

Design Info				
Location	Design Speed	Minimum Sight Distance for:		
		Stopping	Safe Passing	Passing for Marking
Sta 8+56 to 908+59 R3	65	645	2285	1100
Sta 8+56 to 666+40 R2	45	360	1625	700
Sta 0+12 to 666+40 R2	65	645	2285	1100
Sta 302+91 to 361+38 R1	55	495	1985	900
Sta 361+38 to 375+37 R1	35	250	1280	550
Sta 375+37 to 392+19 R1	25	155	900	450

NORTH DAKOTA

JOB#30

DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	AC-SS-1-031(010)078	14914	1	1

GOVERNING SPECIFICATIONS: 31-086.670

Standard Specifications adopted by the North Dakota Department of Transportation October 2002; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

LENGTH OF PROJECT

Miles - Gross 33.774 Miles - Net 31.852 1.879 miles deducted for Hwy 200A

Morton, Mercer and Oliver Counties

Project No. AC-SS-1-031(010)078

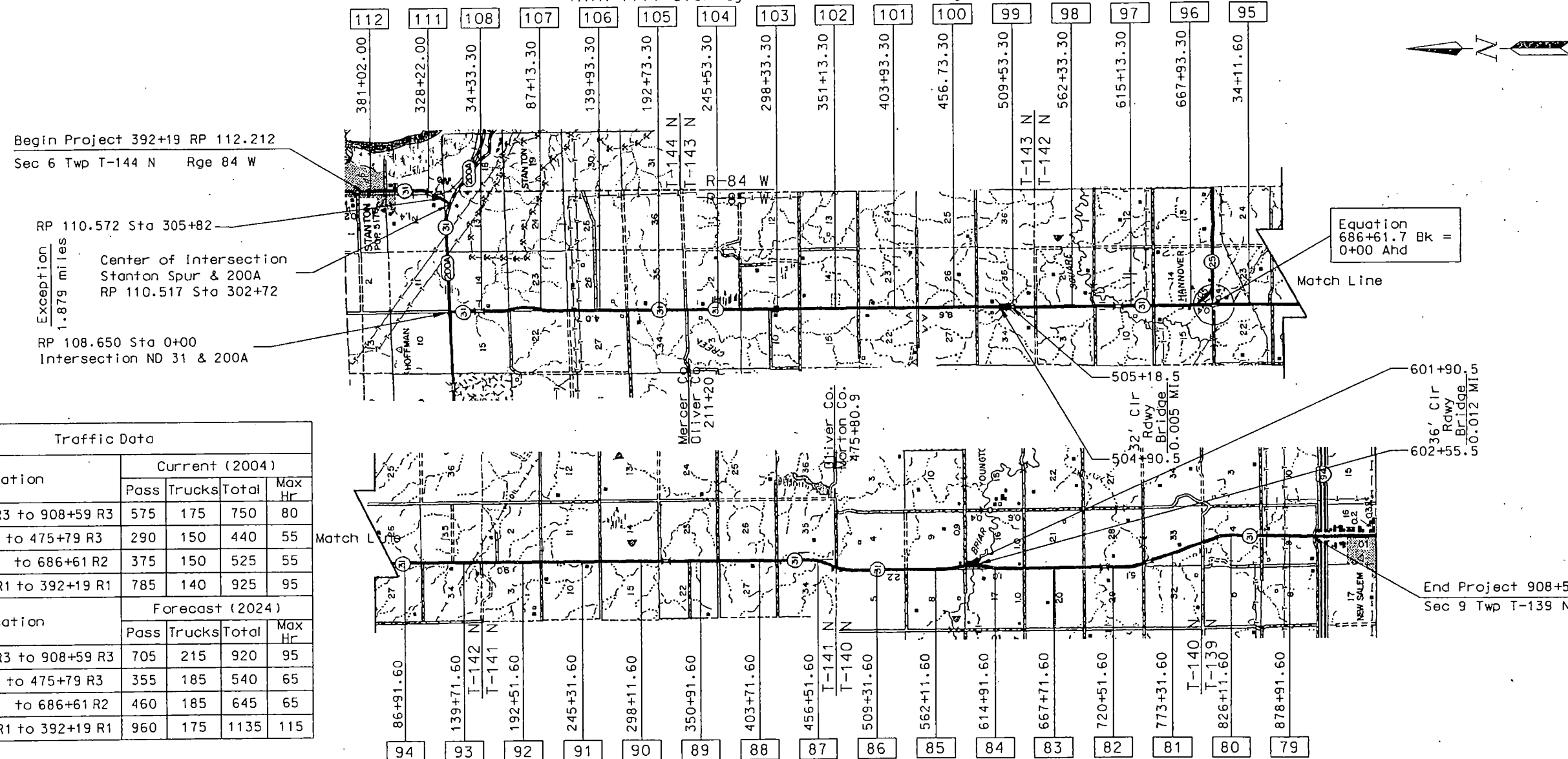
ND Hwy 31 from I-94 North to West Jct ND Hwy 200A

