONTROL STATION IN REMA 1 ENCLOSURE.

PHOTO-CELL CONTROL. DRY-TYPE HERMETICALLY SEALED CADMIUM SULFIDE CELL, EXPULSION ARRESTER AND ELECTRO-MECHANICAL RELAY, MOUNTED IN WEATHERPROOF PLASTIC HOUSING HAVING THIST-LOCK BASE. TURN-ON RANGE OF 0.5 TO 5 FOOTCANDLES, FACTORY-SET AT 12 1/2 FOOTCANDLE. TURN-OFF 2 FOOTCANDLES HIGHER THAN TURN-ON. VOLTAGE RANGE 100 TO 285. CONTROL CIRCUIT TO BE FUSED WITH ENCLOSED IN-LINE FUSEHOLDER AND 5 AMPERE FUSE.

CONTACTOR

THE MAGNETIC LIGHTING CONTACTOR, ELECTRICALLY HELD, OF TYPE DESIGNED TO CONTROL TUNGSTEN, MERCURY VAPOR AND OTHER LIGHTING LOADS. RATED 480 VOLT LOAD AND BE OF TWO-POLE TYPE WITH SILVER ALLOY DOUBLE-BREAK CONTACTS, AMPERE RATING ~~SHALL~~ BE A MINIMUM 30 AMP CONTACT RATING. Control Voltage ~~SHALL~~ BE 120 VOLTS.

GROUNDING:

ALL SERVICE POLES AND SIGN STRUCTURE TOWERS ~~SHALL~~ BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND DETAILS SHOWN ON THE PLANS. GROUND ROD ~~SHALL~~ BE 5/8" DIAMETER COPPER CLAD STEEL. WHERE DRILLED HOLES ARE REQUIRED, THE RODS ~~SHALL~~ BE 8 FEET LONG AND THE BACKFILL MATERIAL SHALL HAVE AN ADMIXTURE OF COMMON SALT. DRIVEN GROUND RODS ~~SHALL~~ BE 10 FEET LONG.

ENCLOSURES

ALL ENCLOSURES HOUSING ELECTRICAL EQUIPMENT ~~SHALL~~ BE GALVANIZED, PRIME PAINTED, RAIN-TIGHT, AND DESIGNED FOR OUTDOOR INSTALLATION IN ACCORDANCE WITH NEMA 3-R OR BETTER. THE LIGHTING CONTACTOR AND CIRCUIT PROTECTOR SHOWN ON THE SERVICE POLE MAY BE HOUSED IN SEPARATE ENCLOSURES. EACH ENCLOSURE ~~SHALL~~ BE PROVIDED WITH A LOCK AND THE CONTRACTOR ~~SHALL~~ PROVIDE THE ENGINEER WITH THREE COPIES OF A MASTER KEY.

PAYMENT:

ALL ITEMS NECESSARY TO ACCOMPLISH THE ILLUMINATION OF THE SIGNS ~~SHALL~~ BE MEASURED AND PAID FOR UNDER ONE OF THE FOLLOWING ITEMS UNLESS OTHERWISE NOTED. STANDARD SPECIFICATION ITEM "SERVICE POLE"; STANDARD SPECIFICATION ITEM "CONDUIT", WHICH ITEM ~~SHALL~~ INCLUDE PAYMENT FOR ALL CONDUIT BETWEEN ONE FOOT AWAY FROM SERVICE POLE TO ONE FOOT AWAY FROM BASE OF SIGN STRUCTURE; SPECIFICATION ITEM "CONDUCTOR" WHICH ITEM ~~SHALL~~ INCLUDE PAYMENT FOR ALL CONDUCTORS BETWEEN THE LAST ELECTRICAL CONNECTION BEFORE LEAVING SERVICE POLE TOWARD THE SIGN STRUCTURE AND THE FIRST ELECTRICAL CONNECTION AT THE BASE OF THE SIGN STRUCTURE, (GROUND WIRE AND ROD TO BE CONSIDERED SUBSIDIARY TO THIS ITEM); SPECIFICATIONS FOR INTERSTATE SIGNING AND DELINEATION PROJECTS, ITEM "HIGHWAY SIGN LIGHTING FIXTURES", WHICH ITEM ~~SHALL~~ INCLUDE PAYMENT FOR ALL MATERIAL, LABOR AND INCIDENTALS INCLUDING GROUNDING SYSTEM, FROM THE BASE OF THE SIGN STRUCTURE TO AND INCLUDING THE FIXTURES ON THE SIGN STRUCTURES IN PLACE AND READY FOR OPERATION. GROUND BONES ~~SHALL~~ BE PAID FOR UNDER STANDARD SPECIFICATION ITEM "GROUND BOX".

NOTE:

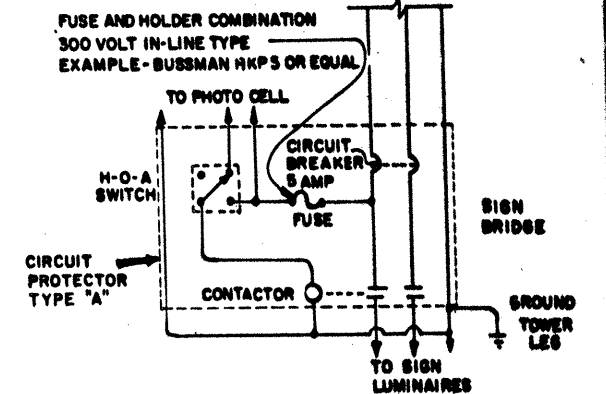
THE CONTRACTOR ~~SHALL~~ ARRANGE FOR AND COOPERATE WITH THE LOCAL POWER COMPANY TO PROVIDE AND INSTALL THE POWER SUPPLY POLE AND/OR POLES. THE LOCAL POWER COMPANY FURNISHES THE METER BASE AND THE CONTRACTOR INSTALLS THE COMPLETE METER LOOP, IN ACCORDANCE TO LOCAL POWER COMPANY SPECIFICATIONS. ALL NECESSARY EXPENSE FOR MAKING POWER SUPPLY CONNECTIONS AS NOTED ABOVE WILL BE INCLUDED IN THE BID PRICE UNDER ITEM 628. ALL OTHER ITEMS REQUIRED ON SERVICE POLE AS NOTED ~~SHALL~~ BE FURNISHED AND PLACED BY THE CONTRACTOR UNDER ITEM 628 AND 629.

FAULTY FABRICATION OR POOR WORKMANSHIP IN ANY MATERIAL, EQUIPMENT AND INSTALLATION WILL BE CONSIDERED JUSTIFICATION FOR REJECTION. THE CONTRACTOR ~~SHALL~~ CONTACT THE ENGINEER ON THE PROJECT AND VERIFY ALL LOCAL POWER COMPANY AND PLAN REQUIREMENTS BEFORE ANY ELECTRICAL FABRICATION IS STARTED.

THE CONTRACTOR ~~SHALL~~ STENCIL THE RESPECTIVE CIRCUIT NUMBER ON EACH SET OF CONTACTORS AND BALLAST BOX OUTER BOTTOM IN FIGURES NOT LESS THAN TWO INCHES.

