north dakota
state highway department,
600 east boulevard avenue
bismarck, north dakota 58505-0177

ALLEN I. OLSON, GOVERNOR
DUANE R. LIFFRIG, COMMISSIONER
RAY ZINK, CHIEF ENGINEE

November 1, 1984

A D D E N D U M

TO: All prospective bidders on Project No. IR-094-4(47)132, Job No. 3, to be let on November 9, 1984

The following revisions are to be made in the plans for this project:

Plan Revisions:

Remove and discard sheets 2 and 37 from your plans and replace with the enclosed sheets.

Sheet 2 - Revised table of contents (Revision date 10-29-84)

Sheet 37 - Sheet removed because attenuation devices are not needed on this project.

Sheet 48 - Sheet has been added to provide bridge painting construction signing details.

This addendum is hereby incorporated into the bidder's proposal for this project.

Francis G. Ziegler
Construction Engineer

jjb

JOB# 3

FHWA REGION	STATE	PROJECT	SHEET NO.
8	N.D.	IR-094-4(47)132	1

NORTH DAKOTA

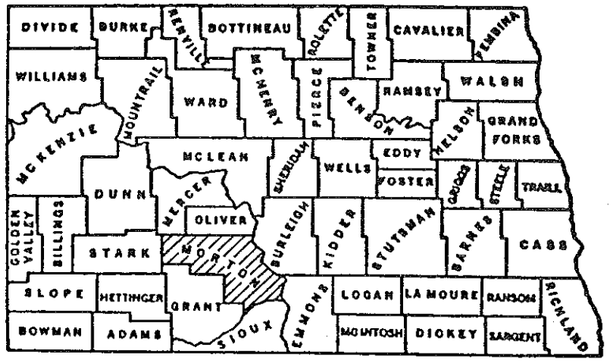
STATE HIGHWAY DEPARTMENT

REPAIR & OVERLAY PORTLAND CEMENT CONCRETE BRIDGE DECKS IN MORTON COUNTY

FEDERAL AID PROJECT NO. IR-094-4(47)132

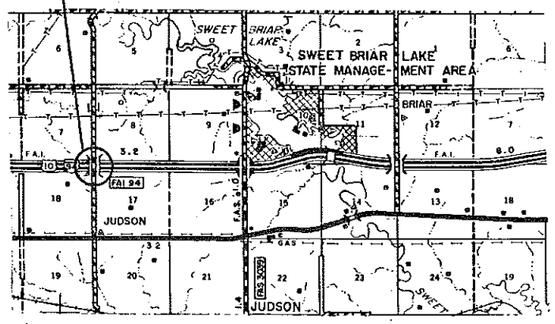
GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway Department, Oct. 1976 and approved by the Federal Highway Administration on Dec. 17, 1976, and Supplemental Specifications thereto adopted July 1, 1983, and approved by the Federal Highway Administration and other Contract Provisions submitted herewith.



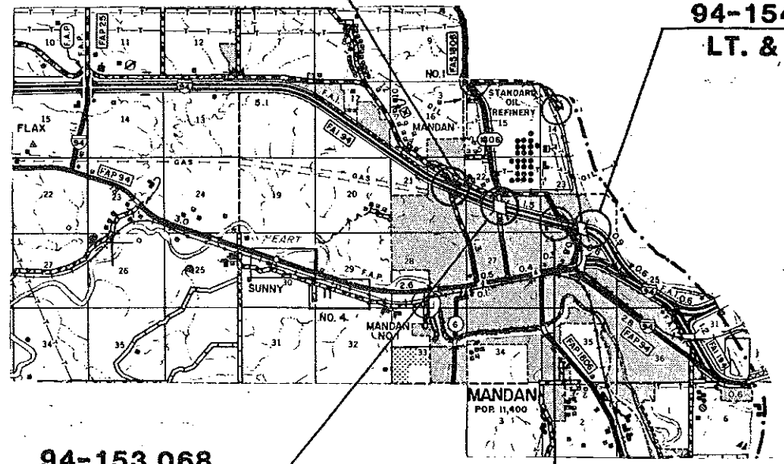
SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

94-132.115
LT. & RT



94-152.329
LT. & RT.

94-154.232
LT. & RT.



94-153.068
LT. & RT

94-153.988
LT. & RT.

APPROVED DATE 9/2/83

for Clifford J. Scott
BRIDGE ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

CLIFFORD J. SCOTT REGISTERED PROFESSIONAL 1267. ENGINEER NORTH DAKOTA

APPROVED DATE 8-3-84

Ray Zink
CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

RAY ZINK REGISTERED PROFESSIONAL P.E. 972 ENGINEER NORTH DAKOTA

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED 11

DIVISION ENGINEER DATE

SYMBOLS

STATE & NATIONAL LINES
COUNTY LINE
TOWNSHIP & RANGE LINES
SECTION LINE
QUARTER SECTION LINE
SECTION CORNER
QUARTER SECTION CORNER
OLD RIGHT OF WAY LINE
NEW RIGHT OF WAY LINE
GRADE LINE
CENTERLINE OF CONSTRUCTION — 500
RAILROAD RIGHT OF WAY LINE
CITY OR VILLAGE CORPORATE LIMITS
PROPERTY LINE
EASEMENT LINE
FENCES
SNOW FENCE
DRAINAGE
WATERS EDGE
MARSH OR SWAMP
RIPRAP
DRAINAGE DITCH
APPROACH — 502+00
TRAVELED WAY
RAILROADS — NAME
GUARD RAIL
GUIDE POSTS
DELINEATORS
HEDGES AND TREES
INTERCHANGE
HIGHWAY GRADE SEPARATION - NO CONNECTION
OTHER SPIDGE
SERVICE ROAD
TERMINATED CROSS-ROAD

BUILDINGS
TELEGRAPH LINES
TELEPHONE LINES
POWER LINES
CULVERTS (In Place)
CULVERTS (Install)
CONCRETE BOX CULVERTS (Install)
BRIDGES (Install)
CONCRETE CURB
CONCRETE CURB AND GUTTER
CONCRETE WALK
CATCH BASIN (Existing)
CATCH BASIN (New)
MANHOLE (Existing)
MANHOLE (New)
CURB INLET (Existing)
CURB INLET (New)
GROUND MOUNTED SIGNS
OVERHEAD SIGNS
HYDRANT
LIGHT STANDARDS
TRAFFIC SIGNALS (Plan & Profile Sheets)
HIGH MAST LIGHTING ASSEMBLY
GROUND ELEVATION 6430
GRADE ELEVATION 6410
245
CENTERLINE
SECTION LINE
DEFLECTION ANGLE (Delta)
SOD OR JUTE MESH
POLES TO BE MOVED
POLES TO BE LOWERED
CONCRETE FOUNDATION
CONDUIT
CONDUCTOR
CONCRETE PULL BOX
FEED POINT
250 WATT LIGHT STANDARDS
400 WATT LIGHT STANDARDS
700 WATT LIGHT STANDARDS
1000 WATT LIGHT STANDARDS
FLASHING BEACON
TRAFFIC SIGNAL - MAST ARM MOUNTED
TRAFFIC SIGNAL - POST MOUNTED
SIGNAL HEAD — 3
PEDESTRIAN PUSHBUTTON POST
TRAFFIC SIGNAL CONTROLLER
FEED POINT - PAD MOUNTED

ABBREVIATIONS

Aggr.	Aggregate
Ahd	Ahead
Alt	Alternate
Approx	Approximate or Approximately
Appr.	Approach
Asph. Cem. or A.C.	Asphalt Cement
Asph. Conc.	Asphaltic Concrete
Bit	Bituminous or Bitumen
Bk	Back
B M	Bench Mark
Bldg.	Building
Br	Bridge
C.A.E.S.	Corrugated Aluminum End Section
C.A.P.	Corrugated Aluminum Pipe
C.B.	Catch Basin
C & G	Curb and Gutter
Ch. Blk	Channel Block
Ch. Ch	Channel Change
C.I.	Curb Inlet
C.I.P.	Cast Iron Pipe
Cl	Class
C.S.E.S.	Corrugated Steel End Section
C.S.P.	Corrugated Steel Pipe
CMS	Cationic Medium Setting
Comp	Compression
Const	Construction
Conc	Concrete
Cont Reinf Conc Pvmt	Continuously Reinforced Concrete Pavement
Contr	Contraction
Crn	Crown
CRS	Cationic Rapid Setting
Crse	Course
C S	Curve to Spiral
C to C	Center to Center
C Y	Cubic Yard
D	Degree of Curvature
D-Load	Dead Load
D B	Ditch Block
Def	Deformed
Det	Detour
D G	Ditch Grade
El or Elev	Elevation
Elipt	Elliptical
Emb	Embankment
Emul	Emulsified
Engr	Engineer
Eq	Equation
E R	East Roadway
E S	End Section
Esmt	Easement
Exc	Excavation
Exp	Expansion
F D	Field Drive
Found	Foundation
F P	Fence Post
Furn	Furnish
Ga	Gage or Gauge
Gr	Grade
Grd	Graded
G V	Gate Valve
Hist	Historical
Hyd	Hydrant
Ident	Identification
Inchg	Interchange
I M	Iron Monument
Inst	Install
Inter	Intersection
Inv	Invert
Jt	Joint
L	Length of Curve
Lc	Length of Spiral
Ldwg	Leveling
L F	Linear or Lineal Foot
Liq	Liquid
Long	Longitudinal
L P	Light Pole
Lt	Left
"M"	One Thousand
Matl	Material
Max	Maximum
MC	Medium Curing
M H	Manhole
Min	Minimum
M L	Main Line
N R	North Roadway
Off Loc.	Office Location
O to O	Out to Out
P & P	Plan and Profile
P C	Point of Curvature
P C C	Point of Compound Curve
P C C Pvmt	Portland Cement Concrete Pavement
P D	Private Drive
Pen	Penetration
Perf	Perforated
P I	Point of Intersection
P O C	Point on Curve
P O T	Point on Tangent
P P	Power Pole
P R C	Point of Reverse Curvature
Pref	Preformed
P S D	Passing Sight Distance
P T	Point of Tangency
PVC	Polyvinyl Chloride Sewer Pipe
Quant	Quantity or Quantities
R	Radius
R or Rge	Range
RC	Rapid Curing
R C E S	Reinforced Concrete End Section
R C P	Reinforced Concrete Pipe
R C P S	Reinforced Concrete Pipe Sewer
Rd	Road
Rdbd	Roadbed
Rdwy	Roadway
Refl	Reflectorized
R R	Railroad
Rt	Right
R/W	Right of Way
Selv	Selvage
San	Sanitary
S C	Spiral to Curve
SC	Slow Curing
Sc	Spiral Deflection Angle
S D	Sight Distance
S E	Superelevation
Sec	Section
Sec Line Appr	Section Line Approach
Sep	Separation
Serv	Service
Sgr Prep	Subgrade Preparation
Shldr	Shoulder
SP	Special Provision
S P P	Structural Plate Pipe
S P P A	Structural Plate Pipe Arch
S R	South Roadway
SS	Slow Setting or Supplement Specification
S S D	Stopping Sight Distance
S T	Spiral to Tangent
Sta	Station
Std	Standard
Std. Specs	Standard Specifications
Struct	Structure
Surf	Surface or Surfacing
Surv	Survey
S W	Sidewalk
S Y	Square Yard
T	Tangent Length (circular curve)
T or Twp	Township
Tel	Telephone
Temp	Temporary
T P	Telephone Pole
Tr	Traffic
Trans	Transverse or Transition
Trtd	Treated
Ts	Tangent Length (curve with spirals)
T S	Tangent to Spiral
U S C & G S	United States Coast and Geodetic Survey
V C	Vertical Curve
V C P	Vitrified Clay Pipe
W M	Water Main
W M V	Water Main Valve
W R	West Roadway
Wrng	Wearing
W S V	Water Service Valve
X-Sec	Cross Section
Xc	Spiral Coordinate
Yc	Spiral Coordinate

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	2

TABLE OF CONTENTS

(Sheet Added)
10-29-84

Sheet Revised
10-29-84

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	3

NOTES:

GENERAL

THE CONTRACTOR SHALL NOTIFY THE DISTRICT OFFICE OF THE STATE HIGHWAY DEPT. WELL IN ADVANCE OF ANY WORK REQUIRED TO BE DONE BY THE STATE MAINTENANCE SO AS NOT TO INTERFERE WITH THE CONTRACTOR'S OPERATIONS. STRUCTURAL DETAILS OF SPECIFIC STRUCTURES ARE AVAILABLE AT THE DISTRICT OFFICE OR AT THE BRIDGE DIVISION OF THE CENTRAL OFFICE IN BISMARCK. LIMITS OF CLASS 2, 2A, AND 3 OVERLAYS SHALL BE DETERMINED BY THE ENGINEER AND OUTLINED WITH SOME SUITABLE MARKING. THESE AREAS SHALL NOT BE EXPANDED UNLESS APPROVED BY THE ENGINEER.
ANY REINFORCING STEEL THAT IS REPLACED IN THE DECK OR ABUTMENT SHALL BE PAID FOR IN ACCORDANCE WITH SECTION 109-5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES. THE LAP LENGTH SHALL BE A MINIMUM OF 30 DIAMETERS. NO WELDED SPLICES WILL BE ALLOWED. THE OVERLAY SHALL BE PLACED OVER ONE-HALF OF THE BRIDGE FROM LONGITUDINAL CENTERLINE TO THE CURB IN ONE CONTINUOUS POUR UNLESS OTHERWISE SHOWN.

CANOPY

SHOULD THE DEPTH OF CONCRETE REMOVAL MAKE IT POSSIBLE FOR THE CHIPPING HAMMER TO PENETRATE THE FULL DEPTH OF THE SLAB A MEANS OF PROTECTING THE ROADWAY BENEATH THE STRUCTURE FROM FALLING DEBRIS SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER. PAYMENT FOR SUCH PROTECTION WILL BE MADE IN ACCORDANCE WITH SECTION 109,5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES.

CONCRETE

THE CONCRETE MIX USED IN THE DECK OVERLAY MAY BE EITHER LOW SLUMP OR LATEX MODIFIED AS SPECIFIED IN THE SPECAIL PROVISIONS.

LINSEED OIL TREATMENT

LINSEED OIL TREATMENT SHALL NOT BE STARTED UNTIL ALL CONCRETE WORK IS COMPLETED. ONLY ONE UNIFORM APPLICATION OF .015 GALLONS PER SQUARE YARD SHALL BE APPLIED TO THE DECK.

SHOULDER REPAIR

AREAS OF BITUMINOUS SURFACED SHOULDERS USED TO CARRY TRAFFIC DURING CONSTRUCTION SHALL BE MAINTAINED BY THE CONTRACTOR AND AFTER COMPLETION OF THE WORK, SHALL BE RESTORED TO SATISFACTORY CONDITION. THE CONTRACTOR WILL BE REIMBURSED AT THE RATE OF $40.00 PER TON FOR HOT MIX USED TO MAINTAIN AND REPAIR THE SHOULDERS. THIS PAYMENT WILL CONSTITUTE FULL REIMBURSEMENT FOR ALL MATERIALS, LABOR, AND EQUIPMENT REQUIRED TO MAINTAIN AND REPAIR THE SHOULDERS. THE QUALITY OF AGGREGATE AND GRADE OF ASPHALT CEMENT USED FOR THE HOT MIX SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

CONSTRUCTION JOINTS

ALL EXISTING CONSTRUCTION OR RELIEF JOINTS, TRANSVERSE OR LONGITUDINAL, SHALL BE CLEANED OUT PRIOR TO THE PLACEMENT OF THE OVERLAY. THE OVERLAY SHALL THEN BE SAW CUT AT THESE LOCATIONS WITHIN 24 HOURS OF PLACEMENT. THE JOINT SHALL THEN BE SEALED WITH HOT POURED ELASTIC TYPE JOINT SEALER 0 INCH TO 1/8 INCH BELOW THE FINISHED PAVEMENT. THE COST OF ANY SUCH WORK SHALL BE INCIDENTAL TO CLASS 1 OVERLAY OR OVERLAY TAPER.

GUARD RAIL AND/OR END POSTS

WITH THE EXCEPTION OF THOSE SPECIFIED, ANY APPROACH GUARD RAIL OR END POSTS REMOVED IN CONNECTION WITH PLACING CURB AND GUTTER SECTIONS, APPROACH TAPERS, OR DECK OVERLAYS SHALL BE FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE COST OF ANY SUCH REMOVAL SHALL BE AT THE CONTRACTOR'S EXPENSE AND THE REMOVED ITEMS SHALL BE REPLACED TO EXISTING CONDITIONS.

ATTENUATION DEVICE

THE CONTRACTOR SHALL PROVIDE THE ATTENUATION DEVICE AS SHOWN IN THE PLANS.

SLOPE PROTECTION

THE JOINTS ON THE SLOPE PROTECTION OF THE SPECIFIED STRUCTURES SHALL BE RESEALED, WHERE THE JOINTS HAVE SEPARATED, THE VOID SHALL BE FILLED WITH GROUT TO A DISTANCE OF 1/2" BELOW THE TOP OF THE SLOPE PROTECTION. THE REMAINDER OF THE JOINT SHALL THEN BE RESEALED WITH HOT POURED ASPHALT VULCANIZED RUBBER JOINT FILLER AS SPECIFIED IN SECTION 550-4.10.6.1 OF THE STANDARD SPECIFICATIONS. THE HOT POURED ASPHALT SHALL BE PAID FOR ON THE BASIS OF GALLONS USED. THE GROUT SHALL CONSIST OF ONE PART PORTLAND CEMENT TO 3 PARTS SAND. THE UNIT OF PAY FOR GROUT SHALL BE CUBIC FEET. THE PAY ITEMS FOR THIS WORK SHALL INCLUDE ALL LABOR, EQUIPMENT, AND MATERIAL REQUIRED TO COMPLETE THE JOB.

PAINTING

STRUCTURAL STEEL ITEMS SHALL BE SANDBLASTED AND PAINTED AS SPECIFIED IN SP-559. THE STRUCTURES WHICH REQUIRE PAINTING AND THE APPROXIMATE WEIGHT OF STRUCTURAL STEEL ARE AS FOLLOWS:

STRUCTURE	GIRDER LINES	APPROXIMATE WEIGHT
NW MANDAN INT LT	5	128,960
NW MANDAN INT RT	5	128,960
COLLINS AVE SEP LT	5	108,600
COLLINS AVE SEP RT	5	108,600
REFINERY ROAD INT LT	5	167,829
REFINERY ROAD INT. RT	5	167,829
BNRR SEP LT	5	129,800
BNRR SEP RT	5	129,800

SHORING (ROSEBUD SEP.)

IF THE AMOUNT OF CLASS 3 CONCRETE REMOVAL IN THE AREA OF THE PIERS IS CONSIDERED TO BE ENOUGH TO AFFECT THE STRUCTURAL INTEGRITY OF THE STRUCTURE, SHORING SHALL BE REQUIRED. THIS DETERMINATION WILL BE MADE DURING THE REPAIR OPERATIONS FOR EACH PARTICULAR STRUCTURE BY THE ENGINEER. IF IT IS DETERMINED THAT SHORING IS REQUIRED, THE SUPERSTRUCTURE SHALL BE SUPPORTED BETWEEN THE 1/4 AND 1/3 POINTS OF EACH AFFECTED SPAN. THE CONTRACTOR SHOULD BASE HIS ESTIMATE ON THE USAGE OF SPREAD FOOTINGS OR MUD SILLS. THE SHORING PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE BEING USED. ADDITIONAL CONCRETE REMOVAL OR PLACEMENT MAY NOT BE DONE UNTIL THE SHORING IS IN PLACE. THE PRICE BID FOR THIS ITEM SHALL INCLUDE ALL LABOR,EQUIPMENT, AND MATERIALS REQUIRED FOR PLACEMENT AND REMOVAL. FOR PAY PURPOSES, "EACH" SHALL MEAN ONE TRANSVERSE LINE OF SHORING.

RAIL RETROFIT

RAIL EXPANSION JOINT SPLICE SLEEVES ARE NOT REQUIRED ON THESE BRIDGES. THE EXISTING ORNAMENTAL METAL RAILING SHALL BE REMOVED AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY HOLES REMAINING AFTER REMOVAL OF THE ORNAMENTAL RAILING SHALL BE FILLED WITH GROUT, THE ENTRANCE END OF EACH BRIDGE HAS SPECIAL CONCRETE BLOCKS ATTACHED TO THE RAIL END POSTS. THESE CONCRETE BLOCKS SHALL BE REMOVED TO FACILITATE THE RAIL RETROFIT AND APPROACH GUARD RAIL. THE WORK TO REMOVE THE ORNAMENTAL RAILING, REMOVE THE CONCRETE BLOCKS AND GROUT THE HOLES SHALL BE INCIDENTAL TO THE BID ITEM "DOUBLE BOX BEAM RAIL RETROFIT".

EXISTING RAILING

THE EXISTING ORNAMENTAL METAL RAILING SHALL BE REMOVED AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY HOLES REMAINING AFTER REMOVAL OF THE ORNAMENTAL RAILING SHALL BE FILLED WITH GROUT. THE WORK TO REMOVE THE ORNAMENTAL RAILING AND TO FILL THE HOLES WITH GROUT SHALL BE INCIDENTAL TO THE BID ITEM "DOUBLE BOX BEAM RAIL RETROFIT".

CONCRETE BLOCKS

THE ENTRANCE END OF EACH BRIDGE HAS SPECIAL CONCRETE BLOCKS ATTACHED TO THE RAIL END POSTS. THESE CONCRETE BLOCKS SHALL BE REMOVED TO FACILITATE THE BRIDGE RAIL AND APPROACH GUARD RAIL. THE WORK TO REMOVE THE CONCRETE BLOCKS SHALL BE INCIDENTAL TO THE BID ITEM "DOUBLE BOX BEAM RAIL RETROFIT".

RAIL RETROFIT

RAIL EXPANSION JOINT SPLICE SLEEVES ARE NOT REQUIRED ON THESE BRIDGES. THE EXISTING ORNAMENTAL METAL RAILING SHALL BE REMOVED AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY HOLES REMAINING AFTER REMOVAL OF THE ORNAMENTAL RAILING SHALL BE FILLED WITH GROUT, THE ENTRANCE END OF EACH BRIDGE HAS SPECIAL CONCRETE BLOCKS ATTACHED TO THE RAIL END POSTS. THESE CONCRETE BLOCKS SHALL BE REMOVED TO FACILITATE THE RAIL RETROFIT AND APPROACH GUARD RAIL. THE WORK TO REMOVE THE ORNAMENTAL RAILING, REMOVE THE CONCRETE BLOCKS AND GROUT THE HOLES SHALL BE INCIDENTAL TO THE BID ITEM "DOUBLE BOX BEAM RAIL RETROFIT".

THE CONTRACTOR SHALL SUBMIT THE FOLLOWING SHOP DRAWINGS FOR APPROVAL BY THE BRIDGE ENGINEER BEFORE FABRICATION:
1. DOUBLE BOX BEAM RAIL

SUMMARY OF QUANTITIES

SPEC NO.	103	705	746	750	756	900	900	900	900	900	550	900	900	107	900	722	762	203	722	722	722	722	722
CODE NO.	0100	0100	0100	0100	0100	8565	9700	9701	9702	9705	0956	8225	8230	0100	9703	3000	3298	0203	0115	0131	0139	0229	2040
BRIDGE NO.	CONTRACT BOND	MOBILIZATION	FLAGGING	LINSEED OIL	FIELD LABORATORY TYPE "A"	SANDBLASTING & PAINTING	CLASS 1 OVERLAY	CLASS 2 OVERLAY	CLASS 3 OVERLAY	OVERLAY TAPER	HOT POURED RUBBERIZED ASPHALT	GROUT	SHORING	RAILROAD PROTECTION INSURANCE	CLASS 2A OVERLAY	DOUBLE BOX BEAM RAIL RETROFIT (BRACED POST)	TRAFFIC CONTROL	EMBANKMENT TYPE C	THREE CABLE GUARD RAIL	W-BEAM GUARD RAIL 6.25' POST SPACING	W-BEAM GUARD RAIL FLARED END TREATMENT & TRANSITION	RESET W-BEAM GUARD RAIL-6.25' POST SPACING	REMOVE 4-CABLE GUARD RAIL & POSTS
	L.S.	L.S.	M. HR.	GAL.	L.S.	L.S.	S.Y.	S.Y.	S.Y.	S.Y.	GAL.	C. FT.	EACH	L.S.	L.F.	L.F.	L.S.	C.Y.	L.F.	L.F.	EA.	L.F.	L.F.
94-132.115 LT ROSEBUD SEP.	1	1	25	14	1		473	95	24	436			1		150	230	1	110		228.8	2	237.5	60
94-132.115 RT ROSEBUD SEP.			25	14			473	95	24	436			1		150	230		200		78.8	2	237.5	60
94-152.329 LT NW MANDAN INT.			100	18		0.12	678	136	34	542	5	25			200	330		245		78.8	2	237.5	
94-152.329 RT NW MANDAN INT.			100	18		0.12	678	136	34	542	5	25			200	330		265		228.8	2	237.5	
94-153.068 LT COLLINS AVE. SEP.			100	17		0.10	617	123	31	542	5	25			200	300		200		78.8	2	75.0	
94-153.068 RT COLLINS AVE. SEP.			100	17		0.10	617	123	31	542	5	25			200	300				16.3	2	300.0	
94-153.988 LT REFINERY ROAD INT.			100	21		0.16	843	169	42	542	5	25			250	410		410		78.8	2	237.5	
94-153.988 RT REFINERY ROAD INT.			100	21		0.16	843	169	42	542	5	25			250	410		165		228.8	2	237.5	
94-154.232 LT BNRR SEP.			100	22		0.12	800	160	40	682	5	25		1	250	360		540	212.5	91.3	2	237.5	
94-154.232 RT BNRR SEP.			100	22		0.12	800	160	40	663	5	25			250	360		260		228.8	2	237.5	
TOTAL	1	1	850	184	1	1	6822	1366	342	5469	40	200	2	1	2100	3260	1	2485	212.5	1338	20	2275	120

SPECIAL PROVISIONS

NO.	NAME
SP-102-20	BIDDING REQUIREMENTS AND CONDITIONS
SP-567	REPAIR & OVERLAY OF P.C.C. BRIDGE DECKS WITH LOW SLUMP CONCRETE
SP-565	MINORITY BUSINESS
SP-496	RAILWAY PROTECTION INSURANCE
SP-568	REPAIR & OVERLAY OF P.C.C. BRIDGE DECKS WITH LATEX CONCRETE
SP-559	BRIDGE PAINTING
SP-746-2	FLAGGING

NOTES & QUANTITIES

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	4

GENERAL NOTES

100 030 UNDERGROUND UTILITIES: The contractor shall notify the local utility companies prior to the beginning of construction, so they may stake location and depth of all utilities in the project area. Subcutting or scarifying over utility lines may be eliminated if, in the opinion of the engineer, a hazardous situation exists. Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the contractor, upon request to the engineer.

REMOVE W-BEAM GUARDRAIL: The sections of W-beam guardrail shown on the plan to be removed shall have the rail, posts, and end anchor removed. The removed guardrail and posts shall be stockpiled on the right of way in the location designated by the engineer. The stockpiled material shall remain the property of the state. If, in the opinion of the engineer, the concrete end anchors will not interfere with other construction, they may be cut off 1' (one foot) below ground line and surface restored to match the surrounding area. Cost of removing the W-beam guardrail shall be considered incidental and shall be included in the price bid for "Reset W-Beam Guardrail."

722 300 EMBANKMENT FOR GUARDRAIL INSTALLATION: The embankment material required for guardrail installation may be obtained from within the right of way with the approval of the Engineer. The existing topsoil shall be removed from the area to be disturbed, stockpiled, and replaced when embankment is completed. The disturbed areas shall be seeded with a seed type approved by the Engineer. Compaction of the embankment shall be in accordance with Section 203-2.5 of the Standard Specifications. The inslopes in areas that are to be widened shall be benched in accordance with Section 203-2.2.2 of the Standard Specifications unless otherwise directed by the Engineer. All existing drainage patterns shall be maintained. This may involve some excavation and ditch widening. Embankment shall be measured using the average end area method and paid for by the cubic yard of embankment in place. The cost for any excavation to maintain the drainage patterns and for benching, seeding, salvaging, stockpiling, and spreading of topsoil shall be included in the price bid for "Embankment, Type C."

