STATE	FEDERAL AID PROJECT NO.	SHEET NO.
TEXAS	HES 000S(606)	1
COUNTY	STATE CONTROL NO.	TOTAL SHEETS
NUECES	0074-06-164	US-181

STATE OF TEXAS
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

CONTROL 0074-06-164
FEDERAL AID PROJECT NO. HES000S(606)

US 181

NUECES COUNTY

LIMITS: FROM SOUTH END OF CORPUS CHRISTI SHIP CHANNEL BRIDGE TO 0.47 MILES WEST,
NET LENGTH OF PROJECT = 3581.6 FT = 0.678 MI.
CONSTRUCTION OF: THE UPGRADING OF A FREEWAY FACILITY CONSISTING OF THE WIDENING OF AN EXISTING STRUCTURE, REPLACEMENT OF METAL BEAM GUARD FENCE, AND TRAFFIC RAILING.

8054
01

BRIDGES: 180.0 FT. = 0.034 MI.
ROADWAY: 3401.6 FT. = 0.644 MI.
TOTAL: 3581.6 FT. = 0.678 MI.

CERTIFICATION FOR FINAL PLANS

Project was built according to the Plans and Specifications. These final Plans reflect the work done and the quantities shown thereon and on the final estimate are final quantities.

Final Plans

Contractor ..... Hess-Anderson Const. Inc.
Date Work Began ..... April 28, 1991
Date Work Completed ..... April 21, 1992
Contract Amount ..... $ 590,827.91
Final Estimate ..... $ 591,678.55
Working Days Allotted 111
Working Days Used 109

STATE OF TEXAS PATRICK UDEN NORRELL 35952 REGISTERED PROFESSIONAL ENGINEER

Patrick U. Norrell P.E.
Supervising Resident Engineer

22 May 92
Date

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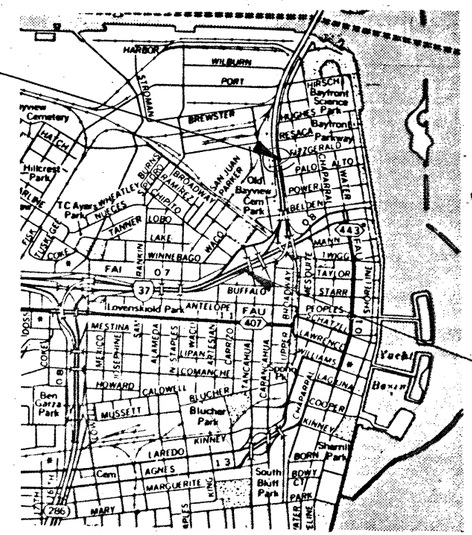
+ IO NOT USED

BEGIN PROJECT
STA. 0+00
CONT. 0074-06-164

REF. MARKER 648+00.261



END PROJECT
STA 24+81.6
CONT. 0074-06-164

NO RAILROAD CROSSINGS
1 EQUATION: 32+04.37 BK = 21+04.37 FWD
NO EXCEPTIONS

FIELD CHANGES

F.C. #1, To modify the design of the proposed Concrete Slab Extension on the East side of bridge.
F.C. #2, To remove existing concrete in order to place T-501 (Retrofit) Rail and replace concrete after the work on said Rail is completed. Along Retaining Wall "C" replace the existing two course surface treatment removed because of placement of T-501 (Retrofit) Rail with concrete Riprap.
F.C. #3, Reduction of Bid prices for Item No. 450, Conc. Traffic Rail.
F.C. #4, Construction of a Horizontal Inlet against the proposed outside Traffic Rail.
F.C. #5, Reduction of Bid Prices for Item No. 422, 423, 425 and 430.
F.C. #6, Increase total Plan Quantity for Item No. 502, "Barricades, Signs, and Traffic Handling".
F.C. #7, Purchase of Metal Beam Guard Fence Timber Post.

RETURN TO
RECORDS MANAGEMENT
DEPARTMENT OF
TRANSPORTATION

* THE ABOVE STANDARD SHEETS SPECIFICALLY IDENTIFIED HAVE BEEN ISSUED BY ME AND AND ARE APPLICABLE TO THIS PROJECT.

Richard D. Zumwalt P.E. — RESPONSIBLE ENGINEER
4-28-91 — DATE

SPECIFICATIONS ADOPTED BY THE STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION OF TEXAS, SEPTEMBER 1, 1982, AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FEDERAL AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, AUGUST, 1989) AND ADDENDUM TO FHWA FORM FHWA 1273, REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS (FEBRUARY, 1991)

DESIGN SPEED	50 MPH
PRESENT (1985) ADT	41,600
FUTURE (2006) ADT	78,800
DESIGN HOURLY VOL.	10.4%
DIRECTIONAL DISTRIBUTION	66-34%
PERCENT TRUCKS (ADT)	4.6%

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

Rev. 2-8-91
Rev. 12-14-90

SUBMITTED BY: 21 Sep 90
SUPERVISING RESIDENT ENGINEER
RECOMMENDED FOR LETTING: April 29, 1991
DISTRICT DESIGN ENGINEER
RECOMMENDED FOR LETTING: 5/1/91
DISTRICT ENGINEER

APPROVED FOR LETTING:
APPROVED FOR LETTING: 5-14-91
for BRIDGE ENGINEER
APPROVED FOR LETTING: 5-21-91
CHIEF ENGINEER OF HIGHWAY DESIGN

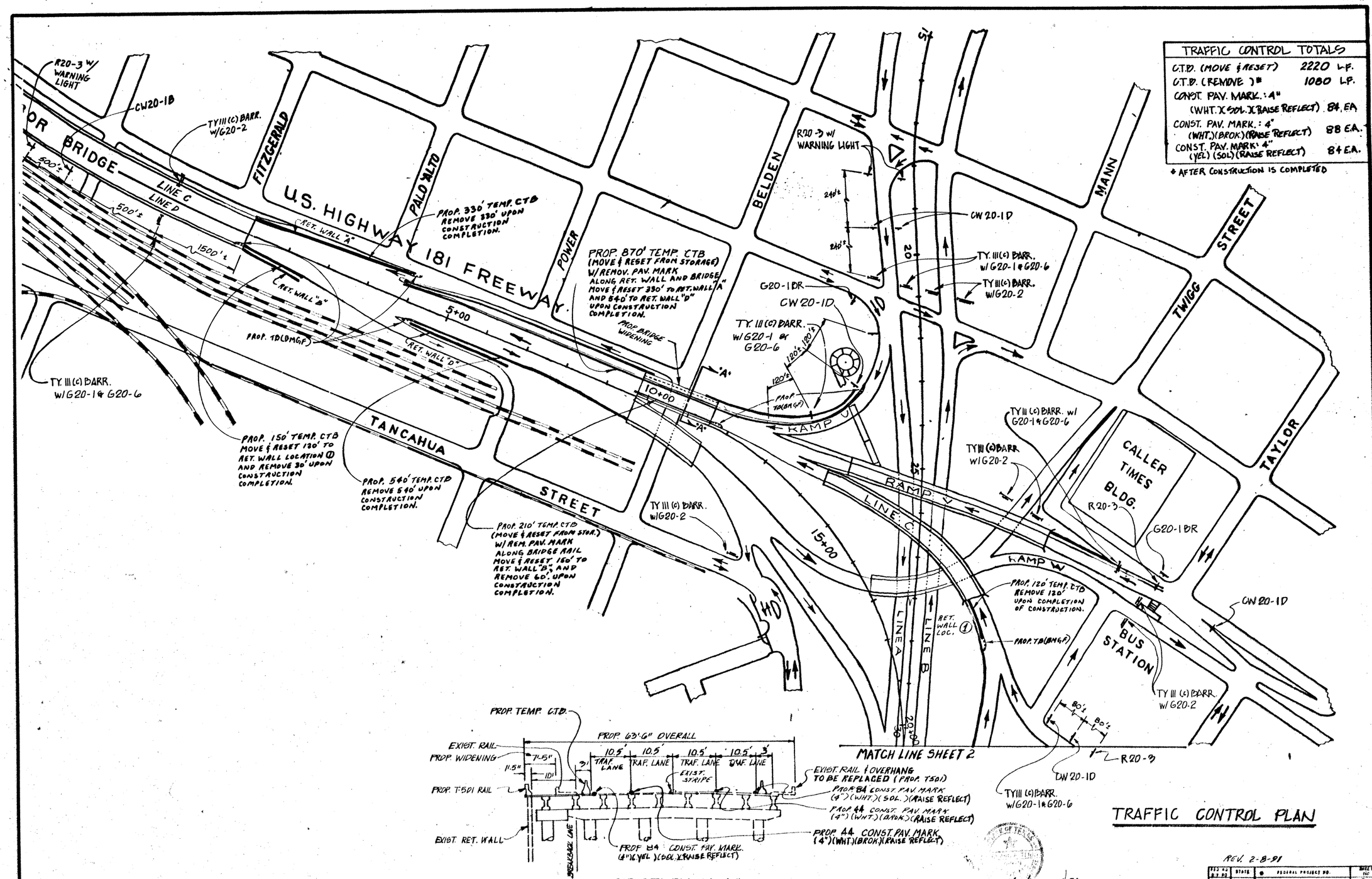
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED:
DIVISION ADMINISTRATOR — DATE

8054 FINAL 79 3 — C99717 Thurman 7-22-92 — D. Khosla 74-6-164 2-Sep-96 1-8-4

NUECES HES 000S (606) .PRF

TRAFFIC CONTROL TOTALS	
C.T.B. (MOVE & RESET)	2220 L.F.
C.T.B. (REMOVE)*	1080 L.F.
CONST. PAV. MARK.: 4" (WHT.)(SOL.)(RAISE REFLECT)	84 EA.
CONST. PAV. MARK.: 4" (WHT.)(BROK.)(RAISE REFLECT)	88 EA.
CONST. PAV. MARK: 4" (YEL.)(SOL.)(RAISE REFLECT)	84 EA.

* AFTER CONSTRUCTION IS COMPLETED



TRAFFIC CONTROL PLAN

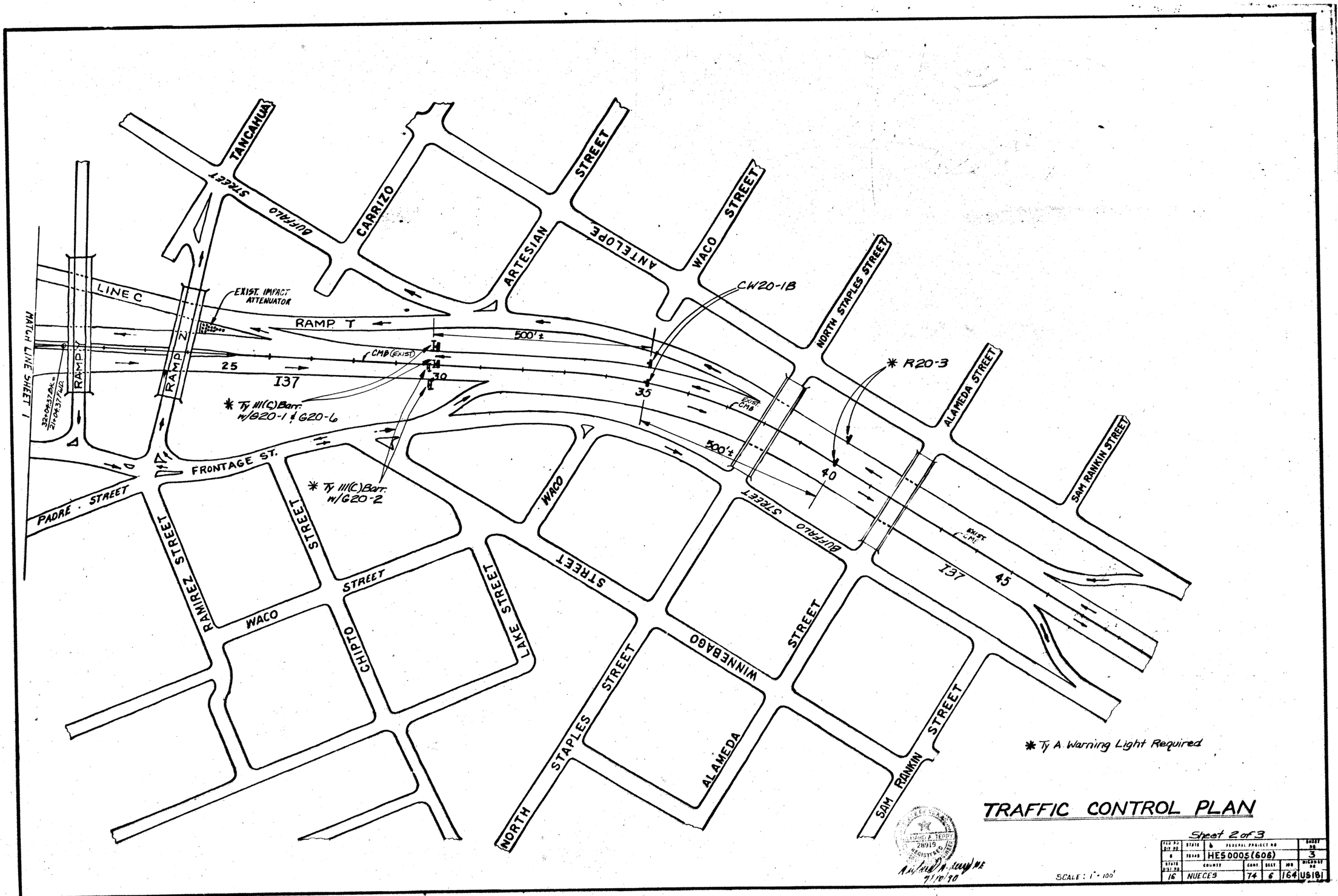
SECTION "A-A"

NOT TO SCALE

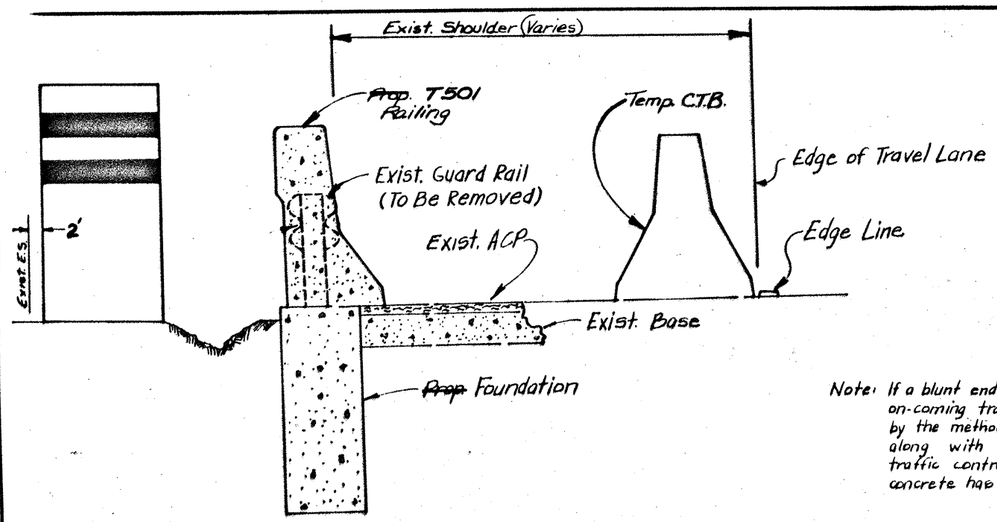
REV. 2-8-91

SCALE: 1" = 100'

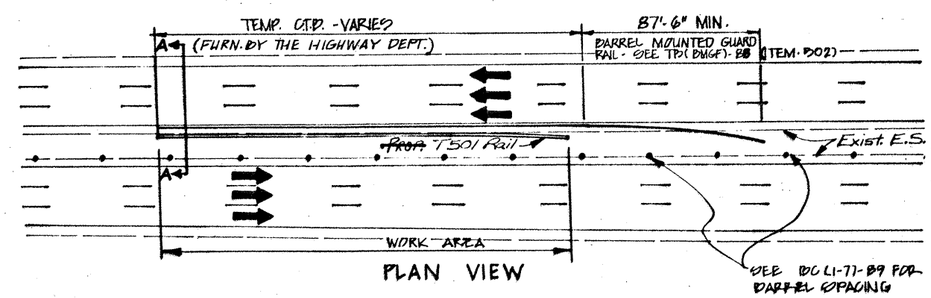
FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES0008(608)				2
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.	
16	NUECES	74	06	164	IH 181	



FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES 0005(606)			3
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES		74	6	164	US181



SECTION A-A



PLAN VIEW

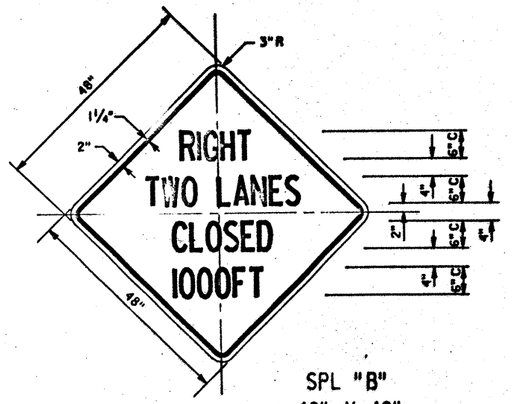
Note: If a blunt end or form is left facing on-coming traffic, it shall be protected by the method shown on sheet TB-(BMGF)-88 along with traffic control shown. The traffic control shall remain in place until concrete has 500 lb. beam break.

TRAFFIC CONTROL PLAN

Rev. 2-8-91

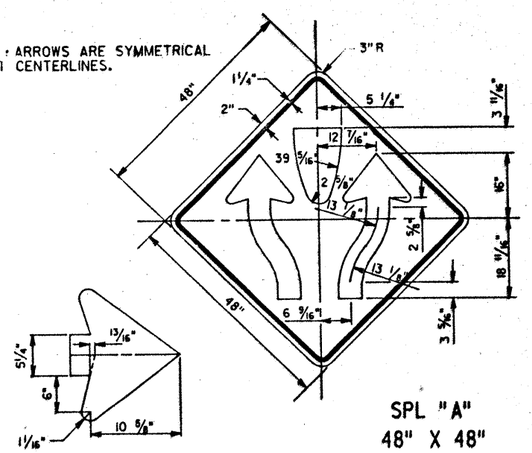
Sheet 3 of 3

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.		SHEET NO.
6	TEXAS	HES0008(608)		4
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	0074	06	164	US181

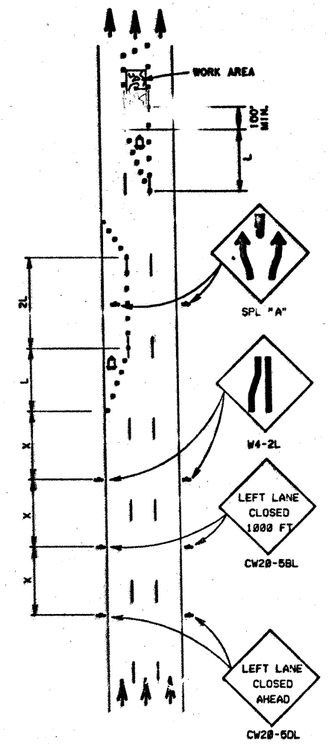


SPL "B"
48" X 48"

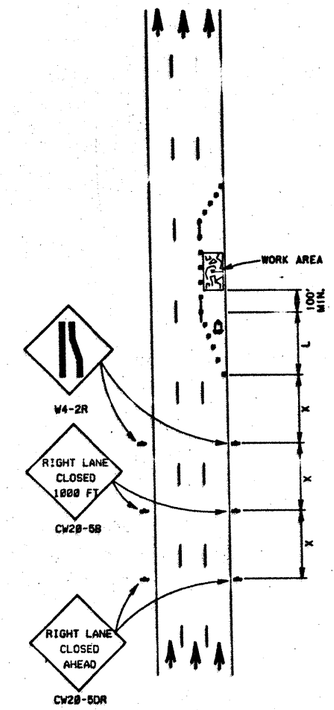
NOTE : ARROWS ARE SYMMETRICAL ABOUT CENTERLINES.



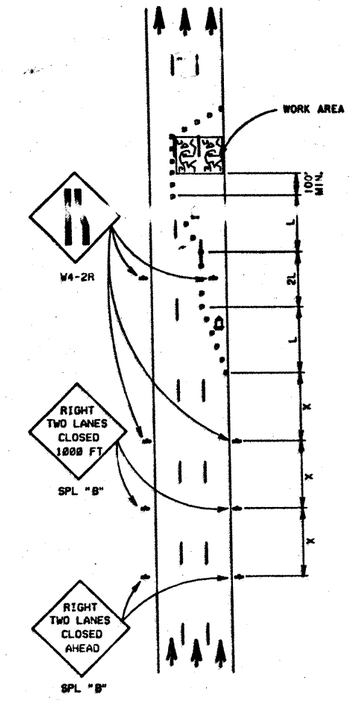
SPL "A"
48" X 48"



MIDDLE LANE CLOSURE



SINGLE LANE CLOSURE



TWO LANE CLOSURE

GENERAL NOTES

1. THE TRAFFIC CONTROL DEVICES SHOWN ARE THE MINIMUM REQUIRED. ADDITIONAL TRAFFIC CONTROL DEVICES MAY BE NECESSARY TO ROUTE TRAFFIC AROUND THE WORK AREA.
2. THE FOLLOWING TRAFFIC CONTROL DEVICES SHALL BE PLACED IN ADVANCE OF THE PROJECT LIMITS. OBSERVE WARNING SIGNS STATE LAW (R20-3), END CONSTRUCTION (G20-2), CONTRACTORS NAME (G20-6), ROAD CONSTRUCTION NEXT XX MILES (G20-1), AND TY III (C) BARRICADES.
3. SIGNING SHOWN FOR ONE DIRECTION ONLY.
4. CONES SHALL BE A MINIUM HEIGHT OF 28".
5. ARROW PANEL SHALL BE TYPE C (15 LAMPS, MINIUM SIZE OF 48" X 96")
6. ONE OR MORE FLAGGERS ARE TO BE USED WHERE TRAFFIC, ROAD CONDITIONS, OR TERRAIN WARRANT THEIR USE.

TABLE FOR DIMENSION "X"
(SIGN SPACING)

POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	80
35	120
40	160
45	240
50	320
55	500

LEGEND :

- CHANNELIZING DEVICES
- FLAGGER
- TRAILER OR TRUCK MOUNTED ARROW PANEL TYPE C

POSTED SPEED *	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS **			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60' -75'
35		205'	225'	245'	35'	70' -90'
40		265'	295'	320'	40'	80' -100'
45	L=WS	450'	495'	540'	45'	90' -110'
50		500'	550'	600'	50'	100' -125'
55		550'	605'	660'	55'	110' -140'
60		600'	660'	720'	60'	120' -150'

* 85TH. PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT.

** TAPER LENGTHS HAVE BEEN ROUNDED OFF.

L = LENGTH OF TAPER (FT)
W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)

TRAFFIC CONTROL FOR LANE CLOSURES LC(16)-2

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES0005(606)				5
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
	NUECES		74	06	164	US 181

GENERAL NOTES AND SPECIFICATION DATA--

GENERAL NOTES AND SPECIFICATION DATA

PERMANENT STRIPING WILL BE DONE BY STATE FORCES.

THE FOLLOWING STANDARD DETAIL SHEETS HAVE BEEN MODIFIED: RID (S)-88, RID (S)-88, GPA-2 AND GPB-2.

ALL EXISTING PAVEMENTS THAT ARE TO REMAIN IN SERVICE THAT ARE CUT BY THE CONTRACTOR IN THE PROCESS OF HIS WORK SHALL BE REPLACED WITH MATERIAL EQUAL TO EXISTING OR AS APPROVED BY THE ENGINEER. REPAIRS SHALL BE MADE IN A TIMELY MANNER AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM 340

THE CONTRACTOR SHALL APPLY ASPHALTIC CONCRETE TYPE D LEVEL-UP TO WIDENED THE PORTION OF THE BELDEN STREET BRIDGE TO MATCH PREVIOUS OVERLAYS ON THE EXISTING PORTION OF THE STRUCTURE.

THE STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION WILL FURNISH THE LABORATORY BUILDING REQUIRED FOR TESTING ALL ASPHALTIC MATERIAL FOR THIS ITEM. THE CONTRACTOR SHALL PROVIDE ELECTRICITY, WATER AND GAS SERVICE AT THIS FACILITY AT HIS OWN EXPENSE.

A MINIMUM POLISH VALUE OF 32, WHEN TESTED IN ACCORDANCE WITH TEST METHOD TEX-438-A, WILL BE REQUIRED FOR THE AGGREGATE USED IN THE SURFACE COURSE, UNLESS SILICEOUS AGGREGATE WITH KNOWN SATISFACTORY PERFORMANCE HISTORY BASED ON S.D.H.P.T. SKID TRAILER MEASUREMENTS IS USED. THE SOURCES FOR THESE SATISFACTORY AGGREGATES MAY BE REVIEWED WITH THE RESIDENT ENGINEER ASSIGNED TO THIS PROJECT AND LISTED IN THE "NOTICE TO CONTRACTORS". IF SILICEOUS AGGREGATES ARE USED, A MAXIMUM FLAKINESS INDEX OF 17 AS DETERMINED BY TEST METHOD TEX-224-F SHALL APPLY.

THE SURFACE COURSE SHALL BE CONSTRUCTED IN WIDTHS THAT WILL MAKE THE LONGITUDINAL JOINTS COINCIDE WITH THE PROPOSED LANE STRIPES.

SAMPLES FOR TEST METHOD TEX-217-F (PARTS I AND II) SHALL BE FROM THE HOT BINS FOR CONVENTIONAL BATCH PLANTS AND FROM THE STOCKPILE FOR DRYER DRUM PLANTS.

COARSE AGGREGATES USED SHALL BE SUBJECTED TO FOUR CYCLES OF THE MAGNESIUM SULFATE SOUNDNESS TEST IN ACCORDANCE WITH TEST METHOD TEX-411-A. THE LOSS SHALL NOT BE GREATER THAN 35 PERCENT. SAMPLING AND

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 340, CONT'D
TESTING SHALL BE AT THE RATE OF 1 FOR EACH 10,000 TONS OR FRACTION THEREOF. IF AGGREGATES ARE BLENDED, EACH INDIVIDUAL AGGREGATE SHALL NOT HAVE A LOSS GREATER THAN 55% AND THE BLEND SHALL NOT HAVE A LOSS GREATER THAN 35%.

SAND EQUIVALENT VALUE OF THE COMBINED MINERAL AGGREGATE SHALL NOT BE LESS THAN 45. AN ADDITIONAL TEST, TEST METHOD TEX-203-F, SHALL BE PERFORMED ON THE SAND ONLY, AND SHALL HAVE A VALUE OF NOT LESS THAN 25.

THE MATERIAL SHALL BE PLACED WITH AN APPROVED SPREADING AND FINISHING MACHINE MEETING THE REQUIREMENTS OF ITEM 520.

AGGREGATE STOCKPILES TESTED AND DESIGNATED FOR DEPARTMENTAL PROJECTS WILL NOT BE USED FOR OTHER SALES AND WILL NOT BE ADDED TO, RESHAPED OR MOVED, WITHOUT APPROVAL OF THE ENGINEER.

WHERE STONE SCREENINGS ARE SPECIFIED FOR USE, OR AUTHORIZED BY THE ENGINEER, THE PERCENT BY WEIGHT PASSING THE #10 SIEVE SHALL BE 70-100. NO OTHER REQUIREMENTS OF THIS ITEM ARE WAIVED OR CHANGED HEREBY.

IF THE CONTRACTOR CHANGES SOURCES OF MATERIALS, THE COST TO REDESIGN THE MIX SHALL BE AT THE CONTRACTOR'S EXPENSE. THE DEPARTMENT'S LABORATORY WILL RUN THE TESTS AT THE CURRENT UNIT PRICE AT THE TIME THE TEST IS RUN. THE CONTRACTOR SHALL REIMBURSE THE STATE FOR THE COST OF THE ADDITIONAL TESTS AND SUCH REIMBURSEMENT WILL BE MADE TO THE STATE BY MAKING DEDUCTIONS FROM THE CONTRACTOR'S ESTIMATE.

ITEM 420

AS SOON AS FORMS ARE REMOVED FROM ALL CONCRETE, AN ORDINARY SURFACE FINISH SHALL BE APPLIED TO THE EXPOSED CONCRETE SURFACES PREPARATORY TO THE HIGHER GRADE OR CLASS FINISH.

ITEMS 421 & 430

BENT CONCRETE SHALL BE PAID FOR AS PLAN QUANTITY.

THE ENGINEER WILL SAMPLE ALL CONCRETE AND MAKE AND TEST ALL TEST BEAMS AND CYLINDERS IN ACCORDANCE WITH TEST METHODS TEX-418-A AND TEX-420-A.

ALL TEST MOLDS WILL BE FURNISHED BY THE ENGINEER AND THE CONTRACTOR SHALL MAINTAIN THEM IN THE PROPER CONDITION. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PERSONNEL TO REMOVE THE

GENERAL NOTES AND SPECIFICATION DATA--

ITEMS 421 & 430, CONT'D
TEST SPECIMENS FROM THE MOLDS AND TO TRANSPORT THEM TO THE PROPER CURING LOCATION AT THE SCHEDULE DESIGNATED BY THE ENGINEER AND IN ACCORDANCE WITH THE GOVERNING SPECIFICATION. FOR ALL CONCRETE ITEMS THE CONTRACTOR SHALL HAVE A WHEELBARROW, OR OTHER CONTAINER ACCEPTABLE TO THE ENGINEER, AVAILABLE TO USE IN THE SAMPLING OF THE CONCRETE.

ALL LABOR AND EQUIPMENT FURNISHED BY THE CONTRACTOR WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS AND WILL NOT BE PAID FOR DIRECTLY.

ITEM 422

THE USE OF PERMANENT METAL DECK FORMS WILL NOT BE PERMITTED ON THIS PROJECT. EXISTING OVERLAY ON BRIDGE WILL BE REMOVED PRIOR TO ANY OTHER CONSTRUCTION. TRANSITION FROM END OF BRIDGE TO EXISTING ASPHALT SHALL BE SMOOTH AND UNIFORM, AS DIRECTED BY THE ENGINEER. BREAK-BACK ON EXISTING SLAB MUST BE SAW CUT TO PROVIDE STRAIGHT CLEAN JOINT FOR WIDEN SECTION, AS DIRECTED BY ENGINEER. REMOVAL OF EXISTING ASPHALT AND SAW CUTTING OF JOINT SHALL BE SUBSIDIARY TO VARIOUS BID ITEMS.

ITEM 427

GRADE SEPARATION STRUCTURES INCLUDING THE EXPOSED FACES OF BENT CAPS, OUTSIDE BEAMS, AND COLUMNS SHALL RECEIVE A GRADE 1, CLASS A OR B FINISH. THE T501 RAIL AND RETAINING WALL COPING SHALL RECEIVE A CLASS B FINISH.

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 442

ARMOR JOINTS SHALL RECEIVE PROTECTION SYSTEM I OR II PRIME COAT.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 446

PRICES CHARGED FOR PAINT FURNISHED BY THE DEPARTMENT WILL BE AS FOLLOWS:

PROTECTION SYSTEM I PRIME COAT, EPOXY ------- $76.90 / 5 GAL.
PROTECTION SYSTEM II PRIME COAT, EPOXY ------- $106.50 / 3 GAL.

ITEM 450

REMOVAL OF CONCRETE FOR RAIL RETROFIT AND REMOVAL OF RETAINING WALL WINGS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 450.

ITEM 502

9-LINE PORTABLE CHANGEABLE MESSAGE SIGNS WILL BE REQUIRED WITH LANE CLOSURES.

CWI-8'S SHALL BE REQUIRED ON THE OUTSIDE OF CURVES AND SHALL BE MOUNTED ON BARRICADES (SEE BC SHEETS).

PLASTIC DRUMS SHALL BE USED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S RECOMMENDATIONS AS APPROVED BY THE ENGINEER.

ITEM 504

ONE FIELD OFFICE (TYPE B) WILL BE REQUIRED FOR THIS PROJECT. THE BUILDING SHALL BE ADEQUATELY VENTILATED AS DIRECTED BY THE ENGINEER. IN ADDITION,THE BUILDING SHALL BE FURNISHED WITH AN APPROVED WASHROOM EQUIPPED WITH A TANK TYPE FLUSH TOILET AND WASHBASIN, BOTH CONNECTED TO ADEQUATE SANITARY FACILITIES. THE BUILDING SHALL BE EQUIPPED WITH ELECTRICITY, NATURAL GAS AND CITY WATER. THE ARRANGEMENT AND NUMBER OF OUTLETS FOR THESE UTILITIES SHALL BE AS DIRECTED BY THE ENGINEER. ADEQUATE ENCLOSED SPACE SHALL BE PROVIDED FOR BEAM CURING TANKS AND BEAM BREAKING MACHINE. THE CONTRACTOR SHALL APPLY AND SECURE ANY PERMITS NECESSARY FOR THE BUILDING. UTILITY METER DEPOSITS AND SERVICE BILLS WILL BE PAID BY THE CONTRACTOR. THE FIELD OFFICE WILL BE AS ABOVE OR AN EQUIVALENT AS APPROVED BY THE ENGINEER.

ITEM 506

AFTER TEMPORARY EROSION CONTROL DEVICES ARE NO LONGER REQUIRED, CLEANUP AND RESHAPING OF THOSE AREAS WILL BE REQUIRED. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 512

APPROXIMATELY 1080 LF OF TYPE 2 CONCRETE TRAFFIC BARRIERS WILL BE SUPPLIED BY THE STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION AND SHALL BE PICKED UP BY THE CONTRACTOR AT A SITE IN THE CORPUS CHRISTI AREA. THE HANDLING AND INSTALLATION OF THE CONCRETE TRAFFIC BARRIERS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "CONC TRAF BAR (MOVE AND RESET)" AND "CONC TRAF BAR (REMOVE)".

CONCRETE TRAFFIC BARRIER UNITS DAMAGED DUE TO CONTRACTOR'S OPERATIONS, HANDLING OR NEGLECT, SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER BEFORE BEING REUSED OR RETURNED TO STORAGE.

ITEM 526

IF MEMBRANE CURING IS USED FOR CURING CONCRETE STRUCTURES, ONLY TYPE 1-D CURING COMPOUND CONFORMING TO THE REQUIREMENTS OF ITEM 526 WILL BE PERMITTED.

ITEM 540

TIMBER POSTS, USED FOR THIS ITEM, ARE NOT TO BE PAINTED.

ITEM 542

ALL GALVANIZED STEEL BEAM GUARD FENCE REMOVED BY THE CONTRACTOR SHALL BE STOCKPILED AT THE JOBSITE, AS DIRECTED BY THE ENGINEER. THE STOCKPILED GUARD FENCE WILL BE PICKED UP BY STATE MAINTENANCE FORCES.

ITEM 612

EXISTING TRANSFORMER BASES ARE TO BE REUSED FOR POLES RELOCATED IN PLACE AND ARE PROTECTED BY RETAINING WALL OR T-501 RAIL.

ALL POLES TO BE RELOCATED SHALL HAVE ALL INTERNAL CONDUCTORS REPLACED WITH NO. 12 TYPE XHHW CONDUCTORS AND ALL FUSED DISCONNECTS MEETING REQUIREMENTS SHOWN ON ROADWAY ILLUMINATION DETAIL SHEETS.

ITEM 616

THE TOP EIGHT (8) INCHES OF FOUNDATIONS SHALL BE FORMED AND STRUCK LEVEL.

BOTH ENDS OF EACH RACEWAY SHALL BE FITTED WITH A TEMPORARY CAP TO PREVENT DIRT AND DEBRIS FROM ENTERING RACEWAY DURING CONSTRUCTION. WHERE STEEL RACEWAY IS USED, BUSHING SHALL BE GROUND-TYPE AND A BONDING

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 616, CONT'D
JUMPER SHALL BE CONNECTED BETWEEN BUSHING AND GROUND ROD.

ITEM 618

CONDUITS UNDER ROADWAYS SHALL BE PLACED A MINIMUM OF 18 IN. BELOW THE SUBGRADE MATERIAL AND LOCATION MARKED ACCORDING WITH PLANS.

AFTER CONDUIT AND WIRING INSTALLATION IS COMPLETED, ALL CONDUIT ENDS SHALL BE SEALED WITH A SEALANT TO BE MADE OF A POLYURETHANE OR EQUIVALENT MATERIAL OF A COMPOSITION THAT WILL CURE IN THE PRESENCE OF MOISTURE. THE SEALANT SHALL ENCAPSULATE AND PROTECT ELECTRICAL CONDUCTORS AND SEAL CONDUIT ENDS FROM MOISTURE AND DIRT. THE CONDUIT SHALL BE SEALED A MINIMUM OF THREE INCHES.

FOR CONDUIT PLACED BY TRENCHING, TRENCHING AND BACKFILLING WILL BE IN ACCORDANCE WITH THE ITEM "EXCAVATION AND BACKFILL FOR SEWERS", EXCEPT FOR MEASUREMENT AND PAYMENT.

CONDUITS ENTERING GROUND BOXES SHALL BE PLACED SO THAT THE CONDUIT ENDS SHALL NOT BE LESS THAN 5 IN. NOR MORE THAN 9 IN. FROM THE BOX COVER.

OPEN ENDS OF ALL CONDUITS AND RACEWAYS SHALL BE FITTED WITH TEMPORARY CAPS OR PLUGS TO PREVENT THE ENTRY OF DIRT, DEBRIS, AND RODENTS DURING CONSTRUCTION.

A PULL WIRE OR PULL ROPE SHALL BE PLACED IN ALL EMPTY CONDUIT THAT IS BEING INSTALLED FOR FUTURE USE. FOR NON-METALLIC CONDUIT, AN APPROVED NON-METALLIC ROPE OR TAPE SHALL BE INSTALLED. ALL CONDUIT ENDS SHALL BE CAPPED WITH AN APPROVED REMOVABLE CAP.

THE ENDS OF ALL METALLIC CONDUIT TERMINATING IN A GROUND BOX , JUNCTION BOX, OR POLE BASE, AND CARRYING INDIVIDUAL CONDUCTORS SHALL BE FITTED WITH INSULATED GROUND BUSHINGS. A BONDING JUMPER SHALL BE INSTALLED FROM BUSHING TO NEAREST GROUND ROD, GROUNDING LUG OR GROUNDED CONNECTOR. AT SERVICE POLES, BONDING JUMPER SHALL BE AWG SIZE NO. 6, ALL OTHER JUMPERS SHALL BE MINIMUM SIZE AWG NO. 10. CONDUIT USED AS CASING UNDER ROADWAYS FOR DUCT CABLE NEED NOT BE GROUNDED IF DUCT EXTENDS FULL LENGTH THROUGH THE CASING.

AT ENDS OF ALL NON-METALLIC CONDUIT (PVC OR HDP) WHERE A THREADED CONNECTOR IS USED (E.G. METAL JUNCTION BOX) A BUSHING SHALL BE INSTALLED.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 628

A NON-METALLIC PULL WIRE OR PULL ROPE SHALL BE USED IN PULLING CONDUCTOR IN NON-METALLIC CONDUIT. A MINIMUM LENGTH OF 3 FT. OF CONDUCTOR SHALL BE LEFT IN GROUND BOXES AND POLE BASES FOR MAKING UP CONNECTIONS.

AFTER CONDUCTOR IS PLACED IN CONDUIT, A PULL TEST WILL BE MADE ON CONDUCTORS. ANY LENGTH OF CONDUCTOR THAT CANNOT BE PULLED EASILY WILL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE.

ITEM 624

ALL GROUND BOXES SHALL BE PERMANENTLY MARKED WITH MANUFACTURER'S NAME OR LOGO AND MODEL NUMBER. MARKING SHALL BE ON TOP RIM OF BOX OR INSIDE BOX NEAR TOP. COVERS FOR GROUND BOXES SHALL ALSO BE MARKED AS ABOVE. CONTRACTOR SHALL ALSO PROVIDE CERTIFICATION THAT ALL GROUND BOX AND LID COMBINATIONS MEET LOADING REQUIREMENTS.

IN AREAS OF HEAVY TRAFFIC OR OTHER AREAS AS DIRECTED BY THE ENGINEER, GROUND BOX WILL BE ENCASED IN CONCRETE.

ITEM 662

PAINT OR FOIL-BACKED PAVEMENT MARKINGS WILL NOT BE PERMITTED AS REMOVABLE MARKINGS. REMOVABLE PAVEMENT MARKINGS SHALL BE WORK ZONE RAISED PAVEMENT MARKERS (SEE STANDARED SHEET TCP(5-1) AND TCP(5-2) PLACED USING A BITUMINOUS ADHESIVE.

ALL DETOURS AND ROADWAYS SHALL HAVE EDGE LINES AND CENTERLINES AS APPLICABLE. ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED OR OBLITERATED BY THE CONTRACTOR AND PAID FOR AT THE UNIT BID PRICE FOR REMOVE PAVEMENT MARKINGS.

F.R. DIV.6 | TEXAS | HES 0005(606) | SHEET 6A
NUECES COUNTY | HWY US 181 | CONT 0074-6-164

GENERAL NOTES AND SPECIFICATION DATA--

****

SPECIFICATION DATA

ITEM 1147 ------ EMBANKMENT (DENS CONT)(TY C)
PLASTICITY INDEX ----------45 MAX
PLASTICITY INDEX ---------- 6 MIN

****

ITEM 340

340 HOT MIX ASPH PAV	150 LBS / SY
AGGR (TY D)	94.5 % BY WT
ASPH	5.5 % BY WT

ESTIMATE SUMMARY

CONTROL 74-6-164

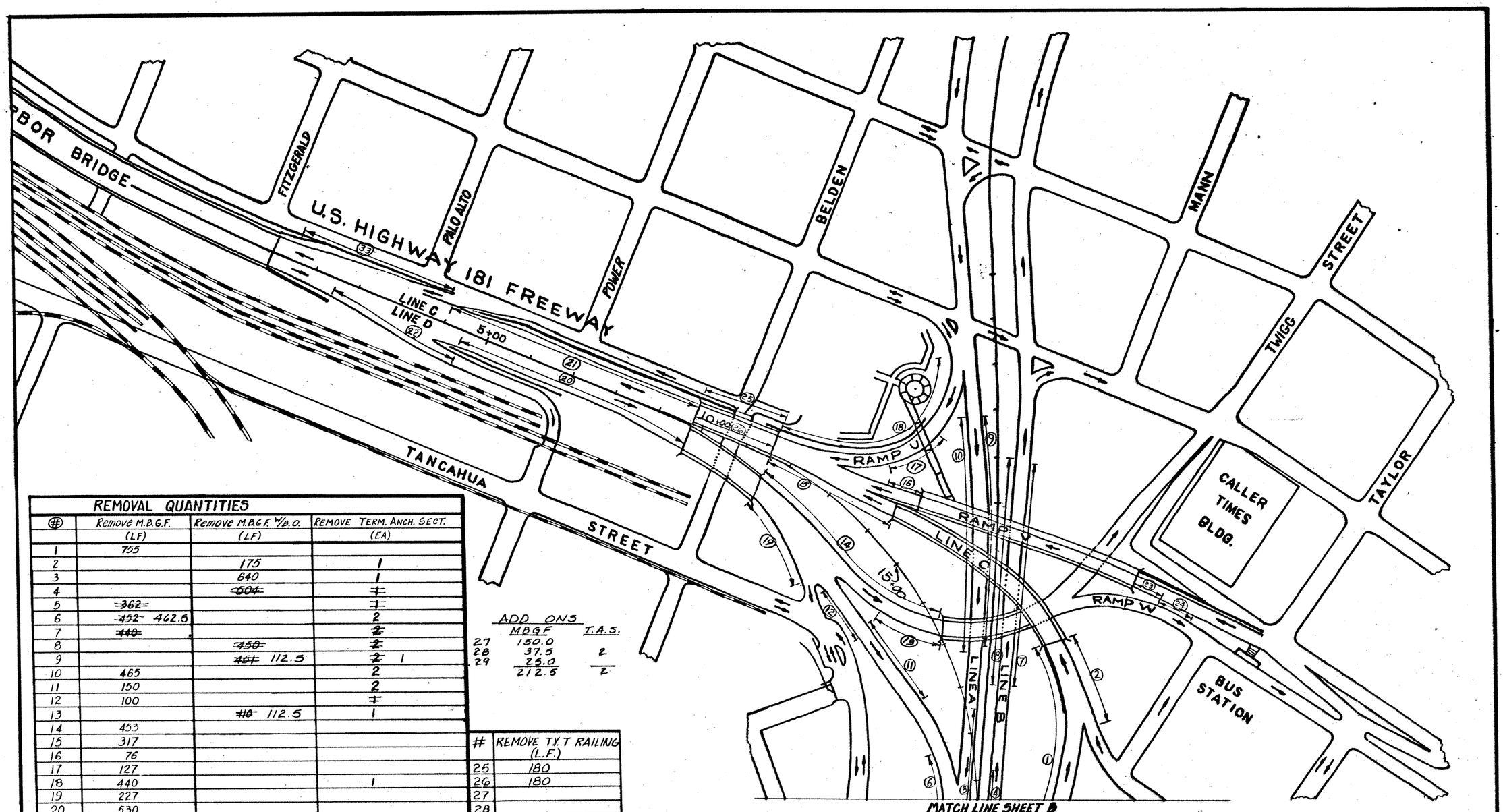
US 181

EST.	FINAL	EST.	FINAL	EST.	FINAL	ROADWAY EST.	ROADWAY FINAL	BRIDGE EST.	BRIDGE FINAL	ALT	ITEM NO	DESC CODE	SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
						18.000					340	027	131	ASPH CONC (TY D)(LEVEL-UP)	TON	18.000	
								100.000			409	003		CONC PIL (16 IN SQ)	LF	100.000	
								33.000			417	002		SLURRY DISPL DRILL SHAFT (24 IN)	LF	33.000	
						34.800					421	015	046	CL C CONC (MISC)	CY	34.800	
								2592.000			422	002	001	REINF CONC SLAB (EXT STR)	SF	2592.000	
						236.000					423	001	049	RETAINING WALL	SF	236.000	
								178.430			425	003	006	PRESTR CONC BEAM (TY C)	LF	178.430	
								14.000			430	006	002	CL C CONC FOR EXT STR (BENT)	CY	14.000	
								4.100			430	007	002	CL C CONC FOR EXT STR (ABUT)	CY	4.100	
						3.000					432	008		RIPRAP (CONC)(CL B)	CY	3.000	
								90.000			442	001	007	STR STL (HYC)	LB	90.000	
								940.000			442	003	007	STR STL (ARMOR JT)	LB	940.000	
						290.000		360.000			450	036	002	RAIL (TY T 601)	LF	650.000	
						1752.000					450	053	002	RAIL (TY T 501R)	LF	1752.000	
						34.200					450	098	002	RAIL (TY T501)(SPL)	LF	34.200	
						360.000					452	001		REMOV RAIL	LF	360.000	
						22.000					471	001		GRATE	EA	22.000	
						22.000					479	002		ADJ INLET	EA	22.000	
						6.000					502	001	015	BARCD,SIGN AND TRAF HANDLING	MO	6.000	
						2220.000					512	002		CONC TRAF BAR (MOVE AND RESET)	LF	2220.000	
						1080.000					512	003		CONC TRAF BAR (REMOVE)	LF	1080.000	
						3800.000					540	010		METAL BEAM GD FENCE (12 GA)(TIM POST)	LF	3800.000	
						22.000					540	011		TERM-ANCH SECT (12 GA)	EA	22.000	
						2975.000					540	015		MET BM GD FE (BLK OUT)(12 GA)(TIM POST)	LF	2975.000	
						20.000					542	003	001	REMOV TERM-ANCH SECT	EA	20.000	
						8581.000					542	006	001	REMOV METAL BEAM GD FENCE (STEEL POST)	LF	8581.000	
						65.000					550	002	003	CHAIN LINK BAR FENCE (6 FT)	LF	65.000	
								2.000			610	164		RDWY ILL ASM (U/P TY 1)(.15KW)S(SPL CO)	EA	2.000	
						13.000		2.000			612	004		RELOC RDWY ILL ASSEM, TRANS BASE	EA	15.000	
						1.000					616	001		RDWY ILL ASSEM FND (TY A)	EA	1.000	
						3180.000		250.000			618	046		CONDT (PVC)(SCH 40)(1 1/2 IN)	LF	3430.000	
						3855.000		250.000			620	002		ELEC CONDR (NO. 6 BAR)	LF	4105.000	
						1670.000					620	032		ELEC CONDR (NO. 6)(TY XHHW)	LF	1670.000	
						6340.000		500.000			620	033		ELEC CONDR (NO. 4)(TY XHHW)	LF	6840.000	
						3.000					624	022		GROUND BOX (RPM)(TY A)(122311) APRON	EA	3.000	
						172.000					662	057	015	CONST PAV MARK (RAISE REFLECT)(TY C)	EA	172.000	
						84.000					662	058	015	CONST PAV MARK (RAISE REFLECT)(TY A)	EA	84.000	
						80.000					1147	002		EMBANK (DC)(TY C)	CY	80.000	
						525.000					5044	001		TEMP METAL BEAM GD FENCE	LF	525.000	
						1.000					5641	001		MOBILIZATION	LS	1.000	
						3.000					5653	014		GD RAIL EN ABS TERM (3FT)(6 BAY)(TY C)	EA	3.000	
						110.000					6427	002		REMOV PAV MARKINGS (4 IN)	LF	110.000	

ESTIMATE & QUANTITY SHEET

Rev. 6-25-91

STATE DIST. NO.	COUNTY	PROJECT NO.	SHEET NO.
16	NUECES	HES 0005(606)	7



REMOVAL QUANTITIES

(#)	Remove M.B.G.F. (LF)	Remove M.B.G.F. w/B.O. (LF)	Remove Term. Anch. Sect. (EA)
1	755		
2		175	1
3		640	1
4		~~504~~	~~1~~
5	~~362~~		~~1~~
6	~~452~~ 462.5		2
7	~~440~~		~~2~~
8		~~450~~	~~2~~
9		~~451~~ 112.5	~~2~~ 1
10	465		2
11	150		2
12	100		~~1~~
13		~~110~~ 112.5	1
14	453		
15	317		
16	76		
17	127		
18	440		1
19	227		
20	530		
21	594		
22	275		1
23	65		
24	~~EXIST. TO REMAIN~~ 75		
25	345		
Total	~~6251~~ 5456.5	~~2330~~ 1040	~~20~~ 12
	+ 212.5 ADD ONS		+ 2 ADD ONS
	5669.0 TOTAL		14 TOTAL

ADD ONS

	MBGF	T.A.S.
27	150.0	
28	37.5	2
29	25.0	
	212.5	2

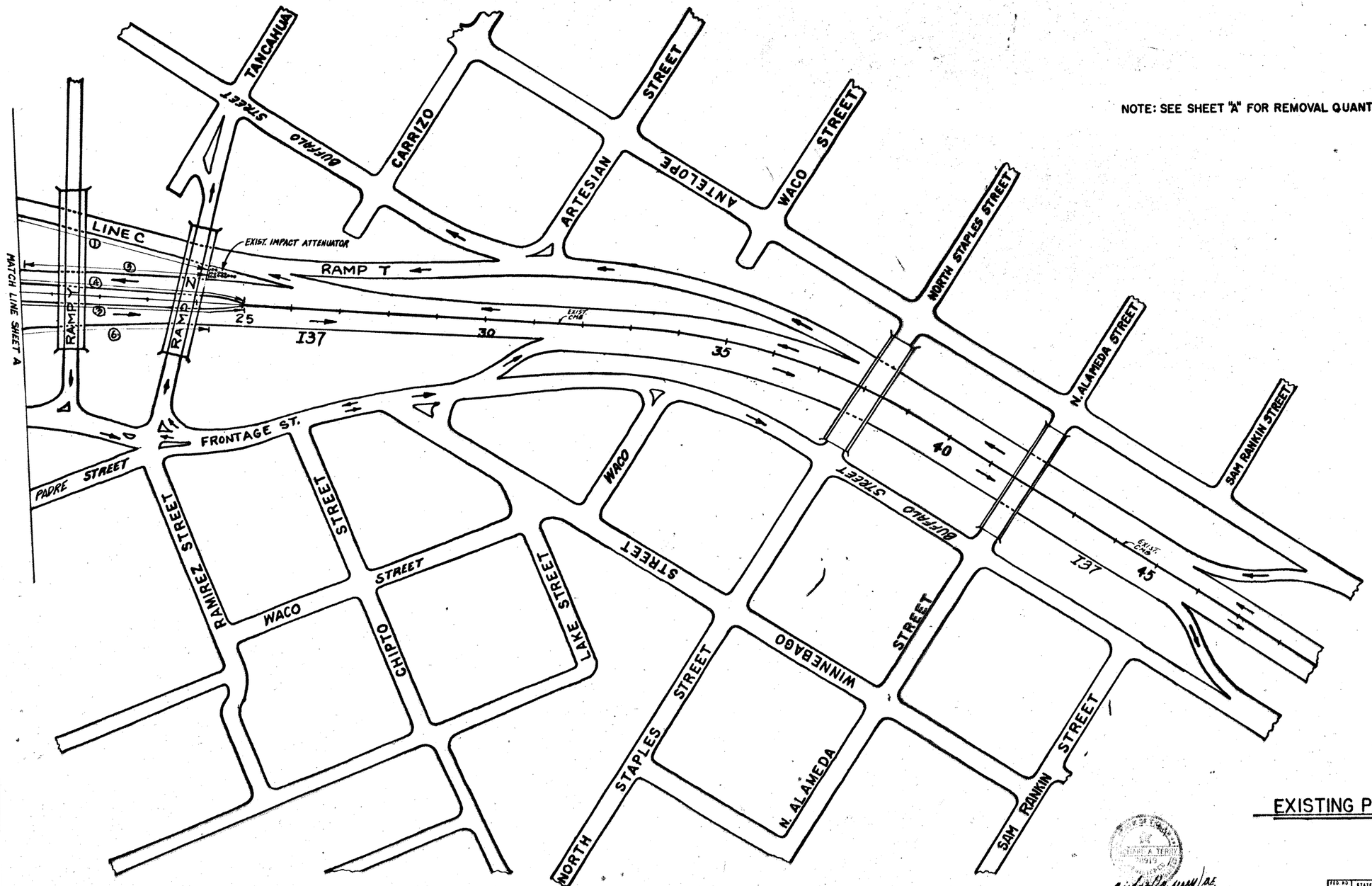
#	REMOVE TY. T RAILING (L.F.)
25	180
26	180
27	
28	
29	
30	
31	
32	
	360

Andrew A. Lucy P.E.
7/10/90

EXISTING PLAN 8

FED. RD. DIST. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES0005(606)				8
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB.	HIGHWAY NO.
16	NUECES		74	06	164	US181

NOTE: SEE SHEET "A" FOR REMOVAL QUANTITIES.

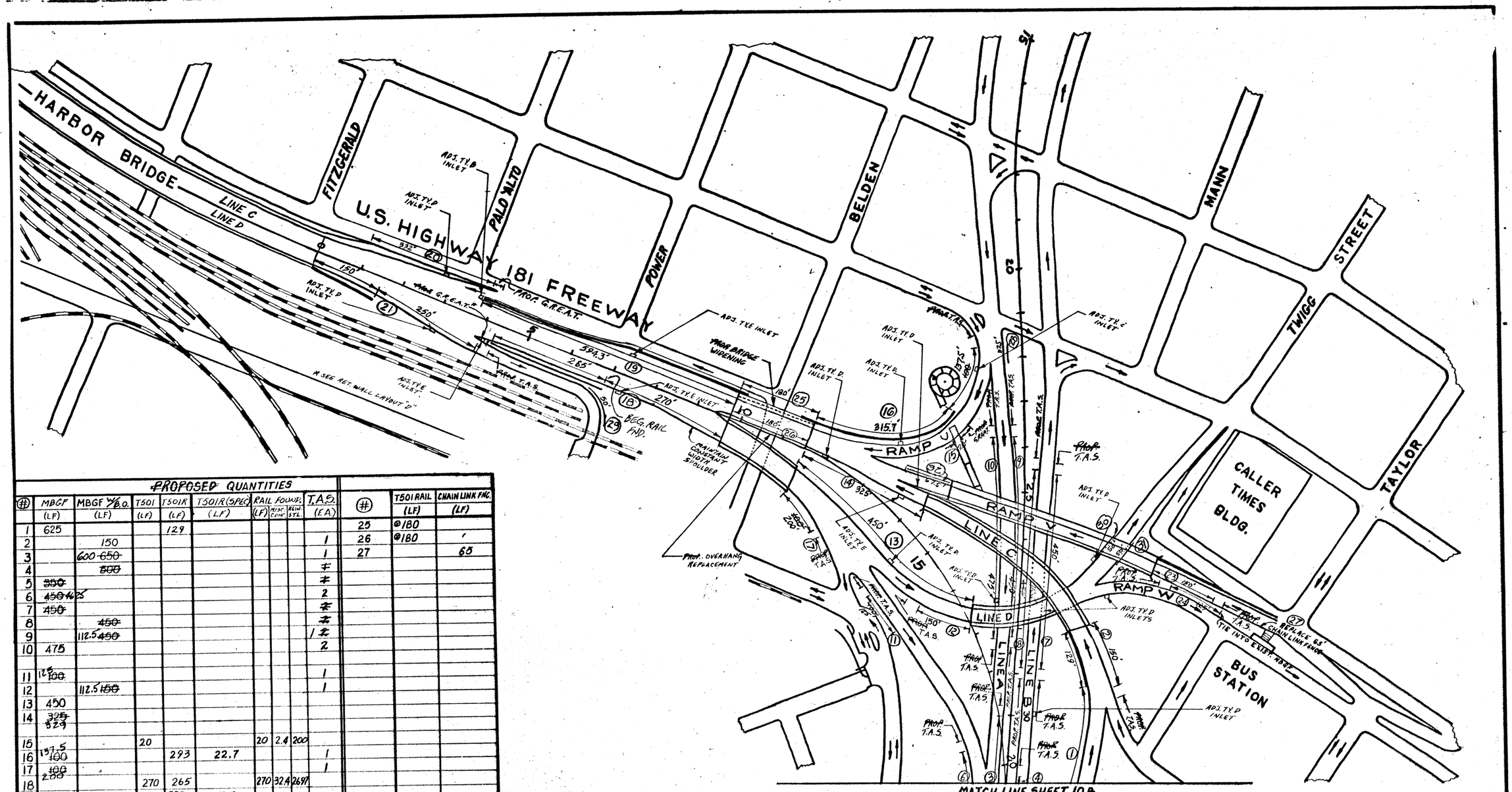


EXISTING PLAN

9

SCALE : 1" = 100'

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES0005(606)			9
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	74	6	164	US181



~~PROPOSED~~ QUANTITIES

#	MBGF (LF)	MBGF W/B.O. (LF)	T501 (LF)	T501R (LF)	T501R (SPEC) (LF)	RAIL FOUND. (LF)	MISC. CONC.	REINF. STL.	T.A.S. (EA)
1	625			129					
2		150							1
3		600 ~~650~~							1
4		~~500~~							~~1~~
5	~~350~~								~~1~~
6	~~450~~ 425								2
7	~~450~~								~~1~~
8		~~450~~							~~1~~
9		112.5 ~~450~~							1 ~~1~~
10	475								2
11	125 ~~100~~								1
12		112.5 ~~150~~							1
13	450								
14	~~325~~ 525								
15			20			20	2.4	200	
16	157.5 ~~100~~			293	22.7				1
17	~~100~~ 200								1
18			270	265		270	32.4	2697	
19				583	11.5				
31	* 50								2
20				332					
21	300 ~~250~~			150					1
32	* 67.5								1
22		450 ~~475~~							2 ~~1~~
23		50 ~~150~~							2 ~~1~~
24	~~125~~	125							2 ~~1~~
28	* 37.5								2
29	*	50							2
30	* 50								2 ~~1~~
TTL	3800 3302	1650 2975	290	1752	34.2	290	34.8	2697	22

#	T501 RAIL (LF)	CHAIN LINK FNC. (LF)
25	@180	
26	@180	'
27		65
TOTAL	@360	65

* Add on quantities

@ Accounted for on Bridge Qtys

~~PROPOSED~~ PLAN

10A

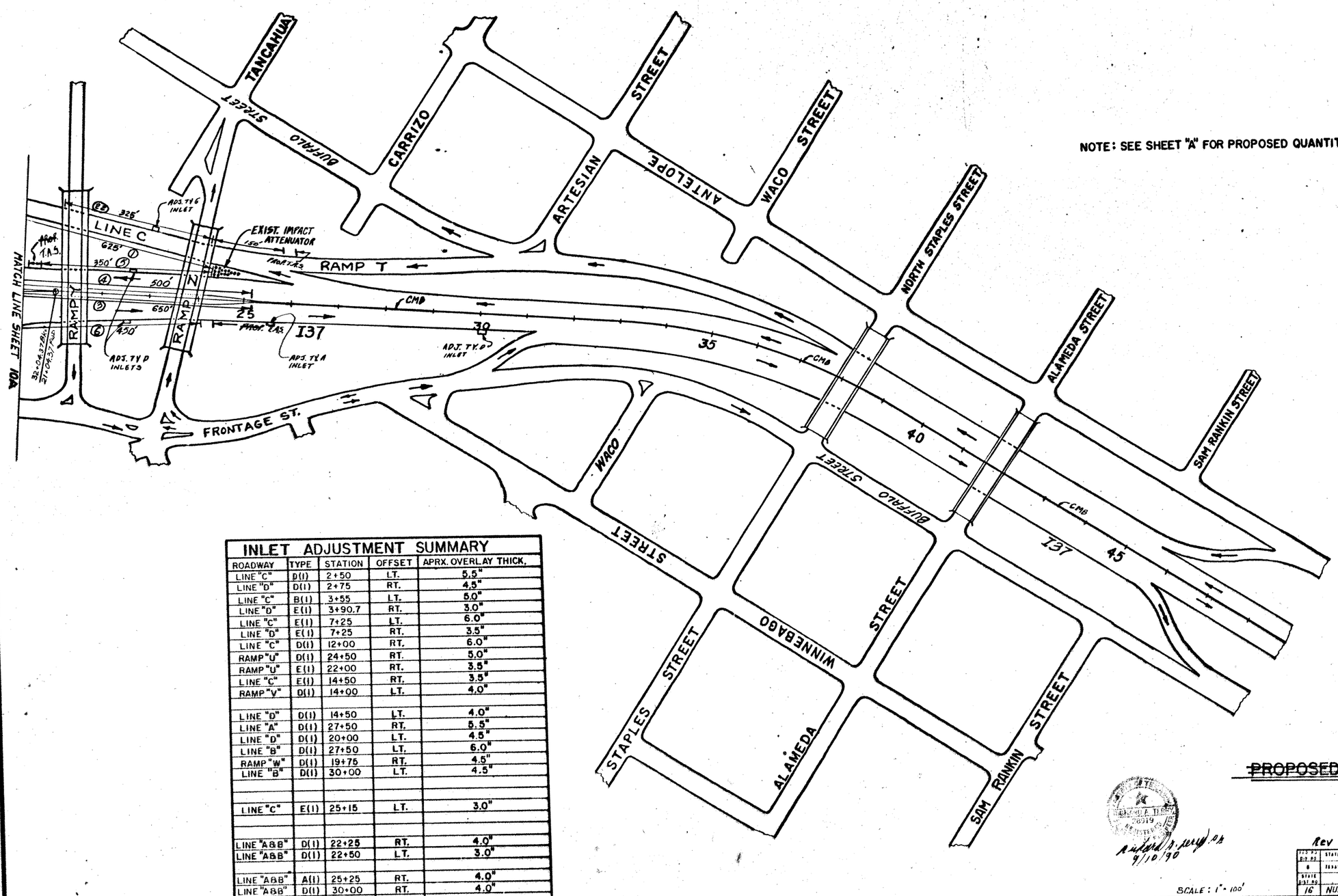
Rev 2-8-91
Rev 12-14-90

DIST. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	HES0005(606)	10A

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	74	06	164	US181

SCALE: 1" = 100'

9/10/90

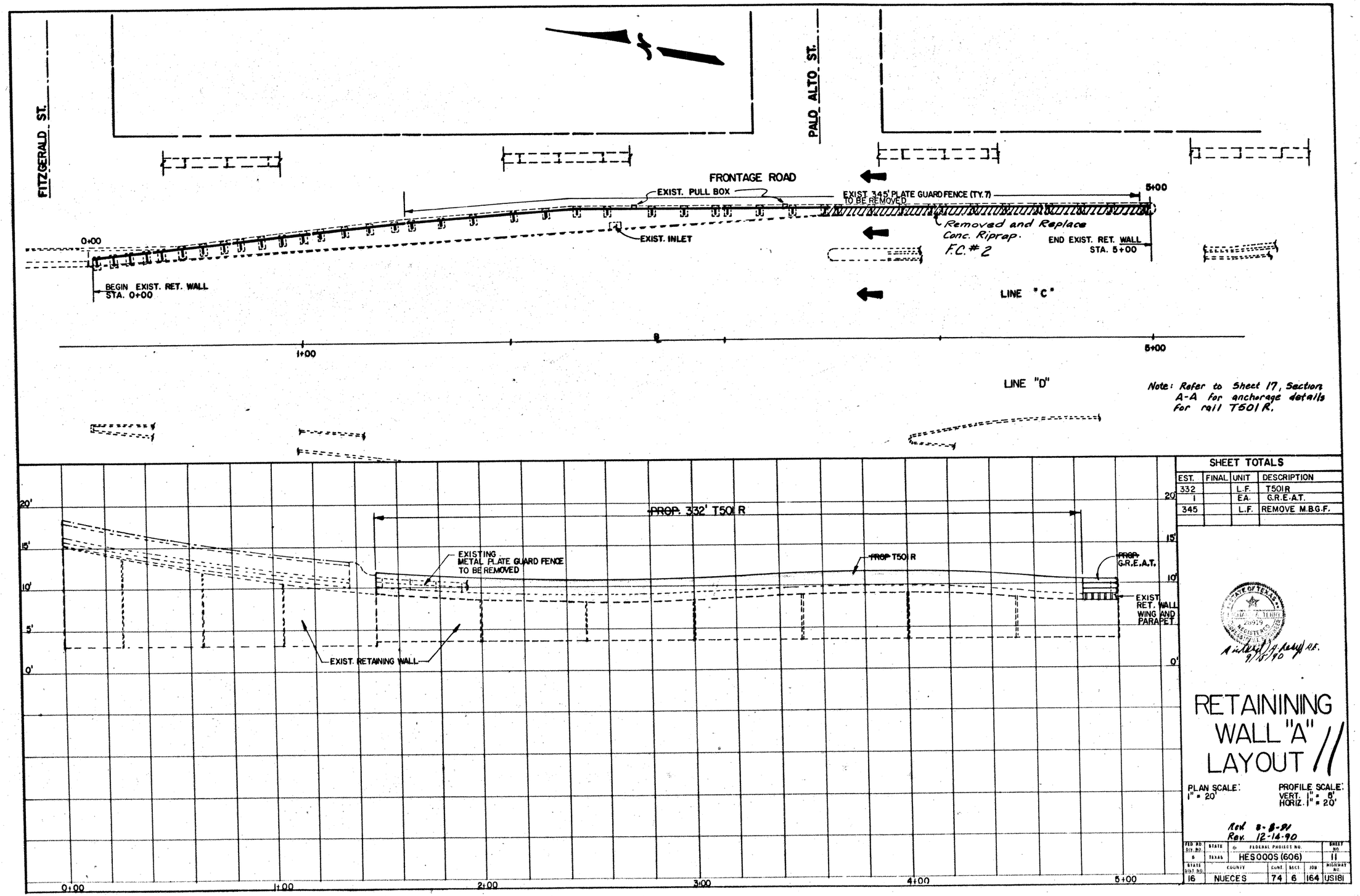


INLET ADJUSTMENT SUMMARY

ROADWAY	TYPE	STATION	OFFSET	APRX. OVERLAY THICK.
LINE "C"	D(I)	2+50	LT.	5.5"
LINE "D"	D(I)	2+75	RT.	4.5"
LINE "C"	B(I)	3+55	LT.	5.0"
LINE "D"	E(I)	3+90.7	RT.	3.0"
LINE "C"	E(I)	7+25	LT.	6.0"
LINE "D"	E(I)	7+25	RT.	3.5"
LINE "C"	D(I)	12+00	RT.	6.0"
RAMP "U"	D(I)	24+50	RT.	5.0"
RAMP "U"	E(I)	22+00	RT.	3.5"
LINE "C"	E(I)	14+50	RT.	3.5"
RAMP "V"	D(I)	14+00	LT.	4.0"
LINE "D"	D(I)	14+50	LT.	4.0"
LINE "A"	D(I)	27+50	RT.	5.5"
LINE "D"	D(I)	20+00	LT.	4.5"
LINE "B"	D(I)	27+50	LT.	6.0"
RAMP "W"	D(I)	19+75	RT.	4.5"
LINE "B"	D(I)	30+00	LT.	4.5"
LINE "C"	E(I)	25+15	LT.	3.0"
LINE "A&B"	D(I)	22+25	RT.	4.0"
LINE "A&B"	D(I)	22+50	LT.	3.0"
LINE "A&B"	A(I)	25+25	RT.	4.0"
LINE "A&B"	D(I)	30+00	RT.	4.0"
TOTAL	22			

Rev 2-8-91

FED. RD. DIV. NO.	STATE				SHEET NO.
6	TEXAS	HES0008(606)			10P
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	74	6	164	US181



SHEET TOTALS

EST.	FINAL	UNIT	DESCRIPTION
332		L.F.	T501R
1		EA.	G.R.E.A.T.
345		L.F.	REMOVE M.B.G.F.

