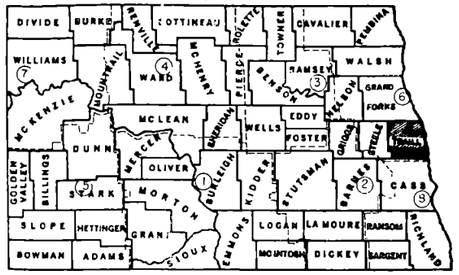
FED ROAD DIV NO	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	ROS-6-200(10)	1



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

SCALES
- LAYOUT SHEET: 1 IN. = 5,200 FT.
- PLAN AND PROFILE DRAWINGS: HOR. 1 IN. = 100 FT. / VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN TRAILL COUNTY

FEDERAL AID PROJ. NO. ROS-6-200(10)388

GRADING, SURFACING & STRUCTURE

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
ROS-6-200(10)	0.464	0.464
TOTALS	0.464	0.464

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway department July 1971 and approved as standard by the Federal Highway Administration Sept. 29, 1971 Required Contract Provisions(Form PR-1273) dated Sept. 1975 and others submitted herewith.

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1976)	1220 PASS. 230 TRUCKS 1450 TOTAL	200
TRAFFIC FORECAST (1996)	1850 PASS. 350 TRUCKS 2200 TOTAL	310

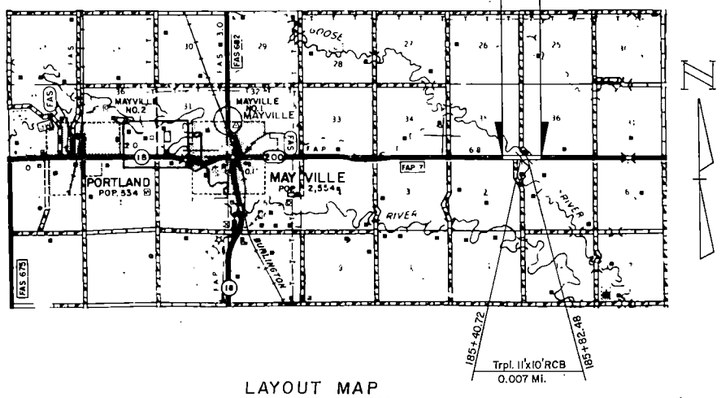
DESIGN SPEED	70 MPH
TRAFFIC CLASSIFICATION	"M"
MINIMUM SIGHT DISTANCE (STOPPING)	850'
MINIMUM SIGHT DISTANCE (SAFE PASSING)	3200'
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1200'

STA. R.C. Box 185+61.6

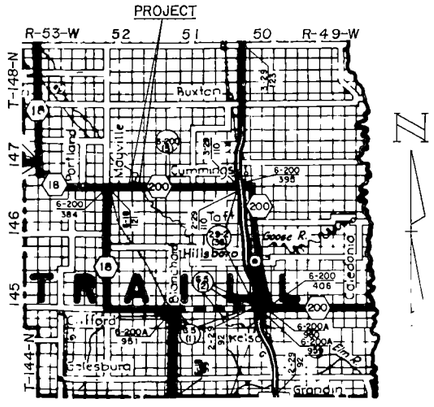
DESIGN LOADING HS 20

BEG. ROS-6-200(10) STA. 171+00=
Sta. 171+00 on F-5(14)
A point 1198.6' West of the N.E. Cor. of Sec. 2, Twp. 146N., Rge. 52W.

END ROS-6-200(10) STA. 195+50=
Sta. 195+50 on F-5(14)
A point 1251.4' East of the N.W. Cor. of Sec. 1, Twp. 146N., Rge. 52W.



LAYOUT MAP
5200 0 5200
SCALE IN FEET



SKETCH MAP OF TRAILL COUNTY

APPROVED DATE 6-1-76

CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

R. E. BRADLEY
REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER DATE

ROS-6-200(10)388

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 BRIDGE
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 / GRADE — 643.0 / 641.0 / 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 PUSH BUTTON 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. Pvm't	Continuously Reinforced Concrete Pavement
Contn.	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
Del.	Deliver
D.G.	Ditch Grade
El. or Elev.	Elevation
Ellipt.	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.	Gravel
Grd.	Graded
G. V.	Gate Valve
Hel.	Helical
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
Levg.	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. Pvm't	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
P.V.C.	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
Salv.	Salvage
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

INSTALL LOOSE ROCK RIP RAP
185+G1.G (R.C.B. Outlet) 135 C.Y.

INSTALL AGGREGATE CUSHION
185+G1.G (R.C.B. Outlet) 52 C.Y.

Beg. Proj. ROS-G-200(10) Sta. 171+00 = Sta. 171+00 on F-5(14)

INSTALL R/W MARKERS

172+00 Lt. & Rt.	3
177+00 Lt.	2
181+98.6 Lt. & Rt.	2
184+18.6 Rt.	1
184+28.6 Lt.	1
188+00 Lt.	1
190+00 Lt. & Rt.	3
195+00 Lt. & Rt.	2

INSTALL PIPE CULVERTS

175+76 Lt.	24"x 36' C.S.P. (.064")	2-C.S.E.S. (.064")
177+67 Lt.	24"x 40' C.S.P. (.064")	2-C.S.E.S. (.064")
177+67 Rt.	24"x 60' C.S.P. (.064")	2-C.S.E.S. (.064")
189+14 Lt.	24"x 68' C.S.P. (.064")	2-C.S.E.S. (.064")
194+04 Rt.	18"x 46' C.S.P. (.064")	2-C.S.E.S. (.064")

REMOVAL OF STRUCTURE
185+G1.G ℄ 1 Lump Sum

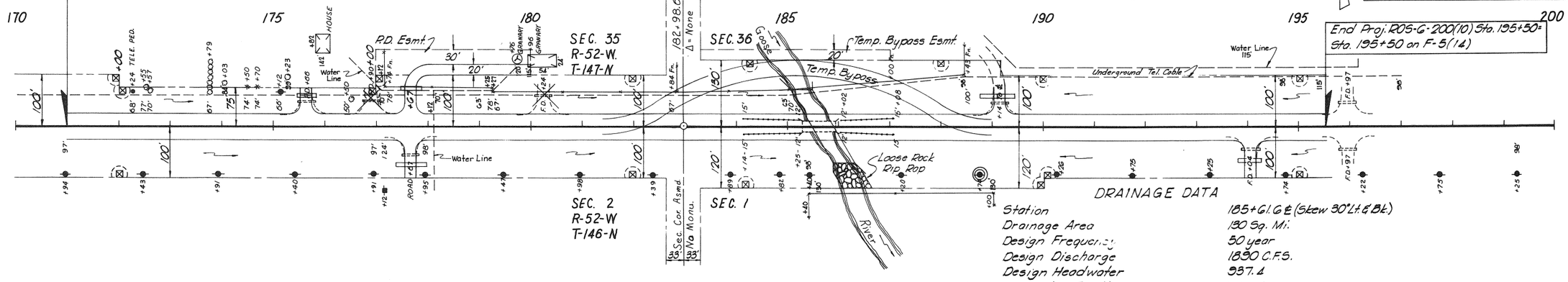
INSTALL R.C. BOX CULVERT
185+G1.G ℄ (Skew 30° Lt. & Bk.)
Trpl. 11'x10'x16'4"

Drwg. Nos. 38G310-1, 2, 3, 4, 5 & 6	
Class 1 Excavation	1164 C.Y.
Foundation Fill (2')	771 C.Y.
Class AE-3 Concrete	757.6 C.Y.
Reinforcing Steel (Grade 40)	111,859 Lbs.
Dampproofing (2-Coats)	56 S.Y.

N

BENCH MARKS

NO	DESCRIPTION	LOCATION	ELEV.
2	Iron Pin by T.P.	177+95 - 95' Rt.	960.04
M-434	S.E. Cor. of Granary	180+54 - 117' Lt.	945.54
Br	S.W. Cor. of S.W. Wing Wall	185+30 - 14' Rt.	944.06
3	Iron Pin by F.P.	188+28 - 126' Lt.	952.94
4	Iron Pin by T.P.	194+60 - 98' Rt.	957.87



175+G6 - 45' Lt.
24"x 44' C.S.P.
Remove - Salv.

176+90 - 45' Lt.
24"x 30' C.S.P.
Remove - Salv.

177+67 - 56' Rt.
24"x 48' C.S.P.
Remove - Salv.

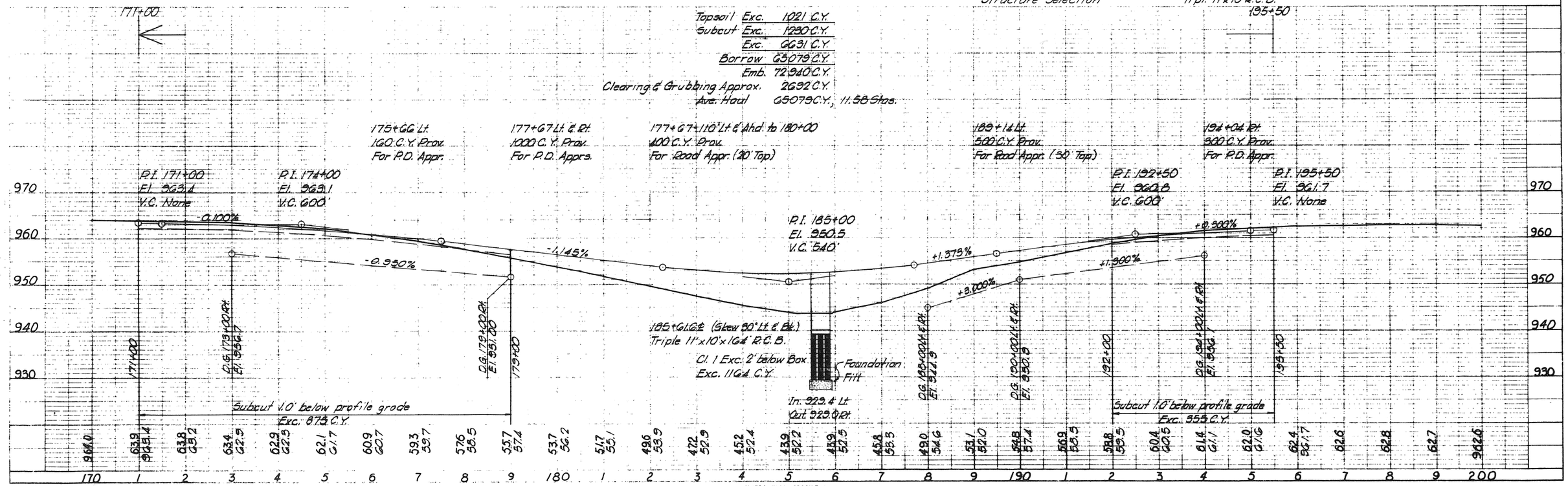
180+24 - 56' Lt.
24"x 34' C.S.P.
Remove - Salv.

Beg. Sta. 185+29.6
End. Sta. 185+93.6
64' R.C."T" Beam Bridge
Remove

189+12 - 41' Lt.
24"x 50' C.S.P.
Remove - Salv.

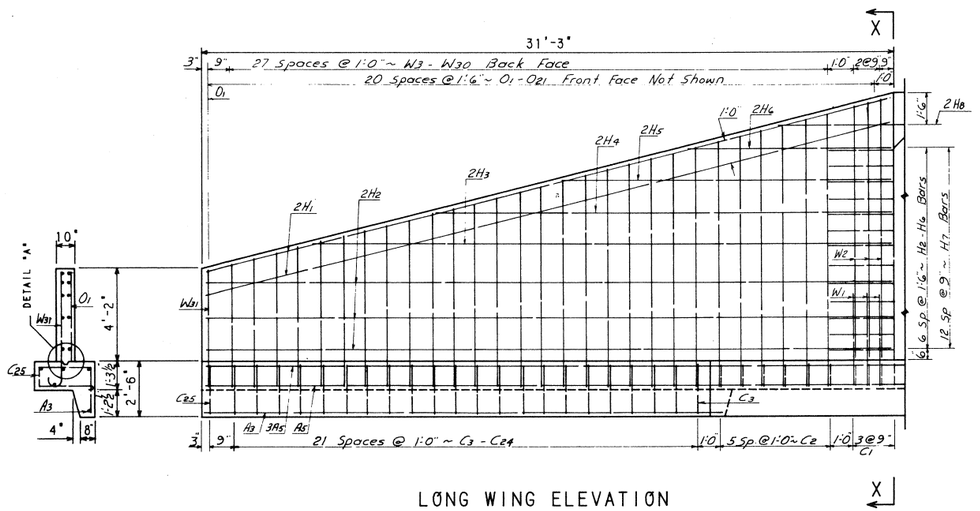
DRAINAGE DATA

Station	185+G1.G ℄ (Skew 30° Lt. & Bk.)	194+04 - 41' Rt.	195+97 - 43' Rt.	195+97 - 43' Lt.
Drainage Area	130 Sq. Mi.	18"x 34' C.S.P.	18"x 34' C.S.P.	18"x 34' C.S.P.
Design Frequency	50 year	Remove - Salv.	To Remain	To Remain
Design Discharge	1890 C.F.S.			
Design Headwater	937.4			
Tailwater Depth	7.9 Ft.			
Velocity through culvert	7.3 F.S.			
100-year Frequency Discharge	2376 C.F.S.			
100-year Frequency Headwater	938.7			
Maximum known discharge	Unknown			
Maximum known stage	940.5			
Frequency of maximum flood	Unknown			
Structure Selection	Trpl. 11'x10' R.C.B.			