East Jct ND Hwy 200A North to Stanton

Structural Overlay and Structural Items

from I-94 North to West Jct ND Hwy 200A

Thin lift overlay from East Jct ND Hwy 200A to Stanton



Traffic Data				
Location	Current (2004)			
	Pass	Trucks	Total	Max Hr
Sta 475+79 R3 to 908+59 R3	575	175	750	80
Sta 0+00 R3 to 475+79 R3	290	150	440	55
Sta 0+12 R2 to 686+61 R2	375	150	525	55
Sta 302+91 R1 to 392+19 R1	785	140	925	95
Location	Forecast (2024)			
	Pass	Trucks	Total	Max Hr
Sta 475+79 R3 to 908+59 R3	705	215	920	95
Sta 0+00 R3 to 475+79 R3	355	185	540	65
Sta 0+12 R2 to 686+61 R2	460	185	645	65
Sta 302+91 R1 to 392+19 R1	960	175	1135	115

DESIGNERS

Matt Linneman

APPROVED DATE 9/22/05

James A. Zupler

OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

APPROVED DATE

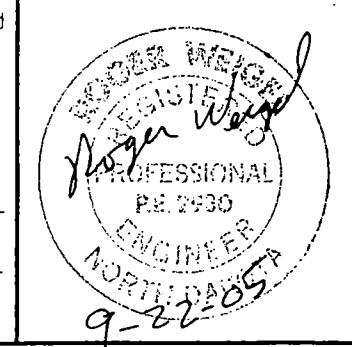
FEDERAL HIGHWAY ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

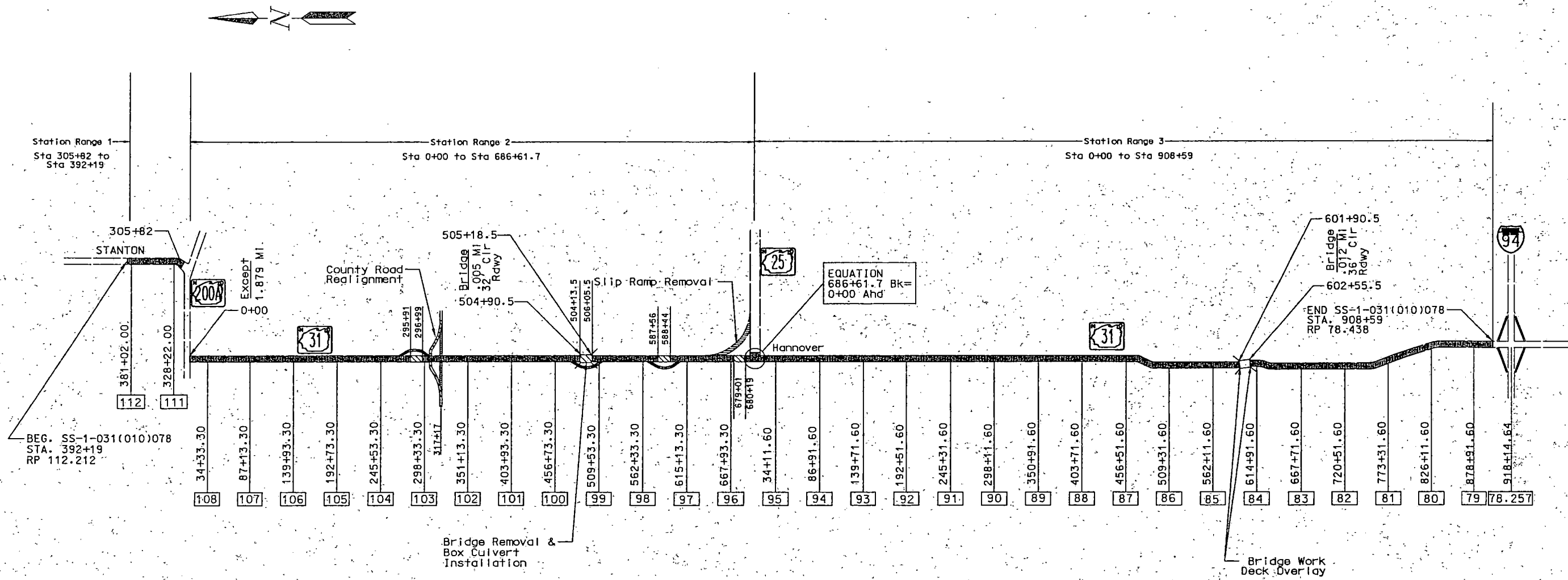
APPROVED DATE 9-22-05

Roger Weigl

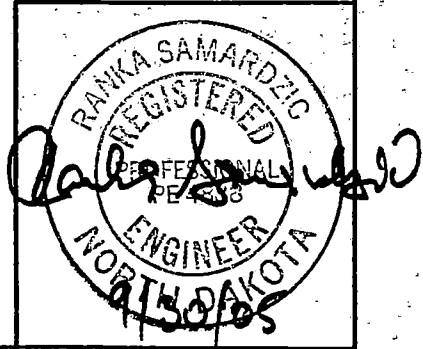
NDDOT DIV-DIST OR CONSULTANT FIRM



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-031(010)078	4	1



- Overlay
- Reconstruction
- Obliteration of Roadway



Scope of Work

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-1-031(010)078	170	5

NOTES:

- 100 SCOPE OF WORK: Work at this site consists of filling voids, with expansive polyurethane foam insulation or flowable fill, caused by the untied construction joint separating on a reinforced concrete box culvert. All debris shall be removed from the box culvert.
- 930 BOX CULVERT JOINT REPAIR: Structure 281-231.502 is a single 9' x 7' x 57' reinforced concrete box culvert. The construction joint is untied and separated approximately 1", allowing seepage into the box culvert.