THE CONTRACTOR MAY CONTACT MR. [Name] WITH CPSS (227-3811), EXT. [Number] FOR FURTHER INFORMATION REGARDING PROPOSED POWER LOCATIONS FOR THIS PROJECT.

BASE OF OVERHEAD SIGN STRUCTURE (I BEAM SUPPORTS) TYPE Q8B7.



CIRCUIT SCHEMATIC (THREE WIRE CIRCUIT SHOWN FOR TWO WIRE CIRCUIT, OMIT ONE HOT WIRE.)

TEXAS HIGHWAY DEPARTMENT
SIGN LIGHTING
(ELECTRICAL DETAILS)

SL(1)(MOD)

ORIGINAL DRAWING DATE	DATE	REVISION	STATE	FEDERAL AID PROJECT	SHEET
8-75	15	6	IA	35-2	68
DN -	REV DEC 1975, DISTRICT 15		COUNTY	CONTRACTOR	JOB
CK -	REV DEC 1980, D-8		BEKAR	17	10/14/84
CH -	REV APR 1987, DISTRICT 15				

Rev. 10/12/84

GENERAL NOTES AND SPECIFICATIONS

Fixtures may be constructed of either aluminum, galvanized steel, or other approved weather-resistant materials and so constructed as to form a watertight unit of sufficient strength to withstand normal installation and maintenance operations.

The fixture shall not exceed 2.0 square feet in projected area, nor exceed 35.0 pounds in gross weight, including ballast. The fixture shall provide aiming provisions that are continuously variable through all angles for 15 degrees on each side of the optimum aiming angle. Aiming shall be marked in 10 degree increments. Provisions shall be incorporated to positively lock the sign-light fixture in the desired position. Mounting provisions shall rigidly support the fixture and be compatible with mounting requirements as set forth in the plans. When aimed at any of the required variable angles, above a plane passing through and parallel to the base of the mounting, the overall height of the fixture above this plane shall not exceed 11 inches.

The optic assembly shall be constructed in such a manner that resilient gaskets are incorporated to maintain a positive seal against weather and other contaminants. The lens of the optic assembly shall be tempered glass. The cover to the optic assembly shall be so designed that the optic assembly may be opened for routine maintenance without the use of tools. A keeper shall be provided to prevent unintentional separation of the cover from the fixture housing.

The metal socket shall incorporate a means to positively resist lamp removal and be attached to a high grade porcelain base that completely encases the metal shell. The socket shall be Underwriter's Laboratory approved.

The fixture shall be internally or externally ballasted with a regulated output-type ballast designed to operate mercury vapor lamps. External ballast shall be in weatherproof encasement. During fluctuation of the primary voltage to the ballast up to $\pm 15\%$ of the center-rated voltage, the input wattage to the ballast shall not vary more than 8%, nor exceed 150% of the lamp-rated wattage. At center-rated voltage, the power factor shall not be less than 90%. Each ballast shall permanently and clearly indicate the following: Type Ballast, Type Lamp, Catalog Number, Voltage Rating, and Wiring Diagram (when stick-on or glue-on label is used, permanency will be considered satisfactory provided no more than 25% of the label can be removed in one piece.) Ballast shall be individually fused with easily accessible in-line 10 amp fuses. Lamps shall be 100-watt (or other wattage as specified in the plans), clear mercury vapor with a rated average life of not less than 24,000 hours.

The Department will bear the cost of testing all materials meeting the requirements of this drawing and the specifications. The contractor will bear the cost of testing all materials failing to meet the above requirements. Cost for testing failing materials will be deducted from amounts due the Contractor on Monthly and Final Estimates.

The 100-watt sign-lighting fixture (when mounted vertically five feet above, and horizontally one foot below, the midpoint of either short side of a horizontal rectangular area measuring eight feet by ten feet, with the fixture facing the center of the opposite short side, and when aimed at optimum angle (C note below)) shall provide measured intensities of not less than 3.0 nor greater than 50 footcandles on any point within the previously defined rectangular area. Measured intensities on the surface of the previously defined rectangular area shall not increase at a rate greater than 2.6 in any one foot interval. Note: Optimum angle is that angle which produces equal measured intensities, in footcandles, on all four corners of the eight foot by ten foot rectangular area described.

Sign-lighting fixtures of wattages other than 100-watt shall meet the photometric requirements stated above when mounted, with respect to the sign, as shown in the plans.

All wired joints within fixture shall be waterproofed.

All electrical components furnished and installed shall be in compliance with National Electrical Code Specifications.

All Mercury Vapor Sign Lighting Fixtures that are to be mounted on Bridge Mounted Sign Structure shall be equipped with Vandal Guards approved by the Engineer. Vandal Guards shall not be paid for directly but shall be considered incidental to "Hwy Sign Lgt. Fxt."

When shown in the plans or required by the Engineer Light Shield shall be installed on Sign Lighting fixtures to prevent glare to the oncoming motorists. Light Shield shall be as approved by the Engineer.

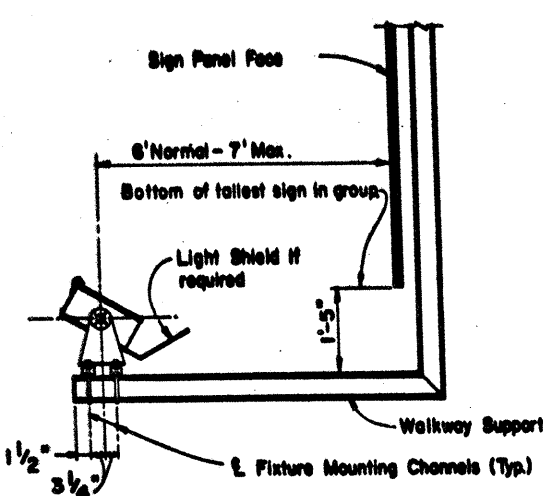
The Supplier shall state the Optimum Angle or the indicator mark centered on 0 at the Optimum Angle.

Sampling and testing shall be in accordance with the Department's "Manual of Testing Procedures." The fixture shall be tested using a lamp furnished for the same project. The manufacturer shall submit a prototype fixture to the Engineer for approval before placement.