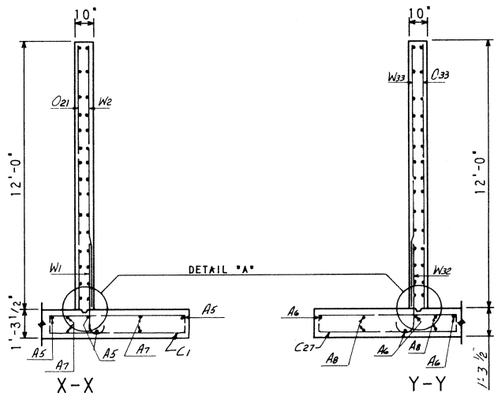


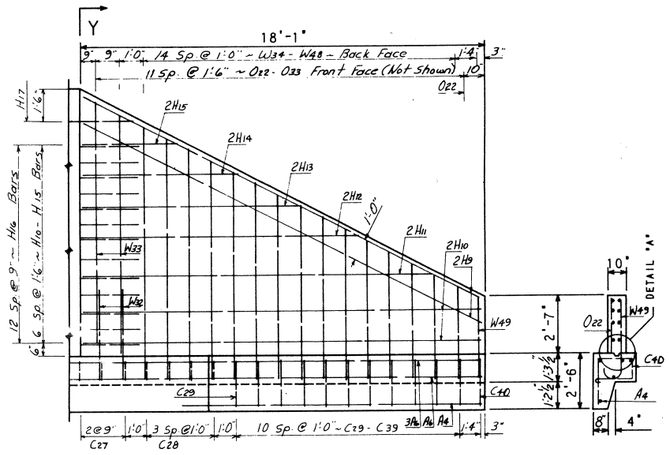
FED. ROAD DIST. NO.	STATE	FED.AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	RDS-6-200(10)		8	

QUANTITIES COMPUTED BY

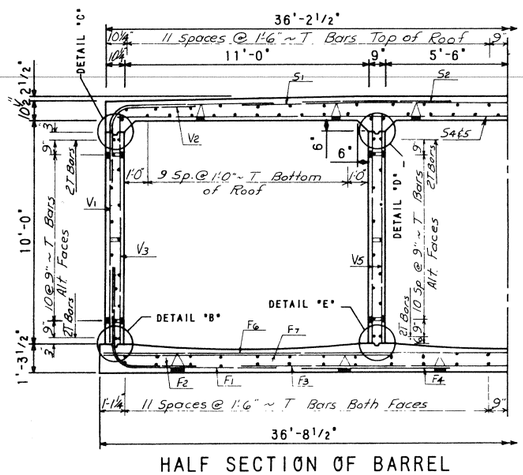


LØNG WING ELEVATIØN



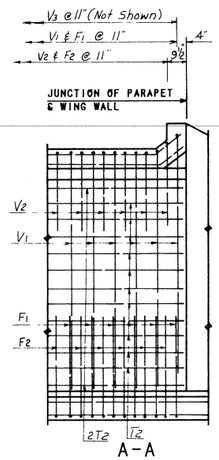


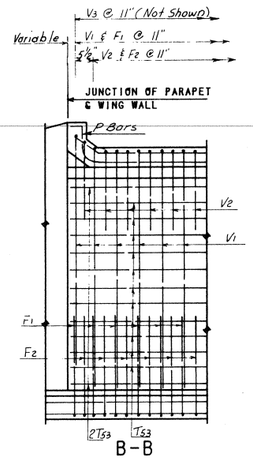
SHØRT WING ELEVATIØN

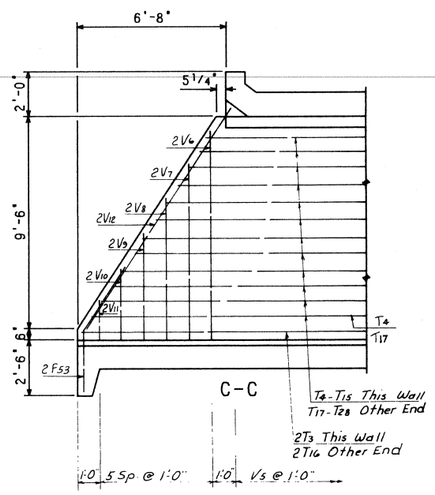


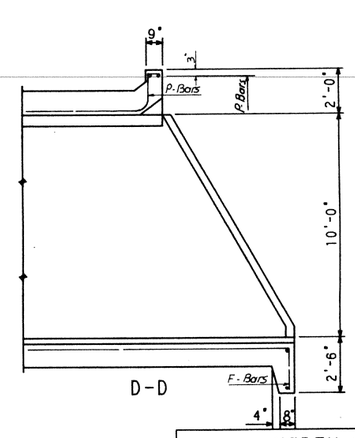
HALF SECTIØN ØF BARREL

168 T Bars / section









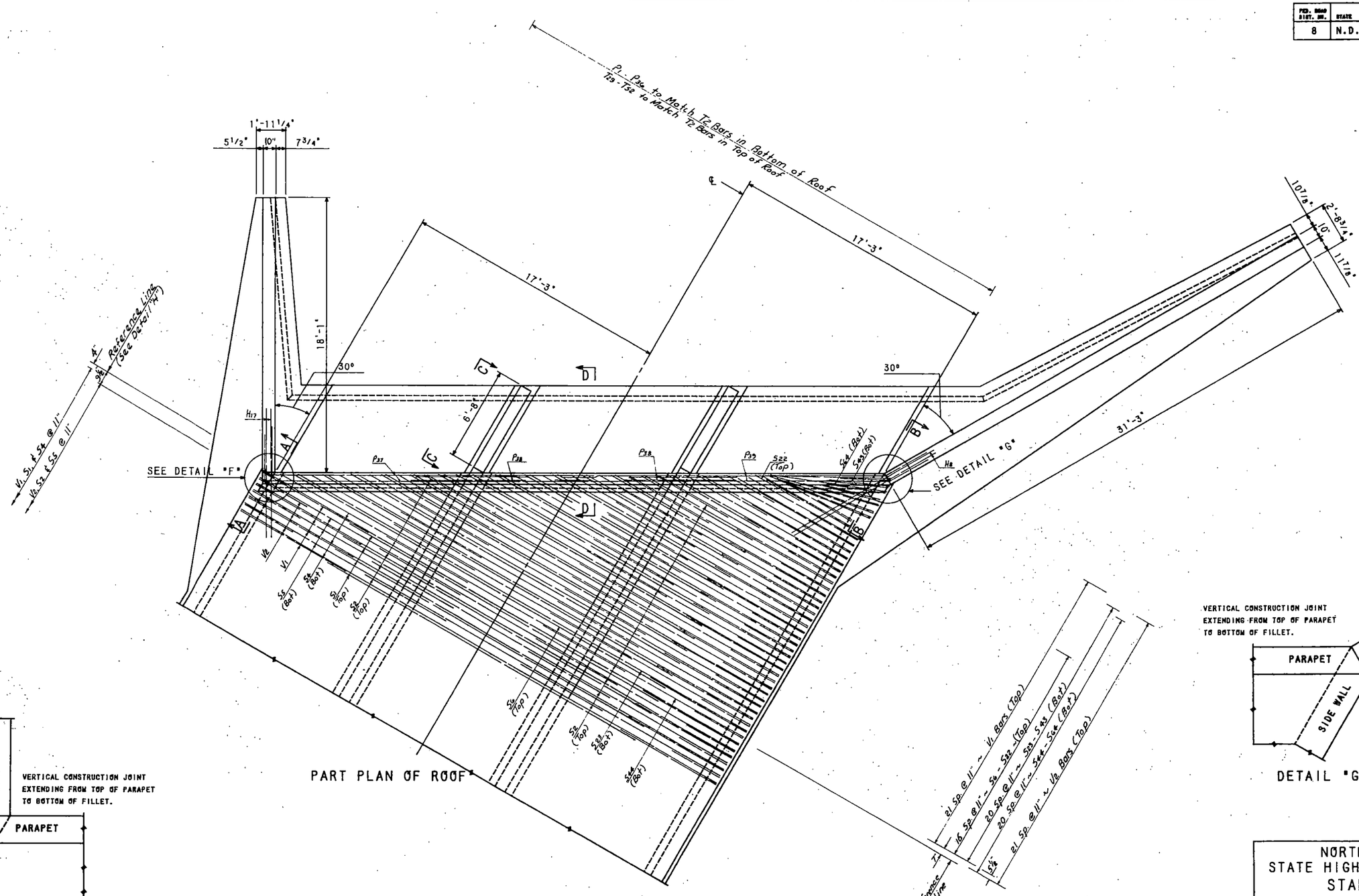
NØRTH DAKØTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFØRCED CØNCRETE TRIPLE BØX CULVERT
SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10'
MAXIMUM FILL 15'

APPROVED 5-10 1926 [signature]
BRIDGE ENGINEER

386310-1

386310-1

FED. ROAD DIST. NO.	STATE	FED.AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	BOS-G-200(10)		9	



PART PLAN OF ROOF

VERTICAL CONSTRUCTION JOINT EXTENDING FROM TOP OF PARAPET TO BOTTOM OF FILLET.

DETAIL "F"

VERTICAL CONSTRUCTION JOINT EXTENDING FROM TOP OF PARAPET TO BOTTOM OF FILLET.

DETAIL "G"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD

REINFORCED CONCRETE TRIPLE BOX CULVERT

SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10'
MAXIMUM FILL 15'

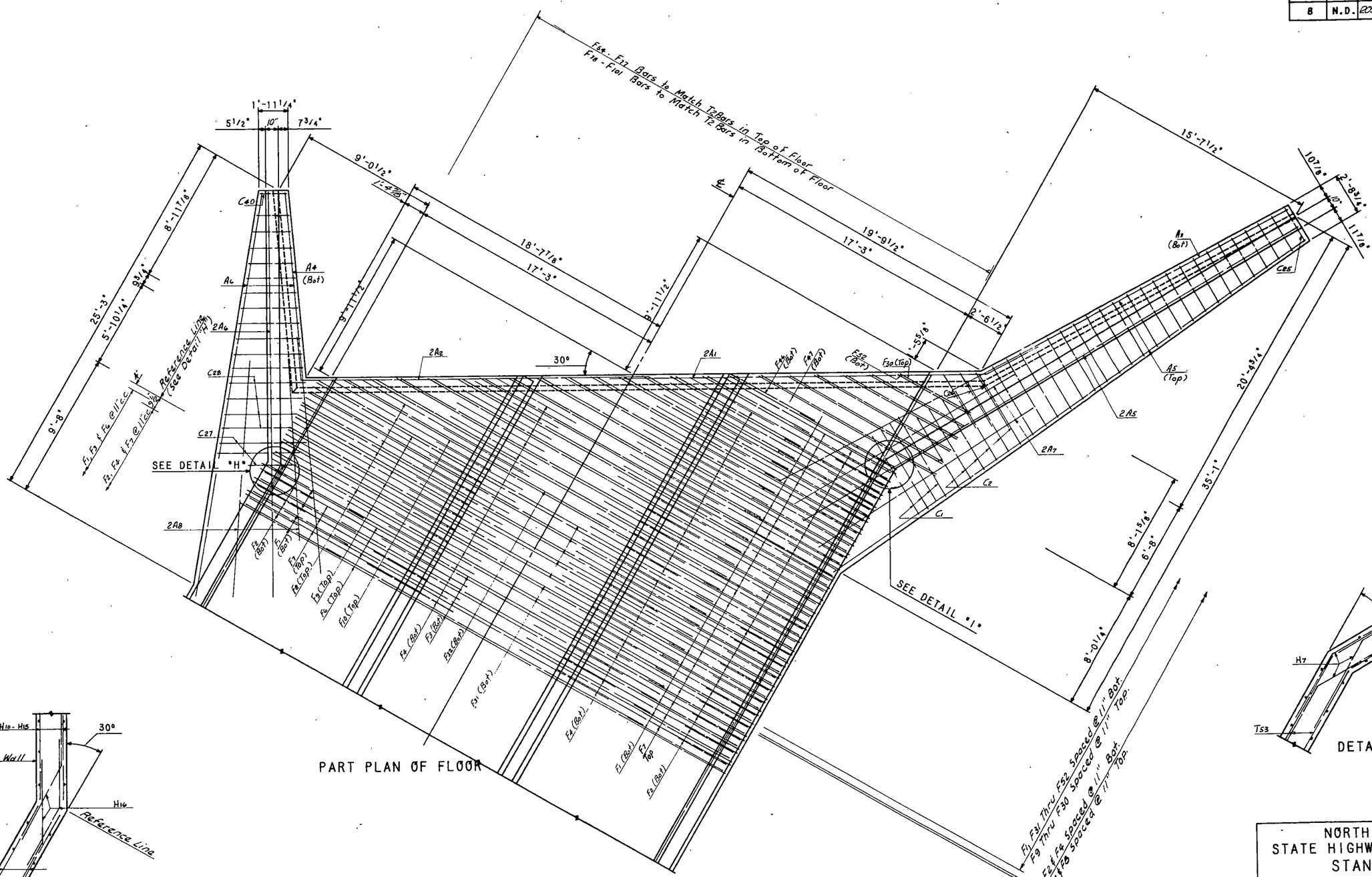
APPROVED 5-10 1926 S. A. Haas
BRIDGE ENGINEER

STANLEY HAAS REGISTERED PROFESSIONAL ENGINEER 904 NORTH DAKOTA

386310-2

386310-2

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	205-G-200(10)		10	



NOTE:
Box Culvert Drawings are shown with Skew 30° Left and Ahead. Box Culvert at this site is skewed Left and Back. See Plan and Profile Sheet No. 7.