25' DOUBLE RAIL SECTION: The 25' double rail section is to be reset. The contractor shall punch new holes to fit the post spacing shown on the plans and shall adjust the post and attachment hardware to the new spacing. The contractor shall furnish one post and the necessary hardware that is required for the new post spacing. The cost of punching, furnishing, adjusting, post spacing, and installing W-beam guardrail shall be included in the price bid for "Reset W-Beam Guardrail."

RESET W-BEAM GUARDRAIL: The engineer shall stake the locations of the "Reset W-Beam Guardrail - 6.25' Post Spacing." The stations for the guardrail are only approximate and shall be established by the engineer. Bent or damaged sections shall be removed as directed by the engineer.

The reflectorized plates shall be furnished by the contractor at the rate shown on the plans and shall not be bid as such but will be considered incidental to item "Reset W-Beam Guardrail."

Guardrail used for Reset W-Beam Guardrail and replacement of bent or damaged sections shall be obtained from salvage and reset as shown on the plans. The W-Beam End Section shall be reset and shall not be bid as such but will be considered incidental to the item "Reset W-Beam."

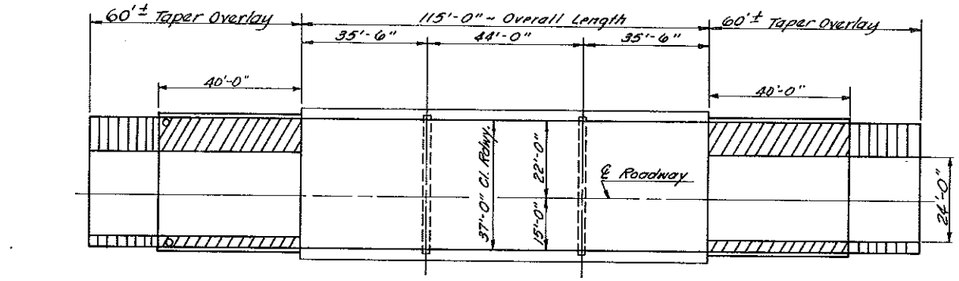
REMOVE 4-CABLE GUARDRAIL AND POSTS: The lengths of 4-cable guardrail shown on the plan to be removed shall have the cable, posts, and end anchors removed. The removed cable, posts, and hardware shall be stockpiled on the right of way in the location designated by the engineer. The stockpiled material shall remain the property of the state. If, in the opinion of the engineer, the concrete end anchors and anchor rod will not interfere with other construction, they may be cut off 1' (one foot) below ground line and surface restored to match the surrounding area. Cost of removing and stockpiling the 4-cable guardrail, posts, and hardware shall be included in the price bid for item; "Remove 4-Cable Guardrail and Posts."

MAIN LINE WEAVE TRAFFIC CONTROL: The contractor may use a taper channelization in place of the weave but a flag person shall be required at the construction zone during construction hours and the cost of the flag person shall be incidental to the traffic control.

The contractor may submit other proposals for traffic control for consideration but they shall be in conformance with the manual on traffic control devices.

SHEET REVISED
10-3-84

CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-221	8	N.D.	IR-094-4 (47)132	5



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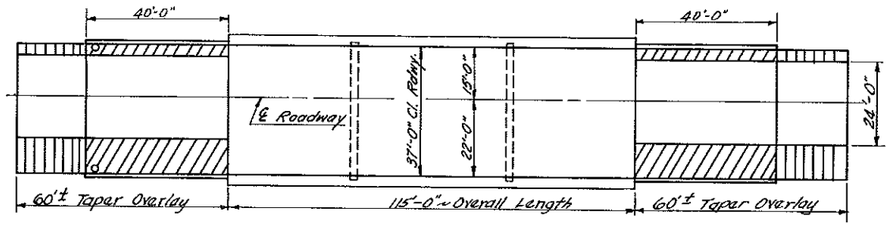
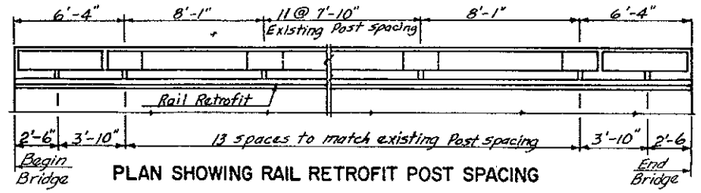
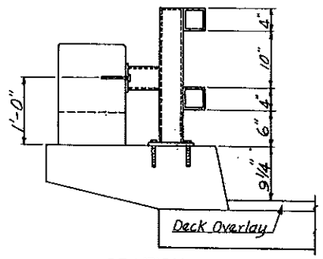


PLAN
37'-0" Clear Roadway



PLAN SHOWING RAIL RETROFIT POST SPACING



SECTION OF RAIL

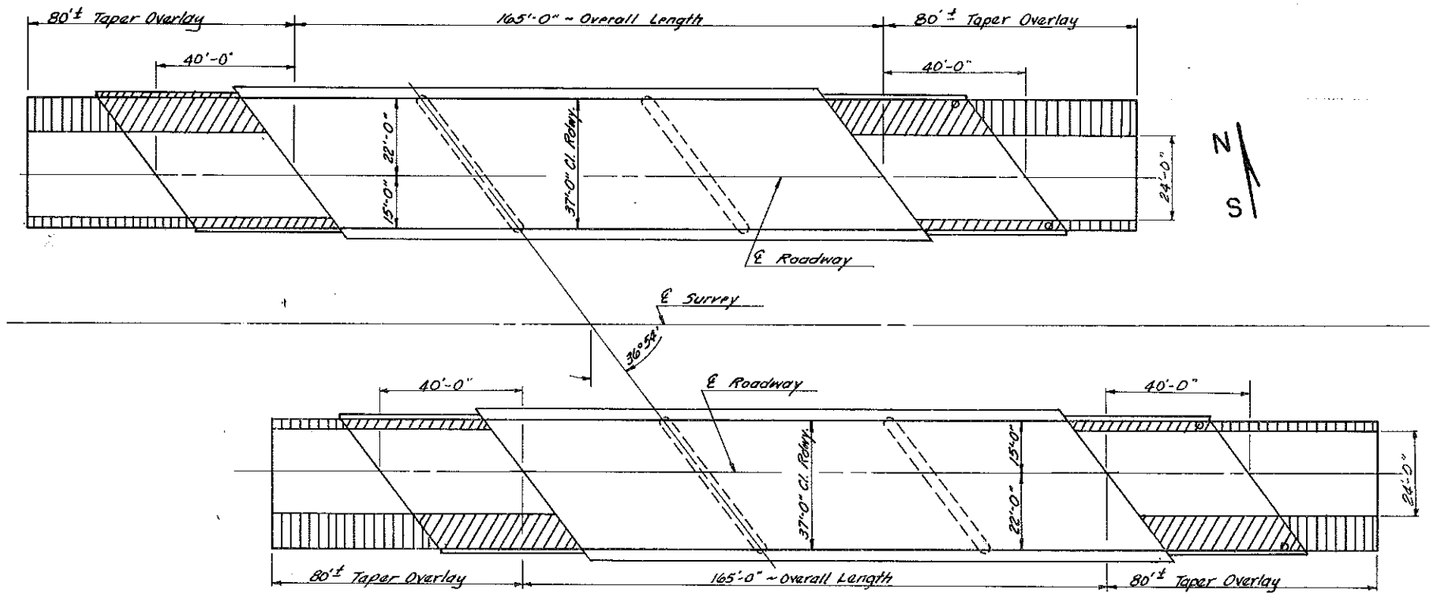
Asphalt shall be removed from top of concrete & surface cleaned. It shall then be brought to grade with overlay material. Removal & extra thickness shall be incidental to "Overlay Taper".

Asphalt shoulders shall be brought to grade with asphalt. Incidental to "Overlay Taper".

ROSEBUD SEPARATION

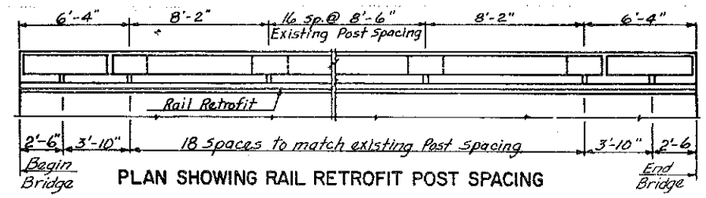
LT. & RT. 94-132.115-3

CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-231	8	N.D.	IR-094-4(47)132	6

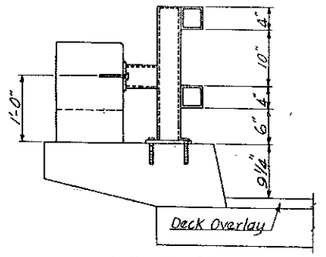


PLAN
37'-0" Clear Roadway

NOTE:
Length of taper overlay may be adjusted to match nearest joint in approach panels.



PLAN SHOWING RAIL RETROFIT POST SPACING



SECTION OF RAIL

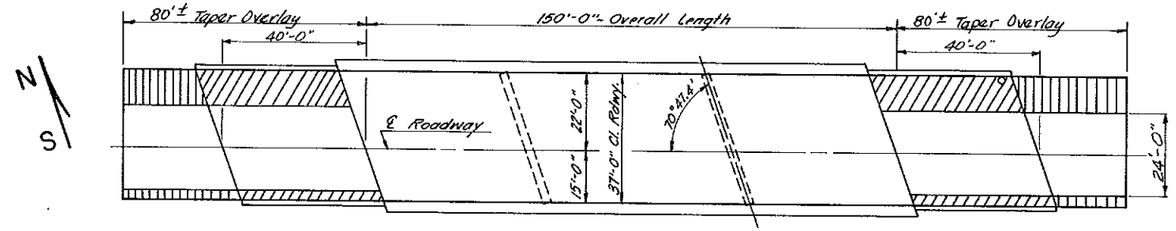
Asphalt shall be removed from top of concrete & surface cleaned. It shall then be brought to grade with overlay concrete. Removal & extra thickness shall be incidental to "Overlay Taper".

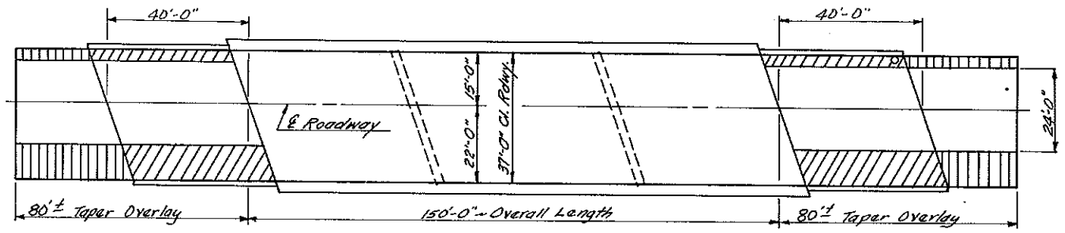
Asphalt shoulders shall be brought to grade with asphalt. Incidental to "Overlay Taper".

WEST MANDAN INTERCHANGE

LT. & RT. 94-152.329-4

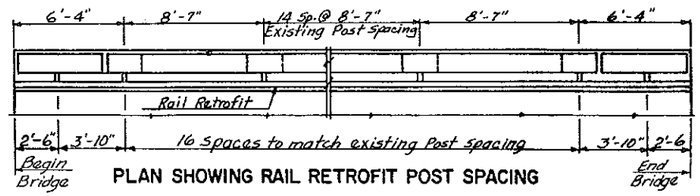
CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-231	8	N.D.	IR-094-4(47)132	7



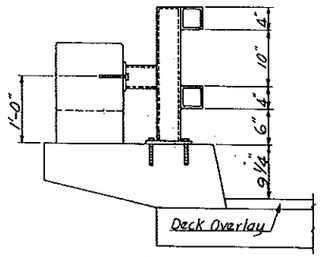


PLAN
37'-0" Clear Roadway

NOTE:
Length of taper overlay may be adjusted to match nearest joint in approach panels.



PLAN SHOWING RAIL RETROFIT POST SPACING



SECTION OF RAIL

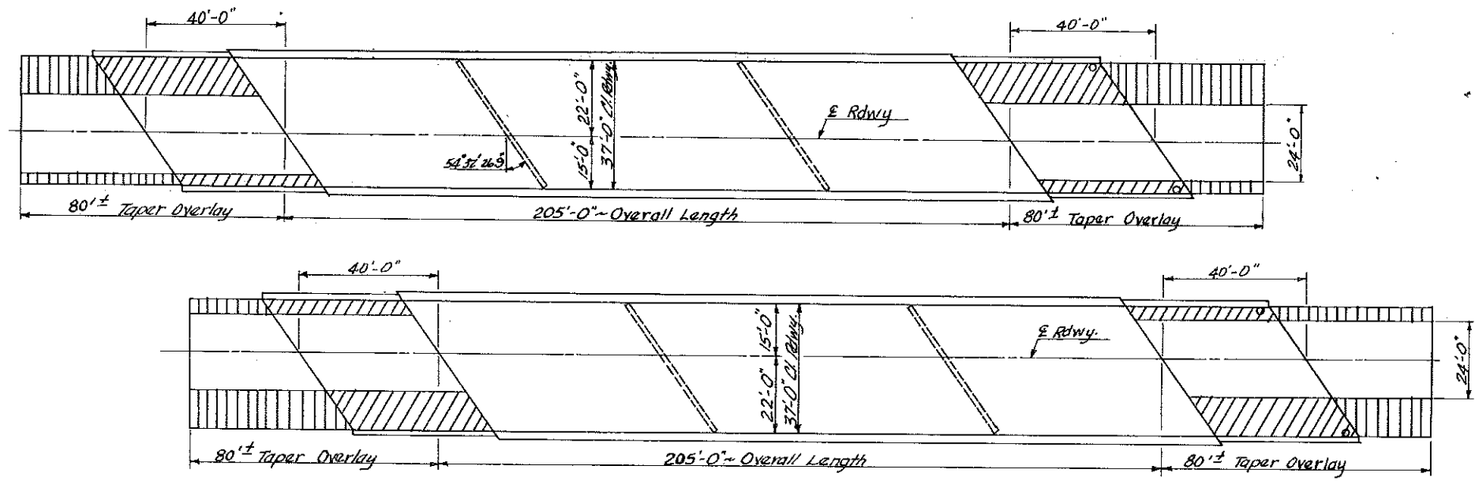
Asphalt shall be removed from top of concrete & surface cleaned. It shall then be brought to grade with overlay concrete Removal & extra thickness shall be incidental to "Overlay Taper".

Asphalt shoulders shall be brought to grade with asphalt. Incidental to "Overlay Taper".

COLLINS AVENUE SEPARATION

LT. & RT. 94-153.068-5

CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-231	8	N.D.	IR- 94-4(47)132	8

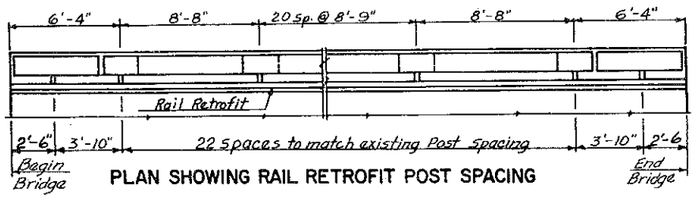


PLAN
37'-0" Clear Roadway

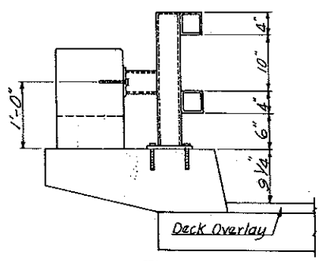
NOTE:
Length of taper overlay may be adjusted to match nearest joint in approach panels.

Asphalt shall be removed from top of concrete & surface cleaned. It shall then be brought to grade with overlay concrete. Removal & extra thickness shall be incidental to "Overlay Taper".

Asphalt shoulders shall be brought to grade with asphalt. Incidental to "Overlay Taper".



PLAN SHOWING RAIL RETROFIT POST SPACING

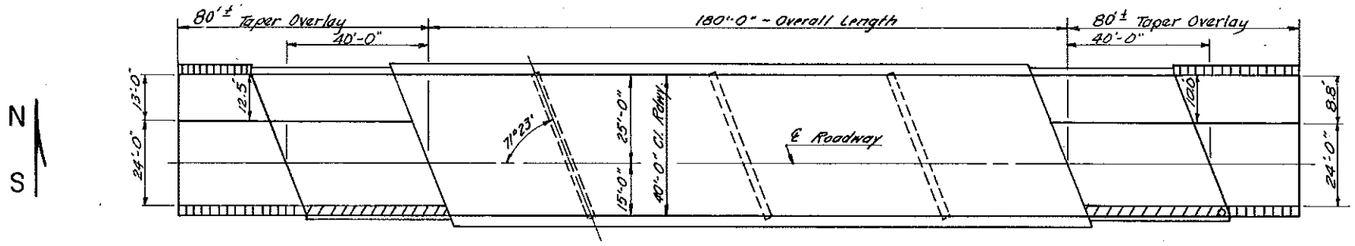


SECTION OF RAIL

REFINERY ROAD INTERCHANGE

LT. & RT. 94-153.988-6

CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-531	8	N.D.	IR- 94-4(47)132	8



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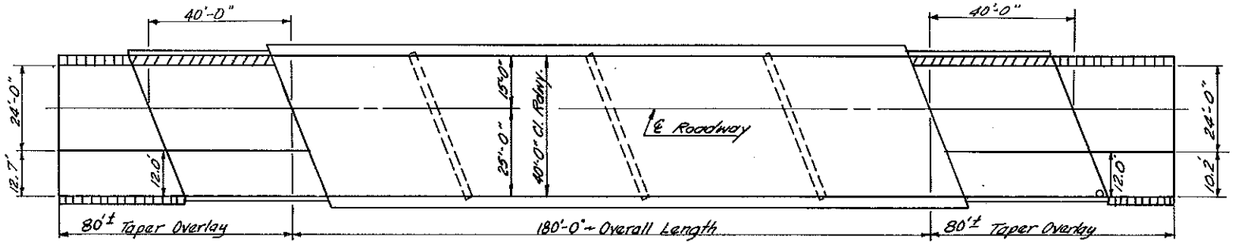
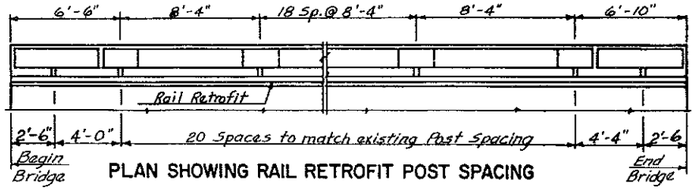
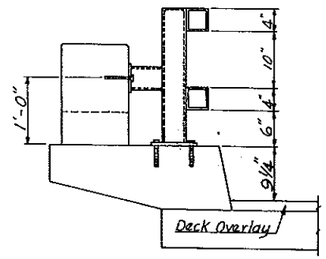


PLAN

40'-0" Clear Roadway



PLAN SHOWING RAIL RETROFIT POST SPACING



SECTION OF RAIL

Asphalt shall be removed from top of concrete & surface cleaned. It shall then be brought to grade with overlay concrete. Removal & extra thickness shall be incidental to "Overlay Taper".

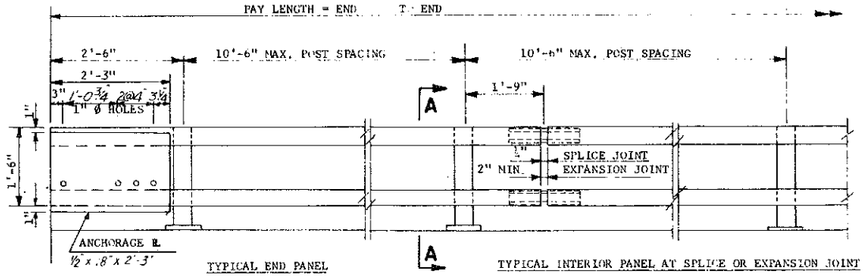
Asphalt shoulders shall be brought to grade with asphalt. Incidental to "Overlay Taper".

NOTE:
Length of taper overlay may be adjusted to match nearest joint in approach panels.

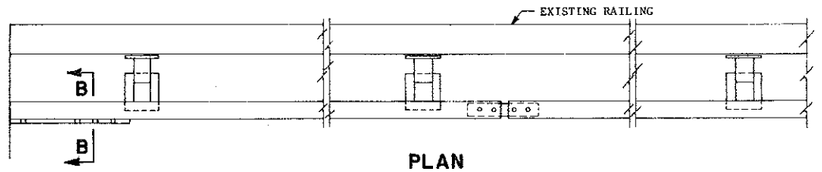
BNRR SEPARATION

LT. & RT. 94-154.232-7

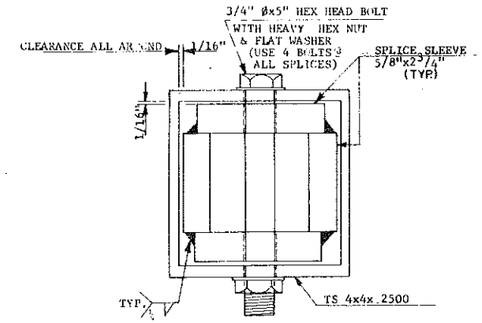
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	10



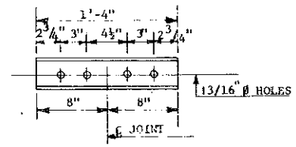
ELEVATION



PLAN



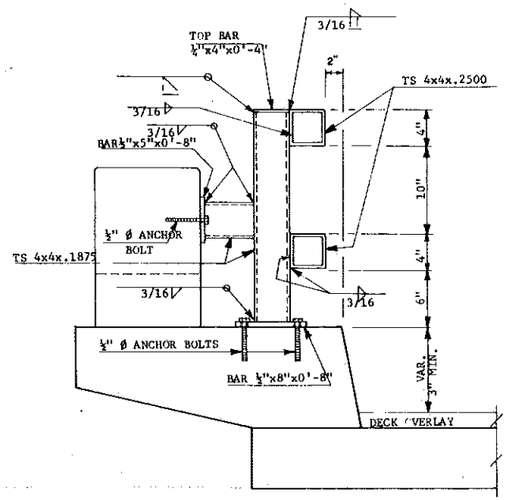
RAIL SPLICE



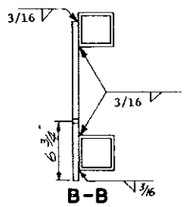
SPLICE SLEEVE AT SPLICE

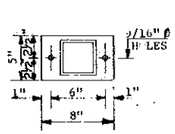
NOTES:

1. THE BID ITEM SHALL BE "DOUBLE BEAM RAILING RETROFIT". THE PAY LENGTH SHALL BE END TO END AND SHALL BE IN LINEAL FEET.
2. THE RAILING, POSTS AND POST SUPPORTS SHALL CONFORM TO ASTM A500, COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES, GRADE B. THE POST TOPS, POST BASE, SUPPORT BASE, SHIMS AND ANCHORAGE PLATES SHALL CONFORM TO ASTM A36 STRUCTURAL STEEL.
3. THE ANCHOR BOLTS MUST BE ABLE TO DEVELOP IN TENSION THE EQUIVALENT OF A ¾" Ø A325 BOLT. THE ANCHOR BOLTS MAY BE MECHANICAL TYPE, GROUT-IN TYPE OR OTHER TYPE THAT CAN DEVELOP THE REQUIRED TENSION IN THE EXISTING CONCRETE.
4. THE TRAFFIC FACE OF THE POST SHALL BE INSTALLED VERTICAL. THE POSTS SHALL BE PERPENDICULAR TO THE TOP OF THE CURB IN THE OTHER DIRECTION. STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQUIRED FOR PROPER ALIGNMENT.
5. RAILS SHALL BE FABRICATED SO THAT EACH RAIL IS ATTACHED TO A MINIMUM OF 2 POSTS AND A MAXIMUM OF 4 POSTS
6. THE BOX BEAM RAILING RETROFIT SHALL BE FABRICATED AND GALVANIZED ACCORDING TO SECTION 850-6 OF THE STANDARD SPECIFICATIONS.
7. THE SPLICE JOINT GAP SHALL ALWAYS BE ¼". THE EXPANSION JOINT GAP SHALL BE 2" UNLESS OTHERWISE SHOWN ON THE BRIDGE PLANS.

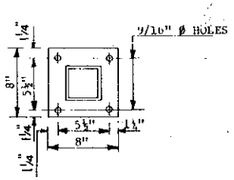


A-A

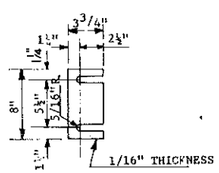




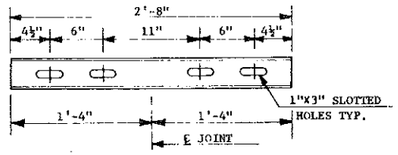
SUPPORT BASE DETAIL



POST BASE DETAIL



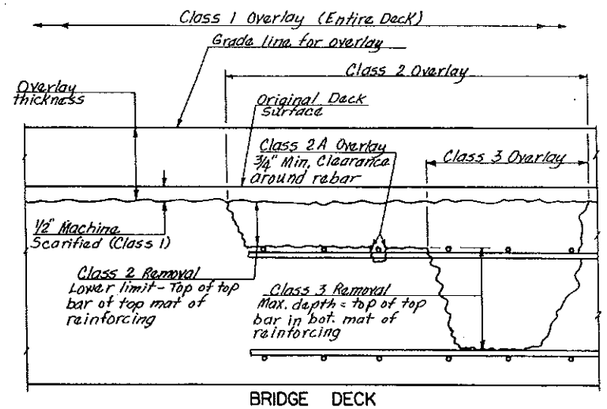
POST SHIM



SPLICE SLEEVE AT EXPANSION JOINT

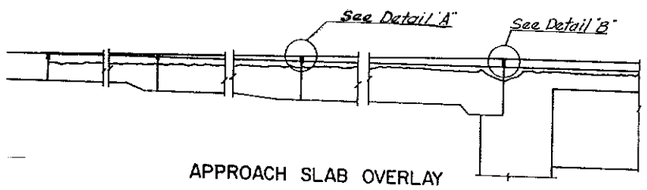
DOUBLE BOX BEAM RAIL RETROFIT
(BRACED POST)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	11

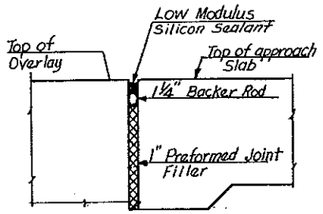


BRIDGE DECK
(Overlay classifications)

Class 4 Removal shall be below limits of Class 3 Removal to full depth

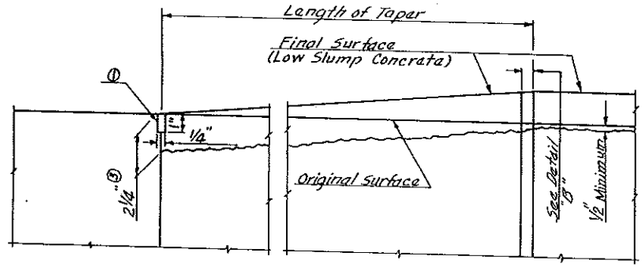


APPROACH SLAB OVERLAY



DETAIL AT END OF BRIDGE

DETAIL "B"

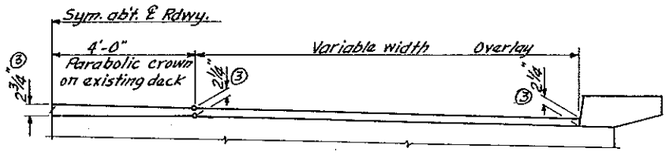


DETAIL "A"

① To be filled with hot poured elastic joint filler.

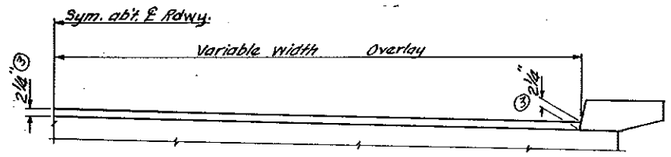
Overlay existing approach slabs only

③ Dimensions may be reduced by 3/4" if Latex Modified Concrete is used for the bridge deck overlay.