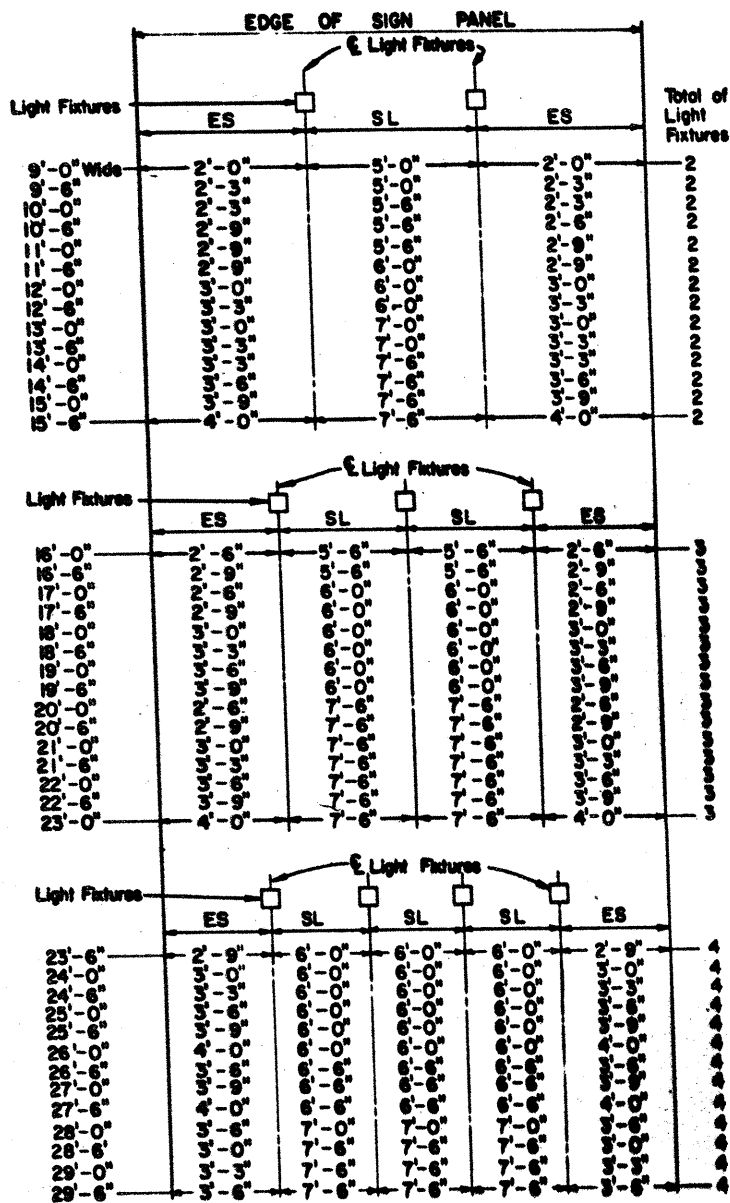
An adequate number of sign lighting fixtures received for the project shall be selected at random by the Department and tested to assure conformity with the specifications. It is not intended that the sign lighting fixtures will be damaged by the test procedures. All fixtures will be inspected and evaluated after energized and adjusted to determine final acceptance of the units.

Fixture Mounting Channels shall be continuous for entire length of walkway and shall be the same distance from the truss for the entire length of the channels.

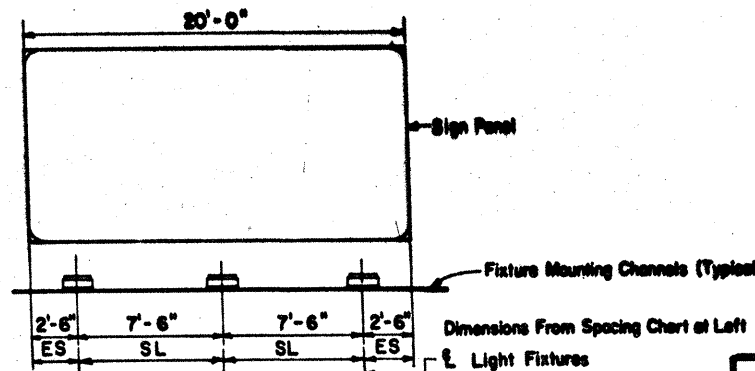
The lighting unit shown is an example only and is not intended to specify a certain manufacturer's product. Other comparable commercial designs which meet the requirements of the specifications, and as approved by the Engineer, will be accepted.



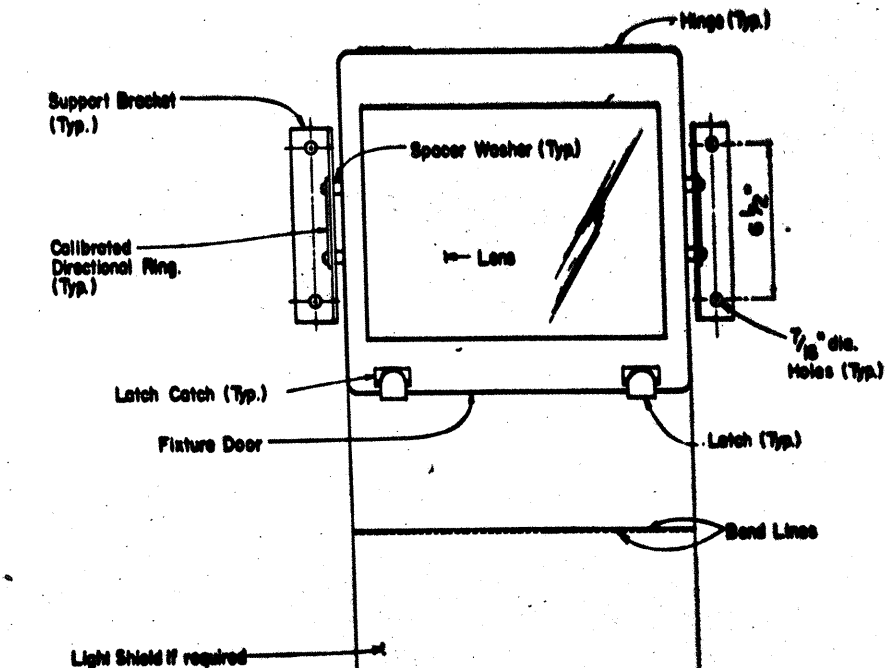
MOUNTING DETAILS



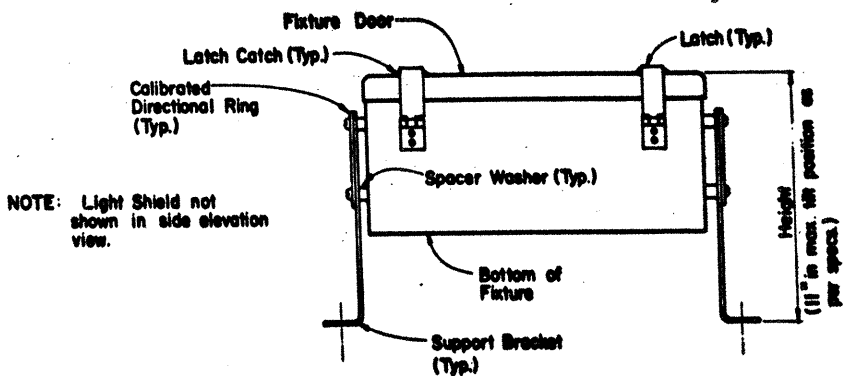
SPACING FOR 100W MERCURY VAPOR LIGHT FIXTURES PER SIGN PANEL



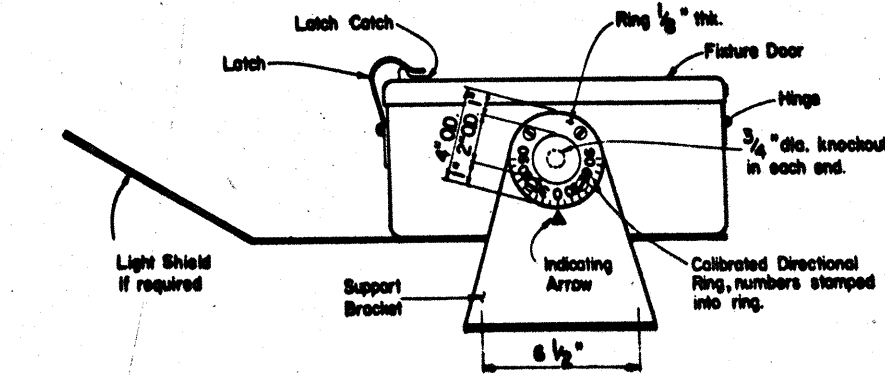
EXAMPLE OF TYPICAL FIXTURE PLACEMENT (FOR 20'-0" SIGN PANEL WIDTH)