STANLEY HAAS REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

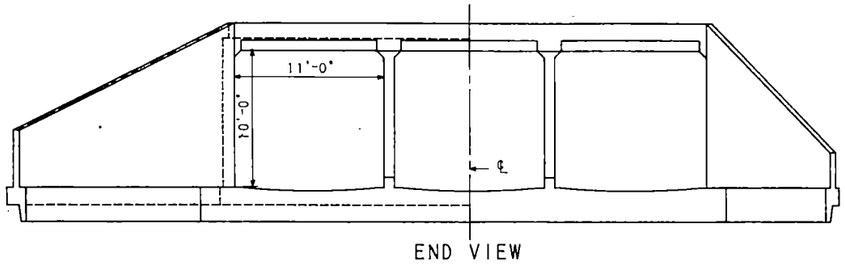
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE TRIPLE BOX CULVERT
SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10
MAXIMUM FILL 15'

APPROVED 5-10 1926 Stanley Haas
BRIDGE ENGINEER

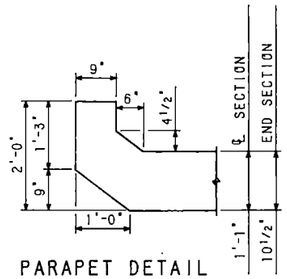
386310-3

386310-3

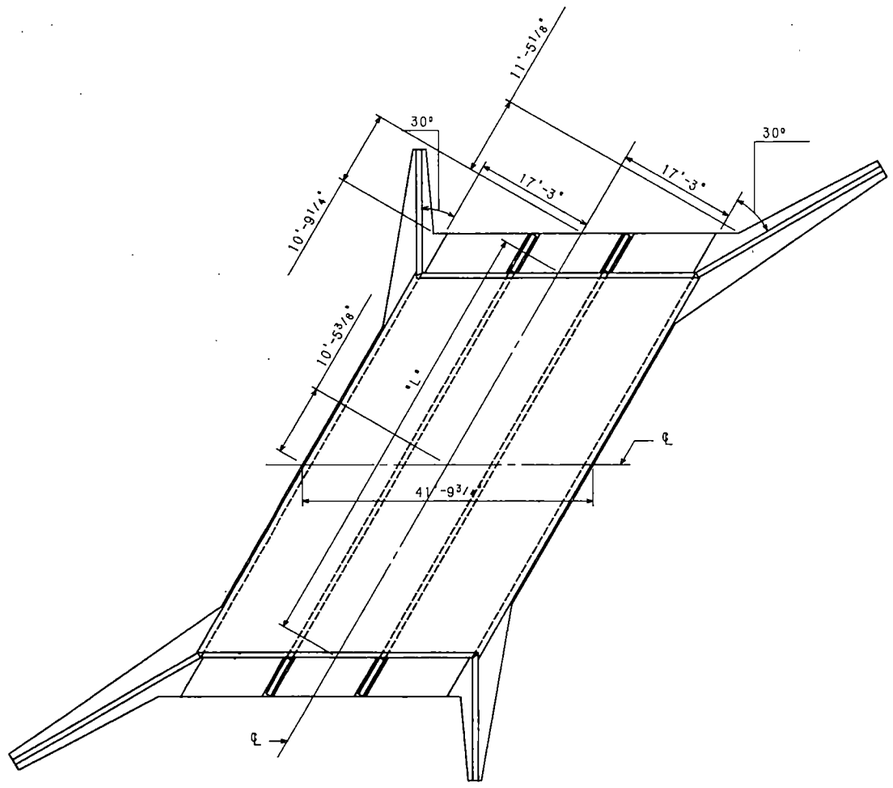
FED. ROAD DIST. NO.	STATE	FED.AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	BRF-G-200(12)		11	



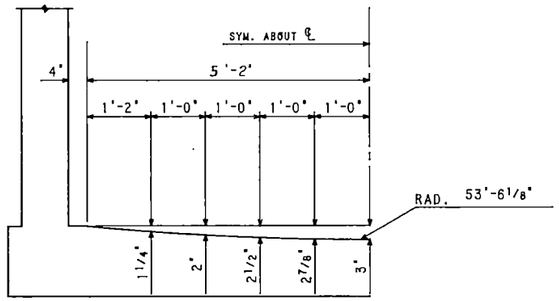
END VIEW



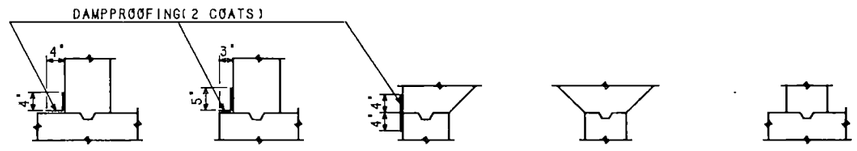
PARAPET DETAIL



PLAN VIEW



CURVED FLOOR OFF-SETS



"A" "B" "C" "D" "E"

DAMPPROOFING & KEY DETAILS
ALL KEYS SHOWN ARE
1 1/2" X 3 1/2"

STANLEY HAAS REGISTERED ENGINEER 1934 NORTH DAKOTA

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE TRIPLE BOX CULVERT
SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10'
MAXIMUM FILL 15'

APPROVED 5-10 1926 Stanley Haas
BRIDGE ENGINEER

CHECKED BY
QUANTITIES
CHECKED BY

386310-4

386310-4

FED. ROAD DIST. NO.	STATE	FED.AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	005-C-200(10)		12	

BAR LIST (CONSTANT)

MARK	SIZE	NO.	LENGTH	SHAPE	MARK	SIZE	NO.	LENGTH	SHAPE	MARK	SIZE	NO.	LENGTH	SHAPE
W 1	7	6	4'-10"	BENT	C24	4	2	8'- 5"	BENT	022-033	4	2 SETS	82'- 6"	STR.
W 2	6	6	11'- 2"	STR.	C25	4	2	8'- 3"	BENT	A 1	6	4	26'- 4"	BENT
W 3	7	2	12'-11"	BENT	C26	4	6	6'- 6"	BENT	A 2	6	4	25'- 0"	BENT
W 4	7	2	12'- 8"	BENT	H 1	7	8	31'- 9"	STR.	A 3	6	2	22'- 7"	STR.
W 5	7	2	12'- 5"	BENT	H 2	4	12	30'- 9"	STR.	A 4	6	2	12'- 1"	STR.
W 6	7	2	12'- 2"	BENT	H 3	4	4	27'- 5"	STR.	A 5	6	8	38'- 6"	STR.
W 7	7	2	11'-11"	BENT	H 4	4	4	21'- 5"	STR.	A 6	6	8	27'- 3"	STR.
W 8	7	2	11'- 8"	BENT	H 5	4	4	15'- 5"	STR.	A 7	6	8	16'- 8"	STR.
W 9	7	2	11'- 5"	BENT	H 6	4	4	9'- 6"	STR.	A 8	6	8	14'- 0"	STR.
W10	7	2	11'- 2"	BENT	H 7	4	78	6'- 0"	BENT	P 1-P36	4	2 SETS	499'- 6"	BENT
W11	6	2	10'-10"	BENT	H 8	6	4	12'- 0"	STR.	P37	6	4	23'- 7"	BENT
W12	6	2	10'- 7"	BENT	C 1-C21	4	2 SETS	164'- 6"	STR.	P38	6	8	7'- 4"	STR.
W13	6	2	10'- 4"	BENT	W32	7	4	4'-10"	BENT	P39	6	4	23'- 7"	BENT
W14	6	2	10'- 1"	BENT	W33	6	4	11'- 0"	STR.	V 6	4	8	8'-11"	STR.
W15	5	2	9'- 9"	BENT	W34	7	2	12'- 5"	BENT	V 7	4	8	7'- 5"	STR.
W16	5	2	9'- 6"	BENT	W35	7	2	11'-11"	BENT	V 8	4	8	6'- 0"	STR.
W17	5	2	9'- 3"	BENT	W36	7	2	11'- 4"	BENT	V 9	4	8	4'- 7"	STR.
W18	5	2	9'- 0"	BENT	W37	7	2	10'-10"	BENT	V10	4	8	3'- 2"	STR.
W19	4	2	8'- 8"	BENT	W38	6	2	10'- 3"	BENT	V11	4	8	1'- 9"	STR.
W20	4	2	8'- 5"	BENT	W39	6	2	9'- 9"	BENT	V12	6	8	11'- 7"	STR.
W21	4	2	8'- 2"	BENT	W40	5	2	9'- 1"	BENT	F 8	6	18	12'- 9"	STR.
W22	4	2	7'-11"	BENT	W41	5	2	8'- 7"	BENT	F 9	6	14	36'- 3"	STR.
W23	4	2	7'- 8"	BENT	W42	4	2	8'- 0"	BENT	F 10-F 30	6	2 SETS	413'- 9"	STR.
W24	4	2	7'- 5"	BENT	W43	4	2	7'- 6"	BENT	F31	7	14	30'-11"	STR.
W25	4	2	7'- 2"	BENT	W44	4	2	6'-11"	BENT	F 32-F 46	7	2 SETS	286'-10"	STR.
W26	4	2	6'-11"	BENT	W45	4	2	6'- 5"	BENT	F 47-F 52	7	2 SETS	53'- 3"	STR.
W27	4	2	6'- 8"	BENT	W46	4	2	5'-11"	BENT	F53	6	8	5'- 6"	BENT
W28	4	2	6'- 5"	BENT	W47	4	2	5'- 5"	BENT	F 54-F 77	4	2 SETS	473'- 0"	BENT
W29	4	2	6'- 2"	BENT	W48	4	2	4'-10"	BENT	F 78-F101	4	2 SETS	431'- 0"	STR.
W30	4	2	5'-11"	BENT	W49	4	2	4'- 2"	BENT	S 6-S22	6	2 SETS	268'- 4"	STR.
W31	4	2	5'- 8"	BENT	C27	6	6	14'- 2"	BENT	S23-S43	6	2 SETS	375'- 4"	STR.
C 1	6	8	14'- 4"	BENT	C28	5	8	12'- 2"	BENT	S44-S64	5	2 SETS	392'-10"	STR.
C 2	5	12	12'-10"	BENT	C29	5	2	12'- 8"	BENT	T 3	4	4	14'- 6"	STR.
C 3	5	2	13'-10"	BENT	C30	5	2	12'- 2"	BENT	T 4-T 15	4	2 SETS	135'- 0"	STR.
C 4	5	2	13'- 6"	BENT	C31	4	2	11'- 7"	BENT	T 16	4	4	21'- 3"	STR.
C 5	5	2	13'- 4"	BENT	C32	4	2	11'- 1"	BENT	T 17-T 28	4	2 SETS	216'- 0"	STR.
C 6	5	2	13'- 0"	BENT	C33	4	2	10'- 7"	BENT	T 29-T 52	4	2 SETS	287' 0"	STR.
C 7	5	2	12'-10"	BENT	C34	4	2	10'- 1"	BENT	T 53	4	30	21'- 2"	STR.
C 8	5	2	12'- 6"	BENT	C35	4	2	9'- 7"	BENT					
C 9	4	2	12'- 3"	BENT	C36	4	2	9'- 1"	BENT					
C10	4	2	11'-11"	BENT	C37	4	2	8'- 5"	BENT					
C11	4	2	11'- 9"	BENT	C38	4	2	7'-11"	BENT					
C12	4	2	11'- 5"	BENT	C39	4	2	7'- 5"	BENT					
C13	4	2	11'- 3"	BENT	C40	4	2	6'- 7"	BENT					
C14	4	2	10'-11"	BENT										
C15	4	2	10'- 9"	BENT	H 9	7	8	19'-11"	STR.					
C16	4	2	10'- 5"	BENT	H10	4	8	17'- 7"	STR.					
C17	4	2	10'- 3"	BENT	H11	4	4	15'-10"	STR.					
C18	4	2	9'-11"	BENT	H12	4	4	12'-11"	STR.					
C19	4	2	9'- 9"	BENT	H13	4	4	10'- 1"	STR.					
C20	4	2	9'- 5"	BENT	H14	4	4	7'- 2"	STR.					
C21	4	2	9'- 3"	BENT	H15	4	4	4'- 4"	STR.					
C22	4	2	8'-11"	BENT	H16	4	78	6'- 0"	BENT					
C23	4	2	8'- 9"	BENT	H17	6	4	7'-10"	STR.					

BAR LIST (VARIABLE)

	"L"			157'	164'					
MARK	SIZE	LENGTH	SHAPE	NO.	NO.	NO.	NO.	NO.	NO.	NO.
V 1	5	17'- 8"	BENT	344	360					
V 2	6	6'- 8"	BENT	336	350					
V 3	4	10'- 4"	STR.	344	360					
V 5	4	10'- 4"	STR.	636	664					
F 1	5	11'- 4"	BENT	344	360					
F 2	6	7'- 8"	BENT	336	350					
F 3	7	24'- 0"	STR.	150	158					
F 4	7	6'- 8"	STR.	362	376					
F 6	6	36'- 3"	STR.	150	158					
F 7	6	12'- 9"	STR.	336	350					
S 1	6	24'- 0"	STR.	150	158					
S 2	7	6'- 8"	STR.	332	346					
S 4	6	35'- 3"	STR.	150	158					
S 5	5	35'- 3"	STR.	146	153					

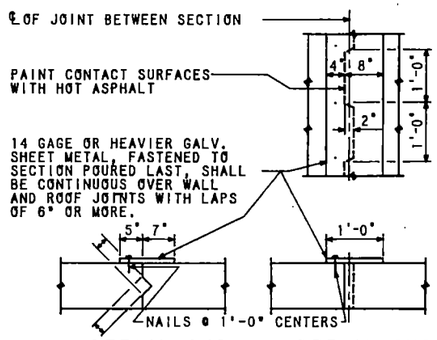
T 1	SIZE	SHAPE	LENGTH	38'- 9"	32'-3"
	4	STR.	NO.	336	504
T 2	SIZE	SHAPE	LENGTH	29'- 0"	21'-10"
	4	STR.	NO.	336	336

SAMPLE RELACEMENT BAR LIST

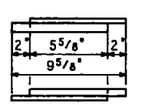
MARK	SIZE	NO.	LENGTH	SHAPE
* SR4	4	1	3'-8"	STR.
* SR5	5	1	4'-0"	STR.
* SR6	6	1	4'-6"	STR.

* SAMPLE REPLACEMENT BARS TO BE SPLICED TO BAR FROM WHICH A 2'-0" SAMPLE HAS BEEN CUT. THE REPLACEMENT BARS WILL NOT BE PAID FOR DIRECTLY. THEIR COST SHALL BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCING STEEL.

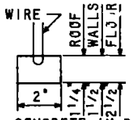
NOTE: T2 BARS ARE USED IN END BARREL SECTION ONLY. T1 BARS ARE USED IN THE CENTER SECTIONS OF THE BARREL.
LENGTH OF END BARREL SECTION IS FROM PARAPET FACE AT SHORT WING TO THE FIRST CONSTRUCTION JOINT. (FOR REINFORCING COMPUTATION ONLY.)



DETAIL "J" DETAIL "K"



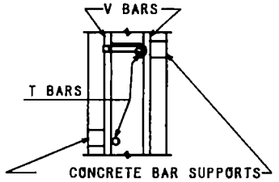
3/4" X 3/4" L-14 GA. OR HEAVIER SHEET METAL, BEND ENDS AROUND T & V BARS SO BAR WILL BEAR AGAINST LEG OF ANGLE. SPACE ABOUT 4-0" C.C.