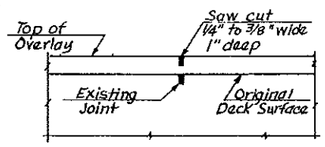
ELEVATION

Rosebud Separation, NW Mandan Int. & Refinery Road Int.



ELEVATION

Collins Ave. & BNRR Sep.

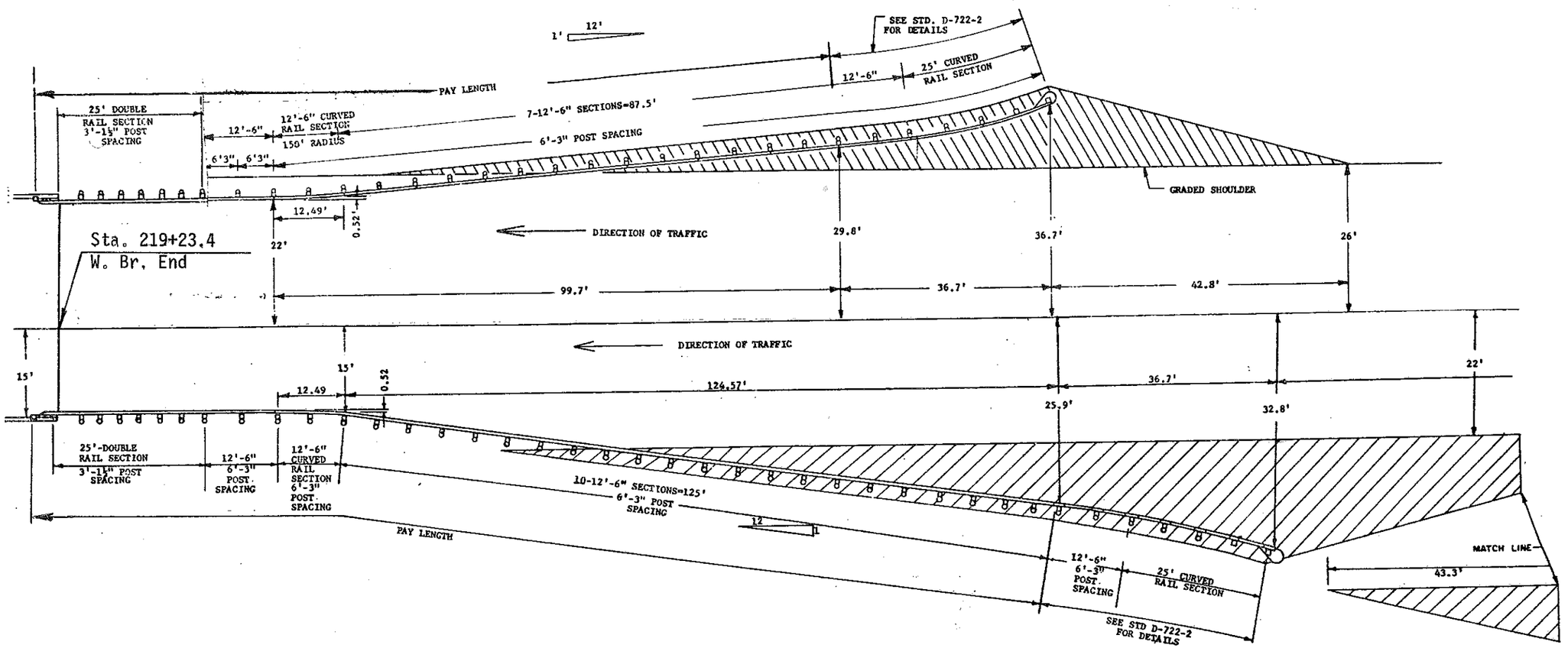


CONSTRUCTION OR RELIEF JOINTS
(TRANSVERSE & LONGITUDINAL)

Incidental to Class 1 Overlay or Overlay Taper

OVERLAY DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	12

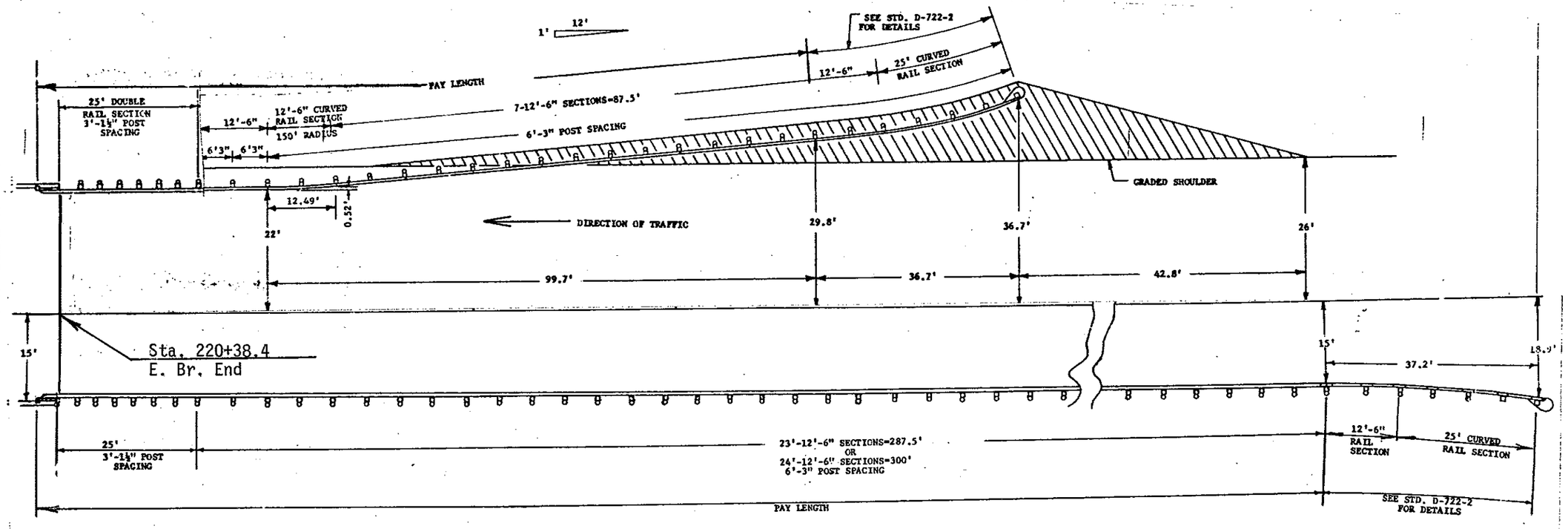


W-Beam Guardrail Layout

Rosebud Separation

E. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	13



W-Beam Guardrail Layout

Rosebud Separation

W. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	14

ESTIMATED GUARDRAIL QUANTITIES*

W-Beam Guardrail

LOCATION	12'6" RAIL SECTION EA	BACKING PLATE EA	LINE POSTS EA	6"X6"X14" WOODEN OFFSET BLOCK EA	5/8" DIA. POST ATTACHMENT BOLTS EA	5/8" DIA. X 2" LONG SPLICE BOLTS EA	7/8" DIA. X 2" LONG BOLTS EA	W-BEAM TERMINAL CONNECTION EA	REFLECTORIZED PLATES EA	12'-6" CURVED RAIL SECTION EA		
217+86.4 to 219+25.5 Rt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
217+73.6 to 219+25.5 Med. Rt.		1	3 (1)	3 (1)	3 (1)	16	4	1	9	1		
220+36.3 to 221+75.6 Lt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
220+36.3 to 223+63.2 Med. Lt.	13	13	26	26	26	112	4	1	7			
TOTALS	21	24	51	51	51	224	16	4	30	3		

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail 6.25' Post Spacing."

(1) One additional post and hardware is provided for installation in the 25' Double Rail Section because of shorter post spacing.

INSTALL W-BEAM GUARDRAIL-6.25' POST SPACING

217+86.4 to 219+25.4 Rt.	64.4 LF
218+73.6 to 219+25.5 Rt. Med.	14.4 LF
220+36.3 to 221+75.6 Lt.	64.4 LF
220+36.3 to 223+63.2	164.4 LF

EMBANKMENT TYPE C 400 CY

REMOVE 4-CABLE GUARDRAIL & POSTS

220+38.4 to 220+98.4 Rt.	60 LF
218+63.4 to 219+23.4 Lt.	60 LF

RESET BEAM GUARDRAIL-6.25' POST SPACING

218+36.2 to 218+73.6	37.5 LF
218+86.1 to 219+23.6 Rt.	37.5 LF
217+49.0 to 218+73.6 Rt.Med.	125 LF
218+86.1 to 219+23.6 Rt.Med.	37.5 LF
220+38.2 to 220+75.7 Lt.	37.5 LF
220+38.2 to 221+25.8 Lt.	37.5 LF
220+38.2 to 222+00.7 Lt.Med.	162.5 LF

W-BEAM GUARDRAIL QUANTITIES

ROSEBUD SEPARATION

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-094-4(47)132	15

ESTIMATED GUARDRAIL QUANTITIES *

W- Beam Guardrail - Flared End Treatment & Transition

LOCATION	Rail Section	Curved Rail Section	Line Posts	6" X 8" Wood Anchor Posts	Concrete Footings	6" X 6" X 14" Wooden Offset Block	Backing Plate	Anchor Plate and Cable Assembly	2' - 6" Special End Shoe	Buffer End Section		5/8" Dia. Post Attachment Bolts	Splice Bolts	Reflectorized Plates			
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA		EA	EA	EA			
217+49.3 to 217+86.4 Rt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
217+12.9 to 217+49.0 Rt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
221+75.6 to 222+12.7 Lt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
223+63.2 to 224+06.3 Lt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
TOTALS	50	100	20	8	8	16	16	4	8	4		28	100	8			

*These items are not to be bid separately but shall be included in the price bid for item; " W- Beam Guardrail-Flared End Treatment & Transition."

INSTALL W-BEAM GUARDRAIL-FLARED END TREATMENT & TRANSITION

217+49.2 to 217+86.4 Rt.	1 EA
217+12.9 to 217+49.0 Rt. Med.	1 EA
221+75.6 to 222+12.7 Lt.	1 EA
223+63.2 to 224+00.3 Lt. Med.	1 EA

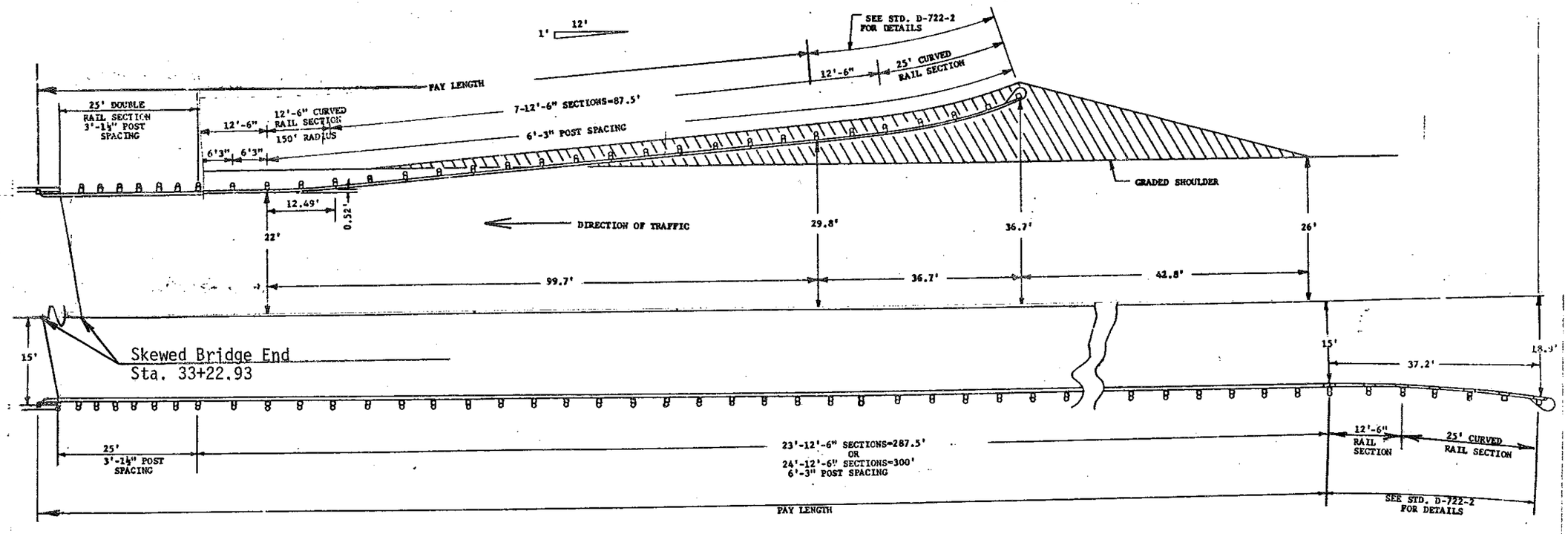
REMOVE W-BEAM GUARDRAIL & POSTS

218+25.1 to 219+25.1 Rt.	100 LF
217+25.1 to 219+25.1 Rt. Med.	200 LF
220+36.7 to 221+36.7 Lt.	100 LF
220+96.7 to 222+36.7 Lt. Med.	200 LF

W-BEAM GUARDRAIL QUANTITIES

ROSEBUD SEPARATION

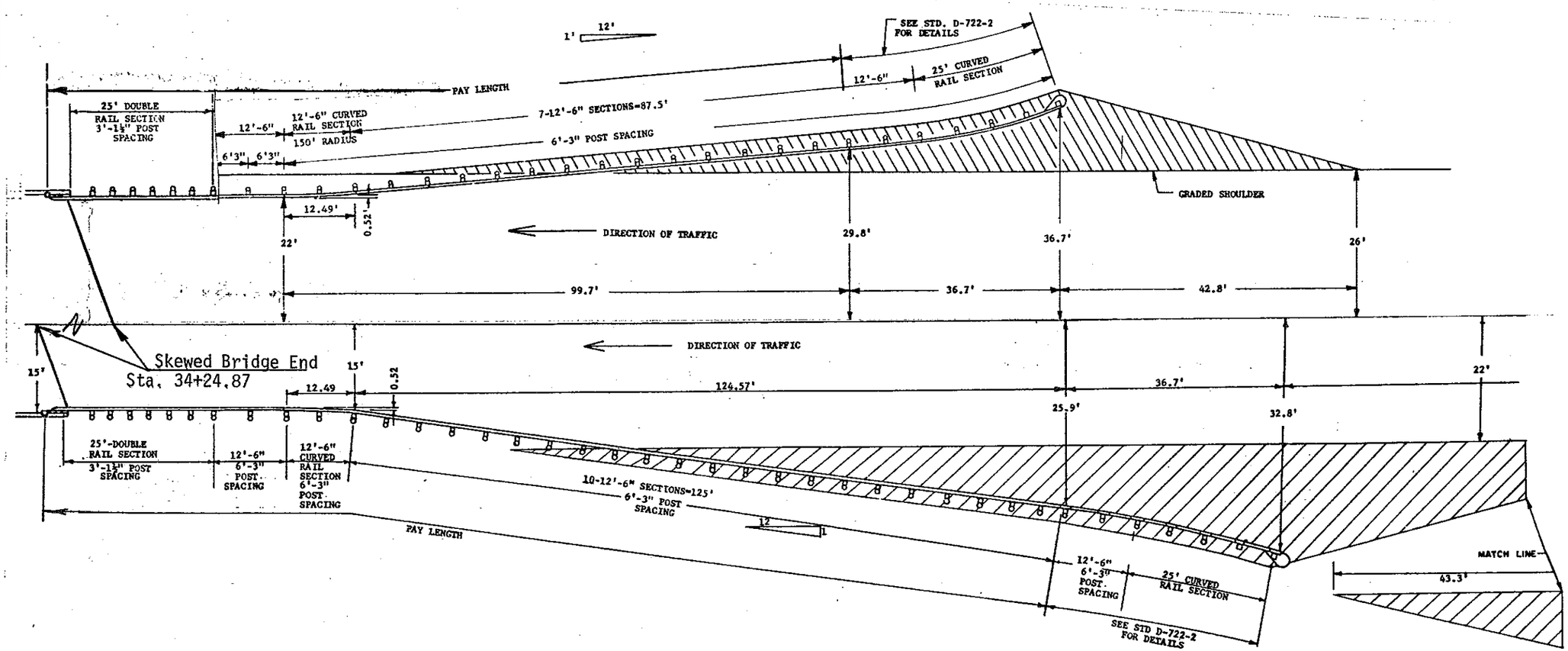
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	16



W-Beam Guardrail Layout
Sunset Drive Interchange

E. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	17



W-Beam Guardrail Layout

Sunset Drive Interchange

W. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	18

ESTIMATED GUARDRAIL QUANTITIES*

LOCATION	W-Beam Guardrail											
	12'6" RAIL SECTION	BACKING PLATE	LINE POSTS	6"X6"X14" WOODEN OFFSET BLOCK	5/8" DIA. POST ATTACHMENT BOLTS	5/8" DIA. X 1¼"LONG SPLICE BOLTS	7/8" DIA. X 2" LONG BOLTS	W-BEAM TERMINAL CONNECTION	REFLECTORIZED PLATES	12'-6" CURVED RAIL SECTION		
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
32+02.3 to 33+41.5 Rt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
30+86.8 to 32+49.3 Rt. Med.	13	13	26 (1)	26 (1)	26 (1)	112	4	1	9			
34+08.4 to 35+45.5 Lt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
34+34.1 to 34+86.0 Lt. Med.		1	3 (1)	3 (1)	3 (1)	8	4	1	9	1		
TOTALS	21	24	51	55	55	216	16	4	32	3		

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail 6.25' Post Spacing."

(1) One additional post and hardware is provided for installation in the 25' Double Rail Section because of shorter post spacing.

INSTALL W-BEAM GUARDRAIL-6.25' POST SPACING

32+02.3 to 33+41.5	64.4 LF
30+86.8 to 32+49.3 Rt. Med.	164.4 LF
34+08.4 to 35+45.5 Lt.	64.4 LF
34+34.1 to 34+86.0 Lt. Med.	14.4 LF

EMBANKMENT TYPE C 510 CY

RESET W-BEAM GUARDRAIL-6.25' POST SPACING

32+52.1 to 32+89.6 Rt.	37.5 LF
33+02.1 to 33+39.1 Rt.	37.5 LF
32+49.3 to 33+11.8 Rt. Med.	162.5 LF
34+08.2 to 34+45.7 Lt.	37.5 LF
34+58.2 to 34+95.7 Lt.	37.5 LF
34+36.0 to 34+73.5 Lt. Med.	37.5 LF
34+86.0 to 36+11.0 Lt. Med.	125.0 LF

REMOVE W-BEAM GUARDRAIL & POSTS

35+01.1 to 35+51.1 Rt.	50 LF
31+96.7 to 32+46.7 Lt.	50 LF

W-BEAM GUARDRAIL QUANTITIES

SUNSET DRIVE INTERCHANGE

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-094-4(47)132	19

ESTIMATED GUARDRAIL QUANTITIES *

W- Beam Guardrail - Flared End Treatment & Transition

LOCATION	Rail Section	Curved Rail Section	Line Posts	6" X 8" Wood Anchor Posts	Concrete Footings	6" X 6" X 14" Wooden Offset Block	Backing Plate	Anchor Plate and Cable Assembly	2' - 6" Special End Shoe	Buffer End Section		5/8" Dia. Post Attachment Bolts	Splice Bolts	Reflectorized Plates			
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA		EA	EA	EA			
31+65.2 to 32+02.3Rt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
30+49.7 to 30+86.8 Rt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
35+45.5 to 35+82.6 Lt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
36+11.0 to 36+48.1 Lt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
TOTALS	50	100	20	8	8	16	16	4	8	4		28	100	8			

*These items are not to be bid separately but shall be included in the price bid for item; "W- Beam Guardrail-Flared End Treatment & Transition."

INSTALL W-BEAM GUARDRAIL-FLARED END TREATMENT & TRANSITION

31+65.2 to 32+02.3	Rt.	1 EA
30+49.7 to 30+86.8	Rt. Med.	1 EA
35+45.5 to 35+82.6	Lt.	1 EA
36+11.0 to 36+48.1	Lt. Med.	1 EA

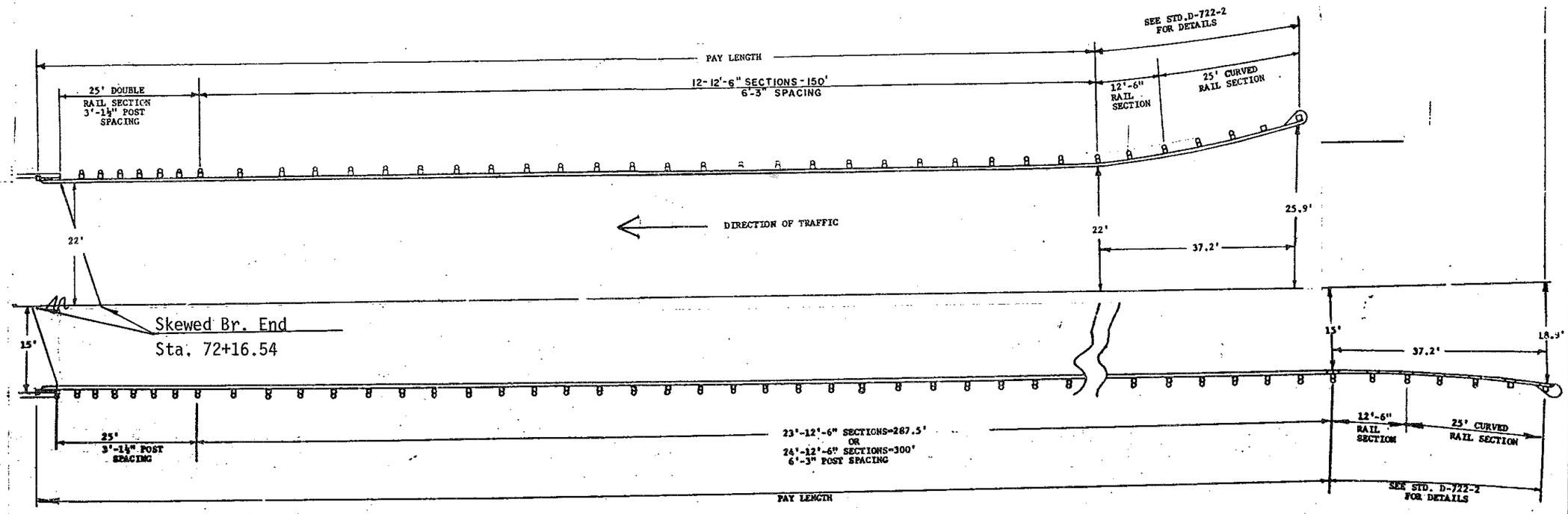
REMOVE W-BEAM GUARDRAIL & POSTS

32+41.1 to 33+41.1	Rt.	100 LF
31+13.3 to 33+13.3	Rt. Med.	200 LF
34+06.7 to 35+06.7	Lt.	100 LF
34+34.5 to 36+34.5	Lt. Med.	200 LF

W-BEAM GUARDRAIL QUANTITIES

SUNSET DRIVE INTERCHANGE

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	20

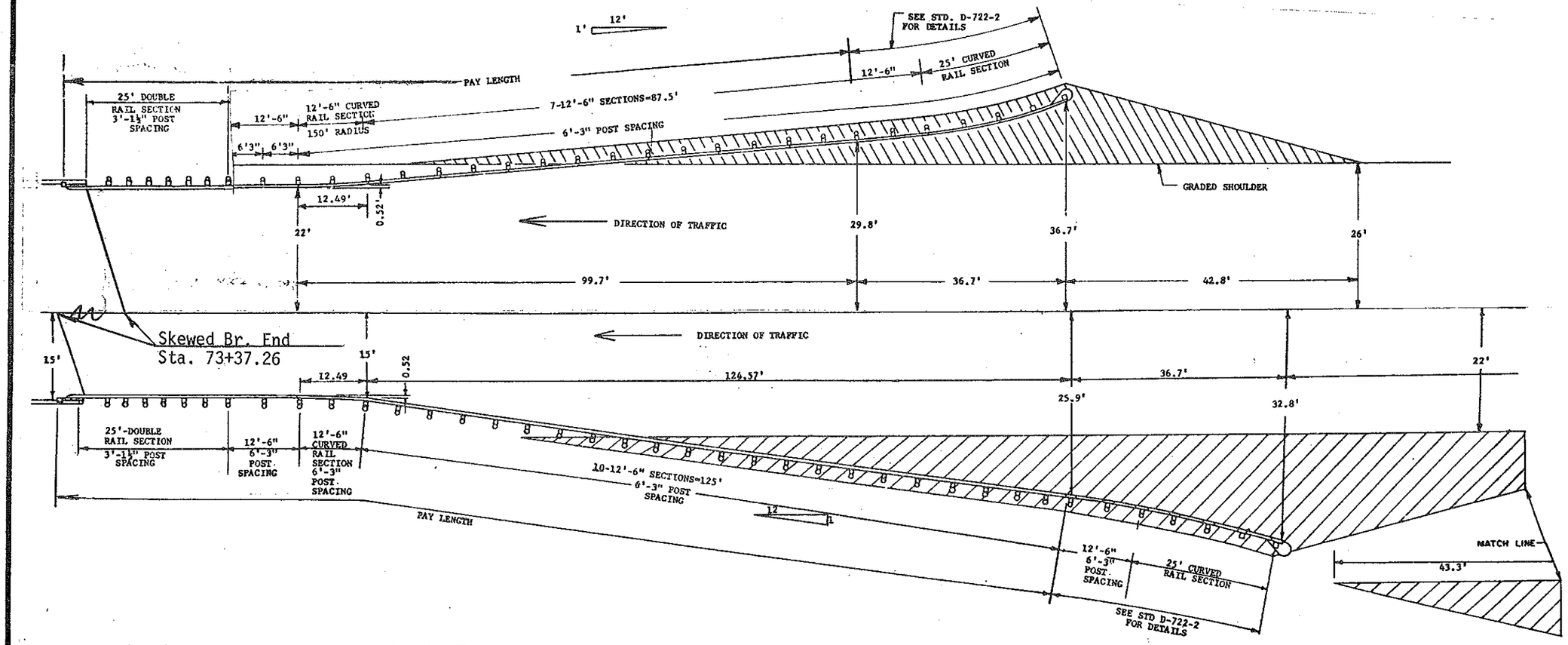


W-BEAM GUARDRAIL LAYOUT

Collins Avenue Seperation

E. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	21



W-Beam Guardrail Layout
Collins Avenue Separation

W. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N.D.	IR-094-4(47)132	22

ESTIMATED GUARDRAIL QUANTITIES*

W-Beam Guardrail

LOCATION	12'-6" RAIL SECTION	BACKING PLATE	LINE POSTS	6"X6"X14" WOODEN OFFSET BLOCK	5/8" DIA. POST ATTACHMENT BOLTS	5/8" DIA. X 1¼" LONG SPLICE BOLTS	7/8" DIA. X 2" LONG BOLTS	W-BEAM TERMINAL CONNECTION	REFLECTORIZED PLATES	12'-6" CURVED RAIL SECTION		
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
72+24.5 to 72+26.4 Rt.			1 (1)	1 (1)	1 (1)	8	4	1	9			
71+61.4 to 72+13.3 Med.Rt.		1	3 (1)	3 (1)	3 (1)	16	4	1	9	1		
73+27.8 to 73+66.9 Lt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
73+40.3 to 73+92.2 Med. Lt.		1	3 (1)	3 (1)	3 (1)	16	4	1	9	1		
TOTALS	4	7	18	18	18	88	16	4	34	3		

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail-6.25' Post Spacing."

(1) One additional post and hardware is provided for installation in the 25' Double Rail Section because of shorter post spacing.