First an 18" wide, 15 gage galvanized steel plate shall be attached to both side wall joints. The voids along the box culvert floor and side walls shall then be filled with flowable fill from inside the box culvert. Install one 3' section of 15 gage steel plate to the roof, and then fill the voids above this 3' section by spraying expansive foam insulation from inside the box culvert. Attach another 3' section of steel plate and fill the voids above with the foam insulation. Continue this procedure until all voids have been filled.

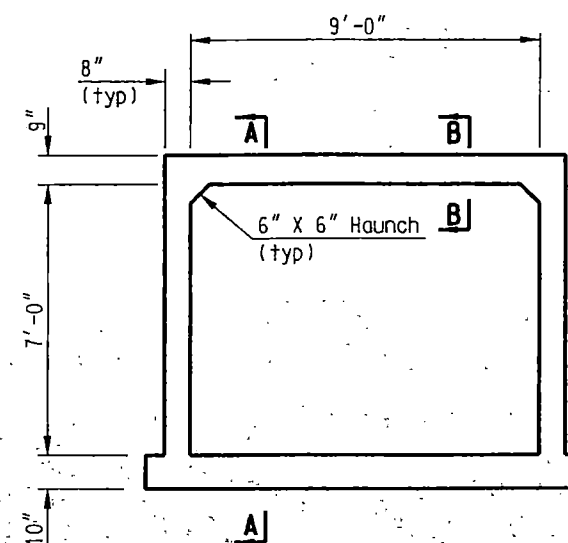
The anchorage system used on the plates shall be installed according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02 of the NDDOT Standard Specifications.

The bid item "Box Culvert Joint Repair" shall apply to all different types of joint segments in a box culvert. At this site, a total of 4 joint segments will be paid for: 1 floor, 2 exterior walls and 1 roof segments. The voids will not be filled on the interior walls. The unit price bid for each type of joint segment shall be the same.

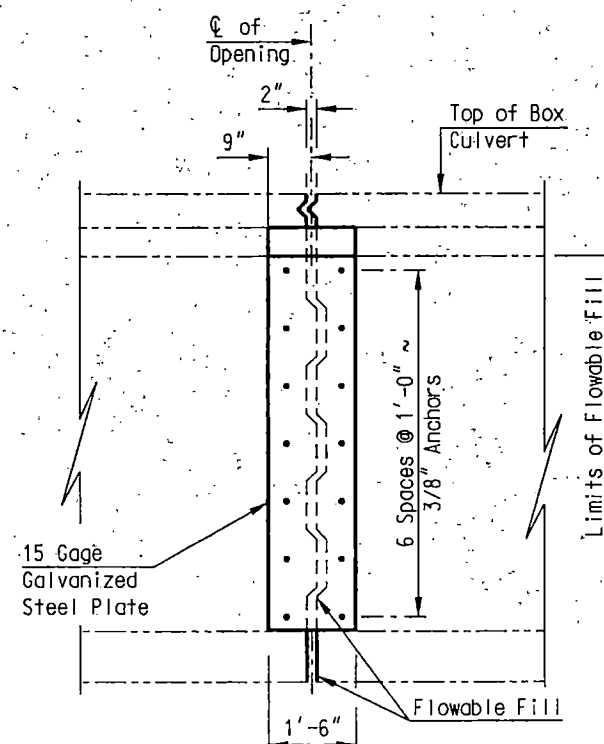
The cost of all equipment, labor and materials required to dewater, remove all debris from the box culvert and fill the void areas shall be included in the price bid for "Box Culvert Joint Repair."

FLOWABLE FILL MIX DESIGN:

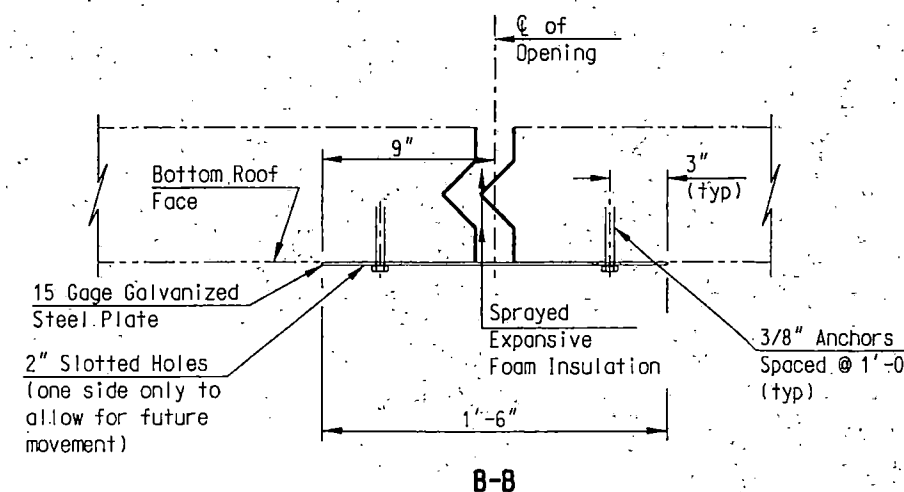
CEMENT	=	60 LBS/CY
FLY ASH	=	290 LBS/CY
FINE AGGREGATE	=	2900 LBS/CY
WATER	=	± 70 GAL/CY