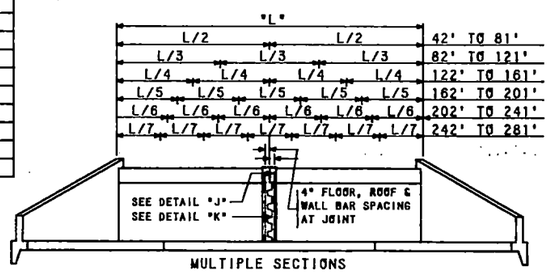
CONCRETE IN BAR SUPPORTS TO BE 1:2 MORTAR. BLOCKS MAY BE EITHER ROUND OR SQUARE IN SECTION

BAR SPACER BAR SUPPORT

BAR SUPPORT DETAILS



BAR SPACER ASSEMBLY



MULTIPLE SECTIONS
ONLY WHEN "L" EXCEEDS 40 FEET

CONTRACTION JOINT

CONCRETE FORMULAS

ENTIRE FLOOR	"L" X 1.56467 +	48.74008 CU YDS.
TWO OUTSIDE WALLS & 4 WINGS	"L" X 0.60108 +	23.45476 CU YDS.
INSIDE WALLS	"L" X 0.52778 +	3.87886 CU YDS.
ENTIRE ROOF	"L" X 1.45238 +	1.60255 CU YDS.
TOTAL	"L" X 4.14591 +	77.67422 CU YDS.

DAMPPROOFING FORMULA

TOTAL	"L" X .297 + 7.3	SQ YDS.

CONSTRUCTION NOTES:

REINFORCEMENT:

THE CONTRACTOR'S ATTENTION IS DIRECTED TO PARAGRAPH 612-3.1 OF THE NORTH DAKOTA STANDARD SPECIFICATIONS REGARDING THE VERIFICATION OF THE REINFORCING STEEL QUANTITY, SIZE AND SHAPE.
THE TRANSVERSE AND VERTICAL BARS SHALL BE PLACED NEAREST THE SURFACE, THE LONGITUDINAL, TEMPERATURE OR TIE BARS SHALL BE PLACED IMMEDIATELY INSIDE THE VERTICAL AND TRANSVERSE BARS AND THE INTERSECTIONS WIRED.
WHEN THE DISTANCE BETWEEN END BARS IS NOT EVENLY DIVISABLE BY BAR SPACING, THE ODD DISTANCE SHOULD BE ADJUSTED BY A FEW IRREGULAR SPACES NEAR THE CENTER, NOT AT THE ENDS OF THE CULVERT.
THE CLEAR DISTANCE FROM THE NEAREST BAR TO THE SURFACE OF THE CONCRETE SHALL BE AS FOLLOWS:

BOTTOM OF WING FOOTING	2 1/2" CLEAR
BOTTOM OF FLOOR SLAB	2 1/2" CLEAR
TOP OF FLOOR SLAB	2" CLEAR
TOP OF WING FOOTING	2 1/2" CLEAR
ALL WALLS	1 1/2" CLEAR
TOP AND BOTTOM OF ROOF SLAB	1 1/4" CLEAR

DIMENSIONS OF BENT BARS ARE GIVEN OUT TO OUT. ALL BENDS CONFORM TO A.C.I. STANDARDS UNLESS INDICATED OTHERWISE.

CONCRETE:

ALL CONCRETE SHALL BE CLASS AE-3 AND SHALL BE COMPACTED BY VIBRATION.
THE FOLLOWING ELEMENTS OF EACH SECTION SHALL BE POURED IN ONE CONTINUOUS RUN:
1. FLOOR SLAB AND WING FOOTINGS.
2. EACH INTERMEDIATE WALL UP TO THE BOTTOM OF FILLETS.
3. EACH SIDEWALL UP TO THE BOTTOM OF FILLETS WITH ITS ADJACENT WINGS COMPLETE TO TOP.
4. ROOF SLAB AND PARAPETS.

ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH 3/4" TRIANGULAR MOLDING.
THE CONCRETE IN THE WALLS SHALL BE ALLOWED TO SET AT LEAST 2 (TWO) HOURS BEFORE THE ROOF SLAB IS POURED.

FOUNDATION FILL:

UNSUITABLE FOUNDATION MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE BACKFILL. THIS BACKFILL WILL BE PAID FOR AT THE CONTRACT PRICE BID FOR "FOUNDATION FILL".

DAMPPROOFING:

TWO COATS OF DAMPPROOFING SHALL BE APPLIED OVER THE ENTIRE LENGTH OF THE CONSTRUCTION JOINTS AT THE TOP AND BOTTOM OF WALLS (OUTSIDE SURFACES ONLY) AS SHOWN ON THE DETAILS. "DAMPPROOFING TWO COATS" WILL BE MEASURED AND PAID FOR IN ACCORDANCE WITH SECTION 736 OF THE STANDARD SPECIFICATIONS.

DESIGN LOADING (HS 20)

QUANTITIES

LENGTH "L" FEET	CONCRETE CLASS AE-3 CU. YDS.	REINFORCING STEEL LBS.	DAMPPROOFING TWO COATS SQ. YDS.
157'	728.6	107,771	54.
164'	757.6	111,859	56.

STANLEY HAAS REGISTERED PROFESSIONAL ENGINEER 4356 STATE OF NORTH DAKOTA

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE TRIPLE BOX CULVERT
SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10'
MAXIMUM FILL 15'

APPROVED 5-10 1926 Stanley Haas
BRIDGE ENGINEER

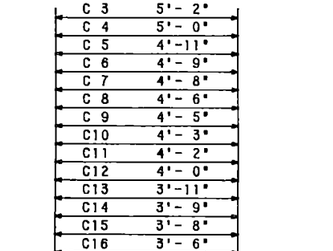
386310-5

386310-5

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N.D.	2.05-G-2(10)		13	

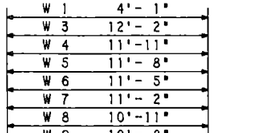
QUANTITIES DONE BY CHECKED BY

C 3	5'- 2"
C 4	5'- 0"
C 5	4'-11"
C 6	4'- 9"
C 7	4'- 8"
C 8	4'- 6"
C 9	4'- 5"
C10	4'- 3"
C11	4'- 2"
C12	4'- 0"
C13	3'-11"
C14	3'- 9"
C15	3'- 8"
C16	3'- 6"
C17	3'- 5"
C18	3'- 3"
C19	3'- 2"
C20	3'- 0"
C21	2'-11"
C22	2'- 9"
C23	2'- 8"
C24	2'- 6"
C25	2'- 5"
C29	4'- 7"
C30	4'- 4"
C31	4'- 1"
C32	3'-10"
C33	3'- 7"
C34	3'- 4"
C35	3'- 1"
C36	2'-10"
C37	2'- 6"
C38	2'- 3"
C39	2'- 0"
C40	1'- 7"

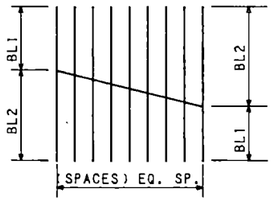


C BARS

W 1	4'- 1"
W 3	12'- 2"
W 4	11'-11"
W 5	11'- 8"
W 6	11'- 5"
W 7	11'- 2"
W 8	10'-11"
W 9	10'- 8"
W10	10'- 5"
W11	10'- 2"
W12	9'-11"
W13	9'- 8"
W14	9'- 5"
W15	9'- 2"
W16	8'-11"
W17	8'- 8"
W18	8'- 5"
W19	8'- 2"
W20	7'-11"
W21	7'- 8"
W22	7'- 5"
W23	7'- 2"
W24	6'-11"
W25	6'- 8"
W26	6'- 5"
W27	6'- 2"
W28	5'-11"
W29	5'- 8"
W30	5'- 5"
W31	5'- 2"
W32	4'- 1"
W34	11'- 8"
W35	11'- 2"
W36	10'- 7"
W37	10'- 1"
W38	9'- 7"
W39	9'- 1"
W40	8'- 6"
W41	8'- 0"
W42	7'- 6"
W43	7'- 0"
W44	6'- 5"
W45	5'-11"
W46	5'- 5"
W47	4'-11"
W48	4'- 4"
W49	3'- 8"



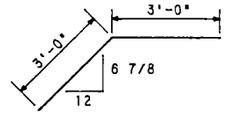
W BARS



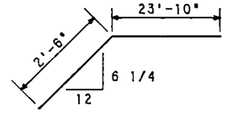
2 SETS SHOWN

MARK	LENGTH 1 SET	BL1	BL2	SPACES
0 1-021	164'- 6"	4'- 1"	11'- 7"	20
022-033	82'- 6"	2'- 7"	11'- 2"	11
F 10-F 30	413'- 9"	34'- 7"	4'-10"	20
F 32-F 46	286'-10"	30'- 3"	8'- 0"	14
F 47-F 52	53'- 3"	12'-10"	4'-11"	5
F 78-F101	431'- 0"	7'-11"	28'- 0"	23
S 6-S22	268'- 4"	28'- 6"	3'- 1"	16
S23-S43	375'- 4"	33'- 9"	2'- 0"	20
S44-S64	392'-10"	34'- 7"	2'-10"	20
T 4-T 15	135'- 0"	14'- 0"	8'- 6"	11
T 17-T 28	216'- 0"	20'- 9"	15'- 3"	11
T 29-T 52	287'- 0"	2'- 0"	21'-11"	23

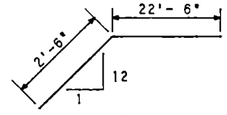
BAR CUTTING DETAILS



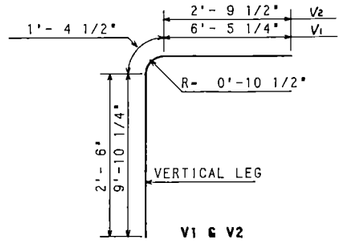
H 7 & H16



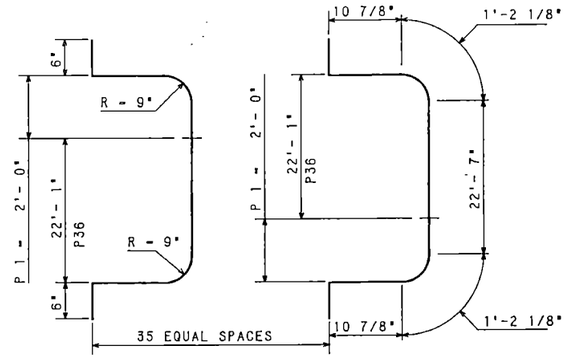
A1



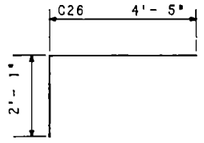
A2



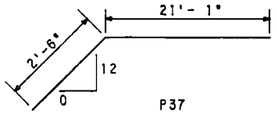
V1 & V2



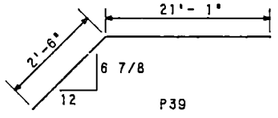
P 1-P36
2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET - 499'- 6"



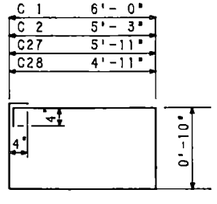
C BARS



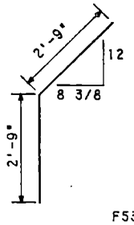
P37



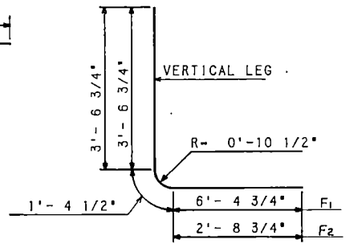
P39



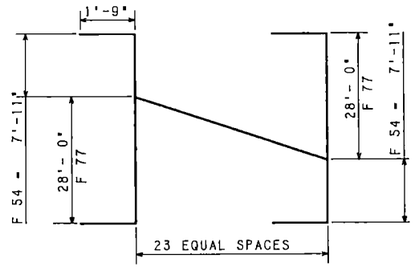
C BARS



F53



F1 & F2



F 54-F 77
2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET - 473'- 0"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD

REINFORCED CONCRETE TRIPLE BOX CULVERT

SKEWED 30°
CLEAR SPAN 3x11' CLEAR HEIGHT 10'
MAXIMUM FILL 15'

APPROVED 5-10 1926 Stanley Hanks
STATE ENGINEER

STANLEY HANKS REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

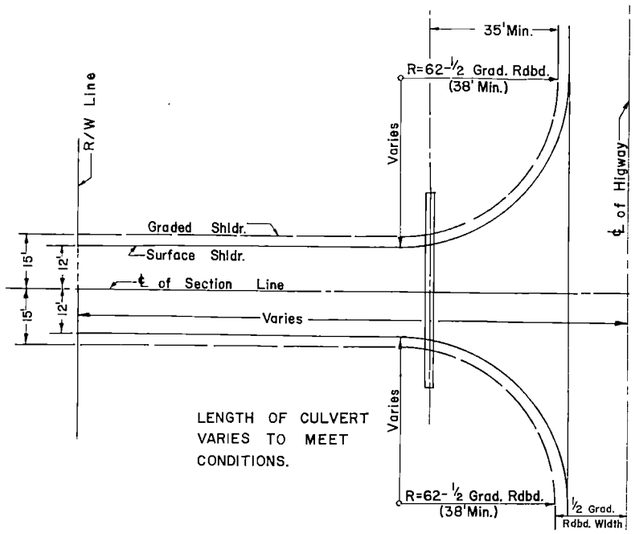
386310-6

386310-6

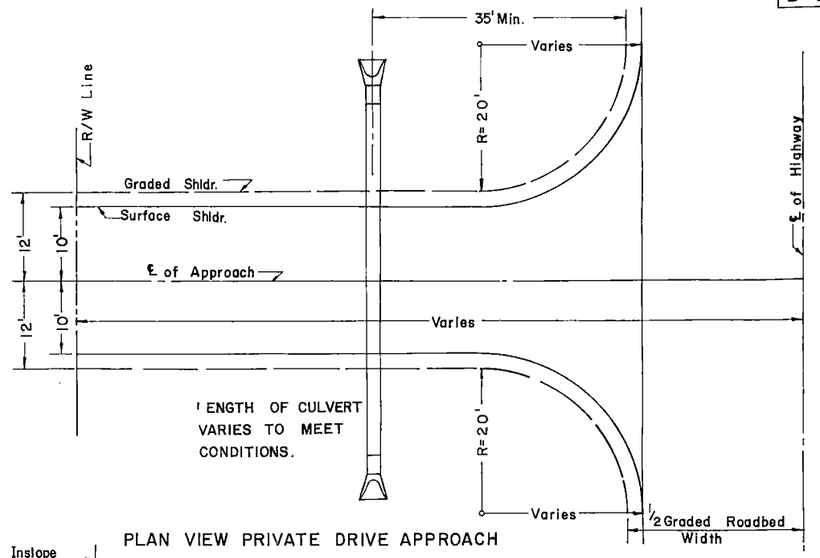
SECTION LINE & PRIVATE DRIVE APPROACHES
(RURAL)

SHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	ROS-6-200(10)	14

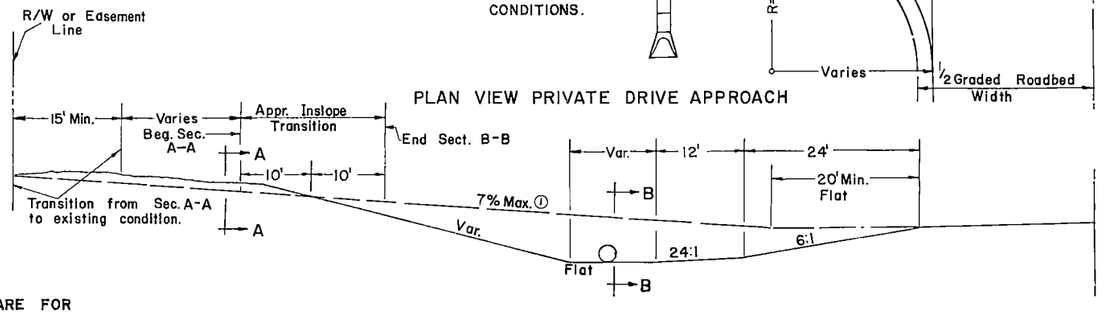
D-203-8



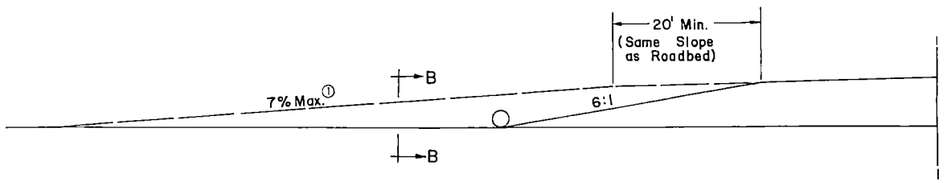
PLAN VIEW SECTION LINE APPROACH (WITHOUT SKEW)



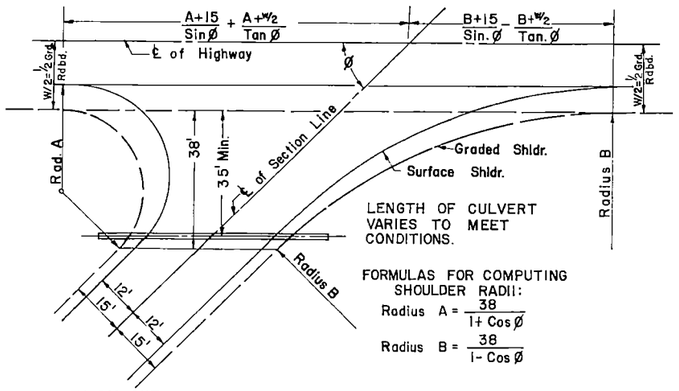
PLAN VIEW PRIVATE DRIVE APPROACH



APPROACH GRADE ON CUT SECTION



APPROACH GRADE ON FILL SECTION 12 FEET OR LESS



PLAN VIEW SECTION LINE APPROACH (SKEWED)

NOTE:

DIMENSIONS SHOWN FOR SURFACING ARE FOR AGGREGATE SURFACE COURSE OR BITUMINOUS SURFACE CONSTRUCTED WITH GRADING CONTRACT.

APPR. GRADES AND TYPICAL SECTIONS APPLY TO BOTH PRIVATE DRIVES AND SECTION LINE APPROACHES.

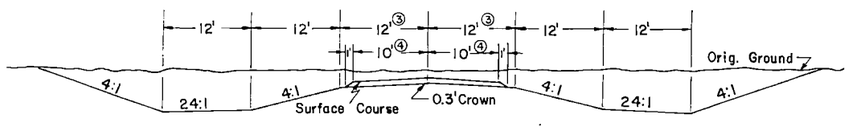
FOOT NOTES

① 10% Max. on Field Drives.

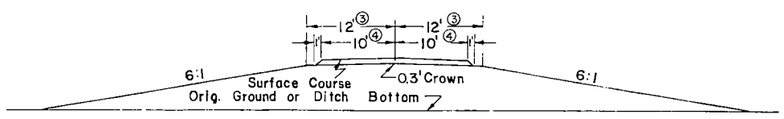
② 3:1 Slope - 20' to 30' Fill
2:1 Slope on Fills over 30'

③ 15' on Sec. Line Appr's.

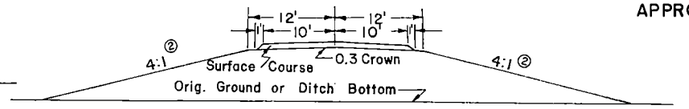
④ 12' on Sec. Line Appr's.



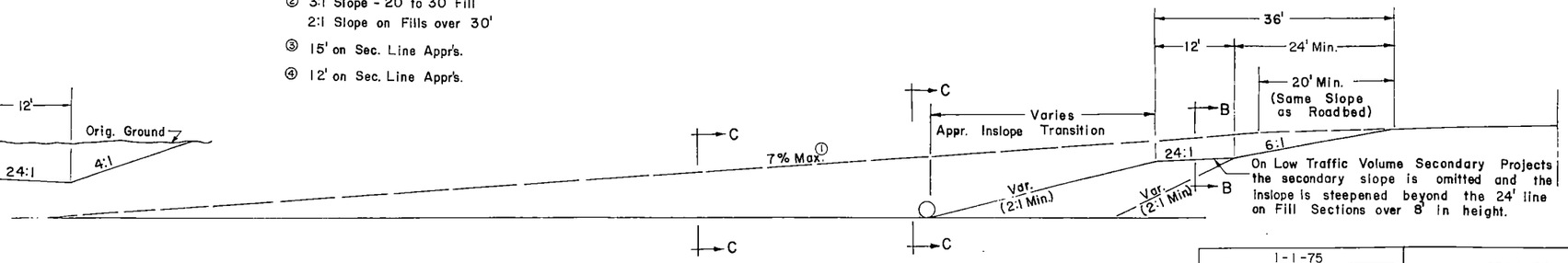
SECTION A-A



SECTION B-B



SECTION C-C



APPROACH GRADE ON FILL SECTION OVER 12 FEET

1-1-75	
REVISIONS	
DATE	CHANGE

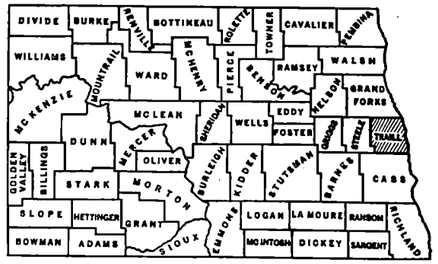
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: _____
Design Engineer

Recommended: _____
Asst. Chief Engineer
Pre-Construction

Approved: _____
Chief Engineer

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
5	N.D.	F-6-200 (05)	1



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

N W E S

SCALES
- LAYOUT SHEET: 1 IN. = 2000 FT.
- PLAN AND PROFILE DRAWINGS (HOR. 1 IN. = 100 FT. / VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN TRAILL COUNTY

FEDERAL AID PROJECT NO. F-6-200(05) 389 OR F-5(19)

GRADE, BIT. BASE, & STRUCTURE

200 - 28

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
F-6-200(05)	0.255	0.255
TOTALS	0.255	0.255

Install Construction Identification Signs:
Sta. 252+00 Rt. & 265+50 Lt.

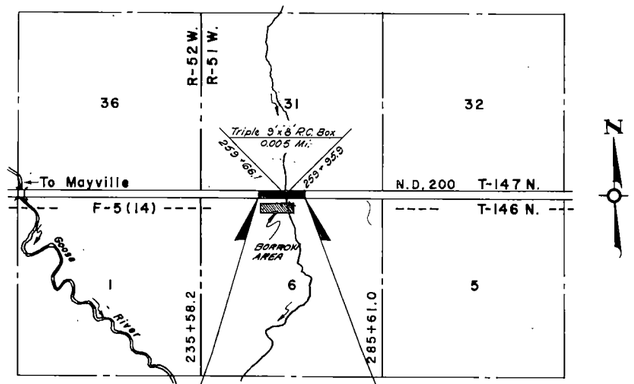
GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway department Jan. 1965 and approved as standard by the Fed. Hwy. Admin. June 23, 1965. Required Contract Provision (Form PR-1273) dated Oct. 1969 and others submitted herewith.

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1971)	935 PASS. 165 TRUCKS 1100	TOTAL 145
TRAFFIC FORECAST (1991)	1400 PASS. 250 TRUCKS 1650	TOTAL 215

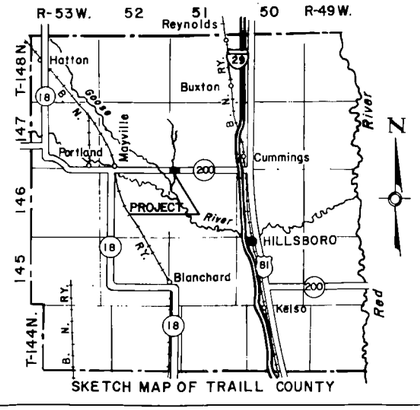
DESIGN SPEED 70 MPH
TRAFFIC CLASSIFICATION "N"
MINIMUM SIGHT DISTANCE (STOPPING) 600'
MINIMUM SIGHT DISTANCE (SAFE PASSING) 3200'
MINIMUM PASSING SIGHT DISTANCE FOR MARKING 1200'
R.C. BOX CULVERT-DESIGN LOADING- HS20-44



LAYOUT MAP
2000 0 2000
Scale in Feet

BEG. F-6-200(05) STA. 252+00=
Sta. 252+00 on F-5(14)
A point 1641.8' East of the
N.W. Cor. of Sec. 6, Twp. 146N., Rge. 51W.

END F-6-200(05) STA. 265+50=
Sta. 265+50 on F-5(14)
A point 2991.8' East of the
N.W. Cor. of Sec. 6, Twp. 146N., Rge. 51W.



SKETCH MAP OF TRAILL COUNTY

APPROVED DATE 2-4-71

CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

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 BRIDGE
SERVICE ROAD
TERMINATED CROSS-ROAD
RAILROAD GRADE SEPARATION

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)
TRAFFIC SIGNALS (Lighting Plan Sheets)
GROUND ELEVATION — 6430 / 6410 / 245
GRADE
CENTERLINE
SECTION LINE
DEFLECTION ANGLE (Delta)
SOD OR JUTE MESH

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.M.E.S.	Corrugated Metal End Section
C.M.P.	Corrugated Metal Pipe
CMS	Cationic Medium Setting
Comp.	Compression
Const.	Construction
Conc.	Concrete
Cont. Reinf. Conc. Pvm't	Continuously Reinforced Concrete Pavement
Contn.	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
Del.	Deliver
D.G.	Ditch Grade
El. or Elev.	Elevation
Ellipt.	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.	Gravel
Grd.	Graded
G.V.	Gate Valve
Hel.	Helical
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
Levg.	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. Pvm't	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
P.V.C.	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
Salv.	Salvage
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

FED. AID DIV. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
5	N.D.	F-6-200(05)	5	

FINAL SURVEY	BY	DATE
SURVEYED		
PLOTTED		
TEMPLATE		
NOTE BOOK		
AREAS		
NO.	AREAS CHECKED	

ORIGINAL SURVEY	BY	DATE
SURVEYED		
PLOTTED		
TEMPLATE		
NOTE BOOK		
AREAS		
NO.	AREAS CHECKED	

CHANNEL PROFILE ABOVE

915

915

905

Upstream (North)

Flow South

Downstream (South)

Scale
Horizontal 1" = 20'
Vertical 1" = 2'

895

North

South

K&E PLATE 3, CROSS SECTION
KEUFFEL & ESSER CO.
48 7052 MADE IN U.S.A.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
5	N.D.	F-6-200(08)389		6	

BAR LIST (CONSTANT)

MARK	NO	SIZE	LENGTH	SHAPE
A1	8	6	21'-6"	Bent
A2	4	6	11'-9"	Str.
A3	16	4	22'-9"	"
A4	8	4	15'-0"	"
F5	24	5	32'-0"	Str.
F6	28	5	12'-0"	"
F7	28	6	5'-8"	"
H1	24	4	17'-9"	Str
H2	8	4	13'-8"	"
H3	8	4	9'-6"	"
H4	16	7	18'-9"	"
H5	8	6	9'-0"	"
H6	120	5	6'-0"	Bent
O1-O6	8 Sets	4	37'-0"	Str.
O7	4	4	9'-6"	"
P1	8	6	18'-0"	Bent
P2	60	4	3'-10"	"
P3	8	6	9'-6"	Str
P4	8	6	5'-0"	Bent
P5	42	4	8'-1"	"
T2	58	4	6'-4"	Str
T3	12	4	4'-9"	"
T4	12	4	3'-3"	"
V6	8	4	2'-9"	Str
V7	8	4	4'-0"	"
V8	8	4	5'-6"	"
V9	8	4	6'-9"	"
W1-W3	12 Sets	4	33'-0"	Bent
W4-W8	12 Sets	5	29'-7"	"
W9	24	5	4'-1"	"
C1-C18	4 Sets	4	171'-8"	Bent
C19	24	4	11'-9"	"
Total = 6717 #				
*SR4	1	4	3'-8"	Str
*SR5	1	5	4'-0"	"
*SR6	1	6	4'-4"	"
*SR7	1	7	5'-0"	"

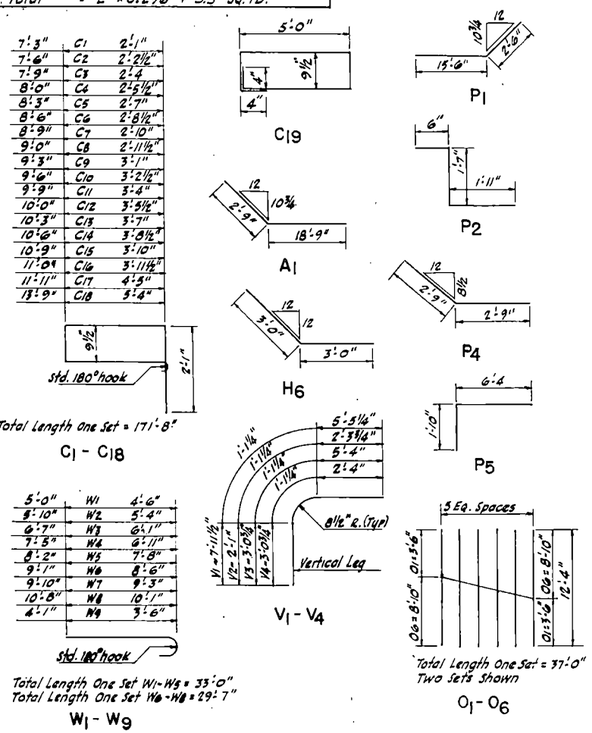
* Sample replacement bar to be spliced to bar from which a 2'-0" sample has been cut. (Non Pay Item)

CONCRETE FORMULAS

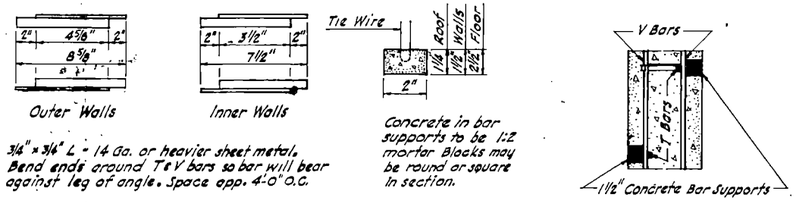
Entire Floor	= "L" x 1.2053 + 31.50 CU.YD.
Inner Walls	= "L" x 0.3704 + 2.24 CU.YD.
O.S. Walls	= "L" x 0.4282 + 12.15 CU.YD.
Entire Roof	= "L" x 1.1234 + 1.72 CU.YD.
Total	= "L" x 3.1273 + 47.65 CU.YD.