**For replacement of bent sections

INSTALL W-BEAM GUARDRAIL-6.25' POST SPACING

72+24.5 to 72+26.4 Rt.	1.9 LF
71+61.4 to 72+13.3 Med. Rt.	14.4 LF
73+27.8 to 73+66.9 Lt.	64.4 LF
73+40.3 to 73+92.2 Med. Lt.	14.4 LF

REMOVE W-BEAM GUARDRAIL & POSTS

70+13.5 to 72+26 Rt.	212.5 LF
70+12.9 to 72+12.9 Med.Rt.	200 LF
73+72.0 to 74+22.0 Lt.	100 LF
73+42.4 to 75+42.4 Med.Lt.	200 LF
71+31.8 to 71+81.8 Lt.	50 LF
73+72.0 to 74+22.0 Rt.	50 LF

RESET W-BEAM GUARDRAIL-6.25' POST SPACING

70+49.5 to 72+24.5 Rt.	175 LF
70+36.8 to 71+61.4 Med.Rt.	125 LF
71+73.9 to 72+11.4 Med.Lt.	37.5 LF
73+29.7 to 73+67.2 Lt.	37.5 LF
73+79.7 to 73+17.1 Lt.	37.5 LF

EMBANKMENT TYPE C 200 CY

W-BEAM GUARDRAIL QUANTITIES

COLLINS AVENUE SEPARATION

FHWA REGION	STATE	FED AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	23

ESTIMATED GUARDRAIL QUANTITIES*

W-Beam Guardrail - Flared End Treatment & Transition

LOCATION	RAIL SECTION	CURVED RAIL SECTION	LINE POSTS	6"X8" WOOD ANCHOR POSTS	CONCRETE FOOTINGS	6"X6"X14" WOODEN OFFSET BLOCK	BACKING PLATE	ANCHOR PLATE AND CABLE ASSEMBLY	2'-6" SPECIAL END SHOE	BUFFER END SECTION	5/8" DIA. POST ATTACHMENT BOLTS	SPLICE BOLTS	REFLECTORIZED PLATES				
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA				
70+12.4 to 70+49.5 Rt.	12.5	25	5	2	2	4	4	1	1	1	7	25	2				
69+99.7 to 70+36.8 Med. Rt.	12.5	25	5	2	2	4	4	1	1	1	7	25	2				
74+66.9 to 75+04.0 Lt.	12.5	25	5	2	2	4	4	1	1	1	7	25	2				
75+16.8 to 75+53.9 Med. Lt.	12.5	25	5	2	2	4	4	1	1	1	7	25	2				
TOTALS	50	100	20	8	8	16	16	4	4	4	28	100	8				

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail-Flared End Treatment & Transition."

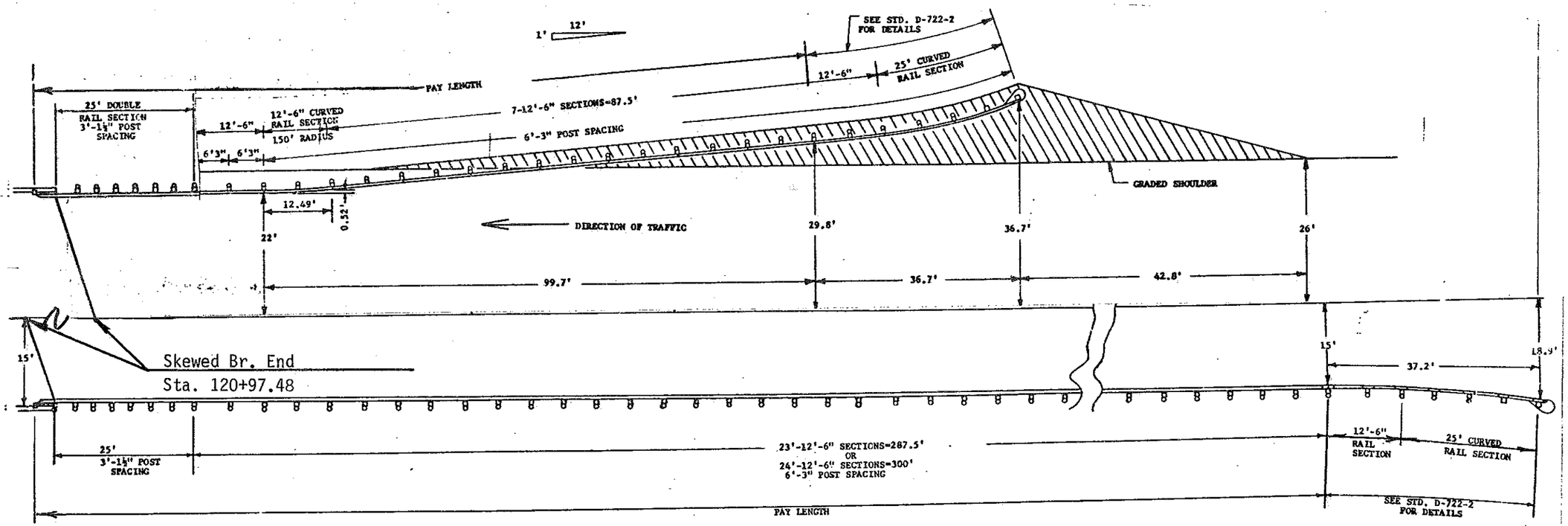
INSTALL W-BEAM GUARDRAIL-FLARED END TREATMENT & TRANSITION

70+12.4 to 70+49.5 Rt.	1 EA
69+99.7 to 70+36.8 Med.Rt.	1 EA
74+66.9 to 75+04.0 Lt.	1 EA
75+16.8 to 75+53.9 Med.Lt.	1 EA

W-BEAM GUARDRAIL QUANTITIES

COLLINS AVENUE SEPARATION

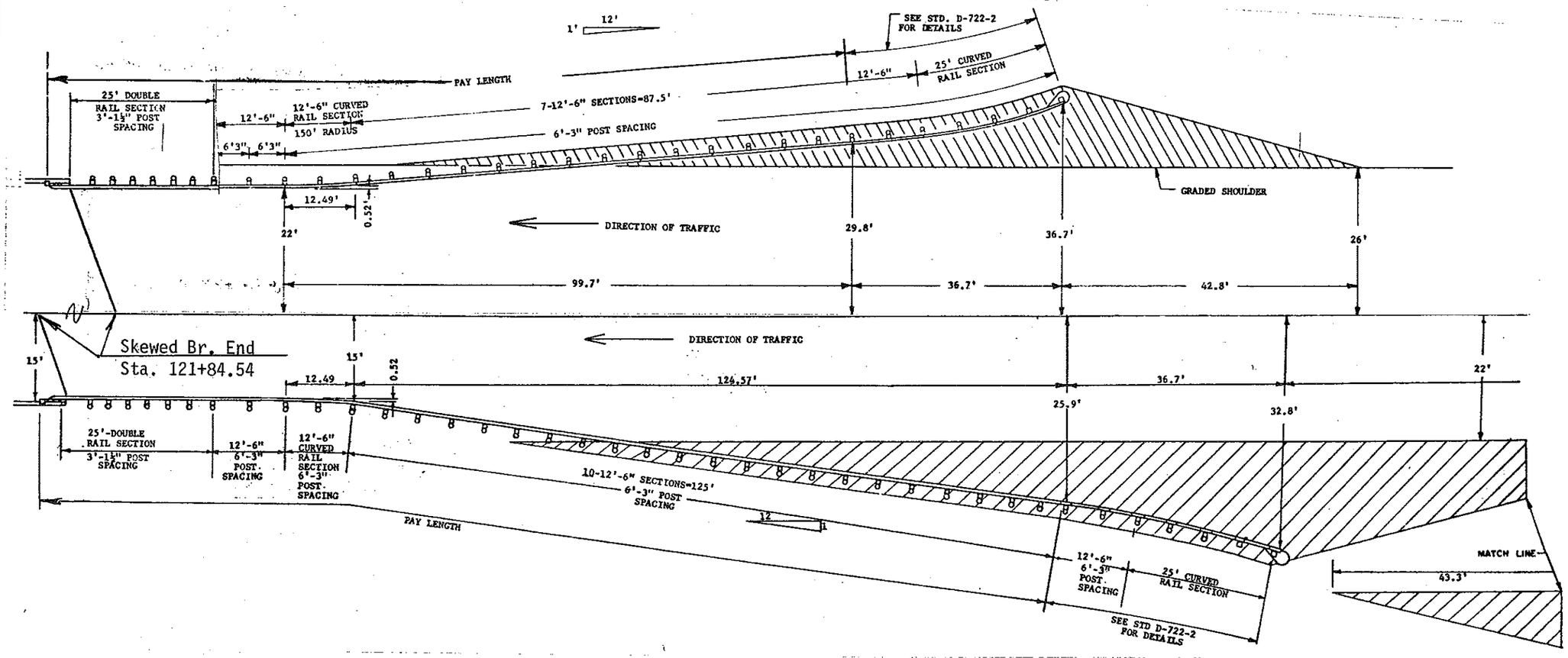
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	24



W-Beam Guardrail Layout
Mandan Avenue Interchange

E. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	25



W-Beam Guardrail Layout

Mandan Avenue Interchange

W. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4 (47)132	26

ESTIMATED GUARDRAIL QUANTITIES*

W-Beam Guardrail

LOCATION	12'6" RAIL SECTION	BACKING PLATE	LINE POSTS	6"X6"X14" WOODEN OFFSET BLOCK	5/8" DIA. POST ATTACHMENT BOLTS	5/8" DIA. X1¼"LONG SPLICE BOLTS	7/8" DIA. X 2" LONG BOLTS	W-BEAM CONNECTION TERMINAL	REFLECTORIZED PLATES	12'-6" CURVED RAIL SECTION		
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
119+91.4 to 121+28.6 Rt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
117+51.6 to 120+76.6 Rt. Med.	13	13	27 (1)	27 (1)	27 (1)	112	4	1	8			
121+51.5 to 122+90.6 Lt.	4	5	11 (1)	11 (1)	11 (1)	48	4	1	7	1		
122+03.5 to 122+55.4 Lt. Med.		1	3 (1)	3 (1)	3 (1)	16	4	1	9	1		
TOTALS	21	24	52	52	52	224	16	4	31	3		

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail 6.25' Post Spacing."

(1) One additional post and hardware is provided for installation in the 25' Double Rail Section because of shorter post spacing.

INSTALL W-BEAM GUARDRAIL-6.25' POST SPACING

119+91.4 to 12 +28.6 Rt.	64.4 LF
117+51.6 to 120+76.6 Rt.Med.	164.4 LF
121+51.5 to 122+90.6 Lt.	64.4 LF
122+03.5 to 122+55.4 Lt.Med.	14.4 LF

REMOVE W-BEAM GUARDRAIL & POSTS

119+10 to 119+60 Lt.	50 LF
123+22 to 123+72 Rt.	50 LF
120+30.1 to 121+30.1 Rt.	100 LF
120+08.2 to 118+80.2 Med. Rt.	200 LF
121+51.9 to 122+51.9 Lt.	100 LF
122+03.9 to 124+03.9 Lt. Med.	200 LF

RESET W-BEAM GUARDRAIL-6.25' POST SPACING

120+41.2 to 120+78.6 Rt.	37.5 LF
120+91.1 to 121+28.6 Rt.	37.5 LF
119+14.11to 120+76.6 Rt. Med.	162.5 LF
121+63.4 to 121+90.9 Lt.	37.5 LF
122+03.4 to 122+40.3 Lt.	37.5 LF
122+05.4 to 122+42.9 Rt. Med.	37.5 LF
122+55.4 to 123+80.0 Lt. Med.	125 LF

EMBANKMENT TYPE C 575 CY

W-BEAM GUARDRAIL QUANTITIES

MANDAN AVENUE INTERCHANGE

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-094-4(47)132	27

ESTIMATED GUARDRAIL QUANTITIES *

W-Beam Guardrail - Flared End Treatment & Transition

LOCATION	Rail Section	Curved Rail Section	Line Posts	6" X 8" Wood Anchor Posts	Concrete Footings	6" X 6" X 14" Wooden Offset Block	Backing Plate	Anchor Plate and Cable Assembly	2' - 6" Special End Shoe	Buffer End Section		5/8" Dia. Post Attachment Bolts	Splice Bolts	Reflectorized Plates			
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA		EA	EA	EA			
119+54.3 to 119+91.4 Rt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
117+14.5 to 117+51.6 Rt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
122+90.6 to 123+27.7 Lt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
123+80.0 to 124+17.1 Lt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
TOTALS	50	100	20	8	8	16	16	4	8	4		28	100	8			

*These items are not to be bid separately but shall be included in the price bid for item; " W-Beam Guardrail-Flared End Treatment & Transition."

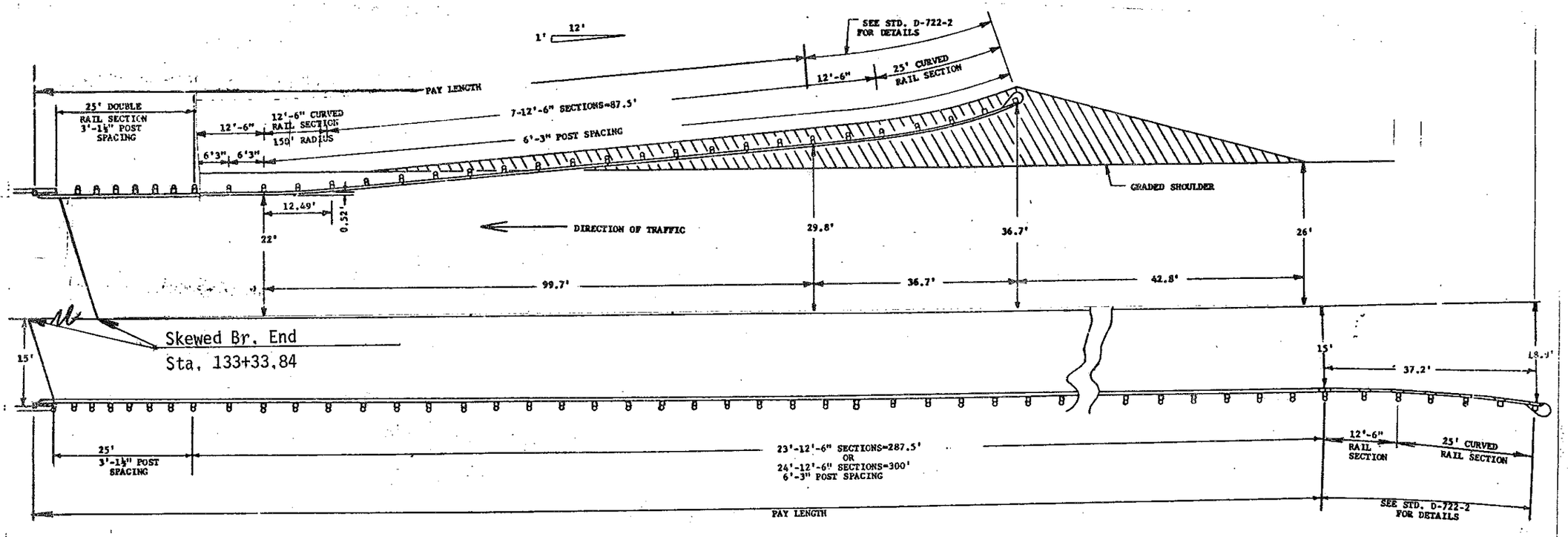
INSTALL W-BEAM GUARDRAIL-FLARED END TREATMENT & TRANSITION

119+54.3 to 119+91.4 Rt.	1 EA
117+14.5 to 117+51.6 Rt.Med.	1 EA
122+90.6 to 123+27.7 Lt.	1 EA
123+80.0 to 124+17.1 Lt.Med.	1 EA

W-BEAM GUARDRAIL QUANTITIES

MANDAN AVENUE INTERCHANGE

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	28

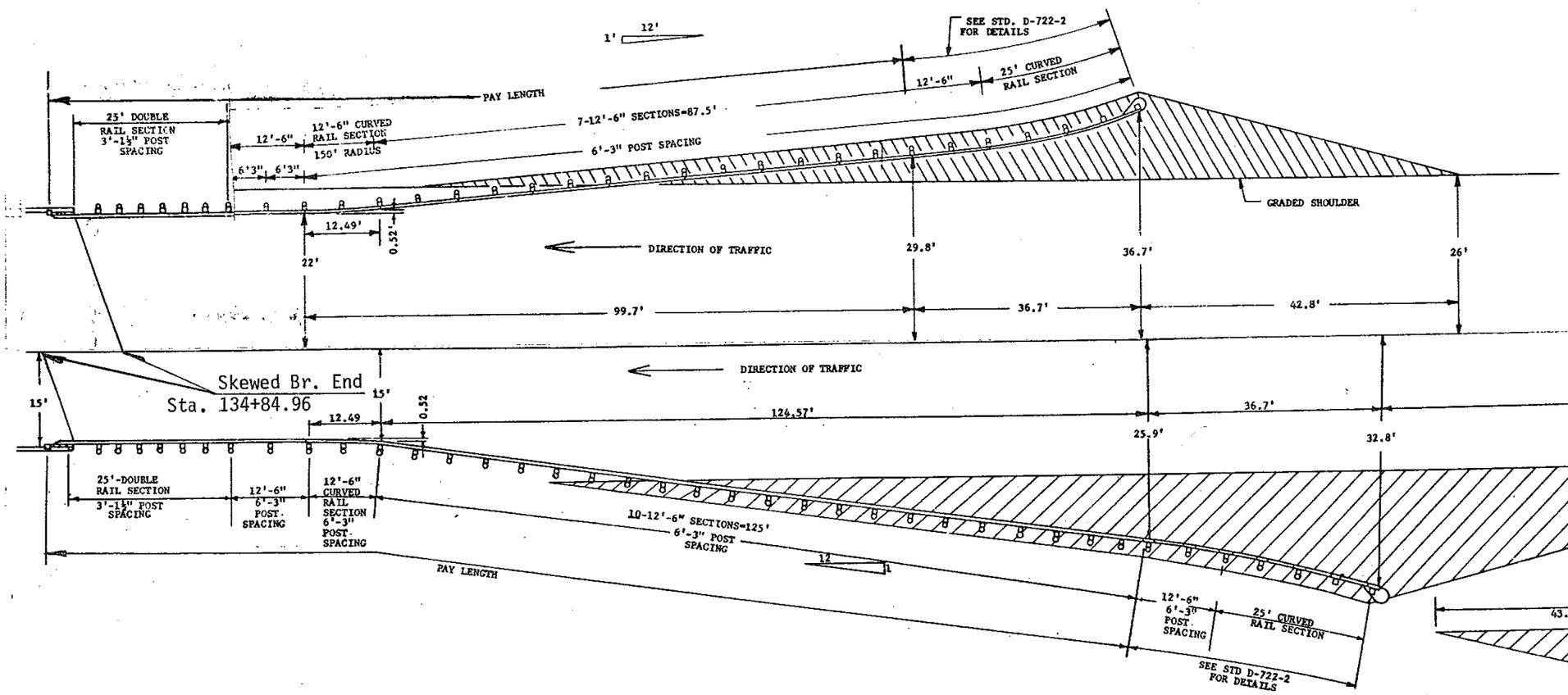


W-Beam Guardrail Layout

BN Railroad Separation

E. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	29



W-BEAM GUARDRAIL LAYOUT

BN RAILROAD SEPARATION

W. Bound Roadway

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	30

ESTIMATED GUARDRAIL QUANTITIES*

W-Beam Guardrail

LOCATION	12'6" RAIL SECTION	BACKING PLATE	LINE POSTS	6"X6"X14" WOODEN OFFSET BLOCK	5/8" DIA. POST ATTACHMENT BOLTS	5/8" DIA. X1¼"LONG SPLICE BOLTS	7/8" DIA. X 2" LONG BOLTS	W-BEAM TERMINAL CONNECTION	REFLECTORIZED PLATES	12'-6" CURVED RAIL SECTION		
	EA	EA	EA	EA	EA	EA	EA	EA	EA			
130+05.2 to 133+44.3 Rt.	4	5	11 1	11 1	11 1	48	4	1	7	1		
130+03.9 to 133+30.8 Rt. Med.	13	13	27 (1)	27 (1)	27 (1)	112	4	1	8			
134+74.5 to 136+13.6 Lt.	4	5	11 (1)	11 1	11 (1)	48	4	1	7	1		
134+88.0 to 136+64.5 Lt. Med.	1	2	5 (1)	5 1	5 (1)	24	4	1	9	1		
TOTALS	22	25	54	54	54	232	16	4	31	3		

*These items are not to be bid separately but shall be included in the price bid for item; "W-Beam Guardrail 6.25' Post Spacing."

(1) One additional post and hardware is provided for installation in the 25' Double Rail Section because of shorter post spacing.

INSTALL W-BEAM GUARDRAIL-6.25' POST SPACING

130+03.9 to 133+30.8 Rt. Med. 164.4 LF
132+05.2 to 133+44.3 Rt. 64.4 LF
134+74.5 to 136+13.6 Lt. 64.4 LF
134+88.0 to 136+64.5 Lt. Med. 26.9 LF

REMOVE W-BEAM GUARDRAIL & POSTS

135+23.7 to 135+73.7 Rt. 50 LF
132+50.3 to 133+00.3 Lt. 50 LF

RESET W-BEAM GUARDRAIL-6.25' POST SPACING

133+42.4 to 133+04.9 Rt. 37.5 LF
132+92.4 to 132+55.0 Rt. 37.5 LF
131+66.4 to 132+28.9 Rt. Med. 162.5 LF
134+76.4 to 135+13.9 Lt. 37.5 LF
135+26.4 to 135+63.8 Lt. 37.5 LF
134+84.9 to 135+27.4 Lt. Med. 37.5 LF
135+39.9 to 136+52.0 Lt. Med. 112.5 LF

EMBANKMENT TYPE C 800 CY

W-BEAM GUARDRAIL QUANTITIES

BN RAILROAD SEPARATION

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-094-4 (47)132	31

ESTIMATED GUARDRAIL QUANTITIES *

W- Beam Guardrail - Flared End Treatment & Transition

LOCATION	Rail Section	Curved Rail Section	Line Posts	6" X 8" Wood Anchor Posts	Concrete Footings	6" X 6" X 14" Wooden Offset Block	Backing Plate	Anchor Plate and Cable Assembly	2' - 6" Special End Shoe	Buffer End Section		5/8" Dia. Post Attachment Bolts	Splice Bolts	Reflectorized Plates			
	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA		EA	EA	EA			
131+68.5 to 132+05.2 Rt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
129+66.7 to 130+03.9 Rt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
136+13.6 to 136+40.3 Lt.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
136+64.5 to 137+01.2 Lt. Med.	12.5	25	5	2	2	4	4	1	2	1		7	25	2			
TOTALS	50	100	20	8	8	16	16	4	8	4		28	100	8			

*These items are not to be bid separately but shall be included in the price bid for item; " W-Beam Guardrail-Flared End Treatment & Transition."

INSTALL W-BEAM GUARDRAIL FLARED END TREATMENT & TRANSITION

131+68.5 to 132+05.2	Rt.	1 EA
129+66.7 to 130+03.9	Rt. Med.	1 EA
136+13.6 to 136+40.3	Lt.	1 EA
136+64.5 to 137+01.2	Lt. Med.	1 EA

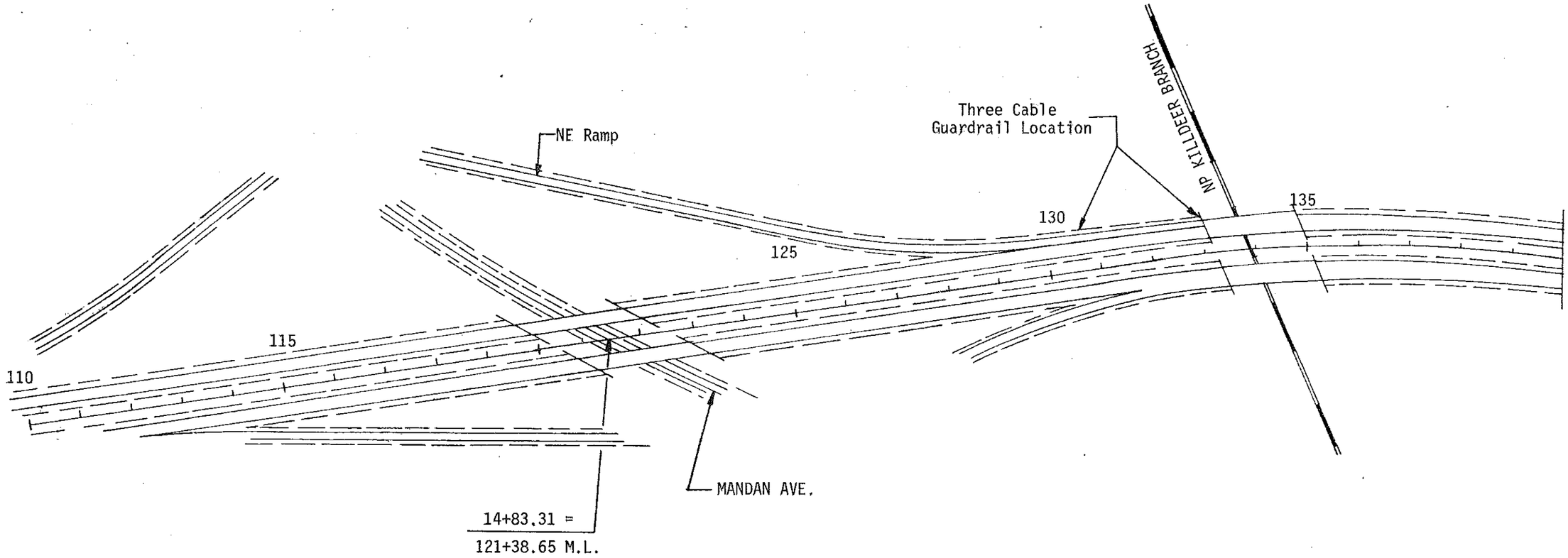
REMOVE W-BEAM GUARDRAIL & POSTS

132+43.9 to 133+43.9	Rt.	100 LF
131+32.5 to 133+32.5	Rt.Med.	200 LF
134+74.9 to 135+74.9	Lt.	100 LF
134+88.4 to 137+08.4	Lt.Med.	200 LF

W-BEAM GUARDRAIL QUANTITIES

BN RAILROAD SEPARATION

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	32



THREE CABLE GUARDRAIL LOCATION

BN Railroad Separation

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	33

ESTIMATED GUARDRAIL QUANTITIES*

LOCATION	Three-Cable Guardrail											
	CONCRETE BEARING BLOCK	POSTS		TENSION SPRING ASSEMBLIES	ANCHOR BLOCK	HOOK BOLT BRACKETS	END TURNBUCKLE TIE RODS	REFLECTORIZED PLATES	END POST ASSEMBLY	TURNBUCKLE ANCHOR ROD		
		LINE	END									
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
131+12.3 to 133+24.8 Lt.	2	16	2	1	2	16	2	8	2	2		
TOTAL	2	16	2	1	2	16	2	8	2	2		

*These items are not to be bid separately but shall be included in the price bid for item; "Three-Cable Guardrail,"

INSTALL 3-CABLE GUARDRAIL

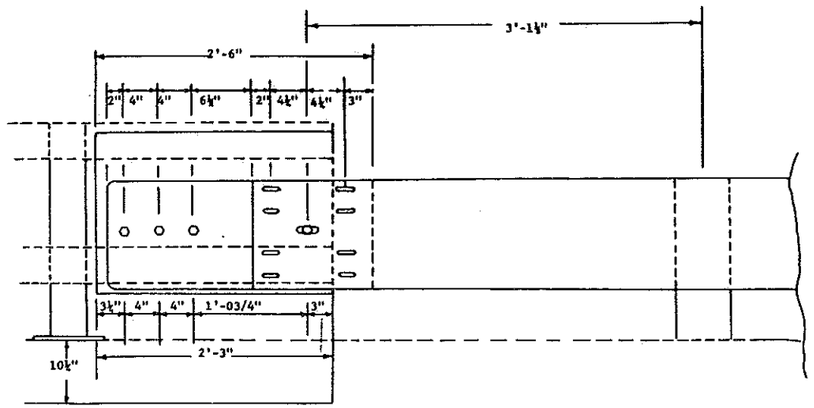
131+12.3 to 133+24.8 Lt. 212.5 LF

The 3-Cable guardrail shall be placed directly behind the curb and continue, at that distance from ℄, for its entire length.