BARREL SECTION
(At Construction Joint)



A-A



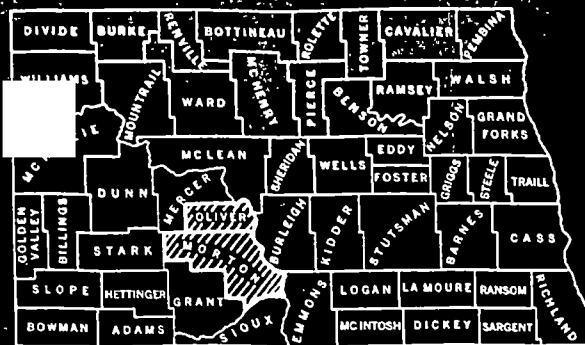
B-B



SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
930	9671	BOX CULVERT JOINT REPAIR	EA	4

CREEK
8 MI N OF I-94
STA: 473+94

BOX CULVERT JOINT REPAIR
OLIVER COUNTY



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES



SCALES

LAYOUT MAP: 1" = 1000 FEET
PLAN & PROFILE: 1" = 100 FEET
DRAWINGS: 1" = 10 FEET
CROSS SECTIONS: 1" = 10 FEET
STRUCTURAL DRAWINGS: AS SHOWN

NORTH DAKOTA STATE HIGHWAY DEPARTMENT PLANS FOR THE PROPOSED IMPROVEMENT OF A STATE HIGHWAY IN OLIVER & MORTON COUNTIES FEDERAL AID SECONDARY PROJECT S.629(1)

INDEX OF DRAWINGS	
SHEET NO.	TITLE PAGE
SHEET NO. 1	TYPICAL SECTIONS & SUMMARY OF QUANTITIES
SHEET NO. 2	CULVERT AND BRIDGE LIST
SHEET NO. 3	TO 36 INCL. PLAN AND PROFILE DRAWINGS
SHEET NO. 4	TO 47 INCL. STRUCTURAL DRAWINGS
SHEET NO. 5	TO 47 INCL. PROFILE
SHEET NO. 6	TO 210 INCL. CROSS SECTIONS

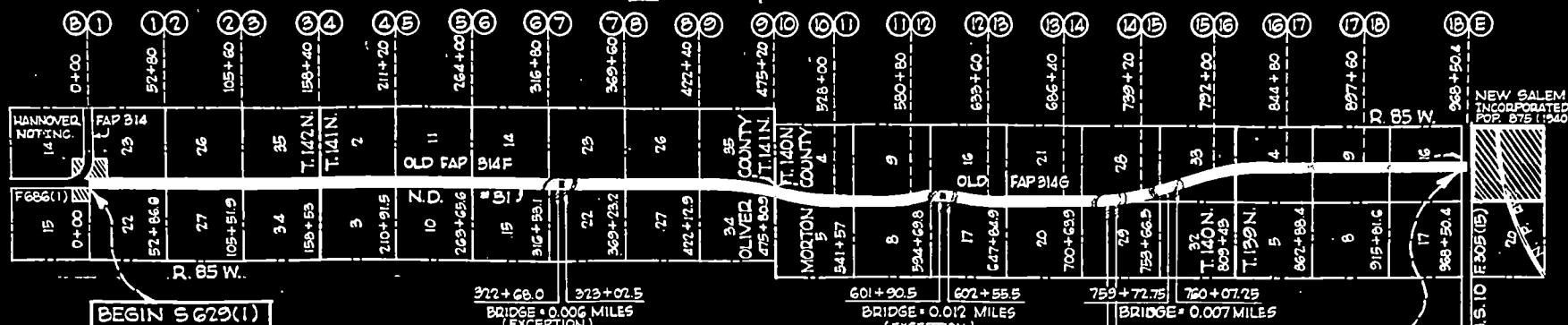
GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota State Highway Department, 1937, and approved as standard by the Bureau of Public Roads, July 2, 1938. Required Special Provisions approved as standard by the Bureau of Public Roads, Aug. 5, 1940, and those submitted herewith.

KEY TO CONVENTIONAL SIGNS

STATE & NATIONAL LINES	
COUNTY LINE	
TOWNSHIP & RANGE LINES	
GRADE LINE	
CENTERLINE OF CONSTRUCTION	
OLD RIGHT OF WAY LINE	
NEW RIGHT OF WAY LINE	
ABANDONED RIGHT OF WAY LINE	
PROPERTY LINE	
STONE WALL	
OTHER FENCES	
POLE LINES	
POWER LINES	
BRIDGE	
GROUND ELEVATION	
GRADE	
TRAVELED WAY	
RAILROADS	
HEDGES AND TREES	
TRAILS	
CITY OR VILLAGE CORPORATE LIMITS	
SECTION CORNER	
QUARTER SECTION CORNER	
BUILDINGS	
OLD CULVERTS	
NEW CULVERTS	
DRAINAGE	
BENCH MARKS	
WATERS EDGE	
MARSH	
WIRE ROPE GUARD RAIL	
SNOW FENCE	
RIPRAP	
GUARD POSTS	
COBBLE GUTTERS	
CONCRETE GUTTERS	

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
PRESENT TRAFFIC (1951)	191 PASS. 94 TRUCKS 285 TOTAL	34
TRAFFIC FORECAST (1971)	339 PASS. 117 TRUCKS 456 TOTAL	55
DESIGN SPEED	60 MPH	
TRAFFIC CLASSIFICATION	M	
MINIMUM SIGHT DISTANCE (NON PASSING)	475 FEET	
MINIMUM SIGHT DISTANCE (SAFE PASSING)	2300 FEET	
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1000 FEET	
BRIDGES	MINIMUM WIDTH = 22 FEET DESIGN LOADING = H20 (1949).	