DAMPPROOFING FORMULA

Total = "L" x 0.296 + 5.3 SQ.YD.



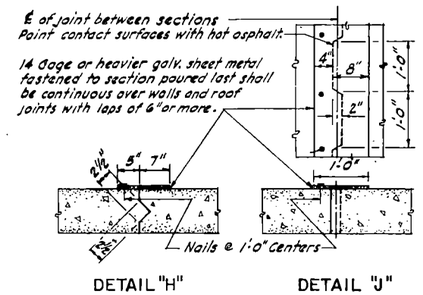
BAR BENDING & CUTTING DETAILS



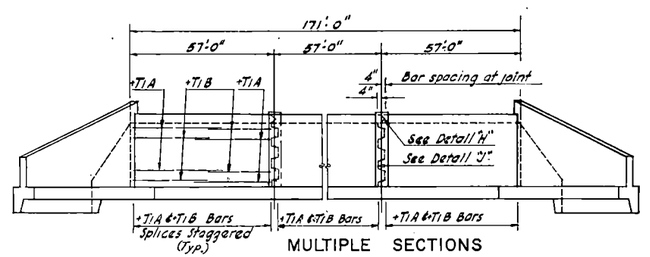
¾" x ¾" L - 14 Ga. or heavier sheet metal. Bend ends around T & V bars so bar will bear against leg of angle. Space app. 4'-0" O.C.

BAR SPACERS — BAR SUPPORT — BAR SPACER ASSEMBLY

BAR SUPPORT DETAILS



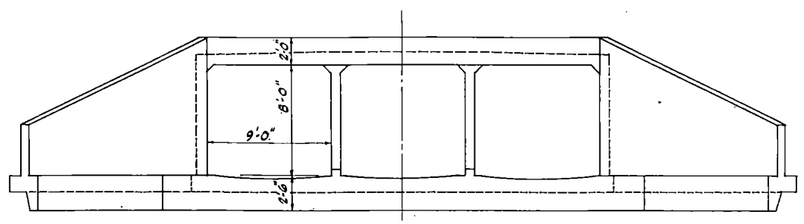
DETAIL "H" — DETAIL "J"



MULTIPLE SECTIONS

CONTRACTION JOINT

\+ Substitute T1A & T1B in lieu of T1 bars in standard.



END VIEW

BAR LIST (VARIABLE)

	"L"		171'		
MARK	SIZE	SHAPE	LENGTH	NO	
F1	6	Str.	30'-0"	207	
F2	5	"	10'-8"	408	
F3	6	"	19'-9"	207	
F4	6	"	5'-8"	408	
S1	5	Str.	29'-0"	411	
S2	6	"	19'-9"	207	
S3	6	"	5'-8"	408	
V1	5	Bent	14'-6"	414	
V2	5	"	5'-6"	408	
V3	5	"	9'-6"	414	
V4	5	"	6'-6"	408	
V5	4	Str.	8'-4"	1044	
			NO	LGTH.	NO LGTH.
T1A	4	Str.	405	30'	
T1B	4	Str.	405	28'	

CONSTRUCTION NOTES

REINFORCEMENT:

THE CONTRACTOR SHALL VERIFY THE QUANTITY, SIZE AND SHAPE OF THE BAR REINFORCEMENT AGAINST THE DRAWINGS AND INFORM THE ENGINEER OF DISCREPANCIES BEFORE ORDERING REINFORCING BARS.

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.

WHEN THE DISTANCE BETWEEN END BARS IS NOT EVENLY DIVISIBLE BY BAR SPACING, THE ODD DISTANCE SHOULD BE ADJUSTED BY A FEW IRREGULAR SPACES NEAR THE CENTER, NOT AT THE ENDS OF THE CULVERT OR SECTION OF CULVERT.

THE CLEAR DISTANCE FROM THE NEAREST BAR TO THE SURFACE OF THE CONCRETE SHALL BE AS FOLLOWS:

BOTTOM OF WING FOOTING	2½" CLEAR
BOTTOM OF FLOOR SLAB	2½" CLEAR
TOP OF FLOOR SLAB	2" CLEAR
TOP OF WING FOOTING	2½" CLEAR
ALL WALLS	1¾" CLEAR
TOP OF ROOF SLAB (AND BOTTOM)	1¾" CLEAR

DIMENSIONS FOR BENT BARS ARE GIVEN OUT TO OUT. ALL BENDS ARE TO MEET ACI STANDARDS UNLESS OTHERWISE NOTED.

CONCRETE:

ALL CONCRETE SHALL BE CLASS AE-3 AND SHALL BE COMPACTED BY VIBRATION.

THE FOLLOWING ELEMENTS OF EACH SECTION SHALL BE POURED IN ONE CONTINUOUS RUN:

1. FLOOR SLAB AND WING FOOTINGS
2. EACH INTERMEDIATE WALL UP TO BOTTOM OF FILLETS
3. EACH SIDEWALL UP TO BOTTOM OF FILLETS WITH ITS ADJACENT WINGS COMPLETE TO TOP
4. ROOF SLAB AND PARAPETS

ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH ¾" TRIANGULAR MOLDING.

THE CONCRETE IN THE WALLS SHALL BE ALLOWED TO SET AT LEAST TWO (2) HOURS BEFORE THE ROOF SLAB IS POURED.

FOUNDATION FILL:

UNSUITABLE FOUNDATION MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE BACKFILL. THIS BACKFILL WILL BE PAID FOR AT THE CONTRACT PRICE BID FOR "FOUNDATION FILL".

DAMPPROOFING:

TWO COATS OF DAMPPROOFING SHALL BE APPLIED OVER THE ENTIRE LENGTH OF THE CONSTRUCTION JOINTS AT THE TOP AND BOTTOM OF WALLS (OUTSIDE SURFACES ONLY) AS SHOWN ON THE DETAILS. "DAMPPROOFING TWO COATS" WILL BE APPLIED, MEASURED, AND PAID FOR IN ACCORDANCE WITH SECTION 736 OF THE STANDARD SPECIFICATIONS.

DESIGN LOADING HS20-44 SERIES OF 1951

QUANTITIES FOR ONE CULVERT

LENGTH "L" FEET	CONCRETE CU.YD.	REINF. STEEL LBS.	DAMPPROOFING 2 COATS SQ.YD.	LENGTH "L" FEET	CONCRETE CU.YD.	REINF. STEEL LBS.	DAMPPROOFING 2 COATS SQ.YD.
				171	582.4	89,207	56

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

STANDARD REINFORCED CONCRETE TRIPLE BOX CULVERT

CLEAR SPAN 3x9' CLEAR HEIGHT 8' MAXIMUM FILL 20'

ALLEN J. ANDERSON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

APPROVED 10-1 19 Allen J. Anderson BRIDGE ENGINEER

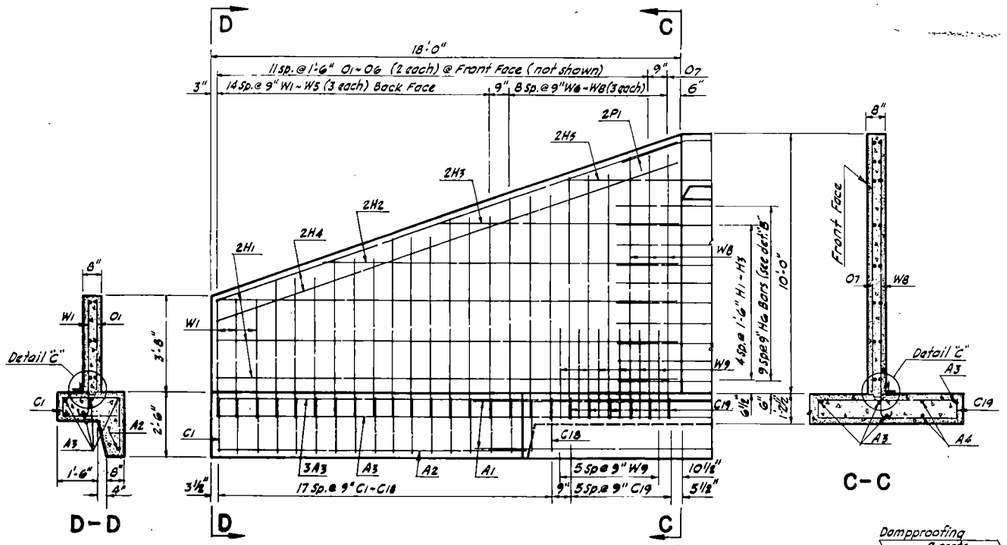
QUANTITIES MADE BY R.L.A. CHECKED BY C.F.S

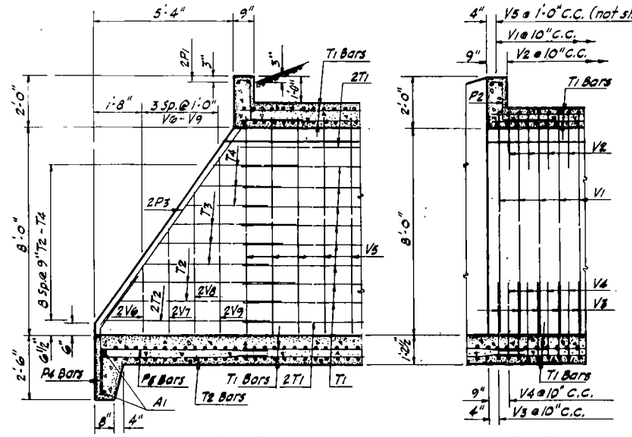
200 — 389.78-1

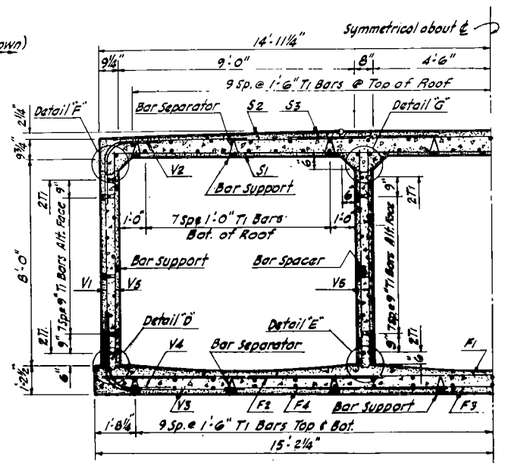
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
5	N.D.	F-6-200(05)389		7	

DESIGN — CHECKED BY N.L.M.
DETAILS — MADE BY N.L.M. — CHECKED BY C.F.S.
RACING — MADE BY N.L.M.
QUANTITIES — MADE BY N.L.M. — CHECKED BY C.F.S.

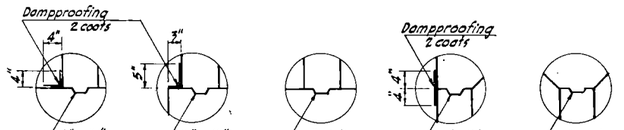
REVISIONS — MADE BY | CHKD BY | DATE



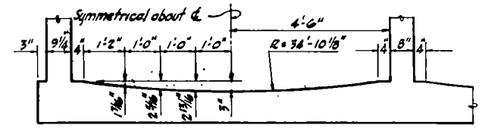




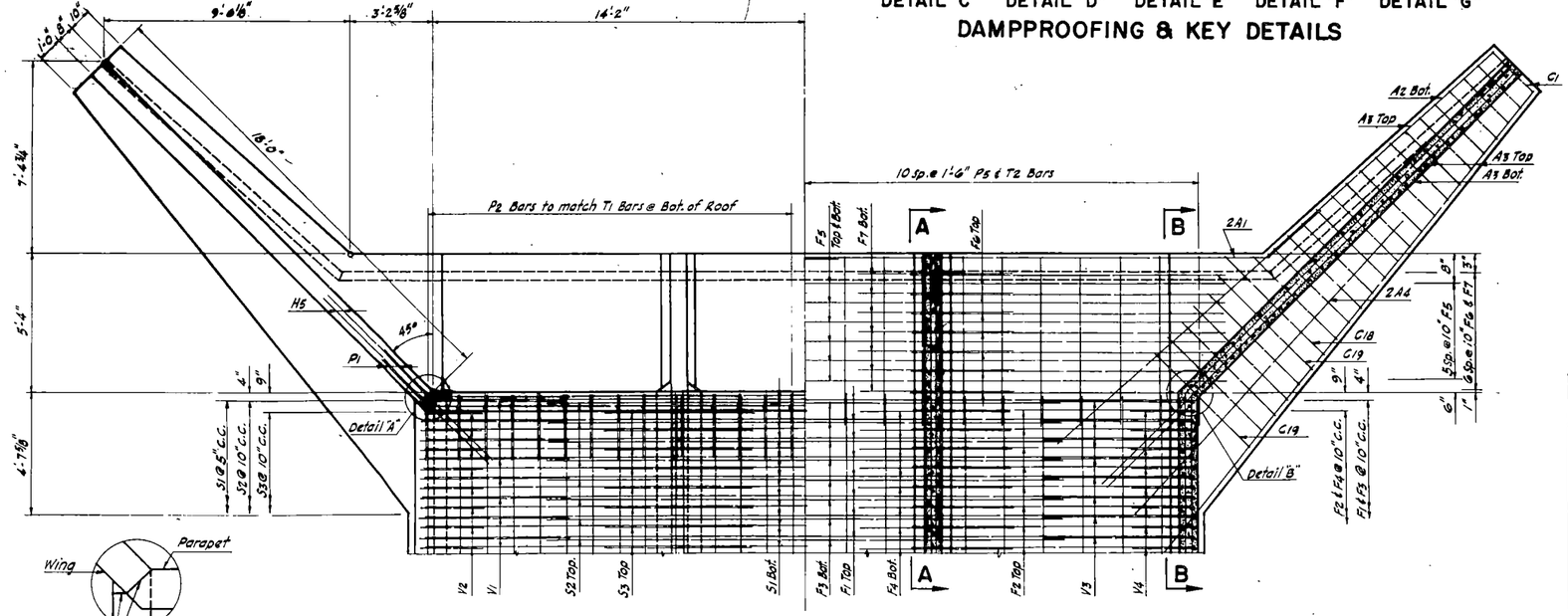
HALF SECTION OF BARREL
135 T1 BARS/SECTION