STATE OF TEXAS — REGISTERED PROFESSIONAL ENGINEER

Antonio J. Perez P.E. 9/18/90

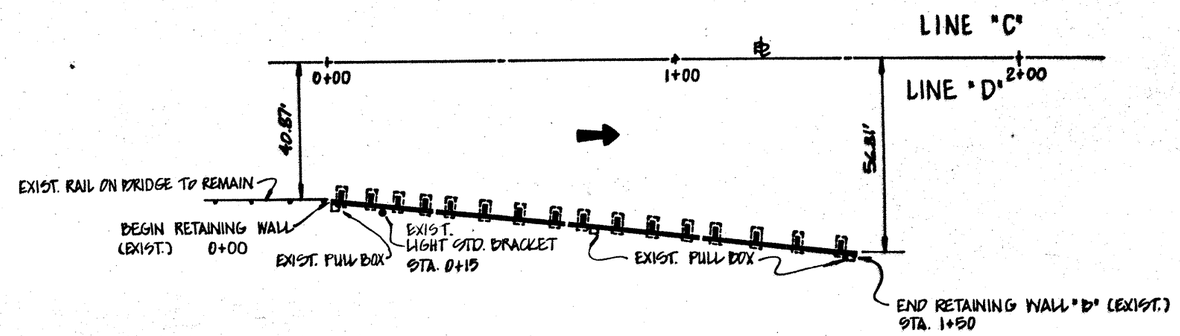
RETAININING WALL "A" LAYOUT //

PLAN SCALE: 1" = 20'

PROFILE SCALE: VERT. 1" = 8' HORIZ. 1" = 20'

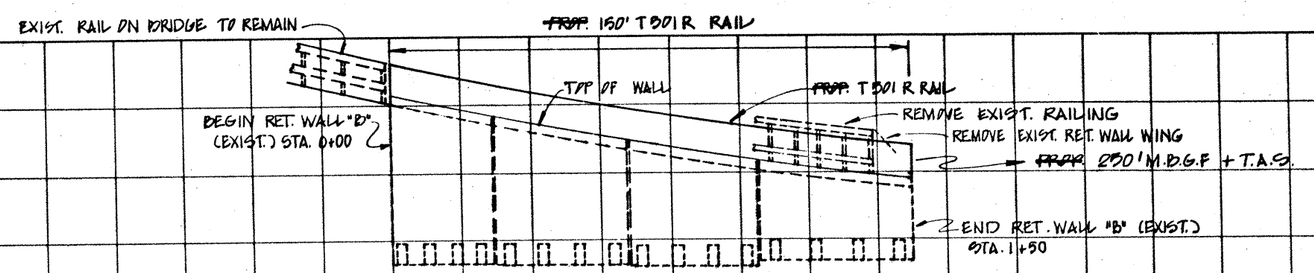
Rev. 8-8-91
Rev. 12-14-90

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES000S (606)				11
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES		74	6	164	US181



Note: Refer to Sheet 17, Section A-A for anchorage details for rail T501R.

SHEET TOTALS			
FINAL	EST.	UNIT	DESCRIPTION
	150	L.F.	T501 R RAIL
	150	L.F.	REMOVE M.D.G.F.
	250	L.F.	M.D.G.F.
	1	EA.	TERM. ANCHOR SECT.



Richard A. McNyre
9/10/90

RETAINING WALL "D"
LAYOUT

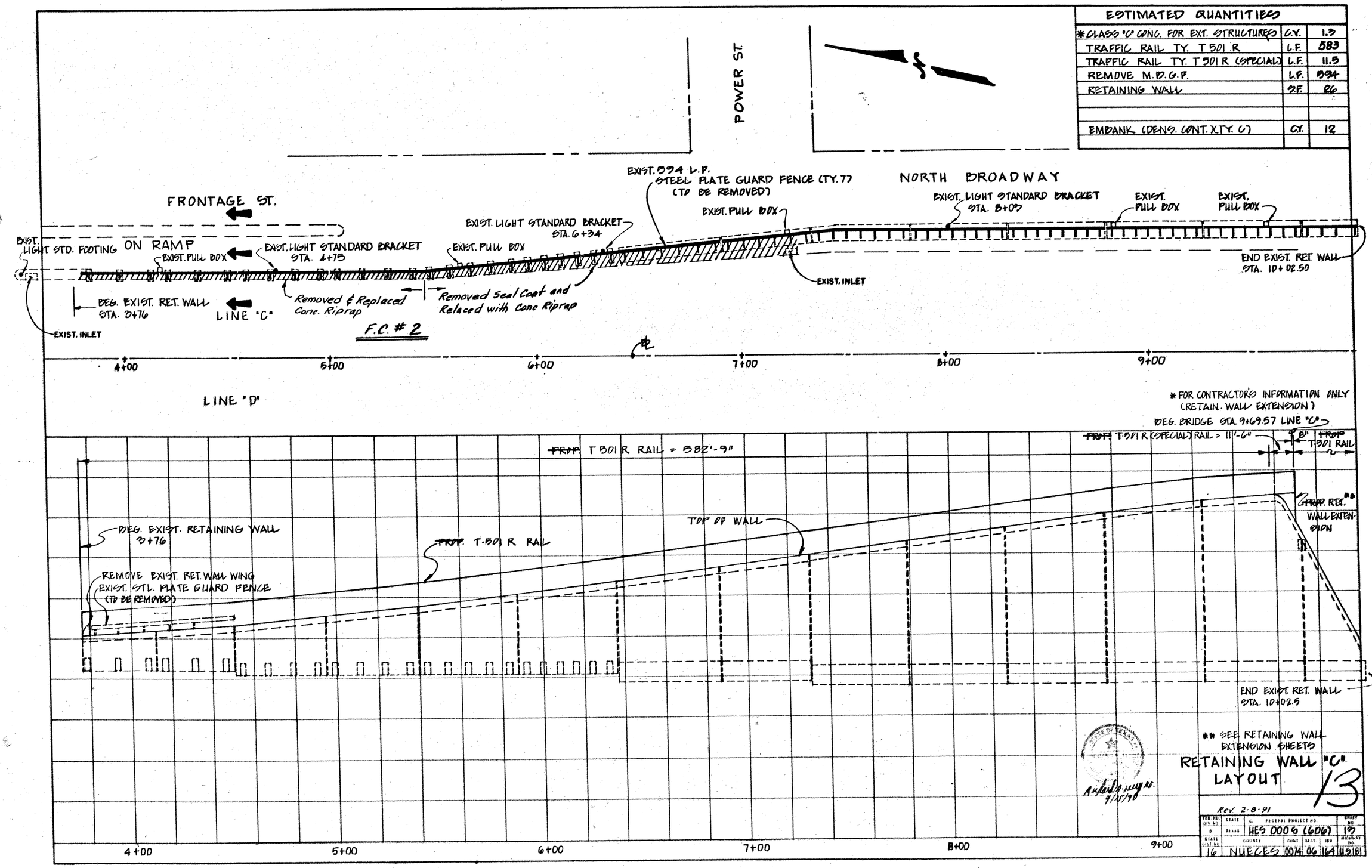
12

Rev. 12-14-90

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	HES 0009 (606)	12

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	0074	06	164	US 181

ESTIMATED QUANTITIES		
*CLASS "C" CONC. FOR EXT. STRUCTURES	C.Y.	1.3
TRAFFIC RAIL TY. T501 R	L.F.	583
TRAFFIC RAIL TY. T501 R (SPECIAL)	L.F.	11.5
REMOVE M.B.G.F.	L.F.	594
RETAINING WALL	S.F.	86
EMBANK. (DENS. CONT. X TY. C)	C.Y.	12



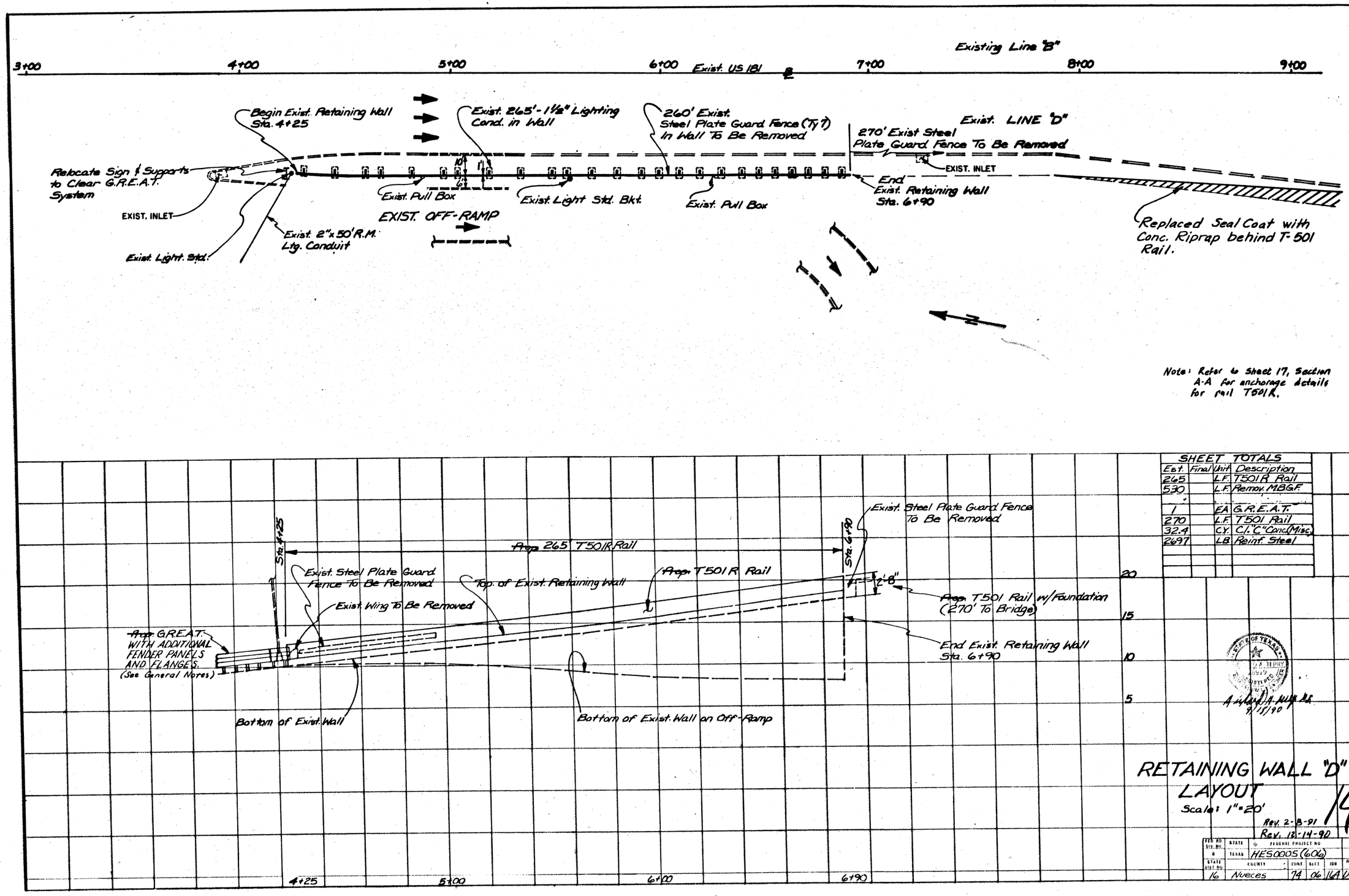
** SEE RETAINING WALL EXTENSION SHEETS

RETAINING WALL "C" LAYOUT

13

Rev. 2-8-91

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES 0009 (606)				17
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES		0074	06	164	US 181



SHEET TOTALS			
Est.	Final	Unit	Description
265		L.F.	T501R Rail
530		L.F.	Remov. MBGF
1		EA	G.R.E.A.T.
270		L.F.	T501 Rail
32.4		C.Y.	Cl. "C" Conc. (Misc.)
2697		LB	Reinf. Steel

STATE OF TEXAS
J. A. TERRY
1069
REGISTERED
PROFESSIONAL ENGINEER

A. J. Terry
9/11/90

RETAINING WALL "D" LAYOUT

Scale: 1" = 20'

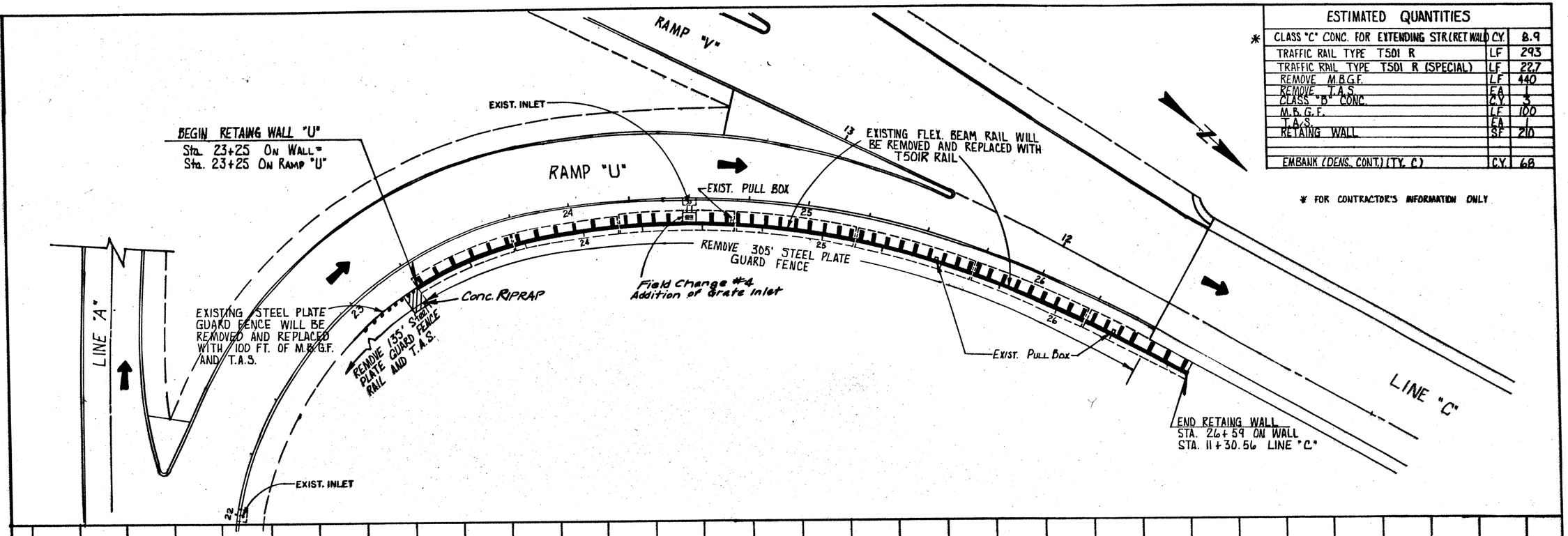
14

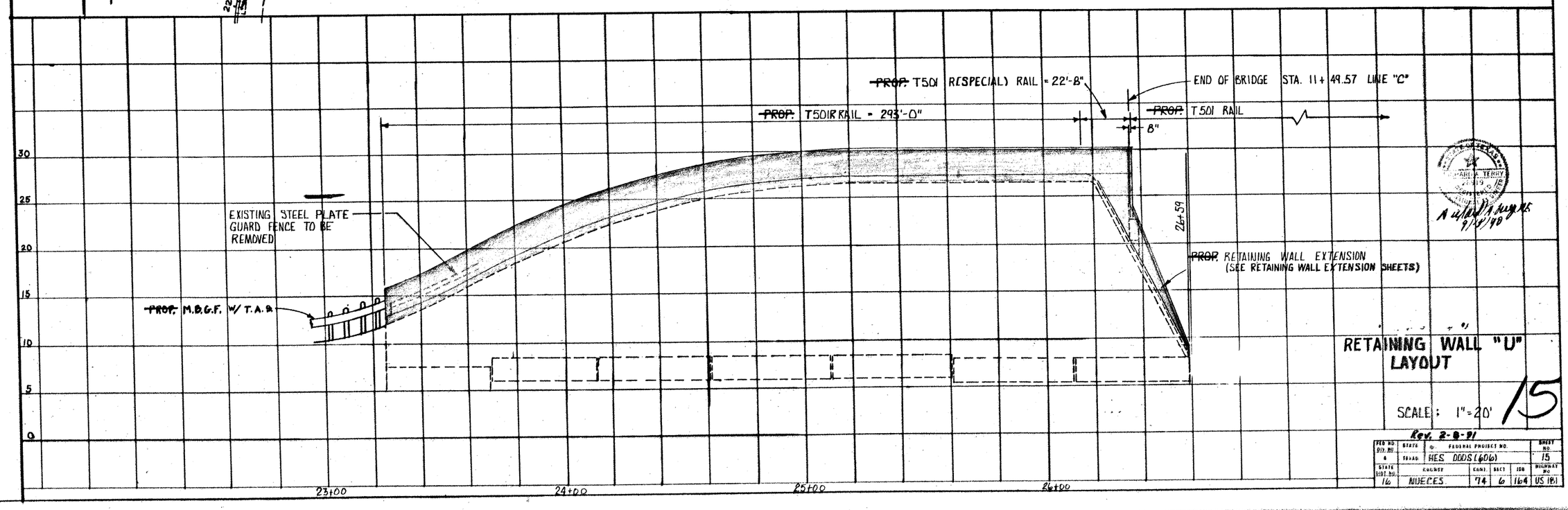
Rev. 2-13-91
Rev. 12-14-90

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO				SHEET NO
6	TEXAS	HES0005(606)				14
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	Nueces		74	06	16A	US 181

ESTIMATED QUANTITIES		
* CLASS "C" CONC. FOR EXTENDING STR.(RET WALL)	C.Y.	8.9
TRAFFIC RAIL TYPE T501 R	LF	293
TRAFFIC RAIL TYPE T501 R (SPECIAL)	LF	22.7
REMOVE M.B.G.F.	LF	440
REMOVE T.A.S.	EA	1
CLASS "B" CONC.	C.Y.	3
M.B.G.F.	LF	100
T.A.S.	EA	1
RETAING WALL	SF	210
EMBANK (DENS. CONT.) (TY. C)	C.Y.	68

* FOR CONTRACTOR'S INFORMATION ONLY





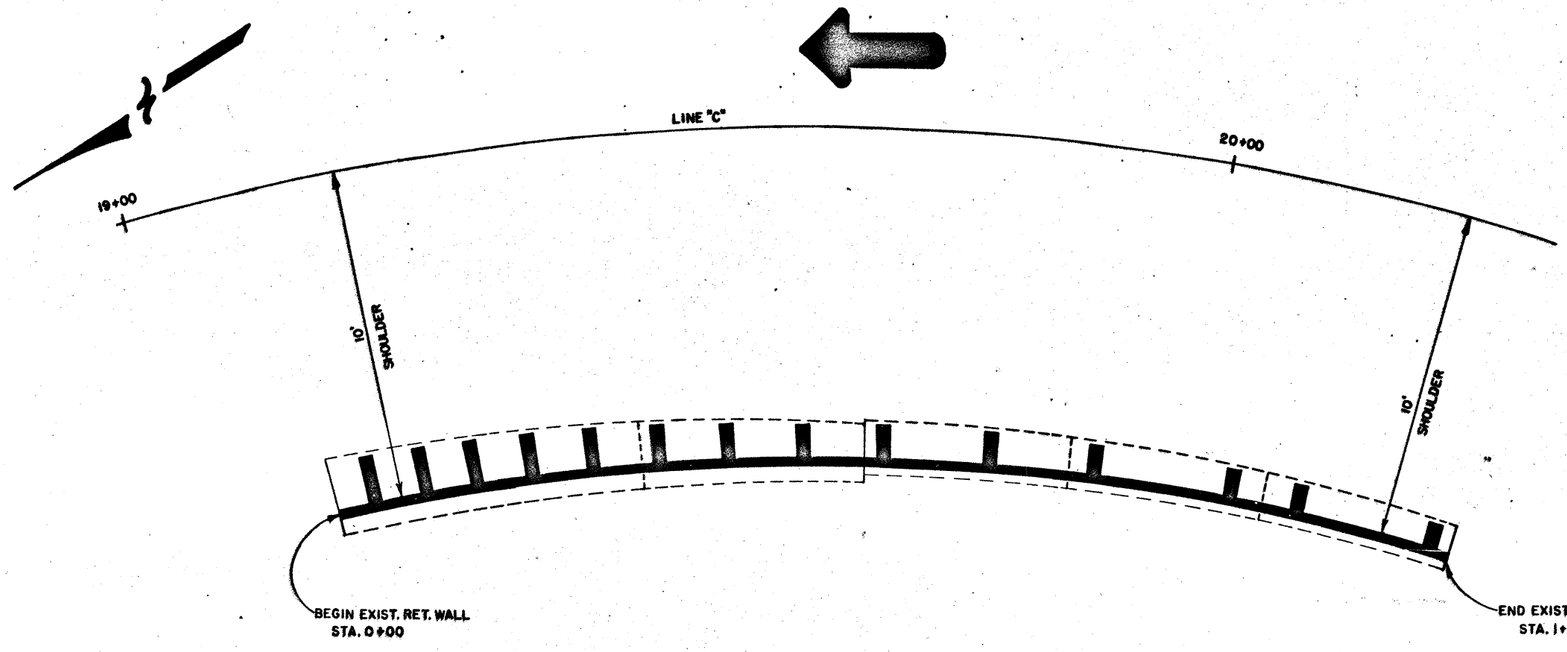
RETAINING WALL "U" LAYOUT

SCALE: 1"=20'

15

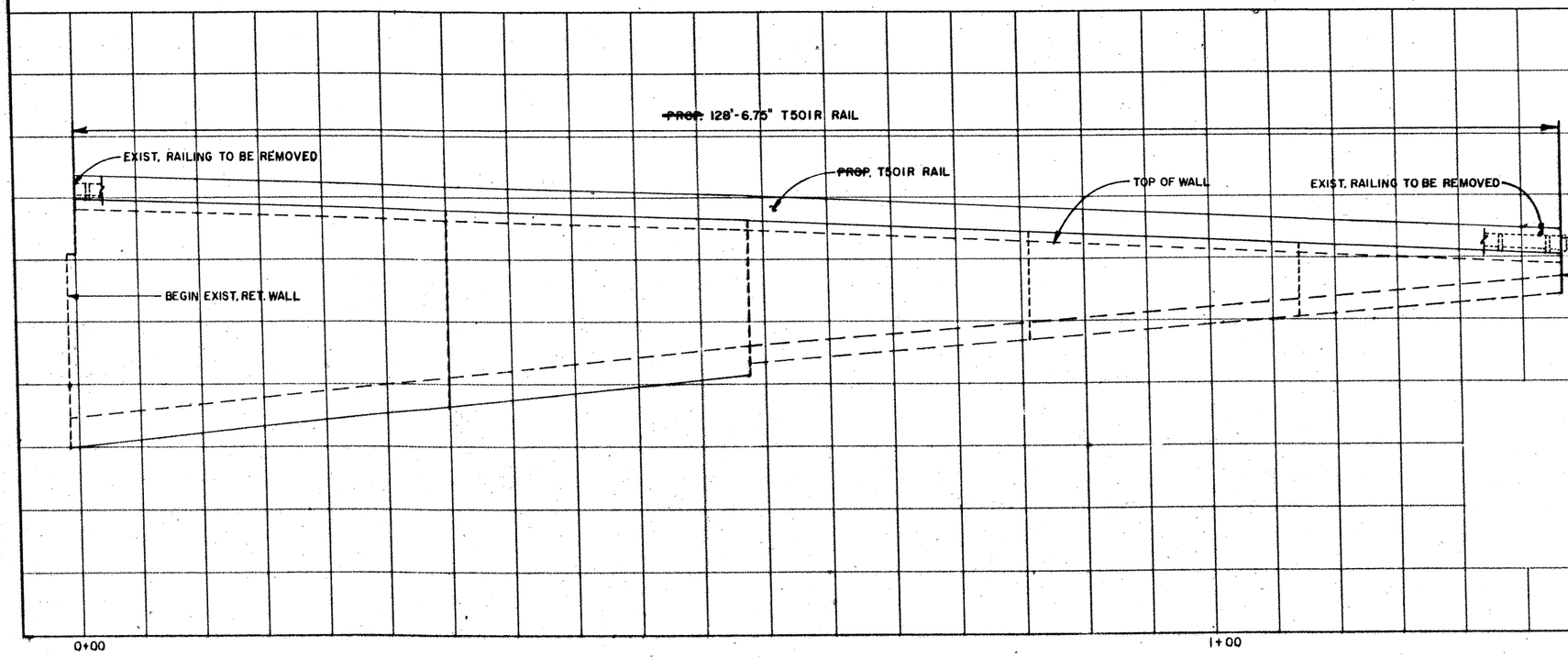
Rev. 2-8-91

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES DODS (606)				15
STATE DIST. NO.	COUNTY		CONT.	SECT	JOB	HIGHWAY NO.
16	NUECES		74	6	164	US 181



NOTE: REFER TO SHEET 17, SECTION A-A FOR ANCHORAGE DETAILS FOR RAIL T501R.

SHEET TOTALS			
FINAL	EST.	UNIT	DESCRIPTION
	129.0	LF	T501R RAIL
	129.0	LF	REMOVE M.B.G.F.
	625.0	LF	M.B.G.F.



NOT TO SCALE

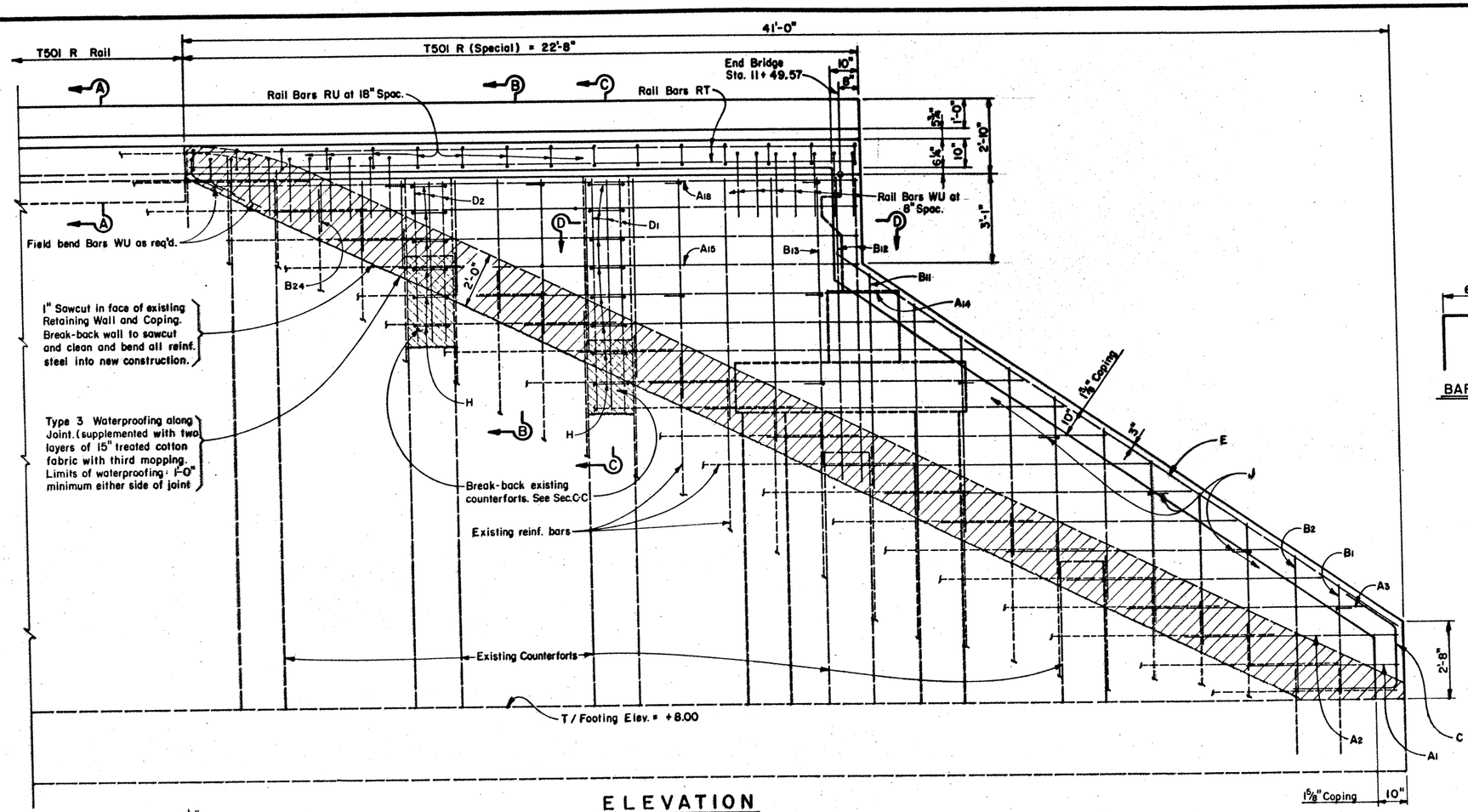
RETAINING WALL LAYOUT

LINE "C" LOCATION NO. 1

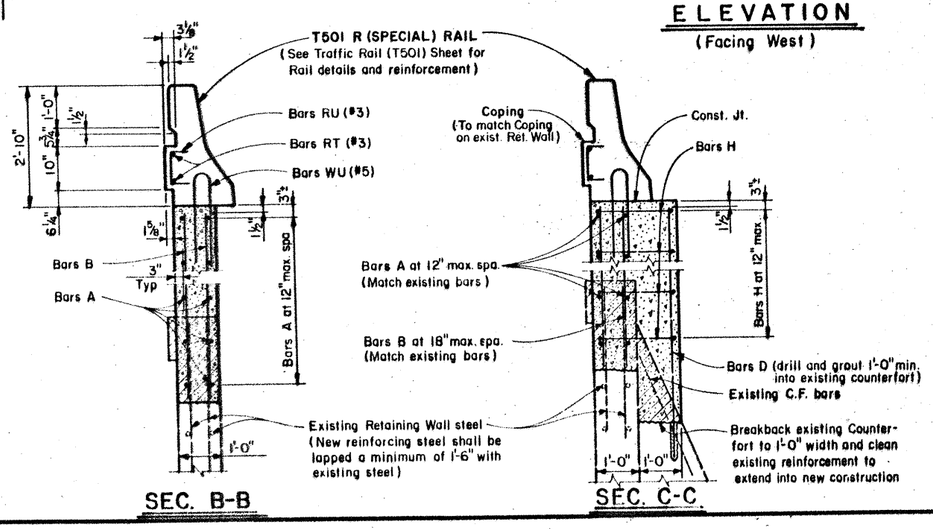
15A

DRAWN	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				HIGHWAY NO.
CHECKED	6	TEXAS	HES0005(606)				US181
TRACED	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
CHECKED	16	NUECES	0074	06	164		15A

SHEET 15A ADDED 2-8-91

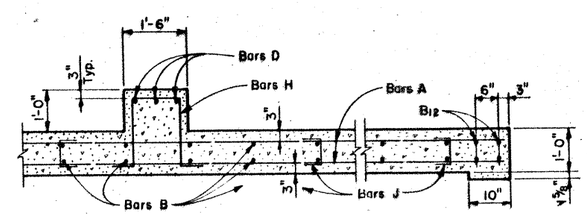


ELEVATION
(Facing West)

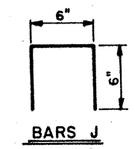


SEC. B-B

SEC. C-C



SEC. D-D



BARS J

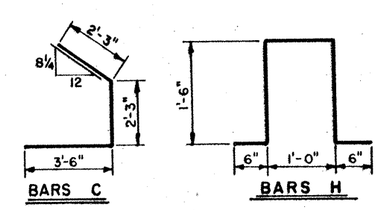
TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A1	2	#5	5'-6"	11
A2	2	#5	7'-6"	16
A3-14	24	#5	12'-0" Av.	300
A15-18	8	#5	19'-0" Av.	159
B1	2	#5	4'-0"	8
B2-11	20	#5	6'-4" Av.	132
B12	4	#5	10'-6"	44
B13-24	24	#5	6'-1" Av.	152
C	2	#5	8'-0"	17
D1	3	#6	9'-2"	41
D2	3	#6	6'-10"	31
E	2	#5	22'-6"	47
H	15	#5	5'-0"	78
J	12	#4	1'-6"	12
Reinforcing Steel			Lb.	✪1048
Cl. "C" Conc. for Ext. Strs.			C.Y.	✪8.9
Type 3 Waterproofing			S.Y.	✪10

✪ For Contractor's information only

A3 = 8'-6"	A14 = 15'-6"	A3-14 = 12'-0" Av.
A15 = 16'-0"	A18 = 22'-0"	A15-18 = 19'-0" Av.
B2 = 4'-11"	B11 = 7'-8"	B2-11 = 6'-4" Av.
B13 = 10'-2"	B24 = 2'-0"	B13-24 = 6'-1" Av.

VARIABLE BARS A & B



BARS C

BARS H

NOTE:
See Sheet 2 of 2 for Section A-A and for Rail Bar Diagrams not shown hereon.

SHEET 1 OF 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

16

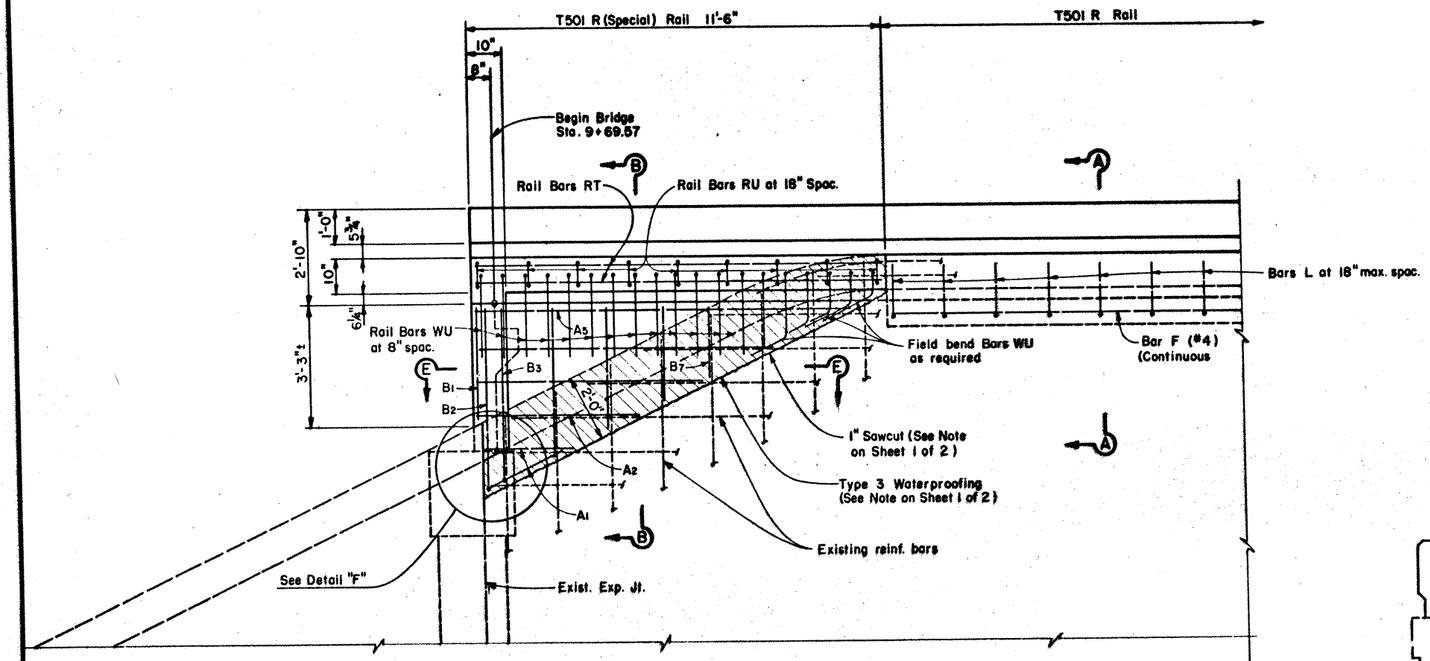
RETAINING WALL EXTENSION AND T501 RAIL RETROFIT

RETAINING WALL "U"

BELDEN STREET OVERPASS WIDENING

ORIGINAL DRAWING DATE	MAY 1990	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
DR. RAC	REVISIONS	16	6	HES0005(606)			16
CH. CEQ		COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW. RNS		NUECES		74	6	164	US181
CK. RAC							

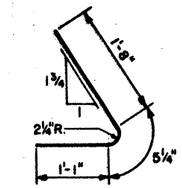
Mark McClelland 6/25/90



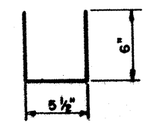
ELEVATION
(Facing West)

A2 = 5'-0"	A5 = 11'-0"	A2-5 = 8'-0"Av
B3 = 5'-0"	B7 = 2'-2"	B3-7 = 3'-7"Av

VARIABLE BARS A2-5 & B3-7



RAIL BARS L (#5)



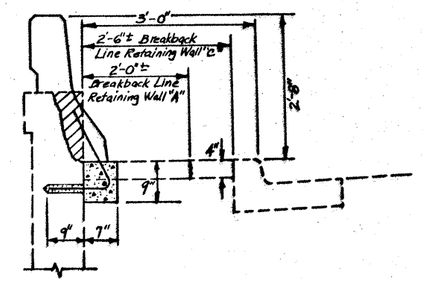
RAIL BARS RU (#3)

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A1	4	#5	2'-9"	11
A2-5	8	#5	8'-0"Av.	67
B1	2	#5	3'-4"	7
B2	2	#5	5'-4"	11
B3-7	10	#5	3'-7"Av.	37

Reinforcing Steel	Lb.	◇133
Cl. "C" Conc. for Ext. Strs.	C.Y.	◇1.3
Type 3 Waterproofing	S.Y.	◇4

◇ For Contractors information only

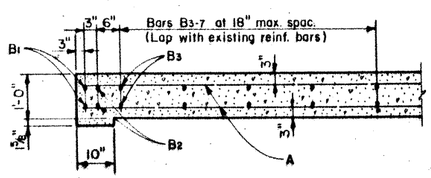


SECTION A-A
(Field Change #2 For Rail Retrofit)

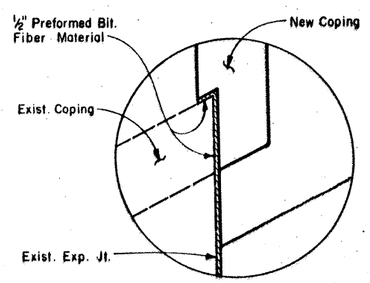
GENERAL NOTES:
Designed in accordance with A.A.S.H.T.O. 1989 Standard Specifications.

Rail Type T501 R (RETROFIT) & (SPECIAL)
All parts of the Rail including Concrete Coping and Support Beam, additional reinforcing bars; F, L, RT, & RU are included in Unit Price Bid for Traffic Rail Type T501 R.
All dimensions, notes, reinforcement, etc. shown on standard Rail Type T501 shall apply unless otherwise shown hereon.
The Retaining Wall Extension details shall replace the Wingwall details shown on T501 Rail Sheet.

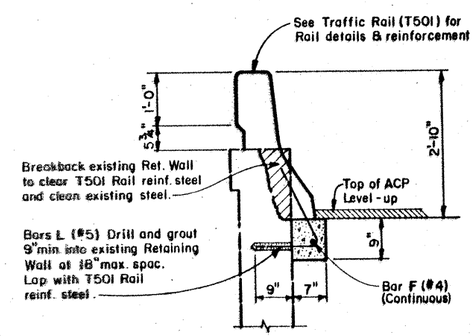
See Sheet 1 of 2 for Section B-B.



SEC. E-E



DETAIL "F"



SECTION A-A
(Typical Section for Rail Retrofit)

SHEET 2 OF 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

17

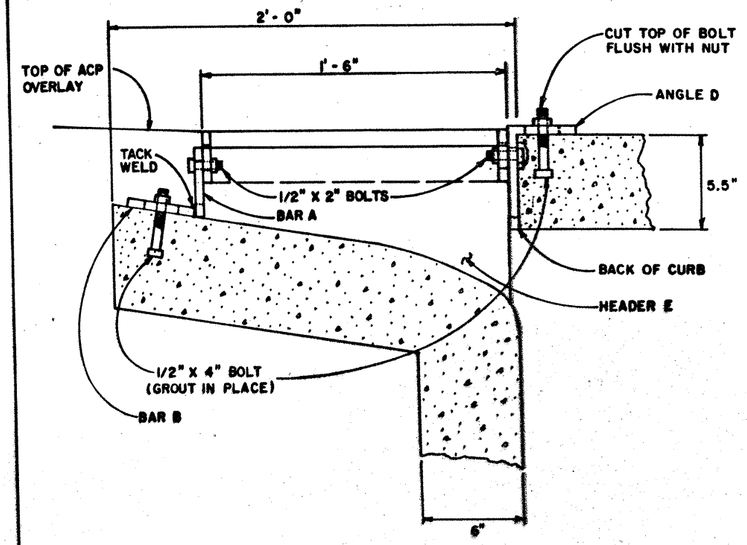
RETAINING WALL EXTENSION AND T501 RAIL RETROFIT
RETAINING WALL "C"
BELDEN STREET OVERPASS WIDENING

ORIGINAL DRAWING DATE: MAY 1990	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #					SHEET
DR - RAC	16	6	HES0005(608)					17
CK - CEQ	COUNTY			CONTROL	SECTION	JOB	HIGHWAY	
DN - RNS	NUECES			74	6	164	US181	
CK - RAC								

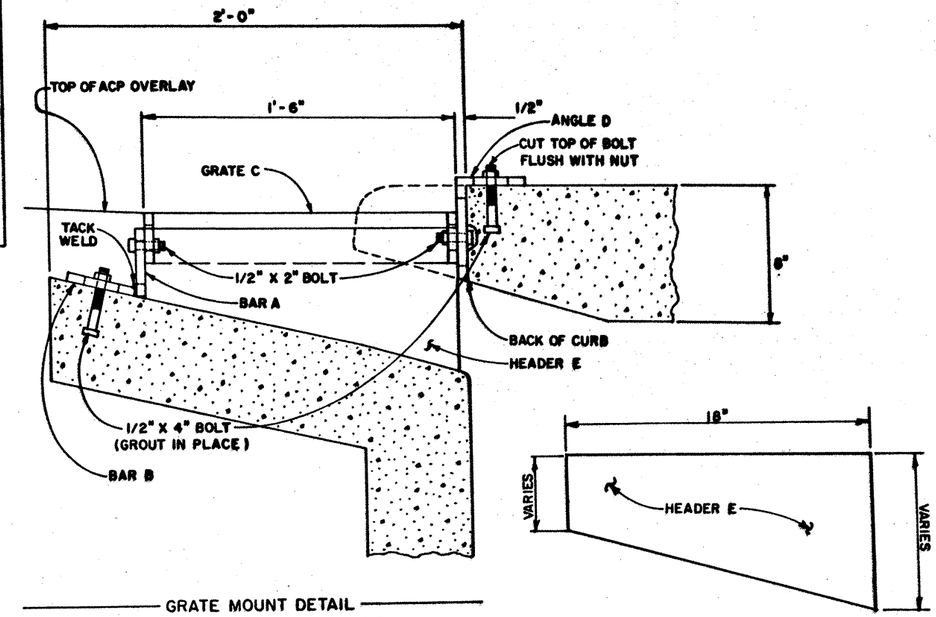
REVISIONS

6/15/90

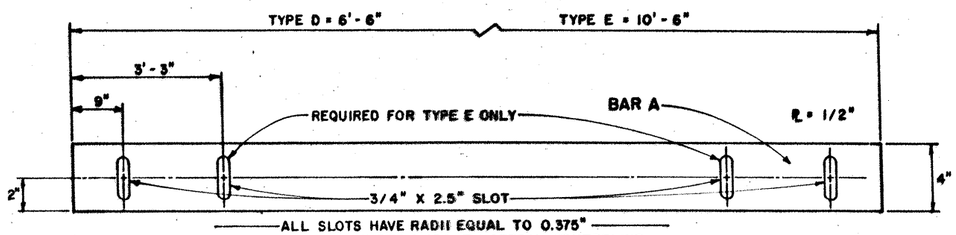
NOTE: PAYMENT FOR VARIABLE DEPTH METAL PLATE HEADERS AT EACH END OF GRATE, GROUTING OF BOLTS, SAWCUTTING AND RESTORING OF PAVEMENT SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE UNIT BID ITEM.
BOLTS AND NUTS SHALL CONFORM TO ASTM A307. STEEL BARS SHALL CONFORM TO ASTM A36.
GRATES, BARS, AND HEADERS SHALL BE GIVEN ONE COAT OF A COMMERCIAL GRADE PRIMER AND TWO COATS OF COMMERCIAL GRADE ALUMINUM PAINT. PAINTED ELEMENTS DAMAGED DURING TRANSPORT OR CONSTRUCTION SHALL BE REPAIRED THROUGH THE APPLICATION OF PRIMER AND ALUMINUM PAINT.
COMMERCIAL GRADE GALVANIZED BOLTS AND NUTS SHALL BE USED.



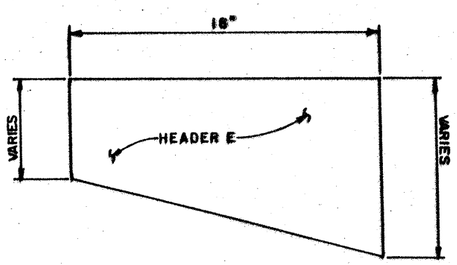
GRATE MOUNT DETAIL
(FOR EXIST. CURB INLET TYPE D & E)
(4" TO 5" OVERLAY THICKNESS)

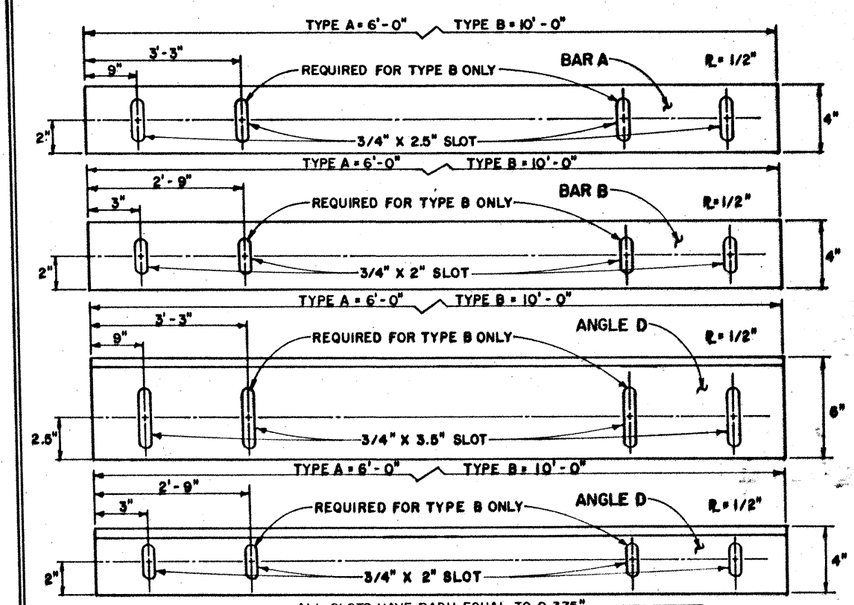


GRATE MOUNT DETAIL
(FOR EXIST. CURB INLET TYPE A & B)
(4" TO 5" OVERLAY THICKNESS)



ALL SLOTS HAVE RADII EQUAL TO 0.375"
BAR IS SYMMETRIC ABOUT LATERAL CENTERLINE





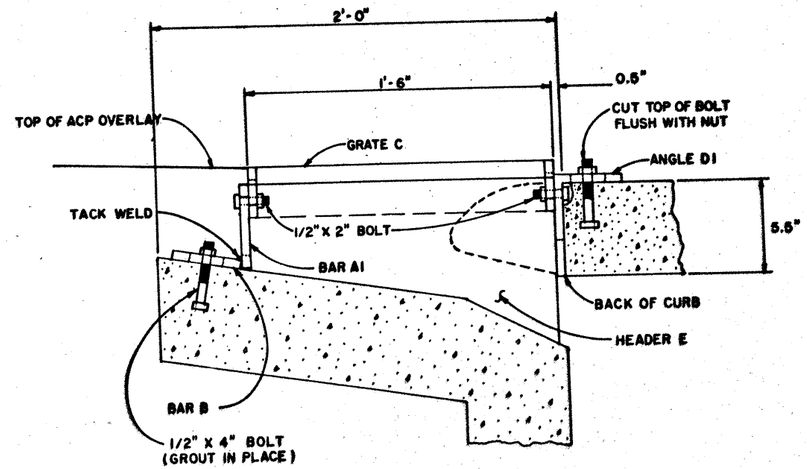
ALL SLOTS HAVE RADII EQUAL TO 0.375"
ALL BARS ARE SYMMETRIC ABOUT THEIR LATERAL CENTERLINES

Ashley A. Luna AE 4-02-91

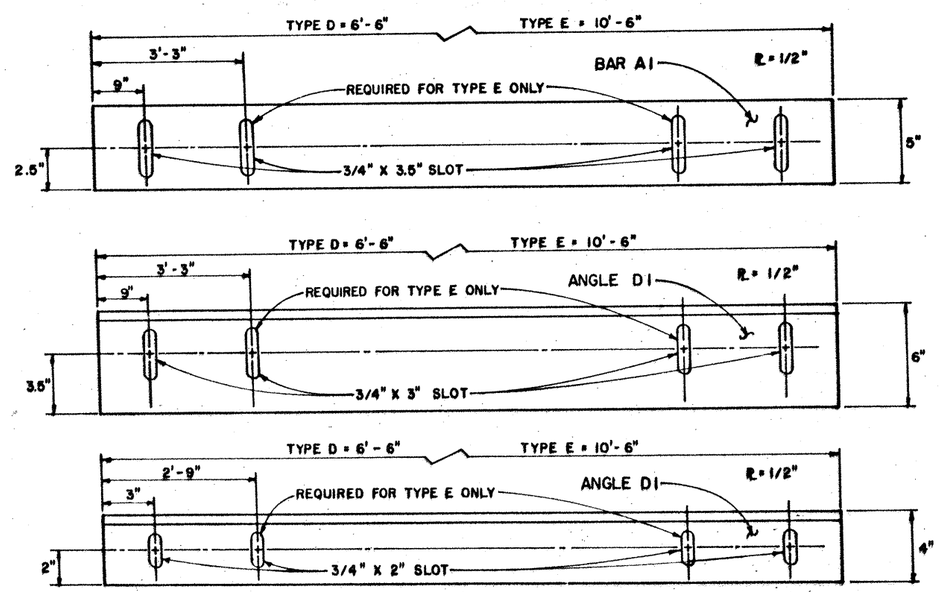
INLET ADJUSTMENT 18

Rev. Sheet 18 2-8-91

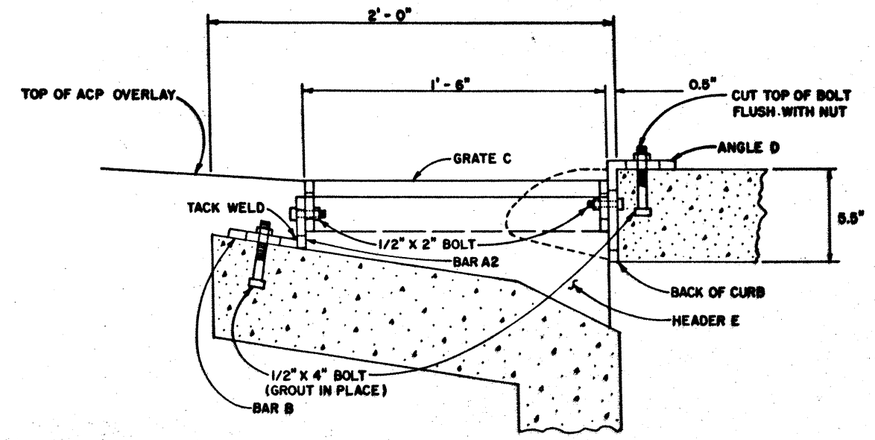
FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES0005(606)			18
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES		0074	06	164	US181



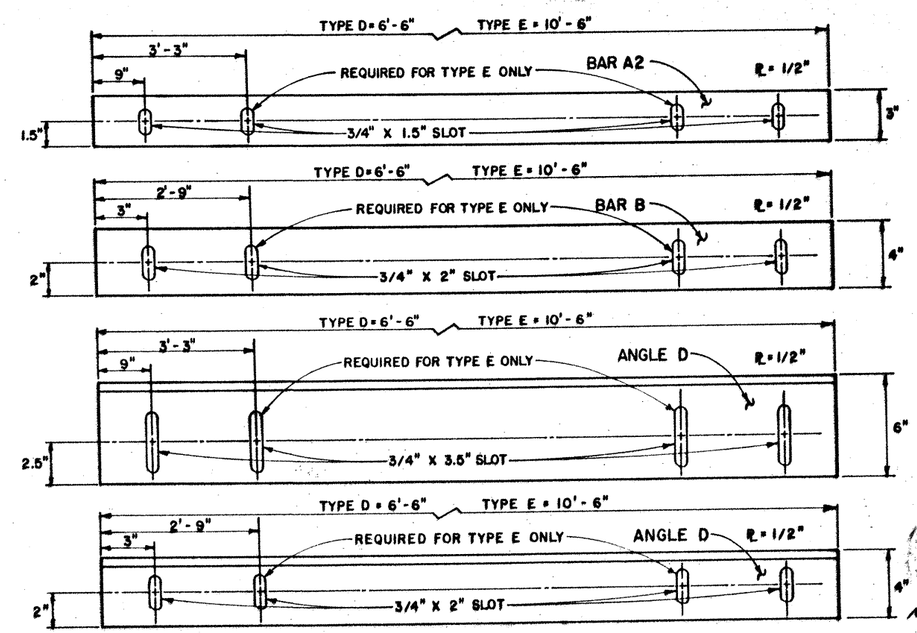
GRATE MOUNT DETAIL
(FOR EXIST. CURB INLET TYPE D & E)
(5" TO 6" OVERLAY THICKNESS)



ALL SLOTS HAVE RADII EQUAL TO 0.375"
ALL BARS AND ANGLES ARE SYMMETRIC TO THEIR LATERAL CENTERLINES



GRATE MOUNT DETAIL
(FOR EXIST. CURB INLET TYPE D & E)
(3" TO 4" OVERLAY THICKNESS)



ALL SLOTS HAVE RADII EQUAL TO 0.375"
ALL BARS AND ANGLES ARE SYMMETRIC TO THEIR LATERAL CENTERLINES

18A

STATE OF TEXAS
CAPITAL LIBRARY
DOCUMENTS DIVISION

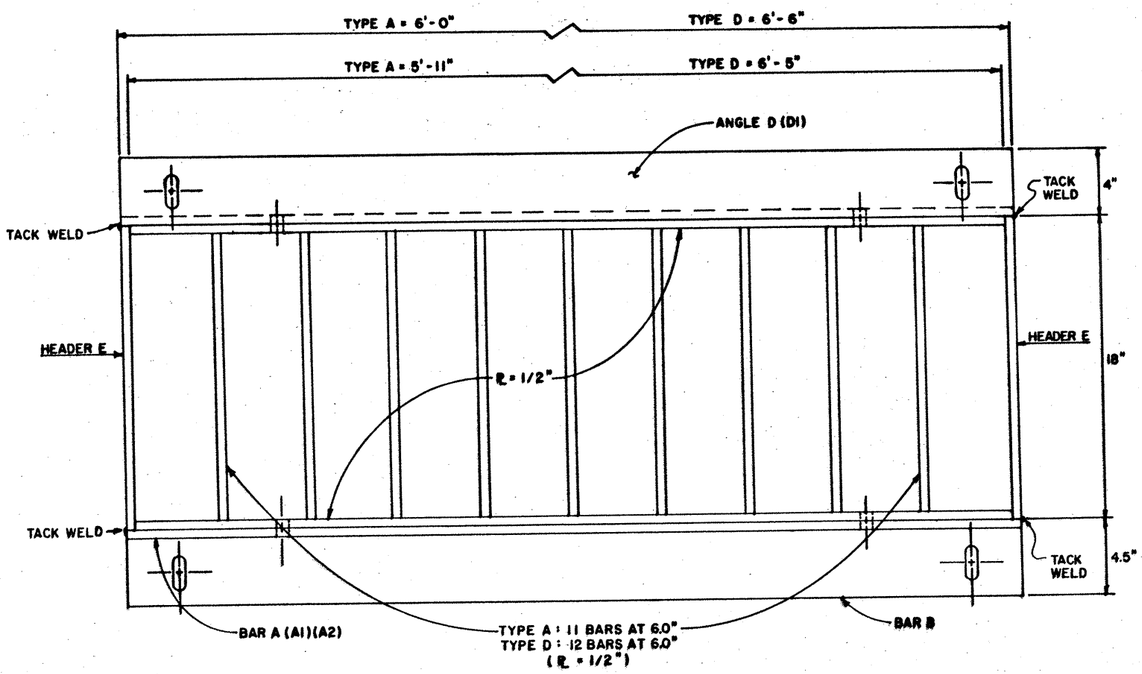
Approved 4-26-99

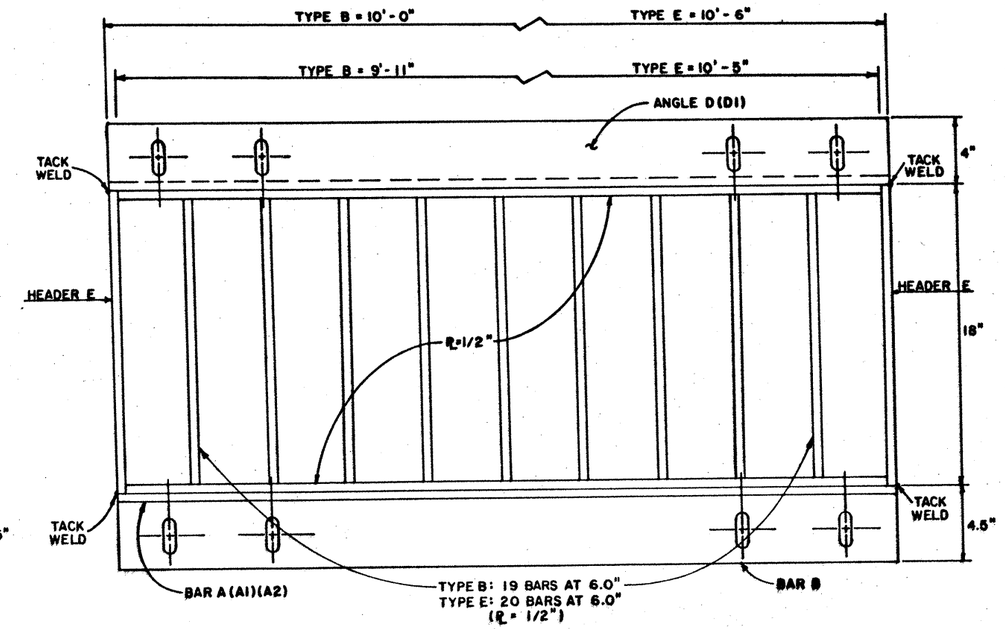
INLET ADJUSTMENT

Repl. Sheet 18 2-8-91

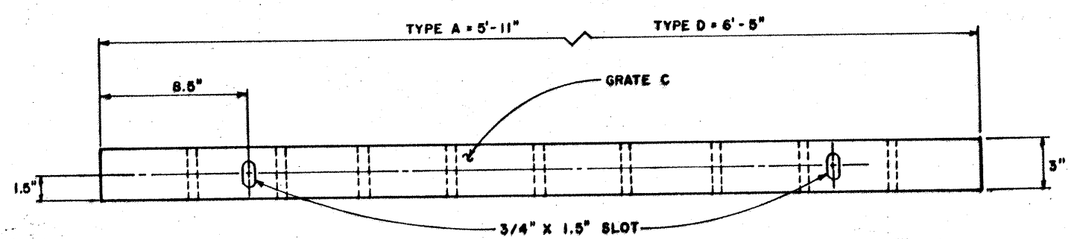
FED RD DIV NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES000S(606)			18A
STATE DIST NO.	COUNTY	CONT.	SECT	JOB	HIGHWAY NO
16	NUECES	0074	06	164	US181

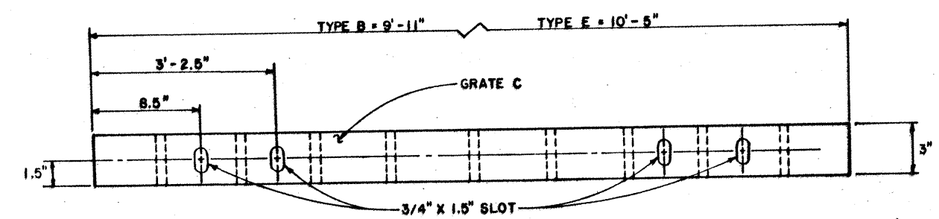
* SEE SHEET FOR DETAILS ON





SEE INLET ADJUSTMENT SHEET FOR DETAILS ON PLATE A, PLATE B, AND ANGLE D.





ALL PLATES ARE SYMMETRIC TO THEIR RESPECTIVE CENTERLINES

* SEE ALSO NOTES ON INLET ADJUSTMENT SHEET

STATE OF TEXAS
RICHARD A. JERRY
28919
REGISTERED
PROFESSIONAL ENGINEER

Richard A. Jerry P.E.
4-26-91

GRATE DETAILS

19

RFL. SHT. 19 2-8-91

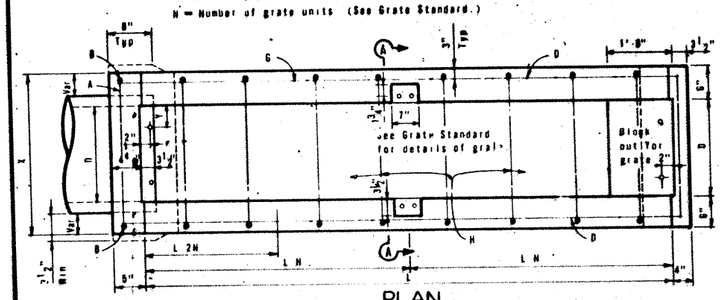
FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES000S(606)			19
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	0074	06	164	US181

SCALE: 1" = 1/3'

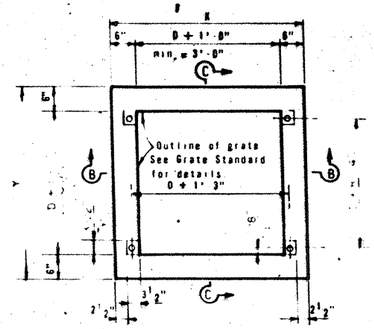
BILL OF REINFORCING STEEL FOR SLOPING INLET

SLOPE	Y	N	DIAM. OF PIPE = D	TABLE OF DIMENSIONS X	H	L	BARS A NO	SIZE	SPA	LGTH	WT.	BARS B NO	SIZE	SPA	LGTH	WT.	BARS C NO	SIZE	SPA	LGTH	WT.	BARS D NO	SIZE	SPA	LGTH	WT.	BARS E NO	SIZE	SPA	LGTH	WT.	BARS G NO	SIZE	SPA	LGTH	WT.	BARS H AV. NO	SIZE	SPA	LGTH	WT.	BARS L NO	SIZE	SPA	LGTH	WT.	BARS Li AV. NO	SIZE	SPA	LGTH	WT.	TOTAL QUANT. STEEL LBS.	CONC. C.Y.
6:1	4 1/2"	2	18"	2'-6"	2'-1 1/2"	12'-9"	2	#4	~	2'-3"	3	2	#4	~	2'-5"	3	1	#4	~	2'-3"	2	3	#4	12"±	13'-3"	27	6	#4	12"±	2'-6"	10	2	#4	~	13'-5"	18	12	#4	12"	4'-5"	35	2	#4	12"	2'-0"	3	2	#4	12"	6'-10"	9	110	1.1
6:1	5"	2	24"	3'-0"	2'-8"	16'-0"	2	#4	~	2'-10"	4	2	#4	~	3'-0"	4	1	#4	~	2'-9"	2	4	#4	12"±	16'-6"	44	8	#4	12"±	2'-6"	13	2	#4	~	16'-9"	22	15	#4	12"	5'-6"	55	2	#4	12"	2'-0"	3	2	#4	12"	9'-10"	13	160	1.7
6:1	5 1/2"	3	30"	3'-6"	3'-2 1/2"	19'-3"	2	#4	~	3'-5"	5	2	#4	~	3'-9"	5	1	#4	~	3'-3"	2	4	#4	12"±	19'-9"	53	8	#4	12"±	2'-6"	13	2	#4	~	20'-0"	27	19	#4	12"	6'-6"	83	2	#4	12"	2'-0"	3	4	#4	12"	10'-1"	27	218	2.4
6:1	6"	3	36"	4'-0"	3'-9"	22'-0"	2	#4	~	4'-0"	5	2	#4	~	4'-2"	5	1	#4	~	3'-9"	3	5	#4	12"±	23'-0"	77	10	#4	12"±	2'-6"	17	2	#4	~	23'-3"	31	22	#4	12"	7'-7"	111	2	#4	12"	2'-0"	3	6	#4	12"	13'-9"	55	307	3.3
6:1	6 1/2"	3	42"	4'-6"	4'-3 1/2"	25'-9"	2	#4	~	4'-7"	6	2	#4	~	4'-9"	6	1	#4	~	4'-3"	3	5	#4	12"±	26'-3"	88	10	#4	12"±	2'-6"	17	2	#4	~	26'-8"	36	25	#4	12"	8'-7"	143	2	#4	12"	2'-0"	3	6	#4	12"	14'-10"	55	357	4.4
6:1	4 1/2"	4	48"	5'-0"	4'-10"	29'-0"	2	#4	~	5'-2"	7	2	#4	~	5'-4"	7	1	#4	~	4'-9"	3	6	#4	12"±	29'-6"	118	12	#4	12"±	2'-6"	20	2	#4	~	29'-10"	40	29	#4	12"	9'-7"	186	2	#4	12"	2'-0"	3	8	#4	12"	14'-5"	77	461	5.7

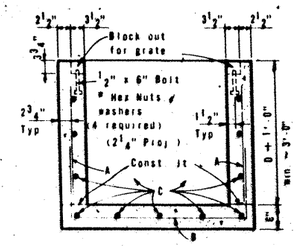
Note For pipe sizes of 21", 27", and 33" use inlets for pipe sizes 24", 30", and 36" respectively
N = Number of grate units (See Grate Standard.)



PLAN



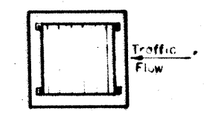
PLAN



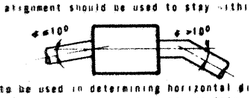
SECTION B-B

GENERAL NOTES

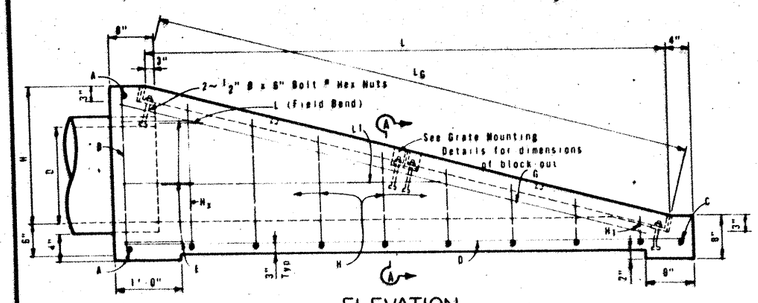
Quantities shown hereon are for the Contractor's information only. Unless otherwise shown in the plans payment will be made for each inlet of the Type specified.
Exposed edges shall be chamfered 3/4".
Alternate design drawings bearing the seal of a registered professional engineer will be acceptable for precast construction of inlets.
Shop drawings will not be required.
The contractor may with the approval of the Engineer furnish inlets of equivalent structural design.
In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel the reinforcement shall be bent or adjusted to clear as directed by the Engineer.
Approximately 2 cy of 6 sack riprap will be used for sloping around perimeter of each inlet except inlets in paved medians.