BEGIN S.629(1)
STA. 0+00 =
Pt. Sta. 2+49.5 on
Old FAP 314 E =
Long Sta. 686+61.7
on F.686(1).
NW Corner Sec. 23
T=142 N, R=85 W.

LAYOUT MAP
6000 FEET 0 6000 FEET
SCALE - FEET

F - 1 - 31 (1)
MILE 77 31-086.670

END S.629(1)
STA. 968+50.4 =
Sta. 494+76.4 on
Old FAP 314 E =
Sta. 497+57.4 on
S.N.F.A.P. 305(15).
A point 40' West
S.E. Corner of the
SW 1/4 of Sec. 16,
T=139 N, R=85 W.

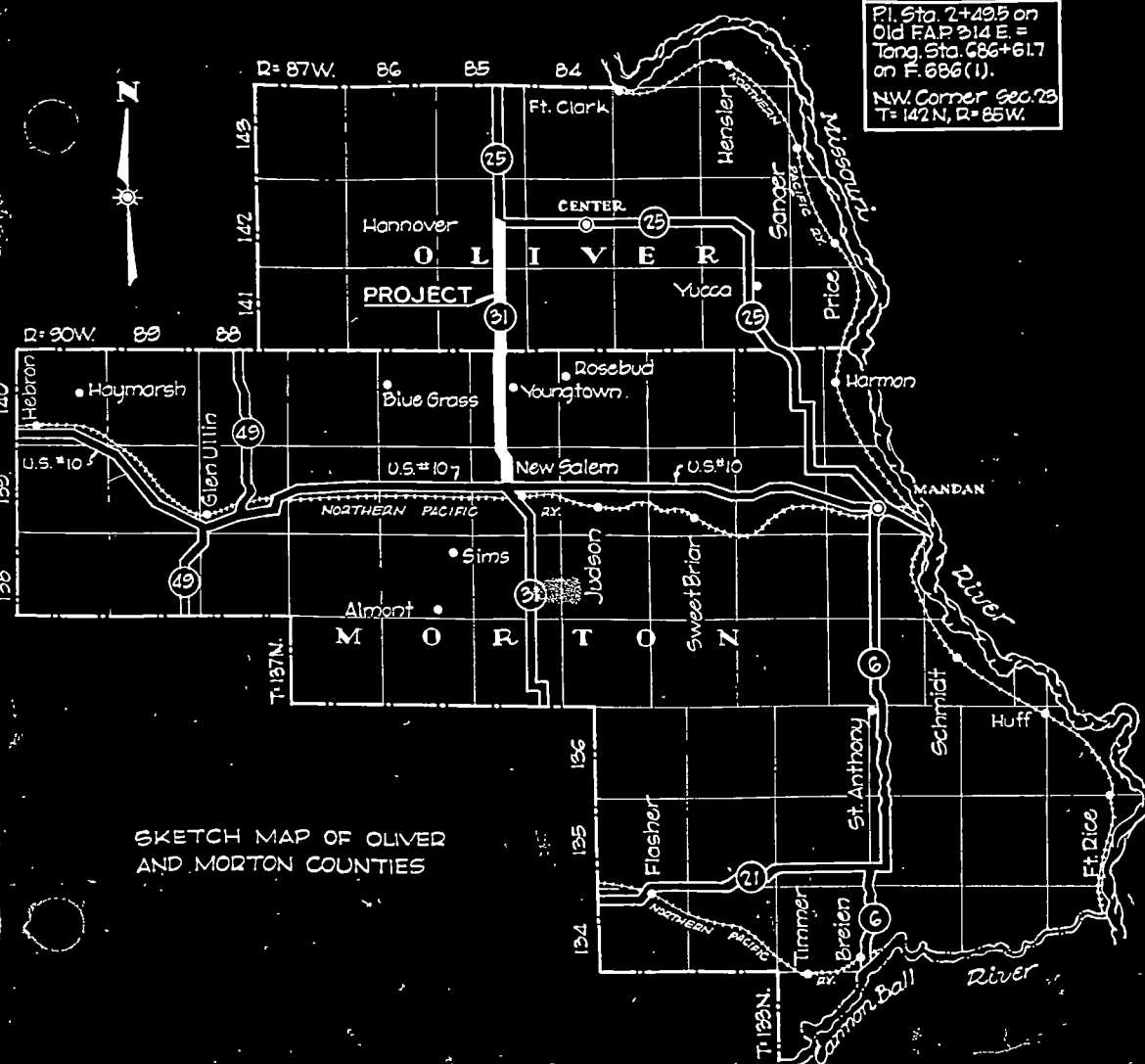


STRAIGHT LINE DIAGRAM OF
PASSING ZONES, NON-PASSING ZONES &
SAFE PASSING SECTIONS.