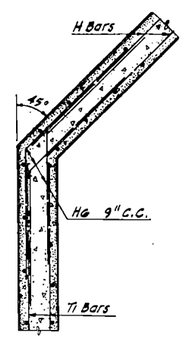


DAMPPROOFING & KEY DETAILS



CURVED FLOOR OFF-SETS





DETAIL "B"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

STANDARD REINFORCED CONCRETE TRIPLE BOX CULVERT

CLEAR SPAN 3X9' CLEAR HEIGHT 8'
MAXIMUM FILL 20'

APPROVED _____ 19__ _____
BRIDGE ENGINEER

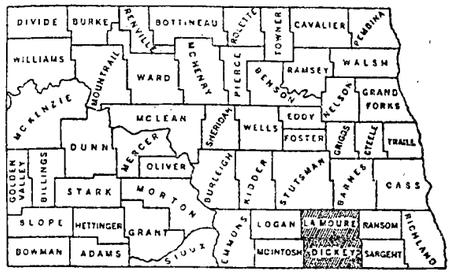
ALLEN J. ANDERSON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA 1871

SHEET 2 OF 2

200-389.78-2

200-389.78-2

SHEET NO	STATE	FED. AID PROJ. NO.	SHEET NO
8	N.D.	F-2-281(02)	1



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

SCALES
- LAYOUT SHEET. 1 IN. = 5000 FT
- PLAN AND PROFILE DRAWINGS (HOR. 1 IN = 100 FT. VERT. 1 IN = 10 FT.)
- STRUCTURAL DRAWINGS - AS SHOWN
- CROSS SECTION SHEETS - 1 IN. = 10 FT.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN LA MOURE & DICKEY COUNTIES

FEDERAL AID PROJECT NO. F-2-281(02)005 OR F-662(5)

~~GRADE, BIT, BASE &~~ STRUCTURES

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
F-2-281(02)	24.564	24.564
TOTALS	24.564	24.564

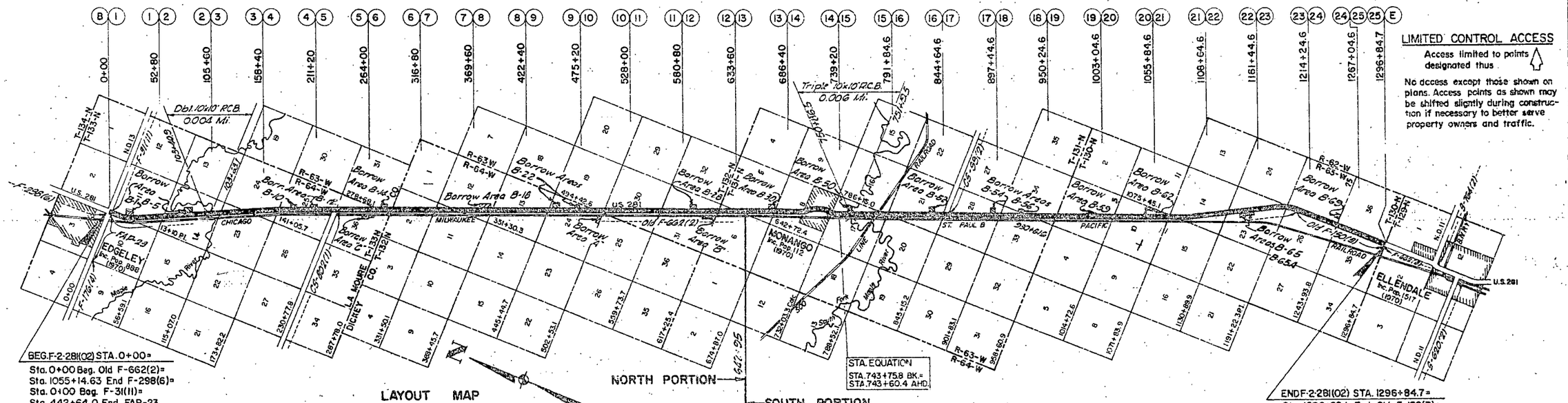
GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway department JULY 1971 and approved as standard by the Federal Highway Administration Sept. 29, 1971. Required Contract Provision (Form PR-1273) dated MAY 1971 and others submitted herewith.

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1972)	900 PASS. 200 TRUCKS 1100 TOTAL	150
TRAFFIC FORECAST (1992)	1425 PASS. 325 TRUCKS 1750 TOTAL	235
DESIGN SPEED	70 MPH	
TRAFFIC CLASSIFICATION	"M"	
MINIMUM SIGHT DISTANCE (STOPPING)	600'	
MINIMUM SIGHT DISTANCE (SAFE PASSING)	3200'	
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1200'	

R.C. BOX DESIGN LOADING H5-20-44



LAYOUT MAP

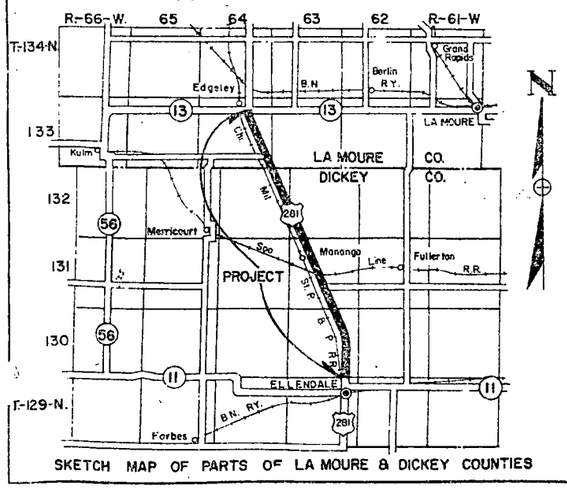
5000 0 5000
SCALE IN FEET

A point 8.6 ft. East and 314.9 ft. North of the SW¼ Cor. of the NW¼ Sec. 5, Twp 131 N., Rge. 63 W.

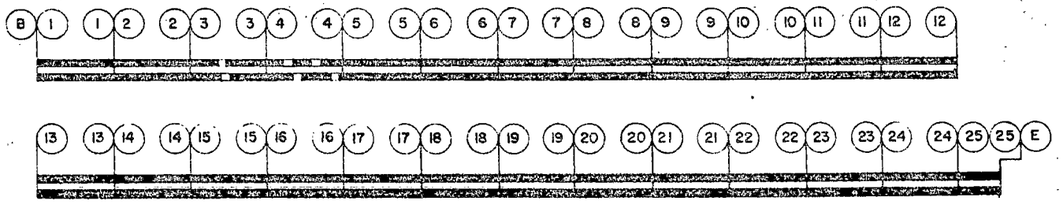
LIMITED CONTROL ACCESS

Access limited to points designated thus ⇧

No access except those shown on plans. Access points as shown may be shifted slightly during construction if necessary to better serve property owners and traffic.



SKETCH MAP OF PARTS OF LA MOURE & DICKEY COUNTIES



BARRIER STRIPING DIAGRAM

LEGEND

Passing Zones
Non Passing Zones (Barrier Stripe)
He = 3.75 Ft, Ho = 4.5 Ft.

APPROVED DATE 6-5-72

CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

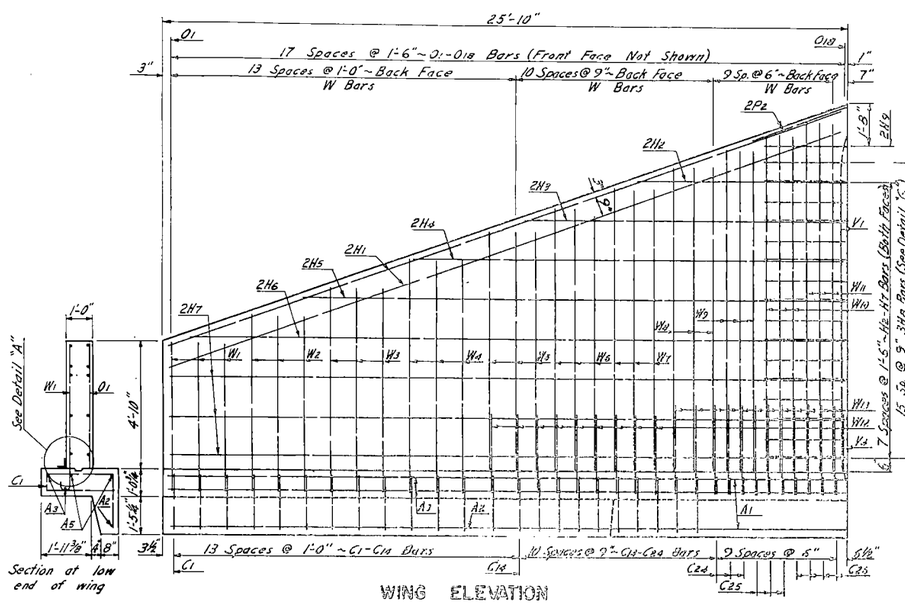
APPROVED

DIVISION ENGINEER DATE

F-2-281(02)005

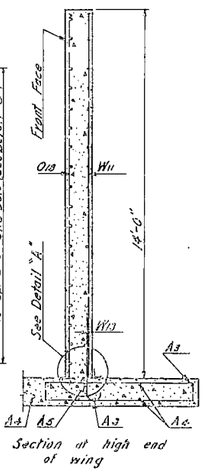
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	F-2-281(02)	101	

TRACING — CHECKED BY A-A
QUANTITIES — MADE BY A.A.R. — CHECKED BY A.A.R.