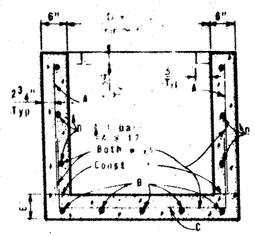
Connecting pipes should enter within 10° of normal to inlet wall. If necessary, pipe elbow or curved approach alignment should be used to stay within this limit.



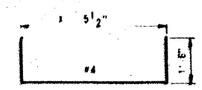
The pipe diameter "D" to be used in determining horizontal dimensions of Type "H" inlet shall be the largest pipe entering or exiting the inlet which would control that particular wall dimension. For vertical dimension, use largest "D" or 1'-0" above highest pipe soffit as a minimum dimension.



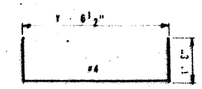
ELEVATION
SLOPING INLET TYPE S



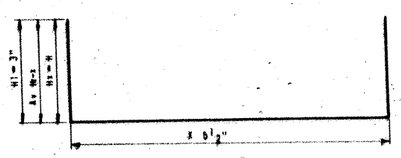
SECTION C-C
HORIZONTAL INLET TYPE H



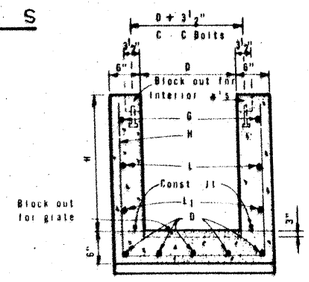
BARS B



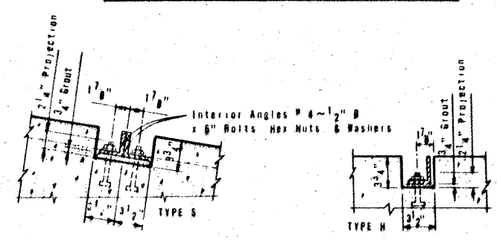
BARS C



BARS H



SECTION A-A



GRATE MOUNTING DETAILS

FIELD CHANGE No. 4

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SLOPING INLET TYPE S AND HORIZONTAL INLET TYPE H

IL-S IL-H (MOD) 19A

ORIGINAL DRAWING DATE DEC 1977

DN ADC
CK THD
DW MGB
CK THD

REVISIONS
Rev 8 86 Gen Notes
Rev 7 91 Grate Placement, Traffic Flow, and General Notes

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
16	6	HES 0005(606)	19A

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
NUECES	74	6	164405(1)	

ILLUMINATION ESTIMATE & QUANTITY SUMMARY

ITEM CODE		DESCRIPTION	UNIT	QUANTITY (ROADWAY)		QUANTITY* (BRIDGE)	
ITEM NO.	DESC. CODE			EST.	FINAL	EST.	FINAL
610	164	RDWY ILL ASM (U/P TY 1)(.15KW)S (SPL CO)	EA.			2	
612	004	RELOC RDWY ILL ASSEM TRANS BASE	EA.	13		2	
616	001	RDWY ILL ASSEM FND (TY A)	EA.	1			
618	046	CONDT (PVC)(SCH 40)(1 1/2IN)	L.F.	3180		250	
620	032	ELECT. CONDR (#6)(TY-XHHW)	L.F.	1670			
620	033	ELECT. CONDR (#4)(TY-XHHW)	L.F.	6340		500	
620	002	ELECT. CONDR (#6 BAR)	L.F.	3855		250	
624	022	GROUND BOX (RPM)(TY A)(122311) APRON	EA.	3			

* SHOWN ALSO ON ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS SHEET FOR BELDEN ST. OVERPASS

ILLUMINATION
ESTIMATE & QUANTITY
SUMMARY

20

STATE	FEDERAL AID PROJECT NO.					SHEET NO.
TEXAS	HES 0005(606)					US181
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
16	NUECES	74	6	164		20

TERRY3

* REMOVE AND REPLACE WITH NEW TYPE I UNDERPASS LUMINAIRE.
** REMOVE AND RELOCATE TO NEW BRACKET ON BELDEN BRIDGE.
Ø REMOVE AND RELOCATE LUMINAIRE.

EXISTING ASSEMBLY SUMMARY

ASSMBLY #	ASSEMBLY DESCRIPTION	MOUNTING TYPE	ASSEMBLY LOCATION
A-1	TYPE D - EXISTING	BRACKET MT.	8+40 LINE "D"
A-2	TYPE G - EXISTING	BRACKET MT.	9+82 LINE "D"
Ø B-1	TYPE D - EXISTING	CONC. FNDT.	8+03 LINE "C"
Ø** B-2	TYPE G - EXISTING	BRACKET MT.	9+74 LINE "C"
Ø** B-3	TYPE G - EXISTING	BRACKET MT.	11+44 LINE "C"
Ø B-4	TYPE D - EXISTING	BRACKET MT.	25+60 RAMP "U"
B-5	TYPE D - EXISTING	CONC. FND.	13+51 RAMP "V"
B-22	TYPE D - EXISTING	CONC. FND.	23+93 RAMP "U"
B-23	TYPE D - EXISTING	CONC. FND.	22+95 RAMP "U"
* B-59	WALL PACK - EXISTING	BENT CAP	10+40 LINE "C"
* B-60	WALL PACK - EXISTING	BENT CAP	10+80 LINE "C"
Ø C-1	TYPE D - EXISTING	BRACKET MT.	7+00 LINE "D"
Ø C-2	TYPE I-EXIST. (TWIN MTD. ON BRKT.)	BRACKET MT.	5+56 LINE "D"
Ø C-3	TYPE C - EXISTING	CONC. FND.	4+27 LINE "D"
C-4	TYPE D - EXISTING	CONC. FND.	2+96 LINE "D"
C-5	TYPE D - EXISTING	CONC. FND.	1+65 LINE "D"
C-6	TYPE A - EXISTING	CONC. FND.	0+15 LINE "D"
C-7	TYPE G - EXISTING	BRACKET MT.	73+06 LINE "D"
Ø D-1	TYPE B - EXISTING	BRACKET MT.	6+34 LINE "C"
Ø D-2	TYPE A - EXISTING	BRACKET MT.	4+75 LINE "C"
Ø D-3	TYPE H-EXIST. (TWIN MTD. ON CONC. FND.)	CONC. FND.	3+50 LINE "C"
Ø D-4	TYPE D - EXISTING	CONC. FND.	1+97 LINE "C"
Ø D-5	TYPE A - EXISTING	CONC. FND.	0+40 LINE "C"
D-6	TYPE G - EXISTING	BRACKET MT.	71+83 LINE "C"

ASSEMBLY SUMMARY (FOR REPLACED LUMINAIRES)

ASSMBLY #	ASSEMBLY DESCRIPTION	MOUNTING TYPE	ASSEMBLY LOCATION
* B-59	(U/P TY I)(.15KW)S(SPL CO)	BENT CAP	10+40 LINE "C"
* B-60	(U/P TY I)(.15KW)S(SPL CO)	BENT CAP	10+80 LINE "C"

NOTES:

1) LUMINAIRES LISTED UNDER THE "EXISTING ASSEMBLY SUMMARY" MAY BE AFFECTED BY PROJECT CONSTRUCTION.
2) ALL EXISTING ASSEMBLIES ARE T-BASE LUMINAIRES WITH DIMENSIONS AS SHOWN ON "LIGHTING ASSEMBLY SCHEDULE". SEE EXISTING LIGHTING DETAILS FOR LUMINAIRE ASSEMBLY DESCRIPTION.
3) ALL LUMINAIRES, CONDUIT AND CONDUCTOR LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
4) EXISTING LUMINAIRES THAT ARE TO BE REMOVED AND RELOCATED SHALL BE STORED IN AN APPROVED LOCATION UNTIL COMPLETION OF CONSTRUCTION.
5) REMOVAL OF EXISTING UNDERPASS LUMINAIRES B-59, B-60 WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ILLUMINATION ASSEMBLY SUMMARY

21

REVISIONS	STATE DISTRICT	FEDERAL AID DIV.	FEDERAL AID PROJECT	SHEET
	16	6	HES000S(006)	21
	COUNTY		CONTROL	SECTION	JOB
	NUECES		074	00	116

CIRCUIT SUMMARY

SEE BRIDGE CONDUIT LAYOUT, BL (MOD) LIGHTING LAYOUTS, AND RID(7)-88.

CKT NUMBER	GRND. LENGTH #6 BARE (FT.)	CONDUCTOR # & LENGTH (FT.) (XHHW)		CONDUIT			
				1¼" RMC (FT.)	1¼" RMC (FT.)	2" RMC	1½" PVC (FT.)
		#4	#6		(BORED)		(SCH 40)
1	50'	2- 50'					50'
2	150'	2-150'					150'
3	180'	2-180'					180'
4	90'	2-90'					90'
5	90'	2-90'					90'
6	180'		2-180'		EXIST.		
7	70'	2-70'				EXIST.	
8	90'	2-90'					90'
9	90'	2-90'					90'
10	90'	2-90'					90'
11	90'	2-90'					90'
12	25'	2-25'					25'
13	90'	2-90'					90'
14	90'	2-90'					90'
15	90'	2-90'					90'
16	25'	2-25'					25'
17		2-50' EXIST		EXIST.			
18		2-50' EXIST		EXIST.			
19		2-50' EXIST		EXIST.			
20		2-30' EXIST		EXIST.			
21		2-25' EXIST		EXIST.			
22		2-25' EXIST		EXIST.			
23	200'		2-200'	EXIST.			
24	90'		2-90'				90'
25	90'		2-90'				90'
26	50'		2-50'				50'
27	125'		2-125'				
28	180'	2-180'					180'
29	100'		2-100'			EXIST.	
30	90'	2-90'					90'
31	90'	2-90'					90'
32	90'	2-90'					90'
33	90'	2-90'					90'
34	90'	2-90'					90'
35	90'	2-90'					90'
36	180'	2-180'					180'
37	100'	2-100'					100'
38	SUBSIDIARY TO U/P (CONDUIT & CONDUCTOR)						
39	50	2-50'					50'
40	SUBSIDIARY TO U/P (CONDUIT & CONDUCTOR)						
41	100'	2-100'					100'
42	180'	2-180'					180'
43	100'	2-100'					100'
44	ABANDON THIS RUN						
45	150'	2-150'					150'
46	180'	2-180'					180'
47	50'	2-50'					50'
48	50'	4-50'					50'
49	100'	4-100'					100'
TOTALS	4105	6,840	1,670				3,430

Service Pole #1

[C4 - C18] = 15-250W HPS
[C1 - C3] = 4-250 W HPS
[A1 - A5] = 5-250 W HPS
[A52 - A53] = 2-250 W HPS
[A34 - A48] = 15-250 W HPS
[A49 - A50] = 2 - 150 W HPS

Service Pole #2

[D1 - D18] = 19-250 W HPS
[B1 - B4] = 4-250 W HPS
[B59 - B60] = 2-150 W HPS

Circuit #1: [B25-B37] = 13-250 W HPS
[B38-B39] = 2-250 W HPS
[B41-B44] = 4-250 W HPS
[B45-B51] = 7-250 W HPS

Circuit #2: [A6-A18] = 13-250 W HPS
[A22-A33] = 12-250 W HPS
[B5-B21] = 16-250 W HPS
[B22-B24] = 3-250 W HPS
[B54-B58] = 5-250 W HPS

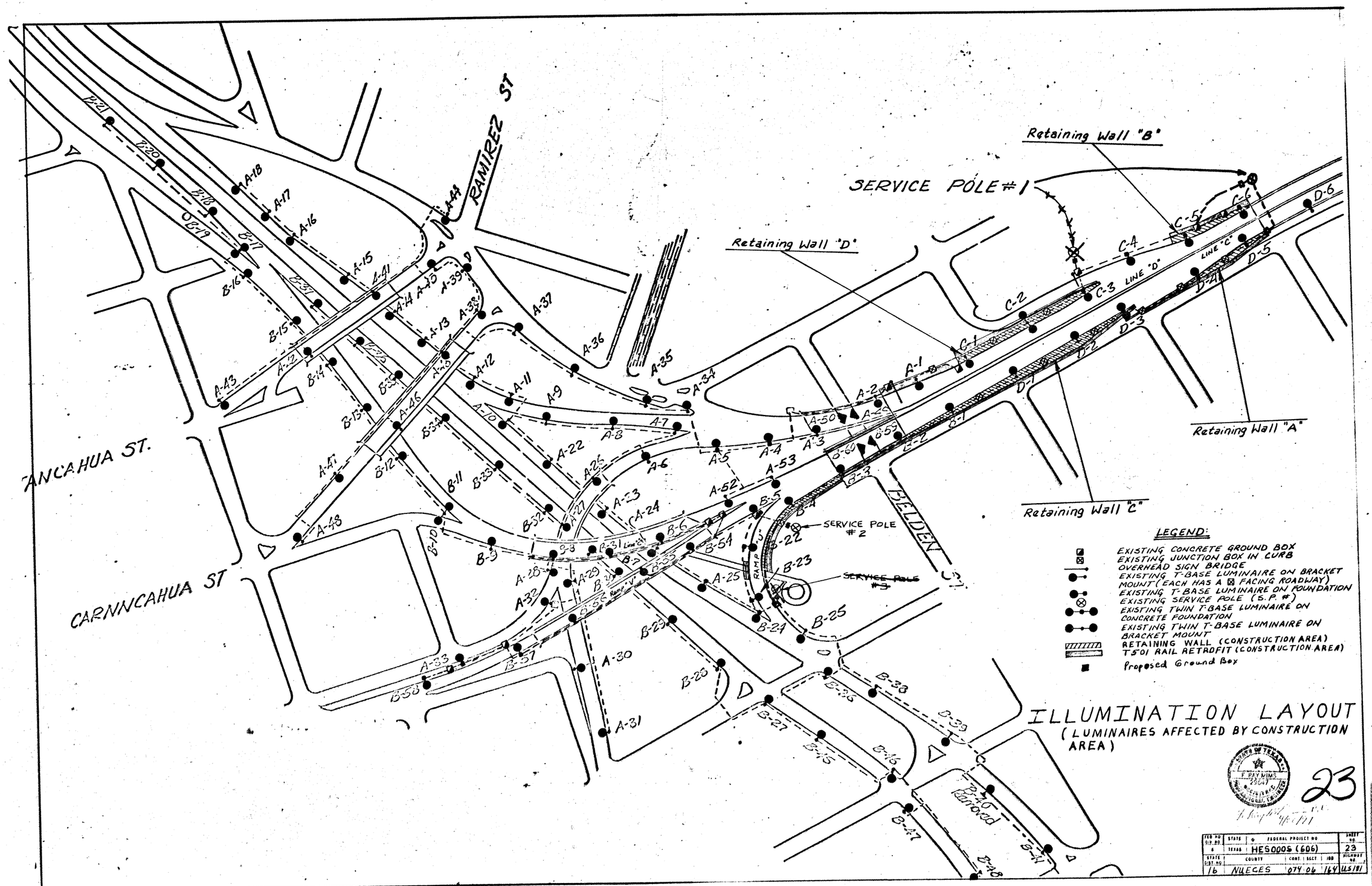
Refer to Sheet 23 (Illumination Layout Sheet) for Circuit Runs.

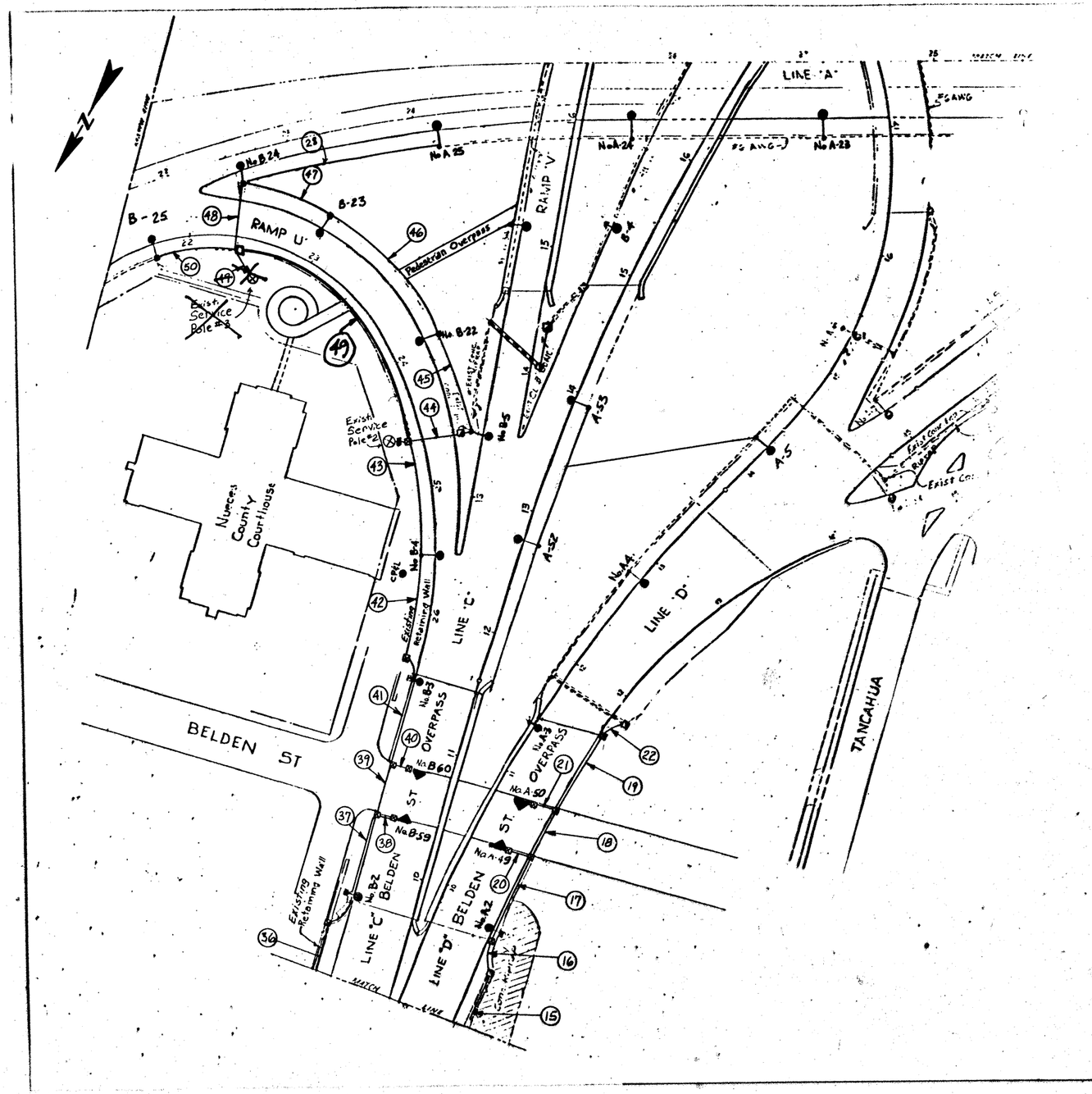
CIRCUIT SUMMARY

22

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
6	TEXAS	HES0005(606)			USTRI
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
16	NUECES	074	06	164	22

TERRYI.DGN


RAMIREZ ST
CARNNCAHUA ST
CARNNCAHUA ST
BELDEN
Retaining Wall "B"
Retaining Wall "D"
Retaining Wall "A"
Retaining Wall "C"
SERVICE POLE #1
SERVICE POLE #2
SERVICE POLE #3
LINE "C"
LINE "D"
RAMP "U"
Ramp "V"
Line "A"
B-40 Removed
LEGEND:
EXISTING CONCRETE GROUND BOX
EXISTING JUNCTION BOX IN CURB
OVERHEAD SIGN BRIDGE
EXISTING T-BASE LUMINAIRE ON BRACKET MOUNT (EACH HAS A ⊠ FACING ROADWAY)
EXISTING T-BASE LUMINAIRE ON FOUNDATION
EXISTING SERVICE POLE (S.P. #)
EXISTING TWIN T-BASE LUMINAIRE ON CONCRETE FOUNDATION
EXISTING TWIN T-BASE LUMINAIRE ON BRACKET MOUNT
RETAINING WALL (CONSTRUCTION AREA)
T501 RAIL RETROFIT (CONSTRUCTION AREA)
Proposed Ground Box
ILLUMINATION LAYOUT
(LUMINAIRES AFFECTED BY CONSTRUCTION AREA)
STATE OF TEXAS
F. RAY MIMS
23647
REGISTERED PROFESSIONAL ENGINEER
23
FED RD DIV NO 6
STATE TEXAS
FEDERAL PROJECT NO HES0005 (606)
SHEET NO 23
STATE DIST NO 16
COUNTY NUECES
CONT 074
SECT 06
JOB 164
HIGHWAY NO US181



Notes:

1) Contractor shall verify the location of conduit, junction boxes, ground boxes, luminaires, service poles and electrical power lines before beginning work.

2) Duct cable to be abandoned shall be cut off 6" below ground. Duct cable abandonment and removal will not be paid for directly but shall be subsidiary to the various bid items.

3) Before beginning any work on existing circuits, the contractor shall ascertain a mutual understanding and agreement from the SDHPT before any circuit may remain de-energized during normal hours of operation. The contractor shall satisfy himself that the circuits are locked open when work is being done.

4) Removal or abandonment of existing RM conduit in wall will not be paid for directly but shall be subsidiary to the various bid items.

5) If GREAT system cannot be accomodated to clear luminaire C-3, then at the Engineer's discretion, the existing foundation will be removed and replaced with a new TYA foundation modified to fit existing luminaire.

6) All electrical fittings, connectors and grounding bushings necessary for the completion of this project will not be paid for directly but shall be subsidiary to the various bid items.

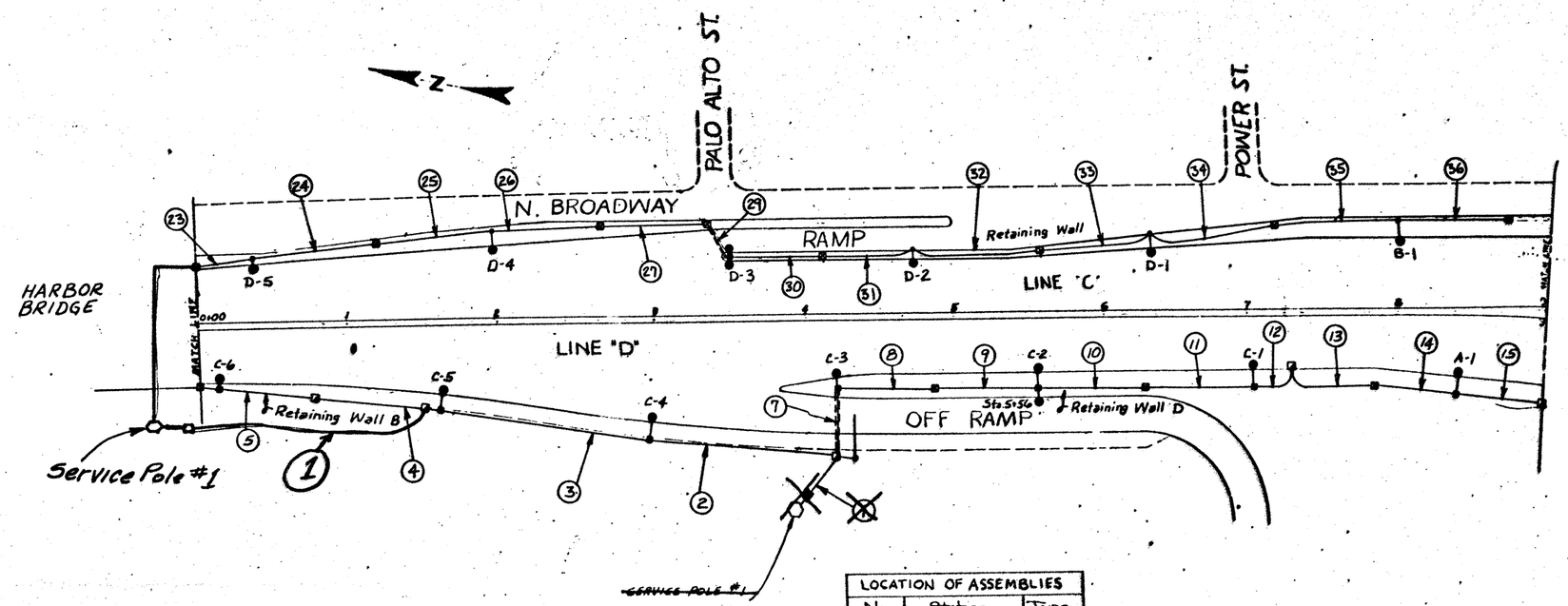
STATE OF TEXAS
T. RAY MIMS
29647
REGISTERED PROFESSIONAL ENGINEER

LIGHTING LAYOUT

24

HES 0005(606) 24

NUECES 74 06 164 US181



LOCATION OF ASSEMBLIES		
No.	Station	Type
C-6	0+15 Line "D"	A
C-5	1+65 " "	D
C-4	2+96 " "	D
C-3	4+27 " "	C
C-2	5+56 " "	I
C-1	7+00 " "	D
A-1	8+40 " "	D
D-5	0+40 Line "C"	A
D-4	1+97 " "	D
D-3	3+50 " "	H
D-2	4+75 " "	A
D-1	6+34 " "	B
B-1	8+03 " "	D

LEGEND

- SERVICE POLE (EXISTING)
- EXIST. T-BASE LUMINAIRE MOUNTED ON CONCRETE FOUNDATION
- EXIST. T-BASE LUMINAIRE MOUNTED ON BRIDGE BRACKET
- EXIST. T-BASE LUMINAIRE MOUNTED ON BRIDGE BRACKET
- EXIST. T-BASE LUMINAIRE MOUNTED ON CONCRETE FOUNDATION
- OVERHEAD SIGN BRIDGE
- CONDUIT & CONDUCTOR RUN (SEE CIRCUIT SUMMARY)
- CONDUIT & CONDUCTOR UNDER ROADWAY (SEE CIRCUIT SUMMARY)
- ~~Proposed~~ Ground Box

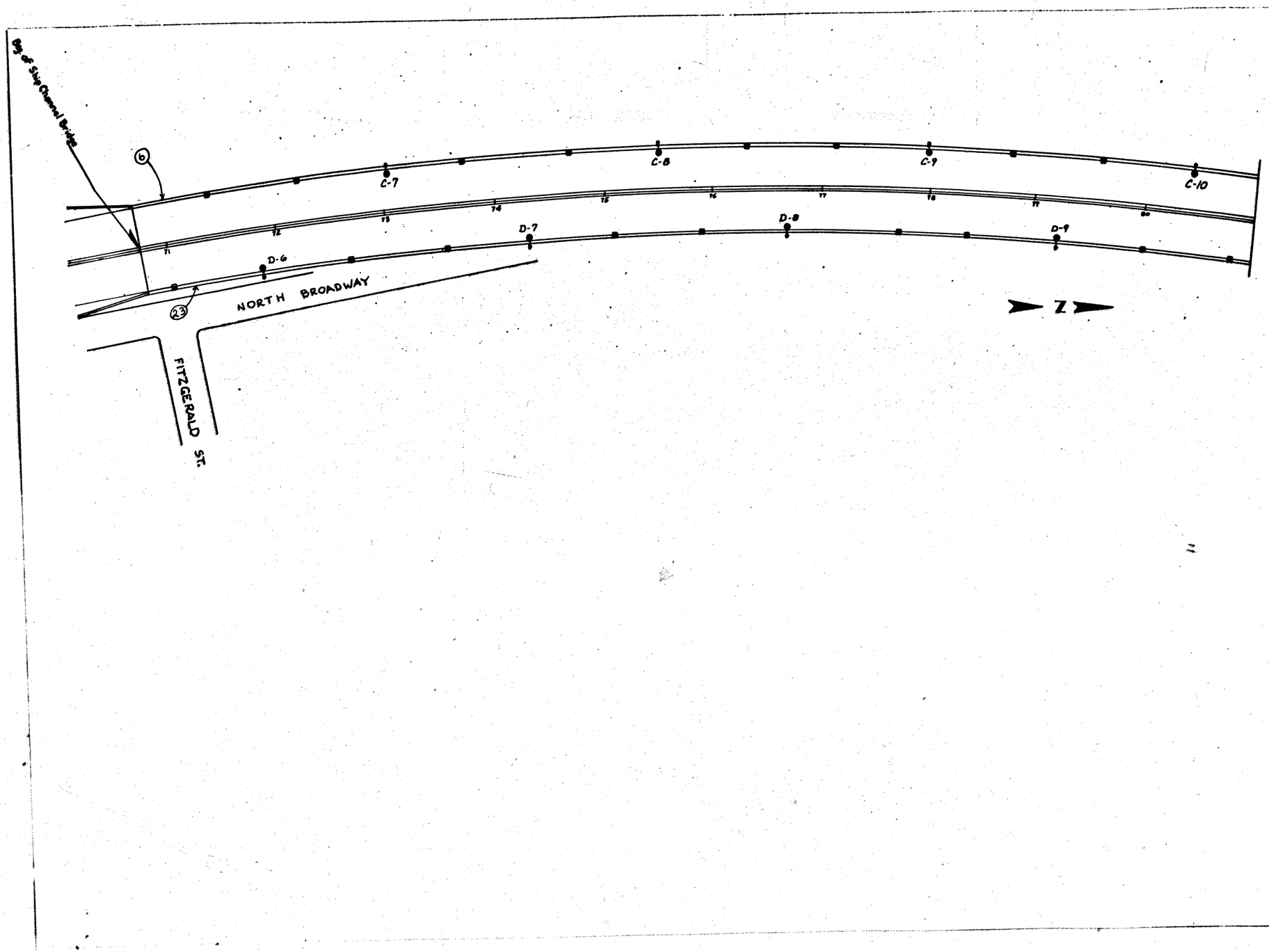
STATE OF TEXAS
F. RAY MIMS
25047
REGISTERED PROFESSIONAL ENGINEER

P.E.
9/22/11

25

LIGHTING LAYOUTS

FED. RD. DIV. NO.	STATE	PROJECT NO.			25
6	TEXAS	HES 000S (606)			
STATE	COUNTY	CONT.	SECT.	JOB	
TEXAS	MILLS	74	6	164	US 181



STATE OF TEXAS
F. RAY MIMS
25647
REGISTERED
PROFESSIONAL ENGINEER

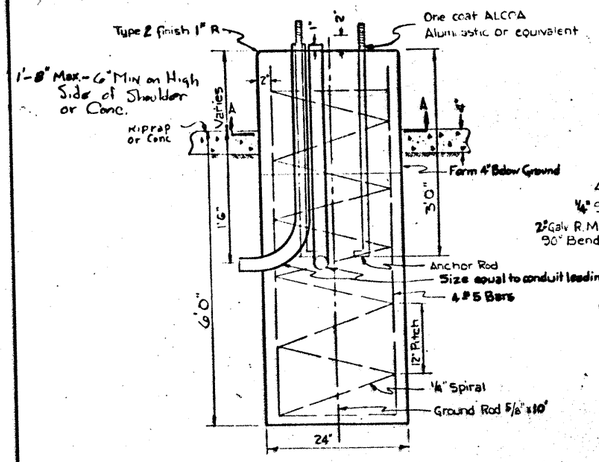
F. Ray Mims P.E.
9/22/91

LIGHTING LAYOUTS

26

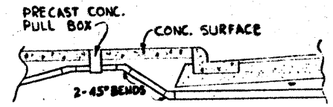
Scale 1" = 40'

		HES0005 (606)				26
		74	6	164	US181	

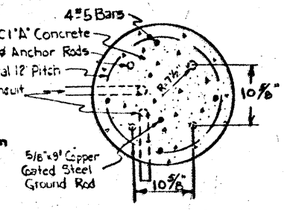


Detail Of Exist. Conc. Foundation

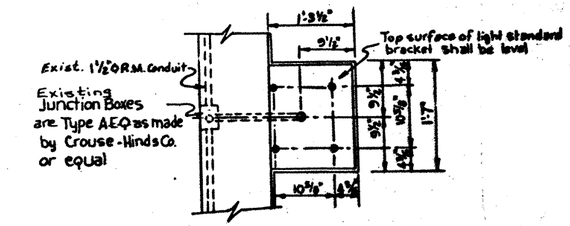
EXIST. CONC. FOUNDATION FOR LIGHT STANDARD



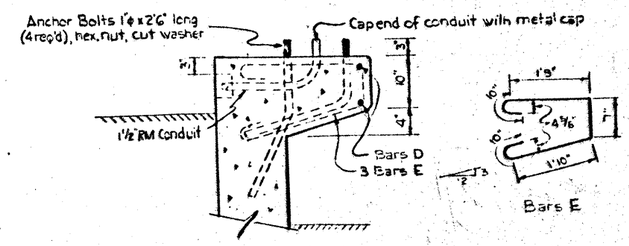
DETAIL OF EXISTING CONDUIT CONNECTION TO PULL BOX



SECTION "A-A"



PLAN OF BRACKET ON EXISTING RETAINING WALL & BRIDGE STRUCTURE



SECTION

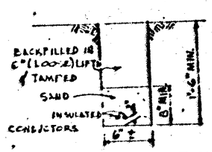
Note:
Anchor bolts, nuts & washers shall, after fabrication, be cadmium coated by the Udylite Process in accordance with A.S.T.M. Spec. A-165 or galvanized in accordance with A.S.T.M. Spec A-153.

EXISTING RETAINING WALL BRACKET

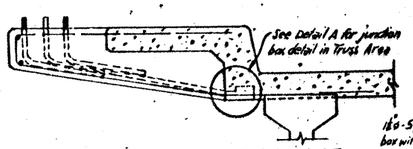
GENERAL NOTES:

1) Existing Retaining Wall Brackets have been Poured Monolithically with Existing Retaining Walls.

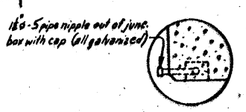
2) Spacing of Existing Light Standard Brackets is Based on Design using 20,000 Lumen Luminaire.



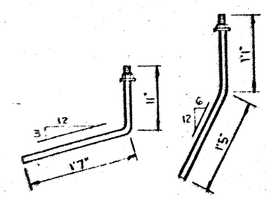
DETAIL CABLE TRENCH



SECTION AT BRACKET

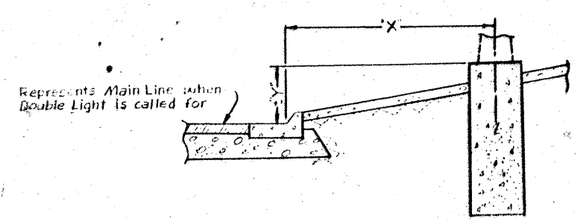


DETAIL A



Note:
Anchor bolts shall be measured and paid for as structural steel.

EXISTING RETAINING WALL ANCHOR BOLT DETAILS



VARIABLE DIMENSIONS OF CONCRETE FOUNDATION FOR LIGHT STANDARD

STATE OF TEXAS
T. RAY MIMS
23147
REGISTERED PROFESSIONAL ENGINEER
4/22/91

EXISTING LIGHTING DETAILS

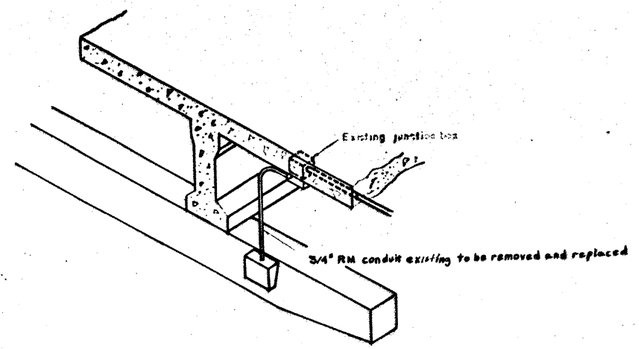
27

FED. RD. DIV. NO.	STATE	FEDERAL PROJ.	SHEET NO.
6	TEXAS	HES0008(806)	27
STATE DIST. NO.	COUNTY	CONT. & SECT. / JOB	HIGHWAY NO.
16	NUECES	0074 06 164 / 0151	

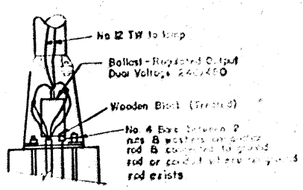
GENERAL NOTES

GENERAL NOTES:

1) Existing Wallpacks B-59 and B-60 shall be removed and replaced with new Type-I underpass Luminaires. see RED(7)-88.



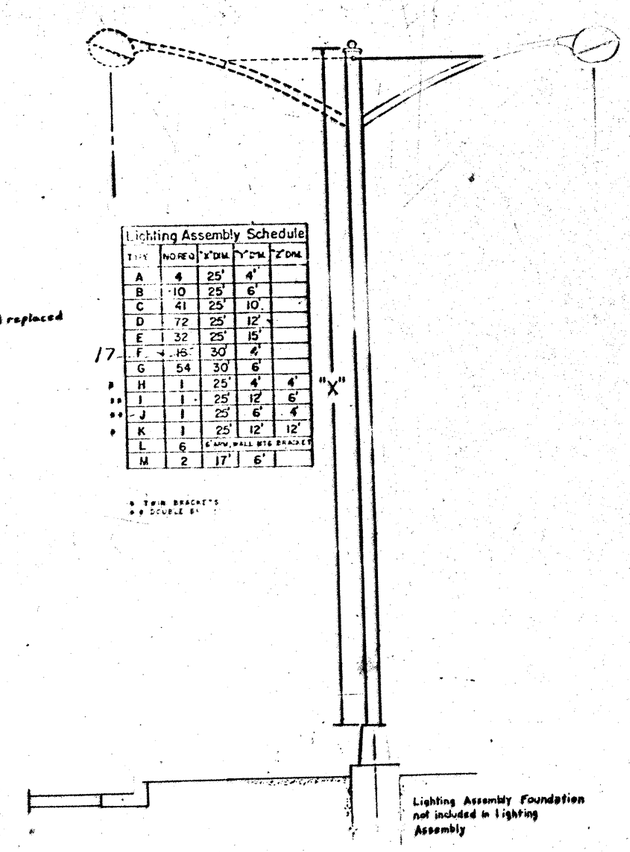
EXISTING WALL PACK ASSEMBLY (B-59, B-60)



DETAIL OF TRANSFORMER BASE CONNECTIONS (EXISTING)

Lighting Assembly Schedule				
TYPE	NO REQ	"X" DIM.	"Y" DIM.	"Z" DIM.
A	4	25'	4'	
B	10	25'	6'	
C	41	25'	10'	
D	72	25'	12'	
E	32	25'	15'	
F	16	30'	4'	
G	54	30'	6'	
* H	1	25'	4'	4'
** I	1	25'	12'	6'
** J	1	25'	6'	4'
* K	1	25'	12'	12'
L	6	6" MIN. WALL BTG BRACKET		
M	2	17'	6'	

* TWIN BRACKETS
** DOUBLE BR



EXISTING LIGHTING ASSEMBLIES TYPE A,B,C,D,E,F,G,H,I,J & K

STATE OF TEXAS
F. RAY MIMS
29647
REGISTERED PROFESSIONAL ENGINEER

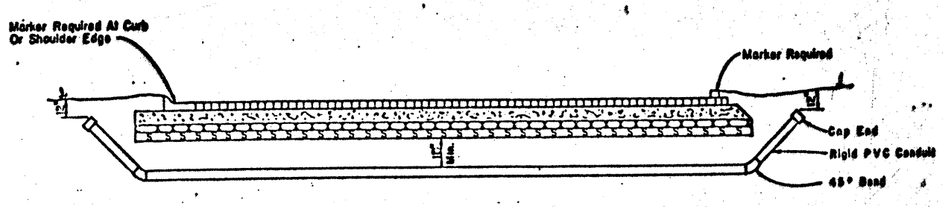
F. Ray Mims P.E.
4/22/91

EXISTING LIGHTING DETAILS

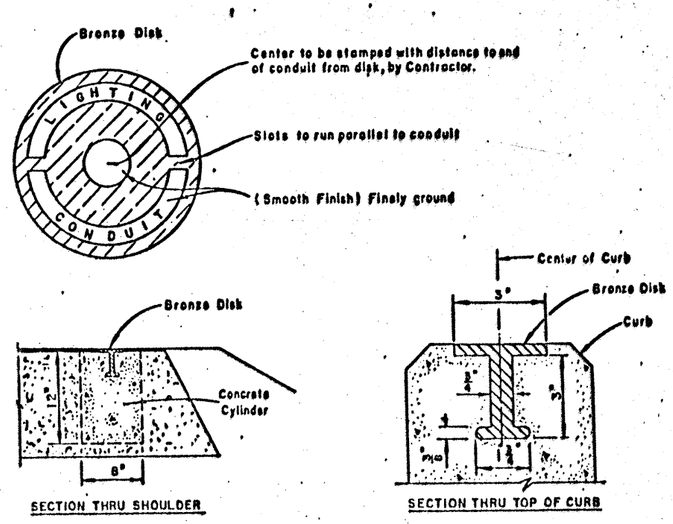
28

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	HES0005(606)	28

STATE CONTROL SECTION	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	0074	06	164	US181



DETAIL OF CONDUIT UNDER ROADWAY



METHOD OF MARKING CONDUIT

NOTE: Conduit shall be marked as follows "Lighting Conduit," "Signal Conduit" or "Sprinkler Conduit." Markers will be placed in curb or in shoulder over the conduit on each side of street.

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2964
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PROFESSIONAL ENGINEER

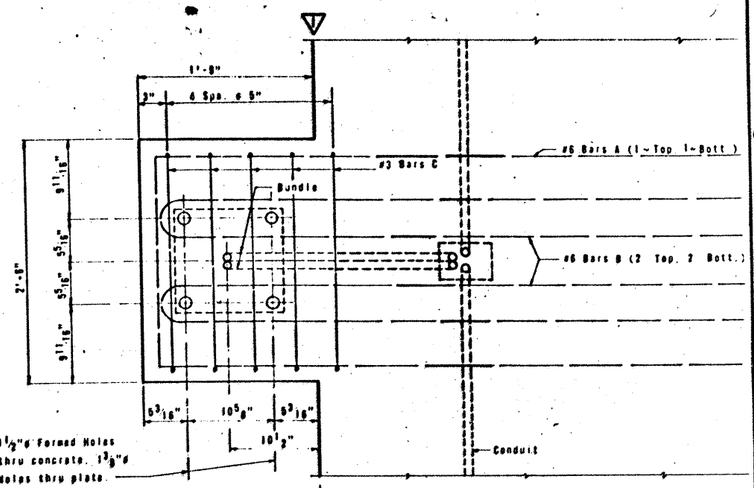
4/22/91

MISC. DETAILS

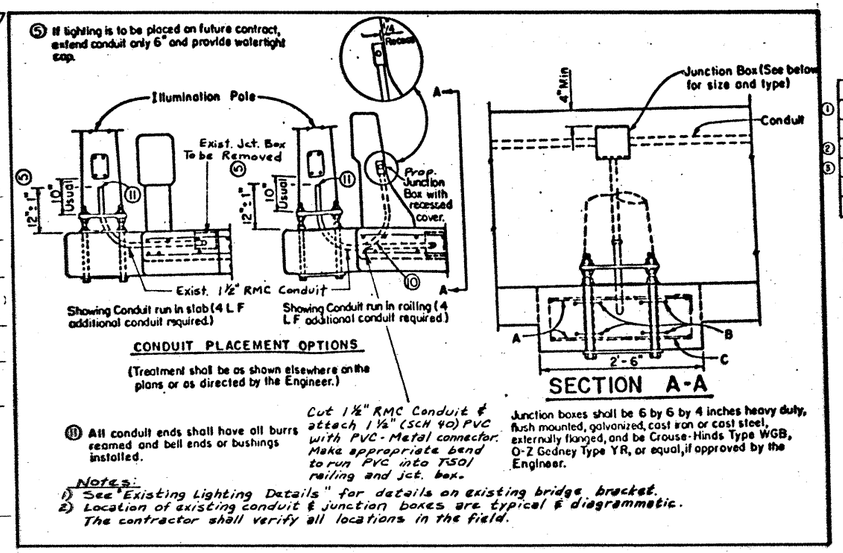
CONDUIT UNDER ROADWAY & CONDUIT MARKERS

29

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES0005(606)				29
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
	NUECES		074	06	164	US 181



PLAN

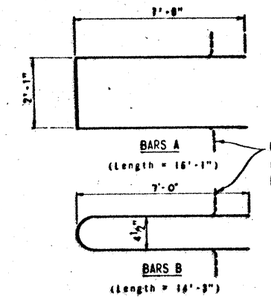


Notes:
1) See "Existing Lighting Details" for details on existing bridge bracket.
2) Location of existing conduit & junction boxes are typical & diagrammatic. The contractor shall verify all locations in the field.

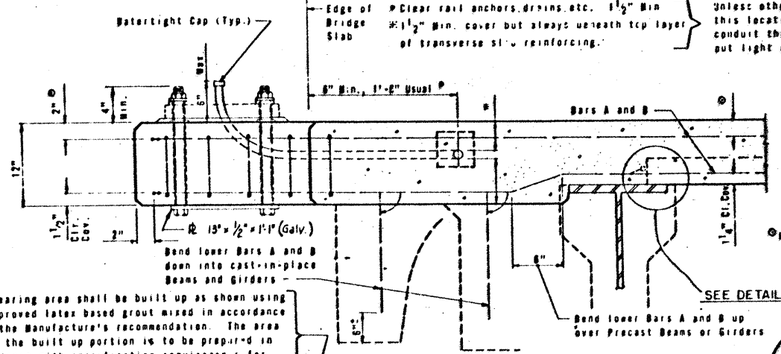
ESTIMATED QUANTITIES ~ ONE BRACKET

	ITEM	UNIT	OUTSIDE	MEDIAN
①	CONCRETE	C.Y.	0.2	0.1
	REINFORCING STEEL	LB	146	134
②	STRUCTURAL STEEL	LB.	45	45
③	CONDUIT	L.F.	4	4

① Variation due to Slab thickness is insignificant.
② Anchor Bolts and Plate
③ Additional to main run

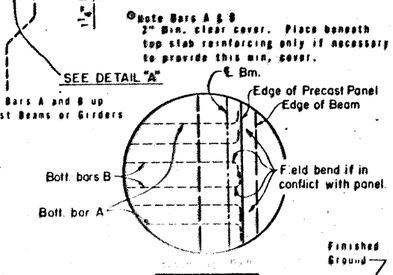


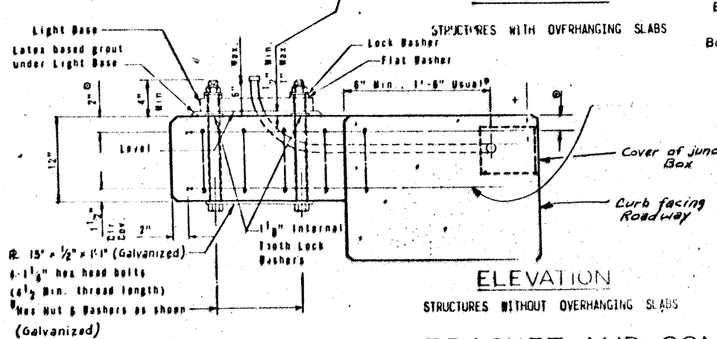
Field bend bottom bars A & B parallel to beam if in conflict with precast panels.



ELEVATION

STRUCTURES WITH OVERHANGING SLABS

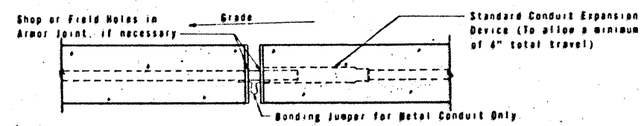




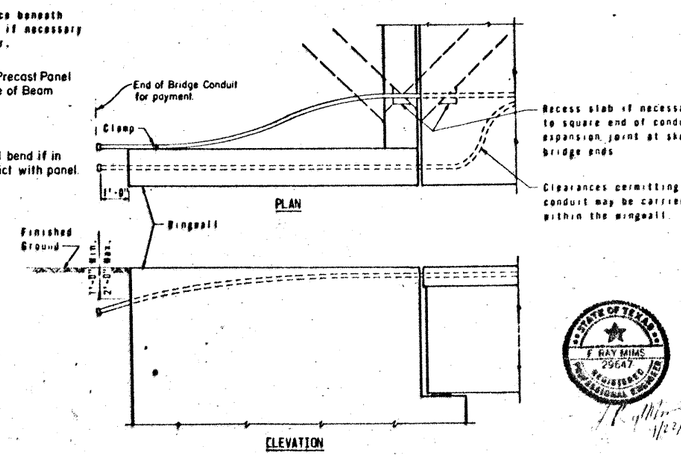
ELEVATION

STRUCTURES WITHOUT OVERHANGING SLABS

LIGHT STANDARD BRACKET AND CONDUIT LOCATION



CONDUIT EXPANSION JOINT



TREATMENT AT BRIDGE ENDS

GENERAL NOTES:

Designed for 100 MPH wind, 50' standard, 15' arm, 250W luminaire and 455 overstress.

Concrete for brackets shall be of the same type as placed monolithically with and paid for at the unit price bid for the bridge slab.

The type and size of conduit and the number and location of brackets shall be as shown elsewhere in the plans. Brackets found to conflict with other components of the bridge may be relocated to clear.

Unless otherwise specified, light standards are to be furnished and paid for under future contract.

Modifications include addition of ▽ to show existing conduit to bracket and transition to proposed T-501 railing with existing bracket. Existing junction box is shown embedded in Plan View & Elevation View. Junction boxes are to be 8" x 8" x 6" PVC NEMA 4X and drainable. 4-19-91 TLE

STATE OF TEXAS
F. RAY MIMS
29647
REGISTERED
PROFESSIONAL ENGINEER

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

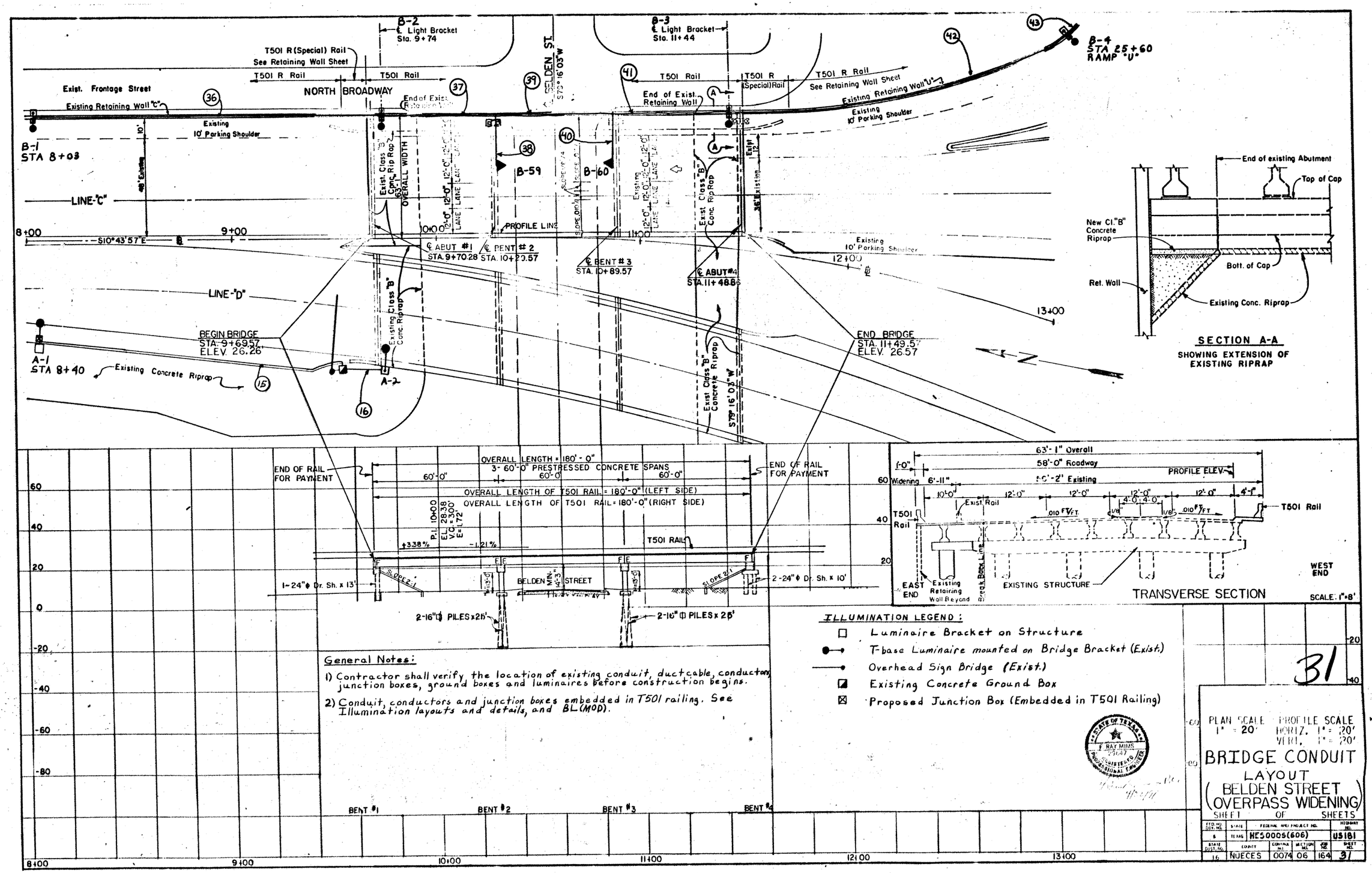
BRIDGE LIGHTING DETAILS

BL 30

PREPARED BY AND FOR THE USE OF TEXAS DOT

ORIGINAL DRAWING DATE DEC 1980	STATE DISTRICT	FEDERAL AID PROJECT	SHEET
DN - LEC	16	HES0005(606)	30
CK - DRW	COUNTY	CONT NO. / SECTION / JOB	HIGHWAY
DW - RLR	NUECES	0074 06 / 164 USIB1	
CK - LEC			

REVISIONS
Rev 3 - B5 (Bars A & B for panels)



General Notes:

1) Contractor shall verify the location of existing conduit, ductcable, conductors, junction boxes, ground boxes and luminaires before construction begins.

2) Conduit, conductors and junction boxes embedded in T501 railing. See Illumination layouts and details, and BL(MOD).

ILLUMINATION LEGEND:

- □ Luminaire Bracket on Structure
- ●—→ T-base Luminaire mounted on Bridge Bracket (Exist.)
- —→ Overhead Sign Bridge (Exist.)
- ◪ Existing Concrete Ground Box
- ⊠ Proposed Junction Box (Embedded in T501 Railing)

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JR.
REGISTERED
PROFESSIONAL ENGINEER

31

PLAN SCALE 1" = 20'
PROFILE SCALE HORIZ. 1" = 20' VERT. 1" = 20'

BRIDGE CONDUIT LAYOUT (BELDEN STREET OVERPASS WIDENING)

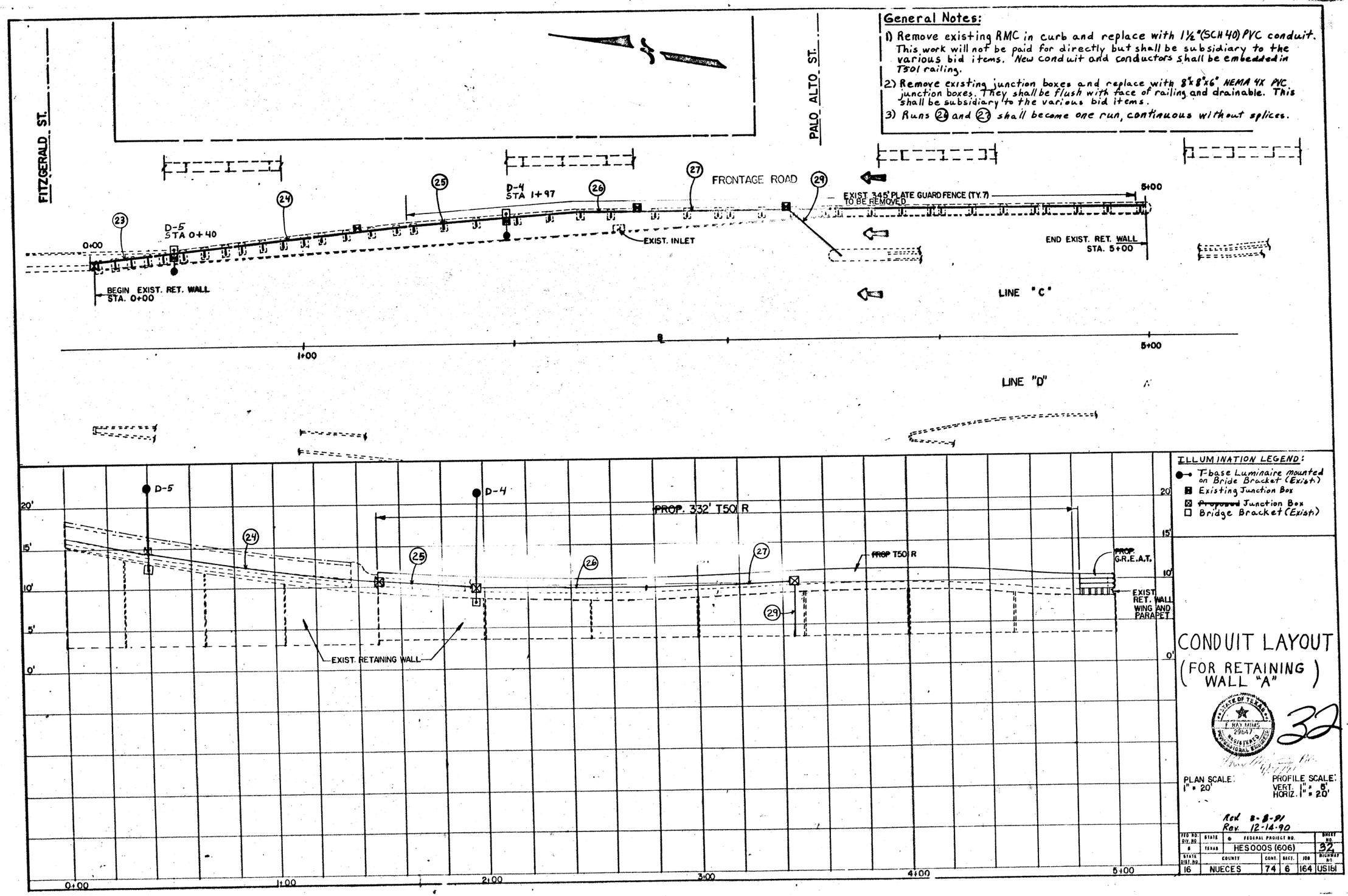
SHEET 1 OF SHEETS

FED. RD. DIST. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	TEXAS	HES0005(606)	US181

STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
16	NUECES	0074	06	164	31

General Notes:

1) Remove existing RMC in curb and replace with 1½"(SCH 40) PVC conduit. This work will not be paid for directly but shall be subsidiary to the various bid items. New conduit and conductors shall be embedded in T501 railing.
2) Remove existing junction boxes and replace with 8"x8"x6" NEMA 4X PVC junction boxes. They shall be flush with face of railing and drainable. This shall be subsidiary to the various bid items.
3) Runs (26) and (27) shall become one run, continuous without splices.



ILLUMINATION LEGEND:

- T-base Luminaire mounted on Bride Bracket (Exist.)
- Existing Junction Box
- ~~Proposed~~ Junction Box
- Bridge Bracket (Exist.)

CONDUIT LAYOUT (FOR RETAINING WALL "A")

STATE OF TEXAS
E. RAY MINS
29647
REGISTERED PROFESSIONAL ENGINEER

32

PLAN SCALE: 1" = 20'

PROFILE SCALE: VERT. 1" = 8' HORIZ. 1" = 20'

Rev. 8-8-91
Rev. 12-14-90

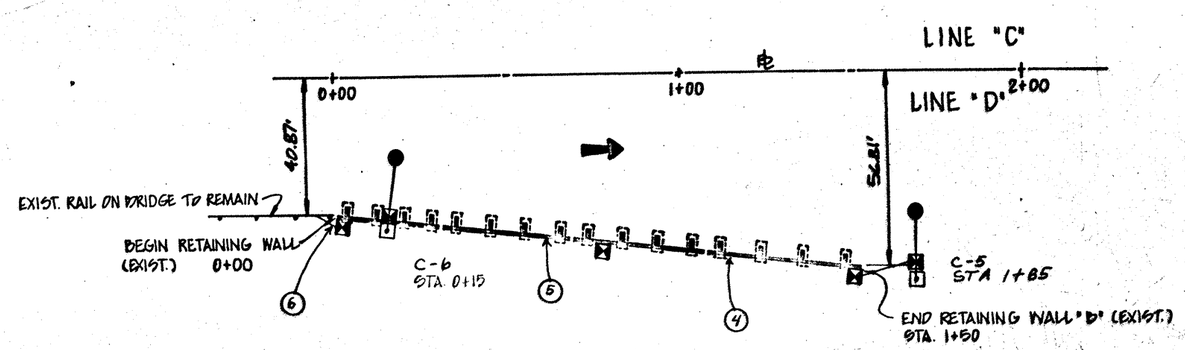
FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES000S (606)			32
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	74	6	164	US181

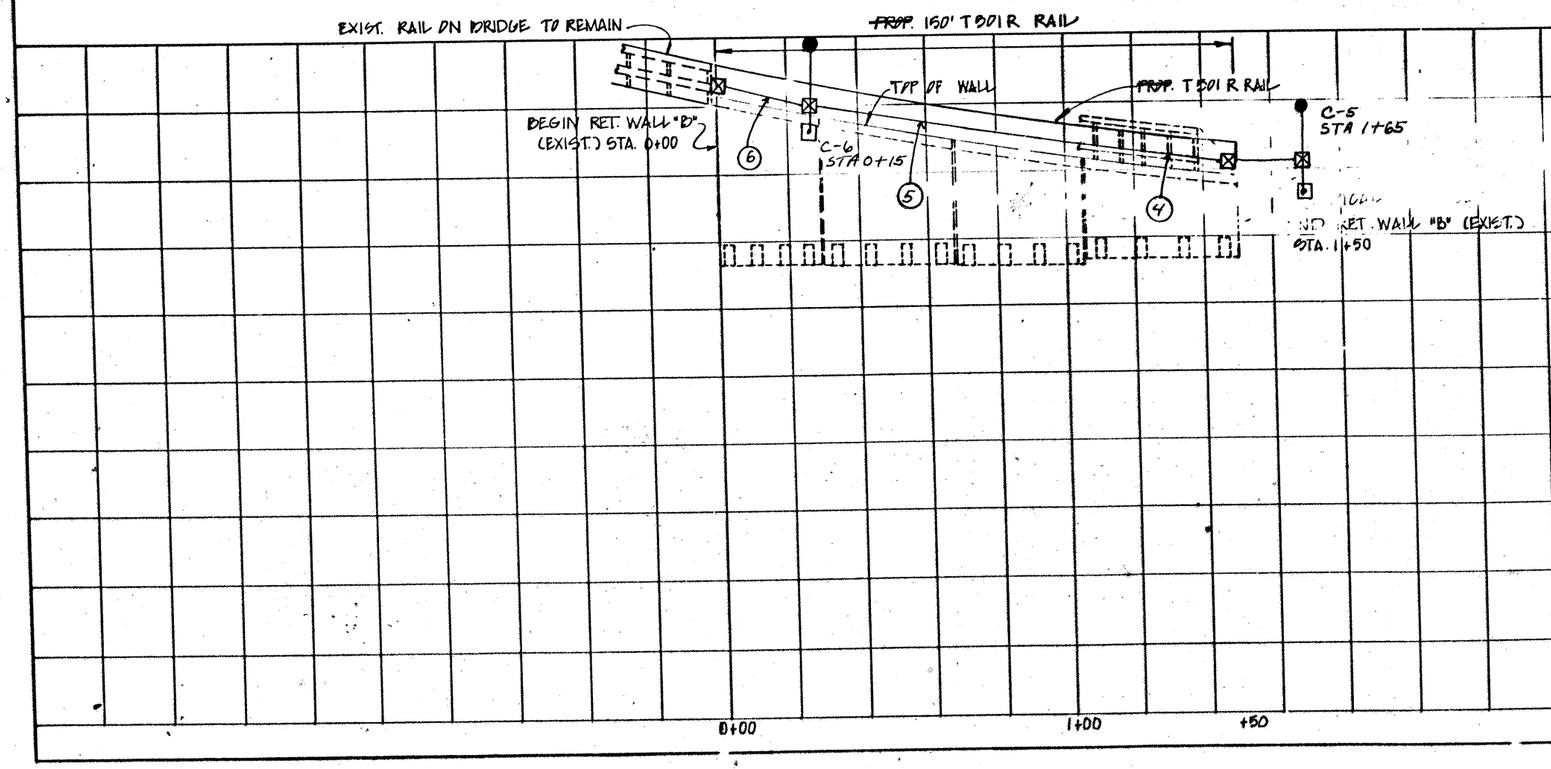
Illumination Legend:

- ⊠ Existing Junction Box
- ⊠ Prop. Junction Box
- □ Existing Bridge Bracket
- ●—• Existing T-base on Bridge Bracket

Notes:

1) See Lighting layouts for details





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29647
REGISTERED PROFESSIONAL ENGINEER

4-Ray Mims 4-2-91

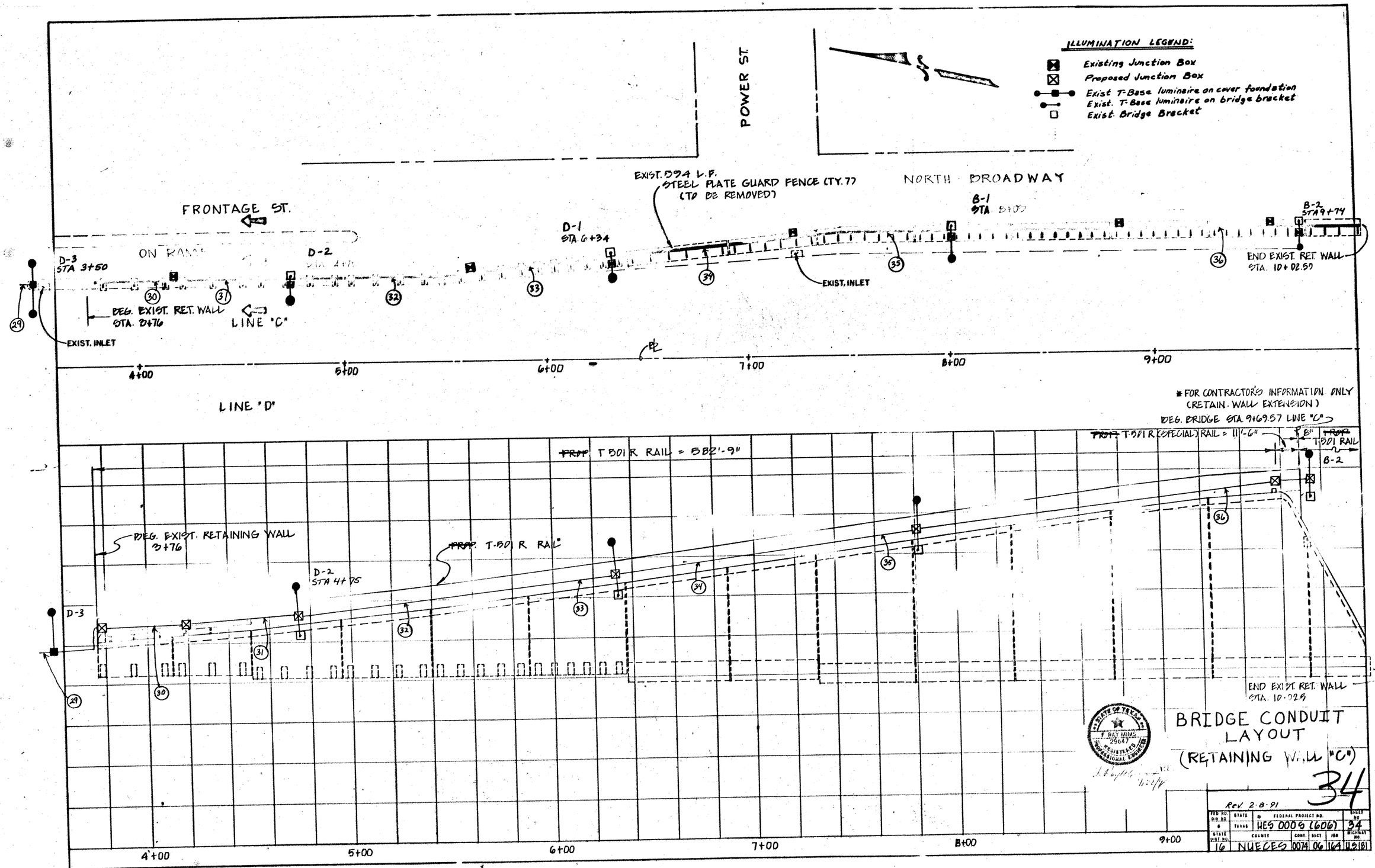
BRIDGE CONDUIT LAYOUT

(RETAINING WALL "D")

33

Rev. 12-14-90

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HES 000 S (606)			33
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES		0074	06	164	US 181



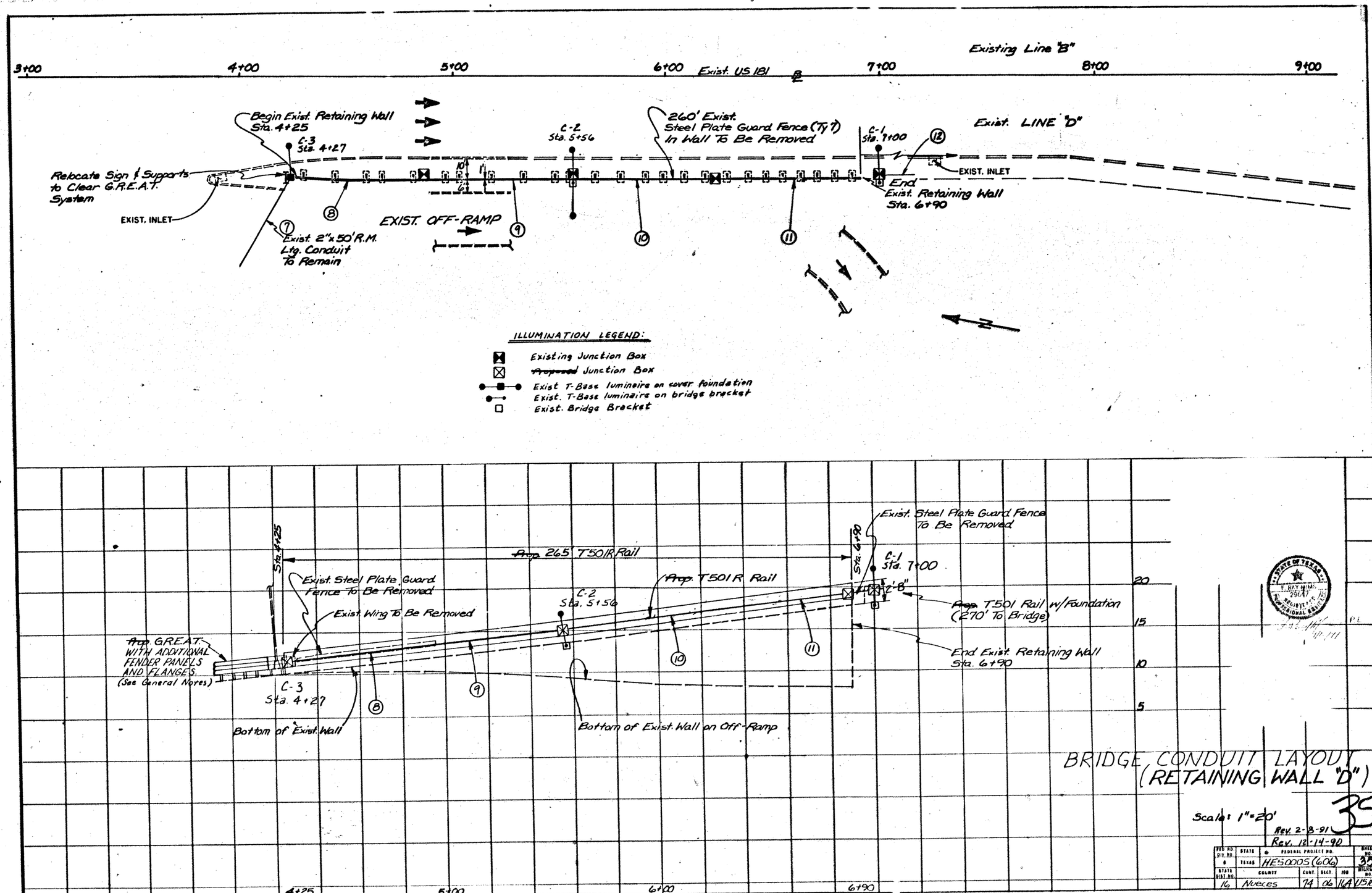
BRIDGE CONDUIT LAYOUT (RETAINING WALL "C")

Rev 2-8-91

34

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.	SHEET NO.
6	TEXAS	HES 0009 (606)	34

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
16	NUECES	0074	06	164	IH 2101



BRIDGE CONDUIT LAYOUT
(RETAINING WALL "D")

Scale: 1"=20'

Rev. 2-8-91
Rev. 12-14-90

35

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.			SHEET NO.
6	TEXAS	HE50005 (606)			35
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
16	Nueces		74	06	16A	US 181

EXIST.