8000' 0' 8000'
SCALE - FEET

LEGEND

Passing Zones.....(1000' Minimum).....
Non-Passing Zones.....
Safe Passing Sections.....(2300' Minimum).....



SKETCH MAP OF OLIVER
AND MORTON COUNTIES

April 20, 1951
Revised to conform to P5 & E.
All sheets affected

APPROVED	DATE 4-24-51
CHIEF ENGINEER, ACTING NORTH DAKOTA STATE HIGHWAY DEPARTMENT	
RECOMMENDED FOR APPROVAL	DATE
DISTRICT ENGINEER, BUREAU OF PUBLIC ROADS DEPARTMENT OF COMMERCE	
APPROVED	DATE
DIVISION ENGINEER BUREAU OF PUBLIC ROADS DEPARTMENT OF COMMERCE	

INSTALL PIPE CULVERTS

Sta 461+52 & 72"x66" RCP 2-72" FES.
Sta 475+80.9 Lt 18"x50" CMP

RELAY PIPE CULVERTS

Sta 456+06 Lt 15"x44" RCP from solv.

BENCH MARKS

NO	DESCRIPTION	LOCATION	ELEV.
48	Emb Rock	455+91 = 148' RT	2105.90
49	Emb Rock	466+70 = 86' Lt	2090.66
50	Lq Emb Rock	475+65 = 175' Lt	2092.91

FED. AID DIST. NO.	STATE	FED. AID PROJECT NO.	LOCAL ROAD	SHEET NO.	TOTAL SHEETS
5N	N.D.	679(1)		19	21

REMOVE EXISTING CULVERT

Sta 461+53.1 & --- Lump Sum

Pit & Mound

No Ties

PI. 460+24.2

2x2 Hub & Nail

460

465

470

475

480

485

490

495

500

505

510

515

520

525

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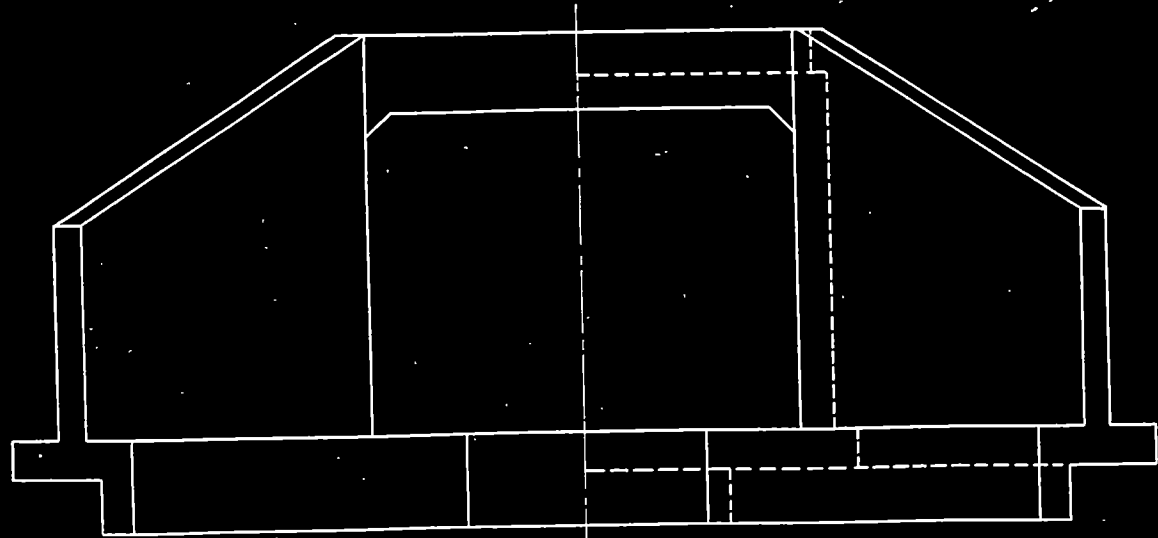
1795