PLAN



FRONT ELEVATION



END ELEVATION

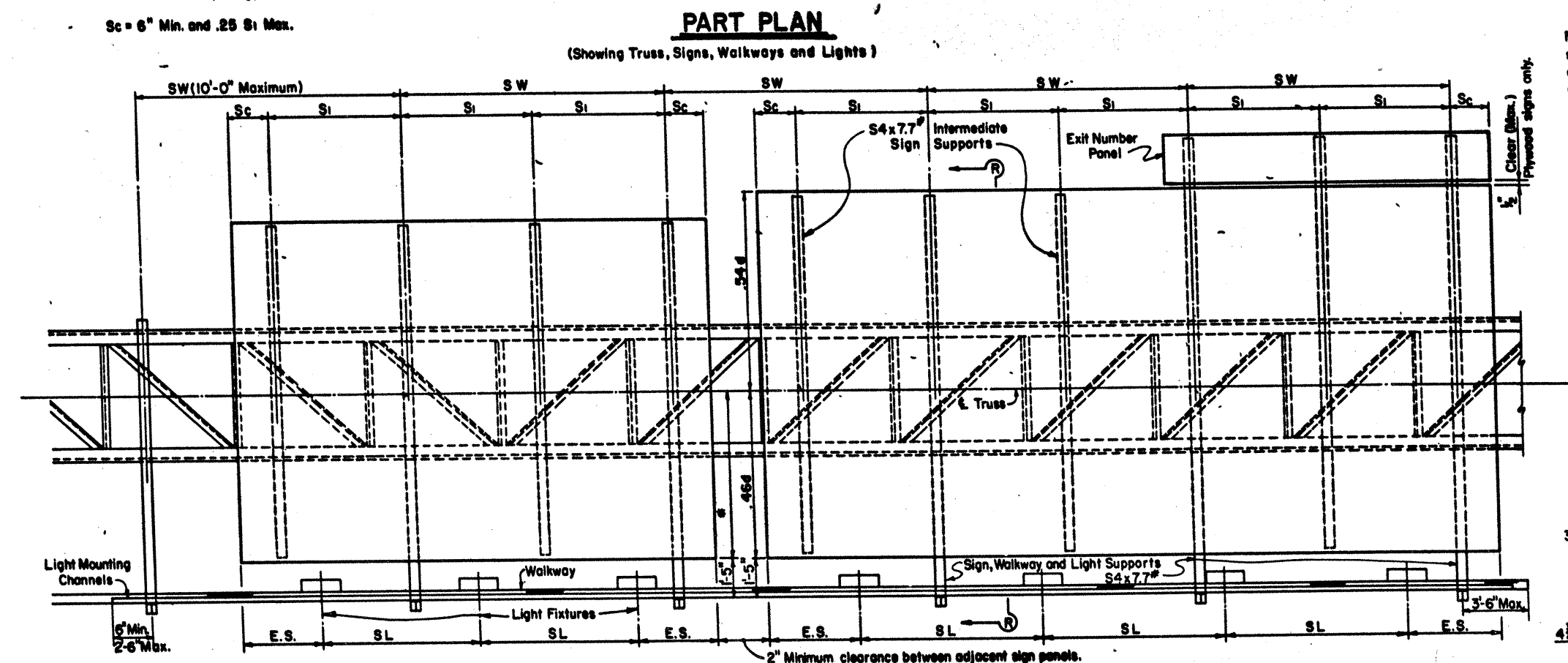
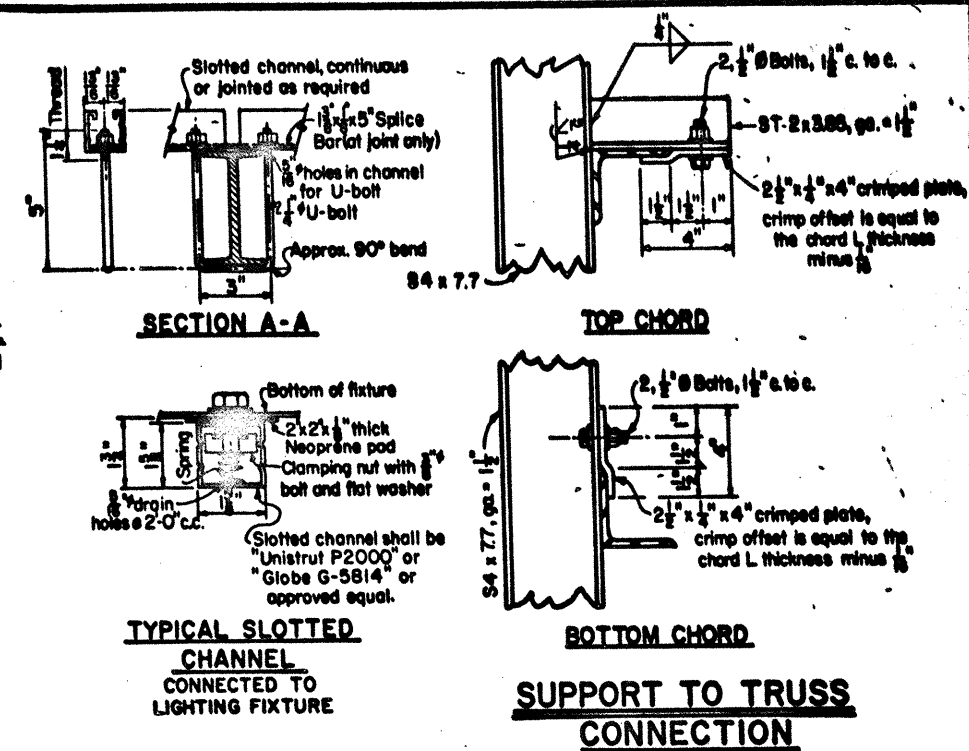
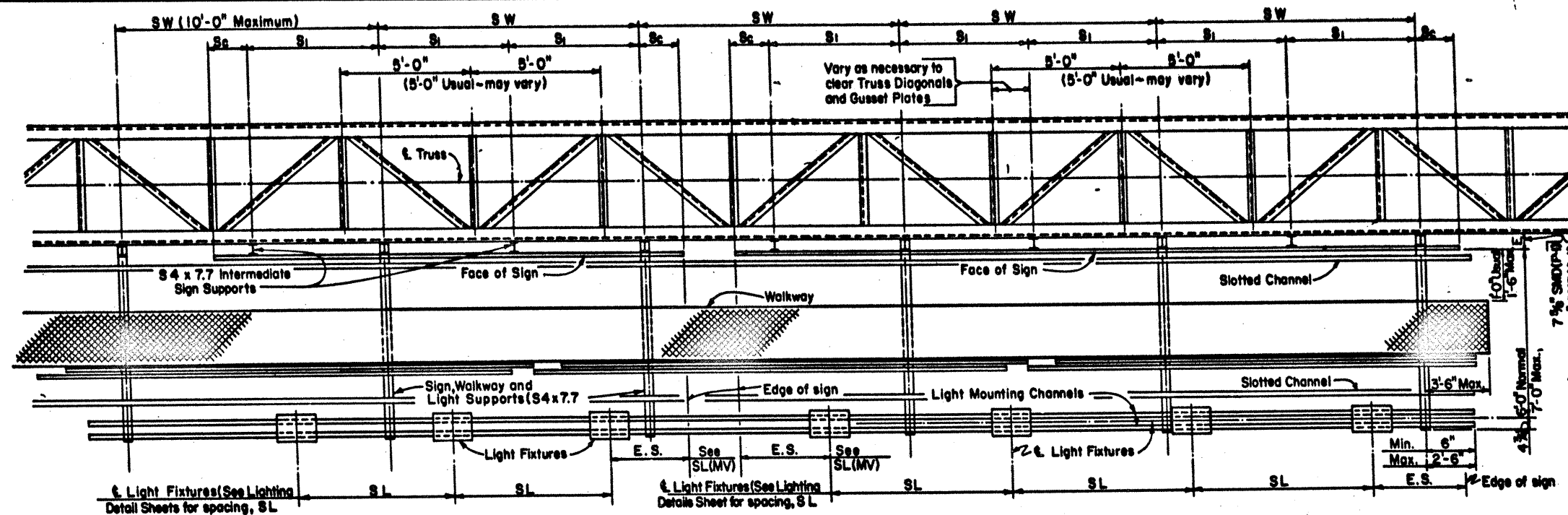


STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

MERCURY VAPOR SIGN LIGHTING FIXTURE

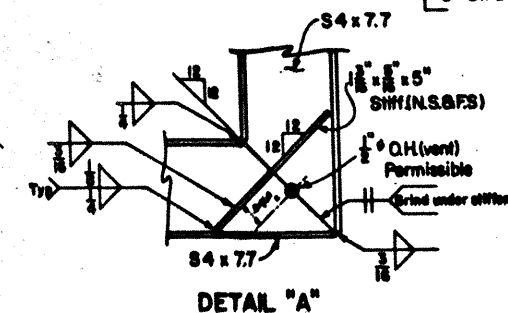
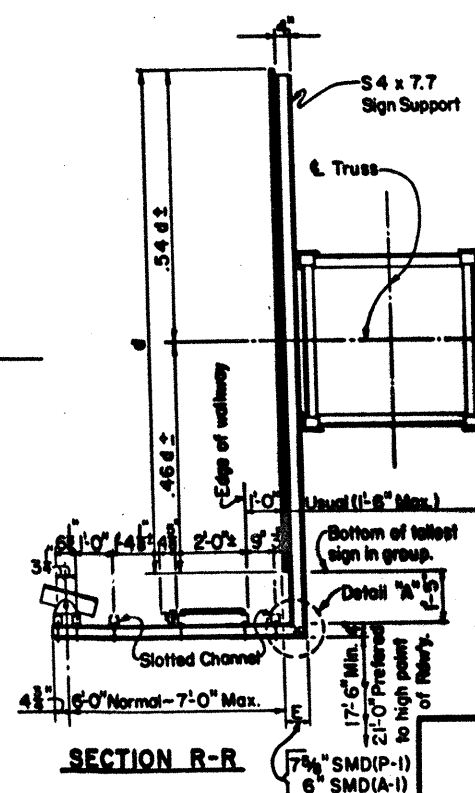
SL(MV)


ORIGINAL DRAWING DATE: 2-82	REVISION	DATE: 15-6	BY: JAS-2(15)/61	CHECK: 57
COUNTY: BEXAR	DISTRICT: 17	SECTION: 10	JOB: 147	REMARKS: 35




NOTE: Exit Panel may be supported by sign support brackets as shown hereon, or may be supported as shown on sheets SMD(P-1) & SMD(A-1). Regardless of method used spacing of supports shall not exceed 54"

GENERAL NOTES:
Design conforms to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
Materials, Fabrication, Construction and Erection ~~shall~~ conform with the requirements of specifications for Interstate Signing and Delineation Projects and Texas Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets and Bridges. Structural Steel ~~shall~~ conform with A.S.T.M. Specification A36 unless noted otherwise.
Bolts ~~shall be~~ Hexagon Heads and Nuts and conform with A.S.T.M. Specification A307.
All parts ~~shall be~~ galvanized after fabrication



* Where signs of different depths are used, the bottom edges of all signs  placed in line. Where this is done, all signs should be so positioned that the bottom edges are approximately 0.46 of the depth of the deepest sign below the E of the truss. When signs are spaced thusly, S₁ is determined by the deepest sign.

See Sheet SL (MV-1) for Lighting Details & Spa. S.L. & E.S.
See Sheet SWW(1) for Walkway Details.
See Sheet SMD(A-1) for Aluminum Sign Details & Max. Spa. for S1.
See Sheet SMD(P-1) for Plywood Sign Details & Max. Spa. for S1.
Sc = 6" Minimum, .25 S1 Maximum.



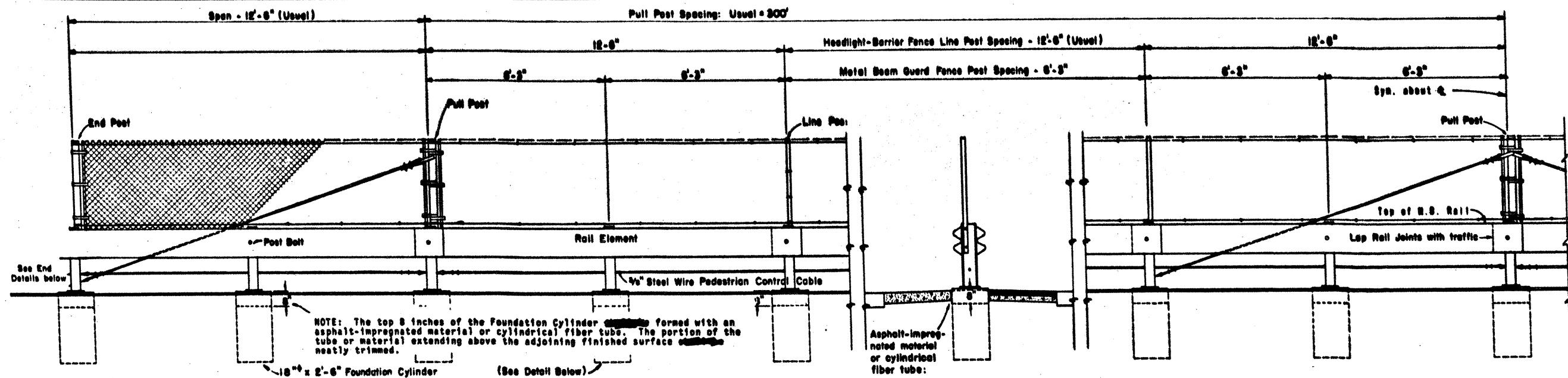
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SUPPORT BRACKETS FOR