RAMP "V"

EXIST. INLET

BEGIN RETAING WALL "U"
Sta. 23+25 On Wall=
Sta. 23+25 On Ramp "U"

RAMP "U"

EXIST. PULL BOX

EXISTING FLEX. BEAM RAIL WILL BE REMOVED AND REPLACED WITH T501R RAIL

REMOVE 305' STEEL PLATE GUARD FENCE

EXISTING STEEL PLATE GUARD FENCE WILL BE REMOVED AND REPLACED WITH 100 FT. OF M.B.G.F. AND T.A.S.

REMOVE 135' Steel PLATE GUARD FENCE RAIL AND T.A.S.

LINE "A"

B-23

~~Exist. Service Pole #3~~

EXIST. INLET

B-4
Sta 25+60

Exist. Service Pole #2

B-3 Sta 11+44 Line C
END RETAINING WALL
STA. 26+59 ON WALL
STA. 11+30.56 LINE "C"

LINE "C"

ILLUMINATION LEGEND

- Exist. Jct. Box
- ~~Prop.~~ Jct. Box
- Exist. T-base on concrete foundation
- Exist. T-base on bridge bracket
- Exist. bridge bracket

PROP.

~~PROP.~~ T501 R(SPECIAL) RAIL = 22'-8"

END OF BRIDGE STA. 11+49.57 LINE "C"

~~PROP.~~ T501R RAIL = 293'-0"

~~PROP.~~ T501 RAIL

B-4
Sta 25+60

8"

EXISTING STEEL PLATE GUARD FENCE TO BE REMOVED

26+59

~~PROP.~~ RETAINING WALL EXTENSION
(SEE RETAINING WALL EXTENSION SHEETS)

~~PROP.~~ M.B.G.F. W/ T.A.S.

30 25 20 15 10 5 0

23+00 24+00 25+00 26+00

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25647
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BRIDGE CONDUIT LAYOUT
(RETAINING WALL "U")

SCALE: 1"=20'

36

Rev. 2-8-91

FED. RD. DIV. NO.	STATE	FEDERAL PROJECT NO.				SHEET NO.
6	TEXAS	HES DDDS (606)				36
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB		HIGHWAY NO.
16	NUECES	74	6	16		US 181

GENERAL NOTES:

I. SCOPE

Details herein apply to roadway lighting installations bid under the following Specification items: Roadway Illumination Assemblies, Relocate Roadway Illumination Assemblies, Roadway Illumination Assembly Foundations, Conduit, Electrical Conductor, Duct Cable, Ground Box, Circuit Protector Assembly, Service Poles, Transformer Stations and Special Specifications relating to lighting and electrical items. All work, materials and services not shown on 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. Where manufacturer's provide warranties or guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

II. MATERIALS

A. General

All materials shall be new and unused. Alternate material equal to or better than those specified may be substituted with the approval of the Engineer.

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 the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." All poles shall be designed for 90 mph wind loads. An additional 1.3 gust factor shall be applied to the wind loads. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. Manufacturer's shop drawings shall include the ASTM designations for all material to be used. See paragraph II D for additional requirements for the transformer base.

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 and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 55-pound luminaire having an effective projected area of 1.4 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-64lb, or repaired by the application of repair compounds meeting Federal Specification O-G93 (stick only) in accordance with the manufacturer's recommendations.

5. Pole Bonding Means. All shoe base poles, including poles on concrete traffic barriers, shall have a grounding lug with 1/2-13 NC female threads inside the pole near the hand hole, minimum of 3 full threads.

6. Hand Holes. All shoe base poles shall have hand holes with reinforcing frames and covers. The openings on all poles shall be approximately 4 inches x 6-1/2 inches located approximately 10 inches 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 plans. See paragraph III.B.4 for CTB mounted poles.

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

8. J-Hooks. All mast arm type poles shall be equippped with a J-hook inside the pole, near the top for supporting vertical conductors.

9. Base Plate Bolt Circle. Bolt circle for poles (except CTB-mounted poles) less than 40 feet MH shall be 13 inches. For MH 40 feet or greater, bolt circle shall be 15 inches. For poles placed on existing bridge brackets or existing foundations, bolt circle shall be coordinated with anchor bolts in place.

10. 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. 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-572 Grade 50 or ASTM A-595 Grade A (50 KSI min. yield) or ASTM A-36M50, in accordance with item 4146. Galvanized in accordance with ASTM A-123.

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

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

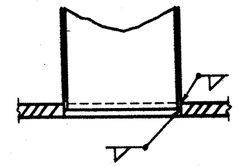
Mast Arms: Steel Pipe ASTM A-53 Grade A or B or ASTM A-501 or A-513 TY 1 with minimum 30 KSI yield and 20% elongation in 2 inches, galvanized in accordance with ASTM A-123.

Pole Cap: Pole cap shall be zinc die-cast, aluminimum, or galvanized metal, secured by three stainless steel or galvanized screws.

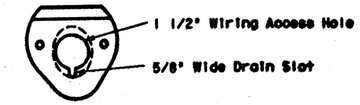
Pole Hardware: All bolts except mast arm connection bolts shall be stainless steel or standard steel galvanized ASTM A-153 Class C or D, or B-695 Class 40. Mast arm connection bolts shall be ASTM A-325, ASTM A-321 or ASTM A-193 Grade B-7, galvanized as above. Nuts and washers shall be compatible with the bolts and shall be stainless steel or steel, galvanized as above. Lock washers shall be provided on all bolted connections.

II. Aluminum Poles.

a. Aluminum poles shall be fabricated in accordance with "Structural Welding, Aluminum" ANSI/AWS D1.2.

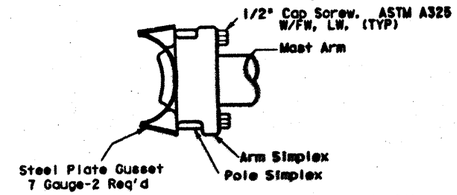


SECTION
POLE SHAFT TO BASE PLATE

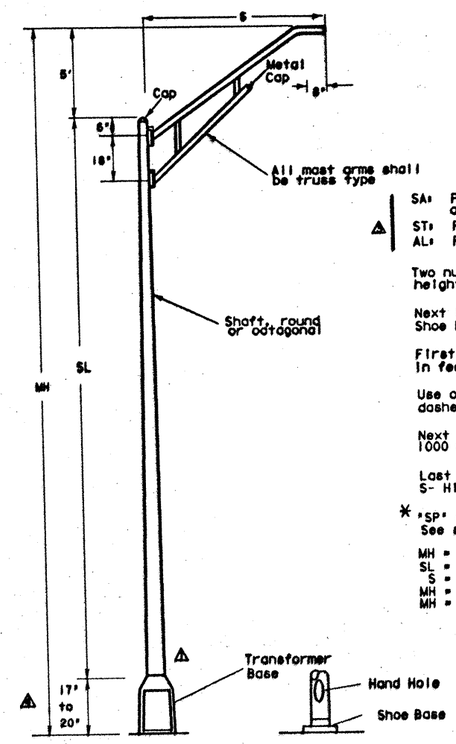


MAST ARM CONNECTOR

Steel Poles Only
Aluminum Pole Connector
Shall Be Clamp-on Type



MAST ARM TO POLE SHAFT CONNECTION



ROADWAY ILLUMINATION ASSEMBLY

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

TYPE * SA 50 T 8 8 .4KW S

SA: Pole assembly may be steel or aluminum.
ST: Pole assembly must be steel.
AL: Pole assembly must be aluminum.

Two numerical digits denote mounting height in feet.

Next letter denotes type of base, (S- Shoe Base, T-Transformer Base).

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Next three figures indicate luminaire rating (1 KW= 1000 watts, .4 KW= 400 watts, etc.)

Last letter indicates the type of lamp (M- Mercury, S- High Pressure Sodium, L- Low Pressure Sodium).

* "SP" denotes special (ovalized) steel pole for installing on CTB. See standard sheet CTB1 (4).

MH = Mounting Height
SL = Shaft Length
S = Spread (Mast arm length)
MH = SL + 5' + 20' (T-Base)
MH = SL + 5' (Shoe Base)

37

11-90 Modified T-Base.
4-90 Changed pole material.
8-89 Reduced to 34' Sheet.
8-89 Removed hand hole for T-Base poles.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS
RID (1)-88

	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
DN:	ORIGINAL	1-88	6	TEXAS	HES 0005 (606)				37
CK:	REVISIONS	8-89	STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
DN:	REVISIONS	4-90	16	NUECES		74	6	164	RS-181
CK:	REVISIONS	11-90							

ZFA3: L122,1063RID1B8

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

Shaft: ASTM B-221 or B-241 Alloy 6063-T6, ASTM B-209 Alloy 5086-H34; ASTM B-221 Alloy 6005-T5.

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

Mast Arm Fittings: ASTM B-209 Alloy 6061-T6 or ASTM B-221 Alloy 6005-T5.

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

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

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

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

13. Installation of High Strength Bolts. The tightening of nuts on high strength bolts shall be in accordance with the item "Structural Bolting."

C. Foundations

1. Concrete and reinforcing steel for foundations will be included for payment under item "Roadway Illumination Assembly Foundations" only. Top 6 inches of foundation shall be formed and struck level.
2. Anchor bolts for all poles except CTB-mounted poles shall be steel, ASTM A-36M55. Anchor bolts for CTB-mounted poles shall be steel, ASTM A-325 or A-321 threaded rod. Nuts for CTB anchor bolts shall be ASTM A-563 Grade D heavy hex, galvanized. The top 8 inches of all anchor bolts shall be galvanized per ASTM A-153. Anchor bolts in foundations shall be 1 1/4 in. x 48 in. and shall have top end threaded not less then 5 inches and furnished with galvanized hex 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. See CTB details for anchor bolts in CTB. Anchor bolts and nuts shall have Class 2A and 2B fit. Nuts shall be tapped or chased after galvanizing.
3. Concrete shall be Class A or C in accordance with item "Concrete for Structures". Reinforcing steel shall meet the requirements of the item "Reinforcing Steel".
4. The bolt circle in foundations for transformer base poles with a mounting height (MH) less than 40 feet shall be 14 inches. The bolt circle for shoe base poles less than 40 feet MH shall be 13 inches. For poles with MH 40 feet or greater, bolt circle in foundations shall be 17-1/4 inches in diameter if a transformer base is used and 15 inches if a shoe base mounting is used.
5. A minimum of two conduits shall be installed in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Any unused conduits in foundations shall be capped on both ends.

D. Transformer Base

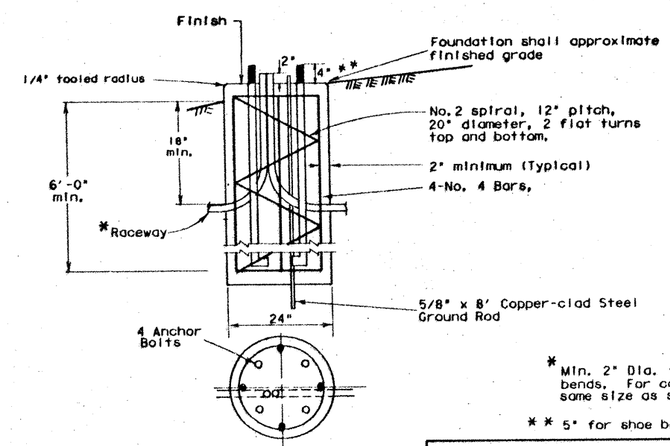
1. Transformer base shall be cast from aluminum, ASTM B-108 or B-26 Alloy 356.0-T6, and shall be furnished with four washers or lugs as recommended by the manufacturer. Base for poles less than 40 feet MH shall have a bottom bolt circle to accommodate a 14 inch anchor bolt circle. Top bolt circle shall be 13 inches. Bases for poles with MH 40 feet or greater shall have a bottom bolt circle to accommodate a 17-1/4 inch anchor bolt circle, top bolt circle shall be 14 inches to 15 inches.
2. Transformer base shall be approximately 20 inches high and shall have a door approximately 13 inches X 8 inches X 9-1/4 inches. Screw or bolts for attachment of door to base shall be stainless steel. Four machine bolts with four nuts, eight flat washers and four lock washers, galvanized ASTM A-153 Class C or D, or B-695 Class 40, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A-563 Grade DH, galvanized. A 1/2-13 NC female threaded grounding lug shall be provided inside the transformer base. Leveling nuts shall not be used under transformer bases.
3. Transformer bases shall meet the breakaway requirements of the AASTHO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 1985 edition, and shall have been tested by FHWA-approved methods.
4. Transformer bases shall have been structurally tested to meet or exceed the full designed plastic moment capacity of the pole.
5. Certification of the plastic moment load test and FHWA breakaway requirement test shall be submitted with shop drawings. Shop drawings shall show transformer base model number and logo.
6. Aluminum transformer bases shall be stamped, incised or by other approved permanent means, marked to show fabricators name or logo, model number and maximum allowable pole weight. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
7. Doors for transformer bases shall be made of plastic, fiberglass or other non-aluminum material approved by the Engineer.

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 green drab or yellow chromate conversion coating, or other approved conversion coatings 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 enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. Reflectors shall be aluminum and shall not be painted.
3. Mast-arm mounted luminaires, except underpass 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. Underpass luminaires shall be fused internally. Fuses shall be 5 amp time-delay type.

II. B. 13. Fabrication Tolerances

Part	Dimension	Tolerance
Pole Assembly	Shaft length	±1 in.
	I.D. of outside piece of slip fitting pieces	+1/8 in., -1/16 in.
	O.D. of inside piece of slip fitting pieces	+1/32 in., -1/8 in.
	Shaft diameter: other	+ 3/16 in.
	Out of "round"	1/4 in.
	Straightness of shaft	±1/4 in. in 10 ft.
	Twist in shaft	4° in 50 ft.
	Perpendicular to baseplate	1/8 in. in 24 in.
	Pole centered on baseplate	± 1/4 in.
	Location of Attachments	± 1/4 in.
Arm Assembly	Arm Length	± 3 in.
	Arm Rise	±1 3/4 in. in 10 ft.
	Arm Diameter	± 3/16 in.
	Overall length or width	± 1/4 in.
	Thickness	+1/4 in., -1/16 in.
	Deviation from flat	1/8 in. in 12 in.
	Spacing between holes	±3/32 in.
	Anchor bolt hole size	±1/16 in.
Anchor Bolt	Length	+ 1 in., -1/4 in.
	Threaded length	+1 1/2 in., -1/8 in.
	Galvanized length (if required)	+ 8 in., -1/4 in.
Miscellaneous	Bolt hole spacing	± 1/16 in.
	Strut location in truss arms	± 1 1/2 in.



TYPE B FOUNDATION

TYPE A FOUNDATION

Same except without reinforcing steel

38

* Min. 2" Dia. for duct cable, 18" radius bends. For conductor in conduit system, same size as system conduit.

** 5" for shoe base poles.

4-90 Changed to '85 AASHTO.
8-89 Non-Aluminum doors REQ'D.
8-89 Reduced to 34" Sheet.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS
RID (2)-88

	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
DN.:	ORIGINAL	1-88	6	TEXAS	HES 0005(606)				38
CK.:	REVISIONS	3-89							TOTAL SHEETS
DN.:	REVISIONS	8-89	STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	
CK.:	REVISIONS	4-90	16	NUECES		0074	06	164	USI81

281RID2.D16

II. F. High Pressure Sodium Vapor Luminaires

1. Photometrics

a. The (TY UP) (SPL-CO) (.15KW)S underpass luminaires shall be 150 watt high pressure sodium, IES TYPE M-C-III. The fixtures shall provide a minimum measured intensity of .2 footcandles in a rectangular area measuring 80 feet X 30 feet, when mounted 20 foot above the midpoint of either long side of the surface area.

b. The 250-watt mast-arm mounted luminaire shall be IES Type M-S-III and, 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:

$$F = \frac{L\ (I\ Min.)}{I\ Max.}$$

Where:
F = the uniformity factor
L = 200
I Min. = minimum measured intensity within the rectangle
I Max. = maximum measured intensity within the rectangle

c. The 400-watt mast-arm mounted luminaire shall be IES Type M-S-III and, when mounted 50 feet above the point 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. Lighting 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:

$$F = \frac{L\ (I\ Min.)}{I\ Max.}$$

Where:
F = the uniformity factor
L = 250
I Min. = minimum measured intensity within the rectangle
I Max. = maximum measured intensity within the rectangle

d. The luminaires shall meet the photometric requirements shown above, when energized at 90 percent of rated line voltage.

2. Ballasts

a. All ballasts shall be isolated-winding lag-type magnetic regulator 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 +10 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 +10 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. Luminaires will be tested for satisfactory operation of the starter board under open-circuit (lamp-out) condition for a minimum of 72 hours. Any failures of starter boards will be considered grounds for rejection of the model starter board being supplied.

g. 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 no earlier than six months prior to 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. 150 watt lamps shall be rated for 55 volts.

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 SDHPT Materials and Test Division's 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 in accordance with the 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. All 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.

2. Insulated conductors shall be NEC Type XHHW or Type USE(XLP). Conductors in circuits containing two or more insulated conductors shall be color-coded at each accessible point (i.e., ground boxes, pole bases, junction boxes). Color-coding will be required on pre-condutized duct cable containing two or more insulated conductors. Color-coding of electrical conductors may be made using colored tape. Tape marker shall consist of half-lap layer of tape covering a six inch length of jacket. Tape markers shall be placed on all insulated conductors needing coding at all pole bases, ground boxes, junction boxes, service assembly enclosures and luminaires.

3. Insulated conductors shall be marked in accordance with Article 310 of the NEC, and shall meet the requirements of Underwriters Laboratories' Standards.

4. Neutral conductors shall be insulated and shall be white or black with white tape marking. White shall not be used for any other conductor. Grounding conductors shall be bare or if insulated shall have green jacket or green tape marking. Green shall not be used for any other conductor.

△2

I. Conduit and Fittings

1. Conduit must be UL-approved for the intended use shown on plan sheets. Aluminum conduit will not be permitted, unless allowed 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. Insulated grounding bushings shall be used on all metallic conduit entries into boxes or enclosures without bossed hubs and in ground boxes.

4. Expansion joints for metallic conduit shall be provided with a grounding strap. Expansion Joints for metal conduit shall be Appleton UNYL 50 Series, OZ AX Series or equal.

J. Ground Boxes

1. Ground Boxes shall meet the following requirements.

a. Boxes shall be manufactured from Reinforced Polymer Concrete (RPM) composed of borosilicate glass fiber, a catalyzed polyester resin and an aggregate.

b. Minimum inside dimensions (WxLxH) shall be as follows:
Type A shall be 12 inches x 23 inches x 11 inches.
Type B shall be 12 inches x 23 inches x 22 inches.
Type C shall be 16 inches x 29 inches x 11 inches.
Type D shall be 16 inches x 29 inches x 22 inches.

c. Bottom edge of box or extension shall be footed (2-1/2 inch flange).

d. Ground boxes and covers shall be designed for heavy duty loading (15,000 lb load over 10 inches x 10 inches area). Ground boxes and covers shall have been tested to meet required loading. Contractor shall submit certification of such tests.

e. All ground boxes and covers shall be permanently marked with manufacturer's name or logo and manufacturer's model number.

f. Ground box covers shall be steel, hot dipped galvanized, and shall have "ELECTRIC" imprint. Covers shall be bolted down. A grounding lug with 1/2-13 NC female threads shall be placed on the underside of the cover. Cover shall be bonded to grounding conductor with 3 foot jumper, Blackburn TTC4 or Burndy KC22B2 connector and split bolt connector. Two wire branch systems shall have a ground rod installed in ground box and be bonded to underside of cover with green bonding jumper. △3

2. Where indicated on plans, ground box will be encased in concrete apron as detailed.

3. A minimum gravel fill of 9 inches shall be placed under each ground box.

4. The Contractor may cut the necessary conduit holes in box extensions only. Holes must be 18 inches or more below the cover.

5. The Contractor shall make brochure submittal (four copies) on ground boxes.

△4 6. Conduit bodies, junction and pull boxes shall be so installed that the wiring contained in them can be rendered accessible without excavating sidewalks, paving, earth, or other substance that is to be used to establish the finished grade unless their location is effectively identified and accessible for excavation.

T.L.C.
△4 9-90 Accessible wiring in ground boxes
△3 9-90 Changed to conform with NEC 250-61(b)
△2 8-89 Removed note H-5.
△1 8-89 Reduced to 34" Sheet.

STATE OF TEXAS
F. RAY MIMS
29647
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by F. RAY MIMS, P.E. 29647, on 4/1/__, 19__

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS

RID (3)-88 (MOD)

	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
DN.:	ORIGINAL	1-88	6	TEXAS	HES000(606)			39
CK.:	REVISED	3-88	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
DW.:	REVISED	4-89						
CK.:	REVISED	8-89	16	NUECES	074	06	164	US181

286RID3.D16

39

II. K. Junction Boxes

1. Junction boxes shall be cast iron or cast steel, hot-dipped galvanized, or cast aluminum (surface-mounted only) unless otherwise noted on plans.

2. Surface-mounted junction boxes for conduit 1-1/4 inches and larger shall be Crouse Hinds Type WAB, OZ Type YS, or Adalet Type 3R, with mounting lugs, minimum size 6 inches x 6 inches x 4 inches, or approved equal. For conduit 1 inch or smaller, surface-mounted boxes may be 4-1/2 inches round and approximately 3 inches deep, Crouse Hinds Type GRFX, Appleton Type JBDX, three-gang FD, or approved equal.

3. Flush-mounted junction boxes installed in concrete structures shall be Crouse Hinds, OZ, or approved equal similar to boxes described above but for flush mounting.

III. CONSTRUCTION METHODS

A. General

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

2. Erection and/or removal of poles and luminaires located near any overhead electrical lines shall be accomplished using established industry and utility safety practices. The Contractor shall consult with the appropriate utility company prior to beginning such work.

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 only leveling nuts may be used. Leveling nuts shall not be used under transformer bases. Grout will not be placed between base flange and the foundation.

2. In each pole, continuous color-coded stranded No. 12 AWG copper Type XHHW or other approved XLP conductors shall be connected to the line side of each ballast. Color coding shall be accomplished as described in paragraph II.H.

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. Fuses shall be 5 ampere time-delay type.

4. For median-mounted poles placed on concrete median barrier, all 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. Nut covers will not be allowed.

C. 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. Conduit hangers or straps shall be spaced at maximum intervals of 5 feet. Hangers shall be Unistrut Series J1200, Globe Series 450, or equal, unless otherwise indicated in the plans. Conduit spacers shall be used on Rigid Metal conduit placed on vertical surface of concrete structures (see conduit detail).

3. Conduit hangers shall not be attached directly to prestressed concrete girders except as shown in the plans and approved by the Engineer.

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 tunneling 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.

5. For all conduit placed by trenching, trenching and backfilling shall be in accordance with the item, "Excavation and Backfill for Sewers," except for measurement and payment. Trenching depth shall provide a minimum of 18 inch cover over conduit, unless noted otherwise on the plans.

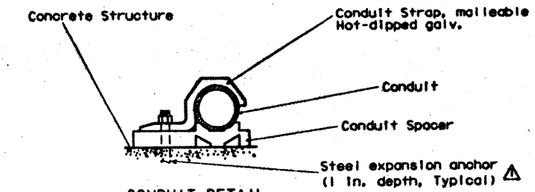
6. With approval of the Engineer conduit placed under new roadways may be trenched in subgrade and backfilled with excavated material. When approved by the Engineer, conduit may be trenched in sub-base but must be backfilled with cement-stabilized base. Conduit placed after base or surfacing operation has begun must be jacked or bored. Conduit placed under existing roadways, driveways or sidewalks shall be placed as directed by the Engineer or as shown on plans.

7. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction.

8. Conduit entry into junction boxes shall be made weathertight using threaded fittings or hubs, or with sealing locknuts inside and out.

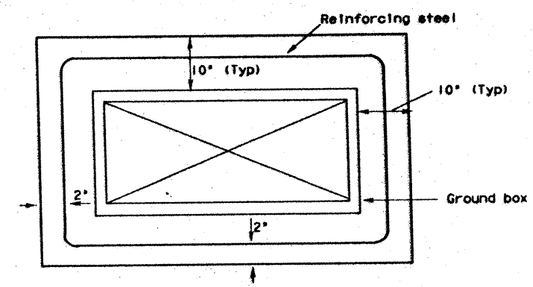
9. The ends of all metallic conduit terminating in a ground box, junction box, enclosure, or light pole base carrying individual conductors shall be fitted with insulated grounding bushings. A bonding jumper shall be installed from bushings to nearest ground rod, grounding lug, or grounded conductor. At service poles, bonding jumper shall be AWG Size no. 6. All other jumpers shall be minimum size AWG No. 8. Metallic conduit run undergroundand not exposed or accessible at any point need not be grounded.

10. Conduits shall be sealed with heat shrink boots or tubes, with sealant, or shall be sealed by other methods approved by Engineer. Sealing shall be done after completion of the pull test described in paragraph III.D.3.

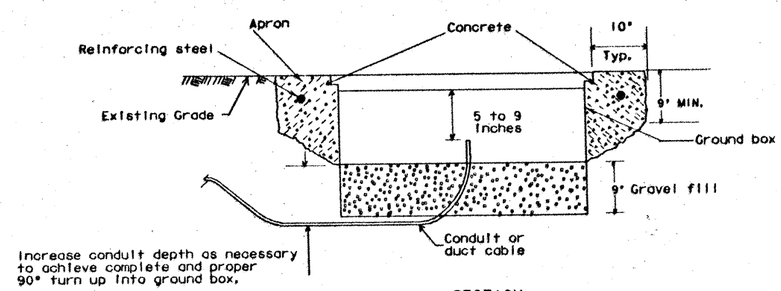


CONDUIT DETAIL
(Attachment to vertical surfaces)
(See para. III.C.2)

~~Proposed~~ class A concrete apron reinforced with No. 3 reinforcing steel. Subsidiary to item 624



PLAN VIEW



SECTION

APRON FOR GROUND BOXES

(Where required by plan note)

40

8-89 Reduced to 34" Sheet.
8-89 Clarified note K-1.
8-89 Modified apron, specified anchor.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS

RID (4)-88

	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
DN.	ORIGINAL	1-88	6	TEXAS	HES 0005(606)				40
CK.	REVISED	3-88	STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
DN.	REVISED	4-89	16	NUECES		0074	06	164	US181
CK.	REVISED	8-89							

281RID4.D16

III C.

11. All conduit entering ground boxes and pole bases and used to carry individual conductors shall be furnished with bell end fittings or bushings. Metallic conduit shall be fitted with grounding strap and bonding jumper. Jumper shall be tied to nearest ground rod or grounding conductor.

12. Where called for on plans, the conduit shall be placed on a 2-inch sand cushion and backfilled with a minimum of 6-inch sand fill.

13. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less than 5 inches nor more than 9 inches from the box cover (see ground box detail).

D. Electrical Conductor

1. A non-metallic pull rope shall be used in pulling conductor in non-metallic conduit.

2. After installation and prior to connecting ends, each continuous run of insulated conductor shall have a minimum D.C. insulation resistance of one megohm when tested at 1000 volts D.C. All or part of conductor system may be tested by the Engineer. Conductors exhibiting an insulation resistance of less than one megohm shall be replaced by the Contractor at his own expense.

3. After conductor is placed in conduit, a pull test will be made on conductors. Any length of conductor that cannot be pulled easily will be replaced by the Contractor at his expense.

4. Conductors shall be supported by a J-hook in top of illumination poles.

5. A minimum length of 3 feet of conductor shall be left in ground boxes and pole bases for making up connections.

E. Duct Cable

1. Duct cable shall be placed by the open trench method, except where otherwise noted, at a depth of 18 inches unless otherwise indicated. Bends in duct cable shall be made in the manner recommended by the manufacturer. Minimum bending radi shall be as follows:

1-inch duct : 15 inches R.
1-1/4 inch duct : 18 inches R.

Handling of duct cable reels and installation of duct shall be as recommended by the manufacturer. Duct entering ground boxes shall be placed so that the duct ends shall be not less than 5 inches nor more than 9 inches from the box cover.

2. All ducts entering ground boxes shall be securely lashed together in vertical position. After duct cable has been installed, a pull test will be made on conductors. If conductors cannot be easily pulled, Contractor shall replace or otherwise adjust installation to free up the conductors. Duct cable ends shall be sealed with approved compound after pull test is completed.

3. Where noted on plans duct cable shall be placed on a 2-inch sand cushion and backfilled with a minimum 6 inches of sand.

F. Bonding and Grounding

1. The Contractor shall insure that all exposed metal containing electrical conductors is bonded and grounded, using ground rods, grounding bushings, locknuts, and other fittings as necessary.

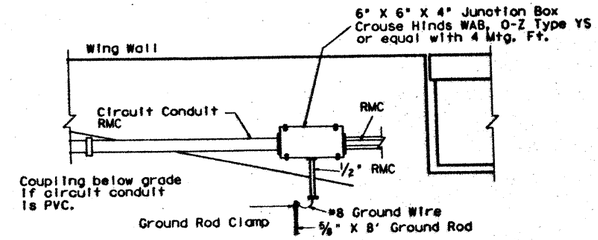
2. Metallic conduit, lighting poles, and luminaires on bridge structures shall be grounded. Each structure shall have at least one 5/8-inch x 8 foot copper-clad ground rod driven in the ground and a No. 8 AWG copper bonding jumper shall be installed from the ground rod to the grounding conductor of the lighting circuit.

3. The bonding jumper shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

G. Connectors and Splices

1. Splices, in locations permitted by the Engineer, shall be made with approved compression sleeves or split bolt connectors insulated with heavy-wall heat shrink tubing containing factory-applied sealant or approved waterproof mechanical splice kit (Homac "Flood Seal"). Heat shrink sleeves shall lap conductor insulation a minimum of 2 inches on both sides of the splice. If split bolt connectors are used, connectors shall be covered with two half-lap layers of rubber tape before insulation is applied.

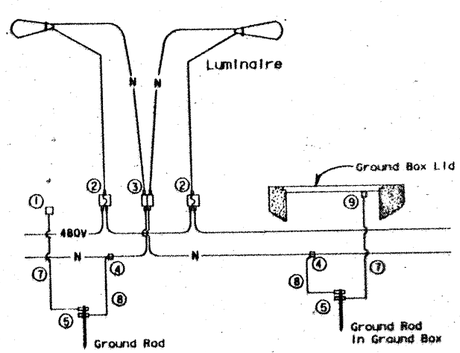
2. When approved by the Engineer, wire nuts may be used for No. 8 and smaller conductors in above ground junction boxes but not in pole bases or ground boxes. Wire nuts shall be positioned upright to prevent the accumulation of water.



NOTES

1. Conduit shall be 2" RMC for duct cable entry to junction box.
2. Ground rod clamp to be Blackburn GG 5/8H, Weaver W5/8 or equal.
3. All conduit entering junction box shall have locknuts and bushings. Conduit for ground wire shall have grounding type bushing.
4. For conduit to be placed in structure use flush-mounted box, Crouse Hinds WEB, O-Z Type YU or equal.

CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

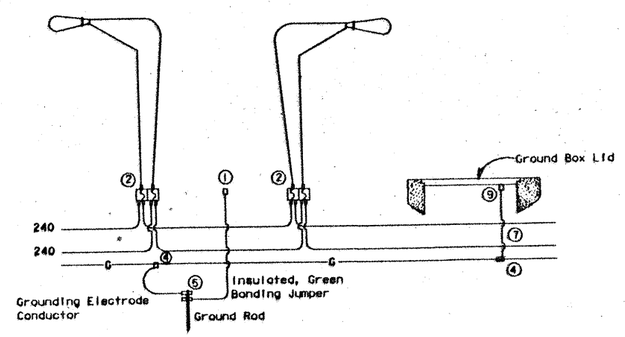


NOTES:

① Pole Bonding Connector-Blackburn #TTC3 or Weaver #TGC3 or equal.
② Fused Connector-Homac, Bussman HEB, HEX, or equal.
* ③ Un-fused Connector-Homac, Bussman HEB, HEX, or equal.
④ Split Bolt Connector.
⑤ Ground Rod Clamp - 2 Required - Blackburn GG58H Burndy GKP635 or equal.
⑥ All fuses shall be time-delay types, 10 Amp (Littlefuse FLQ, Bussman FNQ or equal)
⑦ Bonding Jumper (Insulated, Green, XHHW)
⑧ Grounding Conductor (Insulated, White, XHHW)
⑨ Grounding Lug

*For Transformer Base Poles. On Shoe Base Poles, omit un-fused connector for neutral conductor.

TWO WIRE CIRCUIT-OUTSIDE GROUNDED
LUMINAIRES SERVED AT 480V
TYPE B (MOD) SERVICE



FOR THREE-WIRE CIRCUIT-CENTER GROUNDED
LUMINAIRES SERVED AT 480V
TYPE A 240V/480V SERVICE

STATE OF TEXAS
F. RAY MING
29647
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by F. RAY MING, P.E. 29647, on 4/1, 1991

11-90 Ground Box Diagram Added to Show Bonding and Grounding of 480V Two Wire Branches with Ground Rod Installed TLC

8-89 Reduced to 34" Sheet.

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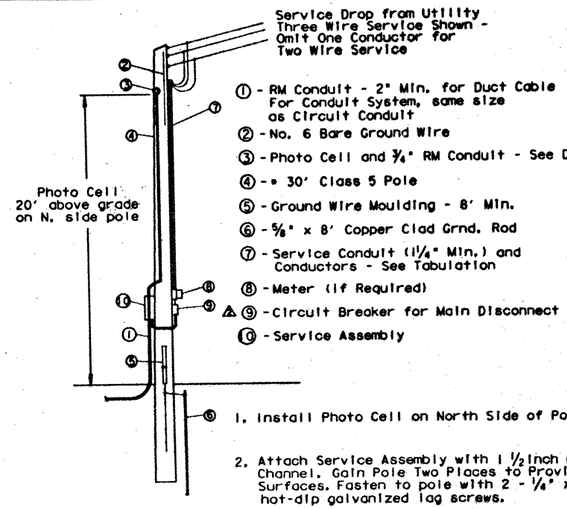
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS
RID (5)-88 (MOD)

	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
DN.	ORIGINAL	1-88	6	TEXAS	HES0005(606)			41
CK.	REVISED	3-89						
DR.	REVISED	8-89	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
CK.	REVISED		16	NUECES	0074	006	164	US181

28IRID5.D16



① - RM Conduit - 2" Min. for Duct Cable For Conduit System, same size as Circuit Conduit
② - No. 6 Bare Ground Wire
③ - Photo Cell and ¾" RM Conduit - See Detail
④ - * 30' Class 5 Pole
⑤ - Ground Wire Moulding - 8' Min.
⑥ - ⅝" x 8' Copper Clad Grnd. Rod
⑦ - Service Conduit (1¼" Min.) and Conductors - See Tabulation
⑧ - Meter (If Required)
⑨ - Circuit Breaker for Main Disconnect
⑩ - Service Assembly

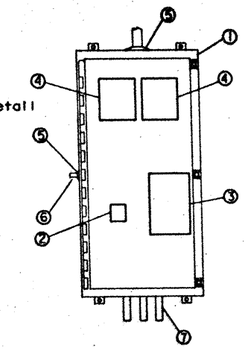
1. Install Photo Cell on North Side of Pole.

2. Attach Service Assembly with 1 ½ inch Galvanized Channel. Gain Pole Two Places to Provide Flat Surfaces. Fasten to pole with 2 - ⅛" x 3' hot-dip galvanized lag screws.

* Or as Required By NESC and Utility Company.

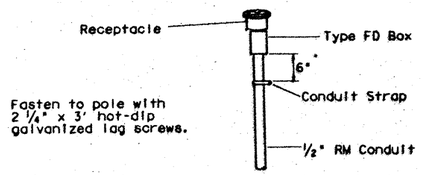
TYPICAL SERVICE POLE

See Service Pole Schematic For Types.
See SL(1)MOD

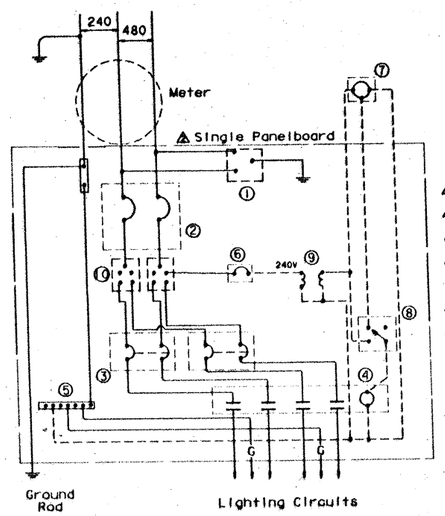


① - Enclosure with vertical piano hinge
② - Control Unit
③ - Lighting Contactor
④ - Circuit Breakers
⑤ - Conduit Hub
⑥ - Conduit to Photo Cell
⑦ - Conduit as required

SERVICE ASSEMBLY DETAIL



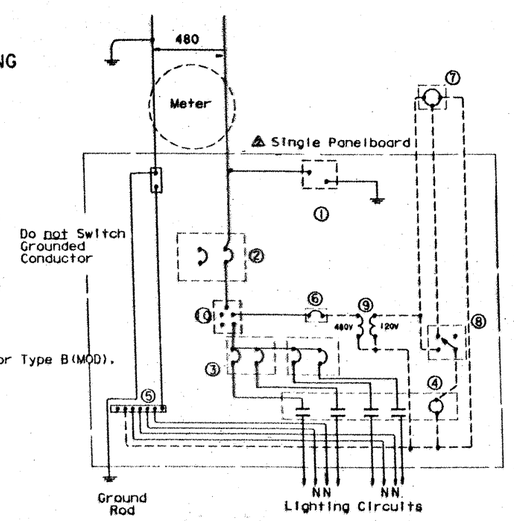
DETAIL
PHOTO CELL MOUNTING



SERVICE POLE TYPE A
240 / 480 VOLTS - THREE WIRE BRANCHES

Single Panelboard ① Lightning Arrester - In Enclosure
Single Panelboard ② Circuit Breaker - Main Disconnect
Single Panelboard ③ Circuit Breaker - For Individual Circuits
Single Panelboard ④ Lighting Contactor
⑤ Factory-made Neutral Bus
Single Panelboard ⑥ Circuit Breaker - 15A for Control Circuit
Single Panelboard ⑦ Photo-Electric Control - 100 to 285V
⑧ Control Unit-"Manual-Off-Automatic"
Single Panelboard ⑨ Control Transformer - 480V:120V, 0.5KVA For Type B(MOD). 240V:120V, 0.5KVA For Type A Service.
⑩ Distribution Block

——— Power Wiring
- - - - - Control Wiring



Single Panelboard SERVICE POLE TYPE B (MOD)
480 VOLTS - TWO WIRE BRANCHES

SERVICE POLE SCHEMATIC

GENERAL NOTES:

SERVICE POLE AND CIRCUIT PROTECTOR ASSEMBLY

Single Panelboard 1. Service Assembly Enclosure. NEMA 4X enclosure consisting of enclosure with drip shield and conversion hardware, constructed of fiberglass with piano hinge and resilient gasket. Door held with clamps with provisions for padlock. Equipment-mounting panelboard shall be 12-gauge stainless steel. Each enclosure shall be supplied with one rigid vinyl or plastic accident prevention tag with the message, "DO NOT THROW SWITCH MEN AT WORK ON CIRCUIT".

Single Panelboard 2. Lighting Contactor. NEMA 4X, electrically-held, of type designed to control tungsten, mercury vapor and other lighting loads, Square D Class 8903 Type S, Allen Bradley 702L or approved equal.

3. Control Unit. Standard duty 3-position (Auto-Manual-Off) control station in NEMA 1 enclosure.

Single Panelboard 4. Photo-Electric Control. Dry-type hermetically sealed cadmium sulfide cell, expulsion arrester and electro-mechanical relay, mounted in weatherproof plastic housing having twist-lock base. Turn-on range of 0.5 to 5 footcandles, factory-set at 1 ± 1/2 footcandle. Turn-off 2 footcandles higher than turn-on. Voltage range 100 to 285. Control circuit to be protected by a 15A circuit breaker. Breakers for a two-wire 480V system shall be rated 480V, for a three-wire center-grounded 240/480V system shall be rated 277/480 volts.

Single Panelboard 5. Lightning Arrester. Valve-type, 0-650 volt with bracket for enclosure mounting.

6. Circuit Breakers for a three-wire center-grounded 240/480 service shall be rated 277/480 volts. Circuit breakers for a two-wire 480 volt system shall be rated 480 volts, and shall control only one circuit. Circuit breakers for 120/240 volt systems shall be rated 240 volts.

Single Panelboard 7. Circuit Breaker for Main Disconnect shall be heavy-duty type, two-pole, rated 480 volts with a solid neutral assembly mounted in the NEMA 4X enclosure. Circuit breakers for 240 volt systems shall be the same except rated 120/240 volts.

8. Metering. Where metering is required, utility company will provide the meter base. Contractor shall install the base. Some utility companies require the meter base to be installed on the load side of the safety switch. Contractor shall consult with the utility company before making up the service poles.

9. Circuit Protector Assemblies shall be similar to Service Pole Assemblies except that SDHPT wood pole is existing at the designated locations shown on plan sheet. Circuit Protector Assemblies for service poles shall consist of disconnecting & removing existing equipment and replacing with the specified equipment.
All salvagable electrical equipment will become the property of the Texas Department of Highways and Public Transportation.

10. The Contractor shall be responsible for paying all costs involved in obtaining power, except that the costs incurred in extending primary line to service pole location will be paid for separately.

SERVICE POLES & CIRCUIT PROTECTOR ASSEMBLIES

Circuit Protector Designation	Service Pole Designation	Type	Service Conduit Size	Service Conductors No./Size	Main Circuit Breaker Amps	Contactor Poles/Amps	Circuit No.	Circuit Breakers	KVA Load
EXIST.	1	A							
EXIST.	2	A							
EXIST.	3	A							

STATE OF TEXAS
F. RAY WIMS
29647
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by F. Ray Wims, P.E. 29647, on 4/22, 1996.
F. Ray Wims P.E.

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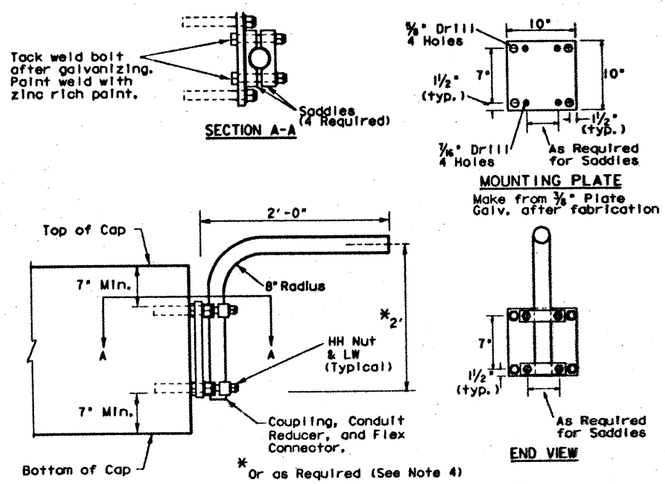
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAILS
RID (6)-88
DIST.-16 STANDARD

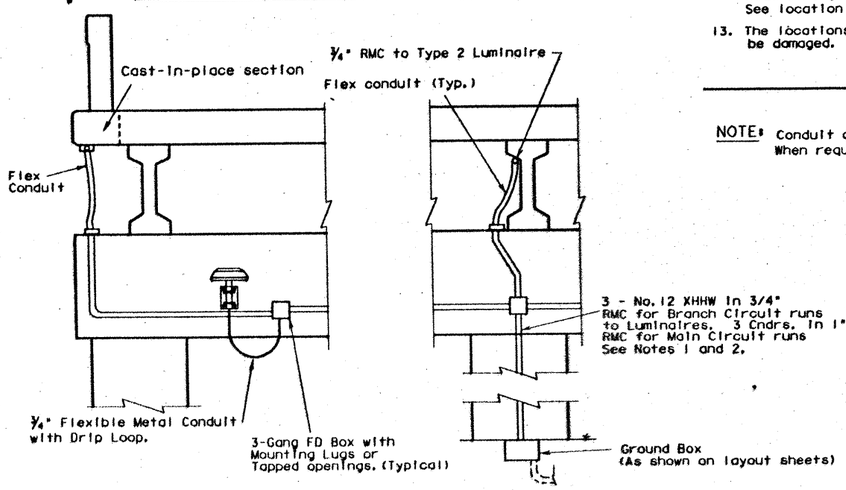
DN	DRAWING	DATE	FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
CK DN	ORIGINAL	1-88	6	TEXAS	HES0005(606)			42
DW	REVISED	8-88						TOTAL SHEETS
CK DW	REVISED	4-89	STATE DIST. NO.	COUNTY		CONT. NO.	SEC. NO.	JOB NO.	HIGHWAY NO.
TR	REVISED	8-89							
TLC	DIST. 16	9-90	16	NUECES		0074	006	164	US181

Modifications for existing 480V 2-wire branch system.
9-90 District-16 Standards
8-89 Reduced to 34" Sheet.

28IRID6.DGN



UNDERPASS LIGHTING ARM TYPE 1



**Note: If Luminaire overhangs traffic lane, or shoulder, bottom of Luminaire must be at elevation of bottom of beam.

*If bridge has pre-stressed panels under deck, run circuit under deck edge. See detail at left.

U/P (SPL-CO) (KW) S (TYPE 1)

NOTES:

ALL LUMINAIRES

1. Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
2. All No. 12 Conductors and 3/4" conduit necessary for installation of U/P lights shall not be paid for directly but shall be considered subsidiary to the various bid items. All larger conductors and conduit will be paid for under the items "Conduit" and "Electrical Conductor." See lighting layout sheets.
3. A ground rod shall be installed and attached to the equipment grounding conductor in all ground boxes containing conduit that extends above ground. All RMC in these boxes shall have grounding bushings and shall be properly bonded.
4. Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and layout sheet. Where traffic is likely to pass under luminaires, place luminaires so that bottom of luminaire is above bottom of beam, maximum of 3 inches.
5. All bolts, nuts and washers shall be galvanized.
6. Fabrication of brackets will not be paid for directly but shall be subsidiary to Item 610, Rdwy Illum Assemblies.

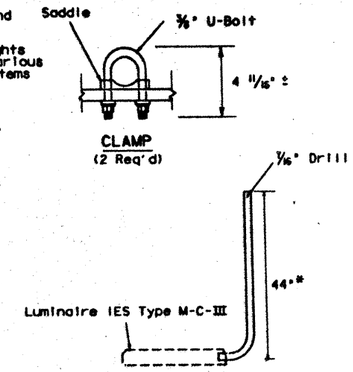
TYPE 1

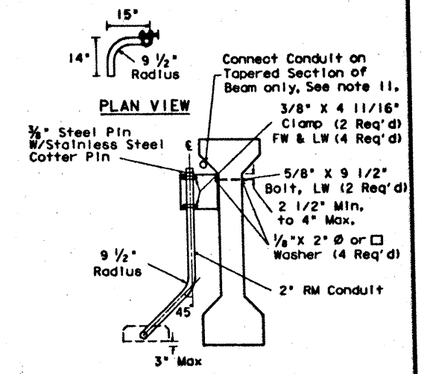
7. Type 1 arm shaft - 1-1/2" rigid metal conduit (1.90" O.D. .145" wall).
8. Anchor bolts for Type 1 luminaire shall be 3/8 in. bolt or stud expansion anchors with min. pull out of 3000 lb pull out each, with 4 in. min. embedment. Provide lock washers.
9. Attach conduit to plate with 4 saddles, 4-3/8" bolts, HHN & LW.

TYPE 2

10. Reduce conduit length for Type C concrete beams. Field cutting and threading will be permitted.
11. Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 inch.
12. Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Drilling location shall be only as directed by Engineer. See location of underpass lighting mounting bracket detail.
13. The locations given in the table are such that reinforcing strands will not be damaged.

NOTE: Conduit on Columns, Caps, and Slab is shown surface mounted. When required by the Engineer, Contractor shall embed conduit.

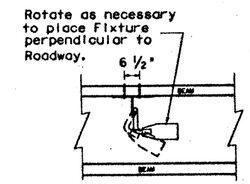




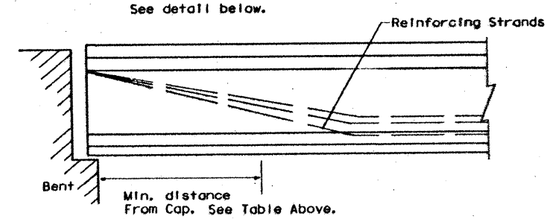
UNDERPASS LIGHTING ARM TYPE 2

Bridge Span Length	Minimum Distance From Bent Cap to Fixture Mounting Arm
<50'	10'
50'-70'	15'
70'-90'	20'
>90'	25'

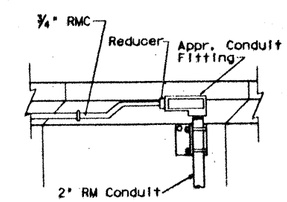
See detail below.



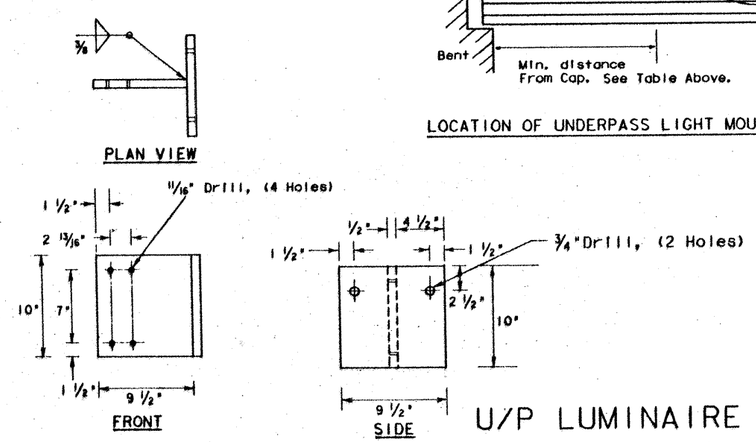
FIXTURE ORIENTATION



LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET



CONDUIT CONNECTION
(TYPICAL)



BRACKET DETAIL
Make From 1/2" Plate (ASTM A-36) Galv. after fabrication

U/P (SPL-CO) (KW) (TYPE 2)

U/P LUMINAIRE DETAILS

⚠ 8-89 Reduced to 34" Sheet.

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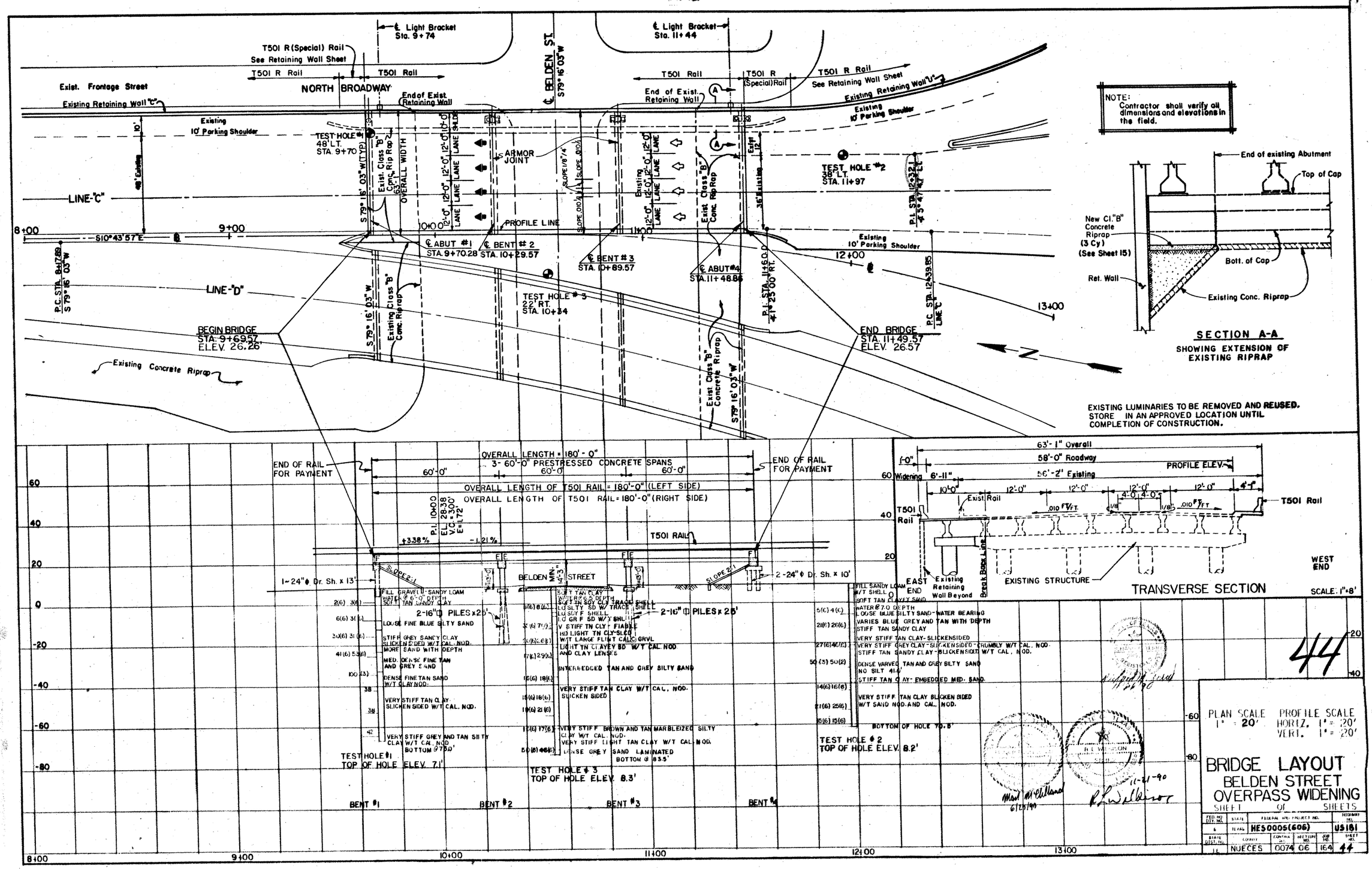
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ROADWAY ILLUMINATION DETAIL RID (7)-88

	DWN. NO.	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
DN.:	DE.G.NN.	1-88	6	TEXAS	HES 0005(606)				43
CK.:	REVISIONS	3-88	STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
DN.:	REVISIONS	4-89	16	NUECES		0074	06	164	US181
CK.:	REVISIONS								

281RID7.016


℄ Light Bracket Sta. 9+74
℄ Light Bracket Sta. 11+44
T501 R (Special) Rail
See Retaining Wall Sheet
T501 R Rail
T501 Rail
NORTH BROADWAY
℄ BELDEN ST.
S79° 16' 03" W
End of Exist. Retaining Wall
Exist. Frontage Street
Existing Retaining Wall "C"
Existing Retaining Wall "D"
Existing 10' Parking Shoulder
TEST HOLE #1 48' LT. STA. 9+70
TEST HOLE #2 38' LT. STA. 11+97
TEST HOLE #3 22' RT. STA. 10+34
ARMOR JOINT
PROFILE LINE
LINE-"C"
LINE-"D"
S10°43'57"E
P.C. STA. 8+17.85
P.I. STA. 12+32.1
P.I. STA. 11+60.0
P.C. STA. 12+39.85
℄ ABUT #1 STA. 9+70.28
℄ BENT #2 STA. 10+29.57
℄ BENT #3 STA. 10+89.57
℄ ABUT #4 STA. 11+48.86
BEGIN BRIDGE STA. 9+69.57 ELEV. 26.26'
END BRIDGE STA. 11+49.57 ELEV. 26.57'
Existing Concrete Riprap
Exist. Class "B" Conc. Rip Rap
Exist. Class "B" Concrete Riprap
Existing Class "B" Conc. Riprap
OVERALL WIDTH 63'
12'-0" LANE
SLOPE .010
Exist. 12'
36' Existing
8+00
9+00
10+00
11+00
12+00
13+00
NOTE: Contractor shall verify all dimensions and elevations in the field.
End of existing Abutment
Top of Cap
New Cl."B" Concrete Riprap (3 Cy) (See Sheet 15)
Bott. of Cap
Ret. Wall
Existing Conc. Riprap
SECTION A-A
SHOWING EXTENSION OF EXISTING RIPRAP
EXISTING LUMINARIES TO BE REMOVED AND REUSED. STORE IN AN APPROVED LOCATION UNTIL COMPLETION OF CONSTRUCTION.
END OF RAIL FOR PAYMENT
OVERALL LENGTH = 180'-0"
3-60'-0" PRESTRESSED CONCRETE SPANS
60'-0"
OVERALL LENGTH OF T501 RAIL = 180'-0" (LEFT SIDE)
OVERALL LENGTH OF T501 RAIL = 180'-0" (RIGHT SIDE)
P.I. 10+00.0 ELEV. 28.38 V.C. = 3.00' ELEV. 72'
+3.38% -1.21%
T501 RAIL
1-24" ϕ Dr. Sh. x 13'
2-24" ϕ Dr. Sh. x 10'
2-16" ϕ PILES x 25'
BELDEN STREET
MIN. 44.3'
SLOPE 2:1
TEST HOLE #1 TOP OF HOLE ELEV. 7.1'
TEST HOLE #2 TOP OF HOLE ELEV. 8.2'
TEST HOLE #3 TOP OF HOLE ELEV. 8.3'
BOTTOM OF HOLE 70.8'
BENT #1
BENT #2
BENT #3
BENT #4
63'-1" Overall
58'-0" Roadway
56'-2" Existing
PROFILE ELEV.
Widening 6'-11"
Exist Rail
T501 Rail
Break Back Line
Existing Retaining Wall Beyond
EXISTING STRUCTURE
EAST END
WEST END
TRANSVERSE SECTION
SCALE: 1"=8'
PLAN SCALE 1" = 20'
PROFILE SCALE HORIZ. 1" = 20' VERT. 1" = 20'
BRIDGE LAYOUT
BELDEN STREET OVERPASS WIDENING
SHEET OF SHEETS
FEDERAL AID PROJECT NO. HES0005(606)
HIGHWAY NO. US181
STATE NUECES
CONTROL 0074 SECTION 06 JOB NO. 164 SHEET NO. 44
44

SUMMARY OF ESTIMATED QUANTITIES

DESCRIPTION \ ITEM	Concrete Piling	Slurry Displacement Drilled Shafts	Class "C" Concrete (for Extending Struct.)		Reinf. Conc. Slab (for Ext. Struct.)	Prestr. Conc. Beam		Structural Steel	Structural Steel	Railing	Conduit PVC Sch 40 1½" ϕ	RDW. ILL. ASM. (U/P TY1) (0.15KW)S (SPL CO)	RELOC. RDWY. ILL. ASM. TRANS. BASE	ELEC. CONDR. (#6 BARE)	ELEC. CONDR. (#4)(TY-XHHW)
	16" Sq.	24" ϕ	Abutment	Bent		(Type C)		(Arm. Jt.)	(HYC)	(Type T501)					
	L.F.	L.F.	C.Y.	C.Y.	S.F.	L.F.		Lbs.	Lbs.	L.F.	L.F.	EA.	EA.	LF.	LF.
2 ~ Abutments		33	4.1												
2 ~ Interior Bents	100			14.0								2			
3 ~ 60'-0" Prestr. Conc. Bm. Spans					2592	178.43		940		360.0	242			242	484
2 ~ Bridge Lighting Brackets									90		8		2	8	16
TOTAL	100	33	4.1	14.0	2592	178.43		940	90	360.0	250	2	2	250	500

BEARING SEAT ELEVATIONS

	BEAM 1
BENT 1 (FWD)	22.0860
	BEAM 1
BENT 2 (BK)	22.7210
BENT 2 (FWD)	22.7299
	BEAM 1
BENT 3 (BK)	22.8316
BENT 3 (FWD)	22.8276
	BEAM 1
BENT 4 (BK)	22.3949

H 20 LOADING

45

STATE OF TEXAS
R. L. WILKISON
38362
REGISTERED
PROFESSIONAL ENGINEER
11-26-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

BELDEN STREET OVERPASS WIDENING

D45350A1:ZFA2:I3557561420S1AB01.DGN

PREPARED BY AND FOR USE OF TEXAS SDH&PT

ORIGINAL DRAWING DATE	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
APRIL 1990		16	6	HES0005(606)	45

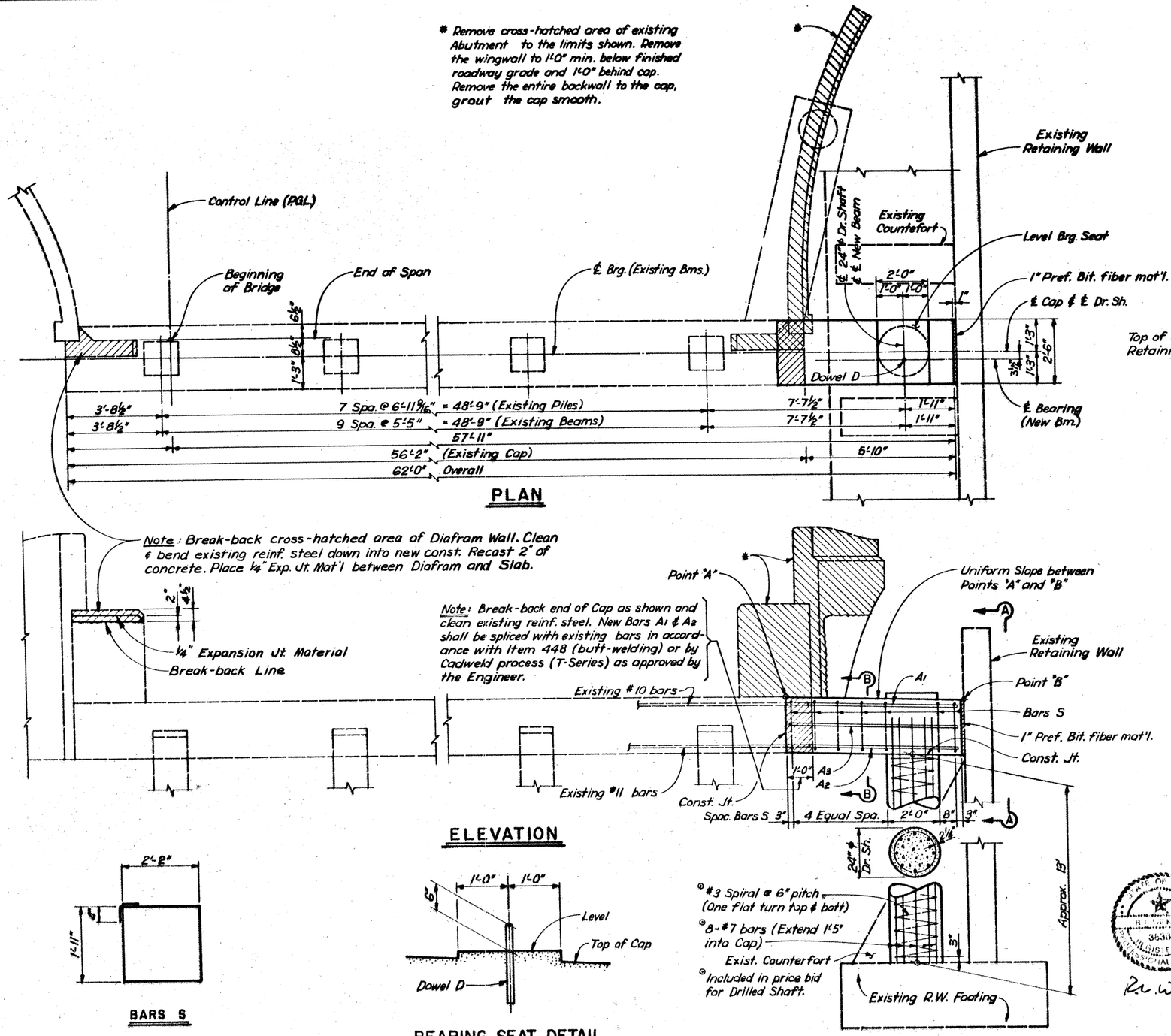
DR. RAC
CK.
DES. JTM
CK. TAM

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
NUECES	0074	06	1E4	U5181

Rev. 2-8-91
Rev. 12-31-90

TABLE OF ESTIMATED QUANTITIES				
Bar	No.	Size	Length	Weight
A1	3	#10	5'-10"	75
A2	2	#11	5'-10"	62
A3	1	#10	6'-6"	28
D	1	1¼"ϕ	1'-6"	6
S	7	#4	8'-10"	41
Reinforcing Steel			Lb	◊ 212
Cl. "C" Conc. for Ext. Strs.			C.Y.	1.4

◊ For Contractor's information only.



GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1989 Standard Specifications.

Calculated Shaft load = 50 Tons.

Care shall be taken to prevent damage to existing footing while drilling shaft. Shaft may require casing. Top of footing shall be cleared of loose particles in order to assure good contact with new shaft concrete.

H 20 LOADING

46

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

ABUTMENT NO. 1

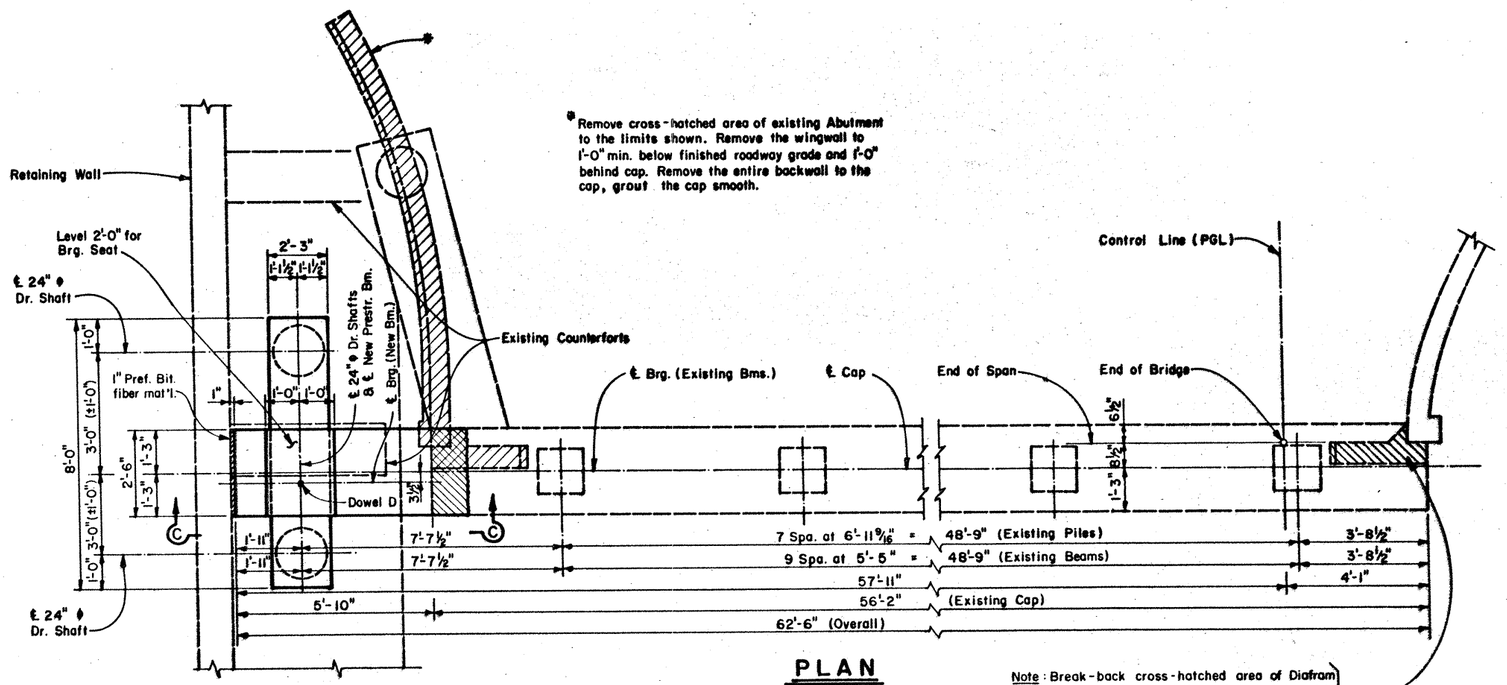
BELDEN STREET OVERPASS WIDENING

ORIGINAL DRAWING DATE	FEB. 1990	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT -I-				SHEET
DR. RAC / JCW	REVISIONS	16	6	HES0005(606)				46
CK. CEQ		COUNTY			CONTROL	SECTION	JOB	HIGHWAY
DN. RNS		NUECES			74	6	164	US181
CK. RNS								

STATE OF TEXAS — R. NEIL WILLIAMS — 36362 — REGISTERED PROFESSIONAL ENGINEER

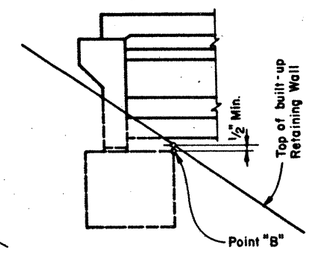
11-26-90

R. N. Williams



PLAN

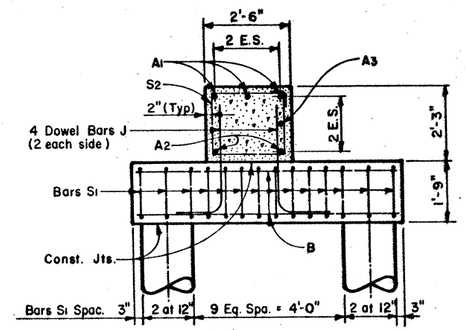
* Remove cross-hatched area of existing Abutment to the limits shown. Remove the wingwall to 1'-0" min. below finished roadway grade and 1'-0" behind cap. Remove the entire backwall to the cap, grout the cap smooth.



ELEV. A-A

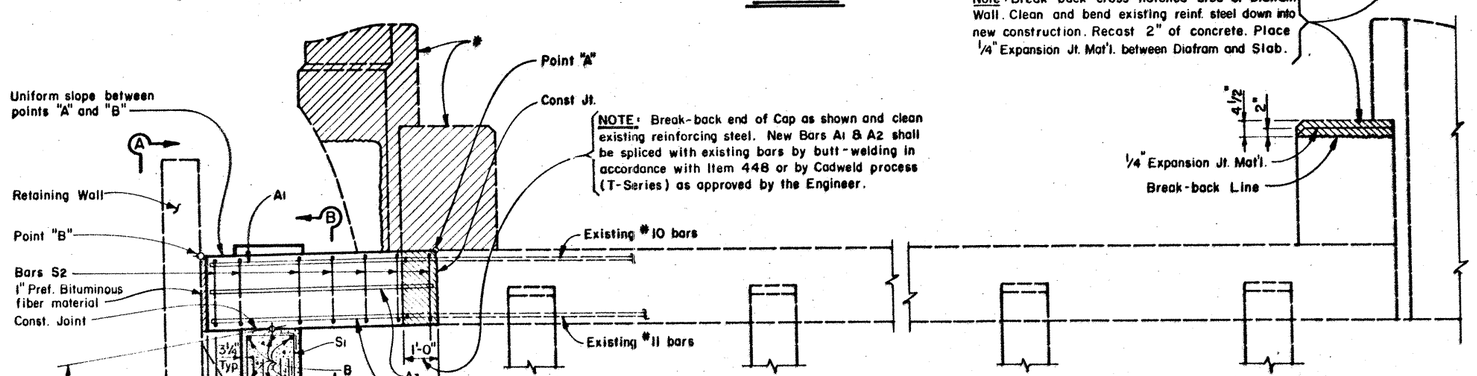
TABLE OF ESTIMATED QUANTITIES				
Bar	No.	Size	Length	Weight
A1	3	#10	5'-10"	75
A2	2	#11	5'-10"	62
A3	1	#10	6'-6"	28
B	6	#11	7'-8"	244
D	1	1¼"ϕ	1'-6"	6
J	4	#9	4'-10"	66
S1	14	#5	6'-8"	97
S2	7	#4	9'-0"	42
Reinforcing Steel			Lb.	✪620
Cl."C" Conc. for Ext. Strs.			C.Y.	2.7

✪ For Contractor's information only.



SEC. B-B

Note: Break-back cross-hatched area of Diafram Wall. Clean and bend existing reinf. steel down into new construction. Recast 2" of concrete. Place ¼" Expansion Jt. Mat'l. between Diafram and Slab.



NOTE: Break-back end of Cap as shown and clean existing reinforcing steel. New Bars A1 & A2 shall be spliced with existing bars by butt-welding in accordance with Item 448 or by Cadweld process (T-Series) as approved by the Engineer.

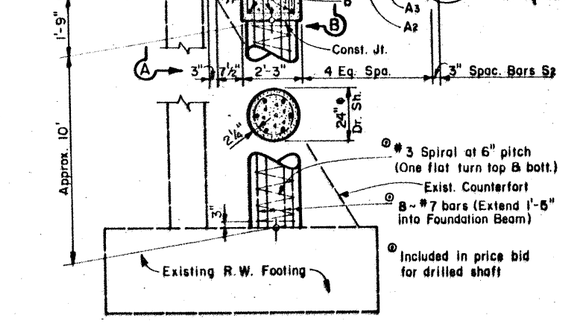
ELEVATION

GENERAL NOTES:

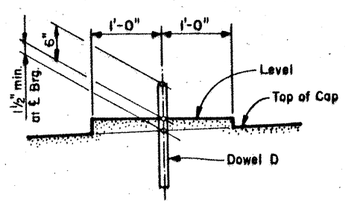
Designed in accordance with A.A.S.H.T.O. 1989 Standard Specifications.

Calculated Shaft Load = 25 Tons/shaft.

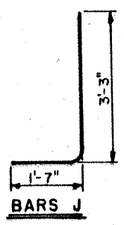
Care shall be taken to prevent damage to existing footing while drilling shafts. Shafts may require casing. Top of footing shall be cleared of loose particles in order to assure good contact with new shaft concrete.



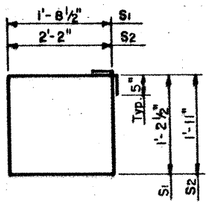
SEC. C-C



BEARING SEAT DETAIL



BARS J



BARS S

H20 LOADING

47

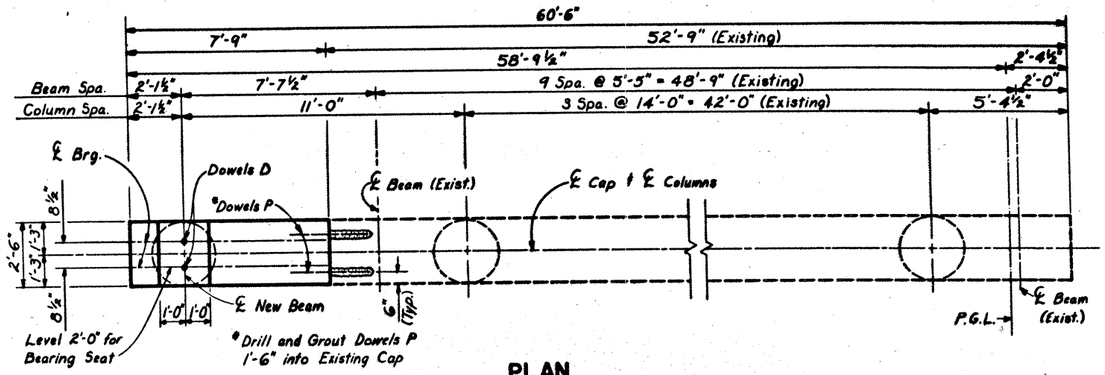
STATE OF TEXAS
R.L. WILLISON
58362
REGISTERED PROFESSIONAL ENGINEER
11-26-90

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

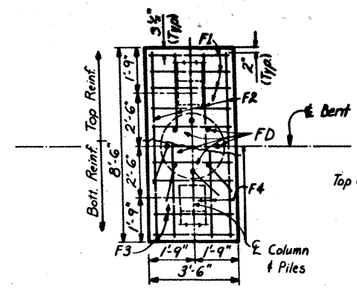
ABUTMENT NO. 4

BELDEN STREET OVERPASS WIDENING

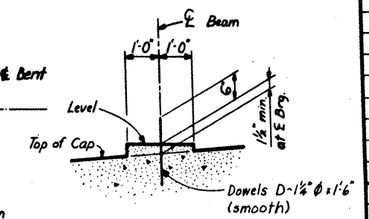
ORIGINAL DRAWING DATE APRIL 1990		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
DR. RAC / JCW	REVISIONS	16	6	HES0005(606)				47
CK. CEQ		COUNTY			CONTROL	SECTION	JOB	HIGHWAY
DW. RNS		NUECES			74	6	164	US181
CK. RAC								



PLAN



FOOTING PLAN

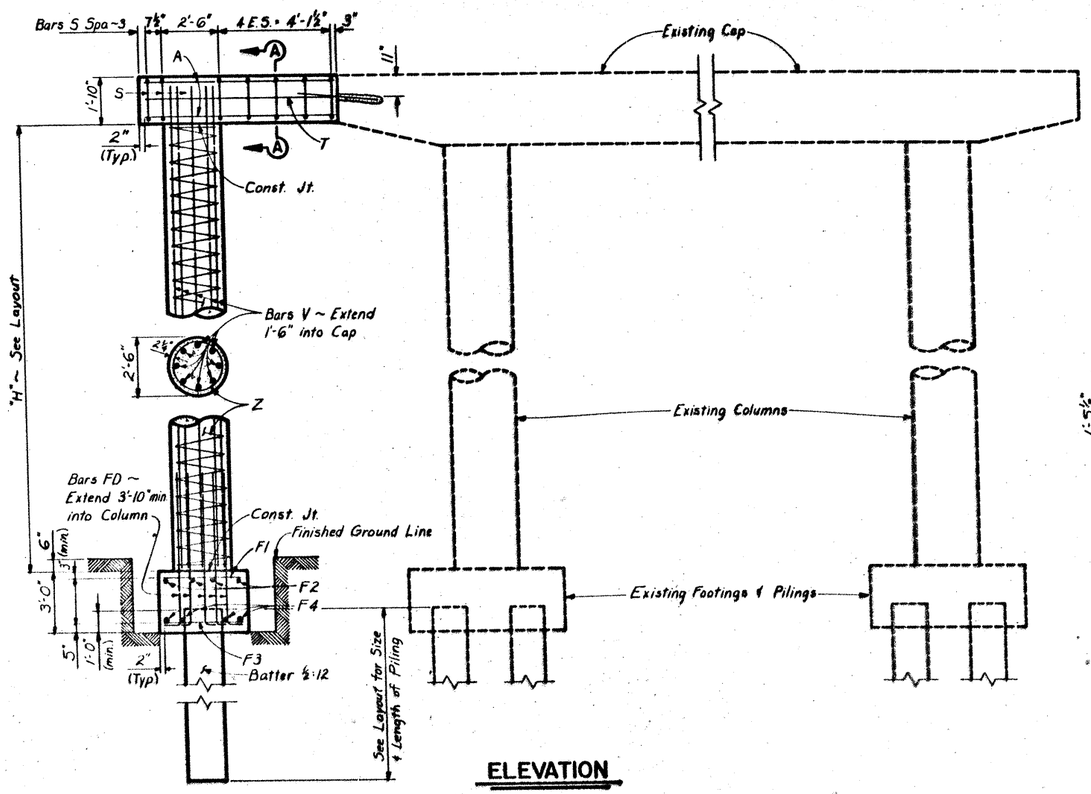


BEARING SEAT DETAIL

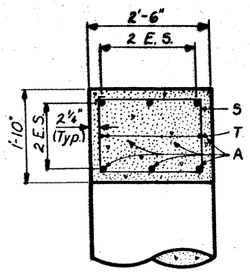
▣ TABLE OF CONSTANT QUANTITIES

Bar	No.	Size	Length	Weight
A	6	#10	7'-5"	191
D	2	1¼"ϕ	1'-6"	13
F1	11	#4	3'-2"	23
F2	4	#4	8'-2"	22
F3	9	#6	3'-2"	43
F4	4	#6	8'-2"	49
FD	8	#9	7'-11"	215
P	2	#9	3'-0"	20
S	7	#4	7'-10"	37
T	2	#5	7'-5"	15
Reinforcing Steel		▲	Lb.	628
Class "C" Concrete		⊖	C.Y.	4.6

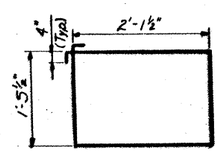
▣ Quantities shown are for one Bent only.
▲ For Contractor's information only.
⊖ For Extending Structures.



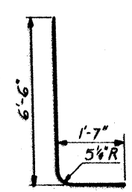
ELEVATION



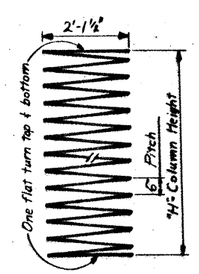
SECTION A-A



BARS S



BARS FD



BAR Z

▣ TABLE OF VARIABLE QUANTITIES / ▣ TOTAL ESTIMATED QUANTITIES

"H"	⊖ CLASS "C" CONC.	BAR V 8~#9		BAR Z 1~#3 SPIRAL		▲ REINF. STEEL	⊖ CLASS "C" CONC.
Ft.	C.Y.	Length	Weight	Length	Weight	Lbs.	C.Y.
10	1.8	11'-6"	313	147'	55	996	6.4
11	2.0	12'-6"	340	161'	61	1029	6.6
12	2.2	13'-6"	367	174'	65	1060	6.8
13	2.4	14'-6"	394	187'	70	1092	7.0
14	2.5	15'-6"	422	201'	76	1126	7.1
15	2.7	16'-6"	449	214'	80	1157	7.3

GENERAL NOTES:

Designed in accordance with A.A.S.H.T.O. 1989 Standard Specifications.

All Cap Steel shall be Grade 60.

Calculated Pile Loading = 45 tons/pile.

48

H 20 LOADING

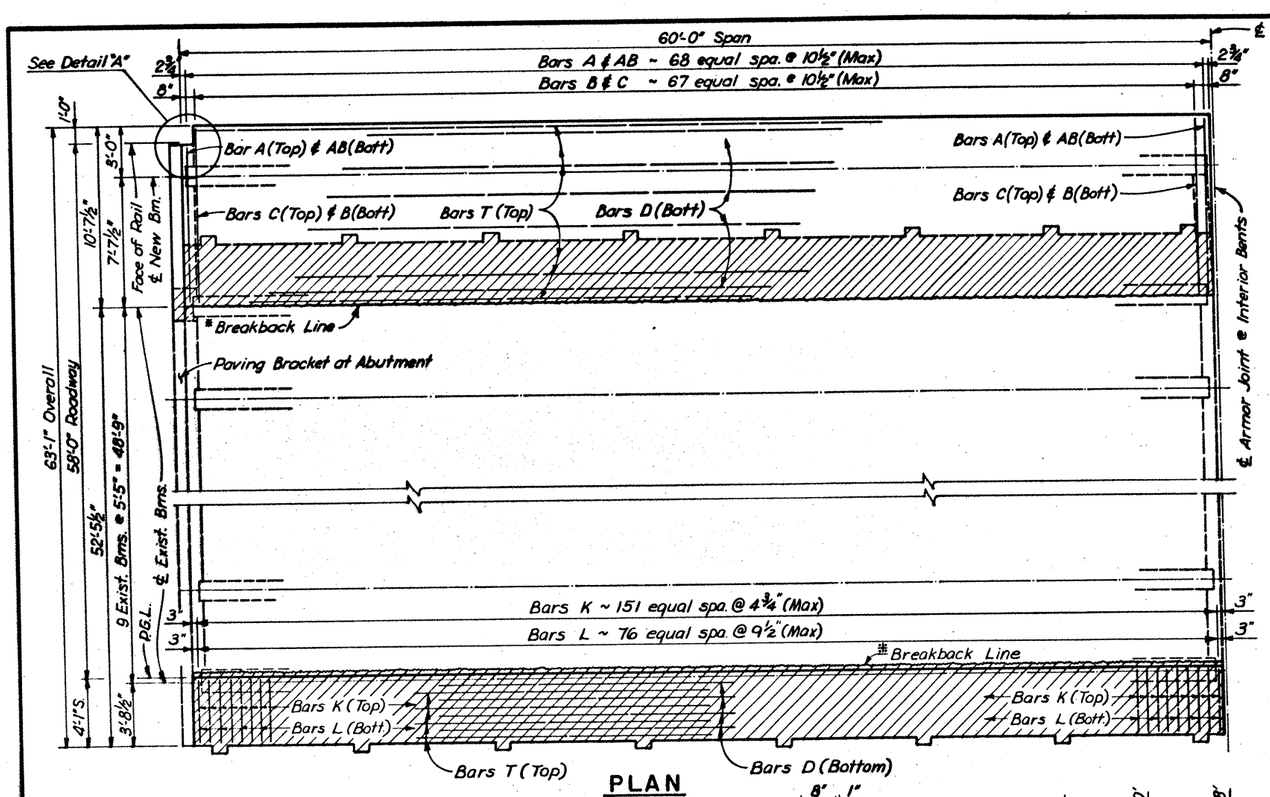
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

INTERIOR BENTS 2 & 3

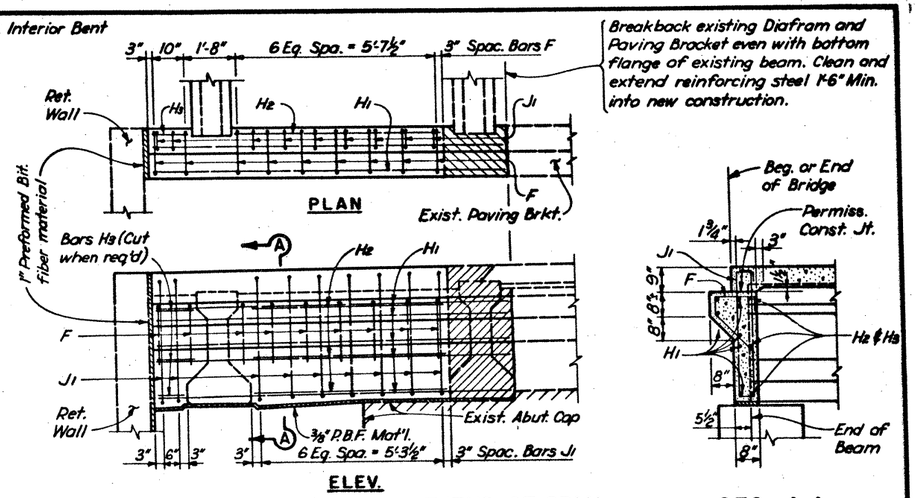
BELDON STREET OVERPASS WIDENING

R. L. Wilkins 11-26-90

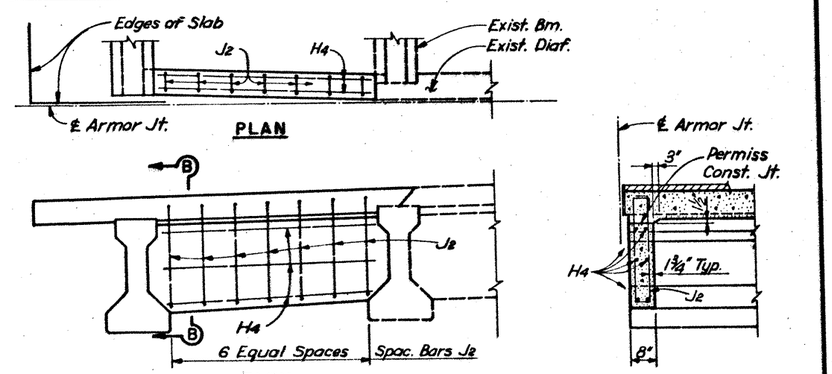
ORIGINAL DRAWING DATE FEBRUARY 1990	STATE DISTRICT 16	FEDERAL REGION 6	FEDERAL AID PROJECT HES0005(606)		SHEET 48
DR RAC / CK CEQ / DN TGA / CK RAC — DESIGNS	COUNTY NUECES	CONTROL 74	SECTION 6	JOB 164	HIGHWAY US 181



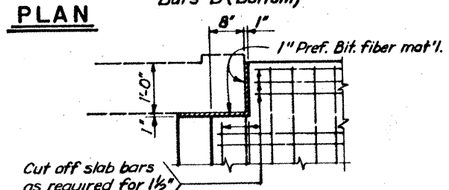
PLAN



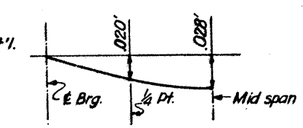
TYP. DIAFRAM AT ABUTMENT END OF SPAN



TYPICAL DIAFRAM AT INTERIOR BENT



DETAIL "A"

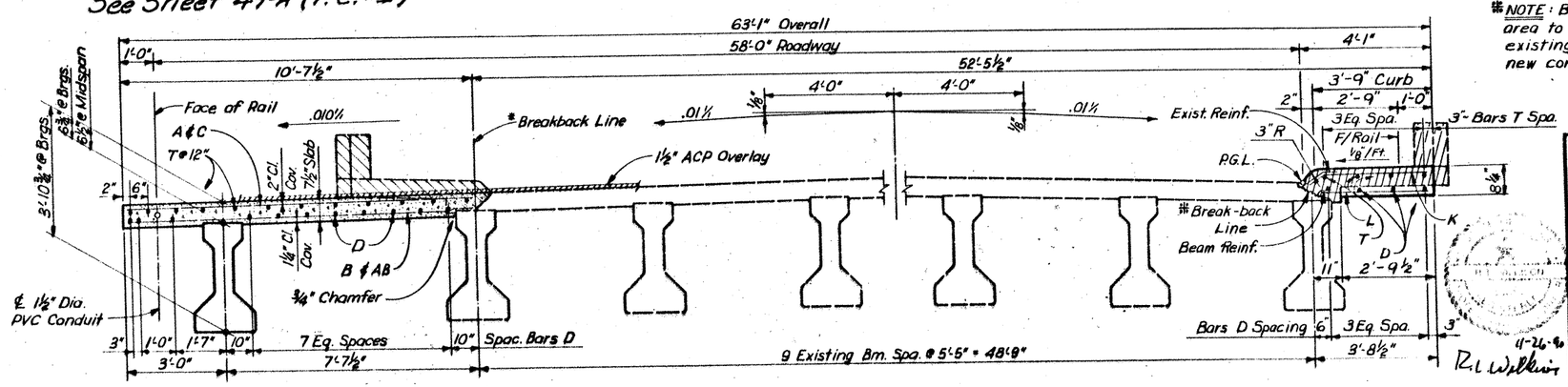


Deflections are due to cast-in-place concrete only. ($E = 5 \times 10^6$)

D.L. DEFLECTION DIAGRAM

* Breakback existing concrete to ℄ of existing outside beam. Clean and extend existing reinforcing steel 1'-6" Min. into new construction.

See Sheet 49-A (F.C. #1)



TRANSVERSE SECTION

* NOTE: Breakback existing cross-hatched area to breakback line. Clean and bend existing reinforcing steel 1'-6" min. into new construction.

49

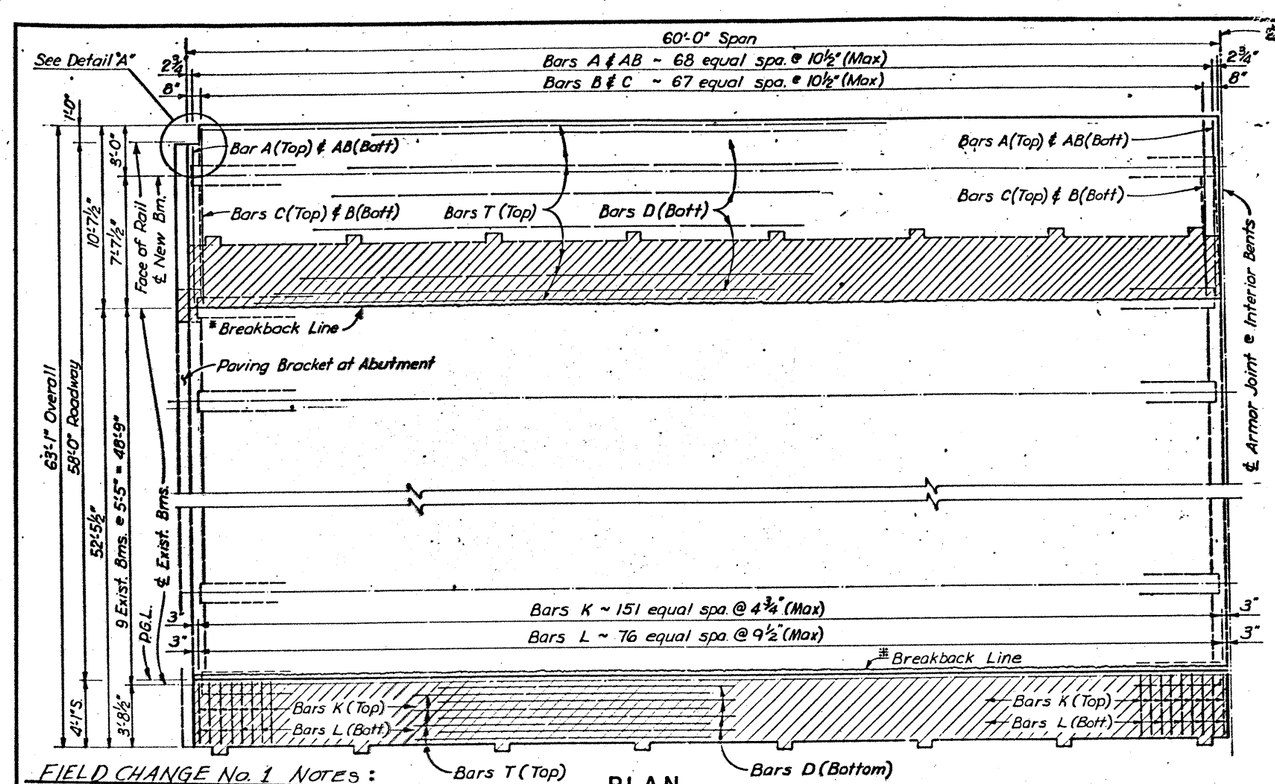
H20 LOADING SHEET 1 OF 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

60'-0" PRESTRESSED CONC. BEAM SPAN

BELDEN STREET OVERPASS WIDENING

ORIGINAL DRAWING DATE MARCH 1990	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
DR. RAC / JCW REVISIONS	16	6	HE50005(606)				49
CK. CEQ	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW. RNS	NUECES		74	6	164	US181
CK. RAC						

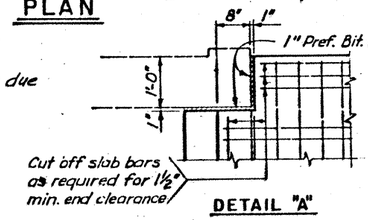


PLAN

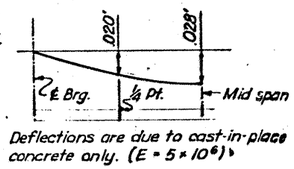
FIELD CHANGE No. 1 NOTES:

1. Reversed cross-slope of proposed slab widening.
2. Lap-weld bars A & C to existing bars A & B resulting in 13" bar spacing.
3. Bars A & C changed to Gr. 60 instead of Gr. 40 due to increased bar spacing.

* Breakback existing concrete to ℄ of existing outside beam. Clean and extend existing reinforcing steel 1'-6" Min. into new construction.

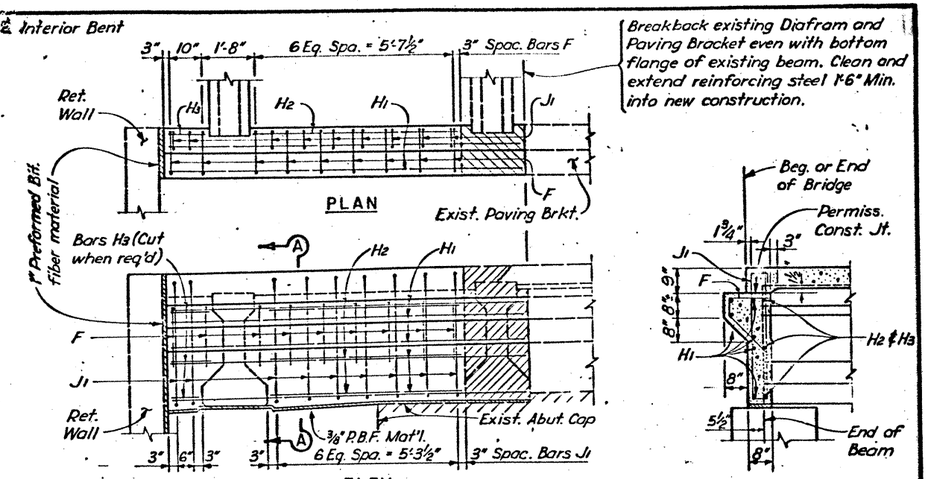


DETAIL "A"



Deflections are due to cast-in-place concrete only. ($E = 5 \times 10^6$)

D.L. DEFLECTION DIAGRAM

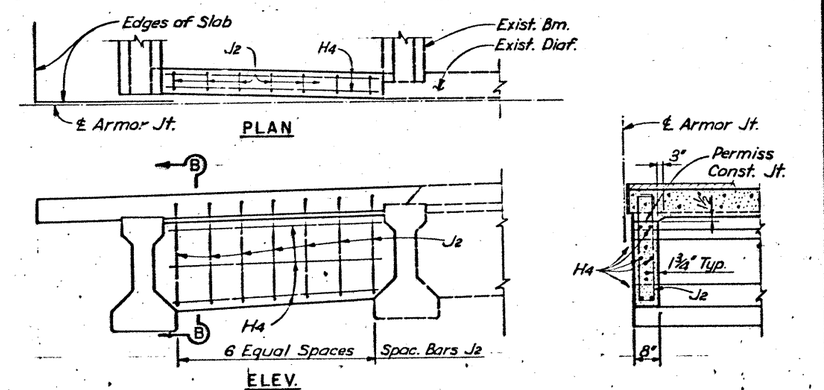


PLAN

ELEV.

TYP. DIAFRAM AT ABUTMENT END OF SPAN

SEC. A-A

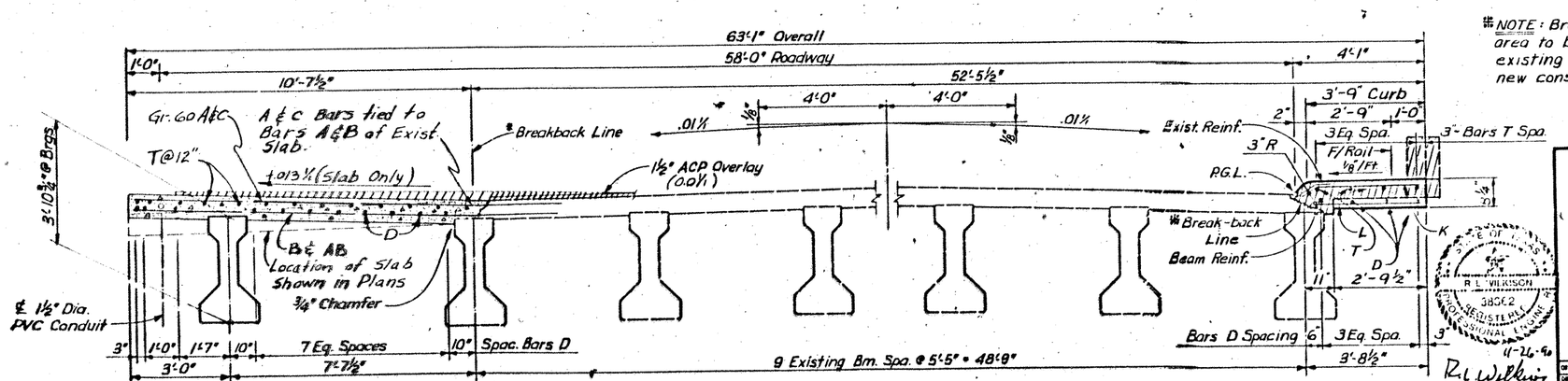


PLAN

ELEV.

TYPICAL DIAFRAM AT INTERIOR BENT

SEC. B-B



TRANSVERSE SECTION

* NOTE: Breakback existing cross-hatched area to breakback line. Clean and bend existing reinforcing steel 1'-6" min. into new construction.

49A

H20 LOADING SHEET 1 OF 2

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

60'-0" PRESTRESSED CONC. BEAM SPAN

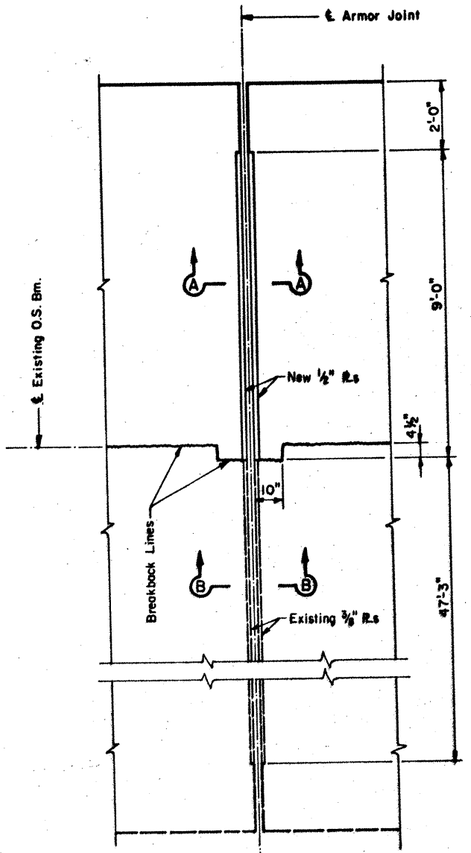
BELDEN STREET OVERPASS WIDENING

FIELD CHANGE No. 1

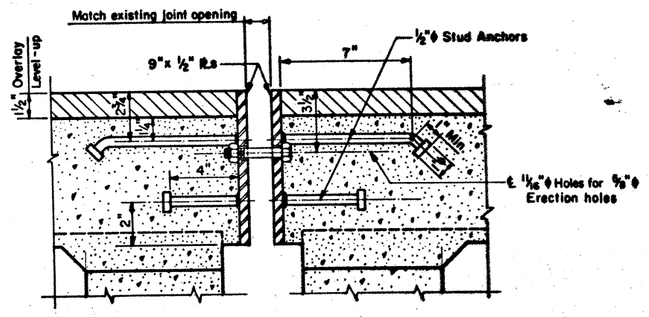
R. L. WILKISON 38562 REGISTERED PROFESSIONAL ENGINEER 11-26-90

R L Wilkison

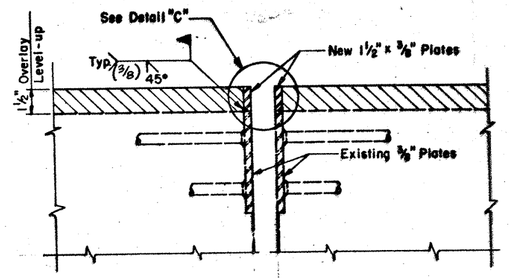
ORIGINAL DRAWING DATE	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
MARCH 1990	16	6	HE50005 (606)	49A
DR.-RAC / JCW	COUNTY	CONTROL	SECTION	JOB
DR.-CEQ	NUECES	74	6	164
DR.-RNS				US181
G.-QAC				



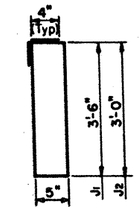
PLAN OF ARMOR JOINT



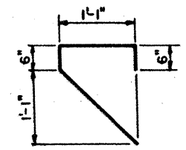
SEC. A-A



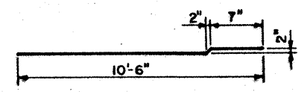
SEC. B-B



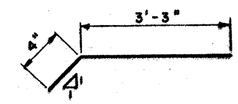
BARS J



BARS F



BARS B & AB



BARS K

TABLE OF ESTIMATED QUANTITIES FOR 1 SPAN

FOR SPANS 1 OR 3					FOR SPAN 2				
BAR	NO.	SIZE	LENGTH	WEIGHT	BAR	NO.	SIZE	LENGTH	WEIGHT
A	69	#5	10'-6"	756	A	69	#5	10'-6"	756
AB	69	#5	10'-7"	762	AB	69	#5	10'-7"	762
B	68	#4	10'-7"	481	B	68	#4	10'-7"	481
C	68	#5	10'-6"	744	C	68	#5	10'-6"	744
D	15	#5	59'-9"	935	D	15	#5	59'-9"	935
F	9	#4	3'-7"	22	H4	12	#5	6'-2"	77
H1	6	#5	10'-2"	64	J2	14	#4	7'-6"	70
H2	3	#5	5'-7"	17	T	16	#4	59'-9"	638
H3	3	#5	1'-2"	4	K	152	#5	3'-7"	568
H4	6	#5	6'-2"	39	L	77	#5	3'-4"	267
J1	9	#4	8'-6"	51					
J2	7	#4	7'-6"	35					
T	16	#4	59'-9"	639					
K	152	#5	3'-7"	568					
L	77	#5	3'-4"	267					

Reinforcing Steel	Lb.	⊙ 5384	Reinforcing Steel	Lb.	⊙ 5298
Reinf. Conc. Slab for Ext. Strs.	S.F.	864	Reinf. Conc. Slab for Ext. Strs.	S.F.	864
Prestr. Conc. Beams (Type C)	L.F.	59.38	Prestr. Conc. Beams (Type C)	L.F.	59.67
Struct. Steel (Armor Joint)	Lb.	235	Struct. Steel (Armor Joint)	Lb.	470
Class "S" Conc. (Slab)	C.Y.	⊙ 20.2	Class "S" Conc. (Slab)	C.Y.	⊙ 20.2
Class "S" Conc. (Diaframs)	C.Y.	⊙ 1.3	Class "S" Conc. (Diaframs)	C.Y.	⊙ 0.9

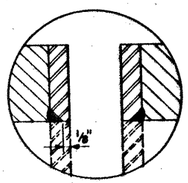
⊙ For Contractor's information only

GENERAL NOTES:

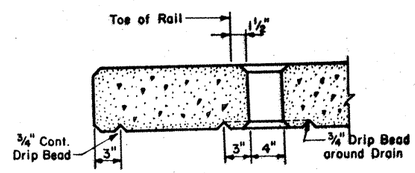
Designed in accordance with AASHTO 1989 Standard Specifications.

Design fc = 1200 p.s.i.

The use of PCP's or PMDF's will not be permitted.

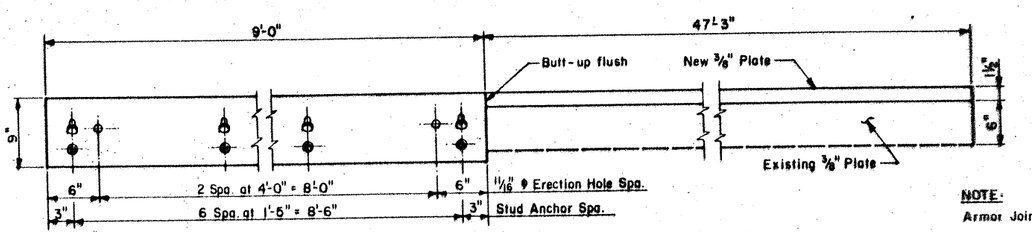


DETAIL "C"



4"x6" Formed Drain. Bend reinforcing steel to clear drain 1". Drains shall be located as directed by the Engineer. No drains shall be located over roadway.

DRAIN DETAILS



ELEVATION OF ARMOR PLATES

NOTE:

Armor Joints shall be provided at all locations shown on Layout.

Stud Anchors shall be electric arc end welded to plates with complete fusion.

Erection holes shall be punched to line up in final position of Armor Joint.

Corresponding plate sections shall be match marked and bolted together for shipment.

Erection bolts shall be cut off flush with armor plates promptly after the concrete in the latter of the two placements has taken initial set.

STATE OF TEXAS R. L. WILKINSON 38362 REGISTERED PROFESSIONAL ENGINEER

11-26-90

R.L. Wilkinson

REV. 12-31-90

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H20 LOADING

SHEET 2 OF 2

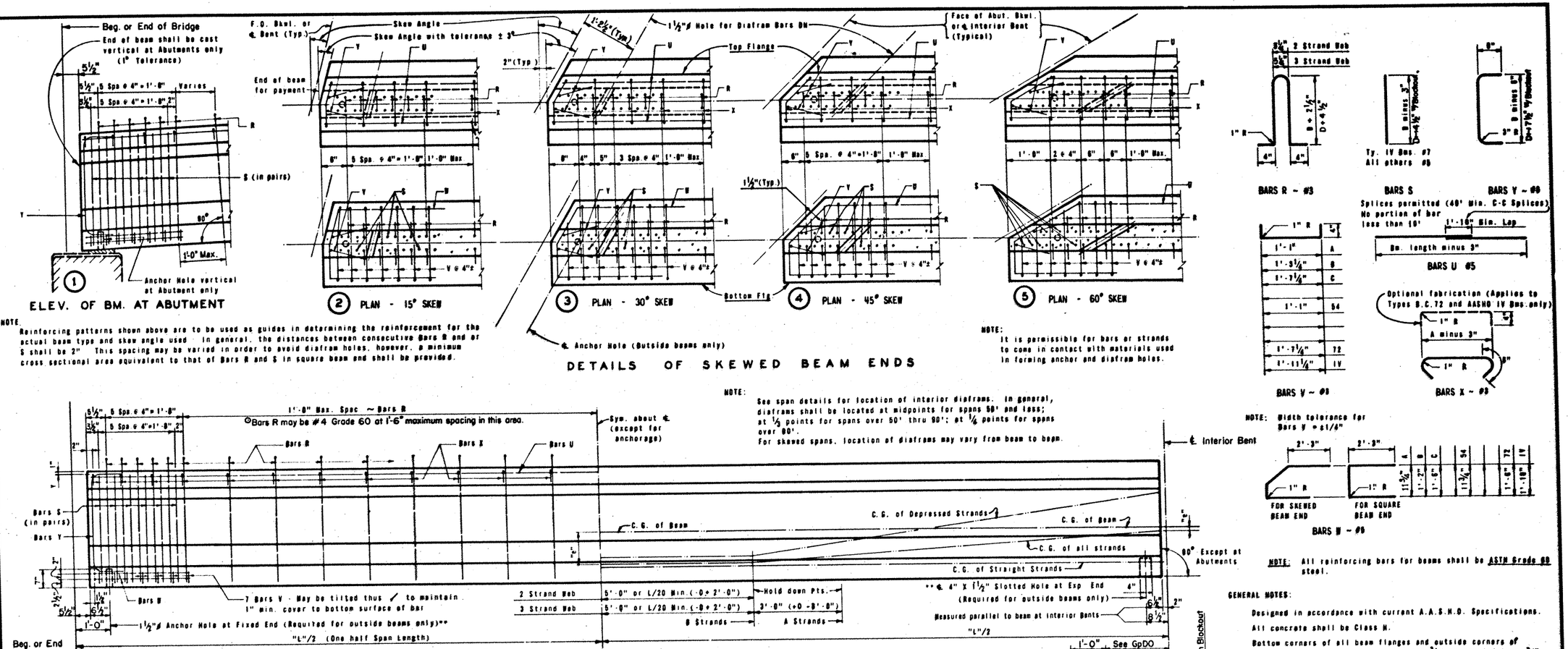
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

60'-0" PRESTRESSED CONC. BEAM SPAN

BELDEN STREET OVERPASS WIDENING

ORIGINAL DRAWING DATE MARCH 1990	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT					SHEET
DR - RAC	16	6	HES0005(606)					50
CK - CEQ	COUNTY			CONTROL	SECTION	JOB	HIGHWAY	
DW - RNS	NUECES			74	6	164	US181	
CK - RAC								

REVISIONS



NOTE:
Reinforcing patterns shown above are to be used as guides in determining the reinforcement for the actual beam type and skew angle used. In general, the distances between consecutive Bars R and or S shall be 2". This spacing may be varied in order to avoid diafram holes, however, a minimum cross sectional area equivalent to that of Bars R and S in square beam end shall be provided.

NOTE:
It is permissible for bars or strands to come in contact with materials used in forming anchor and diafram holes.

NOTE:
See span details for location of interior diaframs. In general, diaframs shall be located at midpoints for spans 50' and less; at ⅓ points for spans over 50' thru 90'; at ¼ points for spans over 90'.
For skewed spans, location of diaframs may vary from beam to beam.

NOTE: Width tolerance for Bars V = ±1/4"

NOTE: All reinforcing bars for beams shall be ASTM Grade 60 steel.

** NOTE: Anchorage holes may be tapered (4¾" x 1⅝" Exp End) (1⅝" Fixed End) at base. If holes are formed with sheet metal, forms may be left in place. Holes at fixed end may extend full depth of beam. Plug top or fill with asphalt mastic. At the option of the Fabricator, inside beams may be furnished with anchor holes.

BEAM DIMENSIONS AND SECTION PROPERTIES

BEAM TYPE	A IN.	B IN.	C IN.	D IN.	E IN.	F IN.	G IN.	H IN.	J IN.	K IN.	W IN.	Yt IN.	Yb IN.	AREA IN.²	I IN.⁴	WT. P.L.F. LB.
A	12	16	5	28	5	11	3	4	13	15	6	15.39	12.61	275.4	22.658	287
B	12	18	6	34	5¾	14	2¾	5½	17	15	6½	19.07	14.93	360.3	43.177	375
C	14	22	7	40	7½	16	3½	6	21	15	7	22.91	17.09	494.9	82.602	516
54	16	16	8	54	5	32	5	4	35	15	6	28.47	25.53	493.4	164.022	514
72	22	22	11	72	7½	40½	7½	5½	47	15	7	38.27	33.73	863.4	532.060	899
IV	20	26	8	54	9	23	6	8	33	18	8	29.25	24.75	788.4	260.403	821

Tolerance for Dimensions J & K = (+½"; -1") (Same tolerance to be applied to all holes for a given diafram Bar DN)

GENERAL NOTES:

Designed in accordance with current A.A.S.H.O. Specifications.

All concrete shall be Class H.

Bottom corners of all beam flanges and outside corners of exterior beam ends shall be chamfered ¾" or rounded to a ¾" radius.

The use of diafram holes for lifting purposes will not be permitted.

STATE OF TEXAS — R. L. WILKISON — 38362 — REGISTERED PROFESSIONAL ENGINEER

11-26-90

R. L. Wilkison

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TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS

BEAM DETAILS

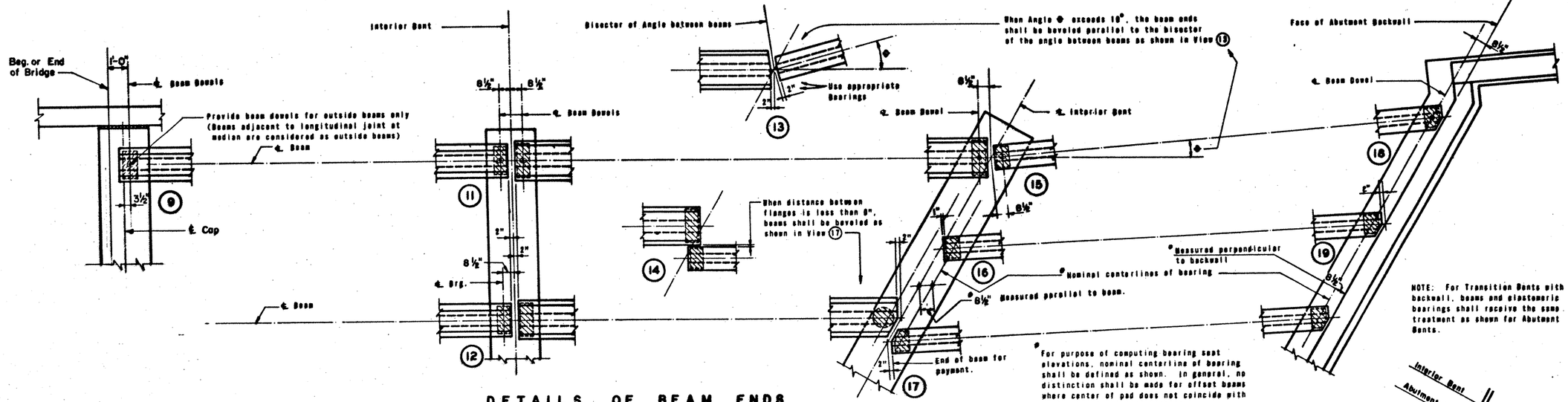
Mod 5-90: Views 1 & 6 Bm end at end of bridge
RHS/RAC

(MOD) Gp A-2

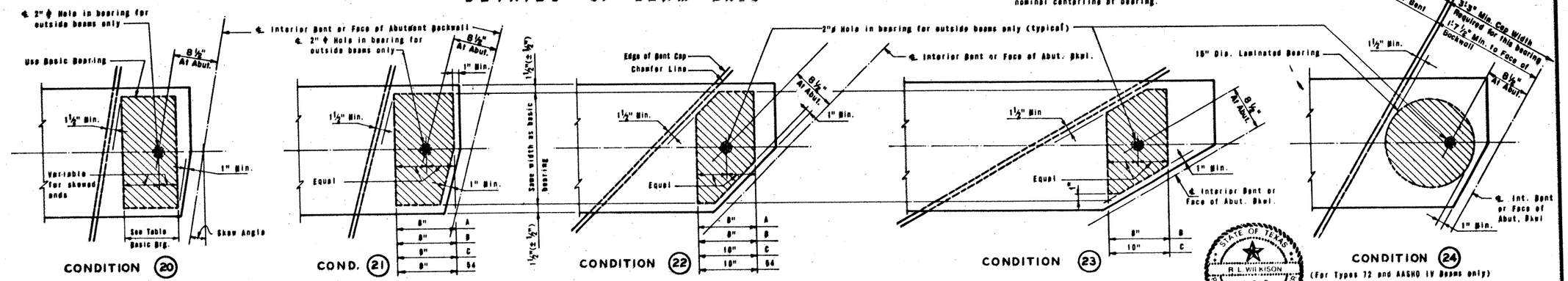
ORIGINAL DRAWING DATE JUNE 1985	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DN - THD	16	6	HES0005(606)	51
CK - THD	COUNTY			
DW - GNS	NUECES			
CK - HJD				

REVISIONS: Rev. 11-85 (Bars S) D=4½" *Blockout; *Rev 2-86; Rev 6-87 (Remove 48, 60, 66 Bms.)

CONT	SECTION	JOB	HIGHWAY
73	6	164	US181

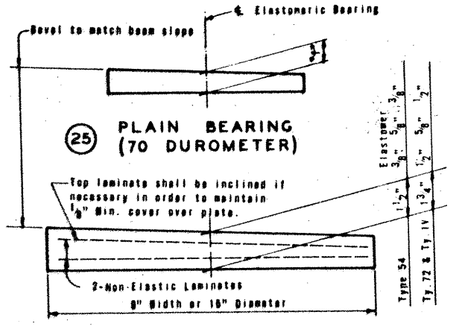


DETAILS OF BEAM ENDS



NOTE: Basic Bearings are to be used for square beam ends and for moderately skewed beam ends as covered in Condition 20. Holes in bearings for square beams shall be centered on pad.

DETAILS OF ELASTOMERIC BEARINGS



BASIC BEARINGS		
BM. TYPE	SIZE. THICKNESS "t" & DESCRIPTION	
A	8" X 14" X ¾"	PLAIN
B	8" X 16" X ¾"	PLAIN
C	9" X 19" X 1"	PLAIN
54	9" X 14" X 1½"	LAMINATED
72	9" X 20" X 1¾"	LAMINATED
IV	9" X 22" X 1¾"	LAMINATED

BEARINGS FOR BEVELED BEAM ENDS					
BM. TYPE	CONDITION 20	CONDITION 21	CONDITION 22	CONDITION 23	CONDITION 24
A	0° THRU 20°	20° THRU 30°	OVER 30°	NOT APPLICABLE	NOT APPLICABLE
B	0° THRU 15°	15° THRU 30°	30° THRU 55°	OVER 55°	NOT APPLICABLE
C	0° THRU 10°	10° THRU 20°	20° THRU 50°	OVER 50°	NOT APPLICABLE
54	0° THRU 10°	10° THRU 25°	OVER 25°	NOT APPLICABLE	NOT APPLICABLE
72	0° THRU 10°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 10°
IV	0° THRU 8°	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	OVER 8°

Skew angle of Bm. end

GENERAL NOTES:

Beams shall be seated on elastomeric bearings of the dimensions shown.

Bearings shall be furnished with their thickness varying in one direction depending on the slope of the erected beam.

Constant thickness bearings may be used for moderate beam slopes if the variation is within the allowable dimensional tolerances given in the specifications.

Cost of furnishing and installing elastomeric bearing shall be included in unit price bid for "Prestressed Concrete Beams"

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11-26-90
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TEXAS HIGHWAY DEPARTMENT
BRIDGE DIVISION

PRESTRESSED CONCRETE BEAMS

BEAM ENDS & BEARINGS

(MOD) Gp B-2

ORIGINAL DRAWING DATE JUNE 1985	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DN - HJD	16	6	HES0005(606)	52
CK - THD				
DW - RNS	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
CK - THD	NUECES	74	6	164	US181

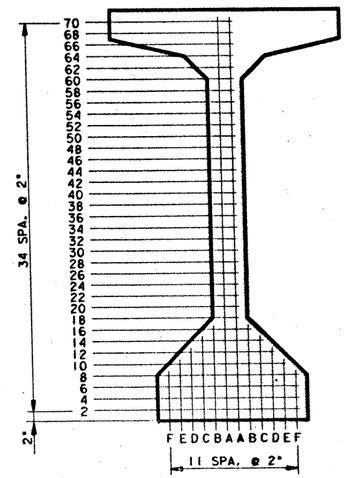
REVISIONS
Mod. 5-90 View 9, Bm end at end of bridge RNS / RAC

DESIGNED BEAMS (DEPRESSED STRANDS)

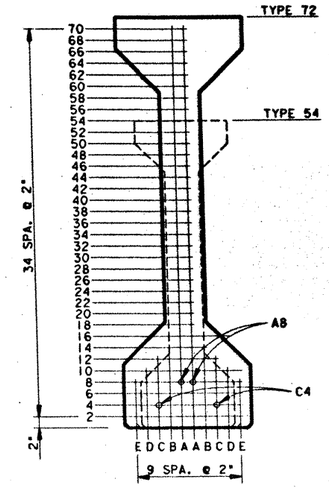
STRUCTURE	SPAN	BEAM NO.	* BEAM TYPE	NON-STD. STRAND PATTERN	PRESTRESSING STRANDS TOTAL NO.	TOTAL SIZE	TOTAL STRGTH.	"e" ℄ (in.)	"e" END (in.)	DEPRESSED NO.	DEPRESSED TO (in.)	CONCRETE RELEASE STRGTH. f'ci (psi)	CONCRETE MINIMUM 28 DAY COMP. STRGTH. f'c (psi)	OPTIONAL DESIGN DN. LOAD COMP. STRESS (TOP ℄) fct (psi)	DN. LOAD TENSILE STRESS (BOTT. ℄) fcb (psi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (Ft. Kips)
BELDEN ST. OVERPASS WIDENING	1 & 3	1	C		16	1/2"	270	14.34	10.84	4	A-18	4000	5000	1994	-2384	2233
	2	1	C		16	1/2"	270	14.34	10.64	4	A-18	4000	5000	1875	-2301	2196

NON-STANDARD STRAND PATTERNS

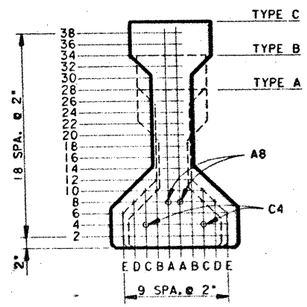
PATTERN	STRAND ARRANGEMENT AT ℄ OF BEAM



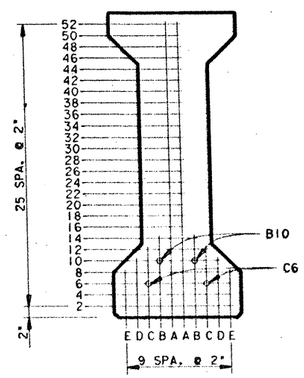
TYPE VI (MOD) BM.
*VIM DENOTES TYPE VI (MOD) BEAM.



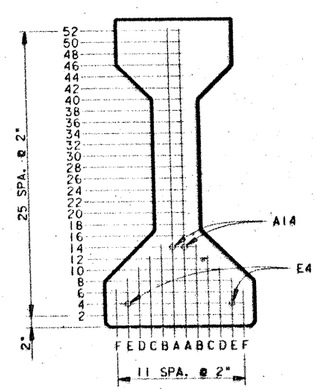
TYPES 54 & 72 BMS.



TYPES A, B, & C BMS.



TYPE 54 (MOD) BM.
* 54M DENOTES TYPE 54 (MOD) BEAM.



AASHTO TYPE IV BM.

GENERAL NOTES:

Designed in accordance with current A.A.S.H.T.O. Specifications.

All concrete shall be Class H.

When shown on this sheet, the Fabricator has the option of furnishing either the designed depressed strand beam or an approved optional beam design using stress relieved or low relaxation strands. Optional designs for beams 120 foot or longer shall have a calculated residual camber equal to or greater than that of the designed beam.

Prestress losses for the designed beams have been calculated according to the current A.A.S.H.T.O. Standard and Interim Specifications for a relative humidity of 75 %. Optional designs shall likewise conform.

Certain beams with depressed strands are subject to cracking in the end of the beam. When such cracks occur, all subsequent beams of the same type and strand pattern shall have strands wrapped in the following manner:

1. Alternate rows of depressed strands shall be wrapped for 2 feet from each end of the beam.
2. One half of the straight strands, as nearly as possible, shall be wrapped for 4 feet from each end of the beam.
3. The wrapping pattern shall be symmetrical about the vertical axis of the beam for both depressed and straight strands.
4. Strands shall be wrapped so that the centers of gravity of the depressed strands and the straight strands will remain within 1 inch of their original location.
5. Strands shall be tightly wrapped with plastic tubing. Both ends and the seam of the tube shall be sealed with waterproof tape.
6. Revised shop drawings will not be required.

For depressed strand designed beams, strands shall be located as low as possible on the 2" grid system shown hereon unless a non-standard strand pattern is indicated. Fill row "2", then row "4", then row "6", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position shall be depressed, maintaining the 2" spacing so that the upper two strands are in the position shown in the table at the beam ends.

Initial pretension for 1/2" 270 K strands = 28.9 K for stress relieved strands or 31.0 K for low relaxation strands.

Design shown based on initial pretension of 31.0 K.

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STATE OF TEXAS
R. L. WILKISON
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REGISTERED PROFESSIONAL ENGINEER
11-26-90
R.L. Wilkison

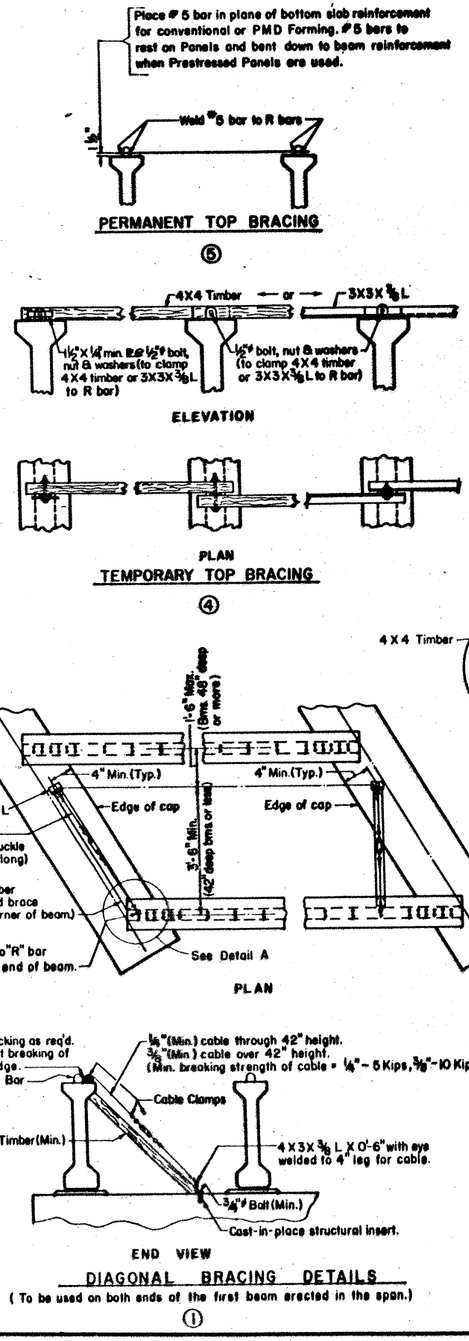
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

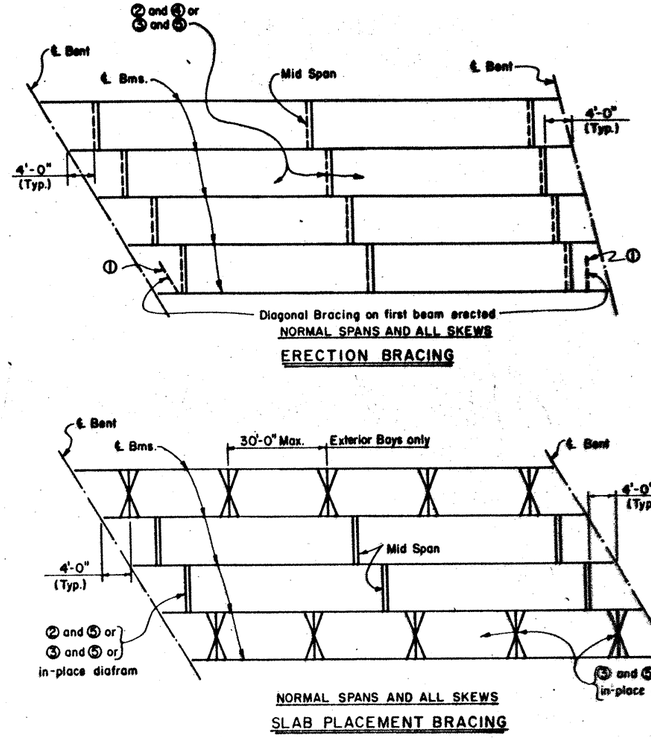
PRESTRESSED CONCRETE BEAMS

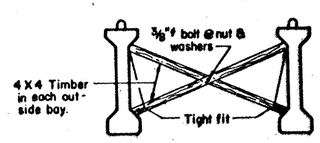
(NON-STANDARD SPANS)

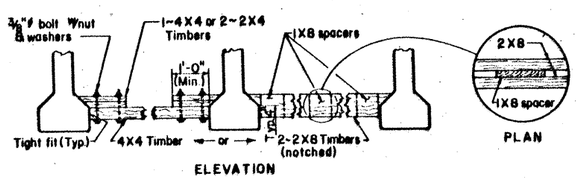
Gp-NS-LR

D45350AFZFA2:E355156142GMGD02.DGN
ORIGINAL DRAWING DATE: MAY 1990
REVISIONS: Original prepared Oct 1989
PREPARED BY AND FOR USE OF TEXAS SDHPT
DIST. 16 | REG. NO. 6 | FEDERAL AID PROJECT | SHEET 53
HE50005(606)
COUNTY: NUECES
CONTROL | SECTION | JOB | HIGHWAY: 1014 | 06 | 164 | US181









Indicates Diagonal Bracing ①

Indicates Bottom Bracing ② with Temporary Top Bracing ④ or "X" Bracing ③ with Permanent Top Bracing ⑤.

Indicates Permanent Top Bracing ⑤

Indicates Bottom Bracing ② or "X" Bracing ③, either one with Permanent Top Bracing ⑤ or an in-place diafram only.

Indicates "X" Bracing ③ & Permanent Top Bracing ⑤ or an in-place diafram only.

GENERAL NOTES:

ERECTION BRACING:

Erection bracing details are considered minimum for fulfilling the requirements of Specification Item 425 (Article 425.5), and Special Provisions thereto, for bracing Types A, B, C, III, IV and V prestressed concrete beams erected in the span over a traveled way or railroad, and in those spans generally parallel to a traveled way or railroad and within a distance equal to the difference in elevation between the top of cap upon which the beams are being erected and the traveled way, or 30 feet, whichever is greater.

Required erection bracing shall be placed immediately after erection of each beam and remain in place until diafram bars DN are tightened or additional bracing as required for slab placement is in place.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Item 420, Article 420.9 (4) and special provisions thereto.

Required slab placement bracing shall remain in place until the slab concrete has attained a flexural strength of 500 p.s.i.

GENERAL:

Bracing details for closely spaced beams (as on ramps or railroad structures) are not included herein. The Contractor shall submit his proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems and/or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align beams is permissible.

Bottom flange bracing at beam ends may be omitted when all beams are fixed with dowel bars or when erection is on steel caps or floor beams containing bearing seats which restrict lateral movement.

All turn-buckles, come-alongs and other connections shall be capable of developing the full strength of the cable shown hereon.