1800

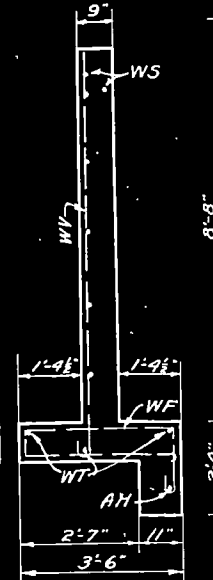
1805

1810

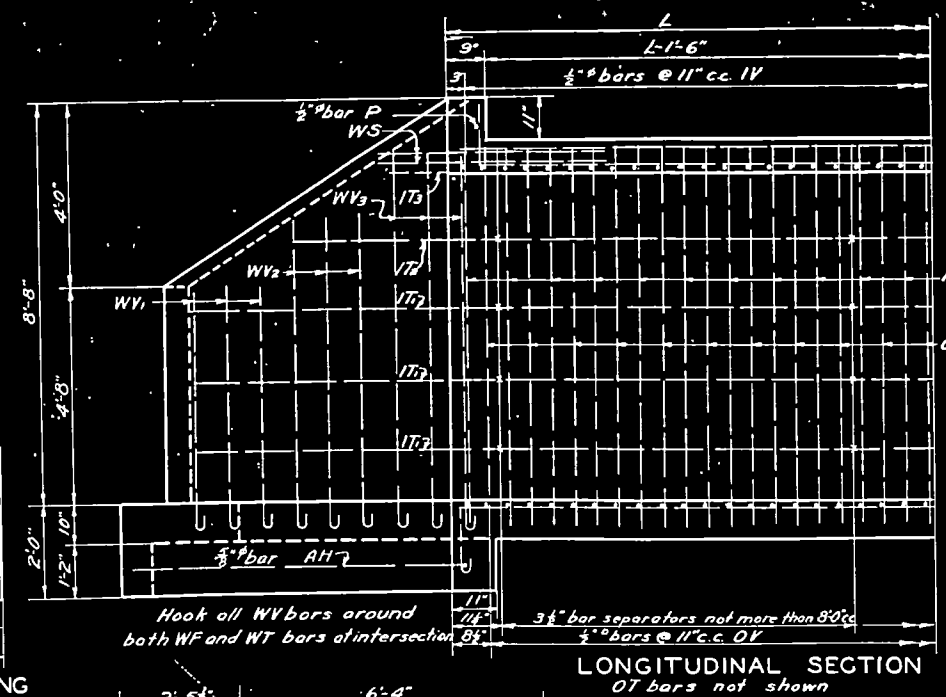
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	N. D.				



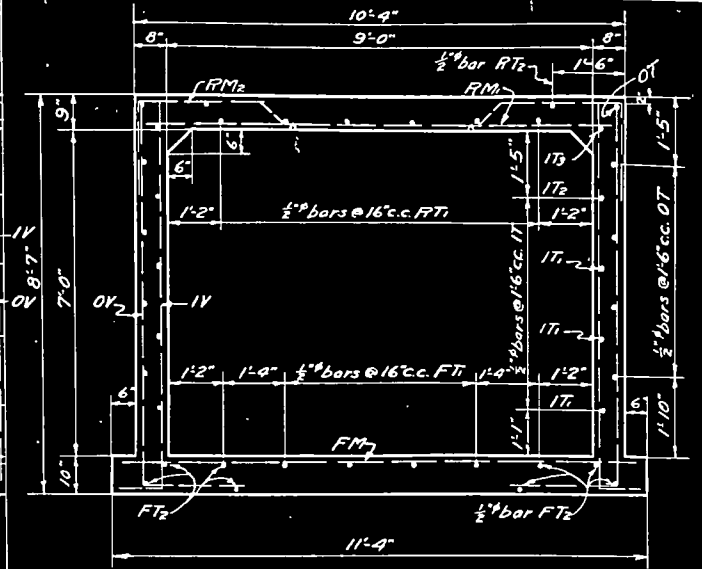
END VIEW



SECTION OF WING



LONGITUDINAL SECTION
OT bars not shown



SECTION OF BARREL

CONSTRUCTION NOTES

REINFORCEMENT:-

The transverse and vertical bars shall always be placed nearest the surface. The longitudinal, temperature, or tie bars shall be placed immediately inside of the vertical and transverse bars, and the intersections wired.

The ends of the FM bars do not lap, but alternate with the OV bars. The FM bars match with the IV bars and the FM bars with the OV bars.

When the distance between end bars is not evenly divisible by the bar spacing, the odd distance should be compensated by a few irregular spaces near the center, not at the ends of the culvert.

The distance from the nearest bar to the surface of the concrete shall be as follows:

- Bottom of floor slab: 2" Clear.
- Bottom of wing footing: 2 1/2" to 3" Clear.
- Top of floor slab: 1 1/2" Clear.
- Top of wing footing: 2 1/2" to 3" Clear.
- Side walls & wingwalls: 1 1/2" Clear.
- Bottom of roof slab: 1" Clear.
- Top of roof slab: 1 1/2" Clear.

CONCRETE:

All concrete shall be Class "A". The floor slab and wing footings shall be poured in one continuous run. The side walls, wingwalls and roof slab shall be poured in one continuous run.

All exposed edges of concrete shall be beveled with 1" or 3/4" triangular moulding. Designed for a MAXIMUM FILL 6' 3" F.

QUANTITIES FOR ONE CULVERT					
L	Concrete Cu Yds	Rein Steel Lbs	L	Concrete Cu Yds	Rein Steel Lbs
28'	40.08	3924	36'	48.01	4875
29'	41.07	4109	37'	49.01	4988
30'	42.06	4217	38'	50.00	5095
31'	43.05	4326	39'	50.99	5209
32'	44.05	4432	40'	51.98	5397
33'	45.04	4540	41'	52.97	5516
34'	46.03	4647			
35'	47.02	4751	44'	55.94	5836

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE
BOX CULVERT

Clear Span: 9 Ft. Clear Height: 7 Ft.

APPROVED 8-25-1927

APPROVED 9-1-1927

Series of 1927

NOTE: In the Bar List an allowance of 2'-0" has been made for a splice in each bar more than 40'-0" in length.