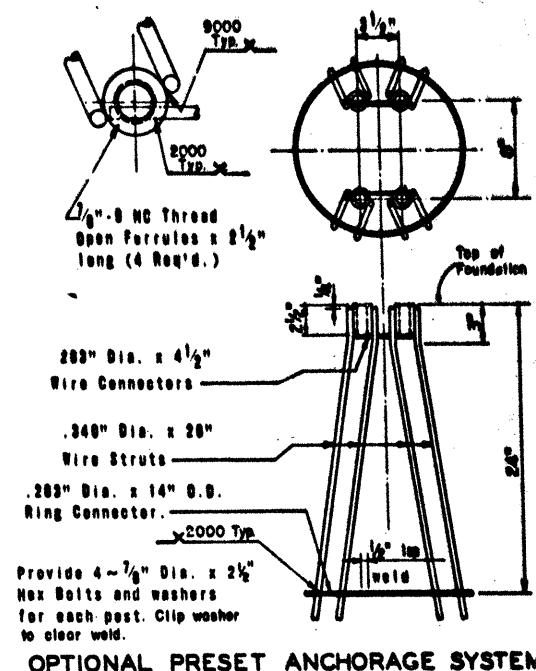
SIGNS, WALKWAY & LIGHTS

SB (SWL-1)

ORIGINAL DRAWING DATE: 2-82		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	BR
REVISED		15	6	IR35-2(18)16	1
ENCL.: CWC		COUNTY		SHEET	SECTION
CR.: -				17	10
DW.: EDS				17	10
CR.: CWC				17	10



METAL BEAM GUARD FENCE (BARRIER) & CONTROL-OF-ACCESS HEADLIGHT-BARRIER FENCE



PRESET ANCHORAGE SYSTEM:

At the option of the Contractor, the preset anchorage system shown above may be used in lieu of conventional anchor bolts and reinforcing steel for rail posts mounted on foundation cylinders.

Material for the preset anchorage shall be as follows:

Ferrules: Steel A.S.T.M. A100 Grade 12 L 14
Wire Connectors: Steel A.S.T.M. A510 Grade 1000
Struts: Steel A.S.T.M. A510 Grade 1032 or 1033
Contractor shall furnish certification that the material furnished meets the requirements of the A.S.T.M. designations.

Other systems of similar design submitted to the Bridge Engineer for approval. Such proposed systems shall be submitted and approved prior to their incorporation on shop drawings for any project. Approval shall be based on certified test results from an approved testing laboratory, that the proposed anchorage satisfies the following requirements:

- Minimum pull-out strength: 40,000 Lb. tension on 2 bolts
- Minimum shear strength: 40,000 Lb. shear on 4 bolts
- Values based on 28 day comp. strength of Conc. = 3000 p.s.i.

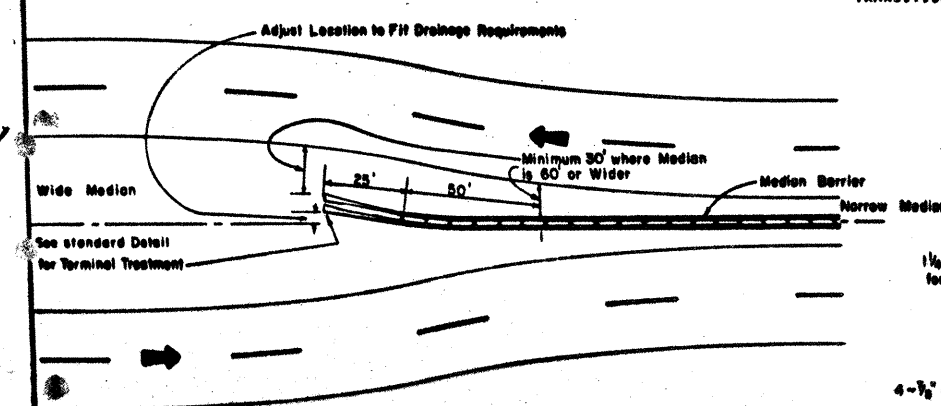
An accurate description of the test set-ups shall be included with test results. Test set-ups shall be such that the forces exerted on the test specimen simulate those acting on a post-mounted on a concrete foundation cylinder.

GENERAL NOTES:

- If "Metal Beam Guard Fence (Barrier) Block Out" is required by bid item, the requirements for the block outs shall conform to the requirements shown on standard Metal Beam Guard Fence (Block Out Rail Element).
- At the option of the Contractor, the rail element for the guard fence shall be furnished in 20 foot lengths with post bolt slots for 8/8" diameter bolt anchorage to intermediate posts.
- All steel fittings shall be galvanized.
- For control of access headlight barrier fence details see standard for control of access-headlight barrier fence.
- Unless otherwise specified on the plans, a 3/8" pedestrian control cable shall be placed through the posts as indicated.
- Metal beam guard fence shall maintain continuity of strength at all times. No special provisions for expansion at or near structures or at any other location is needed due to the ability of the rail to distribute such movement over considerable lengths of rail.

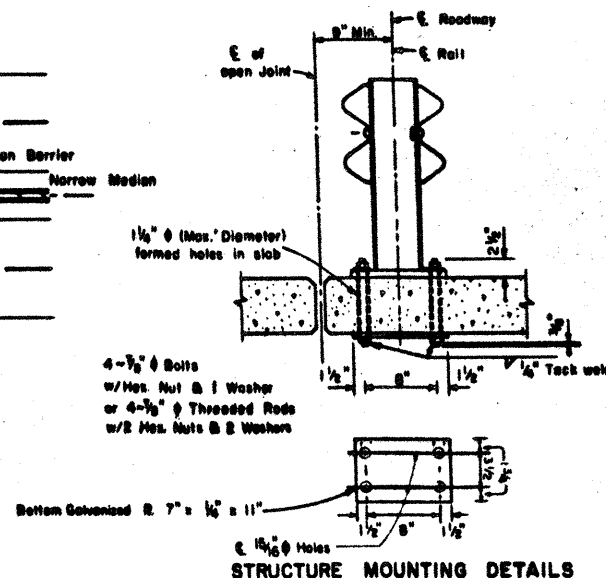
TREATMENT AT MEDIAN OBSTRUCTIONS

NOTE: ON NEW STRUCTURES OR STRUCTURES TO BE WIDENED LOCATE OPEN JOINT 9" OFF E. OF ROADWAY. ON EXISTING STRUCTURES WHERE OPEN JOINT IS ON E. OF STRUCTURE LOCATE BARRIER 9" OFF CENTER WITH 2" REVERSE CURVE TRANSITION OFF END OF STRUCTURE.