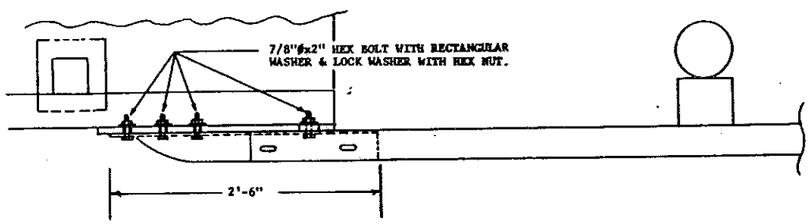
THREE CABLE GUARDRAIL QUANTITIES

BN Railroad Separation

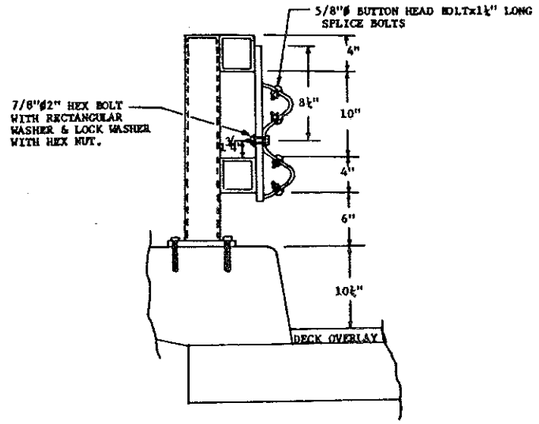
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	34



ELEVATION



PLAN



END VIEW

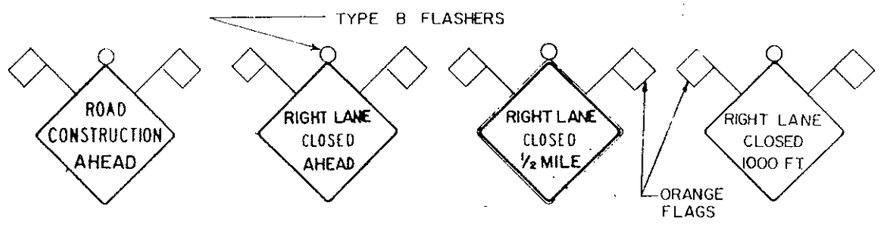
W-BEAM GUARDRAIL BRIDGE

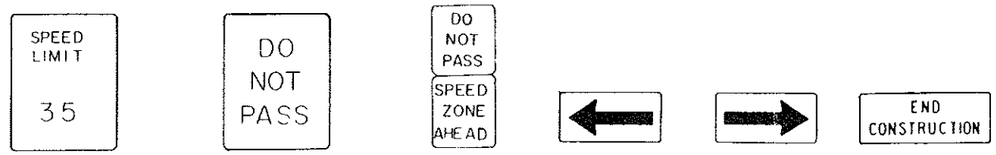
END CONNECTION DETAILS

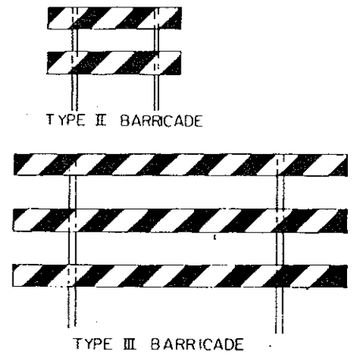
RETROFIT BRIDGE RAILING

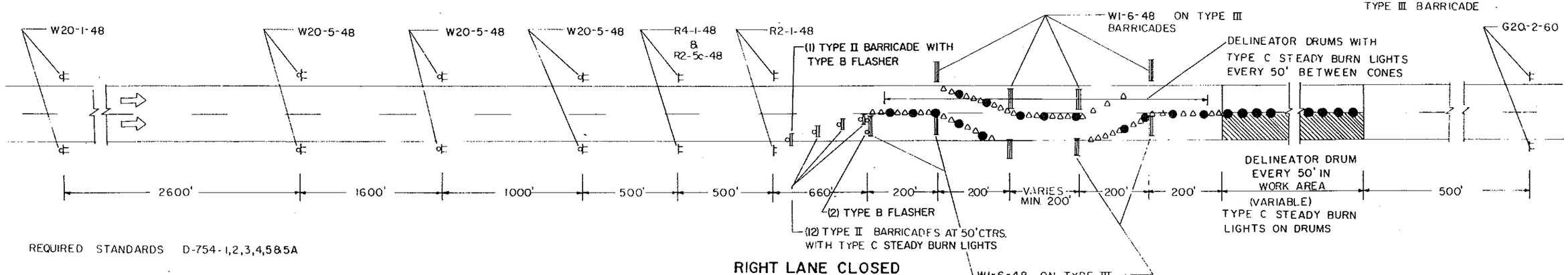
FHWA REGION	STATE	FED. AID PROJ NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	35

SIGN LAYOUT FOR ONE LANE CLOSURE
INTERSTATE SYSTEM



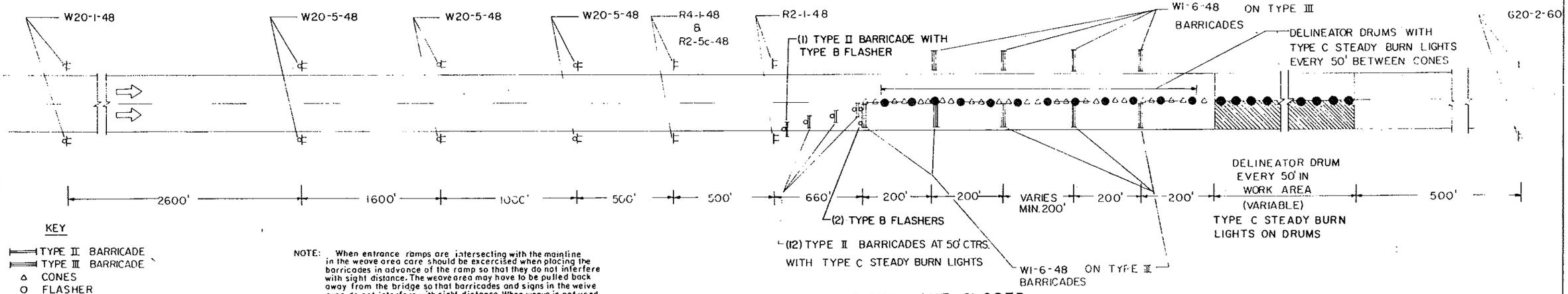






REQUIRED STANDARDS D-754-1,2,3,4,5&5A

RIGHT LANE CLOSED
WORKMEN IN WORK AREA



RIGHT LANE CLOSED
NO WORKMEN IN WORK AREA

KEY

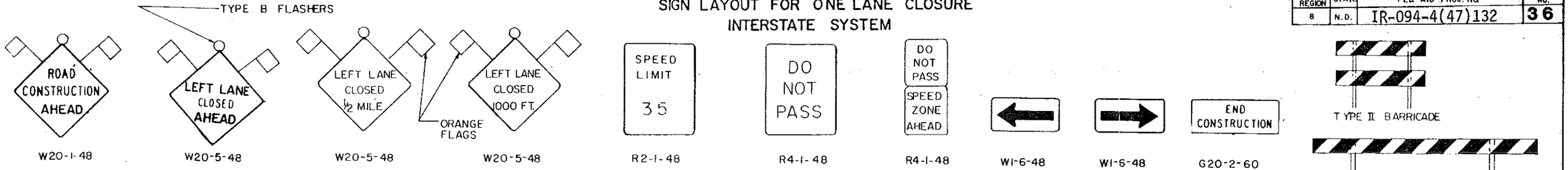
- TYPE II BARRICADE
- TYPE III BARRICADE
- CONES
- FLASHER
- DELINEATOR DRUM
- SIGNS
- WORK AREA

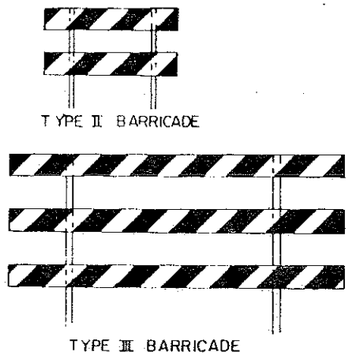
NOTE: When entrance ramps are intersecting with the mainline in the weave area care should be excercised when placing the barricades in advance of the ramp so that they do not interfere with sight distance. The weave area may have to be pulled back away from the bridge so that barricades and signs in the weive area do not interfere with sight distance. When weave is not used the barricades and signs should be moved out of the way off the roadway in such a way to provide maximum sight distance.

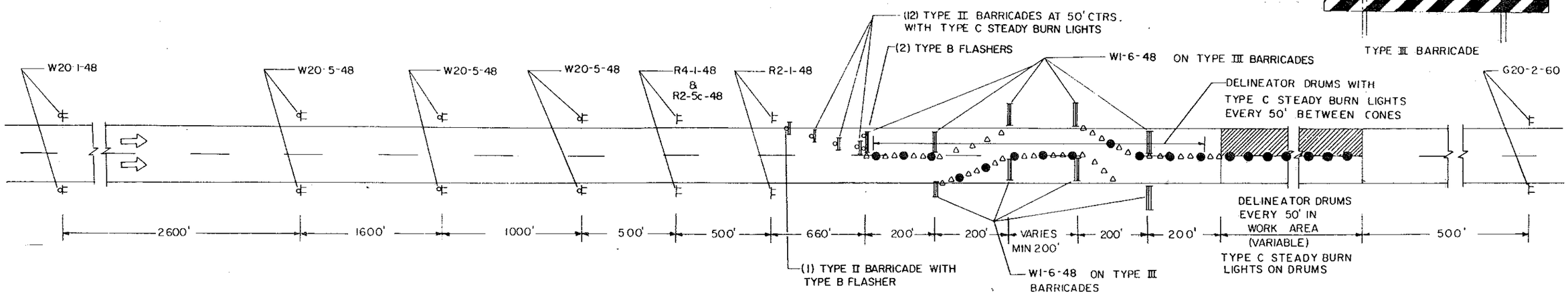
SHEET REVISED
10-3-84

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	36

SIGN LAYOUT FOR ONE LANE CLOSURE
INTERSTATE SYSTEM

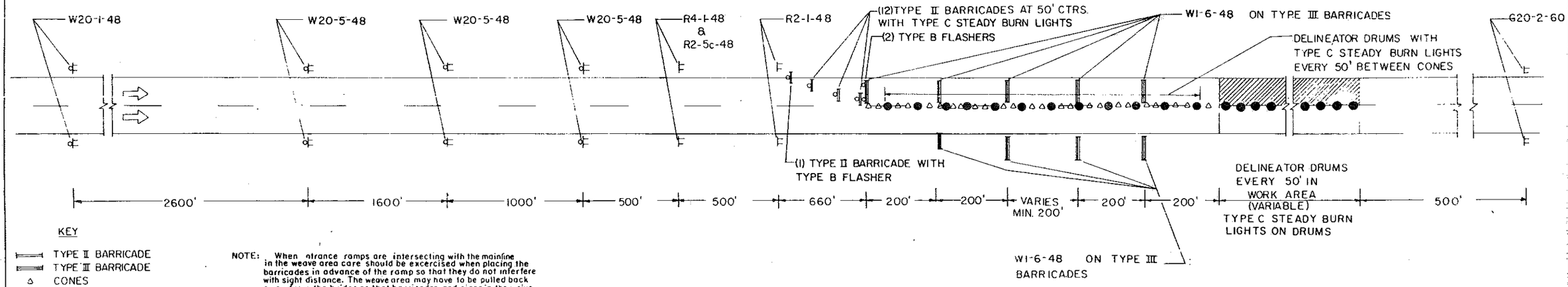






REQUIRED STANDARDS D-754-1,2,3,4,5&5A

LEFT LANE CLOSED
WORKMEN IN WORK AREA



KEY

- TYPE II BARRICADE
- TYPE III BARRICADE
- CONES
- FLASHER
- DELINEATOR DRUM
- SIGNS
- WORK AREA

NOTE: When ntrance ramps are intersecting with the mainline in the weave area care should be excercised when placing the barricades in advance of the ramp so that they do not interfere with sight distance. The weave area may have to be pulled back away from the bridge so that barricades and signs in the weive area do not interfere with sight distance. When weave is not used the barricades and signs should be moved out of the way off the roadway in such a way to provide maximum sight distance.

LEFT LANE CLOSED
NO WORKMEN IN WORK AREA

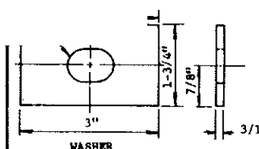
SHEET REVISED

10-3-84

W BEAM GUARDRAIL GENERAL DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	38

D-722-1

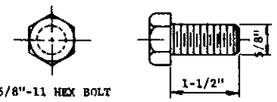


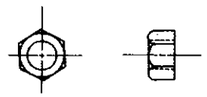
WASHER

3/16" (APPROX. BASE METAL THICKNESS)

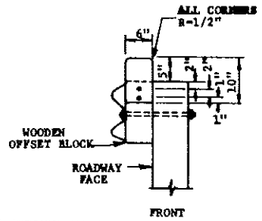
RECTANGULAR PLATE WASHER

NO RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE 2nd THRU 8th POST OF END TREATMENT.

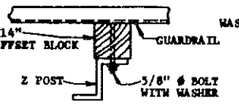

5/8"-11 HEX BOLT


5/8"-11 HEX NUT

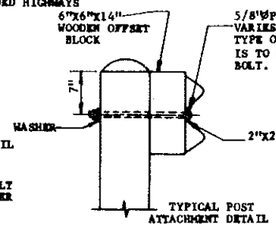
5/8" HEX BOLT AND NUT



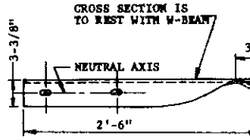
REFLECTORIZED PLATE DETAIL

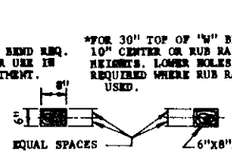


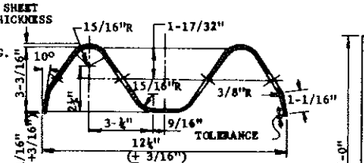
Z POST ATTACHMENT DETAIL

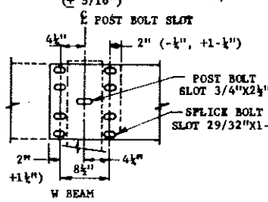


TYPICAL POST ATTACHMENT DETAIL

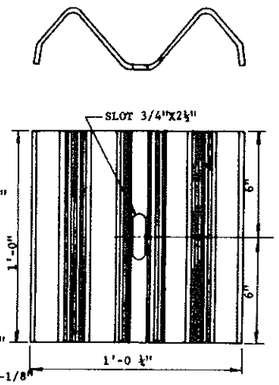




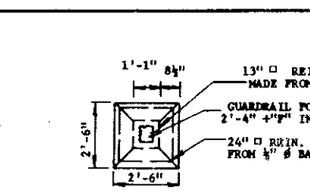




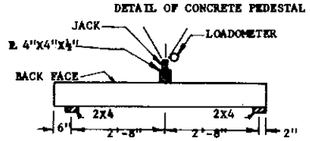
W BEAM



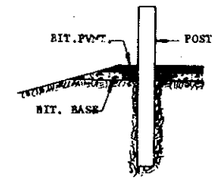
W BEAM BACK-UP PLATE



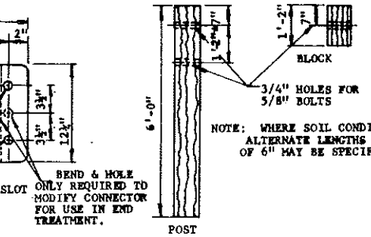
DETAIL OF CONCRETE PEDESTAL FOR POSTS



TRANSVERSE LOAD TEST (CONCRETE POSTS)



REPLACEMENT OF SURFACING

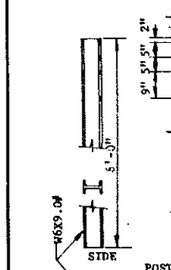


W BEAM TERMINAL CONNECTOR

BLOCK

NOTE: WHERE SOIL CONDITIONS REQUIRE ALTERNATE LENGTHS IN INCREMENTS OF 6" MAY BE SPECIFIED.

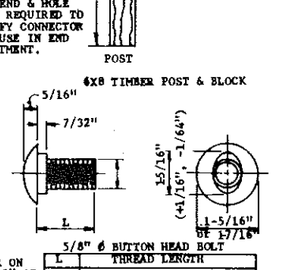
BEND & HOLE ONLY REQUIRED TO MODIFY CONNECTOR FOR USE IN END TREATMENT.



STRUCTURAL SHAPE POST AND BLOCK

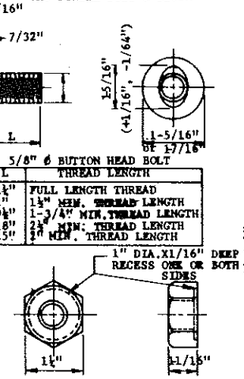
FRONT (TRAFFIC FACE) SIDE

6X8 CONCRETE POST



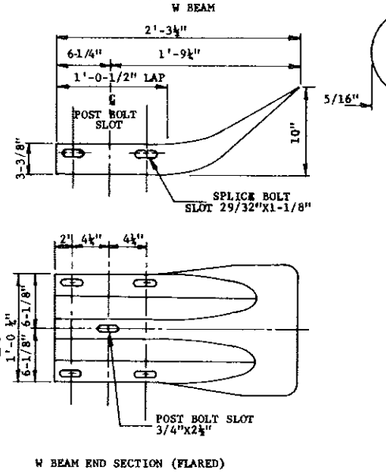
5/8" ϕ BUTTON HEAD BOLT

L	THREAD LENGTH
1¼"	FULL LENGTH THREAD
2"	1½" MIN. THREAD LENGTH
9½"	1-3/4" MIN. THREAD LENGTH
18"	2½" MIN. THREAD LENGTH
25"	2½" MIN. THREAD LENGTH

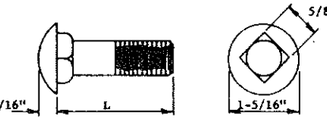


5/8" ϕ RECESS NUT

5/8" BUTTON HEAD BOLT AND RECESS NUT

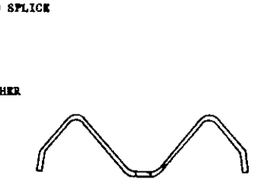


W BEAM END SECTION (FLARED)



5/8" ϕ CARRIAGE BOLT

L	THREAD LENGTH
11"	FULL THREAD
3"	1½" MIN. THREAD LENGTH
11"	1-3/4" MIN. THREAD LENGTH
13"	1-3/4" MIN. THREAD LENGTH


5/8" ϕ HEX NUT

5/8" CARRIAGE BOLT & NUT

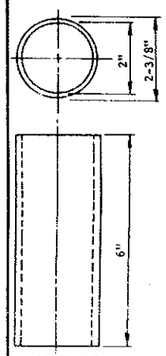
NOTE: REFLECTORS: THE REFLECTOR SHALL BE THE SAME COLOR AS THE PAVEMENT MARKING ADJACENT TO THE REFLECTOR UNLESS NOTED OTHERWISE ON THE PLANS.

ALTERNATE FOR CONCRETE FOOTINGS: A STEEL TUBE WITH A SOIL PLATE MAY BE USED AS AN ALTERNATE FOR CONCRETE FOOTINGS END TREATMENT. THE BREAKAWAY WOOD POST SHALL BE 6"X8"X[illegible]" LONG.

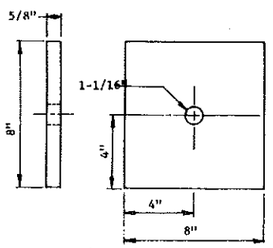
DETAIL OF CONCRETE PEDESTAL FOR POSTS: TO BE USED OVER CULVERTS OR FOOTINGS WHEN DIMENSION "P" IS LESS THAN 3'-8". WHEN Z OR ROUND POSTS ARE USED AND THE PEDESTAL IS REQUIRED THE POST HOLE IN THE PEDESTAL SHALL BE VARIED AS REQUIRED BY THE POST SHAPE.

MANNER OF REPLACING BIT. MATERIAL AT GUARDRAIL POST: ALL EXCESS EARTH FROM EXCAVATIONS FOR GUARD POSTS SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER. REPLACE BIT. MATERIAL WHEREVER GUARDRAIL IS INSTALLED AFTER MAT HAS BEEN LAID. COST OF EXCAVATION AND REPLACING OF BIT. MATERIAL TO BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

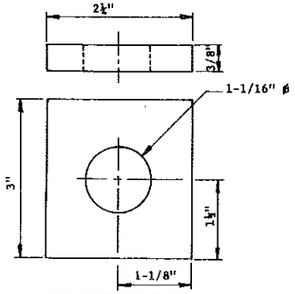
BCT CABLE ASSEMBLY: THE CONTRACTOR MAY SUBSTITUTE A ROD TYPE ASSEMBLY WITH A MINIMUM BREAKING STRENGTH AS SPECIFIED IN SECTION 850-3.4.2 OF THE SUPPLEMENTAL SPECIFICATIONS.



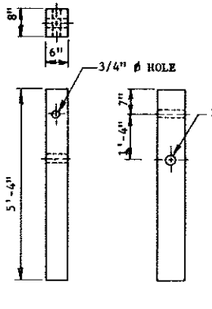
BCT SLEEVE



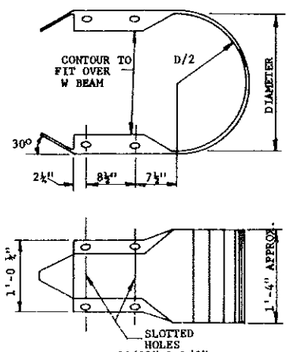
BCT (TIMBER) BEARING PLATE



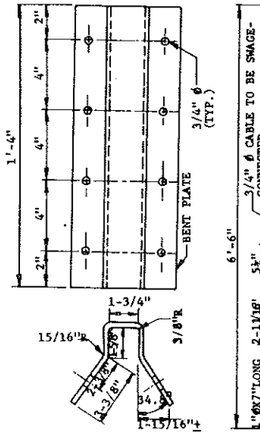
BCT CABLE END PLATE



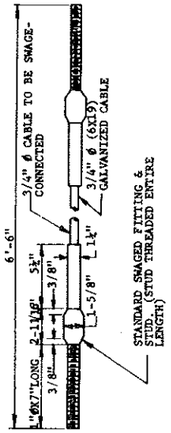
BCT TERMINAL POST (TIMBER)



W BEAM END SECTION (BUFFER)



BCT ANCHOR PLATE



BCT CABLE ASSEMBLY

REVISIONS	
DATE	CHANGE
7-19-83	NOTE CHANGE
1-10-84	ADD NOTE

4-1-83

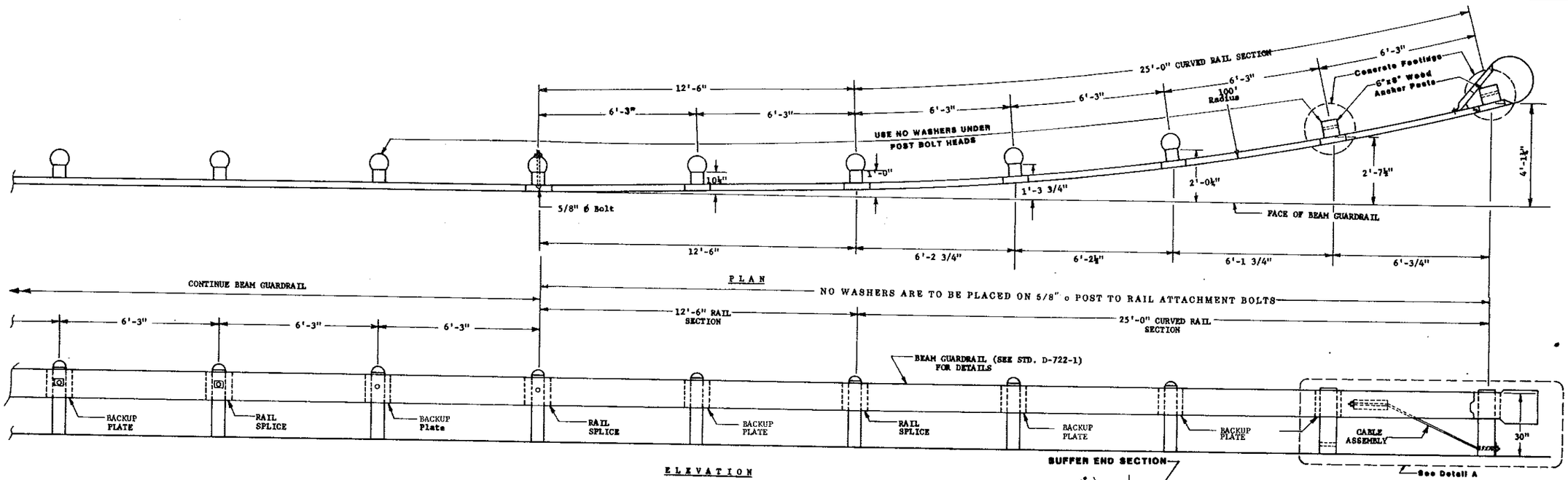
NORTH DAKOTA STATE HIGHWAY DEPARTMENT

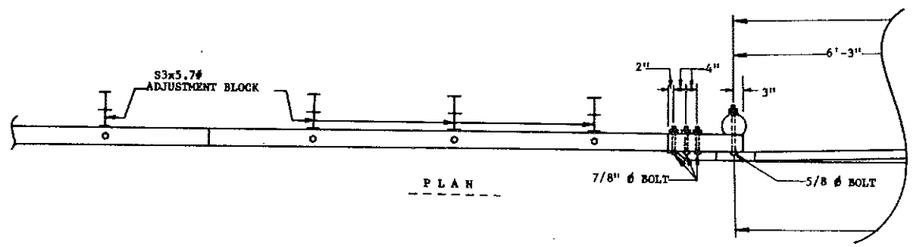
SUBMITTED: [signature] DESIGN ENGINEER

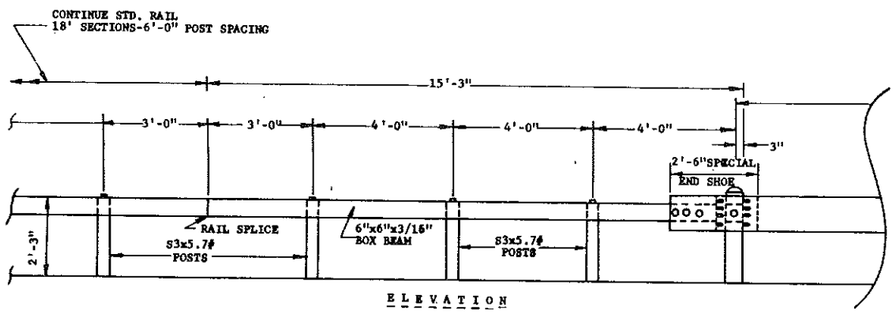
BEAM GUARDRAIL-FLARED END TREATMENT AND TRANSITION

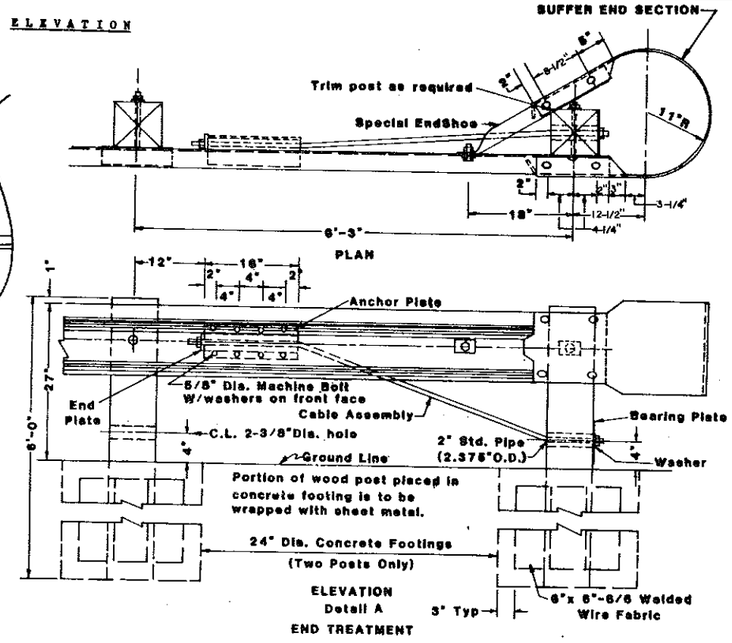
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	39