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STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

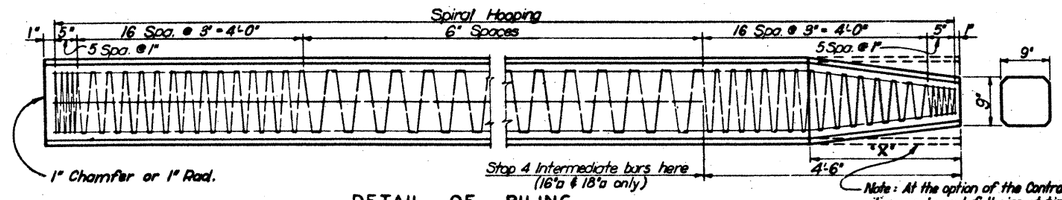
PRESTRESSED CONCRETE BEAMS

TYPES A, B, C, III, IV & V

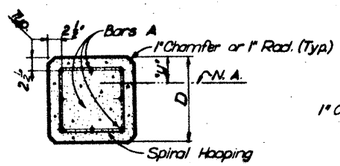
MINIMUM ERECTION AND BRACING REQUIREMENTS

PCB-MEBR (1)

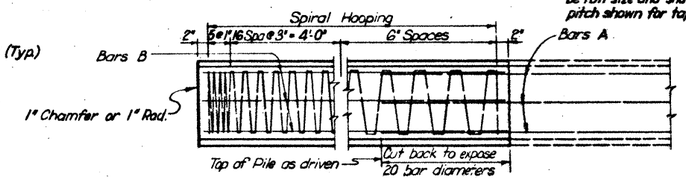
ORIGINAL DRAWING DATE DEC 1980		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #				SHEET
DN -THD	REVISIONS	16	6	HES0005(608)				54
CK -THD		COUNTY		CONTROL	SECTION	JOB	HIGHWAY	
DW -EDS		NUECES		74	6	164	US181	
CK -THD								



DETAIL OF PILING



TYP. SECTION THRU. PILING



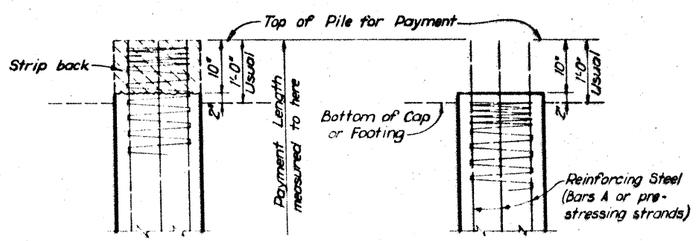
PILE BUILD-UP DETAIL

Optional Method: Pile shall be cut back to expose reinforcement a min. of 9". Butt weld Bars B to Bars A.

PRECAST CONCRETE PILING
(TYPE "A" DISPLACEMENT PILING)

TABLE OF ELEMENTS FOR PRECAST CONCRETE PILING							
Pile Size "D"	Area. Sq In.	"y" In.	Ic In⁴			Bars A & Bars B	Dim. "X"	Weight Lb/ft.
†† 14"a	194	3.86	1200			4 ~ #8	1'-8"	202
†† 15"a	223	4.27	1787			4 ~ #9	2'-0"	232
16"a	254	4.99	2624			8 ~ #8	2'-4"	265
18"a	322	5.62	4463			8 ~ #9	3'-0"	336

†† When 14"a piling are specified on the plans, Contractor has the option of furnishing either 14"a, 15"a or 16"a piling.
△ When 15"a piling are specified on the plans, Contractor has the option of furnishing either 15"a or 16"a piling.



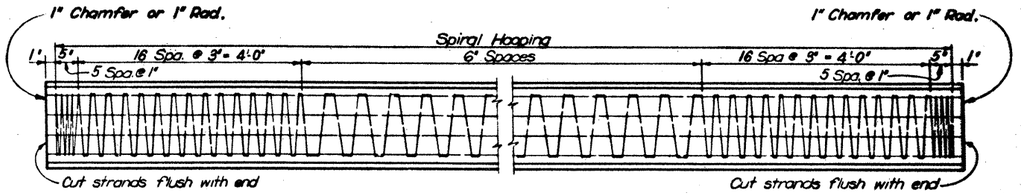
PILE STRIPPED BACK AFTER DRIVING

PILE CAST WITH REINF. STEEL PROTRUDING

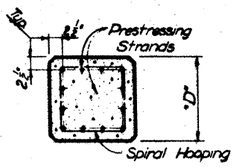
PILES AFTER DRIVING (SPECIAL)

Note: Payment for piling shall be made in accordance with detail shown above.
Reinforcing steel shall protrude into substructure only where shown in substructure details, in which case piles may be cast 10" short of payment length with reinforcing steel protruding from the top of piles; or they may be cast to full payment length (or slightly more for Precast Concrete Piling if desired by Contractor), and cut back after driving to expose reinforcing steel 10".
Piles shall be stripped back 10" when the side cover from the edge of pile to the edge of cap or footing is less than 4" after driving.

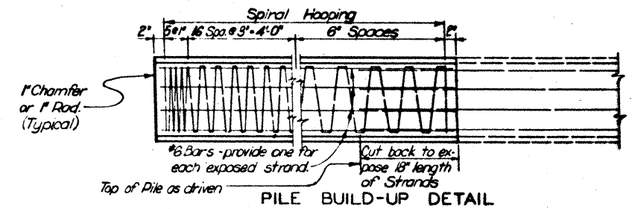
Note: Piling shall be held firmly in this position (horiz.) throughout all lifting and handling operations.



DETAIL OF PILING



TYP. SECTION THRU PILING



PILE BUILD-UP DETAIL

Class S or H Concrete may be used for pile build-up

Note: Strand location shall be symmetrical about the axis of the pile with no more than one strand difference between any two adjacent sides.

PRESTRESSED CONCRETE PILING
(TYPE "A" DISPLACEMENT PILING)

TABLE OF ELEMENTS FOR PRESTRESSED CONCRETE PILING																				
Pile Size "D"		Area of Pile Section	I	Weight	3/8"~ 250 K Strands			7/16"~ 250 K Strands			7/16"~ 270 K Strands			1/2"~ 250 K Strands			1/2"~ 270 K Strands		
					No.	Initial Prestress Force	Final Prestress (20% Loss)	No.	Initial Prestress Force	Final Prestress (20% Loss)	No.	Initial Prestress Force	Final Prestress (20% Loss)	No	Initial Prestress Force	Final Prestress (20% Loss)	No.	Initial Prestress Force	Final Prestress (20% Loss)
		Sq In.	In⁴	Lb/Ft		Kips	p.s.i.		Kips	p.s.i.		Kips	p.s.i.		Kips	p.s.i.		Kips	p.s.i.
†† 14"a		194	3110	202	14	196	808	10	189	778	8	174	718	8	202	833	6	173	714
15"a		223	4116	232	14	196	703	12	227	814	10	217	780	8	202	725	8	231	829
16"a		254	5340	265	16	224	706	12	227	713	12	260	819	10	252	794	8	231	728
18"a		322	8600	336	22	308	765	16	302	750	14	304	757	12	302	750	10	289	718
20"a		398	13150	415	26	384	732	20	378	759	18	391	786	14	353	713	14	405	813

GENERAL NOTES FOR CONCRETE PILING:
All concrete for Precast Piling shall be Class S or H. Design f'_c = 1200 p.s.i.
Concrete for Prestressed Piling shall be Class H except as noted.
All corners shall be chamfered as shown or noted.
All dimensions relating to reinf. or prestressing steel are to centers of bars or strands.
Size, number, and length of piling shall be as shown on Layout Sheets.
Spiral Hooping shall have a minimum diameter of .207."
All piling to be cast with concrete using Type II cement.

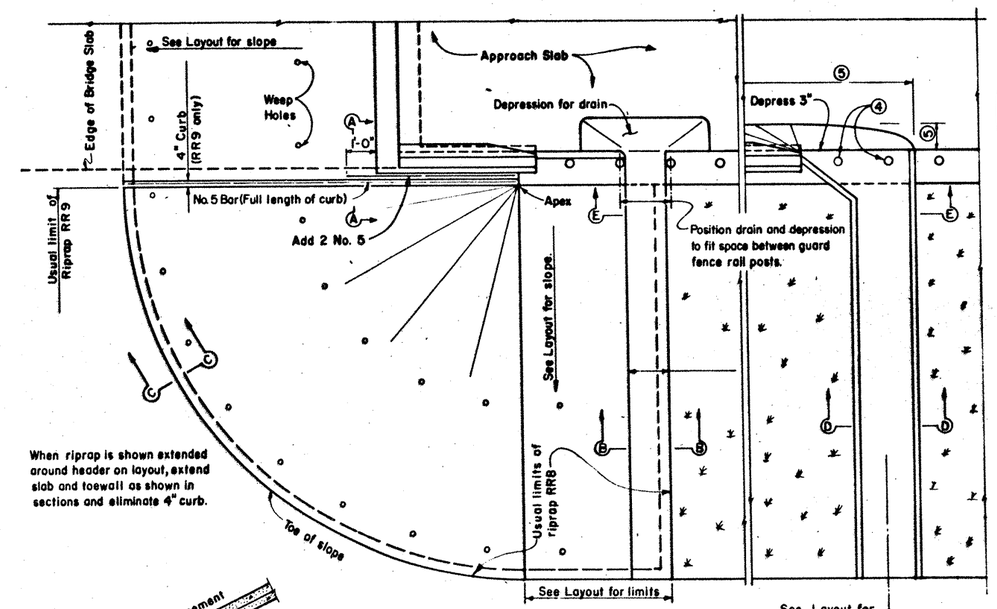
NOTE: These details are generally to be used for piling which will be subject to sulfate attack or other adverse conditions. Standard CP-2 covers piling to be used under normal conditions.

Release strength for Class H Concrete = 4000 p.s.i.
Minimum compressive strength 28 day (f'_c) = 5000 p.s.i.

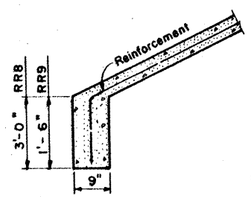
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

CONCRETE PILING 55
PRECAST CONCRETE &
PRESTRESSED CONCRETE
CP-1

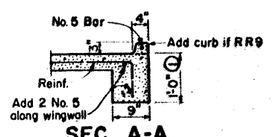
Dr. RLR	Drawing	Date	Fed. Aid Div. No.	State	Federal Aid Project No.					Sheet No.
Ck. Dr. TCE	ORIGINAL	DEC 1980	6	TEXAS	HES0005(606)					55
Dr. RLR	Rev. 5-83									
Ck. Dr. RLR	Rev. 5-86 (Delete Note)									
Ts.	Rev. 12-86 (Strip back note)		State Cont. No.	County	Control	Section	Job No.	Highway No.		
Ck. Tr.	Rev. 5-88 (Conc. & sc. H)		16	NUECES	74	6	164	US181		



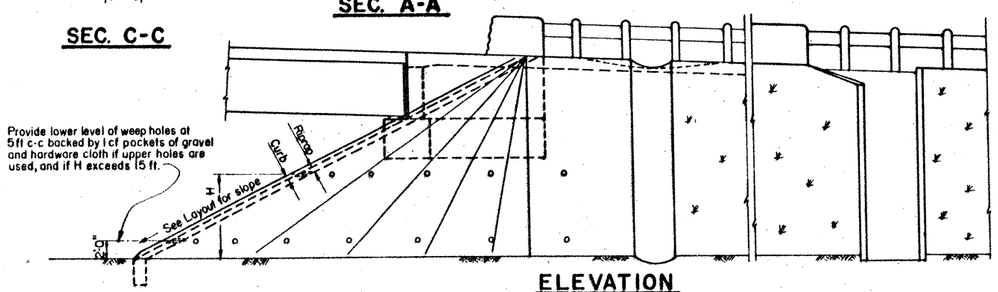
PLAN



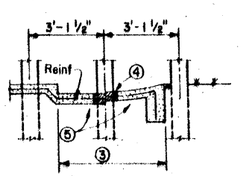
SEC. C-C



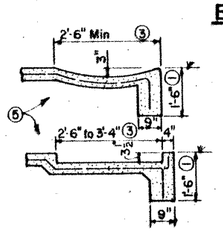
SEC. A-A



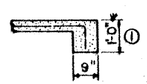
ELEVATION



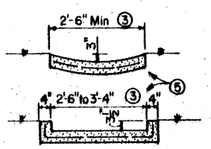
SEC E-E



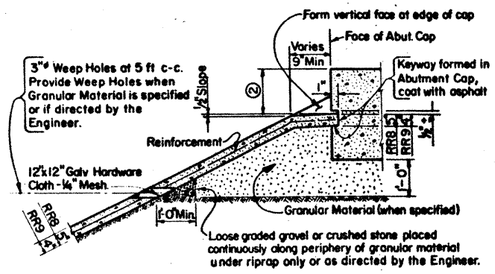
SEC B-B
(With Drain)



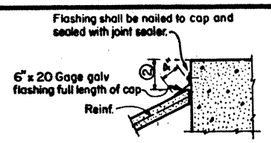
SEC B-B
(No Drain)



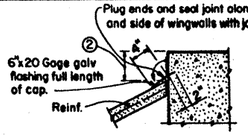
SEC D-D
(Shoulder Drain)



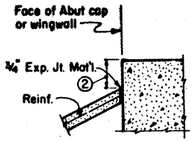
WITH KEYWAY



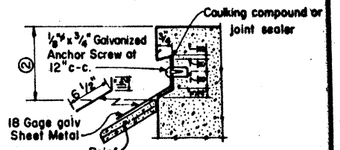
OPTION A



OPTION B



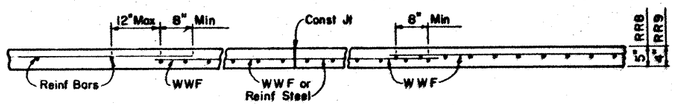
OPTION C



OPTION D

The sealing option of the joint between the face of cap and riprap shall be as designated by the Engineer. Options A or C may be used at wingwalls in all cases.

SECTIONS THRU RIPRAP AT CAP



Reinforcing bars shall be No. 3 at 18 in. spac c-c. Welded wire fabric shall be 6 x 6 - W2.9 x W2.9. Combinations of WWF and reinforcing bars may be used if both are permitted. Lap splices shall be a minimum of 8 inches, measured from the transverse wire of WWF.

SECTION THRU REINFORCING AND CONST JOINT

① Wall extension may be reduced or modified if approved by the Engineer.

② Dimension varies as directed by the Engineer. Should be 9" Min for stringer type bridges and 1'-6" for slab type bridges.

③ Wider or other drain configurations shall be used if shown elsewhere in plans or if directed by the Engineer.

④ A 12 in. diameter leave out should be provided in the riprap at the guard fence location. Backfill with 4 in. of ACP if directed by the Engineer.

⑤ Limits and configuration of drains and depressions shall be as shown elsewhere in plans or as directed by the Engineer.

GENERAL NOTES:

Concrete shall be Class B unless noted elsewhere in plans.

Reinforcing other than that shown may be used by substituting reinforcement of equal or greater unit cross-sectional area. The maximum reinforcement spacing shall be 18 inches.

Construction joints or grooved joints extending the full slant slope height shall be at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Porus Concrete Filter Blanket and Gravel Backfill shall be placed if shown elsewhere in the plans or if directed by the Engineer.

Hardware cloth, loose graded stone behind weep holes, flashing, or other sealing material shall not be paid for directly but shall be subsidiary to the bid item, Riprap.

Unless specified elsewhere in the plans to be only reinforcing bars, the riprap reinforcing may be composed of reinforcing bars, welded wire fabric, or any suitable combination of both types.

RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

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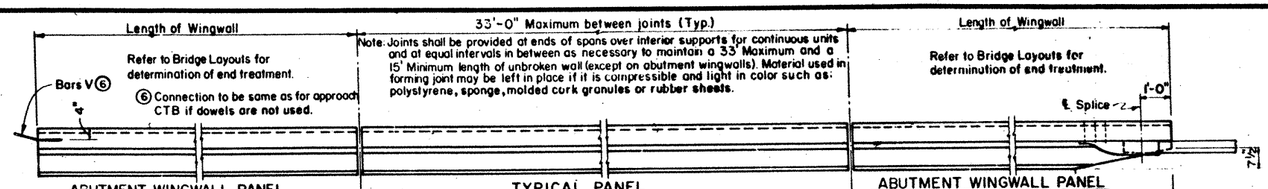
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

CONCRETE RIPRAP

FOR EMBANKMENT SLOPES UNDER BRIDGE ENDS

RR8 & RR9

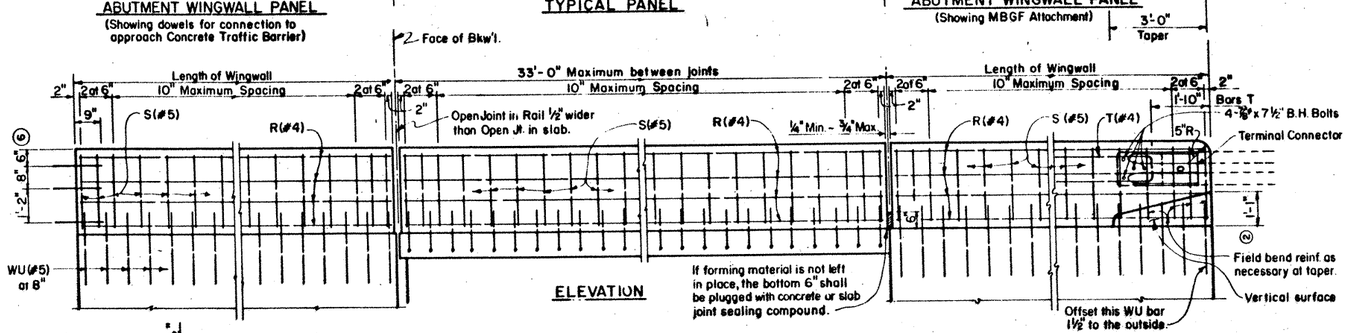
ORIGINAL DRAWING DATE FEB 1987		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #				SHEET
DR. JJP	REVISIONS	16	6	HES0005(606)				58
CK. THD		COUNTY			CONTROL	SECTION	JOB	HIGHWAY
DR. EDS		NUECES			74	6	164	US181
CK. JJP								



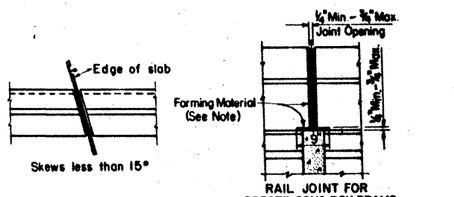
ABUTMENT WINGWALL PANEL
(Showing dowels for connection to approach Concrete Traffic Barrier)

TYPICAL PANEL

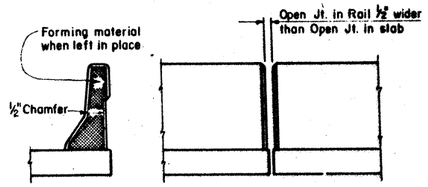
ABUTMENT WINGWALL PANEL
(Showing MBGF Attachment)



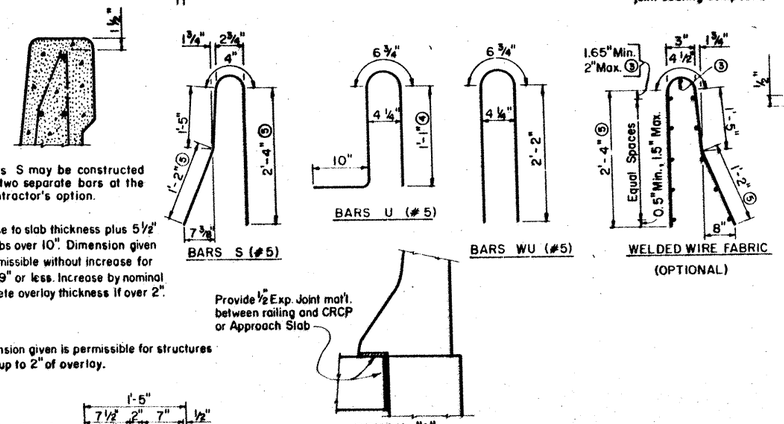
ELEVATION



RAIL JOINT FOR PRESTR. CONC. BOX BEAMS

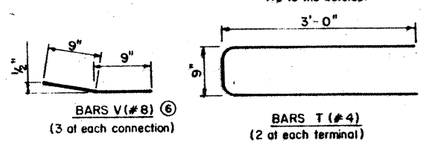


EXPANSION JOINT



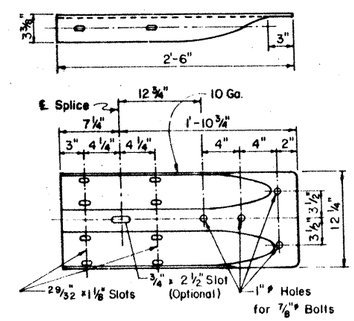
④ Increase to slab thickness plus 5½" for slabs over 10". Dimension given is permissible without increase for slabs 9" or less. Increase by nominal concrete overlay thickness if over 2".

⑥ Dimension given is permissible for structures with up to 2" of overlay.



DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
1. Minimum (Cumulative Total) Wire Area	0.933 Sq. In.	0.248 Sq. In. Per Ft.
2.	No. of Wires	Spacing
Minimum	6	4"
Maximum	11 ③	12"
3. Maximum Wire Size Differential	The smaller wire shall have an area of 40% or more of the larger wire.	

③ Longitudinal wires may be within upper bend if vertical wires are D8.7 or smaller, in which case the 2" dimension to the next lower bars may be increased to 4" max.



TERMINAL CONNECTOR

Terminal Connector shall receive the same protective coating as the attached Metal Beam Guard Fence.

GENERAL NOTES:

Designed according to AASHTO 1977 Standard and current Interim Specifications.

All parts of the railing including concrete parapet wall, reinforcing, terminal connector, bolts, nuts and washers are included in the price bid per linear foot of rail.

All steel components except reinforcing shall be galvanized unless otherwise shown in plans.

All concrete for railing wall shall be Class "C".

Dimensions relating to reinforcing steel are to centers of bars.

Metal Beam Guard Fence or Concrete Traffic Barrier is usually attached to the abutment wingwall panel. See plan sheet for details and length for payment. The splice between the approach guard fence and the terminal connector shall be with the normal eight bolts. The dowel connection to the approach traffic barrier shall be grouted the same as other barrier joints.

Shop drawings will not be required for this rail.

This railing may be constructed with slip-forms with equipment approved by the Engineer. Sensor control for both line and grade must be provided. When slip-forming is used, the concrete may be cured with membrane curing compound.

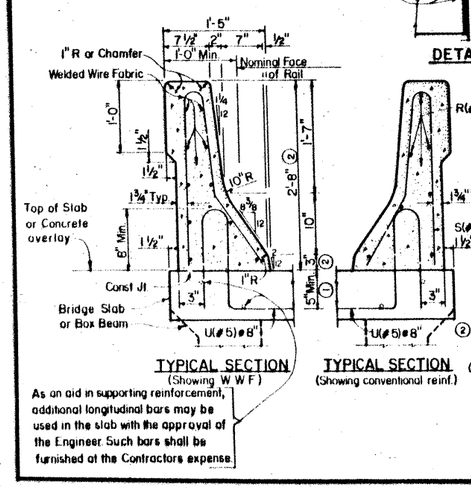
The back of railing shall be vertical unless otherwise shown in plans.

Welded wire fabric may be used as an option to conventional reinforcement and shall be made in accordance with A S T M A497.

Welded Wire Fabric Detail shown is for D8.4 longitudinal wires and D8.3 vertical wires. Combinations of Reinforcing Steel and Welded Wire Fabric or configurations of Welded Wire Fabric other than shown will be permitted when the conditions in the table are satisfied and the dimension from end of section to first welded vertical wire does not exceed 3".

Additional reinforcing may be tack welded to the upper two thirds of the reinforcing cage to provide bracing when slip-forming is used. Additional anchorage devices may be added when welding is necessary in the lower one third of the cage. Do not weld to U or S bars in the lower one third of the cage.

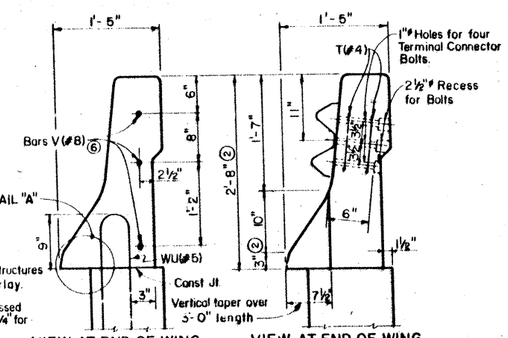
P.L.F. weight of railing (with no overlay increase) is 326 plf.



As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars shall be furnished at the Contractors expense.

② Increase 2" for structures with A C P overlay.

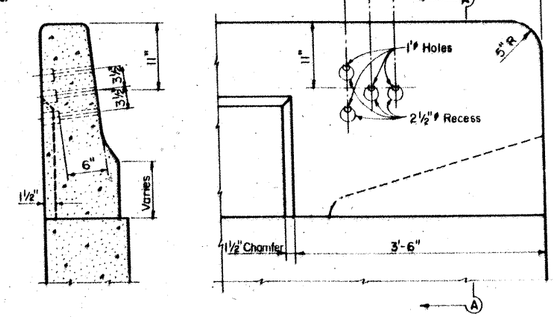
① 4" for prestressed boxes and 4¼" for CGC Spans.



VIEW AT END OF WING
(Showing C T B Connection and typical WU Bar placement)

VIEW AT END OF WING
(Showing MBGF Connection)

NOTE: Holes and recesses must be formed or cored. Percussion drilling is not permitted.



SEC. A-A

OPTIONAL END TREATMENT

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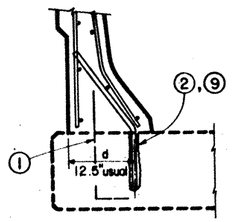
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TRAFFIC RAIL

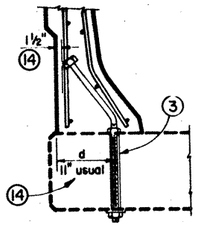
TYPE T501

ORIGINAL DRAWING DATE JUNE 1985	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT ϕ	SHEET
DN :-THD	16	6	HES0005(606)	57
CK :-THD	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DW :-EDS	NUECES		74	6	164	US181
CK :-JJP						

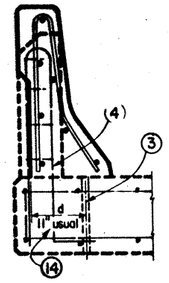
REVISIONS
Rev. ''' 85 (Added Det 'A')
Rev. 4 86 (Det 'A')
4 87 (Conc. Overlay)



SLABS OVER 12" THICK



SLABS OVER 6½" THICK



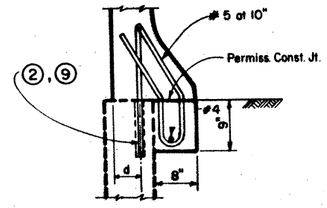
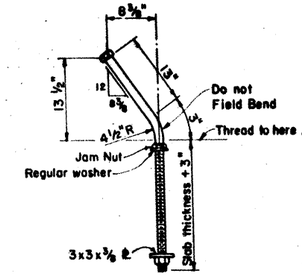
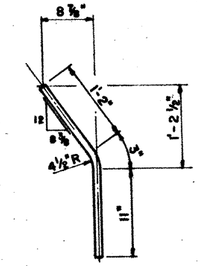


TABLE S

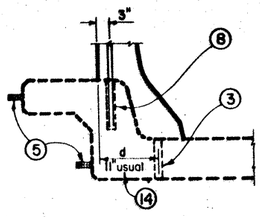
d Inches	Maximum Spacing Dowels ② No.6 Gr.60	Anchor (Inches) Bolts ③&⑭ 1" A193 B7
5	8.2	25.6
7	11.8	36.9
10	17.4	54.0
12	21.1	65.3
Other spacings may be interpolated		

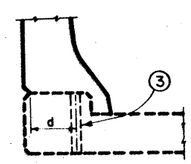


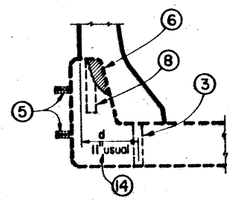
1" ANCHOR BOLT ③
(A193 B7)

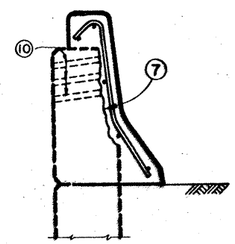


NO. 6 DOWEL ②
(Gr. 60)
Use straight dowel at wingwall or turn in line with wingwall.

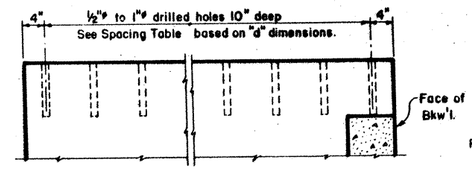




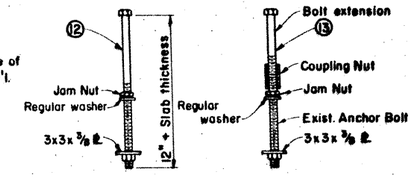




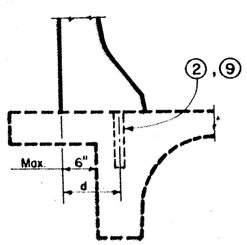
TYPICAL WINGWALL T501R RETROFIT DETAILS

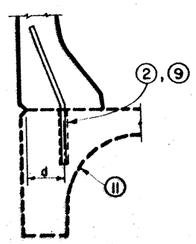


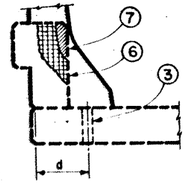
WINGWALL ELEVATION

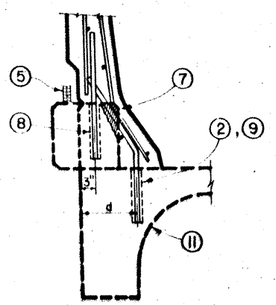


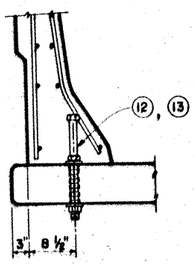
⅞" ANCHOR BOLT ⑫, ⑬
(A321, A325 or A193 B7)











Existing T1 Rail only.

TYPICAL T501R RETROFIT DETAILS

① On the bridge deck, remove existing rail posts, leaving at least 12 inches of the four No. 5 front face reinforcing bars intact which must be incorporated into the new rail. The existing four post bars may be considered to be equivalent to 1.5 of the No. 6 dowels.

② No. 6 dowels are to be epoxy grouted into the existing bridge slab as shown at a spacing not to exceed that given in Table S.

The holes for the dowels shall be 10 inches deep which are 0.875 to 1.0 inch in diameter. The holes shall be clean and dry. Compressed air, if used to clean the holes, shall have no oil in suspension. The holes may be drilled with impact, rotary, or percussion type drilling equipment.

The dowels shall be set into the holes with epoxy binder which conforms to the requirements of SDHPT Epoxy type VIII (formerly B-102). They shall not be disturbed for a minimum of 72 hours in which the air temperature is more than 40 degrees Farenheit. Temperatures below 40 degrees shall not be considered as part of the epoxy curing time.

③ Drill 1.125 to 1.25 inch diameter holes through the existing bridge deck at a spacing not to exceed that given in Table S.

The holes through the bridge deck must be drilled with rotary or coring type equipment. Percussion or impact drilling shall not be used. Spalls in the bottom of the slab exceeding 0.5 inch from the edge of the holes shall be patched.

The bolts, nuts, and bottom plate washers shall be galvanized. Bolts and nuts shall have Class 2A and 2B fit tolerances. The nuts shall be tapped after galvanizing.

④ On the bridge deck, remove existing rail posts, leaving at least 12 inches of the four No. 5 front face reinforcing bars intact, which must be incorporated into the new rail. The existing four post bars may be considered to be equivalent to 0.35 anchor bolts.

⑤ Remove existing rail, cut and grind anchor bolts flush, and paint ends with two coats of zinc dust-zinc rich oxide paint as described under Item 450.

⑥ Notch the existing curb at the bolt locations to provide 0.5 in minimum clearance behind the bolts.

⑦ Break back upper face of existing parapet to provide 0.5 inch minimum clearance behind the S and R bars.

⑧ No. 6 dowels must be epoxy grouted into the existing curb or parapet as shown at a spacing not to exceed 5 feet, using the same procedures as described for note ②.

⑨ An approved resin type binder in capsules may be used for the No. 6 dowels in lieu of the epoxy binder. Depth of holes and installation shall be in accordance with manufacturer's recommendations such that the full pullout strength of the dowel may be obtained.

⑩ Drill holes through existing wingwall for terminal anchorage bolts.

⑪ Patch if spall occurs while drilling.

⑫ Remove old Anchor Bolts and replace with ⅞" Bolts in the two existing interior holes. Also add one of these bolts at the midpoint between old posts. Drill holes 1" in diameter for the additional bolt using procedure described for Note ③. Secure bolts with a Jam Nut and washer. Galvanize Nut, washers and lower 12" of bolt (Min.) Existing bottom plates may be used at old post locations in place of the 3x3x⅜ plates.

⑬ At existing posts, two interior bolts may optionally be left in place with an additional length of bolt joined by a rod coupling nut. Rod Coupling Nut shall be grade 5 or better with a proof load capacity at least equivalent to A325 Nuts. Do not galvanize. Class 2B thread fit tolerance. The two exterior bolts may be used for the bolt extensions. In either case, the length of bolt and head protruding from slab shall be approximately 11½" to insure adequate development length and cover over the bolt head. Bolts may be slightly field bent to maintain cover.

⑭ If d dimension is less than the usual 11 inches, use reduced spacing as given in Table S and turn bolt as required to maintain 1½" cover to back of rail.

GENERAL NOTES:

Designed in accordance with AASHTO 1977 Standard and Interim Specifications. Pullout tests have been performed on the epoxied No. 6 dowel anchorage system which have demonstrated that over 60 kcl can be developed in the dowel. See Traffic Rail Type T501 standard for details not shown herein.

Not all possible combinations of existing railing, curbs, parapets, etc have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

Additional reinforcing may be tack welded to the upper two thirds of the reinforcing cage to provide bracing when slip forming is used. Additional dowels or anchorages may be added when welding is necessary in the lower one third of the cage. Do not weld to the anchor bolts or required dowels.

This sheet is intended to be used as a guide for retrofitting existing structures with the T501 type of railing. Details with appropriate notes taken from this guide should be prepared for the specific application.

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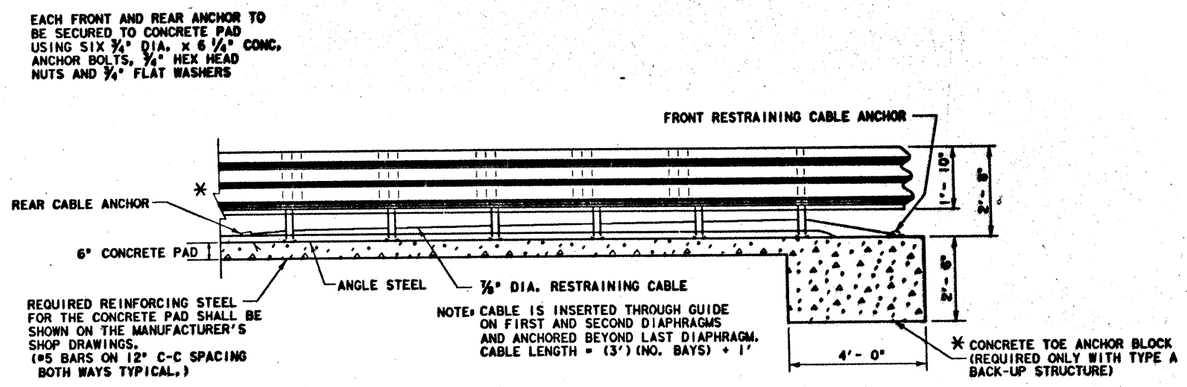
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

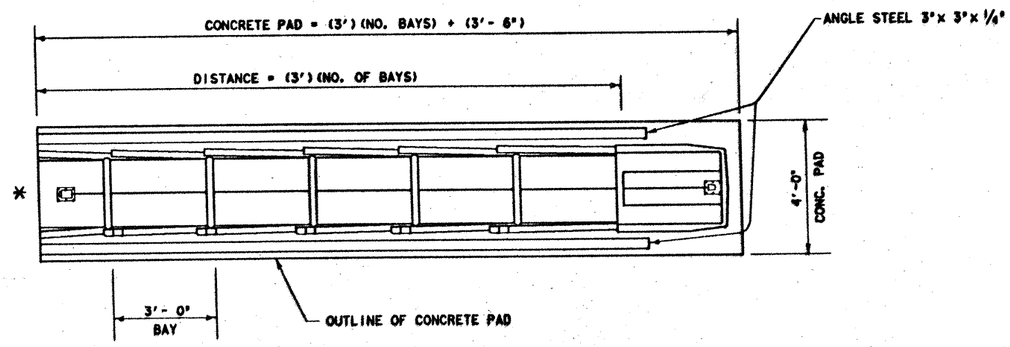
RETROFIT TRAFFIC RAIL DETAILS

T 501 R

ORIGINAL DRAWING DATE JUNE 1985	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
DR -JJP		16	6	HES0005(606)	58
CK -		COUNTY		CONTRACT SECTION	JOB / HIGHWAY
DW -EDS		NUECES		74 6	184 US181
CK -					



ELEVATION



PLAN

* SEE NOTE FOR BACK-UP STRUCTURE INFORMATION

DESIGN SPEED (MPH)	NO. OF BAYS ①
40 OR LESS	3
45	4
50	5
55	6
60	8
65	10

① BASED ON MAXIMUM DECELERATION FORCE OF 6 G'S

IF TYPE CZ UNIT IS USED, REFER TO STRUCTURAL INFORMATION FOR FOR WIDTHS AND NUMBER OF BAYS.

STRUCTURAL INFORMATION

TYPE A TENSION STRUT: CONSISTS OF DIAGONAL STRUTS, CONNECTIONS, AND ACCESSORIES, AS DETAILED BY THE MANUFACTURER, LOCATED AT REAR OF G.R.E.A.T. UNIT. WHEN USED, A 4' x 4' x 2'-6" CONCRETE TOE ANCHOR BLOCK SHALL BE PROVIDED BENEATH THE FRONT PORTION OF THE CONCRETE PAD EXCEPT WHERE THE G.R.E.A.T. UNIT IS TO BE PLACED ON CONTINUOUSLY REINFORCED CONCRETE PAVEMENT.

TYPE B CAST-IN-PLACE CONCRETE WALL BACKUP: WHEN A TYPE B BACKUP IS SPECIFIED, THE BACKUP WALL SHALL BE DETAILED ELSEWHERE IN THE PLANS. IF CAST-IN-PLACE STRUCTURES SUCH AS CONCRETE TRAFFIC BARRIER, BRIDGE PARAPETS, COLUMNS, OR SPECIAL WALLS ARE USED AS BACKUP STRUCTURES, THEN INTERMEDIATE WALLS AS DETAILED ELSEWHERE IN THE PLANS SHALL BE PROVIDED BETWEEN THESE STRUCTURES AND THE G.R.E.A.T. UNIT. THE INTERMEDIATE WALLS SHALL BE EQUAL IN HEIGHT AND WIDTH TO THAT OF THE G.R.E.A.T. UNIT. THE INTERMEDIATE WALLS SHALL BE REINFORCED WITH A STEEL CAGE. PRECAST CONCRETE MEDIAN BARRIER SHALL NOT BE USED AS A BACKUP STRUCTURE FOR THE G.R.E.A.T. UNIT.

TYPE C WIDE FLANGE BACK-UP: CONISTS OF TWO 6WF25 x 6'-2" STEEL POSTS ERECTED VERTICALLY AT REAR OF G.R.E.A.T. UNIT. POSTS ARE SET IN A CAST-IN-PLACE, REINFORCED FOUNDATION WHICH IS 4'-0" x 2'-0" x 3'-0", WITH THE 3'-0" DEPTH MEASURED FROM THE TOP OF CONCRETE PAD. DETAILS FOR CONNECTIONS AND ACCESSORIES FOR THE WIDE FLANGE BACK-UP PROVIDED BY THE MANUFACTURER.

TYPE CZ CONSTRUCTION ZONE BACK-UP: CONSISTS OF A STEEL BASE AND BACK-UP AS INTEGRAL PARTS OF THE G.R.E.A.T. UNIT. ANCHORAGE PROVIDED BY ANCHOR BOLTS WHERE THE UNIT IS PLACED ON CONCRETE OR BY DRIVEN, STEEL ANGLE ANCHOR PINS FOR PLACEMENT ON OTHER THAN CONCRETE. THE TYPE CZ UNIT IS ONLY AVAILABLE IN 2' OR 2.5' WIDTHS WITH 3 OR 6 BAYS.

NOTES: TYPE OF BACK-UP STRUCTURE FOR EACH LOCATION SPECIFIED ELSEWHERE IN THE PLANS.

DETAILS OF COMPONENTS TO THE GUARD RAIL ENERGY ABSORBING TERMINAL WILL BE SHOWN ON SHOP DRAWINGS FURNISHED TO THE ENGINEER BY THE MANUFACTURER.

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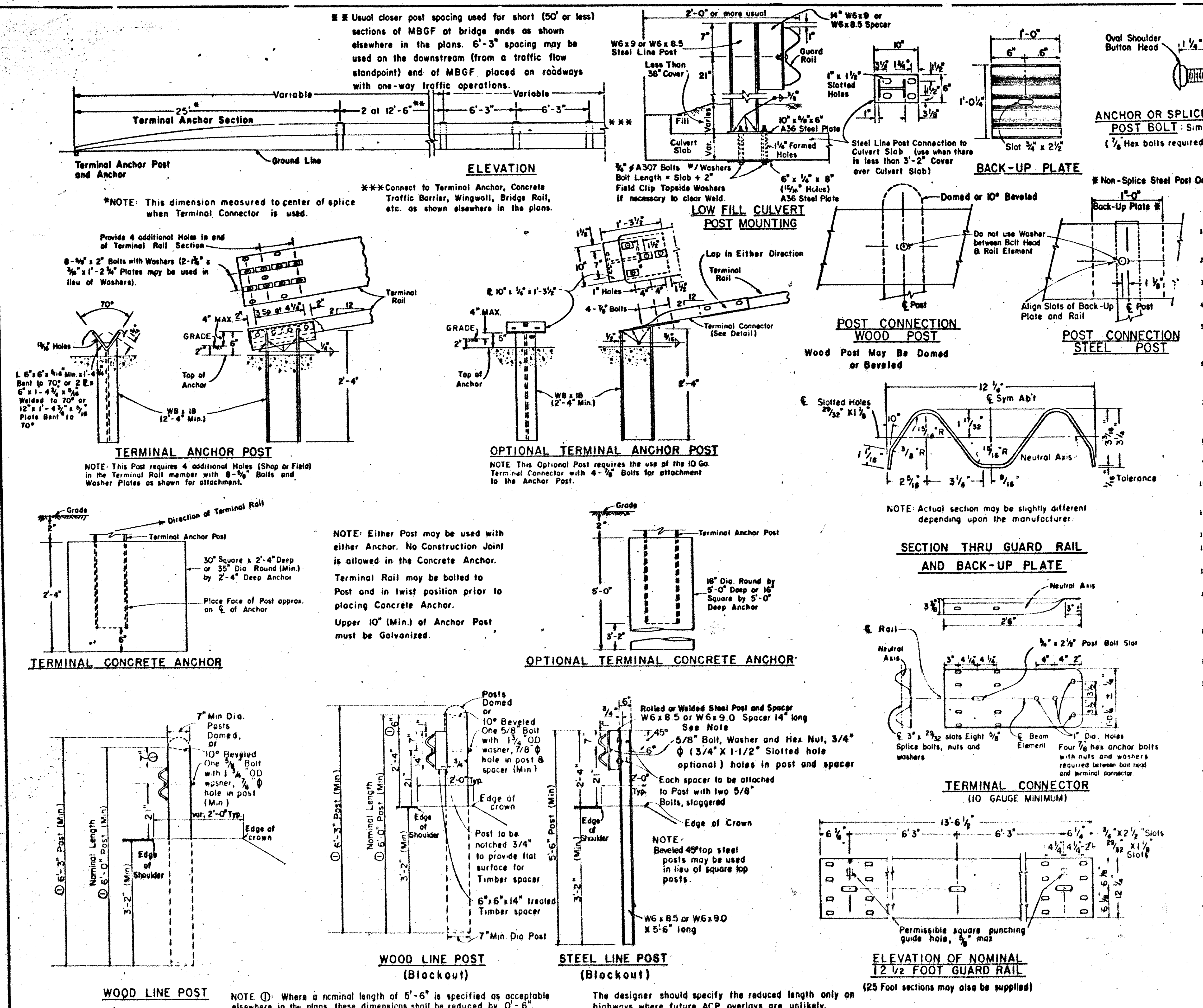
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

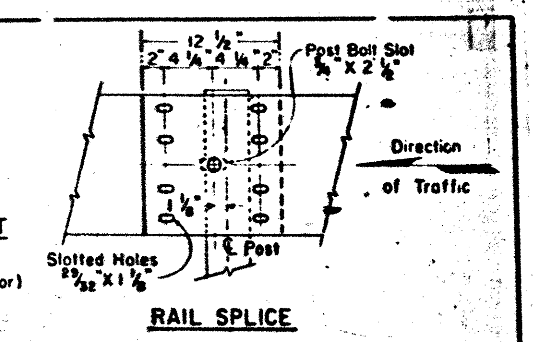
GUARD RAIL ENERGY ABSORBING TERMINAL

GREAT-89

REVISIONS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
	6	TEXAS	HE90005(606)	59
	STATE DIST. NO.	COUNTY	CONT. / SECT. / JOB	HIGHWAY NO.
	16	NUECES	74 / 6 / 164	US181

A-61





GENERAL NOTES

1. THE EXACT POSITION OF GUARD FENCE SHALL BE AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. GUARD FENCE SHALL BE TRANSITIONED TO A SMOOTH CONNECTION WITH OTHER GUARD FENCE OR STRUCTURE RAILING AS SHOWN ELSEWHERE ON PLANS.
2. AT THE OPTION OF THE CONTRACTOR THE RAIL ELEMENTS FOR THE GUARD FENCE MAY BE FURNISHED IN EITHER 12 1/2 OR 25 FOOT NOMINAL LENGTHS WITH POST BOLT SLOTS FOR CONNECTION TO POSTS.
3. BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.
4. THE TOP OF THE TERMINAL ANCHOR POST AND ALL STEEL FITTINGS THEREON SHALL BE GALVANIZED A MINIMUM OF 10" AS SHOWN.
5. WHERE SOLID ROCK IS ENCOUNTERED OR WHERE SHOWN ON THE PLANS, THE DIAMETER OF THE HOLES SHALL BE APPROXIMATELY 12 INCHES, THE BACKFILLING SHALL BE WITH A COHESIONLESS MATERIAL, AND EMBEDMENT DEPTH SHALL BE 1'-6" OR MORE AS DIRECTED BY THE ENGINEER. TIMBER POSTS SHALL NOT BE SET IN CONCRETE.
6. THE TERMINAL ANCHOR POST SHALL BE SET IN CLASS "A", "B" OR "C" CONCRETE IN ACCORDANCE WITH ITEM, "CONCRETE FOR STRUCTURES", OR SET IN CONCRETE IN ACCORDANCE WITH ITEM "CONCRETE PAVEMENT". CONCRETE SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TERMINAL RAIL SECTION AND ANCHORAGE SYSTEM.
7. TIMBER POSTS MAY BE BEVELED AT APPROXIMATELY 10 DEGREES ON THE TOP OR BOTH ENDS WITH HIGH SIDE OF TOP OF POST PLACED TOWARD THE ROADWAY OR THEY MAY BE DOMED. WHEN "BLOCKED OUT", THE UPPER PORTION OF THE POST SHALL BE NOTCHED 3/4" TO PROVIDE FLAT SURFACE FOR TIMBER SPACER. A TOLERANCE OF + 1/8" WILL BE PERMITTED ON THE NOTCHED PORTION OF THE POST.
8. AN ANCHOR OTHER THAN TO A TERMINAL ANCHOR POST SHALL CONSIST OF A CONNECTION SIMILAR TO THE RAIL SPLICE OR SIMILAR TO THE TERMINAL CONNECTOR.
9. SPECIAL FABRICATION WILL BE REQUIRED IN INSTALLATIONS HAVING A CURVATURE OF LESS THAN 150' RADIUS.
10. POST SPACING WILL BE 6' - 3" EXCEPT THAT THE FIRST POST WILL BE 25' FROM THE TERMINAL ANCHOR POST AND THE NEXT TWO POSTS SPACED AT 12' - 6" WITH A MINIMUM OF 8 POSTS ADJACENT TO STRUCTURES SPACED AT 3' - 1 1/2".
11. THE 10 GAGE TERMINAL CONNECTORS MUST BE USED WITH THE OPTIONAL TERMINAL ANCHOR POST. EITHER ANCHOR POST MAY BE USED WITH EITHER CONCRETE ANCHOR.
12. CROWN WILL BE WIDENED TO ACCOMMODATE GUARD FENCE.
13. STEEL POSTS SHALL BE BLOCKED OUT. A W6x8.5 OR W6x9.0 STEEL SPACER SHALL BE USED WITH STEEL POSTS. BACK-UP PLATES SHALL BE PROVIDED AT INTERMEDIATE (NON-SPLICE) STEEL POSTS.
14. WHEN BLOCKOUT GUARD FENCE IS SPECIFIED ELSEWHERE IN THE PLANS, A 6" x 6" x 14" TREATED TIMBER SPACER OF YELLOW PINE SHALL BE USED WITH WOOD POSTS.
15. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE BLOCKED OUT SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 21-INCHES ABOVE THE GUTTER PAN OR ROADWAY SURFACE.
16. WELDED STEEL POSTS AND SPACERS SHALL MEET THE REQUIREMENTS OF ASTM A-769. THE FLANGE WIDTH AND THICKNESS, WEB THICKNESS, AND DEPTH OF WELDED POSTS AND SPACERS SHALL EQUAL OR EXCEED THE DIMENSIONS OF A STANDARD ROLLED W6x8.5.
17. STEEL POSTS AND SPACERS SHALL MEET THE REQUIREMENTS OF ASTM A-36. BOLT HOLES SHALL BE APPROXIMATELY CENTERED BETWEEN WEB AND EDGE OF FLANGE OF SPACERS AND POSTS.
18. UNLESS OTHERWISE SHOWN IN THE PLANS, MBGF SHALL BE PLACED WITH THE FACE OF RAIL DIRECTLY ABOVE THE SHOULDER EDGE (OR CURBFACE) EXCEPT THE 25' TERMINAL ANCHOR SECTION AND ADJACENT 25' OF MBGF SHALL BE FLARED AT 25:1 (LONGITUDINAL:LATERAL) TO PROVIDE A 2' OFFSET BETWEEN BURIED ANCHOR AND SHOULDER EDGE (OR CURBFACE). FLARING THE 25' TERMINAL ANCHOR AND ADJACENT 25' MBGF IS OPTIONAL FOR ONE-WAY TRAFFIC CONDITIONS ON THE DOWNSTREAM END OF GUARD FENCE.
19. WASHERS USED WITH THE EIGHT 5/8" SPLICE BOLTS AND NUTS THAT ARE PROVIDED FOR TERMINAL CONNECTORS AND OR TERMINAL ANCHOR POSTS SHALL BE 1 3/4" x 3" x 3/16", OR 1" I.D. AND 2" O.D. x 0.134" (ANSI B27.2) NARROW TYPE A PLAIN WASHERS.
20. BACK-UP PLATES SHALL CONFORM TO THE MATERIALS AND GALVANIZING REQUIREMENTS SPECIFIED FOR THE RAIL ELEMENT, AND SHALL BE OF THE SAME NOMINAL THICKNESS AS THE RAIL ELEMENT USED.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

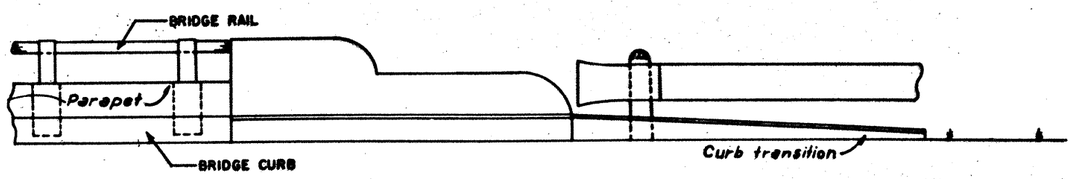
METAL BEAM GUARD FENCE GF(TD)-87

(DIST 16)

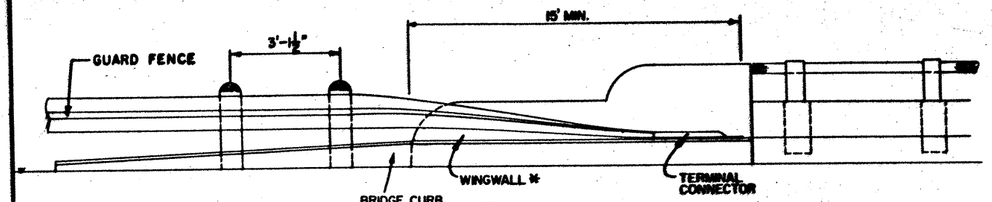
60

MODIFIED 2/90
MODIFIED GRADE AT TERMINAL ANCHOR POST

CK	DRAWING	DATE	FED RD DIV NO	STATE	FEDERAL PROJECT NO				SHEET NO
CK DN	ORIGINAL		6	TEXAS	HES 000 S (606)				60
DW	REVISED		STATE DIST NO	COUNTY		CONT	SECT	JOB	HIGHWAY NO
CK DW	REVISED			Neces		74	6	169	US 181
TR									
CK TR									

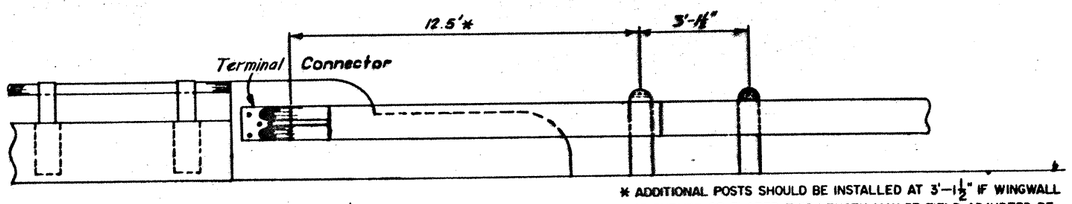


EXISTING ELEVATION



PROPOSED TURNDOWN END ATTACHMENT

TO BRIDGES WITH CURB 14" OR GREATER IN WIDTH

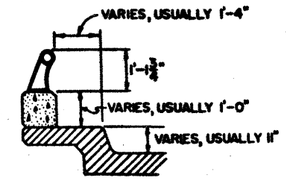


PROPOSED ELEVATION

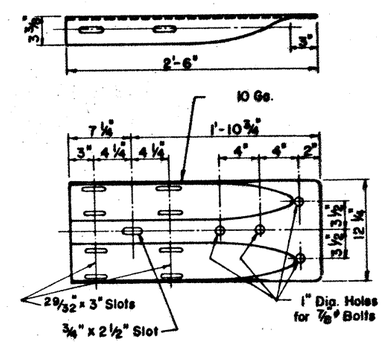
FOR BRIDGES WITH NO CURB

TRAFFIC FLOW

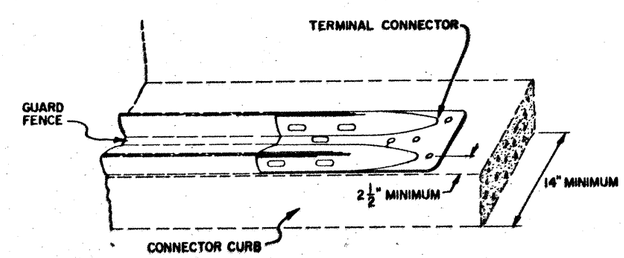
* ADDITIONAL POSTS SHOULD BE INSTALLED AT 3'-1½" IF WINGWALL IS CURVED OR FLARED. THIS LENGTH MAY BE FIELD ADJUSTED DEPENDING ON THE STRENGTH AND AMOUNT OF WINGWALL AVAILABLE. THE GUARD FENCE SHOULD BE LOCATED FLUSH WITH THE FACE OF ANY BRIDGE CURB. SPECIAL LENGTH POSTS AND/OR SPECIALLY DESIGNED BLOCKOUTS MAY HAVE TO BE DEVISED TO MEET FIELD CONDITIONS.



TYPE T RAIL
(ALUMINUM)



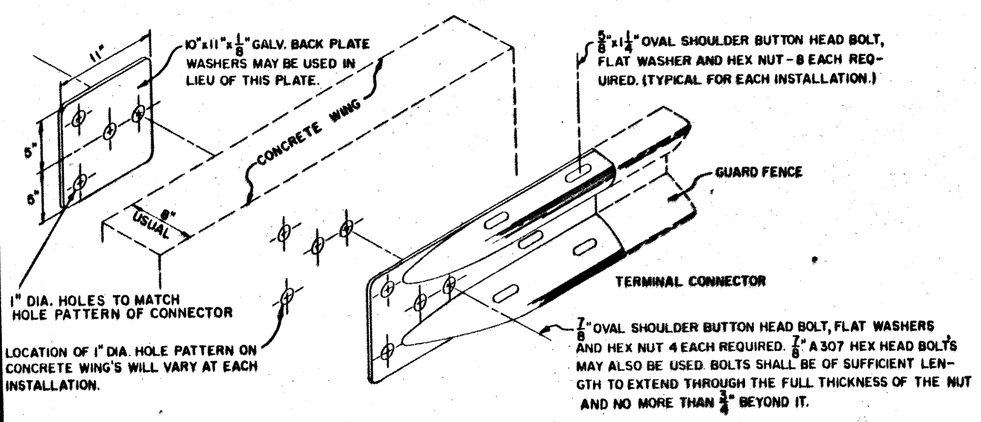
TERMINAL CONNECTOR



4-⅞" A 307 HEX HEAD TYPE BOLTS SHALL BE USED. HOLES SHALL BE DRILLED 4½" DEEP, ¼" GREATER IN DIAMETER THAN THE BOLT HEAD, AND FILLED WITH DHT TYPE B 1 OZ. EPOXY BINDER MIXED WITH SAND.

EXPANSION TYPE BOLTS MAY BE USED WHICH REQUIRE A DRILLED HOLE ONLY AS LARGE AS THE BOLT

THE GUARD FENCE SHALL BE LAPPED UNDER THE TERMINAL CONNECTOR ON AN APPROACH END AND OVER THE TERMINAL CONNECTOR ON A DEPARTURE END.



GENERAL NOTES

EXCEPT WHERE USED AT STRUCTURES THAT ARE NARROWER THAN CROWN WIDTH OR WHERE OTHERWISE INDICATED ON PLANS, THE GUARD FENCE SHALL NOT INFRINGE ON THE SHOULDER AREA. THE EXACT POSITION SHALL BE AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. RAIL SHALL BE TRANSITIONED TO A SMOOTH CONNECTION WITH OTHER STRUCTURES OR RAIL AS SHOWN ELSEWHERE ON THE PLANS.

AT THE OPTION OF THE CONTRACTOR THE RAIL ELEMENTS FOR THE GUARD FENCE MAY BE FURNISHED IN EITHER 12½ OR 25 FOOT NOMINAL LENGTHS. RAIL SHALL BE FURNISHED WITH POST BOLT SLOTS FOR 5/8" DIAMETER BOLT CONNECTION TO POSTS.

BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.

WHERE ROCK IS ENCOUNTERED OR WHERE SHOWN ON THE PLANS, THE DIAMETER OF THE HOLES AND THE MATERIAL FOR BACKFILLING SHALL BE AS DIRECTED BY THE ENGINEER. TIMBER POSTS SHALL NOT BE SET IN CONCRETE.

TIMBER POSTS MAY BE BEVELED AT APPROXIMATELY 10 DEGREES ON THE TOP OR BOTH ENDS WITH HIGH SIDE OF TOP POST PLACED TOWARD THE ROADWAY OR THEY MAY BE DOMED. WHEN "BLOCKED OUT", THE UPPER PORTION OF THE POST SHALL BE NOTCHED 3/4" TO PROVIDE FLAT SURFACE FOR TIMBER SPACER. A TOLERANCE OF ±1/8" WILL BE PERMITTED ON THE NOTCHED PORTION OF THE POST.

IF BLOCKOUTS ARE USED ON BRIDGE RAILS, THEY SHALL BE SPACED AT 6'-3" CENTERS REGARDLESS OF THE POST SPACING ON THE BRIDGE. THEY MAY ALSO BE PLACED ON ALL POSTS AFTER THE 6'-3" SPACING IS ACHIEVED.

FOR BRIDGES 100 FEET AND LESS IN LENGTH, THE APPROACH GUARD FENCE SHALL BE CONTINUED ACROSS THE ENTIRE STRUCTURE. FOR BRIDGES GREATER THAN 100 FEET IN LENGTH, THE GUARD FENCE TREATMENT SHALL BE AS DESCRIBED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.

THE TERMINAL CONNECTOR MAY BE USED WITH THE 18" X 5'-0" CONCRETE FOOTING OR THE ANGLE ANCHOR MAY BE USED WITH THE 2'-6" SQUARE OR EQUIVALENT CONCRETE FOOTING. BOTH FOOTINGS HAVE A 8WF17 X 2'-0" POST.

AN ANCHOR OTHER THAN TO A TERMINAL ANCHOR POST SHALL CONSIST OF A CONNECTION SIMILAR TO THE RAIL SPLICE, TERMINAL CONNECTOR, OR ANY OTHER CONNECTION DEVELOPING A STRENGTH IN TENSION EQUAL TO A STANDARD SPLICE (8 SPLICE BOLTS).

A GUARD FENCE ANCHOR SECTION 25 FEET IN LENGTH SHALL BE REQUIRED AT THE APPROACH END OF THE GUARD FENCE. A SIMILAR ANCHOR SECTION SHALL BE REQUIRED AT THE DEPARTURE END, IF THE DEPARTURE END BECOMES AN APPROACH SITUATION FROM THE OPPOSITE DIRECTION OR IS NOT ANCHORED IN ANOTHER MANNER. A GUARD FENCE ANCHOR SECTION WILL NOT BE REQUIRED AT THE DEPARTURE END OF A BRIDGE CARRYING ONE-WAY TRAFFIC UNLESS OTHER GUARD FENCE WARRANTS ARE MET.

WHEN TWISTING THE GUARD FENCE, 90° AND ANCHORING IT TO A CURB AND/OR SIDEWALK, THE TERMINAL CONNECTOR SHOULD BE CAREFULLY INSTALLED SO THAT THE SPLICE CONNECTION TO THE GUARD FENCE IS MADE WITH THE BOLTS AT THE EXTREME END OF THE 3 INCH EXPANSION SLOTS SO THAT THERE WILL BE NO SPLICE SLACK IF THE TERMINAL CONNECTOR IS SHOVED FORWARD. IF 10 GAUGE MATERIAL IS USED, THEN FOUR 7/8 INCH BOLTS (A307) ARE NEEDED FOR ANCHORING. IF 12 GAUGE MATERIAL IS USED, SIX 3/4 INCH BOLTS (A307) ARE REQUIRED FOR ANCHORING. THIS ANCHORAGE SHOULD NOT BE PLACED CLOSER THAN 2½ INCHES FROM THE EDGE OF THE CURB.

THE "NESTED BACKUP PLATE TERMINAL DESIGN" MAY BE USED ON APPROACHES TO BRIDGES ONLY IF 175 FEET OR MORE OF GUARD FENCE IS INSTALLED WITH ALL POSTS AT 6'-3" SPACINGS.

IF A BRIDGE HAS A CURB AND/OR SIDEWALK, THE GUARD FENCE SHALL BE TRANSITIONED AND ATTACHED SO THAT THE FACE OF THE GUARD FENCE IS FLUSH WITH THE FACE OF THE CURB. IF THE BRIDGE CURB IS LESS THAN 14 INCHES WIDE, THE GUARD FENCE SHALL BE BLOCKED OUT FROM THE EXISTING BRIDGE RAIL SO THAT IT IS FLUSH WITH THE FACE OF THE CURB. IF THE BRIDGE CURB AND/OR SIDEWALK IS GREATER THAN 14 INCHES WIDE, THE GUARD FENCE SHALL BE TWISTED 90° AND ANCHORED TO THE CURB AND/OR SIDEWALK SO THAT IT IS FLUSH WITH THE FACE OF THE CURB. EITHER OF THESE ANCHORAGE SYSTEMS SHALL BE CARRIED A MINIMUM OF 16 FEET ONTO THE BRIDGE, IF POSSIBLE.

STEEL POSTS SHALL BE SET IN CONCRETE AND BLOCKED OUT.

THE TOP OF THE TERMINAL ANCHOR POST ASSEMBLY AND ALL STEEL FITTINGS THEREON SHALL BE GALVANIZED AS SHOWN. THE TERMINAL ANCHOR POST SHALL BE SET IN CLASS "A", "B" OR "C" CONCRETE IN ACCORDANCE WITH ITEMS "CONCRETE FOR STRUCTURES" OR "CONCRETE PAVEMENT". CONCRETE SHALL BE SUBSIDIARY TO THE BID ITEM "METAL BEAM GUARD FENCE".

POST SPACING WILL BE 6'-3" EXCEPT THAT THE FIRST POST WILL BE 26' FROM THE TERMINAL ANCHOR POST AND THE NEXT TWO POSTS SPACED AT 12'-6" WITH A MINIMUM OF 8 POSTS ADJACENT TO STRUCTURE SPACED AT 3'-1½"

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

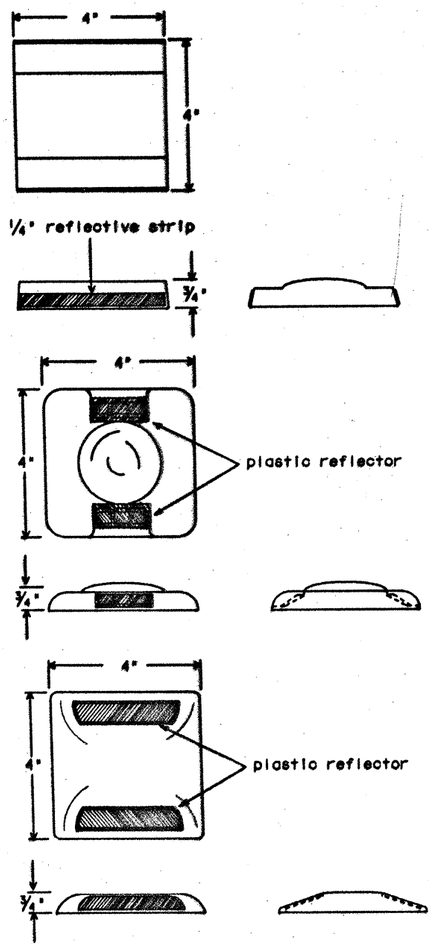
GUARD FENCE ATTACHMENT TO BRIDGE RAIL TYPE T (ALUMINUM)

61 GF(3)

ORIGINAL DRAWING DATE 12-78 mrm	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
REVISIONS 8-12-80 mm	16	6	HES 0005 (606)				61
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY	
	NUECES		74	6	64	(SH 181)	

WORK ZONE PAVEMENT MARKINGS

Raised Markers



NOTES FOR WORK ZONE PAVEMENT MARKINGS

GENERAL

1) This sheet is to be used in conjunction with Standard Sheet TCP(5-2).
2) Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
3) Raised markers and temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values additional maintenance replacement of devices should be planned, or permanent individual unit pavement markings used, as detailed on sheets IPM(1), IPM(2), PM(0), PM(1), PM(2), PM(3) or as detailed elsewhere in the plans.

RAISED MARKERS

General

1) Raised Markers detailed on this sheet will be designated Type AA (two amber reflective surfaces with yellow body); Type A (one amber reflective surface with yellow body) or Type C (one silver reflective surface with white body). Color used shall be in accordance with the TMUTCD.

Sampling & Testing

1) Pavement Markings detailed on this sheet are to be inspected and accepted by the Project Engineer or designated representative. Sampling and testing is not normally required.

ABBREVIATED PAVEMENT MARKINGS

General

1) Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one silver reflective surface with white body).

Material

1) Temporary flexible-reflective roadway marker tabs shall meet requirements of Department Material Specification D-9-8242.
2) The body of the temporary flexible-reflective roadway marker tabs shall consist of a base and vertical wall made of polyurethane, polyester elastomer or other material approved by the Materials and Tests Division.
3) The reflective material shall be protected with an easily removable heat resistant transparent cover capable of withstanding and protecting the reflective material from the application of 400 degree F asphalt. Stapling or clipping devices used to retain the protective cover shall not protrude through the reflective material.

Sampling & Testing

1) Temporary flexible-reflective roadway marker tabs for seal coat projects detailed on this sheet are to be inspected and accepted by the Project Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A) Select five (5) or more temporary flexible-reflective roadway marker tabs at random from each lot or shipment and submit to the Materials and Tests Division to determine specification compliance.
   B) Select five (5) temporary flexible-reflective roadway marker tabs and submit to the following test. Affix five (5) tabs at two (2) foot intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.