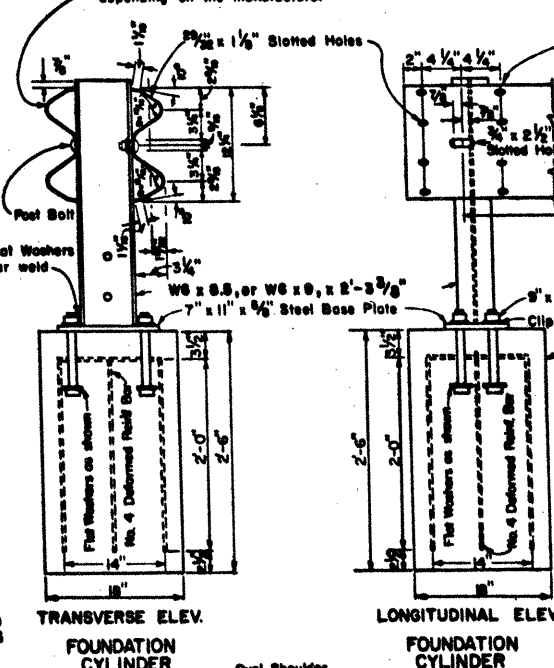
TYPICAL END TREATMENT

NOTE: IF MEDIAN IS 60' OR LESS IN WIDTH THE DOUBLE MEDIAN RAIL SHALL BE ENDED NEAR THE CENTER LINE. CARE SHALL BE TAKEN TO NOT INTERFERE WITH DRAINAGE REQUIREMENTS.



STRUCTURE MOUNTING DETAILS

Note: Actual section slightly different depending on the manufacturer

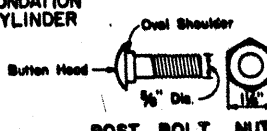


TRANSVERSE ELEV.

FOUNDATION CYLINDER

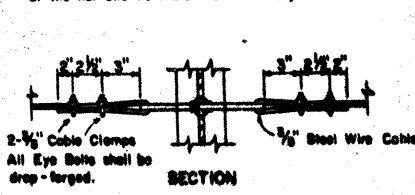
LONGITUDINAL ELEV.

FOUNDATION CYLINDER

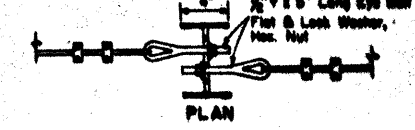


POST BOLT NUT

NOTE: Bolts used in attaching rail to post shall be of sufficient length to extend through the full thickness of the nut and no more than 1/4" beyond it.

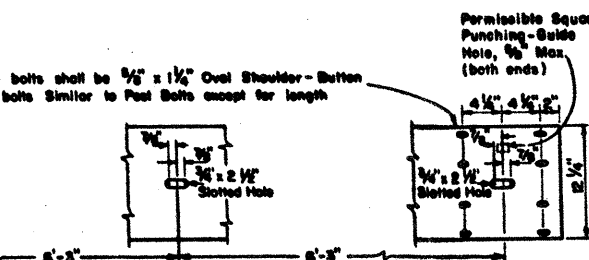


SECTION



PLAN

MEDIAN CABLE CONNECTION AT PULL POST FOR PEDESTRIAN CONTROL CABLE



ELEVATION OF GUARD RAIL

NOTE: Actual section slightly different depending on the manufacturer

NOTE: Actual section slightly different depending on the manufacturer

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BASE PLATE & POST DETAILS

GUARD RAIL POST - W6 x 8.5, or W6 x 9, x 2'-3 3/8"
STEEL BASE PLATE - 7' x 11' x 1/2"

ELEVATIONS

END & PULL POST

PLANS

LINE POST

GUARD RAIL MOUNTING

END & PULL POST

PLANS

LINE POST

GUARD RAIL MOUNTING

END & PULL POST

PLANS

LINE POST

GUARD RAIL MOUNTING

END & PULL POST

PLANS

LINE POST

GUARD RAIL MOUNTING

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LINE POST

GUARD RAIL MOUNTING

END & PULL POST

PLANS

LINE POST

GUARD RAIL MOUNTING

END & PULL POST

PLANS

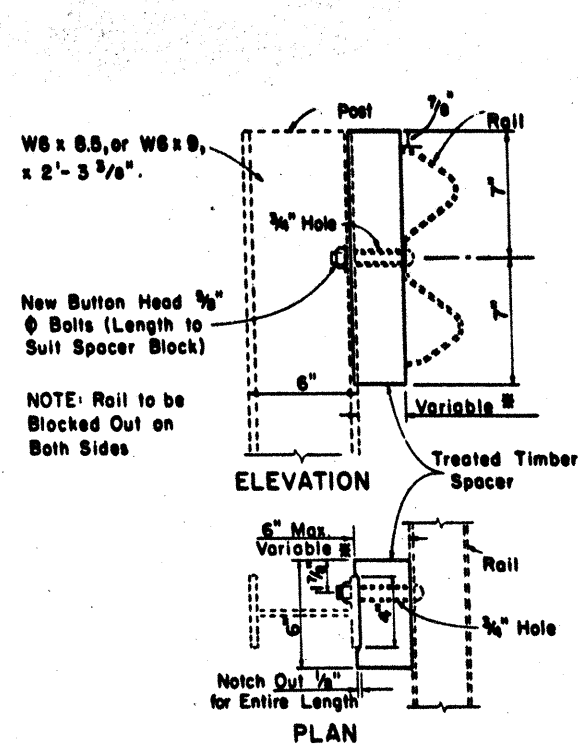
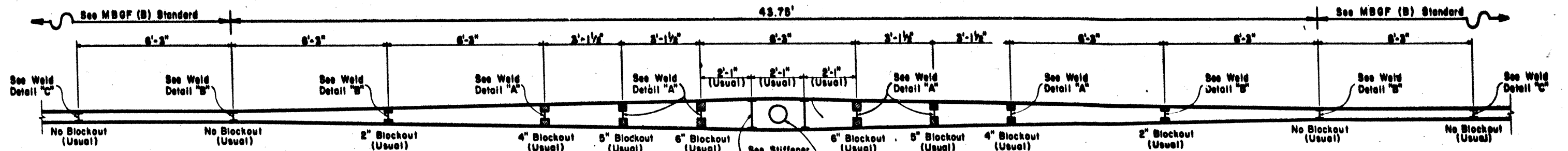
LINE POST



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
METAL BEAM GUARD FENCE (BARRIER)
MBGF (B)-74