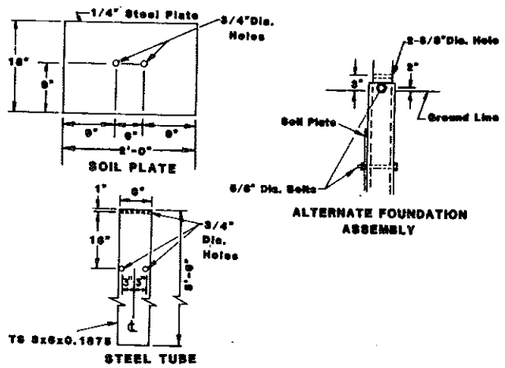
D-722-2











4-15-83 REVISIONS	
DATE	CHANGE
6-21-83	ANCHOR POST SIZE
7-19-83	ADD NOTE
4-11-84	BCT WASHER REMOVED
5-30-84	BACKUP PLATE

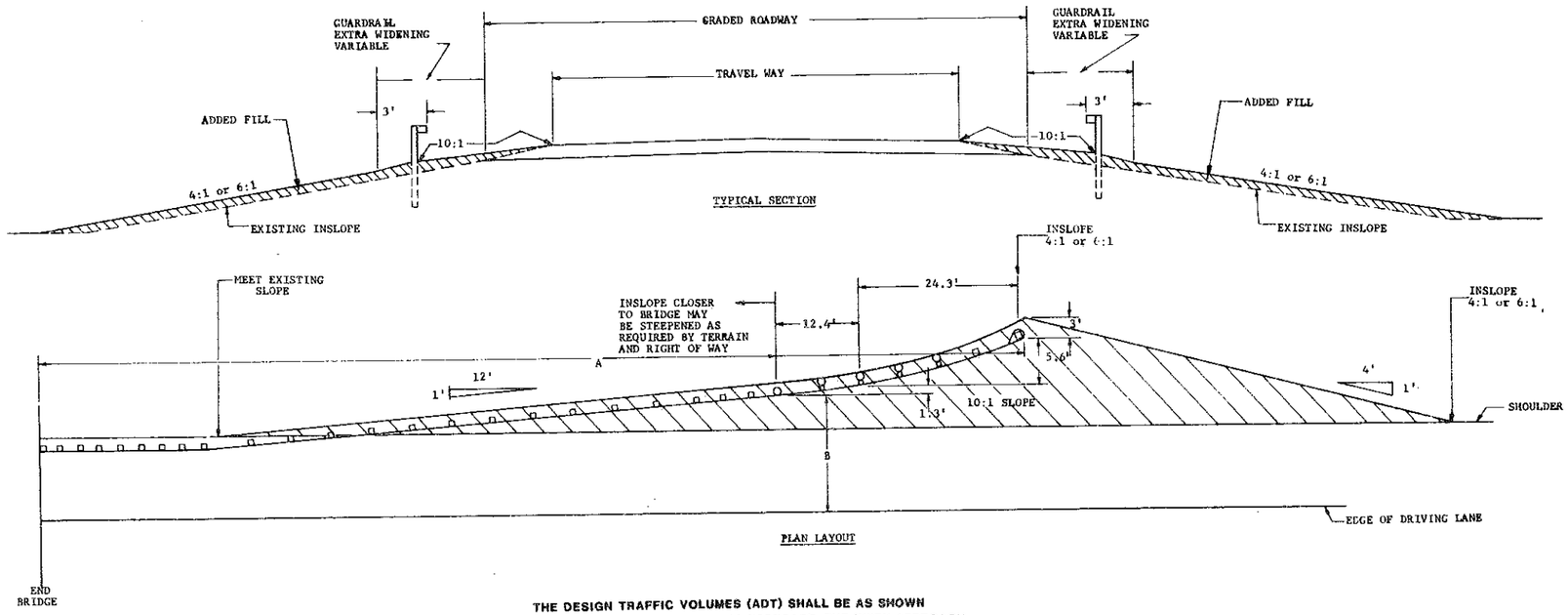
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
Submitted: David K. D. Leer
Design Engineer

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	40

D-722-5

TYPICAL GRADING AT BRIDGE ENDS

With Breakaway Cable Terminal



NOTE: THE DESIGN TRAFFIC VOLUMES (ADT) SHALL BE AS SHOWN ON TITLE SHEET UNDER TRAFFIC FORECAST. THE "WITH APPROACH CURB" LENGTH SHALL BE USED WHERE BRIDGE APPROACH DRAINS ARE INSTALLED. ON DIVIDED HIGHWAYS THE MEDIAN SIDE SHALL USE THE LENGTHS AS SHOWN ON THE PLAN LAYOUTS.

WHERE NORMAL INSLOPE IS 4:1 THE ADDED FILL SHALL BE 4:1.

WHERE NORMAL INSLOPE IS 6:1 THE ADDED FILL SHALL BE 6:1.

BOX BEAM DIMENSION TABLE

DESIGN TRAFFIC VOLUME (ADT)	CLEAR RDWY. WIDTH OF BRIDGE	APPROACH SIDE: WITHOUT APPROACH CURB A FT.	APPROACH SIDE: WITHOUT APPROACH CURB B FT.	APPROACH SIDE: WITH APPROACH CURB A FT.	APPROACH SIDE: WITH APPROACH CURB B FT.	OPPOSITE SIDE: WITHOUT APPROACH CURB A FT.	OPPOSITE SIDE: WITHOUT APPROACH CURB B FT.	OPPOSITE SIDE: WITH APPROACH CURB A FT.	OPPOSITE SIDE: WITH APPROACH CURB B FT.
UNDER 250	44	60.5	12.8	57.5	11.3	30.1	10.0	39.5	10.0
	42	60.5	11.8	57.5	10.3	30.1	9.0	39.5	9.0
	40	60.5	10.8	75.4	10.8	30.1	8.0	39.5	8.0
	38	78.5	11.3	75.4	9.8	30.1	7.0	39.5	7.0
	36	78.5	10.3	75.4	8.8	30.1	6.0	39.5	6.0
	34	78.5	9.3	93.3	9.3	30.1	5.0	39.5	5.0
	32	96.4	9.7	93.3	8.3	30.1	4.0	39.5	4.0
	30	96.4	8.7	93.3	7.3	30.1	3.0	39.5	3.0
	28	96.4	7.7	111.3	7.7	42.6	3.3	39.5	2.0
	26	114.3	8.2	111.3	6.7	42.6	2.3	39.5	1.0
	24	114.3	7.2	111.3	5.7	42.6	1.3	57.5	1.3
800-250	44	78.5	14.3	75.4	12.8	30.1	10.0	39.5	10.0
	42	78.5	13.3	75.4	11.8	30.1	9.0	39.5	9.0
	40	78.5	12.3	93.3	12.3	30.1	8.0	39.5	8.0
	38	96.4	12.7	93.3	11.3	30.1	7.0	39.5	7.0
	36	96.4	11.7	93.3	10.3	30.1	6.8	39.5	6.0
	34	96.4	10.7	111.3	10.7	42.6	6.3	39.5	5.0
	32	114.3	11.2	111.3	9.7	42.6	5.3	39.5	4.0
	30	114.3	10.2	111.3	8.7	42.6	4.3	57.5	4.3
	28	114.3	9.2	129.2	9.2	60.5	4.8	57.5	3.3
	26	114.3	8.2	129.2	8.2	60.5	3.8	57.5	2.3
	24	132.3	8.7	129.2	7.2	60.5	2.8	57.5	1.3
2000-800	44	78.5	14.3	93.3	14.3	30.1	10.0	39.5	10.0
	42	96.4	14.7	93.3	13.3	30.1	9.0	39.5	9.0
	40	96.4	13.7	93.3	12.3	30.1	8.0	39.5	8.0
	38	96.4	12.7	111.3	12.7	42.6	8.3	39.5	7.0
	36	114.3	13.2	111.3	11.7	42.6	7.3	39.5	6.0
	34	114.3	12.2	111.3	10.7	42.6	6.3	57.5	6.3
	32	114.3	11.2	129.2	11.2	60.5	6.8	57.5	5.3
	30	132.3	11.7	129.2	10.2	60.5	5.8	57.5	4.3
	28	132.3	10.7	129.2	9.2	60.5	4.8	75.4	4.8
	26	132.3	9.7	147.2	9.7	78.5	5.3	75.4	3.8
	24	132.3	8.7	147.2	8.7	78.5	4.3	75.4	2.8
6000-2000	44	96.4	15.7	111.3	15.7	42.6	11.3	39.5	10.0
	42	114.3	16.2	111.3	14.7	42.6	10.3	39.5	9.0
	40	114.3	15.2	111.3	13.7	42.6	9.3	57.5	9.3
	38	114.3	14.2	129.2	14.2	60.5	9.8	57.5	8.3
	36	132.3	14.7	129.2	13.2	60.5	8.8	57.5	7.3
	34	132.3	13.7	129.2	12.2	60.5	7.8	57.5	6.3
	32	132.3	12.7	147.2	12.7	78.5	8.3	75.4	6.8
	30	150.2	13.2	147.2	11.7	78.5	7.3	75.4	5.8
	28	150.2	12.2	147.2	10.7	78.5	6.3	93.3	6.3
	26	150.2	11.2	165.1	11.2	78.5	5.3	93.3	5.3
	24	150.2	10.2	165.1	10.2	96.4	5.7	93.3	4.3
OVER 6000	44	114.3	17.2	129.2	17.2	60.5	12.8	57.5	11.3
	42	132.3	17.7	129.2	16.2	60.5	11.8	75.4	11.8
	40	132.3	16.7	129.2	15.2	60.5	10.8	75.4	10.8
	38	132.3	15.7	147.2	15.7	78.5	11.2	75.4	9.8
	36	150.2	16.2	147.2	14.7	78.5	10.2	75.4	8.8
	34	150.2	15.2	147.2	13.7	78.5	9.2	93.3	9.3
	32	150.2	14.2	165.1	14.2	96.4	9.7	93.3	8.3
	30	168.2	14.7	165.1	13.2	96.4	8.7	93.3	7.3
	28	168.2	13.7	165.1	12.2	96.4	7.7	111.3	7.7
	26	168.2	12.7	183.0	12.7	114.4	8.2	111.3	6.7
	24	168.2	11.7	183.0	11.7	114.4	7.2	111.3	5.7

REVISIONS	
DATE	CHANGE
7-26-83	NOTE CHANGE

12-1-82

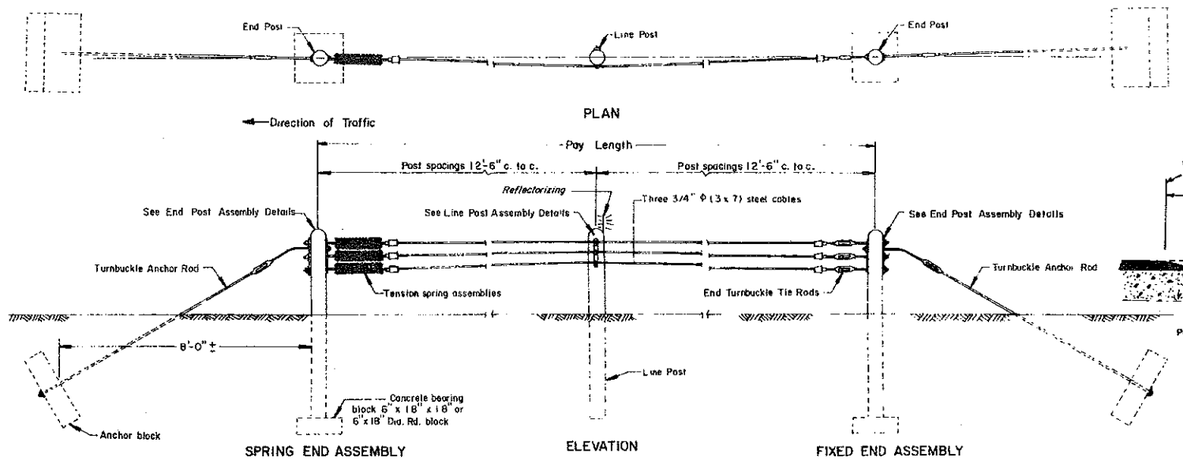
NORTH DAKOTA STATE HIGHWAY DEPARTMENT

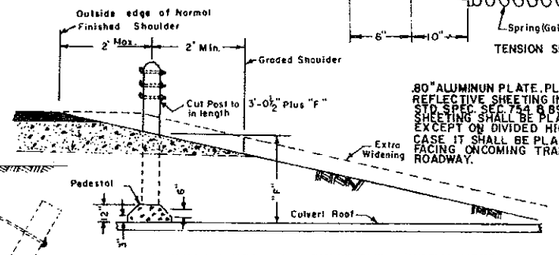
APPROVED: David K. Carlson
DESIGN ENGINEER

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N.D.	IR-094-4(47)132	41

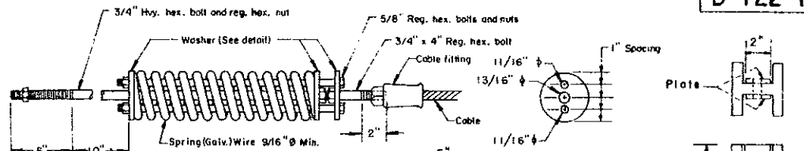
D-722-11

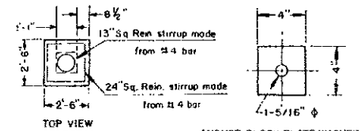
THREE CABLE GUARD RAIL (WOOD POSTS)

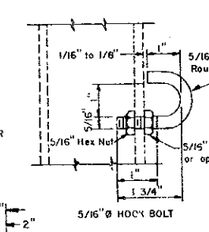


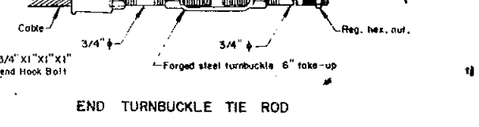


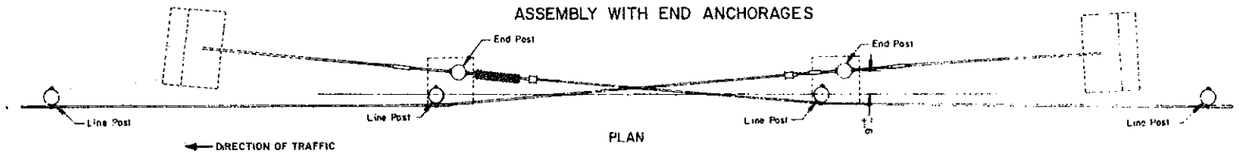
INSTALLATION AT CULVERTS (WHEN USED)

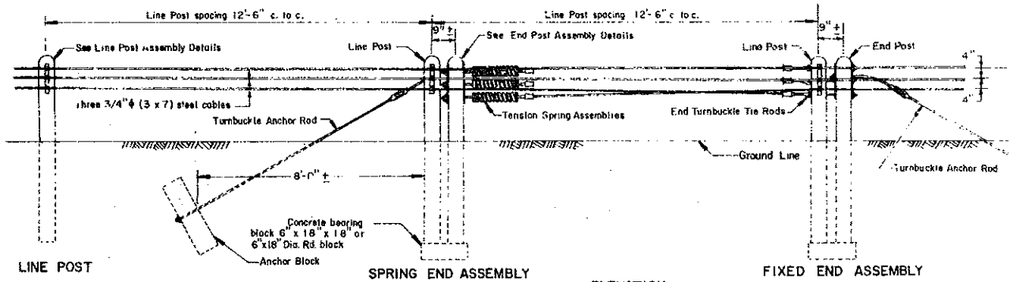


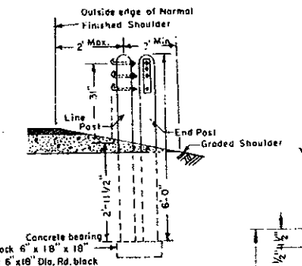




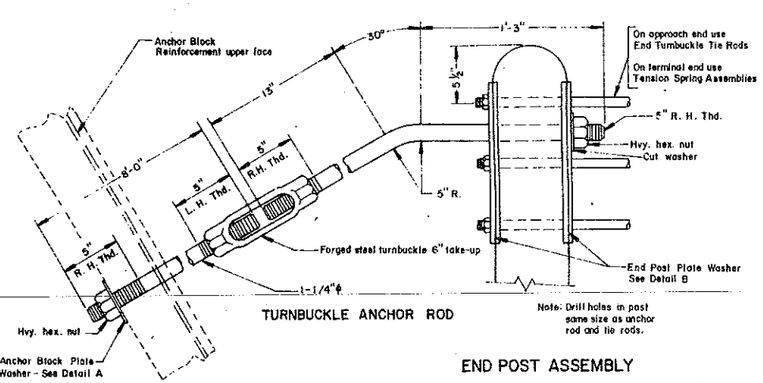


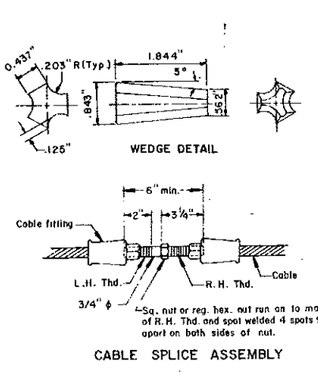


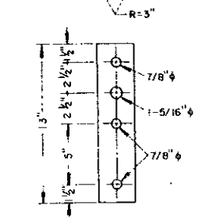


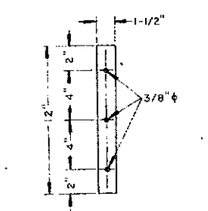


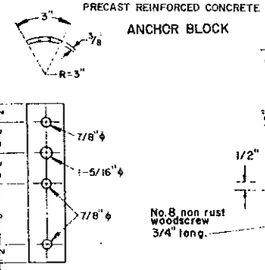
ASSEMBLY WITH INTERMEDIATE ANCHORAGES

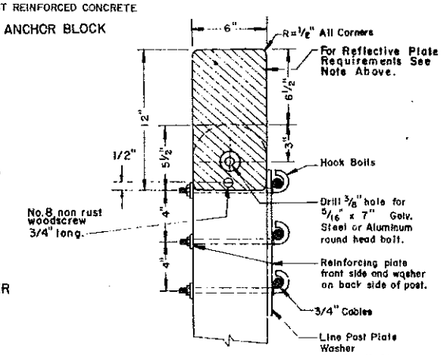


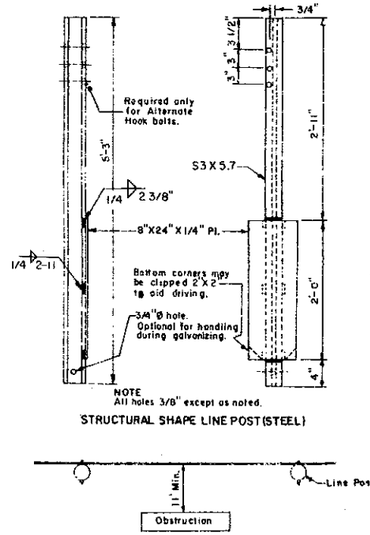


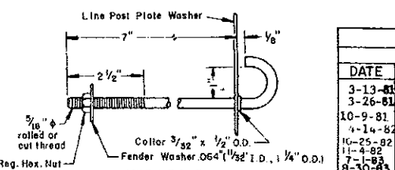












NOTES:
REFLECTORIZED PLATES: REFLECTOR PLATES SHALL BE SPACED AT 25' CENTERS ON GUARDRAIL LESS THAN 250' IN LENGTH AND AT 50' CENTERS FOR GUARDRAIL OVER 250' IN LENGTH. THE REFLECTOR SHALL BE THE SAME COLOR AS THE PAVEMENT MARKING ADJACENT TO THAT REFLECTOR UNLESS NOTED OTHERWISE ON THE PLANS.

1-1-75	
REVISIONS	
DATE	CHANGE
3-13-81	NOTE CHANGE
3-26-81	NOTE CHANGE
10-9-81	DETAIL CHANGE
4-14-82	NOTE ADDED
10-25-82	DETAIL CHANGES
11-4-82	POST LENGTH
7-1-83	TYPICAL SECTION
8-30-83	Add Details & Notes
7-16-84	Shldr. Detail Change

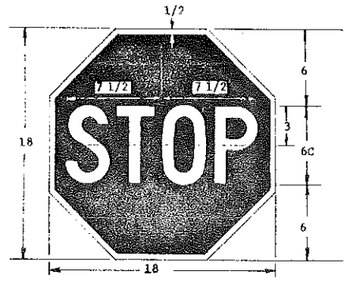
NORTH DAKOTA STATE HIGHWAY DEPARTMENT
Submitted: David K.O. Leer
Design Engineer

10.6A

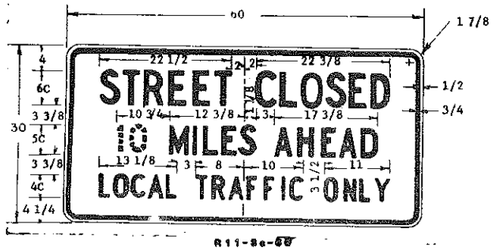
CONSTRUCTION SIGN DETAILS

FHWA REGION	STATE	FED. PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	42

D754-1

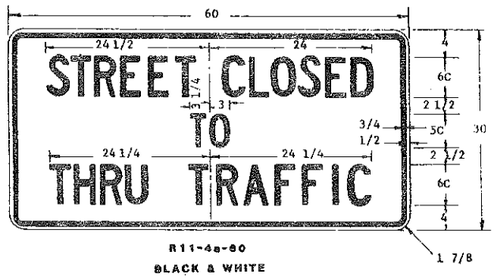


STOP-SLOW PADDLE
RED & WHITE
FLAGPERSON PADDLE



R11-3a-60
BLACK & WHITE

R11-2-48
BLACK & WHITE



R11-4a-60
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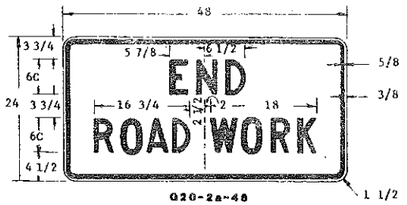
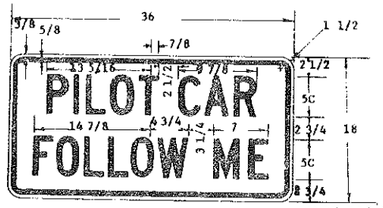
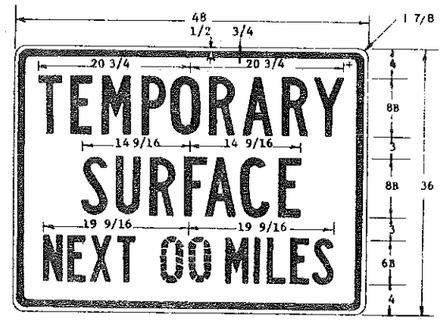


G20-2a-48
BLACK & ORANGE

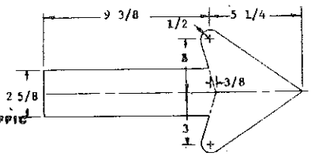


G20-4-36
BLACK & ORANGE

PILOT CAR SIGN SHALL BE MOUNTED ON REAR OF A VEHICLE USED FOR GUIDING CONTROLLED ONE-WAY TRAFFIC THROUGH A CONSTRUCTION AREA.



G20-8-48
BLACK & ORANGE

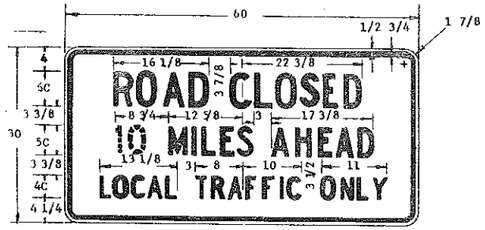


ARROW DETAIL FOR SIGN NO'S.
G20-50-72 & G20-52-72

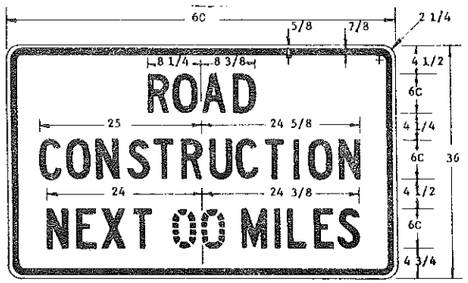
MESSAGES AND BORDERS: THE MESSAGES AND BORDERS SHALL BE SCREENED ON REFLECTIVE SHEETING OR INSTALLED USING PIGMENTED PLASTIC FILM CONFORMING TO THE REQUIREMENT OF SEC. 804-3.5 OF THE STD. SPECIFICATIONS. THE PIGMENTED PLASTIC FILM SHALL BE INSTALLED IN ACCORDANCE WITH THE REFLECTIVE SHEETING MANUFACTURERS RECOMMENDATIONS. THE BORDERS SHALL HAVE THE RADII AND WIDTH SHOWN ON THE PLANS. THE LETTERS SHALL BE FABRICATED IN ACCORDANCE WITH THE STANDARD LETTER GUIDE OF THE HEIGHT AND SERIES SHOWN ON THE PLANS.

THE DETAILS OF THESE LETTERS MAY BE OBTAINED FROM THE STATE HIGHWAY DEPARTMENT OR THE SHEETING MANUFACTURER.

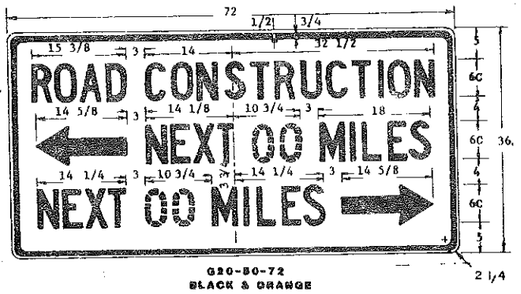
NOTE: ALL SIGNS SHALL HAVE REFLECTORIZED MESSAGE BORDER AND BACKGROUND, UNLESS SHOWN OTHERWISE ON THE PLANS, IN NO CASE IS THE COLOR BLACK REFLECTORIZED.



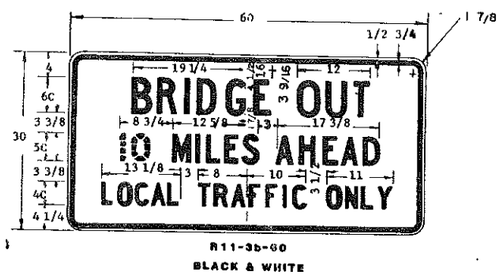
R11-3a-60
BLACK & WHITE



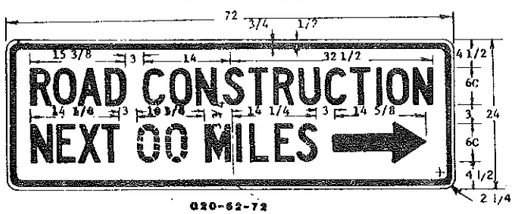
G20-1-60
BLACK & ORANGE



G20-50-72
BLACK & ORANGE

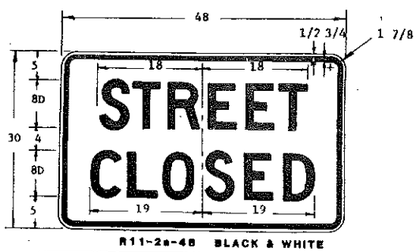


R11-3b-60
BLACK & WHITE

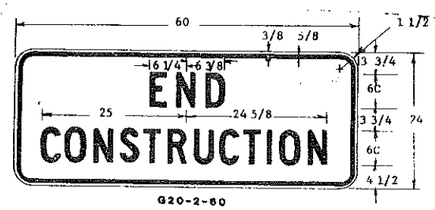


G20-52-72
BLACK & ORANGE

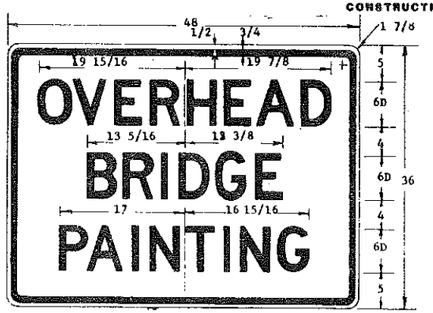
ARROW MAY BE TO RIGHT OR LEFT OF LEGEND TO INDICATE CONSTRUCTION TO THE RIGHT OR LEFT.