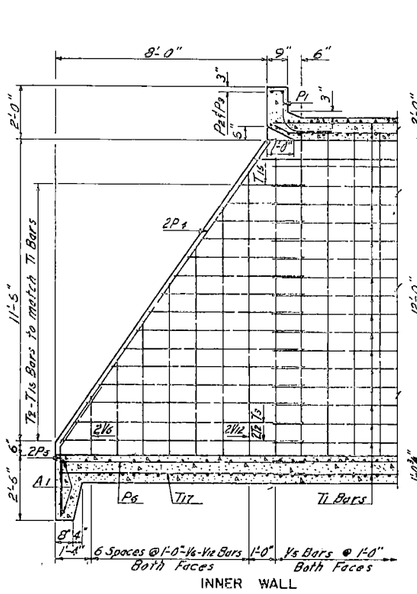


Section at low end of wing

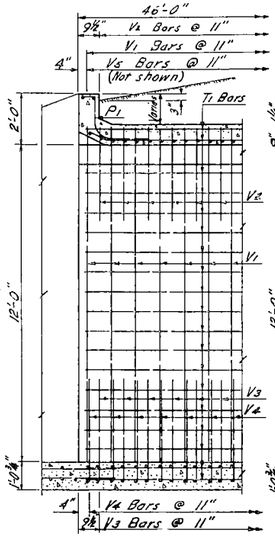
WING ELEVATION



Section at high end of wing

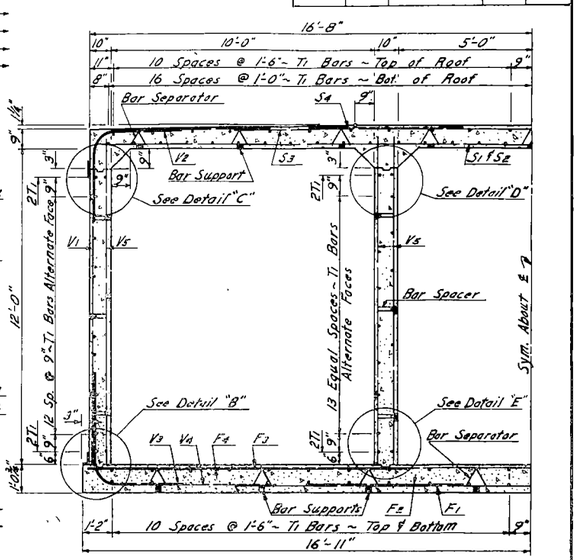


INNER WALL

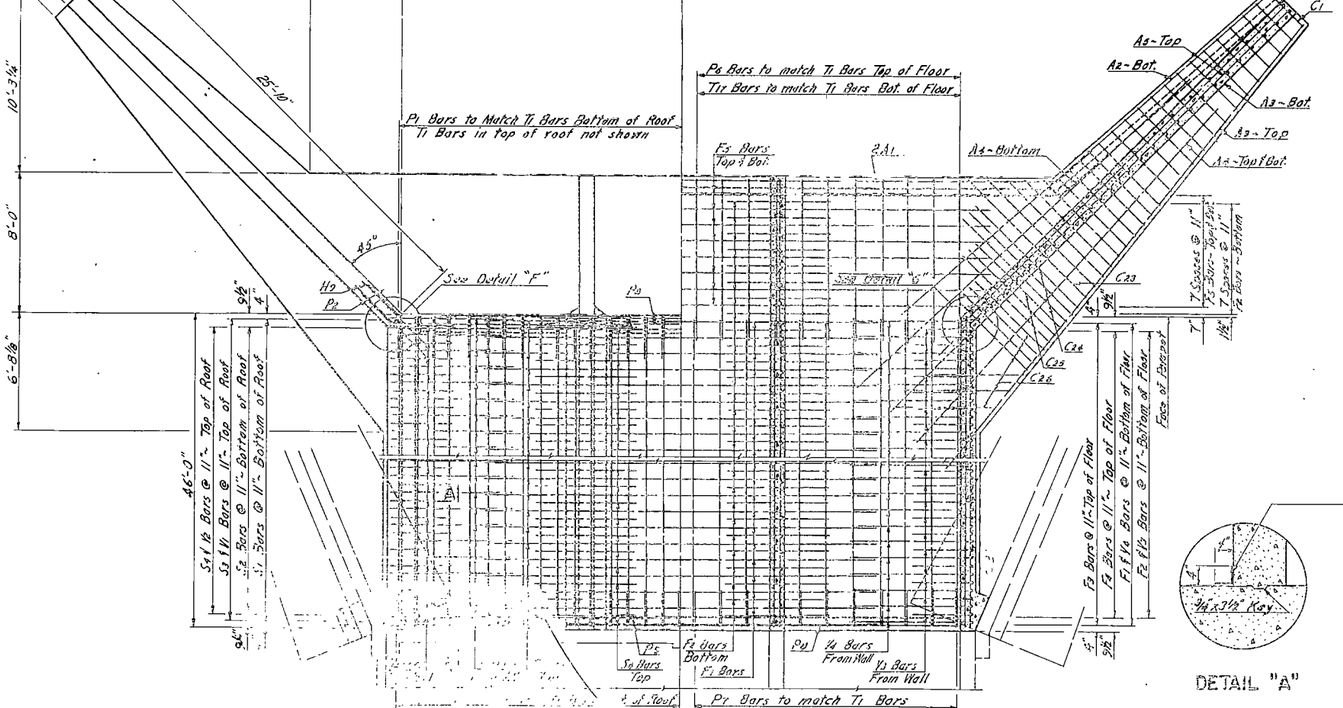


OUTER WALL

LONGITUDINAL SECTIONS OF BARREL

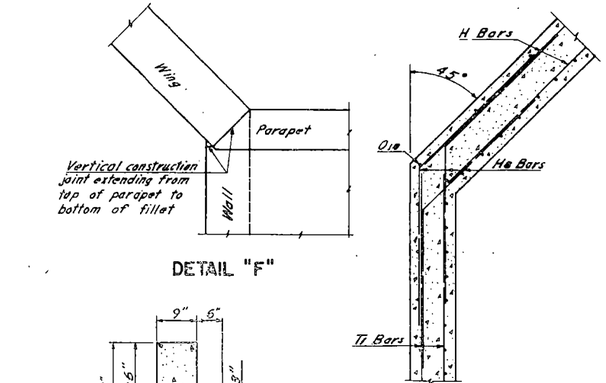


HALF BARREL SECTION
169 T1 Bars / Section



HALF ROOF PLAN
(S Bars in Bottom of roof not shown)

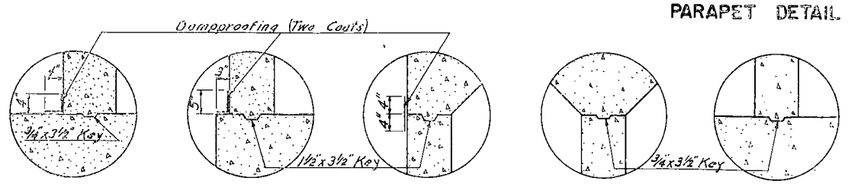
HALF FLOOR PLAN
(Bars in Top of Floor not shown)



DETAIL "F"

DETAIL "G"

PARAPET DETAIL



DETAIL "A" DETAIL "B" DETAIL "C" DETAIL "D" DETAIL "E"

SHEET 1 OF 2

TRIPLE 10'X12'-10' FILL BOX CULVERT EXTENSION

PROJ. F-2-281(02) STA. 751+03

DICKEY COUNTY

ALLEN J. ANDERSON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

APPROVED 6-5-72 Allen J. Anderson BRIDGE ENGINEER

281-16.46-1

281-16.46-1

FED. ROAD DIST. NO.	STATE	PROJ. NO	SHEET NO.	TOTAL SHEETS
8	N. D.	F-2-281(02)	102	

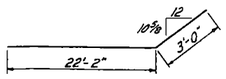
CONCRETE QUANTITIES

Entire Floor	=	177.25 C.Y.
4 Walls & 2 Wings	=	170.84 C.Y.
Entire Roof	=	111.86 C.Y.
Total	=	459.9 C.Y.

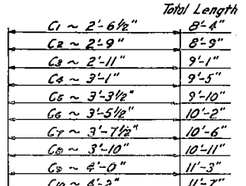
BAR LIST (ONE EXTENSION)

MARK	NO	SIZE	LENGTH	SHAPE	UNIT W
A1	4	6	25'-2"	Bent	37.80
A2	2	6	16'-6"	Str.	24.78
A3	4	4	32'-6"	"	21.70
A4	6	4	25'-6"	"	17.02
A5	4	4	28'-0"	"	18.69
C1-C16	2 Sets	4	204'-11"	Bent	136.80
C17-C22	2 Sets	5	92'-7"	"	97.62
C24	6	6	19'-2"	"	28.79
C25	6	6	16'-8"	"	25.03
C26	14	6	13'-4"	"	20.03
F1	52	6	22'-3"	Str.	33.42
F2	116	6	5'-9"	"	8.64
F3	52	5	33'-4"	"	34.77
F4	100	4	12'-0"	"	8.01
F5	16	5	35'-0"	"	36.51
H1	8	7	27'-3"	Str.	55.71
H2	4	4	7'-9"	"	5.17
H3	4	4	12'-0"	"	8.01
H4	4	4	16'-3"	"	10.85
H5	4	4	20'-5"	"	13.63
H6	4	4	24'-8"	"	16.47
H7	12	4	25'-6"	"	17.02
H8	96	5	6'-0"	Bent	6.26
H9	4	6	6'-0"	Str.	9.01
O1-O18	1 Set	4	333'-0"	Str.	222.31
P1	33	4	3'-10"	Bent	2.56
P2	4	6	15'-0"	"	22.53
P3	2	6	13'-3"	Str.	19.90
P4	4	6	14'-3"	"	21.40
P5	4	6	5'-6"	Bent	8.26
P6	22	4	11'-6"	"	7.69
P7	22	4	4'-3"	"	2.84
P8	1	6	31'-9"	Str.	47.69
P9	2	6	33'-0"	"	49.57
P10	33	4	4'-0"	Bent	2.67
S1	52	5	32'-4"	Str.	33.73
S2	50	4	32'-4"	"	21.59
S3	52	6	22'-3"	"	33.42
S4	100	6	5'-9"	"	8.65
T1	338	4	22'-6"	Str.	15.02
T2	4	4	9'-4"	"	6.23
T3-T16	1 Set	4	159'-10"	"	106.70
T17	22	4	9'-5"	"	6.29
V1	104	5	19'-0"	Bent	19.82
V2	100	6	6'-4"	"	9.51
V3	100	6	7'-3"	"	10.89
V4	104	5	10'-8"	"	11.13
V5	296	4	12'-4"	Str.	8.23
V6-V12	2 Sets	4	91'-7"	Str.	61.14
W1	6	4	6'-1"	Bent	4.06
W2	6	4	7'-2"	"	4.78
W3	6	4	8'-3"	"	5.51
W4	6	4	9'-4"	"	6.23
W5	6	4	9'-0"	Str.	6.01
W6	6	4	9'-11"	"	6.62
W7	6	4	10'-8"	"	7.12
W8	6	4	11'-6"	"	7.68
W9	6	4	12'-3"	"	8.18
W10	6	4	12'-9"	"	8.51
W11	6	4	13'-3"	"	8.85
W12	18	5	3'-7"	Bent	3.74
W13	24	6	4'-1"	"	6.13
*SR4	1	4	3'-8"	Str.	
*SR5	1	5	4'-0"	"	
*SR6	1	6	4'-6"	"	
*SR7	1	7	5'-0"	"	

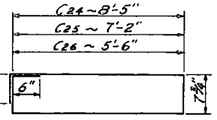
*Sample replacement bars to be spliced to bar from which a 2'-0" sample has been cut. Furnish only one set for entire structure.
Sample replacement bars will not be paid for directly, but their cost shall be included in the unit price bid for reinforcing steel.



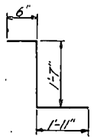
A1



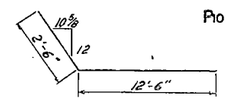
C1 - C16 & C19 - C23



C24 - C26



P10



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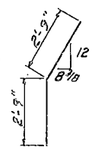
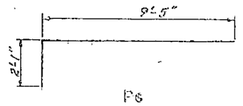
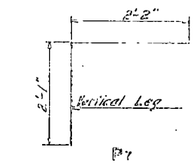


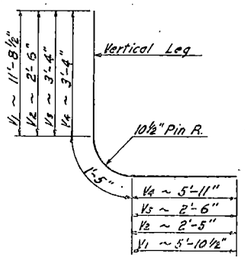
P5



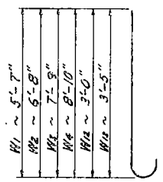
P6



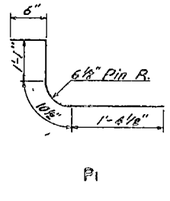
P7



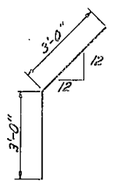
V1 - V4



W1 - W4, W12 & W13



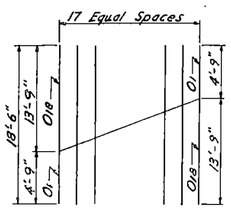
P1



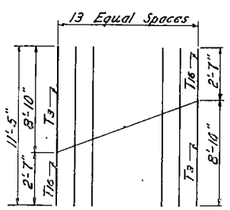
H8

BENT BAR DETAILS

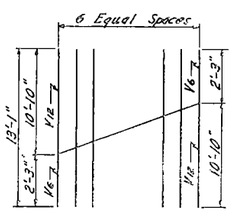
Dimensions Shown Are Out to Out



O1 - O18
1 Set Shown

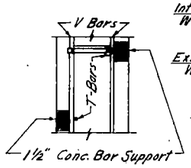


T3 - T16
1 Set Shown

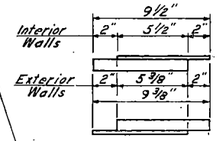


V6 - V12
1 Set Shown

BAR CUTTING DIAGRAMS

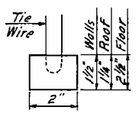


BAR SPACER ASSEMBLY



¾"x¾" L-14 Ga. or heavier sheet metal. Bend ends around T & V Bars so bar will bear against leg of angle. Space about 4'-0" c.c.

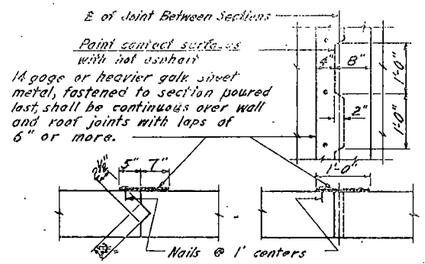
BAR SPACER



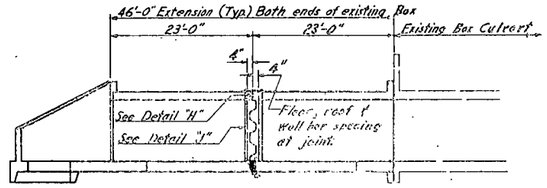
Concrete in bar supports to be 1:2 mortar: Blocks may be either round or square in section.

BAR SUPPORT

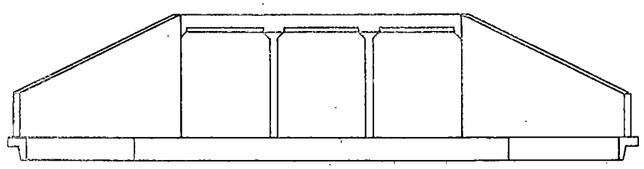
BAR SUPPORT DETAILS



DETAIL "H" DETAIL "J"



CONTRACTION JOINT


END VIEW

CONSTRUCTION NOTES:

This detail shows arrangement at the junction of old "K" bar culvert with the 1951 Series extension complete. The new concrete is to be butted against the old concrete without doweling or anchoring. No old concrete is to be removed. Ends of new walls and bottom of floor rest on old footings as shown.

REINFORCEMENT:

The contractor's attention is directed to paragraph 612-3.1 of the North Dakota Standard Specifications regarding the verification of the reinforcing steel quantity, size and shape.

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

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

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

Bottom of Wing Footing	2½" clear
Bottom of Floor Slab	2½" clear
Top of Floor Slab	2" clear
Top of Wing Footing	2½" clear
All Walls	1½" clear
Top & Bottom of Roof Slab	1¼" clear

Dimensions of bent bars are given out to out. All bends conform to A.C.I. Standards unless indicated otherwise.

CONCRETE:

All concrete shall be Class AE-3 and shall be compacted by vibration.

The following elements of each section shall be poured in one continuous run:

1. *Floor Slab & Wing Footings.*
2. *Each Intermediate Wall up to the bottom of Fillets.*
3. *Each Sidewall up to the bottom of Fillets with its adjacent wing complete to top.*
4. *Roof slab & Parapets.*

All exposed edges of concrete shall be beveled with ¾" triangular molding.

The concrete in the walls shall be allowed to set at least 2(Two) hours before the roof slab is poured.

FOUNDATION FILL:

Unsuitable foundation material shall be removed and replaced with suitable backfill. This backfill will be paid for at the contract price bid for "Foundation Fill."

DAMPPROOFING:

Two coats of dampproofing shall be applied over the entire length of the construction joints at the top & bottom of walls (outside surfaces only) as shown on the details. "Dampproofing Two Coats." will be measured & paid for in accordance with Section 736 of the Standard Specifications.

SHEET 2 OF 2

QUANTITIES

Class AE-3 Concrete	459.9 C.Y.
Reinforcing Steel	58,500 Lbs.
Dampproofing (2 Coats)	35.0 S.Y.

TRIPLE 10X12-10' FILL BOX CULVERT EXTENSION

PROJ. F-2-281(02) STA. 751+03

DICKEY COUNTY

APPROVED BRIDGE ENGINEER

DESIGN LOADING HS20-44

281-16.46-2

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