Maintenance

1) When dry, the temporary flexible-reflective roadway marker tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
2) No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of note 1.
3) The Contactor will be responsible for maintaining the abbreviated pavement markings, when they are used, until the standard pavement markings are in place. When the Contractor is responsible for placement of the standard pavement markings, no segment of roadway shall remain without standard pavement markings for a period greater than two (2) weeks unless weather conditions prohibit placement. The standard pavement markings shall be placed as soon as weather permits.
4) After 72 hours following the seal coat operation, provided the standard pavement markings have not been placed, any temporary flexible-reflective roadway marker tabs not meeting the visibility requirements stated in note 1, shall be replaced as directed by the Engineer.

REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

Sampling & Testing

1) Removable - Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Department Materials Specifications D-9-8241. The list of approved materials may be obtained from the Equipment and Procurement Division.

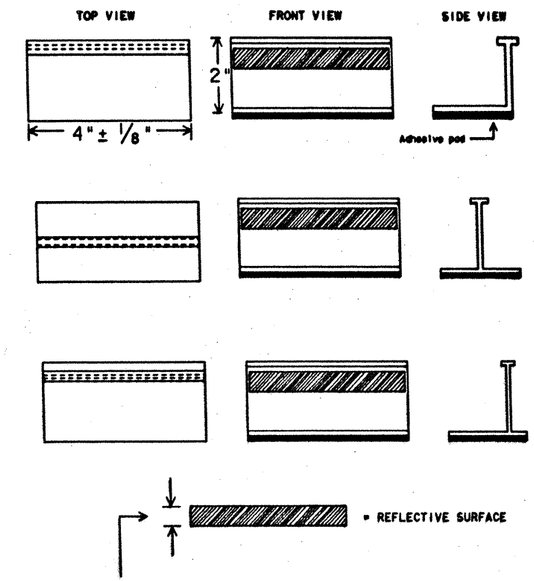
CONSTRUCTION GRADE - PREFABRICATED PAVEMENT MARKINGS (FOIL BACK)

Sampling & Testing

1) Construction Grade - Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on the list of approved material covered by the Specification SDHPT - 550-74-01. The list of approved materials may be obtained from the Equipment and Procurement Division.

WORK ZONE PAVEMENT MARKINGS

Temporary Flexible-Reflective Roadway Marker Tabs for Seal Coat Projects



Height of sheeting will be determined by Note 1 under Maintenance of ABBREVIATED PAVEMENT MARKINGS. Usually more than .2 inch and less than 1 inch.

PREQUALIFICATION PROCEDURES MAY BE OBTAINED BY WRITING:

EQUIPMENT AND PROCUREMENT DIVISION
STATE DEPT. OF HIGHWAY & PUBLIC TRANS.
125 EAST 11th STREET
AUSTIN, TX 78701-2483

SPECIFICATION REFERENCE TABLE
, MATERIALS AND TEST SPECIFICATIONS (D-9)

PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	D-9-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	D-9-8242

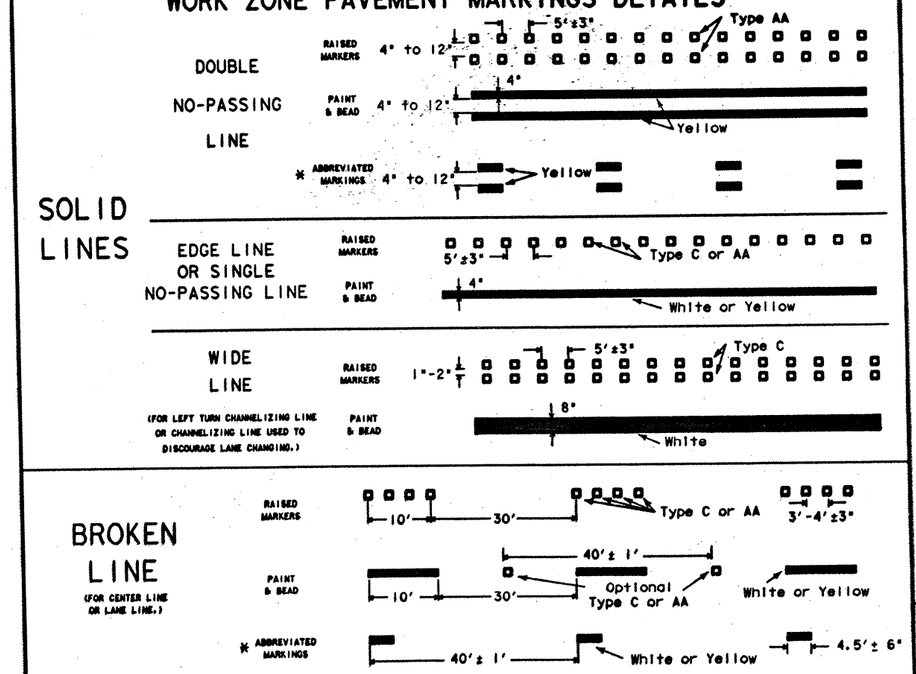
STANDARD PLANS
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

WORK ZONE PAVEMENT MARKINGS 62

(1 of 2) TCP(5-1)-91

ORIGINAL DRAWING DATE: 5-88		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
DR.: LR	REVISION	16	6	HES 0005 (606)				62
CK.:	3-91	COUNTY		CONTROL	SECTION	JOB	HIGHWAY	
DR.: DN		NUECES		14	06	164	US 181	
CK.:								190

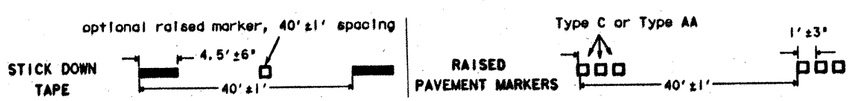
WORK ZONE PAVEMENT MARKINGS DETAILS



NOTES FOR STANDARD WORK ZONE PAVEMENT MARKINGS

1) Standard Work Zone Pavement Markings may be of paint and beads, raised markers or combination of paint and raised markers. Thermoplastic paint and beads may be used in lieu of paint and beads unless otherwise specified elsewhere in the plans. Abbreviated marking patterns are not to be used for standard pavement markings.
2) Raised markers detailed on TCP(5-1) are to be placed according to the patterns on this sheet. Standard, permanent, raised markers as detailed on sheets IPM(1) and IPM(2) shall be placed according to patterns on sheets IPM(1), IPM(2), PM(0), PM(1), PM(2) or PM(3).
3) For additional details on Work Zone pavement markings see sheet TCP(5-1).
4) Spacing for pavement markings on this sheet are maximum spacings and may be reduced to fit field conditions.
5) Adhesive used for work zone raised pavement markings shall be Bituminous material hot applied, or Butyl Rubber/pad.
6) Channelizing (wide) lines shall be minimum 8" wide.

ABBREVIATED (SHORT TERM) PAVEMENT MARKING DETAILS



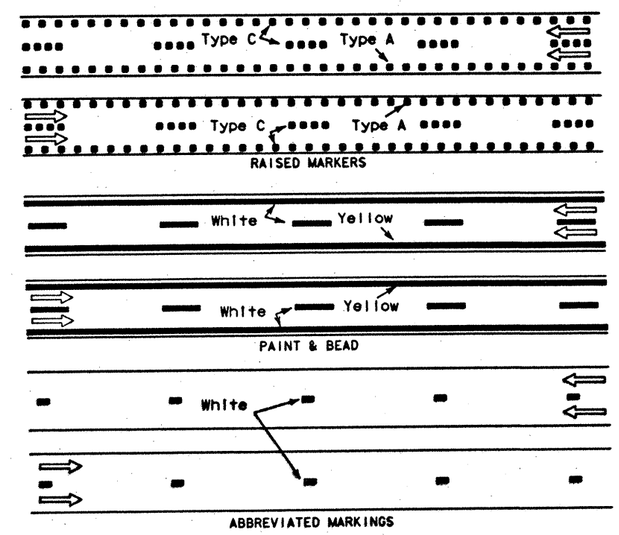
NOTES FOR ABBREVIATED (SHORT TERM) PAVEMENT MARKINGS

1) Abbreviated pavement marking materials may be stick down tape, raised markers or paint and beads unless otherwise specified elsewhere in the plans.
2) Abbreviated pavement markings for seal coat projects shall use temporary flexible-reflective roadway marker tabs. Temporary flexible-reflective roadway marker tabs are to be installed to provide true alignment for striping crews as directed by the Engineer.
3) Temporary flexible-reflective roadway marker tabs for seal coat projects should be applied to the pavement no more than two days before the seal coat is applied. After the seal coat is rolled and swept the cover over the reflective strip shall be removed, and standard markings installed.
4) Abbreviated pavement markings shall not be used to simulate edge lines.

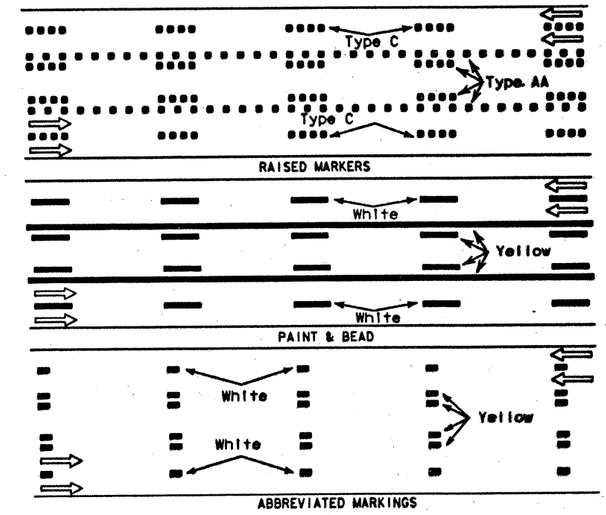
USE OF ABBREVIATED (SHORT TERM) PAVEMENT MARKINGS

1) On low volume two lane roadways, 4000 ADT or less, signs may be used to indicate no-passing zones for up to two weeks. Standard centerline markings should be placed within two weeks.
2) On two lane roadways with more than 4000 ADT, signs may be used to indicate no-passing zones for up to three days. Standard centerline markings should be placed within three days.
3) On undivided highways with four or more lanes, standard centerline and lane line pavement markings should be in place at the end of each workday on roadways open to traffic. On divided highways, abbreviated markings may be used for lane lines for up to two weeks. Standard markings should be in place after two weeks.

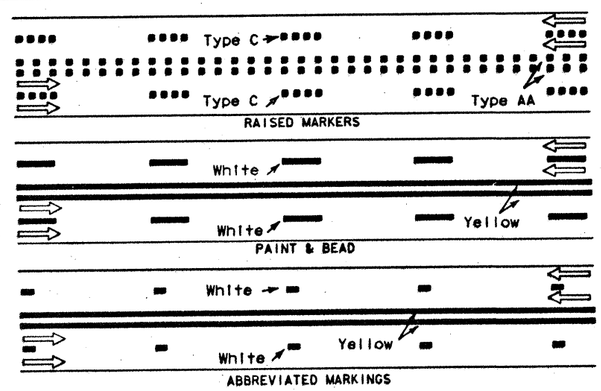
PAVEMENT MARKING PATTERNS



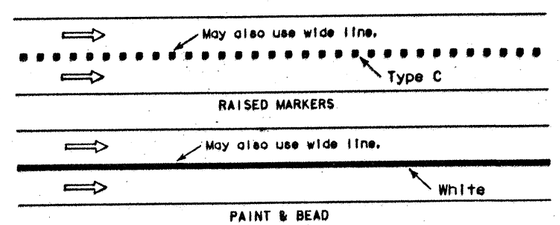
EDGE & LANE LINES FOR DIVIDED HIGHWAY



PAVEMENT MARKINGS FOR TWO-WAY LEFT TURN LANE

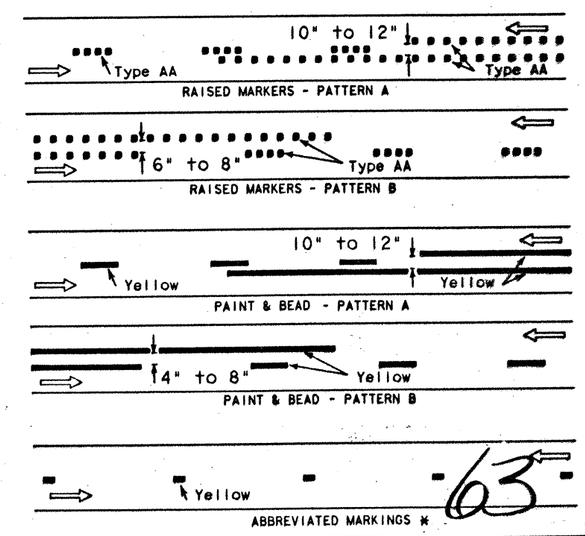


LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



CHANNELIZING LINE TO DISCOURAGE LANE CHANGING

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



NOTE

1) Spacing between markers shall be uniform with no more than a 10% variation in spacing.
2) Pattern A is the Department Standard. Pattern B may be used if approved by the Engineer.
*3) When abbreviated markings are used in areas of no-passing zones, signs in accordance with the TMUTCD shall be used to indicate the limits of the no-passing zones.

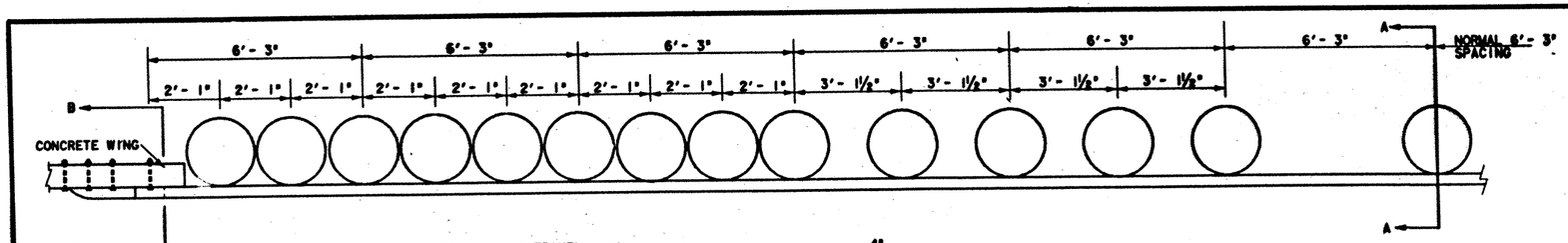
STANDARD PLANS
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

WORK ZONE PAVEMENT MARKINGS

(2 of 2) TCP(5-2)-91

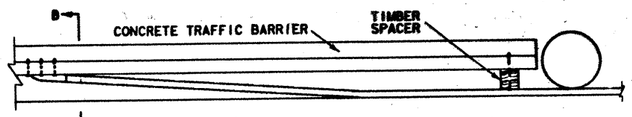
ORIGINAL DRAWING DATE: 5-88	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DR.: TR — REVISIONS 6-89 3-91	16	6	HES-[illegible]	63
CE.:	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
DW.: DN	NUECES	74	16	164	US-181

191

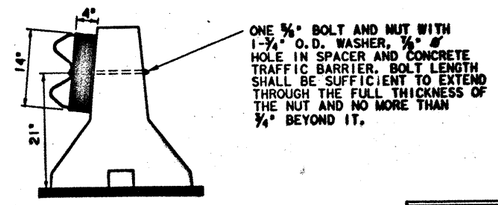


PLAN VIEW

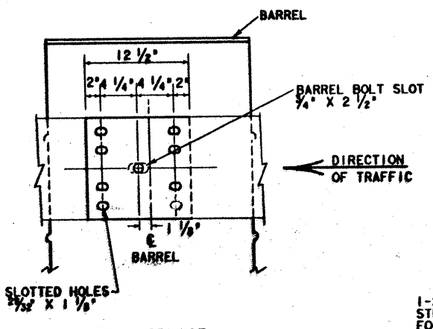
ATTACHMENT TO BRIDGE RAIL OR CONCRETE TRAFFIC BARRIER



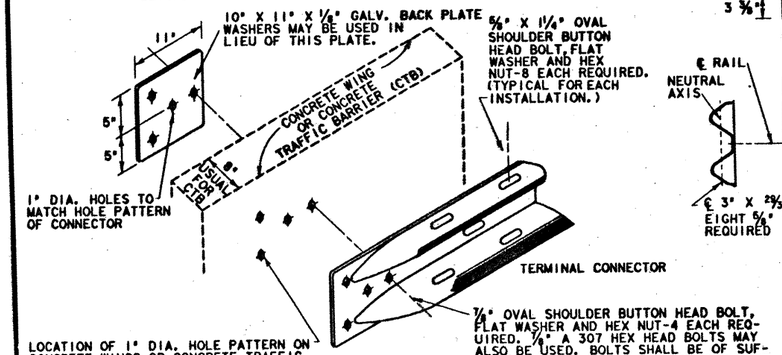
WHEN ATTACHING RAIL ELEMENTS TO TRAFFIC BARRIER, A 4" X 6" X 14" TREATED TIMBER SPACER SHALL BE REQUIRED AND THE RAIL ELEMENT SHALL BE EXTENDED AN ADDITIONAL 12'- 6" BEYOND THE BLOCKOUT.



CONCRETE TRAFFIC BARRIER
SHOWING BLOCKOUT

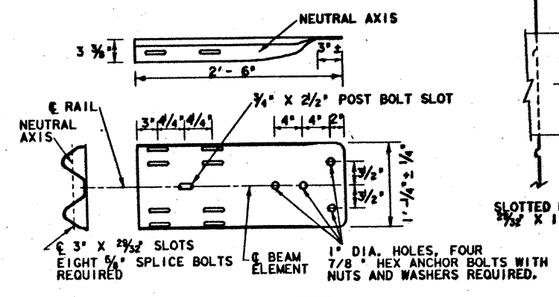


RAIL SPLICE

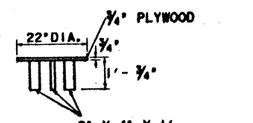


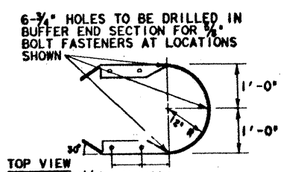
ATTACHMENT TO BRIDGE RAIL OR CONCRETE TRAFFIC BARRIER

SECTION B-B



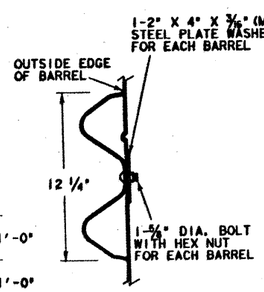
TERMINAL CONNECTOR
(10 GAUGE MINIMUM)



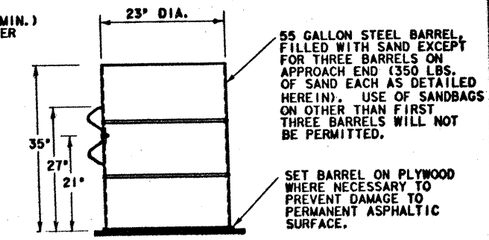


W-BEAM END SECTION (BUFFER)

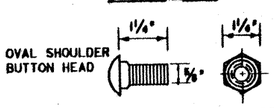
BUFFER DETAIL



DETAIL OF RAIL ELEMENT CONNECTION TO BARREL

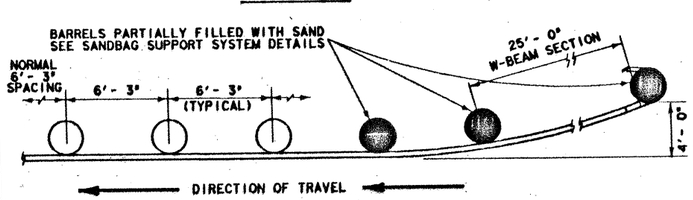


SECTION A-A

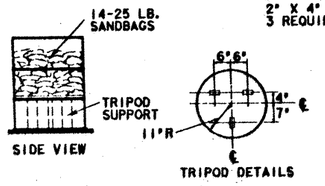


BARREL CONNECTOR OR SPLICE BOLT ⅝" NUT

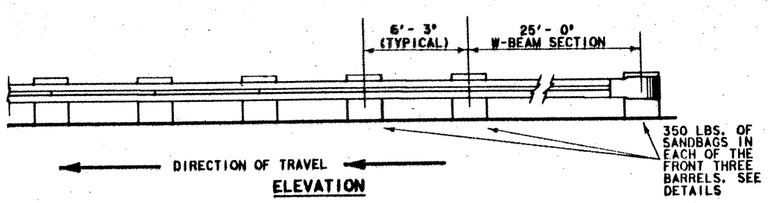
POST BOLT: SIMILAR EXCEPT LENGTH
(⅞" HEX BOLTS REQUIRED FOR TERMINAL CONNECTOR)



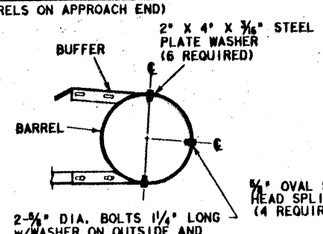
PLAN

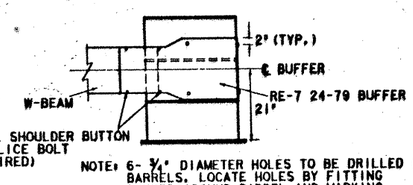


SANDBAG SUPPORT SYSTEM
(THREE BARRELS ON APPROACH END)



ELEVATION





NOTE: 6- ¾" DIAMETER HOLES TO BE DRILLED IN BARRELS. LOCATE HOLES BY FITTING BUFFER AROUND BARREL AND MARKING BARREL TO ENSURE PROPER FIT.

BARREL CONNECTION DETAILS

GENERAL NOTES

1. RAIL ELEMENT MAY BE EITHER 12.5 OR 25 FOOT LENGTHS, EXCEPT A 25 FOOT LENGTH IS REQUIRED ON THE APPROACH TERMINAL, AND EITHER 10 OR 12 GAUGE.
2. MINIMUM LENGTH OF PLACEMENT EQUALS 100 FEET EXCEPT WHERE BOTH ENDS ARE CONNECTED TO A POSITIVE BARRIER (BRIDGE RAIL, CTB, ETC.) MINIMUM LENGTH OF PLACEMENT EQUALS 75 FEET WHERE ONE END IS CONNECTED TO A POSITIVE BARRIER.
3. WHEN THE ROADWAY SURFACE IS ASPHALT, PLYWOOD SHALL BE PLACED UNDER THE BARRELS TO PREVENT DAMAGE TO THE PERMANENT ASPHALTIC PAVEMENT.
4. LOCATION OF BARREL MOUNTED GUARD FENCE IS SHOWN ELSEWHERE IN THE PLANS.
5. RAIL ELEMENT SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
6. RAIL SPLICES SHALL BE CONNECTED WITH THE NORMAL EIGHT 1 ⅛" LONG OVAL SHOULDER BUTTON HEAD BOLTS WHICH ARE ⅝" IN DIAMETER.
7. BARREL SPACING SHALL BE 6'-3", EXCEPT CLOSER SPACING SHALL BE USED AS SHOWN TO TRANSITION INTO A CONNECTION WITH A BRIDGE RAIL, CONCRETE TRAFFIC BARRIER, OR SIMILAR FIXED OBJECT. WHEN USED AS A TRANSITION SPACING OF BARRELS SHOULD BE (FROM FRONT BARREL) ONE SPACE AT 25', 3 SPACES AT 6'-3", 4 SPACES AT 3'-1½" AND 8 SPACES AT 2'-1".
8. DRAINAGE HOLES SHALL BE DRILLED IN THE BOTTOM OF THE BARRELS TO ALLOW FOR DRAINAGE OF WATER.
9. APPROACH END OF THE TEMPORARY BARRIER SHALL BE FLARED AWAY FROM THE ROADWAY AND SHALL BE TREATED AS SHOWN.
10. IF THE BARRIER IS USED AS A CHANNELIZING DEVICE IN NIGHTTIME SITUATIONS, IT SHALL BE SUPPLEMENTED BY DELINEATION OR CHANNELIZATION MARKINGS OR DEVICES. REFLECTORIZED MARKINGS ON DRUMS AS DETAILED ON THE BC STANDARD SHEETS, OR VERTICAL PANELS, OR DELINEATORS SHALL BE USED TO PROVIDE SUPPLEMENTAL DELINEATION.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

TEMPORARY BARRIER BARREL-MOUNTED GUARD FENCE

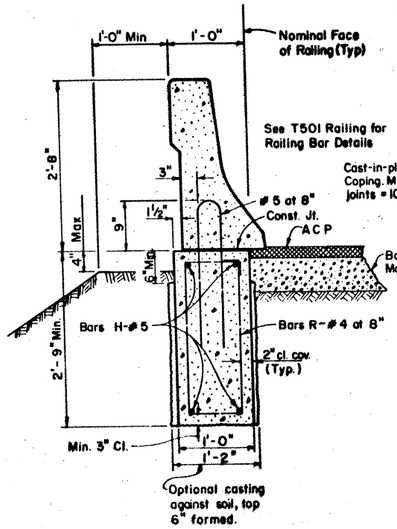
TB (BMGF)-88

64

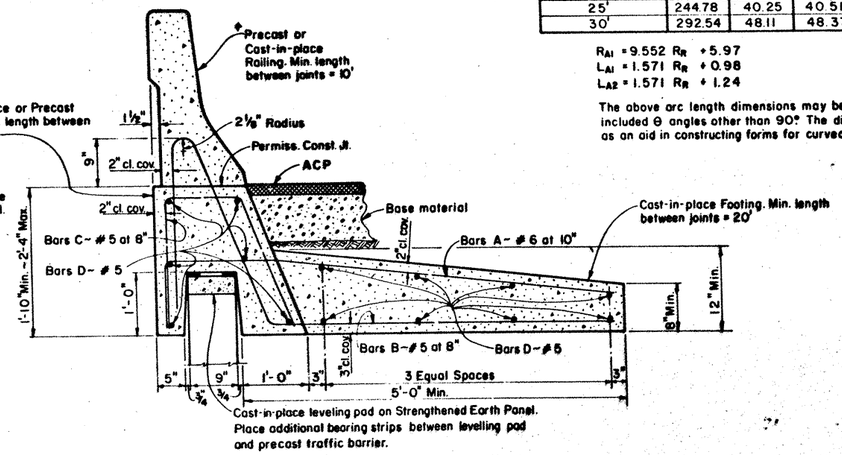
REVISIONS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
	6	TEXAS	HES0005(606)				64
	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.	
	16	NUECES	74	6	164	US181	

A-60

† Precast versions of this detail may be covered by patents held by The Reinforced Earth Company. The Contractor shall indemnify and save harmless the State from all claims for infringement by reason of the use of the process by others without the consent of The Reinforced Earth Company.



T501 RAIL



T501 ON STRENGTHENED EARTH WALLS ADJACENT TO ACP

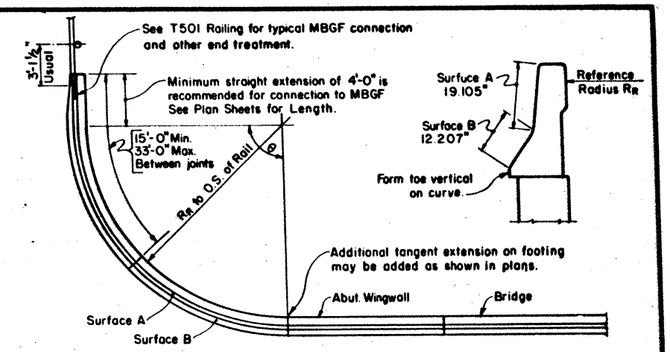
TABLE OF DEVELOPED SURFACES DIMENSIONS FOR Θ = 90°						
Reference Radius R_R to Back of Rail	Radius R_{A1}	Arc Length L_{A1}	Arc Length L_{A2}	Radius R_{B1}	Arc Length L_{B1}	Arc Length L_{B2}
	ft.	ft.	ft.	ft.	ft.	ft.
10'	101.50	16.69	16.95	18.82	16.95	17.87
15'	149.26	24.54	24.81	27.54	24.81	25.72
20'	197.02	32.40	32.66	36.26	32.66	33.58
25'	244.78	40.25	40.51	44.98	40.51	41.43
30'	292.54	48.11	48.37	53.69	48.37	49.28

$R_{A1} = 9.552\ R_R + 5.97$ $\quad R_{B1} = 1.744\ R_R + 1.38$

$L_{A1} = 1.571\ R_R + 0.98$ $\quad L_{B1} = 1.571\ R_R + 1.24$

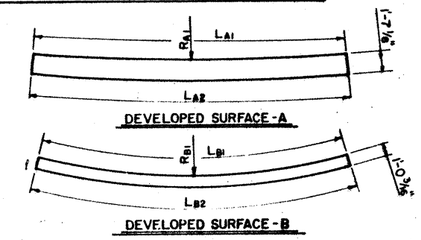
$L_{A2} = 1.571\ R_R + 1.24$ $\quad L_{B2} = 1.571\ R_R + 2.16$

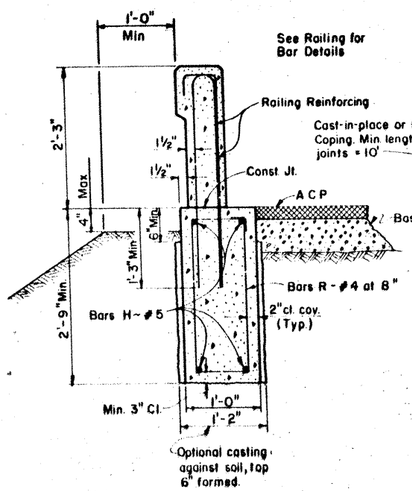
The above arc length dimensions may be linearly ratioed for included Θ angles other than 90°. The dimensions are intended as an aid in constructing forms for curved T501 Railing.



CURVED T501 RAILING AT BRIDGE ENDS

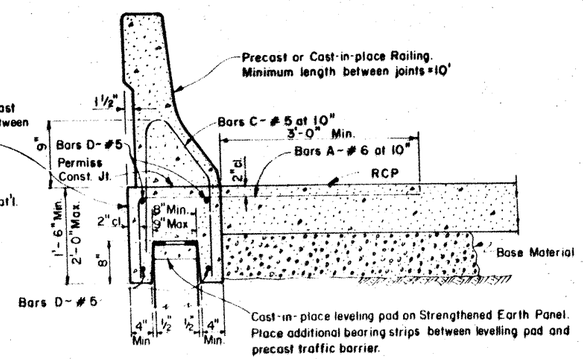
DESIGN NOTE: The curved end treatment at bridge ends should only be used in areas where traffic speed is 40 mph or less.





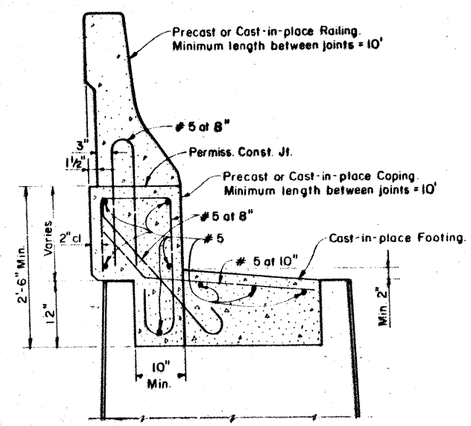
T201, T202 OR C201 RAIL

NOTE: The above footings for T501, T201, or T202 Railing have approx. C.10 C.Y per L.F of Concrete and 10.77 lbs. per L.F of reinforcement.



T501 ON STRENGTHENED EARTH WALLS ADJACENT TO RCP

NOTE: The configurations shown for railing anchorage on strengthened earth walls may be used, or other similar configurations of equivalent strength may be submitted for approval by the Engineer.



T501 ON DOUBLEWAL WALLS

NOTE: The configurations shown for railing on Doublewal walls may be used, or other similar configurations of equivalent strength may be submitted for approval by the Engineer.

Added to Plans 12-18-90

GENERAL NOTES:

The foundations indicated are suitable for mounting typical concrete bridge barrier type railings. The design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper foundations.

The primary use of the curved railing detail is to avoid the necessity of curved MBGF at the ends of bridges adjacent to at grade intersections.

All concrete shall be Class C or better and all reinforcement shall be Grade 60.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

For railing installed on retaining walls, the railing foundation will be considered subsidiary to the Item "Retaining Walls".

Payment for railing foundations will be by CY of Class C Concrete except those copings and/or footings necessary for strengthened earth retaining walls shall be considered subsidiary to the Item "Retaining Walls". The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

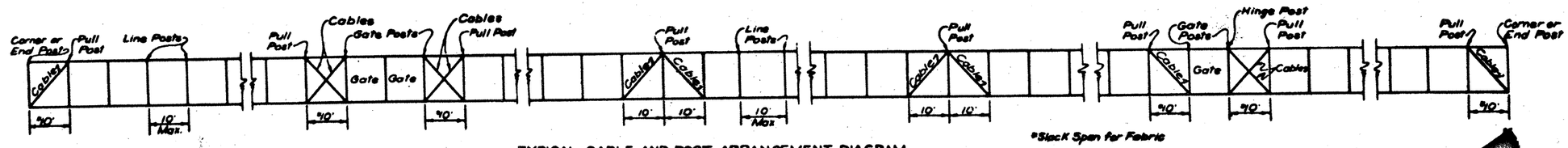
Excavation will be considered subsidiary to other items.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

BRIDGE TRAFFIC RAILING FOUNDATIONS

65 TRF

ORIGINAL DRAWING DATE JUNE 1985		STATE DISTRICT	FEDERAL RESIDEN	FEDERAL AID PROJECT #	SHEET
DN -JJP	REVISIONS	16	6	HES0005(606)	65
CK -MEM	Rev. 8-85 (J.P. R/Added note Rev. 1-86 (Gen. Notes)	COUNTY		CONTROL / SECTION / JOB / HIGHWAY	
DW -FDC	Jan 89 (Payment, Fig)	NUECES		74 6 164	US 181
CK -JJP					



TYPICAL CABLE AND POST ARRANGEMENT DIAGRAM

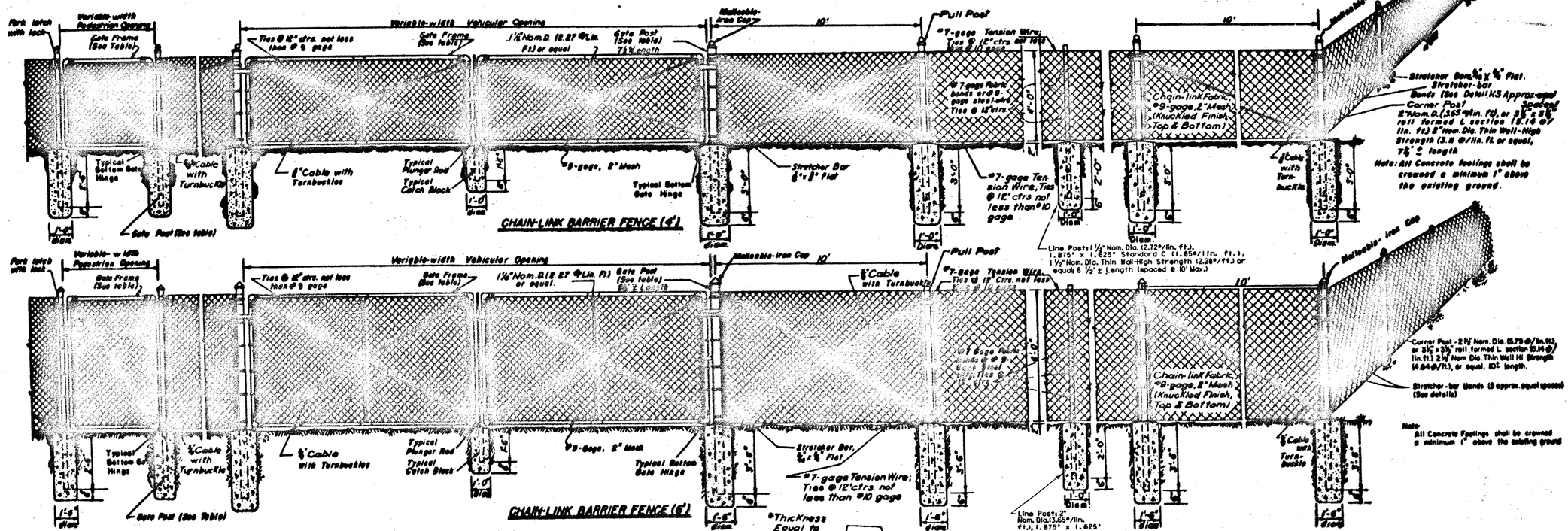


TABLE OF MINIMUM SIZES & WEIGHTS

GATE OPENING TYPE: SINGLE, INCLUSIVE	DOUBLE, INCLUSIVE	GATE FRAME SIZE	GATE FRAME WT./LIN. FT.	GATE POSTS SIZE	GATE POSTS WT./LIN. FT.
UP to 6'	UP to 12'	1½ Nom. D. or Equal	2.72 Lbs.	2½" Nom. D. or equal	5.79 Lbs.
Over 6' to 12'	Over 12' to 24'		2.72 Lbs.	3½" Nom. D. or equal	5.11 Lbs.
Over 12' to 18'	Over 24' to 36'		2.72 Lbs.	4" Nom. D.	10.97 Lbs.
Over 18'	Over 36'		2.72 Lbs.	6" Nom. D.	24.70 Lbs.

GENERAL NOTES

1. TYPICAL INSTALLATION PLAN MAY VARY AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATION OF GATES SHOWN ELSEWHERE ON PLANS.
2. GATE-FRAME MEMBERS SHALL BE BOLTED, AT FRAME CORNERS, TO JOINT FITTINGS WITH FOUR 3/8" BOLTS PER JOINT.
3. ALL CABLE CONNECTIONS ARE TO BE MADE WITH TWO 3/8" CABLE CLAMPS.
4. ALL PULL POSTS AND END POSTS AND THEIR FOUNDATIONS SHALL HAVE THE SAME RESPECTIVE DIMENSIONS AS THOSE SHOWN FOR CORNER POSTS.
5. ALL PULL POSTS SHALL BE FURNISHED WITH TWO STRETCHER BARS.
6. ONE END OF EACH TURNBUCKLE MAY BE ATTACHED DIRECTLY TO FITTINGS WITH A CLEVIS.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

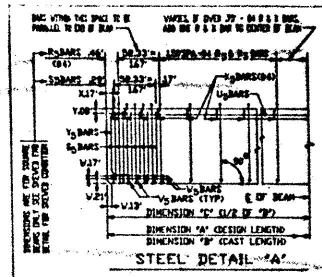
CHAIN-LINK BARRIER FENCE

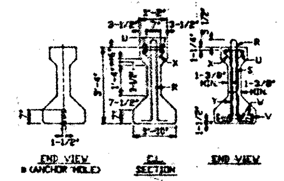
4 AND 6 FOOT HEIGHT

CLF-90 66

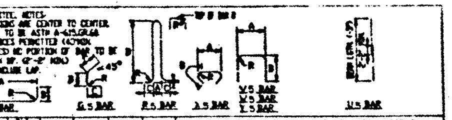
REVISIONS	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
	6	TEXAS	HES 0005 (604)			66
	STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
	16	Nueces		74	6	164	45 181

A-13





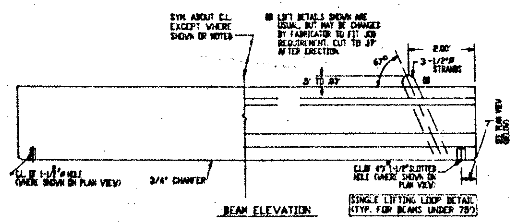
REINFORCING STEEL NOTES:
1. ALL DIMENSIONS ARE CENTER TO CENTER.
2. ALL STEEL TO BE ASTM A-615,GR.60
3. U BAR SPLICES PERMITTED (40"MIN.) C-C SPLICED NO PORTION OF BAR TO BE LESS THAN 10' (2'-2" MIN) DOES NOT INCLUDE LAP.



BEAM MARK		AG-1-3
BAR	SIZE	NO. REQ'D
R5	#4	48
X5	#4	44
S5	#5	24
W5	#5	4
Y5	#6	4
V5	#3	14
G5	#4	29
U5	#5	2

REINFORCING STEEL SCHEDULE & DIMENSIONS

TOTAL	LENGTH	#	A	B	C	D	R
144	8'-3"		3 1/4"	3'-8"	4"		1"
132	1'-9"		11"	6"			1"
72	3'-4"		3'-0"	4 1/2"			3/4"
12	6'-8"		1'-6"	2'-5"			
12	4'-4"		2'-10"	9"			3"
42	2'-3 1/4"		1'-1 1/4"	4"			1"
84	1'-7 1/4"		1'-1"	3 1/4"	3"		1"
6	59'-6"		—STRAIGHT—				



● NOTE:
ANCHOR HOLES MAY BE TAPERED (4 3/4" X 3 3/8" EXP. END) 5/8"Ø FIXED END AT BASE. IF HOLES ARE FORMED WITH SHEET METAL, FORMS MAY BE LEFT IN PLACE. HOLES AT FIXED END MAY EXTEND FULL DEPTH OF BEAM PLUG TOP OF FILL WITH ASPHALT MASTIC AT FABRICATORS OPTION. ALL BEAMS MAY BE FURNISHED WITH ANCHOR HOLES

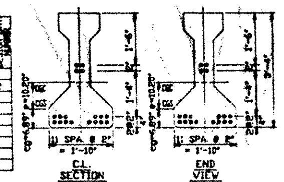
● DENOTES CAST CORRECTION ADDED

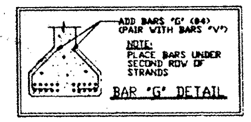
BEAM SCHEDULE & DIMENSIONS

BEAM MARK	NO. REQ'D	BEAM LENGTHS (ALONG CENTERLINE OF BM.) A	B	C	INTERIOR DIAFRAMS CHAINED FROM MARKED END (CAST CORRECTION ADDED) 1	● 1A	2	● 2A	3	● 3A	4	● 4A	PLAN TYPE	REMARKS	
AG-1	1	59.38'	59.41'	29.705'									1		1
AG-2	1	59.67'	59.70'	29.85'									1		2
AG-3	1	59.38'	59.41'	29.705'									1		1

TOT. BMS. 3
TOT. LINEAR FT. 178.43'

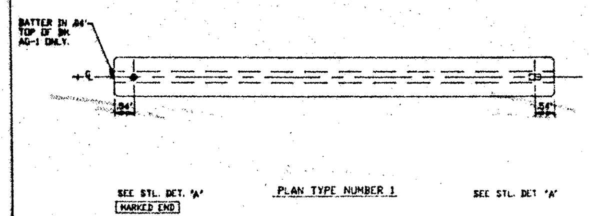
LO-LAX STRANDS





STRAND PATTERN (LO-LAX)	
NUMBER OF STRANDS	18 1/2"Ø 270K @ 31.0K EA.
NUMBER OF STRAIGHT STRANDS	18
~~NUMBER OF DEFLECTED STRANDS~~	
INITIAL LOAD STRAIGHT STRANDS	1000 LBS
~~INITIAL LOAD DEFLECTED STRANDS~~	~~2000 LBS~~
CLASS OF CONCRETE	H OR H*
CONCRETE RELEASE STRENGTH	4000 PSI
CONCRETE DESIGN STRENGTH	5000 PSI
~~UPLIFT AT HOLD-DOWN POINT~~	K

SUBMITTED FOR APPROVAL DATE: 9/4/91
RELEASED FOR FABRICATION DATE:



GENERAL NOTES
1. SPACING OF BARS R & S MAY BE VARIED TO AVOID DIAFRAM HOLES.
2. REINFORCING BARS AND/OR STRANDS MAY COME IN CONTACT WITH MATERIALS USED IN FORMING DIAFRAM HOLES.
3. DIMENSIONS RELATING TO BARS OR STRANDS ARE CENTER TO CENTER.
4. BARS V AND X MAY BE TILTED THEN [illegible] OR SKEWED AS REQUIRED TO MAINTAIN 1" MIN. CONCRETE COVER.
5. STRANDS MAY BE SPREAD TO MISS DIAFRAM HOLES.
6. STRANDS MAY BE RECESSED 1/2" MAX INTO END OF BEAM.
7. BEAM ENDS MAY BE FORMED WITH WOOD.
8. BOTTOM CORNERS OF ALL BEAM FLANGES AND OUTSIDE CORNERS OF EXTERIOR BEAM ENDS SHALL BE CHAMFERED OR ROUNDED TO A 3/4" RADIUS. AT FABRICATORS OPTION ALL VERTICAL EDGES OF ALL BEAMS MAY BE CHAMFERED OR ROUNDED.
9. BEAM MARKS TO BE PLACED ON FIXED END OF AS NOTED.
10. ALL DIMENSIONS MEASURED ALONG BOTTOM OF BEAM @ C.L. UNLESS NOTED OTHERWISE.

●● HAULING OVERHANG		
BEAM MARK	MAX. ONE END	TOTAL BOTH ENDS
ALL BEAMS	7.8'	15.6'

●●FABRICATORS USE ONLY

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
APPROVED
BRIDGE DIVISION
SEP 2 0 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL

FOR ERECTION PLANS SEE SHEET #E-1

BEAM MARK: AG-1-3

"C" BEAM DETAIL
SPAN #1-3
BEAM #1

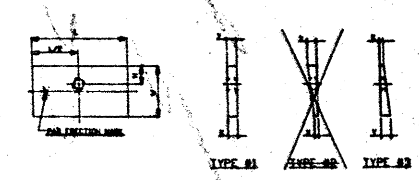
TEXAS CONCRETE COMPANY
P.O. DRAWER 1070 VICTORIA, TEXAS 7790[illegible]

CUSTOMER	HAAS PAVING INC.	DWN. J.H. CHK. J.V.P. DATE 8/3/91
OWNER	S.D.H.P.T.	SHEET NO. D-2016
ENGINEER	S.D.H.P.T.	
STRUCTURE	BELDEN STREET O'PASS. WIDEN	DWG. NO. F-1
LOCATION	NUECES COUNTY	
PROJECT	HES000S(606) CONT.#0074-06-164	JOB NO. 393

ELASTOMERIC PAD SCHEDULE FOR TYPE "C" BEAMS

PAD MARK	NO. REQ'D	L	W	H	R	S	T	Z	●	X	Y	TYPE	COND. NO.	2"Ø HOLE
PH-30	4	19"	9"	4.50"						3"	3"	1	20	APP.
PH-31	2	19"	9"	4.50"						15/16"	1 1/16"	3	20	APP.
TOTAL	6													

CONDITION 20



STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
APPROVED
BRIDGE DIVISION
SEP 2 0 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL

NOTE:
1. ALL PADS TO BE 70 DUROMETERS.
2. PADS TO BE PER T.H.D. STANDARD SPEC. 1982, ITEM 435.

SUBMITTED FOR APPROVAL DATE: 9/4/91
RELEASED FOR FABRICATION DATE:

ELASTOMERIC BEARING PAD SCHEDULE

TEXAS CONCRETE COMPANY
P.O. DRAWER 1070 VICTORIA, TEXAS 77901

CUSTOMER	HAAS PAVING INC.	DWN. J.H. CHK. J.V.P. DATE 8/3/91
OWNER	S.D.H.P.T.	SHEET NO. NP-1
ARCHITECT		
ENGINEER	S.D.H.P.T.	DWG. NO. D-2016
STRUCTURE	BELDEN STREET O'PASS. WIDEN	
LOCATION	NUECES COUNTY	JOB NO. 393
PROJECT	HES000S(606) CONT.#0074-06-164	

SPAN NO.	BEAM TYPE	BEAM NO.	BEAM MARK	NO. REQ'D.	DESIGN LENGTH	1/2"Ø 270K PRESTRESS STRANDS NO.	DEPRESSED NO.	DEPRESSED TO	"e" AT C.L.	"e" AT END	CLASS "H" CONCRETE RELEASE STRENGTH (f'ci)(psi)	DESIGN STRENGTH (f'c)(psi)	DET. SHT. NO.	O.D. SHT. NO.	FAB.	LO-LAX
1	"C"	1	AG-1	1	59.38'	18	—	—	10.20"	10.20"	4000	5000	F-1	1	TCC	APP.
2	"C"	1	AG-2	1	59.67'	18	—	—	10.20"	10.20"	4000	5000	F-1	2	TCC	APP.
3	"C"	1	AG-3	1	59.38'	18	—	—	10.20"	10.20"	4000	5000	F-1	1	TCC	APP.

LEGEND
O.D.-OPTIONAL DESIGN
"e"-ECCENTRICITY

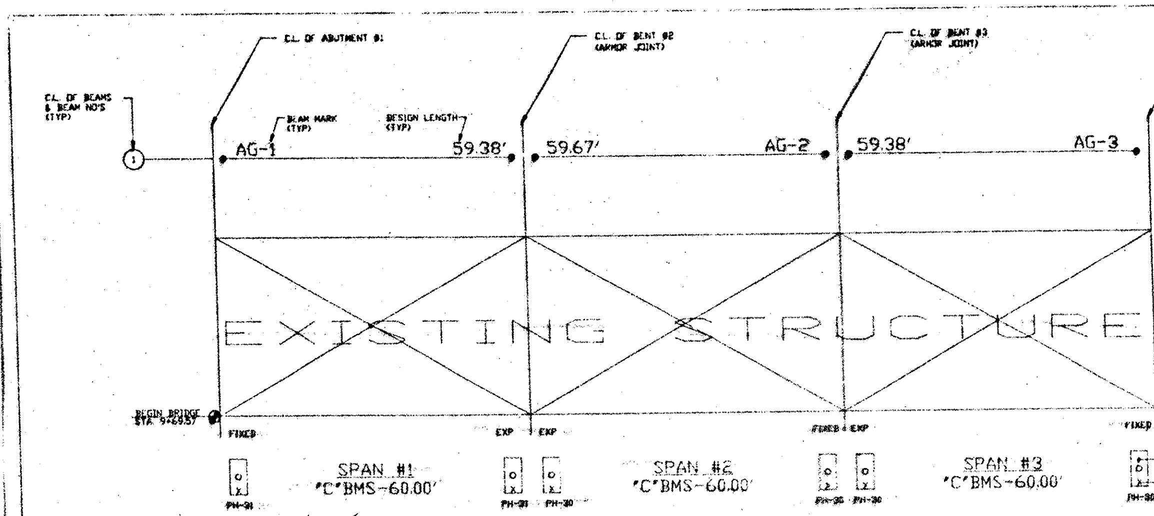
SUBMITTED FOR APPROVAL DATE: 9/4/91
RELEASED FOR FABRICATION DATE:

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
APPROVED
BRIDGE DIVISION
SEP 2 0 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL

BEAM INDEX

TEXAS CONCRETE COMPANY
P.O. DRAWER 1070 VICTORIA, TEXAS 7790[illegible]

CUSTOMER	HAAS PAVING INC.	DWN. J.H. CHK. J.V.P. DATE 9/3/91
OWNER	S.D.H.P.T.	SHEET NO. I-1
ARCHITECT		
ENGINEER	S.D.H.P.T.	DWG. NO. D-2016
STRUCTURE	BELDEN STREET O'PASS. WIDEN	
LOCATION	NUECES COUNTY	JOB NO. 393
PROJECT	[illegible]	



.635' ÷ 59.58 = .0108'/Ft.

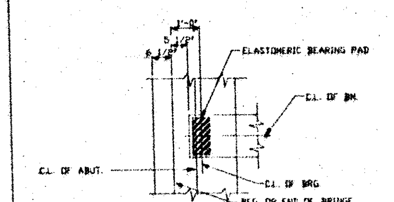
BELDEN STREET OVERPASS WIDENING

NOTE:
CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD.

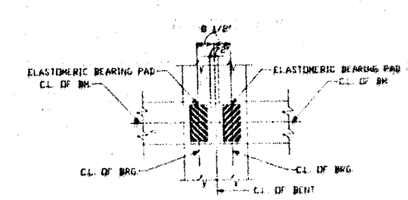
GENERAL NOTES:
1. MARKED END OF BEAMS TO BE PLACED AS SHOWN.
2. FOR ELASTOMERIC BEARING PAD NOTES & DETAILS, SEE SHT. NP-1
3. FOR FABRICATION DETAILS, SEE SHT. F-1
4. ● -- INDICATES LOCATION OF ANCHOR PINS IN CAPS.

TOTAL LINEAR FT.-"C"BMS-178.43'

CONTRACTOR'S OPTIONS	
END DIAFRAM: NONE	SLAB OPTION: NONE
INT. DIAFRAM: NONE	INSERTS: NONE



ABUTMENT DETAIL
(TYP. ABUT. #1; OPP HAND ABUT. #4)



BENT DETAIL
(TYP. BENTS #2&3)

S-1

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
APPROVED
BRIDGE DIVISION
SEP 26, 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL

SUBMITTED FOR APPROVAL DATE: 9/4/91
RELEASED FOR FABRICATION DATE:

ERECTION PLAN
SHT. 1 OF 1

TEXAS CONCRETE COMPANY
P.O. DRAWER 1070 VICTORIA, TEXAS 7790[illegible]

CUSTOMER	HAAS PAVING INC.	DWN. J.H. CHK. J.V.P. DATE 9/3/91
OWNER	S.D.H.P.T.	SHEET NO. E-1
ARCHITECT		
ENGINEER	S.D.H.P.T.	DWG. NO. D-2016
STRUCTURE	BELDEN STREET O'PASS. WIDENING	
LOCATION	NUECES COUNTY	JOB NO. 393
PROJECT	HES000S(606) CONT.#0074-06-164	

TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
PSTRS14 PRESTRESSED CONCRETE BEAM DESIGN/ANALYSIS - 224179 VER 3.0 MAR 90

PSF NO	COUNTY	HIGHWAY NO	CONTROL-SECTION-JOB	CODED BY	DATE
1	NUECES	U. S. 181	0074-06-164		AUG 30, 1991

BELDEN STREET O'PASS
O.D.#2 SPAN NO. 2 BM. 1

INPUT DATA SUBMITTED

BEAM TYPE	SPAN LENGTH C-C BRNG (FT)	BEAM SPAC (FT)	SLAB THICKNESS (IN)	RELATIVE HUMIDITY (PERCENT)
C	58.58	7.63	7.50	75.

CENTERLINE DESIGN STRESSES TOP (PSI)	BOTTOM (PSI)	REQUIRED ULTIMATE MOMENT (K-FT)	BEAM CONCRETE STRENGTHS RELEASE (PSI)	28-DAY (PSI)
1875.	-2301.	2196.	4000.	5000.

PRESTRESSING STRANDS SIZE (IN)	TYPE	STRENGTH (KSI)	MODULUS OF ELASTICITY BEAM (KSI)	SLAB (KSI)	SLAB 28-DAY CONCRETE STRENGTH (PSI)	LIVE LOAD
1/2*	LO-RLX*	270.*	5000.	5000.	3600.*	HS20*

CENTERLINE STRAND PATTERN — STRANDS PER ROW / DIST. FROM BEAM BOT. (IN)
8 6 2 2 0 0 0 0 0 0 0 0 0 0 0 0
2.0 4.0 20.0 22.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
COMPUTED CL ECCENTRICITY = 10.20 IN NO. OF STRANDS = 18

END STRAND PATTERN — STRANDS PER ROW / DIST. FROM BEAM BOT. (IN)
8 6 2 2 0 0 0 0 0 0 0 0 0 0 0 0
2.0 4.0 20.0 22.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
COMPUTED END ECCENTRICITY = 10.20 IN

ORIGINAL DESIGNED BEAM AS SHOWN ON CONTRACT PLANS:
NO. OF STRANDS = 16 END ECCENTRICITY = 10.84 CENTERLINE ECCENTRICITY = 14.34
STRAND SIZE = 1/2 IN* STRAND TYPE = LO-RLX STRAND STRENGTH = 270. KSI*

COMPUTED RESULTS

	RELEASE END	RELEASE HOLD-DOWN	RELEASE CL	FINAL END	FINAL CL
BEAM TOP FIBER STRESS (PSI) =	-425.	290.	311.	-379.	1496.
BEAM BOT FIBER STRESS (PSI) =	2171.	1637.	1621.	1934.	-367.
CONC STRENGTH, REQ'D. (PSI) =	4000.@	4000.	4000.		5000.@

BEAM ALLOWABLE TENSION (PSI) = -474. (RELEASE) -424. (FINAL)
BEAM ALLOWABLE COMPRESSION (PSI) = 2400. (RELEASE) 2000. (FINAL)
ULTIMATE MOMENT PROVIDED (K-FT) = 2369.

*** BEAM SATISFIES ALL DESIGN REQUIREMENTS ***
WARNING: RATIO OF INPUT BEAM TOP FIBER STRESS TO CALCULATED TOTAL EXTERNAL LOAD TOP FIBER STRESS = 0.95238

MAXIMUM CAMBER, ORIGINAL DESIGN (FT) = 0.098 UPWARD IS POSITIVE
MAXIMUM CAMBER, (FT) = 0.077 UPWARD IS POSITIVE

.021

4 (-)

TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
PSTRS14 PRESTRESSED CONCRETE BEAM DESIGN/ANALYSIS - 224179 VER 3.0 MAR 90

PSF NO	COUNTY	HIGHWAY NO	CONTROL-SECTION-JOB	CODED BY	DATE
1	NUECES	U. S. 181	0074-06-164		AUG 30, 1991

BELDEN STREET O'PASS
O.D.#1 SPANS NO. 1 & 3 BM. NO. 1

INPUT DATA SUBMITTED

BEAM TYPE	SPAN LENGTH C-C BRNG (FT)	BEAM SPAC (FT)	SLAB THICKNESS (IN)	RELATIVE HUMIDITY (PERCENT)
C	58.30	7.63	7.50	75.

CENTERLINE DESIGN STRESSES TOP (PSI)	BOTTOM (PSI)	REQUIRED ULTIMATE MOMENT (K-FT)	BEAM CONCRETE STRENGTHS RELEASE (PSI)	28-DAY (PSI)
1994.	-2384.	2233.	4000.	5000.

PRESTRESSING STRANDS SIZE (IN)	TYPE	STRENGTH (KSI)	MODULUS OF ELASTICITY BEAM (KSI)	SLAB (KSI)	SLAB 28-DAY CONCRETE STRENGTH (PSI)	LIVE LOAD
1/2*	LO-RLX*	270.*	5000.	5000.	3600.*	HS20*

CENTERLINE STRAND PATTERN — STRANDS PER ROW / DIST. FROM BEAM BOT. (IN)
8 6 2 2 0 0 0 0 0 0 0 0 0 0 0 0
2.0 4.0 20.0 22.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
COMPUTED CL ECCENTRICITY = 10.20 IN NO. OF STRANDS = 18

END STRAND PATTERN — STRANDS PER ROW / DIST. FROM BEAM BOT. (IN)
8 6 2 2 0 0 0 0 0 0 0 0 0 0 0 0
2.0 4.0 20.0 22.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
COMPUTED END ECCENTRICITY = 10.20 IN

ORIGINAL DESIGNED BEAM AS SHOWN ON CONTRACT PLANS:
NO. OF STRANDS = 16 END ECCENTRICITY = 10.84 CENTERLINE ECCENTRICITY = 14.34
STRAND SIZE = 1/2 IN* STRAND TYPE = LO-RLX STRAND STRENGTH = 270. KSI*

COMPUTED RESULTS

	RELEASE END	RELEASE HOLD-DOWN	RELEASE CL	FINAL END	FINAL CL
BEAM TOP FIBER STRESS (PSI) =	-425.	283.	304.	-378.	1616.
BEAM BOT FIBER STRESS (PSI) =	2170.	1643.	1627.	1933.	-451.
CONC STRENGTH, REQ'D. (PSI) =	4000.@	4000.	4000.		~~5067.@~~

BEAM ALLOWABLE TENSION (PSI) = -474. (RELEASE) -424. (FINAL)
BEAM ALLOWABLE COMPRESSION (PSI) = 2400. (RELEASE) 2000. (FINAL)
ULTIMATE MOMENT PROVIDED (K-FT) = 2369.

*** BEAM DOES NOT SATISFY DESIGN REQUIREMENTS ***
1- FINAL BOTTOM FIBER TENSION AT CL IS HIGH.
2- RATIO OF INPUT F' C TO CALCULATED REQ' D. F' C = 0.88386

MAXIMUM CAMBER, ORIGINAL DESIGN (FT) = 0.098 UPWARD IS POSITIVE
MAXIMUM CAMBER, (FT) = 0.076 UPWARD IS POSITIVE

0.022 OK

M.L.R.

PLEASE REVIEW

THANKS,

MJ.

9-3-91 OK mjr

Optional Design No. OD- 2
Project No.: HES 0006(606)
Contractor: Hess Paving, Inc.
Fabricator: Texas Concrete Co.
Plan Sheet No.: 53

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
PRESTRESSED CONCRETE OPTIONAL DESIGN
STANDARD I BEAM SECTION
(DRAPED OR STRAIGHT STRAND PATTERN)

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
APPROVED
BRIDGE DIVISION
SEP 03 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OR HIS RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

RESERVE THIS SPACE FOR APPROVAL STAMP
Reason for Rejection

SHOP PLAN FILE NO. P-2785-A | COUNTY NUECES | HIGHWAY NO. US 181 | CONTROL-SECTION-JOB 0074-06-164
BELDEN ST. O'PASS
PROB 0.0.#1 SPANS 1 & 3 BM. 1

Beam Code BEAMF — BEAM TYPE C | SPAN LENGTH C-C BRG. (FT.) 58.58 | BEAM SPAC. (FT.) 7.63 | SLAB THICKNESS (IN.) 7.50 | RELATIVE HUMIDITY 75
60.00 / -1.42 / 58.58

Analysis Card ANLY — C.L. DESIGN STRESS (PSI) TOP (fct) 1875 BOTTOM (fcb) -2301 | REQUIRED ULTIMATE MOMENT (kip-ft.) 2196 | FABRICATOR'S CONCRETE STRENGTH (PSI) RELEASE 4000 28-DAY 5000

Strand Card STRD — STRAND SIZE (in.) 1/2 | L R (Low-Relaxation) S R (Stress-Relieved) LR | STRAND ULTIMATE STRENGTH (ksi) 270

Material Card MATL — MOD. OF ELASTICITY OF BEAM (ksi) 5000. | MOD. OF ELASTICITY OF SLAB (ksi) 5000. | SLAB 28-DAY CONC. STRENGTH (PSI) 3600

Specifications Card SPEC — LIVE LOAD TYPE HS20

Centerline Strand Pattern Card STPR LOCR — STRANDS PER ROW — CL 18 — 8 6 2 2 / 2 2 20 22 — (Dist. from bottom, in.) 10 20

End Strand Pattern Card STPR LOCR — STRANDS PER ROW — ED 18 — 8 6 2 2 / 2 2 20 22 — (Dist. from bottom, in.) 10 20

Transformed Steel Card TRNF — BARS U — AREA (sq.in.) DIST. FROM BOTTOM (in.) — 1 18

Original Beam Camber Card ACAM — NO. OF STRANDS 16 | END ECCENTRICITY (in.) 10.84 | C.L. ECCENTRICITY (in.) 14.34 | STRAND SIZE (in.) 1/2 | L R (Low-Relaxation) S R (Stress-Relieved) LR | STRAND ULTIMATE STRENGTH (ksi) 270

Form 1110-A March 1990

MAH

TEXAS CONCRETE COMPANY

POST OFFICE DRAWER - 1070
VICTORIA, TEXAS 77901
Phone (512) 573-9145

DATE: 9/27/91 | JOB NO. 393
ATTENTION: Mr. Luiz Ybanez D-5
RE: Nueces Co.
Project HES 0006(606)
Control 0074-06-164

P-2785-A
LET 7/91

TO: Mr. Arnold W. Oliver
State Dept. of Highways & Public Transp.
11th And Brazos Streets
Austin, Texas 78701

Gentlemen: We are forwarding ☒ attached ☐ under separate cover via ____ the following items:
☒ Shop Drawings ☐ Prints ☐ Specification
☐ Copy of Letter ☐ Plans ☐ ____

COPIES	DATE	DWG. NO.	SHEET NO.	DESCRIPTION
1			OD1-2	Optional Designs

These are transmitted as checked below:
☒ For Approval ☐ As Built Drawings ☐ For Your Files
☐ Final Approval ☐ Plans for Deposit Refund of ____ ☐ Setting & Erection
☐ For Your Use ☐ For Review & Comments ☐ Descriptive Literature Requested

REMARKS:

RECEIVED
AUG 30 1991
BRIDGE DIVISION

C. C. TO:

SIGNED Burson Patton

September 3, 1991

D-5
Shop Plan File: P-2785-A
Your Job: 393

County: Nueces
Control: 0074-06-164
Project: HES 0006(606)
Highway: US 181
Structure: Belden Street O'Pass

Texas Concrete Company, Inc.
P. O. Drawer 1070
Victoria, TX 77902-1070

Attention: Mr. Burson Patton

Gentlemen:

We are returning herewith your Optional Design Data, O.D. Nos. 1 through 2, approved for preparation of shop drawings.

Sincerely,

Original Signed For
Luis Ybanez, P.E.

Luis Ybanez, P.E.
Bridge Engineer

MAH
MHiow
Attach.

cc: Corpus Christi District (Dist. 16)

O.D.#1 & 2

S-2

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt

PANEL MARK	3A-30	3A-31	3A-32	3A-33	3A-34	3A-35	3A-36	3A-37	3A-38	3A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN. WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	9.00	9.30	9.60	9.90	10.20	10.50	10.80	11.10	11.40	11.70
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt

PANEL MARK	3A-40	3A-41	3A-42	3A-43	3A-44	3A-45	3A-46	3A-47	3A-48	3A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN. WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	12.00	12.30	12.60	12.90	13.20	13.50	13.80	14.10	14.40	14.70
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt

PANEL MARK	3A-50	3A-51	3A-52	3A-53	3A-54	3A-55	3A-56	3A-57	3A-58	3A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN. WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	15.00	15.30	15.60	15.90	16.20	16.50	16.80	17.10	17.40	17.70
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 147 SqFt

PANEL MARK	3A-60			3A-63						
NO. REQ'D	8			3						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN. WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	18.00	18.30	18.60	18.90	19.20	19.50	19.80	20.10	20.40	20.70
AREA (SqFt)	90			57						

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 445 SqFt

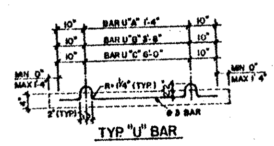
PANEL MARK									3A-78	
NO. REQ'D									19	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN. WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	21.00	21.30	21.60	21.90	22.20	22.50	22.80	23.10	23.40	23.70
AREA (SqFt)									445	

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt

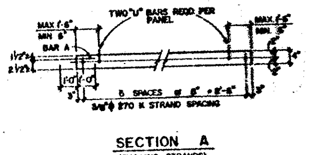
PANEL MARK	3A-80	3A-81	3A-82	3A-83	3A-84	3A-85	3A-86	3A-87	3A-88	3A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN. WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	24.00	24.30	24.60	24.90	25.20	25.50	25.80	26.10	26.40	26.70
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt

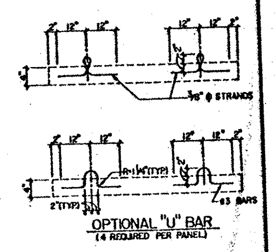
PANEL MARK	3A-90	3A-91	3A-92	3A-93	3A-94	3A-95	3A-96	3A-97	3A-98	3A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN. WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	27.00	27.30	27.60	27.90	28.20	28.50	28.80	29.10	29.40	29.70
AREA (SqFt)										



TYP. "U" BAR

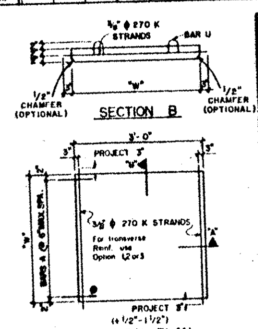


SECTION A (SHOWING STRANDS)



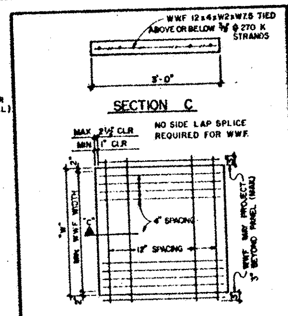
OPTIONAL "U" BAR (4 REQUIRED PER PANEL)

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.



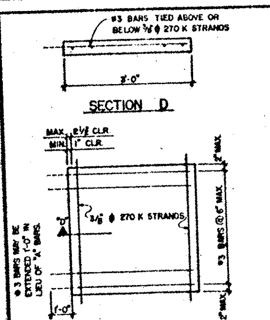
SECTION B

TYPICAL PLAN



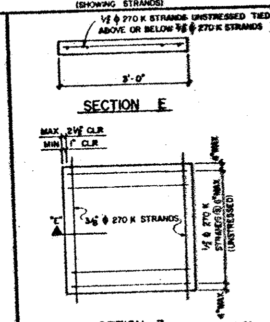
SECTION C

OPTION 1 (TRANSVERSE REINF.)



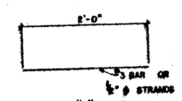
SECTION D

OPTION 2 (TRANSVERSE REINF.)



SECTION E

OPTION 3 (TRANSVERSE REINF.)