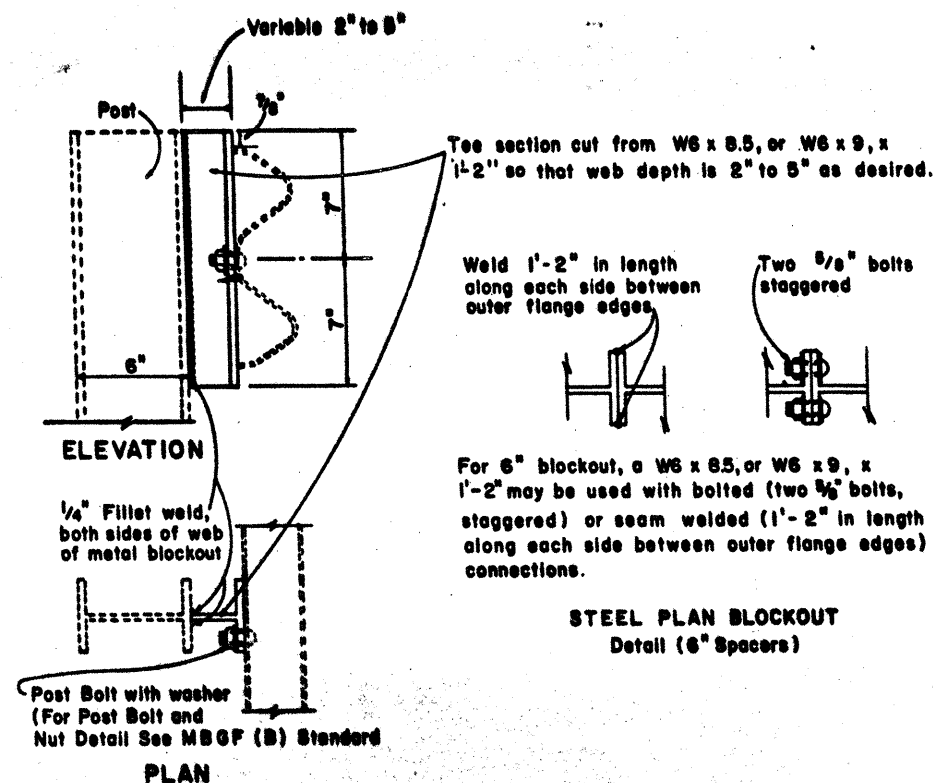
DN.	DRAWING	DATE	REV.	STATE	FEDERAL PROJECT NO.	POST
CK DN.	ORIGINAL			TEXAS	2835-2 (18) 141	71
CK DN.				STATE	COUNTY	CON. DIST. NO.
TR.	Rev. 4-72			BRAND	17 10	147 18 35
CK TR.	Preset Anchor			15		

Revised Steel Post 7-15-83



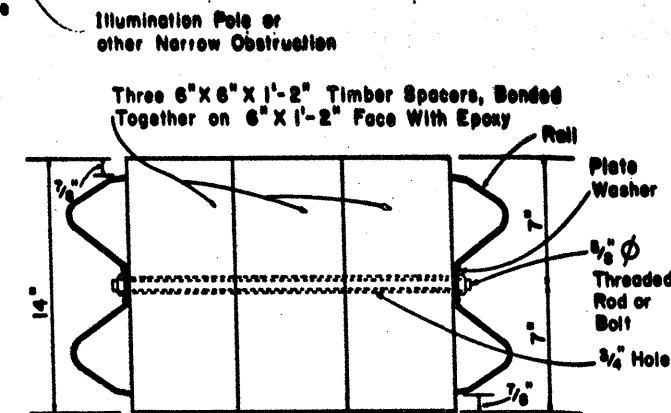
**MEDIAN RAIL
BLOCKOUT DETAIL
(TIMBER)**
All Spacer Sizes

* NOTE: Steel Posts adjacent to obstruction ~~shall~~ fitted with 6\"/>

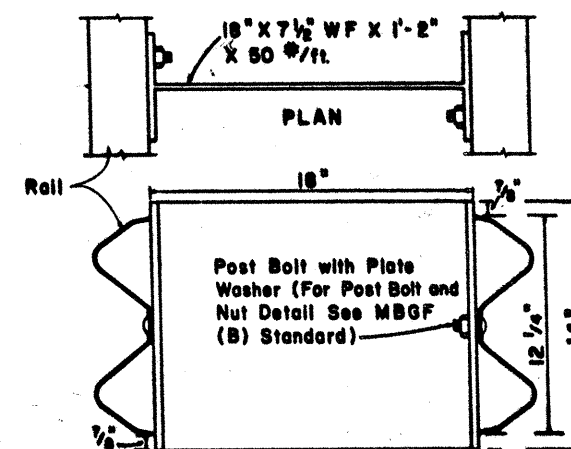


**STEEL BLOCKOUT DETAIL
(2\"/>**

**OPTIONAL MEDIAN RAIL
BLOCKOUT DETAIL
(STEEL)**

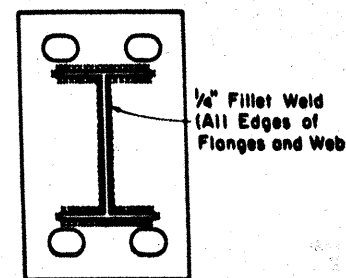


OPTIONAL STIFFENER DETAIL

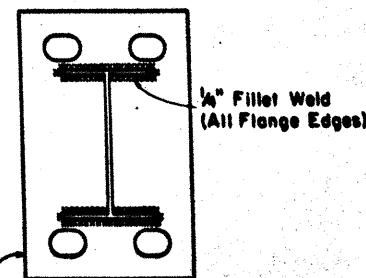


STIFFENER DETAIL

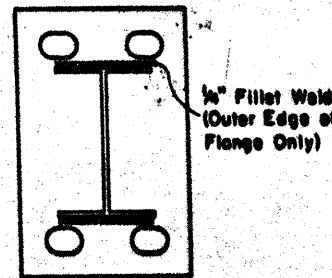
NOTE: Stiffeners ~~shall~~ usually be located 2'-1\"/>



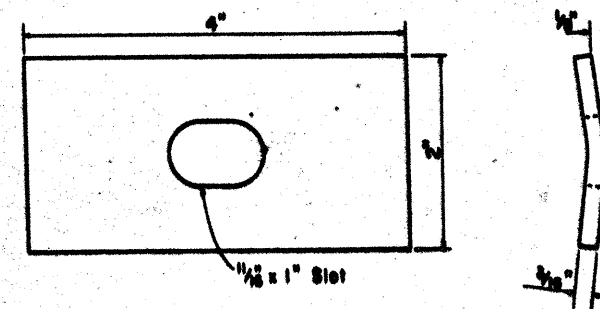
WELD DETAIL "A"



WELD DETAIL "B"



WELD DETAIL "C"



**PLATE WASHER FOR METAL
BEAM AT STIFFENERS
(Galvanize After Fabrication)**

GENERAL NOTES

1. RAIL ELEMENT ~~SHALL~~ 10 GAUGE.
2. WHERE OBSTRUCTION LOCATION PROHIBITS USUAL LOCATION OF STIFFENER, ADJUSTMENTS IN LOCATION ~~SHALL~~ AS DIRECTED BY THE ENGINEER.
3. TIMBER OR STEEL BLOCKOUTS ~~SHALL~~ BE USED. FOR 6\"/>

7671
6

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION							
METAL BEAM GUARD FENCE (BARRIER OBSTRUCTION)							
MBGF (B) OBS-74 72							
TREATMENT AT NARROW OBSTRUCTIONS IN MEDIAN							
DN	DRAWING	DATE	FED NO	STATE	FEDERAL PROJECT NO.	DATE	BY
CK DN	ORIGINAL		6	TEXAS	TR-35-2 (81) 161	72	
CK DN	REVISED						
CK DN	REVISED						
TR							
CK TR			15	Bexar	17 10 147	1988	

Revised Steel Post 7-13-83
Revised Rail Class 8-10-79