BAR LIST

L	28	29	30	31	32	33	34	L	
Mark	No	Length	No	Length	No	Length	No	Length	Mark
FT	4	31'-4"	4	32'-4"	4	33'-4"	4	34'-4"	FT
FM	6	27'-9"	8	28'-9"	8	30'-9"	8	32'-9"	FM
WT	12	11'-5"	12	11'-5"	12	11'-5"	12	11'-5"	WT
WF	36	8'-9"	36	8'-9"	36	8'-9"	36	8'-9"	WF
AH	2	25'-1"	2	25'-1"	2	25'-1"	2	25'-1"	AH
WV	12	6'-1"	12	6'-1"	12	6'-1"	12	6'-1"	WV
WV2	12	7'-6"	12	7'-6"	12	7'-6"	12	7'-6"	WV2
WV3	12	8'-11"	12	8'-11"	12	8'-11"	12	8'-11"	WV3
OV	60	11'-3"	64	11'-3"	68	11'-3"	72	11'-3"	OV
IV	62	9'-1"	66	9'-1"	70	9'-1"	74	9'-1"	IV
IT	6	46'-3"	6	47'-3"	6	48'-3"	6	49'-3"	IT
IT2	2	38'-3"	2	39'-3"	2	40'-3"	2	41'-3"	IT2
IT3	2	32'-3"	2	33'-3"	2	34'-3"	2	35'-3"	IT3
OT	10	32'-6"	10	33'-6"	10	34'-6"	10	35'-6"	OT
RM	30	10'-1"	32	10'-1"	34	10'-1"	36	10'-1"	RM
RM2	31	14'-7"	33	14'-7"	35	14'-7"	37	14'-7"	RM2
RT	6	29'-6"	6	30'-6"	6	31'-6"	6	32'-6"	RT
RT2	2	27'-9"	2	28'-9"	2	29'-9"	2	30'-9"	RT2
P	2	9'-8"	2	9'-8"	2	9'-8"	2	9'-8"	P
WS	8	5'-0"	8	5'-0"	8	5'-0"	8	5'-0"	WS

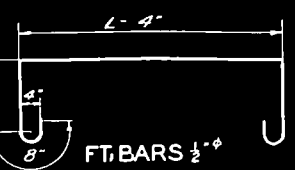
L	35	36	37	38	39	40	41	L	
FT	4	38'-4"	4	39'-4"	4	40'-4"	4	41'-4"	FT
FM	8	34'-9"	8	35'-9"	8	36'-9"	8	37'-9"	FM
WT	12	11'-5"	12	11'-5"	12	11'-5"	12	11'-5"	WT
WF	36	8'-9"	36	8'-9"	36	8'-9"	36	8'-9"	WF
AH	2	25'-1"	2	25'-1"	2	25'-1"	2	25'-1"	AH
WV	12	6'-1"	12	6'-1"	12	6'-1"	12	6'-1"	WV
WV2	12	7'-6"	12	7'-6"	12	7'-6"	12	7'-6"	WV2
WV3	12	8'-11"	12	8'-11"	12	8'-11"	12	8'-11"	WV3
OV	76	11'-3"	80	11'-3"	84	11'-3"	88	11'-3"	OV
IV	78	9'-1"	82	9'-1"	86	9'-1"	90	9'-1"	IV
IT	6	53'-3"	6	54'-3"	6	55'-3"	6	56'-3"	IT
IT2	2	47'-3"	2	48'-3"	2	49'-3"	2	50'-3"	IT2
IT3	2	43'-3"	2	44'-3"	2	45'-3"	2	46'-3"	IT3
OT	10	59'-6"	10	60'-6"	10	61'-6"	10	62'-6"	OT
RM	38	10'-1"	40	10'-1"	42	10'-1"	44	10'-1"	RM
RM2	39	14'-7"	41	14'-7"	43	14'-7"	45	14'-7"	RM2
RT	6	36'-6"	6	37'-6"	6	38'-6"	6	39'-6"	RT
RT2	2	34'-9"	2	35'-9"	2	36'-9"	2	37'-9"	RT2
P	2	9'-8"	2	9'-8"	2	9'-8"	2	9'-8"	P
WS	8	5'-0"	8	5'-0"	8	5'-0"	8	5'-0"	WS

21-9

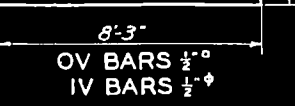
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171-8

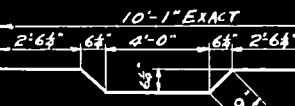
AH



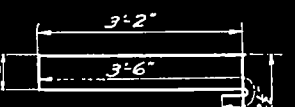
FT BARS 1/2"



OV BARS 1/2"



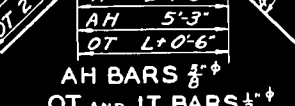
RM BARS 3/8"



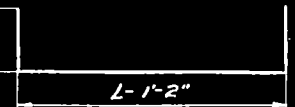
WF BARS 1/2"



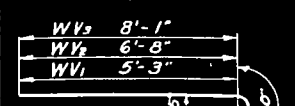
AH BARS 3/8"



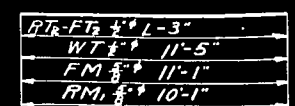
OT AND IT BARS 1/2"



RT BARS 1/2"



WV BARS 3/8"



STRAIGHT BARS



WV BARS 3/8"

BAR DETAILS