TYP. "A" BAR

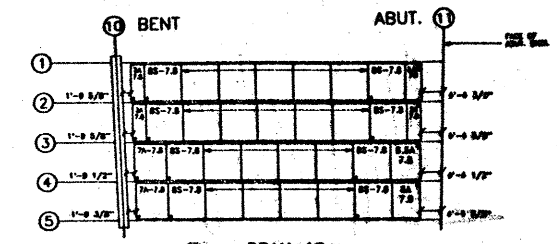
INITIAL FORCE: 2,000 # @ STRAND
6 3/8" ϕ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 592 SqFt.

GIFFORD–HILL PRESTRESS CO., INC.
VICTORIA, TEXAS
CONTRACTOR: HELDENFELS BROS., INC.

FED. RD. DIV. NO.	STATE	PROJECT NO.	HWY. NO.
6	TEXAS	HES 0005(607)	S.H. 358 etc.
STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO.	JOB NO.
16	NUECES	617 / 01	123

DRAWN: D.M. · CHECK: R.S.M. · DATE: 11/15/91 · SHEET: FP-1
JOB NO. 0072 · 91-080H · 3A-FAB SHEET



SPAN 10

AYERS STREET & RAMP F
OVERPASS WIDENING

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

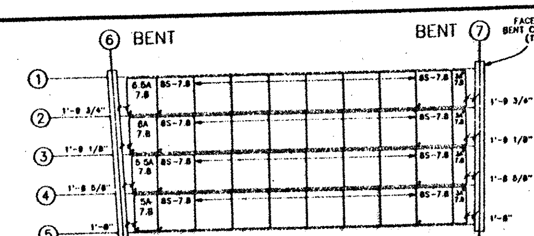
NOTE
1. ALL DIMENSIONS SHOWN ARE ON A HORIZONTAL PLANE.
2. ALL DIMENSIONS SHOWN ARE MEASURED FROM CENTERLINE OF BENT OR FACE OF ABUTMENT BACKWALL OR FACE OF I.T. BENT CAP BACKWALL, ALONG CENTERLINE OF BEAM.

● DENOTES ERECTION MARK

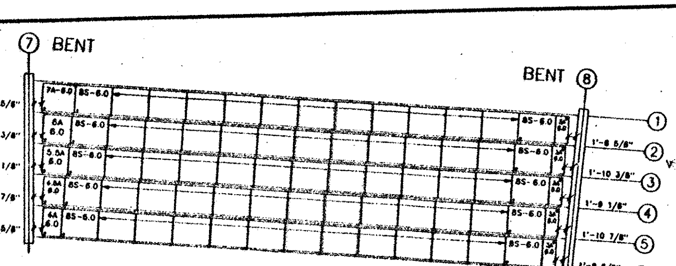
GIFFORD–HILL PRESTRESS CO., INC.
CONTRACTOR: HELDENFELS BROS., INC.
CONTRACTORS OPTIONS: END DIAFRAM: E.D.O. #2 · INTERIOR DIAFRAM: N/A · SLAB: PANELS

FED. RD. DIV. NO.	STATE	PROJECT NO.	HWY. NO.
6	TEXAS	HES 0005(607)	S.H. 358
STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO.	JOB NO.
16	NUECES	617 / 01	123

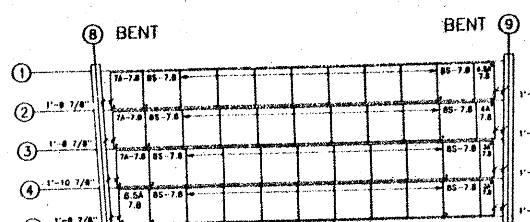
COPYRIGHT 1989 BY ΣΣΛ STRUCTURAL ENGINEERING ASSOCIATES, INC. CONSULTING ENGINEERS, SAN ANTONIO, TEXAS
JOB NO. 0072 · DRAWN D.M. · CHECKED R.S.M. · DATE 11/1/91 · SHEET NO. EP-3
SEA JOB NO. 91-080H · ERECTION SHEET



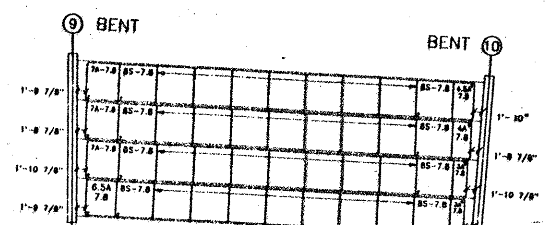
SPAN 6



SPAN 7



SPAN 8



SPAN 9

AYERS STREET & RAMP F
OVERPASS WIDENING

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

NOTE
1. ALL DIMENSIONS SHOWN ARE ON A HORIZONTAL PLANE.
2. ALL DIMENSIONS SHOWN ARE MEASURED FROM CENTERLINE OF BENT OR FACE OF ABUTMENT BACKWALL OR FACE OF I.T. BENT CAP BACKWALL, ALONG CENTERLINE OF BEAM.

● DENOTES ERECTION MARK

GIFFORD–HILL PRESTRESS CO., INC.
CONTRACTOR: HELDENFELS BROS., INC.
CONTRACTORS OPTIONS: END DIAFRAM: E.D.O. #2 · INTERIOR DIAFRAM: N/A · SLAB: PANELS

FED. RD. DIV. NO.	STATE	PROJECT NO.	HWY. NO.
6	TEXAS	HES 0005(607)	S.H. 358
STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO.	JOB NO.
16	NUECES	617 / 01	123

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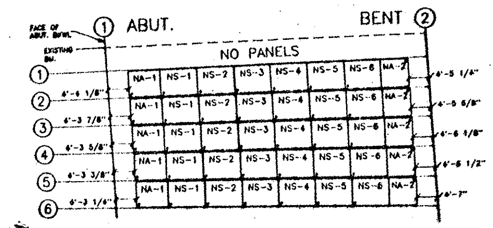
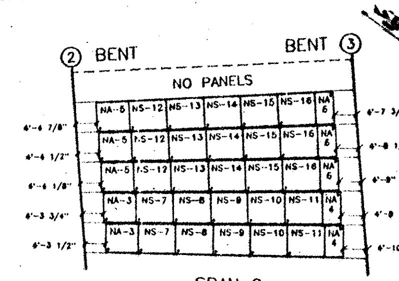
JOB NO. 0072 · DRAWN D.M. · CHECKED R.S.M. · DATE 11/1/91 · SHEET NO. EP-2
SEA JOB NO. 91-080H · ERECTION SHEET



SPAN 1



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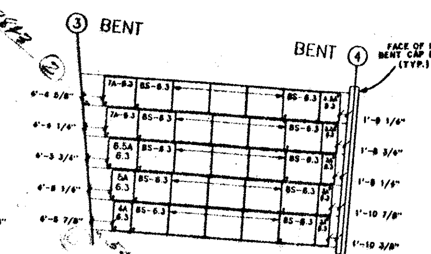

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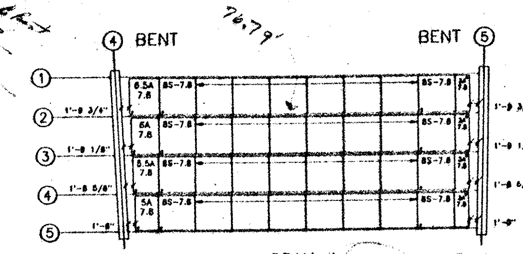

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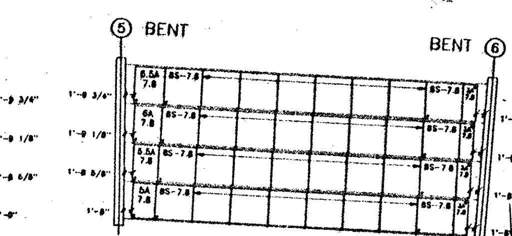

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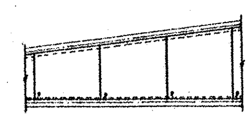
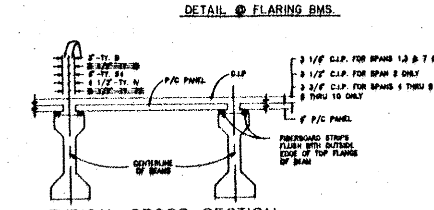
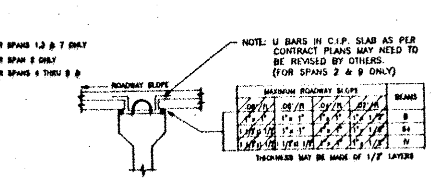

DETAIL @ FLARING BMS.



TYPICAL CROSS SECTION



FIBERBOARD DIMENSIONS

AYERS STREET & RAMP F
OVERPASS WIDENING

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~ MH
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

83

NOTE
1. ALL DIMENSIONS SHOWN ARE ON A HORIZONTAL PLANE.
2. ALL DIMENSIONS SHOWN ARE MEASURED FROM CENTERLINE OF BENT OR FACE OF ABUTMENT BACKWALL OR FACE OF I.T. BENT CAP BACKWALL, ALONG CENTERLINE OF BEAM.

● DENOTES ERECTION MARK

△ REVISED 11/15/91 SPANS 1 & 2

TOTAL PANEL AREA OF THIS PROJECT 22,217 Sq. Ft.

GIFFORD–HILL PRESTRESS CO., INC.
CONTRACTOR: HELDENFELS BROS., INC.
CONTRACTORS OPTIONS: END DIAFRAM: E.D.O. #2 · INTERIOR DIAFRAM: N/A · SLAB: PANELS

FED. RD. DIV. NO.	STATE	PROJECT NO.	HWY. NO.
6	TEXAS	HES 0005(607)	S.H. 358
STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO.	JOB NO.
16	NUECES	617 / 01	123

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JOB NO. 0072 · DRAWN L.I.A. · CHECKED R.S.M. · DATE 11/15/91 · SHEET NO. EP-1
SEA JOB NO. 91-080H · ERECTION SHEET

5A-FAB SHEET (FP-5)

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	5A-30	5A-31	5A-32	5A-33	5A-34	5A-35	5A-36	5A-37	5A-38	5A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	15.00#	15.50#	16.00#	16.50#	17.00#	17.50#	18.00#	18.50#	19.00#	19.50#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	5A-40	5A-41	5A-42	5A-43	5A-44	5A-45	5A-46	5A-47	5A-48	5A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	20.00#	20.50#	21.00#	21.50#	22.00#	22.50#	23.00#	23.50#	24.00#	24.50#
AREA (SqFt)										

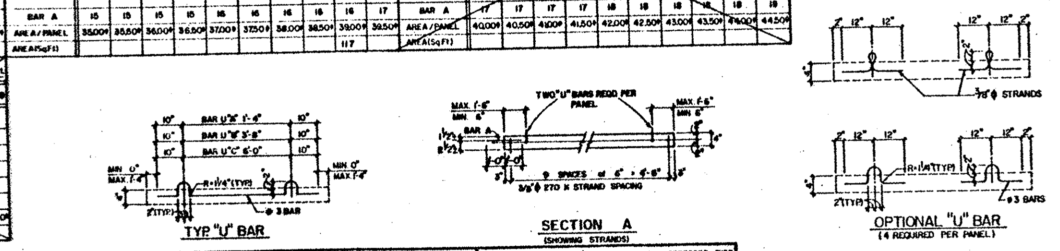
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	5A-50	5A-51	5A-52	5A-53	5A-54	5A-55	5A-56	5A-57	5A-58	5A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	25.00#	25.50#	26.00#	26.50#	27.00#	27.50#	28.00#	28.50#	29.00#	29.50#
AREA (SqFt)										

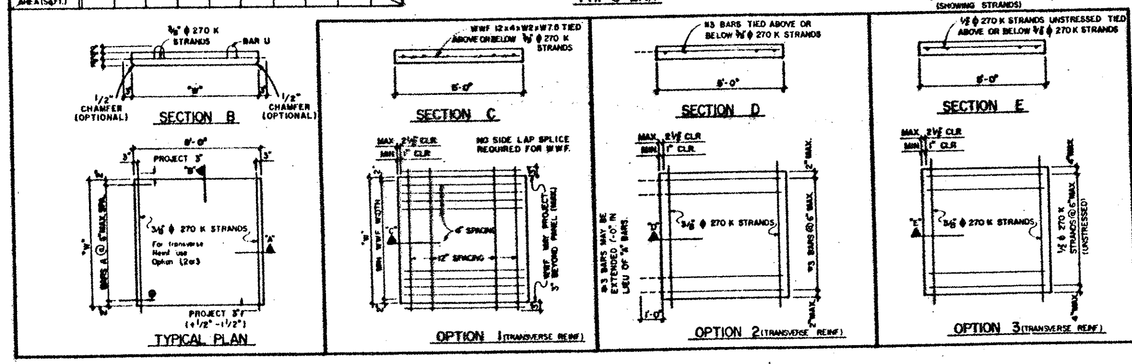
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 32 SqFt										
PANEL MARK				5A-63						
NO. REQ'D				1						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	30.00#	30.50#	31.00#	31.50#	32.00#	32.50#	33.00#	33.50#	34.00#	34.50#
AREA (SqFt)				32						

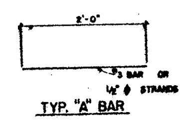
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 117 SqFt										
PANEL MARK									5A-78	
NO. REQ'D									3	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	35.00#	35.50#	36.00#	36.50#	37.00#	37.50#	38.00#	38.50#	39.00#	39.50#
AREA (SqFt)									117	

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	5A-80	5A-81	5A-82	5A-83	5A-84	5A-85	5A-86	5A-87	5A-88	5A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	40.00#	40.50#	41.00#	41.50#	42.00#	42.50#	43.00#	43.50#	44.00#	44.50#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	5A-90	5A-91	5A-92	5A-93	5A-94	5A-95	5A-96	5A-97	5A-98	5A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	45.00#	45.50#	46.00#	46.50#	47.00#	47.50#	48.00#	48.50#	49.00#	49.50#
AREA (SqFt)										







TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

INITIAL FORCE: 2,000# @ STRAND
10 3/8" φ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 149 SqFt

GIFFORD-HILL PRESTRESS CO., INC. VICTORIA, TEXAS
CONTRACTOR HELDENFELS BROS. INC.
STATE: TEXAS | PROJECT NO. HES 0005(607) | HWY NO. SH 358 etc.
COUNTY: NUECES | CONTROL 617 | SECTION 01 | JOB 123
DRAWN D.M. | CHECK R.S.M. | DATE 11/1/90 | SHEET FP-5
JOB NO. 0072 | 5A-FAB SHEET
91-080H

45A-FAB SHEET (FP-4)

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	45A-30	45A-31	45A-32	45A-33	45A-34	45A-35	45A-36	45A-37	45A-38	45A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	13.50#	13.95#	14.40#	14.85#	15.30#	15.75#	16.20#	16.65#	17.10#	17.55#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	45A-40	45A-41	45A-42	45A-43	45A-44	45A-45	45A-46	45A-47	45A-48	45A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	18.00#	18.45#	18.90#	19.35#	19.80#	20.25#	20.70#	21.15#	21.60#	22.05#
AREA (SqFt)										

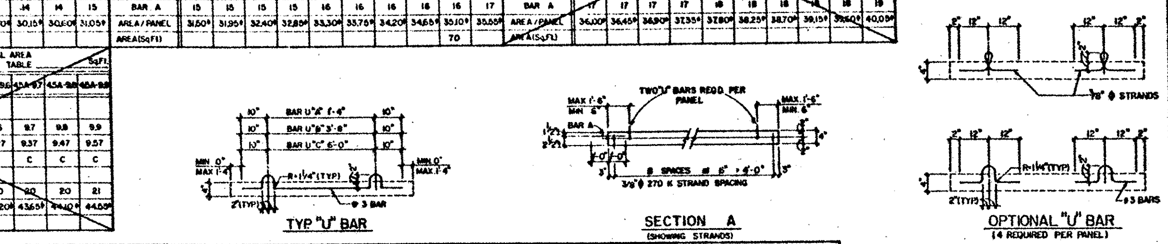
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	45A-50	45A-51	45A-52	45A-53	45A-54	45A-55	45A-56	45A-57	45A-58	45A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	22.50#	22.95#	23.40#	23.85#	24.30#	24.75#	25.20#	25.65#	26.10#	26.55#
AREA (SqFt)										

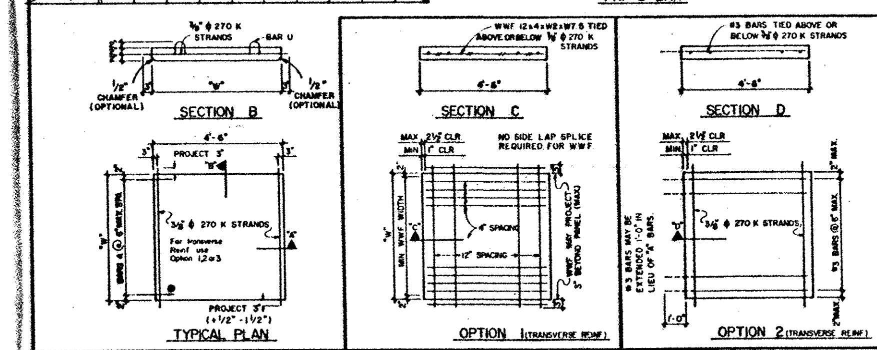
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 55 SqFt										
PANEL MARK	45A-60			45A-63						
NO. REQ'D	1			1						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	27.00#	27.45#	27.90#	28.35#	28.80#	29.25#	29.70#	30.15#	30.60#	31.05#
AREA (SqFt)	27			28						

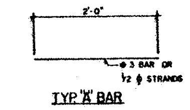
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 70 SqFt										
PANEL MARK									45A-78	
NO. REQ'D									2	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	31.50#	31.95#	32.40#	32.85#	33.30#	33.75#	34.20#	34.65#	35.10#	35.55#
AREA (SqFt)									70	

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	45A-80	45A-81	45A-82	45A-83	45A-84	45A-85	45A-86	45A-87	45A-88	45A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	36.00#	36.45#	36.90#	37.35#	37.80#	38.25#	38.70#	39.15#	39.60#	40.05#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	45A-90	45A-91	45A-92	45A-93	45A-94	45A-95	45A-96	45A-97	45A-98	45A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	40.50#	40.95#	41.40#	41.85#	42.30#	42.75#	43.20#	43.65#	44.10#	44.55#
AREA (SqFt)										







TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

INITIAL FORCE: 2,000# @ STRAND
9 3/8" φ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 125 SqFt

GIFFORD-HILL PRESTRESS CO., INC. VICTORIA, TEXAS
CONTRACTOR HELDENFELS BROS. INC.
STATE: TEXAS | PROJECT NO. HES 0005(607) | HWY NO. SH 358 etc.
COUNTY: NUECES | CONTROL 617 | SECTION 01 | JOB 123
DRAWN D.M. | CHECK R.S.M. | DATE 11/1/90 | SHEET FP-4
JOB NO. 0072 | 45A-FAB SHEET
91-080H

4A-FAB SHEET (FP-3)

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	4A-30	4A-31	4A-32	4A-33	4A-34	4A-35	4A-36	4A-37	4A-38	4A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	12.00#	12.40#	12.80#	13.20#	13.60#	14.00#	14.40#	14.80#	15.20#	15.60#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	4A-40	4A-41	4A-42	4A-43	4A-44	4A-45	4A-46	4A-47	4A-48	4A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	16.00#	16.40#	16.80#	17.20#	17.60#	18.00#	18.40#	18.80#	19.20#	19.60#
AREA (SqFt)										

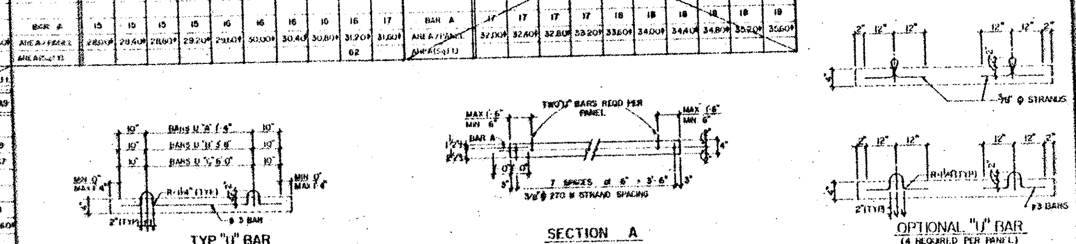
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	4A-50	4A-51	4A-52	4A-53	4A-54	4A-55	4A-56	4A-57	4A-58	4A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	20.00#	20.40#	20.80#	21.20#	21.60#	22.00#	22.40#	22.80#	23.20#	23.60#
AREA (SqFt)										

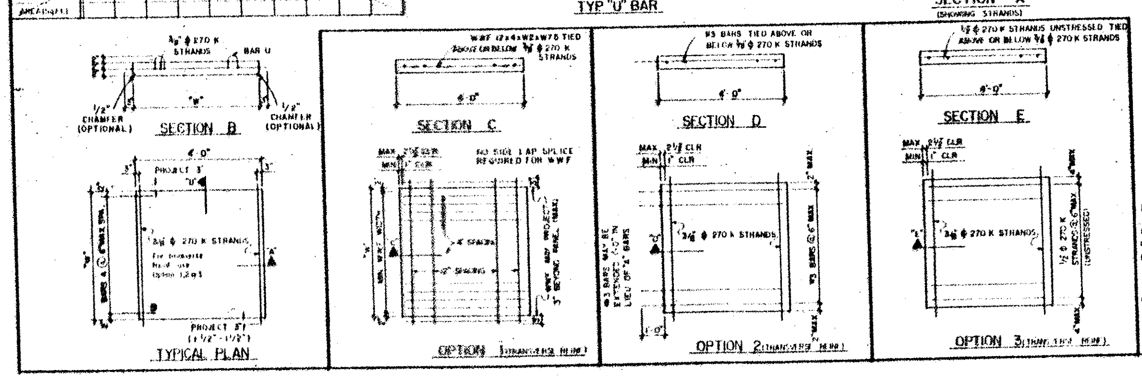
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 49 SqFt										
PANEL MARK	4A-60			4A-63						
NO. REQ'D	1			1						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	24.00#	24.40#	24.80#	25.20#	25.60#	26.00#	26.40#	26.80#	27.20#	27.60#
AREA (SqFt)	24			25						

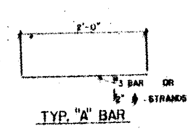
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 62 SqFt										
PANEL MARK									4A-78	
NO. REQ'D									2	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	28.00#	28.40#	28.80#	29.20#	29.60#	30.00#	30.40#	30.80#	31.20#	31.60#
AREA (SqFt)									62	

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	4A-80	4A-81	4A-82	4A-83	4A-84	4A-85	4A-86	4A-87	4A-88	4A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	32.00#	32.40#	32.80#	33.20#	33.60#	34.00#	34.40#	34.80#	35.20#	35.60#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	4A-90	4A-91	4A-92	4A-93	4A-94	4A-95	4A-96	4A-97	4A-98	4A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	36.00#	36.40#	36.80#	37.20#	37.60#	38.00#	38.40#	38.80#	39.20#	39.60#
AREA (SqFt)										







TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

INITIAL FORCE: 2,000# @ STRAND
8 3/8" φ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 111 SqFt

GIFFORD-HILL PRESTRESS CO., INC. VICTORIA, TEXAS
CONTRACTOR HELDENFELS BROS. INC.
STATE: TEXAS | PROJECT NO. HES 0005(607) | HWY NO. SH 358 etc.
COUNTY: NUECES | CONTROL 617 | SECTION 01 | JOB 123
DRAWN D.M. | CHECK R.S.M. | DATE 11/1/90 | SHEET FP-3
JOB NO. 0072 | 4A-FAB SHEET
91-080H

35A-FAB SHEET (FP-2)

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	35A-30	35A-31	35A-32	35A-33	35A-34	35A-35	35A-36	35A-37	35A-38	35A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	10.50#	10.85#	11.20#	11.55#	11.90#	12.25#	12.60#	12.95#	13.30#	13.65#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	35A-40	35A-41	35A-42	35A-43	35A-44	35A-45	35A-46	35A-47	35A-48	35A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	14.00#	14.35#	14.70#	15.05#	15.40#	15.75#	16.10#	16.45#	16.80#	17.15#
AREA (SqFt)										

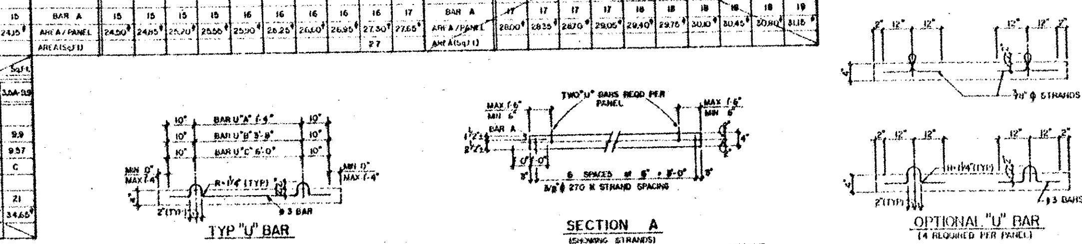
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	35A-50	35A-51	35A-52	35A-53	35A-54	35A-55	35A-56	35A-57	35A-58	35A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	17.50#	17.85#	18.20#	18.55#	18.90#	19.25#	19.60#	19.95#	20.30#	20.65#
AREA (SqFt)										

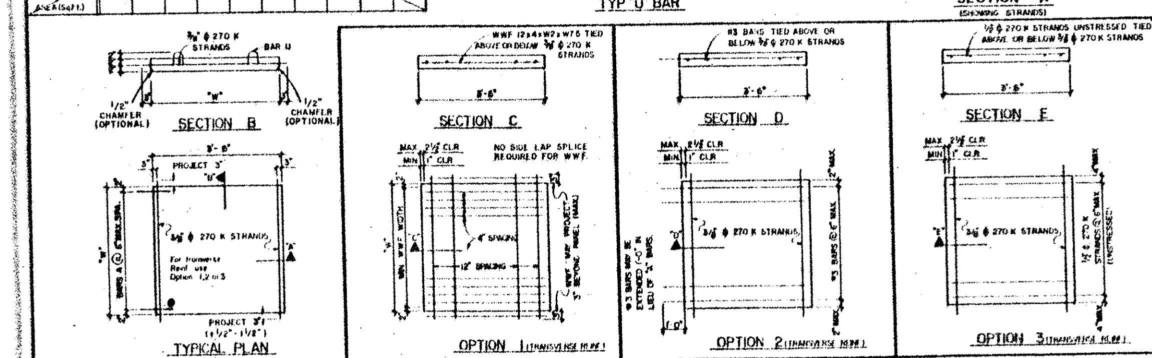
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 22 SqFt										
PANEL MARK				35A-63						
NO. REQ'D				1						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	21.00#	21.35#	21.70#	22.05#	22.40#	22.75#	23.10#	23.45#	23.80#	24.15#
AREA (SqFt)				22						

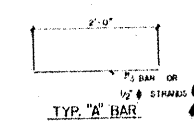
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 27 SqFt										
PANEL MARK									35A-78	
NO. REQ'D									1	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	24.50#	24.85#	25.20#	25.55#	25.90#	26.25#	26.60#	26.95#	27.30#	27.65#
AREA (SqFt)									27	

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	35A-80	35A-81	35A-82	35A-83	35A-84	35A-85	35A-86	35A-87	35A-88	35A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	28.00#	28.35#	28.70#	29.05#	29.40#	29.75#	30.10#	30.45#	30.80#	31.15#
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ___ SqFt										
PANEL MARK	35A-90	35A-91	35A-92	35A-93	35A-94	35A-95	35A-96	35A-97	35A-98	35A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	31.50#	31.85#	32.20#	32.55#	32.90#	33.25#	33.60#	33.95#	34.30#	34.65#
AREA (SqFt)										







S-4

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

INITIAL FORCE: 2,000# @ STRAND
7 3/8" φ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 49 SqFt

GIFFORD-HILL PRESTRESS CO., INC. VICTORIA, TEXAS
CONTRACTOR HELDENFELS BROS. INC.
STATE: TEXAS | PROJECT NO. HES 0005(607) | HWY NO. SH 358 etc.
COUNTY: NUECES | CONTROL 617 | SECTION 01 | JOB 123
DRAWN D.M. | CHECK R.S.M. | DATE 11/1/90 | SHEET FP-2
JOB NO. 0072 | 35A-FAB SHEET
91-080H

Sheet FP-9 (7A-FAB SHEET)

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	7A-30	7A-31	7A-32	7A-33	7A-34	7A-35	7A-36	7A-37	7A-38	7A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN. WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	21.00	21.70	22.40	23.10	23.80	24.50	25.20	25.90	26.60	27.30
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	7A-40	7A-41	7A-42	7A-43	7A-44	7A-45	7A-46	7A-47	7A-48	7A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN. WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	28.00	28.70	29.40	30.10	30.80	31.50	32.20	32.90	33.60	34.30
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	7A-50	7A-51	7A-52	7A-53	7A-54	7A-55	7A-56	7A-57	7A-58	7A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN. WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	35.00	35.70	36.40	37.10	37.80	38.50	39.20	39.90	40.60	41.30
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 130 SqFt

PANEL MARK	7A-60			7A-63						
NO. REQ'D	1			2						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN. WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	42.00	42.70	43.40	44.10	44.80	45.50	46.20	46.90	47.60	48.30
AREA (SqFt)	42			88						

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 437 SqFt

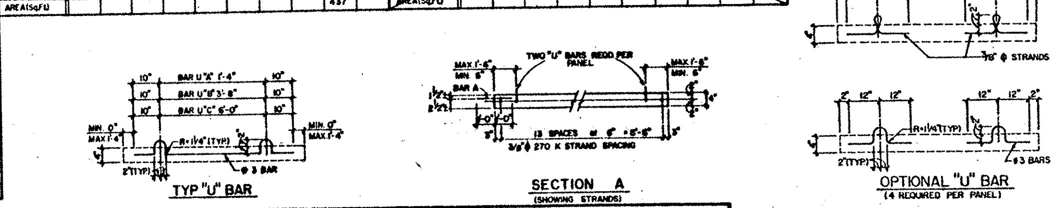
PANEL MARK									7A-78	
NO. REQ'D									8	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN. WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	49.00	49.70	50.40	51.10	51.80	52.50	53.20	53.90	54.60	55.30
AREA (SqFt)									437	

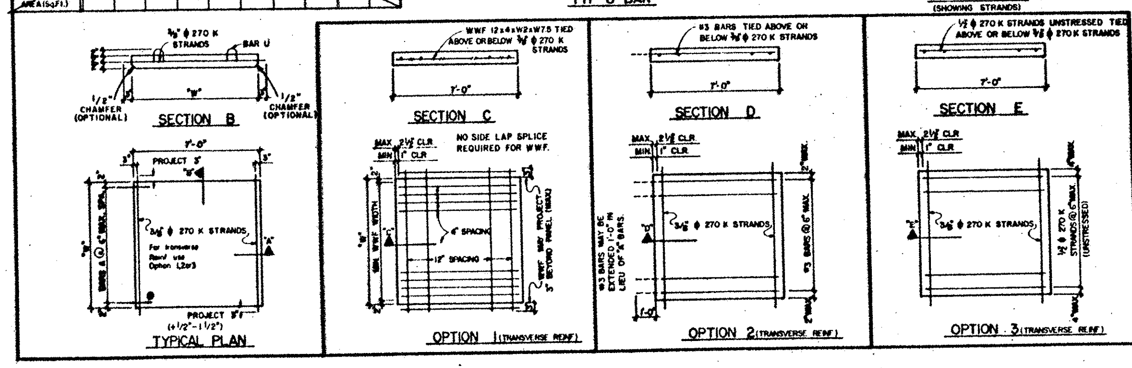
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

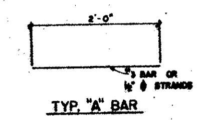
PANEL MARK	7A-80	7A-81	7A-82	7A-83	7A-84	7A-85	7A-86	7A-87	7A-88	7A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN. WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	56.00	56.70	57.40	58.10	58.80	59.50	60.20	60.90	61.60	62.30
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	7A-90	7A-91	7A-92	7A-93	7A-94	7A-95	7A-96	7A-97	7A-98	7A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN. WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	63.00	63.70	64.40	65.10	65.80	66.50	67.20	67.90	68.60	69.30
AREA (SqFt)										







INITIAL FORCE: 2,000 # @ STRAND
14 3/8" ϕ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS: H
RELEASE STRENGTH: 4,000 psi
28 DAY STRENGTH: 5,000 psi
TOP FINISH: BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 567 SqFt

GIFFORD–HILL PRESTRESS CO., INC. — VICTORIA, TEXAS
CONTRACTOR: HELDENFELS BROS., INC
STATE: TEXAS — PROJECT NO: HES 000S(607) — HWY NO: SH 358 etc.
COUNTY: NUECES — CONTROL 617 — SECTION 01 — JOB 123
DRAWN: DM — CHECK: RSM — DATE: 11/1/91 — JOB NO 0072 — 7A-FAB SHEET — SHEET FP-9
91-080N

Sheet FP-8 (6.5A-FAB SHEET)

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6.5A-30	6.5A-31	6.5A-32	6.5A-33	6.5A-34	6.5A-35	6.5A-36	6.5A-37	6.5A-38	6.5A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN. WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	19.50	20.15	20.80	21.45	22.10	22.75	23.40	24.05	24.70	25.35
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6.5A-40	6.5A-41	6.5A-42	6.5A-43	6.5A-44	6.5A-45	6.5A-46	6.5A-47	6.5A-48	6.5A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN. WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	26.00	26.65	27.30	27.95	28.60	29.25	29.90	30.55	31.20	31.85
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6.5A-50	6.5A-51	6.5A-52	6.5A-53	6.5A-54	6.5A-55	6.5A-56	6.5A-57	6.5A-58	6.5A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN. WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	32.50	33.15	33.80	34.45	35.10	35.75	36.40	37.05	37.70	38.35
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 41 SqFt

PANEL MARK				6.5A-63						
NO. REQ'D				1						
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN. WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	39.00	39.65	40.30	40.95	41.60	42.25	42.90	43.55	44.20	44.85
AREA (SqFt)				41						

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 304 SqFt

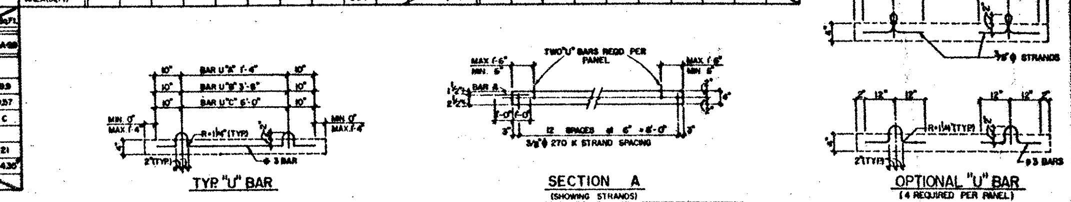
PANEL MARK									6.5A-78	
NO. REQ'D									6	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN. WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	45.50	46.15	46.80	47.45	48.10	48.75	49.40	50.05	50.70	51.35
AREA (SqFt)									304	

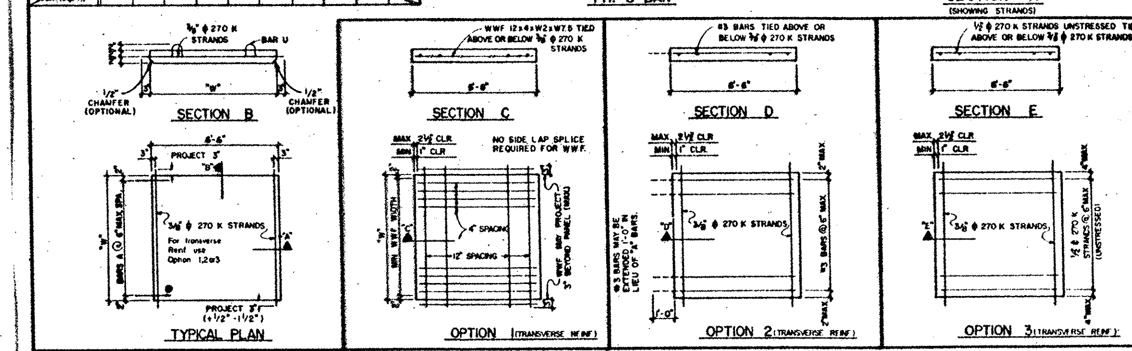
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

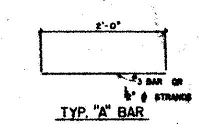
PANEL MARK	6.5A-80	6.5A-81	6.5A-82	6.5A-83	6.5A-84	6.5A-85	6.5A-86	6.5A-87	6.5A-88	6.5A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN. WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	52.00	52.65	53.30	53.95	54.60	55.25	55.90	56.55	57.20	57.85
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6.5A-90	6.5A-91	6.5A-92	6.5A-93	6.5A-94	6.5A-95	6.5A-96	6.5A-97	6.5A-98	6.5A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN. WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	58.50	59.15	59.80	60.45	61.10	61.75	62.40	63.05	63.70	64.35
AREA (SqFt)										







INITIAL FORCE: 2,000 # @ STRAND
13 3/8" ϕ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS H
RELEASE STRENGTH 4,000 psi
28 DAY STRENGTH 5,000 psi
TOP FINISH BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 345 SqFt

GIFFORD–HILL PRESTRESS CO., INC. — VICTORIA, TEXAS
CONTRACTOR: HELDENFELS BROS., INC.
STATE: TEXAS — PROJECT NO: HES 000S(607) — HWY NO: SH 358 etc.
COUNTY: NUECES — CONTROL 617 — SECTION 01 — JOB 123
DRAWN: DM — CHECK: RSM — DATE: 11/1/91 — JOB NO 0072 — 6.5A-FAB SHEET — SHEET FP-8
91-080N

Sheet FP-7 (6A-FAB SHEET)

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6A-30	6A-31	6A-32	6A-33	6A-34	6A-35	6A-36	6A-37	6A-38	6A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN. WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	18.00	18.60	19.20	19.80	20.40	21.00	21.60	22.20	22.80	23.40
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6A-40	6A-41	6A-42	6A-43	6A-44	6A-45	6A-46	6A-47	6A-48	6A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN. WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	24.00	24.60	25.20	25.80	26.40	27.00	27.60	28.20	28.80	29.40
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6A-50	6A-51	6A-52	6A-53	6A-54	6A-55	6A-56	6A-57	6A-58	6A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN. WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	30.00	30.60	31.20	31.80	32.40	33.00	33.60	34.20	34.80	35.40
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 36 SqFt

PANEL MARK	6A-60									
NO. REQ'D	1									
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN. WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	36.00	36.60	37.20	37.80	38.40	39.00	39.60	40.20	40.80	41.40
AREA (SqFt)	36									

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 187 SqFt

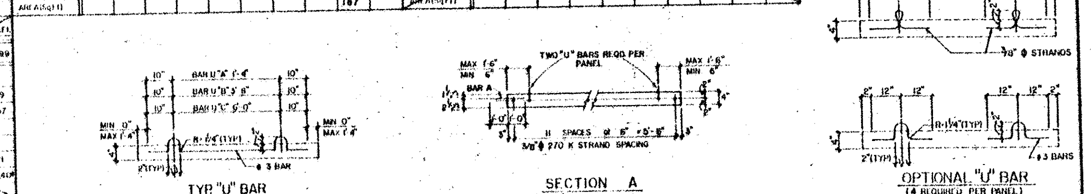
PANEL MARK									6A-78	
NO. REQ'D									4	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN. WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	42.00	42.60	43.20	43.80	44.40	45.00	45.60	46.20	46.80	47.40
AREA (SqFt)									187	

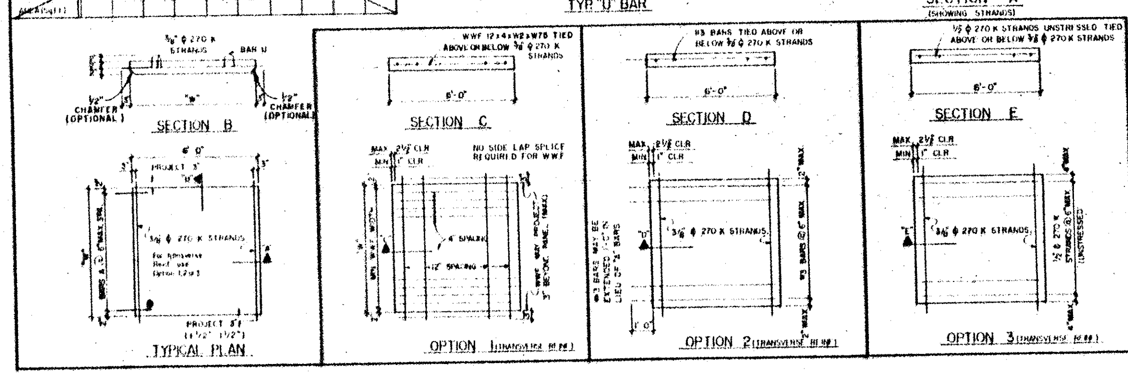
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

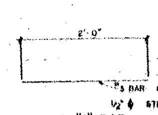
PANEL MARK	6A-80	6A-81	6A-82	6A-83	6A-84	6A-85	6A-86	6A-87	6A-88	6A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN. WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	48.00	48.60	49.20	49.80	50.40	51.00	51.60	52.20	52.80	53.40
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	6A-90	6A-91	6A-92	6A-93	6A-94	6A-95	6A-96	6A-97	6A-98	6A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN. WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	54.00	54.60	55.20	55.80	56.40	57.00	57.60	58.20	58.80	59.40
AREA (SqFt)										







INITIAL FORCE: 2,000 # @ STRAND
12 3/8" ϕ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS H
RELEASE STRENGTH 4,000 psi
28 DAY STRENGTH 5,000 psi
TOP FINISH BROOM
● ERECTION MARK

TOTAL PANEL AREA THIS SHEET 223 SqFt

GIFFORD–HILL PRESTRESS CO., INC — VICTORIA, TEXAS
CONTRACTOR: HELDENFELS BROS, INC
STATE: TEXAS — PROJECT NO: HES 000S(607) — HWY NO: SH 358 etc
COUNTY: NUECES — CONTROL 617 — SECTION 01 — JOB 123
DRAWN: DM — CHECK: RSM — DATE: 11/1/91 — JOB NO 0072 — 6A-FAB SHEET — SHEET FP-7
91-080N

Sheet FP-6 (5.5A FAB SHEET)

TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED ~~EXCEPT AS NOTED~~
DIVISION OF BRIDGES AND STRUCTURES
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL.

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	5.5A-30	5.5A-31	5.5A-32	5.5A-33	5.5A-34	5.5A-35	5.5A-36	5.5A-37	5.5A-38	5.5A-39
NO. REQ'D										
"W"	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
MIN. WWF WIDTH	2.67	2.77	2.87	2.97	3.07	3.17	3.27	3.37	3.47	3.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	7	7	7	7	8	8	8	8	8	9
AREA / PANEL	16.50	17.05	17.60	18.15	18.70	19.25	19.80	20.35	20.90	21.45
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	5.5A-40	5.5A-41	5.5A-42	5.5A-43	5.5A-44	5.5A-45	5.5A-46	5.5A-47	5.5A-48	5.5A-49
NO. REQ'D										
"W"	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
MIN. WWF WIDTH	3.67	3.77	3.87	3.97	4.07	4.17	4.27	4.37	4.47	4.57
BAR U TYPE	A	A	A	A	A	A	A	A	A	A
BAR A	9	9	9	9	10	10	10	10	10	11
AREA / PANEL	22.00	22.55	23.10	23.65	24.20	24.75	25.30	25.85	26.40	26.95
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	5.5A-50	5.5A-51	5.5A-52	5.5A-53	5.5A-54	5.5A-55	5.5A-56	5.5A-57	5.5A-58	5.5A-59
NO. REQ'D										
"W"	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
MIN. WWF WIDTH	4.67	4.77	4.87	4.97	5.07	5.17	5.27	5.37	5.47	5.57
BAR U TYPE	A	A	A	A	B	B	B	B	B	B
BAR A	11	11	11	11	12	12	12	12	12	13
AREA / PANEL	27.50	28.05	28.60	29.15	29.70	30.25	30.80	31.35	31.90	32.45
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 33 SqFt

PANEL MARK	5.5A-60									
NO. REQ'D	1									
"W"	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
MIN. WWF WIDTH	5.67	5.77	5.87	5.97	6.07	6.17	6.27	6.37	6.47	6.57
BAR U TYPE	B	B	B	B	B	B	B	B	B	B
BAR A	13	13	13	13	14	14	14	14	14	15
AREA / PANEL	33.00	33.55	34.10	34.65	35.20	35.75	36.30	36.85	37.40	37.95
AREA (SqFt)	33									

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE 129 SqFt

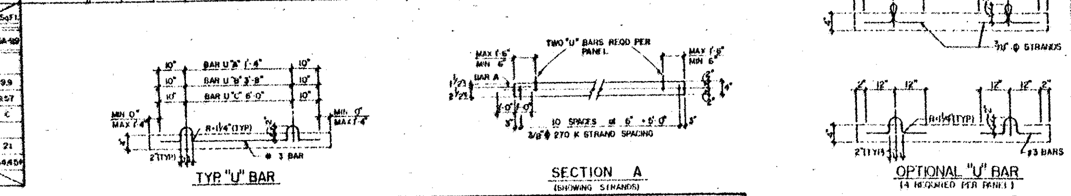
PANEL MARK									5.5A-78	
NO. REQ'D									3	
"W"	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
MIN. WWF WIDTH	6.67	6.77	6.87	6.97	7.07	7.17	7.27	7.37	7.47	7.57
BAR U TYPE	B	B	B	B	B	B	B	C	C	C
BAR A	15	15	15	15	16	16	16	16	16	17
AREA / PANEL	38.50	39.05	39.60	40.15	40.70	41.25	41.80	42.35	42.90	43.45
AREA (SqFt)									129	

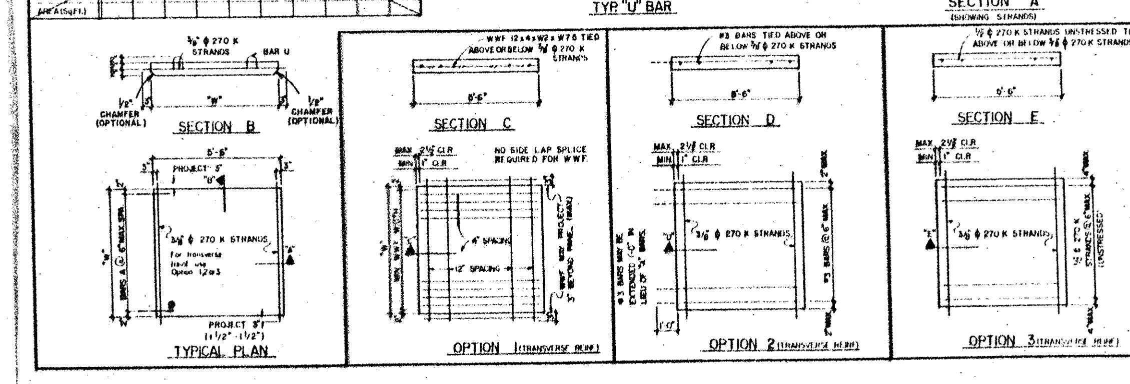
SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

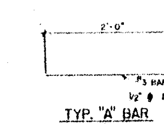
PANEL MARK	5.5A-80	5.5A-81	5.5A-82	5.5A-83	5.5A-84	5.5A-85	5.5A-86	5.5A-87	5.5A-88	5.5A-89
NO. REQ'D										
"W"	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
MIN. WWF WIDTH	7.67	7.77	7.87	7.97	8.07	8.17	8.27	8.37	8.47	8.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	17	17	17	17	18	18	18	18	18	19
AREA / PANEL	44.00	44.55	45.10	45.65	46.20	46.75	47.30	47.85	48.40	48.95
AREA (SqFt)										

SCHEDULE OF PANEL DIMENSIONS — TOTAL AREA THIS TABLE ____ SqFt

PANEL MARK	5.5A-90	5.5A-91	5.5A-92	5.5A-93	5.5A-94	5.5A-95	5.5A-96	5.5A-97	5.5A-98	5.5A-99
NO. REQ'D										
"W"	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
MIN. WWF WIDTH	8.67	8.77	8.87	8.97	9.07	9.17	9.27	9.37	9.47	9.57
BAR U TYPE	C	C	C	C	C	C	C	C	C	C
BAR A	19	19	19	19	20	20	20	20	20	21
AREA / PANEL	49.50	50.05	50.60	51.15	51.70	52.25	52.80	53.35	53.90	54.45
AREA (SqFt)										





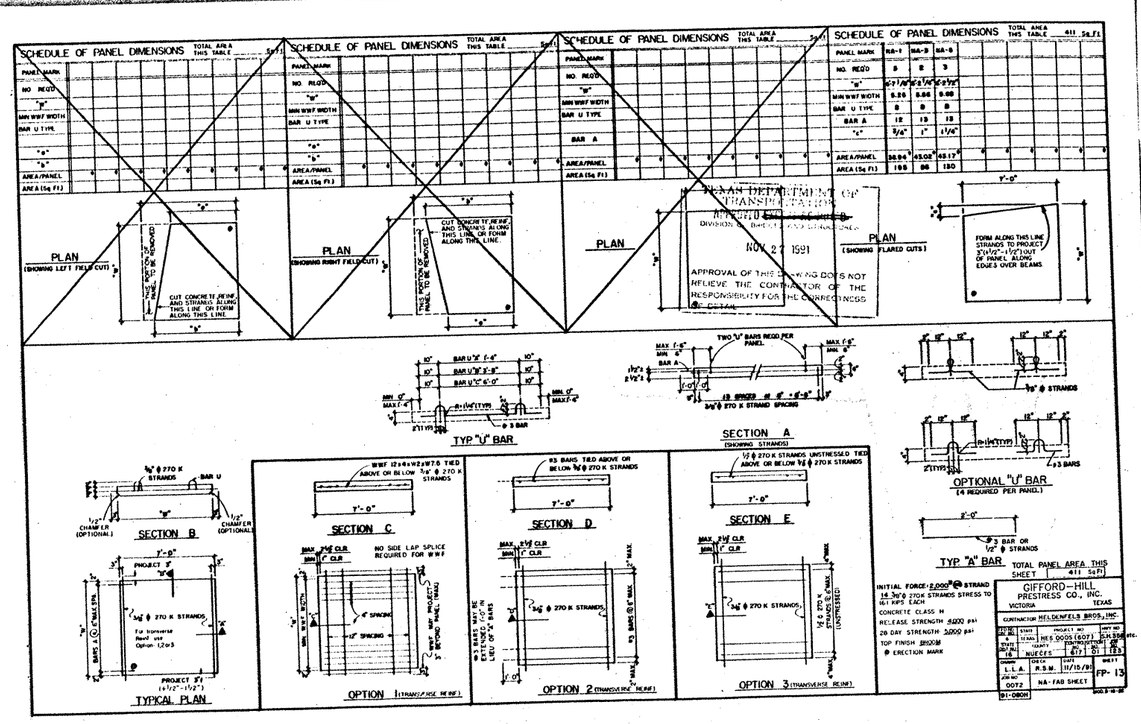


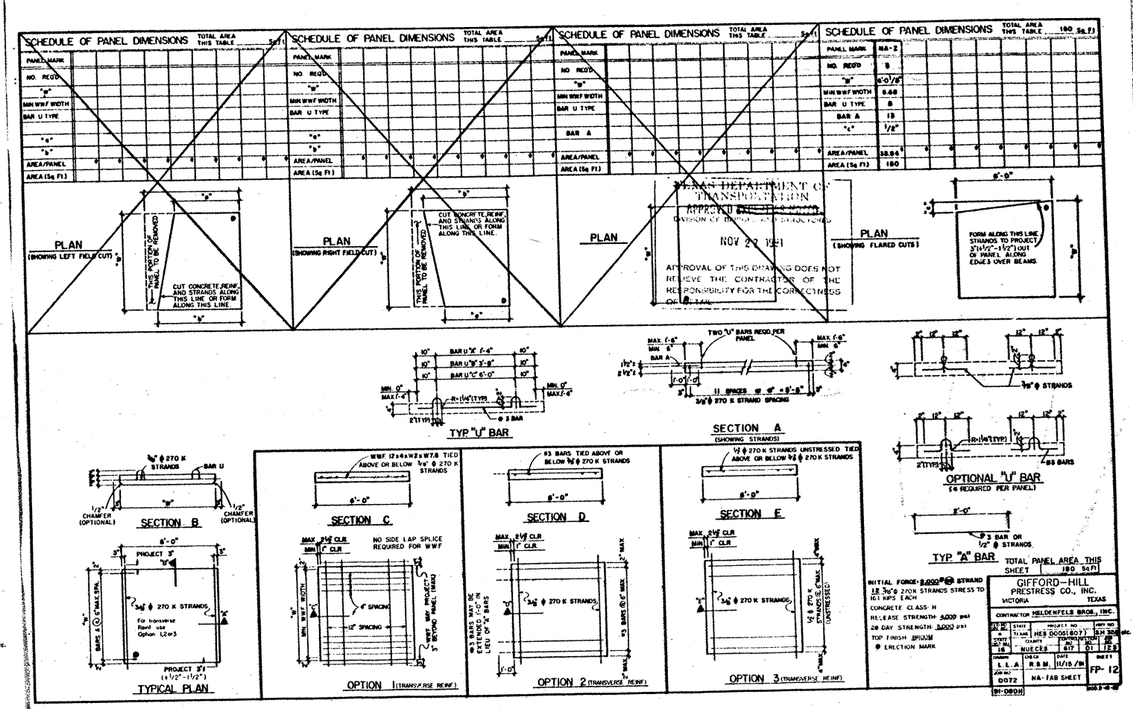
8-5

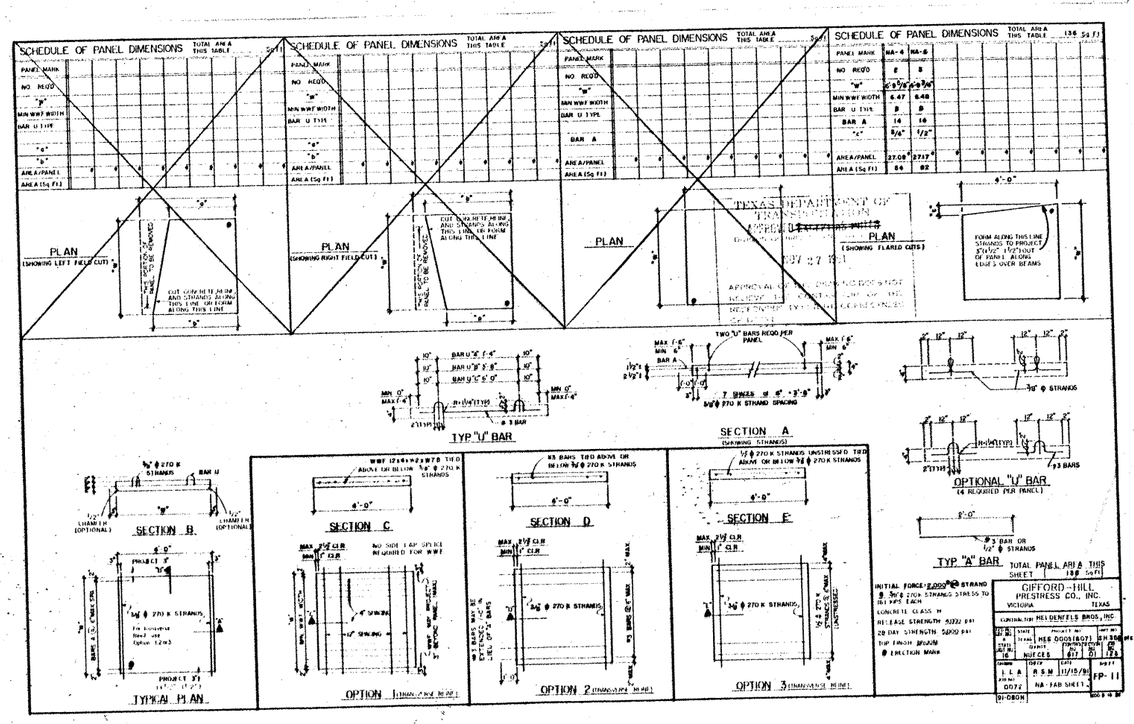
INITIAL FORCE: 2,000 # @ STRAND
11 3/8" ϕ 270K STRANDS STRESS TO 16.1 KIPS EACH
CONCRETE CLASS H
RELEASE STRENGTH 4,000 psi
28 DAY STRENGTH 5,000 psi
TOP FINISH BROOM
● ERECTION MARK

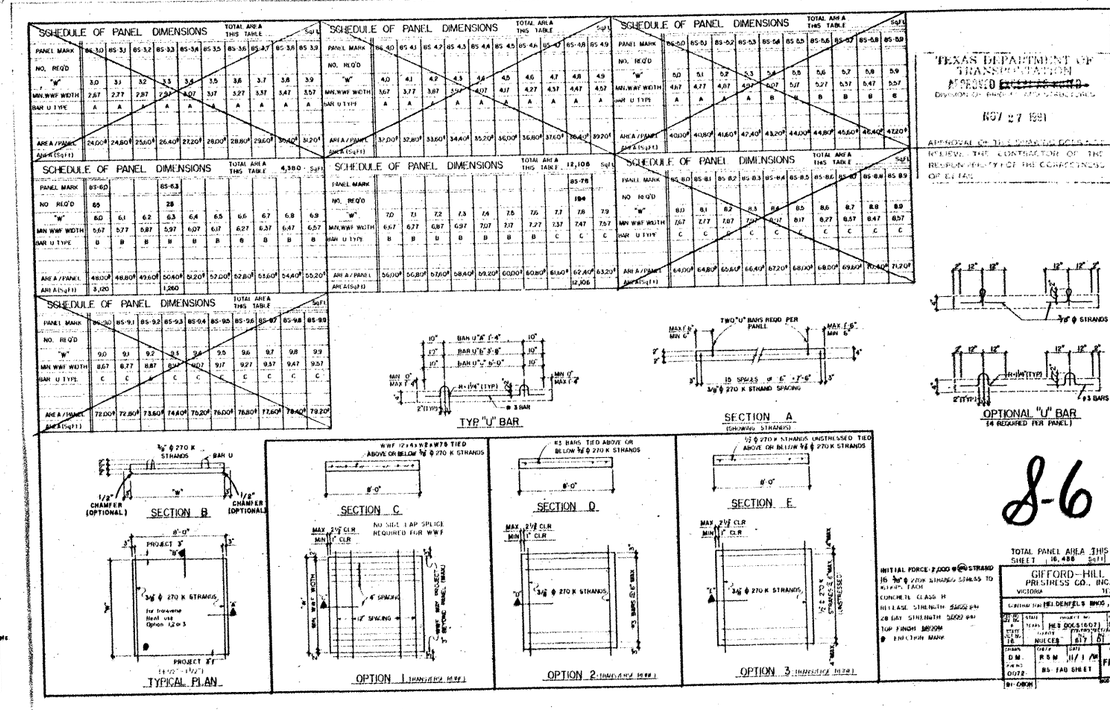
TOTAL PANEL AREA THIS SHEET 162 SqFt

GIFFORD–HILL PRESTRESS CO., INC. — VICTORIA, TEXAS
CONTRACTOR: HELDENFELS BROS, INC
STATE: TEXAS — PROJECT NO: HES 000S(607) — HWY NO: SH 358 etc
COUNTY: NUECES — CONTROL 617 — SECTION 01 — JOB 123
DRAWN: DM — CHECK: RSM — DATE: 11/1/91 — JOB NO 0072 — 5.5A FAB SHEET — SHEET FP-6
91-080N


SCHEDULE OF PANEL DIMENSIONS
PLAN (SHOWING LEFT FIELD CUT)
PLAN (SHOWING RIGHT FIELD CUT)
PLAN
PLAN (SHOWING FLARED CUTS)
TEXAS DEPARTMENT OF TRANSPORTATION
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL
TYP "U" BAR
SECTION A (SHOWING STRANDS)
OPTIONAL "U" BAR (4 REQUIRED PER PANEL)
SECTION B
SECTION C
SECTION D
SECTION E
TYP "A" BAR
TYPICAL PLAN
OPTION 1 (TRANSVERSE REINF.)
OPTION 2 (TRANSVERSE REINF.)
OPTION 3 (TRANSVERSE REINF.)
GIFFORD-HILL PRESTRESS CO., INC.
VICTORIA TEXAS
FP-13


SCHEDULE OF PANEL DIMENSIONS
PLAN (SHOWING LEFT FIELD CUT)
PLAN (SHOWING RIGHT FIELD CUT)
PLAN
PLAN (SHOWING FLARED CUTS)
TEXAS DEPARTMENT OF TRANSPORTATION
NOV 27 1991
APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAIL
TYP "U" BAR
SECTION A (SHOWING STRANDS)
OPTIONAL "U" BAR (4 REQUIRED PER PANEL)
SECTION B
SECTION C
SECTION D
SECTION E
TYP "A" BAR
TYPICAL PLAN
OPTION 1 (TRANSVERSE REINF.)
OPTION 2 (TRANSVERSE REINF.)
OPTION 3 (TRANSVERSE REINF.)
GIFFORD-HILL PRESTRESS CO., INC.
VICTORIA TEXAS
FP-12


SCHEDULE OF PANEL DIMENSIONS
PLAN (SHOWING LEFT FIELD CUT)
PLAN (SHOWING RIGHT FIELD CUT)
PLAN
PLAN (SHOWING FLARED CUTS)
TEXAS DEPARTMENT OF TRANSPORTATION
NOV 27 1991
TYP "U" BAR
SECTION A (SHOWING STRANDS)
OPTIONAL "U" BAR (4 REQUIRED PER PANEL)
SECTION B
SECTION C
SECTION D
SECTION E
TYP "A" BAR
TYPICAL PLAN
OPTION 1 (TRANSVERSE REINF.)
OPTION 2 (TRANSVERSE REINF.)
OPTION 3 (TRANSVERSE REINF.)
GIFFORD-HILL PRESTRESS CO., INC.
VICTORIA TEXAS
FP-11


SCHEDULE OF PANEL DIMENSIONS
TEXAS DEPARTMENT OF TRANSPORTATION
NOV 27 1991
TYP "U" BAR
SECTION A (SHOWING STRANDS)
OPTIONAL "U" BAR (4 REQUIRED PER PANEL)
SECTION B
SECTION C
SECTION D
SECTION E
TYPICAL PLAN
OPTION 1 (TRANSVERSE REINF.)
OPTION 2 (TRANSVERSE REINF.)
OPTION 3 (TRANSVERSE REINF.)
GIFFORD-HILL PRESTRESS CO., INC.
VICTORIA TEXAS
FP-10
8-6

SCHEDULE OF PANEL DIMENSIONS

TOTAL AREA THIS TABLE _____ Sq.Ft.

PANEL MARK									
NO REQ'D									
"a"									
MIN WWF WIDTH									
BAR U TYPE									
"c"									
"b"									
AREA/PANEL									
AREA (Sq. Ft.)									

SCHEDULE OF PANEL DIMENSIONS

TOTAL AREA THIS TABLE _____ Sq.Ft.

PANEL MARK									
NO REQ'D									
"a"									
MIN WWF WIDTH									
BAR U TYPE									
"c"									
"b"									
AREA/PANEL									
AREA (Sq. Ft.)									

SCHEDULE OF PANEL DIMENSIONS

TOTAL AREA THIS TABLE 1,692 Sq.Ft.

PANEL MARK	NS-1	NS-2	NS-3	NS-4	NS-5	NS-6	NS-7	NS-8	NS-9
NO REQ'D	5	5	5	5	5	2	2	2	2
"a"	0'-7 1/4"	0'-8 3/4"	0'-10 1/4"	0'-11 3/4"	0'-9 3/4"	0'-7 1/4"	0'-8 3/4"	0'-10 1/4"	0'-11 3/4"
MIN WWF WIDTH	5.32	5.39	5.40	5.51	5.57	5.64	5.97	6.08	6.19
BAR U TYPE	B	B	B	B	B	B	B	B	B
"c"	9 1/4"	9 1/4"	9 1/4"	9 1/4"	9 1/4"	11 1/4"	11 1/4"	11 1/4"	11 1/4"
AREA/PANEL	45.00°	46.42°	46.00°	46.50°	47.00°	47.42°	49.92°	50.83°	51.67°
AREA (Sq. Ft.)	225	227	230	233	235	237	100	102	103

SCHEDULE OF PANEL DIMENSIONS

TOTAL AREA THIS TABLE 889 Sq.Ft.

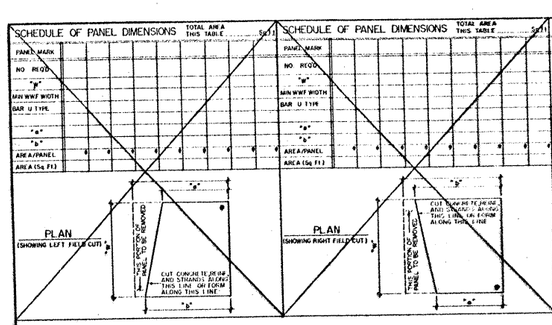
PANEL MARK	NS-10	NS-11	NS-12	NS-13	NS-14	NS-15	NS-16		
NO REQ'D	2	2	2	2	2	2	2		
"a"	0'-7 1/4"	0'-8 3/4"	0'-10 1/4"	0'-11 3/4"	0'-9 3/4"	0'-7 1/4"	0'-8 3/4"		
MIN WWF WIDTH	6.30	6.41	6.99	6.10	6.21	6.32	6.43		
BAR U TYPE	B	B	B	B	B	B	B		
"c"	11 1/4"	11 1/4"	11 1/4"	11 1/4"	11 1/4"	11 1/4"	11 1/4"		
AREA/PANEL	52.58°	53.42°	50.08°	51.00°	51.85°	52.75°	53.08°		
AREA (Sq. Ft.)	106	107	150	153	155	158	161		

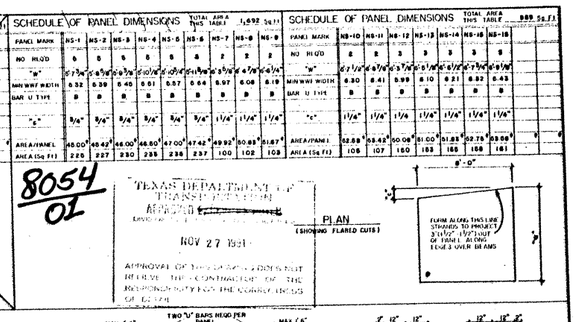
8054
01

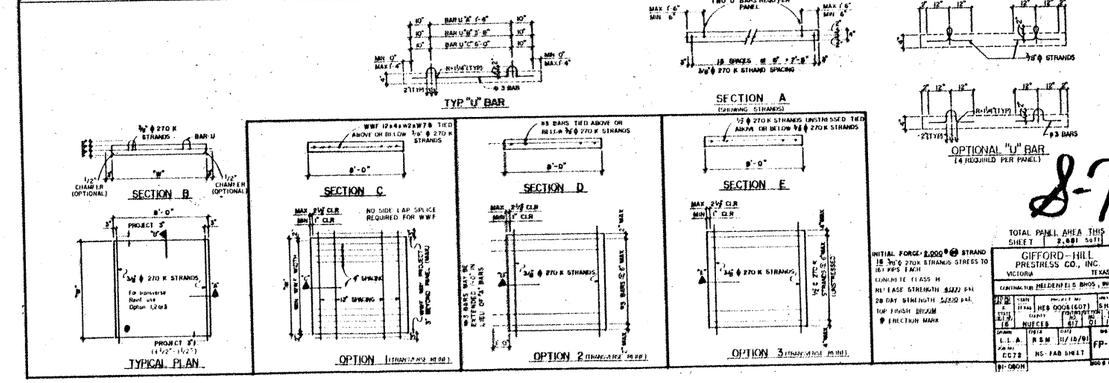
TEXAS DEPARTMENT OF TRANSPORTATION
APPROVED
DIVISION ENGINEER

NOV 27 1991

APPROVAL OF THESE PLANS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR THE CORRECTNESS OF DETAILS







8-7

INITIAL FORCE = 2,000 # @ STRAND
18 3/8" ϕ 270K STRANDS STRESS TO 31 KPS EACH
CONCRETE CLASS H
RELEASE STRENGTH 6,000 psi
28 DAY STRENGTH 5,000 psi
TOP FINISH BROOM
(PRECTION MARK

TOTAL PANEL AREA THIS SHEET 2,881 Sq.Ft.

GIFFORD-HILL PRESTRESS CO., INC.
VICTORIA TEXAS

CONTRACTOR HILDEBRANDT BROS., INC.

DATE	STATE	PROJECT NO.		SHEET NO.
12-6-91	TEXAS	HBB 0006(607)		FP-14
DESIGNED	CHECKED	DRAWN	CHECKED	SHEET
S.L.A.	R.S.M.	11/18/91		
FOR NO. CC72	NS-FAB SHEET			

91-0809