R11-2a-48 BLACK & WHITE



G20-2-60
BLACK & ORANGE



G20-54-48
BLACK & ORANGE

2-17-78 REVISIONS	
DATE	CHANGE
12-18-78	TITLE ADDED
2-22-80	SIGN COLOR
6-23-80	SIGN NUMBERS
[illegible]	SIGN COLOR
5-19-81	SIGN NUMBERS
6-[illegible]-81	[illegible]

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted _____
Design Engineer

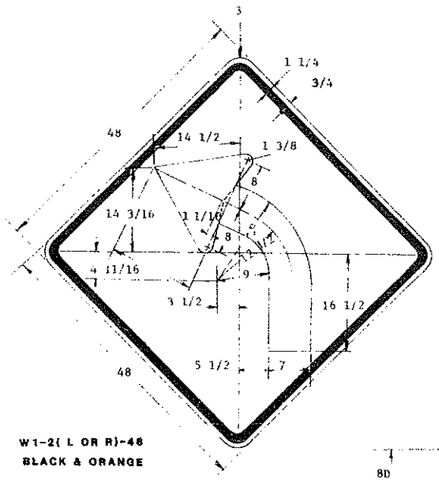
Recommended _____
Asst. Chief Engineer, Proj. Constr.

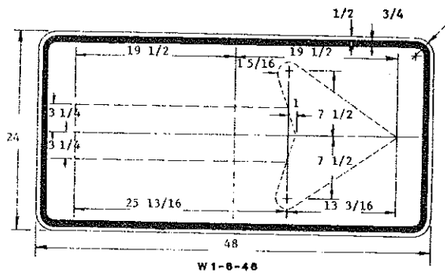
Approved _____
Chief Engineer

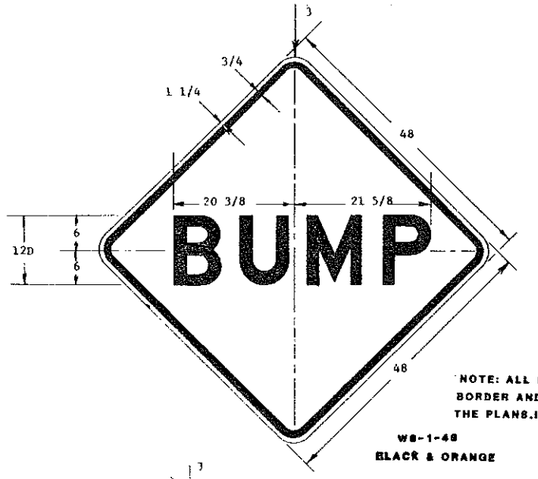
CONSTRUCTION SIGN DETAILS

FHWA REGION	STATE		
8	N.D.	IR-094-4(47)132	43

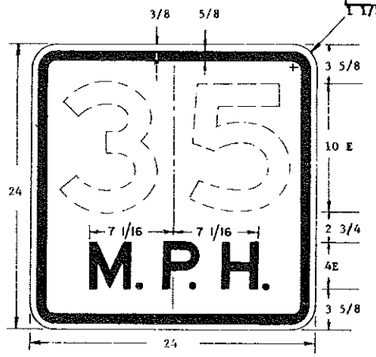
D-754-2

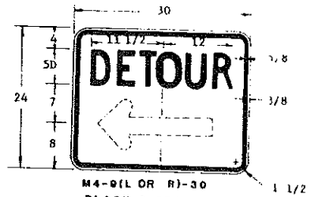


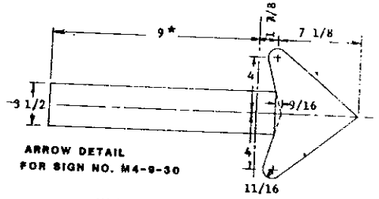


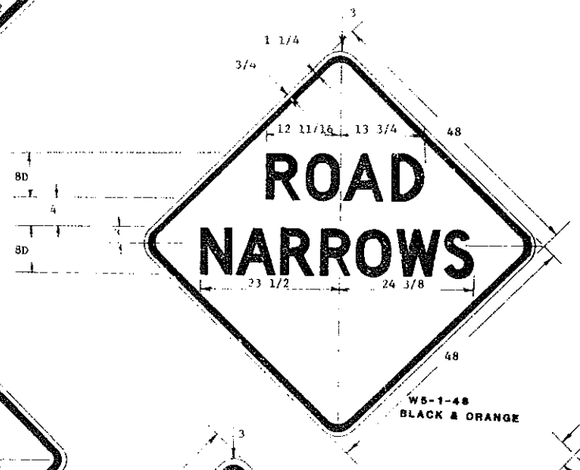


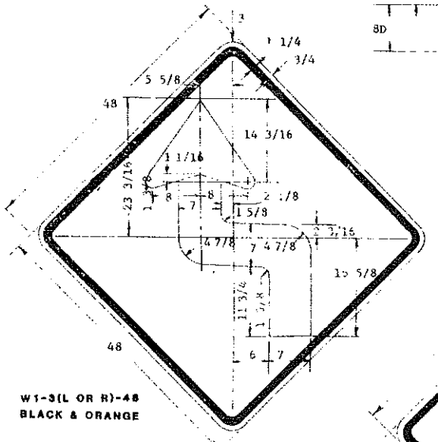
NOTE: ALL SIGNS SHALL HAVE REFLECTORIZED MESSAGE BORDER AND BACKGROUND, UNLESS SHOWN OTHERWISE ON THE PLANS. IN NO CASE IS THE COLOR BLACK REFLECTORIZED.

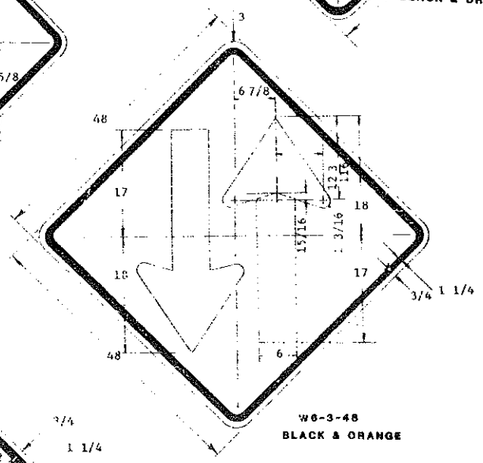


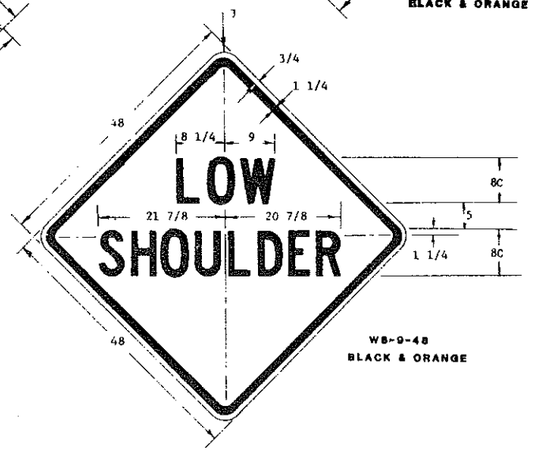


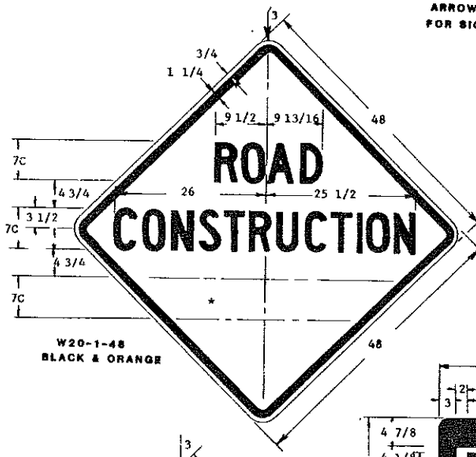






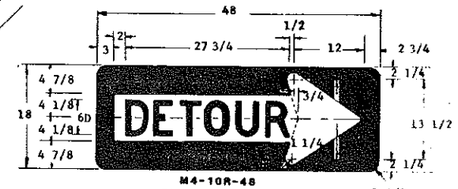


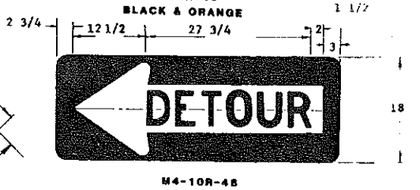


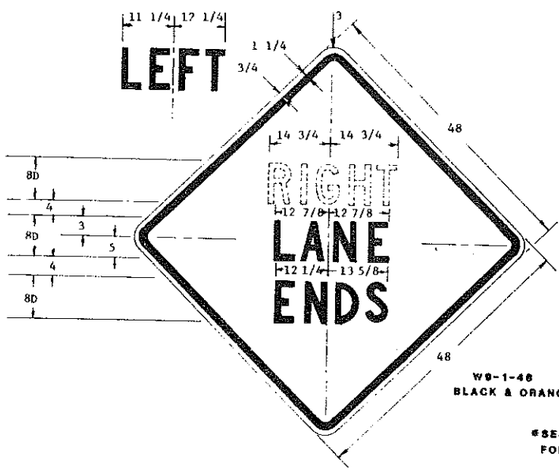


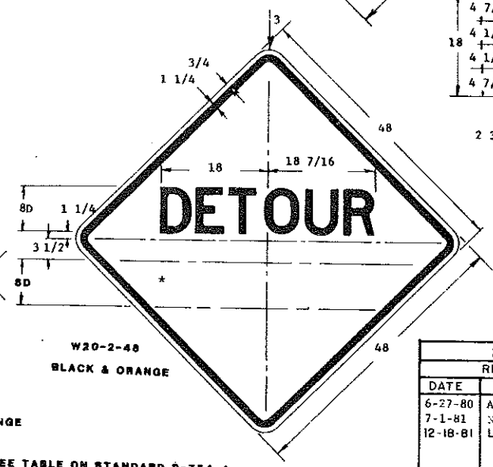
MESSAGE AND BORDER: THE MESSAGES AND BORDERS SHALL BE SCREENED ON REFLECTIVE SHEETING OR INSTALLED USING PIGMENTED PLASTIC FILM CONFORMING TO THE REQUIREMENT OF SEC. 604-3.5 OF THE STD. SPECIFICATIONS. THE PIGMENTED PLASTIC FILM SHALL BE INSTALLED IN ACCORDANCE WITH THE REFLECTIVE SHEETING MANUFACTURERS RECOMMENDATIONS. THE BORDERS SHALL HAVE THE RADII AND WIDTH SHOWN ON THE PLANS. THE LETTERS SHALL BE FABRICATED IN ACCORDANCE WITH THE STANDARD LETTER GUIDE OF THE HEIGHT AND SERIES SHOWN ON THE PLANS. THE DETAILS OF THESE LETTERS MAY BE OBTAINED FROM THE STATE HIGHWAY DEPARTMENT OR THE SHEETING MANUFACTURER.

*DIMENSION SHALL BE 3" WHEN ARROW IS PLACED VERTICALLY.









*SEE TABLE ON STANDARD D-754-4 FOR MESSAGE AND DIMENSIONS.

2-17-78	
REVISIONS	
DATE	CHANGE
6-27-80	ADDED NOTE
7-1-81	NOTE ADDITION
12-18-81	LETTERING

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: _____ Design Engineer

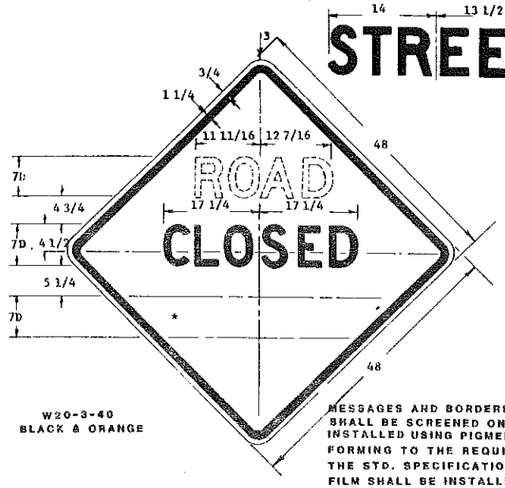
Recommended: _____ Asst. Chief Engineer, Pre-Constr.

Approved: _____ Chief Engineer

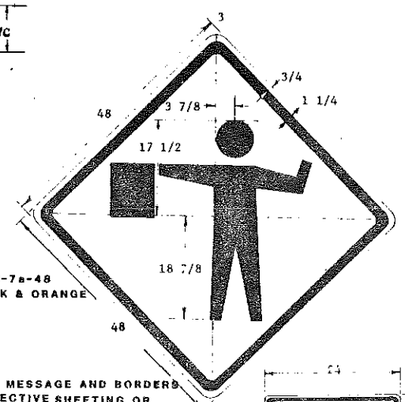
CONSTRUCTION SIGN DETAILS

FHWA REGION	STATE	FED A'D PROJ NO	SHEET NO.
8	N.D.	IR-094-4(47)132	44

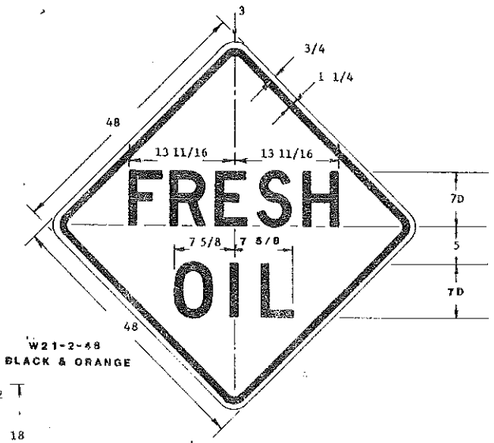
D 754 - 3



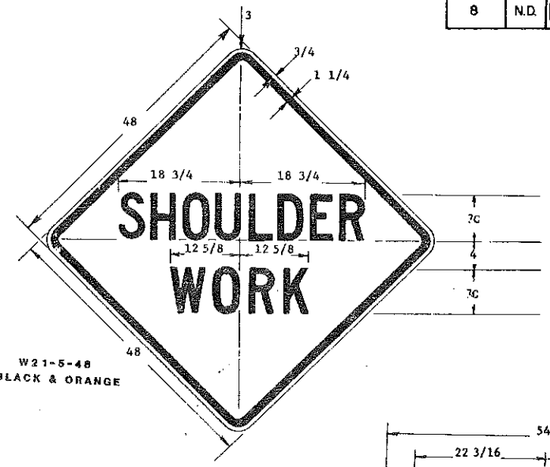
W20-3-48
BLACK & ORANGE



W20-7a-48
BLACK & ORANGE



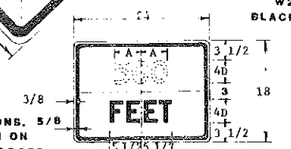
W21-2-48
BLACK & ORANGE



W21-5-48
BLACK & ORANGE

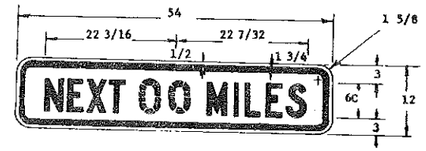
NOTE: EXISTING INVENTORY OF FLAGMAN & MEN WORKING SIGNS WITH WORD MESSAGES MAY BE USED UNTIL THEY NEED REPLACE -MENT.

MESSAGES AND BORDERS: THE MESSAGE AND BORDERS SHALL BE SCREENED ON REFLECTIVE SHEETING OR INSTALLED USING PIGMENTED PLASTIC FILM CONFORMING TO THE REQUIREMENT OF SEC. 894-3.5 OF THE STD. SPECIFICATIONS. THE PIGMENTED PLASTIC FILM SHALL BE INSTALLED IN ACCORDANCE WITH THE REFLECTIVE SHEETING MANUFACTURERS RECOMMENDATIONS. THE BORDERS SHALL HAVE THE RADII AND WIDTH SHOWN ON THE PLANS. THE LETTERS SHALL BE FABRICATED IN ACCORDANCE WITH THE STANDARD LETTERS GUIDE OF THE HEIGHT AND SERIES SHOWN ON THE PLANS. THE DETAILS OF THESE LETTERS MAY BE OBTAINED FROM THE STATE HIGHWAY DEPARTMENT OR THE SHEETING MANUFACTURER.



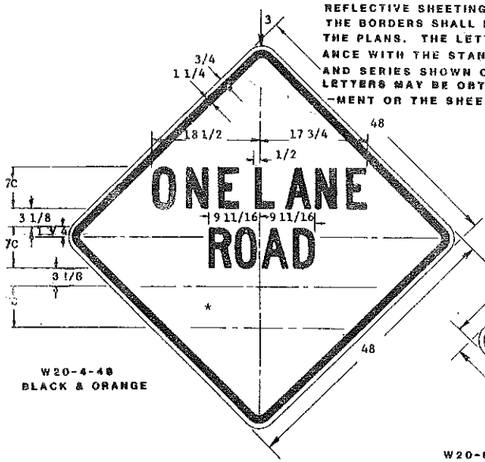
SIGN	A DIMENSION (INCHES)
500'	4 - 11/16
1000'	5 - 1/2
1500'	5 - 5/16

W20-7k-24
FOR USE WITH W20-7a-48 & W21-1a-48
BLACK & ORANGE

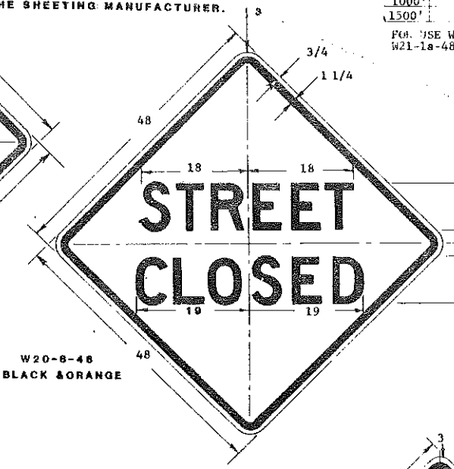


W20-52-54
BLACK & ORANGE

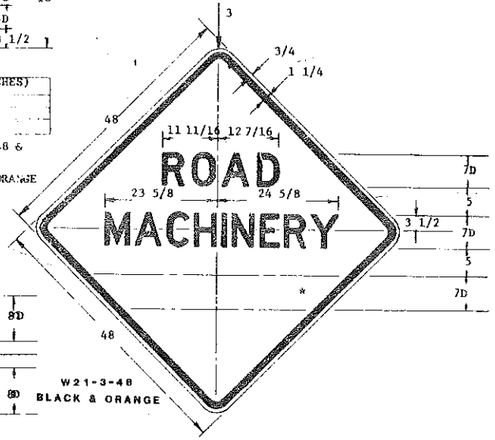
NOTE: ALL SIGNS SHALL HAVE REFLECTORIZED MESSAGES, BORDER AND BACKGROUND, UNLESS SHOWN OTHERWISE ON THE PLANS. IN NO CASE IS THE COLOR BLACK REFLECTORIZED.



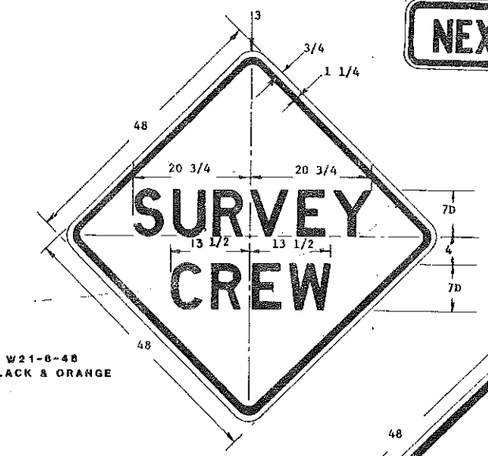
W20-4-48
BLACK & ORANGE



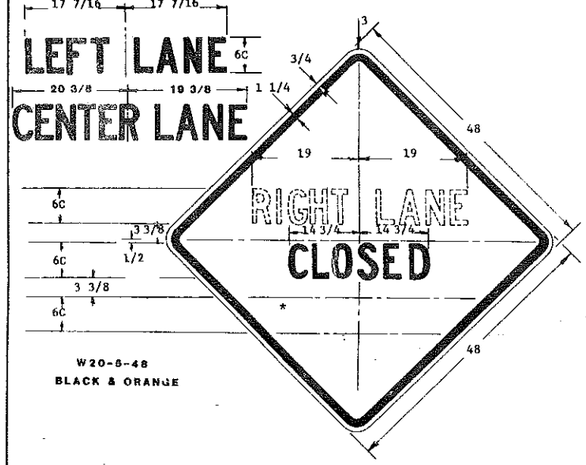
W20-6-48
BLACK &ORANGE



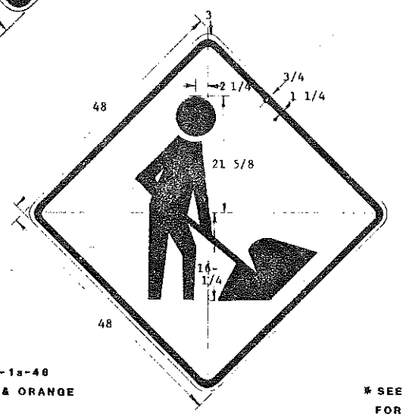
W21-3-48
BLACK & ORANGE



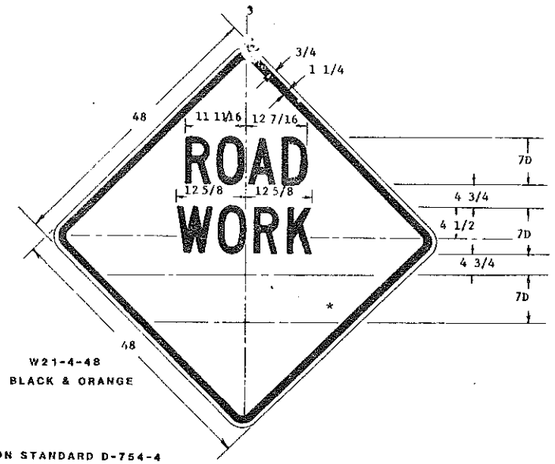
W21-6-48
BLACK & ORANGE



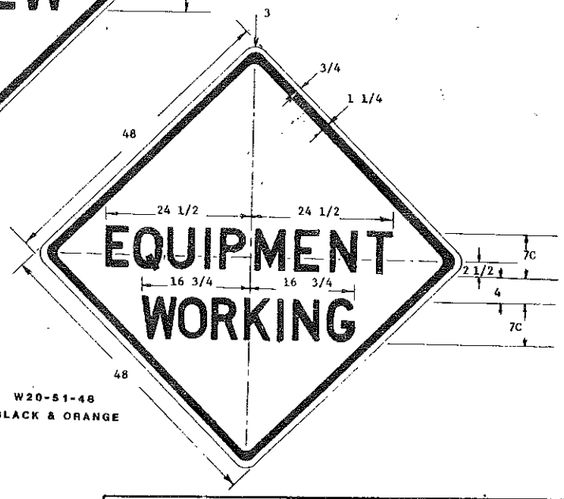
W20-5-48
BLACK & ORANGE



W21-1a-48
BLACK & ORANGE



W21-4-48
BLACK & ORANGE



W20-51-48
BLACK & ORANGE

* SEE TABLE ON STANDARD D-754-4 FOR MESSAGES AND DIMENSIONS.

2-17-78	
REVISIONS	
DATE	CHANGE
5-14-79	Symbols Added
1-16-80	ADD DIMENSION
6-27-80	REVISED SIGN NO.'S
9-1-81	LETTERING
4-12-82	ADD LEGEND

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: _____ Design Engineer

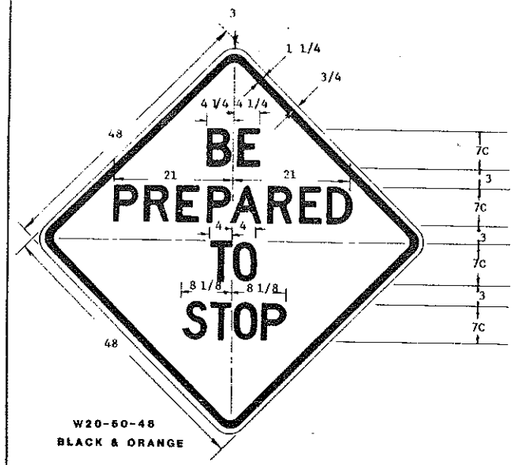
Recommended: _____ Asst. Chief Engineer, Pre - Constr

Approved: _____ Chief Engineer

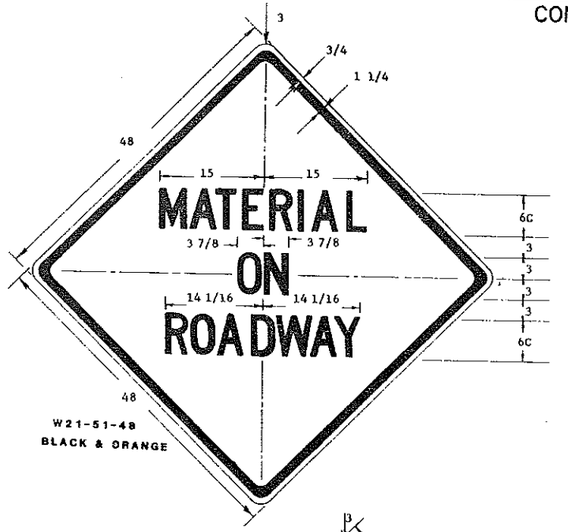
CONSTRUCTION SIGN DETAILS

FHWA REGION		FED. AID PROJECT NO.	
8	N.D.	IR-094-4(47)132	45

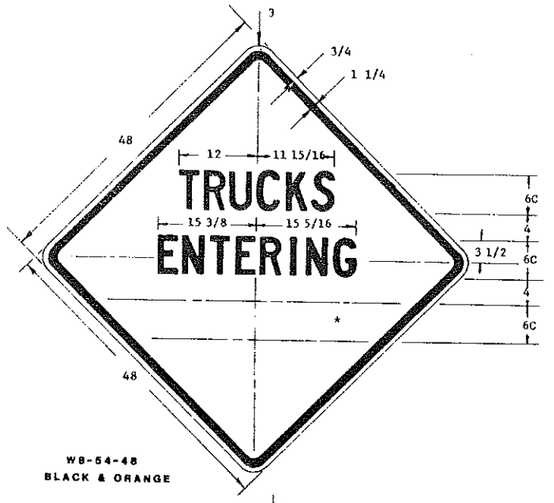
D 754-4



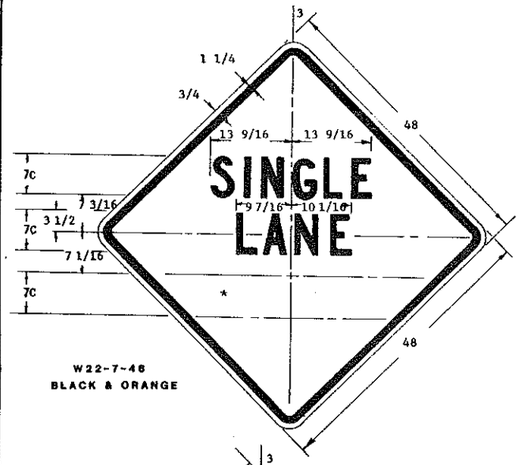
W20-60-48
BLACK & ORANGE



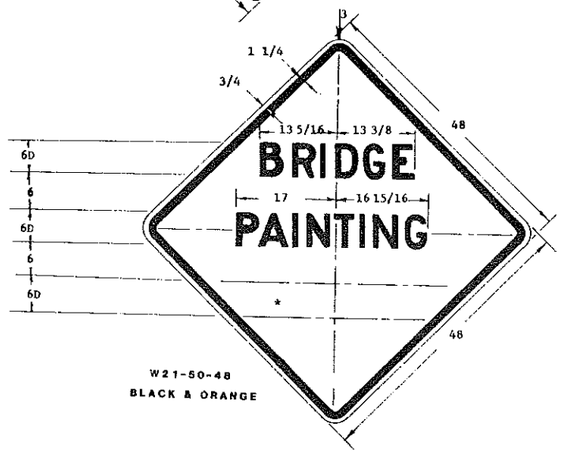
W21-51-48
BLACK & ORANGE



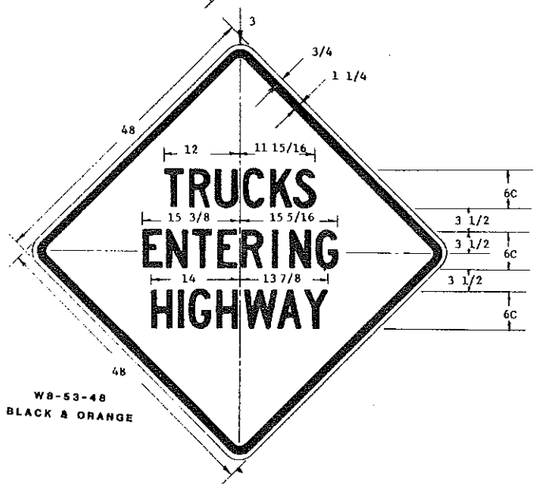
W8-54-48
BLACK & ORANGE



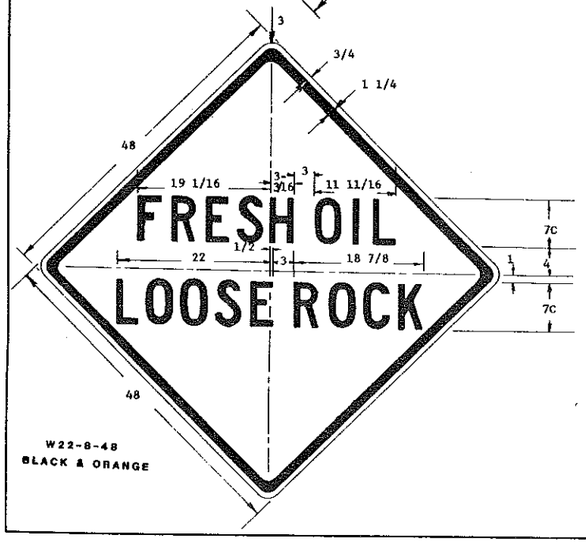
W22-7-48
BLACK & ORANGE



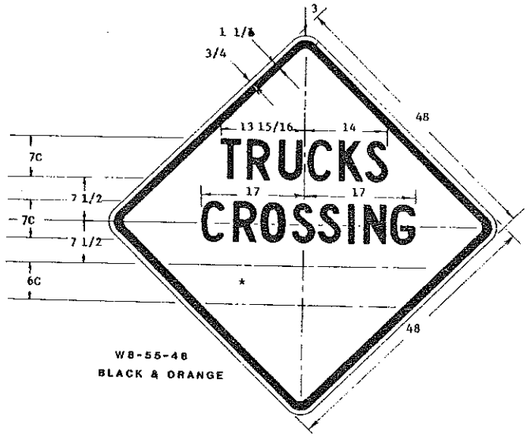
W21-50-48
BLACK & ORANGE



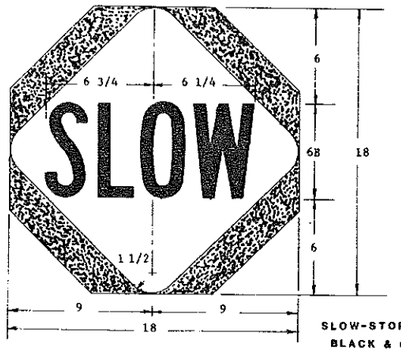
W8-53-48
BLACK & ORANGE



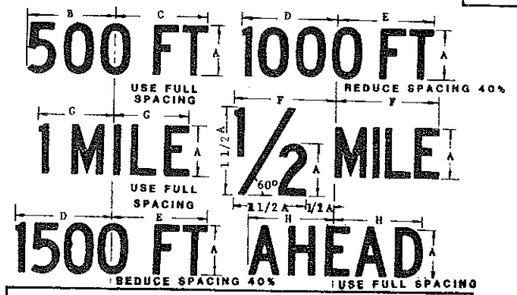
W22-8-48
BLACK & ORANGE



W8-55-48
BLACK & ORANGE



SLOW-STOP PADDLE
BLACK & ORANGE
FLAGPERSON PADDLE



DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H
4C	6-7/8	7	7-1/2	8	8-5/16	6-1/16	7
5C	8-3/4	8-13/16	9-3/8	10	10-7/16	7-5/8	8-3/4
6C	10-3/8	10-1/2	11-1/4	12	12-1/2	9-1/8	10-1/2
7C	12	12-3/16	13-1/8	14	14-9/16	10-5/8	12-1/4
8C	13-3/4	14	15	16	16-5/8	12-1/8	14
4D	8-1/8	8-5/8	8-1/2	9	9	7-3/16	8-11/16
5D	10-3/16	10-13/16	11-5/8	11-1/4	11-1/4	9-1/2	10-7/8
6D	12-3/16	12-15/16	12-3/4	13-1/2	13-1/2	11-13/16	13-1/8
7D	14-1/4	15-1/8	14-7/8	15-3/4	15-3/4	13-1/16	15-1/2
8D	16-1/4	17-1/4	17	18	18	14-3/8	17-7/14

MESSAGES AND BORDERS: THE MESSAGES AND BORDERS SHALL BE SCREENED ON REFLECTIVE SHEETING OR INSTALLED USING PIGMENTED PLASTIC FILM CONFORMING TO THE REQUIREMENT OF SEC. 894-3.8 OF THE STD. SPECIFICATIONS. THE PIGMENTED PLASTIC FILM SHALL BE INSTALLED IN ACCORDANCE WITH THE REFLECTIVE SHEETING MANUFACTURERS RECOMMENETION.
THE BORDERS SHALL HAVE THE RADII AND WIDTH SHOWN ON THE PLANS. THE LETTERS SHALL BE FABRICATED IN ACCORDANCE WITH THE STANDARD LETTER GUIDE OF THE HEIGHT AND SERIES SHOWN ON THE PLANS. THE DETAILS OF THESE LETTERS MAY BE OBTAINED FROM THE STATE HIGHWAY DEPARTMENT OR THE SHEETING MANUFACTURER.

NOTE: ALL SIGNS SHALL HAVE REFLECTORIZED MESSAGE BORDER AND BACKGROUND, UNLESS SHOWN OTHERWISE ON THE PLANS. IN NO CASE IS THE COLOR BLACK REFLECTORIZED.

STANDARD SIGNS THAT ARE SHOWN IN THE CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS SHALL BE FABRICATED IN THE SHAPE, COLOR AND DIMENSIONS AS SHOWN IN THE STANDARD SIGNS LAYOUT BOOKLET.

2-17-78	
REVISIONS	
DATE	CHANGE
6-27-80	REVISED SIGN #'S
12-17-81	Notes

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted _____ Design Engineer

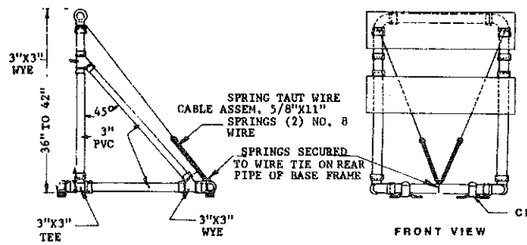
Recommended _____ Asst. Chief Engineer, Pre-Constr

Approved _____ Chief Engineer

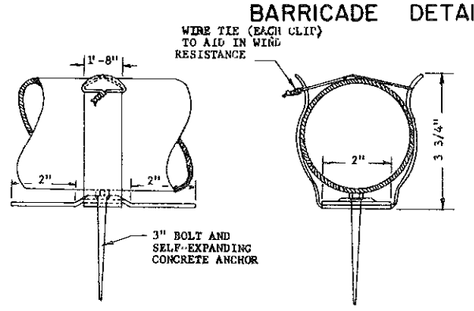
BARRICADE DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-094-4(47)132	46

D 754-5



SIDE VIEW FRONT VIEW



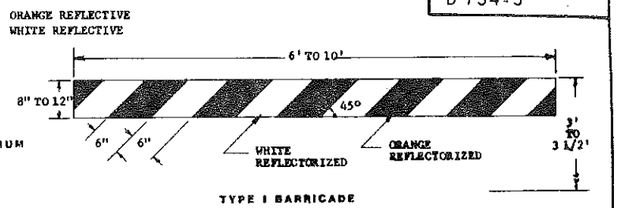
TYPICAL CLAMP DETAIL

(SINGLE FIRE EXTINGUISHER CLIPS, 3 1/2" DIA.)

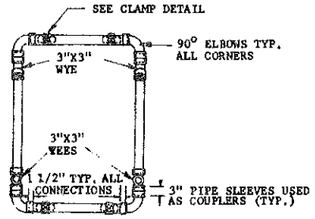
DELINEATOR DRUMS

THE MARKINGS ON DRUMS SHALL BE ORANGE AND WHITE STRIPES 4 TO 6 INCHES WIDE. THERE SHALL BE AT LEAST THREE ORANGE AND TWO WHITE STRIPES. WHERE DRUMS HAVE RIBS OR INDENTATION THERE SHALL BE NO REFLECTORIZED SHEETING IN THIS AREA. THIS SPACE SHALL BE PAINTED ORANGE AND SHALL BE NO MORE THAN 2 INCHES WIDE. THE STRIPE COLOR SHALL BE CHANGED AT THESE POINTS (ORANGE ABOVE WHITE BELOW OR WHITE ABOVE AND ORANGE BELOW). THE DRUM SURFACE SHALL BE PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE REFLECTIVE SHEETING IS APPLIED.

DELINEATOR DRUM



TYPE I BARRICADE



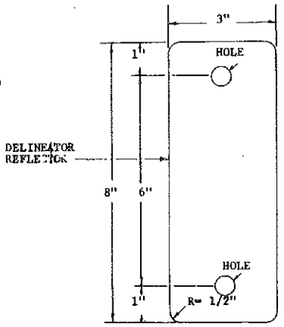
BASE

BREAKAWAY BARRICADE ASSEMBLY

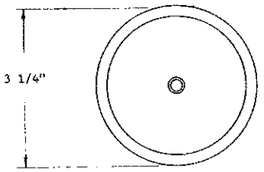
NOTE: THE PIPE, WYES, TEES ANDD ELBOWS USED TO CONSTRUCT TYPE II BARRICADES (SPECIAL) SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION: D2241 FOR PVC 1120 OR 1220, SDR 21, PRESSURE RATING 200 P.S.I. THE WYES, TEES, AND ELBOWS SHALL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION : D-2466, TYPE II, GRADE 1. ALL JOINTS SHALL BE SLIP-FIT AND SHALL NOT BE THEADED OR CEMENTED.

3" PVC PIPE CONFORMING TO ASTM D2665-DWV OR ASTM D2729 MAY BE USED AS AN ALTERNATE TO ASTM D2241-SDR 21.

THE 9" X 48" BARRICADE RAIL SHALL BE FABRICATED FROM 0.025" ANODIZED ALUMINUM AND SHALL BE ATTACHED WITH 1 INCH NO. 14 PAN BEAD METAL SCREWS. COLORS: REFLECTIVE ORANGE AND REFLECTIVE WHITE.

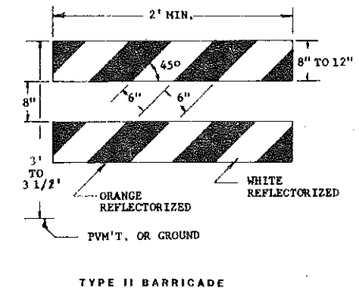


3" x 8" - 18 GUAGE GALVANIZED STEEL SHEETS, OR OR .080" ALUMINUM PLATE WITH WHITE REFLECTIVE SHEETING (TYPE III OR IV) AS SPECIFIED IN SECTION 894 OF THE STANDARD SPECIFICATIONS.

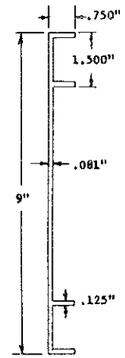


ACRYLIC PLASTIC REFLECTOR

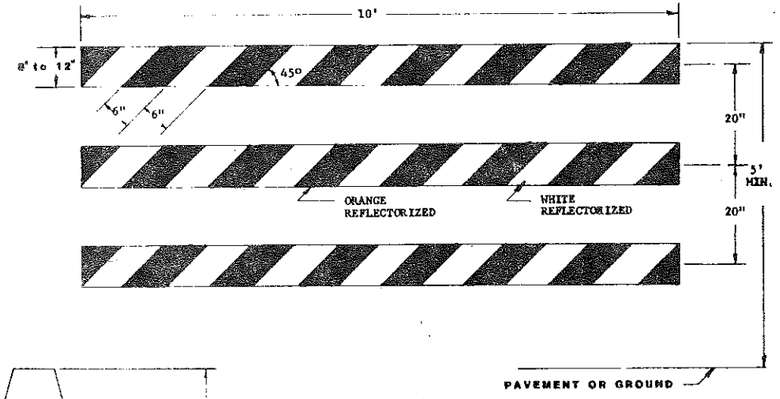
DELINEATOR REFLECTOR SHALL MEET THE REQUIREMENTS OF SECTION 894.



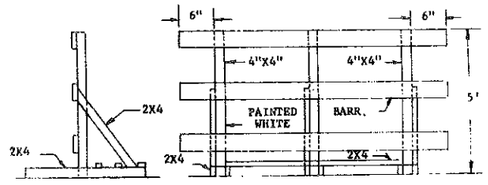
TYPE II BARRICADE



EXTRUDED ALUMINUM BARRICADE BAR DETAIL



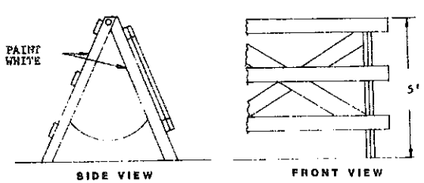
TYPE III BARRICADE



SIDE VIEW FRONT VIEW

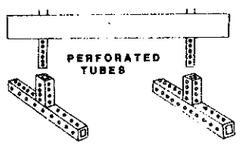
MOVABLE BARRICADE ASSEMBLY

NOTE: EACH MOVABLE BARRICCADE SHALL BE WEIGHTED DOWN BY A SUFFICIENT NUMBER OF SAND BAGS OR OTHER SUITABLE WEIGHT SO THAT IT WILL NOT BE BLOWN OVER BY THE WIND UNLESS THE MOVABLE SUPPORTING STRUCTURE IS CONSTRUCTED IN SUCH A MANNER THAT THE WIND CANNOT BLOW IT OVER. WEIGHT USED SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. THE STRIPES SHALL SLANT DOWNWARD TOWARD THE SIDE WHICH TRAFFIC IS TO PASS. BARRICADES USED AT THE BEGINNING OF A PROJECT SHALL FACE TRAFFIC ENTERING THAT PROJECT.

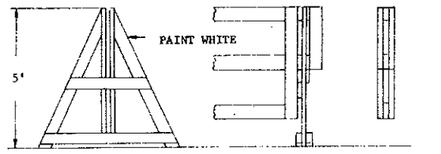


SIDE VIEW FRONT VIEW

HINGED BARRICADE ASSEMDLY

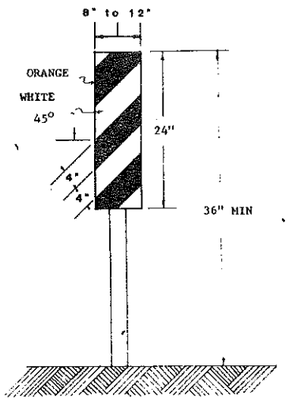


SECTIONAL BARRICADE

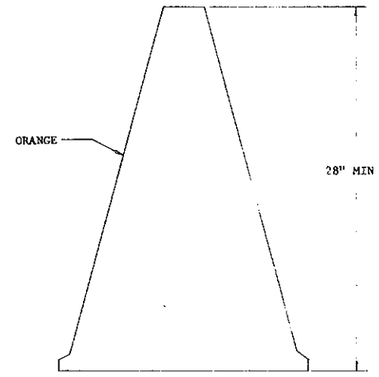


SIDE VIEW FRONT VIEW END VIEW

DEMOUNTABLE BARRICADE ASSEMBLY



VERTICAL PANEL



CONE

REVISIONS	
DATE	CHANGE
5-14-79	Delineator Drum Removed
3-12-81 9-1-81	NOTE CHANGE NOTES
1-18-82	Dimensions
4-8-82	HEADING & PANEL

2-17-78

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted _____ Design Engineer

Recommended: _____ Asst. Chief Engineer, Pre - Constr

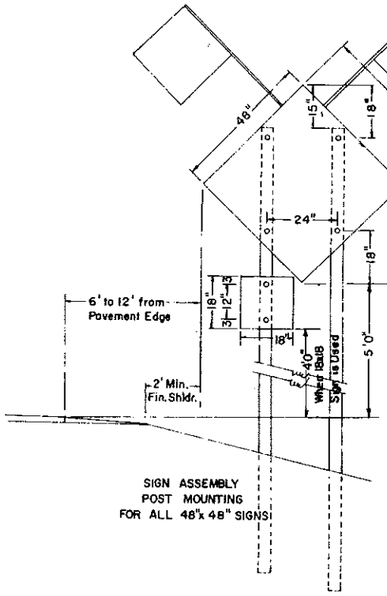
Approved _____ Chief Engineer

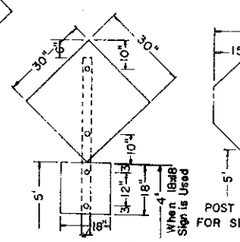
CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS

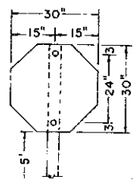
FHWA REGION	STATE	FED AID PROJ NO
8	N.D.	IR-094-4(47)132

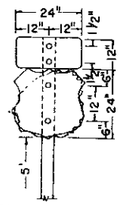
47

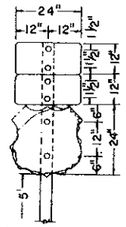
D-754-5-A

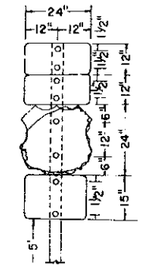


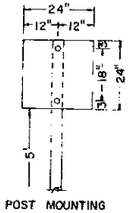


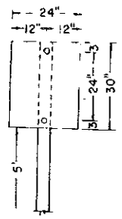


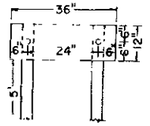


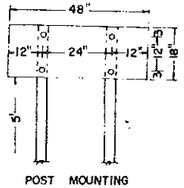


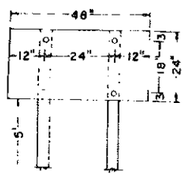


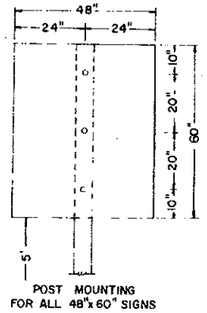


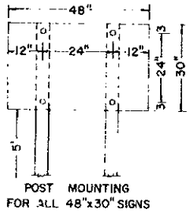


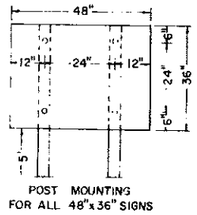


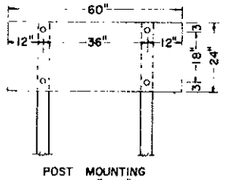


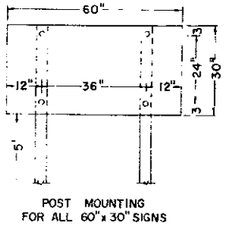


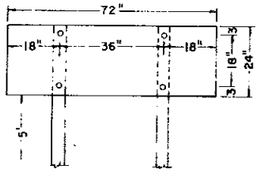


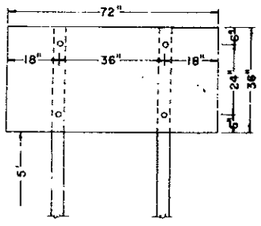


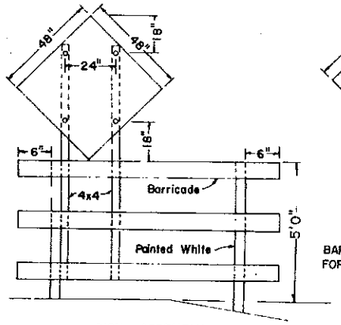


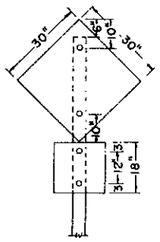


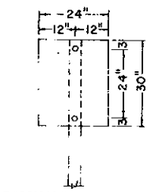


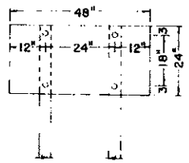


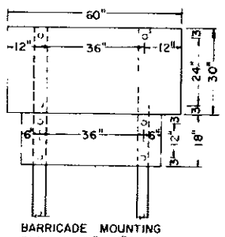


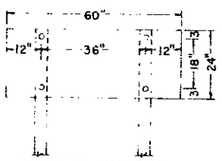


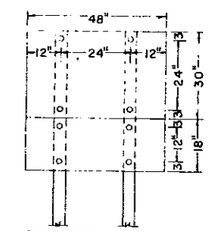


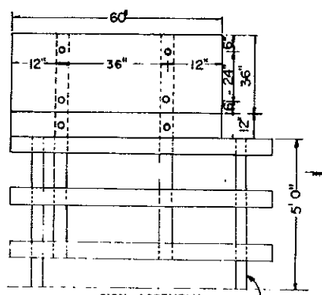




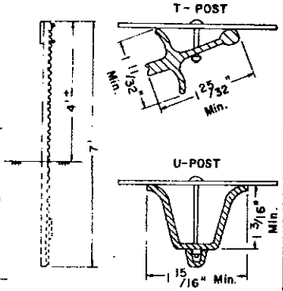


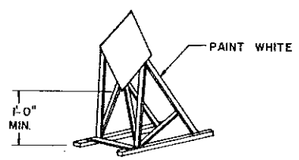


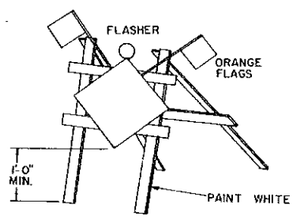




DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS







NOTES:

Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.

NOTES:

DELINEATOR POSTS: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.

BARRICADE MOUNTING SIGNS: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4x4 min. SFS or equivalent steel posts. See Stds. D-754-5 thru D-754-9 for construction sign and barricade location details. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.

SIGN SUPPORTS: The sign supports shall be imbaded to a sufficient depth so that the signs will remain plumb throughout duration of the project. It is suggested that the min. depth of imbedment be 5'-0".

MATERIAL: All signs shall be .100" aluminum, 12 gage galv. steel, 1/2" plywood or other approved mat'l.

HOLES: All holes to be punched round for 3/8" bolts.

ALTERNATE MESSAGES: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate without a border and this plate installed and removed as required.

2-17-78

REVISIONS	
DATE	CHANGE
8-21-78	DETAIL ADDED
4-16-79	SIGN NO. CORRECTION
2-6-81	NOTE ADDED

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: _____ Design Engineer

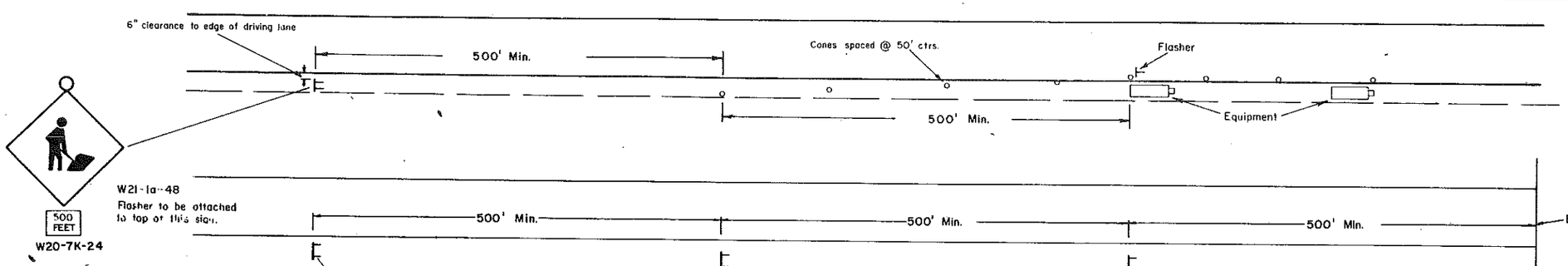
Recommended: _____ Asst. Chief Engineer, Pre-Constr.

Approved: _____ Chief Engineer

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-094-4(47)132	48

D-754-12



TYPE U

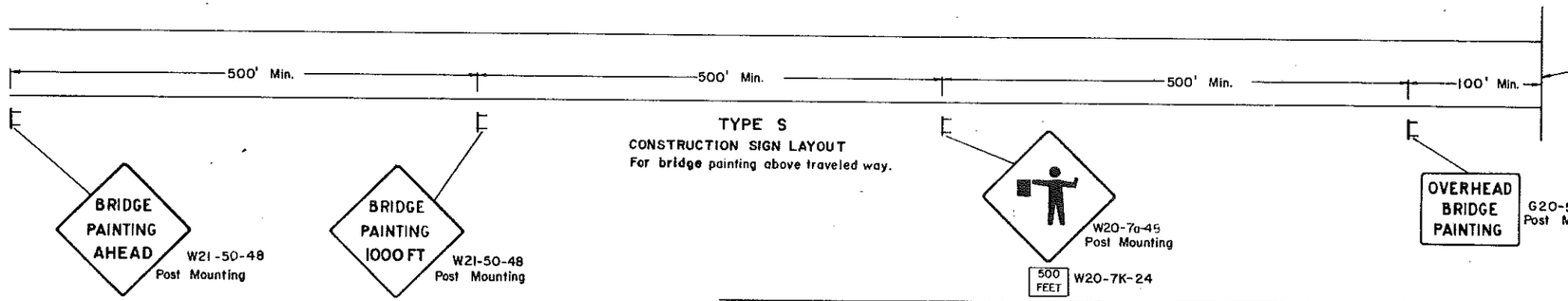
TRAFFIC PROTECTION DEVICES PLACEMENT FOR SITUATION WHEN EQUIPMENT WILL BE PARKED ON THE RIGHT SHOULDER

TYPE R

CONSTRUCTION SIGN LAYOUT
For bridge painting below traveled way,

KEY

- Type I Barricades
- Type II Barricades
- Type III Barricades
- Cones
- Lighting Device
- Flagman
- Delineator Drums
- Signs
- Type A Delineator



TYPE S

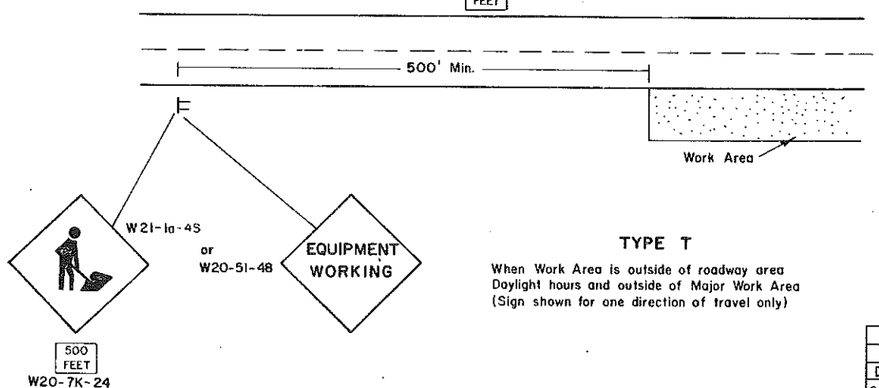
CONSTRUCTION SIGN LAYOUT
For bridge painting above traveled way.

NOTE:

FLAGS: All advance warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when flag is hung limp it will not touch the sign.

Where advance warning sign placed as shown interferes with permanent signs, The warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.

Lighting - The flashers and steady burn lights shall be maintained as shown. If the danger exists at night and the work area is close to traffic lane, the edge of the traffic lane on the work area side shall be illuminated by steady burn lights spaced at 100 ft. centers. The flashers shall be placed at the beginning and middle of the hazard. Where traffic is tapered into another lane, the flashers shall be placed at the beginning and middle of the taper, and the remaining tapering devices shall be illuminated by steady burn lights. The steady burn light shall be spaced at the dimension S used in calculating length of taper. Flashers shall be placed above the barricade bars and above all warning signs unless barricades and signs have encapsulated lens reflective sheeted faces.



TYPE T

When Work Area is outside of roadway area Daylight hours and outside of Major Work Area (Sign shown for one direction of travel only)

Sheet Added
10-29-84

7-15-78

REVISIONS	
DATE	CHANGE
8-21-78	Note Change
1-5-79	General Revisions
3-7-73	Note Change
6-23-80	Sign Std. Numbers

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: _____ Design Engineer

Recommended: _____ Asst. Chief Engineer, Pre-Constr.

Approved: _____ Chief Engineer